Classification, reconstructed phylogeny and geographic history of the New World members of Plateumaris Thomson 1859, and phylogeny and reclassification of the genera of Donaciinae (Coleoptera: Chrysomelidae).

by

Ingolf S. Askevold

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CLASSIFICATION, RECONSTRUCTED PHYLOGENY AND GEOGRAPHIC HISTORY OF THE NEWWORLD MEMBERS OF *Plateumaris* THOMSON 1859, AND PHYLOGENY AND RECLASSIFICATION OF THE GENERA OF DONACIINAE (Coleoptera: Chrysomelidae)

BY

INGOLF S. ASKEVOLD

A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

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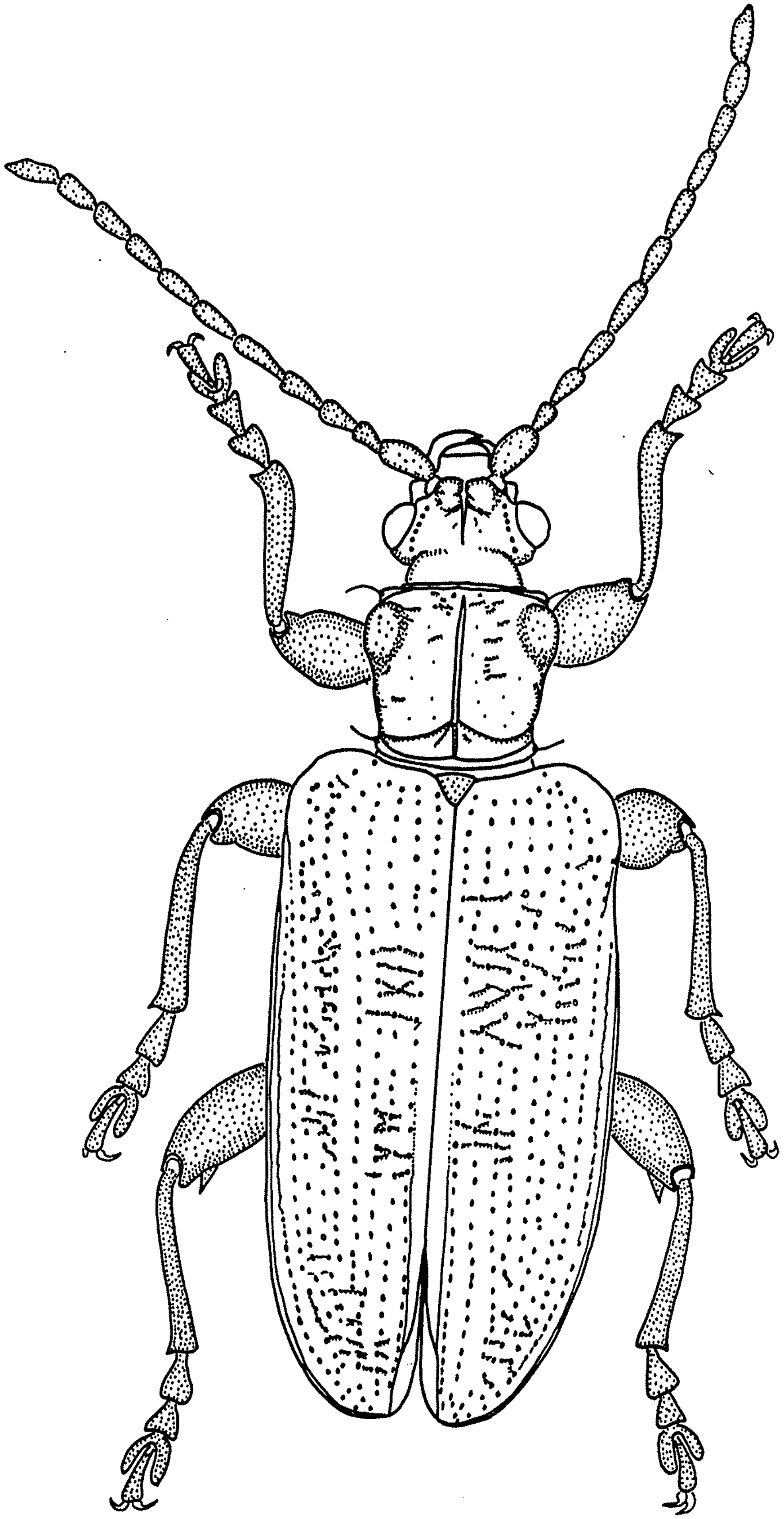
FIGURE 1: Habitus of *Plateumaris chalcea* (Lacordaire).



ABSTRACT.

New World members of *Plateumaris* Thomson are systematically revised, including study of Old World species; 17 New World and 9 Old World species are recognized. *Plateumaris balli* and *P. schaefferi* are newly described. Elevated from synonymy and recognized as valid are *Plateumaris aurifer* (LeConte) [removed from synonymy of *P. wallisi* (Schaeffer)], *P. shoemakeri* (Schaeffer) (elevated from subspecies of *P. flavipes*), *P. frosti* (Schaeffer) [elevated from subspecies of *P. emarginata* (Kirby)], and *P. robusta* (Schaeffer) (elevated from subspecies of *P. pusilla*). Newly synonymized are *P. wallisi* [with *P. flavipes* (Kirby) (new species concept)], *P. sulcicollis* Lacordaire, *D. kirbyi* Lacordaire, *D. chalcea* Lacordaire, *D. jucunda* LeConte and *D. affinis* Kirby [with *P. rufa* (Say) (new combination, new species concept), *P. emarginata*, *D. juncina* Couper and [with *P. nitida* (Germar) (new species concept)], *P. idola* Hatch [with *P. dubia* (Schaeffer)], *P. longicollis* Schaeffer and *P. vermiculata* Schaeffer [with *P. longicollis* (Schaeffer)]. Reduced from subspecies status to synonymy are *P. pacifica* Schaeffer [with *P. nitida* (Germar)], *P. pyritosa* LeConte [with *P. pusilla* (Say)] and *P. flavipennis* Mannerheim [with *P. germari* (Mannerheim)].

Phylogenetic relationships and geographic history of members of *Plateumaris* are analyzed. World members are placed in five species-groups: *P. braccata*-Group, *P. rufa*-Group, *P. pusilla*-Group, *P. shoemakeri*-Group, and *P. nitida*-Group. A subgeneric classification is rejected as unsupported; *Juliusina* Reitter and *Euplateumaris* Iablokoff-Khnzorian are placed as junior objective and junior subjective synonyms, respectively, of *Plateumaris*.

The phylogenetic relationship of world genus-level taxa of Donaciinae is analyzed; genera are placed in a new tribal classification: Plateumarini is newly erected, including *Plateumaris* and *Poecilocera* Schaeffer (removed from *Sominella* Jacobson). *Donaciella* Reitter (removed from *Donacia* Fabricius), *Sominella*, *Donaciasta* Fairmaire (with *Prodonacia* Chen and *Donaciocrioceris* Pic as new synonyms) and *Donacia* are placed in the Donaciini; *Donacia* includes three subgenera, *Donacia s. str.*, *D.* (*Cyphogaster*) Goecke, and *D.* (*Donaciomima*) Medvedev (new status); *Donacia microcephala* Daniel is left as *incertae sedis* in Donaciini; *D. reticulata* Gyllenhal and *D. kraatzi* Weise are transferred to the grade genus *Sominella*. Haemoniini includes *Neohaemonia* and *Macroplea*, with *Neohaemonia voronovae* Medvedev as *incertae sedis* in Haemoniini.

ABSTRACT

North American members of the genus *Plateumaris* Thomson, 1859, are revised systematically; 17 species are recognized as valid, and 23 taxonomic changes are made in their classification. *Plateumaris balli* and *P. schaefferi* are described as new species. Names elevated to species rank are *P. robusta* (Schaeffer) and *P. frosti* (Schaeffer); *P. aurifer* (LeConte) is not a junior synonym of *P. wallisi* (Schaeffer); *Donacia idola* Hatch is reduced to a junior subjective synonym of *P. dubia* (Schaeffer); *D. pyritosa* LeConte is reduced to a junior subjective synonym of *P. pusilla* (Say); an altered species concept is transferred to *P. flavipes* (Kirby), with *D. wallisi* Schaeffer as new junior subjective synonym, while *P. flavipes auctorum*, is correctly named *P. chalcea* (Lacordaire); *D. longicollis* Schaeffer and *D. vermiculata* Schaeffer are newly placed as junior subjective synonyms of *P. neomexicana* (Schaeffer); *D. flavipennis* Mannerheim is reduced to a junior subjective synonym of *P. germari* (Mannerheim); *D. rufa* Say (not *D. rufa auctorum*) is transferred to *Plateumaris* from *Donacia*, with an altered species concept applied to it, and *D. affinis* Kirby, *D. sulcicollis* Lacordaire, *D. kirby* Lacordaire, and *D. jucunda* LeConte are newly placed as junior subjective synonyms of *P. rufa* (Say). The taxon previously recognized as *D. nitida* Germar (*sensu* Schaeffer) is newly redescribed as *P. schaefferi*; *P. nitida* (Germar) is recognized as valid, but applied to a different taxon, with *D. emarginata* Kirby, *D. juncina* Couper, and *D. pacifica* Schaeffer newly placed as junior subjective synonyms of *P. nitida*. Neotypes are designated for Say and Ahrens species and for *D. indica* Melsheimer; lectotypes are designated for remaining authors' names, where necessary.

New synonymies of several Palaearctic taxa are proposed: *Plateumaris morimotoi* Kimoto and *P. hirashimai* Kimoto are placed as junior subjective synonyms of *P. weisei* Duvivier; *P. affinis* (Kunze) and its synonyms are placed as junior subjective synonyms of *P. rustica* (Kunze); *P. discolor* (Panzer) is placed as a junior subjective synonym of *P. sericea* (Linnaeus).

Based on phylogenetic analysis of genera of Donaciinae, three tribes of Donaciinae are recognized: Donaciini Kirby, Haemoniini Chen, and Plateumarini new tribe. All described genus- and species-group taxa are placed within this tribal classification, except *Donacia microcephala* Daniel and Daniel (uncertain generic assignment) in Donaciini, and *Neohaemonia voronovae* Medvedev (uncertain generic assignment) in Haemoniini. The current subgeneric classification of *Plateumaris* is rejected: *Juliusina* Reitter is shown to be a junior objective synonym of *Plateumaris* Thomson. *Poecilocera* Schaeffer is removed from synonymy with *Sominella* Jacobson and includes a single Nearctic species, *P. harrisii* (LeConte). *Pseudodonacia* Reitter and *Plateumaroides* Khnzorian (both monobasic) are newly placed as junior subjective synonyms of *Sominella*. *Prodonacia* Chen and *Donaciocrioceris* Pic (both monobasic) are newly placed as junior subjective synonyms of *Donaciasta* Fairmaire. *Donacia* (*Donaciomima*) Medvedev is removed from synonymy with *Donacia*, and is recognized as a valid subgenus, including most species hitherto placed in *Donacia* *s. str.* (*i.e.*, 22 Nearctic and 52 Palaearctic species). The fossil genus *Hemidonacia* Haupt is newly placed as junior subjective synonym of *Donacia* (*Cyphogaster*) Goecke, and *Eodonacia* Haupt is newly placed as junior subjective synonym of *Donacia* (*s. str.*) Fabricius. *Donaciella* Reitter is elevated to generic status, with the

Nearctic species Donacia pubicollis Suffrian and Palaearctic species Donacia clavipes Fabricius, Donacia cinera Herbst, and Donacia tomentosa Ahrens transferred to this genus.

Based on fossil and chorological data, the geographic history of donaciines in general, and of Plateumaris in particular, is deduced to be so old as to obscure possible correlations of more recent phylogenetic divergences and speciations with specific geologic events. The geographic history of even the most highly derived donaciine groups extends well into the Cretaceous. Therefore, explanations are speculative beyond the generality that donaciines have a long geologic history.

Donaciines seem to be associated with aquatic, vascular angiospermous host plants in a pattern of association by colonization, rather than in a pattern of association by descent (coevolution). This pattern is not consistent with the hypothesized expectation that phylogeny of phytophagous beetles should parallel that of their host plants.

Instead, it was found that donaciines are adapted to aquatic plants according to growth form of plants. Plants used as hosts by donaciines are grouped in three categories according to their growth form and the way they are used by donaciines. Most primitive and many phylogenetically intermediate donaciines use plants in category A, dicots which grow along the margin of water bodies and have a vertical growth form. Other phylogenetically intermediate, but more specialized, donaciines use certain dicots and monocots in category B, which are plants that have leaves that float on the water surface. Plant category C includes only a few plant types that have both submerged and apical, floating leaves (mostly Potamogeton). This arrangement is not correlated with plant phylogeny, but does closely correspond to the reconstructed phylogeny of donaciine genera. Donaciines using plants of category A are more primitive and relatively terrestrial in defense reactions, oviposition, plastron development and mandibular structure. Donaciines that use plants of categories B and C show increasing structural and behavioural specialization to aquatic habits, closely corresponding to the growth form of these plants, the use of which requires more refined adaptations.

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VITA.

I was born the only son of German immigrants, Sigurd and Imme Askevold, high school teacher and medical doctor, respectively, in Creston, British Columbia. I owe to my parents a substantial debt for the perseverance they showed in encouraging their children to speak German at home; the abilities thereby acquired have been immeasureable assets to me in my later university years. I grew up in Creston, and after 2 years' interruption in high school education after Grade 11, completed matriculation in 1976. That year I began study at Selkirk College, Castlegar, B.C. After two years I continued study at the University of Alberta, majoring in Entomology, and graduated with a B.Sc. (Honours) in 1981. For one year I taught biology laboratory classes and worked in the Strickland Museum at the Department of Entomology. In 1982 I was accepted by the Department of Entomology at the University of Manitoba, to begin post-graduate study toward an M.Sc. degree. I was fortunate enough to win a Natural Sciences and Engineering Research Council of Canada Post-graduate Scholarship in 1985, and so transferred my study to Ph.D. level. In December 1980 I married Kathleen Mary Traj of Nelson, B.C., and we now have two sons, Erik Sven, born Oct. 8 1985, and Stefan Karl, born Jan. 22 1988.

PUBLICATIONS:

1990. Classification of Tertiary fossil Donaciinae of North America and their implications about evolution of Donaciinae (Coleoptera: Chrysomelidae). Canadian Journal of Zoology, in press.

1988. Gruev, B. and I.S. Askevold. New species in the genera _Taizonia_ and _Longitarsus_ from India. (Coleoptera: Chrysomelidae: Alticinae). Pan-Pacific Entomologist 64(2):139-145.

1988. Aggregation of Phyllotreta striolata (Fab.) at high altitude in southwest Alberta, Canada (Coleoptera, Chrysomelidae: Alticinae). Coleopterists Bulletin 42(1):10.

1988. The genus Neohaemonia Székessy in North America (Coleoptera: Chrysomelidae: Donaciinae): systematics, reconstructed phylogeny, and geographic history. Transactions of the American Entomological Society 113:360-430.

1987. The identity of Donacia caerulea Olivier, 1795 (Coleoptera, Chrysomelidae). Coleopterists Bulletin 41(4):345-349.

1987. The identity of Donacia cuprea Kirby, 1837, and Donacia quadricollis Say, 1827, with a taxonomic revision of members of the D. subtilis Kunze - group (Coleoptera: Chrysomelidae: Donaciinae). Canadian Entomologist 119:629-645.

SUBMITTED:

(Askevold and L. LeSage). The genus Jansonius Baly, 1878, of Chile: a case of misidentification and taxonomic confusion (Coleoptera: Chrysomelidae: Eumolpinae). Revista Chilena de Entomologia.

Book Review: R.L. Jacques, 1988. The Potato Beetles. Bulletin of the Entomological Society of America.

Plateumaris Thomson, 1859, proposed conservation under the plenary powers (Insecta: Coleoptera). I.C.Z.N.

PAPERS PRESENTED AT SCIENTIFIC MEETINGS:

1988. A fossil species of Donacia (Donacia) from the late Palaeocene of Alberta: implications for the evolution of Donaciinae and other Northern Hemisphere temperate insects. Presented at the XVIII International Congress of Entomology, Vancouver, July 1988.

1987. Geographic history of the members of the Nearctic genus *Neohaemonia* (Coleoptera: Chrysomelidae). Presented at the Entomological Society of Manitoba Annual Meeting, Winnipeg, November 1987.

1987. Geographic history of the members of the Nearctic genus *Neohaemonia* (Coleoptera: Chrysomelidae). Presented at the Entomological Society of Canada Annual Meeting, Penticton, September 1987.

1986. Patterns and evolution of endophallic structure in donaciine leaf beetles (Coleoptera: Chrysomelidae). Presented at the Entomological Societies of Canada and Manitoba, Joint Annual Meeting, Winnipeg, October 1986.

1984. Phylogeny and zoogeography of generic groupings of Donaciinae: A generic review, with comments on generic ranking. Presented at XVII International Congress of Entomology, Hamburg, August 1984.

1984. Genitalia, taxonomy, and distribution of Nearctic *Plateumaris*. Presented at XVII International Congress of Entomology, Hamburg, August 1984.

1983. Male genitalia, taxonomy, and distribution of Nearctic *Plateumaris* species. Presented at the Entomological Society of Manitoba Annual Meeting, Winnipeg, November 1983.

ACKNOWLEDGEMENTS.

I view my academic career, and interest in Entomological Systematics, as having been formed by a series of fortuitous and timely events rather than by design. At Selkirk College, Dr. Peter Wm. Wood was the first to attract me to Entomology, and gave me summer employment collecting and identifying insects. Without his early influence I might not have chosen this as a major subject of study at the University of Alberta. Choice of that university was itself rather lucky, for it turned out be one of only few institutions at which one could study entomology in Canada. There, I was influenced, perhaps most strongly, by Dr. Steve Ashe, who enthusiastically taught two courses in insect systematics, and thereby captured my imagination for future career options. Dr. George E. Ball next fed this interest by giving me employment in the Strickland Museum for the years I was at the University of Alberta and has always encouraged me since. Lastly, but by no means least, it was Dr. Robert E. Roughley who accepted me as his first graduate student in 1982. I believe it was Rob's unusual patience and forbearance, encouragement and farsightedness, which caused me to survive the vagaries and uncertainties of a graduate career. It is to him that I am immeasureably obliged, for he provided me the many opportunities and privileges that I enjoyed during more than 90 months as graduate student under his tutelage.

I must acknowledge Dr. Hans Silfverberg, who pointed out to me that <u>Plateumaris</u> was first described in 1859, not 1866; this small fact was essential in resolution of some taxonomic confusion.

I profusely thank Hedy Kling and Dorothy Majewski of the Freshwater Institute for their help with SEM photography. I must also acknowledge the enormous assistance of the librarians of the University of Manitoba (especially Mrs. Barbara Bennell), for they succeeded in exhuming a large amount of literature for me.

Several sources of funding helped me survive my graduate student years: an NSERC PGS Scholarship to me, and NSERC grant #A04128 held by Dr. R.E. Roughley; I was also fortunate enough to be granted some financial assistance by the Dean of Agriculture, Dean R.C. McGinnis, to see me through the final stages of thesis preparation.

Lastly and most importantly, for she helped me keep body and mind together, my wife Kathleen must know her support and patience were integral during my prolonged period of study; I am sure that she suffered my every emotional fluctuation as keenly as I, and she was most supportive during the latter stages of thesis writing. Her understanding is deeply acknowledged. Also, my sons and friends Erik and Stefan unwittingly played a role, for their enthusiasm to see me provided daily instant distraction from consuming thesis thoughts.

1. INTRODUCTION.

The importance of entomological systematics to biological sciences in general is recognized by systematists and others. Systematic research provides the most basic information about species and their identification, which is a "prerequisite for all other enquiries about the natural world" (Danks 1988:271). Systematic research is needed not only among groups which include taxa of economic importance, but also for insects in general, simply for reasons of other human interest. Human interest should be understood to mean the proximal issues such as food supply as well as matters of intellectual interest; the number of amateurs, in all parts of the world, who pursue natural history of insects for this latter reason is rarely considered. Insect systematics deserves as much consideration as do so many areas of human endeavour.

Hardly by intent, I find myself in the present position of researching the systematics of leaf beetles, or Chrysomelidae; the present document represents the result of fortuitous, not intentional, selection of the "longhorned leaf beetles", the Donaciinae, as the creatures with which to occupy myself. At one time I thought chrysomelids thoroughly contemptible beetles (I once thought the same of carabids too), but gradually came to think otherwise. Indeed, I think I have arrived at a point of understanding with a predecessor: "... for the Chrysomelidae are always with me; they come from all parts of the world; they crowd upon me. Never did I realize better what power dead beetles can have over living man" (S. Maulik 1935:v).

Chrysomelidae are a group of phytophagous beetles, including many species of economic consequence as well as aesthetic and intellectual appeal. Whether for economic or intellectual benefit they are deserving of investigation because they constitute one of the largest and most diverse groups of Coleoptera, yet systematic research in this group lags substantially behind that of others, such as the weevils, water beetles and ground beetles. Systematics of the chrysomelids has barely begun to emerge from the purely descriptive period of taxonomic work in this group, and the row to hoe is unfathomably long. Yet chrysomelids offer areas of systematic and nonsystematic research which merit the attention of new scholars of systematic entomology.

The field of chrysomelidology is effectively an untapped resource. Donaciines, in particular, have a unique appeal among chrysomelids. Phylogenetically, donaciines are a well defined group because they are aquatic and they possess uniquely derived features that set them apart from other subfamilies of chrysomelids. The beetles occur abundantly on aquatic plants and are therefore easily collected and observed. They are a convenient group because of limited diversity, and because they are largely restricted to the Northern Hemisphere. The Neotropical fauna is a major historical source of other components of the Nearctic fauna, and its consideration would complicate any attempt to analyze a comparably diverse assemblage of species of almost any other subfamily of Chrysomelidae. Thus, donaciines offer the distinction of phylogenetic isolation and relatively low diversity, and the benefits of observability for study.

Study of the North American Donaciinae began with description of two species by Olivier (1795), then one each by Ahrens (1810) and Germar (1811). These were supplemented by Say (1824, 1827), Kirby (1837), Mannerheim (1843), and Melsheimer (1847), with Lacordaire (1845) adding many species (most now assigned to _Donacia_ Fabricius (_s_. _str_.) or herein moved to *D*. (*Donaciomima*) Medvedev). All known Nearctic taxa were first synthesized and supplemented by LeConte (1851, 1868). Crotch (1873) reviewed the known taxa, although incompletely, adding two species in his monograph on Nearctic Phytophaga. Suffrian (1872), LeConte (1878), and Jacoby (1884) described one species each; Leng (1891) repeated the monographic exercise, more thoroughly than had Crotch. Blatchley (1910) and Schaeffer (1919) described more species. Schaeffer (1925) presented the most comprehensive taxonomic treatment of the Donaciinae of North America. He accounted for all species and names and corrected a large number of nomenclatural problems. Székessy (1941) erected the generic name *Neohaemonia*. Marx (1957) reviewed Nearctic members of *Donacia*, and alleviated some problems of identification left unresolved by Schaeffer. However, the species of *Plateumaris* (hitherto as a subgenus of *Donacia* by many North American workers) have remained unstudied since Schaeffer (1925).

Perhaps the single most important reason taxonomic problems in Donaciinae have persisted is that authors did not examine structure of male genitalia. I believe it has been a matter of convenience, and taxonomic tradition, that genitalic detail has not found popular use. Indeed, shape of the median lobe itself seldom offers species specific characters in donaciines, bearing out their observations. However, several authors showed that internal sac structure could be useful taxonomically. Sharp and Muir (1912) illustrated details of male genitalic structure in many Chrysomelidae, including internal sac structure of one donaciine. Powell (1941) examined relationships of chrysomelid groups on the basis of genitalic structure, referring to the internal sac also. Székessy (1941) was the first to use donaciine internal sac structure for taxonomic purposes, followed by Nyholm (1948), who relied extensively on shape of internal sac sclerites in his study of a group of European species of Donacia. Recently, taxonomic treatments of Donaciinae were published that detailed endophallic structure in particular (Tominaga and Katsura 1984, Anonymous 1985, Askevold 1987a, 1988). These have amply demonstrated the importance of detailed study of male genitalic structure in traditional chrysomelid systematics.

In total, I examined 135 valid and/or undescribed taxa of Donaciinae (56 New World, 79 Old World) of 162 world taxa listed in the most recent catalogue (Borowiec 1984), representing all described genera. Only 21 names remain unstudied, all of which are Palaearctic. Taxonomic problems exclusive of Plateumaris, especially pertaining to the Nearctic fauna, were treated independently of this thesis: revision of Nearctic species of the Donacia subtilis Kunze Group (Askevold 1987a), resolution of a taxonomic problem of correct application of the name Donacia caerulea Olivier (Askevold 1987b), systematic revision and evolutionary analysis of the members of Neohaemonia Székessy and relationship of this genus to other Haemoniini (Askevold 1988), and systematic revision and evolutionary analysis of the Afrotropical genus Donaciasta Fairmaire (Askevold, in preparation). Also, the Tertiary donaciine fossils of North America were analyzed, which contributed important background data to this thesis (Askevold 1990).

The objective of research comprising this thesis was to revise systematically the New World members of Plateumaris Thomson, to investigate its taxonomic rank, and to analyze evolutionary aspects. To investigate these questions it was necessary to determine what monophyletic groupings exist among the members of Donaciinae, their phyletic relationships, and their host plant relationships. These supplemental goals were undertaken, and additionally a study of as many of the described taxa as possible was attempted. Thus, the thesis presented here is comprised of four, somewhat disparate sections: taxonomic revision and evolutionary analysis of the genus *Plateumaris*, redescription of *Poecilocera* Schaeffer and *P. harrisii* (LeConte), analysis of phylogeny and reclassification of genera of Donaciinae, and analysis of host plant relationships of the Donaciinae. However, I perceive these independent sections as being unified in the context of a generalized and interrelated theme - the systematics and evolution of Donaciinae.

2. MATERIALS AND METHODS.

2.1. MATERIALS.

This revision is based on the study of 22,230 Nearctic specimens (excluding most type specimens) of Plateumaris, 109 specimens of Poecilocera harrisii, at least 20,000 specimens of the other described and undescribed Nearctic species of Donaciinae, as well as specimens of 79 Old World taxa of Donaciinae (excluding 16 placed in synonymy). I have not examined specimens of 21 Palaearctic taxa which remain unknown to me. Primary types of all nominal taxa assignable to Nearctic members of Plateumaris were examined except for those of Donacia rugifrons Newman, Donacia chalcea Lacordaire, and Donacia germari Mannerheim. The primary types of most other nominal Nearctic donaciine taxa were studied, and the status of each is indicated in a checklist of Nearctic Donaciinae presented in Section 7.4.5.

2.1.1. List of collections examined. The following 85 collections are referred to in the text and/or in lists of locality data taken from specimens examined by the codens assigned to them below. codens are presented in alphabetical sequence. For the most part, I used codens that Heppner and Lamas (1982) assigned to world collections of insects. However, I also needed to create many codens, and chose to alter a few (CUIC, DEFW, DEUN, MNHN, and WEEM) because I thought them more appropriate. In the list of collections, private collections have the owner's name appearing first in the address; institutional collections have the curator's name listed last.

AMNH. Department of Entomology, American Museum of Natural History, Central Park West at 79th St., New York, NY 10024, U.S.A; L. H Herman.

ANIC. Division of Entomology, Australian National Insect Collection, CSIRO, Canberra, Australia; J. F. Lawrence.

APHIS. Animal and Plant Health Inspection Service, USDA, Room 308, 40 South Gay St., Baltimore, MD 21202, U.S.A.; J.F. Cavey.

ASRC. A.C. Ashworth and D.P. Schwert, Department of Geology, University of North Dakota, Fargo, ND 58105, U.S.A.

BMNH. Department of Entomology, British Museum of Natural History, Cromwell Road, London SW7 5BD, England; R.D. Pope and S.L. Shute.

BPBM. Entomology-Coleoptera, Bernice P. Bishop Museum, Honolulu, HI 96819, U.S.A.; G.A. Samuelson.

CARR. J.L. and A.F. Carr, 24 Dalrymple Green, N.W. Calgary, Alta. Canada, T3A 1Y2.

CAS. Department of Entomology, California Academy of Sciences, Golden Gate Park, San Fransisco, CA 94118, U.S.A.; D. Kavanaugh and N.D. Penny.

CDAS. California Department of Food and Agriculture, California State collection of Arthropods, Insect Taxonomy Laboratory, 1220 N Street, Sacramento, CA 95814, U.S.A.; T.N. Seeno and A.J. Gilbert.

CLCH. C. Chantal, B.P. 2072, St. Nicolas-est, P.Q., Canada, GOS 3LO.

CMP. Section of Entomology, Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, PA 15213, U.S.A.; G. Ekis and R.L. Davidson.

CNC. Coleoptera Section, Biosystematics Research Centre, Agriculture Canada, Ottawa, Ont. Canada K1A OC6; L. LeSage.

CUCC. Department of Entomology, Fisheries and Wildlife, College of Agricultural Sciences, 114 Long Hall, Clemson University, Clemson, SC 29631, U.S.A.; S.W. Hamilton.

CUIC. Department of Entomology, Comstock Hall, Cornell University, Ithaca, NY 14853, U.S.A.; J.K. Liebherr.

DBUM. Department of Biology, University of Mississippi, University, MS 38677, U.S.A.; P.K. Lago.

DEFW. Department of Entomology, Fisheries and Wildlife, University of Minnesota, 219 Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108, U.S.A.; P.J. Clausen.

DEUN. Research and Systematics Collections, University of Nebraska State Museum, University of Nebraska, W-436 Nebraska Hall, Lincoln, NB 68585, U.S.A.; B.C. Ratcliffe.

EGRC. E.G. Riley, Department of Entomology, Texas A & M University, College Station, TX 77843-2475, U.S.A.

Elias. S.A. Elias, Institute of Arctic and Alpine Research, Campus Box 450, University of Colorado, Boulder, CO 80309 U.S.A.

EMUS. Department of Biology, College of Science, Utah State University, UMC 53, Logan, UT 84322, U.S.A.; W.J. Hanson.

FMNH. Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, Il 60605, U.S.A.; L.E. Watrous.

INHS. Department of Entomology, Illinois Natural History Survey, Natural Resources Bldg., Urbana, IL 61801, U.S.A.; J.K. Bouseman.

ISAC. I.S. Askevold, Department of Entomology, University of Manitoba, Winnipeg, Man. R3T 2N2, Canada.

JBWM. J.B. Wallis Museum, Department of Entomology, University of Manitoba, Winnipeg, Man. R3T 2N2, Canada; R.E. Roughley.

JLLC. J.-L. Laliberté, 2400 Chemin Ste.-Foy, Saint Foy, P.Q. Canada, J1V 1T2.

LACM. Entomology, Los Angeles County Natural History Museum, 900 Exposition Boulevard, Los Angeles, CA 90007 U.S.A.; J.P. Donahue.

LEM. Collection Provancher, Départment de biologie, Université Laval, Québec, P.Q. Canada; J.M. Perron.

LSU. Department of Entomology, Louisiana State University, Baton Rouge, LA 70803, U.S.A.; C.B. Barr.

MCSN. Museo Civico di Storia Naturale, Lungadige Porta Vittoria 9, 37100 Verona, Italia; M. Daccordi.

MCZ. Department of Entomology, Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138, U.S.A.; A.F. Newton and S.R. Shaw.

MDOB. M.Döberl, Seeweg 34, D-8423 Abensberg, West Germany.

MEMU. Mississippi Entomological Collection, Department of Entomology, Mississippi State University, State College, MS 39762, U.S.A.; P. R. Miller.

MLU. Section Biowissenschaften, WB Zoologie, Martin-Luther- Universität Halle-Wittenberg, Domplatz 4, DDR-4010 Halle (Saale) East Germany; M. Dorn.

MNHN. Entomologie, Muséum d'Histoire Naturelle, 45 Rue de Buffon, 75005 Paris, France; N. Berti.

MRAC. Section d'Entomologie, Koninklijk Museum voor Midden-Afrika, B-1980 Tervuren, Belgium; J. Decelle.

MSUE. Department of Entomology, Michigan State University, East Lansing, MI 48824, U.S.A.; R.L. Fischer.

MTSU. Department of Entomology, Montana State University, Bozeman, MT 59717, U.S.A.; M.A. Ivie.

MUIC. Department of Biology, Memorial University, St. John's Nfld. A1B 3X9, Canada; D.J. Larson.

NDSU. North Dakota State Insect Reference Collection, Department of Entomology, North Dakota State University, Fargo, ND 58105, U.S.A.; E.U. Balsbaugh.

NFRC. Northern Forest Research Centre, Department of the Environment, Canadian Forestry Service, 5320 122 St., Edmonton, Alta. T6H 3S5, Canada;D. Langor.

NMDC. N.M. Downie, 505 Lingle Terrace, Lafayette, IN 47901, U.S.A.

ODAC. Entomology Section, Plant Division, Oregon Department of Agriculture, 635 Capitol N.E., Salem, OR 97301, U.S.A.; R.L. Wescott.

OKS. Department of Entomology, Oklahoma State University, Stillwater, OK 74074, U.S.A.; W.A. Drew.

OSUC. Systematic Entomology Laboratory, Department of Entomology, Oregon State University, Corvallis, OR 97331, U.S.A.; G.L. Peters.

PMV. Entomology Division, British Columbia Provincial Museum, Victoria, B.C. V8V 1X4, Canada; R.A. Cannings.

PMY. Division of Entomology, Peabody Museum of Natural History, Yale University, New Haven, CT 06520, U.S.A.; D.G. Furth

PUL. Department of Entomology, Entomology Hall, Purdue University, West Lafayette, IN 47907, U.S.A.; A. Provonsha.

RMC. R. Morris, 5205 91 St., Lubbock, TX, 79424, U.S.A.

RNEL. R.E. Nelson, Department of Entomology, Colby College, Waterville, ME 04901-4799, U.S.A.

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SCSU. Department of Biological Sciences, St. Cloud State University, St. Cloud, MN 56301, U.S.A.; R. Gunderson.

SDNH. Entomology Department, San Diego Society of Natural History, Natural History Museum, P.O. Box 1390, San Diego, CA 92112 U.S.A.; D.K. Faulkner.

SJSU. Entomology Museum, Department of Biological Sciences, San Jose State University, San Jose, CA 95192 U.S.A.; W.A. Maffei.

SMCL. S.M. Clark, Pest Identification Laboratory, West Virginia Department of Agriculture, Charleston, WV 25305, U.S.A.

SMF. Forschungsinstitut Senckenberg, Senckenberganlage 25, 6000 Frankfurt 1, West Germany; R. zur Strassen.

SMNS. Entomologische Abteilung, Staatliches Museum für Naturkunde in Stuttgart, Zweigstelle, 7140 Ludwigsburg, Arsenalplatz 3, Stuttgart, West Germany; T. Osten.

SNMB. Entomologie, Naturhistorisches Museum Basel, Augustinergasse 2, CH-4001 Basel, Switzerland; M. Brancucci.

SPMC. Museum of Natural History, Wascana Park, Regina, Sask., Canada S4P 3V7; R. Hooper and K. Roney.

TAMU. Department of Entomology, Texas A & M University, College Station, TX 77843-2516, U.S.A.; S.J. Merritt and E.G. Riley.

TMB. Természettudományi Múzeum Állattára, Zoological Department, Hungarian Natural History Museum, Baross u. 13, H-1088 Budapest, Hungary; O. Merkl.

UADB. Department of Biology, College of Arts and Science, University of Alabama, University, Alabama 35486, U.S.A.; M.C. Rhode.

UAE. Department of Entomology, University of Alberta, Edmonton, Alta. Canada T6G 2E3; G.E. Ball and D. Shpeley.

UBC. Spencer Entomological Museum, Department of Zoology, University of British Columbia, Vancouver, B.C. Canada, V6T 2A9; S.G. Cannings.

UCM. Entomology Museum, University of Colorado, Henderson Bldg., Campus Box 218, Boulder CO 80309, U.S.A.; U.N. Lanham.

UCR. UCR Entomological Teaching and Research Collection, Department of Entomology, University of California, Riverside, CA 92521 U.S.A.; S. Frommer.

UCS. Museum of Natural History, University of Connecticut, U-43, Storrs, CT, 06268, U.S.A.; J.E. O'Donnell.

UGA. Department of Entomology, University of Georgia, Athens, GA 30602, U.S.A.; C.L. Smith.

UGIC. Department of Environmental Biology, University of Guelph, Guelph, Ont. Canada N1G 2W1; S.A. Marshall.

UIM. Department of Plant, Soil and Entomological Sciences, College of Agriculture, University of Idaho, Moscow, Idaho, 83843, U.S.A.; J.B. Johnson.

UMHF. Universitetets Zoologiska Museum, Entomologiska Avdelningen, N.Järnvägsgatan 13, SF-00100 Helsingfors 10, Finland; H. Silfverberg.

UMMA. Museum of Zoology, Insect Division, The University of Michigan, Ann Arbor, MI 48109. U.S.A.; M.F. O'Brien.

UNH. Department of Entomology, College of Life Sciences and Agriculture, Nesmith Hall, University of New Hampshire, Durham, NH 03824, U.S.A.; D.S. Chandler.

USNM. National Museum of Natural History, Smithsonian Institution NHB-105, Washington, D.C. 20560, U.S.A.; R.E. White and G.F. Hevel.

UVDZ. Department of Zoology, Marsh Life Science Bldg., University of Vermont, Burlington, VT 05401, U.S.A.; R.T. Bell.

UWAT. Quaternary Entomology Laboratory, Department of Earth Sciences, University of Waterloo, Waterloo, Ont. N2L 3G1, Canada; J. Pilny and A.V. Morgan.

UWL. Entomological Museum, University of Wyoming, University Station, P.O. Box 3354, Laramie, WY 82071, U.S.A.; R. Lavigne.

UWM. Department of Entomology, 237 Russell Laboratories, 1630 Linden Drive, University of Wisconsin-Madison, Madison, WI 53706, U.S.A.; W.E. Hilsenhoff and S. Krauth.

UZIL. Museum of Zoology, University of Lund, Helgonavägen 3, S-223 62 Lund, Sweden; R. Danielsson.

VPI. Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061, U.S.A.; M. Kostarab.

WEEM. W.R. Enns Entomology Museum, Department of Entomology, College of Agriculture, University of Missouri-Columbus, 1-87 Agriculture Bldg., Columbia, MO 65211, U.S.A.; R.L. Blinn.

WSU. James Entomological Collection, Department of Entomology, Washington State University, Pullman, WA 99164-6432, U.S.A.; R.S. Zack.

ZMHB. Zoologisches Museum, Museum für Naturkunde der Humbolt-Universität zu Berlin, Invalidenstr. 43, 1040 Berlin, DDR; F. Hieke.

ZMUH. Zoologisches Institut und Zoologisches Museum, Universität Hamburg, Martin-Luther-King Platz 3, 2000 Hamburg 13; R. Abraham.

ZSBS. Entomologie, Zoologische Staatssammlung, Maria-Ward-Strasse 21,
D-8000 München 60, West Germany; G. Scherer.

2.1.2. List of taxa examined.

All New World taxa of Donaciinae were studied. These 56 species are catalogued in detail in Section 7.2.4. I list here all Old World taxa of Donaciinae [mostly as catalogued by Jolivet (1970) and Borowiec (1984)] which I have examined. Not all of these species were examined for detailed genitalic study, but these taxa are placed within the genus-group classification I propose. A few new synonymies are proposed, mostly on the basis of examination of types, but these are not discussed further here. One species is undescribed, _Donacia_ (_Donacia_) _okavangensis_, which is listed here. Taxa within genera are listed alphabetically.

List of non-Nearctic donaciine taxa examined.

Plateumaris Thomson.

- _P_. _akiensis_ Tominaga and Katsura
- _P_. _braccata_ (Scopoli)
- _P_. _consimilis_ (Schrank)
- _P_. _constricticollis_ (Jacoby) (and subspecies)
- _P_. _roscida_ Weise
- _P_. _rustica_ (Kunze)
    - _P_. _affinis_ (Kunze), SYN. NOV.
- _P_. _sericea_ (Linnaeus)
    - _P_. _discolor_ (Panzer), SYN. NOV.
- _P_. _shirahatai_ Kimoto.
- _P_. _weisei_ Duvivier
    - _P_. _hirashimai_ Kimoto, SYN. NOV.
    - _P_. _morimotoi_ Kimoto, SYN. NOV.

Taxa unknown to me: P. caucasica Zaitsev, P. mongolica Semenow, P. obsoleta Jacobson, P. sachalinensis Medvedev, P. socia Chen, P. sulcifrons Weise, P. tenuicornis Balthasar (= 7 taxa).

Sominella Jacobson

- S. kraatzi (Weise), NEW COMBINATION
- S. longicornis (Jacoby)
- S. macrocnemia (Fischer von Waldheim)
- S. reticulata (Ahrens) NEW COMBINATION

Donaciella Reitter

- D. cinerea (Herbst) NEW COMBINATION
- D. clavipes (Fabricius) NEW COMBINATION
- D. tomentosa (Ahrens) NEW COMBINATION

Donacia (Donacia) Fabricius

- D. crassipes Fabricius
- D. okavangensis Askevold, UNDESCRIBED SPECIES
- D. ozensis Nakane
- D. recticollis Jacoby
  - D. clarki Monrós (replacement for D. indica Clark), SYN. NOV.
  - D. indica Clark (preoccupied), SYN. NOV.

Taxon unknown to me: D. ussuriensis Medvedev.

Donacia (Cyphogaster) Goecke

- D. australasiae Blackburn
- D. delesserti Guérin-Méneville
- D. inopinata Goecke
- D. javana Wiedemann
- D. lenzi Schönfeld
- D. papuana Gressitt
- D. provosti Fairmaire

D. transversicollis Fairmaire

  D. tuberfrons Goecke, SYN. NOV.

Taxon unknown to me: D. yuasi Nakane.

Donacia (Donaciomima) Mevedev

D. antiqua Kunze

D. apricans Lacordaire

D. aequidorsis Jacobson

D. aquatica Linnaeus

D. aureocincta J. Sahlberg

D. bactriana Weise

D. bicolora Zschach

D. bicoloricornis Chen

D. brevicornis Ahrens

D. brevitarsis Thomson

D. clavareaui Jacobson

  D. fukiensis Goecke, SYN. NOV.

D. delagrangei Pic

D. dentata Hoppe

D. fennica Paykull

  D. ochroleuca Weise, SYN. NOV.

  D. flavidula Reitter, SYN. NOV.

D. flemola Goecke

D. frontalis Jacoby

D. gracilicornis Jacobson

D. gracilipes Jacoby

D. hirtihumeralis Komiya and Kobuta

D. hiurai Kimoto

D. impressa Paykull

D. *jacobsoni* Reiche

D. *jacobsoniana* Shavrov

D. *japana* Chûjô and Goecke

D. *katsurai* Kimoto

D. *kweilina* Chen

D. *malinowskyi* Ahrens

D. *marginata* Hoppe

D. *mistshenkoi* Jacobson

D. *nitidior* (Nakane)

D. *obscura* Gyllenhal

D. *polita* Kunze

D. *semenowi* Jacobson

D. *semicuprea* Panzer

D. *simplex* Fabricius

D. *sparganii* Ahrens

D. *springeri* Müller

D. *thalassina* Germar

D. *versicolorea* Brahm

D. *vulgaris* Zschach

Taxa unknown to me: *D*. *breviuscula* Jacobson, *D*. *fedschenkoae* Jacobson, *D*. *freyi* Goecke, *D*. *galaica* Baguena, *D*. *humilis* Weise, *D*. *intermedia* Jacobson, *D*. *kirgizkaisaka* Jacobson, *D*. *knipowitschi* Jacobson, *D*. *koenigi* Jacobson, *D*. *mannerheimi* Lacordaire, *D*. *mediohirsuta* Chen, and *D*. *tschitscherini* Semenow (= 12 taxa).

Donaciasta Fairmaire [revised synonymies unpublished].

D. *abortiva* (Fairmaire), COMB. NOV.

D. *minuta* Pic.

D. *madecassa* Pic.

  - *D. notaticollis* Pic
- *D. assama* (Goecke), COMB. NOV.
  - *Prodonacia shishona* Chen.
  - *Donacia vietnamensis* Kimoto and Gressitt.
- *D. dentata* (Pic), COMB. NOV.
- *D. goeckei* Monrós
  - *D. quioca* Monrós.
  - *D. capensis* Monrós.
  - *D. garambana* Jolivet.
  - *D. monrosi* Jolivet.
- *D. luridiventris* (Lacordaire)
- *D. perrieri* (Fairmaire)

Macroplea Samouelle

- *M. appendiculata* (Panzer)
- *M. japana* (Jacoby)
- *M. mutica* (Fabricius)
- *M. pubipennis* (Reuter)
  - *Haemonia piligera* Weise, SYN. NOV.
  - *Haemonia incostata* Pic, SYN. NOV.

TAXON OF UNCERTAIN PLACEMENT WITHIN DONACIINI:

- *D. microcephala* Daniel and Daniel

TOTAL: 79 valid Palaearctic taxa examined for generic assignment; 21 taxa are unknown to me.

2.1.3. Other specimens used for comparative study. The following sagrines were examined: *Atalasis sagroides* Lacordaire, *Ametalla atenodera* Lacordaire, *Ametalla spinolae* Hope, *Megamerus femoralis* Lea, *Mecynodera coxalgica* Boisduval, *Carpophagus banksiae* McLeay, *Polyoptilus erichsoni* Germar, *Diaphanops westermanni* Boheman, and various Oriental and Afrotropical species of *Sagra*. A number of criocerine species in the genera *Lema*, *Oulema*, *Lilioceris* and *Crioceris* were examined for general structure, and some of these were examined also for male genitalic structures. I relied principally on the figures of male genitalia of Criocerinae presented in White (in prep.) to infer widespread presence of characters among criocerines. Other than members of Sagrinae and Criocerinae, I have studied those of many other Chrysomelidae and perhaps some statements (hypotheses or observations) I make take their study into account, though not explicitly.

2.1.4. Information sources regarding literature and historical collections. A number of sources of information were important in finding both historical literature and for tracing the history of collections. These sources are seldom cited in publications, yet they are vitally important to taxonomic work. Catalogues such as Goecke (1941, 1960a), Monrós (1959), and Jolivet (1970) were useful in finding most publications about Donaciinae, but they did not detail titles and full bibliographic citation of these publications. It was therefore necessary to duplicate their collective efforts to find the publications relevant to Donaciinae, and to verify their citations.

The series of volumes about entomological collections by Horn and Kahle (1935, 1936, 1937) and a supplement to these (Sachtleben 1961) were important in searching for the historically important collections of various authors (*e.g.* Ahrens, Guérin, and Germar). These volumes were critical in tracking the fragmentation and eventual deposition of various collections, and some could not otherwise have been found. The location of certain collections, such as that of A. Ahrens, is not widely known beyond statements in Horn and Kahle.

Horn and Schenkling's (1928, 1929) volumes were important for historical, entomological literature up to and including 1863. Derksen and Scheiding (1963, 1965, 1968, and 1972), and index thereto (Gaedike 1975) detailed publications appearing from 1864 to 1900.

2.2. METHODS.

A general comment about wording should be made, in view of the general truth observed by Ball (1977) that phrases in literature of systematic biology are often grammatically incorrect. Much of the content of what is written herein is phrased in a manner much like that often found in taxonomic literature, but that does not make it correct. Therefore, the reader is advised that certain phrases should be understood to have a specific meaning. In particular, the use of phrases such as "*Atalsis* is most similar to *Plateumaris*", should be understood to mean "Specimens of members of *Atalasis* are most similar to specimens of members of *Plateumaris*". Similarly, with regard to sex of specimens, when I state "Endophallus of *Plateumaris* *aurifer* with... ", this should be understood to mean "Endophallus of male specimens of *P. aurifer* with... ". In other words, I write as though I am discussing taxa, but this should be understood to mean that I am discussing specimens of members of those taxa. I do not use these phrases uniformly; sometimes I use the "correct" form for variation. However, in general, I use the "incorrect" forms because I find the correct forms lengthy and cumbersome.

2.2.1. Presentation of species treatments. Species treatments are presented phylogenetically, by species group.

A note on presentation of type specimen data is needed. Each species treatment begins with a list of synonymies and historical use of names. Details of the type specimens of the senior and valid name are given following this list under the heading "TYPE SPECIMEN[S]". Type specimens of junior synonyms are detailed within the synonymical list. Label data of the primary type are stated *verbatim* in quotation marks, the data of each label separated by a comma.

The printing capacity of the mainframe laser printer at the University of Manitoba does not include the symbols for male and female. The female (♀) can be produced by combining two characters, but no exact symbol for male can be produced in this way. Thus, I have composed the closest symbol possible: "o^", which is used in species treatments of *Plateumaris*. Readers may be puzzled by this otherwise nonsensical symbol.

2.2.2. Technique for preparation of male genitalia.

Differentiation of sexes. Male specimens of all known donaciine species can be recognized by a small impression on the posterior half of the apical, abdominal sternum [contrary to Monrós' (1959) statement that members of *Macroplea* do not possess such a depression] (I refer to the last apparent apical sternum as the apical sternum, though it is in fact only sternum VI). In most males this depression is bordered apically by a narrow bead which is absent from female specimens; the bead continues around the depression to the lateral margins. Females have this sternum variously modified in some members of *Donacia* (*s*. *str*.), or not (other genera), but it is not impressed in the same way. Numerous other sexual differences can be found, but none are as applicable to all taxa. Some species are sexually dimorphic in pronotal sculpture, robustness and armature of the metafemora, width of the basal protarsomere (some members of Donacia s. str.) and shape of the pygidium. Females Macroplea have the metatibiae markedly sinuate. Males of many members of Plateumaris and some of Donacia and Donaciasta possess a small tooth-like projection on the meso- and metatibiae, which I refer to as "tibial tubercle". Lastly, females are, on average, slightly larger than males, and in some species, there is no overlap in size range. I used the depression on the abdominal sternum to select male specimens for dissection.

Extraction of aedeagus. Prior to dissection, dry specimens were relaxed in warm soapy water for one to several hours, depending on recency of collection. Under a dissecting microscope, the relaxed specimen was held obliquely between thumb and fore-finger, with elytra exposed. One or both elytra were hooked and rotated to the sides using a finely hooked pin mounted on a short stick. With this tool, membranes connecting terga VI and VII to pleura on one side, and that of tergum VII to VIII (pygidium), were severed in a manner similar to that described by Lindroth (1969:xxxi). The aedeagus was teased from connective tissue and from the internally concealed tergum IX and pulled out with fine forceps. If the abdomen was removed, it was glued onto a point with the specimen, because important sexual and sometimes species specific characters are found on the pygidium and/or apical sternum.

Ease and quality of preparation depends upon recency of collection and method of killing and preserving specimens (cf. Lindroth 1957b). Specimens which were killed with ethyl acetate or which were preserved very recently in 70% ethanol give best results. Most such specimens can be prepared without clearing in hyrdoxide, because membranes and musculature sufficiently rehydrate and can be pulled off with forceps.

Clearing. The aedeagus was placed in a 50 ml flask of 10-20% sodium hydroxide or potassium hydroxide solution and warmed in a water bath (60°C) for up to 10 minutes, but generally for only 1-3 minutes. Clearing was carefully monitored and arrested before endophallic sclerites became too transparent; excessive clearing can result in distortion and collapse of structures. After clearing, the aedeagus was removed and rinsed in water to eliminate hydroxide. It was not necessary to rinse with acetic acid to arrest clearing. Any excess musculature was then removed with forceps. It was essential that the retractor muscle be removed if it did not completely hydrolyze or the endophallus would not evert.

Eversion of endophallus. Eversion of the internal sac has been accomplished in different ways by workers studying different groups of insects, although most authors discussing the internal sac provide no information about eversion (e.g. Brivio and Balsbaugh, 1984, Kingsolver, 1970). I found a syringe, as used by Hardwick (1950) for moths, unsuitable. Aedeagal curvature, shape of the apical orifice and basal foramen, and rigidity of basal sac-supporting sclerites in male donaciines made eversion in this manner impossible. Freitag (1969:92) used forceps, pulling the sclerites out through the apical orifice. I found the donaciine apical orifice too small to permit this method. Instead, I found part of Madge's (1967:143) technique most effective: a very finely hooked minuten pin mounted on a short stick was inserted through the apical orifice of the median lobe. The sac sclerites, especially the BSB (basal supporting block, cf. Section 3.2.2), were hooked and gradually extruded. However, I did not find his technique of pushing the endophallus with the tips of forceps successful for donaciines, because the sclerites tended to jam together at the apical orifice.

The eversion process was performed with the aedeagus in a dish of glycerine or water. Twenty-five power magnification is necessary for sac sclerites to be adequately distinguished and hooked. The aedeagus was held steady with fine forceps while the minuten pin was inserted into the lumen of the median lobe to hook the endophallus. Several problems were encountered at various times. Plateumaris males have the median lobe more markedly curved than those of other taxa; the endophallus is positioned proximally, and is not easily accessible with a pin inserted through the distal opening. In such specimens, the sac was pulled out a bit at a time until the BSB (basal supporting block) could be caught and pulled out. For some specimens this was complicated by a greatly elongated and curved MEG (median ejaculatory guide, cf. Section 3.2.5) catching at the orifice (e.g. members of Donaciasta), or an exceedingly long BSB (e.g. Poecilocera harrisii) which could bend or break. Patience was the most critical ingredient, but in some specimens the endophallus simply had to be removed through the basal foramen by detachment from the sac membrane.

Special problems. Air bubbles were trapped in most median lobes dissected, reducing visibility of sac sclerites. Gentle squeezing of the median lobe forced out most bubbles so that endophallic sclerites were recognizeable, and the specimens, with some experience, could be reliably identified by comparison with drawings without eversion. The median lobe of most species of Donaciinae is fairly large, lending itself to this method of air removal. A chemical method proposed by Smith (1979:95) may also be helpful, but I found simple squeezing sufficient.

For some specimens, fluid inside the median lobe was discoloured such that internal structures were not visible. This darkening was perhaps due to decomposition of body fluids and organs, or to the methods of killing and preservation. In much the same manner as that used for air bubbles, the discoloured fluid was squeezed out. With either problem if not immediately resolved, leaving the genitalia in glycerine for several days usually improved visibility markedly.

Many specimens killed in alcohol or formalin presented special problems, depending upon the length of time such specimens were kept in these preservatives prior to dissection. Such specimens were recognizeable by a combination of separated elytra, oral secretions dried on the mouthparts, disfigured and brittle abdomens, and relative stiffness of appendages. Abdominal terga were brittle and little softened by soaking of the specimen, and greater care was required for extraction of the aedeagus. Borkent (1979:130) suggested a method of restoration of dried and shrivelled specimens mounted directly from alcohol, which I did not use but which may be helpful for important specimens. During clearing in hydroxide, aedeagal musculature of such specimens became somewhat translucent but did not hydrolyze completely. While most musculature could be scraped off, the problem of extraction of the endophallus, if necessary, remained. The sac membrane was too stiff and brittle to be everted in the normal fashion, so when close examination of the endophallus was required, it was detached from the sac membrane by severing the attachment around the base of BSB.

Detachment of the endophallus has several disadvantages: integrity of the genitalia is lost and the endophallus may become dissociated or at least difficult to find and remove from a genitalia microvial (however, it can be placed back inside the median lobe); anatomical orientation of the armature may be easily confused; the sac-supporting sclerites and setal brush situated basally on the sac are unobserved inside the sac unless the sac is fully everted.

2.2.3. Measurements, figures and drawings. Total length (size) was measured with an eye-piece micrometer, from the tip of the labrum along the midline to the inner apical angle of the elytra, viewed dorsally. Each of the head, pronotum and elytra were measured independently, combined to give overall length. Size range was estimated by visually selecting several of the largest and smallest specimens of each sex. Pronotal length was measured along the midline, and width across the anterolateral calli. Elytral length was measured along the midline, from the base of the scutellar declivity to elytral apices, and width calculated as half the width of elytra at the humeri.

Drawings and figures were made using a Wild M5 dissecting microscope with the aid of a camera lucida. Slight disorientation of the endophallus can result in substantial distortion of sclerite shape and proportion, or asymmetry of drawings, so care was taken that the endophallus was horizontal for drawing. During eversion, the endophallus of many specimens was disfigured slightly, and drawings were corrected for such distortion. It was easiest to draw only one half of the endophallus in detail and to trace the other half of the drawing. The completed drawing was enlarged on a Canon® photocopier before inking. Scanning electron microscopy was done using a Cambridge Stereoscan 90® with polaroid camera attachment. Genitalic photographs were taken with Kodak Tech-Pan 100 ASA film using a Nikon Optiphot and Nikon Microflex HFX photographic attachment.

2.2.4. Recording of locality data. All collection information taken from labels borne by specimens of _Plateumaris_ and _Poecilocera_ examined is recorded. Localities are listed for Canada first, then for the United States. Within these political boundaries, provinces or states, and counties within states, are arranged alphabetically. Individual records are alphabetically arranged within these political subdivisions. Canadian localities were not arranged according to county, as such divisions do not occur uniformly in all political divisions within Canada.

For each locality record the following are given: first the specific locality, then date(s) of collection and any biological information, then the collector(s), and lastly the museum(s) and number of specimen(s) examined. No attempt was made to record dates, altitudes, and units of distance uniformly, as I cite the label data _verbatim_. However, it is usually assumed that dates in Roman Numerals correspond to the month of collection. Locality data are presented in the following ways to eliminate repetition of codens, collectors or localities as much as possible:

a) "Locality, date, biological information, collector(s), (coden #);"
b) "Locality: date, collector (#)... (coden);" or "Locality, date, collector (coden #), date, collector (acronym #);" and
c) "Locality, collector: date(s) (coden #);".

Thus, a number in parenthesis after a date or collector corresponds to the number of specimens examined, corresponding to the subsequent museum coden.

I decided arbitrarily that, where the number of specimens of a species examined exceeded 1200, these locality data would be listed in the Appendix (Appendix 10.1 to 10.5). Otherwise, locality data are listed at the end of each species' treatment.

2.2.5. Philosophy of classification. An important component of systematics is the observation that nested sets of derived character states form the basis of classification, only in the cladistic school of systematics. A classification based upon reconstruction of phylogeny is ostensibly more stable because there exists only one true pattern of evolution; the classification that most accurately mirrors this pattern should be least altered by future treatments, and addition of new data and/or taxa. From such stability can arise reproducible results, and particularly, predictability about other components of the biota that other sciences draw and rely on.

Schools of systematics do not agree entirely on how or to what degree classification should be a reflection of evolutionary relationships. Strict cladism dictates development of a strict hierarchical classification from which a phylogeny can be derived directly. However, the evolutionary systematics school diverges from cladistics on this point, attempting to draw evolutionary divergence into the classification as well (Bock 1974). That is, cladistic classifications allow only holophyletic and monophyletic taxa, while evolutionary classifications accept paraphyletic taxa as valid (Ashlock 1974, Cronquist 1987) because characters are differentially weighted as to their significance in the evolution of organisms (Mayr 1974). Thus, an evolutionary classification can reflect aspects of evolutionary phenomena or important structural innovations that are responsible for radiation in a group of organisms, while a strictly cladistic classification reflects only pattern of phyletic relationship.

While I ascribe to cladistic methods of phylogenetic analysis, I also accept a non-cladistic philosophy relating to derivation of classifications, particularly at the supra-generic level. Cronquist's (1987) views on this matter are a good approximation of mine. Hull's (1979:437) simple assessment sums up my conclusions, that "the cladists' rules for classifying are simple enough, but that the resulting classifications are not." Disney (1989) observed that "Paraphyletic taxa... are avoided on principle, but in practise one is always confronted by 'residual paraphyletic groups'." Thus, I have accepted what are evidently paraphyletic groups in the Donaciinae, partly because I am not able to resolve the relationships of all genera, or because some clades are not well defined. I do so because such a tribal classification is more useful in conveying information about the state of knowledge of the evolution of Donaciinae than would the lack of a tribal classification. This tribal classification also allows statements about the successive grades donaciines have achieved with respect to host plant use. Such statements would be confused by a more complicated higher classification. I suspect similar treatments in other groups of Chrysomelidae would result once they are analyzed, because much of evolution proceeds in grades of adaptation (see Erwin 1981, for example). It is my opinion that no strictly cladistic classification for most groups of chrysomelids could be manageable.

2.2.6. Species concept and criteria for ranking. I refer to three criteria that bear on what I consider the species of Donaciinae to represent. A structural component, a theoretical component, and a practical consideration, have some relevance to how I delimit the species I recognize, and I present each in this sequence.

Structural component.

The endophallus of series of specimens was examined to ascertain uniformity of structure among specimens collected at one location. Endophallic structure of these specimens was compared with that of specimens from other geographic locations to ascertain uniformity of structure among geographically divergent locations. Groups of specimens with the same endophallic character states were assumed to belong to the same, geographically broader, reproductively continuous species. Thus, endophallic similarity was used as the indicator of degree of genetic continuity among populations. It was inferred therefore that a group with distinctive endophallic structure is reproductively isolated from other groups, in the absence of evidence to the contrary. External structures were then examined to find other diagnostic characters that correlated with endophallic characters.

Presumably, the endophallus functions as a lock and key mechanism, but I make no attempt to rationalize the validity of such a presumption, for the theoretical claim remains unsubstantiated (Shapiro and Porter 1989). Competing theories exist, most recently the theory of "female choice" (Eberhard 1985). Regardless of theoretical considerations, I found that the endophallus offers the best, and geographically most uniform, characters for grouping of specimens. Therefore, I have come to consider that evolution of a distinct endophallus is paramount to speciation in members of this subfamily.

Theoretical component. My species concept is similar to that of most systematists, who typically cite Mayr (1963): a population or group of populations reproductively isolated from other such populations. However, I do not believe contemporary species-level taxa are likely to remain as presently distributed spatially. Populations that constitute the species will redistribute themselves eventually, and will have altered patterns of gene flow. These altered patterns are not necessarily predictable, but we can predict that certain climatic events will operate to influence the redistribution of populations. It may be plausible to propose that populations of a group of beetles are not rapidly evolving, as evidenced by low species diversity, limited structural diversity, or lack of complex patterns of variation among populations of some taxa. If this is so, we may need to suggest that evolutionary divergence is an unlikely event in such taxa, and that lineages can survive periods of isolation, only to introgress at some later time, and to result in panmixia. It remains, therefore, for the systematist to evaluate such potential as pertaining to the group of organisms in question. If such potential appears to exist, then strict adherence to the biological species concept is not tenable, and some other species concept is required.

I invoke an evolutionary species concept similar to that advocated by Wiley (1978, 1981), though I do so retrospectively, not a priori. I am induced to apply such a concept to donaciines, on the basis of several considerations. Delimitation of a species, especially in a geographical context, requires consideration of the organism's vagility (Erwin 1981). Brachypterous insects will, naturally, tend toward greater endemism, while insects which fly readily are more likely to be able to abandon habitats of declining suitability to locate newly-appearing suitable habitats, hence tend to introgression. Among Donaciinae, all species that I have observed, fly readily; many species of Plateumaris are the first to colonize new excavations filled with water, while some species of *Donacia* arrive later as their host plants also colonize. Perhaps for this reason, many species in both the Palaearctic and Nearctic regions are transcontinentally distributed.

Pleistocene glaciations have exerted perhaps the most recent and most profound influence on contemporaneous insect distribution. I see no reason to believe that glacial events will not recur; it is thus likely that disjunct populations produced by glacial advance may introgress as they are displaced, with resultant panmixia. For example, populations of *Neohaemonia flagellata* and *N. nigricornis* are rather isolated in the Western Cordillera from remaining populations in the east, but show no obvious, structural differences (Askevold 1988). On the other hand, the western *P. dubia* is almost identical to the eastern *P. metallica* in genitalic details, though showing many external structural differences. These populations, faced with future glacial advance, could conceivably respond in any of several ways: by extinction, dispersal to other areas southwards, or by introgression with their eastern counterparts in some areas, perhaps along compressed boreal habitats near glacial maxima. This example is not to imply that I intend to invoke glacial phenomena as the geologic event with which speciation events in *Plateumaris* are maximally correlated.

A decision not to recognize subspecific taxa, as done for *P. chalcea*, *P. neomexicana*, and *P. metallica* is a predictive statement about the possible geographic and evolutionary future of sibling lineages. Recognition of two or more subspecies taxa does not make any particularly useful statement in any of these taxa (*i.e.* *P. metallica* and *P. dubia*, *P. neomexicana*, and *P. chalcea*). In recognizing only a single species taxon for the latter two species, I hypothesize that the allopatric populations may introgress in the future, and therefore together effectively represent a single evolutionary lineage. For P. metallica and P. dubia, the hypothesis is that the two closely related vicariants have accumulated sufficient structural difference as to render them genetically distinct and reproductively incompatible.

Growing evidence summarized by Coope (1970,1979), in my opinion, supports a view for some Northern Hemisphere temperate beetles which does not suggest extinction as the commonest result of adverse conditions such as glaciation. This is a view which is almost required if persistence of species over long periods of geologic time is plausible; it is one which has become more common in systematic literature (e.g. Spanton 1988, Anderson 1987), and is proposed here also.

Practical component. One final consideration was made in assigning full species status in preference to subspecific status. It is my obervation, at least in the chrysomelid literature, that taxa listed as varieties or subspecies have tended to be treated as synonyms and become disregarded. Thus subspecific taxa tend to be lost rather than maintained. I think this is principally because such taxa were erected typologically in the past, rather than the result of careful and complete analysis of variation. I decided to assign P. dubia full species status to ensure a more prolonged recognition of the taxon.

2.2.7. Phylogenetic reconstruction. The principles of Hennig (1965,1966), which he called "Phylogenetic Systematics", have become integrated into modern systematics, and discussed at length by many authors (e.g. Kavanaugh 1972; Ashlock 1974; DeJong 1980; Wiley 1981). The term "Cladistics" has largely replaced Hennig's term; though often understood as synonymous, some workers prefer association with Hennig specifically (e.g. Schmitt 1989). These methods are simply the process of searching for characters, by comparison among a number of related taxa, that one would consider useful for cladistic analysis (phylogenetic reconstruction). All structures and their states are potential candidates for analysis, and one searches for certain of these characters and their states that exhibit patterns of transformation from one state to progressively derived states. Derived states (apomorphies) that are possessed by two or more taxa can often be considered shared (synapomorphies) by those taxa and indicative of their relative recency of ancestry.

Some aspects of cladistics have gained particular attention because of procedural difficulties. Most notable have been methods of polarization of characters and their states (i.e., outgroup analysis), and methods of character weighting as a tool for forcing computer programs to select particular patterns of grouping of taxa. The former subject and its attendant methods were discussed by DeJong (1980), Watrous and Wheeler (1981), and Maddison et al. (1984). Character weighting has received considerable attention [e.g. Neff (1986), Wheeler (1986)], and is reviewed most recently by Sharkey (1989). I discuss selection of out-group to Donaciinae in section 6.1.2.

I used two methods of reconstructing phylogenies (i.e. manual and computer-aided), and eventually selected a compromised result that was consistent both with certain a priori views about donaciine evolution, and to some extent with general parsimony; I did not take exception to Neff's (1986) advocating of a priori weighting as Sharkey (1989) did. Initially, I used a manual method based on first selecting principal characters that I thought were significant to partially resolve a tree and then added the remaining characters to more fully resolve this tree.

I also used PAUP [Phylogenetic Analysis Using Parsimony, Version 2.4.1 (Swofford, 1985)] to extensively test these reconstructions, to perform a progressive series of analyses that entailed recoding of incompatible characters (see below) that were found to be highly homoplastic (I use this adjectival form, cf. Clark, 1986); this series is detailed below.

The following method was used in PAUP-zanalysis of world species of Plateumaris. I constructed character matrices progressively: beginning with an original matrix (Table 2) and terminating with a more refined one (Table 3). The original matrix included all characters coded according to their principal states. I define the principal state as that which occurs in the majority of specimens in a taxon where such characters vary. The original matrix includes both states found in taxa, with non-principal states in parenthesis. For many characters it was decided a priori that the principal state must be a loss or reversal, and such characters were recoded to 1 (derived) in Table 3. Initial PAUP analysis, using SWAP=GLOBAL and MULPARS options, was performed. Characters that were found to be highly inconsistent (homoplastic) were re-examined, and recoded in one of two ways. If derived states occurred among unrelated taxa (=outgroup), the independently-occurring derived states were either recoded as "0" (if occurring in a single, phylogenetically isolated taxon), or they were recoded as separate, non-homologous characters, to derive a secondary matrix. This method was recycled several times to produce fewer trees with a higher consistency index.

Each sequential matrix was analyzed with characters that were unweighted initially and weighted subsequently. Characters were weighted as inversely proportional to number of incompatibilities with other characters. I did not think deriving complex "randomness ratios" to derive character weights was necessary (*cf*. LeQuesne 1969, Sharkey 1989). Sharkey (1989) used randomness ratios to rank characters of equal incompatibility, but I grouped characters according to the number of expressed incompatibilities, and ranked them from 1 to 9 in weight. Characters would have the same weight if they had the same number of incompatibilies.

Compatibility matrices were derived from each progressive character matrix by comparing each possible character-pair combination for compatibility. Among characters coded with a single derived state, four pair-wise combinations, 1-1, 0-0, 1-0 and 0-1 are possible. Incompatible characters are those for which all four of these pairwise combinations occur (LeQuesne 1969). There is no way to derive one taxon from the other with those characters without invoking homoplasy in one or both of the characters. Characters with multiple derived states were considered as a single state character for the purpose of compatibility.

Thus, PAUP analysis was performed on increasingly compatible characters, with homoplastic characters reconsidered at each stage. Coding of characters was rationalized in detail in both the character analysis and discussion of phylogeny.

2.2.8. Biogeographic methods. The method of Hennig for reconstruction of phylogeny became adopted rather quickly by workers as a tool for understanding organismic geographic history (*e.g.* Brundin 1966). Since then, the subject has gained increasing attention (*e.g.* Brundin 1972, Ball 1976, Platnick and Nelson 1978, Nelson and Platnick 1981, Humphries and Parenti 1986), and recently it was reviewed by Wiley (1988). The cladistic biogeographic method has become an integration of geologic and geographic data with hypotheses of phylogenetic history. The historical relationships of geographic areas should be reflected by the phylogenetic relationships of taxa that occur in these geographic areas. This school of biogeography is better known as vicariance biogeography because one of the most basic tenets of the method is the assumption of allopatric speciation. The methods used are more testable: hypotheses are formulated on the basis of available data, and the resulting interpretations invoke fewer ad hoc assumptions; such hypotheses are testable by data obtained subsequently, and can be modified accordingly. Fewer subordinate, unsubstantiated hypotheses are needed to explain biogeographic patterns by the vicariance method (as opposed to the dispersal method, which can explain any pattern as long as one is willing to accept a sufficient number of postulated dispersals).

Biogeography, in the form of reconstruction of geographic history, is an analysis of spatial relationships of taxa over the span of their geologic history, consisting of hypotheses about the way(s) and time(s) by which extant taxa have come to occupy the geographic regions they do today. Phylogenetic and biogeographic analyses can complement and TEST one another, if compared for level of congruency: if the geologic relationships (expressed cladistically) of geographic areas are congruent with the cladistic relationships of the taxa that occupy these geographic areas, then one can consider that each hypothesis is better substantiated.

3. STRUCTURES USED IN CLASSIFICATION OF DONACIINAE.

Here I outline briefly the characters, and their states, that I have found useful in classification of donaciines. The first two sections concerning male genitalic structure, and the third, concerning female genitalic structure, are descriptive; new terms proposed for donaciines are defined there. The fourth section is an outline and definition of the non-genitalic structures I have used, in alphabetical sequence.

Structure of external genitalia of males of Donaciinae was addressed by several authors (Mann and Crowson 1983a, Powell 1941, Harusawa 1985), but no author has examined this structure in most species in the subfamily. Below, I describe individual structures as they occur and vary among representative taxa and discusss their taxonomic utility.

Because male genitalic structure in donaciines is so important at all taxonomic levels, I discuss at length structure and polarization of character states. Sections dealing with genitalic structure take the form of description of characters followed by comparison among taxa and polarization of character states.

I hypothesize that the aedeagal structure and endophallic sclerite arrangement exhibited by males of Plateumaris is most primitive for extant Donaciinae. Crowson (1945:78) suggests the Sagrinae are the most basic group of Chrysomelidae, from which all others have arisen, directly or indirectly, and proposed Ametalla Hope as the taxon "annectant" to Donaciinae. Other sagrine genera also exhibit similarity to Plateumaris, notably Atalasis Lacordaire. In male genitalic structure (including endophallus), Atalasis is most similar to members of Plateumaris. Atalasis also possesses some secondary sexual characters found in donaciines: depressions of the venter and abdominal apex, and pygidial shape. My interpretation of donaciine phylogeny with respect to genitalia is therefore polarized with Plateumaris exhibiting the most plesiomorphic states, according to criteria of out-group analysis (Hennig 1966, DeJong 1980, Watrous and Wheeler 1981, Maddison *et al*. 1984, Kavanaugh 1972).

3.1. GENERAL AEDEAGAL STRUCTURE.

3.1.1. Median Lobe (Figs. 6-8). The median lobe of male specimens of Donaciinae is almost hemispherically curved. The large basal foramen is about one third the length of the median lobe, and the apical orifice is elongate and positioned dorsally. On the undersurface, the median lobe is covered typically with fine longitudinal striations. Several members of Plateumaris have a single median carina on the underside, while members of D. (Donacia) and D. (Cyphogaster) have the underside flattened or furrowed, compared to the more common cylindrical shape.

An angulation located ventrally at the posterior end of the basal foramen (ba, Fig. 8) is present in all members of Donaciinae except those of Plateumaris, Poecilocera, two species of Sominella (S. longicornis and S. macrocnemia), and Donaciasta. I suggest its absence is a primitive condition among Donaciinae, and that it was secondarily lost in members of Donaciasta (on the basis of character congruence). Such an angulation is also found in all Criocerinae examined, but it is different in general shape and prominence. While similar in appearance, I conclude the angulation is not homologous among donaciines and criocerines.

3.1.2. Tegmen (Figs. 6-8). The aedeagus (*sensu* Lindroth 1957a, Lindroth and Palmén 1956) consists of a median lobe and lateral parameres. The parameres in chrysomeloids are fused basally and distally, forming a ring around the median lobe. This state is retained (at least primitively) by the sagroid subfamilies of Chrysomelidae (*i*.*e*. Criocerinae, Sagrinae and Donaciinae). Sharp and Muir (1912) term this parameric structure the tegmen, composed of a ventral strut, and a dorsal cap. The strut provides attachment for muscles which enclose the basal foramen of the median lobe, and which, upon contraction, provide the hydrostatic pressure necessary for eversion of the endophallus during copulation ["basal pump" of Kingsolver (1970), "phallic bulb" of Mukerji and Bhuya (1937)]. The cap has a cluster of long setae around the apex. In members of Haemoniini, *Donaciasta*, *Donaciella*, and most *Donacia* and *Sominella*, the cap is long and uniformly slender. In members of *Plateumaris*, *Poecilocera*, and Sagrinae, it is broad, thickest basally, and tapering toward the apex. In some *D*. (*Donacia*) and *D*. (*Cyphogaster*) it is broad and thin. *Plateumaris* and *Poecilocera* exhibit the plesiomorphic condition among donaciines for the structure, which is bilobed apically in some specimens, as it is among those of Sagrinae. The tegmen of members of *Plateumaris* is not consistently emarginate or bilobed apically, this state occurring only in some specimens of some species.

Among criocerines examined, the tegmen is comprised only of the ventral strut portion, similar to alticines and galerucines; loss of the dorsal cap appears to be synapomorphic for Criocerinae.

3.2. INTERNAL SAC AND ENDOPHALLIC STRUCTURE (Figs. 4-6).

The internal sac is continuous with the median lobe's apical orifice; the sac may be almost as long as the median lobe. Most males of Chrysomelidae have an internal sac, which is largely membranous. In those of many groups of the family the membrane is provided with various teeth and denticles, as among the bruchids (Kingsolver 1970) or galerucines (Wilcox 1965, Silfverberg 1974, 1982). Other groups have sclerites as found in Cryptocephalinae [e.g. Cryptocephalus (White 1968)], Chrysomelinae [e.g. Phratora (Brown 1951, Mohr 1966)], Chlamisinae [e.g. Neochlamisus (Karren 1972)], or Eumolpinae (personal observation).

The term endophallus is generally considered synonymous with the internal sac by coleopterists (e.g. Lindroth 1957a), a use consistent with Torre-Bueno's (1978) definition. In Donaciinae, denticles, basal sclerites, setal brush, apical sclerites and sac membrane together comprise the internal sac or endophallus. I use the term endophallus most often in reference to donaciines, largely in reference to the apical sclerites, but the term is understood to comprise all internal sac structures.

Much of the internal sac membrane of donaciines is covered with fine denticles that are generally visible only under a compound microscope. Examination of these denticles was not a significant part of this study. I infer that as long as hydrostatic pressure in the median lobe is maintained, the denticles are pressed against the wall of the bursa copulatrix, and may prevent inadvertant release of the copulatory mechanism.

It is probable that the primitive coleopteran internal sac is entirely membranous; in many chrysomelids, this sac has undergone folding and selective sclerotization of these folds. This would at be least the interpretation I offer for donaciines. All donaciines share a common overall structure of the internal sac; males of various species differ in the shape and relative positions of sclerites, or in other parts of folds which are sclerotized additionally.

I have chosen, for brevity in discussion and description, to adopt the following abbreviations for the important endophallic structures: BSB - basal supporting block; ELD - endophallic lateral digit (ELDs, plural); MEG - median ejaculatory guide; PDS - paired dorsal sclerites; pELD - pseudo-ELD; SRF - subapical ring fold.

Bilateral symmetry of the endophallus is most evident in members of *Plateumaris* (Figs. 116-176). By comparison and by use of in-group and out-group methods and character congruence, I have concluded that members of *Plateumaris* have retained the most primitive, ground-plan endophallic structure and sclerite arrangement. Therefore, the primitive donaciine endophallus consists of a basal supporting block (BSB), paired dorsal sclerites (PDS), a pair of lateral, elongate sclerites (ELD), and a median curved sclerite (MEG) [possibly homologous with the "flagellum" of Sharp and Muir (1912) and subsequent authors], through which the ejaculatory duct passes. This last structure is sheathed with membrane which is continuous with the ELD and PDS, whereby all the sclerites appear to be held together. In most *Plateumaris* the ELDs articulate with the BSB, and can flex laterally, though the ELDs and BSB seem fused in a few taxa, such as *P. chalcea*, and are immoveable. *In situ* the ELDs enclose the MEG, but separate on eversion.

Members of *Plateumaris* deviate little from this basic organization. Any given sclerite is generally easily assigned to the appropriate structure. Members of other groups of Donaciinae have the arrangement and relative positions of these structures greatly modified, so that discrimination of sclerites is not always clear. Consequently, I have based sclerite identification and homology in other genera on their articulation with, or position relative to, the BSB.

3.2.1. Basal brush and sac-supporting sclerites (Figs. 4-6). Situated basally on the internal sac is a brush of setae. This is fairly obvious in members of most genera, but generally it is not visible unless the sac is everted. I can offer no explanation of function or taxonomic utility.

Flexible, sac-supporting sclerites are located basally on the sac, dorsally and laterally. The dorsal sclerite arises as a prolongation of the dorsal surface of the median lobe, originating from the dorsal margin of the apical orifice. It is elongate and apically bifurcated, folding at a subbasal point as the sac is retracted. In other chrysomelid groups, a sclerite in the same position has been variously called the "Klappe" (some German authors), "apical hood" (Powell 1941:152), "orificial plate" (Wilcox 1965:116), or it may be homologous with the "dorsal valve" of Kingsolver (1970:379). None of these terms adequately describes its function, which is inferred to be that of a flap, valve, or hood which seals the pseudolumen created when the sac is in repose. However, it likely also provides rigidity to the everted sac because, as in bruchids (Kingsolver 1970), the endophallus must penetrate the female vagina farther than does the median lobe.

Basolateral, sac-supporting sclerites occur on each side of the sac, of which the basalmost one articulates at the lateral margins of the apical orifice. As many as two or three serially arranged sclerites may be evident. I suspect they may be important in assisting correct folding of the sac as the endophallus is retracted. I did not find these sclerites to be of any classificatory significance. They are also present in the sagrines and criocerines examined, and I conclude their presence is synapomorphic for at least the sagroid subfamilies.

3.2.2. BSB (Basal Supporting Block) (Figs. 4-5). As a general rule, the BSB has the form of a somewhat flattened cylinder, variously curved and modified, according to species. I have not found character states of value at the generic level in this sclerite. It is located proximally on the endophallus (anatomically anterior), providing attachment for the retractor muscle and articulation for other sclerites. Among donaciines, there is only one retractor muscle which originates on the basal margin of the median lobe, inside the basal pump, and inserts on the base of the BSB. This is the same arrangement of the retractor muscle in Bruchidae (Kingsolver 1970:381), Sagrinae and Criocerinae, but unlike bruchids there are no intrinsic sac muscles in donaciines.

The ejaculatory duct passes through the BSB, and continues through the MEG. In many species the BSB consists of two parts of which one may be variously reduced or enlarged, and are separated by a more or less distinct suture.

Among the Sagrinae I examined (Table 5), a BSB appears to be absent (but they have apical and median sac slerites somewhat like those of donaciines). However, some figures of species of Sagra by Mann and Crowson (in preparation) show structures resembling the BSB found among Donaciinae. Among criocerines examined, a sclerite is present in some taxa in a position similar to that found in donaciines, but I have not examined enough taxa to make broad generalizations about Criocerinae. I hypothesize tentatively that presence of a BSB is synapomorphic, at least, for all Donaciinae.

3.2.3. ELD (Endophallic Lateral Digit) (plural, ELDs) (Figs. 4-5). The ELDs are a pair of elongated sclerites, which are variously curved and longitudinally folded, and in some taxa lobed laterally. It is most evident in members of *Plateumaris*, where it is ventrolateral in position, articulated at its base with the BSB apex. In criocerines and some sagrines examined, such a pair of sclerites is present, which appears to be homologous with that of donaciines. Thus I conclude presence of this sclerite is synapomorphic for the sagroid subfamilies.

In *Atalasis sagroides* the ELD is well developed, and similar to the arrangement found among members of *Plateumaris*. Among remaining sagrines examined, either no sac sclerites are present, or sclerites were not homologized with those found in donaciines and criocerines (see Table 5). Several criocerines examined possess a pair of sclerites similar in this arrangement. Therefore I suggest the condition found in males of *Plateumaris* is plesiomorphic for Donaciinae.

In most members of *Plateumaris* the ELD is folded once longitudinally, from near the apex to subbasally. A basal prolongation articulates with the BSB. In *P. neomexicana* (Schaeffer), *P. metallica* (Ahrens), and *P. dubia* (Schaeffer), each ELD has an internal tooth, which is not found in other species. The ELDs of *P. constricticollis* (Jacoby) and *P. rufa* (Say) have an external refolding, which is unique to members of this species group.

Among the Donaciini + Haemoniini, I suggest (*cf*. section 6.2, character #5) that the two ELDs shifted medially to enclose the MEG. In some members of *Sominella*, *Donaciella* and *D*. (*Donaciomima*) only the apices of the ELDs meet, basally articulating as they do in members of *Plateumaris*. In most members of *Donaciasta*, the ELDs are reduced greatly such that the median sclerite remains the MEG. In some taxa in which these sclerites cannot be distinguished, the MEG is evidently reduced (or possibly lost), such that the median sclerite has become the pair of contiguous ELDs. Evidently, homoplasy is involved, but I conclude for the present that such states represent reversals from the state I interpret as synapomorphic for Donaciini plus Haemoniini, because the basally separated condition occurs in such widely divergent taxa.

In the members of these two groups I hypothesize that the ELDs together form a curved tapering tube which resembles the MEG of *Plateumaris*, and possibly assumes its function, which I speculate to be supporting the ejaculatory duct. In members of *Neohaemonia* and *Macroplea* the ELDs are similarly contiguous, enclosing the MEG, but are also uniquely associated with the dorsal sclerites (PDS). In most members of *Donaciasta*, (exclusive of *D. assama*), the ELDs are shortened and inconspicuous, although the MEG is present and well developed.

3.2.4. pELD (pseudo-ELD) and SRF (subapical ring fold) (not figured). The SRF is a subapical telescoping of the sac, producing a circular fold from which the endophallus protrudes. It occurs among all Donaciinae examined, but it is not modified (*i.e.* protruding abnormally or sclerotized) in most taxa except for some mentioned below. It is therefore generally not a conspicuous structure and probably functions in retraction of the endophallus, but it is taxonomically useful because of modification in certain taxa (*e.g. P. germari*, *cf.* Fig. 124).

Cursory examination of the endophallus of members of *Neohaemonia* suggests possession of a lobe similar to an ELD, but which is not articulated with the BSB. Closer study suggests it is an extension (evagination) of the SRF, which I call the pELD (pseudo-ELD) (*cf.* Askevold 1988). Interestingly, the pELD is unique to *Neohaemonia*, absent in its probable sister genus *Macroplea*, with which it has been considered congeneric by many authors.

While modification of the SRF in males of Neohaemonia is a protrusion forming a pELD, modification in some members of D. (Cyphogaster) and D. (Donaciomima) consists of sclerotization of the sac invagination (SRF is a fold). An internal surface of the sac invagination may be sclerotized, which then also resembles the ELD, though it is very short. This is exhibited by Poecilocera harrisii (LeConte) ((Fig. 271), D. canadensis n. sp., D. limonia Schaeffer, D. semenowi Jacobson, and D. provosti Fairmaire.

3.2.5. MEG (Median Ejaculatory Guide). Lindroth and Palmén (1956:70) define the flagellum of Coleoptera as "a sclerotized terminal prolongation of the ejaculatory duct...". The flagellum of many chrysomelids is elongate, thin and greatly exceeds the median lobe in length. Among donaciines, no flagellum of this kind is evident, but there is a structure which I call MEG. The MEG is a curved tube through which the ejaculatory duct passes. Homology with the flagellum is uncertain because it seems that the MEG is a sclerotized evagination of the sac apex, that envelopes the ejaculatory duct apex. Therefore I do not think the term flagellum is applicable to this structure of donaciines. Mann and Crowson (in prep.) used the term flagellum to denote what I call the MEG.

A structure similar to the MEG of donaciines is present in many criocerines. However, it is present in only some of the sagrines examined (i.e. Atalasis and some Sagra). Presence of the MEG sclerite could be considered synapomorphic for the sagroid subfamilies (i.e. Sagrinae + Criocerinae + Donaciinae) but lost in some sagrines.

The MEG is curved upwards and most distinct in species of Plateumaris. It is less distinct in members of Neohaemonia, concealed but for its apex within a larger sclerotized structure (ELD + PDS). In some members of Donaciini and Haemoniini the MEG appears to have been lost. However, as mentioned above in discussion of the ELD, in a few members of Donaciini (_e.g._ _Sominella_, _Donaciella_) the ELDs are not contiguous at their bases, and the MEG is visible there. So, I infer that the MEG is merely enclosed by the ELDs, and is therefore not prominent in most taxa.

3.2.6. PDS (Paired Dorsal Sclerites) (Figs. 4-5). The PDS in most donaciines is a paired sclerotization of the dorsal part of the SRF. In members of _Plateumaris_, the two are fused together, and may be fused to the base of the MEG to form a single, curved sclerite. In many members of _Donacia_ there is no evidence of PDS, but where they are present they are separate and do not articulate with the fused ELDs. In members of Haemoniini the PDS is enlarged greatly; in most members of _Neohaemonia_, it exceeds the size of the ELDs, forming a large mass that fills the lumen of the median lobe.

3.3. FEMALE GENITALIC STRUCTURE.

Terms for female genitalic structures are adopted from Lindroth (1957a) and Tanner (1927), as follows: spiculum ventrale continuous with sternum VIII; segment IX of paired large ventral coxites, and dorsally of medially emarginate paraproct, continuous laterally with coxites; apical styli absent, but reduction to this state evidenced by tactile setae on apex of coxites (Mann and Crowson, 1983a). Bursa copulatrix of sheath type (Kasap and Crowson, 1980), with or without distinctive sclerites. Spermathecal duct opening into the bursa copulatrix adjacent to bursal sclerite(s) (if present). Askevold (1988) found bursal sclerites useful in taxonomy of _Neohaemonia_, but no such sclerites have been found in _Plateumaris_.

Most females of Donaciinae do not possess significant female genitalic characters, such as are common among many other subfamilies of Chrysomelidae (*e.g.* spermathecal duct structure and spermathecal shape). Some structures were found in members of *Neohaemonia*, *e.g.* bursal sclerites, shape of coxites, and small lip on apex of tergum VIII. While none of these were useful in members of *Plateumaris*, or in other genera, shape of tergum and sternum VIII was useful at the specific level in *Plateumaris*, and in some instances also at the species-group level. I refer to these two sclerites as the dorsal valve (=tergum VIII) and ventral valve (=sternum VIII) of the ovipositor.

All female specimens of *Plateumaris* examined had great sclerotization of both the dorsal and ventral valves. The ventral valve is apically acute, and serrated about the lateral apical margins. Serration may be very fine (usually) to very coarse (*P. germari*), though often worn in older specimens such that margins are smooth. In general shape, the ventral valve may be nearly parallel, slightly flared just before apex, or toothed in this position. The dorsal valve is shorter than the ventral valve in *Plateumaris*, and may be apically rounded, pointed, or emarginate; a finely incised suture-like line may be present medially, which may or may not extend to the apical margin.

Members of *Donaciella* also possess a sclerotized ventral valve, with the dorsal valve not so prominently hardened, similar to that found in *Plateumaris*. The valves of *Donaciella clavipes* and *D. pubicollis* are more similar to those of *Plateumaris* in shape and degree of sclerotization of the ventral valve, than are those of *D. tomentosa* and *D. cinerea*.

3.4. NON-GENITALIC STRUCTURES.

ANTEMEDIAN DEPRESSION. On an elytron, a depression in anterior half or third of disc, extending from 1st to 3rd stria, in the area just posterior to the last puncture of scutellar striole. In some taxa, this depression is very deep, oblique and extending to and sometimes confluent with a sulcus mesad of the humerus.

APICAL STERNUM. The last visible sternum of the abdomen, anatomically sternum VII.

BASAL SULCUS. Transverse sulcus basally on the pronotum, beginning before the posterior setiferous tubercles on each side, across the base of the disc.

CALLOSAL SULCUS. Arcuate sulcus that delimits the anterolateral callus of the pronotum.

CALLUS. A swelling or tubercle that is not setiferous. Callus as used here refers to swellings in several locations: on the vertex of the head, at the base of antennae, or on the pronotum, laterally either behind the anterior setiferous tubercle, or before the posterior setiferous tubercle. Any or all may be present. The anterolateral pronotal callus may be delimited internally by the callosal sulcus. The head calli may be delimited by sulci positioned along the midline, behind them, or between the eyes and calli.

FRONTAL GROOVE, or FRONTOCLYPEAL GROOVE. Some authors (e.g. Schmitt 1985) have considered presence of deep X-shaped furrows on the head synapomorphic for Criocerinae + Sagrinae. I consider these grooves as consisting of two parts, an intraocular \ /- or V-shaped portion, and ^-shaped frontoclypeal portion, which do not necessarily meet at their apices to form X-shaped furrows. The frontoclypeal groove, in which the frontoclypeal suture is imbedded, with the apex located between the antennal bases, is rather obvious among criocerines and sagrines because these taxa tend not to be as pubescent as donaciines. However, many donaciines also possess somewhat incised grooves, but these are concealed below the antennal sockets by pubescence. I consider the frontoclypeal groove synapomorphic for the sagroid subfamilies, a few taxa with extreme development and contiguity with well developed intraocular grooves (discussed below).

HYPOMERON. Inflexed sides of pronotum between the procoxal cavity and the dorsolateral declivity of the pronotal disc. This surface is variously sculptured or punctate, or with a broad area of pubescence. Sculpture (rugosity) is more or less longitudinal immediately above procoxal cavities, more punctured or microreticulate dorsally, and posteriorly, before the hind margin, the surface is generally dorsoventrally rugose.

MUCRO. A short immoveable projection that is not articulated yet is much like a normal spur, located on the anteroventral angle of the metatibial apex, directed in same plane as tibial axis. Donaciines do not possess an articulated metatibial spur. I adopt this term for use in donaciines, which is in use in literature on bruchids (e.g. Borowiec 1987).

OCCIPITAL SULCUS. A transverse sulcus extends across the occiput of many specimens, from side to side immediately behind the eyes, accentuated anteriorly by calli of the vertex. Not to be confused with intraocular sulcus or ocular grooves.

OCULAR GROOVE or INTRAOCULAR SULCUS. Sulcus inside medial margin of eyes, that curves behind the eyes; in most donaciines this is a broad, shallow and obscure furrow if present, but in most members of *Donaciasta*, it is narrow and deep, extending from antennal bases to behind the eyes, which I consider synapomorphic for the genus. In reference to that genus I have used the term intraocular sulcus.

Ocular grooves are the V-shaped dorsal portion of the "frontal grooves" of authors. These tend to be obscure, or very shallow in donaciines (except for specimens of *Donaciasta*). Among sagrines and criocerines these vary from being extremely well developed to effectively absent, contrary to claims of authors who have generally examined only taxa with extreme development. Because of this variation in development I find these grooves of little value in determining sagroid subfamily relationship. At best, grooves might be considered primitively present in sagroids, variously lost or reduced in many lineages, or even hyperdeveloped in others.

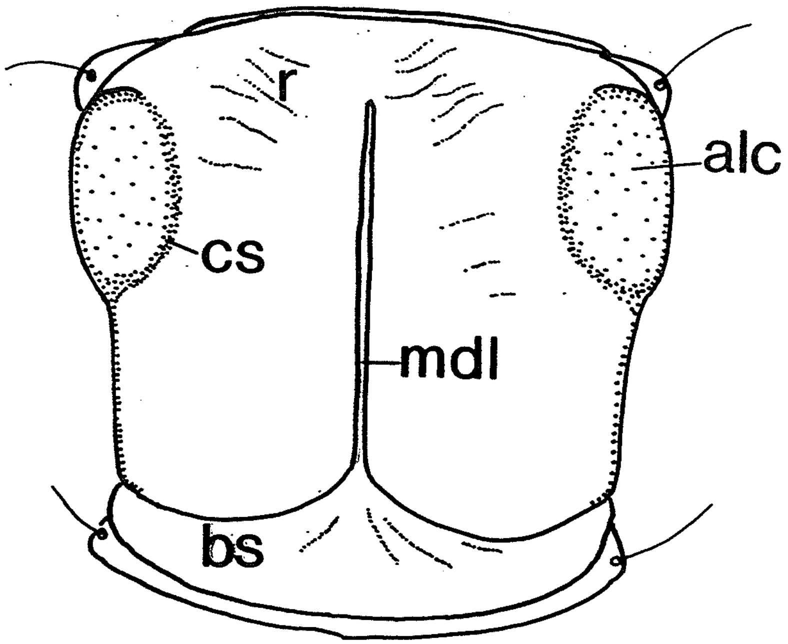
POSTMEDIAN DEPRESSION. On elytron, a depression in posterior half or third of elytra, about equidistant from the antemedian depression and apex, extending from 1st to 2nd or from 1st to 3rd stria.

RUGAE, RUGOSITY. Transverse, or more or less transverse, rugae of the cuticle occurring on elytron, pronotal disc and hypomeron, that are produced by confluence of punctures and/or punctulae. Rugulose is used to imply smaller dimension of such sculptural characters.

TIBIAL SPUR. Pro- and mesotibiae, but not the metatibiae, possess moveable spurs on their ventral apices. These are generally conspicuous and curved, and that of the mesotibia may even be as large as that of the protibia. These are not to be confused with apical tubercles (mucro and tibial tubercle, above) that is be present on the meso- and metatibiae of some taxa. The condition of single tibial spurs on these tibiae seems to be synapomorphic for Donaciinae. One interpretation of tibial spur state (1-1-0) is that the donaciine condition is derived from the groundplan 2-2-2 state of most criocerines. No sagrines examined have tibial spurs; therefore, if donaciines and/or criocerines were derived from a lineage of sagrines, then they should not have spurs. Alternatively, on the basis of tibial structure, it is more easily argued that sagrines are derived from some lineage of criocerines, by complete loss of tibial spurs from the 2-2-2 state typical of criocerines.

TIBIAL TUBERCLE. A short immoveable projection, on the ventroapical margin of the meso- and metatibiae of males only, among species of Plateumaris; it is located on the posteroventral angle, 90° around the tibia from the mucro, and is perpendicular to the tibial axis. It is distinguishable from the numerous small spines and setae only at high magnification in some species, or some specimens of some species. Considerable care must be taken to rotate specimens to see tibiae against a white background.

FIGURES 2-3. Head and prothorax structure of _Plateumaris_ species: **2**, pronotum of _Plateumaris_ _notmani_ (Schaeffer); **3**, head of _Plateumaris neomexicana_ (Schaeffer). ac = antennal calli; alc = anterolateral callus; bs = basal sulcus; cs = callosal sulcus; mdl = median line; os = occipital sulcus; ss = supraorbital setae; r = rugae; vt = vertexal calli.



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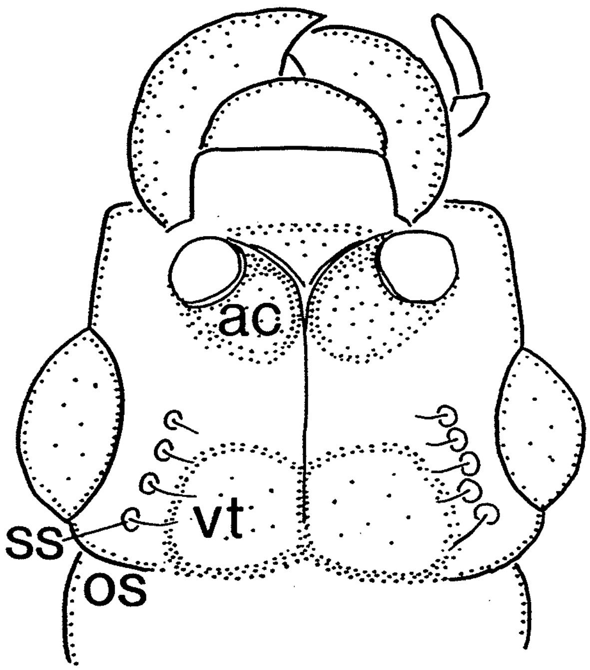
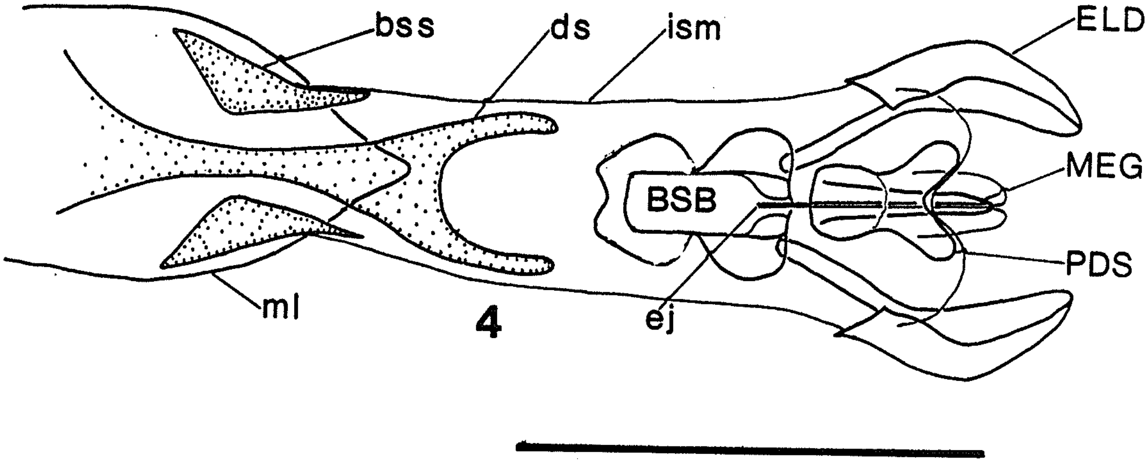


FIGURES 4-8. Male genitalia of representative Donaciinae. **4,5**, internal sac structure of *Plateumaris flavipes* (Kirby), dorsal view and lateral view (scale bar = 0.5 mm); **6-8.** (Scale bar = 1.0 mm). **6**, median lobe of *Plateumaris flavipes* (Kirby); **7**, median lobe of *Poecilocera harrisii* (LeConte); **8**, median lobe of *Donacia distincta* LeConte. aa = aedeagal apodeme; ap = apical part of BSB; ba = basal angle; bb = basal setal brush; bp = basal part of BSB; BSB = basal supporting block; bss = basolateral sac-supporting sclerites; c = cap of tegmen; ds = dorsal sac-supporting sclerite; ej = ejaculatory duct; ELD = endophallic lateral digit; ism = internal sac membrane; MEG = median ejaculatory guide; ml = median lobe; PDS = paired dorsal sclerites.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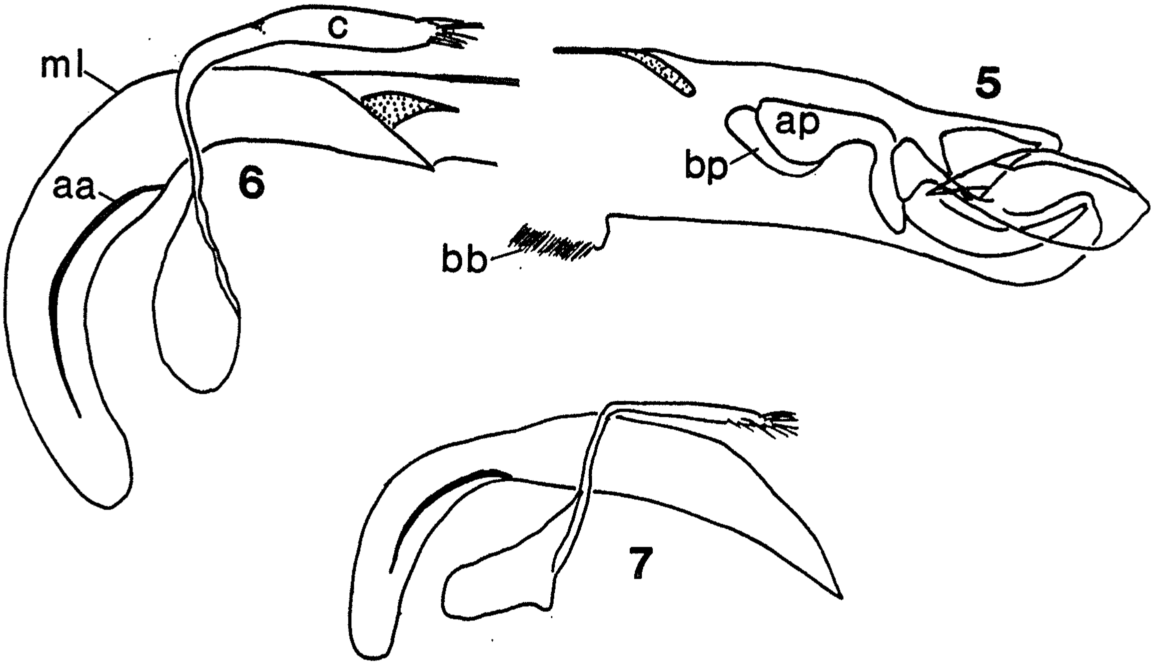
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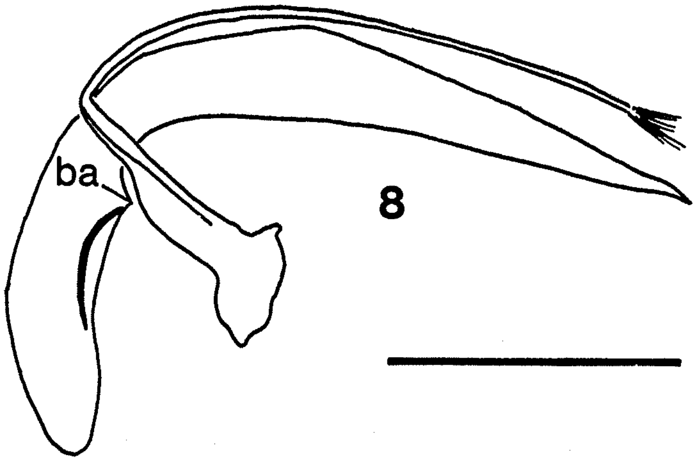
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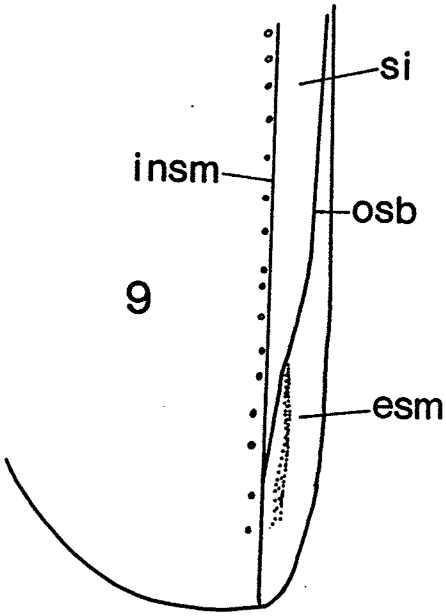
FIGURES 9-13. Elytral apices of some representative Donaciinae (most punctation omitted): **9**, Plateumaris rufa (Say); **10**, Poecilocera harrisii (LeConte); **11**, Sominella longicornis (Jacoby); **12**, Sominella macrocnemia (Fischer von Waldheim); **13**, Donacia (Donacia) texana Crotch. esm = explanate sutural margin; insm = inner sutural margin; osb = outer sutural bead; si = sutural interval; 1i = interval 1.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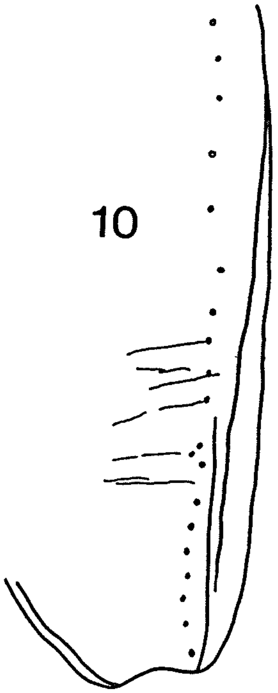
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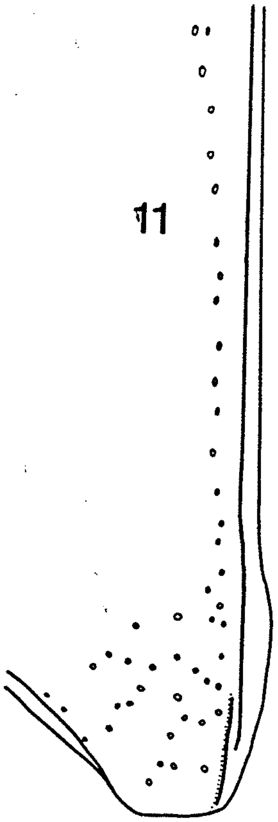
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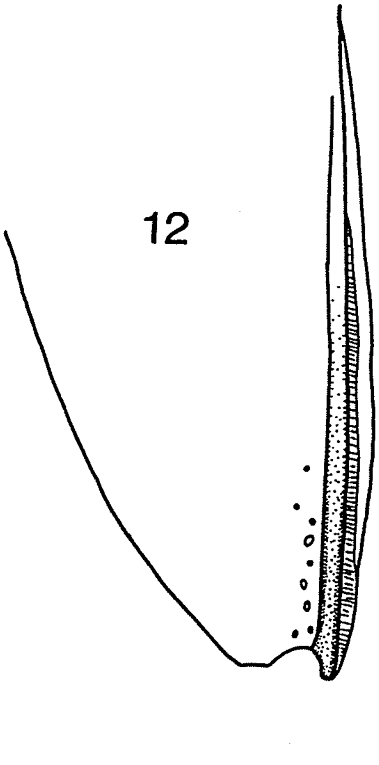
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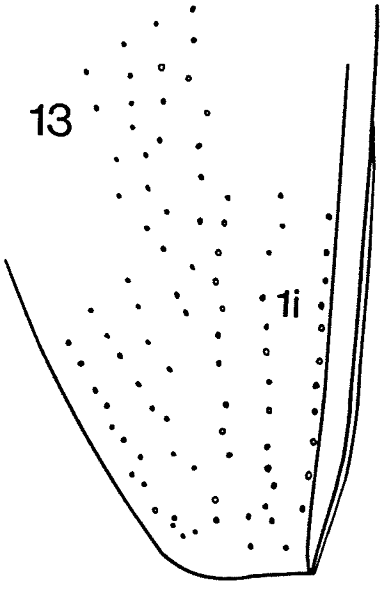
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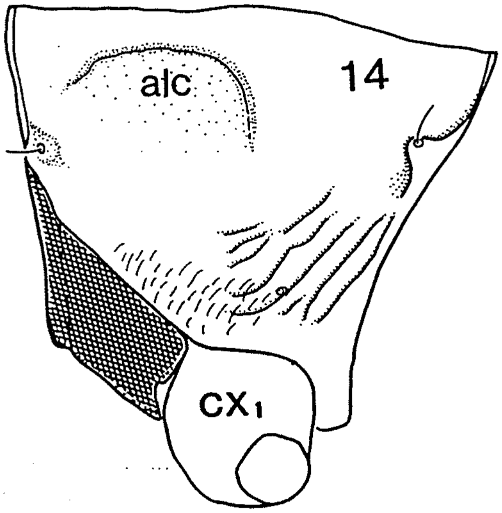
FIGURES 14-17. Pronotal hypomeron of representative Donaciinae: **14**, Poecilocera harrisii (LeConte); **15**, Sominella macrocnemia (Fischer von Waldheim); **16**, Sominella reticulata (Gyllenhal); **17**, Donacia (Donacia) texana Crotch; alc = anterolateral callus; cx1 = procoxa; r = rugae; crosshatching = dense pubescence.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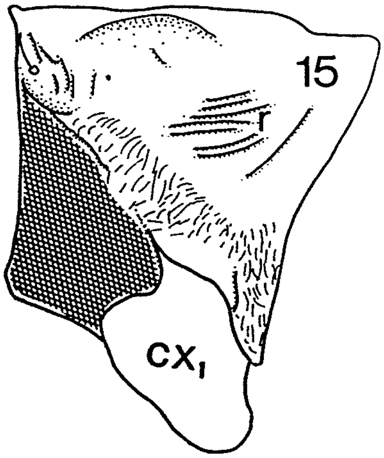
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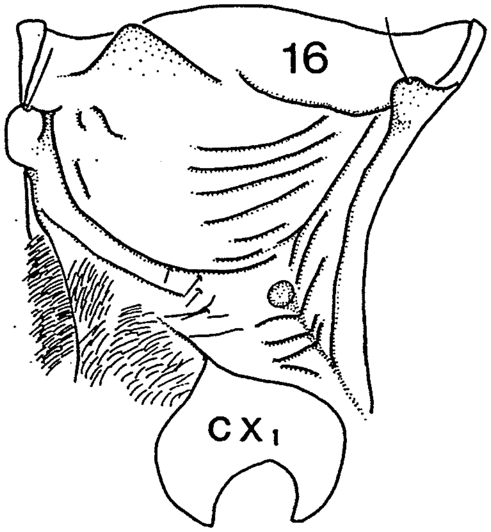
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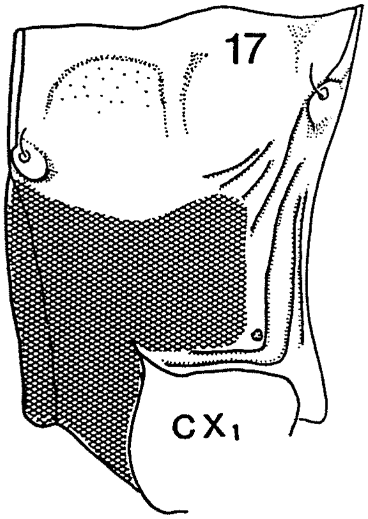
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4. CLASSIFICATION OF PLATEUMARIS.

Plateumaris Thomson, 1859.

Plateumaris Thomson (1859:154), Type species Donacia nigra Fabricius (=Prionus braccatus Scopoli), by original designation. Thomson (1866:105), Jacoby and Clavareau (1904:9), Clavareau (1913:28), Chen (1941:6), Monrós (1959:92), Goecke (1960a:8), Gressitt and Kimoto (1961:22), Jolivet (1970:48), Balsbaugh and Hays (1972:15), Bayer and Brockman (1975:223), Wilcox (1975:3), Seeno and Wilcox (1982:21), Mann and Crowson (1983a), Kimoto (1983:13), Borowiec (1984:450), Gruev and Tomov (1984:65).

Donacocia Gistel (1857:12), Type species Donacocia aenea Gistel (1857:12), by monotypy [probably = P. discolor (Panzer)]. Application submitted to ICZN. **REJECTED**

Juliusina Reitter (1920:41), Type species Prionus braccatus Scopoli, designation by Monrós (1959). **NEW SYNONYMY**

Euplateumaris Iablokoff-Khnzorian (1966:121), Type species Donacia sericea L., by original designation.

Donacia (Plateumaris): Crotch (1873:20), Schaeffer (1919:308, 1925:122), Beller and Hatch (1932:82), Mead (1938:118), Müller (1949-1953:259), Marx (1957:201), Goecke (1960b:164), Arnett (1968:904), Hatch (1971:169), Brigham (1982:12.123).

Donacia (pars): LeConte (1851:310), Crotch (1873:20), Leng (1891:163, Group D), Blatchley (1910:1099), Wilcox (1954:365).

Plateumaris (Juliusiana): Mohr (1966:108). **UNJUSTIFIED EMENDATION**

4.1. TAXONOMIC TREATMENT.

4.1.1. Type species designation. Almost all authors have cited 1866 as the date of original description of *Plateumaris* by Thomson, unaware that original description was in fact Thomson (1859), where he also stated "Typus *P. nigra* (FAB.)". Because of this oversight concerning correct date of authorship of *Plateumaris*, it became erroneously assumed that no designation of type species had been made. Reitter (1920) erected the subgenus *Juliusina*, but designated no type species for either this subgenus or the nominal subgenus *Plateumaris*. Chen's (1941) subsequent designation of *D. affinis* Kunze as type species for *Plateumaris* was therefore invalid; even Chen's designation was overlooked by later authors. Monrós (1959), unaware of Chen's (1941) designation, designated *Donacia geniculata* Thomson (=*D. discolor* Panzer) as type species for *Plateumaris s. str.*, and *Prionus braccatus* Scopoli for *Juliusina* Reitter. Iablokoff-Khnzorian (1966) then designated "*D. nigra* F. (=*braccata*)" as type species of *Plateumaris*, in apparent ignorance of both Monrós' (1959) and Chen's (1941) designations, and therefore placed *Juliusina* as a junior synonym of *Plateumaris* because both became based on the same nominal taxon. He then erected a new subgenus, *Euplateumaris*, and designated *D. sericea* L. as type species.

Jolivet (1970) followed the designations of Iablokoff-Khnzorian. Mann and Crowson (1983a) accepted Monrós' designations, and advocated acceptance of *Plateumaris s.str.* (=*Euplateumaris*) and *P.* (*Juliusina*) as the correct subgeneric classification of *Plateumaris*.

In view of the above discussion, then, *Juliusina* is a junior objective synonym of *Plateumaris*, because both are based on the same nominal taxon regardless of any type designations since Thomson's original (1859) designation for Plateumaris, and Monrós' designation for Juliusina is clearly valid. If any future subgeneric classification of the genus is found to be useful, the name Euplateumaris is available.

4.1.2. Taxonomic status of Plateumaris and its subgenera. The genus Plateumaris gained relatively early acceptance in European literature. North American authors have not followed consistently their lead, and instead have oscillated between use of this name at generic and subgeneric rank. As discussed above, some confusion over subgeneric nomenclature has persisted. No author has attempted to assess the validity of Plateumaris as a genus, nor to assess the validity of subgenera of Plateumaris. This is one of the objectives of this revision.

4.1.2.1. Generic Status of Plateumaris. Consideration of three criteria causes me to give Plateumaris full generic status. Firstly, Plateumaris is monophyletic, as defined by the synapomorphy of ovipositor structure (cf. section 6.2). Secondly, Plateumaris is the sister group to the remainder of Donaciinae; therefore, either all members of the subfamily belong to one genus or they represent several genera. I choose the latter. Neohaemonia is defined by at least 13 autapomorphies, Macroplea by nine, and Haemoniini by six autapomorphies (Askevold 1988). To deny Plateumaris as a genus would require denial that such other well-defined groups as these are valid too.

The third criterion is that the genus is a taxon that includes an array of members that have in common some structural, adaptive attributes that reflect an evolutionary event in the history of the group. My classification is a reflection of structural and adaptive progression among the genera, from primitive to derived groups. Such information would be less easily retrieved were no generic classification used.

4.1.2.2. Subgeneric Classification of *Plateumaris*. The nomenclature of subgeneric names is reviewed above. The two subgenera of *Plateumaris* were erected on the basis of characters that do not apply to all members assigned to them, or they are based on characters which are plesiomorphic. No author has assessed the character states of these structures among the taxa that have been assigned to the subgenera of *Plateumaris*. Reitter (1920) described (in the first couplet of his key to Palaearctic species of *Plateumaris*) the subgenus *Juliusina* as defined by possession of tibiae with prominent carinae, metafemora robust and with prominent tooth, and pronotum with disc pubescent and hypomeron differentiated. *Plateumaris* *s*. *str*. was characterized as possessing fewer and incomplete tibial carinae, clavate metafemora and less prominent tooth, and pronotum glabrous and with differentiated disc.

Reitter (1920) placed the species *P*. *discolor*, *P*. *sericea*, *P*. *annularis*, *P*. *obsoleta*, *P*. *amurensis* and *P*. *weisei* in *Plateumaris* *s*. *str*.; *P*. *braccata*, *P*. *affinis*, *P*. *consimilis*, *P*. *rustica*, *P*. *sulcifrons* and *P*. *mongolica* were placed in *P*. (*Juliusina*). Mohr (1966) and other authors also have used these structures to characterize these groups of species. Plesiomorphic and homoplastic characters do not by themselves invalidate a taxon, in this instance the subgenera of *Plateumaris*. However, the lack of a synapomorphy can. Below, I assess briefly the characters listed above, upon which subgenera of *Plateumaris* have been based.

Presence of tibial carinae is plesiomorphic because they are found in Sagrinae (and many other chrysomelids). They are more or less complete in *P. braccata* and *P. consimilis*, but not in *P. rustica*; other species that have been assigned to the group with *P. braccata* as type species do not possess tibial carinae other than the typical dorsal carina. It is probable that tibial carinae have been reduced or lost independently among many donaciines and within *Plateumaris*.

Differentiation of pronotal disc from the hypomeron is a character of punctation and sculpture. An undifferentiated hypomeron is merely one without coarse longitudinal rugae. Most species, except *P. braccata*, *P. consimilis* and *P. rustica*, possess coarse rugae, contrasting with the disc markedly. Some species, such as many of those here placed in the *P. pusilla*-Group, have a coarsely punctate to rugose hypomeron. Similar rugae also occur in other donaciines, and in sagrines, so the character is evidently plesiomorphic with losses or modifications occurring widely among donaciines.

Pronotal pubescence has also been used to characterize the same group of species. Indeed, several species, such as most specimens of *P. braccata* and *P. consimilis*, have rather evident discal setae. However, other species, notably *P. aurifer*, have a pubescent pronotum; further, most members of *Plateumaris* have very short, fine setae in most discal punctures, which are normally not easily distinguished with a light microscope but which are clearly visible with SEM (Figs. 212, 213, 216-220, 222, 228). Many sagrines and other donaciines have setae in pronotal punctures, and the character is evidently plesiomorphic and subject to homoplasy. These setae are merely long and therefore more visible in a few taxa, especially *P. aurifer* (Fig. 212).

Leg robustness and armature vary among members of the genus, and some species are sexually dimorphic. Plateumaris braccata, P. consimilis and P. rustica have rather robust metafemora that are basally broad; the metafemora therefore are less clavate than in many other species. However, such metafemoral shape also occurs in P. germari and P. diversa, and among all these species the character states vary considerably. Metafemoral armature is also a variable character, and the same group of species has been characterized by having a large metafemoral tooth. However, the tooth varies considerably among specimens of these species and is no more diagnostic in these species than in most other members of the genus. The clavate, toothed metafemur is typical of donaciines, sagrines, and even some criocerines, and is therefore plesiomorphic.

Thus, none of the characters traditionally used in recognizing subgenera are synapomorphic for any group of taxa within Plateumaris. The characters are useful in identification of specimens, but they are not useful for phylogenetic purposes. I have found no other significant characters that discriminate distinct groups of taxa. Therefore, I recognize no subgeneric taxa within Plateumaris.

4.1.3. Description of Plateumaris.

TYPE SPECIES: Donacia nigra Fabricius (=Prionus braccatus Scopoli), by original designation.

ETYMOLOGY. Not stated by Thomson; gender feminine. According to Jaeger (1955:98, 200) it is derived from the Greek words platys, meaning broad or flat, and eumaris, meaning a thick-soled Asiatic shoe or slipper; these may be in reference to the ovipositor of females of the genus, which is frequently exserted in preserved specimens. Schenkling (1922:92) gives a differing meaning for eumares (not eumaris): easily moveable, but I do not know to what this might refer.

DIAGNOSIS AND DESCRIPTION. Elytron with apex rounded, sutural interval sinuate near apex, broadly exposing the lower sutural margin; mandible with apical teeth approximate; hypomeron glabrous; mesosternum narrow between mesocoxae; head with eyes small and round, vertex virtually flat, not or only slightly raised, but swellings present between vertex and occiput in specimens of some taxa; females with acute, sclerotized ovipositor, ventral valve (= sternum VIII) minutely to coarsely serrate and glabrous beneath, dorsal valve (= tergum VIII) much shorter than ventral valve, thinner, and glabrous above; aedeagus with tegmen broad and robust at base, tapering to apex, median lobe without subbasal basal angulation; two ELDs of endophallus distinct, separated by distinct MEG; colour variously metallic above and below in most members (except some specimens of P. germari flavous, and P. braccata, P. rustica, and some P. consimilis blackish).

HOST PLANTS. The host plants are mostly members of Cyperaceae, but include some Juncaceae, Acorus calamus (Araceae) and Caltha palustris (Ranunculaceae).

DISTRIBUTION. Holarctic; widely distributed in North America, largely exclusive of the Great Plains and Arctic tundra, and restricted in the arid, southwestern U.S. to high elevations; Old World distribution not well known except for Japan and Europe.

4.1.4. Key to adults of North American members of Plateumaris.

1.a. MALE specimens: apical sternum with distinct broad depression at apex; basal abdominal sternum with medial oblong depression; pygidium broadly and distinctly truncate to deeply emarginate .. 19.

b. FEMALE specimens: apical sternum broadly rounded, without depression; basal abdominal sternum without medial depression; pygidium with apex rounded to deeply emarginate, or notched; spear blade-like acute ovipositor protruding from between pygidium and apical sternum of many specimens .... 2.

2.a.(1). FEMALES. Pygidium broadly rounded with an apical, median, hemispherical notch, this conspicuous and deep to small and concealed by pubescence (Figs. 18, 30, 32, 234) .... 3.

b. Pygidium broadly rounded (Fig. 232) or broadly emarginate, appearing bilobed, but not with small apical notch (*e.g.* Figs. 20, 22, 27, 28, 49, 51) .... 5.

3.a.(2) Pygidium with large apical hemispherical notch (Figs. 32, 234); metafemur with large triangular subapical ventral tooth in most specimens (Figs. 65, 236); appendages pale brown or rufous to entirely black or metallic, most specimens darkened to some degree .... *P. fulvipes* (Lacordaire).

b. Pygidium apically with small apical notch, notch concealed in some specimens by pubescence (Figs. 18, 30); metafemur with subapical tooth absent, to moderate if present, not so prominently triangular (Figs. 61, 77-79); appendages entirely testaceous, pale brown or pale reddish in most specimens, some specimens with antennomeres dark apically or with antenna and femur partly infuscate, very few specimens with appendages entirely dark .... 4.

4.a.(3) Pronotum almost entirely and uniformly finely pubescent, setae about as conspicuous as those of head and scutellum, median line indistinct or absent (Fig. 212); colour brilliant green, some specimens slightly coppery green; elytron with extremely dense rugosity (Fig. 240), specimens thus brilliant to the unaided eye; size smaller, 6.7 - 7.7 mm .... P. aurifer (LeConte).

b. Pronotum glabrous, median line of most specimens distinct though fine, disc more or less uniformly punctate and punctulate, or with very fine transverse rugulosity, some areas about midline obscurely alutaceous (Figs. 211, 213); colour green, red, blue, coppery; elytron with rugosity not so dense, not so brilliant in most specimens (Fig. 241); size larger, 8.23 - 9.27 mm .... P. flavipes (Kirby).

5.a.(2) Ventral valve of ovipositor with apical margins straight and convergent to acute apex, at lateral angles with small tooth (Figs. 177, 179, 238), dorsal valve triangularly emarginate (Figs. 178, 180, 238); pygidium of many specimens with conspicuous oval depression subapically each side of slightly raised midline, midline with punctures and setae absent or less dense than surrounding surface (Figs. 25, 57, 232), punctures of surface of most specimens widely separated and coarse (unlike venter); elytron with apical exposed explanate sutural margin reddish .... 6.

b. Ventral valve of ovipositor not abruptly angulate or toothed subapically, lateral apical margins rounded, dorsal valve rounded or pointed, not emarginate (Figs. 237, 239); pygidium flat or slightly convex, without depressions, and uniformly densely punctate and pubescent (similar to venter); elytron with apical exposed sutural margin of most specimens of same colour as elytral disc .... 7.

6.a.(5) Pronotum longitudinally more or less flat, with disc more or less uniformly and densely punctate, punctures in most specimens contiguous, in some specimens confluent and in form of more or less transverse irregular rugulosity over much of disc, punctures fine and sparse in posterior half, in some specimens indistinctly alutaceous; metafemur with base about as thick as apex, therefore appearing broad, not markedly clavate (Figs. 68-70), metatibia with mucro short, inconspicuous; elytron with L:W of most specimens greater than 3.60, not unusually declivous at apex, disc more or less uniformly reticulately rugose as well as punctulate; apical sternum narrow, broadly truncate; colour above metallic brown or coppery .... _P_. _diversa_ (Schaeffer).

b. Pronotum longitudinally distinctly convex, disc shiny, with surface between punctures punctulate, punctures not confluent or contiguous, disc not alutaceous; metafemur robustly clavate (Figs. 95-96), metatibia with mucro prominently prolonged, up to half length of basal metatarsomere (Fig. 97); elytron relatively short (L:W 3.29 - 4.37, mostly less than 3.60), distinctly declivous, disc shiny and punctulate, rugose at most only laterally and apically; apical sternum more or less triangular, apically slightly triangularly produced; colour above metallic reddish coppery, coppery, blue, green, purplish .... _P_. _rufa_ (Say).

7.a.(5) Metafemur basally broad, about as broad as at apex (Figs. 80-84); pronotum with median line absent, at most appearing suture-like in some specimens, disc more or less entirely alutaceous in most specimens (Figs. 217-218); ventral valve of ovipositor coarsely serrate and laterally broadly rounded (Fig. 183); pygidium broadly deeply emarginate (Fig. 37) .... _P_. _germari_ (Mannerheim).

b. Metafemur not so broad basally, more distinctly clavate; pronotum of most specimens with distinct median groove or line, this in some specimens deeply furrowed, disc of most specimens not alutaceous (except most female specimens of _P_. _nitida_ and some of _P_. _neomexicana_); ventral valve of ovipositor at most minutely serrulate, laterally broadly rounded or not; pygidium various, apically deeply and broadly emarginate to shallowly emarginate or broadly rounded to obtusely pointed .... 8.

8.a.(7) Elytra and pronotum multicoloured: sutural area and 1st interval golden greenish, extended also from apex to humerus, laterally including epipleuron and 9th interval, 2nd and 8th intervals grading into purplish red, remainder of disc purplish red; pronotum similarly banded with greenish and purplish red; antennal callus prominent and impunctate, not margined about antennal socket, frons deeply depressed behind .... _P_. _schaefferi_ Askevold.

b. Elytra and pronotum unicolourous (some specimens with explanate suture reddish, but not metallic); antennal callus margined or not above sockets, impunctate or punctate (most specimens), frons deeply depressed behind or not (most specimens) .... 9.

9.a.(8) Pygidium apically deeply and broadly emarginate (Figs. 20, 34 47); legs of most specimens entirely dark (metallic), with at most extreme base of each of femur, tibia and tarsus rufous, antenna of most specimens entirely dark (metallic), some specimens with only apical antennomeres rufous at least basally [some Oregon - Washington specimens of _P_. _nitida_, (_cf_. couplet 11a) with almost entirely rufous appendages, but then pronotal disc prominently alutaceous, shagreened, with punctures and punctulae distinct, and median line distinct, Figs. 227-228] .... 10.

b. Pygidium apically broadly rounded to obtusely pointed (e.g. Figs. 22, 27, 39-40, 49, 51, 54, 55), many specimens slightly emarginate (Figs. 47, 52); legs and antenna entirely dark (metallic or not) to entirely testaceous or rufous .... 12.

10.a.(9) Antenna bicoloured, basal antennomeres dark, apical antennomeres half to entirely rufous; antennal callus impunctate and shiny in most specimens, frons deeply depressed behind them, callus very prominent; pronotal disc with more or less sparse punctation, punctures of various sizes but shallow, anteriorly confluent in form of transverse rugae, disc shiny but otherwise smooth, median line deep, regular, narrow, extended to hind margin and evident across the deep basal sulcus in most specimens; colour dorsally metallic green; distributed in eastern North America along Atlantic coast, from New Brunswick to Virginia .... P. balli Askevold.

b. Antenna entirely dark in many specimens, or with underside of apical antennomeres reddish; antennal callus more or less half to entirely punctate, frons hardly depressed behind, callus not prominent; pronotal disc with or without distinct punctation, if with, then coarse punctures sparse and intervening surface alutaceous (various in distinctness), or whole disc more or less finely transversely rugulose and punctures indistinct, median line and basal sulcus not so deep; colour dorsally green, purple, violet, red, blue, coppery, and bronze .... 11.

11.a.(10,12) Pronotal disc of most specimens entirely distinctly alutaceous, to shagreened, between distinct sparse coarse punctures, in some specimens shagreening or microsculpture evident only narrowly about midline, discal area more or less flat or slightly convex from side to side (Figs. 227-228); pygidium shallowly emarginate in most specimens, moderately in some, bilobed in appearance; metafemur with subapical tooth relatively small, but acute, not set off from ventro-lateral surface of femur (Figs. 85-86) .... _P_. _nitida_ (Germar).

b. Pronotal disc not alutaceous or shagreened in most specimens, punctures not very distinct or coarse, surface exclusive of midline more or less transversely rugulose, midline longitudinally and more coarsely rugose, medial area of disc longitudinally depressed, disc therefore concave, in most specimens (Fig. 230); pygidium deeply emarginate in most specimens; metafemur with tooth broad, blade-like, triangular and acute, set off from lateral surface by constriction (Figs. 73-74, 236) .... _P_. _frosti_ (Schaeffer).

12.a.(9) Pronotum with disc uniformly alutaceous to shagreened between sparse coarse punctures (Figs. 227-228); pygidium slightly to moderately emarginate (Fig. 47) .... (return to) 11.a.

b. Without above combination of character states: pronotal disc not alutaceous (except some _P_. _neomexicana_), at most with slight and obscure alutaceousness that does not cover entire disc, sparsely to densely, finely to coarsely punctate, dull to shiny, smooth to rugose; pygidium shallowly emarginate to rounded or pointed, ... 13.

13.a.(12) Pygidium apically broadly and evenly rounded to slightly emarginate (Figs. 49, 51-52, 54); ventral valve of ovipositor subapically broadly rounded, curving to apex (Figs. 189, 191, 206, 237); legs varying in colour and metafemoral tooth size, entirely dark and metafemur with large distinct tooth (Figs. 87-88), or entirely rufous and metafemur with small but distinct tooth (Fig.

91), or with apical half of femur metallic (Fig. 89) (except some California - Oregon specimens of P. pusilla, cf. couplet 15.b) . 14.

b. Pygidium apically broadly and obtusely pointed, in outline not uniformly rounded or slightly emarginate (Figs. 22, 27, 39, 40, 43, 44); ventral valve of ovipositor more slender, not subapically widened and broadly rounded, more uniformly tapering to apex (Figs. 181, 195, 197, 199, 239); legs entirely rufous to entirely metallic, if femur entirely metallic, metafemoral tooth small to absent (Figs. 66, 67, 71, 72, 75, 76), otherwise metafemoral tooth varying from absent to large (Figs. 63, 64) .... 16.

14.a.(13) Legs entirely dark or metallic, metafemoral tooth of most specimens moderate and triangular (Fig. 87); antenna of most specimens entirely dark; ovipositor with ventral valve relatively narrow at subapical broadest point (width 0.47 - 0.52 mm) (Fig. 206), dorsal valve rounded apically; pronotum with punctation relatively sparse, forming some transverse or longitudinal (about midline area) rugosity, basal sulcus deep, well developed (Fig. 2), hypomeron with few very coarse longitudinal rugae; elytron with disc shiny, intervals punctulate, with few transverse rugae, these more numerous apically .... P. notmani (Schaeffer).

b. Legs rufous with at most apical half of femur metallic, metafemoral tooth small but acute, not prominent (Figs. 89-92); antenna with basal half of antennomeres rufous; ovipositor with ventral valve broader subapically, about 0.61 - 0.75 mm wide, dorsal valve pointed apically in most specimens (Figs. 190, 192, 237); pronotum with punctation dense and coarse in most specimens, punctures contiguous but not forming rugae, disc not shiny, median line in most specimens not very deep or regular, basal sulcus not deep or sharply defined, hypomeron moderately to finely rugose, or largely confusedly punctate; elytron with entire surface more or less uniformly irregularly rugose between strial punctures, punctulate or not on rugae .... 15.

15.a.(14) All femora entirely rufous in most specimens, at most with small subapical infuscation, meso- and metatibia flared at apex (Figs. 91-94); antennomeres 2 and 3 in most specimens equal in length, these each hardly longer than width at apex; dorsal valve of ovipositor with distinct median groove reaching apex (Figs. 192, 237); distribution mostly only in central Prairie Provinces and States, also arid interior of Washington and British Columbia .... P. robusta (Schaeffer).

b. All femora with apical half metallic in most specimens, metallic band sharply defined from about midlength, completely encircling the apex (Figs. 89, 90) (some specimens from San Francisco area north to southern Oregon with femur entirely rufous, to slightly infuscated apically, or normal as above; most such specimens with pronotal disc finely but perceptibly pubescent), meso- and metatibia straight to apex, of more or less uniform thickness; antennomere 3 slightly longer than 2 in most specimens; dorsal valve of ovipositor with fine median line not nearly reaching apex (Fig. 190); distribution transcontinental, largely exclusive of prairies... P. pusilla (Say).

16.a.(13) Most specimens with: metafemoral tooth large, acute (Figs. 63, 236), legs entirely rufous; antenna entirely rufous; pronotum with median line broad, deep, precisely defined, basal and callosal sulci well-defined, disc shiny, irregularly punctured (sparsely) and punctulate (more densely), in form of transverse rugae (Figs. 1, 224); hypomeron with coarse longitudinal rugae that markedly contrast discal sculpture. Specimens from southeast U.S.A. (Alabama and Florida) are different in these character states: pronotal disc and hypomeron uniformly closely and coarsely punctured, median line and basal and callosal sulci less deep and regular, elytral disc more or less reticulately rugose, antenna largely infuscated, size larger, length more than 6.32 mm Host plants _Acorus_ _calamus_ and possibly Cyperaceae, but adventitious records include most aquatic vascular plants .... _P_. _chalcea_ (Lacordaire).

b. Metafemoral tooth absent to small and inconspicuous (Figs. 66, 67, 71, 72, 75, 76), legs and antenna entirely rufous to entirely metallic; pronotum with median line deep and irregularly defined to narrow and shallow, to virtually absent, callosal and basal sulci varying from well defined and prominent to not very deep, discal sculpture varying from smooth and distinctly punctulate to entirely rugulose or rugose (these western specimens), or alutaceous and punctate (western specimens), hypomeron with or without longitudinal rugae, contrasting discal sculpture or not. (If specimens from Florida-Alabama, then character states as in couplet 17.a). Host plants Cyperaceae, not _Acorus_ .... 17.

17.a.(16) Specimens from eastern North America, east of Great Plains, from Florida north and west to Minnesota. Pronotum with disc either side of midline shiny, more sparsely punctate than elsewhere, callosal sulci relatively slightly indicated, median line relatively finely and narrowly incised (Fig. 223) ...... _P_. _metallica_ (Ahrens).

b. Specimens from west of Great Plains, New Mexico north to Alberta and British Columbia. Pronotum with disc uniformly punctured and/or sculptured, not shinier or less punctured either side of midline than elsewhere, callosal sulci rather deeply impressed in most specimens, calli therefore prominent, median line variable, from deep and broad to nearly absent .... 18.

18.a.(17) Most specimens with legs and antenna entirely dark or metallic, at most very base of femur, tibia, and antennomeres rufous; pronotum with disc more or less shiny and coarsely to finely transversely rugose, not much longer than broad across calli (L:W ratio across calli 0.96 - 1.09) (Fig. 222); some specimens not distinguishable without accompanying males ... P. dubia (Schaeffer).

b. Most specimens with legs rufous except femur with subapical dark or metallic band (Figs. 75, 76), antennomeres half to entirely rufous (but see below); pronotal shape varying, most specimens (except Arizona - New Mexico) markedly longer than broad across calli (L:W ratio 0.98 - 1.23), and with discal sculpture varying: northern specimens (Washington - British Columbia) with disc more or less transversely rugose but shiny, median line and basal sulcus in these deep and more or less regular (Fig. 220), many California specimens and those from Arizona and New Mexico with disc coarsely punctured, spaces between finely rugose to shagreened, therefore not shiny, median line and basal sulcus irregular to obscured (Fig. 219), many of these with legs and antenna darker, even entirely dark in many Utah and Idaho specimens, or entirely rufous in California, Arizona and New Mexico specimens; some specimens inseparable without accompanying males ....P. neomexicana (Schaeffer).

19.a.(1) MALES. Specimens with pronotum almost entirely uniformly pubescent, the setae about as conspicuous as those of head and scutellum, even antennal callus finely pubescent (Fig. 212); colour brilliant green, some specimens slightly coppery green; elytral intervals with dense transverse (to oblique) rugae connecting strial punctures (Fig. 240); legs and antenna (except in some specimens antennomere apices) entirely testaceous ...... P. aurifer (LeConte).

b. Specimens with pronotal disc and many also with antennal callus glabrous, at least antennal callus not so prominently and densely pubescent; colours green or otherwise; elytron with intervals on disc punctulate and smooth (Fig. 242), or rugose and punctulate (Figs. 243-245); legs and antenna entirely testaceous or rufous to entirely infuscate or metallic .... 20.

20.a.(19) Elytra and pronotum multicoloured: sutural area and 1st interval golden greenish, this extended from apex to humerus, laterally including epipleuron and 9th interval, 2nd and 8th intervals grading into purplish red, the remainder of disc purplish red; pronotum similarly banded with greenish and purplish red; antennal callus very prominent and impunctate, not margined about antennal sockets, and deeply depressed behind .... P. schaefferi Askevold.

b. Elytra and pronotum unicolourous (some specimens with explanate suture reddish, but this not metallic); antennal callus margined or not above sockets, impunctate or punctate (most specimens), deeply depressed behind or not (most specimens) .... 21.

21.a.(20) Elytron with explanate sutural margin toward apex rufous, contrasting rest of elytral surface (but cf. some specimens of P.

metallica, couplet 26, some P. robusta, couplet 32, and some P. germari, couplet 24); pygidial apex more or less truncate, at most very shallowly emarginate and broadly so (Figs. 26, 58); pronotum with callosal sulci more or less obliterated in most specimens (Fig. 225) (many specimens of P. metallica also, cf. couplet 26, but metafemur not broad at base) .... 22.

b. Specimens without preceding combination: elytron with explanate sutural margin more or less concolourous with elytral disc, not rufous in most specimens; in most specimens metafemur not so broad at base (but cf. couplet 24, P. diversa and P. germari), therefore more or less clavate; pygidial apex truncate to deeply emarginate (e.g. Figs. 21, 23, 24, 31, 35 36, 38, 50, 55, 56,); pronotum with callosal sulci obliterated (Fig. 225) to deep and prominent (Fig. 224) .... 23.

22.a.(21) Elytron smooth and shiny, intervals sparsely punctulate in most specimens (Fig. 242), hardly rugose, in shape short and robust, markedly declivous (L:W ratio across humerus 3.29 - 4.37, mostly less than 3.60); metafemur extremely robust and nearly oval (Figs. 95-96); pronotal disc of most specimens very shiny with scattered coarse punctures, punctulate or not between, median line fine, regular, distinct in most specimens, basal sulcus distinct and deep, hypomeron with longitudinal coarse rugae over most of surface, contrasting disc (Figs. 225-226); colours dorsally coppery or reddish coppery in most specimens, blue, green or purple in some specimens; (some specimens of P. metallica may key here, but these with apical half or more of femur metallic, tooth absent or small, and mesotibia without tubercle, cf. couplet 26) ..... P. rufa (Say).

b. Elytron not shiny, intervals densely punctulate and coarsely rugose over most of disc, not so robust and declivous in shape; metafemur robust but not oval, basally very broad, therefore lateral surface somewhat flat (Figs. 68-70); pronotal disc more or less densely and irregularly coarsely punctate, punctures contiguous to confluent over much of disc, some areas of disc slightly alutaceous in some specimens, median line obscure to absent, basal sulcus shallow, hypomeron with only a few coarse rugae, surface irregularly punctured toward dorsum, not markedly contrasting disc; colours dorsally coppery or brownish-coppery .... P. diversa (Schaeffer).

23.a.(21) Metafemur broad at base, about as broad as apex, lateral surface rather flat in most specimens (Figs. 68-70, 80-84); pronotum with median line obscured to absent; legs and antenna testaceous or rufous to black, in some specimens with obscure metallic sheen; meso- and metatibial tubercle prominent, easily visible despite surrounding pubescence .... 24.

b. Metafemur more slender at base, shape more clavate, lateral surface more or less uniformly convex (Figs. 62-67,71, 72, 75, 76, 85-94); pronotum with median line obscured to fine, or coarse and conspicuous; appendages testaceous to rufous or dark, but then in most specimens distinctly metallic; meso- and metatibial tubercle small and obscured by pubescence in most specimens, or mesotibial one absent, or both absent .... 25.

24.a.(23) Pygidium deeply emarginate (Fig. 38); pronotum with median line absent, at most indicated by fine suture line, disc variously punctured, most specimens sparsely, surface between coarsely alutaceous, even shagreened, in most specimens, disc more or less flat about midline (Figs. 217-218); endophallus with ELD slender and elongate, with PDS elongately triangular and tapered, fused with MEG to form long C-shaped structure (Figs. 124, 125) .... *P. germari* (Mannerheim).

b. Pygidium apically truncate to shallowly emarginate (Fig. 26); pronotum with median line obscured by punctation, to fine, the disc more or less shallowly furrowed medially, punctation coarse and dense, contiguous to irregularly confluent, some specimens with surface alutaceous where punctures sparse; endophallus with ELDs broader, more robust, with external lobe (Figs. 118, 119) .... *P. diversa* (Schaeffer).

25.a.(23) Pygidium with apex subtruncate to clearly truncate with small median sinuation (*e.g.* Figs. 28, 29); metafemoral tooth small to absent (Figs. 66, 67, 71, 72, 75, 76); mesotibia without tubercle, that of metatibia small; ELD of endophallus with tooth at base (Figs. 134-139) .... 26.

b. Pygidium with apex deeply to shallowly emarginate, subtruncate or truncate (Figs. 21, 23, 24, 31, 33, 35, 36, 48, 50, 53, 56), but if truncate then femur with large tooth; metafemur of most specimens distinctly toothed (but *cf.* Florida - Alabama specimens of *P. chalcea* and some *P. flavipes*); meso- and metatibia of most specimens with tubercle (but *cf.* *P. notmani* and some specimens of *P. chalcea*), though small in some taxa (*i.e.* *P. robusta*, *P. pusilla*); ELD of endophallus without tooth at base .... 28.

26.a. (25) Specimens from eastern North America, Florida to Quebec, west to Minnesota, hardly exceeding the Mississippi River; tibia, pygidium and femoral bases rufous; pronotal disc swollen each side of midline, there more sparsely punctured, therefore more shiny over broad area either side of midline, and calli not prominently delimited by sulci (Fig. 223) (very similar to _P_. _rufa_) .... _P_. _metallica_ (Ahrens).

b. Specimens from western North America, New Mexico to California north to Alberta and British Columbia; legs entirely rufous to entirely dark; pronotum of various punctation and microsculpture, but disc without swollen shiny areas each side of median line, and calli more or less prominently delimited by arcuate sulcus (Figs. 219-222) .... 27.

27.a.(26) Legs and antennomeres of most specimens entirely dark, with slight reddish areas basally on each article in most specimens; pronotum relatively quadrate, L:W ratio across calli 0.96 - 1.09, discal sculpture of irregular transverse rugae, punctation therefore indistinct (Fig. 222); endophallus with PDS and BSB more or less horizontal, PDS broadly oval and deeply notched, and BSB with basal part prominent (Figs. 134, 135); distribution generally more inland and centred more in the Pacific Northwest .... _P_. _dubia_ (Schaeffer).

b. Legs and antennomeres of specimens of largest part of distribution largely reddish (Figs. 75, 76), but entirely dark in specimens from Utah and Idaho, entirely reddish in many New Mexico - Arizona specimens; pronotum relatively long in most specimens, L:W ratio across calli 0.98 - 1.23, disc of variable sculpture, northern specimens (BC) with coarse, irregularly transverse rugae and indistinct punctation (Fig. 220), grading geographically southwards to distinctly punctate with fine, dense rugulae, to distinctly and very coarsely punctured with surface between alutaceous (many from

California) to very coarsely shagreened (New Mexico, Arizona) (Fig. 219); endophallus with PDS and BSB oblique (lateral view), PDS more or less triangular, and BSB of only one part (Figs. 136, 137); wider in distribution in the southwest U.S.A., but restricted rather coastally from California to British Columbia
.... P. neomexicana (Schaeffer).

28.a.(25) Legs and antennomeres entirely dark or metallic, some specimens with tarsus, antennal apex, and extreme base of tibia and femur rufous .... 29.

b. Legs and antennomeres from entirely rufous or testaceous to with apical ½ to ⅓ of femur metallic (cf. P. pusilla), or appendages with varyious amounts of infuscation (cf. P. chalcea, P. flavipes, P. fulvipes) .... 32.

29.a.(28) Pygidial apex subtruncate, only very shallowly and broadly emarginate (Fig. 50); meso- and metatibia without tubercle; endophallus with PDS apically notched, not concealed in large membranous lobes, and BSB with small basal part (Figs. 144, 145)
.... P. notmani (Schaeffer).

b. Pygidial apex distinctly and deeply emarginate; meso- and metatibia each with tubercle; endophallus with PDS not so notched apically, but concealed in large membranous lobes, BSB with basal part lacking or nearly as long as apical part (Figs. 132, 133, 140-143) ..... 30.

30.a.(29) Antennal callus rather prominent, deeply depressed behind; pronotum with hypomeron coarsely longitudinally rugose over whole surface; all known specimens green; endophallus with BSB elongate, of two nearly equal parts (Figs. 132, 133) ..... P. balli Askevold.

b. Antennal callus not so prominent, vertex not distinctly and deeply depressed behind; pronotum with hypomeron at most rather finely rugose; specimens red, coppery, blue, purple, violet, as well as green; BSB of endophallus short, of 1 piece (Figs. 140-143) .... 31.

31.a.(30) Metafemur with tooth broad and triangular, constricted along base of tooth to make tooth very slender in X-section (Figs. 73, 236); pronotum medially broadly furrowed about midline, each side of disc therefore more or less swollen, areas about midline without alutaceous microsculpture (Fig. 230); endophallus with PDS extended as far as membranous lobes, ELDs shorter and robust (Figs. 142, 143) .... _P_. _frosti_ (Schaeffer).

b. Metafemur with tooth moderate but not prominently set off from femur, not so slender in X-section (Figs. 85, 86); pronotum medially not broadly furrowed, most specimens with disc more or less evenly flat, in many specimens area immediately near midline with slight alutaceousness and scattered coarse punctation that resembles female specimens (Fig. 227); endophallus with PDS shorter in relation to membranous lobes, ELDs narrow and elongate (Figs. 140, 141); see also Couplet 34.a .... _P_. _nitida_ (Germar) (in part).

32.a.(28) Meso- and metatibia distinctly flared just at apex (Figs. 93, 94); legs entirely rufous, femur and tarsus at most with small areas of infuscation in only a few specimens; antennomeres 2 and 3 short and equal in length in most specimens, or 3 slightly longer, antennomeres each rufous in about basal half; distributed mostly in central Prairie Provinces and States .... _P_. _robusta_ (Schaeffer).

b. Meso- and metatibia of more or less uniform width to apex; legs entirely rufous to entirely infuscated or with only apical half of femur metallic; antennomere 3 slightly to much longer than 2, antenna entirely rufous to entirely infuscate or metallic, or each antennomere with basal half rufous (cf. P. pusilla); distribution largely exclusive of prairie areas of central Prairie Provinces and States .... 33.

33.a.(32) Pygidium truncate apically (Figs. 23, 24); pronotum with disc more or less shiny, sparsely punctured and punctulate, with more or less transverse coarse rugae median line deep, wide and regular (typically Figs. 1, 224), hypomeron with coarse longitudinal rugae (e.g. Figs. 221, 226); elytron shiny and sparsely punctulate (Fig. 242), with few transverse rugae; [specimens from southeast U.S.A. (Florida - Alabama) with pronotum coarsely and closely punctured, median line not deep, callosal sulci not deep, elytral disc rugose, not shiny as above]; endophallus as in Figs. 120, 121 .... P. chalcea (Lacordaire).

b. Pygidium subtruncate (very shallowly emarginate) to deeply emarginate (Figs. 31, 33, 48, 52, 53); pronotum with disc more or less uniformly densely punctured and punctulate to extremely finely rugose or alutaceous, not shiny, median line irregular and indistinct, not broad or deep, hypomeron finely rugose to densely punctate; elytral disc of most specimens not so shiny, surface more densely punctulate and most of surface coarsely rugose, especially laterally and apically .... 34.

34.a.(33) Pronotal disc distinctly alutaceous (especially females of these series), nearly shagreened in some specimens, with sparsely scattered distinct punctures and punctulae, median line distinct and deep, with alutaceousness longitudinal about median line in many specimens (Figs. 227-228); pygidium deeply emarginate; specimens from Oregon - Washington; .... *P. nitida* (Germar) (in part).

b. Pronotal disc at most indistinctly alutaceous, with punctation more or less contiguous, without much intervening space, and median line not deep and distinct, though present (Figs. 215-216); pygidium deeply to shallowly emarginate (nearly truncate); specimens from other areas, as well as Oregon - Washington (*cf.* also Couplet 31) .... 35.

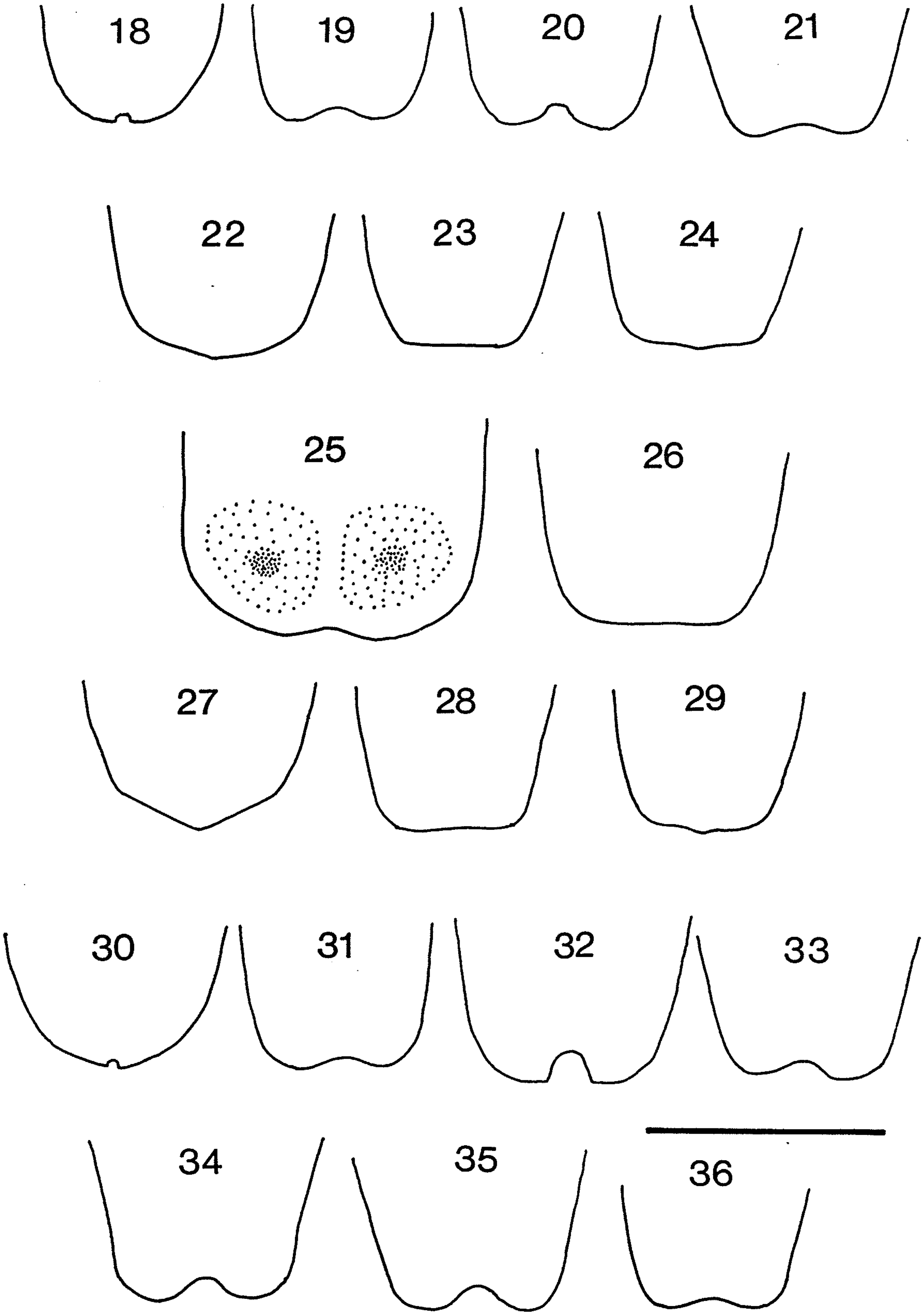
35.a.(34) All femora, especially metafemur, with apical ½ to ⅓ metallic, basally rufous, the metallic part distinctly and abruptly delimited (Fig. 90) (this colour does not apply to some specimens from mid-California to southern Oregon); metafemur with small acute tooth; tibia and tarsus rufous; antennomeres with apical ½ metallic and basally rufous, antennomere 3 slightly longer than 2 (ratio 3:2, 1.0 - 1.32); endophallus *cf.* Figs. 126, 127 ...... *P. pusilla* (Say).

b. All femora entirely testaceous or rufous to entirely infuscate or obscurely metallic, but few specimens with apical half so abruptly metallic, metafemur with tooth absent to large and triangular (Figs. 65, 77-79); tibia and/or tarsus rufous, testaceous, or partly to entirely infuscate; antenna entirely rufous or testaceous to entirely infuscate or metallic in some specimens, few specimens with basal half of antennomeres rufous and apical half metallic, antennomere 3 relatively longer than 2 in most specimens (ratio 1.25 or more) .... 36.

36.a.(35) Appendages of most specimens entirely testaceous, some rufous, a few specimens with slight infuscation of legs, fewer entirely infuscate but not metallic; metafemur with tooth absent to moderate in size (Figs. 77-79); pygidium truncate to shallowly emarginate (Fig. 31); pronotal disc with medial area finely irregularly rugulose, to alutaceous in some specimens (Figs. 211-213); median lobe apex without single prominent carina below; ELDs of endophallus with prominent hind angles, BSB robust, of two parts with dorsal part expanded to cover ventral part (Figs. 4, 5) .... P. *flavipes* (Kirby).

b. Appendages from rufous to entirely infuscate or metallic, in most specimens not entirely rufous; metafemur with tooth prominent and triangular in most specimens (Figs. 65, 236); pygidium deeply emarginate (Fig. 33); pronotal disc more or less uniformly punctate - punctulate, with medial area not finely rugulose or alutaceous (Fig. 231); median lobe with coarse carina below from basal foramen to apex (Figs. 106, 235); ELDs of endophallus without acute hind angles, BSB more slender, of two parts end to end (Figs. 122, 123) .... P. *fulvipes* (Lacordaire).

FIGURES 18-36. Pygidial apex shapes of Nearctic Plateumaris species: **18,19**, female and male, P. aurifer (LeConte); **20,21**, female and male, P. balli Askevold; **22,23** female and **24** male, P. chalcea (Lacordaire); **25,26** female and male, P. diversa (Schaeffer); **27** female and **28,29** male, P. dubia (Schaeffer); **30,31** female and male, P. flavipes (Kirby); **32,33** female and male, P. fulvipes (Lacordaire); **34** female and **35,36** male, P. frosti (Schaeffer). (scale bar = 1.0 mm).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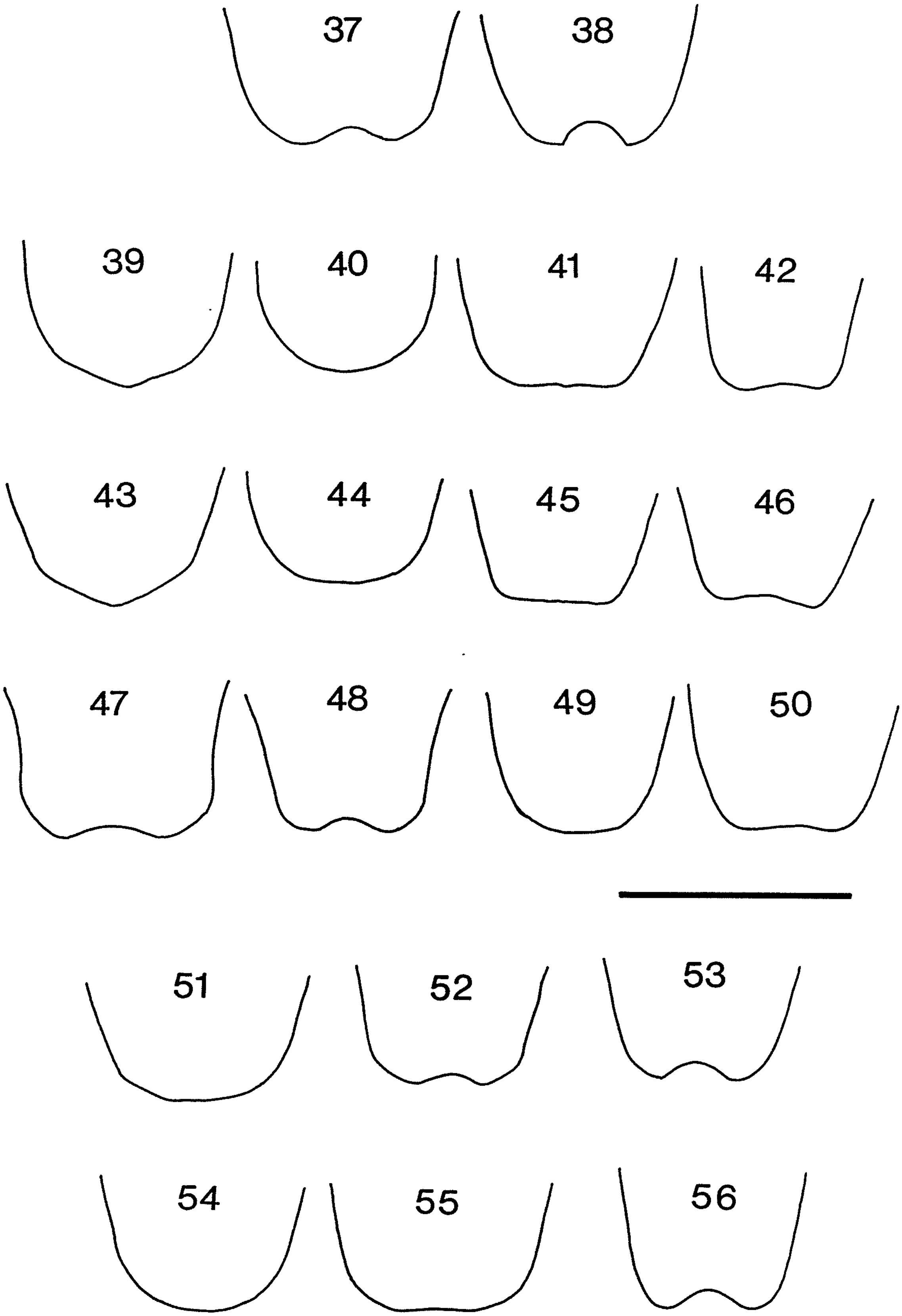
FIGURES 37-56. Pygidial apex shapes of Nearctic *Plateumaris* species. **37,38** female and male, *P. germari* (Mannerheim); **39,40** female and **41,42** male, *P. metallica* (Ahrens); **43,44** female and **45,46** male, *P. neomexicana* (Schaeffer); **47,48** female and male, *P. nitida* (Germar); **49,50** female and male, *P. notmani* (Schaeffer); **51,52** female and **53** male, *P. pusilla* (Say); **54,55** female and **56** male, *P. robusta* (Schaeffer). (scale bar = 1.0 mm).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FIGURES 57-67. Pygidial shapes and metafemora of Nearctic _Plateumaris_ species: **57-60,** pygidial apex: **57,58** female and male, _P_. _rufa_ (Say); **59,60** female and male, _P_. _schaefferi_ Askevold. **61-67,** Left metafemur: **61,** _P_. _aurifer_ (LeConte), typical of both sexes; **62,** _P_. _balli_ Askevold, typical of both sexes (not shaded to show pigmentation); **63,64,** _P_. _chalcea_ (Lacordaire), range of variation of shape and armature typical of both sexes (not shaded to show pigmentation); **65,** _P_. _fulvipes_ (Lacordaire), typical of both sexes (not shaded to show pigmentation); **66-67,** _P_. _dubia_ (Schaeffer), range of variation typical of both sexes (not shaded to show pigmentation). (scale bar = 1.0 mm).

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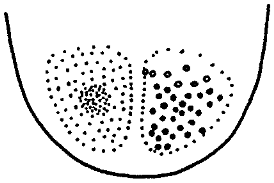

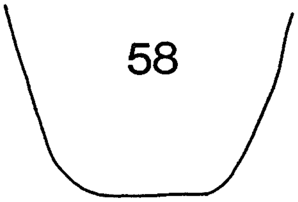

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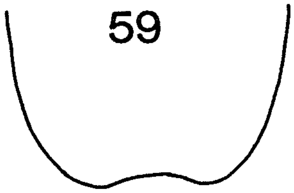

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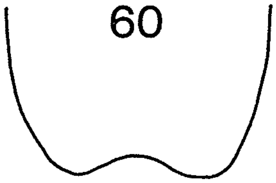

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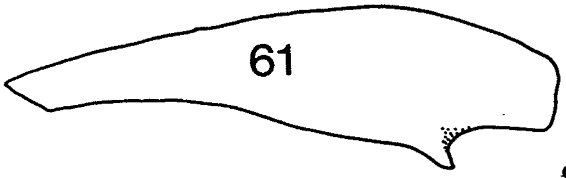

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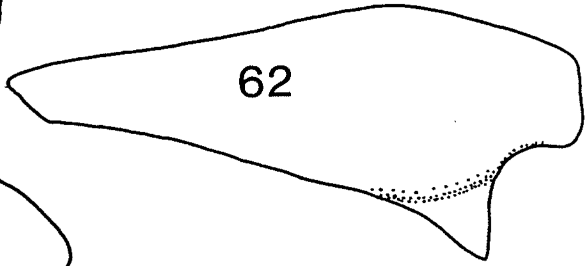

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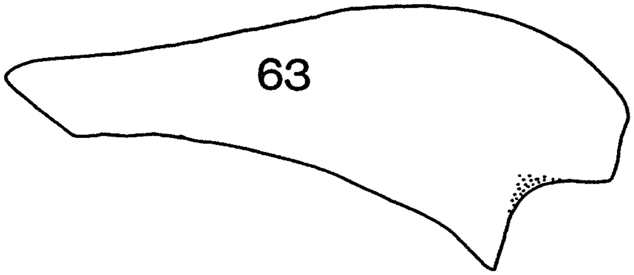

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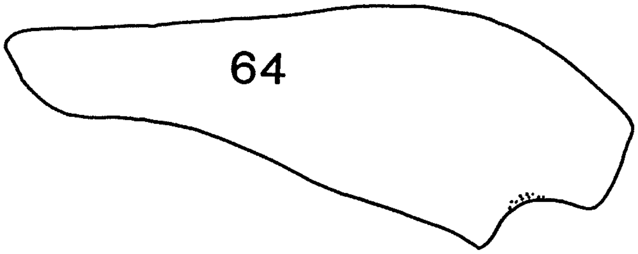

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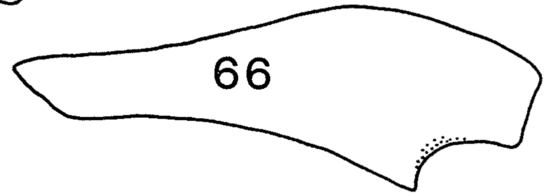

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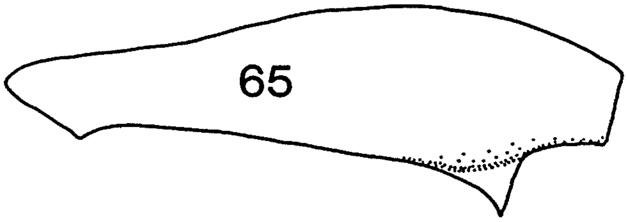

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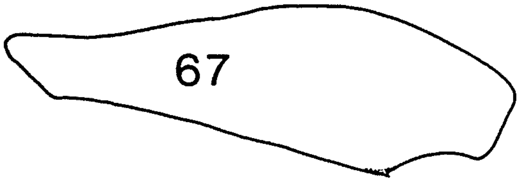

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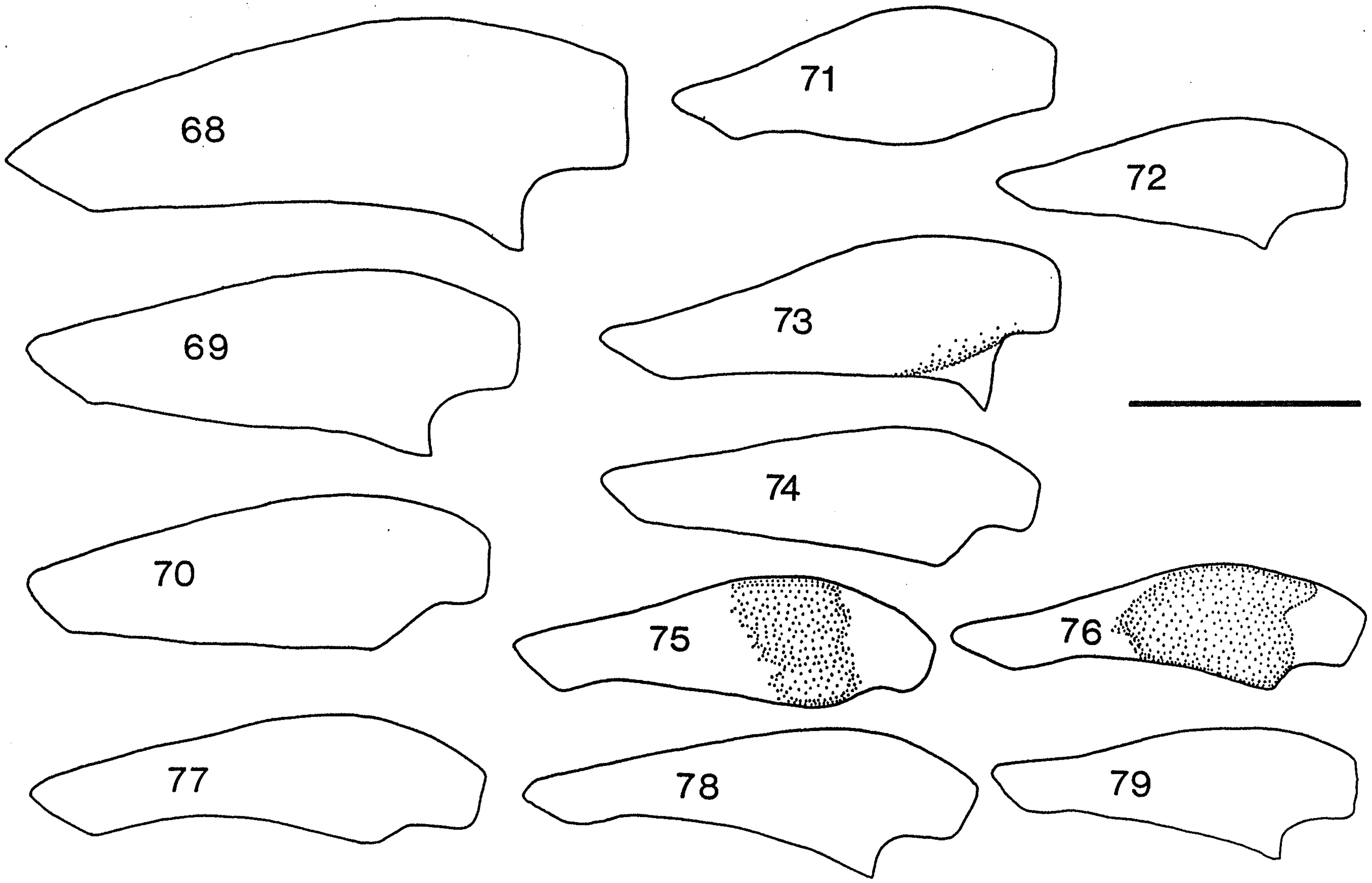
FIGURES 68-79. Left metafemur of Nearctic *Plateumaris* species: **68-70,** *P*. *diversa* (Schaeffer), range of variation typical of both sexes, **68** (♀, Normandale, Ont.), **69** (♀, Victoria Beach, Man.), and **70** (o^, "Dawson Trail", Man.) (not shaded to show pigmentation). **71-72,** *P*. *metallica* (Ahrens), **71**, typical of both sexes, **72**, extreme o^ example (not shaded to show pigmentation); **73-74,** *P*. *frosti* (Schaeffer), **73**, typical of both sexes, **74** extreme example (George Lake, Alta.) (not shaded to show pigmentation); **75-76,** *P*. *neomexicana* (Schaeffer), typical of both sexes; **77-79,** *P*. *flavipes* (Kirby), range of variation typical of both sexes. (scale bar = 1.0 mm).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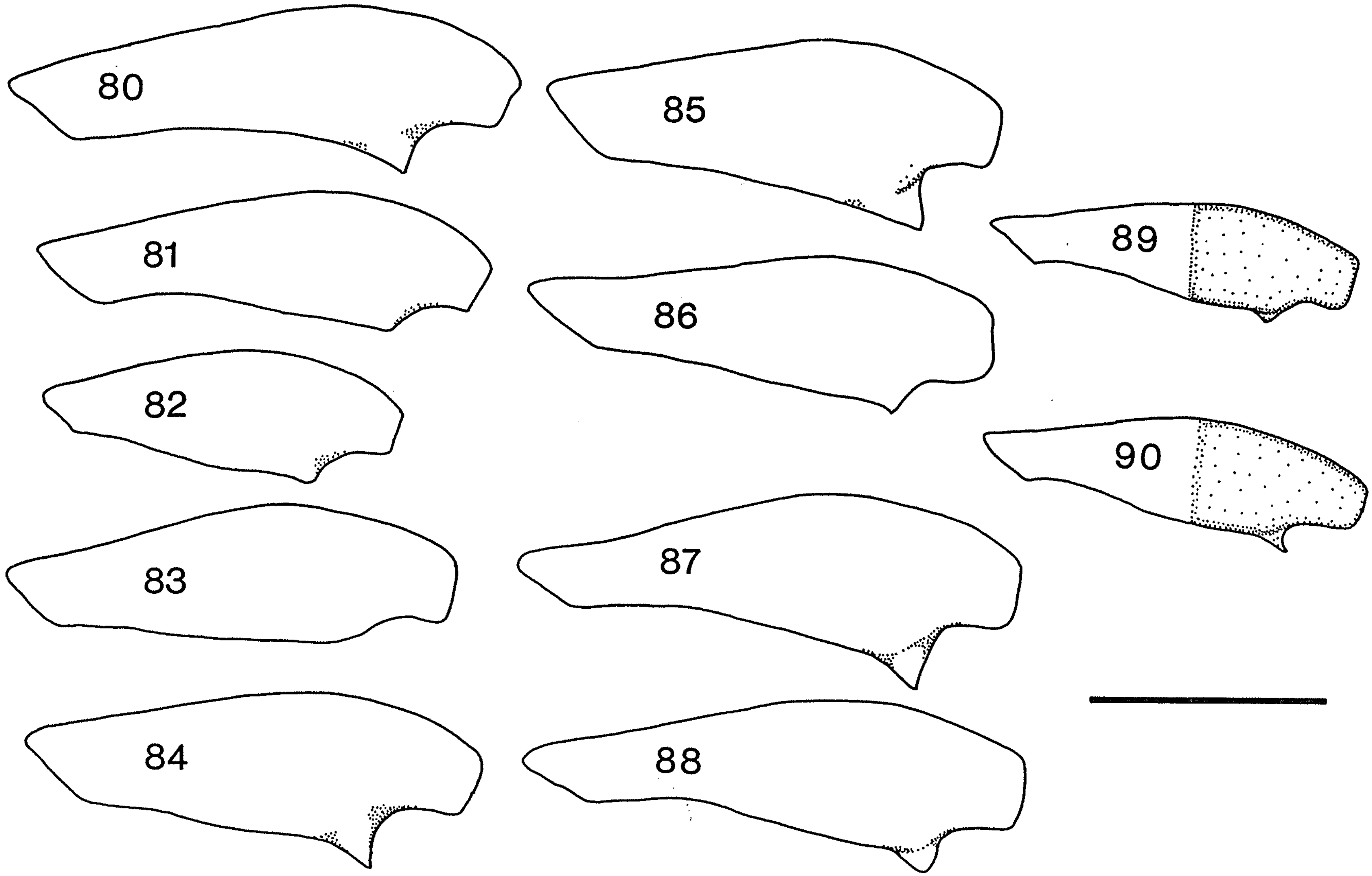
FIGURES 80-90. Left metafemur of Nearctic _Plateumaris_ species: **80-84,** _P_. _germari_ (Mannerheim), range of variation of shape and armature typical of both sexes (not shaded to show pigmentation); **85-86,** _P_. _nitida_ (Germar), shape and armature typical of both sexes (not shaded to show pigmentation); **87-88,** _P_. _notmani_ (Schaeffer), shape and armature typical of both sexes (not shaded to show pigmentation); **89-90,** _P_. _pusilla_ (Say), shape, armature, and pigmentation pattern typical of both sexes. (scale bar = 1.0 mm).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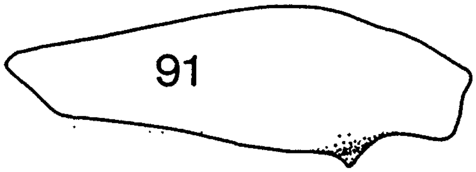
FIGURES 91-98. Left metafemur of Nearctic *Plateumaris* species: **91-94,** *P*. *robusta* (Say), metafemur and metatibia shape and armature typical of both sexes, **91** (typical ♀) and **92** (typical o^), **93** metatibia, and **94** mesotibia, lateral aspects; **95-97,** *P*. *rufa* (Say), **95**, metafemur typical of both sexes, **96** extreme example, **97** left metatiba of female, lateral aspect; **98,** *P*. *schaefferi* Askevold, typical of both sexes, (not shaded to show pigmentation). (scale bar = 1.0 mm).



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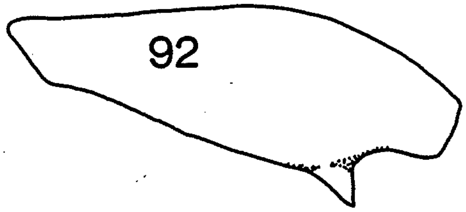

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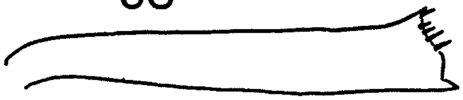

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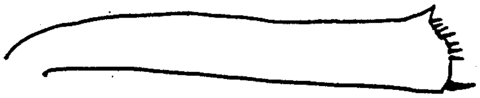

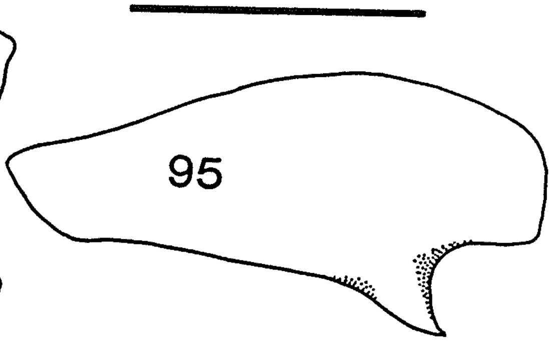

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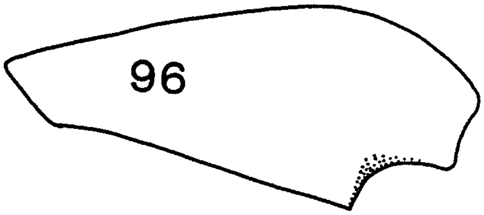

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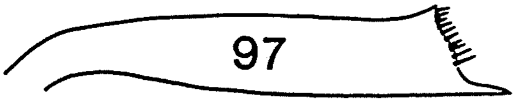

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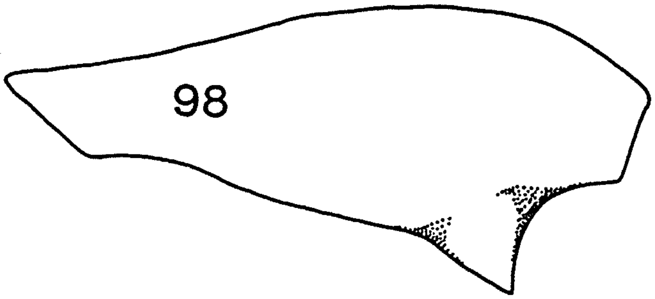

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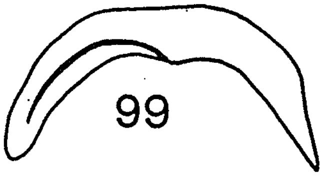
FIGURES 99-110. Median lobe of Nearctic Plateumaris species, lateral aspect: **99**, P. aurifer (LeConte); **100**, P. balli Askevold; **101**, P. chalcea (Lacordaire); **102**, P. diversa (Schaeffer), 102a, dorsal aspect of cap apex; **103**, P. dubia (Schaeffer); **104**, P. flavipes (Kirby); **105**, P. frosti (Schaeffer); **106**, P. fulvipes (Lacordaire), 106a, apex, ventral view; **107**, P. germari (Mannerheim); **108**, P. metallica (Ahrens); **109**, P. neomexicana (Schaeffer); **110**, P. nitida (Germar). (scale bar = 1.0 mm).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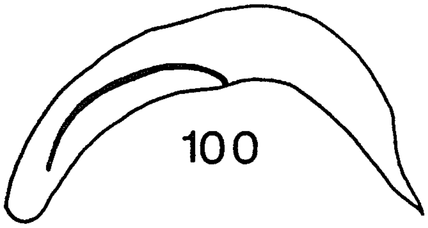
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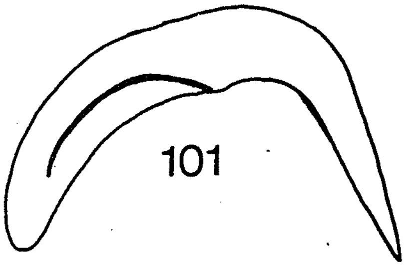
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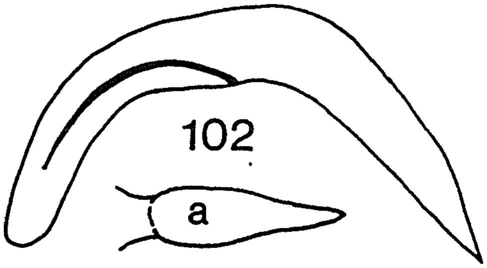
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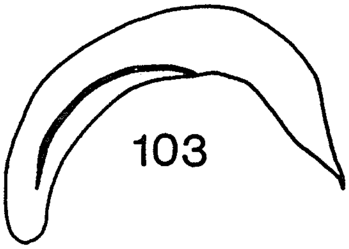
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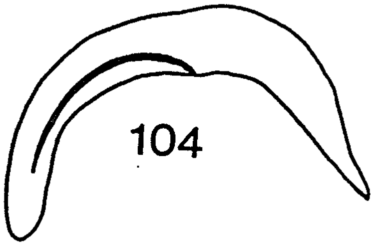
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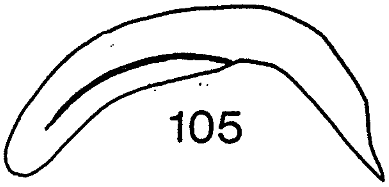
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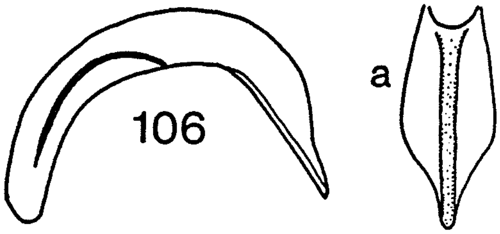
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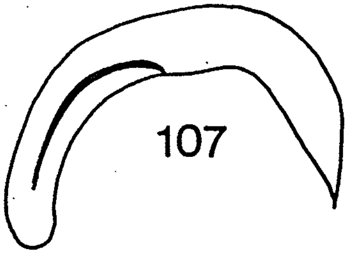
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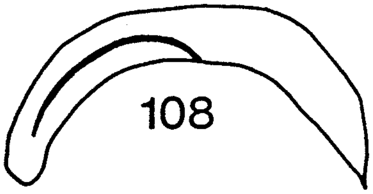
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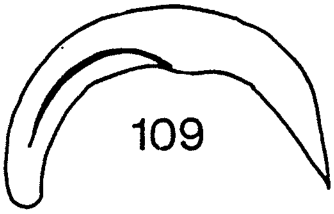
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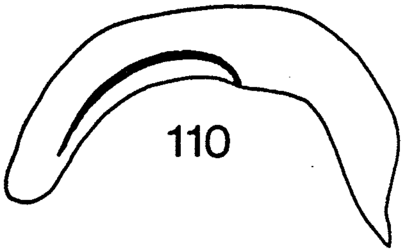
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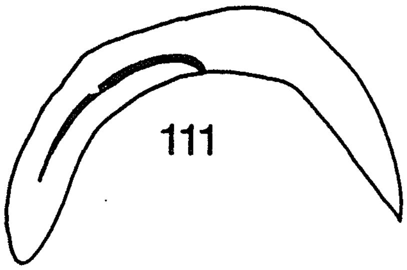
FIGURES 111-115. Median lobe of Nearctic Plateumaris species, lateral aspect: **111**, P. notmani (Schaeffer); **112**, P. pusilla (Say); **113**, P. robusta (Schaeffer); **114**, P. rufa (Say), 114a = dorsal aspect of cap apex; **115**, P. schaefferi Askevold. (scale bar = 1.0 mm).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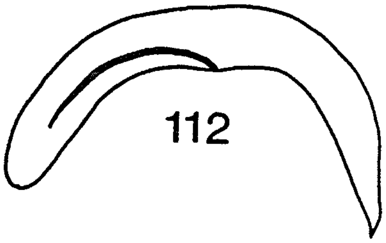
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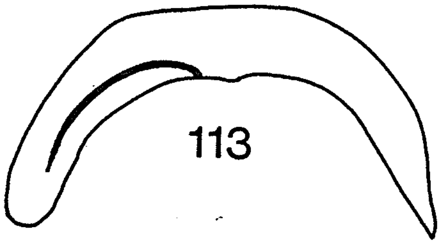
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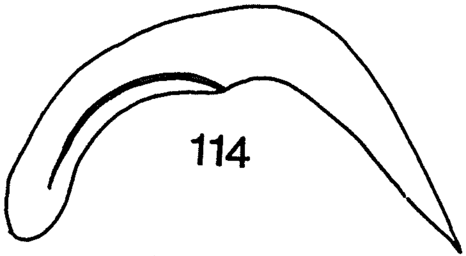
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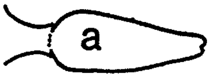

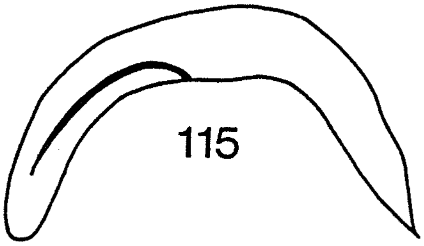
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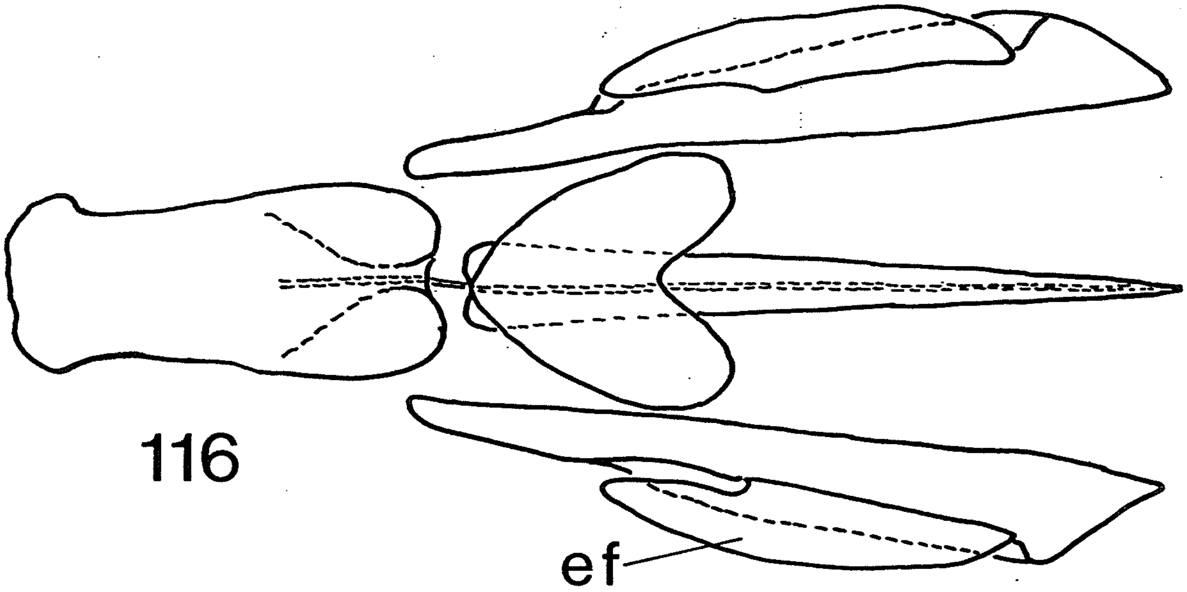
FIGURES 116-117. Endophallus of Plateumaris rufa (Say), dorsal and lateral aspects respectively; ef = external fold of ELD. (scale bar = 0.5 mm).



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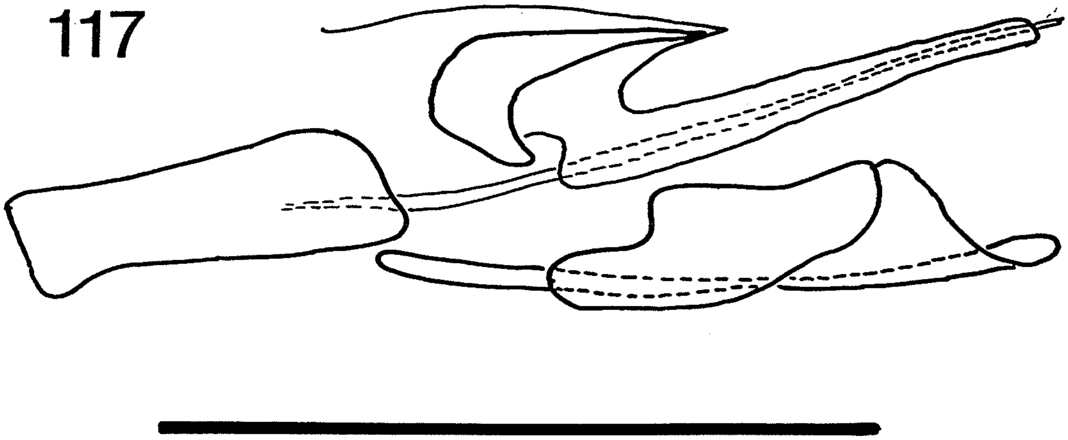

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FIGURES 118-119. Endophallus of Plateumaris diversa (Schaeffer), dorsal and lateral aspects respectively; ef = external fold of ELD. (scale bar = 0.5 mm).

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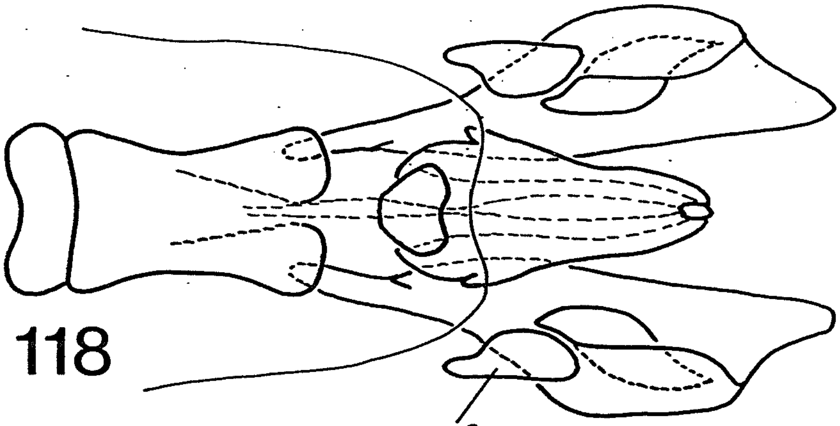

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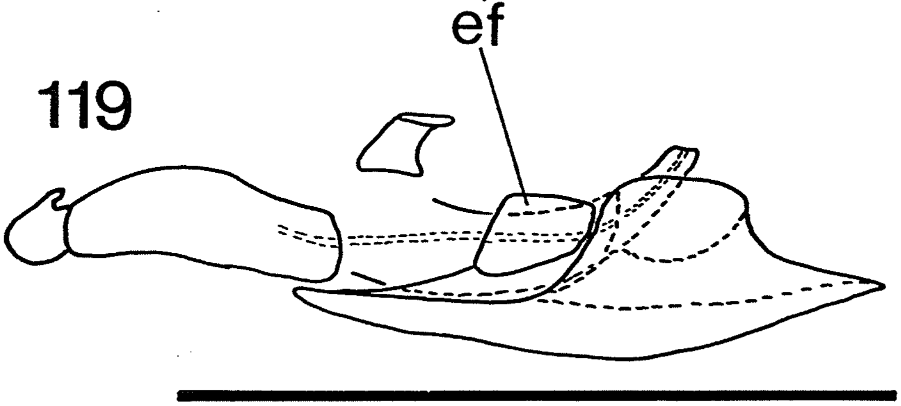

FIGURES 120-121. Endophallus of Plateumaris chalcea (Lacordaire), dorsal and lateral aspects respectively. (scale bar = 0.5 mm).

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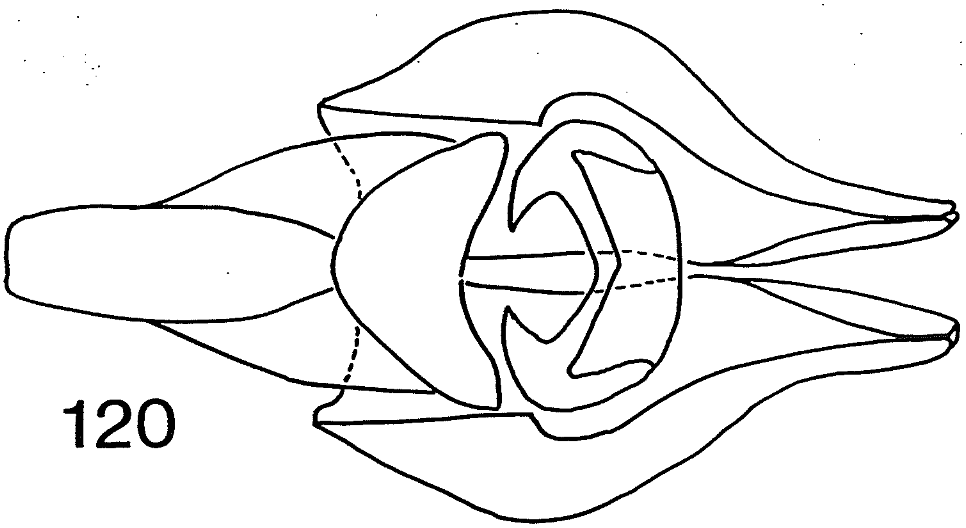

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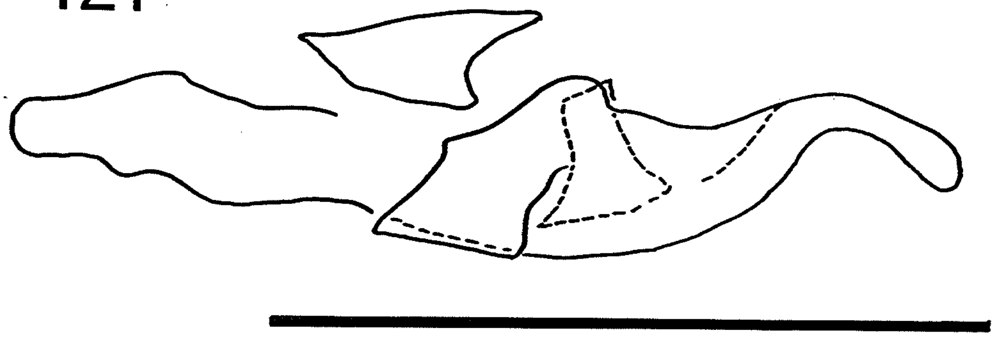
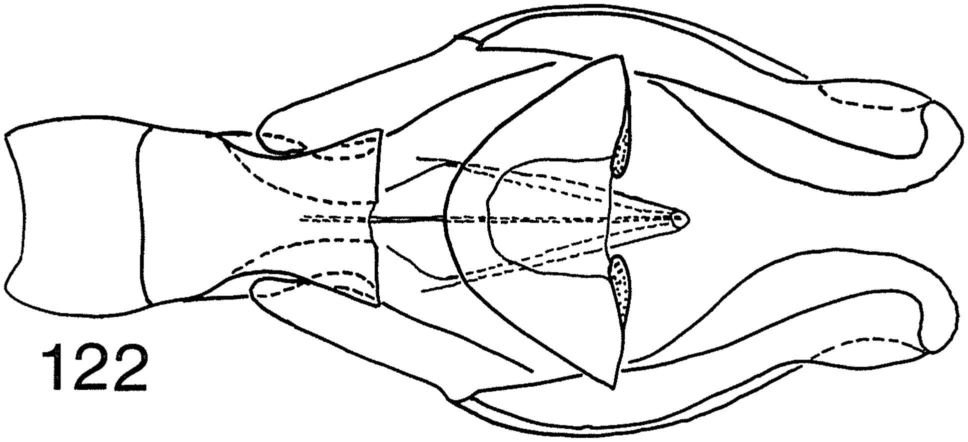


FIGURES 122-125. Dorsal and lateral aspects of endophallus of **122,123,** Plateumaris fulvipes (Lacordaire) and **124,125,** P. germari (Mannerheim). (scale bar = 0.5 mm).



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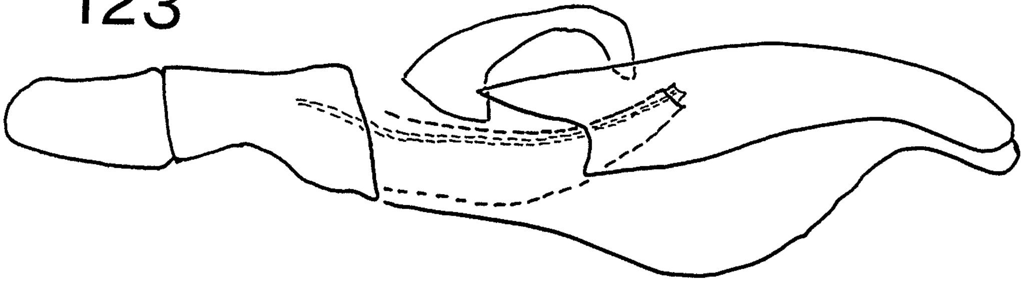

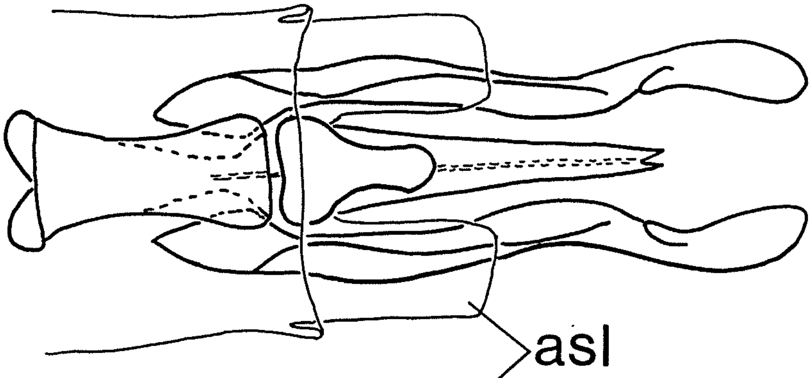

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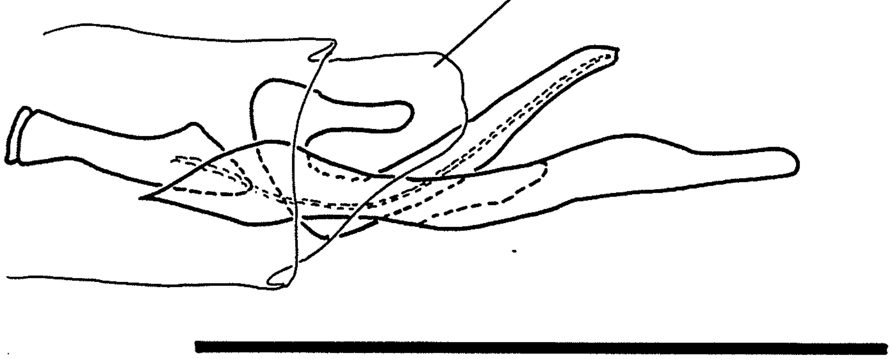

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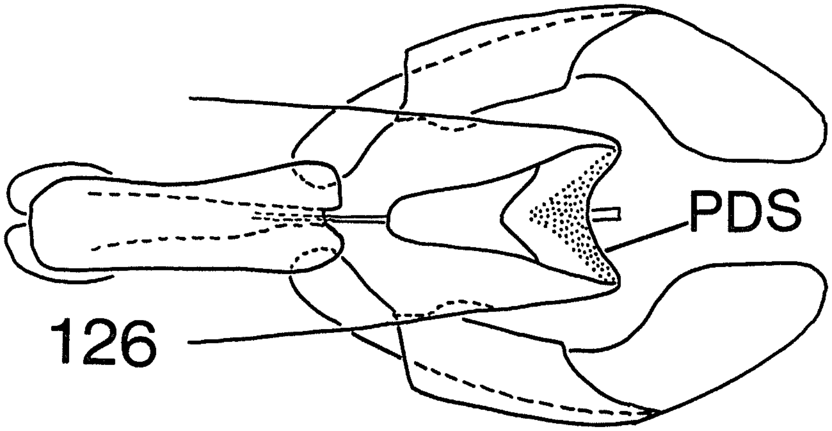
FIGURES 126-129. Dorsal and lateral aspects of endophallus of **126,127,** Plateumaris pusilla (Say) and **128,129,** P. robusta (Schaeffer). (scale bar = 0.5 mm).



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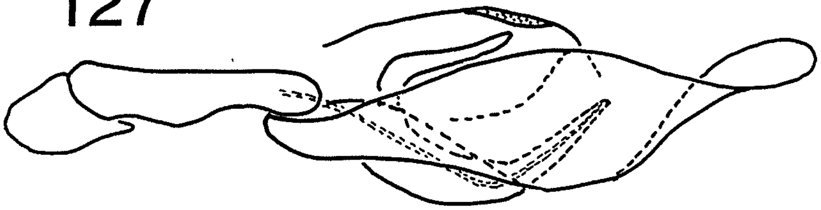

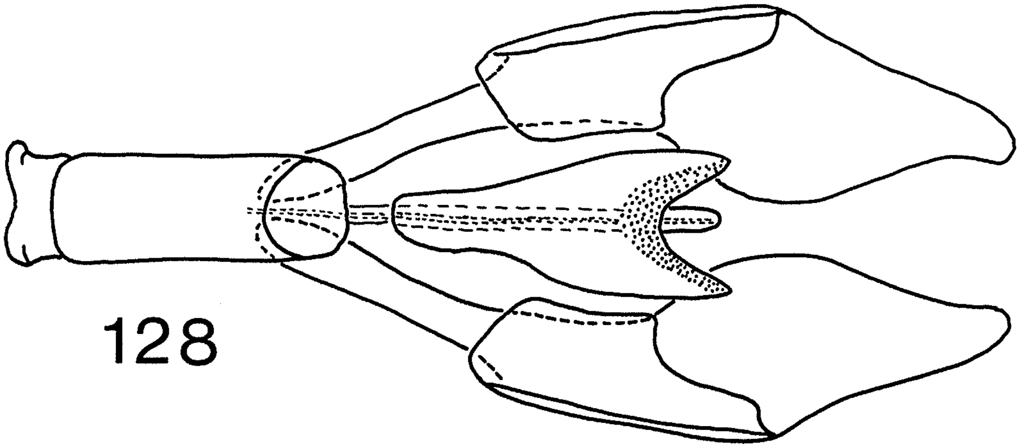

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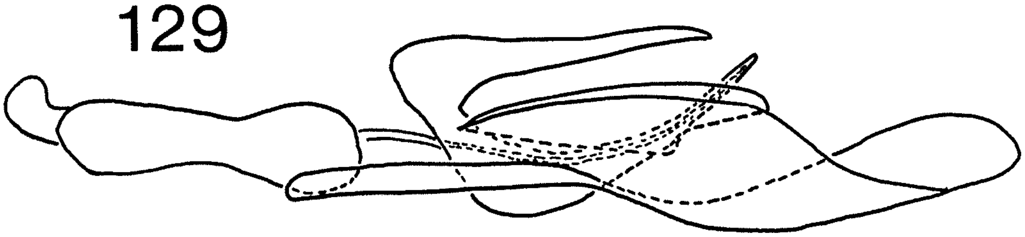
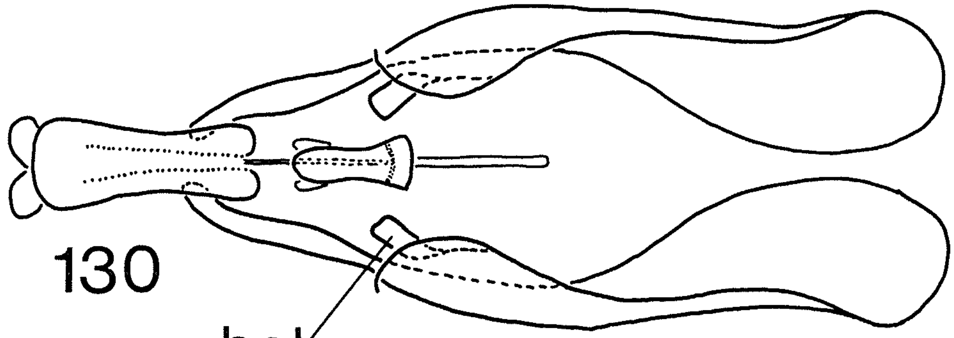


FIGURES 130-133. Dorsal and lateral aspects of endophallus of **130,131,** *Plateumaris aurifer* (LeConte) and **132,133,** *P. balli* Askevold; bal = basal angulate lobe. (scale bar = 0.5 mm).



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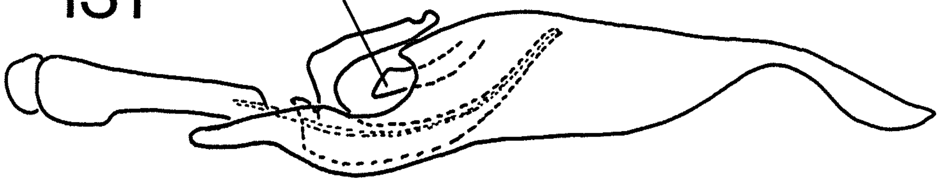

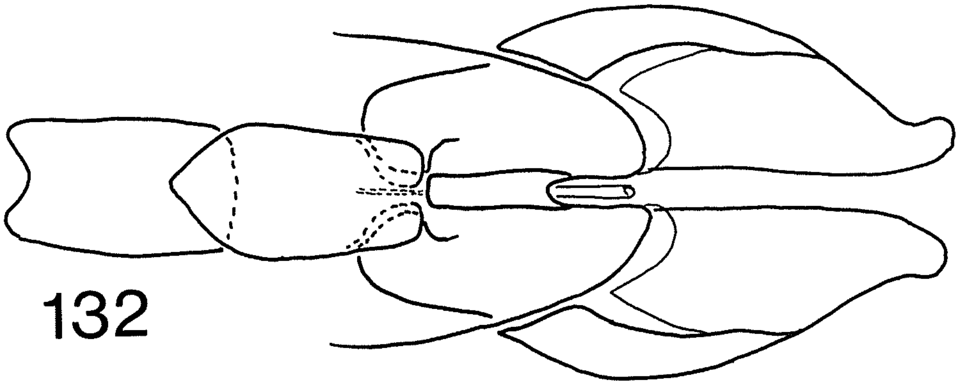

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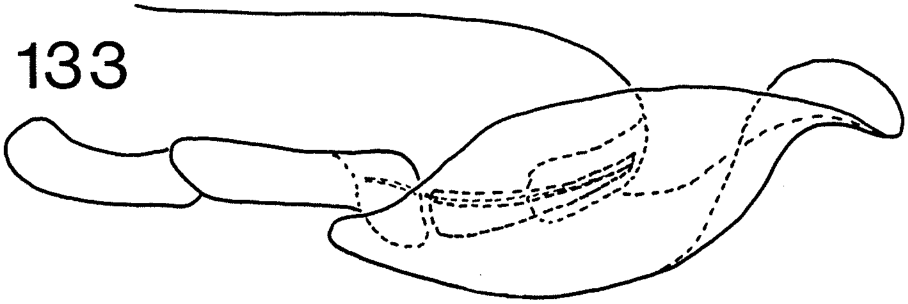
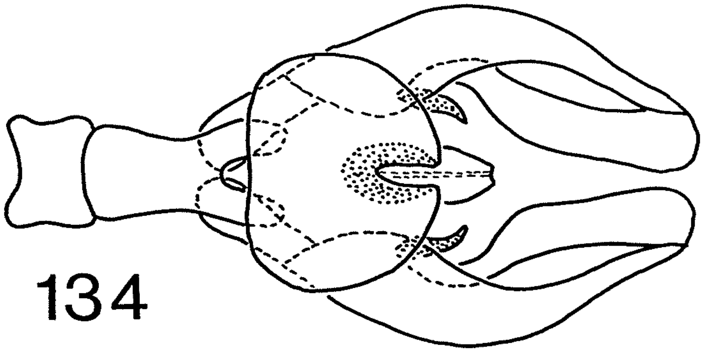


FIGURES 134-139. Dorsal and lateral aspects of endophallus of **134,135,** *Plateumaris dubia* (Schaeffer), **136,137,** *P. neomexicana* (Schaeffer), and **138,139,** *P. metallica* (Ahrens). t=tooth of ELD. (scale bar = 0.5 mm).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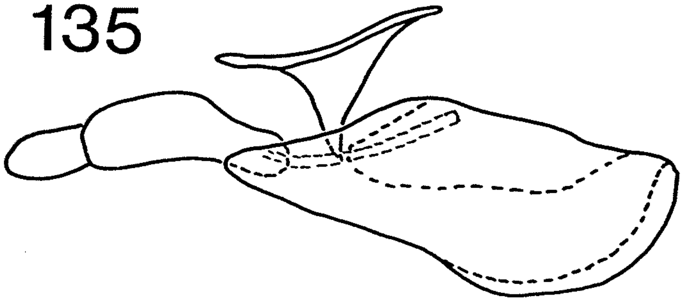
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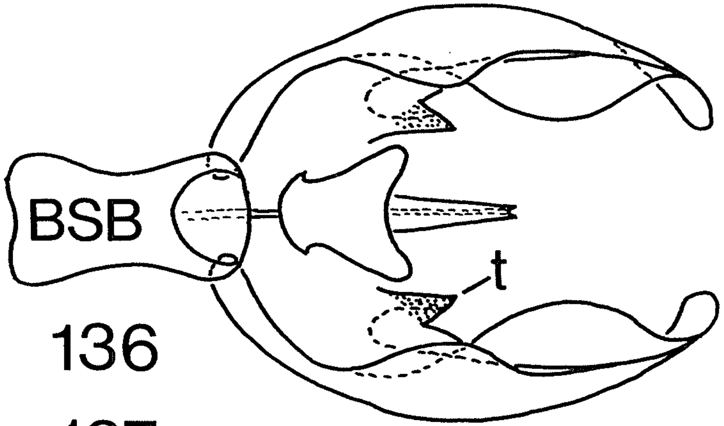

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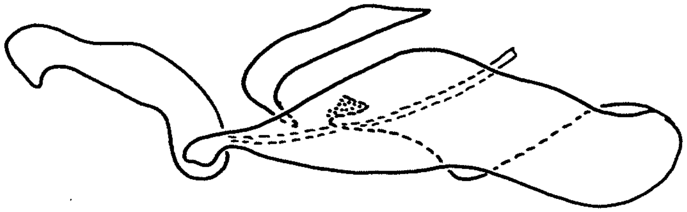
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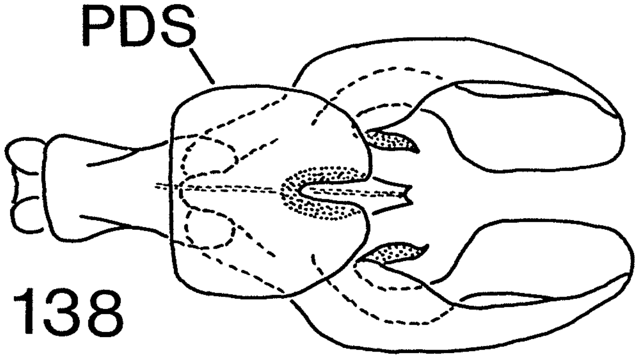

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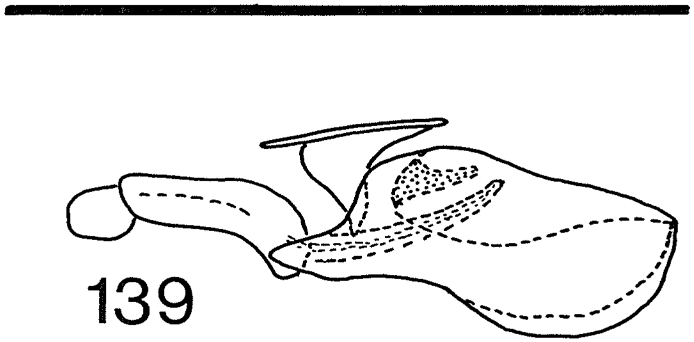
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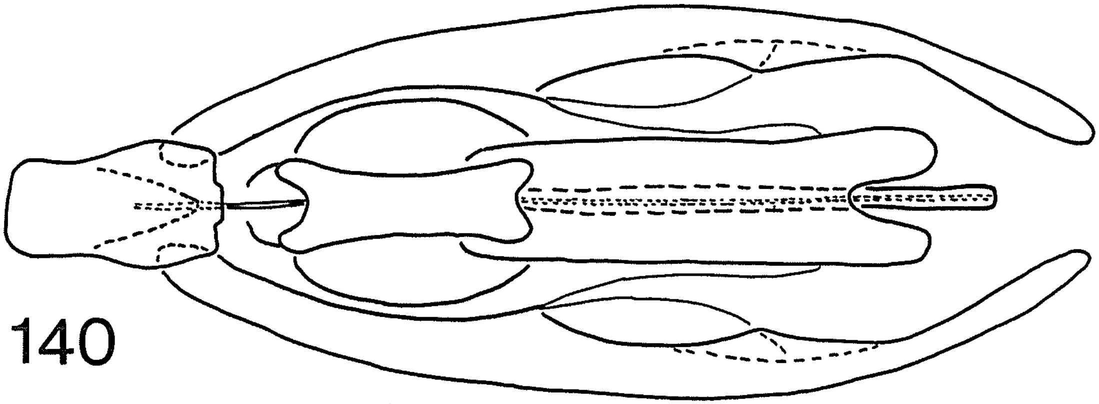
FIGURES 140-143. Dorsal and lateral aspects of endophallus of **140,141,** *Plateumaris nitida* (Germar), and of **142,143,** *P. frosti* (Schaeffer). (scale bar = 0.5 mm).



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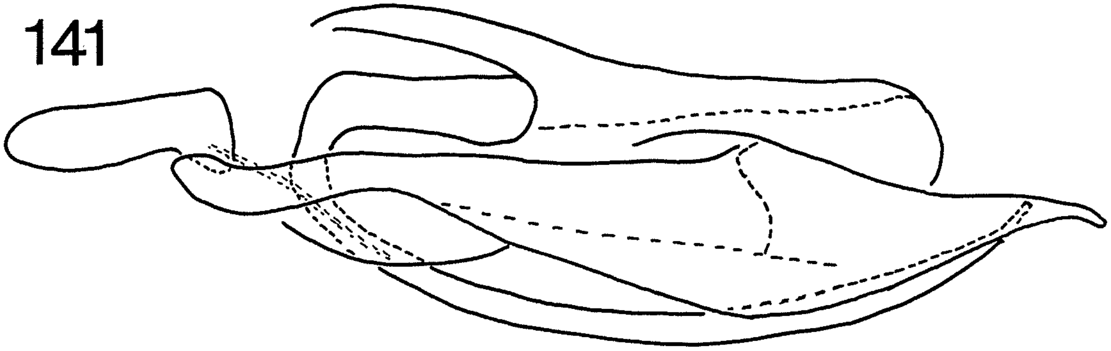

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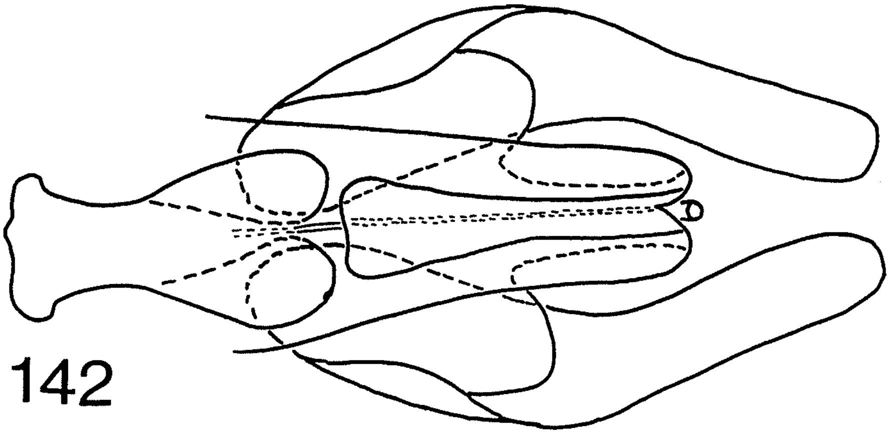

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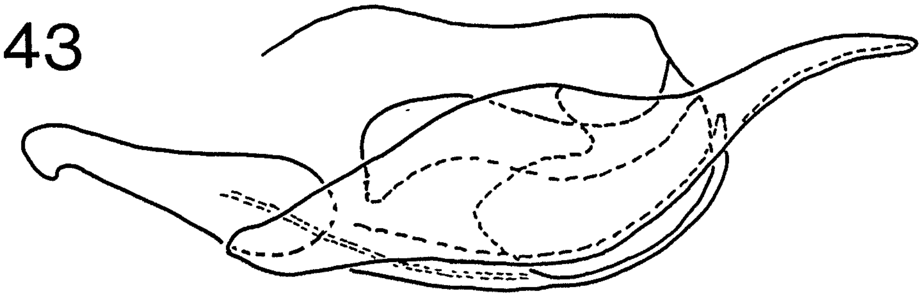

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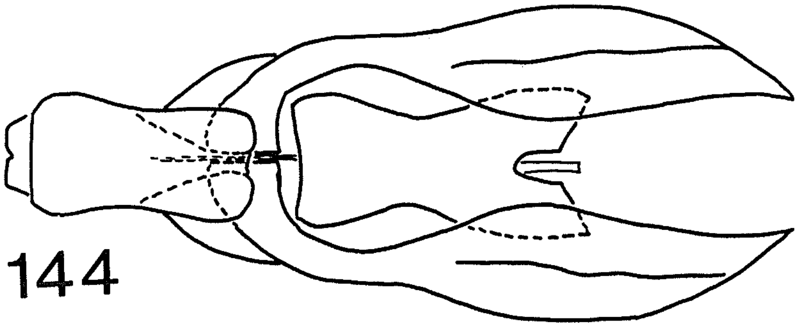
FIGURES 144-147. Dorsal and lateral aspects of endophallus of **144,145,** *Plateumaris notmani* (Schaeffer), and of **146,147,** *P. schaefferi* Askevold; bal = basal angulate lobe. (scale bar = 0.5 mm).



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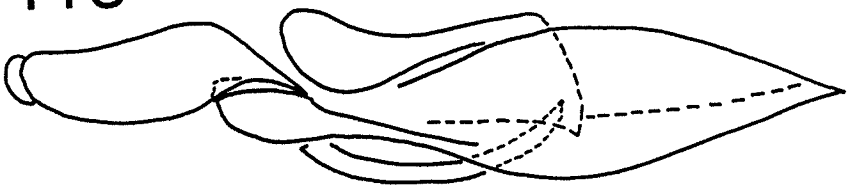

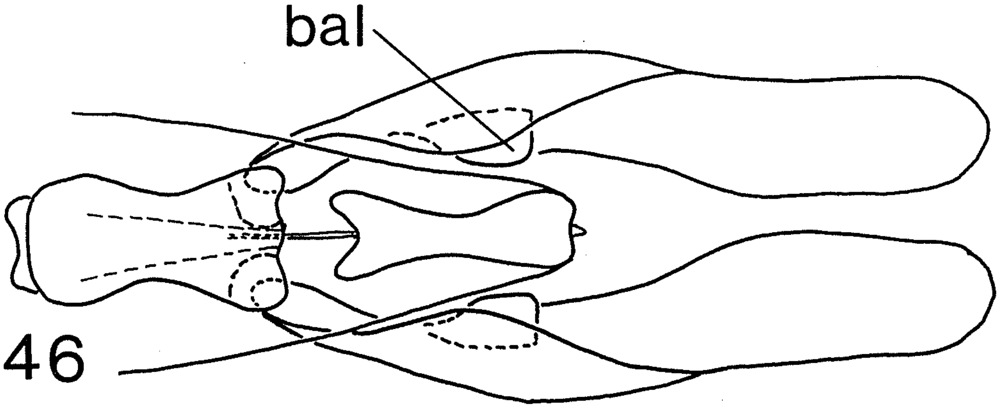

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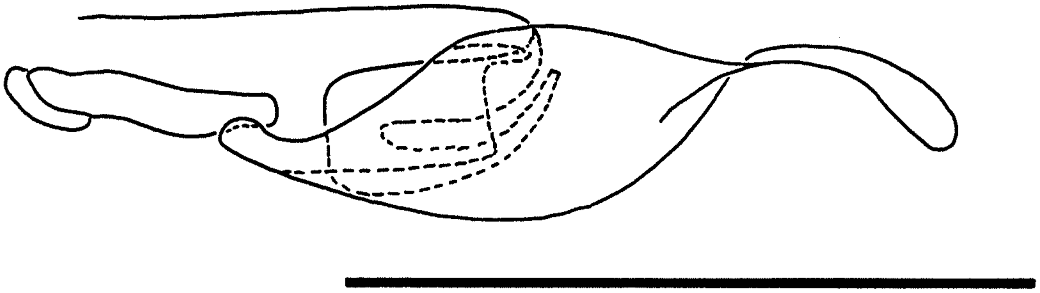
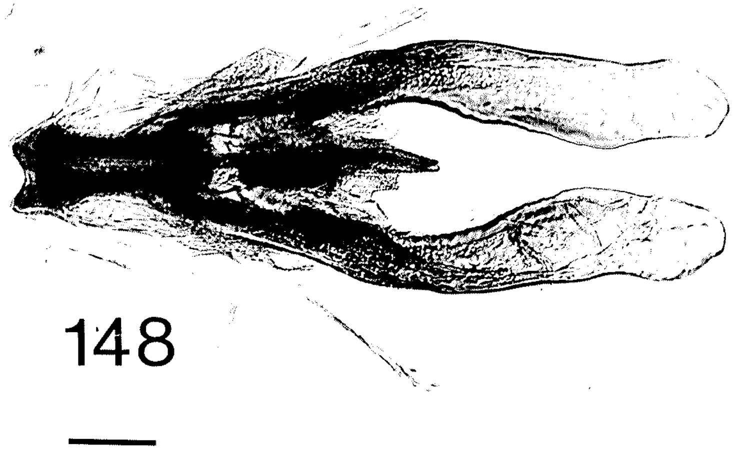


FIGURES 148-151. Photographs of endophallus of Nearctic Plateumaris species (dorsal aspect): **148** P. aurifer (LeConte); **149,** P. germari (Mannerheim); **150,** P. chalcea (Lacordaire); **151,** P. flavipes (Kirby). (scale bar = 0.1 mm).



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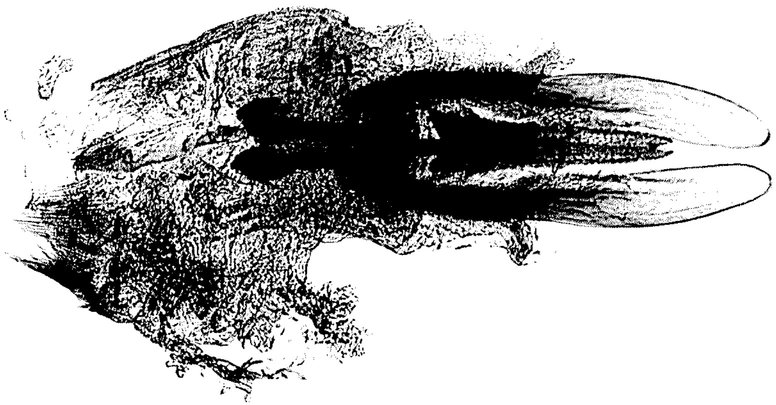

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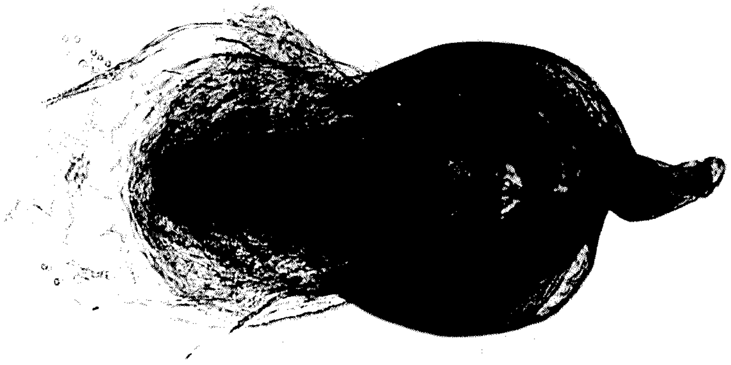

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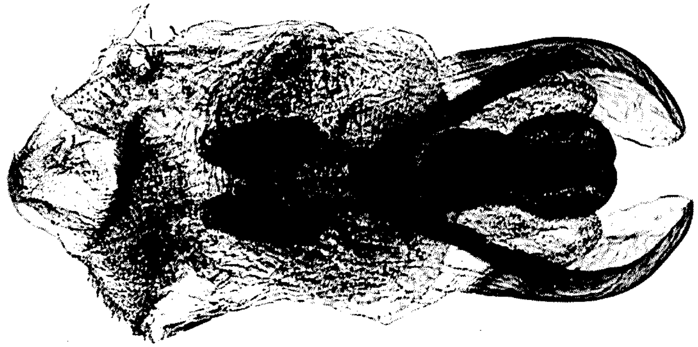

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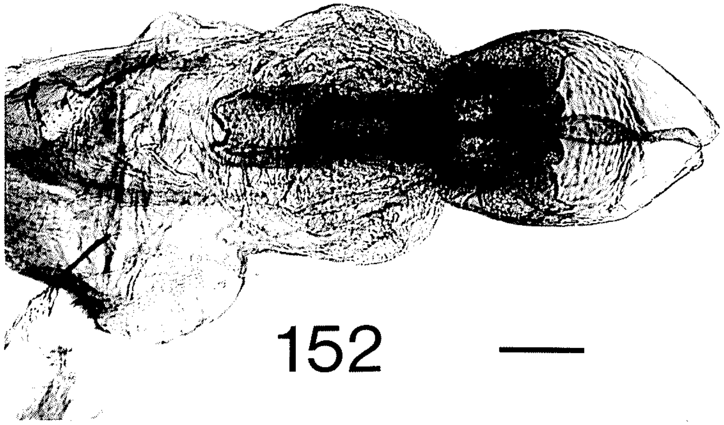
FIGURES 152-155. Photographs of endophallus of Nearctic *Plateumaris* species (dorsal aspect): **152,** *P. balli* Askevold; **153,** *P. notmani* (Schaeffer); **154,** *P. nitida* (Germar); **155,** *P. frosti* (Schaeffer). (scale bar = 0.1 mm).



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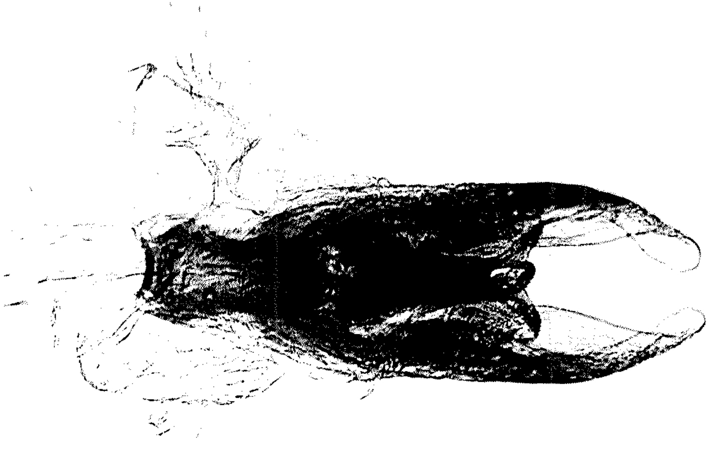

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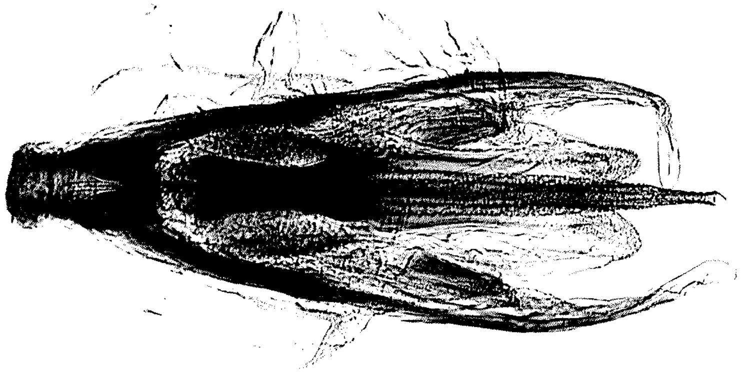

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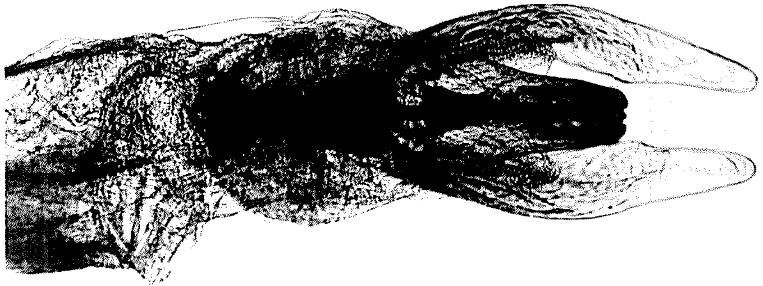

FIGURES 156-159. Photographs of endophallus of Nearctic *Plateumaris* species (dorsal aspect): **156,** *P. schaefferi* Askevold; **157,** *P. neomexicana* (Schaeffer); **158,** *P. metallica* (Ahrens); **159,** *P. dubia* (Schaeffer). (scale bar = 0.1 mm).

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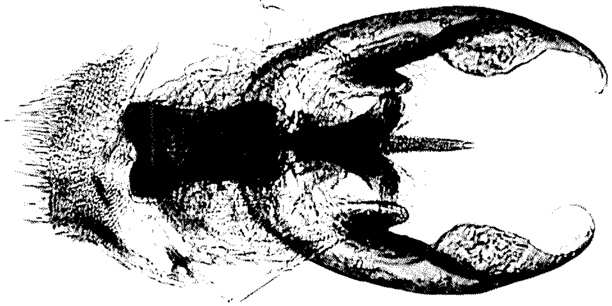

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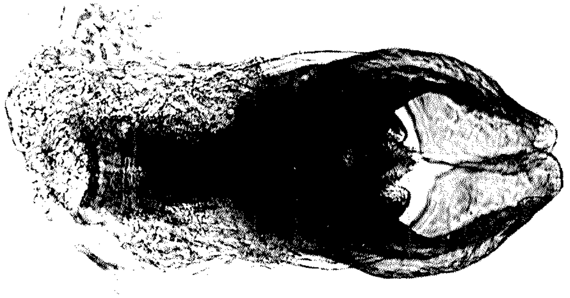

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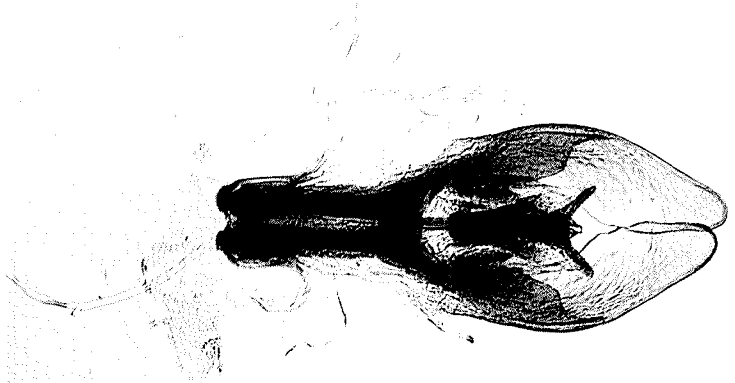
FIGURES 160-163. Photographs of endophallus of Nearctic Plateumaris species (dorsal aspect): **160,** P. pusilla (Say); **161,** P. robusta (Schaeffer); **162,** P. diversa (Schaeffer); **163,** P. rufa (Say). (scale bar = 0.1 mm).



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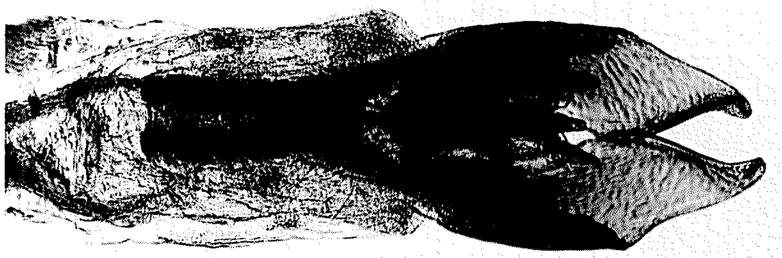

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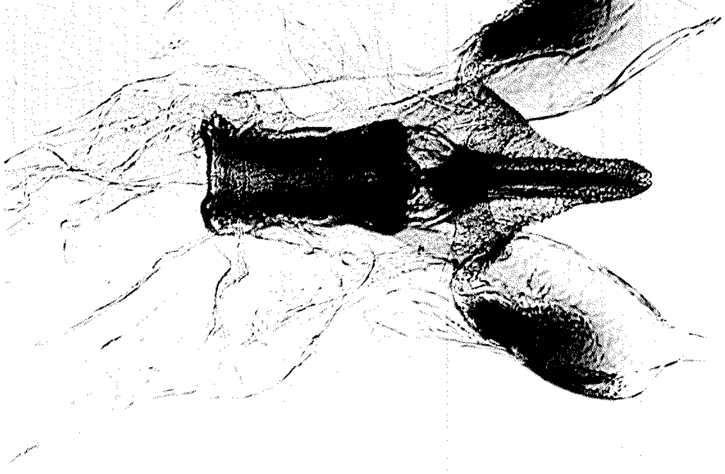

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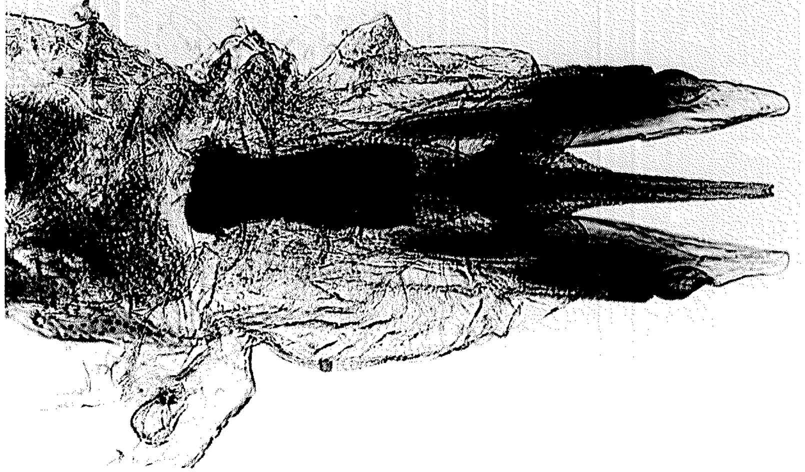

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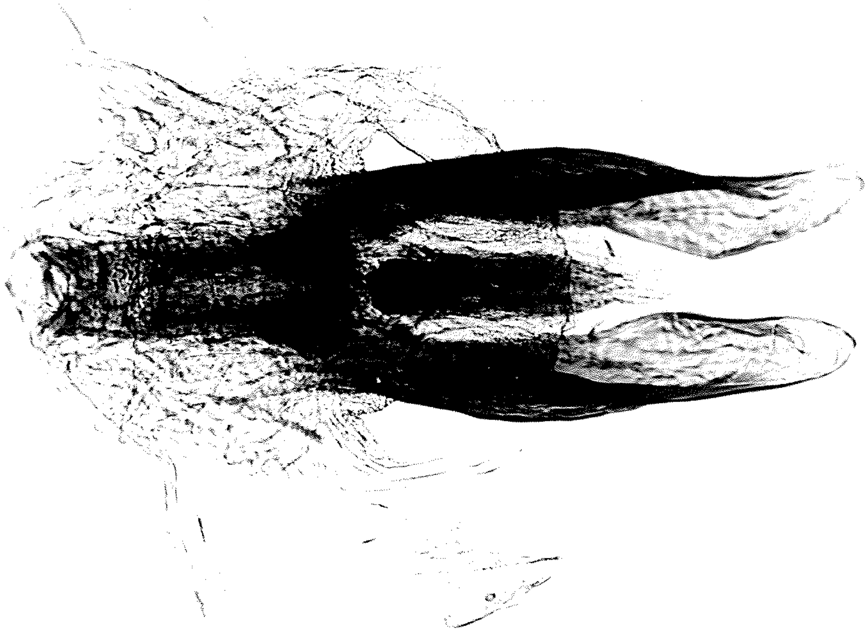
FIGURES 164-165. Photographs of endophallus of Nearctic and Palaearctic *Plateumaris* species (dorsal aspect): **164,** *P. fulvipes* (Lacordaire); **165,** *P. roscida* Weise. (scale bar = 0.1 mm).

164



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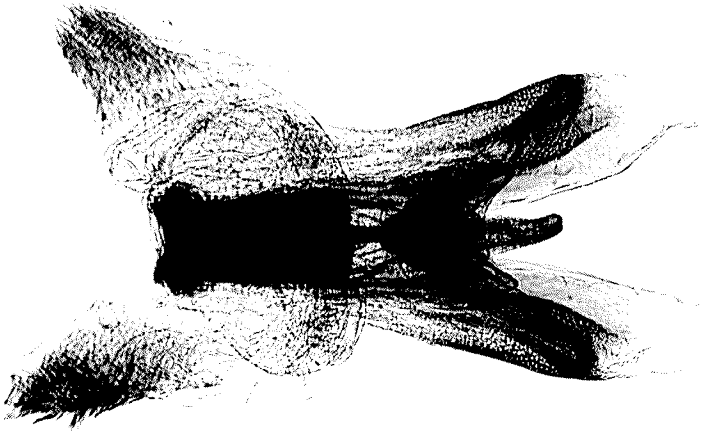
FIGURES 166-169. Photographs of endophallus of Palaearctic *Plateumaris* species (dorsal aspect): **166,** *P. constricticollis* (Jacoby); **167,** *P. akiensis* Tominaga and Katsura; **168,** *P. weisei* (Duvivier) (*cf.* "*hirashimai*" Kimoto); **169,** *P. weisei* (Duvivier). (scale bar = 0.1 mm).



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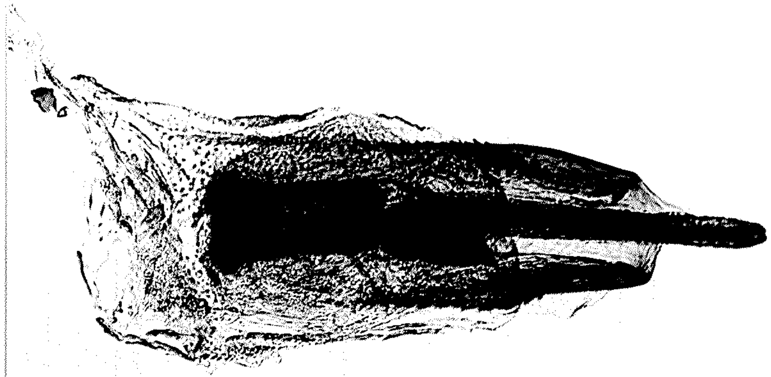

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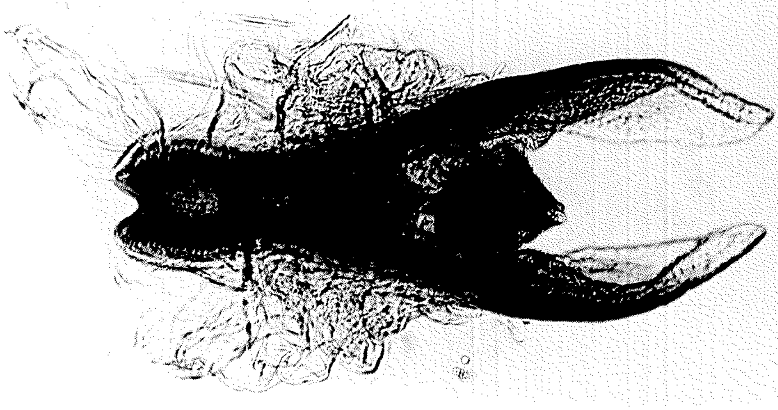

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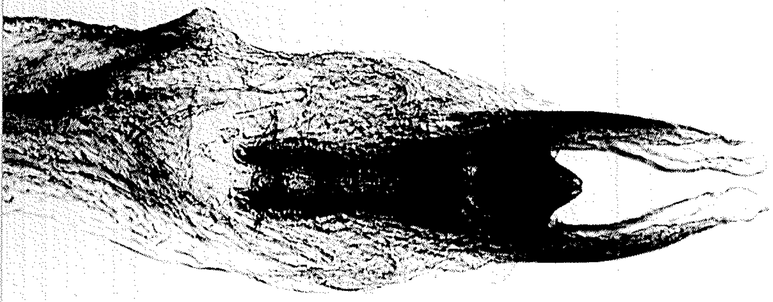

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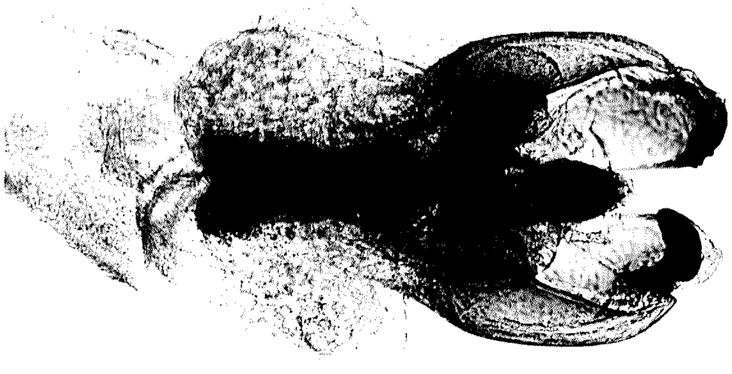
FIGURES 170-173. Photographs of endophallus of Palaearctic *Plateumaris* species (dorsal aspect): **170,** *P. sericea* (L.) (*cf.* "*discolor*" Panz.), specimen from Poland; **171,** *P. sericea* (L.), specimen from Italy; **172,** *P. sericea* (L.), specimen from Japan; **173,** *P. shirahatai* Kimoto. (scale bar = 0.1 mm).



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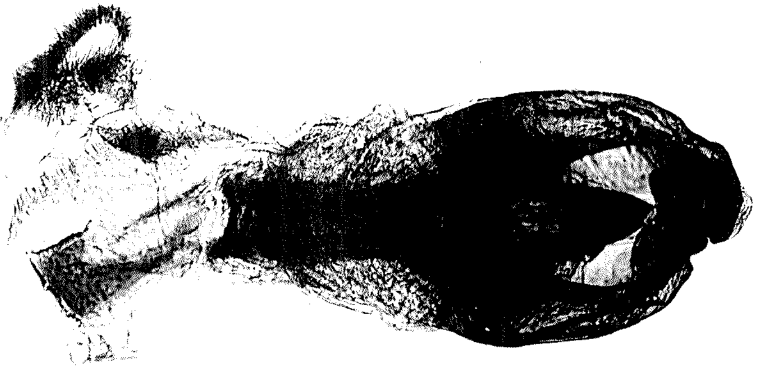

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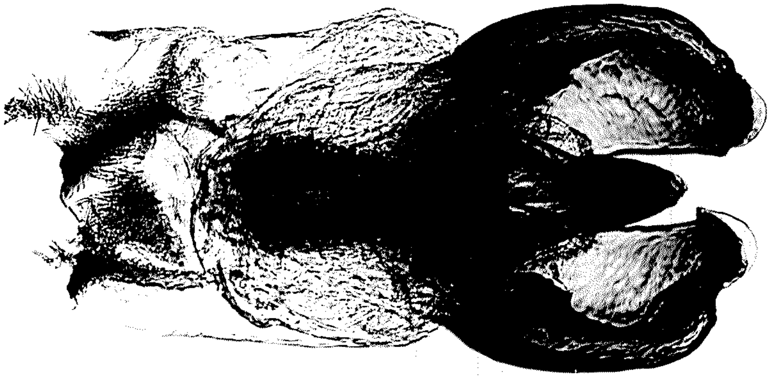

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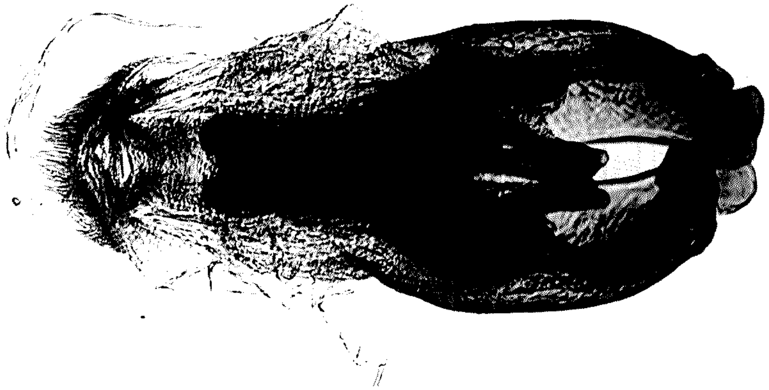
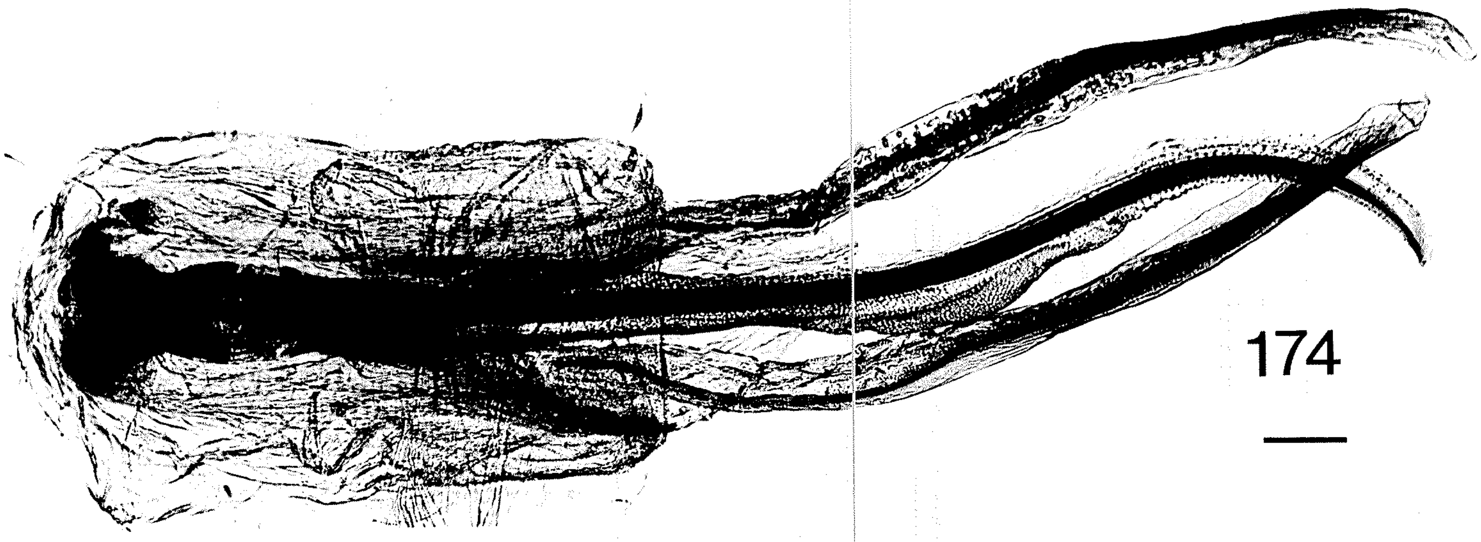


FIGURES 174-176. Photographs of endophallus of Palaearctic *Plateumaris* species (dorsal aspect): **174,** *P. braccata* (Scopoli); **175,** *P. rustica* (Kunze); **176,** *P. consimilis* (Schrank). (scale bar = 0.1 mm).



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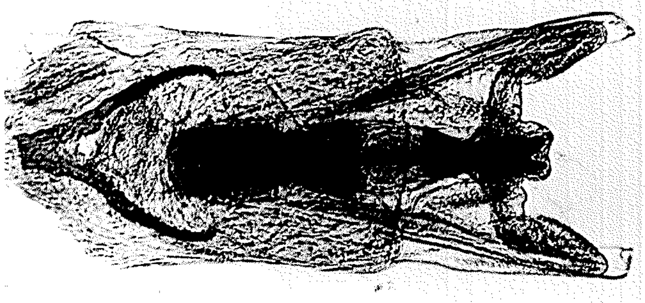

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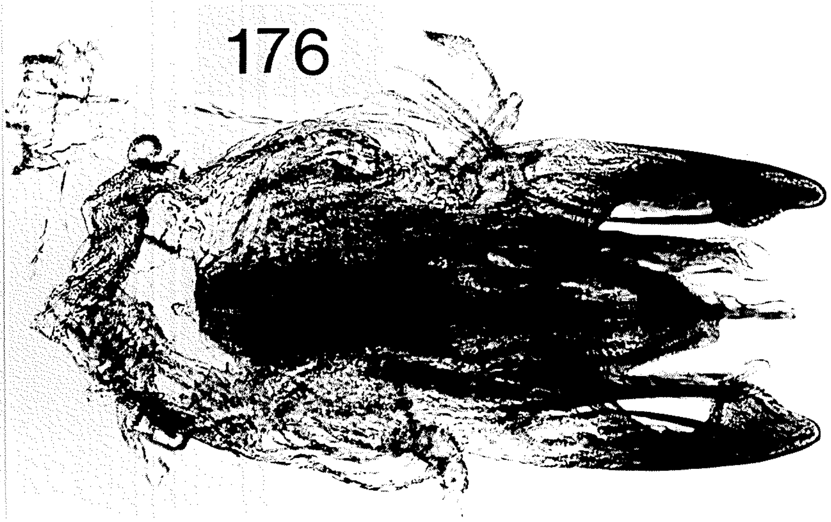

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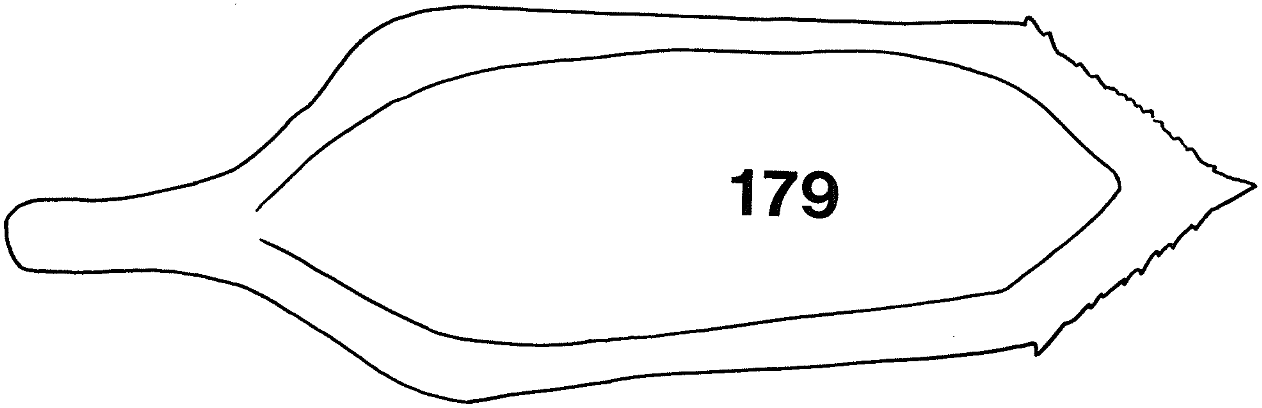
FIGURES 177-180. Ventral and dorsal ovipositor valves of Nearctic *Plateumaris* species (dorsal aspect): **177-178**, *P. rufa* (Say), and **179-180**, *P. diversa* (Schaeffer). (scale bar = 1.0 mm).



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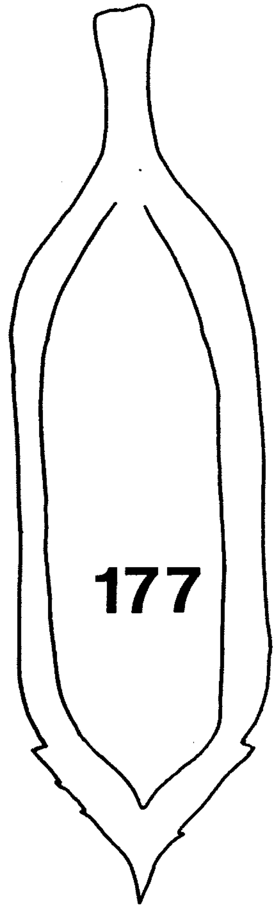

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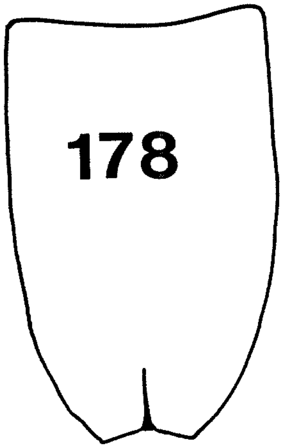

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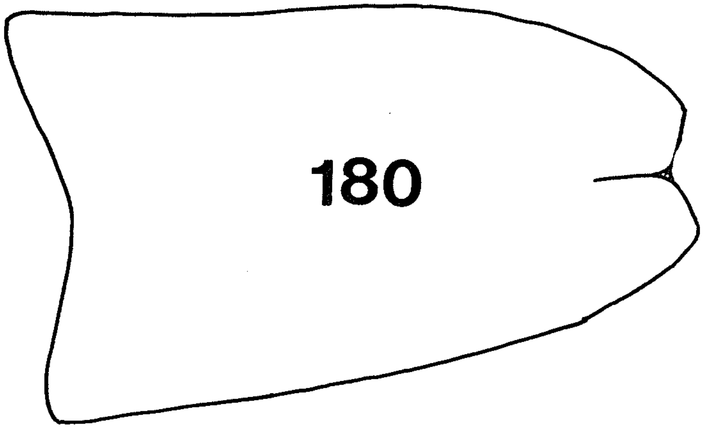

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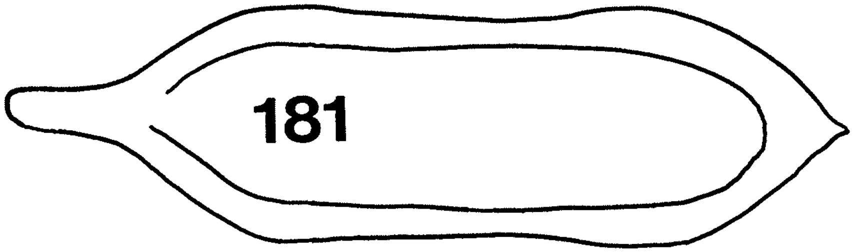
FIGURES 181-188. Ventral and dorsal ovipositor valves, respectively, of Nearctic *Plateumaris* species : **181-182**, *P. chalcea* (Lacordaire), **183-184**, *P. germari* (Mannerheim), **185-186**, *P. aurifer* (LeConte), and **187-188**, *P. flavipes* (Kirby). (scale bar = 1.0 mm).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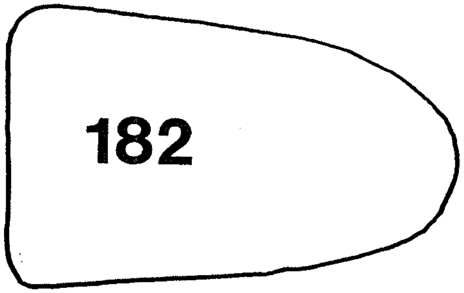
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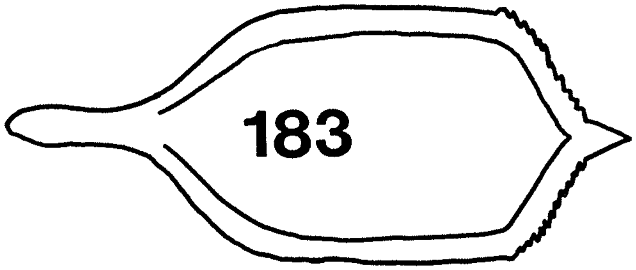
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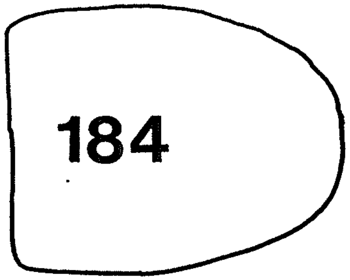
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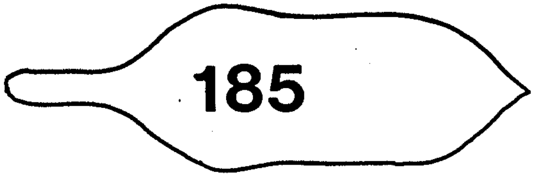
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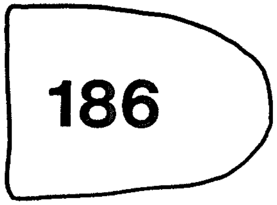
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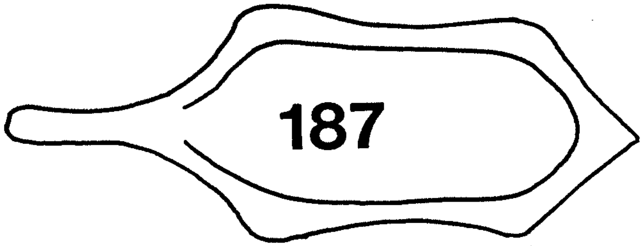
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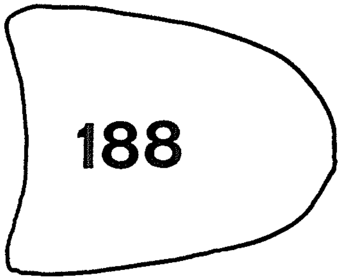
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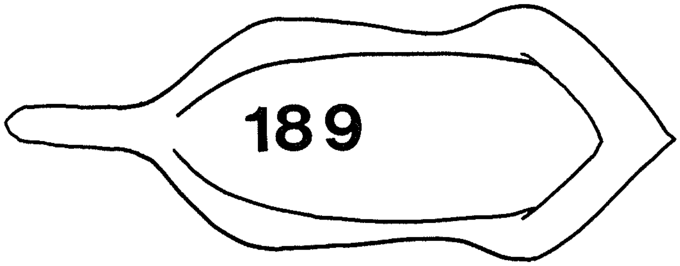
FIGURES 189-196. Ventral and dorsal ovipositor valves, respectively, of Nearctic _Plateumaris_ species (dorsal aspect): **189-190**, _P_. _pusilla_ (Say), **191-192**, _P_. _robusta_ (Schaeffer), **193-194**, _P_. _fulvipes_ (Lacordaire), and **195-196**, _P_. _neomexicana_ (Schaeffer). (scale bar = 1.0 mm).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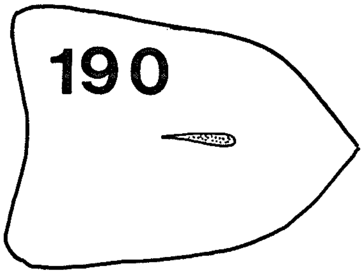
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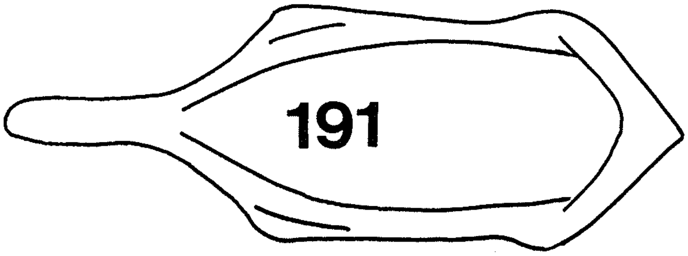
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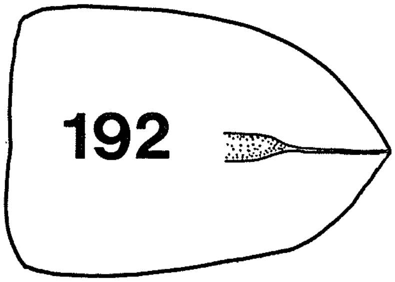
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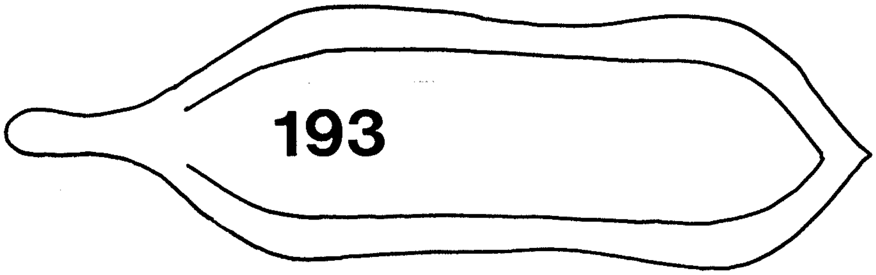
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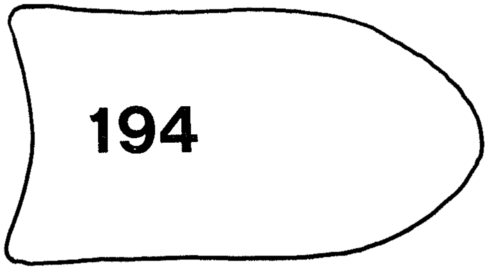
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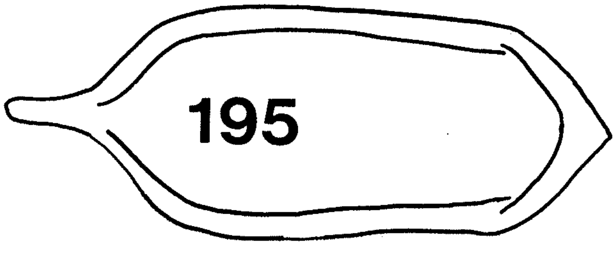
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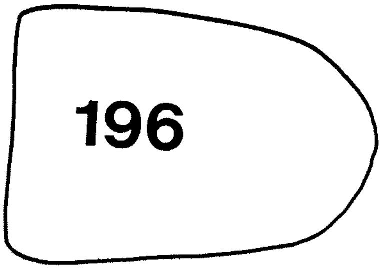
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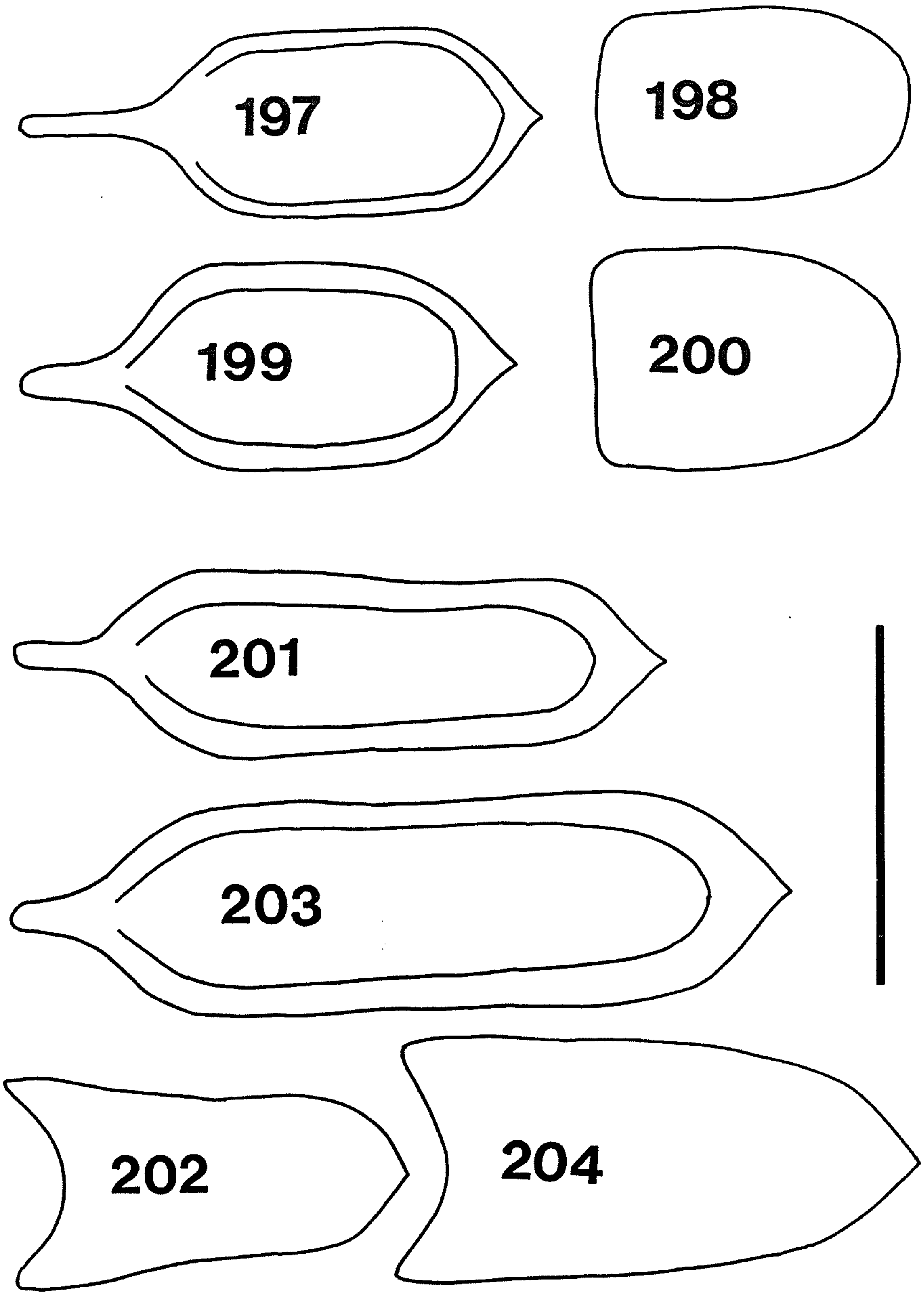
FIGURES 197-204. Ventral and dorsal ovipositor valves, respectively, of Nearctic Plateumaris species (dorsal aspect): **197-198**, P. metallica (Ahrens), **199-200**, P. dubia (Schaeffer), **201-202**, P. nitida (Germar), and **203-204**, P. frosti (Schaeffer). (scale bar = 1.0 mm).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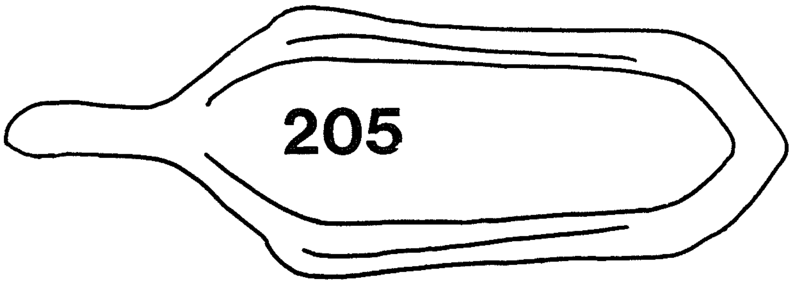
FIGURES 205-210. Ventral and dorsal ovipositor valves, respectively, of Nearctic *Plateumaris* species (dorsal aspect): **205,207**, *P*. *balli* Askevold, **206,208**, *P*. *notmani* (Schaeffer), and **209-210**, *P*. *schaefferi* Askevold. (scale bar = 1.0 mm).



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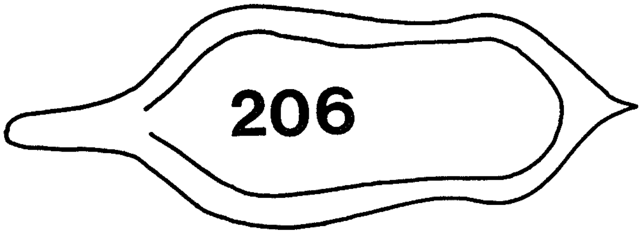

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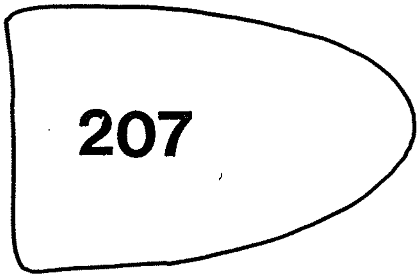

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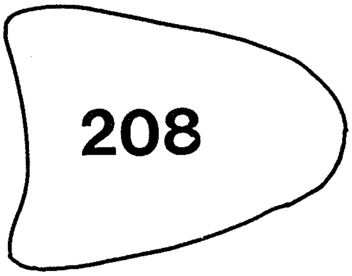

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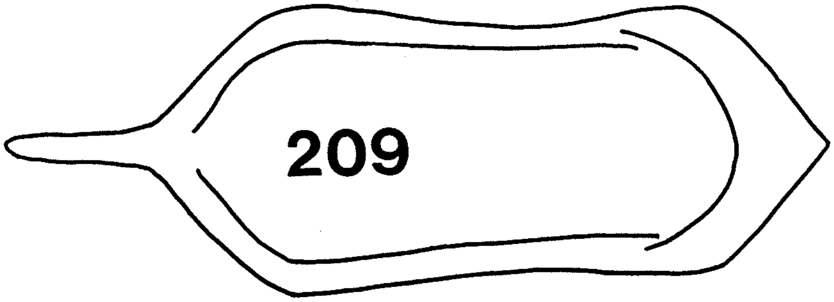

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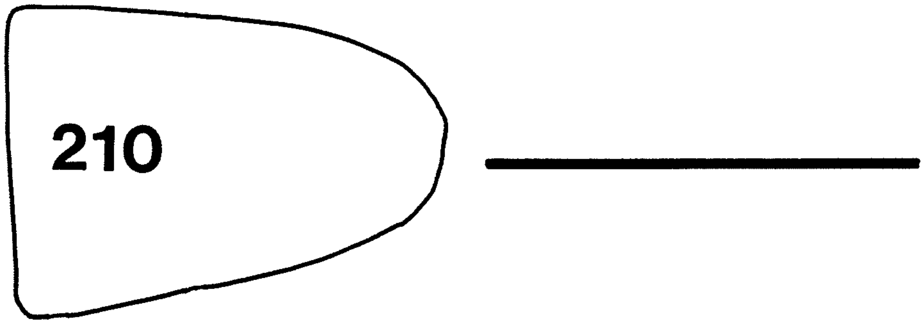

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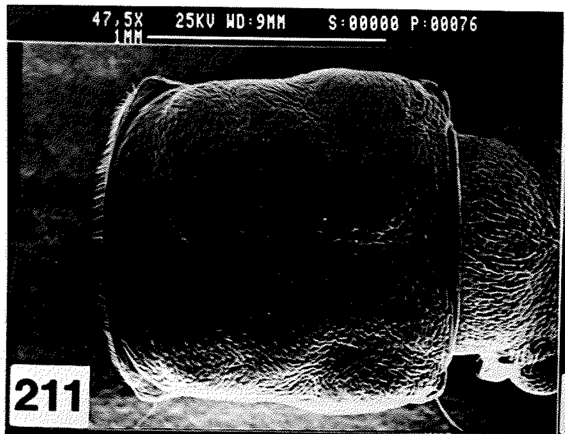
FIGURES 211-218. Pronotal structure of Nearctic Plateumaris species: **211,** P. flavipes; **212,** P. aurifer; **213,** sculptural detail of female specimen of P. flavipes; **214,** hypomeron of P. flavipes; **215,** P. pusilla; **216,** P. robusta; **217,** P. germari; **218,** sculptural detail of P. germari.



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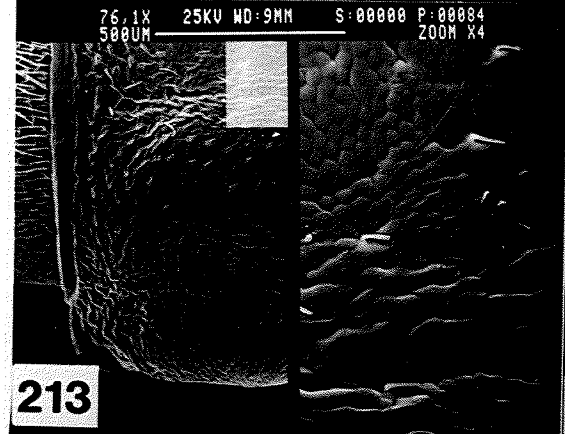

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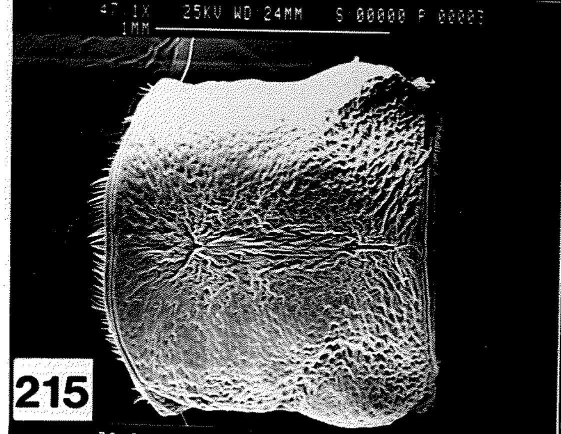

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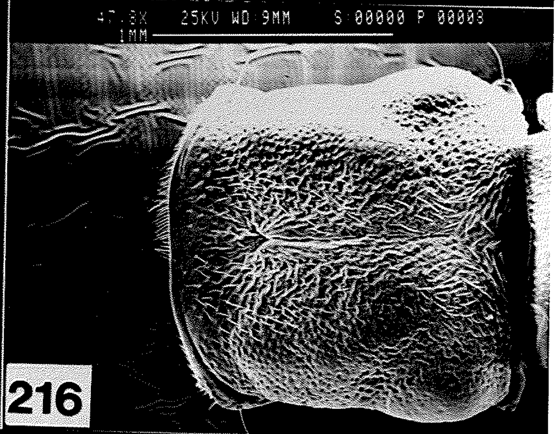

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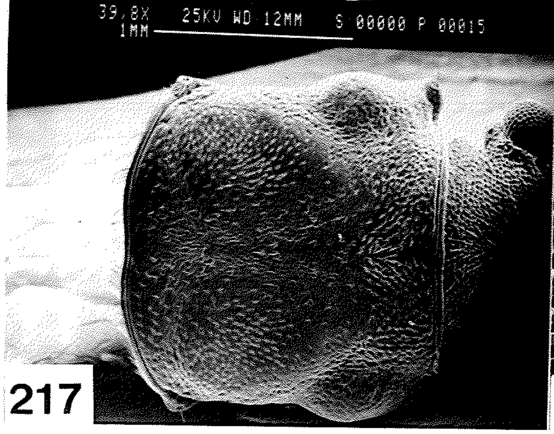

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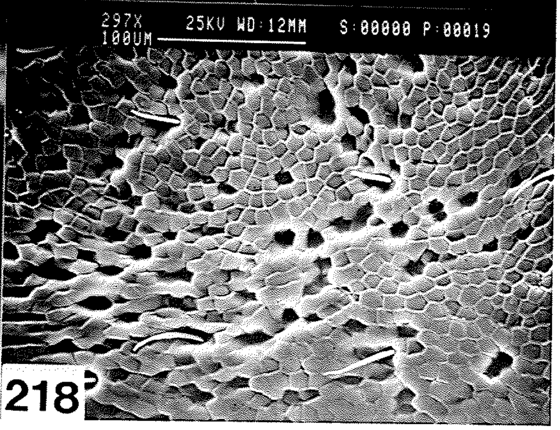

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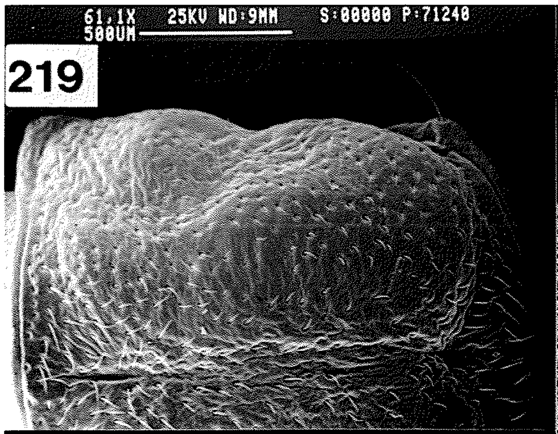
FIGURES 219-226. Pronotal structure of Nearctic *Plateumaris* species: **219,** detail of right half of specimen from Arizona of *P. neomexicana*; **220,** detail of right half of specimen from Oregon of *P. neomexicana*; **221,** hypomeron of *P. dubia*; **222,** *P. dubia*; **223,** *P. metallica*; **224,** *P. chalcea*; **225,** detail of left anterolateral area of *P. rufa*; **226,** hypomeron of *P. rufa*.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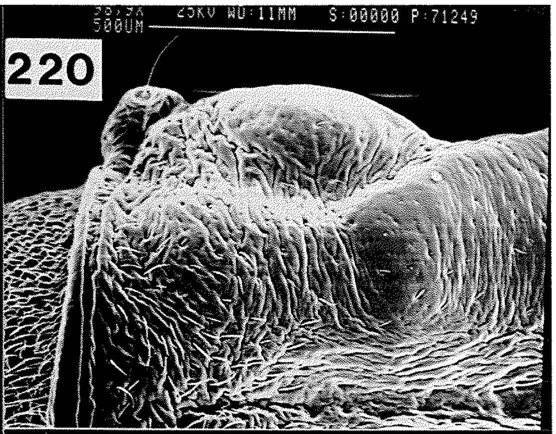
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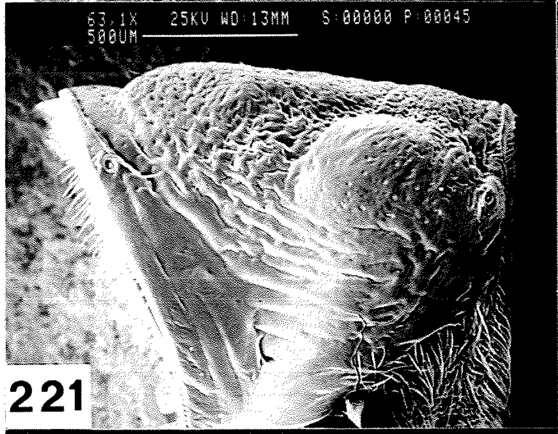
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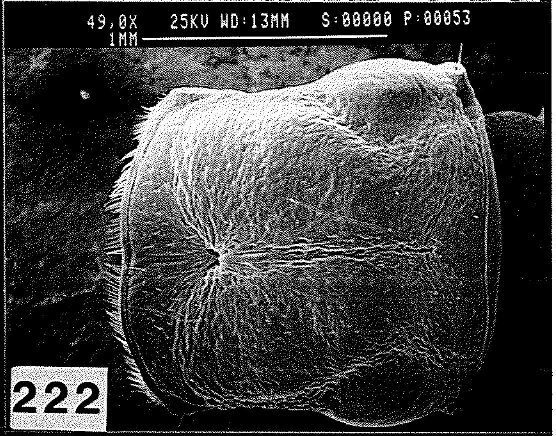
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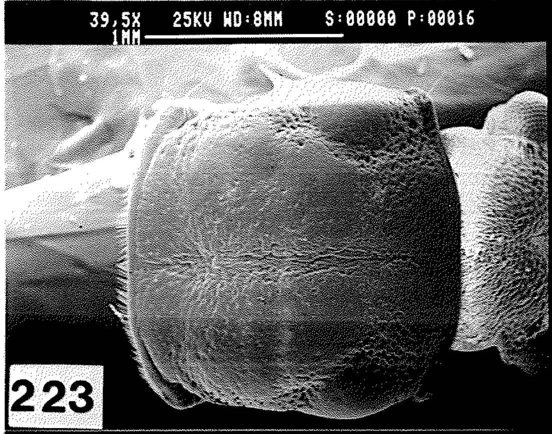
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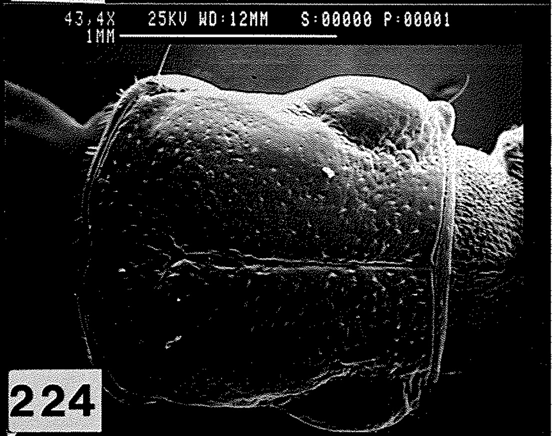
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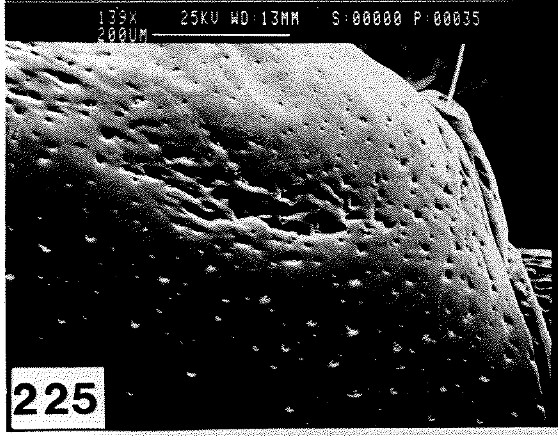
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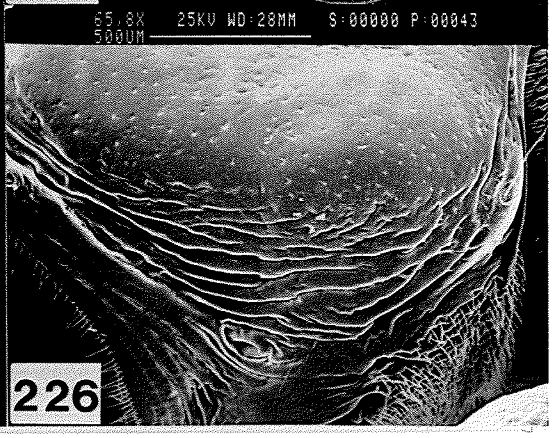
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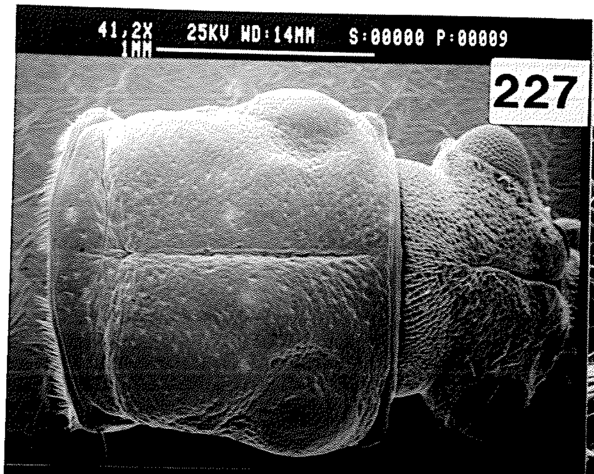
FIGURES 227-231. Pronotal structure of Nearctic Plateumaris species: **227,** P. nitida; **228,** sculptural detail of female of P. nitida; **229,** lateral aspect of P. nitida; **230,** P. frosti; **231,** P fulvipes.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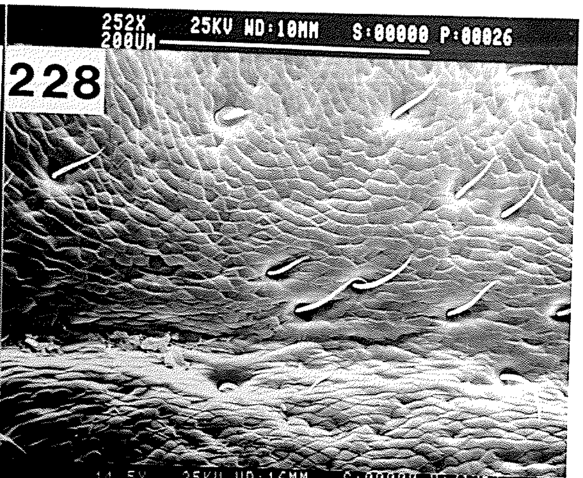
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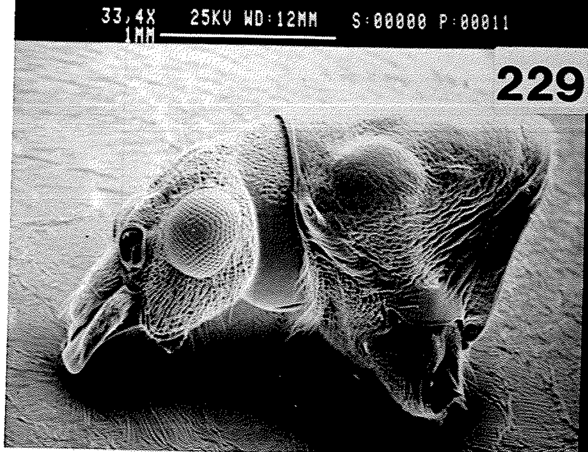
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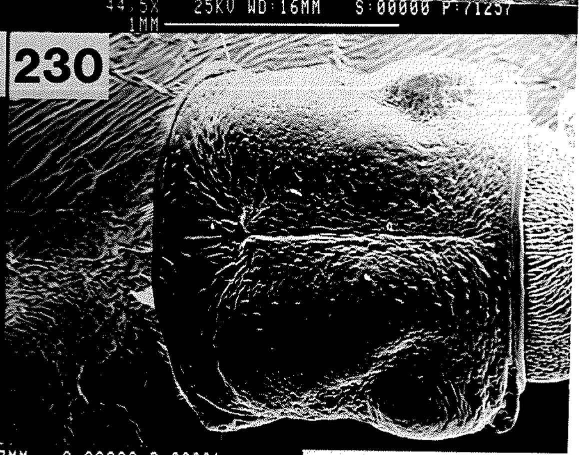
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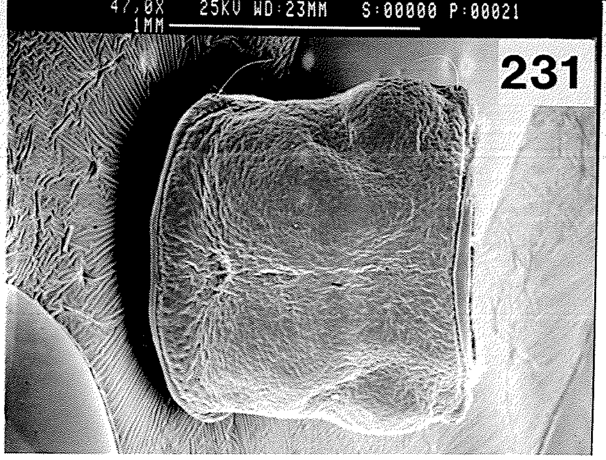
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FIGURES 232-239. Structural features of Nearctic *Plateumaris* species: **232-233,** pygidium and structural detail of pygidium of female of *P. rufa*; **234-235,** pygidium of female and underside of median lobe of *P. fulvipes*; **236,** apex of left metafemur of *P. frosti*; **237,** dorsal aspect of ovipositor of *P. robusta*; **238,** dorsal aspect of ovipositor of *P. rufa*; **239,** dorsal aspect of ovipositor of *P. nitida*.

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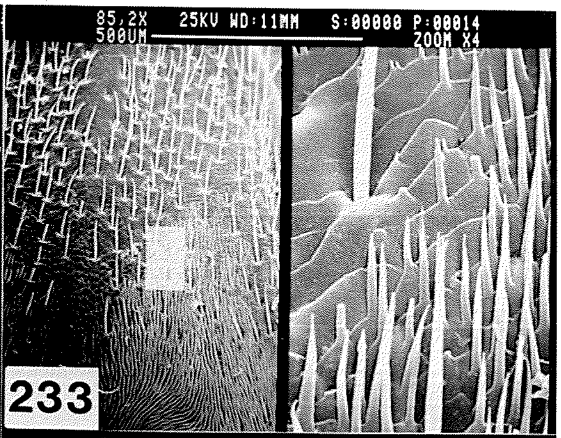

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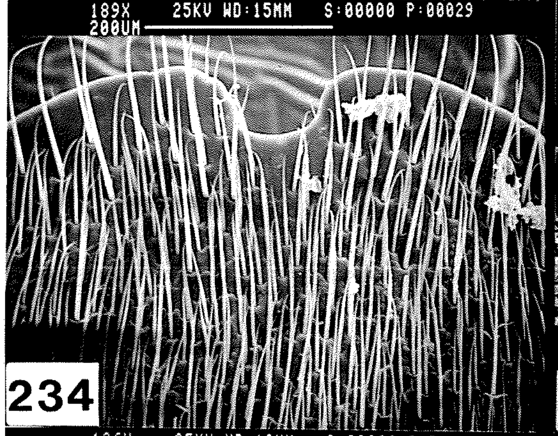

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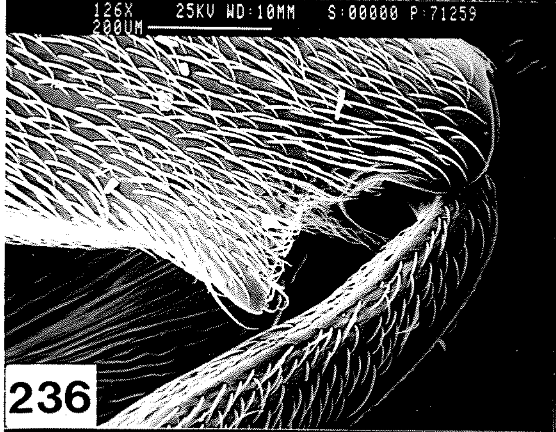

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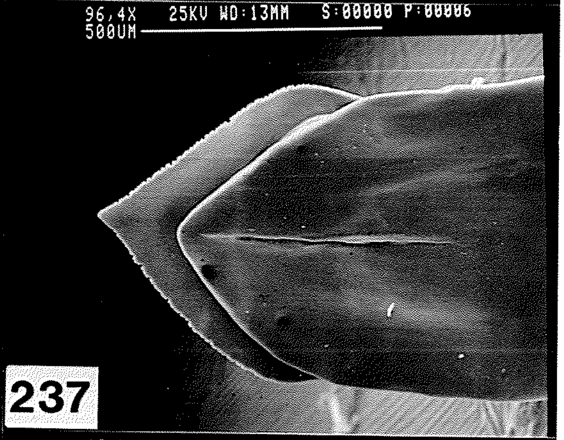

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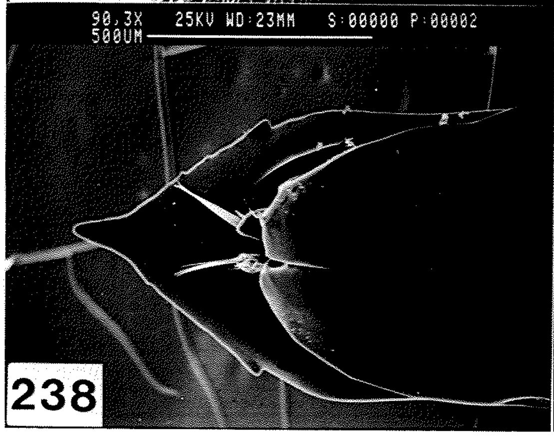

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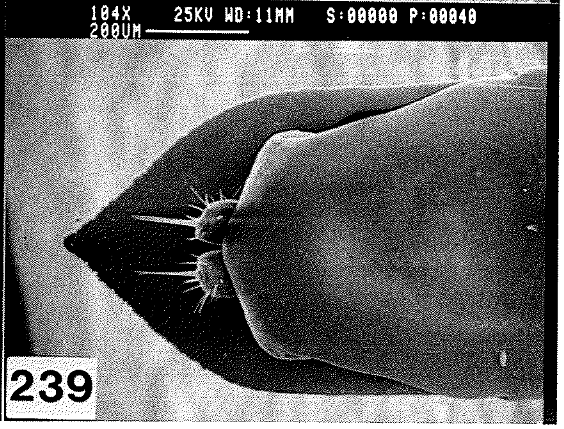

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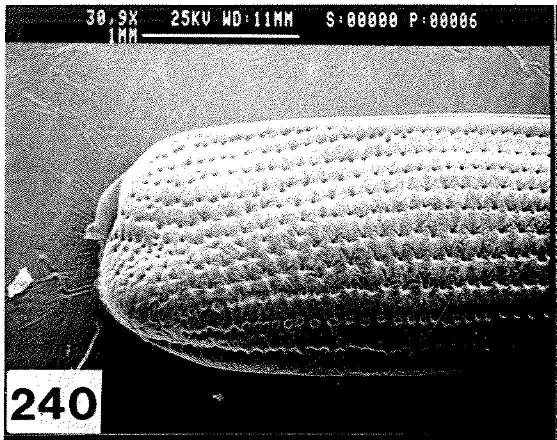
FIGURES 240-245. Elytral structure of Nearctic species of *Plateumaris*: **240-242,** base of left elytron of **240,** *P. aurifer*, **241,** *P. flavipes*, **242,** *P. chalcea*; **243-245,** detail of elytral punctulation and rugosity of **243,** *P. robusta*, **244,** extreme base of *P. fulvipes*, **245,** midlength of *P. fulvipes*.



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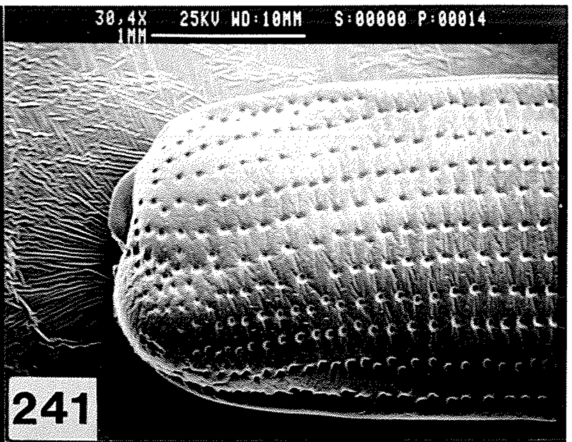

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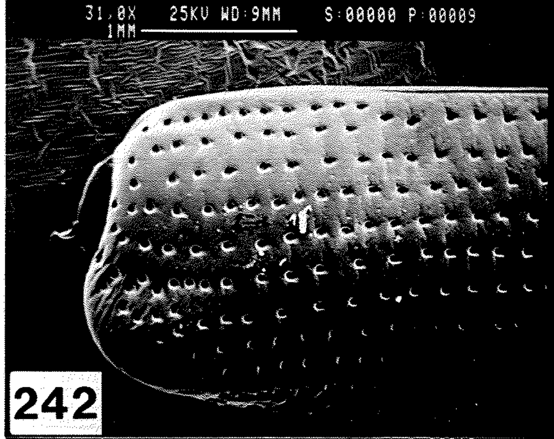

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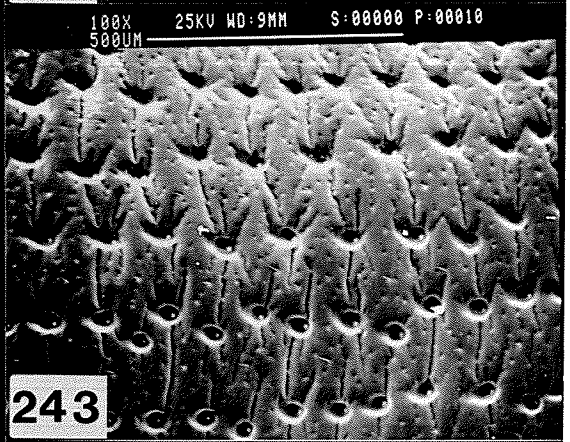

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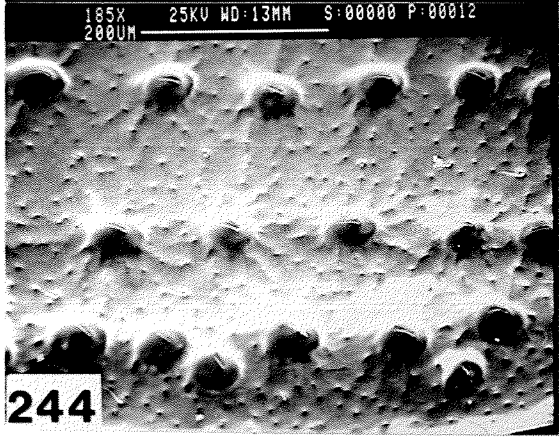

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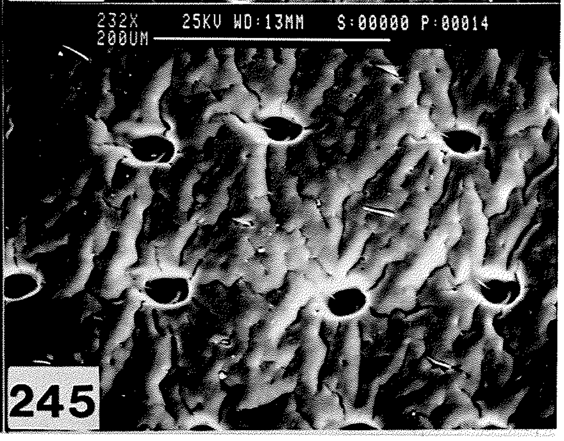

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4.1.5. Description of *Plateumaris* species.

P. *RUFA* -GROUP.

DIAGNOSIS. Members of this group are recognized by pygidium of female with midline more or less raised, in most members also glabrous, with shallow, oval depression either side of midline; ELD of endophallus with external lobe.

Plateumaris *rufa* (Say, 1827) ALTERED CONCEPT, NEW COMBINATION.

Figures 9, 57, 58, 95-97, 114, 114a, 116, 117, 163, 177, 178, 225, 226, 232, 233, 238, 246.

Donacia *rufa* Say (1827:283).

Donacia *sulcicollis* Dejean (1837:383) **NOMEN NUDUM.**

Donacia *affinis* Kirby (1837:224) (not Kunze 1818:37): LECTOTYPE ♀, BMNH by present designation: "LECTOTYPE [blue trim disc] [added by me], TYPE [red trim disc], N. Scotia 5950 b., Donacia affinis Kirby type." I added the labels: "LECTOTYPE ♀ Donacia affinis Kirby 1837 designated 11.VII.1984 I.S. Askevold [red]" and "Plateumaris rufa Say det. I.S. Askevold '84". The specimen is pinned through the prothorax, with left antenna and left fore leg missing. **NEW SYNONYMY.**

Donacia *sulcicollis* Lacordaire (1845:186): LECTOTYPE o^, BMNH by present designation: "LECTOTYPE [blue trim disc, added by me], TYPE [red trim disc], TYPE, LeConte [green], 67.56, Donacia sulcicollis mihi h. in

Amer. bor. D. Latreille [green label]". I added also the labels "LECTOTYPE o^ Donacia sulcicollis Lacordaire 1845 designated 10.VII.1984 I.S. Askevold [red]" and "Plateumaris sulcicollis (Lac.) det. I.S. Askevold '84." The specimen lacks its right antenna. **NEW SYNONYMY.**

Donacia kirbyi Lacordaire (1845:202), (replacement name for D. affinis Kirby, 1837). **NEW SYNONYMY.**

Donacia jucunda LeConte (1850:237). **NOMEN NUDUM.**

Donacia jucunda LeConte (1851:315), LECTOTYPE o^, MCZ type #4248, by present designation: "LECTOTYPE [blue trim disc, added by me], TYPE 4248 [red], D. jucunda LeC., J.L. LeConte Collection" I added the labels "LECTOTYPE Donacia jucunda LeConte 1851 designated I.S. Askevold 1983" and "Plateumaris sulcicollis (Lacordaire) det. I.S. Askevold 1983". **NEW SYNONYMY.**

Donacia rufa: Blatchley (1910:1107), Leng (1891:175).

Donacia jucunda: Crotch (1873:21).

Donacia kirbyi: Crotch (1873:21).

Donacia sulcicollis: Wilcox (1954:372).

Plateumaris rufa: Jacoby & Clavareau (1904:11), Clavareau (1913:31).

Plateumaris sulcicollis: Monrós (1959:104), Goecke (1960a:10), Jolivet (1970:61), Borowiec (1984:453).

TYPE SPECIMEN. NEOTYPE o^, MCZ Type #32947: "orange disc, D. Kirbyii LeC. affinis//Kirby, D. rufa Say". I added the label "NEOTYPE o^ Donacia rufa Say 1827 designated I.S. Askevold 1984 [red]."

Information about the type: The specimen selected for Neotype is from the LeConte collection under the labels "D. Kirbyii LeC. affinis//Kirby" and "D. rufa Say", the first of 11 specimens. Schaeffer (1925:118) disputed Leng's (1891) interpretation of D. rufa. I do not find any mention by Say of character states that conclusively support either author's use of D. rufa. The overriding consideration here is the assumption that LeConte correctly compared Say's D. rufa with his specimens; one as observant as Dr. LeConte would not likely have confused specimens of D. tuberculata Lacordaire (=D. rufa of Schaeffer, 1925), and his D. jucunda. It would appear that at a later date, as stated above, LeConte added the header label "D. rufa Say" to his series of D. jucunda.

TYPE LOCALITY. "Schuylkill River", as stated by Say.

ETYMOLOGY. Say (1827) probably named this species D. rufa for the of entirely reddish appendages and reddish- or brownish-bronze dorsum of most specimens.

TAXONOMIC HISTORY AND SYNONYMIES. Specimens of D. rufa were unknown to LeConte (1851), whose treatise formed the basis for subsequent treatments of Donaciinae. Thus, D. rufa was not used by Crotch (1873) either. Both authors recognized both D. jucunda LeConte and D. kirbyi Lacordaire instead, and LeConte recognized D. sulcicollis Lacordaire in addition. Leng (1891) then correctly recognized D. rufa with its junior synonyms D. affinis, D. kirbyi, and D. sulcicollis, but placed D. jucunda as a junior synonym of D. flavipes [here =P. chalcea (Lacordaire)]. Leng's arrangement was followed by Jacoby and Clavareau (1904) and again by Clavareau (1913). Schaeffer (1925:118) believed Leng was mistaken, more on account of statements absent from Say's description than on the basis of characters that would be decisive. Thus, Schaeffer instead recognized the name *D. sulcicollis* Lacordaire. Marx (1957) followed Schaeffer's use of *D. rufa*, as did Wilcox (1954). Blatchley (1910) followed Leng (1891) and used *D. rufa* in the present, correct sense. For reasons stated above, I must reject Schaeffer's assessment, and revert to use of *D. rufa sensu* Leng; this LeConte evidently decided to do after 1851, as evidenced by the header labels in his collection. The neotype designated above reflects this decision by LeConte.

DIAGNOSIS. Adult specimens of *P. rufa* are recognized at once by their convex pronotal disc, the disc shiny, sparsely punctate and punctulate, median line finely incised, basal sulcus deep, callosal sulci obsolete, legs and antennae entirely rufous, metafemur robust, nearly elliptical, with large, acute tooth, elytra with exposed sutural area rufous.

COMPARISONS. Specimens of *P. rufa* are unlike those of any North American species; the most similar are those of a Japanese species, *P. constricticollis* (Jacoby). Specimens of *Plateumaris diversa* are like those of *P. rufa* in ovipositor shape and pygidial characters, but have the dorsum more rugose, pronotum punctate and more quadrate in shape. In colour, luster and punctation, specimens of *P. rufa* are similar to those of *P. chalcea*, but the pronota of the latter have a deep and wide median line, disc commonly with some coarse transverse rugae, prominent basal and callosal sulci. Specimens of *P. chalcea* are generally larger, more elongate, and with elytra less markedly declivous. Some specimens of *P. rufa* that have a more punctate pronotum, tending to some rugosity, are similar to those of *P. metallica* because both have a truncate male pygidium, and rounded female pygidium in some specimens of *P. metallica*.

Specimens of P. rufa differ from those of that species by the prominent metafemoral tooth, prominent meso- and metatibial tubercle of males, and generally entirely rufous appendages, rounded female pygidium with raised and glabrous median area in most specimens.

DESCRIPTION. LENGTH. Males: 6.45-7.98 mm, females: 7.38-8.99 mm

COLOUR. Most specimens metallic reddish-coppery, some blue, green, few are purple; appendages rufous, pygidium of most specimens rufous, varying to more or less entirely infuscate in some specimens.

PRONOTUM. Disc markedly convex, basally markedlyy constricted, basal sulcus deep in most specimens, calli and callosal sulci obsolete, median line fine but distinct and regular; disc smooth and shiny, sparsely punctured and punctulate in most specimens, in very few specimens these denser and more or less confluent in form of rugulae; hypomeron with coarse longitudinal rugae.

HEAD. Antennal calli slight, punctate or not, vertexal calli obsolete, occiput not transversely sulcate; pubescence inconspicuous except on gena and clypeus.

APPENDAGES. LEGS. Entirely rufous in most specimens, femora in very few specimens with faint infuscation; metafemur nearly elliptical, similar in both sexes, with tooth prominent and obtuse, to stout and acute; meso- and metatibia of male with prominent tubercle, mucro of metatibia of female unusually long and prominent, up to half as long as basal tarsomere; meso- and metatibia slightly flared at extreme apex.

ANTENNAE. Rufous, antennomere proportions typical of genus.

ELYTRA. Interstriae shiny, sparsely to densely punctulate, rugose in some specimens at most at apices and laterally; explanate sutural margin rufous; antemedian depression slight, postmedian obsolete; surface extremely convex, apically markedly declivous; robust in shape, L:W ratio (of each elytron) 3.29-4.37 (mostly less than 3.60).

PYGIDIUM. Dimorphic sexually as detailed below; rufous to infuscate; midline sparsely pubescent and raised in most specimens (especially ♀), slightly depressed each side; punctation coarse, conspicuous and visible through sparse pubescence.

MALES. Pygidial apex truncate; meso- and metatibia with tubercle prominent in most specimens; endophallus with ELDs apically acute, at midlength with large external fold, PDS cordate, MEG more or less straight, as long as ELD.

FEMALES. Pygidial apex rounded, margins broadly glabrous; midline raised and impunctate in most specimens (but varying), at least at extreme apex with slight evidence of raised midline, shallowly depressed either side of midline; ovipositor with ventral valve acute, apical margins straight from apex to subapical lateral tooth, moderately serrate to not at all (possibly worn), dorsal valve triangularly emarginate, with short median line apically; apical sternum more or less broadly pointed, triangular; metatibial mucro elongate, about half basal tarsomere length.

SEXUAL DIMORPHISM. Sexual dimorphism is found in certain features: size, male tibial tubercle, female metatibial mucro, pygidial shape, pubescence, and prominence of midline.

VARIATION. Specimens of _P_. _rufa_ are rather uniform in structure, though varying slightly in density of pronotal punctation and elytral punctulation, prominence and acuteness of metafemoral tooth; prominence of midline of pygidium is especially varied, in some specimens the midline is hardly if at all, raised, the punctation in these specimens more or less uniform over the whole surface.

NATURAL HISTORY. Host plant associations are probably typical for the genus, including various Cyperaceae; the hosts of a closely related species in Japan, P. constricticollis, are stated to be Carex sp. and Scirpus sp. (Anonymous 1985), so it is probable that P. rufa uses the same host genera. Other hosts, such as Caltha palustris, Ranunculus acris, and Carex stricta were cited by Schaeffer (1925:126). Other records from Prunus, Acer saccharinum and even skunk cabbage, are probably adventitious as sites of copulation, etc. A number of specimens were collected sifting leaf litter, etc., in October and November, indicating that P. rufa probably overwinters in the adult stage.

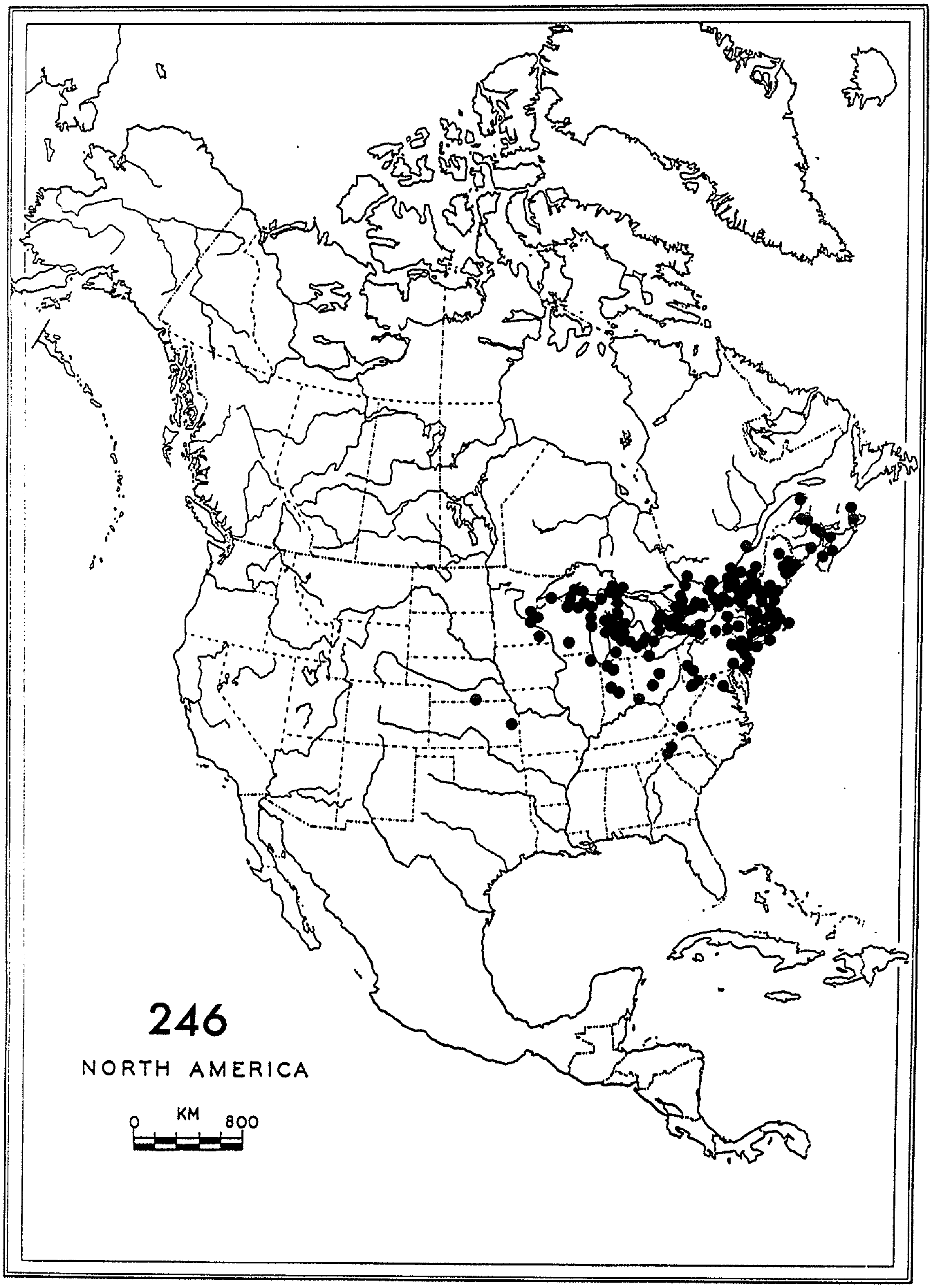
DISTRIBUTION. Plateumaris rufa occurs in the eastern half of North America, from West Virginia north to Quebec, and as far west as Minnesota, with isolated records from Nebraska and Kansas (Fig. 246).

CHOROLOGICAL RELATIONS. The range of P. rufa is fully sympatric with that of most other eastern Nearctic members of the genus, and frequently it has been collected together with many other species. The taxa most closely related to P. rufa (P. akiensis and P. constricticollis) are known only from Japan.

PHYLOGENETIC RELATIONS. In most respects, P. rufa is unique among North American Plateumaris, though there is great similarity to P. diversa in genitalic structure. The Japanese species, P. constricticollis and P. akiensis, are more similar in external structure to P. rufa than is P. diversa. These three species are hypothesized to form a closely related group of species, but of undetermined relationship to one another. Together, the Nearctic species, P. rufa and P. diversa, and the Japanese species, P. constricticollis and P. akiensis, form a group of species that seems most closely related to the European species *P. rustica*. These five species are combined in what seems to be a monophyletic group, which I call the *P. rufa*-Group. This group is the sister group to the *P. braccata*-Group; together these groups are the sister group to the remaining species groups in the genus.

SPECIMENS EXAMINED. 1690 males and females, excluding types. See Appendix 10.5 for detailed list of locality data from these specimens. I have examined specimens from the following provinces and states: CANADA: NB, NS, ON, PQ; UNITED STATES: CT, DC, IN, KS, ME, MD, MA, MI, MN, NB, NH, NJ, NY, NC, OH, PA, RI, VT, VI, WV, WI.

FIGURE 246. Known distribution of <u>Plateumaris</u> <u>rufa</u> (Say), from specimens examined. Each dot represents one collection record, or a group of very close records.



246

Plateumaris diversa (Schaeffer, 1925).

Figures 25, 26, 68-70, 102, 102a, 118, 119, 162, 179, 180, 247.

Donacia diversa Schaeffer (1925:143).
Donacia harrisi: Blatchley (1910:1105).
Donacia diversa: Wilcox (1954:373).
Plateumaris diversa: Jolivet (1970:58), Monrós (1959:105), Goecke (1960a:8), Borowiec (1984:452).

TYPE SPECIMENS. Holotype ♀, Indiana, Donacia diversa Schffr, USNM Type #42397, and allotype o^, USNM, Wisc., O. Dietz. The holotype lacks tarsi.

TYPE LOCALITY. "Indiana", as stated by Schaeffer.

ETYMOLOGY. I could not determine what basis for this name Schaeffer used; perhaps he merely thought the species unusual in some structures, thus diversely different from other Nearctic members of the genus.

TAXONOMIC HISTORY. This species not having been described until 1925, has a brief taxonomic history; it was misidentified by Blatchley (1910) as Donacia harrisi, as was realized by Schaeffer (1925).

DIAGNOSIS. Specimens of P. diversa are easily recognized on the basis of their robust femora, especially the metafemur, which is as large in diameter at the base as at the apex, and therefore not markedly clavate; pygidium of female specimens with two depressions, ventral valve of ovipositor parallel-sided, with apical parts straight and converging to acute point, at lateral angles with small tooth; pronotum with disc more or less alutaceous and irregularly and confluently punctate, median line obscured or absent, callosal sulcus shallow, the callus therefore poorly delimited, basal sulcus shallow, better developed than callosal sulci;

elytral disc more or less uniformly punctulate, intervals coarsely transversely rugose.

COMPARISONS. Specimens of P. diversa are most easily confused with those of P. germari, both of which possess basally broadened metafemora, and the median line of pronotum is absent from some specimens of P. diversa. Females of P. diversa, however, possess an ovipositor like P. rufa (and certain Palaearctic species), which is more or less parallel, with a single tooth subapically, the apical margins extend straight to an acute apex. The ovipositor of P. germari is subapically broadly rounded, but apical margins very coarsely serrate. They also differ markedly in pygidial characters, females of P. diversa generally having a more or less salient midline and lateral depressions of the pygidium, as do those of P. rufa. Males may be a little more difficult to reliably distinguish, but then (as in females) the median pronotal line of P. diversa is generally visible, the disc more or less uniformly punctate, the spaces between punctures not so alutaceous, as is typical of P. germari. Specimens of both species may have the subapical explanate sutural margin of elytra reddish, this in most specimens of P. diversa, and only some specimens of P. germari.

DESCRIPTION.

LENGTH. Males: 7.45 - 8.77 mm, females: 9.55 - 10.26 mm.

COLOUR. Coppery or brownish coppery; antenna entirely rufous to entirely infuscate; legs entirely rufous, or with tibiae and tarsi infuscate, and metafemur with up to apical two thirds infuscate to metallic; pygidium rufous to metallic.

PRONOTUM. Disc more or less densely punctured, these in most specimens contiguous to confluent and forming irregular rugae over much of the disc, punctures sparser and finer in posterior half, there indistinctly alutaceous in some specimens; median line obscure in some specimens, obliterated in most specimens by irregular and confluent punctation; callosal sulcus obsolete, the callus not prominent; basal sulcus present, but shallow (better developed than callosal sulcus); hypomeron with lower half more or less regularly longitudinally rugose, becoming less regular, more punctured toward lateral margin.

HEAD. Typical of genus, antennal calli slight, punctured, vertexal calli absent.

APPENDAGES. LEGS. Tibiae and tarsi rufous to partly infuscate, femora rufous or with apical two thirds in some specimens piceous or obscurely metallic; femora robust and broad, not markedly clavate, metafemur with base as broad as apex, and with tooth broad and obtuse to large and acute; meso- and metatibia with tubercle in male specimens, mucro of mesotibia of most specimens, conspicuous, curved, as long as that of protibia. **ANTENNAE.** Entirely rufous to entirely infuscate, antennomere proportions typical of genus.

ELYTRA. Surface punctulate, strial punctures with transverse rugae between them, these of varying density and regularity; exposed apical sutural margin rufous in most specimens.

PYGIDIUM. Dimorphic sexually, as detailed below; entirely rufous to entirely dark or metallic.

MALES. Pygidium broadly and shallowly emarginate apically, to truncate, in some specimens shallowly depressed subapically, each side of midline; meso- and metatibial tubercle distinct, short; endophallus with PDS small and triangular, BSB with small basal part, ELDs with small external lobe; cap of tegmen distinctly tapering to narrow apex.

FEMALES. Pygidium parallel-sided, laterally rounded apically, shallowly emarginate at apex, shallowly depressed subapically each side of midline in most specimens, the midline slightly raised, narrowly glabrous, the whole surface, except apex, with coarse, broadly impressed punctures, distinctly alutaceous between them; ovipositor with ventral valve parallel-sided, abruptly angulate subapically, toothed at lateral angles, apical margins variably serrate; dorsal valve of ovipositor of most specimens notched or broadly emarginate, and with fine apical median line; apical sternum more or less straight from side to side, therefore broadly truncate and short.

SEXUAL DIMORPHISM. The sexes differ in size, depressions and shape of pygidium, and males possess a tubercle on meso- and metatibia.

VARIATION. Appendages and pygidium varying from rufous to infuscate, femora apically metallic in some specimens; metafemoral tooth broad and obtuse to large and acute.

NATURAL HISTORY. No host records accompanied specimens, but Schaeffer (1925) reported that Blatchley collected specimens from sedges in moist meadows.

DISTRIBUTION. Plateumaris diversa is known from collection records from Ontario and Indiana, west to Iowa, Minnesota and Manitoba (Fig. 247).

CHOROLOGICAL RELATIONS. The distribution of P. diversa overlaps with that of most of the eastern species of the genus, but has seldom been collected with other species. Judging by collection data, it was collected together with P. rufa in Minnesota.

PHYLOGENETIC RELATIONS. Plateumaris diversa is more closely related to P. rufa (Say) than to any other Nearctic species, though P. rufa is more closely related to two Japanese species. Plateumaris diversa is a member of a heterogeneous species group that has two Nearctic species, two Japanese and one European species. See discussion of P. rufa for further details.

SPECIMENS EXAMINED: 24 males and females, including types as follows (some localities cited by Schaeffer, but from which I saw no specimens, are included):

CANADA. MANITOBA: Cedar Lake, July.1936, 5.July.1936, CT Parsons (MCZ 2);

"Dawson Trl." [interpreted as N.E. area of Winnipeg], 19.vii.29, [probably coll. by J.B. Wallis] (JBWM 1);

"Vic. Bch." [=Victoria Beach], 9.vii.24, L.H. Roberts (UAE 1).

ONTARIO: Normandale, 17.vi.1931, WJ Brown (CNC 1);

Point Pelee, vi.13.1920, NK Bigelow (MCZ 1).

USA: INDIANA: Lake Co.: County record (according to Schaeffer, 1925);

Kosciusko Co.: County record (according to Schaeffer, 1925);

St. Joseph Co.: Pine (according to Schaeffer, 1925).

IOWA: "County #3": 10.vi.1938, B Berger, (UMMA 1), June.22.1935, LEW (AMNH 1), June.17.1933, M Jacques (AMNH 1).

MICHIGAN: Livingston Co.: ES George Reserve, 30.vi.1947, K Bohnsack (UMMA 1);

G. Res., v.28.44, RR Dreisbach (MSUE 1);

County record: vi.12.1923, MM Hatch (OSUC 2).

MINNESOTA: Becker Co.: Green Water Lake, 15.vi.1980 (NDSU 1);

Clearwater Co.: Itasca State Park, Jun.18.1937, HR Dodge (WSU 2,ISAC 1);

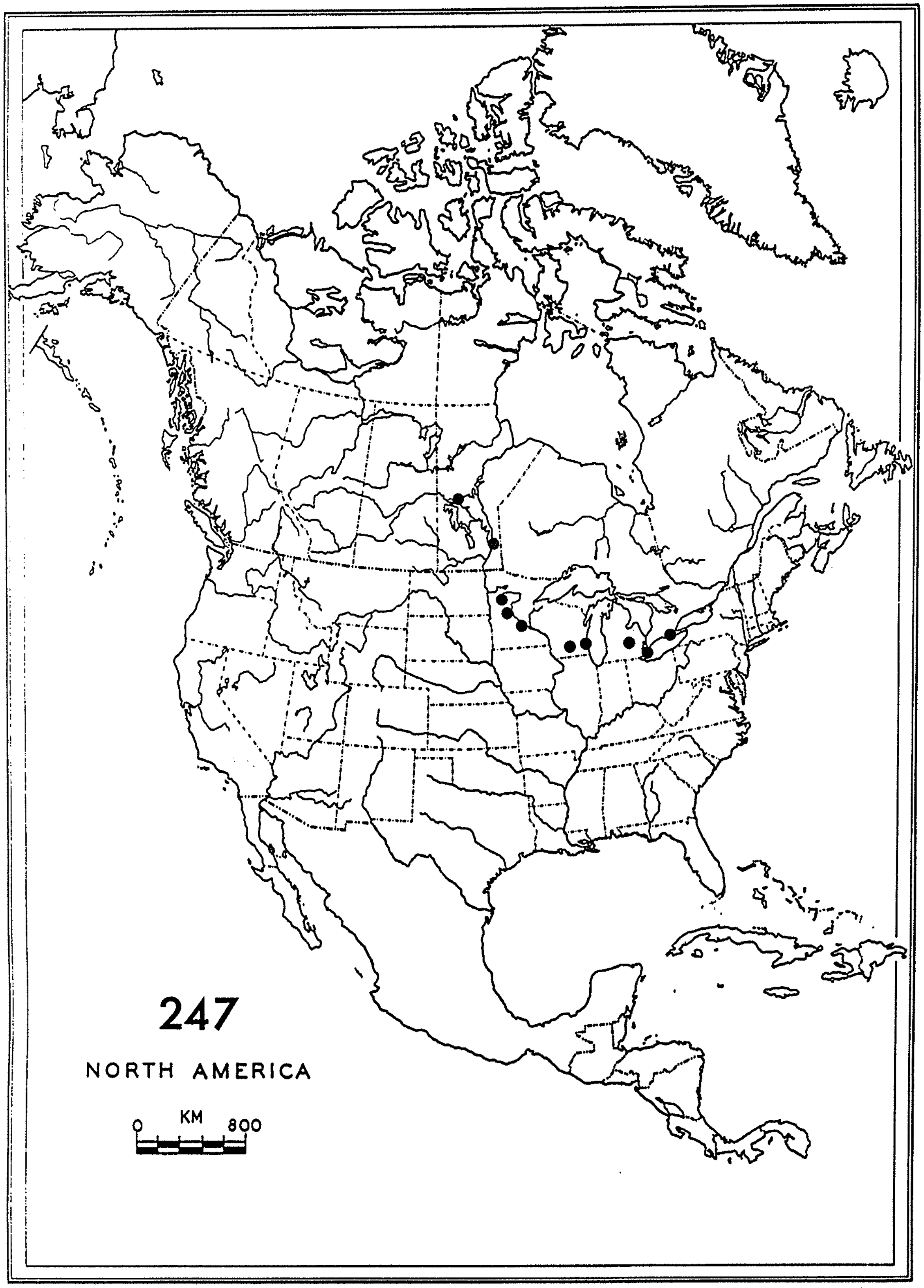
Hennepin Co.: "low prairie", 27.v.1922, WmE Hoffman (DEFW 2, ISAC 1);

Todd Co.: Big Swan Lake, 26.vii.1979, C van Nidek (CVNC 1).

WISCONSIN: Dane Co.: Madison, 22.vi.1933 (UWM 1);

Miscellaneous localities: "Wis." [according to Schaeffer (1925), near Milwaukee, by O. Dietz.), (USNM 1).

FIGURE 247. Known distribution of Plateumaris diversa (Schaeffer), from specimens examined and from localities listed by Schaeffer (1925). Each dot represents one collection record, or a group of very close records.



247
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P. PUSILLA -GROUP.

DIAGNOSIS. Members of this group of species are recognized by rugose or at least densely punctulate elytra, closely punctured pronotal disc (except P. germari and P. hirashimai), pygidium of males emarginate, tibial apices not at all flared (except P. robusta), and appendages of most specimens rufous or at most infuscate to partly metallic (except some specimens of P. germari and P. hirashimai).

Plateumaris pusilla (Say, 1827)

Figures 51-53, 89, 90, 112, 126, 127, 160, 189-190, 215, 248.

Donacia pusilla Say (1827:293).

Donacia rugifrons Newman (1838:391). Trenton Falls, New Jersey. Type not found, reported to be in BMNH. Schaeffer (1925) also reported that G.J. Arrow was unable to locate this type for comparison. Type presumed lost, but synonymy here follows Schaeffer (1925); Newman's original description could apply equally well to D. (Donaciomima) caerulea Olivier. I have no specimens from New Jersey at hand at this time, so P. pusilla may not occur there. In this case, D. rugifrons may correctly be a junior synonym of D. caerulea Olivier, and not P. pusilla (Say), as followed here.

Donacia pyritosa LeConte (1857:66). LECTOTYPE ♀ MCZ Type #4246, by present designation: "blue disc, Type 4246 [red], pyritosa 2, LECTOTYPE ♀ Donacia pyritosa LeConte 1860 designated I.S. Askevold ["preprints" of this publication were distributed in 1857; for nomenclatural purposes, the date of publication of the name is 1857, not 1860 as printed on the book].

NEW SYNONYMY.

Donacia pusilla var. *pyritosa*: Leng (1891:176), Schaeffer (1925:151), Beller and Hatch (1932:84), Mead (1938:119), Hatch (1971:170).

Donacia pyritosa: Lacordaire (1845:200), Crotch (1873:21).

Donacia pusilla: Lacordaire (1845:199), Schaeffer (1925:149), Wilcox (1954:373).

Donacia cuprea: Crotch (1873:31).

Plateumaris pusilla: Jacoby and Clavareau (1904:11), Clavareau (1913:31), Monrós (1959:105), Goecke (1960a:9), Jolivet (1970:60), Borowiec (1984:453).

TYPE SPECIMEN. NEOTYPE o^, MCZ Type #32950: "Canada, Manitoba, Duck Mtn. Prov. Park, Madge Lake, 24.VII.83, I.S. Askevold; NEOTYPE o^ Donacia pusilla Say 1827, designated I.S. Askevold 1984". The genitalia are preserved in a microvial pinned beneath the specimen.

TYPE LOCALITY. The type locality was given as "inhabits middle states" by Say, hereby restricted to the above locality in Manitoba by implication of ICZN (1985) Article 75(f).

ETYMOLOGY. Undetermined.

TAXONOMIC HISTORY AND SYNONYMIES. The history of the name *P. pusilla* is not complicated; it is among the oldest names of Nearctic donaciines, and has therefore long been recognized. However, the history of its various junior synonyms and their uses, is convoluted. *Donacia pyritosa* LeConte was recognized until Leng (1891) doubted its validity. Schaeffer (1925) gave it varietal status. *Donacia rugifrons* Newman was not recognized since the original description, but was placed as a junior subjective synonym *D*. *emarginata* Kirby by Leng (1891), who perhaps merely accepted LeConte's (1851) placement of *D*. *rugifrons* as a possible synonym of *D*. *emarginata*, even though Leconte also placed *D*. *rugifrons* as "*Species dubiae*...". Jacoby and Clavareau (1904) and Clavareau (1913) followed this treatment. Crotch (1873) did not take this name into consideration. Schaeffer (1925) did not agree with its placement as a synonym of *D*. *emarginata* and transferred it to a junior subjective synonym of *D*. *pusilla* Say. *Donacia cuprea* Kirby was recognized by Crotch (1873) as the present species, with *D*. *pusilla* Say, *D*. *aurifer* LeConte, and *D*. *dives* LeConte as synonyms. That was clearly an error of priority which Leng (1891) corrected. *Donacia cuprea* was left as a synonym of *D*. *pusilla* by Jacoby and Clavareau (1904) and Clavareau (1913), but Schaeffer (1925) transferred it to junior subjective synonymy with *D*. *quadricollis* Say. [*D*. *cuprea* finally achieved specific status in *Donacia* because *D*. *quadricollis* had been misidentified (Askevold 1987a)]. *Donacia cataractae* Newman was also placed as a junior subjective synonym of *D*. *pusilla* by Leng (1891) and Jacoby and Clavareau (1904); this was corrected by Schaeffer (1925), and *D*. *cataractae* was correctly transferred to a junior subjective synonym of *P*. *metallica* (Ahrens). *Donacia dives* LeConte was correctly placed under *D*. *pusilla* also, but is correctly a junior synonym of *P*. *germari* (Mannerheim), as Schaeffer (1925) indicated. Here again, Schaeffer was instrumental in sorting out the taxonomy of these taxa, *albeit* with some errors that do not now affect the taxonomy of *P*. *pusilla*.

DIAGNOSIS. Adult specimens of P. pusilla are recognized by the bicoloured antennomeres and femora, rufous tibiae and tarsi; metafemur with small acute tooth; pronotum more or less uniformly coarsely, closely punctate, median line narrowly defined or with median area broadly excavated, basal sulcus obscure, anterior calli well-defined; pygidium of males deeply emarginate, of females rounded to slightly emarginate; endophallus with ELD broad, simple, curved dorsad, MEG and PDS fused in C-shape, MEG robust, BSB of two parts, basal part very short; ovipositor with ventral valve broadly rounded laterally, dorsal valve with apex acute, median line fine, restricted to basal area (therefore generally not visible).

COMPARISONS. Specimens of P. pusilla are the most commonly collected of the genus. They may be confused with specimens of P. fulvipes or P. germari that have the apical half of femora metallic, because these also have emarginate pygidia of males. Specimens of P. germari, however, have broad femora, especially the metafemur, alutaceous pronotal microsculpture, and lack median line. Those of P. fulvipes have a more prominent metafemoral tooth, antennomeres 2 and 3 not subequal in most specimens, and females have a deeply notched pygidium. In pronotal and elytral sculpture, antennomere proportions, and metafemoral tooth size, specimens of P. pusilla are similar to those of P. robusta, and are hardly distinguishable from that species by genitalic characters. Antennomeres 2 and 3 of specimens of P. rubusta are nearly globular, but in some specimens antennomere 3 is slightly longer than 2 and thus certain specimens resemble those of P. pusilla; similarly, some specimens of P. pusilla have these antennomeres equal in length. The two species are easily distinguished by several characters, though.

Specimens of Plateumaris pusilla have the apical half of femora metallic, those of P. robusta have legs entirely rufous and have the meso- and metatibia slightly flared apically, whereas specimens of P. pusilla have these straight to apex; specimens of P. robusta have a quadrate pronotum, whereas those of P. pusilla have the pronotum slightly constricted behind, at least in most specimens. In central California and southern Oregon, some male specimens of P. pusilla are similar to those of P. neomexicana, because some series contain specimens with entirely rufous appendages, or femora with narrow subapical metallic area, like those of P. neomexicana. These specimens are easily distinguished by antennomere proportions, pronotal and pygidial shapes, femoral tooth size, and presence of mesotibial tubercle in males of P. pusilla.

DESCRIPTION.

LENGTH. Males: 6.77 - 8.25 mm, females: 7.20 - 8.89 mm

COLOUR. Green, blue, red, coppery, reddish-purple; antennomeres and femora bicoloured, tibiae and tarsi rufous.

PRONOTUM. Punctation dense and coarse in most specimens, some swollen areas of disc more sparsely punctate, therefore shiny in many specimens (especially males), that of most female specimens more closely punctate than males; median line more or less distinct, in many males and some females medial area broadly furrowed with rather finer median line; basal sulcus obscure; callosal sulci moderately deep, but calli prominent in most specimens; hypomeron with a few coarse longitudinal rugae, but largely densely punctate, like disc. Some female specimens from all areas of the distribution with some setae evident on disc, but some specimens from California to southern Oregon with very dense punctation and distinct short pubescence; males from these series without such pubescence, but disc swollen each side of median line and there shiny and sparsely, more finely punctate; appendages of these series largely rufous, but variable, and typical specimens are often mixed with these.

HEAD. Vertex with calli prominent to entirely absent, the head flat between eyes; antennal calli punctate and pubescent to punctate only, to impunctate and shiny.

APPENDAGES. LEGS. Entirely rufous, with femora of most specimens with about apical half to one third metallic, this abruptly defined and sharply contrasting, femora of some California to southern Oregon specimens with this metallic area reduced to absent, these often mixed with typical specimens in series; metafemur with small, acute tooth in most specimens; meso- and metatibia of males with small tubercle.

ANTENNAE. Scape entirely metallic, remaining antennomeres of most specimens basally rufous, apical half or more metallic, some specimens from California to southern Oregon with antennae largely to entirely rufous; antennomeres 2 and 3 subequal in length (variable, length 3:2 =1.0-1.32).

ELYTRA. Majority of disc of most specimens rugose, the surface of these with punctulae, in some specimens, especially anteriorly, depth and density of rugae reduced, surface therefore shiny, but still punctulate; antemedian and postmedian depressions prominent to obscured.

PYGIDIUM. Dimorphic sexually as detailed below; apical half or more metallic, some specimens with only apical margin rufous.

MALES. Pygidium deeply to moderately emarginate; meso- and metatibia with small tubercle; endophallus with BSB of two parts, basal part short, PDS prominent, fused with MEG basally, MEG just extending past PDS, ELDs simple, curved inward toward apex.

FEMALES. Pygidium broadly rounded in most specimens, varying to slightly truncate or shallowly emarginate in some specimens; ventral valve of ovipositor laterally broadly rounded, curving to slightly acute apex, margins finely serrate (may be worn); dorsal valve pointed, with fine median line short, not attaining apex.

SEXUAL DIMORPHISM. Typically, sexual dimorphism is found in size, pygidial shape, and presence of tibial tubercle in males; females tend to have punctation of pronotal disc denser, in some specimens with very fine short setae, these setae in some California to southern Oregon specimens longer and conspicuous, the males of these series with sparser than usual punctation on swollen disc either side of midline.

VARIATION. The species varies in size, antennomere ratios, femoral and antennal colour, density of pronotal punctation and pubescence (♀), and pygidial shape, as detailed above.

NATURAL HISTORY. *Plateumaris pusilla* is typical of other members of the genus. Host records include *Carex*, *Scirpus*, *Juncus*, *Eleocharis palustris*, and other records from *Eleocharis* spp.; a variety of, in my opinion, adventitious records include: "*Mentha* and *Potentilla*", *Potentilla simplex*, *Solidago*, *Rumex*, *Alnus*, *Sparganium*, *Salix*, *Dulichium arundinaceum*, *Agropyron cristatum*, *Lepidium*, *Abies contorta*, Buttercups, and "*ex* blue camas". Specimens are commonly the most abundant at collecting sites, outnumbering many other species with which it co-occurs. In my collecting in western Canada, I found *P. pusilla* to be the species that invariably was found in new aquatic habitats, such as borrow pits and recent man-made excavations that had only recently been colonized by the various marginal aquatic plants. Areas of permanent water bodies that could be regarded as sources of colonists, often would yield a wider variety of donaciines in the genus *Plateumaris*, as well as *Donacia* and *Neohaemonia*. Yet, *P. pusilla* would be one of few species present, and then by far the most abundant. It appears that this species may be an active colonizer, searching out new water bodies, and therefore being one of only a few species that is really transcontinental in distribution; this propensity may account for the limited range of variation that I perceive, and rather uniform structure transcontinentally.

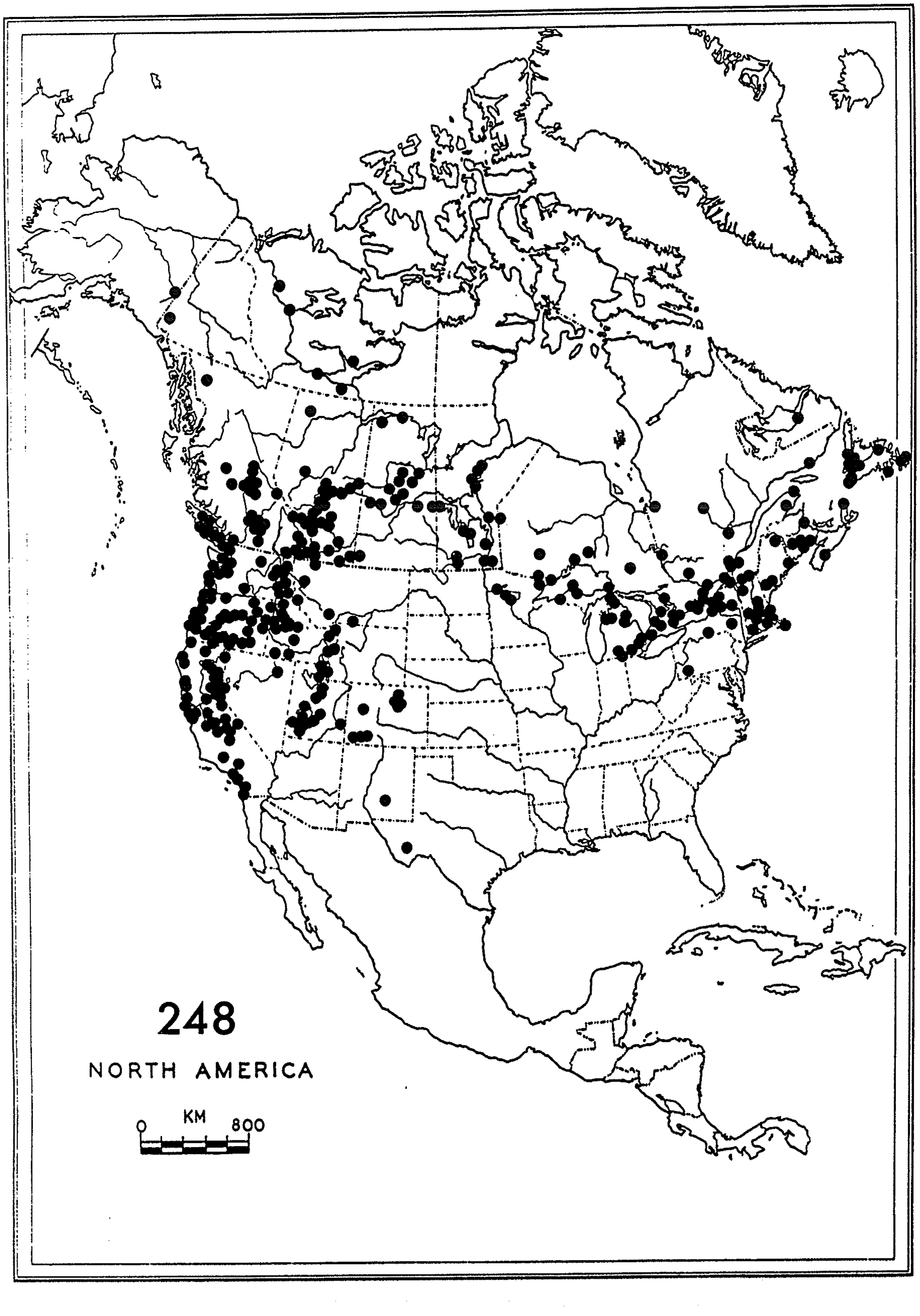
DISTRIBUTION. *Plateumaris pusilla* is widespread, transcontinentally from Alaska to Newfoundland, in the east as far south as southern Pennsylvania, in the west as far south as southernmost California, and isolated high altitude records are known from Cloudcroft, New Mexico, and Davis Mountains, Texas (Fig. 248).

CHOROLOGICAL RELATIONS. *Plateumaris pusilla* co-occurs broadly over most of North America with other species of the genus and it has been collected simultaneously with almost all. It also co-occurs in many areas surrounding the prairies with its sister species, *P. robusta*, without any hybridization that I could perceive, as would be evidenced by structural intermediates in series of specimens from regions of distributional overlap.

PHYLOGENETIC RELATIONS. *Plateumaris pusilla* is most closely related to the Nearctic *P. robusta*. Together these species comprise a group of uncertain relationship to other species that I place in the *P. pusilla*-Group. The group is defined on the basis of elytral rugosity and emarginate male pygidium; the species generally have a coarsely punctate pronotum, but this character state is variably expressed.

SPECIMENS EXAMINED. 5362 males and females, excluding types. See Appendix 10.4 for detailed list of locality data from these specimens. I have examined specimens from the following provinces and states: CANADA: AB, BC, LB, MB, NB, NF, NWT, NS, ON, PQ, SK, YT; UNITED STATES: CA, CO, CT, ID, ME, MA, MI, MN, MT, NV, NH, NM, NY, OR, PA, RI, VT, TX, UT, WA, WY.

FIGURE 248. Known distribution of Plateumaris pusilla (Say), from specimens examined. Each dot represents one collection record, or a group of very close records.


248
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800

Plateumaris robusta (Schaeffer, 1919) NEW STATUS.

Figures 54-56, 91-94, 113, 128, 129, 161, 191, 192, 216, 237, 243, 249.

Donacia pusilla var. *robusta* Schaeffer (1919:318).

Donacia pusilla var. *robusta* Schaeffer (1925:151), Hatch (1971:170).

Plateumaris pusilla, *ex parte*: Monrós (1959:105), Jolivet (1970:60).

Plateumaris pusilla var. *robusta*: Goecke (1960a:9).

TYPE SPECIMENS. HOLOTYPE o^, USNM Type #42398: "Como, S. Wyoming, Alt. 8000 ft.", and 3 paratypes #42398, USNM.

TYPE LOCALITY. Como, in Carbon Co., Wyoming, as stated by Schaeffer (1919).

ETYMOLOGY. So named because of its robustness, relative to the otherwise similar *P. pusilla*. The name was based on limited material; following examination of further material, I conclude that *P. robusta* is not significantly more robust.

TAXONOMIC HISTORY. The name, *P. robusta*, was given varietal status by Schaeffer (1925), following his original (1919) description. Since then the name was used as a variety also by Hatch (1971).

DIAGNOSIS. Adult specimens of *P. robusta* are easily recognized by the entirely rufous legs with flared meso- and metatibial apices, pronotum with more or less uniformly, contiguously and coarsely punctate disc, antennomeres 2 and 3 short, more or less equal in length, antennomeres bicoloured, metafemur with acute, small tooth, male pygidium emarginate, female pygidium broadly rounded, ovipositor with dorsal valve pointed and with conspicous median line.

COMPARISONS. In pronotal and elytral sculpture, antennomere proportions, and metafemoral tooth size, specimens of *P. robusta* are similar to those of *P. pusilla*, and males are not distinguishable from that species by genitalic characters. Antennomere 2 of some specimens is nearly globular; in some specimens antennomere 3 is slightly longer than 2 and these resemble specimens of *P. pusilla*; similarly, these antennomeres are equal in length in some specimens of *P. pusilla*. Specimens of these two species are easily distinguished by several characters states, as discussed under *P. pusilla*. Some specimens of *P. fulvipes* could be confused with those of *P. robusta*, as discussed in treatment of that species.

DESCRIPTION.

LENGTH. Males: 6.8 - 8.29 mm, females: 7.90 - 9.15 mm.

COLOUR. Coppery, green, red, blue, violet; legs rufous; antennomeres basally rufous, apically metallic.

PRONOTUM. Disc coarsely, contiguously punctate in most specimens, slightly swollen either side of midline, there more sparsely and more finely punctate in some specimens; basal sulcus very shallow in most specimens; median line obscured by punctation, to prominent; callosal sulci moderate, anterolateral calli moderate and punctate; hypomeron with normal rugae above coxae and at hind margin, confusedly punctate above, varying to moderately rugose.

HEAD. Vertexal calli absent in most specimens, slight in some, without occipital sulcus in most specimens; antennal calli slight to well developed, punctate and setose to shiny and impunctate.

APPENDAGES. LEGS. Entirely rufous, very few specimens with small subapical infuscation of femora; meso- and metatibia distinctly flared at apex in most specimens, males with small tubercle; metafemur with moderate acute tooth in most specimens, to small and obtuse in some specimens. **ANTENNAE.** Antennomeres 2 and 3 short, more or less globular in many specimens, nearly equal in length in most specimens; antennomeres basally rufous, apically metallic.

ELYTRA. Disc more or less uniformly densely punctulate, moderately rugose, more densely rugose laterally and apically.

PYGIDIUM. Dimorphic sexually as detailed below; most specimens subapically metallic with apical margin rufous, some specimens almost entirely metallic.

MALES. Pygidium broadly moderately emarginate; meso- and metatibia with small tubercle; endophallus much like that of _P_. _pusilla_, differing in minor detail, with ELDs more pointed apically.

FEMALES. Pygidium more or less uniformly rounded; ventral valve of ovipositor subapically broadly rounded, tapering to acute apex, the margins very finely serrulate; dorsal valve pointed, with prominent and complete median line.

SEXUAL DIMORPHISM. Slight, dimorphism only in size and pygidial shape.

VARIATION. Specimens of _P_. _robusta_ vary in lengths of antennomeres 2 and 3, these varying from short, globular and equal in length to more like _P_. _pusilla_, with 3 slightly longer than 2 (up to about ratio 1.25), prominence of metafemoral tooth, prominence of apically flared tibia, density and uniformity of pronotal punctation and hypomeral rugosity, prominence of pronotal median line, and some specimens with femora subapically a little infuscate.

NATURAL _HISTORY_. From available host records, Cyperaceae: _Carex_, _Scirpus_, and _Eleocharis_. A single record of _Sparganium_ is probably adventitious. Most collection records are from the midcontinental, prairie, or grassland regions, though overlapping broadly with aspen parkland, and even some boreal areas. In sites such as prairie ponds and streams, *P. robusta* will be the only species present.

DISTRIBUTION. *Plateumaris robusta* is distributed mostly in the central prairie provinces and states and in more arid areas of British Columbia and Washington, with isolated records from Northwest Territories and the southern James Bay area. "State records" from California, Arizona, and New York probably require corroboration, otherwise, Massachussetts and Michigan records exceed the normal prairie distribution for the species (Fig. 249).

CHOROLOGICAL RELATIONS. *Plateumaris robusta* is largely allopatric of other species, though overlapping broadly about marginal prairie, aspen parkland, even boreal areas; it overlaps only narrowly with its sister species, *P. pusilla*, from which zones I have not found specimens that I interpret as hybrids.

PHYLOGENETIC RELATIONS. *Plateumaris robusta* is most closely related to *P. pusilla*; it is evidently its sister species, and has nearly identical endophallic structure. See discussion of *P. pusilla* for further comments.

SPECIMENS EXAMINED. 756 males and females, excluding types. I have examined specimens from the following provinces and states: CANADA: AB, BC, MB, NWT, ON, PQ, and SK; UNITED STATES: AZ, CA, CO, ID, IA, KS, MA, MI, MN, MT, NB, NM, NY, ND, SD, UT, WA, and WY. Details of locality data from specimens examined are as follows:

CANADA. ALBERTA: Battle Creek, Cypress Hills, vi.23.1955, FS Carr (UAE 5); Battle River, x Hwy. #21, 8/10.vi.1980, C & A v.Nidek (CVNC 15);

9.6. km.W. Busby, 13.vi.1982, sweep Carex & Eleocharis, IS Askevold (ISAC 2); Calgary, June.11-12.1890 (USNM 1), 12.vi.1971, BF & JL Carr (CARR 1), 19.vi.1963m BF & JL Carr (CARR 1), 28.vi.1956, BF & JL Carr (CARR 1), 19.vi.1960, BF & JL Carr (CARR 2), 4.vi.1957, BF & JL Carr (CNC 6), June.11-12.1890, R Hayward (MCZ 9); Calgary (Glenmore), 1.vi.1972, BF & JL Carr (CARR 1); Calgary, Sarcee Reserve, vi.11.1928, O Bryant (CAS 1); Chain Lakes, 16.vi.1974, GJ Hilchie (GJHC 2); Cochrane, 19.vi.1960. BF & JL Carr (CARR 1); Cypress Hills, vi.25.1927, FS Carr (UAE 1, CAS 7, OSUC 4, CNC 3, MCZ 2, UADB 7), 3.vi.1924, FS Carr (UAE 1), 3.vi.1925, FS Carr (UAE 3), 4.vi.1930, FS Carr (UAE 1), 13.vi.1928, FS Carr (CNC 5); 5 km.W. Dogpound, cpgd. on Hwy. #22, 9.vi.1980, RE & ML Roughley (ISAC 1); Drumheller, 21.vi.1954, BF & JL Carr (CARR 3); Edmonton, 4.June.1952, EP Smereka (UAE 1), viii.16.1959, AR Gittins (UIM 2); Elkwater park, 27.v.1952, AR Brooks (CNC 1); Empress, vi.8.26 (UMMA 3), 4.vi.25, FS Carr (MCZ 1), vi.3.26, FS Carr (CAS 3, MSUE 3, UAE 5), 4.vi.26, FS Carr (UAE 4, SDNH 2, UMMA 4, CAS 3), v.3.26, FS Carr (AMNH 2); George Lake, 53°54'N, 114°06'W, 15.vi.1982, sweep Carex & Eleocharis, IS Askevold (ISAC 2); Ghost Dam, 11.vi.1980, BF & JL Carr (1), 25.vi.1964, BF & JL Carr (CARR 1); Holden, 21/24.v.1979, C & A v.Nidek (CVNC 1); Hussar, 4.iv.1959, BF & JL Carr (CARR 1), 28.vi.1959, BF & JL Carr (CARR 1); 2.6 km.S. Huxley, Ghost Pine Creek, 27.vi.1982, IS Askevold (ISAC 6); 6 km.E. Jct. Hwy. 2 & 564, sweep Eleocharis, IS Askevold (ISAC 10); 4.2 km.N. Irricana, Hwy.#9, 27.vi.1982, sweep Carex & Eleocharis, IS Askevold (ISAC 10); Kimball, 16.vi.1952, AR Brooks (CNC 1); Kneehills Crk., 13 km.E. Acme, sweep Carex, IS Askevold (ISAC 9); Lethbridge, 18.vi.1930, JH Pepper (CNC 2); Little Red Deer Riv., 10 km.S. Westward Ho, 26.vi.1982, sweep

Carex, IS Askevold (IASC 3); Medicine Hat [FS Carr], 11.vi.27 (USNM 1), 11,16.vi.1923 (CNC 4, UADB 4), vi.11.23 (UAE 8, CAS 3), 16.vi.23 (UAE 2, MCZ 1), 17.vi.23 (UAE 1), 3.vi.1930 (UAE 1), v.31.1925 (CAS 3), vi.11 (MCZ 3), 17.vi.1924 (UAE 1), 15.vi.1930 (UAE 1), 20.vi.1930 (UAE 1), 5.iv.1926 (UAE 1), 1.vii.1927 (UAE 1), July (AMNH 1), 12,15.vi.1930, JH Pepper (CNC 2); Milk River, 22.v.1977, GJ Hilchie (GJHC 4); Milk R., 49°08', 110°48', 5.vi.1955, JR Vockeroth (CNC 1); 7.4 km. S. Riviére Que Barre, 15.vi.1982, sweep Carex, IS Askevold (IASC 2); Sherwood Park, 7/20.ix.1978, C v.Nidek (CVNC 1); Tp. 14, Rge. 13, W. 4 Mer., 19.v.1980, BF & JL Carr (CARR 1); 30 km W. Turner Valley, 7.vi.1987, C & A v.Nidek (CVNC 5); Vegreville, sweep Carex, Scirpus, Eleocharis, IS Askevold (ISAC 20); Wabamun L. Prov. Pk., vi.17.1962, GB Wiggins (ROMC 1); Waterton, 6,7.vi.1962, KC Herman (CNC 3); 0.5 mi. E. Writing-on-Stone Prov. Park, 14.vi.1982, RS Anderson (ISAC 4).

BRITISH COLUMBIA: Canal Flats, 17.v.1984, BF & JL Carr (CARR 6); Cranbrook, 10.vi.1957, G Stace Smith (UBC 1); 6 km.N. Invermere, 23.May.1981, Carex, IS Askevold (ISAC 2); 10 mi.N. Oliver, v.18.1958, H & A Howden (CNC 1); Radium, 6.vi.1953, BF & JL Carr (CARR 4); Vernon, 24.v.1929, RC Treherne (UBC 1); White Lake, Oliver, 17.v.1959, RE Leech (CNC 2).

MANITOBA: Altona, 8.Sept.1958, JA Scott (UAE 1); Aweme, 6.vi.1922, N Criddle (CNC 1), vi.7 (UAE 1), 12.vi.07, N Criddle (CNC), vi.10 (MCZ 3, UADB 1); Birds Hill Prov. Pk., June.19.1984, Scrapnecks (ISAC 3), 13.vi.1984, Carex, IS Askevold (ISAC 1); Brandon, May.27.1950, JC Guppy (JBWM 1); Brokenhead River, x-ing Hwy. #15 20 km.E. Anola, 31.v.1984, Carex, IS Askevold (ISAC 2), 18.May.1986, IS Askevold (ISAC 3), 30.May.1986, IS Askevold (ISAC 5), 7.vi.1986, IS Askevold (ISAC 2); Dubas Crk. at Hwy. #59, N. of Winnipeg, 4.vi.1985, Carex & Eleocharis, IS Askevold (ISAC 10); Fort Whyte, 5.28.1977, EE Adams (JBWM 1); Glenlea Res. Sta., 15.vi.1975, MCA Nadder (JBWM 2), June.23.1974, TD Galloway (JBWM 3); Glen Souris, 5.vi.1923, N Criddle (CNC 10), 5.vi.1923, HA Robertson (CNC 1); Grassmere Cr., Stony Mtn., 15.vi.1984, TD Galloway (JBWM 1); Husavik, 1.vii.1922, LH Roberts (CNC 1, JBWM 5); Îles des Chênes, 20.vi.1978, J Broatch (JWBM 1); Lake Manitoba Narrows, July.2.1982, Scirpus, Eleocharis, IS Askevold (ISAC 1); 13 km.E. Lake Manitoba Narrows, 2.July.1982, sweep Carex & Eleocharis, IS Askevold (ISAC 25); 15 km.W. Lake Manitoba Narrows, 2.July.1982, sweep Scirpus, Eleocharis, IS Askevold (ISAC 1); 26 km.W. Lake Manitoba Narrows, 2.July.1982, Carex, Eleocharis, Scirpus, IS Askevold (ISAC 3); MacGregor, vi.5.57, D Peschken (JBWM 1); Miami, 17.vi.1917, JB Wallis (CNC 1); Moon Lake, Riding Mts., 28.vi.1948, JB Wallis (CNC 1); Ninette. 3,14.vi.1958, McAlpine (CNC 2), 7.vi.1958, RB Madge (CNC 1), 13.vi.1958, RL Hurley (CNC 1); Niverville, 1.vii.24, JB Wallis (JBWM 2, INHS 2), 12.5. km.N. St. Laurent, Jct. Hwy.#6 & 511, July.2.1982, Eleocharis & Scirpus, IS Askevold (ISAC 9); St. Norbert, vi.24, JB Wallis (USNM 1); Sandilands For. Res., 13.vi.1975, MCA Madder (JBWM 2); 10 km. SE. Selkirk, June.10.1984, Scrapnecks (ISAC 7); Stony Mountain, 8.vi.1912, JB Wallis (CNC 2, MCZ 1); Treesbank, 6.vi.1922, HA Robertson (CNC 1), 6.vi.1925, RM White (CNC 1), 18.vi.1958, JG Chilcott (CNC 7), 15.vi.1923, HA Robertson (CNC 2, JBWM 4, NFRC 2); Treesbank, Assiniboine R., 18.vi.1958, CDF Miller & RB Madge (CNC 11); Tyndall, 13.vi.1984, Carex & Scripus, IS Askevold (ISAC 4), June.10.1984, Scrapnecks (ISAC 11); Winnipeg, 24.vi.1911, JB Wallis (CNC 1 MCZ 6), 12.vi.11, JB Wallis (MCZ 1), 13.vi.26, JB Wallis (MCZ 1), 18.vi.24, JB Wallis (MCZ 1), 5.vii.1926, HJ Brodie (CNC 1), 24.vi.1917, LH Roberts (JBWM 2), June.10.1952, B Furgala (JBWM 7), 23.vi.1925, LH Roberts (UAE 1).

NORTHWEST TERRITORIES: 11 km.NW Jct. Hwy. 1 & 3, 11.VI.1988, BF & JL Carr (CARR 1); Ft. Resolution, Gt. Slave Lake, July.3-6.1947 (CUIC 1), 6.17.1947 (CUIC 1); Resolution, 5.vi.47 (CNC 1).

ONTARIO: Moose Factory, 22-26.vi.1948, WY Watson (ROM 2); Moose River, Hudson Bay, July.1935 (CMP 1); Moosonee, 18.vii.1934, GS Walley (CNC 4), 21.vii.77, F Liard (CLCH 1).

QUEBEC: James Bay, East Coast, 30.vi.1920, F Johansen (CNC 1); Pt. Harrison, 27.vi.1949, DP Whillans (CNC 1).

SASKATCHEWAN: Assiniboia, 3.vi.1955, JR Vockeroth (CNC 2); Attons Lake, Cut Knife, 3.vi.1940, AR Brooks (CNC 3, AMNH 1); Canora, 11.vii.1954, Brooks-Wallis (CNC 24), 13.vi.1954, Brooks-Wallis (CNC 16), 11.vii.1956, Brooks-Wallis (CNC 5); 9 mi. NE. Canora, 11.vii.1954, JB Wallis (JBWM 23, CNC 1); 9 mi. S. Canora, 13.vi.1954, JB Wallis (JBWM 3); Cut Knife, 7.vi.1940, AR Brooks (CNC 2); Elbow, 3.vi.1960, AR Brooks (CNC 3); Good Spirit Lake, 10.vii.1954, AR Brooks & JB Wallis (CNC 3); Hanley, 8.vi.1962, G Lancaster (SPM 1); Madge Lake, 15.vi.1944, C Shaw (SPM 1); Norquay, 11.vi.1975, RR Hooper (SPM 1); North Battleford, Murray Lake, 15.vi.1952, D Barr (ROM 3); Redvers, no date (MCZ 1); Spy Hill, 11.vii.1972, RR Hooper (SPM 1); 10 km.W. Sheho, 30.vi.1982, Carex & Eleocharis, IS Askevold (ISAC 28); Val Marie, 11,14.6.1955, AR Brooks (CNC 9); Willows, 49°37', 105°52', 19.vi.1955, JR Vockeroth (CNC 1).

UNITED STATES. ARIZONA: "Arz." [interpreted as state record], no date (INHS 2).

CALIFORNIA: "Cal." [interpreted as state record], no date (INHS 1).

COLORADO: **Adams Co.:** Denver, 27.vi (CUIC 1); **Boulder Co.:** Boulder, 5800', June.5.1961, BH Poole (CNC 1), 5500', June.13.1961, JR Stainer (CNC 1); 4.5 mi.N. Boulder, 5100', June.13.1961, CH Mann (CNC 6); Lafayette, 14.vi.1954 (PUL 1); **Jefferson Co.:** Bear Ck. Lk. Pk., Soda Lake (w. of Denver), 1.June.1985, MF Whiting (SMLC 2); Golden, 22.vii.16, WJ Gerhard (UADB 1); **Miscellaneous:** "Colo. Morr." no date (MSUE 1).

IDAHO: **Franklin Co.:** Bloomington Lake, 8200-9200', 25.June.72, M Schwartz (OSUC 1); Bloomington Lake, Wasatch Mtns., 8200', July.7.1952, B Malkin (OSUC 7, UIM 2, FMNH 8); **Miscellaneous:** "Idaho" no date (INHS 3).

IOWA: **Woodbury Co.:** Sioux City, no date, CN Ainslie (DEFW 3).

KANSAS: **Douglas Co.:** County record, 900', no date, FH Shaw (CUIC 1).

MASSACHUSSETTS: **Barnstable Co.:** Mashpee, 6/14/49, "Sparganium", EJF Marx (AMNH 1); **Nantucket Co.:** Nantucket Isl., no date (INHS 5).

MICHIGAN: **Roscommon Co.:** County record: 5.31.57, R & K Dreisbach (AMNH 1).

MINNESOTA: **Otter Tail Co.:** County record: no date, O Luger Coll'n (DEFW 1).

MONTANA: **Cascade Co.:** Vaughn, June.24.1955, RC Froeschner (MTSU 4); **Gallatin Co.:** Three Forks, vi.18.1955, AR Gittins (UIM 1); County records: 5/16/1957 (MTSU 1), 3900', July.11.1916 (MTSU 1); **Teton Co.:** Bynum, vi.21.1962, CW O'Brien (ISAC 1); **Miscellaneous:** "Mon", no date (CMP).

NEBRASKA: **Blaine Co.:** Dunning, 6.4.56, R & K Dreisbch (MSUE 1); **Cherry Co.:** Valentine N.W.R., 10.June.1982, GW Wolfe (RUNB 1); **Daves Co.:** Marsland, vi.10.34, HJ Ball (DEUN 1); **Sheridan Co.:** County record: 6.5.56, R & K Dreisbach (AMNH 1, MSUE 1); **Sioux Co.:** 24 mi. N. Harrison, vi.8.54, LW Quate (DEUN 1); **Thomas Co.:** Halsey, vi.13.1971, KP Huess (DEUN 19).

NEW MEXICO: **Otero Co.:** Cloudcroft, vi.27.40, DE Hardy (AMNH 1).

NEW YORK: **Miscellaneous:** "N.Y.", no date, FA Eddy Coll'n (MCZ 4).

NORTH DAKOTA: **Billings Co.:** Kadr. Dam, 10.vi.1965, D Aarhus (NDSU 2); **Divide Co.:** Whiting Rock Pk., 6.10.1967, W Kotchman (NDSU2); **Foster Co.:** County record: 6.2.1967, W Kotchman (NDSU 2); **Grant Co.:** Heart Butte Dam, 10.vi.1967, W Kotchman (NDSU 12); 4 mi. N. Tschida, no date, AC Ashworth (ASRC 1); **Logan Co.:** County record: 27.vi.1967, W Kotchman (NDSU 1); **McLean Co.:** County record: 6.18.1968, W Kotchman (NDSU 1); **Mercer Co.:** Golden Valley, 13.vi.1962 (NDSU 1); **Morton Co.:** 6 mi.E. Glen Ullin, 8June.1974, PK & BA Lago (NDSU 13), 15.June.1974, PK & BA Lago (NDSU 10), **Mountrail Co.:** County record: 7.6.1967, W Kotchman (NDSU 6); **Nelson Co.:** County record: 9.vi.1906 (IHNS 1); **Pembina Co.:** County records: 6.16.1967, W Kotchman (NDSU 1), 29.vi.1967, D Aarhus (NDSU 2); **Rolette Co.:** Sec. 24 Twp. 161 R. 73, 9.vi.1967, J Knudson (NDSU 2); **Sargent Co.:** Lake Teewaukon, 4.vi.1964, R Gordon (NDSU 2); Teewaukon Refuge, 4.vi.1964, DG Aarhus (NDSU 3); **Towner Co.:** Mauvais, Coulee Creek, 10.vi.1964, D Aarhus (NDSU 1); **Williams Co.:** County record: 6.6.1967, W Kotchman (NDSU 2).

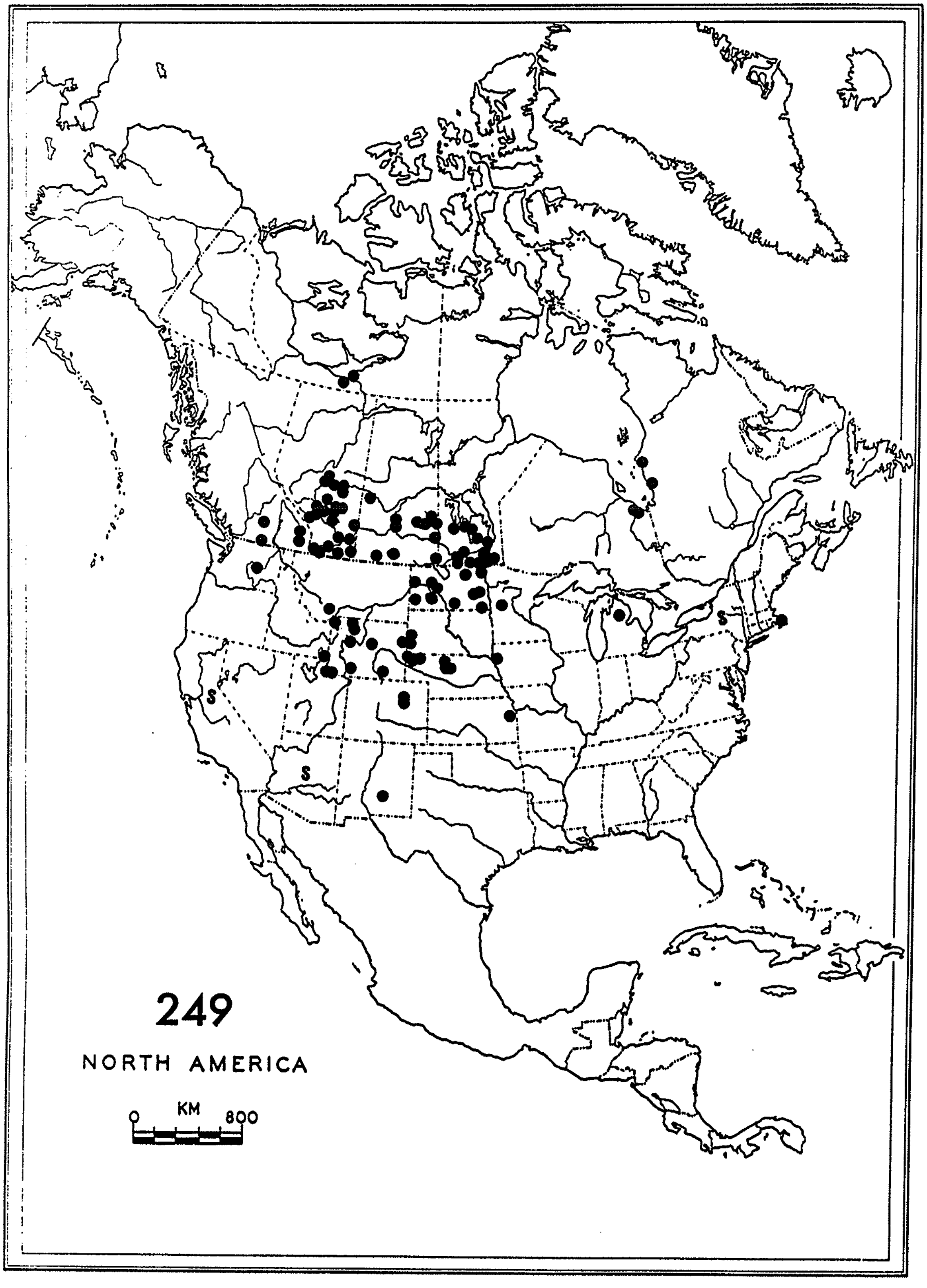
SOUTH DAKOTA: **Lawrence Co.:** Lead, 13.June.1968, VM Kirk (NDSU 1); **Pennington Co.:** Black Hills, #110, 1 mi. E. of #117, 19.June.1966, EU Balsbaugh (NDSU 1); Spring Creek, at Jct. Hwy. #16 & 385, June.26.1983, IS Askevold (ISAC 2).

UTAH: Miscellaneous: "Uta.", no date (OSUC 2).

WASHINGTON: Grant Co.: Blue Lake, Coulee City, 22.v.1954 (RNel 1); Grand Coulee, Blue Lake, May.7.1938, MH Hatch (OSUC 3), May.23.1954, MH Hatch (OSUC 3); Grand Coulee, Dry Falls, 5.14.1950 (OSUC 1); Grand Coulee, Upper Grand Coulee, May.13.1950, MH Hatch (OSUC 1), May.23.1954, MH Hatch (OSUC 8);

WYOMING: Albany Co.: Laramie, 4.15.94 (UWL 1), vi.5.1955, WD Fronk (ESUW 1); **Carbon Co.:** Como, no date (MCZ 2), 8000', no date (CMP 4, AMNH 1); **Fremont Co.:** Crowheart on Rt. #26, 28.vi.1968, Wiggins, Yamamoto & Smith (ROM 2); **Johnson Co.:** Barnum, 4.vi.82, BF & JL Carr (CARR 5); **Park Co.:** Cody, April.20.1925, LG Lavaka (UMMA 1); Jct. Hwy. #210 & 296, 27.vi.82, BF & JL Carr (CARR 3); **Sweetwater Co.:** Rock Springs, 8.6.50, R & K Dreisbach (MSUE 1); **Uinta Co.:** Evanston, 12.vii.38, Knowlton & Hanson (EMUS 3, AMNH 2); Fort Bridger, 26.vi.1939, Knowlton & Hanson (EMUS 1, AMNH 1); **Weston Co.:** C.R. 450, 6.4 mi. S. Jct. 450 & 16, 13.June.1982, GW Wolfe (RUNB 1).

FIGURE 249. Known distribution of Plateumaris robusta (Schaeffer), from specimens examined. Each dot represents one collection record, or a group of very close records. S = state record.



249

NORTH AMERICA

Plateumaris aurifer (LeConte, 1851) **NEW STATUS**

Figures 18, 19, 61, 99, 130, 131, 148, 185, 186, 212, 240, 250.

Donacia aurifer LeConte 1850:237. **NOMEN NUDUM**
Donacia aurifer LeConte 1851:313.
Donacia cuprea: Crotch 1873:21, ex parte.
Donacia pusilla: Leng 1891:176, ex parte.
Donacia germari: Schaeffer 1925:164, ex parte.
Donacia wallisi: Schaeffer 1925:165, ex parte.

TYPE SPECIMEN. Lectotype o^, MCZ Type #4247, by present designation. The specimen designated bears the following label data: blue disc [cut twice], LECTOTYPE [white disc, blue trim, added by me], Type #4247 [red], aurifer 3, J.L. LeConte Collection, Lectotype Donacia aurifer LeConte 1851 designated by I.S. Askevold 1983 [red label, my handwriting].

Information about type specimen. Three specimens in the LeConte collection are labelled aurifer 1, 2 and 3; 1 and 2 are specimens of P. germari (Mannerheim), which I have labelled thus. The third specimen best fits LeConte's description and is therefore selected as lectotype. Crotch and Leng probably placed D. aurifer in synonymy according to their evaluation of LeConte's description, while it seems Schaeffer saw these specimens and therefore placed D. aurifer under both D. germari and his D. wallisi, reflecting his evaluation of all three specimens.

TYPE LOCALITY. "N. Shore, Lake Superior". According to the LeConte colour chart a pale blue disc with two cuts indicates collection from the north shore of Lake Superior.

ETYMOLOGY. Aurifer is Latin for gold-producing or gold-bearing, no doubt in reference to the greenish-gold metallic luster caused in part by densely rugose elytra and fine golden pubescence of the pronotum.

TAXONOMIC HISTORY: LeConte's P. aurifer was not recognized by any subsequent author. Crotch (1873) placed it as a junior subjective synonym of D. cuprea [although he did not indicate to which of either Kirby's (1837) or Melsheimer's (1847) concept it belonged]. In either case, both Kirby's and Melsheimer's D. cuprea belong in D. (Donaciomima) (cf. Askevold, 1987a,b). Leng (1891) placed it as a junior synonym of D. pusilla (Say), presumably because Crotch (1873) did so. This arrangement was later followed by Jacoby and Clavareau (1904) and again by Clavareau (1913). Finally, Schaeffer placed it as a junior synonym of both D. germari and D. wallisi, for the reasons I stated above. As a result, the species was not recognized, but had Schaeffer examined a sufficient number of specimens he certainly would have recognized it as different. On the basis of specimens I have examined bearing his determination label, he examined only one specimen from Minnesota, and the specimen in the LeConte collection, which were not enough to cause him to recognize that character states were constant.

DIAGNOSIS. Specimens of P. aurifer are recognized at once by the distinctly and finely pubescent pronotum, the brilliant green colour of the dorsum (some specimens a little bronzish), pale testaceous legs and antennae, lack of distinct median line of pronotum of most specimens, and small notch at apex of pygidium of female specimens, and relatively slender body.

COMPARISONS. It is unlikely that one could confuse P. aurifer with any other Nearctic species of the genus. Specimens are similar to those of P. flavipes in features such as testaceous appendages, pygidial shape of both sexes, small metafemoral tooth, and rugose elytra; they differ from those of P. flavipes in pronotal sculpture and pubescence, lack of midline, alutaceous microsculpture of most specimens, denser and finer elytral rugosity, and endophallic structure. Their similarity to those of P. flavipes is probably what caused Schaeffer to determine the few specimens he saw as that species (which he called P. wallisi). In pronotal sculpture, specimens of P. aurifer resemble those of P. germari; both species are similar in lack or poor development of median line, sparse punctation of most specimens, with alutaceous microsculpture over much of disc in both taxa. Appendages may also be entirely testaceous in some specimens of P. germari. The endophallus is also similar in these two species. However, specimens of P. germari differ in lack of pronotal pubescence, broader femora, less prominent and dense elytral rugosity, pygidium of females broadly emarginate, and ovipositor very coarsely serrate.

DESCRIPTION.

LENGTH. Males: 6.0 - 6.8 mm, females: 6.7 - 7.7 mm.

COLOUR. Brilliant metallic green or gold-green dorsally and ventrally, some specimens bronzish; appendages and pygidium pale testaceous, in some specimens antennomere apices slightly infuscate.

PRONOTUM. Disc finely and more or less uniformly pubescent, the setae as distinct as those of head and scutellum; punctures more or less contiguous throughout, in some specimens more widely spaced about the midline but then becoming alutaceous there; area of hypomeron above coxa longitudinally rugose, becoming distinctly and irregularly punctate toward dorsum; callus distinct but not deeply delimited by sulcus; basal transverse furrow shallow but distinct; median line indistinct but fine, absent in some specimens.

HEAD. Calli of vertex slight, occipital sulcus therefore hardly or not at all indicated, antennal and vertexal calli as coarsely and densely punctate as rest of head, pubescence conspicuous, like that of pronotum and scutellum.

APPENDAGES. LEGS. Pale testaceous; metafemur with acute tooth of moderate size, of same size in both sexes; meso- and metatibia without tubercle, but minute in some male specimens. **ANTENNAE.** Pale testaceous except apices in some specimens, antennomere proportions of normal lengths for genus.

ELYTRA. All interstriae coarsely and deeply irregularly transversely rugose, at extreme base less so, there shiny and punctulate; antemedian depression slightly more distinct than postmedian, both shallow and hardly evident; each elytron slender in proportion, L:W ratio (L along suture, W at humerus) 4.43 - 4.71.

PYGIDIUM. Dimorphic sexually as detailed below; testaceous in most specimens.

MALES. Pygidial apex slightly arcuately emarginate; metafemur with acute tooth of moderate size; meso- and metatibia with tubercle absent or minute, if present difficult to distinguish from setae about tibial apex; median lobe acute, becoming carinate below toward apex; endophallus with BSB of two parts, the basal one very short, ELDs broadened in apical third, apex declivous (lateral aspect), inside base adjacent to PDS with rectangular tooth-like process, PDS slender, broadened at apex with transverse furrow, more or less fused with MEG below.

FEMALES. Pygidial apex with small hemispherical notch; metafemur with moderate tooth; ventral valve of ovipositor more or less parallel-sided, evenly tapering to acute point, the margins very finely serrate if at all (may be worn to smooth margin); dorsal valve of ovipositor broadly rounded apically, without median line.

SEXUAL DIMORPHISM. Slight, predominantly in length and pygidial structure.

VARIATION. Slight variation in colour within a narrow range of greenish hues. Appendages in some specimens infuscate.

NATURAL HISTORY. Host plant associations of P. aurifer are typical for the genus; it has been collected on Carex, Scirpus, and Eleocharis, any or all of which may be used as host-plants for oviposition.

DISTRIBUTION. Known distribution is from Newfoundland to Alaska in the north, and in the United States south of the 49th parallel, from only Minnesota and Idaho (Fig. 250).

CHOROLOGICAL RELATIONS. In Newfoundland, P. aurifer was collected with P. germari, in the Yukon with P. flavipes, and in Manitoba with seven other species of Plateumaris that are also collected from Cyperaceae (as well as some species of D. (Donaciomima)). Otherwise, it appears to be sympatric throughout much of its range with most species of the genus except P. neomexicana, P. balli, and P. notmani, but has seldom been collected.

PHYLOGENETIC RELATIONS. Plateumaris aurifer appears to be most closely related to the Nearctic species P. flavipes, and these are hypothesized to be sister taxa. These two species are hypothesized to be members of a larger group of rugose species, the P. pusilla-Group. See P. pusilla for further details.

SPECIMENS EXAMINED. 130 (males and females), excluding type, as follows:

CANADA. ALBERTA:

Tp.28 Rge.5 W.5 Mer., 19.vi.1977, BF & JL Carr, Lot 6, (CARR 1).

MANITOBA:

Birds Hill Prov. Park, 30.v.1986, sweep Carex, IS Askevold (JBWM 1);

Brokenhead River, 20 km.E. of Anola on Hwy #15, 7 June 1984, ex Carex (8), 31 May 1984, ex Carex, (4), IS Askevold (ISAC), 6 June 1984, ex Carex DA Pollock (JBWM 1), May.18.1985 (4), May.26.1985 (2), May.30.1985 (14), ex Carex, IS Askevold (ISAC), 6.vi.1986, IS Askevold (JBWM 4;ISAC 15), 7.vi.1986 IS Askevold (ISAC 34), 23.v.1987, Carex & Scirpus, IS Askevold (ISAC 9);

Molson, 5 km.E., June.10.1984, R & R Scrapneck (ISAC 1);

Molson, 10 km.S.E., June.10.1984, Scrapneck (ISAC 1);

Piquitenay, vii.22.17, JB Wallis (MCZ 2);

Teulon, 24.v.1922, NJ Hunter (JBWM 1);

Tyndall, 13 June 1984, ex Carex, IS Askevold (ISAC 4), June.10.1984, Scrapneck (ISAC 1).

NEWFOUNDLAND: 5 mi. s. of Glenwood, 23.vi.1978 (CNC 3, MUIC 8).

NORTHWEST TERRITORIES: Hwy.#4 crossing at Cameron River [= 62°30'N, 113°30' east of Yellowknife, pers. comm.], 19.vii.1981, B.F. & J.L. Carr, Lot 2 (CARR 2).

QUEBEC: P.S.P. Station, Lake Opasatika, N. Queb., June 1921, HS Fleming, (CNC 1).

YUKON: Gravel Lake, 63°48'N.,137°53'W., 6.vi.1981, CS Guppy (UBC 1).

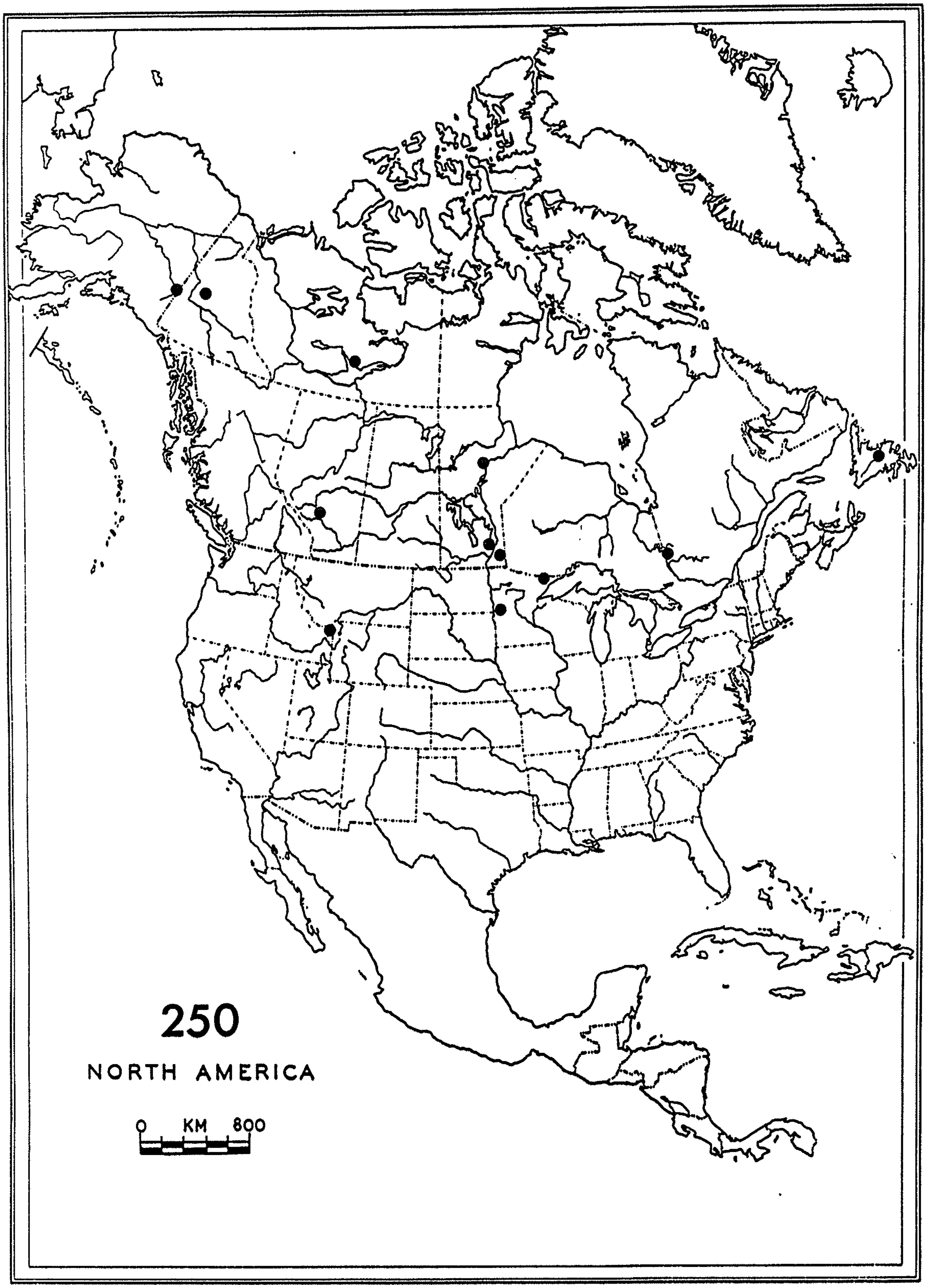
UNITED STATES. ALASKA: mile 1249, Alaska Highway, Deadman Lake, vii.6-7.1968, Campbell & Smetana (CNC 1).

IDAHO: **Fremont Co.:** Cave Falls Rd., Targhee Nat. For., 12 km.W. of Wyo. border, 17.vi.1986, BF & JL Carr (CARR 7).

MINNESOTA: Lake Co. Basswood Lake, Q-5 WRC Sec.9, twp.64N., Rge.10W., July 13 1951, Nampa (DEFW 3);

Ottertail Co. County record: "Chas. Schaeffer Coln./ aurifera var. LeC. (USNM 1).

FIGURE 250. Known distribution of Plateumaris aurifer (LeConte), from specimens examined. Each dot represents one collection record, or a group of very close records.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NORTH AMERICA
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Plateumaris flavipes (Kirby, 1837) **ALTERED CONCEPT**

Figures 4-6, 30, 31, 77-79, 104, 151, 187, 188, 211, 213, 214, 241, 251.

Donacia flavipes Kirby (1837:223).

Donacia wallisi Schaeffer (1925:147), USNM Type #42399: "Mile 17, HBRy, Man., 2.VII.17.", ♀ Allotype #42399 and 13 Paratypes, USNM. **NEW SYNONYMY**

Donacia wallisi: Wilcox (1954:373).

Plateumaris wallisi: Jolivet (1970:61), Monrós (1959:105), Goecke (1960a:10), Borowiec (1984:453).

TYPE SPECIMEN. LECTOTYPE ♀, BMNH, by present designation: "LECTOTYPE [blue trimmed disc added by me], TYPE [red trimmed disc), N. Amer. 5949 a. [white disc], Donacia flavipes Kirby N. America 5949. Rev. W. Kirby [upper side] flavipes Kirby type [underside]." The labels "LECTOTYPE: ♀ Donacia flavipes Kirby 1837 designated 11.vii.1984 I.S. Askevold" [red label], and "Plateumaris flavipes (Kirby) det. I.S. Askevold '84" were added by me.

Information about type: Kirby had before him a single specimen, it now lacks some tarsi and legs.

TYPE LOCALITY. Latitude 65° North. According to Lindroth (1953), Richardson and Franklin's journey at this latitude was in the vicinity of Fort Franklin around Great Bear Lake.

ETYMOLOGY. Evidently named for its flavous legs, as Kirby gave it the common name "Yellow-Legged Donacia".

TAXONOMIC HISTORY AND SYNONYMIES. Kirby's D. flavipes became misinterpreted because no author considered the northern latitude from which it was described. The taxon I believe correctly named P. chalcea is that which has long been placed as a junior synonym of P. flavipes, but the two bear no more than generic resemblance to one another. As discussed under P. chalcea, LeConte appears to have been the first to incorrectly use P. flavipes, and subsequent authors (Crotch 1873, Leng 1891, Jacoby and Clavareau 1904, Clavareau 1913) merely followed him in this use. Schaeffer (1925) then believed the present species to be undescribed, having followed previous authors' uses of P. flavipes, and thus described D. wallisi. Examination of the pertinent types clarified this: P. flavipes correctly applies to the present taxon, formerly known as P. wallisi; the taxon hitherto known as P. flavipes is thus correctly known as P. chalcea, as discussed in my treatment of that species, below.

DIAGNOSIS. Plateumaris flavipes is generally easily recognized by the combination of completely testaceous appendages, moderate to absent metafemoral tooth of most specimens, pronotum with dense punctation, often rugulose to broadly alutaceous to shagreened about midline (especially females), female pygidium rounded with small apical notch, male pygidium subtruncate, median lobe without carina below and ELDs of endophallus with acute hind angles.

COMPARISONS. Specimens of P. flavipes could easily be confused with those of P. fulvipes, P. aurifer, and perhaps P. robusta. Compared to those of P. fulvipes, specimens of P. flavipes are generally easily distinguished by their smaller metafemoral tooth, which in P. fulvipes is much larger and prominent in most specimens; females of P. flavipes have only a small apical notch on the pygidium, but this notch is larger in P. fulvipes. The two species are often mixed in series, and when variation confuses assignment, especially of males, then genitalia must be examined: specimens of _P. fulvipes_ have a carina on the ventral surface of the median lobe, which those of _P. flavipes_ lack, as well as endophallic differences. Compared to those of _P. aurifer_, specimens of _P. flavipes_ are most easily distinguished by lack of pronotal pubescence, more prominent median line, less dense elytral rugosity, colours other than green as well as green, and by endophallic differences; females possess the same secondary sexual character states, but differ slightly in ovipositor shape. Specimens of _P. robusta_ are similar to those of _P. flavipes_ in pronotal punctation and elytral rugosity, but _P. robusta_ females have a rounded pygidium, not with a small notch; both sexes of _P. robusta_ have a small, acute metafemoral tooth, which is usually small and obtuse, or absent, in _P. flavipes_; antennomeres 2 and 3 are equal in length in most specimens of _P. robusta_, but 3 is 1.25 or more the length of 2, in _P. flavipes_.

DESCRIPTION.

LENGTH. Males: 6.85 - 7.86 mm, females: 8.23 - 9.27 mm.

COLOUR. Most specimens coppery, some specimens reddish coppery, red, green, or even blue; appendages of most specimens testaceous, some specimens more or less black.

PRONOTUM. Disc densely and finely punctate, especially in female specimens medial area also densely transversely rugulose, even rugulae shagreened so that coarse punctures are not distinguishable save a few scattered ones; median line more or less distinct but not clearly delimited, rugulae there irregular to longitudinal; basal sulcus moderate; hypomeron rugose at base to finely rugulose to completely confusedly punctate above.

HEAD. Occipital sulcus hardly or not at all indicated; antennal calli not prominent, more or less punctate, pubescent in some specimens.

APPENDAGES. LEGS. Most specimens entirely testaceous, some with small areas infuscate, very few entirely blackish; metafemur with tooth absent to moderate; meso- and metatibia with tubercle of males small.

ANTENNAE. Colour as in legs, though more often apical antennomeres partly infuscate; antennomere 3:2 ratio varying from 1.29 to 1.80.

ELYTRA. Most specimens densely punctulate over disc and intervals rather rugose, especially laterally and apically; antemedian and postmedian depressions moderate to absent, often only antemedian visible; slender in shape, L:W ratio across humerus 4.18 to 4.66.

PYGIDIUM. Dimorphic sexually as detailed below; testaceous to metallic.

MALES. Pygidial apex subtruncate, shallowly and broadly emarginate; metafemur with tooth absent to moderate, meso- and metatibia with tubercle; ELDs of endophallus acutely angulate basally, BSB large, of two parts, the basal part enlarged dorsally and covering ventral part, MEG enclosed in large membranous lobes.

FEMALES. Pygidial apex broadly rounded, with small hemispherical notch, this often hidden by pubescence; metafemur with tooth absent to small in most specimens; ventral valve of ovipositor more or less subapically broadly rounded, tapering to acute point, the margins finely serrulate (may be worn to smooth margin); dorsal valve of ovipositor broadly rounded apically, without median line; pronotal discal punctation finer, rugulose and alutaceous to shagreened in most specimens.

SEXUAL DIMORPHISM. Size, pronotal sculpture, pygidial shape, prominence of metafemoral tooth, and tubercle of tibiae of males, as detailed above.

VARIATION. Plateumaris flavipes is more or less constant in most character states, especially in appendage colour; rather few specimens show extremes in infuscation of appendages, though the metafemoral tooth and antennomere 2:3 ratio are most variable.

NATURAL HISTORY. Carex, Eleocharis and Scirpus, without more specific determinations on records of collection, are used as host plant.

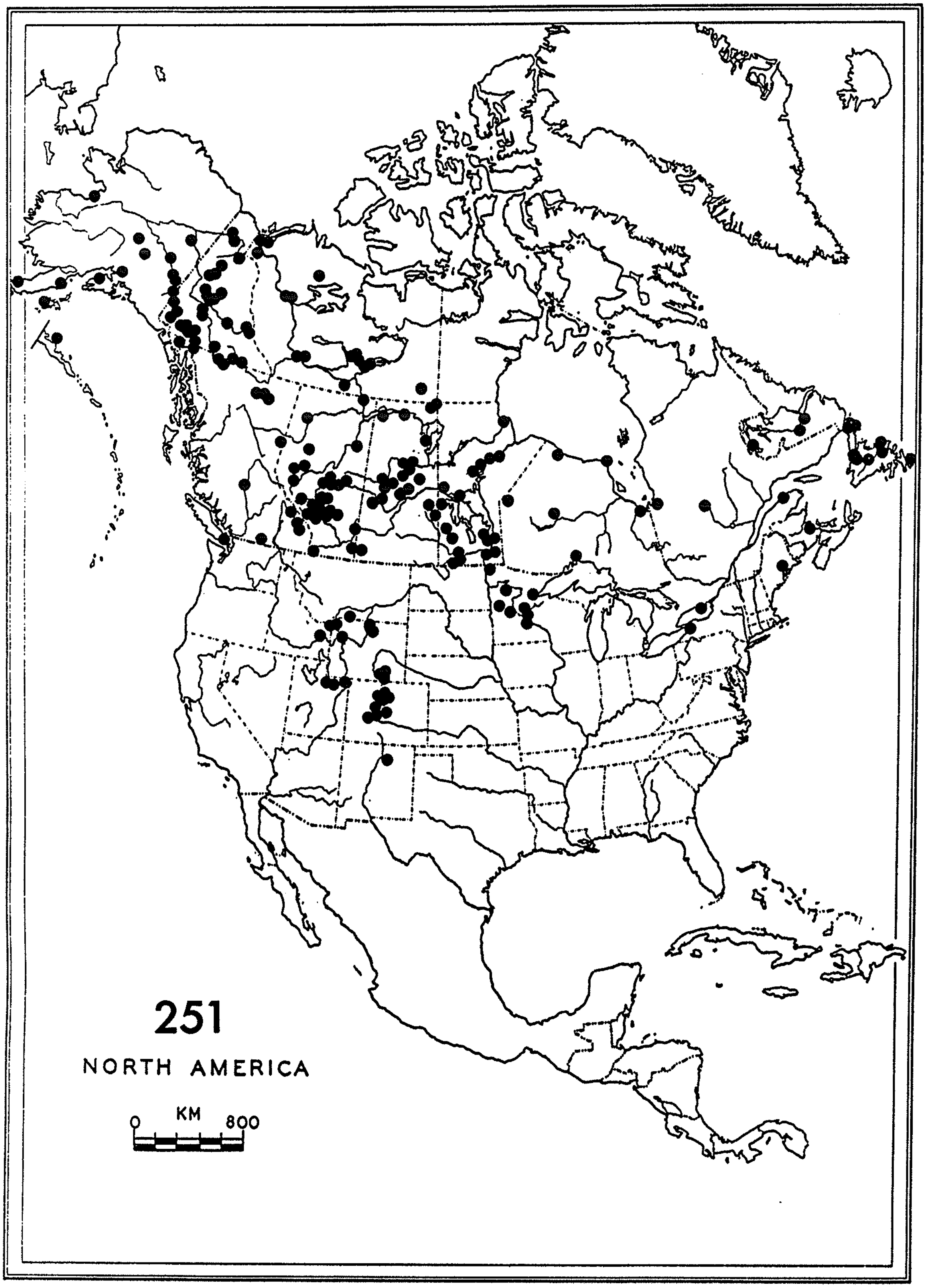
DISTRIBUTION. Transamerican, in the east from New York north, in the west from northern New Mexico north to Alaska: generally a boreal species occurring to the treeline and tundra, and in the southwest Rocky Mountains at high elevations (Fig. 251).

CHOROLOGICAL RELATIONS. Plateumaris flavipes occurs together over most of its distribution with most other members of Plateumaris. In Manitoba it has been collected together with seven other species at once from the same plants, while in Alaska, Yukon and Northwest Territories it is typically the only species collected, even in large series.

PHYLOGENETIC RELATIONS. Plateumaris flavipes appears to be most closely related to the Nearctic species P. aurifer, and these species are hypothesized to be sister taxa on the basis of female pygidial shape. Together these two species are members of a larger group of rugose species, which I call the P. pusilla-Group. See discussion of P. pusilla for further details.

SPECIMENS EXAMINED: 2274 males and females, excluding types. See Appendix 10.1 for detailed list of locality data from these specimens. I have examined specimens from the following provinces and states: CANADA: AB, BC, SK, MB, ON, PQ, LB, NB, NF, NS, YT, NWT; UNITED STATES: AK, CO, ID, ME, MN, MT, NM, NY, UT, WY.

FIGURE 251. Known distribution of _Plateumaris flavipes_ (Kirby), from specimens examined. Each dot represents one collection record, or a group of very close records.



251

NORTH AMERICA

Plateumaris germari (Mannerheim, 1843).

Figures 37, 38, 80-84, 107, 124, 125, 149, 183, 184, 217, 218, 252.

Donacia germari Mannerheim (1843:306).

Donacia flavipennis Mannerheim (1843:306) **NEW SYNONYMY.**

Donacia dives LeConte (1851:314). HOLOTYPE ♀, MCZ Type #4245: "[blue disc, not cut], TYPE 4245 [red], D. dives LeC., J.L. LeConte Collection" "Plateumaris germari (Mannerheim) 1843 det. I.S. Askevold 1982", added by me. LeConte described a unique specimen, so that specimen is the holotype.

Donacia serricauda Schaeffer (1919:318), HOLOTYPE ♀, USNM Type #42396, "Stephenville Bay, St. George, NFLD."

Donacia femoralis: LeConte (1851:315), Crotch (1873:21), Leng (1891:173).

Donacia flavipennis: Lacordaire (1845:193).

Donacia germari: Mannerheim (1852:368), Schaeffer (1925:140), Lacordaire (1845:191), Beller & Hatch (1932:83), Mead (1938:119), Hatch (1971:170), Wilcox (1954:373).

Donacia germari var. flavipennis: Schaeffer (1925:142), Beller & Hatch (1932:83).

Donacia germari, ab. flavipennis: Hatch (1971:170).

Plateumaris femoralis: Jacoby and Clavareau (1904:11), Clavareau (1913:30).

Plateumaris germari: Monrós (1959:105), Goecke (1960a:9), Jolivet (1970:59), Borowiec (1984:453).

TYPE SPECIMENS. The holotypes of *D. germari* and *D. flavipennis* were not examined. Silfverberg (pers. comm. 1987) suggests that Mannerheim must have returned them to Eschscholtz, from whom he received them, and that they should therefore be preserved in Moscow. However, it appears that one Syntype of *D. germari* was retained by Mannerheim, and is preserved in Helsinki (UMHF). This specimen is ♀, bearing the following labels: "o^, Eschsch., Sitkha, Coll. Mannerh., Germari Eschsch.", and the labels "SYNTYPE ♀ Donacia germari Mannerheim design. I.S. Askevold 1988 [red]", and "Plateumaris germari (Mannerheim) 1843 det. I.S. Askevold 1988" were added by me. There is no doubt about the correct application of *D. germari* to the species here discussed, or about correct synonymization of *D. flavipennis* with it.

TYPE LOCALITY. "Habitat in insula Sitkha" (Alaska), as stated by Mannerheim.

ETYMOLOGY. Naming it after E.F. Germar, Mannerheim retained the unpublished name on its label provided by Eschscholtz.

TAXONOMIC HISTORY. Mannerheim later (1852) remarked that he had obtained a pair of specimens collected *in copula*, one of which was his *D. germari*, the other his *D. flavipennis*, and therefore synonymized the two names. In the meantime, LeConte (1851) did not account for *D. germari*, but recognized *D. femoralis* Kirby instead [see *P. metallica* (Ahrens)]. Nevertheless, he described *D. dives* additionally, a surprising error considering the distinctiveness of *P. germari* (*D. femoralis*, *sensu* LeConte). This error was followed by Crotch (1873), and by Leng (1891), who placed *D. germari* and *D. flavipennis* in synonymy with *D. femoralis*. Crotch placed *D. dives* LeConte under *D. cuprea* Kirby [see discussion under *P. pusilla* (Say)]; that was followed by subsequent authors until

Schaeffer (1925) correctly placed it as a junior synonym of P. germari. Schaeffer (1919) suspected D. germari may have been incorrectly synonymized, but then described D. serricauda on the basis of its coarsely serrated ovipositor. He later (1925) resurrected D. germari, and elevated D. flavipennis as a variety of it, and placed D. serricauda in synonymy. Schaeffer (1925) was correct in his assessment of D. germari, but the flavous specimens do not deserve any separate taxonomic status, as he gave them.

DIAGNOSIS. Specimens of P. germari are recognized at once by the alutaceous pronotal disc with sparse large punctures, absent midline, prominent calli, shallow basal sulcus, pygidium emarginate in both sexes, ventral valve of ovipositor coarsely serrate, and metafemora (especially of males) broad throughout, basally broader than at apex in most specimens.

COMPARISONS. Specimens of P. germari could be confused with those of P. diversa; in pronotal characters (except pubescence), specimens are similar to those of P. aurifer. Specimens of P. germari can be distinguished from specimens of these species by the characters that are discussed in the treatments of these taxa, compared with P. germari, above. Specimens of P. germari that have the apical half of femora metallic could be confused with specimens of P. pusilla, and some specimens of P. fulvipes, because all three species have an emarginate male pygidium. However, specimens of P. germari have basally broadened femora, alutaceous pronotal disc, lack median pronotal line, and have a prominent tibial tubercle. Some specimens of P. nitida (from Oregon and Washington) are very similar to those of P. germari: reddish appendages with subapical dark femoral areas, and alutaceous pronotal disc between scattered punctures, apical area of elytra alutaceous to shagreened, and emarginate pygidium; specimens of _P. nitida_, however, have a distinct median pronotal line, small tibial tubercle, metafemur clavate, not basally broadened as in _P. germari_, and with ovipositor at most finely serrulate.

DESCRIPTION.

LENGTH. Males: 6.47 - 8.43 mm, females: 8.10 - 8.79 mm

COLOUR. Most specimens coppery, some blue, green, and some western specimens with elytra, or also pronotum and even part of head flavous; antennae entirely rufous to entirely dark, legs of most specimens testaceous with subapical dark or metallic area.

PRONOTUM. Disc of most specimens punctate anteriorly, posteriorly and about midline, rest of disc more or less sparsely punctured with intervening surface coarsely alutaceous, shagreened in some specimens; median line absent in most specimens, indicated at most by some rugulosity or fine suture-like line, the disc therefore unusually flat medially; basal sulcus shallow to absent, callosal sulcus well developed, the anterior calli prominent, and some specimens with conspicuous basolateral calli also; hypomeron of most specimens confusedly and densely punctate above the usual rugae adjacent to the coxae and posterior margin.

HEAD. Vertexal calli absent to very slight, occipital sulcus therefore at most slightly indicated; antennal calli slight in most specimens, densely punctate and setose to impunctate, shiny.

APPENDAGES. LEGS. Largely testaceous in most specimens, with small subapical dark or metallic area on femora, typically with metafemoral tooth and immediate area dark, but varying from entirely testaceous to nearly entirely dark; metafemoral tooth typically prominent and acute, but varying to absent; femora of most specimens broad, robust but not markedly clavate, the basal width of metafemora greater than apical width, but some specimens (especially females) more slender basally, therefore relatively clavate; meso- and metatibia of males with prominent tubercle. **ANTENNAE.** Entirely rufous to entirely dark, even metallic, but most specimens with each antennomere rufous at base, apically dark; antennomere length proportions typical of genus.

ELYTRA. Moderately rugose in most specimens, sparsely punctulate, rugae more numerous, finer and denser toward apex, there becoming rather reticulate and obscuring strial punctures, the extreme apical area with some alutaceous microsculpture in some males and most females, in many specimens even becoming granulate; lateral intervals (5-9) of many specimens with supernumerary punctures, giving the appearance of somewhat confused elytral punctation; explanate sutural margin rufous in some specimens.

PYGIDIUM. Slightly sexually dimorphic, as detailed below; entirely rufous to entirely metallic.

MALES. Pygidium deeply and broadly emarginate; meso- and metatibia with prominent tubercle that protrudes beyond pubescence; endophallus with ELDs slender, BSB with basal part small, PDS triangular and tapering, fused with MEG into long, robust, C-shaped structure, and apical sac area with membranous lobe on each side.

FEMALES. Pygidium slightly to deeply and broadly emarginate; ventral valve of ovipositor with apical margins very coarsely serrate, though in some specimens (presumably older and worn) serrations much less conspicuous, sides rather parallel subapically; dorsal valve apically rounded, without median line.

SEXUAL DIMORPHISM. The sexes differ somewhat in size and depth of pygidial emargination, and males with prominent tibial tubercle; females tend to have alutaceous microsculpture more conspicuous and more widely spread about elytral apex than males, shagreened in some specimens.

VARIATION. Specimens of P. germari vary in many characters in addition to size: density of pronotal punctation, alutaceousness of pronotal disc obscured to nearly shagreened, anterior setiferous tubercle of pronotum exceeding calli in many specimens, so pronotum rather tapered; appendages and pygidium varying from entirely testaceous (legs) or rufous (antennae) to entirely dark or metallic; elytra, pronotum and even part of head flavous in some western specimens; metafemora varying from very broad basally and therefore not markedly clavate, to typically clavate in some specimens, metafemoral tooth typically prominent and acute but varying to absent in some specimens; elytra with supernumerary punctation in lateral intervals of many specimens, and varying in amount and coarseness of apical alutaceous microsculpture; ventral valve of ovipositor varies in coarseness of serrations, in some specimens (presumably worn) the serrations nearly absent.

NATURAL HISTORY. Host data accompanying specimens are Carex, Scirpus, and Eleocharis species, as is typical of Plateumaris; Carex rostrata is specifically indicated in one instance.

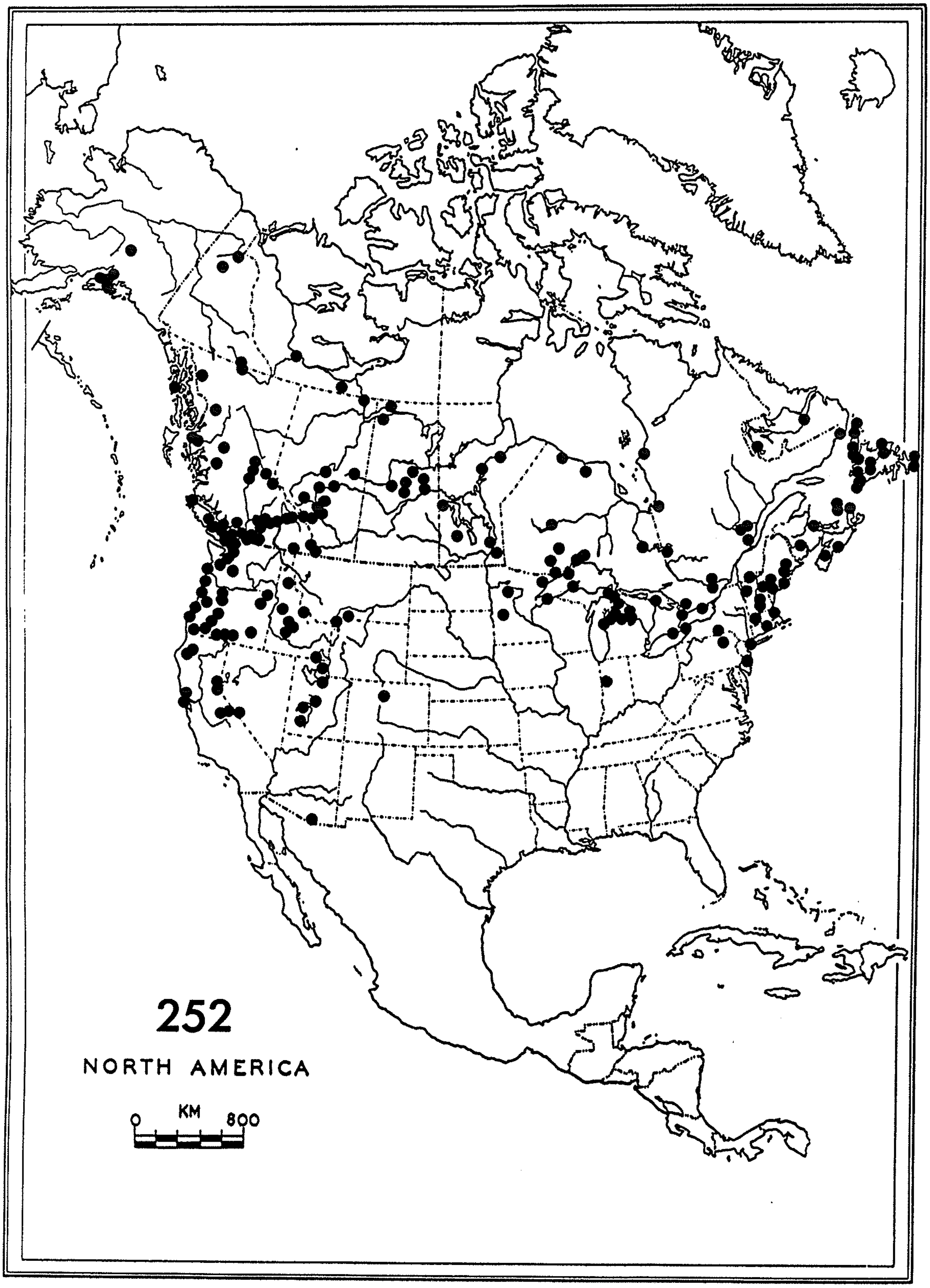
DISTRIBUTION. Plateumaris germari is distributed transcontinentally, from Newfoundland to Alaska, as far south as California coastally, and east of the Great Basin at a high altitude southern Arizona locality, and in eastern North America it is known as far south as New Jersey and Indiana (Fig. 252).

CHOROLOGICAL RELATIONS. *Plateumaris germari* is fully sympatric with all other Nearctic members of the genus, though it is not known to extend very far south in eastern North America. Its sister species, *P. weisei*, is trans-Palaearctic in distribution, from Scandinavia to Japan.

PHYLOGENETIC RELATIONS. *Plateumaris germari* appears to be most closely related to the trans-Palaearctic species *P. weisei*; these two species are hypothesized to be sister taxa on the basis of five synapomorphies (though mostly homoplastic characters). Together these two species are of undefined relationship to other rugose species placed in the *P. pusilla*-Group. See discussion of *P. pusilla* for further details.

SPECIMENS EXAMINED. 1668 males and females, excluding types. See Appendix 10.2 for detailed list of locality data from these specimens. I have examined specimens from the following provinces and states: CANADA: AB, BC, SK, MB, ON, PQ, NB, NS, NF, NWT, YT; UNITED STATES: AK, AZ, CA, CO, CT, IL, IN, ME, MS, MI, MN, MT, NV, NH, NJ, NY, OR, PA, VT, WA, WI, WY. One specimen was labelled simply "Mexiko", without date or specific locality, which I suspect represents an old collection, possibly from California.

FIGURE 252. Known distribution of Plateumaris germari (Mannerheim), from specimens examined. Each dot represents one collection record, or a group of very close records.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NORTH AMERICA
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Plateumaris fulvipes (Lacordaire, 1845)

Figures 32, 33, 65, 106, 106a, 122, 123, 164, 193, 194, 231, 234, 235, 244, 245, 253.

Donacia fulvipes Dejean (1837:383) **NOMEN NUDUM.**
Donacia fulvipes Lacordaire (1845:192).
Donacia cuprea: LeConte (1851:314).
Donacia pusilla: Leng (1891:172), *ex parte*.
Donacia fulvipes: Schaeffer (1925:145), Mead (1938:117), Wilcox (1954:373).
Plateumaris fulvipes: Jolivet (1970:59), Monrós (1959:105), Goecke (1960a:9), Borowiec (1984:452).

TYPE SPECIMEN. HOLOTYPE o^, BMNH: "TYPE [red trim disc], TYPE, E. Coll Laferté, 67.56, Donacia fulvipes Lacord. Type, Donacia fulvipes mihi h. in Amer. bor. [green, folded]". The following label was added by me: "Plateumaris fulvipes (Lacordaire) det. I.S. Askevold '84."

Information about type: Lacordaire claimed to have had before him a single female, but this specimen is male; it is in poor condition, with antennae, right hind leg and most tarsi broken off.

TYPE LOCALITY. "Amérique du nord", as stated by Lacordaire.

ETYMOLOGY. The name is probably in reference to the fulvous or testaceous colour of appendages of many specimens.

TAXONOMIC HISTORY. Authors subsequent to Lacordaire did not recognize *P. fulvipes* (*i.e.* LeConte 1851 and Crotch 1873), but Leng (1891) placed it in synonymy with *P. pusilla* (Say). Leng's arrangement was merely followed by Jacoby and Clavareau (1904) and by Clavareau (1913). Schaeffer (1925) stated that LeConte (1851) had wrongly identified it as

Donacia cuprea Kirby. Crotch (1873) and Leng (1891) both placed D. cuprea as a junior synonym of D. pusilla, and therefore also placed D. fulvipes as a junior synonym of D. pusilla because they followed LeConte's (1851) arrangement of these names. Thus, it is no surprise this name was not recognized until Schaeffer (1925) correctly did so.

DIAGNOSIS. Specimens of P. fulvipes are recognized by the broad metafemoral tooth, emarginate male pygidium, notched female pygidium, most specimens with more or less quadrate pronotum and densely punctate and punctulate disc, elytra densely punctulate on rugae, therefore appearing nearly reticulately rugulose, and male with median lobe carinate below.

COMPARISONS. Specimens of P. fulvipes are easily confused with those of several species: specimens with entirely dark or metallic appendages may be confused with those of P. frosti (see discussion of P. frosti); specimens with rufous appendages can be confused with those of P. flavipes and perhaps P. aurifer (see discussions of these species); specimens with the apical parts of antennomeres and femora dark or metallic may be confused with those of P. pusilla; specimens with rufous legs and partly dark antennomeres may be confused with those of P. robusta. From both these species, specimens of P. fulvipes are distinguished by the more prominent metafemoral tooth, female pygidium with conspicuous apical notch, and antennomere 3 generally longer in relation to 2, than in specimens of either P. pusilla or P. robusta.

DESCRIPTION.

LENGTH. Males: 7.42 - 8.43 mm, females: 7.90 - 9.33 mm

COLOUR. Coppery, green, blue, red; appendages and pygidium entirely rufous to entirely dark or metallic.

PRONOTUM. More or less quadrate, about as wide posteriorly as anteriorly; disc more or less uniformly punctate and punctulate, the punctures and punctulae more or less uniformly dense throughout, some specimens with alutaceous areas and/or rugulose areas about median line; median line moderately deep and regular to fine or obscure, basal sulcus moderate to obscure, callosal sulci moderate, clearly delimiting the calli, which in most specimens exceed the anterolateral setal tubercle in width; hypomeron moderately rugose, becoming punctate toward disc.
HEAD. Vertexal calli slight, occipital sulcus hardly indicated in most specimens; antennal calli punctate in most specimens, in many specimens also setose, the midline moderately depressed behind as oval depression.
APPENDAGES. LEGS. Entirely dark, even metallic, to entirely rufous; metafemur with broad, bladelike tooth in most specimens; meso- and metatibia of males with small tubercle. **ANTENNAE.** Entirely dark, even metallic, to entirely rufous; antennomere 3 slightly, to much longer, than 2, proportions otherwise typical of genus.
ELYTRA. Disc more or less uniformly irregularly rugulose, densely punctulate on the rugae, accentuating the rugosity and giving a dull appearance; antemedian and postmedian depressions obscure in most specimens, to evident or moderate in some.
PYGIDIUM. Dimorphic sexually as detailed below; rufous to apical half dark.
MALES. Pygidium with apex deeply emarginate; meso- and metatibia with tubercle; median lobe carinate below, from basal foramen to apex, the tip somewhat acuminate, especially in lateral view; endophallus with PDS broadly U-shaped, its apex abruptly declivous and perpendicular, BSB of two subequal parts, and ELDs markedly curled toward apex.

FEMALES. Pygidium broadly rounded with hemispherical notch, and apical margin glabrous; ovipositor elongate, with ventral valve more or less parallel-sided, tapering to acute apex, dorsal valve rounded apically, without median line.

SEXUAL DIMORPHISM. Sexual dimorphism in P. fulvipes is found only in size, pygidial shape, and tibial tubercle of males.

VARIATION. Specimens of P. fulvipes vary slightly in size, prominence of basal pronotal sulcus, length of antennomere 3, prominence of metafemoral tooth, depth and shape of pygidial notch of females, and depth of pygidial emargination of males; specimens vary markedly in appendage colour, from entirely rufous to entirely dark or metallic, with all intermediate proportions of rufous to metallic or dark.

NATURAL HISTORY. Plateumaris fulvipes, on the basis of host records, is typical of most Plateumaris, being associated with Cyperaceae: Carex, Scirpus, and Eleocharis. One adult was collected at George Lake, Alberta, from its cocoon in very early spring, before adults could be found active on plants. This may indicate that P. fulvipes overwinters as an adult in the cocoon; however, careful search did not locate further specimens.

DISTRIBUTION. Plateumaris fulvipes has been collected in western Canada and Alaska east to Newfoundland, and in the east as far south as New Jersey, though a state record exists for North Carolina (Fig. 253).

CHOROLOGICAL RELATIONS. Plateumaris fulvipes is sympatric with most other Nearctic species of the genus, and has been collected simultaneously with many of them. It is only narrowly sympatric with P. dubia, and not at all sympatric with P. neomexicana, in the west. It is seldom collected in large numbers, and is therefore easily confused with other species collected simultaneously in large series, when *P. fulvipes* may be represented only by a few specimens. The sister taxon of *P. fulvipes*, *P. roscida*, is known only from the eastern Palaearctic region, from northern China to Yakutsk.

PHYLOGENETIC RELATIONS. The eastern Palaearctic species, *P. roscida*, is more similar to *P. fulvipes* than either is to other taxa in their respective regions. The females of *P. roscida* and *P. fulvipes* possess the same pygidial notch, and males of both species have a similar endophallus. Both sexes have a prominent blade-like metafemoral tooth, and are similar in pronotal and elytral sculpture. These two species are hypothesized to be sister taxa, and are members of a larger group of rugose species, which I call the *P. pusilla*-Group. See *P. pusilla* for further details.

SPECIMENS EXAMINED: 422 males and females, excluding types. I have examined specimens from the following provinces and states: CANADA: AB, BC, MB, NB, NF, NWT, ON, PQ, SK; UNITED STATES: AK, CT, IN, ME, MA, MI, MN, NH, NJ, NY, NC, ND, PA, VT and WI. Detailed locality data from specimens examined are as follows:

CANADA. ALBERTA: Edmonton, 18.vi.'18, FS Carr (UAE 1), 14.vi.'18, FS Carr (UAE 1), vi.20 (MCZ 1); George Lake, 53°54'N, 114°06'W, 14.v.1982, "in pupal case, *ex* roots *Carex*, IS Askevold (ISAC 1), 15.vi.1982, *Carex*/*Eleocharis*, IS Askevold (ISAC 2); Sturgeon Riv. at Lac Ste. Anne, 50°43'N, 114°20'W, 1-3.vi.1982, JR Richardson (ISAC 8); Wabamun L. Prov. Park, June.13.1982, sweep *Carex*/*Typha*, IS Askevold (ISAC 1).

BRITISH COLUMBIA: Barkerville, 17.vii.1948, HR MacCarthy (UBC 1); Bear L., Prince George, 22.vi.1985, SG Cannings (UBC 4); Invermere, 6 km.N., 23.v.1981, IS Askevold (ISAC 3).

MANITOBA: Atikameg L., 20.5.64, "Salix sp." (NFRC 1); Aweme, 29.vii.1924, JB Wallis (CNC 2,JBWM 2), 30.vi.1920, JB Wallis (CNC 1); Brokenhead Riv., 20 km.E. Anola, Hwy. #15, 31.v.1984, ex Carex, IS Askevold (ISAC 5), 7.vi.1984, ex Carex, IS Askevold (ISAC 1), 18.v.1985, ex Carex, IS Askevold (ISAC 5), 30.v.1985, ex Carex, IS Askevold (ISAC 3), June.3.1984, Scrapnecks (ISAC 2); Cedar Lake, July.1936, CT Parsons (MCZ 1); Duck Lake, 24.7.64, "Picea glauca" (NFRC 1); Husavik [all LH Roberts], 3.vii.1917 (JBWM 1), 4.vii.1917 (JBWM 13), 9.vii.1917 (JBWM 1), 13.vii.1917 (JBWM 2); mile 214, Hudsons Bay Railway, 12.vii.1914, JB Wallis (PMAE 1); Niverville, 1.vii.24, JB Wallis (JBWM 1,CNC 1); Piquitenay [=Pikwitonei], 6.vii.1917, JB Wallis (JBWM 1); Red Deer Lake, N. of Barrows, 3.vii.1982, sweep Eleocharis, Carex, & Scirpus, IS Askevold (ISAC 5); crk., b/n Red Deer R. and Overflowing R., Hwy. #10, 19.vi.1984, DA Pollock (JBWM 1); Stony Mountain, 8.vi.12, JB Wallis (CNC 1); Teulon, 24.v.1922, AJ Hunter (JBWM 1); Tp.66, R17, W. 1 Mer., 10.vii.1985, BF & JL Carr (CARR 21); Victoria Beach, 10.vii.1924, LH Roberts (JBWM 1), 15.vi.1986, sweep Carex, IS Askevold (JBWM 2); Winnipeg, [all JB Wallis], 13.vi.1926 (CNC 4,JBWM 3), 30.vi.1928 (CNC 2,JBWM 2), 3.vii.1926 (GJHC 3,JBWM 6,CNC 10, NFRC 1), 24.vi.17, LH Roberts (JBWM 1).

NEW BRUNSWICK: Fredericton, 17.vi.1981, DR Ward (ISAC 2); Hatfield Pt., 18.vi.1981, DR Ward (ISAC 1), 18.vi.1981, L LeSage (CNC 1); McDonald Pt., 18.vi.1981, L LeSage (CNC 1); Mechanic's Lake, vii.30.26, CA Frost (MCZ 4, CAS 3, USNM 2, CNC 2).

NEWFOUNDLAND: Grand Falls, C.NF., 26.vii.1951, Lindroth (CNC 1); Harmon Field, v.23.1949, WJ Brown (CNC 1); Red Indian L., Winddrift, 25.vi.1980, Brennan & Larson (CNC 1,MUIC 5); Renews, June.30.1937, ST

Brooks (CMP 3); St. George's R., N. Branch, 17.vi.1979, Larson & Swales (MUIC 3,CNC 1); **Miscellaneous:** "N.F.", no date, Schffr colln (USNM 1).

NORTHWEST TERRITORIES: Simpson Is., Great Slave Lake, 5.vii.1965, DJ Larson (UAE 2).

ONTARIO: Ignace, July.12.1978, JA Carson (UGIC 1); Kenora, 1.vii.1978, DH Marlow (JBWM 1); 14 mi.E. Kenora, 9-10.vi.1960, Kelton & Whitney (CNC 1); Lake Esnagami, 50°19'N, 86°51'W., 28.vi.1900 (ROMC 1); Macdiarmid, 22.vi.1921, NK Bigelow (ROMC 1), 26.vii.1921, NK Bigelow (ROMC 1); Nipigon, July.4.1912, K Jennings (CMP 3), July.24.1913, K Jennings (CMP 1), no date (MCZ 1); Ottawa, 20.vi.14, FG Ouellet (JLLC 1); Southampton, Chesley L., no date, AC Ashworth (ASRC 1); Toronto, vii.19 (MCZ 1).

QUEBEC: Arthabasca, Arth., 24.vi.30, JL Laliberte (JLLC 1); Chicoutimi, 24.vii.1915, G Beaulieu (CNC 2); Duparquet, 29.vi.1941, G StaceSmith (CAS 1); Knowlton, 23.vi.1929, LJ Milne (CNC 1), 11.vii.1928, GH Fisk & JA Adams (CNC 2); Knowlton, Brome Lake, 27.vi.1928, WJ Brown (CNC 1); Knowlton's Landing, 18.vi.1928, GH Fisk & WJ Brown (CNC 2), 10.vii.1927, WJ Brown (CNC 3); Montreal, no date, Knab colln (USNM 1); Mt. St. Hilaire, vi.09, F Knab (USNM 1); Rigaud, no date, Liebeck colln (MCZ 1); St.-Augustin, Portneuf, 25.vi.35, JL Laliberte (JLLC 1); Val Morin, no date, Liebeck colln (MCZ 1).

SASKATCHEWAN: Attons Lake, Cut Knife, 15.vi.1940, AR Brooks (CNC 1); Waskesu, 11.7.1938, C Shaw (SPMC 1).

UNITED STATES. ALASKA: mile 1249, Alaska Hwy., Deadman Lake, 6-7.July.1968, Campbell & Smetana (CNC 15).

CONNECTICUT: **New Haven Co.:** New Haven, vi.1.1911, Liebeck colln (MCZ 1); So. Meriden, 4.17.1913, H Johnson (CDAS 1).

INDIANA: **Lake Co.:** Miller, v.30.06, WJ Gerhard (FMNH 1).

MAINE: **Aroostook Co.:** Stockholm, 22,23,25.7.27, EJF Marx (AMNH 8); **Franklin Co.:** Weld, vi.30.1038, CA Frost (MCZ 1); **Kennebec Co.:** Belgrade, 22.vi.1983, RE Nelson (RNEL 8); Monmouth, vi.29.05, CA Frost (MCZ 1); **Oxford Co.:** Bethel, no date, JG Gehring colln (MCZ 1); Bethel, Songo Pond, 28.vi.1915 (AMNH 8); Paris, vi.13.10, CA Frost (MCZ 1), vii.2.32, CA Frost (MCZ 1);

Sommerset Co.:| Fairfield, 6.vi.1986, treading in small pond, RE Nelson (RNEL 2); **Washington Co.:** Meddybemps, 6.23.22, MB & RJ Sim (MCZ 1); **Miscellaneous material:** "Me." no date (CAS 6, MCZ 2).

MASSACHUSSETTS: **Barnstable Co.:** Woods Hole, no date, AL Melander (WSU 1), no date (NMDC 1); **Essex Co.:** Nahant, vi.3.1925, Darlington (MCZ 1); **Hampton Co.:** 18.vi.06, CA Frost (USNM 1); **Middlesex Co.:** Concord, June, A Fenyes colln (CAS 1); Dover, 5.30.02 (MCZ 1); Framingham [all CA Frost], 22.vi.1924 (CUCC 1), 13.vii.1926 (CUCC 4,OSUC 4), vi.4.04 (MCZ 1), vi.5.04 (MCZ 2), no date (MCZ 2); Hopkinton, vi.27.26, "Sagittaria leaves", CA Frost (MCZ 1); Natick, 19.vi.1932, CA Frost (LACM 1,MCZ 1), vi.9.29, CA Frost (MCZ 1); Sherborn, vi.13.1926, CA Frost (MCZ 1); Tyngs, no date (MCZ 2); Wilmington, v.31.28, CA Frost (MCZ 1); **Norfolk Co.:** Dover, 5.30.02 (MCZ 1); Milton, June.8.1902, PG Bolster colln (MCZ 1); Wellesley, 30.v.08, Bolster (MCZ 2), 13.vi.15, Bolster (MCZ 3); **Plymouth Co.:** Hanson, 30.vi.07, PG Bolster (MCZ 1), Jun.22.1919, Bolster (MCZ 4); Pembroke, June.1913, PG Bolster (MCZ 1); **Wenham Co.:** Wenham, Ipswich River, 20.v.1922, "sifting", JH Emerton (USNM 1); **Worchester Co.:** Wichendon, July.5.1892, AP Morse (MCZ 4); **Miscellaneous material:** "Mass." (CAS 1, MCZ 2).

MICHIGAN: Cheboygan Co.: Cheboygan, 6.29.1939, F Hubbs (UIM 1); Douglas Lake, vii.2.1936, RR Dreisbach (AMNH 1), 7.2.50, RR Dresibach (MSUE 2); Lancaster Lake, 11.vii.1952, PJ Spangler (WEEM 1); County Record, 25.vi.1953, SE Neff (CUCC 3); **Chippewa Co.:** White Fish Pt. L.S., no date, Hubbard & Schwarz (USNM 1), 23.vii.14 (UMMA 1); **Houghton Co.:** Chassell, 24.June.1964, RB Willson (MSUE 1); **Ionia Co.:** Belding, 4.June.1925, LG Gentner (MSUE 1); **Keweenaw Co.:** Is. Royale, no date (MCZ 2); **Livingston Co.:** County Record, 12.vi.1923, MH Hatch (OSUC 1); **Marquette Co.:** Huron Mtn. Club, Cranberry Bog, 10-15.vi.1974, D Young &R Arnold (EGRC 3); **Montmorency Co.:** County Record, 7.5.40, RR Dreisbach (UMMA 1, AMNH 1); **Oakland Co.:** Kensington Park, 25.vi.1981, C Brivio (PIME 1); **Schoolcraft Co.:** Manistique, Jun.3.1923, S Moore (UIM 1); County Record, 4.vii.47, RR Dreisbach (CAS 2, MSUE 3).

MINNESOTA: Clearwater Co.: Itasca St. Park, Jun.11.1935, "sweeping swale", HR Dodge (WSU 2), June.17.1961, A Raske (CNC 1), June.16.1961 (DEFW 1), vi.19.68, R Gunderson (SCSU 1); **Cook Co.:** County Record, June.28.1924 (DEFW 1); **Lake Co.:** Basswood Lake, Q-S WRC Sec.9 Twp.64N Rge.10W, July.13.1951, EF Cook (DEFW 3), 12,13,16.vii.1951, R Namba (DEFW 5); 9 mi.NW Isabella, 7.1.1979, R Gunderson (SCSU 1).

NEW HAMPSHIRE: Carroll Co.: N. Conway, vi.15.1946, CA Frost (MCZ 1); **Grafton Co.:** Rumney, vi.15.1924 (MCZ 1); **Rockingham Co.:** Northwood, vi.1.1976, JF Burger (UNH 1); **Strafford Co.:** Dover, 6.3.1936, BG Markos (EGRC 1), 5.24.1936, BG Markos (EGRC 3,UNH 9); Durham, v.30.46, RL Blickle (UNH 1); Strafford, vi.20.1937, BG Markos (UNH 2).

NEW JERSEY: Burlington Co.: Centerton, vi.4., Liebeck colln (MCZ 1), vi.10, Liebeck colln (MCZ 5), v.27, Liebeck colln (MCZ 2); **Essex Co.:** Newark, no date (RUNB 1); **Mercer Co.:** Trenton, vi.8 (RUNB 1,MCZ 1), x.10 (AMNH 1); **Ocean Co.:** Pt. Pleasant, 6. (RUNB 3); **Miscellaneous material:** "N.J." no date (UMMA 1), "N. Jersey" no date, Leng (USNM 1).

NEW YORK: **Bronx Co.:** Bronx, iv.1942.25, SC Harriot (AMNH 1); **Hamilton Co.:** 1 mi.SE of Blue Mtn. Lake, Hwy.30, 8.vi.1986, DA Pollock (ISAC 10); **Oswego Co.:** St. Mary's Pond, 15.vii.1971, LL Pechuman (CUCC 1); **St. Lawrence Co.:** Rossie, 6.14.1965, NM Downie (NMDC 1), 6.15.1956, NM Downie (NMDC 1), 6.19.1972, NM Downie (NMDC 1), vi.1.1941, NM Downie (NMDC 1); **Suffolk Co.:** Orient, x., Schott (USNM 1).

NORTH CAROLINA: "N.C.", State Record, no date (UADB 1).

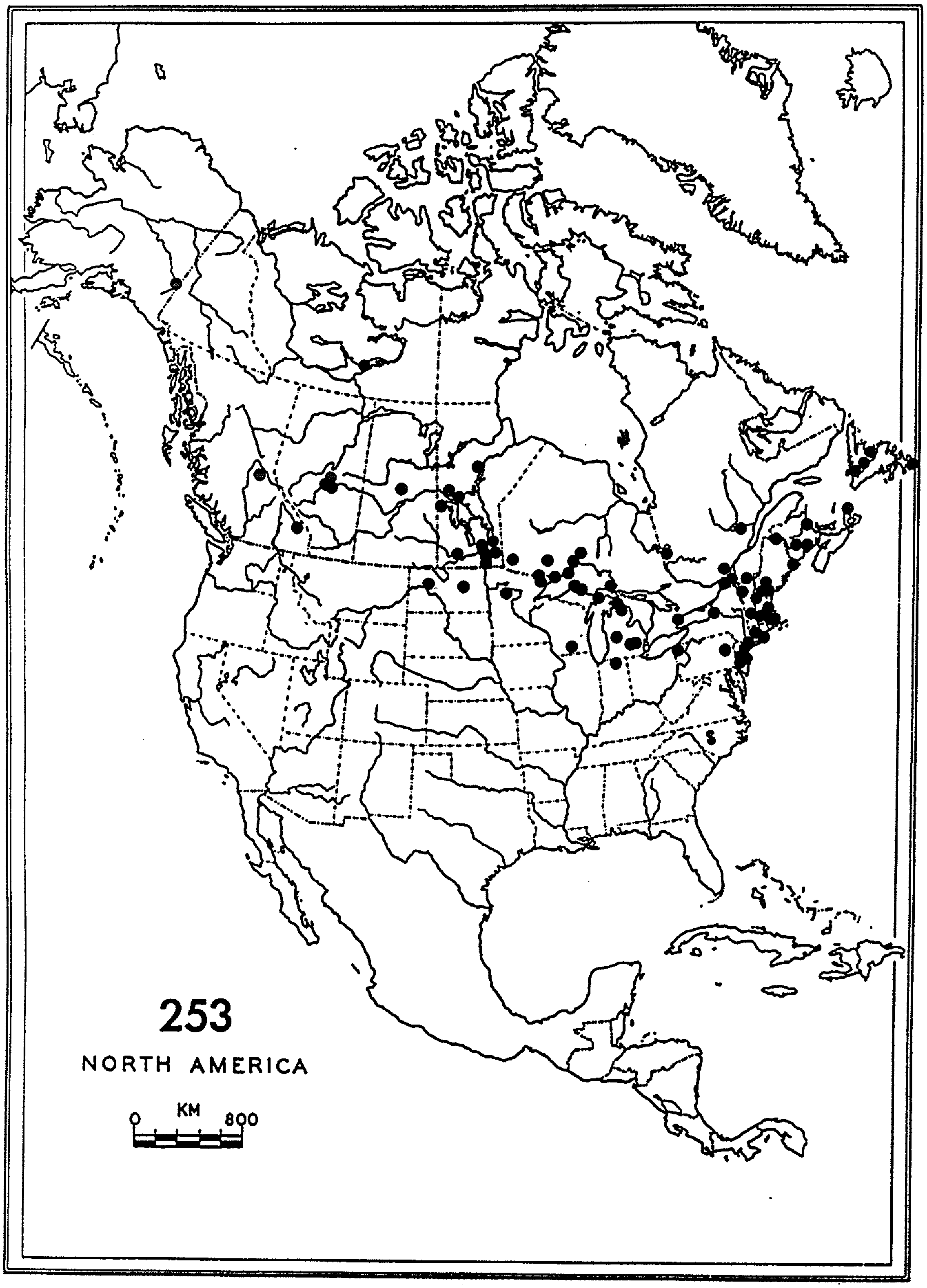
NORTH DAKOTA: **Benson Co.:** Devil's Lake, 22.vi.1967, W Kotchman (NDSU 3); County Records, 7.23.1967, W Kotchman (NDSU 10), 23.vi.1967, W Kotchman (NDSU 3); **Mountrail Co.:** County Record, 11.vi.1967, W Kotchman (NDSU 1).

PENNSYLVANIA: **Columbia Co.:** County Record, July.6.1926, H Klages (CMP 1); **Crawford Co.:** Conneaut Lake, Aug.26.1934, RJ Simon (CMP 1).

VERMONT: **Chittendon Co.:** Burlington, Lone Rock Pt., vi.17.1977, Pomer (UVDZ 1); **Windham Co.:** Laurel Lake, nr. Jacksonville, vi.23.1934, HD Pratt (MCZ 1), June.19.1938, HD Pratt (DEFW 1).

WISCONSIN: **Dane Co.:** County Record, 29.v.1960, Wesenberg (UWM 1); **Polk Co.:** Amery, vi.2.18 (UNH 1).

FIGURE 253. Known distribution of Plateumaris fulvipes (Lacordaire), from specimens examined. Each dot represents one collection record, or a group of very close records. S = state record.



253
NORTH AMERICA
0 KM 800

P. *CHALCEA* -GROUP.

DIAGNOSIS. Members of this group are recognized by the pointed pygidium of females, truncate pygidium of males, and pronotum of most specimens with prominent calli, median line and basal sulcus.

Plateumaris chalcea (Lacordaire, 1845) NEW STATUS

Figures 1, 22-24, 63, 64, 101, 120, 121, 150, 181, 182, 224, 242, 254.

Donacia chalcea Lacordaire (1845:188).

Donacia flavipes: LeConte (1851:315), Crotch (1873:21), Leng (1891:174, 176), Blatchley (1910:1106), Schaeffer (1925:127), Wilcox (1954:372), Hatch (1971:169), Brigham (1982:10.123).

Donacia flavipes var. *lodingi* Schaeffer (1925:129). USNM Type o^ #4239-2: Springhill, Ala., III.27.1923, H.P. Loding; 1 Paratype #42392, USNM.

Donacia flavipes var. *shoemakeri* Schaeffer (1925:129). USNM Type o^ #4239-1: Malaga, N.J., V.30.1911; 5 Paratypes #42391, USNM.

Donacia flavipes lodingi: Balsbaugh and Hays (1972:15).

Plateumaris flavipes: Jacoby and Clavareau (1904:11), Clavareau (1913:31), Jolivet (1970:58), Monrós (1959:104), Goecke (1960a:9), Borowiec (1984:452).

TYPE SPECIMEN. Type not found, probably in the BMNH, where the remainder of Lacordaire types of Donaciinae are preserved. Lacordaire did not reliably sex donaciines, so the sex he stated may not be correct.

Information about type. According to Lacordaire, he had before him only a single female, which he had received from E.F. Germar under the above name. I was not able to locate this type during a visit to BMNH in 1984, although all other Lacordaire types of North American taxa were found there. It is possible that the type was returned to Germar, but I have yet not been able to ascertain if it is preserved in the Germar collection (Halle, in Suffrian collection, MLU; see discussion under P. nitida).

Additional notes. Lacordaire's description of D. chalcea is similar to that of his D. sulcicollis and I can find no diagnostic statements that should cause me to apply the name D. chalcea to this species. However, I have seen the type of D. sulcicollis [see P. rufa (Say)], and I cannot believe Lacordaire would have described the same species (now P. rufa) under two names, both being such distinctive taxa. Lacordaire separately described the sexes of some sexually dimorphic species of Donacia (s. str.), but I do not think he did so in this case. The best I can do at present, in the absence of a type specimen, is to apply D. chalcea to the present taxon; until now it has been known as P. flavipes (Kirby), but because D. chalcea is the eldest available name, and based on my interpretation of Lacordaire's description, I revalidate the name P. chalcea. I note that this situation needs further investigation, and should the name P. chalcea turn out to be incorrectly applied, then D. lodingi Schaeffer, 1925, would be available.

TYPE LOCALITY. "État de Massachussetts", as stated by Lacordaire.

ETYMOLOGY. Unknown.

TAXONOMIC HISTORY AND SYNONYMIES. Authors subsequent to Lacordaire synonymized D. chalcea with D. flavipes Kirby (that is, from Crotch 1873 to Schaeffer 1925, inclusive). LeConte (1851) did not recognize Lacordaire's _D_. _chalcea_, placing it as "_species_ _mihi_ _ignotae_", while Crotch failed to account for it. Instead, both authors recognized the name _D_. _flavipes_. This apparent synonymization was followed consistently and probably came about when Leng (1891) interpreted _D_. _chalcea_ as the same as _D_. _flavipes_ _sensu_ Crotch and LeConte, with which he placed it in synonymy. No author recognized the significance of _D_. _flavipes_ being described from 65°N latitude, and so the name _D_. _flavipes_ continued to be misapplied. With proper placement of _D_. _flavipes_, _D_. _chalcea_ becomes valid pending discovery of Lacordaire's type.

DIAGNOSIS. Typically, specimens of _P_. _chalcea_ are recognized by presence of deep, regular median line and basal and callosal sulci of pronotum, largely reddish appendages, robustly clavate metafemur with large acute subapical tooth, and shiny, sparsely (relatively) punctate pronotal disc, those in most specimens fine but confluent forming rugae, elytral disc shiny and punctulate, pygidium truncate in male specimens, broadly rounded to obtusely pointed in female specimens. Specimens from Alabama and Florida are unlike specimens from more northern parts of the distribution, as detailed below.

COMPARISONS. Specimens of this species are among the most distinctive of the Nearctic members of _Plateumaris_, and no species in the Palaearctic Region bears any great resemblance to it either. Its profound and broad median pronotal line, unusual endophallus, and general lack of rugosity dorsally are distinctive, though many specimens have rugae on the pronotum. Also unusual is its host plant, which, at least according to most host records, is _Acorus_ _calamus_ L. (Sweet Flag), an aromatic lemon-smelling plant that tends to grow apart from dense stands of Carex and Scirpus where most Plateumaris will be found. It does seem to use Cyperaceae when Acorus is not present, as suggested by a few collection records from Cyperaceae, and at times I have collected it at habitats where no Acorus was apparent.

In colour, shinyness and pygidial shape (male), specimens of P. chalcea resemble those of P. rufa, which are smaller, more convex, with more robust metafemur, finer pronotal median line and punctation, without discal rugae, and callosal sulci not well developed, as well as distinctive pygidial surface features and genitalic differences of both sexes. Specimens of P. chalcea from Florida and Alabama differ from the typical specimens from northern and western parts of the distribution, but these still bear little resemblance to any other species that occur in that region. These southern specimens resemble those of P. fulvipes in pronotal and elytral punctation and sculpture; however, only P. metallica is also recorded from the extreme southeast of North America.

DESCRIPTION.

LENGTH. Males: 5.54 - 6.84 mm, females: 6.32 - 7.50 mm.

COLOUR. Coppery or reddish-coppery, some specimens purplish, brassy, or blue; appendages rufous, in some specimens femora and antennae partly to almost entirely dark; underside dark or metallic like dorsum, with abdomen reddish to entirely dark save extreme apex; pygidium rufous to almost entirely dark.

PRONOTUM. Median line, callosal and basal sulci in most specimens deep, regular, all these less so in southern specimens; disc shiny, finely punctured and punctulate, punctures confluent over parts of disc forming transverse rugae, in southern specimens these more numerous, denser, even with some shagreening on disc, therefore not shining; hypomeron coarsely longitudinally rugose.

HEAD. Occipital sulcus not indicated, or at most very slightly so.

APPENDAGES. LEGS. Legs of most specimens entirely rufous, metafemora of some specimens with up to apical two thirds dark, markedly robust, in both sexes with a large acute tooth, this in some specimens (southern) prominent, obtuse; tibiae and tarsi entirely rufous, partly infuscate in southern specimens, meso- and metatibia of males with tubercle absent to small and inconspicuous, mesotibial mucro longer and curved, similar in length to protibial spur. **ANTENNAE.** In most specimens rufous, antennomeres in some specimens with apical halves infuscated.

ELYTRA. Shiny, smooth, densely to sparsely, finely puctulate; disc with few coarse rugae in most specimens, but southern specimens coarsely rugose over much of the surface, the rugae also punctulate.

PYGIDIUM. Dimorphic sexually, as detailed below; rufous to almost entirely metallic.

MALES. Pygidium with apex truncate; median lobe more or less flat beneath from foramen to apex, that part straight and markedly uniformly tapering (lateral view); endophallus with PDS broadly triangular, BSB tapering, ELDs fused basally with BSB, therefore not moveable.

FEMALES. Pygidium with apex broadly rounded to obtusely pointed; ventral valve of ovipositor more or less parallel-sided, slightly subapically widened, tapering to acute apex, dorsal valve apically rounded, without median line.

SEXUAL DIMORPHISM. None, excepting size, pygidial shape, and tibiae of most male specimens with tubercle.

VARIATION. Most specimens have entirely pale appendages, but some specimens with almost entirely piceous appendages; southern specimens differ markedly from the typical northern specimens in sculpturing of the pronotum and elytral surface, and have the pronotal callus less prominent, the callosal sulcus less developed.

I am not confident that the geographic areas intermediate between Florida and Alabama, and the rest of *P. chalcea*'s range (Fig. 254) have been adequately sampled to make a different decision about the taxonomic status of these southern specimens. On the basis of structural differences alone (*i.e.*, of external structures) it could easily be concluded that the southern population(s) should be assigned subspecific status as *P. chalcea lodingi* (Schaeffer), or they could be accorded full species status, as I have done in the example of *P. metallica* and *P. dubia*. As in that example, I have found no difference in genitalic structure. Samples from intermediate areas of the distribution of *P. chalcea* are lacking, but I expect that structurally intermediate specimens will be found in these areas in the future. Therefore I conclude for the present that the southern specimens do not deserve any formal taxonomic status. However, I should draw attention to the possibility that no intermediate populations will be found, and that this decision may have to be re-evaluated at some later date. If the southern populations are to be raised in taxonomic rank, then the name *P. lodingi* (Schaeffer) is the correct name to which they should be assigned. My decision not to recognize these southern populations with any formal taxonomic status, and simply to describe the observed variation, is derived from the species concept that I have adopted.

NATURAL HISTORY. Host records include collection of specimens from *Carex*, *Nuphar variegatum* Engelm., *N. advena*, *Sparganium*, *Peltandra*, *Iris versicolor* L., *Potamogeton*, *Juncus*, and *Acorus calamus*. I suspect most of these records, except those from *Carex*, *Acorus calamus*, and possibly

Iris, are accidental collections of specimens that fly to various plants when disturbed, or which were en route elsewhere across a water body. In Manitoba, I found *P. chalcea* only on *Acorus calamus*, and not on adjacent *Carex* and *Scirpus*. Records of *Sparganium* may be incorrect determinations of the plant, as *Acorus calamus* resembles *Sparganium*. Specimens of *P. chalcea* have been collected from leaf litter or humus during winter months, and from bushes some distance from water in early spring, indicating that it likely overwinters in the adult stage, away from water bodies.

DISTRIBUTION. Florida and Alabama north to Québec, west to the interior of British Columbia, with an old but probably valid, record from northern Utah (Fig. 254).

CHOROLOGICAL RELATIONS. *Plateumaris chalcea* occurs in company with other species of the genus, and has been collected with almost all others that occur in the east. Its distribution is fully sympatric with most of the species except the western *P. neomexicana* and *P. dubia*, and is only one of two *Plateumaris* species that extend as far south as Florida.

PHYLOGENETIC RELATIONS. *Plateumaris chalcea* appears to be most closely related to a group of three other Nearctic species, *P. neomexicana*, *P. dubia* and *P. metallica*, defined by shape of the female pygidium. I hypothesize that *P. chalcea* and these species comprise a monophyletic group of species that I call the *P. chalcea*-Group. It is the only species group that has no member in the Palaearctic region. The *P. chalcea*-Group and *P. nitida*-Group together form a lineage that is defined by prominent pronotal sulci, though these characters are lost in some members of these groups.

SPECIMENS EXAMINED. 1170 males and females, excluding types. Specimens were examined from: CANADA: AB, BC, SK, MB, ON, PQ, NB, NS, PEI; UNITED STATES: AL, CT, GA, FL, IL, IN, IO, ME, MA, MI, MN, NB, NH, NJ, NY, OH, PA, RI, UT, VT, VI, and WI. The detailed locality data are as follows:

CANADA. ALBERTA: Sturgeon River at Lac Ste. Anne, 50°43'N, 114°20'W, 1-3.vi.1982, Richardson (ISAC 2); Wabamun, 2.vii.17, FS Carr (UAE 1); Wabamun Lake Prov. Park, June 13 1982, sweep *Carex* and *Typha*, IS Askevold (ISAC 3).

BRITISH COLUMBIA: "Br. Col. Can. Entomological Branch Ottawa" (CNC 1); Glacier, Hubbard & Schwarz (USNM 1).

MANITOBA: Brokenhead River, 20 km. e. of Anola on Hwy.#15, 7, 31.vi.1984, sweep *Carex*, IS Askevold (ISAC 2), May.30.1985, *Acorus calamus* IS Askevold (ISAC 8), May.22.1986, "sweeping roses near river", IS Askevold (JBWM 1), 6.vi.1986, IS Askevold (ISAC 1), 7.vi.1986, IS Askevold (ISAC 2), 31.v.1987, *Acorus calamus*, IS Askevold (ISAC 8); Brokenhead River at Hwy#44 near Beausejour, June.10.1984, R & R Scrapneck (ISAC 1); Duck Mtn. Prov. Pk., [pers. comm., =circa 5 mi. n. of Wellman L. Cmpgrd. on Hwy.#366], June 19-24 1981, Ashworth, Schwert & Keller (ASRC 1); Mistik Creek at Hwy.#10 b/n Flin Flon and Cranberry Portage, 20.vi.1984 DA Pollock (JBWM 1).

NEW BRUNSWICK: Hatfield Pt., 18.vi.1981, DR Ward (ISAC 1).

NOVA SCOTIA: Cape Breton National Park, Freshwater Lake, Tp.19 PG989683, 29.vi.1983, *Nuphar variegatum*, LL58B, L. LeSage (CNC 2).

ONTARIO: Allenford, Sauble Riv., AC Ashworth, (ASRC 1); Arkell, June 5/196, SM Ball (UGIC 1); Benmiller, June 9, 1978, JD VanLoon (UGIC 1); Black Rapids, 20.v.1927, WJ Brown, (CNC 1); Bruce Mines, 1 mi. e., 27.vi.1964, CW O'Brien, (EMUS 1); Chaffey's Locks, 10.vi.1981, DR Ward

(ISAC1); Chalk River, 23.vi.1960, HF Howden (CNC 2); Cochrane, 3.vi.1949, EJ LeRoux, (CNC 2); Geralton, vi.22.82, Pily & Motz, (Elias 1); Hastings Co., 20.v.1939 (2), 23.v.1955 (1), JF Brimley, (CNC); Ignace, July 12 1978, J.A. Carson (UGIC 1); Jockvale, 28.v.1934, WJ Brown, (CNC 1); Kenora, 1.Sept.1978, DH Marlow, (JBWM 1); Killarney, 6/30-2/vii.1952, M White, (CUIC 1); Kinburn, 20.vi.1965, JEH Martin, (CNC 2); Kingsville, v.21.09, (UMMA 1); Lake of Bays, Norway Point, 11.vii.1920, J. McDunnough, (CNC 2); Lanarck, 1.vii.1959, SD Hicks (CNC 2); London, (UGIC 2); Marmora: 18.iv.1952, JF McAlpine (CNC 1), 23.v.1952, JR McGillis (CNC 1), 27.vi.1952, JC Mitchell (CNC, 1), 5.21.1952, R, Lambert (CNC 1); Matice, vi.9.82, Pilny & Motz, (Elias 2), June.19.1982, J. Pilny (UWAT 1); Mud Lake, Parry Sound, 10.vii.1956, LL Pechuman, (CUIC 4); Orrville, 21.vi.1958, LL Pechuman, (CUIC 1); Ottawa, 25.v.96, (CNC 1), 17.vi.14, FG Ouellet (JLLC 1), 10.vii.14, Fr. Germain (JLLC 1); Parry Island, 24.vii.1958, LL Pechuman, (CUIC 4); Port Credit, 1.vii.1896, RJ Crew, (CUIC 2); Port Sydney, 21.vi.1919, NK Bigelow, (ROMC 1); Savant Lake, 4 mi.s., vi.23.1973, Campbell & Parry (CNC 2); Schomberg, 6.vi.1964, RS Scott, (ROMC 1); Snelgrove, 23.vi.1952, GB Wiggins (ROM 1); Toronto, 5.21.09, M.C.V. coll. (CAS, 2), (Brodie collr.): 13.5.94 (3),22.5.98 (1), 26.5.86 (2), 5.6.92 (2), 13.6.92 (4), 13.6.09 (1), 17.6.85 (1), 17.7.85 (1), 5.9.82 (1), no date (1), (ROMC); Trenton, 29.v.10, Evans, (CNC 1); Ventnor, ix.1.1928, JA Adams (CNC 1);

PRINCE EDWARD ISLAND: Marie, 26.vi.1985, LeSage & Rochon (CNC 1).

QUEBEC: Becancour, 19.vi.67, (CDAS 1); Cap Rouge, 9.vii.1953, on mud flat, R Lambert,(CNC 1), 24.vi.1981, DR Ward, (ISAC 12), 24.vi.1981, fauchage bord Saint Laurent, L. LeSage, (CNC 6), 23.vi.59, JC Aube, (AMNH 2), 26.v.60, HC Aube (NMDC 1), 2.vii.65, C Chantal (NMDC 1, CLCH 2), 29.vi.64, C Chantal (CLCH 13, ISAC 4), 21.vi.64 (6), 10.vii.65 (4), 23.vi.64 (5), 12.vii.64 (2), 26.vi.65 (5), 28.vi.64 (2), 27.vi.64 (5), 1.vii.64 (4), 19.vi.65 (4), 1.vii.62 (6), 2.vii.65 (5), 10.vii.65 (4), 17.vi.65 (1), 24.vi.62 (2), 24.vi.67 (1), 28.vi.61 (1), 25.vi.61 (1), 23.vi.64 (3), 23.vi.63 (4), 30.vi.61 (2), C Chantal (CLCH); Gentilly, Nic. 20.ix.70, C Chantal (CLCH 1); Île de Montreal, 21.vi.01, Beaulieu (USNM 2); Knowlton, 23.vi.1929 (7), 21,26.vii.1929 (8), LJ Milne (CNC); Knowltons Landing, 18.6.1928, GH Fisk (CNC 1); La Trappe, vi.11.37, J Ouillet, (MSUE 4); Montreal, no date, Knab Coll'n., (USNM 4), no date (UADB 1), 6.23, Liebeck Coll'n., (MCZ 2); Mt. St. Hilaire, vi.09/vii.09, Knab Coll'n., (USNM 5); Phillipsburg, Missisquoi, 4.vi.74, JL LaLiberte (JLLC 5); Pte.-du-Lac, St.-Maurice, 20.vii.26 (1), 16.viii.27 (1), JL LaLiberte (JLLC); Potton Springs, Jly.1-4.'20, PG Bolster (MCZ 1); Quebec, vi.23.1961, JC Aube (NMDC 1); Rigaud, Liebeck Coll'n., (MCZ 1); Rouville Co., 12.vii.02, Knab Coll'n., (USNM 1); St.-Augustin, Portneuf, 9.vi.72 (2), 23.vi.70 (1), 24.vi.54 (7), 27.vi.72 (1), JL LaLiberte (JLLC); 6.x.74, *Potamogeton*, C Chantal (CLCH 4), 1.vii.66, *Potamogeton* C Chantal (ISAC 8); St.-Jean d'Or, Montmorency, 16.vii.60, JL LaLiberte (JLLC 1); St. Joachim, Mcy. Co., 4.v.63, C Chantal (CLCH 1); St. Johns Co., 8.vii.04, Knab Coll'n., (USNM 1), vii., Chagnon, (UAE 1).

SASKATCHEWAN: La Ronge, 17/6-1968, "Tamarack" (NFRC 1); Namew Lake, west end, 27.vi.1985, R. Hooper (SPMC 1); Tp.68 Rge. 15 W2, 8.vii.1985, lot 2, BF & JL Carr (CARR 1); Weyakwin, 20 km. s., 29.vi.1985, C & A v.Nidek (CVNC 1).

UNITED STATES. ALABAMA: Mobile Co.: Mobile, 28.iii.11 (1), no date, HP Loding (1) (UADB), no date, (1), iii.17.21 (1), HP Loding (MCZ); Springhill, iii.27.11 (1), iii.27.1921 (1), HP Loding, iii.1921, Th. Van Aller (1), Liebeck Coll'n. (2), iv.7.23, Liebeck Coll'n. (1) (MCZ); iii.23.20, Knaus Coll'n. (AMNH 1); iii.17.21, HP Loding (USNM 2); 27.iii.21, HP Loding (3), 17.iii.21, Th. Van Aller (2), 7.iv.1923 (2), (UADB).

CONNECTICUT: Litchfield Co.: Cornwall, 12.vi.1920, KF Chamberlain, (UAE 1); Lakeville, June 1932, H Bunting, (PMY 1); **Middlesex Co.:** Cobalt, 16.x.65, J Kuehle, (UCS 1); **New Haven Co.:** Meriden, 30.6.48, A Jansson (UZIL 1); So. Meriden, vi.4.1937, H Johnson (CAS 4), 4.28.1913, H Johnson (CDAS 1); **New London Co.:** Groton, 21.6.48, A Jansson (UZIL 5); **Tolland Co.:** Staffordville, Roaring Brook, 14.vi.1977, RJ Pupedis (UCS 1); **Windham Co.:** 1 mi. n. of Jctn. of Rtes. #44 & #89, 26.May.1982, DG Furth (PMY 1).

DISTRICT OF COLUMBIA: Washington: 26.x.21, CB Notman (CAS 1), 3.18.24 (2), 3.18.28 (1), JG Gehring (MCZ), 26.x.21, Chapin, Barber, Notman (CNC 1); **Miscellaneous DC:** Eastern Branch: nr. Bennings, Feb.23.1913, in old leaves, WL McAtee (1), M Street, 22.2.06, WL Colemons (1), 14.5.05, DH Clemons (1), (USNM), May, F. Knab (USNM 1, MCZ 2), near Bennings, March.23.1913, in old leaves, WD Appel (FMNH 1).

GEORGIA: Clarke Co: Whitehall Forest, 27.May.1978, R Turnbow (EGRC 1).

FLORIDA: Franklin Co.: Eastpoint, 4.16.1977 (NMDC 1), 4.15.1977 (ISAC 2), April.22,1980, RM Brattain (NMDC 1;ISAC 7;CLCH 3); **Liberty Co.:** Hosford, 1.7 mi. w., 24.iii.54, TH Hubbell (UMMA 1); **Miscellaneous localities:** "Fla-84", FA Eddy Coll'n., (MCZ 1).

ILLINOIS: Bureau Co.: Algonquin, Nason (INHS 2); **McHenry Co.:** Tiskilwa, May.27.1954, MW Sanderson (INHS 8); **Miscellaneous:** "Ill." (INHS 1).

INDIANA: Kosciusko Co.: County records: 6.6.01, WSB, (PUL 1); **Lake Co.:** County records: 5.28.03 (3), 6.7.05 (1), WSB, (PUL), 28.v.03 (TAMU 1); **Porter Co.:** Miller iv.12.1934, FW Furry (LACM 1), May.22.1910, FH Shoemaker, (CAS 2); **Vigo Co.:** County records: 5.21.93, WSB (PUL 1); **Wayne Co.:** County records: s.26.09, WSB (PUL 1); **Localities not found:** Clarke, 12.vi.04, AB Wolcott (DEFW 1).

IOWA: Buchanan Co.: Independance, 21.iii.90 (LSU 1); **Miscellaneous locality:** "Co. #11: May 28.1939 (2), May.29.1939 (1) (UMMA).

MAINE: Aroostook Co.: Stockholm, EJF Marx coll.: 18.7.27 (CAS 1); 7/16/27 (3), 7/19/27 (8), 7/20/27 (3), 7/21/27 (2), 7/25/27 (1) (AMNH); **Cumberland Co.:** Brunswick, Peckard coll., (MCZ 1); **Hancock Co.:** Bar Harbour, May.26.'33, AE Brower (UNH 1); **Oxford Co.:** Paris, CA Frost: vi.13.10, (MCZ 1); 21.vi.1945 (UCR 1); **Washington Co.:** E. Machias, A. Fenyes:, June (CAS 4), 14.6.19 (MCZ 1); **Miscellaneous locality:** "Me." JW Green, (CAS 4).

MASSACHUSSETTS: Barnstable Co.: Hyannis, 6.15.49, EJF Marx on Sparganium sp. (AMNH 1); Woods Hole, 6.19.36 (UCS 1), LJ Milne (UNH 2), no date AL Melander (WSU 1); **Bristol Co.:** Fall River: iv.23.10, NS Easton (UMMA 1); ii.26.'10, (1), iii.24.'13 (1), v.25.'89 (1) NS Easton (MCZ); **Essex Co.:** Lawrence, King (CUIC 1); **Hampshire Co.:** Easthampton, v.22.1942, AR Lewis (UNH 1); Northhampt., 14.June.1902, F. Knab Coll'n. (USNM 2); **Middlesex Co.:** Bedford, vi.20.07, CA Frost (MCZ 1), vi.17.1908, LW Swett (MCZ 1); Framingham, CA Frost: vi.4.30 (MCZ 1), xi.29.1928 "sifting" (MCZ 1), vi.4.04 (MCZ 2), 7.vi.45 (UCR 1), 6.2.45 (UCRC 1), 3.x.48 (CUIC 1), v.20.1931 (OSUC 1), xi.11.42 "sifting humus"

(OSUC 1); Holliston, 5.v.1923, JH Emerton (CAS 1); Hopkinton, vi.27.26 "Sagittaria leaves", CA Frost (MCZ 3); Medford, 6.11.20 (RUNB 7), 5.vi.04, F. Knab Coll'n. (USNM 1); Melrose, 6.11.20 (RUNB 16); Natick, CA Frost: 17.iv.1937 (CAS 2), 15.iv.47 (UMMA 1), v.30.1930 "sweeping" (MCZ 1), 6.9.29 (SDNH 1); Sherborn, CA Frost: 27.iv.1915 "sweeping at river" (UAE 1), 5.17.49 (AMNH 1); Tyngs, 11.19.99 (1), June '93 (5), F Blanchard Colln. (MCZ); **Nantucket Co.:** Nantucket, vi.25.26 (SDNH 1); **Norfolk Co.:** "Nor.Co." June, R. Hayward Coll'n. (MCZ 2); Blue Hills, May.30.1914, WJ Clench (OSUC 1); Milton, May.17.1903, PG Bolster Coll'n. (MCZ 1); Wellesly: June 1.1900, AP Morse (1), PG Bolster: 22.v.21 (1), 29.v.'10 (3), 30.v.08 (2), Jun.2.12 (8), 20.vi.15 (6) (MCZ); **Plymouth Co.:** Hanson, Jun.22.1919, AP Morse (MCZ 1); **Stafford Co.:** vi.30.1934, CW Sabrosky, salt marsh (MSUE 1); **Suffolk Co.:** Boston: 6.[?].98 (1), Liebeck Coll'n. (1) (MCZ); **Worcester Co.:** Northboro, vi.28.36, CA Frost (MCZ 1); **Miscellaneous locality:** "Mass.": Stromberg Coll'n. (UNH 1), F. Blanchard Col. (MCZ 4, CMP 3); **Localities not found:** Mt. Tom, Liebeck Coll'n. (MCZ 1).

MICHIGAN: **Allegan Co.:** Fennville, 27.May.1927, LG Gentner (MSUE 1); **Berrien Co.:** St. Joseph, 11.June.1969, DD Wilder (MSUE 1); **Charlevoix Co.:** County Record: 5.28.55, RR Dreisbach (MSUE 1); **Cheboygan Co.:** Cheboygan, 7.25.28 (1), 7.18.28 (1), W Clanton (UMMA); Douglas Lake: vii.15.1920, 957fi, (1), vii.14.1920, 956e, (1) MH Hatch (OSUC), 7.10.15, PW Fattig (UAE 1, EGRC 1), 27.vi.1960, MG Naumann (VPI 2), 4.vii.1959, G Greene (UMMA 1), 7.vii.1957, RE Beer (UMMA 1), July.1928 (UMMZ 2), vii.9.1920, MH Hatch (UMMA 1), vii.29.1920, MH Hatch (UMMA 1), July.9.1932, J Leonard (UMMA 1), vii.1.1936, CD Lyman (UMMA 1), 7.1924 (UMMA 1), 15.ix.1939, IJ Cantrall (UMMA 1), 24.vi.1937 (CUIC 3), 18.vii.1952 (1), 26.vi.1952 (12), 10.viii.1952 (4), PJ Spangler (WEEM), 26.vi.52, I Krneger (WEEM 1), 26.vi.52 (2), 30.vi.52 (1), DJ White (WEEM), 19.vii.1968, JL Young (EMUS 1), 28.vi.1960, MG Naumann (EMUS 1), 4.vii.1962 (PIME 5), 7.10.15, PW Fattig (UGA 1), July 4.31, C.W.S., (MSUE 2), 6.20.1948, GF Edwards (INHS 3); Hebron Swamp, JL Young (EMUS 1); Topinabee, 4 mi. n., 17.vii.1958, (UMMA 1); County Records: July.8.1932, J Leonard (UMMA 5), vi.27.1945, J Alvarez (UMMA 2), 6.24.1954, SA Brask (UMMA 1), vi.15.1955, GB Fairchild (UMMA 1), 7.27.35, DS Shelter (UMMA 1), vii.3.1941, C Hubbs (UMMA 1), 6.29.1939, F Hubbs (UMMA 1), vi.30.1932, J Leonard (UMMA 1), 2.vii.1948, GW Byers (UMMA 3), Aug.1.1935, Perin (UMMA 4), 25.vi.1953, SE Neff (CUIC 2), 7.1.1931, JS Todd (AMNH 1), vii.24.1945, RL Fischer (MSUE 1), vii.7.1941, TW Porter (MSUE 1), vi.28.1945, J Naz (MSUE 1) 10.vii.1945, E Long (FMNH 4), vi.23.1949, JO Corliss (PMY 4), 6.28.1945, C Dixon (INHS 1), 7.23.1945 (INHS 2), vi.24.1949, JO Corliss (PMY 1); **Clare Co.:** County Record: 6.4.49, RR Driesbach (MSUE 1); **Emmet Co.:** Wilderness St. Pk., 25.June.1972, DK & DC Young (EGRC 1); **Kalkaska Co.:** Kalkaska, v.22.1955, RL Fischer (MSUE 1); **Livingston Co.:** ES George Reserve, v.28.44, R Dreisbach (MSUE 2); **Mackinac Co.:** Brevort, June.22.1956, HD Niemczyk (MSUE 2); St. Ignace, 19.vi.1921, S Moore (UMMA 1); **Macomb Co.:** Memphis, e. of, 24.v.1972, C Brivio (PIME 2), 26.v.1972 C Brivio (PIME 6), 19.vi.1971, Doneda (PIME 1), 15.vi.1971, Doneda (PIME 2), 17.vi.1963, on <u>Carex</u> (1), 7.v.1972 (2), 19.v.1972 (1), 14.vi.1972 (1), 2.vi.1973 (2), 5.vi.1973 (1), 5.vi.1973 (1), C Brivio (PIME); **Oakland Co.:** Bloomfield, vi.7.09 (UMMA 1); Kensington Park, 20.v.1981 (1), 4.vi.1979 (1) (PIME); vi.15.1913, WS McAlpine (UMMA 1); **Schoolcraft Co.:** County records: vi.5.59, R & K Dreisbach (UMMA 1, AMNH 1) **Shiawassee Co.:** Bancroft, 25.vi.1979 (PIME 12); Rose Lake Wldf. Expt. Sta., 16.v.1976, DK Young (EGRC 1); **Washtenaw Co.:** Ann Arbor: vi.17.1916, TH Hubbell (OSUC 1, UMMA 4), 14.vii.1920, MH Hatch (UMMA 1), 21.v.1927, NK Bigelow (UMMA 2), 21.vi.'16 (UMMA 2); "3rd Sister Lake", 13.vi.1932, AL Olsen (UMMA 2); **Wayne Co.:** Detroit: 25.vi.1908, VanDyke Coll'n. (CAS 1), vi.23.11 (UMMA 1), (RUNB 1); **Miscellaneous locality:** "Mich.", FA Eddy Coll'n. (MCZ 3).

MINNESOTA: **Clearwater Co.:** Itasca State Park: 28.v.1934, CY Liu (DEFW 1), 17.vii.1937 (DEFW 1), 29.v.1934, CE Mickel (DEFW 1), June 23 1937, HR Dodge (WSU 1), June.20.1966, Barker (SCSU 2); **Houston Co.:** Hokah, 30.v.1942, M Rockstein (DEFW 1); 3 mi. n. Hokah, Hwy.#26, 30.v.1942, M Rockstein & M Hooper (DEFW 4); Winnebago Cr., 27.v.1956 (DEFW 1); Winnebago Cr. Valley, 3-4 mi.ne. of Eitzen, 25.v.1952 (DEFW 2); Winnebago Cr. Valley, 3-6 mi.w. New Albin, Iowa, May.30.1960, swamp, (CNC 1), 20.v.1959 (DEFW 1); County Records: 23-24.v.36, D Murray (DEFW 5), 29.v.39, CE Mickel (DEFW 3); **Lake Co.:** Basswood Lake, Q-SWRC, Sec.9 twp.64N Rge.10W, 13.vii.1951, Cook, Eber, Nambe (DEFW 3); **Mille Lacs Co.:** Mille Lacs Lake, nr. Vineland. 24.v.1941, HC Barnett (DEFW 1); **Ottertail Co.:** Maplewood State Park, May.27.1983, IS Askevold, sweep bushes 30 m. from pond (ISAC 2), May.27.1983, sweep Carex, IS Askevold (ISAC 1); **Pine Co.:** mouth, Snake River, 17.v.1951 (DEFW 1); **Saint Laurent Co.:** Duluth, (LACM 1); **Wabasha Co.:** Wabasha, Aug.17.1941, HT Peters "emerged Sept.7.'41" (DEFW 1).

NEBRASKA: **Blaine Co.:** Dunning, 6.4.56, R & K Dreisbach (MSUE 1); **Chase Co.:** Champion, 12.vii.1960, WF Rapp (DEUN 2); **Douglas Co.:** Omaha, Child's Point, May.9.1908, FH Shoemaker (DEUN 1); **Sarpy Co.:** Bellevue, May.9.1908, L Bruner (DEUN 7); **Thomas Co.:** Halsey, vi.13.1971 (DEUN 10).

NEW HAMPSHIRE: Coos Co.: Mt. Washington, AT Slosson coll. (AMNH 2); **Grafton Co.:** Rumney, vii.4.24 (MCZ 1); **Rockingham Co.:** Exeter, vi.23.24 (MCZ 1); Hampton, vi.22.1930, SA Shaw (UNH 2); **Stafford Co.:** Durham, v.25.1955, WJ Morse (UNH 4), 25.07, W & F (UNHC 1); **Miscellaneous locality:** "N.H." (MCZ 1).

NEW JERSEY: Atlantic Co.: Hammonton, 15.vi.1929, JW Green (CAS 1); **Burlington Co.:** Centerton: vi.4 (1), vi.10 (6), Liebeck coll'n. (MCZ), 6.11.1944 (1), 5.21.1944 (1), 7.4.1944 (2), on Acorus calamus, EJF Marx (AMNH); Masonville, v.28.22, HW Wenzel (CAS 1), 6.4. (RUNB 1); Riverton, vi.8 (RUNB 1), vi.20.09, JW Green Coll'n. (CAS 1), 13.vi.1923, CA Thomas (CMP 1), vi.9, Liebeck Coll'n. (MCZ 1); W. Branch, Wading River, 7.19.50, on Juncus sp.?, EJF Marx (AMNH 1); **Camden Co.:** County Records: 5.27.51, on Nuphar advena, in coitu, EJF Marx (AMNH 2), 5.27.51, on Acorus calamus, EJF Marx (AMNH 7), 5.28.44, EJF Marx (AMNH 4); **Cape May Co.:** Sea Is. City, 6.16 (RUNB 3); Wildwood, 6.17.35, LJ Bottimer (ISAC 1); **Gloucester Co.:** Malaga: 30.v.1911 (UAE 4), 13.iv.1913, Schaeffer Coll'n., (USNM 1), 30.v.1911 (UADB 1), v.30.1911, Shoemaker Coll'n., (MCZ 4), v.30.1911,vi.15.12, Shoemaker (AMNH 2); Wenonah, 7.v.1922, HW Wenzel (UADB 1), v.23.22, HW Wenzel (CAS 1); Westville, v.20, HA Wenzel (AMNH 1); **Monmouth Co.:** Manasquan River, 16.xi.35 (FMNH 1); **Morris Co.:** Lake Hopatcong, 9.vi.40 (FMNH 9); Newfoundland, EA Bischoff (CUIC 1), v.29.10 (AMNH 1); **Ocean Co.:** Lakehurst, vi.29 (AMNH 1); Pt. Pleasant, 6. (RUNB 3); **Localities not found:** Anglesea, 7.3, Liebeck Coll'n., (MCZ 1), 1.12, beach drift (RUNB 1); Atsion, 6.18.47, leaf Iris versicolor, EJF Marx (AMNH 2), 7.15.48, EJF Marx (AMNH 2), vi.28.1925, E. Baylis (AMNH 1); Morgan, vi.19, Weiss & West (MCZ 1).

NEW YORK: Bronx Co.: Bronx Park, vi.3, vi.19, on Peltandra, Wm J Davis (USNM 2); Van Cortland Park, NYC, 6.vi.39 (FMNH 4); **Dutchess Co.:** Amenia, 27.v.1936, H Dietrich (CUIC 1); **Erie Co.:** Buffalo, H Klages Coll'n. (CMP 5); Hamburg, 5.22.10 (1), 5.28.11 (1), MC Van Duzee (CAS); **Franklin Co.:** Saranac Lake, 2,3.ix.1909, Shoemaker Coll'n. (USNM 7); Up-Saranac, 2.vii.1928 (9), 7.vii.28 (3), 8.vii.28 (1), JW Green (CAS); **Genesee Co.:** Batavia, 5.vi.1914, HH Knight (USNM 1); **Hamilton Co.:** 1 mi. SE Blue Mtn. Lake on Hwy.30, 8.vi.1986, DA Pollock (ISAC 11); **Kings Co.:** Rockaway B., L.I., 4.vi.1911, Shoemaker Coll'n. (1), vi., Schffr Coll'n. (1) (USNM); **Monroe Co.:** Rochester, 19.vi.1902, JL Zabriskie (AMNH 1), 13.vi.44 LL Pechuman (CUIC 2); **Oneida Co.:** Trenton Falls, E Doubleday (BMNH 1); **Richmond Co.:** Princes Bay, Staten Island, 22.June.1941, G Kelly (CAS 1); Staten Id., 6.vi. F Knab Coll'n. (USNM 1), ii.22.1913 (AMNH 1); **Rockland Co.:** Ramapo Mts., (AMNH 18), W Beutenmueller (CUCC 6); Suffern: no date (CUCC 1); **Saint Lawrence Co.:** Canton, vi.12.1935 (2), v.2.1933 (1), vi.3.1935 (1), NM Downie (NMDC); Rossie, 5.28.1975 NM Downie (1), vi.1.1961 NM Downie (2), 6.18.1968 NM Downie (1), 6.19.1965 NM Downie (1), 6.16.1965 NM Downie (1) (NMDC); vi.1.41 (FMNH 2); **Schoharie Co.:** Lake Charlotte, 26.vi.1920 (CUIC 1); **Suffolk Co.:** Calverton, L.I., 2.vii.1947 (10), 3.viii.1947 (1), R Latham (CUIC), vii.2.1947, R Latham (AMNH 1); Greenport, L.I. vi.16.1947 R Latham (AMNH 1), 8.iv.1947 (1), 14.vi.1947 (1), 6.vii.1947 (2), 8.vii.1947 (2), 11.vii.1947 (1), R Latham (CUIC); Montauk, L.I., 30.vi.1947 R Latham (CUIC 2); Northwest, L.I., June.19.1947 R Latham (AMNH 4), 1.vi.1948 (1), 12.vi.1948 (1), 19.vi.1947 (11), R Latham (CUIC); Orient, L.I., ix.6.1943, R Latham (AMNH 1), 1.vi.1948 (1), 16.vi.1950 (1), 8.ix.1948 (1) R Latham (CUIC); Riverhead, L.I., 27.v.1950 (1), 14.vi 1949 (1), 21.vii.1950 (1), 1.viii.1947 (1), R Latham (CUIC); Sag Harbour, L.I., 2.vii.1947, R Latham (CUIC 2); Southold, L.I., 9.vii.1947 (2), 4.x.x.1947 (3), R Latham (CUIC), vi.9.1948, x.4.1947, R Latham (AMNH 3); **Tompkins Co.:** Ithaca, 14.v.1919 (1), 8.vi.1919 (2), 12.vi.1917 (3), H Dietrich (CUIC), 8.June.1919, Van Dyke Coll'n. (CAS 1), 10.vi.16 (CUIC 1), 4.v.1913 (CUIC 1), 22.June.17 (RUNB 5); McLean Res., Mud Pond, 19.vi.1924 (CUIC 1); **Washington Co.:** Whitehall, 26.vi.1934, H Dietrich (CUIC 3); **Westchester Co.:** Armonk, 24.v.1936, LL Pechuman (CUIC 2); New Rochelle, 17.vi.1940 (FMNH 3); **Miscellaneous localities:** "NY": (CAS 2), Liebeck Coll'n (MCZ 4), (FMNH 5), W Beutenmueller (CUCC 2), New York City, 7.6.1964 (UZIL 2); **Localities not found:** "Ionaisld". May.13.1916. FM Schott (USNM 1).

OHIO: **Fairfield Co.:** Barneby Center, 10.May.1986, SM Clark (SMCL 1); **Hamilton Co.:** Cincinatti, (BMNH 5); **Richland Co.:** Ontario, 3.vi.1985, "at light" (ISAC 4); **Localities not found:** Cedar Swamp, 12.vi.1926, JS Hine (UGA 2).

PENNSYLVANIA: **Bradford Co.:** Columbia x-roads, 13.vi.1932, RM Leonard (UGA 1); **Center Co.:** Poe Paddy State Park, 7.June.1965, on Sparganium, EU Balsbaugh (NDSU 4); **Cumberland Co.:** Mt. Holly Springs, 3.vi.1961, FB Negley (NDSU 1); **Dauphun Co.:** Linglestown, vii.4, Liebeck Coll'n. (MCZ 1); **Erie Co.:** Presque Isle, 16.vi.1953, GE Wallace (CMP 1); **Lancaster Co.:** County records: 31.v.1947, AW Shertz (UCS 1); **Mercer Co.:** Shenango, June.23.1928, JT Gamble (CMP 15); **Monroe Co.:** Mt. Pocono, 4.vi.1933, JW Green (CAS 1); **Pike Co.:** Greentown, 1.vi.1920, ED Quirsfeld (UAE 4, CUIC 2).

RHODE ISLAND: **Bristol Co.:** Barrington, vi.22.12 (1), vii.15.16 (1), NS Easton (MCZ); **Kent Co.:** Warwick, May.30.1922 (4), June.4.1922 (3), June.22.1912 (2), May.27.1923 (2), EE Calder (UMMA), 6.15, Liebeck Coll'n., (MCZ 1); Warwick, Warwick Pond, 24.May.1915, M Bowe (PMY 1); **Providence Co.:** Cranston, 22.Feb.1915 (1), 2.Apr.1916 (1), M Bowe (PMY); Cranston, Blackmore Pond, 24.May.1915, M Bowe (PMY 1); Cranston, Dyers Ledge, 2.5.16., M Bowe (PMY 1); Cranston, Dyers, iii.13.22, (1), xi.7.15 (1), xii.5.15 (2), JV Nylen (PMY); Limerock, Lincoln, 21.June.1914, M Bowe (PMY 2); Lonsdale, 18.June.1916, M Bowe (PMY 1); Providence, 24.10.15 (2), 5.Dec.1915. (1), M Bowe (PMY), iv.2.16. (1), vi.10.06 (1), 18.x.13. (1), xi.14.15 (1), JV Nylen (PMY); **Washington Co.:** Kingston, Larkin Pond, 30.v.1924, EE Calder (UMMA 1).

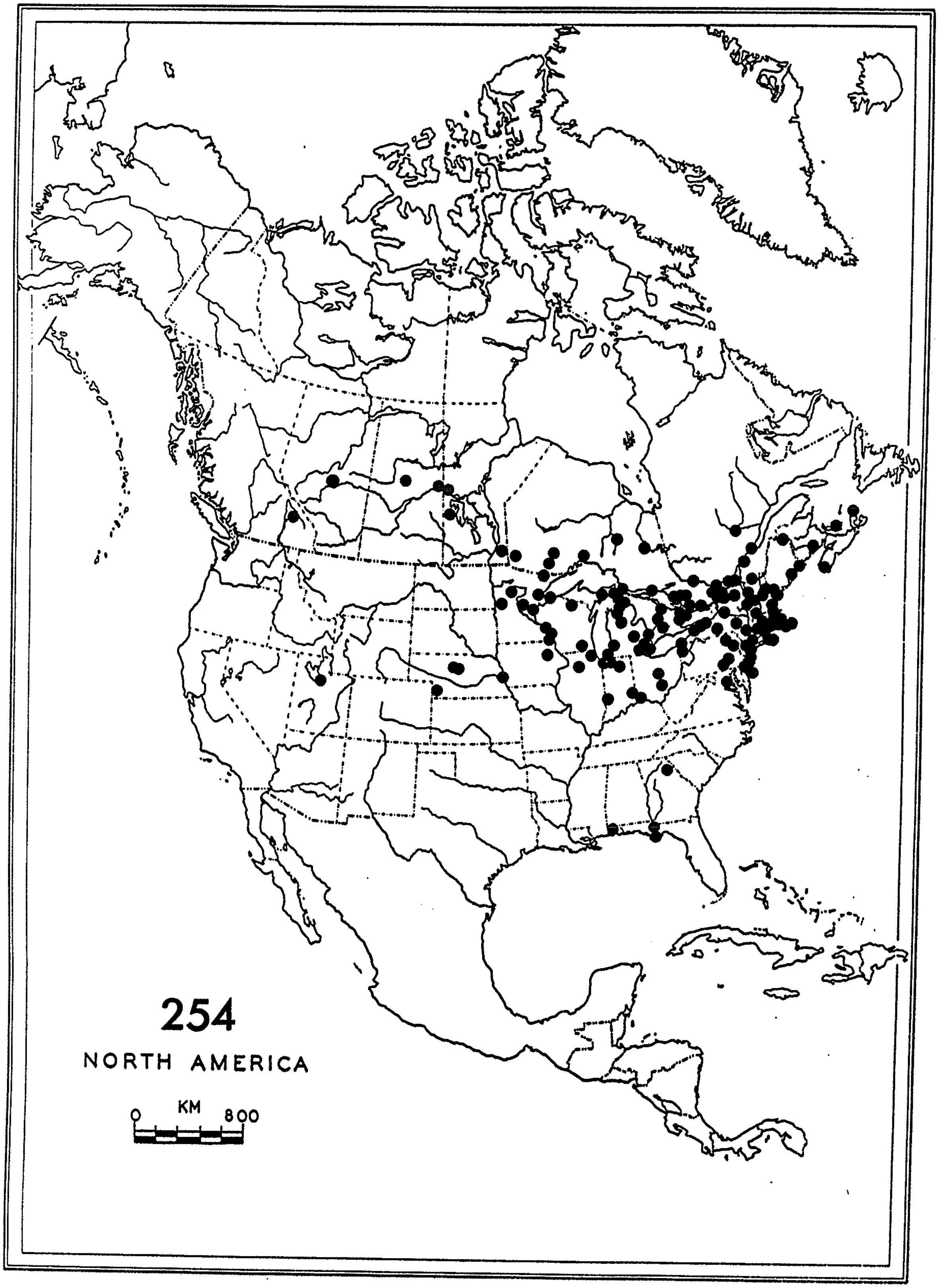
UTAH: **Salt Lake Co.:** S. Lake City, H. Klages Coll'n. (CMP 3).

VERMONT: **Addison Co.:** Ferrisburg, Lewis Creek, ix.15.1978, G Lawrence (UVDZ 1); **Chittendon Co.:** Burlington, Set.14.1974, Bishop (UVDZ 1), June.15.1940, UVM (UVDZ 1); Burlington, Lake Champlain, vi.18.1975, M Langworth (UVDZ 4); Jonesville, 2mi.s., Gillette Pond, 5.June.1973, 800', Kavanaugh & Goulet (CAS 4); **Windham Co.:** Jacksonville, 19.vi.1938, E Pratt (DEFW 1); **Windsor Co.:** Chester, 3 mi.se., 1.Oct.1976, AJ & ME Gilbert (CDAS 40); **Localities not found:** Colchester Point, Sept.30.1971, RC Rosen (UVDZ 1).

VIRGINIA: **Localities not found:** Dyke, 18.5.'11, F Knab (AMNH 1).

WISCONSIN: **Bayfield Co:** County record: Liebeck Coll'n. (MCZ 1); **Dane Co.:** Nevin Marsh, 20.vi.74, AT Bach (UWM 1); Rockdale, June.15.1936, (OSUC 1); County records: v.22., Liebeck Coll'n. (MCZ 5), no date, Ouellet (CAS 1); **Oneida Co.:** Minocqua, 31.v.1938, FW Furry (UMMA 8, LACM 3), 8.vi.1935 (LACM 1), 23.vi.1935 (LACM 10); **Miscellaneous locality:** "Wis.": (DEFW 2, UADB 2).

FIGURE 254. Known distribution of Plateumaris chalcea (Lacordaire), from specimens examined. Each dot represents one collection record, or a group of very close records.


254
NORTH AMERICA
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Plateumaris dubia (Schaeffer, 1925) NEW STATUS

Figures 27-29, 66, 67, 103, 134, 135, 159, 199, 200, 221, 222, 255.

Donacia dubia Schaeffer (1925:152).

Donacia idola Hatch (1938:110). HOLOTYPE ♂ USNM Type #103893 and Allotype ♀ OSUC: "Chase Lake, Snohomish Co., Washington" and 45 Paratypes (OSUC) **NEW SYNONYMY**

Donacia dubia: Mead (1938:119), Hatch (1971:170).

Donacia idola: Mead (1938:119), Hatch (1971:170).

Plateumaris dubia: Monrós (1959:105), Goecke (1960a:8) Jolivet (1970:58), Borowiec (1984:452).

Plateumaris idola: Monrós (1959:105), Goecke (1960a:9) Jolivet (1970:59), Borowiec (1984:453).

TYPE SPECIMENS. HOLOTYPE ♂, USNM Type #4240-C: "Yellowstone Pk, Wyo.", ♀ allotype # 42400 and 4 paratypes, USNM.

TYPE LOCALITY. Yellowstone National Park, Wyoming.

ETYMOLOGY. *Plateumaris dubia* was so named, perhaps indicating that Schaeffer doubted its validity; he thought it similar to, and easily confused with, *P. pusilla* (Say).

TAXONOMIC HISTORY. Hatch (1938) described the species separately as *Donacia idola*, and later (Hatch 1971) recognized both *P. dubia* and *P. idola*.

DIAGNOSIS. Specimens of *Plateumaris dubia* are recognized by the combination of pronotum with calli, callosal sulci, median line and basal sulcus prominent, disc without alutaceous sculpture, appendages more or less entirely dark or metallic, tibiae, femora and antennomeres rufous only at extreme bases, pygidium entirely metallic, truncate in males, pointed in females, mesotibia of males without tubercle, and metafemur with tooth small to absent.

COMPARISONS. Among species occurring in western North America, most specimens of P. dubia are distinctive; however, P. neomexicana and P. dubia are difficult to distinguish in some geographic areas where their distributions overlap, principally in Utah and Idaho. Except these two species, no specimens of other western species lack or have a very small metafemoral tooth and lack mesotibial tubercle of males. Specimens of no other species occurring in the west have a truncate male pygidium and pointed female pygidium, save P. chalcea, but specimens of this species have a prominent femoral tooth, entirely rufous appendages, deeper median pronotal line, are larger, and all western specimens a coppery colour. Plateumaris neomexicana is a variable species, and specimens from Utah and Idaho can easily be confused with those of P. dubia. Female specimens from these areas may not be confidently assigned without association with males; differentiation of the species is discussed under P. neomexicana, below.

DESCRIPTION.

LENGTH. Males: 6.65 - 7.66 mm, females: 7.38 - 8.67 mm

COLOUR. Coppery, green, greenish coppery, purple or black, legs typically entirely metallic or dark and antennomeres bicoloured, pygidium metallic, in some specimens apically rufous.

PRONOTUM. Shiny, smooth and punctulate, varying to punctate and rugose (fine to coarse); median line deep and broad, in many specimens partly confused by rugosity; callosal and basal sulci deep, the calli prominent, sides appearing sinuate and constricted behind; hypomeron coarsely longitudinally rugose; length more or less equal to width across calli, hardly longer than wide (L:W = 0.96 - 1.09).

HEAD. Vertexal calli absent to slight, with shallow occipital sulcus behind in many specimens, coronal suture prominently depressed, accentuating the calli; antennal calli moderate to prominent, punctate and finely setose in most specimens.

APPENDAGES. LEGS. Entirely dark or metallic, many specimens with extreme femoral, tibial and tarsomere bases rufous; metafemur with tooth absent to very small in both sexes; mesotibia of male without tubercle, that of metatibia small. **ANTENNAE.** Largely dark or metallic, or with base of antennomeres rufous, some specimens with apical antennomeres rufous, or with intermediate ones nearly rufous; length proportions typical of genus.

ELYTRA. Typically smooth, shiny, minutely sparsely punctulate; most specimens with a few rugae on disc, rugose apically, some specimens coarsely rugose over most of disc.

PYGIDIUM. Dimorphic sexually, as detailed below; entirely metallic, many specimens with extreme apex rufous.

MALES. Pygidium truncate, mesotibia without tubercle, that of metatibia small; endophallus with ELD with "tooth" at base internally beside PDS, BSB deeply cleft at articulation with ELDs and with basal part prominent, PDS broadly oval and deeply notched.

FEMALES. Pygidium pointed, rounded in a few specimens; ventral valve of ovipositor more or less parallel-sided, tapering to acute point, apical margins finely serrulate unless worn, dorsal valve apically rounded, without median line.

SEXUAL DIMORPHISM. Dimorphism virtually absent, only in size, pygidial shape, and males with mesotibial tubercle only.

VARIATION. *Plateumaris dubia* varies in size, slightly in pronotal shape, appendage colour and metafemoral tooth size, and in rugosity of the pronotal disc and elytral rugosity.

NATURAL HISTORY. Available host records are typical: Cyperaceae (*Carex*, *Eleocharis*, and probably *Scirpus*). A record of "*Smilacina et al*" (B.C.) probably included these sedges.

DISTRIBUTION. *Plateumaris dubia* is restricted in distribution to western North America, known from southern Utah to northern British Columbia; it attains the west coast only from Oregon northward, and to the east hardly exceeds the foothills of the Rocky Mountains. Schaeffer (1925) recorded a specimen from Detroit, but I have not seen this specimen and surmise it is probably a rather rugose (pronotum) specimen of *P. metallica* (Fig. 255).

CHOROLOGICAL RELATIONS. *Plateumaris dubia* is sympatric with other species that extend to the west, but is largely allopatric of the other exclusively western species, *P. neomexicana*; these two species overlap in distribution only coastally and in Utah and Idaho. Its sister species, *P. metallica*, is restricted to eastern North America.

PHYLOGENETIC RELATIONS. *Plateumaris dubia* is evidently most closely related to *P. metallica*, sharing the same genitalic and sexual characters, and it belongs to a small group of three species (including *P. neomexicana*) with mesotibial tubercle of males absent, and ELD of endophallus with a basal tooth. It is hypothesized to be the sister taxon of *P. metallica*. Together, these three species appear to be members of a monophyletic group of species with pointed female pygidium, the *P. chalcea*-Group. See *P. chalcea* for further details.

SPECIMENS EXAMINED: 1161 males and females, excluding primary types. Prior to present writing, I treated *P. dubia* and *P. metallica* as subspecies; I rejected this classification in the latter stages of writing this manuscript, but most specimens I examined and returned to their respective collections bear my determination label that reads "*Plateumaris metallica dubia* (Schaeffer) 1925 ...". These specimens should be considered determined with the species status I give the taxon now. I have examined specimens from the following provinces and states: CANADA: BC, AB; UNITED STATES: AK, ID, MT, OR, UT, WA, WY. A detailed list of locality data from specimens examined is as follows:

CANADA. ALBERTA: Banff, 26.vi.1922, E Hearle (CAS 3,CNC 1), 30.v.1922, CBD Garrett (CNC 1), 26.vi.1922 (USNM 1), 11 mi.W., 4500', 11.vii.1955, WJ Brown (CNC 10), Eisenhower Jct., 4700', 6.vii.1955, JR McGillis (CNC 1); Bragg Creek, 11.vii.1954, BF & JL Carr (CARR 1); Calgary, 4.vi.1928, "Sarcee Reserve, blue grass", O Bryant (CAS 1), 16.vi.1959, BF & JL Carr (CARR 1), 30.vi.1959, BF & JL Carr (CARR 4), 31.vi.1973, BF & JL Carr (CARR 2), 2.vii.1959, BF & JL Carr (CARR 1), 14.vii.1959, BF & JL Carr (CARR 1), 29.vi.1973, GJ Hilchie (UAE 1), June.11-12.1890, R Hayward (MCZ 1), 25/29.vi.1974, C & A v.Nidek (CVNC 1), 4.vi.1957, JF Brimley (CNC 1); Calgary, Fish Cr., 19.vi.1973, BF & JL Carr (CARR 3); Chain Lakes, 16.vi.1974, GJ Hilchie (UAE 1); Cochrane, 10.vii.1960, BF & JL Carr (CARR 4); Coleman, 2.vii.1981, BF & JL Carr (CARR 1), @1450m, 1/6.vii.1981, C & A v.Nidek (CVNC 7), 15.vii.1988, BF & JL Carr (CARR 40); Dogpound, 13.vii.1981, C & A v.Nidek (CVNC 6); Exshaw, 22.vi.1954, BF & JL Carr (CARR 1); Frank, 18.vi.1952, AR Brooks (CNC 2); Ghost Dam, 9-11.vi.1980, BF & JL Carr (CARR 4), 13.vi.1974, GJ Hilchie (UAE 2); Gorge Creek, North Fork rd. ponds & streams, 24.vi.1970, R Gooding & M

Wilkie (UAE 4); Heath Ck., 1 km.N. Oldman R., June.19.1986, D. Langor (NFRC 1); Kananaskis, 26.vi.1928, O Bryant (CAS 1); Lamoral, vii (UAE 1); Little Red Deer Riv., 10 km.S. Westward Ho, 26.vi.1982, sweep Carex, IS Askevold (ISAC 2); Pincher Creek, Beauvais Lake, 14-16.vi.1987, C & A v.Nidek (CVNC 1); Sibbold Flats, Tp.23, Rge.6, W5, 6.vi.1987, C & A v.Nidek (CVNC 5); Tp. / Rge. / W. 5 Mer: 5 / 3, 20.vi.1976, BF & JL Carr (CARR 1); 9 / 7, 4.vii.1981, BF & JL Carr (CARR 1); 22 / 4, 3.vi.1981, BF & JL Carr (CARR 3); 27 / 7, 7.vi.1964, BF & JL Carr (CARR 1); 28 / 5, 5.vi.1981, BF & JL Carr)CARR 2), 6.vii.1981, BF & JL Carr (CARR 4), 10.vi.1972, BF & JL Carr (CARR 1), 20.vi.1978, BF & JL Carr (CARR 2), 22.vi.1954, BF & JL Carr (CARR 1), 21.vi.1973, GJ Hilchie (UAE 5), 19.vi.1977, GJ Hilchie (UAE 2); Upper Waterfowl Lake, Banff Nat. Park, 5700', 10.vii.1970, JM & BA Campbell (CNC 1); Waiparous, 28.vi.1957, Carr (CNC 2); Waterton Lakes Nat. Park: Belly R., Chief Mtn. Hwy., 4500', 18.vi.1980, JM Cambell (CNC 3); mi.3, Chief Mtn. Hwy., 4500', 6.vi.1980, JM Campbell (CNC 4), 14-17.vi.1980, JM Campbell (CNC 2); km. 9, Chief Mtn. Hwy., 4500', 17-19.vi.1980, "ex flight intercept trap", JM Campbell (CNC 2), 5000', 28.vi.1980, JM Campbell (CNC 2); Lookout Butte Picnic Site, 9-14.vi.1980, "ex flight intercept trap", JM Campbell (CNC 4); Lost Horse Creek, 4900', 6.vi.1980, JM Campbell (CNC 1); Maskinonge Lake, 4200', 14.vi.1980, JM Campbell (CNC 1); nr. Hwy. 6, 4.4 km.SE jct. Hwy. 5, 5-6.vi.1980, "treading beaver pond", IM Smith (CNC 1).

BRITISH COLUMBIA: Alert Bay, Vanc. Isl., no date, JH Keen (USNM 1); 2.6 mi. N. Avolla, 17.v.1980, RE & ML Roughley (ISAC 2); Baynes Lake, 3.vii.1981, BF & JL Carr (CARR 1); Bruer Creek, 14.vii.1935, JK Jacob (CNC 1); Crescent Valley, 3000;, 5,23.vi.1967, JS Shepard (UBC 2);

Crescent Valley (Krestova), 17.v.1980, Eleocharis, IS Askevold (ISAC 1); Emerald Lake, June, A Fenyes coll'n (CAS 3); Galena Bay, 10.vi.1984, BF & JL Carr (CARR 1); Glacier, 9.6. Schffr coll'n (USNM 1); Glacier Nat. Pk., 10 mi.E. Rogers Pass, 17.vi.1968, Campbell & Smetana (CNC 4); Golden, 27.vi.1976, BF & JL Carr (CARR 1); Grohman Narrows Prov. Pk, 3 km.SW Nelson, sweep Carex & Eleocharis, IS Askevold (ISAC 3); Heather Lake, 6400', 20.vii.1978, IS Askevold (ISAC 4); Kamloops, Nov.1.1932, O Bryant (CAS 14); Liard R. Hot Springs, 24.v.1981, ex Carex, Vasington & Cannings (UBC 5), 17.vi.1982, ex Smilacina et al, Wilkie & Cannings (UBC 10), 27.vi.1985, SG Cannings (UBCZ 1); Monashee Mine, S. of Cherryville, 13.vii.1949, HB Leech (CAS 2, AMNH 2); Mt. Revelstoke, 3.vii.1952, G Holland (CNC 1); Robson, July.20.'60 (NMDC 1, ISAC 2); Salmon Arm, 26.v.1932, HB Leech (CNC 10, CAS 2, UBC 1), 20.v.1929, HB Leech (CNC 1), 3,4,8.vi.1925, AA Dennys (CNC 7, MCZ 3); Vancouver, 19.vii.1931, HB Leech (CNC 3); Vernon, 20.v.1921, MH Ruhmann (CNC 1); Yoho Valley, Yoho Nat. Pk., 4400', 22.vii.1955, WJ Brown (CNC 1).

UNITED STATES. ALASKA: Juneau, Granite Basin, 13.viii.1979, DP Schwert (ASRC 1); Kruzof Island, vi.20.1986, "small pool in Sphagnum bog, pine forest", R. Maddison (Elias 2); Mitkof Isl., Falls Creek, Wrangell Narrows, 1.ix.1951, B Malkin (FMNH 1).

IDAHO: **Adams Co.:** Bear, 2.vii.1968, BF & JL Carr (CARR 1); **Benewah Co.:** Emida, 5.viii.84, BF & JL Carr (CARR 2); St. Maries, 7 mi.NE, v.21.1970, WF Barr (UIM 4); **Blaine Co.:** Galena, 7600', 15.vii.1961, BH Poole (CNC 1), 14.vii.1968, BF & JL Carr (CARR 3); Hyndman Creek, Challis N.F., 21.vii.1952, B Malkin (OSUC 1, FMNH 1); **Boise Co.:** Banner Summit, Hwy. 217, 7.vii.86, BF & JL Carr (CARR 1); Gardena, 23.v.86, BF

& JL Carr (CARR 2); 5 km.N. Gardena, 23.v.1986, C & A v.Nidek (CVNC 3); Garden Valley, 9 mi.E., v.24/1976, WF Barr (UIM 5); **Bonner Co.:** Priest R. Exp. For., vi.2.1959, WF Barr (OSUC 1, UIM 3); **Bonneville Co.:** Palisades, 14 mi.SE, vi.16.68, WF Barr (UIM 1); **Boundary Co.:** Kaniksu Nat'l. For., Selkirk Mtns., 5500', July.11-13.1967 (NMDC 4, ISAC 4); Roman Nose L., 15 mi.NW Naples, vii.8.1968, WF Barr (UIM 9); **Clearwater Co.:** Elk River, 12/6/61, "Pine duff", M Ollieu (UIM 1), v.19.63, WF Barr (UIM 10, OSUC 1), vi.9.1962 & vii.14.1963, RE Stecker (SJSU 2); Elk Riv., 10 mi W. Ruby Creek, v.8.49, WF Barr (UIM 1); 1 mi.N. Elk River, 21.May.1985, RS Zack (WSU 5); Lolo Pass, vi.14.1963, WF Barr (UIM 2); Wieppe, 1 mi.n., v.17.61, AR Gittins (UIM 1); **Custer Co.:** Cape Horn, 8.vii.1968, BF & JL Carr (CARR 1); Salmon River, 7 mi.S. Stanley, vi.28.1965, ER Logan (UIM 3); Stanley, 6200', 7.10.1926, RW Begele (OSUC 1); **Elmore Co.:** Dixie, vi.10.1960, BA Foote (UIM 1), vi.27.1964, WF Barr (UICM 1); 20 km.NE. Mountain Home, 30.v.1986, C & A v.Nidek (CVNC 29); Prairie, 1.vi.1986, C & A v.Nidek (CVNC 1); 5 km.E. Prairie Jctn., Hwy.#20, 30.v.86, BF & JL Carr (CARR 2); **Fremont Co.:** Jct. Fish Cr. & Snow Cr. rds., Targhee Nat. For., 14.vi.1986, BF & JL Carr (CARR 17); N. shore Henry's Lake, no date, BA Foote (SJSU 1); Warm River Cpgrd., 16.vi.86, BF & JL Carr (CARR 4); Warm River Springs, Targhee N.F., 7-18.vi.1986, C & v.Nidek (CVNC 19); **Idaho Co.:** Lolo Pass, vi.30.1964, WF Barr (OSUC 2), vi.30.1964, RL Westcott (UIM 8), vi.25.1967, AC Manis (UICM 7); O'Hara Campgr., v.31.1975, Wharton (TAMU 1); Riggins, 1 mi.W., v.23.1963, GP Martin (UIM 1); **Latah Co.:** Boville, vi.8.1932, MH Hatch (OSUC 6); Hellmer, 3 mi.S., v.22.1971, WJ Turner (WSU 2); Juliaetta, no date, Chttn (USNM 1); Laird Park, vi.2.1963, WF Barr (UIM 1), vi.25.1962, RE Stecker (SJSU 5); Moscow, vii.18.1962, RE Stecker (SJSU 1), x.23.1962, RE Stecker (SJSU 1), vi.17.1962, RE & P Stecker (SJSU 15), May.30.1956, VE Pratke (UIM 1); 6 mi.N. Moscow, v.22.1971, WJ Turner (WSU 1); Moscow Mtn., north slope, vii.5.1966, HC Manis (UIM 40), 4.30.41, R Halasey (WSU 1), vi.3.11 (JECW 1); sect. 9 pond, vi.25.1976, DF Viers (UIM 20), May.19.1955, 3000 ft. RC Carlstrom (UIM 1); Ruby Creek, vii.2.1955, WF Barr (UIM 1); Strychnine Crk., 14 mi.ENE. Potlatch, 1.June.1981, WJ Turner (WSU 1); 6 mi.E. Viola, 16.June.1988, ME RIce (EGRC 3); **Lemhi Co.:** Meadow Lake, vii.1.1977, JM Domek (UIM 5); **Lewis Co.:** Rubens, vi.10.1948, AJ Walz (UIM 2); **Nez Perce Co.:** Craig's Mt., no date, Otto Luger (DEFW 11); **Shoshone Co.:** 23 mi.S. Avery, vii.12.1958, AR Gittins (OSUC 1, UIM 3); Merry Creek, 2 mi.E. Clarkia, v.26.1966, MA Brusven (UIM 1); **Valley Co.:** Crouch, 24 mi.N, 12.July.1968, DR Harris (CDAS 1); McCall, 24.vii.1952, MC Lane (OSUC 2), June.24.1938, MC Lane (SJSU 1, UIM 1); Warm Lake, 2 mi.N., vi.25.1959, WF Barr (SJSU 1); **Localities not found:** Ladd Cr., 13 mi.SW La Grande, vii.16.75, AR Gittins (UIM 2); Moores Lake,vii.10.07, JM Aldrich (UIM 2).

MONTANA: **Beaverhead Co.:** Lemni Pass, source Missoula, Beaverhead N.F. 7400', 26.vi.1956, CP Alexander (MCZ 2); **Carbon Co.:** East Rosebud Lake, 19.vi.1961, SM Sutter (UCM 17), 24.vi.1961, B Vogel (UCM 1), 27.vi.1961, B Vogel (UCEC 2), 10.Jly.1964, B & C Durden (PMY 1); **Deer Lodge Co.:** Anaconda, 11 mi.W., 5500', Aug.7.67, L Russel (OSUC 2); **Flathead Co.:** Bigfork, 3000', June.13.1967, R Russell (OSUC 30); **Gallatin Co.:** Bozeman, June.5.1913 (MTSU 1), June.4.1954, RC Froeschner (MTSU 1); **Jefferson Co.:** 9 mi.SE Butte, vii.16.1988, 6000 ft., R. Wharton (TAMU 1); **Lake Co.:** Swan Lake, 3200', July.14.1967, L Russell (OSUC 10); 14 km.S. Swan Lake, 3200', June.14.1963, L Russell

(OSUC 4); County record: v.19.1936, RD Eichmont (MTSU 12); **Lewis & Clark Co.:** MacDonald Pass, 6325', July.31.1967, L Russell (OSUC 3); **Mineral Co.:** Lookout Pass, 3609-4200', June.9.1967, L Russell (OSUC 12); **Missoula Co.:** Lolo Pass, 5200', June.28.1967, L Russell (OSUC 6); Lolo Pass summit, 5187', June.28.1967, L Russell (OSUC 44); Seeley L., 3500', June.15.1967, L Russell (OSUC 1); **Sanders Co.:** 5 mi.S. Hot Springs, 2900', June.23.1967, L Russell (OSUC 2); Rainbow Lake, 2900', June.13.1967, L Russell (OSUC 1); **Ravalli Co.:** Camp Creek, 7.4.33, WL Jellison (OSUC 1); 7 mi.E. Lolo Pass, 4300', June.28.1967, L Russell (OSUC 3); Sula, vi.27.1929, "on flowers of Carex", D DeLeon (CAS 3); **Teton Co.:** Couteau, vi.22.1954, RC Froeschner (MTSU 2); **Localities not found:** East Flathead, 5700', July.25.1902 (MTSU 1); Glacier N.P., Johns Lake bog, 4500', July.20.1967 L Russell (OSUC 11); Mont. Exp. Sta., Como, May.1915 (OSUC 1); **Miscellaneous:** Glacier Nat. Park, vii.35, JE Blum (CAS 4, EGRC 13, ISAC 2, WSU 2).

OREGON: **Baker Co.:** Anthony L., 6000', June.12.1939, MC Lane (OSUC 19) Anthony L., Blue Mtns., 7000', June.27.1948, CP Alexander (MCZ 1); Baker, 2.vi.1939, JH Becker (CUIC 1); Sumpter, 28.v.1984, BF & JL Carr (CARR 19); **Clackamas Co.:** Mt. Hood, Gov. Camp, 4000', June.2.1939, MC Lane (OSUC 17); **Deschutes Co.:** Indian Ford, Hwy. #20, 20.vi.1964, K Goeden (ODAC 1); Indian Ford Creek, May.17.1976, JR Willard (OSUC 1); Sisters, 7 mi.NW, May.17.1963, DR Smith (OSUC 1); **Grant Co.:** Clear Creek, Hwy.26, 29.June.1985 (SMCL 3); Dixie Pass, 5200', June.1.1957, B Malkin (FMNH 10, OSUC 10); Dixie Pass, Malheur N.F., 23.June.1961, Wood, Karren & Bright (VPI 2); Granite, June.21.1945, MC Lane (OSUC 3); Hoodoo Ck. R.S., June.12.1939, MC Lane (OSUC 14); Moon Meadows, July.12.1939, MC Lane (OSUC 3); **Hood River Co.:** Mt. Hood, Bear Springs

R.S., June.12.1961, MC Lane (OSUC 4), 4000', June.15.1962, MC Lane (OSUC 3); Mt. Hood, Hood River Meadows, 4500', July.6.1938, MC Lane (OSUC 1), 4000', June.21.1958, MC Lane (OSUC 2), 8.Oct.1964, K Goeden (ODAC 2); **Linn Co.:** Marion Lake, 4200', Aug.11.1964, DR Smith & CW Baker (OSUC 9); **Umatillo Co.:** Lehman Springs, Hwy.#44, 14.vi.84, BF & JL Carr (CARR 14); **Union Co.:** Catherine Cr., iv.10.61, RH Abbott (UIM 5, SJSU 1, OSUC 1); Ladd Cyn., 14 mi.S. LaGrande, 4280', vi.17-19.1976, "malaise baited with CO_2", EJ Davis (WSU 2); Perry, 14.vi.1984, BF & JL Carr (CARR 1); Spout Springs, 2 mi.S. on Hwy.#204, 9.viii.1963, K Goeden (ODAC 3); **Wallowa Co.:** Blue Mtns, Gold Center Camp (W. of Becker), 15.June.1941, KM Fender (OSUC 1); Blue Mtns., Mottet R.S., 4500', 27.vii.1936, MC Lane (OSUC 14), 7.vii.1938, MC Lane (OSUC 1), 29.vii.1939, MC Lane (OSUC 3), June.27.1935, EW Jones (UIM 4); Minam, 13.vi.1984, BF & JL Carr (CARR 2); Mottet Mead., Blue Mts, vi.7.1938, Van Dyke (CAS 5), 6.11.1940 KM Fender (OSUC 9); Wallowa, 7 mi.W., 17.v.1949, JE Davis (ODAC 5); Wallowa Lake, 21.June.1941, KM Fender (OSUC 2); **Wasco Co.:** Bear Springs, May.18.1940, KM Fender (OSUC 12); Bear Springs, Wapinita Cutoff, June.30.1941, KM Fender (OSUC 8); Wapinita Cutoff, 5.30.38 (OSUC 1); **Wheeler Co.:** Straw Fork Butte Creek, S. Fossil, 28.June.1985 (SMCL 3); **Locality not found:** Winema N.F., Walker Prairie, 13.June.1962, MC Lane (OSUC 4).

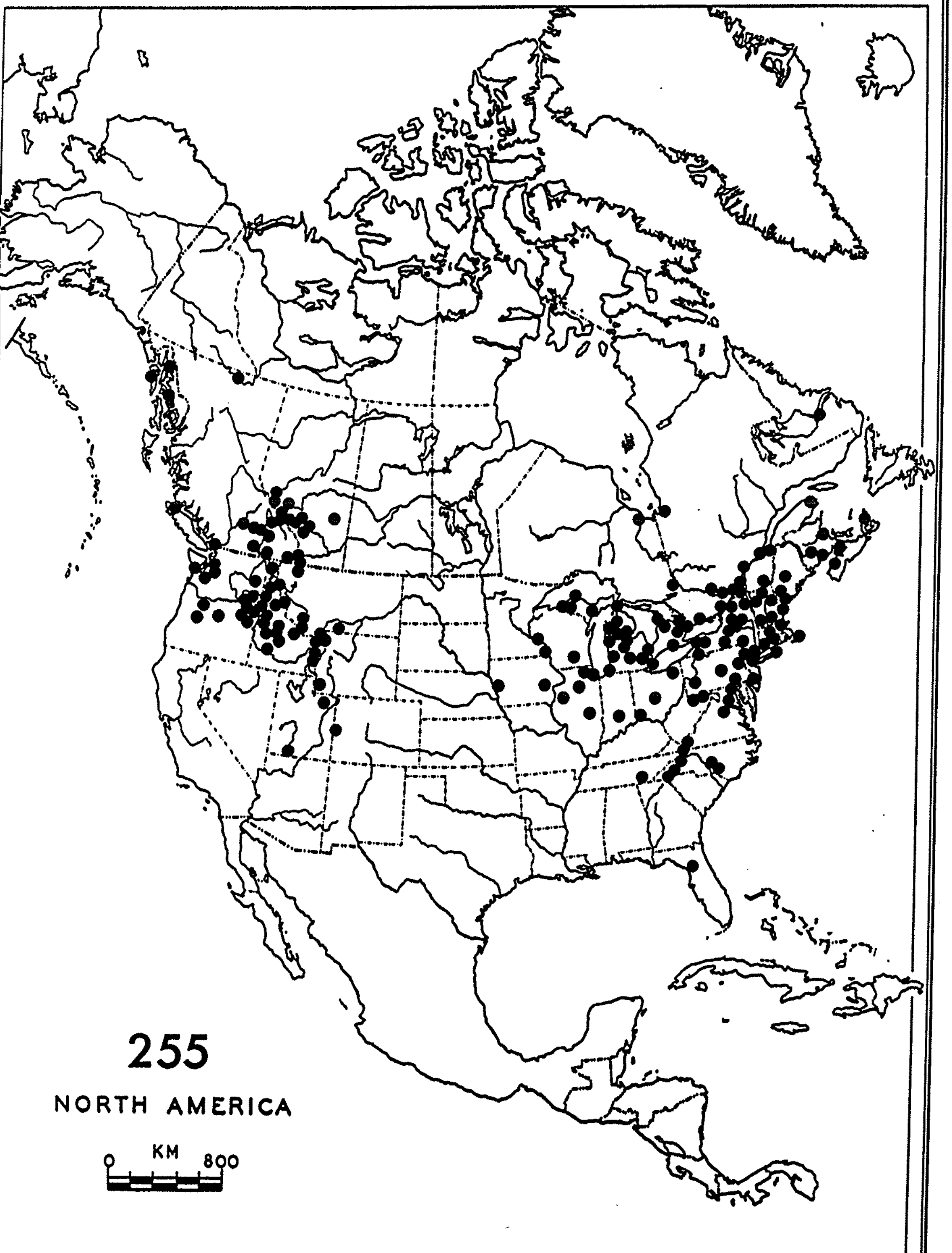
UTAH: **Kane Co.:** Glendale, May.1939, GF Knowlton & FC Harmston (EMUS 3); 3 mi.W. Glendale, 17.vi.1982, WJ Hanson (EMUS 1); **Uinta Co.:** White Rocks, 31.v.1940, GF Knowlton & FC Harmston (EMUS 1).

WASHINGTON: **Asotin Co.:** Field's Spr. S.P., 4 mi.S. Anatore, 3500-4000', 1.vi.1973, WJ Turner (WSU 1); **Columbia Co.:** Blue Mtns, Godman Sprgs, 500', June.25.1935, EW Jones (UIM 2); **Gray Harbour Co.:**

Copalis Beach, June.7.1940 (OSUC 1); **King Co.:** Shoqualmie Pass, June.13.1949, MC Lane (OSUC 1), 29.June.24, AL Melander (AMNH 1); **Pierce Co.:** Mt. Rainier, vii.20.27, Darlington (MCZ 1); Mt. Rainier, Reflection Lakes, June.22.1958, MC Lane (OSUC 3), July.11.1961, MC Lane (OSUC 3), 4800' July.24.1962, MC Lane (OSUC 3), July.16.1963, MC Lane (OSUC 1); Mt. Rainier Nat. Pk., Frog Heaven, E. of Canyon Rim turnout on Hwy.#706, 14.Jun.1969, ROM Fld. Pty. (ROMC 1); **Snohomish Co.:** Chace Lake, iv.27.1939 (WSU 1), v.7.1940, GE Sawyer (OSUC 1), iv.28.38, CH Lavergo (OSUC 1), 5.v.1942, H Plank (UBC 3), **PARATYPES** of *P. idola* (Hatch): 4.29.37, Ostroff (OSUC 1), 4.29.36, RP Owen (OSUC 6), v.5.49, AM Sunde (OSUC 1), iv.28.38 (OSUC 48), v.28.39 (OSUC 1), v.7.41 (OSUC 1), 27.iv.39, EP Caughran (OSUC 3), v.7.40, RA Foster (OSUC 1), 4.27.39, D Pike (OSUC 1), v.1.38, O Stout (OSUC 5), Apr.27.1939, MH Hatch (OSUC 3), iv.36, MH Hatch (OSUC 4, AMNH 1), v.9.34, MH Hatch (OSUC 16, AMNH 1), v.14.30, MH Hatch (OSUC 1), iv.26.33, MH Hatch (OSUC 1), iv.27.31, MH Hatch (OSUC 1), iv.28.1938, MH Hatch (AMNH 1), v.3.51, Tach & Beresford (OSUC 1), v.14.30 (OSUC 5), v.14.30 (OSUC 5), 5.14.30, Lanphere (OSUC 5), 4.26.33, LC Snyder (OSUC 1, AMNH 1).

WYOMING: Lincoln Co.: Bedford, 30.v.1963, GL Jenson (VPI 2, EMUS 3); Pine Cr. rd., Cokeville, 25.vi.1986, BF & JL Carr (CARR 6); **Yellowstone Nat. Park Co.:** Yellowstone N.P., E300716, vii.16.1930 (AMNH 7); Y.N.P., Norris, 24.vi.1936, MH Hatch (OSUC 3); Y.N.P., Old Faithful, 24.vi.1936, MH Hatch (OSUC 1); Y.N.P., Spirea Crk., 8.Jly.63, JG Edwards (SJSU 3); Y.N.P., Spring Creek, 15.July.23, AL Melander (AMNH 1, USNM 1); "Yellowstone N.Pk.", vii.22 (USNM 1), 20.ix.1930, JS Alexander (UMMA 1), no date (EMUS 2); "W. Yellowstone", vi.16.30 (AMNH 3, CAS 10).

FIGURE 255. Known distribution of Plateumaris dubia (Schaeffer) in western North America, and Plateumaris metallica (Ahrens) in eastern North America, from specimens examined. Each dot represents one collection record, or a group of very close records.


255
NORTH AMERICA
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Plateumaris metallica (Ahrens, 1810)

Figures 39-42, 71, 72, 108, 138, 139, 158, 197, 198, 223, 255.

Donacia metallica Ahrens (1810:33).

Donacia femoralis Kirby (1837:223). LECTOTYPE ♀, BMNH: "LECTOTYPE [blue trim disc added by me], TYPE [red trim disc], N. Scotia 5948a [white disc], Donacia femoralis Kirby N. Scotia 5948 - Rev. W. Kirby [upper side] femoralis Kirby type [underside]." I added the labels "LECTOTYPE ♀ Donacia femoralis Kirby 1837 designated 11.vii.1984 I.S. Askevold" and "Plateumaris metallica (Ahrens) det. I.S. Askevold '84". Kirby did not indicate the number of specimens before him.

Donacia cataractae Newman (1838:391). LECTOTYPE o^, BMNH: "LECTOTYPE [blue trim disc added by me], TYPE H.T. [red trim disc], R. Foster Trenton Falls New York, Donacia cataractae type Newman G.K. Arrow det.". I added the labels "LECTOTYPE o^ Donacia cataractae Newman 1838 designated 11.vii.1984 I.S. Askevold" and "Plateumaris metallica (Ahrens) det. I.S. Askevold '84".

Donacia parva Lacordaire (1845:190). LECTOTYPE o^, BMNH: "LECTOTYPE [blue trim disc added by me], TYPE [red trim disc], Donacia parva ♀ Type Lacord., TYPE, 17., D. parva ♀ Lac. type, E. coll. Laferté, 67.56, 48 parva Lac. Mon. 190 type Am. Sept. [upper side] Deloyala Roba Chvt Mexico [underside]". I added the labels "LECTOTYPE o^ Donacia parva Lacordaire 1845 designated 10.vii.1984 I.S. Askevold" and "Plateumaris metallica (Ahrens) det. I.S. Askevold 1984". Of the two specimens Lacordaire stated he had before him, I could find only the single specimen here designated.

Donacia indica Melsheimer (1847:158). (not Clark 1866:1). NEOTYPE o^, MCZ: "Mt. Hope Lancaster Co. 6.15 Pa, Liebeck Collection". I added the labels "NEOTYPE o^ Donacia indica Melsheimer design. IS Askevold '89 [red]" and "Plateumaris metallica (Ahrens) det. I.S. Askevold 1989". No original Melsheimer specimen bearing this name was found in the Melsheimer collection, nor under this or related names in the LeConte collection. It ought to have been found in the LeConte collection because D. indica Melsh. appears to have been described from a unique example, and LeConte obtained the uniques from the Melsheimer collection (LeConte 1961). I have therefore selected the above specimen as neotype, this from Pennsylvania from which the original specimen came.

Donacia nana Melsheimer (1847:160). LECTOTYPE o^, MCZ Type #32953: "♀ [pink disc, indicating wrong sex, = Middle States, N.Y.], LECTOTYPE [blue trim disc added by me], metallica 3, J. LeConte Collection". I added the labels "LECTOTYPE o^ Donacia nana Melsheimer 1847 designated 1984 by I.S. Askevold" and "Plateumaris metallica (Ahrens) 1810 det. I.S. Askevold 1984". In the LeConte collection (MCZ) are seven specimens under the heading "D. metallica Ahr. nana Melsh." There are no specimens under D. nana in the Melsheimer collection of MCZ; since LeConte acquired all the unique types of Melsheimer (LeConte 1961), I assume that one specimen of the above series must be the type, even though none bears a Melsheimer label.

Donacia gentilis LeConte (1851:314). LECTOTYPE o^, MCZ Type #4249: "LECTOTYPE [blue trim disc added by me], pink disc [= Middle States, N.Y.], TYPE 4249 [red], D. gentilis LeC., J.L. LeConte Collection" I added the labels "LECTOTYPE o^ Donacia gentilis LeConte 1851 designated I.S. Askevold 1983" and "Plateumaris metallica metallica (Ahrens) 1810 det. I.S. Askevold 1983". Of three specimens in the LeConte collection under the label D. gentilis, this is selected as lectotype.

Donacia metallica: LeConte (1851:314), Crotch (1873:21), Leng (1891:174), Blatchley (1910:1106), Schaeffer (1925:137), Wilcox (1954:373), Brigham (1982:10.123).

Plateumaris metallica: Jacoby and Clavareau (1904:31), Clavareau (1913:11), Monrós (1959:105), Goecke (1960a:9), Jolivet (1970:59), Borowiec (1984:453).

TYPE SPECIMEN. NEOTYPE o^ CNC TYPE #19493: "USA, PA, West. Co., Forbes St. For., Spruce Flats, 2700', vii.11/12-1984, DS Chandler treading". I added the labels "NEOTYPE o^ Donacia metallica Ahrens design. I.S. Askevold 1987" and "Plateumaris metallica metallica (Ahrens) det. I.S. Askevold 1986".

Additional notes: The following statements taken verbatim from Ahrens (1810:34) cause me to believe this taxon is correctly assigned: "... Das Halschild hat mehrere undeutliche, glatte, glänzende Erhabenheiten, mit fein punktierten, sanften Vertiefungen dazwischen... Die Längsrinne ist schwach, und endet nach hinten in einer seichten Vertiefung; ... blos an der Wurzel rothe Schenkel, von denen die hinten schwach gezahnt sind." Askevold (1987a:632-3) discussed reasons for believing Donaciinae of the Ahrens collection to be destroyed. The above neotype is designated, consistent with Ahren's description, and with over 60 years' use of the name, which I believe Schaeffer (1925) elevated correctly.

TYPE LOCALITY. "Habitat in Pennsylvania", as stated by Ahrens, and hereby restricted to the above locality from the neotype originated by implication of ICZN (1985) Article 75(f).

ETYMOLOGY. Evidently named for the metallic colouration of specimens of this species; though this is not unusual for donaciines, it may have impressed Ahrens, who described in *Donacia*, in the same publication, two other species which are now known as *Syneta ferruginea* and *Orsodacne atra*, neither of which is metallic in colour.

TAXONOMIC HISTORY: LeConte (1851) monographed *D. metallica*, but may not have seen any specimens, and so added *D. gentilis*, in spite of recognizing *D. femoralis* Kirby. He placed *D. cataractae* Newman as "*species dubiae*". Crotch (1873) recognized both *D. femoralis* and *D. metallica*, without accounting for *D. cataractae*, but the sense in which he used the name *D. femoralis* was evidently in reference to *P. germari* (Mannerheim). This arrangement was followed by Leng (1891), and therefore also Jacoby and Clavareau (1904) and Clavareau (1913), with *D. cataractae* placed a junior synonym of *D. pusilla*. Crotch (1873) also did not account for the names D. parva Lacordaire, D. nana Melsheimer, and D. indica Melsheimer. Leng (1891) placed D. indica as a junior synonym of D. femoralis (correctly by accident, because of misapplication of D. femoralis as a senior synonym of P. germari); D. nana he correctly placed as a junior synonym of D. metallica, but placed D. parva as a junior synonym of D. flavipes Kirby. Leng's arrangement of the names was followed entirely by Jacoby and Clavareau (1904) and again by Clavareau (1913). With help from G.J. Arrow at the BMNH, Schaeffer (1925) correctly rearranged the names pertinent to D. metallica, as they stand above and corroborated by me by examination of all types.

DIAGNOSIS. Specimens of P. metallica are easily recognized by the swollen, more or less shiny, less punctate area of pronotal disc either side of midline, more or less obsolete but shiny calli, truncate pygidium of males, pointed in females, absent tubercle of mesotibia of males, absent metafemoral tooth of females.

COMPARISONS. Specimens of P. metallica cannot be easily confused with those of any eastern species of the genus. Specimens resemble those of P. rufa in pronotal shape and convexity, and poor development of sulci, rufous explanate sutural margin of elytra of some specimens, and rufous pygidium of most specimens. It differs from specimens of that species by small (males) or absent (females) femoral tooth, lack of mesotibial tubercle of males, largely dark appendages, some rugosity on pronotal disc about median line and laterally, callosal sulci slightly more prominent, and by genitalic differences. Specimens of other eastern species that have nearly entirely dark appendages also have a more distinct metafemoral tooth, most have emarginate pygidium, or pygidium emarginate and metallic, and males of these species possess a mesotibial tubercle (if absent, then lacking metatibial tubercle also, cf. P. notmani).

DESCRIPTION.

LENGTH. Males: 6.15 - 7.48 mm, females: 6.65 - 8.57 mm

COLOUR. Coppery, green, purplish black, or blue; legs of most specimens rufous with femur broadly metallic apically, antennae of most specimens metallic with antennomere bases rufous.

PRONOTUM. Most specimens shiny and punctulate on swollen area either side of midline, closely moderately punctate, even rugulose adjacent to midline, anteriorly and laterally, but some specimens more or less uniformly moderately punctate and punctulate over whole disc; median line narrow, prominent; many specimens with slight alutaceousness about midline; callosal sulci shallow, more or less obliterated in many specimens, the calli therefore not well-defined but varying to sulci and calli prominent, and calli shiny and more or less impunctate; basal sulcus moderate and well-defined to absent; hypomeron with usual coarse rugae above coxae and at hind margin, most specimens grading to finer rugae to confusedly punctate upper margin, some specimens more or less entirely confusedly punctate.

HEAD. Vertexal calli absent, occipital sulcus absent; antennal calli hardly developed to prominent and with oval depression behind, and shiny to punctate.

APPENDAGES. LEGS. Tibiae and tarsi of most specimens rufous, femora with apical or subapical half to two-thirds metallic, a few specimens with legs entirely rufous, or some specimens with tibiae and tarsi apically to entirely infuscate; metafemur with tooth minute to moderate and acute in males, absent to small in females; meso- and metatibia slightly flared at extreme apex, mesotibia of males without tubercle.

ANTENNAE. Antennomeres of most specimens basally rufous, apical half dark or metallic, but varying from apical antennomeres rufous to entire antennae rufous; length proportions typical of genus.

ELYTRA. Surface of most specimens shiny, smooth, but densely punctulate, with rugae few or absent over most of surface, but varying to prominently rugose in some specimens; explanate sutural margin rufous in many specimens, in a few specimens even epipleuron rufous; antemedian and postmedian depressions entirely absent in most specimens, slightly indicated in some.

PYGIDIUM. Dimorphic sexually, as detailed below; entirely rufous to entirely dark or metallic, rufous in most specimens.

MALES. Pygidium truncate; metafemur with small to moderate, acute tooth, mesotibia lacking tubercle; ELDs of endophallus with tooth-like projection at base adjacent to PDS, BSB deeply cleft at apex and with basal part large, PDS very broad, deeply cleft apically.

FEMALES. Pygidium pointed, rounded in some specimens; metafemur with tooth absent to very small; ovipositor more or less parallel-sided, tapering to acute apex, apical margins finely serrulate (unless worn), dorsal valve apically rounded, without median line.

SEXUAL DIMORPHISM. The sexes of P. metallica are dimorphic in size, pygidial shape and metafemoral tooth size as detailed above, and males with metatibial tubercle only.

VARIATION. Specimens of P. metallica vary in colour of appendages, pygidium and elytral sutural margin as well as in pygidial shape of females. Most specimens have femora apically or subapically broadly metallic, but of some specimens these are entirely rufous or with tibiae and tarsi partly to entirely infuscated; antennae typically rufous, antennomeres apically metallic, but some specimens with antennae entirely rufous, or only apical antennomeres entirely rufous; pygidium varies from rufous (most specimens) to entirely metallic, in females typically pointed, but rounded in some specimens; explanate sutural margin rufous in many specimens, even epipleuron rufous in a few specimens.

NATURAL HISTORY. Available host records are of the Cyperaceae, as would be typical of the genus: *Carex* and *Scirpus*, but possibly also Juncaceae ("*Scirpus* & *Juncus*"), and a more specific record of *Juncus affinis* in New Jersey. Several other, adventitious, records of collection are: "*Alnus rugosa*", "*Potentilla simplex*", "*Sparganium*", and "skunk cabbage". There has also been one collection from a malaise trap (North Carolina).

DISTRIBUTION. Eastern North America, from Florida north to Labrador, west to eastern Minnesota and Iowa (Fig. 255).

CHOROLOGICAL RELATIONS. *Plateumaris metallica* is fully sympatric with all other eastern species of the genus. Its sister species, *P. dubia*, is restricted to western North America, not extending farther east than the foothills of the Rocky Mountains, in Alberta. It is one of only two species in the genus that extend as far south as Florida.

PHYLOGENETIC RELATIONS. *Plateumaris metallica* is most closely related to the western species *P. dubia*; they are virtually identical in all sexual character states, especially the endophallus, but differ markedly in some details of external structure, especially the pronotum, which I suggest are character state reductions in *P. metallica*. These two sister taxa are most closely related to another western species, *P. neomexicana*. They form a group of three species defined by lack of mesotibial tubercle of males, and presence of a tooth on the endophallic ELDs. Together, these three species appear to be most closely related to P. chalcea, comprising a monophyletic group of species that possess a pointed female pygidium. See discussion of P. chalcea for further details.

SPECIMENS EXAMINED. 1052 males and females, excluding types. Prior to present writing, I had been of the opinion that P. dubia and P. metallica should be treated as subspecies; however, I reconsidered, but specimens I examined and returned to their respective collections bear my determination label that reads "Plateumaris metallica metallica (Ahrens) 1810 ...". These specimens should be considered determined as P. metallica. I have examined specimens from the following provinces and states: CANADA: LB, NB, NS, ON, PQ; UNITED STATES: AK, CT, DC, FL, GA, IL, IN, IA, ME, MD, MA, MI, MN, NH, NJ, NY, NC, OH, PA, TN, VT, VI, WV, WI. Details of locality data from specimens examined are as follows:

CANADA. LABRADOR: Carter Basin, 53°29'N, 59°52'W, 5.vii.58, 1958-490, BSES Expd. Brit. Mus. (BMNH 3).

NEW BRUNSWICK: Bathurst, vi.21, JN Knull (CNC 1); Fredericton, 17.vi.1981, DR Ward (ISAC 34), 17.vi.1981, LeSage & Ward (CNC 6), 22.vi.1982, LeSage (CNC 4); Hatfield Point, 18.vi.1981, DR Ward (ISAC 3); Jemseg, 18.vi.1981, "Potentilla simplex", LeSage & Ward (CNC 2); Kouchbouguac N.P., 16,20.vi.1978, DB Lyons (CNC 2); McDonald pt., 18.vi.1981, LeSage & Ward (CNC 2).

NOVA SCOTIA: Bridgetown, 20.vi.1981, DR Ward (ISAC 19), 20.vi.1981, LeSage & Ward (CNC 3), 20.vi.1981, "Alnus rugosa", LeSage & Ward (CNC 1); Cape Breton Highlands Nat. Park: Fishing Cove Rov., TP57 PG655780, 11.vii.1983, LeSage (CNC 12); French Mtn., Tp58 PG629791, 10.vii.1983, Carex & Scirpus, LeSage (CNC 1); Grande Anse River, Tp50 PG732858, 8.vii.1983, LeSage (CNC 9); Grand Falaise, 30 m., PG566704, 5 km.N., 9.vi.1984, Goulet (CNC 6); Lone Shieling 400m. PG729861, 6.vi.1983, "Fen", Goulet (CNC 1); MacKenzie Mtn. PG65785, 8.vi.1983, Scirpus & Juncus, LeSage (CNC 1); Mouth Warren Br., TP23 OG019765, 30.vi.1983, marginal Carex, LeSage (CNC 1); Sammys Barren (Bog) 425 m., PG764857, 14.ix.1984, Campbell & Davies, Shagnum bog (CNC 1); Clarence, 20.vi.1981, LeSage & Ward (CNC 1); Mt. Smoky, Cape Breton, vii.1.31 (MCZ 3); Portaupique, vii.22.29, CA Frost (MCZ 1); 10 km.N. Springfield, 20.vi.1981, "sweeping flowers", LeSage & Ward (CNC 1).

ONTARIO: Belfountain, 9.vi.1975, N Wilcox (UGIC 2); Bells Corners, 27.v.1982, M Davis (CNC 4); Bruce Pen., Oliphant, 30.v.1946, G Steyskal (CNC 2); Bruce Pen., L.H.C. Bog, July.5.1943, G Steyskal (UCR 2); 7 km.SW Carleton Place, 24.v.1983, SJ Miller (CNC 1); Chaffey's Locks, 9.vi.1981, DR Ward (ISAC 30), 9.vi.1981, L LeSage (CNC 3), 20.vi.1966, IM Smith (ROMC 1); Delhi, 2.vi.1931, WJ Brown (CNC 2); Durham, Rocky Saugeen R., 25.vi.1974, RE Roughley (ISAC 1); Elmira, Salem Ck., 6.v.1977, LeSage (CNC 1), 2.X.1977, LeSage (CNC 1), 19.21.vi.1977, LeSage (CNC 2), 2.vi.1982, LeSage (CNC 2); Guelph, 16.v.1977, K Barber (UGIC 1), 23.v.1979, KL Bailey (UGIC 2), 28.v.1976, M Sharkey (UGIC 1), 14.v.1979, D Morris (UGIC 1), 24.v.1979, KL Runciman (UGIC 1); May.18.1978, R Jorsevskis (UGIC 1), May.49 (UGIC 1); Kendal, #1 at Squires, 19.Jun.1972, ROM Fld. Pty. (ROMC 2), vi.16.1967, IM Smith (ROMC 1); Kingsville, 31.vi.1899 (UMMA 1); Langton, July.16.1970, JT Tronbridge (CNC 1); Lefroy, 5.vi.33 (ROMC 6); Mer Bleue, 2.vi.1927, GS Walley (CNC 1), 22.vi.1981, DR Ward (ISAC 1), 14.vi.79, DP Schwert

(ASRC 6), vi.7.1928, GH Fisk (CNC 1); Moosonee, 12 mi.NE., 1.vii.1973, Parry & Campbell (CNC 1); Newmarket, 15.viii.1970, GA Surgeoner (UGIC 2); Ottawa, 15.vii.14, G Ouellet (JLLC 3); Tillonsberg, 1.vi.1931, WJ Brown (CNC 2); 11 mi.S. Timagami, strm x-ing Hwy.11, 16.May.1972, ROM Fld. Pty, (ROMC 1); Toronto, 6.vi.1909, RJ Crew (USNM 4), 20.vi.1909, RJ Crew (ROMC 1), 4,7,15.6.1890, Wm Brodie (ROMC 8), 9,10.5.1896, Wm Brodie (ROMC 2), 6.vi.1924, Calder (UMMA 1), no date RJ Crew (CUIC 4, LACM 4), 7.1 (RUNB 1).

QUEBEC: Ancienne Lorette, Quebec, 4.v.75, C Chantal (CLCH 1), 19.v.1973, C Chantal (CLCH 10), 26.v.1973, C Chantal (CLCH 2), 21.vi.1969, C Chantal (CLCH 3); Arthabasca, 8.vii.67, C Chantal (CLCH 1), 3.vi.30, JL Laliberté (JLLC 2), 14.vi.32, JL Laliberté (JLLC 2); Baie James, N. Matagami km. 221, 16.vi.1985, Goulet (CNC 3), ibid, km. 571, Goulet (CNC 2); Becancour, 23.v.1964, C Chantal (CLCH 1); Cap Rouge, 2.vii.61, C Chantal (CDAS 1), 2.vi.74, C Chantal (CLCH 1), 14.v.66, C Chantal (CLCH 1), 26.v.63, C Chantal (CLCH 1); Covey Hill, 17.vi.1927, WJ Brown (CNC 1); Escoumins, Sag., 29.vi.1981, C Chantal (CLCH 1); Fontainebleau, 4.vi.1975, L Brouillet (CNC 1); Gaspé, 26.vii.54, WJ Brown (CNC 1); Gatineau Park, Harrington Lk., 8.vi.1954, R McCoudochie (CNC 1), Ramsey Lake, 17.June.1971, EC Becker (CNC 1); Island of Orleans, St. Patrick Brook, 6.vii.1958, Rene Malouin (CNC 1); Joliette, vi (CNC 2); Kazubazua, 8.vi.1927, FP Ide (CNC 2), 28.viii.1928, WJ Brown (CNC 1); Knowlton, 21.vii.1929, LJ Milne (CNC 8), 9.vii.1927, WJ Brown (CNC 2), 12,14.vi.1928, WJ Brown (CNC 5), 11.7.1928, JA Adams (CNC 1); Labelle, Parc Papineau, May.3.1975, R Sexton (UWAT 1); Lac Taylor, Parc Gatineau, June.15.1975, R Sexton (UWAT 4); Lac Trois Saumons, L'Islet, 11.vi.1966, C Chantal (CLCH 2, CDAS 1), 12.vi.1965, C Chantal (CLCH 1); Lambton, Wolfe, 25.vi.1965, C Chantal (CLCH 1); Lanoraie, Bert., 24.v.1975, L LeSage (CNC 1); Lavaltrie, v.24 (MCZ 3), vi.24.19, LS Slevin (CAS 4), v.22, LS Slevin (CAS 1); Lorette, Quebec, 19.v.1975, JL Laliberté (JLLC 2); Montreal, no date Chagnon (UAE 1), 19.vi (WEEM 1), no date (MCZ 1); Mt. St. Hilaire, 6.vii.18, G Chagnon (CNC 1), 24.v.05, F Knab coll'n (USNM 1), no date (USNM 1) Parc Gatineau, Lac Ramsey, 10.vi.1982, LeSage (CNC 7), 17.June.1971, EC Becker (CNC 1); Parc Gatineau, Lac Taylor, 29.vi.1974, R Sexton (CNC 2); Pointe du Lac, C.St. M.P., 22.v.66, C Chantal (CLCH 1); Potton Springs, Jly.1-4.'20, PG Bolster (MCZ 2); Rigaud, 15.v.1979, Smetana & Becker (CNC 1); Rupert House, 16/21.vi.1949, DP Gray (CNC 4); St. Augustin, Port., 23.vi.35, JL Laliberté (JLLC 1), 22.ix.61, JL Laliberté (JLLC 1), 24.vi.55, JL Laliberté (JLLC 2); Saint-Etienne, Lévis P., 20.v.75, C Chantal (CLCH 3), 9.v.1981, C Chantal (CLCH 3); St. Hippolyte, Terb., 26.vi.1975, LeSage (CNC 1); St. Raymond, Port., 3.vi.62, JL Laliberté)JLLC 1); St.-Sylvestere, 11.vi.1966, C Chantal (CLCH 1); Ste.-Angele, Mask., 22.vi.1975, L LeSage (CNC 5); Sainte-Croix, Lotb., 2.vi.73, JL Laliberté (JLLC 1); Sainte-Foy, Quebec, 12.vii.1965, C Chantal (CLCH 1), 8,10.vii.33, JL Laliberté (JLLC 2), 28.vi.33, JL Laliberté (JLLC 1), 6,19.vii.1935, JL Laliberté (JLLC 4); Villeroy, Ltb., 10.vi.67, C Chantal (CLCH 1); Wakefield, 13.vi.1948, SD Hicks (CNC 1).

UNITED STATES. CONNECTICUT: Litchfield Co.: Cornwall [all KF Chamberlain] 5.vi.1922, (CAS 8, CUIC 6, AMNH 1), 9.vi.1920, (CAS 1), 5.6.1921, (UAE 1, CNC 2), 12.vi.1920, (UMMA 1, CUIC 3, CNC 2), 15.vi.1922, (CUIC 1), 19.iv.1921 (CUIC 1), 29.v.1920 (CUIC 1); Goshen, 1.vi.1936, CA Frost (CAS 2, OKS 4); **New Haven Co.:** Yale Nat. Pres., New Haven, 10.v.42, GE Pickford (PMY 1); **Tolland Co.:** Storrs, 19.v.1954, Antiuk (UCS 1).

DISTRICT OF COLUMBIA: Washington, 3.18.24, JG Gehring coll'n (MCZ 1).

FLORIDA: **Levy Co.:** county record, no date, P Laurent (RUNB 1); **Miscellaneous:** "Fla." no date (MCZ 1).

GEORGIA: **Towne Co.:** vic. F.S. rd. 137, May.25-27.1987, R. Morris (RMC 1).

ILLINOIS: **Champaign Co.:** SR 49, 3.8 mi.S. Ogden at Jct.US 150, vi.14.1983, CP Withrow (SMCL 1); **Cook Co.:** Chicago, no date, Klages (CMP 2); **Douglas Co.:** Walnut St. Park, 5.June.1979, WG Ruesink (INHS 7); **Kane Co.:** Elgin, May.29.1924, "skunk cabbage", ML Bristol (INHS 1); **Lake Co.:** Lake Forest, 5.vi.06, JGN (CUIC 2); **La Salle Co.:** Utica, v.22.1946, FG Werner (INHS 1); **McHenry Co.:** Algonquin, no date, Nason (INHS 22); **Piatt Co.:** Lodge Forest Preserve, 20.May.1977, WG Ruesink (INHS 1); **Warren Co.:** Galesburg, 6/7/93, Stromberg (INHS 5); **Localities not found:** Lakeville, 2 mi.SW, Williamsburg Hill marsh, May.15.1953, MW Sanderson (INHS 3).

INDIANA: **Marion Co.:** county record, 26.iv.1896, WSB (PUL 5); **Tippecanoe Co.:** County record, 6.15.1963, NM Downie (NMDC 1).

IOWA: **Iowa Co.:** Homestead, 30.v.1918, AW Lindsay (LACM 1); **Pottawattomie Co.:** Co. Bluffs [=Council Bluffs], June.6.1934, AS Beardsley (INHS 1).

MAINE: **Franklin Co.:** Weld, vii.3.1938, CA Frost (MCZ 1), vi.30.1932, CA Frost (MCZ 1); **Kennebec Co.:** Augusta, May.31.1946, AE Brower (UNH 1); Hamilton Pond Bog, Belgrade, 5.vi.1986, RE Nelson (RNEL 1); Monmouth, 22.vi.1909, CA Frost (CAS 1), vi.22.07, CA Frost (MCZ 2), vi.27.12, CA Frost (MCZ 1); Waterville, 8.vii.1984, "marsh treading" RE

Nelson (RNEL 1); **Oxford Co.:** Bethel, 11,15,16.vi.24, JG Gehring (MCZ 11); Paris, vi.30.1932, CA Frost (MCZ 1, LACM 1), vii.9.15, CA Frost (MCZ 1); Peru, no date, F Knab (USNM 3); **Penobscot Co.:** Orono, vi.1920, RJ Sim (CMP 4), vi. RJ Sim (MCZ 6), Apr.20.'12, HM Parshley (MCZ 1); **Piscataquis Co.:** Greenville, vi.16.21, CA Frost (MCZ 1); **Sommerset Co.:** Fairfield, Martin Stream, 20.v.1986, "muddy margin", RE Nelson (RNEL 2); Fairfield, 6.vi.1986, "treading in small pond", RE Nelson (RNEL 2); **York Co.:** Saco, 24.vi.00, PG Bolster (MCZ 1).

MARYLAND: **Baltimore Co.:** Baltimore, no date (MCZ 1); **Garrett Co.:** "Herrntn. Mnr.", 6.10.53, EJF Marx (AMNH 13).

MASSACHUSSETTS: **Berkshire Co.:** mt. Hoosac, 5.30.'20 (RUNB 1); **Bristol Co.:** Fall River, vi.1.40, NS Easton (MCZ 1); Westport, iv.21.'06, NS Easton (MCZ 1); **Hampden Co.:** Chicopee, 25.June.1903, F Knab (USNM 1); Wales, vi.19.06, CA Frost (MCZ 2); W. Springfield, no date, G Dimmock (MCZ 1), 13.May.1900, F Knab (USNM 1); **Hampshire Co.:** Amherst, May.5.1939, Sherman (UCR 1), May.22.1938 (UCRC 1); Northampton, 14.June.1902, F Knab (USNM 7); Ware, 29.v.1971, A Lavallee (CDAS 1, UGA 1), 6.vi.1947, CA Frost (LACM 4); **Middlesex Co.:** Ashland, 7.25, CA Frost (CUIC 2), vi.7.25, CA Frost (MCZ 1, FMNH 3), 6.10.49, CA Frost (AMNH 8); Cambridge, v.8.1923, vi.5.1923 (MCZ 2), Jan.1874, GR Crotch (MCZ 2); Concord, June, A Fenyes (CAS 1); Framingham, v.18.12, CA Frost (MCZ 1); Hopkinton, vi.3.23, CA Frost (MCZ 2); Medford, 5.23.'19 (RUNB 1); Natick, 6.vi.1937, CA Frost (CAS 3, BPBM 1, MCZ 1), 2.vi.1940, CA Frost (CAS 1), v.25.41, (FMNH 3), v.24.1936, CA Frost (MCZ 1), v.30.1936, CA Frost (MCZ 1), 24.v.1937, CA Frost (CAS 1), 6.6.1946, CA Frost (CUIC 5); Sherborn, vi, CA Frost (JBWM 1, CNC 1), v.29.21, CA Frost (MCZ 1), 5.17.49, CA Frost (AMNH 1); Tyngs, 11.xii.6, Emerton

(MCZ 1); **Nantucket Co.:** Nantucket Isl., no date (DEFW 1, INHS 6); **Norfolk Co.:** Brookline, no date (UADB 1); Milton, vi.5.1922, WJ Clench (UMMA 1); **Worchester Co.:** Southboro, no date (USNM 1), 30.v.1923, CA Frost (CUIC 1, MCZ 1, INHS 1), v.21.22, CA Frost (MCZ 2).

MICHIGAN: **Alger Co.:** County record: 6.19.55, RR Dreisbach (UMMA 1); **Allegan Co.:** Saugatuck, 6.15.23, SB Fracker (UWM 1); County record: v.18.59, RR Dreisbach (UMMA 1); **Antrim Co.:** County record: 7.4.50, RR Dreisbach (UMMA 1, MSUE 3); **Berrien Co.:** EK Warren Preserve, Sawyer, vi.23.1920, MH Hatch (UMMA 1); **Clare Co.:** County record: 6.11.49, RR Dreisbach (UMMA 1), v.23.59, RR Dreisbach (MSUE 3); **Delta Co.:** Escanaba, June.28.1958, RA Scheiber (MSUE 2); **Gladwin Co.:** County record: 6.10.51, RR Dreisbach (UMMA 1, MSCU 4); **Gogebic Co.:** County record: 6.29.55, RR Dreisbach (MSUE 1); **Grand Traverse Co.:** County record: 5.27.50, RR Dreisbach (UMMA 1, MSUE 1); **Gratiot Co.:** County record: 5.14.44, RR Dreisbach (UMMA 1); **Houghton Co.:** Chassell, 24.June.1964, RB Willson (MSUE 1); **Ingham Co.:** East Lansing, 3.June.1937 (MSUE 1); **Kalkaska Co.:** County record: 6.29.46, RR Dreisbach (UMMA 1), 6.17.51, RR Dreisbach (AMNH 1); **Keweenaw Co.:** Copper Harbour, June.24.1957, RW Hodges (MSUE 1); **Lake Co.:** County record: vi.9.40, RR Dreisbach (MSUE 2); **Livingston Co.:** Greenoak, vi.6.1920, MH Hatch (OSUC 1); Pinckney, 18.v.1937, DL Cantrell (UMMA 1); **Mackinac Co.:** Manitou Paymen, June.5.1920 S Moore (UMMA 1); County record, 5.vii.1947, RR Dreisbach (CAS 2, TAMU 3), 6.18.55, RR Dreisbach (MSUE 3), 7.7.46, RR Dreisbach (MSUC 1); **Macomb Co.:** E. of Memphis, 7.v.1969, C Brivio (PIME 1); **Midland Co.:** County record: 6.8.35, RR Dreisbach (MSUE 1), 5.24.51, RR Dreisbach (MSUC 4), 6.1.49, RR Dreisbach (MSUE 1), 5.16.145, RR Dreisbach (MSUC 1); **Newaygo Co.:**

County record: v.9.59, R & K Dreisbach (MSUE 1), 5.27.53, RR Dreisbach (MSUE 1), vi.20.47, RR Dreisbach (UMMA 1); **Oakland Co.:** Bloomfield, May.11.1930, S Moore (UMMA 1), vi.7.09 (UMMA 5, MCZ 1); **Oceana Co.:** Shelby, vi.22.1937 (MSUE 1); **Ontanogon Co.:** Bruce Crossing, 5 mi.N., 23.June.1964, RB Willson (MSUE 3); **Osceola Co.:** County record: 5.14.52, RR Dreisbach (MSUE 4, UMMA 1); **Ottowa Co.:** County record: 6.30.1951, RR Dreisbach (UMMA 1); **Roscommon Co.:** County record: 5.24.51, RR Dreisbach (MSUE 1), 6.24.51, RR Dreisbach (UMMA 1); **Washtenaw Co.:** Ann Arbor, 5.vi.1962, C Brivio (PIME 1), 20.iv.1962, C Brivio (PIME 1), 29.iv.1962, C Brivio (PIME 3); Ann Arbor, Barton Marsh, v.22.1919, MH Hatch (OSUC 1), v.22.1919, TH Hubbell (UMMA 1), v.5.1930 (UMMZ 1); **Wayne Co.:** Detroit, vi.13.09 (UMMA 1).

MINNESOTA: **Goodhue Co.:** Lake Pepin, E. Frontenac, 31.v.1951 (DEFW 1); **Houston Co.:** 1 mi.E. Caledonia, v.24.1977, R Gunderson (SCSU 1); 3-6 mi. W. New Albin, IA, Winnebago Cr. Valley, 5.30.1960, R Gunderson (SCSU 3, CNC 4).

NEW HAMPSHIRE: **Cheshire Co.:** Walpole, v.31.20, CA Frost (MCZ 1); **Coos Co.:** Beaver Brook Falls, 3 mi.NE Colebrook, v.28.1986, DS Chandler (UNH 3); Bretton Woods, vi.14.1924, SA Shaw (UNH 1); Hurlbert Swamp, 4 mi.E. West Stewartstown, vi.12.1986, DS Chandler (UNH 8), v.28.1986, DS Chandler (UNH 1), vii.8.1986, DS Chandler (UNH 1); Mt. Washington, no date (CAS 1, CMP 1, MCZ 1, AMNH 2), Jun.74 (MSUE 1), 6.17.20 (RUNB 1); Norton Pool, 3 mi.NE. East Inlet Dam, vi.24.1986, DS Chandler (UNH 2); **Grafton Co.:** Franconia, no date, AT Slosson (AMNH 2); Hanover, no date, CM Weed (UNH 1); Zealand Camp, White Mtns., 1500', 5.vi.1940, JM Hansen (CUIC 2); **Strafford Co.:** Dover, 6.3.1936, BG Markos (UNH 1); **Localities not found:** Grant, no date, RN Storey (LSU 1); Glen to Halfway H., White Mtns., July.8.1891, AP Morse (MCZ 1); Glen, White Mtns., 1500', June.2-6.1886, R Hayward (MCZ 1); Three Mile Island, 08.v.27, F Blanchard (MCZ 2); **Miscellaneous:** White Mtns., no date (MCZ 6, UADB 1, CAS 1, UMMA 1).

NEW JERSEY: Bergen Co.: Hillsdale, 7.v.1922, ED Quirsfeld (UAE 3); **Burlington Co.:** Browns Mills, 5.14.1949, MA Cazier (AMNH 2); **Camden Co.:** Ateo, vi.9, Liebeck colln (MCZ 1); Collingswood, Apr., Kemp (CAS 4); Lucaston, 4.25 (RUNB 1); Merchantville, 4.24 (MCZ 3, LACM 4, RUNB 3), 3.30 (RUNJ 1), III.10, WJ Gerhard (FMNH 3), Indian Mills, 5/15/48, "on sedge", EJF Marx (AMNH 2); Taunton Lake, 5.4.1949, "on Juncus affinis", EJF Marx (AMNH 24); **Gloucester Co.:** Wenonah, v.7,23.1922, HA Wenzel (CAS 40; **Ocean Co.:** Pt. Pleasant, 6. (RUNB 8); **Sussex Co.:** Hopatcong, no date, W Beutenmuller (CUCC 1); **Localities not found:** Lahaway, May.30.1916, CE Olson (CUIC 1); Woodside, no date, EA Bischoff (CUIC 1).

NEW YORK: Cattaraugus Co.: Allegany St. Pk., 22.vi.1953, LL Pechuman (CUIC 1), 29.vi.1946, LL Pechuman (CUIC 2); **Clinton Co.:** Dannemora, 6.18.1936, H Dietrich (CUIC 5); Peru, 10.vi.1916 (CUIC 1), 6.17.1936 (CUIC 1), 8.vi.16, Crosby & Forbes (CUIC 1); **Delaware Co.:** Downsville, 9.vi.1964, LL Pechuman (CUIC 5); **Erie Co.:** Buffalo, no date, EP Van Duzee (CAS 1); Colden, 31.v.1914, EP Van Duzee (CAS 2); Springville, 6.7.14, EP Van Duzee (CAS 1); **Essex Co.:** Keene Valley, 18.June.1918, H Notman (USNM 1); **Hamilton Co.:** Piseco Lake, v.29.27, CA Frost (MCZ 1); **Herkimer Co.:** Cold Brook, 6.22,30.1940, H Dietrich (CUIC 3); Herkimer, 8.8.21, MD Leonard (CUIC 1); Old Forge, 1.vii.1965, LL Pechuman (CUIC 1); **Orange Co.:** West Point, May.23.1915, W Robinson (AMNH 4); **St. Lawrence Co.:** Canton, vi.8.1936, NM Downie (NMDC 2), vi.7.1936, NM

Downie (NMDC 1), vi.12.1935, NM Downie (NMDC 1), June.3,30.1935 (OSUC 2); **Schuyler Co.:** Cinnamon Lake, 8.vii.1965, LL Pechuman (CUIC 1); **Suffolk Co.:** Greenport, L.I., 8.vii.1947, R Latham (CUIC 1); Orient, L.I., 7.viii.1958, R Latham (CUIC 1); **Tompkins Co.:** Freeville, 27.iv.21, CR Crosby (CUIC 2); Ithaca, 22.June.'17 (RUNB 1), 31.May.1935 (CUIC 1), 14.May.1919, H Dietrich (CUIC 3), 23.June.1917, H Dietrich (CUIC 1), 31.May.1913, (CUIC 1), 2.vi.1935, (CUIC 1), 30.v.1895 (CUIC 1, 4.vi.1967, LL Pechuman (CUIC 1); L. Enfield nr. Ithaca, 21.may.1950, JC Martin (CNC 1); Ludlowville, 31.v.1964, LL Pechuman (CUIC 2), 9.vi.1967, LL Pechuman (CUIC 1); McLean, 5.29.15 (CUIC 1); McLean Res., May.27.1958 (FMNH 2); Mud Creek, 17-20.June.1904 (USNM 2); N. Lansing, vi.8.1940, NM Downie (NMDC 1); County Record, 6.13.1969, NM Downie (NMDC 1); **Ulster Co.:** Oliverea, 6.18.1934, H Dietrich (CUIC 1); **Wyoming Co.:** Portage, May.30.1888, EP Van Duzee (CAS 2), May.24.1914, HH Knight (UMMA 1 DEFW 4, FMNH 2); **Localities not found:** Concord, no date (UGIC 1, LSU 1), v.18, Liebeck colln (MCZ 1); Protection, 16.vi.1918, MC Van Duzee (CAS 1).

NORTH CAROLINA: **Avery Co.:** B. Elk, June.20.1974, JR Ables (TAMU 1); **Buncombe Co.:** Asheville, no date, JG Gehring (MCZ 1); **Caldwell Co.:** Edgemount, 29.v.1962, JF Cornell (OSUC 1); **Jackson Co.:** Bridal Veil Falls, Hwy. 28, 2 mi. NW Highlands, 25.May.1984 (SMCL 1); **Macon Co.:** Franklin, v.25.1957, WJ Brown (CNC 1); Highlands, v.10.57, JR Vockeroth (CNC 1), vi.2.1957, JR Vockeroth (CNC 2), v.25.1957, WJ Brown (CNC 32), 11.vi.1933, JG Watts (CUCC 1); Highlands Biol. Sta., 20.v.1984, B Heise (ISAC 1); **Moore Co.:** Southern Pines, no date, AH Manee (CNC 1); **Randolph Co.:** Ashboro, 3.iv.'29, CR Crosby (CUIC 3); **Transylvania Co.:** Brevard, 12 mi.NW, 6/8/1971, "malaise", W Atyeo & L Cole (EGRC 2, UGA

2); Pisgah Forest, 29.Apr.1941, WM Upholt (CUCC 1); **Locality not found:** Black Mtns., 22.v.1912, Beutenmuller (CUCC 1), v.15 (AMNH 1).

OHIO: Delware Co.: County record, v.30, DJ & JN Knull (MCZ 2); **Fairfield Co.:** Barneby Center, 19.April.1986, SM Clark (SMCL 5), 10.May.1986, SM Clark (SMCL 4), 12.May.1984, SM Clark (SMCL 4), 14.May.1983, SM Clark (SMCL 16), vi.8.73, D. Broska (PMY 2); **Franklin Co.:** County record, 17.v.1930, D Murray (DEFW 1); **Hamilton Co.:** Cincinnati, v.17.02, Van Dyke (CAS 4), iv.20.01, Van Dyke (CAS 2), 6.17.02, Van Dyke (CAS 4), 6.4.02, Van Dyke (CAS 1), 16.May.1902, C Drury (USNM 8, JBWM 2, UNMMZ 1), 15.6.02 (ROMC 4), no date (CUCC 3, AMNH 2); **Summit Co.:** Hawkins, 18.v.02 (UGA 1).

PENNSYLVANIA: Allegheny Co.: Pittsburg, vi.21, H Klages (CMP 3); County records: no date (NDSU 1, UMMA 1, DEFW 3, CNC 1, CMP 3); "Sample Stat'n, July.5.1920, July.20.1915 (CMP 4); **Center Co.:** Poe Paddy State Pk., 7.June.1965, "on Sparganium", EU Balsbaugh (NDSU 1); **Lancaster Co.:** Lancaster, v.12, Liebeck colln (MCZ 1); Mt. Hope, 6.15, Liebeck colln (MCZ 1); County record: 7.20 (AMNH 1); **Monroe Co.:** Bartonville, May.26.1917 (AMNH 2); Pocono Lake, vi.4, JW Green (CAS 1); **Pike Co.:** Milford, 30.v.-1.vi.1941, B Malkin (FMNH 1); **Union Co.:** Lewisburg, v.30.09 (INHS 1); **Westmoreland Co.:** Forbes St. For., Laurel Summit, 2700', vii.10/11.84, "pitfall", DM Reeves (UNH 1); Forbes St. For., Spruce Flat, 2700', vii.11/12.84, DS Chandler (UNH 4); Jeannette, vii.2, H Klages (CMP 1); **Locality not found:** Starlight, 12,14.vi.1921 (USNM 2).

TENNESSEE: Rhea Co.: Dayton, June.1932, L Turner (CAS 1).

VERMONT: Bennington Co.: East Dorset, June.11,15.1935, CT Parsons (UVDZ 12); **Caledonia Co.:** Lynden, June.13.'14 (WSU 1); Newark, roadside orchid bog 1600', July.19.1965, Bell & Moldenke (UVDZ 1); **Chittendon Co.:** Jonesville, June.8.1974, J & R Bell (UVDZ 1); **Essex Co.:** Bear Mtn. Motel, Rte. 105, Brunswick, 20.vi.1971, LL Pechuman (CUIC 5); Ferdinand, Rte.105, 17.vi.1975, 22.vi.1971, LL Pechuman (CUIC 3); **Windham Co.:** Westminster West, June.11.1960, MS Wilson (OKS 2); **Locality not found:** W. Elmore, June.14.1966, J & R Bell (UVDZ 1).

VIRGINIA: **Augusta Co.:** 8 km.S. Deerfield, 12.vi.1982, Bousquet & Davies (CNC 1); **Craig Co.:** Potts Bog, F. Rd. 604.1, May.28.1977, Kondratieff (VPI 2); **Grayson Co.:** Lewis Fork Fox Creek, Lewis Fork Trail, 27.May.1984 (SMCL 2); **Smyth Co.:** HDQ, Mt. Rogers Rec. Area, 18.May.1981, WH Cross (MEMU 5); Racoon Branch, South Fork Holston River, Racoon Branch Cmpg., 21.vi.1984 (SMCL 2); **Spotsylvania Co.:** "Fredrkbg", no date, Van Dyke (CAS 2); **Miscellaneous:** Jeff. Nat. For., W. Va., vi.12.54, RL Fischer (AMNH 2, MSUE 2); **Localities not found:** Glencarlyn, 10.May, Banks (MCZ 1), v.30.19, WS Fischer (AMNH 2); Northwest, v.8.1952, GH Nelson (UIM 1).

WEST VIRGINIA: **Marion Co.:** Fairmont, vi.10.1928, PN Musgrave (CAS 2); **Preston Co.:** Cranesville, 6.11.53 (AMNH 1); Cranesville Marsh, 10.vi.1977, LL Pechuman (CUIC 1); **Locality not found:** Mont Chateau, June.1910 (CMP 1).

WISCONSIN: **Dane Co.:** Madison, 31.v.1933, CL Fluke (UWM 1).

Plateumaris neomexicana (Schaeffer, 1925)

Figures 3, 43-46, 75, 76, 109, 136, 137, 157, 195, 196, 219, 220, 256.

Donacia neomexicana Schaeffer (1925:154).

Donacia longicollis Schaeffer (1925:156). HOLOTYPE o^, USNM Type #4248-2: Shasta Springs, Cal.; ♀ allotype #42402 and 22 paratypes, USNM. **NEW SYNONYMY**

Donacia vermiculata Schaeffer (1925:158). HOLOTYPE ♀, USNM: "Cal.", Chs. Schffr Colln, HS Barber bequest 1950, D. vermiculata Schffr." [no type label on specimen]. **NEW SYNONYMY**

Donacia longicollis: Beller and Hatch (1932:84), Mead (1938:119), Hatch (1971:169).

Plateumaris longicollis: Goecke (1960a:9), Monrós (1959:106), Jolivet (1970:59).

Plateumaris neomexicana: Goecke (1960a:9), Monrós (1959:106), Jolivet (1970:60).

Plateumaris vermiculata: Goecke (1960a:10), Monrós (1959:106), Jolivet (1970:61).

TYPE SPECIMENS. HOLOTYPE o^, USNM Type #42401-1: "Jemez Mts. N.M."; ♀ allotype #42401 and 3 paratypes, USNM.

TYPE LOCALITY. Jemez Mountains, New Mexico, as stated by Schaeffer.

ETYMOLOGY. This name is based on the origin of specimens described by Schaeffer, from New Mexico.

TAXONOMIC HISTORY AND SYNONYMIES: Schaeffer (1925) described three taxa which I assign to one variable species; the name *P. neomexicana* has page priority over *P. longicollis* and *P. vermiculata*, and therefore is used.

Beller and Hatch (1932), Mead (1938) and Hatch (1971) referred to the name P. longicollis in their treatments of western species.

DIAGNOSIS. Most specimens of P. neomexicana are easily recognized by the combination of pygidium truncate in males, pointed in females, mesotibia of males without tubercle, metafemur lacking tooth, pronotum of most specimens with median, basal, and callosal sulci deep, the pronotal calli therefore prominent, antennae of most specimens entirely or largely rufous, legs of most specimens entirely rufous to metafemora with subapical metallic band, ELD of endophallus with basal tooth adjacent to MEG, ventral valve of ovipositor parallel-sided, dorsal valve rounded to pointed, with fine median line.

COMPARISONS. Over most of its distribution, specimens of P. neomexicana could not be confused with those of most other species in the west because of elongate pronotum with deep sulci, lack of mesotibial tubercle of males, lack of metafemoral tooth, and largely rufous appendages. However, some male specimens of P. pusilla from central California to southern Oregon appear much like those of P. neomexicana because of largely rufous appendages, but these specimens possess other characters that are typical of P. pusilla elsewhere: shorter antennomeres, 2 and 3 subequal, pygidium emarginate in males, rounded to emarginate in females, males with mesotibial tubercle, pronotum without deep median line and hypomeron not so coarsely rugose. In Utah and Idaho, specimens of P. neomexicana could easily be confused with those of P. dubia. Specimens of the latter species, however, have a more quadrate pronotum, the disc generally has transverse rugae more distinct and less distinct punctation, and femur with no more than extreme base rufous; some females of both species are almost indistinguishable without associated males, because the pronotum of P. neomexicana is variable in L:W proportions and punctation.

DESCRIPTION. LENGTH. Males: 6.61 - 8.55 mm, females: 7.42 - 9.39 mm

COLOUR. Green, red, coppery, blue, purple, black; antennae rufous to partly dark, femora and tibiae rufous to dark, in most specimens largely rufous.

PRONOTUM. Median line of most specimens broad, deep, more or less regular, in some specimens obscured by punctation and irregular minute rugulae; basal sulcus prominent, punctate, callosal sulci deep, the calli very prominent in most specimens; disc of varying sculpture and punctation (Table 1): specimens from New Mexico and Arizona with distinct, uniformly distributed coarse punctures, granulate between, these in most specimens with distinct setae, especially in basal sulcus, some specimens from California similar but punctation less distinct and without setae, punctures in specimens from Oregon to British Columbia obscured, but then disc more or less uniformly finely strigate (more or less transversely), almost alutaceous, with some punctures visible anteriorly and posteriorly, Utah and Idaho specimens are similar to those from Oregon and Washington, but punctation moderate. A few specimens have strigations obscured at midlength, disc shiny and sparsely punctate. Hypomeron with coarse longitudinal rugae. Shape variable, L:W ratio 0.98 to 1.23, posterior width much less than anteriorly, the anterior setiferous angles prominent, protruding beyond the calli in most specimens.

HEAD. Vertex of most specimens with prominent posteriorly arcuate calli, these delimiting a prominent, sinuate occipital sulcus, but varying from prominent to obsolete.

APPENDAGES. LEGS. Metafemur relatively abruptly clavate, with tooth absent, a few specimens with a distinct small tooth; mesotibia of males without tubercle, metatibia with tubercle small. Colour varying as follows (Table 1): some specimens from Utah with tibiae and tarsi slightly infuscate to entirely dark, these otherwise entirely rufous; femora of specimens from Utah and Idaho dark (more or less metallic) with up to basal third rufous, in New Mexico and Arizona specimens entirely rufous with slight subapical infuscation or small metallic area, most specimens from California to southern British Columbia with distinct subapical metallic band that occupies about the subapical quarter to half; some specimens from California to northern British Columbia have femora entirely rufous. **ANTENNAE.** Antennomere proportions more or less typical of genus; colour varies as summarized in Table 1: specimens from northern British Columbia with antennomeres entirely rufous, some (10- 20%) specimens from California to southern British Columbia with apical antennomere halves metallic, specimens from New Mexico and Arizona similar, but most specimens from Utah and Idaho with antennae largely dark.

ELYTRA. Disc more or less rugose laterally and apically, the surface punctulate in most specimens, antemedian and postmedian depressions obsolete to distinct, subapical exposed sutural margin reddish in many specimens; L:W ratio 3.61-4.54.

PYGIDIUM. Sexually dimorphic as detailed below; varying from entirely rufous to metallic with only apical margin rufous.

MALES. Pygidium truncate; metatibia only with tubercle; endophallus with ELD laterally evenly rounded, apices directed inward (dorsal aspect), and basally with tooth adjacent to PDS, MEG slender and simple, nearly straight (lateral aspect), PDS triangular, oblique (lateral aspect), BSB curved, and oblique (lateral aspect), lacking basal part.

FEMALES. Pygidium pointed in most specimens, rounded in some; ovipositor with ventral valve parallel-sided, tapering to acute point, dorsal valve apically rounded, to pointed in many specimens, without median line.

SEXUAL DIMORPHISM. The sexes are dimorphic in size, pygidial shape, and tibial tubercle of males.

VARIATION. Substantial variation among specimens of P. neomexicana was observed in pronotal punctation/sculpture, and antennal and leg colour, the pattern of which was geographically correlated. Variation in these specific characters is detailed within their description above, under pronotum and appendages. Additionally, specimens of P. neomexicana vary in size, prominence of vertexal calli, depth of median sulcus of pronotum, pronotal shape, shape of pygidium of females, and metafemoral tooth small but present in a few specimens. In specimens from New Mexico and Arizona the pronotum tends to be more quadrate, L:W ratio ranging from 0.98 to 1.13, California to British Columbia specimens tend to be more elongate, 1.03 to 1.23, but both ranges broadly overlap in shape.

NATURAL HISTORY. Few host records accompanied specimens examined, but these included Carex and other sedges as hosts; hosts probably include other Cyperaceae, e.g. Scirpus, as would be typical of other species of Plateumaris. One, probably adventitious, record is from Angelica genuflexa Nutt., a plant occurring along water margins in western North America.

DISTRIBUTION. Restricted to the Western Cordillera, from British Columbia south to California, one record in Idaho, widespread in Utah, and restricted to high elevations in Arizona and New Mexico. This is one of only two species restricted to western North America (Fig. 256).

CHOROLOGICAL RELATIONS. Plateumaris neomexicana overlaps broadly with several species in the west and is often collected together with them; P. neomexicana is one of only a few species of Plateumaris with populations isolated in the mountains of New Mexico and Arizona. It is largely allopatric of the group of species to which it is most closely related, the species pair P. dubia and P. metallica. In relation to the other strictly western species, P. dubia, P. neomexicana is largely more southern and coastal in distribution.

PHYLOGENETIC RELATIONS. Plateumaris neomexicana is evidently most closely related to the pair of species P. metallica and P. dubia. Some specimens of P. dubia (especially ♀♀) are indistinguishable from it, especially in Utah where most specimens of P. neomexicana have largely darkened appendages and more quadrate pronotum, greatly resembling specimens of P. dubia in this region. I hypothesize P. neomexicana to be the sister taxon to these two species, as evidenced by lack of the tibial tubercle in males and basal tooth of the endophallic ELD, and that they together are the sister group to P. chalcea, as evidenced principally by shape of the female pygidium. See discussion of P. chalcea for further details.

SPECIMENS EXAMINED. 856, males and females, excluding types. I have examined specimens from the following provinces and states: CANADA: BC; UNITED STATES: AZ, CA, ID, NV, NM, OR, UT, WA, WY. Details of locality data from specimens examined are as follows:

CANADA. BRITISH COLUMBIA: Agassiz, 17.vi.1926, HH Ross (CNC 1); Alice Arm, vii.34, A Nicholls (PMV 2); Brooks Pen., V.I., Brasenia Lake, 50°11'N 129°47'W, 7.viii.1981, RA & SG Cannings (UBC 1); Duncan, (V.I., S. Falls), 3.6.09, AW Hanham (PMV 1); Errington, V.I., 7.vi.49, GH Larnder (PMV 1); Graham Is., Q. Charlotte City, 6.viii.1983, "bog pond 14 km.N. on MB main road", RA Cannings (UBC 1); Inverness, vii, JH Keen (MCZ 1, USNM 4); Kaien, 20.vi.79, RJ Cannings (UBC 1); Lakelse Lake nr. Terrace, 14.vii.1955, GP Holland (CNC 2); Metlakatla, 1911, JH Keen (CNC 6), vii, JH Keen (UADB 1, LSU 1), no date (USNM 1), 1915, JH Keen (BMNH 56); Mission City, 5.vii.1953, SD Hicks (CNC 1), 3,4.vi.1953, WRM Mason (CNC 2); Nanaimo Biol. Sta., 26.vi.1920, Van Dyke (CAS 1); Port Edward, 18.vii.1960, BS Heming (CNC 1); Prince Rupert, Mt. Hays 1-2000', vi.29.1968, Campbell & Smetana (CNC 1); Quamicham Lake, V.I., no date, AW Hanham (PMV 3); Stewart, 22.vii.83, GGE Scudder (UBC 9); Terrace, no date, ME Clark (MCZ 1); Tyee, SE Pr. Rupert, 8.vi.1958, Lindroth (CNC 5); Vancouver, 28.vii.1922, W Downes (CNC 1); Victoria, 9.vi.1923, KF Auden (CNC 1); Wellington, V.I., 3.vi.1951, R Guppy (OSUC 1).

UNITED STATES. ARIZONA: Apache Co.: Apache N.F., White Mtns., 8300', Alpine Divide Camp, vi.11.1958, CP Alexander (NMDC 2, ISAC 2, CNC 2, TAMU 1), vi.10,26.1958, CP Alexander (MCZ 6), 9,10,11,26.vi.1958, CP Alexander (AMNH 20); Greer, White Mtns., 8800', vi.22.1947, CP Alexander (MCZ 1), 8000', 6.vii.1953, A & H Dietrich (CUIC 31); White Mountains, 4,6,9.vii.1933, O Bryant (CAS 8); **Navajo Co.:** Lakeside, 6.6.'46, GP MacKenzie (UCR 1).

CALIFORNIA: Eldorado Co.: 7 mi.S. Yellow Jacket Camp, 29.June.80, 5.July.1985, LG Bezark (ISAC 2); **Fresno Co.:** Shaver Lake, vii.13.1946, BE White (CAS 1); **Humboldt Co.:** Arcata, vi.30.69, DP Levin (LACM 1); Blocksburg, May.21.33, BP Bliven (CAS 1); Eureka, iv.12.37, BP Bliven

(CAS 1); County record: iv.25.11, Nunenmacher (FMNH 1); **Kern Co.:** 7 mi.N. Greenhorn Mtn. Summit, vii.29.1975, Gilbert & Poore (CDAS 8), vi.28.1977, Gilbert & Griffen (CDAS 1); **Mendocino Co.:** 15 mi. E. Fort Bragg, 19.vi.1984, R. Baranowski (UZIL 1); **Modoc Co.:** Ft. Bidwell, no date, G Holleman (MCZ 1); **Plumas Co.:** 5 mi.N. Chester, vii.19.1964, JA Litzinger (UWM 4); Cromberg, vi.7-12.1973, FL Blanc (CDAS 4); **Shasta Co.:** Shasta Springs, v.23.1914, Schaeffer coll'n (USNM 3); County records: May.1914, Schaeffer coll'n (USNM 3), May.1913, May.1914, FM Schott coll'n (CUIC 2), no date (MCZ 1); **Siskiyou Co.:** Dunsmuir, v.29.1914, JA Kusche (CAS 5), no date, Wickham (USNM 5), no date (WEEM 1); Mount Shasta [=Sisson], May (MCZ 3); Sisson, July.25.1918, EP Van Duzee (CAS 1); **Sonoma Co.:** Bennett Mtn., nr. marshy lake, 14.v.1955, P Rubtzoff (CAS 1); 2 mi.W. Graton, v.16.1963, LB O'Brien (VPI 1); Vic. Rohnert Park, vi.16.1983, AJ Gilbert (CDAS 1); **Trinity Co.:** Big Flats, Trinity Center, W Russel (CAS 1); Carrville, vi.3.1934, JC Lindahl (WSU 3), 2400-2500', 5.16.1934 (CDAS 1, CAS 2), 2400-2500', v.18.1934, Nunenmacher (FMNH 5); Eagle Creek, v.28.1949, AT McClay (AMNH 2); Mtn. Mdw. Rch, Coffee Crk, 8-10.vii.1969, DL Levin (LACM 1); Trinity R. Camp, vi.2,3.1951, AT McClay (AMNH 4); County record: 1934, Nunenmacher (FMNH 7); **Tuolumne Co.:** Coffee Crk, vi.23.31 (AMNH 1), vi.23.31, Van Dyke (CAS 2); Strawberry, vi.19.51, JL Mallars (CDAS 1), 23.vi.1951, EL Silver (LACM 3), vi.23.51, AT McClay (AMNH 3); County record: vi.1891, Van Dyke (CAS 2); **Localities not found:** Cole, July, Fenyes (AMNH 1, CAS 1); St. Cruz Beach, 14,18.v.1907, Bradley (CUIC 1); **Miscellaneous:** San Francisco, v.21.1911, Van Dyke (CAS 1); S.F. Bay area, no date, D Guiliani (CAS 2).

IDAHO: **Bear Lake Co.:** St. Charles Can., Wasatch Range, vi.15.1965, RL Westcott & LS Hawkins (UIM 5); **Nez Perce Co.:** Webb, v.15.1951, WF Barr (UIM 1).

NEVADA: **State record:** "Nev." no date (UADB 1, MCZ 4).

NEW MEXICO: **Mora Co.:** 5 mi.S. Buena Vista, 5.vi.1977, Knowlton & Hanson (EMUS 3); **Sandoval Co.:** Jemez Mtns., vi.18, J Woodgate (UAE 8), vii.18, J Woodgate (AMNH 6), vii.3, J Woodgate (CAS 17), no date J Woodgate (UADB 1); Jemez Springs, vi.27.1917, J Woodgate (USNM 2, MCZ 2); **Taos Co.:** Peñasco, July.10.1970, JR McClellan (EGRC 2).

OREGON: **Benton Co.:** Corvallis, 6.19.98 (OSUC 1); McDonald St. For., 20.May.1977, M Schwartz (OSUC 1); Sulfur Springs, 7 mi.N. Corvallis, May.14.1963, DR Smith (OSUC 4), 1.June.1970, R Turnbow (EGRC 4); **Clackamas Co.:** Gov. Camp, Mt. Hood, July.6.1938, MC Lane (OSUC 3), 5.vii.1942, B Malkin (FMNH 1), 4000', Jl.21.1945,HH Ross (INHS 2); Salmon River near Jct. Hwy.26 & 35, 27.Aug.1985 (SMCL 3); **Clatsop Co.:** Seaside, June.29.1964, R Nagle (SDNH 1), July7.1966, R Nagle (SDNH 16), July.11.1961, R Nagle (SDMC 1); **Coos Co.:** Bandon, Apr.17.1962, MC Lane (OSUC 1); **Crook Co.:** Ochoco N.F., vi.25.41 (OSUC 1); Princeville, Crystal Springs, 4.vii.1962, J Capizzi (ODAC 1); **Deschutes Co.:** Indian Ford, Hwy. 20, 20.vi.1964, K Goeden (ODAC 5); Sisters, Indian Ford Creek, June.6.1957,B Malkin (OSUC 43), 3.vi.1965, FP Larson (ODAC 3); **Douglas Co.:** Diamond Lk., vii.17.34, Van Dyke (CAS 1); 6 mi.E. Elkton, Mehl Cr., May.27.1964, JD Vertrees (NMDC 2); **Hood River Co.:** Bear Spring For., Camp Maupin Road, 26 mi.SE Mt. Hood, July.14.1956, PO Ritcher (OSUC 2); Dee, May.20.1959, J Schuh (AMNH 1); Hood River, vi.21.17, FR Cole (USNM 2), no date (OSUC 1); Mt. Hood, Bear Springs R.S., June.12.1961, MC Lane (OSUC 26), 3000', June.15.1962, MC Lane

(OSUC 9); Mt. Hood, River Meadows, 4000', June.21.1958, MC Lane (OSUC 1); Mt. Hood, nr. Still Crk., Still Creek For. Camp., 20.June.1968, Wiggins, Smith & Yamamoto (ROMC 49); Mt. Hood, White R.G.C., vii.3.27, Darlington (MCZ 1); S. Mt. Hood, vii.2.37 (MCZ 3); 13.5 mi.S. Mt. Hood P.O., 3600', 13.vii.1971, DH Kavanaugh (UAE 1); **Klamath Co.:** Lake of the Woods, Klamath Falls, 11.vi.45, KM Fender (OSUC 3); **Jackson Co.:** Grizzly Ridge, 22.vi.1975, Knowlton/Hanson (EMUS 1); Little Butte Creek, Hwy. #140, 23.vi.1974, A & D Smetana (CNC 3); Thousand Spring, near Center Lake (SMCL 7); Upland Meadows, Ashland, Lk. of Woods, June.11.1945, KM Fender (OSUC 1); Whiskey Creek Cmpgrd. on Hwy. 62, 15 km.E. Union Creek, 1460m, 27.vii.1974, PH Arnaud (CAS 1); **Jefferson Co.:** Metolius R., vi.14 (OSUC 1), Aug.3.1948, KM Fender (OSUC 1), May.27.1950, KM Fender (OSUC 3); **Josephine Co.:** 8 mi.N. Camp Sherman, along Metolius R., 12.vi.1965, K Goeden (ODAC 3); Golden, v.10.15, E.S.L. (OSUC 2); Scout Lake, 5.July.1967, R Turnbow (CDAS 1); 4 mi.W. Selma, 24.v.1964, K Goeden (ODAC 3); 4 mi.W. Selma, Illinois R., 1164', R8W T38S Sec8, 23.v.64, DR Smith (OSUC 3); **Lake Co.:** Quartz Mtn., Fremont N.F. 5000', June.12.1962, MC Lane (OSUC 11); Silver Lake, 1.vii.1984, BF & JL Carr (CARR 2); Summer Lake, 15.VI.1984, R Danielsson (UZIL 1); **Lane Co.:** Vida, v.41, R Fauts (FMNH 1); **Linn Co.:** Marion Forks, 30.June.1962, GC Eickwort (MSUE 17, AMNH 2); 8 mi.S. Marion Forks, 10.vii.1962, "resting on shrubs", K Goeden (ODAC 5); Monument Peak, 2.viii.1969, RL Westcott (ODAC 7), 4500', 16.vii.1960, K Goeden (ODAC 1); **Tillamook Co.:** Boyer, 23.July.1941, KM Fender (OSUC 1); Miles Lk., July.13.1941, KM Fender (OSUC 1); 0.9 mi.W. Sand Lake, 13.vi.72, Lattin (OSUC 2); 1 mi.W. Sand Lake, 1.May.1973, Lattin (OSUC 1); **Wasco Co.:** Bear Springs, v.26.1940, (CAS 6, FMNH 2, NMDC 2, ISAC

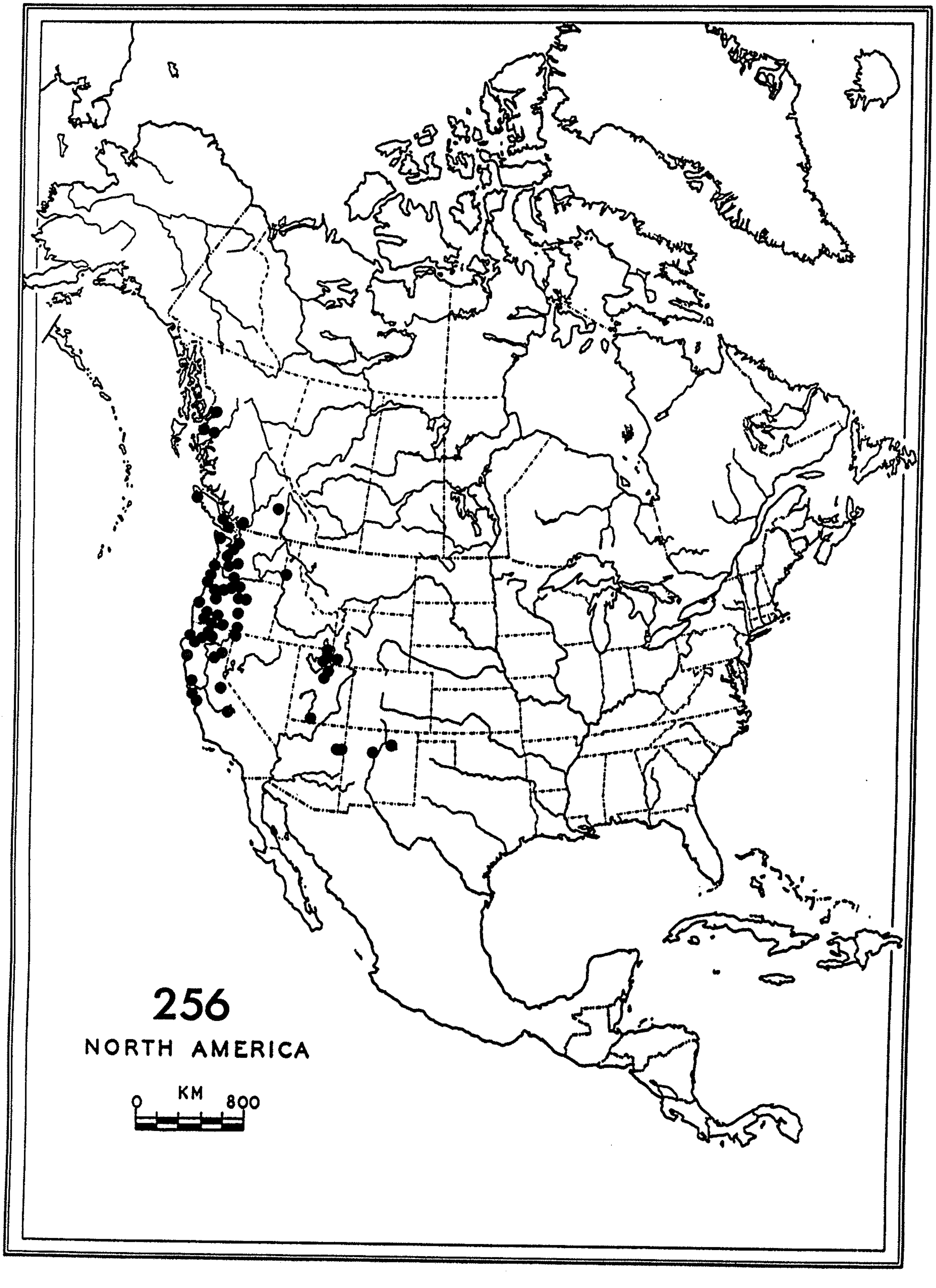
3), May.18.1940, KM Fender (OSUC 15), 5/26/1962, KM & DM Fender (AMNH 6); Bear Spring, Forest Camp, 19.vii.1951, JE Davis (ODAC 1); Bear Springs, Wapinitia Cutoff, June.30.1941, K & D Fender (OSUC 6); Kelly Creek, Wapinitia, June.22.1947, KM Fender (OSUC 1); 3 mi.E. Mosier, 23.v.1959, PF Torchie (EMUS 1); Warm Springs Ind. Res., 26.vi.1975, Knowlton/Hanson (EMUS 10); **Yamhill Co.:** McInnville, Peavine Ridge, May.6.1947, KM Fender (OSUC 1); **Localities not found:** Clear Lake, July.1.1941, KM Fender (OSUC 2); Walker Prairie, Winema N.F., June.13.1962, MC Lane (OSUC 3).

UTAH: **Box Elder Co.:** Perry, 25.v.1943, T Knowlton (DEFW 1); Willard, 29.iv.1939, Knowlton/Hanson (EMUS 1); **Cache Co.:** Amalga, 6.19.1937, CF Smith (EMUS 1); Cache Junction, vi.11.1957, JL Eastin (MCZ 2, AMNH 1, EMUS 8), 27.v.1944, GF Knowlton (EMUS 2), 16.vi.1967, GF Knowlton (EMUS 3); Cornish, 27.vii.1973, Eickwort & Bohart (CUIC 1); Logan, 2.vii.1955, SL Wood (CNC 1), 13.vi.1944, GF Knowlton (DEFW 2), 21.vi.1963, WJ Hanson (EMUS 1), 16.vi.1967, GF Knowlton (EMUS 4), 27.vii.1937, GF Knowlton (EMUS 1), 18.vi.1948, RW McAdams (EMUS 1), 24,29.vii.1948, JH Judd (EMUS 3), 20.v.1949, GL Dean (EMUS 1), 3.vii.1958, AB Altikriti (EMUS 1), 2.vi.1943, ER Stoddard (EMUS 1), 2.vii.1943, PE Telford (EMUS 1), 7.2.1947, SE Harrison (AMNH 1); W. Logan, 17.vi.1967, WJ Hanson (EMUS 6); Mendon, 16.vi.1967, GF Knowlton (EMUS 4); Wellsville, 11.vi.1975, GF Knowlton (EMUS 2); **Davis Co.:** Farmington, 19.vi.1929, <u>Carex</u>, DE Hardy (EMUS 1); **Juab Co.:** Mt. Nebo, 7.25.42, GF Knowlton (EMUS 1); Mt. Nebo Loop, 3.vii.1972, Knowlton/Hanson (EMUS 6); **Kane Co.:** 3 mi.N. Glendale, 17.vii.1982, WJ Hanson (EMUS 2); **Rich Co.:** Garden City, 16.vii.55, SL Wood (CNC 25); Lakota, 24.vii.1943, Knowlton/Hanson (EMUS 1); **Summit Co.:** Francis, 12.vii.1963, Knowlton/Hanson (EMUS 2); Kamas, 24.vii.1939, Knowlton/Hanson (EMUS 1), 12.vi.1963, GF Knolwton (EMUS 3), 15.viii.1943, Knowlton/Maddock (EMUS 2); Utah Co.:| Orem Marina, 4.vi.1981, SM Clark (SMCL 1); Provo, 7.7.1937, H Chandler (CAS 2), 1.vi.1967 (TAMU 1), 5.vi.1944, Knowlton/Wood (EMUS 2), 12.vii.1962, GL Jensen (EMUS 1), May.1.1968, WN Mathis (CDAS 1), 26.May.1968, DR Harris (CDAS 1), 5.vi.1944, GF Knowlton (DEFW 15), June.1.1967 (CDAS 3); Provo, Utah Lake, 25.May.1968, DR Harris (CDAS 2); **Weber Co.:** Eden, 5.vii.1940, Knowlton/Hanson (EMUS 1); Head, Beaver Creek, 7.vii.1977, Knowlton/Hanson (EMUS 20), 1.viii.1980, Knowlton/Clemons (EMUS 1), 21.vii.1976, GF Knowlton (EMUS 4), 6.vii.1976, GF Knowlton (EMUS 4), 6.vii.1976, WJ Hanson (EMUS 2); Huntsville, June.1947, M Nielson (EMUS 1); Liberty, 5.vii.1940, Knowlton/Hanson (EMUS 1); Lime Spr., Beaver Crk., 6.vii.1976, GF Knowlton (EMUS 1); N.W. Ogden, 24.vi.1935, GF Knowlton (EMUS 1), 18.vi.1937, DE Hardy (EMUS 1); 6 mi.S. Monte Cristo, 6.vii.1976, GF Knowlton (EMUS 1); North Logan, 20.5.1950, PR Fitzgerald (EMUS 1); Riverdale, 7.10.1937, GF Knowlton (EMUS 1).

WASHINGTON: **Chelan Co.:** Icicle Creek, 15 km.SW of Leavenworth, 1.vi.1981, RE Nelson (RNEL 3); **Clallam Co.:** Ozette R., 26.v.1932 (OSUC 1); **Cowlitz Co.:** Toutle River, S. Fork, 2.vi.1979, TL Whitworth (EMUS 1); **Jefferson Co.:** Hoh River, Olympic Nat. Pk., July.18,19.1953, KM Fender (OSUC 2), 29.vi-1.vii.1969, ROM Fld. Pty. (ROMC 1); Kalaloch, 19.vii.1975, TL Whitworth (EMUS 2); **King Co.:** Bothell, v.22.34, JL Wilson (OSUC 2); Cedar Mountain, v.20.1935 (OSUC 4), v.9.1940, RH Foster (OSUC 3), May.9.1940, MH Hatch (OSUC 2), May.13.1936, MH Hatch (OSUC 1), v.15.1947 (OSUC 2), May.16.1946, MH Hatch (OSUC 1), 5.19.38 (OSUC 1), May.20.1935, MH Hatch (OSUC 6), May.20.1948 (OSUC 6), May.20.1948, MH Hatch (OSUC 1), May.22.1941, MH Hatch (OSUC 2), May.29.1945, MH Hatch (OSUC 1); Evans Creek, May.11.1929, MH Hatch (OSUC 11), 3 km.N. of Fall City, 23.v.1982, RE Nelson (RNEL 1); Raging R., 2 km.NE of Preston, 17.vi.1978, RE Nelson (RNEL 2); Renton, Cedar River, 17.v.1956, CS Leuthan (WSU 2), v.20.1948 (OSUC 2), v.15.1947, N Vowles (OSUC 3), v.6.1940, GE Sawyer (OSUC 1), v.24.1949, BFL (OSUC 1), May.18.1950, MH Hatch (OSUC 2), May.8.1959, MH Hatch (OSUC 1), May.7.1957, MH Hatch (OSUC 3); Seattle, 20.vi.1954, B Malkin (FMNH 1), 4.22.02 (OSUC 1), v.21.1965, F Lighter (OSUC 10); Tiger Mt. St. Forest, 15.May.1988, "on Lysichitum americanum, ME Rice (EGRC 3); **Klickitat Co.:** 5 mi.W. Cle Elum, 8.June.1969, D Harris (CDAS 2); Satus Pass, June.15.1962, MC lane (OSUC 1); Thorp, 8.June.1969, D Harris (CDAS 3); **Mason Co.:** Hoodsport, vii.19.1985, MT & D James (WSU 1); **Pierce Co.:** Electron, v.31.1933,vi.2.1933, SE Crumb (OSUC 2); Greenwater, 20.June.1986, DG Furth (PMY 1); Mt. Rainier N.P., Longmire, May.23.1952, MH Hatch (OSUC 2), June.26.1956, MH Hatch (OSUC 2), 19.June.1986, DG Furth (PMY 1); Mt. Rainier, Tahoma Cr., 3000', vii.20.1935, IW Bales (WSU 1), 2300', 12.viii.1973, A & D Smetana (CNC 2), July.20.1935, MH Hatch (OSUC 4); Tacoma, 1889, Horn (USNM 2), no date, Chttn. (USNM 2); **Skamania Co.:** Mt. St. Helens, Maratta Ck., 2000', July.10.1956, CP Alexander (AMNH 1, MCZ 1); **Snohomish Co.:** Mud Lake, July.22.1927, "Angelica genuflexa" (OSUC 1); **Yakima Co.:** 1 mi.N. Nile, 8.vii.1973, NE Woodley (EGRC 1); 1 mi.W. Tieton R.S., pond nr. Rimrock Lk., 12.vi.1973 (WSU 1); **Locality not found:** Mt. Adams, West Klickitat, 3300', July.1.1925, CA Morley (USNM 2).

WYOMING: **Lincoln Co.:** Pine Cr. Rd., Cokeville, 25.vi.1986, BF & JL Carr (CARR 6); **Uinta Co.:** 29 mi.S. Evanston, 30.vii.1975, GC Eickwort (CUIC 2).

FIGURE 256. Known distribution in North America of _Plateumaris neomexicana_ (Schaeffer), from specimens examined. Each dot represents one collection record, or a group of very close records.



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NORTH AMERICA

TABLE 1.

Geographic variation in pronotal sculpture and appendage colour of specimens of *Plateumaris neomexicana* (Schaeffer) (values expressed as per cent of N, number of specimens).

GEOGRAPHIC AREA:	N	PRONOTAL PUNCTUATION coarse	medium	fine	FEMORA $>\frac{1}{3}$ RED	$\leq\frac{1}{3}$ RED	ANTENNAE 100% RED	$\geq$50% DARK
Northern British Columbia	19	0	0	100	0	100	100	0
Washington + S. British Columbia	85	0	0	100	8	92	89	11
Oregon	269	0	1	99	14	86	89	11
California	25	0	92	8	76	24	80	20
Arizona	60	100	0	0	0	100	88	12
New Mexico	37	100	0	0	0	100	88	12
Utah	148	0	100	0	99	1	10	90
Idaho	6	0	100	0	100	0	33	67

P. NITIDA -GROUP.

DIAGNOSIS. Members of this group are recognized by entirely dark or metallic appendages (apex of antenna, at most, rufous).

Plateumaris notmani (Schaeffer, 1925)

Figures 2, 49, 50, 87, 88, 111, 144, 145, 153, 206, 208, 257.

Donacia notmani Schaeffer (1925:132).

Plateumaris notmani: Monrós (1959:105), Goecke (1960a:9), Jolivet (1970:60), Borowiec (1984:453).

TYPE SPECIMENS. HOLOTYPE o^, USNM Type #42393: "Wallface Mt. Essex Co. NY", ♀ allotype #42393 and 5 paratypes, USNM.

TYPE LOCALITY. Wallface Mountain, Essex Co., New York.

ETYMOLOGY. Named after Howard Notman, who provided Schaeffer with specimens.

TAXONOMIC HISTORY. The name, *P. notmani*, has not been used since it was made available, because the species has not been known to occur in areas that have been treated taxonomically or faunistically (*e.g.* Wilcox 1954).

DIAGNOSIS. Specimens of *P. notmani* are recognized by entirely dark appendages, pygidium more or less truncate in males, rounded in females, pronotum with prominent sulci and median line, hypomeron very coarsely rugose, elytra smooth, meso- and metatibiae of males without tubercle, antennomeres at extreme base rufous in some specimens, female ovipositor very small, only 0.47-0.52 mm wide at widest subapical point.

COMPARISONS. Specimens of *P. notmani* are similar to those of several other species with entirely dark appendages: *P. balli*, *P. nitida*, and *P.*

frosti. Specimens of P. notmani are easily distinguished from those of these species by the truncate pygidium in males, rounded in females (these other three species emarginate in both sexes), lacking meso- and metatibial tubercle of males, and by the narrow, laterally explanate ovipositor. Specimens of P. metallica also have more or less entirely dark femora and truncate male pygidium, and female pygidium of some specimens may be rounded also, but this species lacks a femoral tooth, the femoral bases are rufous, and tibiae, tarsi and pygidium are rufous in most specimens.

DESCRIPTION.

LENGTH. Males: 8.23 - 8.67 mm, females: 8.67 - 9.48 mm

COLOUR. Males dark purplish or nearly black, with underside and legs bluish-purple; females coppery, greenish-coppery or green, underside and legs green or greenish-blue; antennae metallic or black, legs metallic, tarsi of some specimens rufous.

PRONOTUM. Disc more or less shiny, sparsely punctulate or with punctulae and punctures mixed more or less densely, most specimens anteriorly with punctures confluent, forming arcuate rugae that curve to midline, there becoming longitudinal; posteriorly on disc punctulation and/or punctation sparser and less confluent; median line prominent, basal sulcus and callosal sulci moderate to deep; hypomeron with very coarse longitudinal rugae.

HEAD. Antennal calli prominent, shiny and impunctate in most specimens, more or less prominently excavated behind as oval to round depression; vertexal calli hardly indicated in most specimens, occipital sulcus shallow to absent.

APPENDAGES. LEGS. Metallic, not of same colour as dorsum in most specimens, tarsi rufous in some specimens; metafemur with tooth moderate to large, acute, thin and bladelike; meso- and metatibia of males without tubercle. **ANTENNAE.** Black to metallic, extreme antennomere bases reddish in some specimens; antennomere proportions typical of genus.

ELYTRA. Shiny, sparsely punctulate, with few sparse rugae; extreme apex impunctate, with few punctulae, many specimens with indistinct microsculpture (shagreening); antemedian depression moderate to prominent, postmedian depression absent to shallow; epipleuron smooth, punctulate, without rugae, flat and more or less uniformly wide to near apex.

PYGIDIUM. Dimorphic sexually as detailed below; entirely metallic to margined with rufous.

MALES. Pygidium truncate to very shallowly emarginate; all specimens dark purplish or nearly black, underside and legs bluish-purple; meso- and metatibia without tubercle; median lobe with fine ventral carina; endophallus with ELDs apically acute, BSB with basal part small, PDS robust, deeply notched, angulate at apical angles.

FEMALES. Pygidium broadly rounded with apical margin sparsely pubescent; all specimens coppery to green, with green underside and legs; ventral valve of ovipositor more or less cordate, broadest subapically, but overall small, only 0.47 - 0.52 mm wide subapically at widest point, tapering to very acute apex; dorsal valve rounded apically, without median line.

SEXUAL DIMORPHISM. Specimens are sexually dimorphic in size, pygidial shape and colour.

VARIATION. Specimens of _P. notmani_ vary in density of punctulation (and therefore also rugosity) of the pronotal disc, prominence of occipital sulcus, and distinctness of microsculpture at elytral apex, and some specimens with metafemoral tooth less prominent, obtuse.

NATURAL HISTORY. No host data accompany specimens examined. Dates of collections are typical of the genus.

DISTRIBUTION. Specimens have been seen from West Virginia, New York and Pennsylvania, representing only four collection localities (Fig. 257).

CHOROLOGICAL RELATIONS. _Plateumaris notmani_ has been collected together with only _P. metallica_ at Fairmont, West Virginia, though other species' distributions fully overlap that of _P. notmani_

PHYLOGENETIC RELATIONS. _Plateumaris notmani_ appears to be the most plesiomorphic member of a group of species possessing metallic appendages, which is here called the _P. nitida_-Group. See discussion of _P. nitida_ for further details.

SPECIMENS EXAMINED. 32 males and females, excluding type. A detailed list of locality data from specimens examined is as follows:

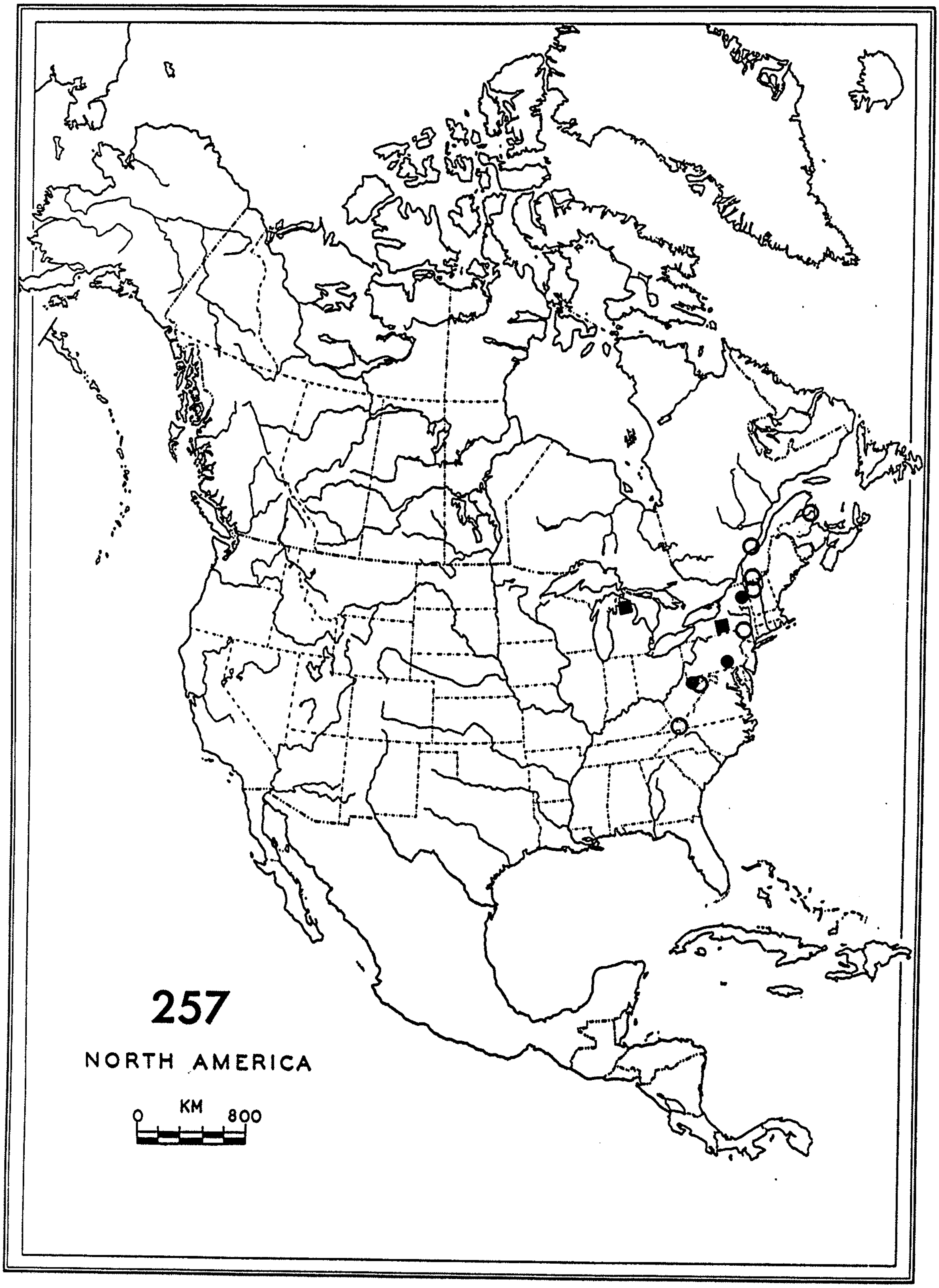
UNITED STATES. NEW YORK: Essex Co.: Wallface Mountain, 15.VII.1922, H. Notman (USNM 5, UADB 1, AMNH 1, BMNH 2, CNC 1, MCZ 2), VII.1922, A. Nicolay (USNM 5, CUIC 1), 17.VII, Quirsfeld (USNM 2).

PENNSYLVANIA: Dauphin Co.: County record, VI.21.28, J.N. Knull (CAS 3).

WEST VIRGINIA: Marion Co.: Fairmont, VI.10.28, PN Musgrave (CAS 5, AMNH 1); **Raleigh Co.:** "Cranberry Gls.", 5.5.52, HV Weems (MCZ 2) [locality not found, but a locality named Cranberry occurs in this County].

MISCELLANEOUS MATERIAL: no locality data, no date, no collector (UADB 1).

FIGURE 257. Known distribution in North America of Plateumaris notmani (Schaeffer) (•), Plateumaris balli Askevold (O), and Plateumaris schaefferi Askevold (■), from specimens examined. Each dot, square or circle represents one collection record, or a group of very close records.


257
NORTH AMERICA
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Plateumaris balli Askevold **NEW SPECIES**

Figures 20, 21, 62, 100, 132, 133, 152, 205, 207, 257.

TYPE SPECIMENS. Holotype o^, CNC Type #19497. Canada, PQ, Mt. Sutton nr. Sutton Ski Area (Hwy. 215), 10.vi.1986, D.A. Pollock. The remaining 13 specimens known to me are designated as paratypes (see specimens examined, below).

TYPE LOCALITY. Same as data of holotype.

ETYMOLOGY. I name this species after Dr. George E. Ball, in recognition of the many kindnesses and encouragement he has extended to me.

DIAGNOSIS. Specimens of *P. balli* are recognized by entirely green, shiny elytra, pronotum, head, underside and legs, pygidium emarginate in both sexes, pronotum with median line, basal and callosal sulci well developed, and disc relatively sparsely punctured, these of various sizes but shallow, and by structure of the male endophallus.

COMPARISONS. Specimens of this species could be easily confused with those of several other eastern species that have entirely (or nearly so) metallic appendages: *P. frosti*, *P. notmani*, *P. nitida*, and except for the distinctive colour pattern, *P. schaefferi* also. From specimens of *P. balli*, specimens of *P. notmani* are easily distinguished by the truncate pygidium of males, broadly rounded in females, very small ovipositor of females, only 0.47-0.52 mm wide, the dorsal valve rounded, meso- and metatibia of males without tubercle, as well as by most specimens of *P. notmani* being a colour other than green. Specimens of *P. nitida* are distinguished by the more deeply emarginate pygidium of both sexes, colours various, including green, and smaller antennal calli, but especially by pronotal sculpture and punctation; many females of P. nitida are alutaceous, even shagreened, between the sparse coarse punctures, males not so, but variably finely rugulose, not shiny. Specimens of P. frosti are distinguished by the more deeply emarginate pygidium of both sexes, smaller antennal calli, and especially by the larger, blade-like metafemoral tooth, but also by the broadly furrowed medial area of pronotal disc, and colours various, including green.

DESCRIPTION.

LENGTH. Males: 8.24 - 9.20 mm, females: 9.68 - 10.80 mm.

COLOUR. Brilliant metallic green (most specimens a pale irridescent shade, may be a little darker), except tarsomeres at extreme base, and apical antennomeres half to entirely reddish.

PRONOTUM. Shiny, smooth save for some irregularities of punctation, the coarser punctures shallow on disc, anteriorly deeper and confluent to form more or less transverse rugae; median line deep, regular, narrow, extending to hind margin and evident across the basal sulcus in most specimens; callosal and basal sulci well developed; hypomeron more or less uniformly rugose, in sharp contrast to disc.

HEAD. Vertexal calli slight to well developed, less densely punctured than rest of head, in many specimens more prominent, then accentuating an occipital sulcus; antennal calli impunctate and shiny in about half the specimens, especially those from Virginia, deeply furrowed between and behind, therefore appearing more prominent (less so than specimens of P. schaefferi).

APPENDAGES. LEGS. Entirely metallic, like body, except extreme tarsomere bases; metafemur of both sexes with broad, acute, triangular tooth; meso- and metatibia of male specimens with tubercle. **ANTENNAE.** Basal antennomeres dark, becoming partly to entirely reddish toward apex; length proportions typical of genus.

ELYTRA. Smooth, shiny, more or less densely and uniformly minutely punctulate over whole surface, but with very few rugae, even laterally and apically; antemedian impression broad but shallow, postmedial impression obsolete to normal.

PYGIDIUM. Slightly dimorphic sexually, as detailed below; entirely dark, except extreme apical margin in females.

MALES. Pygidium broadly emarginate, less deeply so than female specimens; meso- and metatibia with tubercle; median lobe more or less carinate beneath, extreme apex blunt and declivous (lateral aspect), dorsal margin about apical orifice markedly sinuate (lateral aspect); endophallus with BSB short, of two parts subequal in length, apex of ELD declivous (lateral aspect), PDS notched to receive apex of MEG, which is difficult to distinguish.

FEMALES. Pygidium broadly emarginate, more deeply so than in males; ventral valve of ovipositor more or less parallel-sided, subapically curving markedly to an almost 90° apex, apex bluntly rounded, lateral margins minutely serrulate; dorsal valve with apex broadly rounded, without median line.

SEXUAL DIMORPHISM. Slight variation in body length and slight difference in degree of emargination of pygidium.

VARIATION. None was observed, except for amount of reddish colour on apical antennomeres, and prominence of antennal calli.

NATURAL HISTORY. D.A. Pollock informed me that at Mt. Sutton, specimens (*P. balli* and other species) were swept from sedges in a seepage area. It seems this species is not at all unusual in its habits, although it is one of the most rarely collected members of the genus.

DISTRIBUTION. *Plateumaris balli* has not been collected often; most records are from single male specimens, although small series have been collected from Mt. Sutton, Québec, and Virginia. Eight records of collection are known from New Brunswick and Québec to Virginia (Fig. 257).

CHOROLOGICAL RELATIONS. *Plateumaris balli* is sympatric with all the eastern species of the genus, as far as is known, with the possible exception of *P. notmani*; it has been collected in company of other species on sedges at the type locality, and in Virginia with *P. metallica*.

PHYLOGENETIC RELATIONS. *Plateumaris balli* is most closely related to the Nearctic species *P. schaefferi*, and they are hypothesized to be sister taxa as evidenced by prominent antennal tubercles and similar punctation and pygidial shape. Together these two species seem to be most closely related to five other species comprising the *P. nitida*-Group. See discussion of *P. nitida* for further details.

SPECIMENS EXAMINED. 12 males, 5 females, plus holotype, as follows:

CANADA.

NEW BRUNSWICK: Bathurst, vi.21, JN Knull (AMNH 1o^).

QUEBEC: Mount Sutton, nr. Sutton Ski Area (Hwy. 215), 10.vi.1986, D.A. Pollock (ISAC 1o^,3♀);

Ste.-Catherine, Port. 16.vi.1968, C. Chantal (CNC 1o^);

Sutton, Mt. Sutton, 24.June.1970, E.C. Becker (CNC 1o^).

UNITED STATES.

MARYLAND: Garrett Co.: Garrett St. For., 6-5-86, JF Cavey (APHIS 1o^);

Mt. Backbone, 6/6/86, JF Cavey (APHIS 1o^, 1♀).

NEW YORK: Ulster Co.: Slide Mtn., May.24.1952, G.E. Ball (UAE 1o^).

VERMONT: Lamoille Co.: Sterling Pond, Stowe, Aug.10.1974, R. Davidson (UVDZ 1o^).

VIRGINIA: Grayson Co.: Lewis Fork Fox Creek, Lewis Fork Trail, 27.May.1984, Baumann & Nelson (USNM 1o^, CAS 1o^);

Mt. Rogers Nat'l. Rec. Area, Lewis Fork Trail, 27.May.1984, Baumann & Nelson (SMCL 1o^,1♀, ISAC 1o^).

Plateumaris schaefferi Askevold **NEW SPECIES**

Figures 59, 60, 98, 115, 146, 147, 156, 209, 210, 257.

Donacia nitida: Schaeffer (1925:130).

Plateumaris nitida: Monrós (1959:105), Goecke (1960a:9), Jolivet (1970:60), Borowiec (1984:453).

TYPE SPECIMENS. HOLOTYPE o^, USNM: "Freeville nr. Ithaca N.Y. June 7 '96, Coll. F. Knab, D. nitida Germ. Schaeffer det." PARATYPES: remainder of specimens examined, below, 5 o^, 2 ♀.

TYPE LOCALITY. Freeville, near Ithaca, New York.

ETYMOLOGY. I name this species after Charles Schaeffer, whose contribution to North American Donaciinae was great and largely accurate; this is particularly noteworthy because he unravelled a number of nomenclatural problems in the group, doing so with neither the benefit of genitalic characters nor personal reference to most types.

TAXONOMIC HISTORY. Of all North American Donaciinae, with the exception of *D. dissimilis* Schaeffer, *P. schaefferi* is the least common species in collections. Schaeffer (1925), in an attempt to conserve Suffrian's *D. nitida*, doubtfully applied that name to the present taxon, but that was clearly a surpising error (*cf.* treatment of *P. nitida*, above).

DIAGNOSIS. Specimens of *P. schaefferi* are easily distinguished from all other known members of the genus by their multi-coloured dorsum: pronotum green with slight purplish lateral hues, elytra purple on disc, laterally, apically and along suture grading to red, gold, then green.

COMPARISONS. Specimens of this species are quite distinctive. Several other Nearctic species have entirely metallic appendages, but *P. schaefferi* is easily distinguished because of its unique dorsal colour.

It is the only member of the genus (worldwide) that possesses a multi-coloured dorsum. Such colour pattern is common among some Palaearctic species of D. (Donaciomima), but does not occur among other genera.

DESCRIPTION.

LENGTH. Males: 7.91 - 9.55 mm, females: 9.80 - 9.97 mm.

COLOUR. Metallic green to greenish blue below; above with head green, pronotum green with slight gold-purplish sheen laterally, elytra green laterally, apically and along suture, this grading toward disc into gold, then red, then purple, mesally from interval 2 and laterally from interval 7.

PRONOTUM. Shiny metallic green with slight metallic gold-purplish sheen toward sides; disc smooth, irregularly sparsely punctured and punctulate, becoming obliquely rugulose anteromedially and posteromedially in most specimens; median line deep, more or less regular, callosal and basal sulci well developed, deep, the calli therefore very prominent, sparsely punctulate; hypomeron with coarse longitudinal rugae, markedlyy contrasting discal surface.

HEAD. Vertexal calli well developed, less densely punctured than rest of head, accentuating well developed occipital sulcus and median line; antennal calli prominent, shiny, impunctate, vertex with prominent, more or less oval depression behind antennal calli.

APPENDAGES. LEGS. Metallic, save trochanters and extreme femoral bases rufous, tibiae and tarsi metallic to slightly rufous in some specimens; metafemur with prominent, acute, triangular tooth in both sexes; meso- and metatibia of male specimens with small, blunt but evident tubercle.

ANTENNAE. Antennomeres dark, more or less metallic, with extreme bases rufous, apical antennomeres in some specimens mostly to entirely rufous; length proportions typical of genus.

ELYTRA. Smooth, shiny, more or less densely and uniformly punctulate over whole surface in male specimens, not at all, or with only a few punctulae, in female specimens; rugae few and sparse, or absent, antemedian depression prominent, postmedian obsolete.

PYGIDIUM. Slightly dimorphic sexually, as detailed below; entirely metallic in colour, with at most extreme apical margin rufous.

MALES. Pygidium moderately emarginate, moreso than in females; meso- and metatibia with tubercle; endophallus with ELDs rounded apically, markedly deflexed (lateral aspect) and with basal angulate lobe, BSB with small basal part, PDS slender, apically slightly notched to receive MEG apex, fused basally with MEG to form C-shaped structure.

FEMALES. Pygidium shallowly emarginate; ventral valve of ovipositor laterally broadly rounded, tapering to slightly obtuse apex, edge inconspicuously minutely serrulate; dorsal valve with apex broadly rounded.

SEXUAL DIMORPHISM. Dimorphism of sexes is slight, and occurs in size and degree of pygidial emargination. Additionally, among female specimens examined, elytra with little or no punctulation on intervals, males densely so; as is typical of members of the genus, males possess a meso- and metatibial tubercle.

VARIATION. None observed, save extent of rufous colouration of apical antennomeres.

NATURAL HISTORY. Unknown, but probably typical of other members of the genus.

DISTRIBUTION. *Plateumaris schaefferi* has only been collected on four occasions, twice at Freeville in 1896 and 1917, and once each at Malloryville (1976) and Montmorency County (1923), New York and Michigan respectively. It is the least-collected Nearctic member of the genus (Fig. 257).

CHOROLOGICAL RELATIONS. In general distribution, *P. schaefferi* is sympatric with most eastern members of *Plateumaris*, but it has evidently been collected concurrently only with *P. rufa* by H. Dietrich at Freeville, judging by dates of collection.

PHYLOGENETIC RELATIONS. *Plateumaris schaefferi* is most closely related to the Nearctic species *P. balli*, and they are hypothesized to be sister taxa. Together these two species seem to be most closely related to a group of five other species comprising the *P. nitida*-Group. See discussions of *P. nitida* and *P. schaefferi* for further details.

SPECIMENS EXAMINED. 5 males, 2 females, plus holotype o^. Details of locality data from specimens examined are as follows:

UNITED STATES.

MICHIGAN: Montmorency Co.: County record: vii.14.1923, T.H. Hubbell (UMMA 1o^, 1♀).

NEW YORK: Tompkins Co.: Freeville, nr. Ithaca, June 7 '96, Collection F. Knab (USNM 1o^, 1♀), 5.June.1917, H. Dietrich, [*D. nitida*, det. Schffr.] (CUIC 1o^); Malloryville, 3.June.1976, LL Pechuman (CUIC 2o^).

Plateumaris _nitida_ (Germar, 1811) **ALTERED CONCEPT**

Figures 47, 48, 85, 86, 110, 140, 141, 154, 201, 202, 227-229, 239, 258.

Donacia *nitida* Germar (1811:31).

Donacia *emarginata* Kirby (1837:224). LECTOTYPE o^, BMNH, by present designation: "Lecotype [blue trim disc added by me], TYPE [red trim disc], N. Scotia 5951a. [white disc], Donacia emarginata Kirby N. Scotia 5951 Rev. Wm. Kirby Type, Lectotype o^ Donacia emarginata Kirby 1837 designated 11.vii.1984 I.S. Askevold [red]; the lectotype is in poor condition, pinned through the prothorax, with the body glued to the prothorax and right hind leg missing. Kirby did not indicate the number of specimens before him, so the above specimen is designated as lectotype; it is the only one in the BMNH that bears a Kirby label with appropriate locality information. **NEW SYNONYMY**

Donacia *emarginata* var. *pacifica* Schaeffer (1925:135), HOLOTYPE o^, USNM Type #42394: "Shasta Co. California May 1911, Type USNM 42394, copy of original label sent 1935 to W. Horn: H.S.B."; ♀ allotype #42394 and 9 paratypes, USNM. **NEW SYNONYMY**

Donacia *nitida*: Lacordaire (1845:195); LeConte [1851:316, as "*species* *mihi* *ignotae*", *cf*. Suffrian (1872:11-13)].

Donacia *binodosa*: LeConte [(1851:316), *cf*. Suffrian (1872:11-12)]. **UNJUSTIFIED EMENDATION**

Donacia *juncina* Couper 1864:88. LECTOTYPE o^, ULAV, designated by Becker (1974:69): "D. emarginata Kirby Canada". **NEW SYNONYMY**

Plateumaris nitida: Clavareau (1913:31), Monrós (1959:105), Goecke (1960a:9), Jolivet (1970:60).

Donacia emarginata: Crotch (1873:21), Leng (1891:174), (ex parte), Blatchley (1910:1106), Schaeffer (1925:133), Beller and Hatch (1932:82), Mead (1938:119), Wilcox (1954:372), Hatch (1971:169).

Donacia junci: Crotch (1873:21), Leng (1891:176).

UNJUSTIFIED EMENDATION

Plateumaris emarginata: Jacoby and Clavareau (1904:11), Clavareau (1913:30), Monrós (1959:105), Goecke (1960a:8), Jolivet (1970:58), Borowiec (1984:452).

TYPE SPECIMEN. LECTOTYPE ♀, MLU, bears the following labels: "31107. [red numbers on white], ♀, Pl emarginata Kirby det. Goecke 1942, nitida Grm. Amer. bor. [greenish with black border, white underside]". The red label "LECTOTYPE Donacia nitida Germar design. I.S. Askevold 1988" was added by me.

Information about the type. The specimen is in perfect condition. It appears, however, that no original label of Germar remains: "31107", and the "nitida Grm Amer. bor." labels are like those found on many Suffrian specimens preserved at MLU, and the "♀" and "Pl. emarginata..." labels are those of Hans Goecke. Initially, it would therefore appear that the specimen must not be one of Germar's two originals; however, I believe it to be one of Germar's specimens based on the following discussion: according to Horn and Kahle (1935:89) the Germar Collection, except for Curculionidae, was distributed by H. Schaum; part of Coleoptera went to the Zoological Museum Berlin, and the rest of Coleoptera via G. Kraatz to the Deutsches entomologisches Institut, Berlin-Dahlem. Horn and Kahle (1936:241) stated that the Chrysomelidae of Schaum went to E. Witte, whose collection went to the Senckenberg Museum, Frankfurt (Horn and Kahle 1937:305). I was not able to find any specimen that I could recognize as a type in Frankfurt in 1984, nor was one found in Berlin (pers. comm., Dr. F. Hieke). These facts seem to render certain remarks made by Suffrian (1872:12) plausible: he claims to have had in his possession the "Donacien der ehemaligen Germar-Schaum'schen Sammlung" [that is, the donaciines of the former Germar-via-Schaum collection], but gave no statement as to how this came about. Suffrian's claim is consistent with Horn and Kahle's (1935-1937) statements above, concerning these collections, and with my failure to locate Germar's type in other repositories. Additionally, Germar's original description rules out specimens of all North American species except those of P. balli, P. emarginata, P. frosti, and P. notmani, so it comes as no surprise that it turns out to be one of these, and that P. nitida therefore takes priority over P. emarginata (Kirby).

TYPE LOCALITY. Germar stated "höchstens Nordamerika" [most likely North America], as he was unsure of the origin of the specimen.

ETYMOLOGY. "Nitida" is Latin for shiny, which the elytron and pronotum of many specimens are.

TAXONOMIC HISTORY AND SYNONYMIES. The name, P. nitida, has not been used correctly by authors since it was first made available by Germar. Instead, P. emarginata has been recognized by all authors since Kirby (1837), and most of this discussion concerns the use of this name. A number of taxa, however, became erroneously synonymized with it: LeConte (1851) first placed D. biimpressa Melsheimer (1847:159) and D.

aurichalcea Melsheimer (1847:159) as junior synonyms of *D. emarginata*, an arrangement which Crotch (1873) likely followed, although he did not mention them. Leng (1891) added *D. rugifrons* Newman (1838:391) and *D. juncina* Couper (1864:88) [as *D. junci*] as junior synonyms of *D. emarginata*. Leng's arrangement, as usual, was followed by Jacoby and Clavareau (1904:30), and Clavareau (1913:11). Schaeffer (1925:99) also rectified these errors (under his discussion of *D. biimpressa*); *D. rugifrons* he correctly transferred to junior synonymy with *D. pusilla* Say, leaving only *D. juncina* (as *D. junci*) as junior synonym of *D. emarginata*. However, Schaeffer (1925) described two varieties of *D. emarginata*: *D. emarginata pacifica* to which I cannot give any valid taxonomic status, while his *D. e. frosti* is here elevated to specific status. The name *D. binodosa* also appeared, first in LeConte (1851); Suffrian (1872) surmised that LeConte mistakenly took one of the first words in Germar's description of *D. nitida*, which happens to be "*binodoso*", and that found its way onto his list of taxa. In any case, the name is either a mistaken emendation, or a *nomen nudum*. Jacoby and Clavareau (1904) had left *D. nitida* as a "Doubtfull [sic] species", but then Clavareau (1913) listed it in *Plateumaris* as a valid species, which Schaeffer (1925) evidently wished to conserve (but applied to the wrong species concept).

DIAGNOSIS. Specimens of *P. nitida* are recognized by the pygidium deeply emarginate in males, shallowly so in females; pronotal disc alutaceous with sparse punctation and punctulation (especially females), basal sulcus shallow, callosal sulcus well developed, the calli prominent, median line typically narrow and deep; head with prominent vertexal calli and occipital sulcus; median lobe with single carina below, endophallus with ELDs sinuate (lateral view) and apically pointed, MEG and PDS fused into elongate C-shaped structure concealed within large membranous lobe; females with ovipositor parallel-sided and tapering to acute apex, dorsal valve apically pointed, without median line.

COMPARISONS. Specimens of *P. nitida* could be confused with those of several other species with dark appendages: *P. frosti*, *P. balli*, and *P. notmani*. From specimens of *P. notmani*, it is easily distinguished as specimens of that species have a truncate pygidium in males, rounded in females, lack tibial tubercle in males, and ovipositor small but subapically rounded, and they lack any alutaceous microsculpture on pronotum. Specimens of both *P. frosti* and *P. balli* are similar to those of *P. nitida* in having metallic (most specimens), emarginate pygidium in both sexes. Specimens of *P. frosti*, however, have the pygidial emargination much deeper, metafemoral tooth is much larger and bladelike, the pronotum medially depressed in most specimens, and pronotal disc and elytral apices without alutaceous microsculpture, this present in most females and some males of *P. nitida*. Among specimens of *P. balli*, the pronotum and elytral apices lack prominent alutaceous microsculpture, apical antennomeres are rufous, and antennal calli more prominent, these shiny and impunctate in most specimens, deeply depressed behind. Some specimens from Oregon and Washington with appendages largely rufous could be confused with *P. germari* and *P. pusilla* as they have a similar pygidial shape; from such specimens, *P. nitida* can then be distinguished from those of *P. germari* by the finely serrate ovipositor, prominent pronotal median line, and more slender femoral bases, the femora more clavate; from specimens of *P. pusilla* they can be distinguished by the parallel-sided ovipositor, alutaceous pronotum, more regular pronotal median line and flat disc.

DESCRIPTION.

LENGTH. Males: 7.42 - 8.75 mm, females: 8.23 - 10.08 mm.

COLOUR. Males blue, purple or purplish-black, some specimens green, females blue, green, coppery, or purple to purplish-black; legs, antennae and pygidium typically entirely dark or metallic, or with extreme base of femora, tibiae, tarsomeres and antennomeres rufous, but some specimens from Oregon and Washington have antennae rufous save basal antennomeres, tibiae and tarsi rufous, femora more extensively rufous basally and apically, and pygidium largely rufous.

PRONOTUM. Disc more or less flat, distinctly alutaceous to shagreened between coarse sparse punctures and scattered punctulae in females, males less conspicuously and widely alutaceous, coarse punctures sparse in most specimens, area about median line with at least some alutaceousness that forms longitudinally elongate meshes in many specimens; median line narrow but deep in most specimens, obscured by some rugosity and punctation in some specimens; basal sulcus shallow, callosal sulci deep, the calli therefore prominent; hypomeron with usual rugae adjacent to coxa and hind margin, above confusedly punctate and irregularly rugose to with largely uniformly distributed moderately coarse rugae, becoming granulate or alutaceous above.

HEAD. Vertexal calli moderate to prominent, delimiting prominent occipital sulcus; antennal calli impunctate and shiny to punctate and setose, slight to moderately prominent, hardly to moderately depressed behind.

APPENDAGES. LEGS. Typically entirely metallic, with extreme femoral, tibial and tarsomere bases rufous in many specimens; metafemur with prominent, acute tooth, in some females tooth varying to nearly absent, indicated only by obtuse swelling; meso- and metatibia of males with conspicuous tubercle. Some specimens from Oregon and Washington with tarsi and tibiae rufous, and femora apically and broadly at base, rufous. **ANTENNAE.** Typically entirely metallic, some specimens with some apical antennomeres rufous, or antennomeres with extreme bases rufous; some specimens from Oregon and Washington with antennae entirely, save basal segments, rufous; length proportions typical of genus.

ELYTRA. Typically smooth, shiny, uniformly punctulate over much of surface, with few rugae except laterally and apically, but varying to coarsely rugose over much of disc in some specimens; extreme apex without rugae, but alutaceous to shagreened in most females, shiny and punctulate to somewhat alutaceous in males.

PYGIDIUM. Dimorphic sexually, as detailed below; entirely metallic in most specimens, but some specimens from Oregon and Washington entirely rufous to with small dark area.

MALES. Pygidium deeply emarginate; meso- and metatibia with tubercle; median lobe with single ventral carina. Endophallus with BSB short, of one piece; ELD sinuate (lateral view), elongate, apically very slender; PDS slender, longer than BSB, fused with MEG to form elongate C-shaped structure; MEG very slender, elongate, protruding from long membranous lobes of PDS, and nearly attaining apex of ELDs.

FEMALES. Pygidium shallowly emarginate, appearing bilobed; ventral valve of ovipositor subapically parallel, tapering to acute apex, margins very finely serrulate (unless worn); dorsal valve apically pointed in most specimens, without median line.

SEXUAL DIMORPHISM. Specimens of _P._ _nitida_ are dimorphic in size, depth of pygidial emargination and pronotal sculpture and punctation. Females have coarse scattered punctures and more distinct and uniformly distributed alutaceous to shagreened microsculpture on disc; males have finer punctation, most specimens with alutaceousness confined to median area about midline, the meshes in many specimens longitudinal and elongate. Pygidial emargination is detailed above. In addition, females show a range of metafemoral tooth size, while males have a metafemoral tooth of rather uniform size. Most females have elytral apex alutaceous to shagreened; males are shiny and punctulate at extreme elytral apex, with at most a little alutaceousness. Females show a wider range of colouration than males, which are mostly dark purple, and only a few specimens are blue or green.

VARIATION. Specimens of P. nitida vary in sexual characters in a way that is typical of the genus: size and colour, amount of pronotal microsculpture and rugosity of elytra, but some series from Oregon and Washington are rather atypical of the species. Most specimens of the species have entirely dark appendages, but some specimens from these areas have antennae nearly entirely rufous, varying to bicoloured antennomeres, tibiae and tarsi entirely rufous, femora rufous apically and broadly at base, and pygidium almost entirely rufous. Otherwise, the species is rather uniform in darkness of appendages, with some variation in metafemoral tooth size (especially females), and distinctness of alutaceous microsculpture in both sexes.

NATURAL HISTORY. Most host records are typical of the genus, including Carex, Scirpus, and Eleocharis as plants from which P. nitida is collected. Some more specific records are Carex microcarpus Pers. and S. macrocarpus; several records such as Juncus ("sweep Scirpus and Juncus") and "yellow Arum" may represent actual food plants. Caltha palustris L.

("marsh marigold") is frequently recorded, this commonly a host of several Palaearctic species. A variety of other "host records" also accompanied specimens: "ex Smilacina et al", "sweep Sparganium", "on Smilacina stellata (L.) Desf. and Iris missouriensis" Nutt. with records such as Picea mariana, "Ranunculus and weeds", Viburnum trilobum Marsh., Cornus stolonifera Michx., Veratrum californicum Durand, Eriogonum, Pinus ponderosa, "spikes of Mayola flowers", "beaten from fir", "on hellebore", Salix, "on skunk cabbage" and "ex pond lily fls" constituing a wide variety of adventious records. From the dates several records, the species may overwinter in the adult stage at least, as would be typical of other members of the genus: "under trash" (Nov.1, Oregon), "sift fern + grass litter in spring" (May 13, Oregon).

DISTRIBUTION. Plateumaris nitida is a transcontinentally distributed species, in the west from southern California north to southern Northwest Territories, and in the east from Virginia (state record) north to Labrador (Fig. 258).

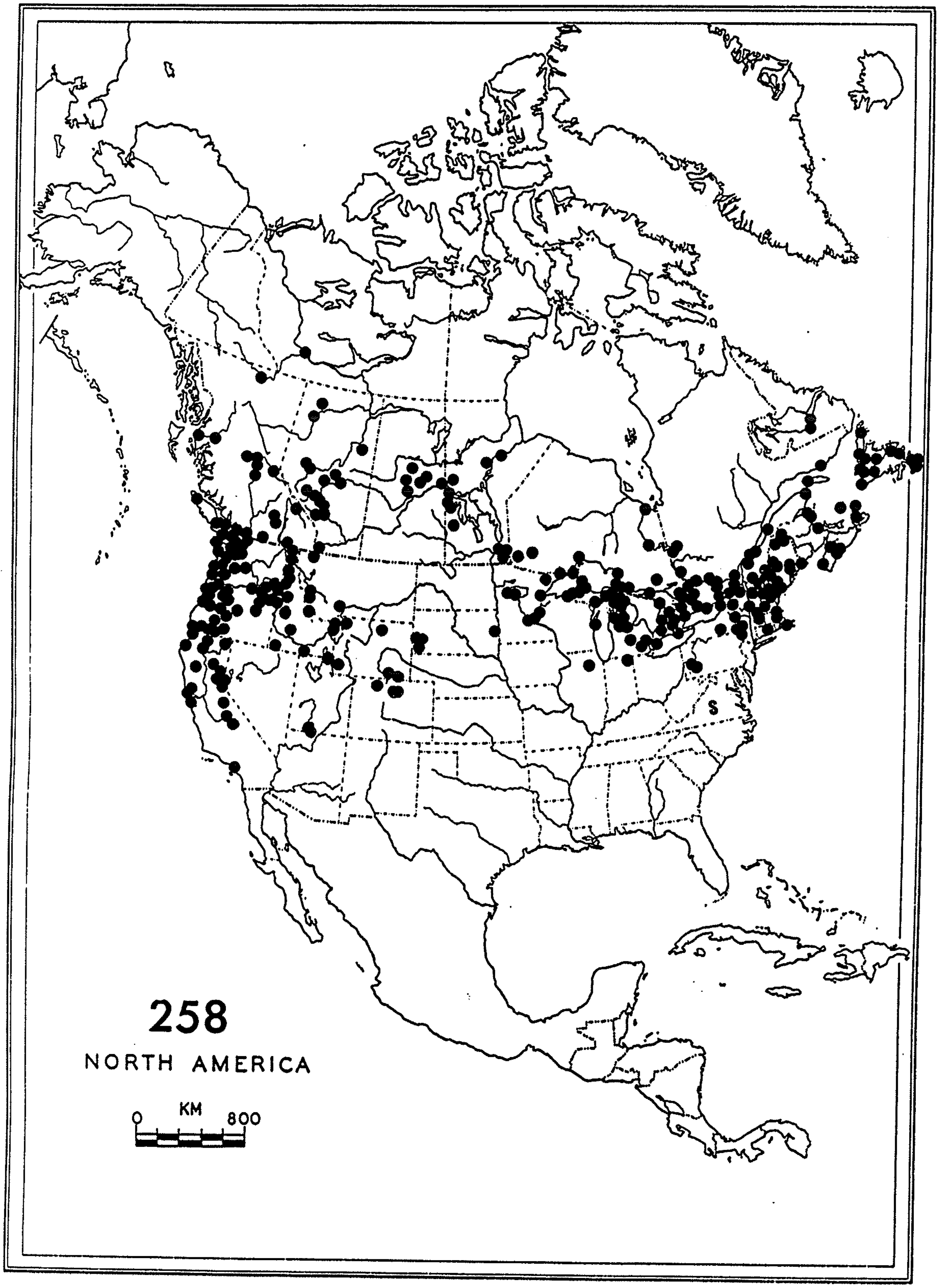
CHOROLOGICAL RELATIONS. Plateumaris nitida is fully sympatric with all other Nearctic members of the genus, and overlaps the entire distribution of its sister species, P. frosti, which is almost entirely restricted to eastern North America. These two Nearctic species are the sister group to two Palaearctic species, the Transpalaearctic P. sericea, and P. shirahatai, known only from Japan.

PHYLOGENETIC RELATIONS. Plateumaris nitida appears to be most closely related to the North American species P. frosti, from which some specimens are difficult to separate. This species pair is most closely related to the Palaearctic species pair of P. sericea and P. shirahatai. Including three other Nearctic species, these form a group that is defined by entirely metallic appendages and robust metafemoral tooth, which I call the _P_. _nitida_-Group. These species together are most closely related to a group of exclusively Nearctic species, the _P_. _chalcea_-Group (four species).

Plateumaris _primaeva_ (Wickham), described from the Early Oligocene Florissant shales of Colorado, was restudied by Askevold (1990). It was assessed as indistinguishable from _P_. _nitida_, representing either an extinct ancestor to _P_. _nitida_, or the same species.

SPECIMENS EXAMINED. 4692 males and females, excluding types. See Appendix 10.3 for detailed list of locality data from these specimens. Prior to returning most of these specimens to their respective collections, I had not yet examined Germar's type of _P_. _nitida_. Therefore, most of these specimens will bear my determination label that reads "_Plateumaris_ _emarginata_ (Kirby) 1837..."; it should be known that these specimens are now correctly named _P_. _nitida_ (Germar). I have examined specimens from the following provinces and states: CANADA: AB, BC, LB, MB, NB, NF, NWT, NS, ON, PEI, PQ, SK; UNITED STATES: CA, CO, CT, ID, IL, IN, ME, MA, MI, MN, NV, MT, NH, NY, OR, PA, RI, SD, UT, VT, VI, WA, WI, WY.

FIGURE 258. Known distribution in North America of *Plateumaris nitida* (Kirby), from specimens examined. Each dot represents one collection record, or a group of very close records. S = state record.


258
NORTH AMERICA
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Plateumaris frosti (Schaeffer, 1925) NEW STATUS.

Figures 34-36, 73, 74, 105, 142, 143, 155, 203, 204, 230, 236, 259.

Donacia emarginata var. *frosti* Schaeffer (1925:136).
Plateumaris emarginata var. *frosti*: Jolivet (1970:58).

TYPE SPECIMENS. HOLOTYPE o^, USNM: "Framingham Mass, Donacia emarginata var. frosti Schffr., Brooklyn Mus. Colln 1929, USNM Type #42395 [red]", ♀ allotype #42395 USNM, and 28 paratypes USNM, and MCZ.

TYPE LOCALITY. Framingham, Massachussetts, as stated by Schaeffer.

ETYMOLOGY. Named after C. A. Frost, who collected in the environs of Framingham.

TAXONOMIC HISTORY. Schaeffer described *P. frosti* as a variety (subspecies) of *P. emarginata* (Kirby) (now = *P. nitida*), to which it bears considerable resemblance. Wilcox (1954) did not discern this taxon, which was probably included in his concept of *P. emarginata*.

DIAGNOSIS. Specimens of *P. frosti* are recognized by the broad, acute, and thin metafemoral tooth, more or less entirely metallic appendages, deeply emarginate pygidium in both sexes, and medial surface of pronotal disc (especially in males) broadly depressed and not alutaceous.

COMPARISONS. Specimens of *P. frosti* could be confused with those of other species that have entirely dark or metallic appendages: *P. nitida*, *P. balli*, *P. notmani*, and some specimens of *P. fulvipes*. From specimens of *P. nitida*, those of *P. frosti* are easily distinguished by the more prominent and bladelike metafemoral tooth, broadly depressed median area of pronotal disc, and lack of alutaceous or shagreened microsculpture (especially females of *P. nitida*) on disc. Some specimens of *P. fulvipes* have appendages entirely dark or metallic, and are similar to those of

P. frosti in metafemoral tooth size. However, females of P. fulvipes are easily distinguished by the rounded pygidial apex, with a conspicuous notch; specimens of P. frosti have the pygidium broadly and deeply emarginate (both sexes). Most specimens of P. frosti have the pygidium entirely metallic, whereas that of specimens of P. fulvipes is largely rufous (varies). Elytra of specimens of P. fulvipes are generally densely punctulate and rugose, while elytra of specimens of P. frosti are shiny, sparsely punctulate and rugose only laterally and apically. From specimens of P. notmani, those of P. frosti are most easily distinguished by the more prominent metafemoral tooth, and the differing forms of the pygidium and ovipositor: the pygidium of specimens of P. notmani is rounded apically in females, truncate in males; the ovipositor specimens of P. notmani is narrow, only 0.47 - 0.52 mm wide, and subapically explanate, this in specimens of P. frosti more or less with parallel sides; in addition, males of P. notmani lack tibial tubercle of both meso- and metatibia. Like specimens of P. frosti, those of P. balli have an emarginate pygidium in both sexes, entirely metallic appendages, and lack pronotal alutaceousness. However, specimens of P. balli have more prominent antennal calli, less deeply emarginate pygidium, smaller metafemoral tooth, pronotum not broadly shallowly furrowed medially, apical antennomeres rufous, and all known specimens are entirely green.

DESCRIPTION.

LENGTH. Males: 7.21-8.31 mm, females: 8.10-9.39 mm

COLOUR. Most males bluish or purplish-blue, some green or greenish-blue, females coppery, red, green, some blue or purplish-blue; femora and tibiae rufous at most at extreme base, tarsi metallic to rufous, pygidium metallic to rufous, antennomeres entirely metallic to with basal half rufous, apical antennomeres more broadly rufous.

PRONOTUM. Disc more or less shiny, confusedly punctate and punctulate, these somewhat irregularly confluent medially in most specimens, some specimens with inconspicuous and small areas of shagreening; in most specimens (males) medial area broadly depressed, therefore sublaterally appearing swollen, females flat to depressed medially; median line fine, more or less irregular, basal sulcus moderate, callosal sulci well developed; hypomeron longitudinally rugose.

HEAD. Antennal and vertexal calli weak, occipital sulcus evident, but not prominent in most specimens.

APPENDAGES. LEGS. Metallic, femora and tibiae reddish at most at extreme bases, tarsi metallic to rufous; metafemur with tooth broad, acute, slender, blade-like bilaterally constricted at its bases and therefore markedly set off from femoral curvature; meso- and metatibia of males with distinct, small tubercle. **ANTENNAE.** More or less metallic, each antennomere rufous at base in many specimens, apical antennomeres largely reddish on underside; antennomere proportions typical of genus.

ELYTRA. Interstriae punctulate, moderately transversely rugose on disc to not at all, more densely so laterally; antemedian depression prominent, postmedian shallow but evident.

PYGIDIUM. Slightly dimorphic sexually, as detailed below; metallic to largely rufous.

MALES. Pygidium broadly, moderately to deeply, emarginate; meso- and metatibia with small tubercle; median lobe emarginate subapically (lateral view), with single ventral carina below; endophallus with ELDs broad, rounded, of more or less uniform width, MEG slender, extending only to apex of large membranous lobe, this only extending two thirds the ELD length, BSB simple, lacking basal part.

FEMALES. Pygidium deeply, more or less angulately emarginate, appearing bilobed; ventral valve of ovipositor slender, parallel, tapering gradually to acute apex, dorsal valve pointed apically, without median line.

SEXUAL DIMORPHISM. Size, pygidial shape, colour.

VARIATION. Specimens of *Plateumaris frosti* vary in size, somewhat in elytral punctulation and amount of rugosity, prominence of medial pronotal depression, and colour of pygidium, tarsi, and presence of rufous tinge basally on tibiae, femora, and antennomeres.

NATURAL HISTORY. All collections I have made of *P. frosti* are from Cyperaceae, typical of the genus generally and in company of a number of other species of *Plateumaris*; one specific host record is from *Carex stricta* Lam. Records from *Caltha palustris* and *Peltandra virginica* (L.) Kunth are probably adventitious.

DISTRIBUTION. *Plateumaris frosti* is known to occur broadly in North America, in the east north of about 38°N, extending west to British Columbia, largely exclusive of the prairies, in the west as far south as northern Utah, north to southern Northwest Territories. A single, possibly mislabelled locality record is from California (Fig. 259).

CHOROLOGICAL RELATIONS. *Plateumaris frosti* occurs widely with most other North American members of *Plateumaris*, generally also sympatrically with *P. nitida*, these two sister taxa often mixed in series.

PHYLOGENETIC RELATIONS. *Plateumaris frosti* is evidently most closely related to *P. nitida*, possessing the same sexual characters and very similar endophallic structure; they are hypothesized to be sister species. See discussion of P. nitida for further details of relationship to other members of the P. nitida-Group.

SPECIMENS EXAMINED: 919 males and females, excluding primary types. I have examined specimens from the following provinces and states: CANADA: AB, BC, MB, NB, NWT, NS, ON, PQ, SK; UNITED STATES: CA, CT, IL, IN, ME, MA, MI, MN, MT, NH, NJ, NY, ND, OH, PA, RI, UT, WI. Detailed locality data from specimens examined are as follows:

CANADA. ALBERTA: Beaver Mines Lake, 17-20.1987, C & A v.Nidek (CVNC 1); Busby, 9.6 km.W., 13.vi.1982, Carex & Eleocharis, IS Askevold (ISAC 21); Chipman, 19.vi.1922, FS Carr (UAE 1); Crestomere, 8 km.W. on Hwy. #53, 26.vi.1982, sweep Carex, IS Askevold (ISAC 1); Edmonton [all FS Carr coll.], 9.vi.1918 (UAE 4,CUIC 1, CAS 11,MCZ 2,AMNH 2), 7.vi.1918 (EGRC 1,MCZ 2), 14.vi.1918 (UAE 4,CAS 3), 15.vi.15 (UAE 1), 20.vi.18 (UAE 2,CAS 2), 18.vi.18 (UAE 1,CAS 2,MCZ 2), 13.vi.1917 (CAS 1), 15.vi.1918 (UAE 1), vi.8 (MCZ 3), 23.vi.1917 (CNC 3,MCZ 3), 31.v.85, BF & JL Carr (CARR 1); Elk Island Nat. Park, 14.v.1980, E Maw (ISAC 1); George Lake, 53°54'N, 114°06'W., 15.vi.1982, Carex/Eleocharis, IS Askevold (ISAC 32); Rivière Que Barre, 7.4 km.S., 15.vi.1982, Carex, IS Askevold (ISAC 3); Seba Beach, 5.4. km.S., Hwy. #759, 20.vi.1982, Carex & Typha, IS Askevold (ISAC 1); Tp. 24, Rge. W5, 4.vi.1961, Brimley (CNC 1); 30 km. W. Turner Valley, 7.vi.1987, C & A v.Nidek (CVNC 4); Vilna, 14.vi.1922, FS Carr (UAE 1); Waterton, 11.vi.1930, FS Carr (UAE 1).

BRITISH COLUMBIA: Springhouse (Caribou), 4.vii.1962, GGE Scudder (UBC 2).

MANITOBA: Aweme, 29.vii.1924, JB Wallis (GJHC 1), 10.vi.1905, E Criddle (UAE 2,MCZ 1), 10.vi.1909, E Criddle (JBWM 3), 10.vi.1906, E Criddle

(USNM 1), vi.3.09, E Criddle (MCZ 3), vi.10 (MCZ 2), 7.vi.04, E Criddle (MCZ 1), 13.vi.04, Criddle (AMNH 1); Brokenhead River, 20 km.E. of Anola, Hwy. #15, 7.vi.1984, *Carex*, IS Askevold (ISAC 3), 31.v.1984, *Carex*, IS Askevold (ISAC 3), 6.vi.1984, *Carex*, DA Pollock (JBWM 1), 30.May.1985, IS Askevold (ISAC 16); Duck Mtn. Prov. Park, Little Beaver Lake, 57°46', 100°53', June.19-24.81, Ashworth, Keller & Schwert (ASCR 2), 5 mi. N. Wellman L. Cpgd., June.19-24.81, Ashworth, Keller & Schwert (ASRC 1); 9 km.S. East Braintree, 6.May.1987, Roughley & Beutel (JBWM 1); Gimli, 19.vi.1923, AJ Hunter (JBWM 1); Glen Souris, 5.vi.1923, N Criddle (CNC 1); Grass River Prov. Pk., 16 km. W. Iskwasum L., 54°38', 101°00', 25-30.81, Ashworth, Schwert & Keller (ASRC 1); Husavik, 9.vii.17, LA Roberts (JBWM 3); Labarrière Pk., Winnipeg, 10.vi.1984, *Carex*, IS Askevold (ISAC 2); Molson, 10 km.SE., June.10.1984, Scrapnecks (ISAC 11), Portage, 22.v.1978, TD Galloway (JBWM 1); crk., b/n Red Deer River & Overflowing R., Hwy. #10, 19.vi.1984, DA Pollock (JBWM 2); Rembrant, v.21 (CAS 2,CNC 1); Selkirk, 10 km.SE., Scrapnecks (ISAC 1); Treesbank, Assiniboine R., 18.vi.1958, CDF Miller (CNC 1); Winnipeg, 13.vi.1926, JB Wallis (CNC 1).

NEW BRUNSWICK: Bathhurst, vi.15, JN Knull (CAS 1).

NORTHWEST TERRITORIES: Rabbitskin R., 23 mi.SE. Ft. Simpson, 12.vi.1972, A Smetana (CNC 1).

NOVA SCOTIA: Tatamagouche, 17.vi.1941, FH Chermock (CAS 1).

ONTARIO: "Alg. Park", 23.vi.1961, T van Quynh (UGIC 11); Arkell, 6.vi.1956, DH Pengelly (UGIC 1); Cedarvale (Toronto), 4.v.25, CE Hope (UNH 2), 2,3.vi.1925, CE Hope (ROMC 6); Coldstream, 22.v.22, AA Wood (CNC 1); Guelph, 23.v.1978, N Pierce (UGIC 1), 28.v.1979, KL Runciman, (UGIC 2), 22.vi.1950, LL Pechuman (CUIC 2); Kearney, 7.9.09, MC Van

Duzee (CAS 1); sm. pond opp. Kenny Lake, Algoma Dist., vii.72, AC Ashworth (ASRC 2); Kingsville, v.31.09 (MSUE 1); L. Severn, H. Klages Colln (CMP 1); Marmora, 23.v.1952, JR McGillis (CNC 1); Perth, 5.ix.49 (CNC 1); Rainy R. District, 4,7.vii.1924, Brimely (CNC 5,INHS 2); Reddit (N. of Kenora), June.11.983, Scrapneck (ISAC 1); Ridgeway, Liebeck colln (MCZ 1); Turkey Point, 6.vi.1956, WJ Brown (CNC 1).

QUEBEC: Kazubazua, 6-10.vi.1927, WJ Brown (CNC 1); Parc Gatineau, Lac Ramsey, 10.vi.1982, L LeSage (CNC 1).

SASKATCHEWAN: Attons Lake, Cut Knife, 3.vi.1940, AR Brooks (CNC 1); Indian Head, 22.vi.1926, E Hearle (CNC 2); McDougal Cr., at Hwy. #120, 31.v.1977, DH Smith (SPMC 2); Tp.56, Rge.27, W. 2 Mer., 21.vi.1985, BJ & JL Carr (CARR 7).

UNITED STATES. CALIFORNIA: Placer Co.: County Record, no date, EC V.Duzee (MCZ 1).

CONNECTICUT: Litchfield Co.: Cornwall (all KF Chamberlain, coll), 14.6.1920 (CNC 3), 20.iii.1921 (CUIC 1), 28.iv.1921 (CUIC 1), 23.v.1925 (CUIC 3), 28.v.1920 (CUIC 3), 28.v.1920 (UAE 2,CUIC 2), 1.vi.1920 (UAE 4,CAS 4), 9.vi.1920 (CAS 4), vi.7.25, LB Woodruff (AMNH 3); **New Haven Co.:** New Haven, June.1932, H Hunting (PMY 1), v.15.1911, Champlain (MCZ 1); South Meriden, 1.v.1913 (UAE 1), v.24.1914 (CNC 1), 4.17.1913, H Johnson (CDAS 1), v.16, H Johnson (USNM 1); **New London Co.:** Lyme, 20.v.1918, WJ Fisher (USNM 1); Groton, 2.6.48, A. Jansson (UZIL 2), 25.5.48, A. Jansson (UZIL 2); **Tolland Co.:** Mansfield, 30.x.1962, BS Roza (UCS 1); Storrs, 14.v.195?, D Stony (UCS 1), 18.v.1949, D Klein (UCSE 1), 1929, FM Riley (FMNH 1); Willington, 26.May.1982, DG Furth (PMY 1).

ILLINOIS: **Cook Co.:** Beverly Hills, Chg. v.21.11, E Liljeblad (MCZ 1); **McHenry Co.:** Algonquin, no date (INHS 2); **Miscellaneous material:** "N. Ill." (NDSU 1), "Illinois" (SMF 1), "Ill." (INHS 2).

INDIANA: **Lake Co.:** County Records, 15.v.1900, WSB (PUL 3), 15.vi.1900, WSB (PURC 3); **Wayne Co.:** Richmond, no date, FH Simonds (CUIC 2); **Localities not found:** Hessville, 30.v.15, E Liljeblad (UMMA 1); Osborn, 31.v.1909, E Liljeblad (UMMA 4);

MAINE: **Cumberland Co.:** Portland, 7.9.09, Van Duzee (CAS 1); **Hancock Co.:** Bar Harbor, 8.vi.34, AE Brower (CAS 1); **Kennebec Co.:** Monmouth, vi.21.09, CA Frost (MCZ 1); **Oxford Co.:** Bethel, 20.vi.24, JG Gehring (MCZ 2), Norway, 1864-65, SI Smith (AMNH 3); **Penobscot Co.:** Passadumkeag, 11.vi.1939, LP Grey (CAS 1).

MASSACHUSSETTS: **Bristol Co.:** Berkley, vi.10.39, NS Easton (MCZ 1); Fall River, iv.23.10, NS Easton (MCZ 1), vi.14.35, NS Easton (MCZ 1); New Bedford, June.10, GN Hough (FMNH 1); Westport, vi.3.'08, NS Easton (MCZ 1); **Essex Co.:** Lawrence, 26.v.1923, EW Mank (CUIC 5), 14.vi.1926, EW Mank (CUIC 1); Nahant, vi.3.1925, Darlington (MCZ 1); **Hampden Co.:** Chicopee, 5.27.82 (MCZ 3); Springfield, no date, G Dimmock (MCZ 2), 21.v.1903, on <u>Carex stricta</u>, F Knab (USNM 5); Wales, 18.v.07, CA Frost (UAE 3), vi.13.09, CA Frost (MCZ 1), vi.18.06, CA Frost (MCZ 1); **Hampshire Co.:** Cummington, May.30.1903, F Knab (AMNH 2,USNM 2); **Middlesex Co.:** Arlington, vii.1914, H Klages colln (CMP 1), iii.20,22,25.1924 (MCZ 3), iv.5.24 (MCZ 1); Ashland, 28.v.1926, CA Frost (SMF 4), 6.10.49, CA Frost (AMNH 1), 13.x.1924, CA Frost (CNC 1), 19.vi.1926, CA Frost (CAS 3); Billerica, vi.8.1924, CA Frost (MCZ 5); Cambridge, no date (CMP 1,MCZ 2,INHS 1), Jan.1874, GR Crotch (MCZ 2), v.18.1923 (MCZ 1), vi.3.1923, JG Gehring (MCZ 1); Framingham [all CA

Frost], no date (MCZ 1), 26.iv.1944 (CUIC 1), 31.iv.1947 (UAE 1), v. (UADB 1,DEFW 1), v.19.06 (FMNH 1) 3.v.1948 (CUIC 1), v.16.09 (MCZ 1),18.v.1925 (UMMA 1), 21.v.1911 (CUIC 2), v.19.1923, in coitu, Carex flowers (MCZ 2), 26.v.1944 (CNC 1), v.26.1938 (MCZ 1), v.23.08 (MCZ 2), 24.v.1944 (CNC 1), v.24.24 (UAE 1), 1.vi.1912 (UAE 1), vi. (BMNH 1), 7.vi.1924 (CUIC 4,AMNH 4,FMNH 5), 13.vi.1926 (SDNH 2,UMMA 1), May.1919 (INHS 1); Hopkinton, 29.v.1947 (UMMA 2); Lexington, v.29.1926, Darlington (MCZ 1), 6.7.'21 (RUNB 1), 5.28.20 (RUNB 3); Natick [all CA Frost], v.18.49 (CDAS 1), 5.18.48 (AMNH 2), v.22.1932 (DEUN 4), 20.v.26 (CUIC 2), 30.v.26 (CAS 4), 28.v.1926 (OSUC 4), 28.v.1944 (CUIC 1), 22.v.'30 (CAS 4), 4.vi.1947 (UCR 1), v.23.50 (NMDC 1); Sherborn [all CA Frost], no date (MZCZ 7), v. (DEFW 2), 23.v.1925 (UMMA 1), 25.v.1924 (CAS 1), v.30.1924 (FMNH 4), v.30.1928, (SDNH 3), v.9.1946 "sifting" (NMDC 1), 30.v.1925 (MCZ 2,UAE 4), 4.vi.1922 (CAS 1), v.30.1926 (MCZ 1,FMNH 2), v.25.1946 (MCZ 1), v.25.1923 (MCZ 1), vi.13.1926 (MCZ 2), xi.6.50 (MCZ 1), xi.7.1926, "sifting" (MCZ 1), xi.18.1928 "sifting" (INHS 1); Tyngs [=Tyngsboro?], no date (MCZ 12,USNM 1), 6.1.72 Blanchard coll (MCZ 2), 6.12.87 (MCZ 1); Wayland, June.6.'31, JP Bill (UCS 1), vi.8.1930 (MTSU 4); Wilmington, 28.v.1920, KW Babcock (UMMA 1); **Norfolk Co.:** Brookline, no date (CMP 1,MCZ 2); Millis, 15.xi.1937, HH Richardson (USNM 1); Walpole, v.26, EM Mank (CUIC 2); **Plymouth Co.:** Humarook, May.16.1932, CE White (MCZ 1); **Suffolk Co.:** Dorchester, 17.vi.1907 (UADB 1), 15.Jun.1898 (MCZ 1), 31.v.08, PG Bolster (MCZ 3), Apr.13.1902, PG Bolster (BMNH 1); Revere, June.4.1933 (MCZ 1); W. Roxbury, May.15.1921, PG Bolster (MCZ 1); **Worchester Co.:** Southboro [all CA Frost], 21.v.1922 (CAS 1), 30.v.1923 (CNC 1,ROMC 1), v.5.21 (UADB 1), May.28.1938 (AMNH 1), vi.6.1925 (AMNH 2), v.17.08, LR

Reynolds (FMNH 1); W. Southboro, v. (BMNH 1); Worchester, no date (MZCZ 8); **Localities not found:** Mt. Tom. St. Pk., vi.4.1946, AR Lewis (UNH 1); **Miscellaneous material:** "Mass." (CAS 7, CUIC 1,MCZ 7,AMNH 1,INHS 1); "Massach." (CUCC 1).

MICHIGAN: **Alcona Co.:** County Record, vi.2.51, RR Dreisbach (AMNH 1); **Arenak Co.:** Saganing, Saganing Riv., May.21.1936, Frison & Ross (INHS 1); **Chippewa Co.:** White Fish Point, LS, no date (MCZ 2); County Record, 6.3.57, RR Dreisbach (AMNH 1); Clare Co.: County Record, v.16.51, RR Dreisbach (MSUE 1), 7.8.50, RR Dreisbach (MSUC 1); **Clinton Co.:** Bath, 30.v.1963, RA Scheiber (AMNH 1,MSUE 4); Rose Lake, WES, 18.May.1964, RW Matthews (MSUE 1); T5N, R4W, Sec.14, May.29.1967, RJ Marbinat (MSUE 1); **Crawford Co.:** Higgins lake, summer 1932, G Kelker (UMMA 1); **Delta Co.:** Escanaba, June.27.1958, RA Scheibner (MSUE 1); **Gladwin Co.:** County Record, 6.4.49, RR Dreisbach (MSUE 2,UMMA 2), 6.3.49, RR Dreisbach (MSUC 1), v.24.59, RR Dreisbach (MSUC 1); **Ingham Co.:** East Lansing, May.30.1957, W Van Velzen (MSUE 1); T4N R1W Sec.27, 29.v.1971, SG Wellso (MSUE 1); **Ionia Co.:** Belding, 4.June.1925, LG Gentner (MSUE 1); **Iosco Co.:** County Record, 30.v.1951, RR Dreisbach (UMMA 1); **Isabella Co.:** County Record, 6.7.58, R & K Dreisbach (AMNH 1); **Lapeer Co.:** County Record, v.30.51, RR Dreisbach (UMMA 1), v.30.52, RR Dreisbach (MSUE 1); **Livingston Co.:** E.S. George Reserve, 24.v.1942, G Steyskal (CNC 1), E.S. George Res., Pinckney, 6.8.42, B Summerville (AMNH 2); Greenoak twp., 23.v.1920, MH Hatch (OSUC 1); Rushton, 19.v.1946, G Steyskal (UCR 1); **Mackinac Co.:** St. Ignace, 30.v.1922, S Moore (UMMA 2); **Macomb Co.:** E. of Memphis, 7.v.1966, C Brivio (PIME 1), 19.v.1972, C Brivio (PIME 1), 7.vi.1966, C Brivio (PIME 1); **Midland Co.:** County Records, 5.15.45, RR Dreisbach (MSUE 1), 5.21.45, RR Dreisbach (MSUC

4), 6.1.50, RR Dreisbach (MSUC 1); **Oakland Co.:** Bloomfield C., 30.v.1915, WS McAlpine (UMMA 1), 11.v.1930, S Moore (UMMZ 1); Kensington Park, 13.v.1981, C Brivio (PIME 3), 20.v.1981, C Brivio (PIME 2), 27.v.1980, C Brivio (PIME 2), 4.vi.1981, C Brivio (PIME 4); Milford, 21.v.1922, TH Hubbel (UMMA 1); County Record, 30.v.1936, AW Andrews (UMMA 1); **Ontonagon Co.:** Bruce Crossing, 5 mi.N., 23.June.1964, RB Willson (MSUE 1); **Osceola Co.:** County Records, 5.23.55, RR Dreisbach (AMNH 1,MSUE 2), 6.4.49, RR Dreisbach (MSC 1), no date (FMNH 1); **Shiawassee Co.:** County Record, 30.May.1963 (MSUE 2); **Tuscola Co.:** County Record, 30.v.1952, RR Dreisbach (UMMA 1); **Washtenaw Co.:** Ann Arbor, 20.v.1928, W Clanton (UMMA 1), 16.v.1931, (UMMZ 1), 18.vii.'19 (UMMA 1); Ann Arbor, Barton Marsh, 22.v.1919m, TH Hubbell (UMMA 1); Cavanaugh, 24.v.1919, TH Hubbell (UMMA 1); Kavanaugh Lake, 30.v.1919, "marsh-grass", MH Hatch (OSUC 6,UMMA 7); Lima twp., 22.v.1920, MH Hatch (UMMA 2); Pittsfield twp., 25.v.1919, MH Hatch (UMMA 1); Sylvan Road, 24.v.1919, RF Hussey (UMMA 1); Sylvan twp., 30.v.1920, MH Hatch (OSUC 2,UMMA 1); County Records, 5.1.1955, RW Thorp (MCZ 1), 16.v.1931 (UMMA 1); **Wayne Co.:** Detroit, 15.v.09, van Dyke colln (CAS 7), 21.v.05, van Dyke colln (CAS 1), 30.v.09, (UMMA 4), 17.vi.07 (UMMZ 1), 9.vii.08 (UMMZ 1), 17.v.08 (MSUE 2,AMNH 3,WEEM 1,UMMA 2), 29.v.08 (UMMZ 1), 31.v.06 (UMMZ 1), 21.v.05 (WEEM 3), 25.v.08 (UADB 4), v.21.,vi.19, Liebeck colln (MCZ 2), v.30.09 (MCZ 7), May.25.1910 (MCZ 2); **Wexford Co.:** County Record, 14.iv.1957, RR Dreisbach (UMMA 1).

MINNESOTA: Clearwater Co.: Itasca St. Park,5.vii.79, K Junge (ASRC 1), June.23.1960, A Raske (CNC 1), June.20.1958, R Gunderson (SCSU 1), June.24.1968, R Gunderson (SCSU 2), vi.23.68 (R Gunderson (SCSU 1), vii.2.68, R Gunderson (SCSU 1), 20.vi.1957, FW Stehr (DEFW 2), 28.v.1939, CY Lin (DEFW 3); **Crow Wing Co.:** Jenkins, 22.v.52, "flowers, Caltha palustris," RL Fischer (DEFW 7); **Kanabec Co.:** Mora, 15.vi.1907, RA Vickery (USNM 4,AMNH 1); **Lake Co.:** 5 mi.E. Isabella, 7.1.1979, R Gunderson (SCSU 3); **Mille Lacs Co.:** Kathio St. Pk., 11.10.1977, R Gunderson (SCSU 2); **Pine Co.:** mouth, Snake River, 29.v.1951, R Namba (DEFW 3); **Saint Louis Co.:** Duluth, no date (INHS 1,LACM 1); **Sherburne Co.:** 28.x.1967, "pitfall trap in oak woods", W Hansen (SCSU 1); **Stearns Co.:** 2 mi.SE. Collegeville, 2.25.1980, R Gunderson (SCSU 2); St. Cloud, Sept.23.1975 (SCSU 1); **Wahnomen Co.:** 9 mi.W. Waubun, 1.vii.1958, LR Abra (DEFW 3).

MONTANA: **Carbon Co.:** E. Rosebud Lake, 12.vi.1961, B Vogel (UCM 56).

NEW HAMPSHIRE: **Cheshire Co.:** Jaffrey, 12.vi.26, BE White (CAS 1); **Coos Co.:** Bretton Woods, 6.30.09, Van Duzee (CAS 1); Mt. Washington, 7/8/99. Blanchard colln (MCZ 1); White Mtns., Alpine, no date, Blanchard colln (MCZ 1); **Merrimack Co.:** Franklin, 6.25.22 (RUNB 2); **Rockingham Co.:** Hampton, vi.5.1934, SA Shaw (UNH 3), 1.20.1927, SA Shaw (UNHC 1), vi.1.1924, SA Shaw (UNH 1), vi.1.1932, SA Shaw (UNHC 1), vi.10.1934, SA Shaw (UNHC 1); Northwood, iv.21.1982, "sift forest litter", DS Chandler (UNH 2), vi.1.1979, JF Burger (UNH 2); **Strafford Co.:** Dover, 6.3.1936, BG Markos (UNH 1), vi.28.32, BG Markos (UNHC 1); Durham, v.25.1955, WJ Morse (UNH 1), v.30.46, RL Blickle (UNH 1), vi.8.1976, WM Chapley (UNHC 1), no date (UNHC 1); Durham Foss. Fm. Rd. Water Tower, x.23.1946, WJ Morse (UNH 2); 3 mi.E. Durham, x.17.1981, "sift pine litter", DS Chandler (UNH 1); Lee, vi.20.1946, R Blickle (UNH 1); **Sullivan Co.:** Claremont, v.10 (USNM 1).

NEW JERSEY: **Burlington Co.:** Upper Mills, 6/2/50, "on Peltandra virginica", EJF Marx (AMNH 2); **Ocean Co.:** Lakehurst, v.24.1914 (AMNH 1), v.05 (AMNH 2); **Union Co.:** Berkeley Hgts., no date, EA Bischoff (CUIC 1).

NEW YORK: **Chenango Co.:** Bainbridge, Roberts Pond, 18.vi.1964, LL Pechuman (CUIC 3); **Herkimer Co.:** Old Forge, 1.vii.1965, LL Pechuman (CUIC 4); **Orange Co.:** Bear Mtn. St. Pk., Bear Mt., 12.v.1936, LL Pechuman (CUIC 1); **Rockland Co.:** Ramapo, no date, Beutenmüller (CUCC 3); Suffern, 30.v.1899, EG Lane (UCS 2), no date (CAS 2,CUCC 2,AMNH 7); **St. Lawrence Co.:** Rossie, 27.v.73, NM Downie (NMDC 1), 6.15.1965, NM Downie (NMDC 1); **Tompkins Co.:** Ithaca, 22.June.'17 (RUNB 1); Ithaca, Ringwood, 27.v.1919, H Dietrich (CUIC 1); **Localities not found:** Protection, 16.vi.1918, MC van Duzee (CAS 1); **Miscellaneous material:** "N.Y." (CUCC 1), "New York" (PUL 1).

NORTH DAKOTA: **Pembina Co.:** County Record, 26.vi.1967, D Aarhus & W Kotchman (NDSU 9); **Ransom Co.:** County Record, 4.vii.1967, M Alby (NDSU 1); **Rolette Co.:** County Record, 7.2.1967, M Alby (NDSU 2).

OHIO: **Franklin Co.:** Columbus, 5.28.17 (EGRC 1).

PENNSYLVANIA: **Westmoreland Co.:** Jeannette, vi.21, HG Klages (CMP 1), vi.22, HG Klages (CMNH 2); **Pike Co.:** Milford, 30.v-1.vi.1941, B Malkin (FMNH 1).

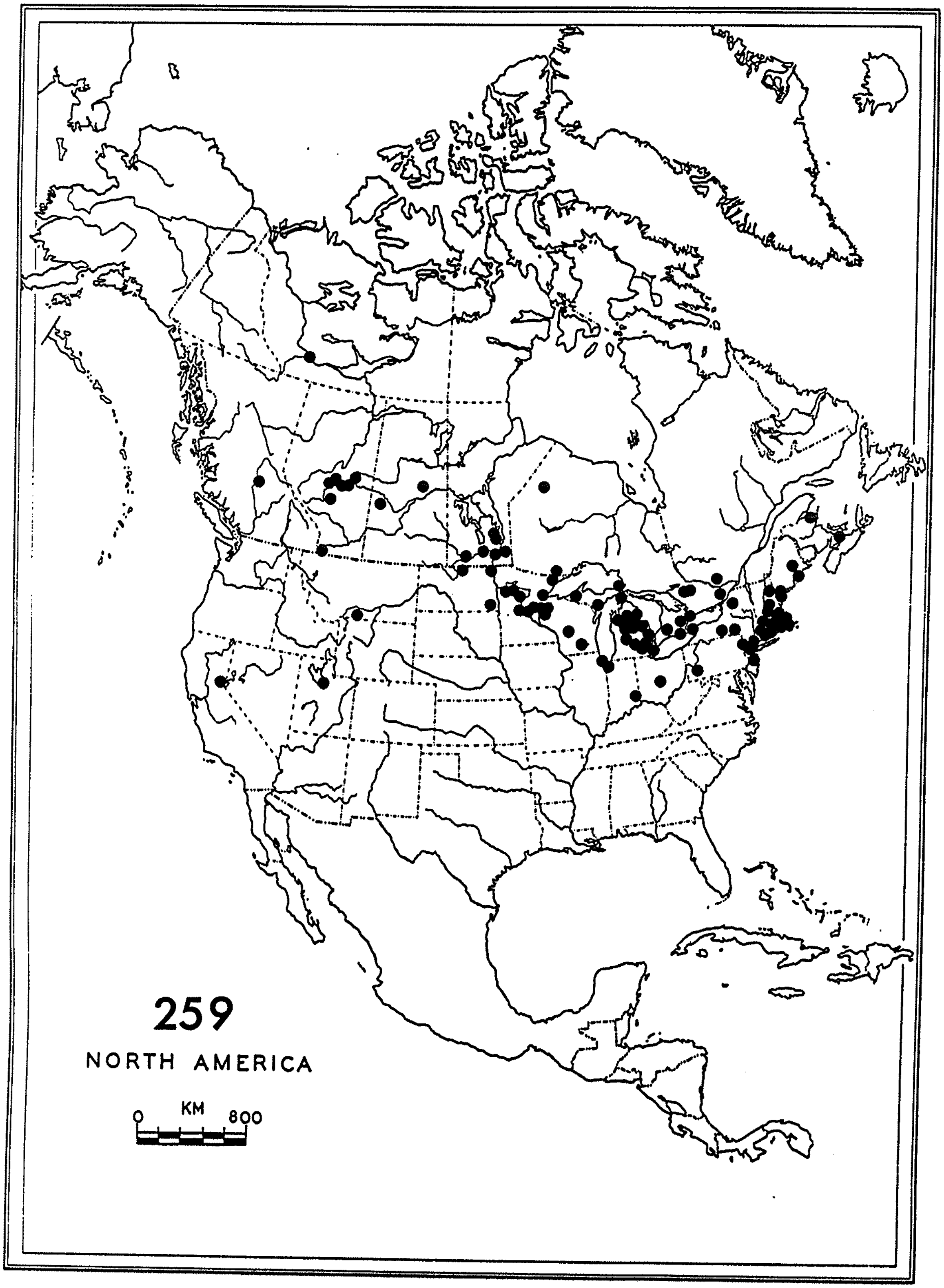
RHODE ISLAND: **Kent Co.:** Warwick, 9.vi.1900, EE Calder (UMMA 1); **Providence Co.:** Chepachet, v.30.22 (PMY 3); Lincoln, v.15.'21, Sanford (MCZ 1); Oaklawn, 23.x.1920 (UMMA 1).

UTAH: **Salt Lake Co.:** S. Lake City, no date, HG Klages colln (CMP 1).

WISCONSIN: **Dane Co.:** County Record, no date (MCZ 1); **Juneau Co.:** Mather, 7.1.30 (UWM 1); **Polk Co.:** Amery, Aug.20.1967, J Martins (UWM

1), 2.vi.1918 (EGRC 1); County Record, 23.ix.1970, "in sawfly cage", J Martins (UWM 1); **Washburn Co.:** Spooner, 6.16.31 (UWM 2); T39N R12W B32, 29.v.1953, RH Jones (EGRC 1); **Miscellaneous material:** "Wis." no dates (NDSU 2, USNM 1, MCZ 2, FMNH 7, RUNB 1, INHS 1).

FIGURE 259. Known distribution in North America of _Plateumaris frosti_ (Schaeffer), from specimens examined. Each dot represents one collection record, or a group of very close records.


259
NORTH AMERICA
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4.2. TAXONOMIC TREATMENT OF PALAEARCTIC TAXA OF *PLATEUMARIS*.

The Palaearctic taxa of *Plateumaris* are in need of systematic revision, but most of this work is not undertaken here. Treatments of the Palaearctic members of *Plateumaris* to date have dealt with either the European fauna (*e.g.* Reitter 1920, Mohr 1966, Gruev and Tomov 1984) or the Japanese fauna (*e.g.* Kimoto 1983, Tominaga and Katsura 1984). A monograph of the Chinese and Korean fauna by Gressitt and Kimoto (1961) does not permit confident assignment of certain names and they used two names that had been placed earlier as synonyms of others [*e.g.*, they used the junior name, *P. annularis* (Reitter), instead of the senior name, *P. roscida* (Weise), even though Goecke (1957) had established their synonymy]. Detailed study of male genitalia of Palaearctic species has been done only by Harusawa (1985) for the Japanese fauna; however, these were not examined in conjunction with study of other Palaearctic taxa to assess their taxonomic status.

As a result of study of Palaearctic taxa of *Plateumaris* available to me, and on the basis of reference to some original descriptions, several taxonomic changes are needed. Of 18 taxa recognized in monographs and catalogues (Jolivet 1970, Borowiec 1984, Tominaga and Katsura 1984), I have examined specimens of 12 taxa; of these 12, I recognize nine as valid on the basis of genitalic structure. A list of these nine species is presented in "Materials" (Section 2.1.2). Each case of synonymization or suggested synonymization is detailed below, within species treatments. This assessment of the Palaearctic species allows me to consider the analysis of phylogenetic relationships of species of *Plateumaris* as encompassing all members of the genus. I base my analysis on this assessment, and henceforth regard hypotheses of phylogeny and geographic history as considering the world fauna.

I referred to the original descriptions of taxa of which I have not examined specimens; these descriptions do not convince me that these taxa are valid. These taxa have not been treated since original description. The characters used in these descriptions were colour of appendages and metafemoral tooth size as the important distinguishing characters, and authors frequently made some comparison to the western Palaearctic taxa of Plateumaris. However, these characters are notoriously variable, and are generally unreliable as species-distinguishing characters. Therefore, I assess the status of taxa I have not yet seen as probable junior synonyms. As a result, the taxa I listed under Plateumaris as unknown taxa (Section 2.1.2) can probably be reduced to none.

Below, I treat the Palaearctic members of Plateumaris in the following manner: (1) a key is presented to the nine species recognize as valid; (2) revised synonymies as proposed, and information about primary type specimens is given if types were examined; (3) a brief taxonomic history, and explanation of modifications to taxonomic status of names accepted; (4) a diagnosis of each taxon recognized as valid; and (5) information on distribution and phylogenetic relations. This treatment parallels somewhat that for the Nearctic members of the genus, omitting details of taxonomic treatment and characterization because these are outside the scope of this work. Taxa are presented in phylogenetic sequence, by species-group, according to results of phylogenetic reconstruction.

4.2.1. Key to adults of Palaearctic species of Plateumaris.

The key to species presented below should be regarded as provisional, for several reasons. I have not examined enough specimens of some species, and it may therefore not account for all variation. Secondly, as is detailed below, I have not examined type specimens of most taxa, and the treatment I give the nine species must not be considered as constituting a systematic revision of the Palaearctic fauna of Plateumaris. However, I have deviated from the characters that have been used traditionally to separate species, using also characters that I think are diagnostic of the taxa I recognize. These are mostly characters that have not been used by previous authors, or at least I describe them differently. I do not key male and female specimens separately.

1.a. Femora with punctures of two distinct sizes on lateral surface, fine (normal) punctures mixed with scattered, large ones, these each with rather long, adpressed seta, and surface distinctly alutaceous; pronotum with anterolateral setiferous tubercle indistinct, surface anterior to setiferous tubercle broadly convex and impunctate, appearing reflexed; pronotal disc flat, uniformly punctured and alutaceous, with median line, basal sulcus, callosal sulci and calli obsolete .... **P. rustica** (Kunze).

b. Femora with punctures of uniform size and surface not alutaceous (except P. braccata and P. consimilis, but not so distinctly); pronotum with anterolateral setiferous tubercle prominent, without convex surface anterior to it, not appearing reflexed; pronotal disc of most specimens more or less convex, punctured or not, alutaceous or not, median line of most specimens present, basal sulcus, callosal sulci and calli of most specimens well developed (except some specimens of P. consimilis and P. constricticollis) .... 2.

2.a. Base of elytron, from humerus to scutellum, densely, finely punctate, in most specimens each puncture with fine seta, like those of pronotum and head; pronotum with disc and hypomeron of most specimens finely pubescent, like head; specimens with head, pronotum and elytra black, at most with faint bluish or purplish metallic sheen .... **P. braccata** (Scopoli).

b. Base of elytron of most specimens not finely punctate from humerus to scutellum, if finely punctate then without setae; pronotum with disc and hypomeron not pubescent (except some specimens of P. consimilis); specimens not black (except some specimens of P. consimilis), but of various metallic colours .... 3.

3.a. Pronotal disc and hypomeron of most specimens uniformly, densely punctate, punctures individually distinct and in many specimens with distinct, short seta, surface of disc of most specimens distinctly alutaceous between punctures, median line obsolete or only slightly indicated in most specimens; tibiae with prominent longitudinal carinae, one dorsally, and one or two (if two then these closely placed to form a furrow) on each of anterior and posterior surfaces that extend to about midlength or more of each tibia; pygidium of female specimens apically rounded and with prominent notch in most specimens (similar to Fig. 18) .... **P. consimilis** (Schrank).

b. Pronotal disc and hypomeron of most specimens punctate or not, but punctures without setae, disc alutaceous or not, median line obsolete to prominent, tibiae with only dorsal carina, anterior and posterior carinae at most slightly indicated at extreme base, the anterior and posterior tibial surfaces therefore convex; pygidium of female specimens rounded or emarginate, without or with notch (only P. roscida) .... 4.

4.a. Legs and antennae entirely metallic, like rest of body, some specimens with base of antennomeres and extreme femoral base rufous; apex of pygidium of most female specimens broadly rounded, some specimens slightly emarginate (as in Figs. 54, 55), and metallic in most specimens; elytron shiny, with relatively few rugae and punctulae (as in Fig. 242); specimens various in colours, including greenish and bronze, but not reddish coppery .... 5.

b. Legs of most specimens largely rufous, some specimens with up to apical half of femur metallic, but tibia and tarsus at most infuscated, not metallic; antennae with base of antennomeres rufous in most specimens, entirely rufous in many specimens, if legs and antennae predominantly metallic, then pygidium rufous and apically emarginate in both sexes; apex of pygidium of female specimens rounded (Japanese species) (similar to Figs. 57, 232) emarginate, or notched, largely rufous in most specimens (similar to Figs. 32, 37, 38, 234); elytron smooth and shiny in most specimens of two Japanese species, these reddish-coppery in colour and legs predominantly rufous, and elytron of two other species rugose and punctulate (as in Figs. 243-245) .... 6.

5.a. Metafemur of most specimens with subapical tooth large and basally constricted, therefore slender and bladelike (as in Fig. 73, 236); pronotum with sculpture various, coarsely rugose in some specimens, to with disc flat, and uniformly, finely alutaceous; MEG of endophallus tapered to slender apex (Fig. 170-172). Distributed from Europe to Japan .... **P. sericea** (Linnaeus).

b. Metafemur of most specimens with subapical tooth obtuse, not basally constricted, not blade-like (as in Fig. 74); pronotum with coarsely rugose sculpture on disc, not alutaceous; MEG of endophallus apically notched (Fig. 173). Known only from Japan .... **P. shirahatai** Kimoto.

6.a. Pronotum with median line obliterated in most specimens, disc flat, punctures scattered (similar to Fig. 227), irregular rugosity, and with surface alutaceous or granulate in most specimens (as in Fig. 217, 218); base of metafemur of most specimens rather broad, lateral surface therefore basally flattened, and with tooth obtuse or absent, but prominent in some specimens (as in Figs. 80-84). Distribution from Fennoscandia to Japan .... **P. weisei** Duvivier.

b. Pronotum with median line distinct in most specimens, disc convex in most specimens, punctures sparse (as in Figs. 225, 226), to dense and contiguous (as in Fig. 231), but surface not alutaceous; base of metafemur not broad, lateral surface uniformly convex, and with tooth prominent in most specimens. Known distribution east of Lake Baikal, and Japan .... 7.

7.a. Elytra shiny, with few rugae in most specimens (as in Fig. 242); pronotum sparsely punctate in most specimens (as in Figs. 225, 226); female specimens with pygidium more or less rounded apically, depressed either side of midline, and with midline slightly raised and more or less glabrous (as in Figs. 57, 232); male specimens with pygidium apically truncate (as in Fig. 58). Known only from Japan .... 8.

b. Elytra rugose and punctulate, not shiny (as in Fig. 234); pronotum coarsely and closely punctate (as in Fig. 231); female specimens with pygidium prominently notched apically, midline not raised or glabrous, not depressed on each side (as in Fig. 32); male specimens with pygidium apically emarginate (as in Fig. 33). Known only from northern China to Yakutsk .... **P. roscida** Weise.

8.a.* Specimens smaller in size, males 6.4-7.5 mm, females 6.6-7.6 mm; antennae rufous, with basal antennomere longer than any other, antennomeres 3-10 only slightly longer than 2 .... **P. akiensis** Tominaga and Katsura.

b.* Specimens larger in size, males 6.8-10.0 mm, females 8.4-11.0 mm; antennae of most specimens with only base of antennomeres rufous, with antennomere 5 the longest, and antennomeres 5 to apex much longer than antennomere 2 .... **P. constricticollis** (Jacoby).

* measurements taken from Tominaga and Katsura (1984); these authors presented additional characters with which to separate specimens of P. akiensis from those of P. constricticollis as well as a key to separate the subspecies of P. constricticollis.

4.2.2. Diagnosis and classification of Palaearctic species.

P. BRACCATA -GROUP.

Plateumaris braccata (Scopoli).

Prionus braccatus Scopoli (1772:100).

TYPE SPECIMEN. Primary type specimens were not examined.

TAXONOMIC HISTORY AND SYNONYMIES. For other names placed in synoynmy with P. braccata, see Jolivet (1970:50).

DIAGNOSIS. Specimens of P. braccata are recognized by pronotum with disc and hypomeron of most specimens conspicuously pubescent, disc of many specimens alutaceous, median line, basal and callosal sulci, and calli well developed in most specimens; pronotal hypomeron punctate, finely pubescent in most specimens, and with longitudinal rugae restricted to area just above procoxa; base of elytron of most specimens from humerus to scutellum closely, finely punctate, each puncture with short, distinct seta; elytral disc rugose; tibiae with dorsal carina, and those of anterior and posterior surfaces, prominent and extending nearly to apex; apex of all tibiae prominently flared; meso- and metatibia of males with prominent tibial tubercle; femora of most specimens basally very broad, most specimens with punctures of two sizes, with large punctures, each with long, adpressed seta, scattered among other, smaller punctures, and with surface alutaceous in most specimens; specimens with head, pronotum and elytra black, with bluish or purplish metallic sheen. Endophallus with MEG and ELD exceedingly elongate (Fig. 174).

DISTRIBUTION. Plateumaris braccata occurs in Europe, but the distribution extends to Turkestan (see Borowiec 1984, Fig. 60).

PHYLOGENETIC RELATIONS. Plateumaris braccata is most closely related to the western Palaearctic species, P. consimilis; they together form a group of two species with plesiomorphic character states, which I call the P. braccata-Group. Together, these two species are most closely related to the five species that comprise the P. rufa-Group.

SPECIMENS EXAMINED. I examined 50 specimens of this species.

Plateumaris consimilis (Schrank).

Leptura consimilis Schrank (1781:155).
Plateumaris tenuicornis Balthasar (1934:128)

PROBABLE NEW SYNONYMY

TYPE SPECIMEN. Primary type specimens were not examined.

TAXONOMIC HISTORY AND SYNONYMIES. Balthasar compared specimens of his *P. tenuicornis*, described from Bosnia, with those of the western Palaearctic species, *P. consimilis*, and presented two figures of the pronotum and head. All character states used by Balthasar are ones that I have also found among *P. consimilis*. Thus I suggest that Balthasar's species should be placed as junior subjective synonym of *P. consimilis*. For other taxa placed in synonymy with *P. consimilis*, see Jolivet (1970:552). I have not assessed the status of *P. c. orientalis* Shavrov, described from Vladivostok.

DIAGNOSIS. Specimens of *P. consimilis* are recognized by pronotum of most specimens with disc and hypomeron uniformly punctate, most specimens with punctures separated by their diameter and each with a fine seta, most specimens with disc convex and alutaceous, median line obsolete to fine but distinct, callosal sulci poorly developed, basal sulcus prominent, and anterolateral setiferous tubercle prominent and acute; pronotal hypomeron punctate, finely pubescent in some specimens, with longitudinal rugae restricted to area just above procoxa; elytron of most specimens rugose and punctulate; tibiae with prominent carinae, dorsal carina complete, those of anterior and posterior surfaces extending to about midlength in most specimens, and in many specimens these are paired, forming a narrow furrow between them; apex of each tibia prominently flared; femora of many specimens basally broad, most specimens with punctures of two sizes, with large punctures, each with long, adpressed seta, scattered among other, smaller punctures, and with surface alutaceous in most specimens; male specimens with prominent meso- and metatibial tubercle; pygidium of most female specimens with prominent apical notch. Endophallus with PDS enlarged and forked, as long as MEG (Fig. 176).

DISTRIBUTION. *Plateumaris consimilis* is distributed in Europe (see Borowiec 1984, Fig. 62), but a subspecies has been described from Vladivostok, *P. c. orientalis* Shavrov.

PHYLOGENETIC RELATIONS. *Plateumaris consimilis* is most closely related to *P. braccata*. See discussion of this species, above, for further details.

SPECIMENS EXAMINED. I examined about 200 specimens of this species, from most parts of Europe.

P. RUFA -GROUP.

Plateumaris rustica (Kunze 1818).

Donacia rustica Kunze (1818:31).

Donacia affinis Kunze (1818:37) **NEW SYNONYMY**

Plateumaris sulcifrons Weise (1900:267)

PROBABLE NEW SYNONYMY

TYPE SPECIMEN. Primary type specimens were not examined.

TAXONOMIC HISTORY AND SYNONYMIES. The name *P. rustica* has been attributed to Schüppel (1818, *in* Kunze 1818) by Jolivet (1970) and Borowiec (1984). However, Kunze (1818) is clearly the sole author of the publication, and the name should be attributed to him.

It was suggested by Goecke (1943:376) that *P. rustica* and *P. affinis* should be considered synonyms. They are typically separated in keys by colour of the appendages and underside, and by metafemoral tooth size; these are highly variable characters among donaciines. I can find no characters that permit discrimination of these two taxa among specimens available to me, and therefore suggest that *P. affinis* be placed as junior subjective synonym of *P. rustica* (Kunze), and treat them as such herein. The junior synonyms listed under *P. affinis* in Jolivet (1970:49-50) are to be transferred to *P. rustica* also. For other names that are placed in synonymy of *P. rustica*, see Jolivet (1970:53).

Weise (1900:267) described *P. sulcifrons* from Malta, and compared it with both *P. rustica* and *P. affinis*. Weise used characters that are typical of *P. rustica*, and I therefore suggest that Weise's species is probably conspecific with this species.

DIAGNOSIS. Specimens of *P. rustica* are recognized by pronotum with anterolateral setiferous tubercle appearing reflexed, *i.e.* surface anterior to setiferous tubercle convex, broadened and impunctate; pronotal disc flat, uniformly punctate with punctures individually distinct, surface alutaceous, median line, basal and callosal sulci, and calli obsolete; pronotal hypomeron punctate, with longitudinal rugae restricted to area just above procoxa; elytra coarsely rugose; femora basally broad, nearly elliptical in shape, with punctures of two sizes, with large punctures, each with long, adpressed seta scattered among other, smaller punctures, and with surface very prominently alutaceous in most specimens; all tibiae with prominent dorsal carina, but anterior and posterior surfaces with carinae poorly developed and restricted to extreme base, and apex of each tibia prominently flared, males with prominent meso- and metatibial tubercle. Endophallus, Fig. 175.

DISTRIBUTION. *Plateumaris rustica* is distributed in the western Palaearctic, and is known from northern Algeria (see Borowiec 1984, Figs. 60, 64, 66). Among literature citing distribution of *P. affinis*, these data should be transferred to *P. rustica*.

PHYLOGENETIC RELATIONS. *Plateumaris rustica* is the most plesiomorphic member of the *P. rufa*-Group.

SPECIMENS EXAMINED. I examined about 150 specimens of this species, from France, Italy, Poland, Romania and Germany.

Plateumaris akiensis Tominaga and Katsura.

Plateumaris akiensis Tominaga and Katsura (1984:25).

TYPE SPECIMEN. Information about type specimens is detailed by the above authors.

TAXONOMIC HISTORY. This species was not recognized until 1984.

DIAGNOSIS. Specimens of *P. akiensis* are recognized by small size, males 6.4-7.5 mm, females 6.6-7.6 mm; antenna rufous, with basal antennomere longer than any other, antennomeres 3-10 each only slightly longer than 2; elytron shiny, sparsely punctulate and with few or no rugae; colour above reddish-coppery, some specimens with a bluish or greenish lustre; pygidium of females rounded, of males truncate. Endophallus, Fig. 167.

DISTRIBUTION. *Plateumaris akiensis* is known only from Japan (Honshu), Hiroshima Prefecture.

PHYLOGENETIC RELATIONS. *Plateumaris akiensis* is closely related to the Japanese species *P. constricticollis* and the Nearctic species, *P. rufa*, but the relationship among these species is not fully resolved. Tominaga and Katsura (1984) separated four subspecies of *P. constricticollis*, and the endophallic figures they provided of these subspecies are as different from one another as any is from *P. akiensis*. Perhaps the reason I have been unable to resolve the relationship of these species of the *P. rufa*-Group is that *P. constricticollis*, as presently defined, is paraphyletic. See discussion of phylogenetic relations of *P. rufa*, above.

SPECIMENS EXAMINED. I examined two specimens, male and female.

Plateumaris _constricticollis_ Jacoby.

Plateumaris _constricticollis_ Jacoby (1885:192).

TYPE SPECIMEN. Holotype [sex not recorded], BMNH. Label data was not recorded, but specimen was examined.

TAXONOMIC HISTORY AND SYNONYMIES. Tominaga and Katsura (1984) presented details concerning the subspecies of _P_. _constricticollis_. They recognized, and presented a key to, four subspecies, _P_. _c_. _constricticollis_, _P_. _c_. _chugokuensis_ Tominaga and Katsura, _P_. _c_. _toyamensis_ Tominaga and Katsura, and _P_. _c_. _babai_ Chûjô.

DIAGNOSIS. Specimens of _P_. _constricticollis_ are recognized by large size of most specimens, males 6.8-10.0 mm, females 8.4-11.0 mm; antennae of most specimens with antennomeres apically dark (entirely rufous in _P_. _constricticollis_ _s_. _str_.), increasing in length from 3rd or 4th antennomere, 5th longest; elytron shiny, punctulate but with few rugae; colour reddish-coppery above; pygidium of females rounded apically, most specimens with raised, glabrous median line and with depression each side; pygidium of males truncate; pronotum of most specimens shiny, with punctures sparse, surface between punctures smooth and shiny, with few or no rugae in most specimens, median line, and callosal and basal sulci various, calli various. Endophallus, Fig. 166.

DISCUSSION. Characters vary greatly among specimens of the four subspecies, including the endophallus. The endophallus of other species of Donaciinae normally is not a variable structure, so I think the status of these subspecies of _P_. _constricticollis_ need to be re-examined. Since the endophallus is normally invariate, I suspect that perhaps each of the subspecies may in fact be separate species.

DISTRIBUTION. *Plateumaris constricticollis* is known only from Japan. For distribution of the nominal taxon and its subspecies, see Tominaga and Katsura (1984:35) and Anonymous (1985, Fig. 15, p.146). The subspecies recognized by Tominaga and Katsura (1984) overlap broadly in distribution.

PHYLOGENETIC RELATIONS. *Plateumaris constricticollis* is most similar to the Nearctic species, *P. rufa*, but is also closely related to the Japanese species, *P. akiensis*. I have not been able to fully resolve the relationship of these three species to one another. See discussion of phylogenetic relations of *P. akiensis* and *P. rufa*, above.

SPECIMENS EXAMINED. I have examined about 40 specimens of this species, including its subspecies.

P. PUSILLA -GROUP.

Plateumaris weisei Duvivier.

Plateumaris weisei Duvivier (1885:CXVI)

Plateumaris hirashimai Kimoto (1963:13) **NEW SYNONYMY**

Plateumaris morimotoi Kimoto (1963:13) **NEW SYNONYMY**

Plateumaris sachalinensis Medvedev (1973:876) **PROBABLE NEW SYNONYMY**

Donacia mongolica Semenov (1895:267) **PROBABLE NEW SYNONYMY**

TYPE SPECIMEN. A male specimen which appears to be the holotype (MNHN) bears the following labels: "Sibérie Coll. Duvivier, Plateumaris weisei TYPE Duv., TYPE [pink], Museum Paris Coll. H. Clavareau 1932". I added the label "vidit 1984 I.S. Askevold". The specimen is in good condition, but lacks both hind legs.

TAXONOMIC HISTORY AND SYNONYMIES. Plateumaris weisei is not treated in faunistic books on the European fauna, because it is a more northern and eastern Palaearctic species and is therefore not covered by treatments dealing with more southerly regions (e.g. Mohr 1966, Müller 1949-1953, Gruev and Tomov 1984). It was listed as recorded from Japan (Borowiec 1984:452), but has not been recognized by Japanese workers. Instead, Kimoto recognized two taxa, P. morimotoi Kimoto (1963) and P. hirashimai Kimoto (1963) which he later synonymized (Kimoto 1981). The endophallus of specimens of P. hirashimai (see Fig. 168) is indistinguishable from that of specimens of P. weisei from Finland in any significant way (see Fig. 169); nor do they differ significantly in external structure. Therefore, I hereby place P. hirashimai and P. morimotoi as junior subjective synonyms of P. weisei.

Medvedev (1973:876) compared *P. sachalinensis* to *P. obsoleta* Jacobson, *P. weisei* Duvivier and *P. amurensis* Weise, separating the former from these latter taxa on the basis of leg colour and metafemoral tooth size. As suggested above, *P. obsoleta* Jacobson is probably a synonym of *P. sericea*; *P. amurensis* was placed as a junior synonym of *P. weisei* by Goecke (1937:371), which is probably correct. Medvedev's description fits well specimens of *P. weisei* from Finland and Japan that I have examined; the distinguishing characters of leg colour and metafemoral tooth size fall well within the variation in these characters as observed in specimens of *P. weisei*. Thus, I suggest that *P. sachalinensis* be placed as a junior subjective synonym of *P. weisei*.

Semenov (1895:267) described *P. mongolica* from northern Mongolia. Characters stated by Semenov indicate probable synonymy with *P. weisei*. In particular, of pronotal characters, he stated "*linea media obsoleta*... *ante basin profunda foveatim impressa*" and "*angulis anticis extrorsum denticulatim prominulis*". Among Palaearctic taxa, these states are effectively diagnostic of *P. weisei*, and Semenov (p. 270) concedes his *P. mongolica* could be considered an "*aberratio*" of *P. weisei*. I concur with this assessment and suggest that *P. mongolica* should be placed as junior subjective synonym of *P. weisei*. *Plateumaris amurensis* Weise is placed as a junior synonym of *P. weisei* in catalogues (*cf*. Jolivet 1970:53).

DIAGNOSIS. Specimens of *P. weisei* are recognized by pronotum with disc flat, with scattered punctures and surface alutaceous or granulate, median line obsolete in most specimens, basal sulcus evident but not deep, calli well defined by callosal sulci, anterior setiferous tubercle prominent, acute, and extending beyond calli in most specimens; elytral disc more or less uniformly rugose and punctulate; base of femora broad in most specimens, underside rather densely pubescent, metafemur of most specimens with tooth obsolete, some specimens with prominent tooth; tibiae not flared apically, with dorsal carina only; male specimens with meso- and metatibial tubercle small; pygidium emarginate in both sexes. Endophallus, Figs. 168, 169.

DISTRIBUTION. *Plateumaris weisei* is Transpalaearctic in distribution; in Europe it is known only from Fennoscandia and eastward (Borowiec 1984, Fig. 66). The Japanese distribution (as *P. hirashimai*) is given in Anonymous (1985, Fig. 17), where it is restricted to Hokkaido; Medvedev (1973) described *P. sachalinensis* from Sachalin Island, and Semenov (1895) described *P. mongolica* from northern Mongolia. I have examined some specimens from the Amur River and Lake Baikal regions, and from northern China. It is probable that *P. weisei* is Transpalaearctic, but there are no available records of collection from geographically intermediate areas, between Baikal and Fennoscandia.

PHYLOGENETIC RELATIONS. *Plateumaris weisei* is most closely related to the Nearctic species, *P. germari*, as a member of the *P. pusilla*-Group. See discussion of phylogenetic relations of *P. germari* for further details.

SPECIMENS EXAMINED. I examined about 35 specimens; most of these are from Fennoscandia, others are from Japan, northern China, and the Amur River and Lake Baikal regions.

P. roscida (Weise).

Plateumaris roscida Weise (1912:77).

Plateumaris annularis Reitter (1920:41), synonymy by Kolossow (1930) and Goecke (1957).

Donacia caucasica (Zaitsev) (1930:111)

PROBABLE NEW SYNONYMY

TYPE SPECIMEN. Holotype male (ZMHB), bears the following labels: "Typus [red], roscida m., coll. J. Weise coll. J. Weise, Zool. Mus. Berlin". I added the labels "HOLOTYPE o^ Plateumaris roscida Weise [red]" and "Plateumaris roscida Weise det. I.S. Askevold 1989".

TAXONOMIC HISTORY AND SYNONYMIES. A male and two female specimens, from different localities, key to P. annularis Reitter in Gressitt and Kimoto (1961). Kolossow (1930) had already synonymized P. annularis with P. roscida, and Goecke (1957) discussed their synonymy further. Gressitt and Kimoto (1961) were evidently not aware of these references. The three specimens I have examined agree well with the holotype male of P. roscida (Weise) (ZMHB), and are assigned to this taxon. I accept Goecke's (1957) synonymization of P. annularis with P. roscida, for he stated he had compared the types.

Zaitsev (1930:111) stated Plateumaris caucasica is intermediate between P. sericea and P. discolor, but gave appendage and pygidial colour precluding such assignment. He made a comparison with P. annularis Reitter "verisimiliter maxime affinis". The description given by Zaitsev agrees well with the specimens I have determined as P. roscida and I therefore suggest placement of P. caucasica as a junior subjective synonym of P. roscida.

DIAGNOSIS. Specimens of *P. roscida* are recognized by pronotum with disc coarsely and closely punctate, not alutaceous, median line distinct, hypomeron punctate and rugose; elytra densely punctulate in most specimens, coarsely and densely rugose over most of surface; legs of most specimens with about apical half of femur rufous, tibia and tarsus rufous, metatibia with prominent, blade-like tooth in most specimens; antenna with antennomeres basally rufous, apically dark or metallic; pygidium of females with prominent apical notch, males broadly emarginate. Endophallus, Fig. 165.

DISTRIBUTION. *Plateumaris roscida* is known from only a few specimens, collected from northern China to the Amur River region, and Yakutsk.

PHYLOGENETIC RELATIONS. *Plateumaris roscida* is most closely related to the Nearctic species, *P. fulvipes*. See treatment of this species for further details, above.

SPECIMENS EXAMINED. I have examined only four specimens of this species, from China (Mts. east of Harbin, Manchukuo, CMNH 1♀), Mongolia (Ersentientze, Manchuria, CAS 1o^), Yakutsk [Jakutsk, no additional data, UMHF 1♀ (these det. by Kontkanen as *P. annularis* Reitter, which is a junior synonym of *P. roscida*)], and the holotype (o^, ZMHB), which Weise described from "Transbaikalien: Dschitah" [=Čita, S.S.S.R.].

P. NITIDA -GROUP.

P. sericea (Linnaeus).

Leptura sericea Linnaeus (1758:397).

Donacia discolor Panzer (1795:216) **NEW SYNONYMY**

Plateumaris obsoleta Jacobson (1894:243) **PROBABLE NEW SYNONYMY**

Plateumaris socia Chen (1941:9) **PROBABLE NEW SYNONYMY**

TYPE SPECIMEN. Primary type specimens were not examined.

TAXONOMIC HISTORY AND SYNONYMIES. It was suggested by Goecke (1943:375) that *P. sericea* and *P. discolor* are not separable, but he did not synonymize them. Specimens have traditionally been separated into two taxa on the basis of ratio of antennomeres 2 and 3 and by coarseness of pronotal rugosity. Both characters are variable among donaciines; in many series of specimens a complete range of pronotal structure, from uniformly alutaceous to entirely coarsely rugose on the disc, can be found. However, I find no appreciable genitalic differences between specimens of geographically divergent areas such as from Poland, Italy and Japan (Figs. 170 - 172, respectively). On the basis of external structure, the specimens from Italy and Japan (Figs. 171,172) are referrable to *P. sericea*, while the specimen from Poland (Fig. 170) is referrable to "*P. discolor*". On the basis of male genitalic structure and variability of external characters that are traditionally used to separate these taxa, I hereby place *P. discolor* and its synonyms (*cf.* Jolivet 1970:54) as junior subjective synonyms of *P. sericea*.

On the basis of structural variation found among specimens of *P. sericea*, I suspect that some other taxa that I have not yet examined are in fact synonyms of *P. sericea* or are senior synonyms of the Japanese species *P. shirahatai*. On the basis of descriptions given by Jacobson and Chen, I think the names *P. socia* Chen and *P. obsoleta* Jacobson are probably junior synonyms of *P. sericea*. The original description of *P. obsoleta* in particular, includes the statement "*Pygidium apice rotundatum*", and therefore this is a description of a female specimen, not a male specimen as Jacobson stated. *Plateumaris sericea* and *P. shirahatai* are the only Palaearctic species with a rounded female pygidium (though the shape does vary somewhat). For additional taxa that are placed in synonymy, see Jolivet (1970:54,55).

DIAGNOSIS. Specimens of *P. sericea* are recognized by entirely metallic appendages and pygidium; pygidium of females rounded, some specimens slightly emarginate, that of males emarginate; metafemur of most specimens with prominent, bladelike tooth; pronotal character states various, disc alutaceous and impunctate to prominently rugose. ELD of endophallus with apical nodule; Figs. 170-172.

DISTRIBUTION. According to Borowiec (1984, Figs. 63, 65, 67) *Plateumaris sericea* is known from Europe and northernmost Africa, to Japan and northern China, and is therefore the most geographically widespread Palaearctic member of the genus.

PHYLOGENETIC RELATIONS. *Plateumaris sericea* is most closely related to the Japanese species, *P. shirahatai*. Specimens differ in only minor external features, and have only minor endophallic differences. Specimens of *P. sericea* of Japan are difficult to separate from those of *P. shirahatai*. For other details of relationship to other members of the *P. nitida*-Group, see discussion of *P. nitida*, above.

SPECIMENS EXAMINED. I examined about 500 specimens of this species, from all regions of Europe, and some specimens from China and Japan.

Plateumaris shirahatai Kimoto.

Plateumaris shirahatai Kimoto (1963:13).

TYPE SPECIMEN. Type specimens were not examined.

TAXONOMIC HISTORY. Plateumaris shirahatai has been recognized by this name by subsequent authors; some specimens may have been previously misidentified as P. sericea.

DIAGNOSIS. Specimens of P. shirahatai are recognized by entirely metallic appendages and pygidium; pygidium of females rounded, some specimens slightly emarginate, that of males emarginate; metafemur of most specimens with tooth obtuse, not prominent; pronotum with disc prominently rugose. ELD of endophallus with apical nodule, MEG with apex notched (Fig. 173).

DISTRIBUTION. This species is known only from Japan; for distribution map, see Anonymous (1985, Fig. 18, p. 146).

PHYLOGENETIC RELATIONS. Plateumaris shirahatai is most closely related to P. sericea, and is difficult to separate from this species. See discussion of P. sericea, and P. nitida, above, for further details of phylogenetic relationship of members of the P. nitida-Group.

SPECIMENS EXAMINED. I examined seven specimens of this species.

4.3. EVOLUTIONARY CONSIDERATIONS.

As determined and rationalized above (Section 4.2), I consider it likely that I have examined all described taxa of Plateumaris because taxa I have not examined are probably conspecific with other Palaearctic species. Thus, both the phylogenetic and biogeographic analyses are based on the premise that all known taxa are included.

4.3.1. Reconstructed phylogeny of Plateumaris.

4.3.1.1 Character analysis.

Character state assignments are summarized in Table 2. Occurrences of postulated reversals (r in parenthesis) and/or homoplasy (h in parenthesis) are detailed; also, if some specimens of the taxon have the alternate state (i.e. 0 or 1), this is included in parenthesis. As discussed in methods, I distinguish the principal state as that occurring in most specimens of a taxon. Character codes as used in PAUP analysis are listed in Table 3. This table is essentially the same data as in Table 2, but (r) and (h) occurrences are omitted; occurrences of reversal are coded as derived (1) to facilitate analysis, as is postulated in discussion of these characters, below.

ENDOPHALLUS

1. ELD TOOTH. (Figs. 134-139, 157-159.). Two states: plesiomorphic, ELD without tooth-like structure; apomorphic, ELD with tooth-like structure mesally adjacent to PDS. The ELDs are bound together with the PDS by membrane (see photograph of endophallus of P. diversa, Fig. 162), but this membrane is typically not conspicuous. In a few species part of the membrane that extends from the mesal surface of the ELD is sclerotized and tooth-like. Three Nearctic species comprising the P. metallica-Group possess this structure, which I consider synapomorphic for species of this group.

2. ELD APEX. (Figs. 170-173). Two states: plesiomorphic, apex of ELD flat or curved; apomorphic, apex of ELD crimped and forming a deformed convolution. In Plateumaris the ELD is normally apically flat or curved, but in a group of Palaearctic species the ELD apex is crimped, folded into a nodule-like structure. I consider this structure synapomorphic for the species pair of P. sericea and P. shirahatai.

3. ELD FOLD. (Figs. 116-119, 162, 163, 166, 167, 175). Two states: plesiomorphic, ELD basally undifferentiated, indistinguishably continuous with internal sac membrane; apomorphic, ELD sclerite-sac membrane junction distinct, folded externally producing a lobe (e.g. Fig. 116, ef). Typically, the ELD is continuous with the sac membrane, without any conspicuous lateral structure. In one group of species the ELD-membrane junction is defined by at least a lobe or fold, but with a more distinct external lobe in the two Nearctic species. I consider this structure synapomorphic for the group of five species: P. diversa, P. rufa, P. constricticollis, P. akiensis, and P. rustica.

4. SHAPE OF PDS. (Figs. 134, 138, 158, 159). Two states: plesiomorphic, PDS narrower than, or not much wider than, than BSB (Fig. 136); apomorphic, PDS very broad, much wider than BSB (Figs. 134, 138). The narrow PDS is typical of the genus, but in two Nearctic species, P. dubia and P. metallica, the PDS is very broad; I consider this state synapomorphic for these two species. Two Palaearctic species, (P. sericea and P. shirahatai), also possess a broadened PDS that is similar to that of these two species; on the basis of correlation with other character states I suggest that this state is independently derived in the two groups, synapomorphic for each pair.

5. FORM OF PDS. (Figs. 126, 128, 160, 161). Two states: plesiomorphic, PDS single; apomorphic, PDS appearing doubled, with basal and apical parts. In the two species _P_. _pusilla_ and _P_. _robusta_ the PDS is typical of the genus except that it is recessed posteriorly, and is apically partly sclerotized to produce a V-shaped darkened area that resembles the PDS of other taxa, and therefore it appears to be doubled. I consider this state synapomorphic for this species pair.

6. FORM OF BSB. (Figs. 136, 140-143, 153, 155, 157). Two states: plesiomorphic, BSB of two distinct parts; apomorphic, BSB with basal part lost. The BSB typically consists of a short, basal part and a more prominent and more heavily sclerotized apical part. In one pair of species the BSB consists of only a single part; this state I consider synapomorphic for the species pair _P_. _nitida_ and _P_. _frosti_. Occurrences of this state that I consider homoplastic are in the species _P_. _neomexicana_, _P_. _akiensis_ and _P_. _braccata_.

OVIPOSITOR.

7, 8. SHAPE OF DORSAL VALVE (TERGUM VIII). (Figs. 178, 180, 190, 192, 202, 204, 237-239). Three states: plesiomorphic, dorsal valve apically rounded (_e_._g_. Figs. 182, 184, 186, 188, 239); apomorphic, dorsal valve apically pointed (Character 7) (_e_._g_. Figs. 190, 192, 202, 204, 237), or apically emarginate (Character 8) (_e_._g_. Figs. 178, 180, 238). Females of most members of _Plateumaris_ have the dorsal valve of the ovipositor apically rounded; because this is the most common state in the genus, it is assessed as plesiomorphic. Two states considered derived from this state are pointed and emarginate. On the basis of correlation with other characters, the pointed state is postulated to have been derived independently in two groups of species, _P_. _nitida_, _P_. _frosti_, _P_. _sericea_ and *P. shirahatai* (though it appears to have been lost in this species) in the *P. nitida*-Group and in *P. pusilla* and *P. robusta* in the *P. pusilla*-Group.

The emarginate state (8) clearly occurs independently in *P. weisei*, and in the group of species for which I consider the state synapomorphic: *P. diversa*, *P. rufa*, *P. akiensis* and *P. constricticollis*. As is stated elsewhere, I have seen only a single female specimen of *P. akiensis*, which happens not to show these characters clearly; however, I expect that other specimens it will be found to possess the apomorphic state.

9, 10. DORSAL VALVE, MEDIAN LINE (TERGUM VIII). (Figs. 178, 180, 190, 192, 237-239). Three states: plesiomorphic, dorsal valve without median line (Fig. 239); apomorphic, dorsal valve with more or less long and prominent median line (Character 9, Figs. 190, 192, 237), or with short apical median line (Character 10, Figs. 178, 180, 238). The dorsal valve of almost all species of *Plateumaris* is devoid of any median line, and is therefore assessed as the plesiomorphic state. On the basis of character correlation, the derived state of prominent, long median line is considered to be derived independently in *P. rustica*, and in the group of species for which I consider the state synapomorphic: *P. pusilla* and *P. robusta*. Similarly, on the basis of character correlation, the derived state of short apical median line is considered to be independently derived in *P. weisei*, and in the group of species for which I consider the state synapomorphic: *P. rufa*, *P. diversa*, *P. akiensis* and *P. constricticollis*. The same argument for character 8 above, with respect to *P. akiensis*, applies here for character 10.

11. SHAPE OF DORSAL VALVE BASALLY (TERGUM VIII). (Figs. 202, 204). Two states: plesiomorphic, dorsal valve basally straight; apomorphic, dorsal valve basally broadly and deeply arcuately emarginate. Most members of Plateumaris have the dorsal valve straight across the basal margin (Figs. 198, 200), or slightly arcuate, but one group of species possesses a deeply emarginate dorsal valve (Figs. 202, 204). This latter state I consider synapomorphic for the group of species P. frosti, P. nitida, P. sericea, and P. shirahatai.

12. STRUCTURE OF VENTRAL VALVE LATERALLY (STERNUM VIII). (Figs. 177, 179, 238). Two states: plesiomorphic, lateral margin at point of curvature evenly rounded (e.g. Fig. 181); apomorphic, point of distal curvature laterally with a single tooth (Figs. 177, 179). One group of species possesses a singular type of ventral valve, which is toothed laterally; this tooth is generally distinguishable from teeth of the "Type B" serration (character 18) because of its position. I have before me only a single female of P. akiensis. This specimen has Type B serration, but not the lateral tooth; I expect that the tooth will be found in other specimens, unless it has been reduced in this species. I consider that this toothed state is synapomorphic for the P. rufa-Group exclusive of P. rustica, and postulate that P. akiensis is included within this group as evidenced by this character also.

13. SHAPE OF VENTRAL VALVE (STERNUM VIII). (Figs. 181, 193, 195, 197, 199, 201, 203, 205, 239). Two states: plesiomorphic, ventral valve somewhat constricted in the middle, the subapical lateral margin therefore appearing slightly broadened (e.g. Figs. 181, 193); apomorphic, ventral valve more or less parallel in shape, without a subapical broadened lateral margin (e.g. Figs. 195, 197, 199, 201, 203, 239). Most species of the genus have the ventral valve broadened subapically, so the apical portion appears cordate in shape. I postulate that reduction of the broadened lateral margin occurred independently in two species (P. fulvipes, Fig. 193, and P. balli, Fig. 205), and in two other groups of species: (P. nitida and P. frosti, and all species in the P. chalcea-Group). I consider that this state is synapomorphic for each of these two groups of species, and autapomorphic for the other two species, independently.

14. SHAPE OF VENTRAL VALVE LATERALLY (STERNUM VIII). (Figs. 187, 189, 191, 206, 237). Two states: plesiomorphic, as stated in character 13, above; apomorphic, lateral margin greatly broadened (e.g. Figs. 189, 191, 237). While most members of Plateumaris have the ventral valve slightly widened subapically, some species have a markedly explanate lateral margin. This latter state is considered synapomorphic for the two species (P. pusilla and P. robusta). On the basis of character correlation, I think other occurrences of this state are homoplastic (P. flavipes, Fig. 181, and P. notmani, Fig. 206).

15, 16. LENGTH OF VENTRAL VALVE (STERNUM VIII). (Figs. 197, 199). Three states: plesiomorphic, ventral valve of moderate length/width proportions; apomorphic, ventral valve short, only a little longer than wide (Character 15); apomorphic, ventral valve much longer than wide (Character 16). On the basis of in-group commonness of a ventral valve of moderate length, I consider that this state is plesiomorphic. On the basis of character correlation, I postulate that the shortened ventral valve is derived independently in two groups of species, but is synapomorphic for each of these two groups: the P. braccata-Group, and the two species P. metallica and P. dubia. A few species possess a much lengthened valve: the species of the *P. nitida*-Group, the pair of species *P. fulvipes* and *P. roscida*, as well as *P. chalcea*. I consider the elongate ovipositor synapomorphic for each of the *P. nitida*-Group, and the species pair *P. fulvipes* + *P. roscida*, and that it is independently derived in *P. chalcea*.

17, 18. VENTRAL VALVE SERRATION, TYPES A AND B (STERNUM VIII). (Figs. 177, 179, 183, 237-239). Three states: plesiomorphic, ventral valve of ovipositor finely serrate (Figs. 237, 239); apomorphic, fine serration absent except for irregularly placed coarse teeth (Fig. 177, 179, 238) (type A, Character 17); apomorphic, serration very coarse (Fig. 183), without fine serration between the prominent teeth, and with a lateral angulation or tooth laterally (type B, Character 18). Most species of *Plateumaris* have serration of the ventral valve more or less uniformly fine (unless the specimen is old and worn). Many species appear to have a distinct pattern: regularly placed deeper incisures with several (2-5 or more) fine serrations between them. This pattern is distinct in some species (especially in *P. pusilla* and *P. robusta*), but generally varies. I could not satisfactorily resolve a pattern of character states that is specific to species or higher group, among the species that possess a finely serrate ventral valve. On the basis of in-group commonness, I consider the finely serrate state plesiomorphic, and the other two states apomorphic, involving loss of fine serration.

The coarsely serrate ventral valve (Character 17) occurs in the members of the *P. braccata*-Group, for which I consider this state a synapomorphy, and occurs homoplastically in *P. germari*. The irregularly coarsely serrate state with a lateral tooth (Character 18) occurs in at least three species in the *P. rufa*-Group. I have only one female of *P.*

akiensis available; it has this type of serration, but lacks the lateral tooth. Specimens of other species in the group vary in distinctness of the lateral tooth, but still have the irregular serration. Therefore I suspect that other females of P. akiensis may have the lateral tooth, and so I consider it synapomorphic for the species of this group exclusive of P. rustica.

PYGIDIUM.

19-22. FEMALE, APEX SHAPE. (Figs. 18, 20, 22, 25, 27, 30, 32, 34, 51, 54, 57, 232, 234). Five states: plesiomorphic, apex rounded (e.g. Figs. 54, 57, 232); apomorphic, apex with small notch (Character 19, Fig. 30); apomorphic, apex with large notch (Character 20, Figs. 32, 234); apomorphic, apex broadly emarginate (Character 21, e.g. Figs. 34-36); apomorphic, apex pointed (Character 22, e.g. Fig. 27). In sagrines, criocerines, and many donaciines, the female pygidium is rounded apically, and this is therefore considered the plesiomorphic state in Donaciinae.

These four apomorphic states I consider independently derived from the plesiomorphic state. Most of these occur homoplastically in the genus. The only taxa with a small notch are P. aurifer and P. flavipes, while the larger notch occurs in P. fulvipes and P. roscida. A notch also occurs in the unrelated species P. consimilis. The broadly emarginate state occurs in several groups of species. On the basis of character correlation I consider these occurrences independently derived, in P. akiensis, P. rustica and P. braccata, and synapomorphic for each of the species pairs P. germari and P. weisei, P. balli and P. schaefferi, and P. frosti and P. nitida. Some specimens of P. pusilla, P. robusta and P. sericea are slightly emarginate but are otherwise rounded, while some specimens of _P_. _rustica_ are rounded, but are otherwise slightly emarginate.

It could be postulated that the first three states are serially derived within members of the _P_. _pusilla_-Group, from a smaller to a larger notch to broadly emarginate. However, such a series would conflict with other characters, and would produce a less parsimonious tree.

23. FEMALE, FORM OF MIDLINE OF PYGIDIUM. (Figs. 25, 57 232). Three states: plesiomorphic, surface of pygidium more or less flat, or uniformly convex; apomorphic 1, midline somewhat raised due to a shallow depression on each side apically; apomorphic 2, midline raised, with pubescence reduced to entirely absent, therefore appearing a little carinate in some specimens (Figs. 25, 57, 232). In donaciines generally the pygidium is uniformly convex and pubescent, and this state is therefore assessed as plesiomorphic. In one group of species, comprising the _P_. _braccata_- and _P_. _rufa_-Groups, the pygidium of females has a pair of shallow depressions, one either side of the midline at the apex, therefore raising the midline. This state is considered synapomorphic for these two species groups.

Among members of the _P_. _rufa_-Group exclusive of _P_. _rustica_, the midline is somewhat to entirely glabrous, and therefore appears somewhat carinate (apomorphic 2). The single female specimen of _P_. _akiensis_ available has somewhat sparser pubescence on the midline; on the basis of character correlation, this species should possess a typical pygidial structure. Some specimens of other species of the _P_. _braccata_- and _P_. _rufa_-Groups that I assess as not possessing a glabrous midline have somewhat sparser pubescence on the midline and thus appear similar to the derived state. Conversely, some specimens of the three species I assess as having a glabrous midline are sparsely to almost normally pubescent. Thus there is some variability among these species. I postulate this series of character states, noting these problems, and consider character 23 (state 2) synapomorphic for all species of the *P. rufa*-Group exclusive of *P. rustica*.

24. MALE, FORM OF PYGIDIAL APEX. (Figs. 19, 21, 31, 33, 35, 36, 38, 48, 53, 56, 60). Two states: plesiomorphic, pygidial apex truncate (*e.g.* Figs. 23, 24); apomorphic, pygidial apex broadly emarginate. Among the sagrines examined, and among many donaciines, the truncate pygidium is common. On the basis of character correlation I conclude that the emarginate state is derived independently in the common ancestor of three separate groups: all species of the *P. pusilla*-Group and the species pairs of *P. balli* and *P. schaefferi*, as well as *P. frosti* and *P. nitida*. Specimens of *P. sericea* vary; commonly, they have the pygidial apex of males truncate, while many specimens have a shallowly, but distinctly and widely emarginate pygidium. In these specimens, and in the other species pair (*P. balli* and *P. schaefferi*) the emargination is differently formed, so I consider the emarginate state independently derived in these three groups.

PRONOTUM.

25. DEPTH OF BASAL SULCUS. (Figs. 1,2, 219-224). Two states: plesiomorphic, basal sulcus shallow; apomorphic, basal sulcus deep, prominent. Among many of the sagrines examined there is a definite basal pronotal sulcus, but it is not especially prominent; similarly, most donaciines possess a distinct but shallow basal sulcus. In most species of the *P. braccata*- and *P. rufa*-Groups there is a well developed basal sulcus, completely reduced in some members, or hyper-developed in others. The state of shallow to moderate depth is assessed as plesiomorphic.

In most members of one group (comprising two species groups), the basal sulcus is especially deep. I consider the derived state as synapomorphic for the *P. chalcea*- + *P. nitida*-Groups. In the *P. chalcea*-Group, *P. metallica* has several pronotal features reduced and the basal sulcus shallower than in other members of the group; on the basis of character correlation I consider that this species represents a secondary reduction. Similarly, most members of the *P. nitida*-Group possess prominent sulci, but the basal sulcus is much reduced in specimens of *P. nitida* and *P. frosti*, for which I consider this a synapomorphic reduction.

26. DEPTH OF MEDIAN LINE. (Figs. 1, 2, 219-224). Two states: plesiomorphic, median line of pronotum present but narrow and relatively shallow (*e.g.* Figs. 215, 216); apomorphic, median line deep and broad (*e.g.* Figs. 219, 224). Among many of the sagrines examined there is a definite but fine median line; similarly, donaciines in general possess a distinct but fine or irregular median line. Therefore this state is assessed as plesiomorphic. I consider the deep, broad and well-defined median line synapomorphic for the *P. chalcea*- + *P. nitida*-Groups; the state also occurs in specimens of the unrelated species, *P. akiensis*. Within the *P. chalcea*-Group, *P. metallica* has several reduced pronotal features; in the *P. nitida*-Group, *P. nitida* and *P. frosti* have the median line poorly developed, while specimens of *P. sericea* and *P. shirahatai* possess both character states as well as intermediates. On the basis of character correlation I consider a less prominent median line in this species a reduction.

27. DEVELOPMENT OF MEDIAN LINE. (Fig. 217). Two states: plesiomorphic, median line present but complete; apomorphic, median line not at all indicated, some specimens with at most faint indication of suture-like line (Fig. 217). Most species of Plateumaris possess a complete median line; in the species pair, P. germari and P. weisei, the median line is entirely absent or indicated only by a faint suture line or this line is confused by rugosity, so I consider absence of this character state synapomorphic for this species pair. Unrelated taxa also lacking a median line are P. rustica, and some specimens of P. aurifer.

28. DEVELOPMENT OF CALLOSAL SULCUS. (Figs. 1, 2, 219-224; cf. Fig. 2 for labels). Two states: plesiomorphic, callosal sulcus present, but moderate (e.g. Fig. 216); apomorphic, callosal sulcus deep (e.g. Fig. 224). Among sagrines examined, and among donaciines generally, the anterolateral, pronotal calli are well defined, but the sulcus is not especially deep. In some groups of species of Plateumaris these sulci are deep. I consider this state as synapomorphic for the P. chalcea- + P. nitida-Groups. Within these groups, specimens of P. metallica, P. nitida and P. frosti have several reduced pronotal features, and on the basis of character correlation I consider the loss of this character state to be secondarily derived.

29. SHAPE.

Two states: plesiomorphic, pronotum more or less quadrate (e.g. Fig. 216); apomorphic, pronotum basally constricted, more or less cordate in shape (e.g. somewhat like Fig. 223). Most members of Plateumaris have a rather quadrate pronotum; it is commonly widest across the calli, appearing rather constricted behind. Species in the P. braccata-Group, and most species in the P. rufa-Group have a markedly constricted pronotum. On the basis of character correlation I consider the absence of this character state in *P. rustica* and *P. diversa* to be losses, and so consider the cordate pronotum synapomorphic for the *P. braccata*- and *P. rufa*-Groups.

30. PUNCTATION OF DISC. (Figs. 225, 226). Three states: plesiomorphic, pronotal punctation largely of coarse punctation, in form of rugae or not (Figs. 215, 216); apomorphic 1, coarse punctation sparse, with numerous minute punctulae between, the surface smooth and shiny (Figs. 225, 226). Most species of *Plateumaris* have a rather punctate pronotal disc, the punctures confluent in many species to form transverse rugae, or they have the surface between the punctures alutaceous or shagreened, or with punctulae. I consider the particular pronotal punctation possessed by *P. rufa* and *P. constricticollis* synapomorphic for this species pair; this species pair is characterized by the shiny cordate pronotum, sparsely punctate, with numerous punctulae and without any microsculpture or rugulosity. I hypothesize that *P. akiensis* belongs to this species group also, but that development of prominent sulci (characters 25, 26, 28) and confluence of punctation has produced a pronotum reminiscent of that of *P. chalcea*, and therefore appearing not to belong to this group. Therefore I assign *P. akiensis* to derived state 2.

31. MICROSCULPTURE OF DISC. (Figs. 213, 228). Two states: plesiomorphic, pronotum without alutaceous microsculpture on surface of disc; apomorphic, pronotal disc with alutaceous microsculpture, in some specimens this appears as granulate (Figs. 218, 228). Most members of *Plateumaris* have a coarsely punctured pronotal surface, with punctulae confluent to form rugae in many species. A number of species have an entirely or partly alutaceous disc, distributed among all species groups. Among the members of the *P. braccata*- and *P. rufa*-Groups, some specimens of *P. consimilis*, and most of *P. rustica* are distinctly alutaceous, even appearing granulate. Among members of the *P. nitida*-Group, female specimens of *P. nitida*, and many specimens of *P. sericea* are alutaceous to granulate (specimens of *P. sericea* are highly variable, but this variation is not sexually correlated). Among members of the *P. chalcea*-Group, some specimens of *P. neomexicana* are somewhat alutaceous. Among members of the *P. pusilla*-Group, female specimens of *P. flavipes* have microsculpture largely restricted to the medial area, while those of both sexes of *P. germari* and *P. weisei* commonly are almost uniformly alutaceous over the entire disc. I consider that alutaceous pronotal microsculpture is synapomorphic for the species pair of *P. germari* + *P. weisei*, and that it is independently derived in other taxa, as detailed above.

32. DEVELOPMENT OF ANTERIOR SETIFEROUS TUBERCLE. (Fig. 217). Two states: plesiomorphic, anterior pronotal setiferous tubercle less prominent than the calli; apomorphic, setiferous tubercle prominent, more prominent than the calli. The pronotum of *Plateumaris* species commonly has the calli as the widest point; specimens of *P. germari* and *P. weisei* typically have the setiferous tubercles more prominent than the calli, a state I consider synapomorphic for this species pair.

LEGS.

33. DEVELOPMENT OF MESOTIBIAL TUBERCLE OF MALES. Two states: plesiomorphic, mesotibia of male with tibial tubercle; apomorphic, mesotibia without tibial tubercle. Male specimens of *Plateumaris* typically have a small tooth-like structure projecting perpendicularly from the tibial axis; in most species it is small, even difficult to distinguish from surrounding pubescence. In male specimens of a few species this tubercle is absent: P. notmani, and three other species in the P. chalcea-Group. I consider absence of this tubercle synapomorphic for the group of species P. neomexicana, P. dubia, and P. metallica, and that it is independently derived in P. notmani.

34. FORM OF MESO- AND METATIBIAL TUBERCLE OF MALES. Two states: plesiomorphic, meso- and metatibia of male with a tibial tubercle of normal (small) size; apomorphic, tibial tubercle enlarged, prominent (see preceding character). Among species of the P. braccata and P. rufa-Groups this tubercle is enlarged. Particularly, specimens of P. braccata seem to have retained some plesiomorphic leg structures, notably the tibial carinae that are complete and more prominent in specimens of this species than in those of any other species with the possible exception of P. consimilis. It is possible that a prominent tibial tubercle of males is also a plesiomorphic character, possibly for donaciines as a whole. However, the tibial tubercle does not occur among sagrines and criocerines examined, nor does it occur in all donaciines (although a similar, non-homologous structure occurs in some female specimens of members of other genera). Therefore I am inclined to consider that the tibial tubercle is of undetermined generic significance, but that the enlarged tubercle is synapomorphic for two groups of species, the P. braccata-Group + P. rufa-Group.

35. FORM OF APEX OF MESO- AND METATIBIA. (Figs. 93, 94, 97). Two states: plesiomorphic, all tibiae distinctly flared at apex; apomorphic, meso- and metatibiae of uniform thickness from near base to apex. Sagrines have all tibiae apically widened; some donaciines also have tibiae widened at apex, though not nearly so dramatically flared as is typical of sagrines. Among donaciines, only the protibiae are flared, in almost all taxa, except in some species of Plateumaris. As is determined by reconstruction of generic relationships, Plateumaris is the most primitive genus, retaining a number of primitive character states. I consider that flared tibial apex is the plesiomorphic state, which is retained only by members of the P. braccata- and P. rufa-Groups, most noticeably so in specimens of P. braccata and P. consimilis. The species of the P. rufa-Group have all tibiae somewhat flared, similar to those of the P. braccata-Group. The remaining species of the genus have the meso- and metatibiae of more or less uniform width to the apex (except for specimens of P. robusta). This character state, being a reduction, could have arisen independently among all other groups of species, but given the number of taxa I do not consider this very likely. Therefore, I consider loss of tibial flaring (reduction to slender tibiae) as synapomorphic for the members of the P. pusilla-Group + P. chalcea-Group + P. nitida-Group. Such an interpretation would require that a similar loss must have occurred at least one other time to produce tibiae typical of the rest of Donaciinae. This character was not considered in reconstruction of generic phylogeny.

36. BASAL FORM OF FEMUR. (Figs. 80-84). Two states: plesiomorphic, femora, especially metafemora, rather clavate, the width at the base less than that at the apex (e.g. Figs. 61, 76, 89); apomorphic, femora, especially metafemora, not so clavate, the width at base at least as much as at apex (Figs. 80-84). Several species have broad femora, notably P. rustica, many specimens of P. diversa, and most specimens of

P. germari and P. weisei. The former two species are unrelated to the remainder, and broad femora are considered independently derived in these species. I consider the derived state synapomorphic for the species pair of P. germari + P. weisei.

37. FORM OF METAFEMORAL TOOTH. (Fig. 236). Two states: plesiomorphic, metafemoral tooth moderately prominent, tapering from base to apex; apomorphic, tooth constricted at base to form rather uniformly slender blade-like tooth. This character was ambiguous even after tertiary analysis. It is possible that I have misinterpreted the state found in P. chalcea; the femoral tooth of this species is large in some specimens, varying to absent. It is more parsimonious to consider this character synapomorphic for members of the P. chalcea- + P. nitida-Groups, with two subsequent losses in P. nitida and in a subset of the P. chalcea-Group.

38. COLOUR OF LEGS. Two states: plesiomorphic, legs only partly metallic or dark, femora basally broadly rufous; apomorphic, legs, including femora, entirely metallic. Among the sagrines examined, femora are rufous at the base and darkened apically (except specimens of Sagra and Atalasis), with tarsi and tibiae dark, so I consider the largely rufous state plesiomorphic. Most specimens of Plateumaris also possess this state. There is some homoplasy in this character, and within series of specimens of some species legs can be entirely rufous or testaceous, varying to entirely metallic. Specimens of several species, such as those of P. fulvipes, P. diversa, P. germari and P. weisei, are among the most variable of species that generally have non-metallic appendages. Some specimens of other species that typically have metallic appendages, have largely rufous appendages. Members of the P. nitida-Group vary little in leg colour, but most specimens of all members have entirely dark legs, and also have antennae entirely or largely dark. Most members of the P. chalcea-Group also have entirely metallic appendages, except for those of P. chalcea and P. neomexicana, and some specimens of P. metallica. It is as parsimonious to consider that metallic leg colour is synapomorphic for these species groups, with subsequent losses in two taxa as it is to infer independent derivation of dark appendages in at least three groups. I consider tentatively the former option as more probable, on the basis of out-group comparison.

OTHER CHARACTERS.

39. DEVELOPMENT OF ANTENNAL CALLUS. (Fig. 3). Two states: plesiomorphic, antennal callus present, the vertex immediately behind it not markedly depressed, the callus therefore not especially prominent; apomorphic, vertex behind antennal callus with deep, oval impression, the callus therefore very prominent. Most donaciines have fairly conspicuous calli at the base of the antennae, with at most a shallow oval depression behind on the vertex, which accentuates them. Two Nearctic species are characterized by prominent antennal calli; this state I consider synapomorphic for the species pair of P. balli + P. schaefferi. The calli of P. notmani are also a little more prominent than is usual in the genus, though not nearly as prominent as in the two preceding species. The possibility that I did not correctly interpret this species was found post-analysis; if so, then the character could be synapomorphic for the three species, and relationships of the species group might be differently resolved.

40. ELYTRAL SCULPTURE. (Figs. 240-245). Two states: plesiomorphic, elytra smooth, with punctulae separated, not confluent to form rugae;

apomorphic, elytra more or less entirely rugose, the rugae running between punctulae, and generally radiating from strial punctures. Among the sagrines examined, both rugose and non-rugose taxa occur: e.g., Atalasis is non-rugose, while Ametalla is rugose, much like many donaciines. Among donaciines, punctulation seems to be a plastic character: many members of Plateumaris are rugose, Donaciella are typically rugose or at least very densely punctulate, and most Donacia (Donaciomima) are rugose. The remaining donaciine groups are typically smooth on the disc, with sparse punctulae, with rugae restricted to the antemedian and postmedian depressions, laterally and apically. The non-rugose state occurs in Atalasis, the taxon which is most similar to, and therefore hypothesized to be most closely related to Plateumaris, among donaciines (see discussion of outgroup in "Methods"). Therefore, I assess the non-rugose state as plesiomorphic. If Criocerinae were selected as the outgroup polarity would not be altered, because most criocerines are non-rugose.

Among members of the P. rufa-Group, P. rustica and P. diversa are rugose. Both species of the P. braccata-Group are also rugose, a group defined by several other synapomorphies. All species of the P. pusilla-Group are rugose, though there is variation in most members of the group from merely dense punctulation on the anterior part of the disc (e.g. Fig. 244) to rather uniform rugosity from base to apex (Fig. 240). All members of this group also possess a male pygidium that is emarginate. I consider that rugosity of elytra is synapomorphic for the members of each of the P. braccata- and P. pusilla-Groups, and independently in two species of the P. rufa-Group, namely P. rustica and P. diversa.

It is possible that the character is incorrectly polarized (*i.e.*, wrong out-group selected). If so loss of elytral rugae would be synapomorphic for the *P. chalcea*- + *P. nitida*-Groups, with one loss in the *P. rufa*-Group also. This alternative is more parsimonius, but I accept the former hypothesis on the basis of out-group comparison.

41. ANTENNAL COLOUR. Two states: plesiomorphic, antenna entirely unpigmented to partially so; apomorphic, antenna entirely pigmented, more or less metallic in colour. Many donaciines, except the majority of species of *D.* (*Donaciomima*), have antennae that are rufous or testaceous, with antennomere apices dark or metallic; this is so for most members of *Plateumaris*. On the basis of in-group criteria, I assess the state of entirely metallic antennae as derived, and synapomorphic for members of the *P. nitida*-Group, and that it is independently derived in *P. dubia*. This interpretation is supported by leg colour, which is also metallic in this group of species.

TABLE 2A.

CHARACTERS USED IN RECONSTRUCTION OF PHYLOGENETIC RELATIONSHIPS OF WORLD SPECIES OF *PLATEUMARIS*, STATES SHOWING POSTULATED REVERSALS, HOMOPLASY AND VARIATION[1]. THE *P. PUSILLA*- AND *P. NITIDA*-GROUPS.

CHARACTERS / SPECIES	aurif	flav	germ	weis	fulv	rosc	pus	rob	bal	schf	notm	fros	nit	ser	shir
ENDOPHALLUS															
1. ELD tooth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. ELD apex	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
3. ELD fold	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. PDS width	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5. PDS doubled	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
6. BSB of 1 part	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
OVIPOSITOR															
7. D.V. pointed	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1(0)
8. D.V. emarginate	0	0	0	1(h)	0	0	0	0	0	0	0	0	0	0	0
9. D.V. m.l. long	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
10. D.V. m.l. short	0	0	0	1(h)	0	0	0	0	0	0	0	0	0	0	0
11. D.V. base	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
12. V.V. toothed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13. V.V. parallel	0	0	0	0	1(h)	0	0	0	1(h)	0	0	1	1	0	0
14. V.V. explanate	0	1(h)	0	0	0	0	1	1	0	0	1(h)	0	0	0	0
15. V.V. short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16. V.V. elongate	0	0	0	0	1	1	0	0	1	1	0	1	1	1	1
17. Serration type A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18. Serration type B	0	0	1(h)	0	0	0	0	0	0	0	0	0	0	0	0
PYGIDIUM															
19. Female, small notch	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
20. Female, large notch	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
21. Female, emarginate	0	0	1	1	0	0	0(1)	0(1)	1	1	0	1	1	0(1)	0
22. Female, pointed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23. Female, midline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24. Male, emarginate	1(0)	1	1	1	1	1	1	1	1	1	0	1	1	0(1)	0

TABLE 2A, continued

CHARACTERS / SPECIES	aurif	flav	germ	weis	fulv	rosc	pus	rob	bal	schf	notm	fros	nit	ser	shir
PRONOTUM															
25. Basal sulcus deep	0	0	0	0	0	0	0	0	1	1	1	0(r)	0(r)	1(0)	1
26. Median line deep	0	0	0	0	0	0	0	0	1	1	1	0(r)	0(r)	1(0)	1
27. Median line absent	0(1)	0	1	1	0	0	0	0	0	0	0	0	0	0	0
28. Callosal sulcus	0	0	0	0	0	0	0	0	1	1	1	0(r)	0(r)	1(0)	1
29. Shape cordate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30. Punctures sparse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31. Alutaceous sculpture	0(1)	1(h0)	1	1	0	0	0	0	0	0	0	0	1(h0)	0(1)	0
32. Ant. setif. tubercle	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
LEGS															
33. Tib. tuberc. absent	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
34. Tib. tuberc. large	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35. Tibiae not flared	1	1	1	1	1	1	1	0(r)	1	1	1	1	1	1	1
36. Femora broad	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
37. Tooth blade-like	0	0	0	0	1	1	0	0	1	1	1	1	0(r)	1(0)	1(0)
38. Colour metallic	0	0	0(1)	0(1)	0(1)	0(1)	0(1)	0	1	1	1	1	1	1	1
OTHER CHARACTERS															
39. Antennal calli	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
40. Elytra rugose	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
41. Antennal colour	0	0	0(1)	0(1)	0(1)	0	0	0	1	1	1	1	1	1	1

[1] **1, 2** = apotypic character states; **0** = plesiotypic character state.
r = reversal (may be reduction also).
h = homoplastic occurrence of character state.
Value in parenthesis = some specimens of taxon having alternate character state.

TABLE 2B.

CHARACTERS USED IN RECONSTRUCTION OF PHYLOGENETIC RELATIONSHIPS OF WORLD SPECIES OF PLATEUMARIS, STATES SHOWING POSTULATED REVERSALS, HOMOPLASY AND VARIATION[1].
THE P. CHALCEA-, P. RUFA- AND P. BRACCATA-GROUPS.

CHARACTERS / SPECIES	chalcea	neomex	dubia	metal	diversa	rufa	constr	akiensis	rustica	consim	braccata
ENDOPHALLUS											
1. ELD tooth	0	1	1	1	0	0	0	0	0	0	0
2. ELD apex	0	0	0	0	0	0	0	0	0	0	0
3. ELD fold	0	0	0	0	1	1	1	1	1	0	0
4. PDS width	0	0	1	1	0	0	0	0	0	0	0
5. PDS doubled	0	0	0	0	0	0	0	0	0	0	0
6. BSB of 1 part	0	1	0	0	0	0	0	1	0	0	1
OVIPOSITOR											
7. D.V. pointed	0	0	0	0	0	0	0	0	0	0	0
8. D.V. emarginate	0	0	0	0	1	1	1	0	0	0	0
9. D.V. m.l. long	0	0	0	0	0	0	0	0	1(h)	0	0
10. D.V. m.l. short	0	0	0	0	1	1	1	0	0	0	0
11. D.V. base	0	0	0	0	0	0	0	0	0	0	0
12. V.V. toothed	0	0	0	0	1	1	1	1	0	0	0
13. V.V. parallel	1	1	1	1	0	0	0	0	0	0	0
14. V.V. explanate	0	0	0	0	0	0	0	0	0	0	0
15. V.V. short	0	0	1	1	0	0	0	0	0	1	1
16. V.V. elongate	1(h)	0	0	0	0	0	0	0	0	0	0
17. Serration type A	0	0	0	0	1	1	1	1	0	0	0
18. Serration type B	0	0	0	0	0	0	0	0	0	1	1
PYGIDIUM											
19. Female, small notch	0	0	0	0	0	0	0	0	0	1(h)	0
20. Female, large notch	0	0	0	0	0	0	0	0	0	0	0
21. Female, emarginate	0	0	0	0	0	0	0	1(h)	1(0)	0	1(h)
22. Female, pointed	1	1	1	1	0	0	0	0	0	0	0
23. Female, midline	0	0	0	0	2	2	2	2?	1	1	1
24. Male, emarginate	0	0	0	0	0	0	0	0	0	0	0

TABLE 2B, continued.

CHARACTERS / SPECIES	chalcea	neomex	dubia	metal	diversa	rufa	constr	akiensis	rustica	consim	braccata
PRONOTUM											
25. Basal sulcus deep	1	1	1	0(r)	0	0	0	0	0	0	0
26. Median line deep	1	1	1	0(r)	0	0	0	1(h)	0	0	0
27. Median line absent	0	0	0	0	0	0	0	0	1(h)	0	0
28. Callosal sulcus	1	1	1	0(r)	0	0	0	1(h)	0	0	0
29. Shape cordate	0	0	0	0	0(r)	1	1	1	0(r)	1	1
30. Punctures sparse	0	0	0	0	0	1	1	2	0(1)	0	0(1)
31. Alutaceous sculpture	0	0(1)	0	0	0	0	0	0	1(h)	0(1)	0
32. Ant. setif. tubercle	0	0	0	0	0	0	0	0	0	0	0
LEGS											
33. Tib. tuberc. absent	0	1	1	1	0	0	0	0	0	0	0
34. Tib. tuberc. large	0	0	0	0	1	1	1	1	1	1	1
35. Tibiae not flared	1	1	1	1	0	0	0	0	0	0	0
36. Femora broad	0	0	0	0	0(1)	0	0	0	1(h)	0	0
37. Tooth blade-like	1(h,0)	0	0	0	0	0	0	0	0	0	0
38. Colour metallic	0	0(1)	1(h)	0	0(1)	0	0	0	0	0(1)	0
OTHER CHARACTERS											
39. Antennal calli	0	0	0	0	0	0	0	0	0	0	0
40. Elytra rugose	0	0	0	0	1(h)	0	0	0	1(h)	1	1
41. Antennal colour	0	0	1(h)	0(1)	0	0	0	0	0	0	0

1 1, 2 = apotypic character states; **0** = plesiotypic character state.
r = reversal (may be reduction also).
h = homoplastic occurrence of character state.
? = suspected state (insufficient material examined).
Value in parenthesis = some specimens of taxon having alternate character state.

TABLE 3.

CHARACTER[1] STATES USED IN RECONSTRUCTION
OF PHYLOGENETIC RELATIONSHIPS OF WORLD
SPECIES OF PLATEUMARIS USING PAUP[2].

CHARACTER # TAXON	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
1 BRACCATA	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0
2 CONSIMILIS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0
3 RUSTICA	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	1	0	0	1	0	1	0	0	0	1	0
4 DIVERSA	0	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0
5 AKIENSIS	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	2	0	0	1	0	1	1	2	0	0	0	1	0	0	0	0	0	0	0
6 RUFA	0	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0
7 CONSTRICTICOLLIS	0	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0
8 PUSILLA	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
9 ROBUSTA	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
10 AURIFER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
11 FLAVIPES	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
12 GERMARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	1	1	0	0	1	1	0	0	0	1	0
13 WEISEI	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	1	0	0	1	1	0	0	0	1	0
14 FULVIPES	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0
15 ROSCIDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0
16 CHALCEA	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
17 METALLICA	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
18 DUBIA	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	1	0	1	0	0	1	0	0	1
19 NEOMEXICANA	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
20 NOTMANI	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	1	0	1	1	0	0	1
21 BALLI	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	1	1	1	0	1
22 SCHAEFFERI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	1	1	1	0	1
23 NITIDA	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	1	1	1	0	1	0	0	1	0	0	0	1	0	1	1	0	0	1
24 FROSTI	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	1	1	0	0	1
25 SERICEA	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0	1	1	0	0	1
26 SHIRAHATAI	0	1	0	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0	1	1	0	0	1

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[1] To save space, character numbers upwards of 9 are repeated as 0 (=10,20,30,40), 1 (=11,21,31,41), etc.

[2] Characters are the same as those in Table 2, but postulated reversals are recoded as derived to simplify analysis. See discussion of phylogenetic analysis in "Methods".

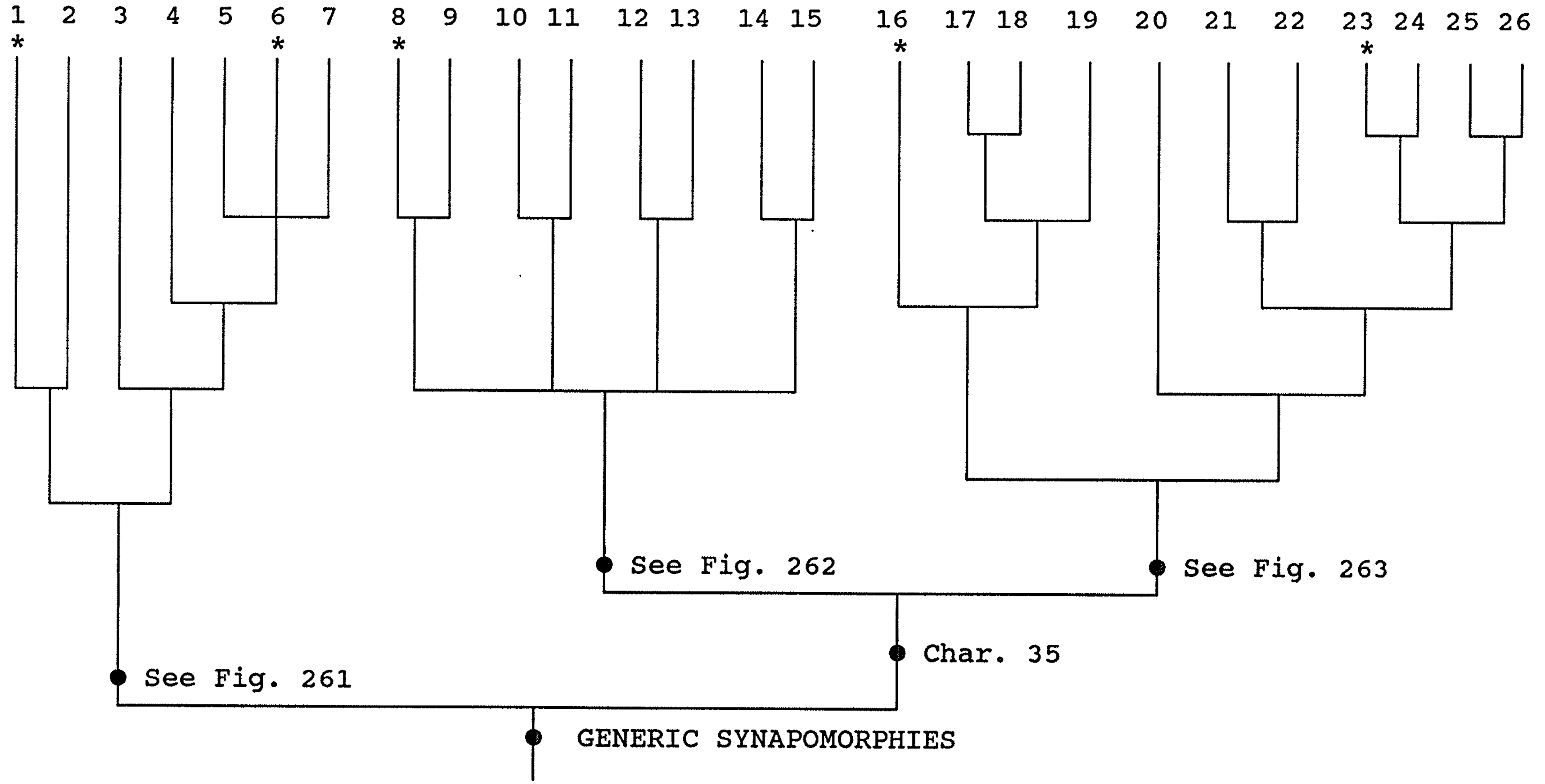

FIGURE 260. Phylogenetic relationships of world members of Plateumaris Thomson. For details of character distribution within groups of species, see following figures. * = nominal taxon of species groups. Numbers across top of phylogeny correspond to members of the genus, presented in the sequence found in Figs. 261-263 and Table 3.

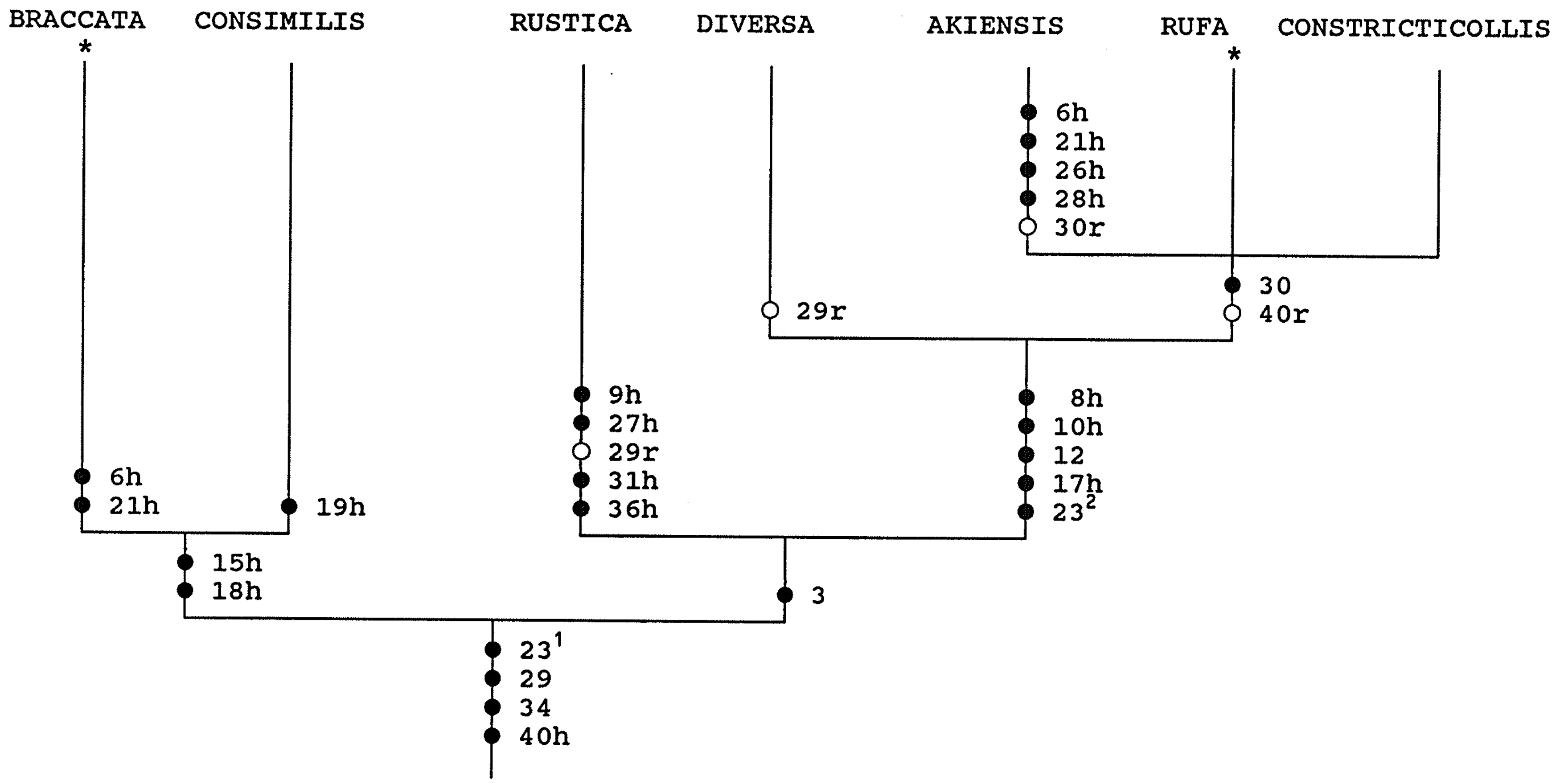

FIGURE 261. Pylogenetic relationships of members of the _P._ _braccata_- and _P._ _rufa_-Groups. (species 1-7, Fig. 260). * = nominal taxon of species group. **r**= reversal, **h**=homoplasy. [1] and [2]= apomorphic character states 1 and 2 of multiple-state characters.

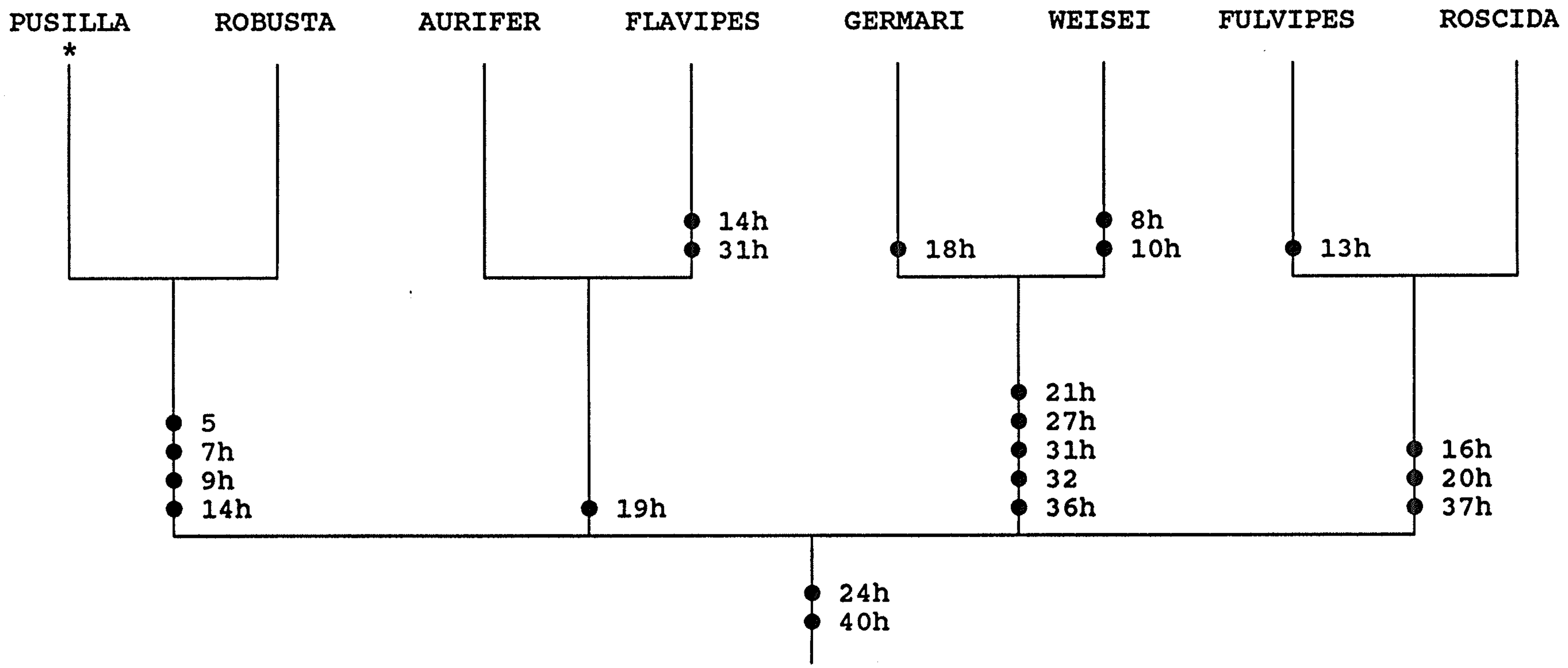

FIGURE 262. Phylogenetic relationships of members of the P. pusilla-Group (species 8-15, Fig. 260). * = nominal taxon of species group. h= homoplasy.

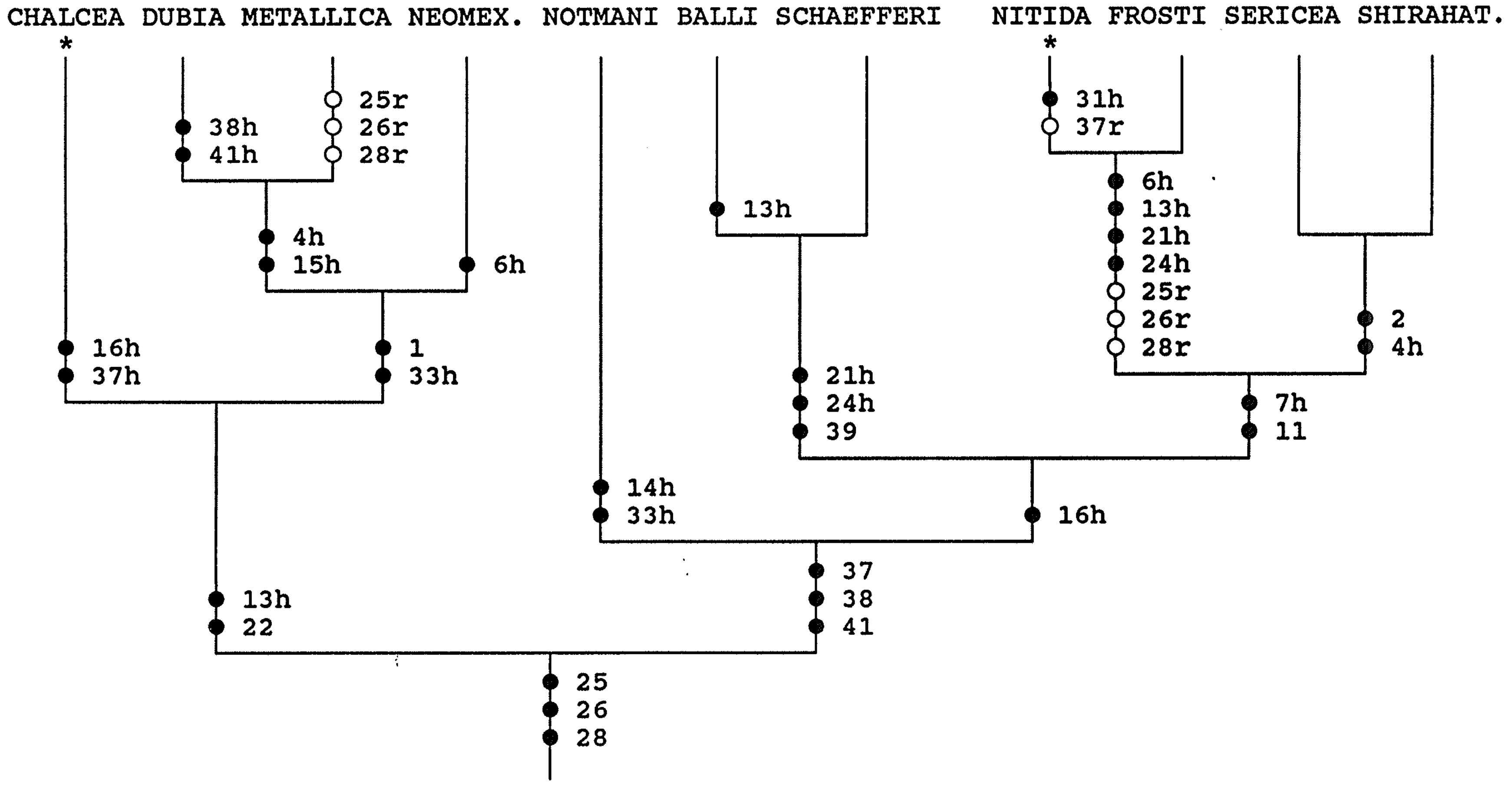

FIGURE 263. Phylogenetic relationships of members of the *P. nitida*- and *P. chalcea*-Groups (species 16-26, Fig. 260). * = nominal taxon of species group. r=reversal; h=homoplasy.

4.3.1.2. PAUP analysis and problematic characters.

The following section is comprised of three elements. In the latter two sections I discuss some aspects of the phylogeny, and I rationalize reasons for not accepting a subgeneric classification of Plateumaris. Firstly, however, I detail aspects of the way I used PAUP as a tool for character analysis, and this merits introductory comment. I found that uncritical acceptance of PAUP-generated phylogenies was not warranted, but that as a tool it was effective in suggesting alternate interpretations. Therefore, it is necessary to rationalize both the limitations of computer-aided phylogenetic reconstruction, and the way in which I found it beneficial.

Two methods of PAUP analysis. Two methods of analysis were used, of which one was discussed in Methods. This method was complex and fraught with procedural complications. In particular, the margin for error when deriving compatibility matrices and when recoding character matrices for PAUP was unacceptably large. Furthermore, results did not become progressively more satisfactory from initial to final analyses, as I anticipated. PAUP generated multiple trees with differences in detail of arrangement within groups, for two reasons. Firstly, PAUP generated all topographically different combinations of trees that could be exchanged among various arrangements of unresolved polychotomies (e.g. the P. pusilla-Group). Secondly, PAUP did not discriminate against violations of Dollo's Law, and I could not eliminate these despite recoding of characters by the method described.

Recoding of characters by changing single homoplastic characters into multiple consistent characters should have generated progressively fewer, more consistent trees. Analyses with PAUP increased in their consistency index, but little in resolution of relationships and character placement. PAUP generated about as many topographically different trees in all analyses, though generally fewer in the weighted analyses. Therefore, I restricted my use of PAUP to that of supplementing reconstruction by hand. I found the analyses with PAUP served to indicate broad generalities of relationship in the same *a priori* pattern I derived by hand. Despite drawbacks, PAUP served one beneficial purpose, which was to demonstrate alternative character distributions that I had not considered, and detailed discussion in the character analysis, above, reflects this.

Having found that PAUP analysis, as most commonly used, produced highly unresolved and large numbers of trees, and having decided that these results were largely undecipherable and unsatisfactory, I considered a second method that would simplify analysis. The general, large groupings of taxa that I perceived *a priori*, and that were also supported by PAUP analysis, were accepted as well founded. The method then used was to delete all taxa save those of individual major groupings that were demonstrated by both reconstructions: three groups that I thought well defined (Figs. 261-263) could be treated individually. Thus, the taxa of the *P. braccata*- + *P. rufa*-Groups were retained in one analysis, deleting all others, then retaining only those of the *P. pusilla*-Group, then only those of the *P. nitida* + *P. chalcea*-Groups. This served to elucidate character problems **within** groups more efficiently. The number of different trees was greatly reduced from nearly 100, to 9, 30 and 3, respectively. It was then possible to re-examine characters placed on these trees more carefully and with less confusion.

Polarity problems. Most groupings of taxa are well supported by synapomorphies, in particular those groupings which I recognize as species groups. In general also, relationships of taxa within species groups are well defined and resolved. However, some details warrant consideration to justify the arrangement finally selected. Characters defining broad lineages of species groups (*i*.*e*. *P*. *pusilla*- + *P*. *chalcea*- + *P*. *nitida*-Groups) are grouped by synapomorphies that could be interpreted (polarized) alternatively.

Polarity of character 35 (slender tibial apices) might be considered reversed if Criocerinae were defined as the outgroup because criocerines have slender tibiae. Reversal of polarity of this character would be sufficient to alter the phylogeny substantially (Fig. 260). The grouping of the *P*. *rufa*- + *P*. *braccata*-Groups by this character would be further supported, while all other major lineages would be an unresolved trichotomy.

Character 40 (elytral rugosity, *cf*. Fig. 262) could be polarized alternatively. Elytral rugosity is a character in which one would expect considerable homoplasy, as evidenced by other donaciines. However, reversing polarity would not cause the grouping of *P*. *pusilla*-Group + (*P*. *nitida*- + *P*. *chalcea*-Groups) to be altered because each is supported by at least one other character. Reversal of polarity would support grouping of *P*. *rufa* + *P*. *constricticollis* + *P*. *akiensis* in the *P*. *rufa*-Group on the basis of loss of elytral rugosity, rather than on the basis of reversal as is presently suggested. It is less parsimonius to invoke primitive acquisition of rugosity in the members of *P*. *braccata*- + *P*. *rufa*-Groups, lost once in the above three species, than it is to invoke rugosity as the plesiomorphic state (for

Plateumaris); this would require a loss once in each of two unrelated lineages. Suggesting that presence of rugosity is the derived state is more consistent with the hypothesized outgroup to Donaciinae (either Criocerinae or Atalasis), as well as the state typical of Donaciinae. In donaciines generally, it seems there is a trend toward increased rugosity (see Figs. 240-245). It is this hypothesis I adopt here, but note that an alternative explanation exists. This alternative is worth considering because of other problematic characters in the P. rufa-Group, with respect to P. akiensis.

Arrangement of taxa within the P. rufa-Group is affected by reconsidering another problematic character, #30 (sparse pronotal punctation), which is of a unique type in the pair of species, P. rufa + P. constricticollis. As stated in the character analysis, alteration of this character state by other pronotal characters (25, 26 and 28) seems possible, in which the type of punctation that typifies P. rufa and P. constricticollis is rendered such as to confuse character state assignment in P. akiensis. Three characters are used to support the arrangement of these species hypothesized in Fig. 261: #23 (female pygidial midline, state 2), #8 (dorsal valve with emarginate apical margin) and #10 (apical incised line of dorsal valve). These may not be coded correctly for P. akiensis because I had seen only a single female; this is a possibility because the character states are variable among series of specimens to some extent. Combined with apparent incorrect coding of character #30 for P. akiensis, this might result in a different arrangement of taxa in the P. rufa-Group, but it would not be supported by elytral rugosity (#40).

4.3.1.3. Classification of subgenera of _Plateumaris_. The phylogeny of _Plateumaris_ comprises two main lineages, the _P_. _braccata_- + _P_. _rufa_-Groups, and the _P_. _pusilla_- + _P_. _chalcea_- + _P_. _nitida_-Groups. The subgeneric classification that has been proposed previously comprises two subgenera, _Plateumaris_ _s_. _str_. (type _P_. _nigra_, =_P_. _braccata_, _P_. _braccata_-Group), and _P_. (_Euplateumaris_) (type _P_. _sericea_, placed in the _P_. _nitida_-Group). Palaearctic taxa that have been placed traditionally in the nominate subgenus are shown by phylogenetic reconstruction to be represented among all groups except the _P_. _chalcea_- and _P_. _nitida_-Groups, while all Nearctic taxa have been placed in _P_. (_Euplateumaris_) (_cf_. Jolivet 1970). Clearly these subgeneric assignments are not supported by the present analysis.

Characters that have been used to recognize the nominate subgenus [misidentified by Reitter (1920), Mohr (1966) and others as _Juliusina_], are not characters that are of use in the phylogeny. As argued earlier, such characters as sculpture, pubescence and tibial carinae have been misunderstood. The characters that I found to be of use in establishing major groups in _Plateumaris_ are not, in my opinion, sufficient to discriminate profoundly structurally different groups as subgenera. The groups of species differ structurally in only small ways, and not at all ecologically excepting a few isolated and unusual host associations. Therefore, I reject the subgeneric classification that has been used traditionally. Furthermore, I propose that no other subgeneric classification of _Plateumaris_ be used at this time because I have not been able to find synapomorphies for major lineages of the genus that are of unequivocal polarity, or that serve to separate such lineages in a marked way.

4.3.2. Biogeographic considerations.

In this section I develop hypotheses about the geographic history of donaciines in general, with a view to placing the geographic history of members of *Plateumaris* in its proper temporal perspective. I draw on geologic, chorologic and fossil data to develop an hypothesis about the time frame that the geographic history of donaciines in general, and then of *Plateumaris* in particular, should be understood in.

4.3.2.1. General distribution of Donaciinae. Most donaciines are distributed in warm-temperate to boreal regions. Most donaciines inhabit relatively temperate zones of the northern continents (Figs. 264-269). Some are tropical: *Donaciasta* is largely Afrotropical (Fig. 265), *D*. (*Cyphogaster*) is Australasian (though principally Oriental), and one species of *D*. (*Donacia*) is known from Botswana.

Members of the subgenus *D*. (*Donacia*) are distributed mostly in southeastern North America (10 species), but with five Old World species: *D*. *crassipes* from Europe to Lake Baikal, *D*. *ozensis* from Japan, *D*. *recticollis* from northeastern India, *D*. *ussuriensis* from the Ussuri River adjacent to Korea, and an undescribed species from Botswana. *Donacia* (*Donaciomima*) is by far the most diverse assemblage of taxa, with 22 Nearctic and 52 Palaearctic taxa, but none in other zoogeographic regions.

Four of the genus-group taxa recognized here have members in both the Nearctic and Palaearctic regions: *Plateumaris* (Fig. 265), *D*. (*Donaciomima*) (Fig. 269), *Donaciella* (Fig. 267) and *D*. (*Donacia*) (Fig. 266). The members of *Poecilocera* and *Neohaemonia* are restricted to the Nearctic region, while those of *Macroplea* and *Sominella* are trans-Palaearctic in distribution (Figs. 267, 268). Donaciines could be considered a group of Laurasian origin, but for a few elements.

4.3.2.2. Argument for geologic age of Donaciinae. The argument I make here for a minimum geologic age of Donaciinae has implications for understanding the probable temporal framework of the geographic history of *Plateumaris* in particular, and donaciines in general. The data I use to construct this argument are of two types: chorological and fossil. Chorologic evidence is interpreted according to vicariance biogeographic criteria, such that the probable age of certain genera that have significantly anomalous distributions (in relation to other donaciines) can be estimated. By extension, some inferences about the age of *Plateumaris* can be made because it occupies the most primitive position within Donaciinae. Fossil evidence is of considerable importance in donaciines; of three significant fossil deposits that contain donaciines, two are North American and the specimens have been available for study (Askevold 1990). Below, I discuss first the chorologic data, and then the fossil data.

Chorological data. Several donaciine genera have distributions that could be considered of prime interest for biogeographic analysis. Genera that have members in more than one zoogeographic region are temporal reference points in the phylogenetic framework. Interpreted in according to vicariance biogeographic criteria, such groups offer insight concerning the *minimum* geologic age of the lineages to which they belong. Because of their phylogenetic position among donaciines, they have significant implications toward understanding the geologic age and geographic history of donaciines. *Donacia* (*Donacia*) and *Donaciasta* are such groups.

Donaciasta, with members in continental Africa, Madagascar, and southeast Asia (Fig. 265), could be argued to have an origin prior to breakup of Gondwanaland in the late Cretaceous. Dietz and Holden (1970), for example, place the separation of Madagascar from Africa near the end of the Cretaceous. Raven and Axelrod (1974) maintain that India, Madagascar and Africa remained connected until at least 100 mya. It could be argued, therefore, that both lineages of the genus (i.e. D. luridiventris + D. perrieri and D. goeckei + D. abortiva) that occupy both Madagascar and continental Africa (Fig. 265) underwent a vicariant separation in the late Cretaceous, preceded by earlier diversification that gave rise to D. dentata which is now restricted to Mozambique and D. assama, which rafted to, or was left behind in, southeast Asia. The origin of Donaciasta would be placed before 100 mya, because these two Madagascan lineages are the most derived in the genus.

It could certainly be argued that the two Madagascan species of Donaciasta could have dispersed there more recently, and this explanation is easiest to accept. However, that does not negate the necessity to explain the disjunct distribution of the genus, with D. assama (Fig. 265, taxon #1) in southeast Asia. Such a distribution is less easily explained by dispersal, and is more consistent with a vicariance interpretation that dates the age of Donaciasta as greater than 100 my in age.

The distribution of D. (Donacia) is rather Carolinian (Fig. 266), with greatest diversity in southeastern North America, but it represents a mixture of elements of undetermined relationship. Occurrence of members in Cuba and Central America are best explained as Quaternary relicts of glacial displacement, because these are populations of two or three species whose main distribution is mostly southeastern, from Florida to eastern Canada. With D. crassipes, D. ussuriensis and D. ozensis occurring in the northern Palaearctic Region, D. (Donacia) would appear to be a rather typical Laurasian group. However, two austral elements confuse geographic relationships. The Afrotropical element (an undescribed species from Botswana), and the Indian element, D. recticollis, suggest that a component of the geographic history of this group is different from most others in the Donaciinae. Relationships of the species assigned to this subgenus have not been analyzed, but the African species in particular is significant, because the distribution of the subgenus, interpreted in a vicariance framework, suggests a geologic age greater than late Cretaceous.

We could deduce, on the basis of the distributions of Donaciasta and D. (Donacia), that donaciines have an origin that must antedate fragmentation of Pangaea, and that the present distribution of donaciines is in part due to vicariant events. Vicariance biogeography theory assumes some degree of widespread distribution of ancestral lineages prior to vicariant events. If this is so, it is difficult to conceive of a reason that there should be no genera of donaciines that have members in both northern and southern continental regions. This expectation could be formulated as a prediction. Such a prediction concerning spiders of the austral genus Eilica, led Platnick (1976) to search for and find a species in India. A number of chrysomelid genera have distributions of this type, and are still effectively cosmopolitan today: e.g., Chaetocnema, Altica, Longitarsus, and Epitrix, to name a few alticine genera. By similar reasoning, in hind-sight, it could have been predicted that species of some Laurasian donaciine groups should occur in Africa, and South America also. Conversely, representatives of Gondwanian groups, of which there is only Donaciasta, should be found in a Laurasian continental area.

The two expectations are borne out, albeit a posteriori, by the occurrence of a species in Botswana of the Laurasian group, D. (Donacia) (but none are known from South America), and by the occurrence of a southeast Asian species of the Gondwanian genus Donaciasta. On the basis of these chorological data, it is arguable that the subgenus and genus, respectively, were in existence prior to complete fragmentation of Pangaea. In the reconstructed phylogeny of genera of Donaciinae (Figs. 264, 275), these two taxa represent more recent lineages. Therefore, the lineages comprising the Plateumarini and Donaciini must have diverged from each other well in advance of the late Cretaceous. Logically, the origin of Plateumaris must have been much earlier in the Cretaceous, if not the Jurassic period, and the geographic history of members of this genus must be understood in this extended temporal framework.

Fossil data. Three Tertiary deposits containing fossils of Donaciinae offer data bearing directly on discussion of the geographic history of Donaciinae: the Eocene Brown Coal of Germany, the early Oligocene Florissant shales, and the late Palaeocene Paskapoo Formation in Alberta. The former specimens were studied by Goecke (1943) and Haupt (1956). Haupt described two fossil genera (comprising three species), and one species assigned to Plateumaris. Plateumaris fallax Haupt is not a donaciine, in my opinion. Discussion below of these taxa is based on interpretation of the descriptions and figures provided by Haupt, and must be limited to assessment of their generic assignment only.

Haupt apparently erected Hemidonacia (including two species) and Eodonacia (including one species) on palaeontologic grounds, but I find no characters in the descriptions and figures that he provided that merit recognition of these as valid genera. I assess Eodonacia as a synonym of D. (Donacia), and Hemidonacia as a synonym of D. (Cyphogaster). Eodonacia goeckei Haupt appears to be very similar to the extant D. crassipes, while Hemidonacia insolita Haupt appears to agree most with the extant D. (Cyphogaster) provosti. If correctly placed in D. (Cyphogaster), H. insolita would be significant because the subgenus does not occur in the western Palaearctic Region today. This should not be surprising, for if a species of D. (Donacia) could become isolated in Africa, representing an earlier, more cosmopolitan distribution, then a former, broad distribution of D. (Cyphogaster) in Laurasia is plausible. Both Eocene taxa, whether conspecific with extant taxa or not, are significant because they demonstrate that their respective subgenera had at least one representative in the western Palaearctic Region at that time. This interpretation confirms expectations resulting from vicariance biogeography, that Laurasian elements of Donaciinae existing at that time at least belong to extant genera, if not smaller groups of species whose members are extant.

Two other fossils, both North American, are important. The Florissant fossil of Donacia primaeva Wickham is reassigned to Plateumaris, placed in the P. nitida-Group near P. nitida, and the Palaeocene fossil, Donacia wightoni Askevold, is placed in D. (Donacia) near D. cincticornis Newman (Askevold, 1990). Both fossils are significant, for reasons similar to those expressed for the Eocene fossils; they place the age of the lineage (i.e. species-group) related to them at greater than 30 my for *P. nitida*, and greater than 58 my for *D. cincticornis*. Furthermore, the Palaeocene fossil is the oldest known fossil of Donaciinae; as a representative of a highly derived lineage in the subfamily, the logical conclusion must be that the most primitive genera, such as *Plateumaris* and *Poecilocera*, are considerably older than 58 my.

Both fossil and chorological data support the interpretation that donaciines are a group with an origin significantly antedating major geologic events in the late Mesozoic (implications of this to understanding host plant relations are discussed below). One important contribution of these data to understanding the evolution and geographic history of *Plateumaris* in particular and of donaciines and perhaps many temperate organisms in general, is that two easily-invoked *a priori* assumptions must be cautioned against: 1) that extant donaciines are the tattered remnant end-points of a phylogenetic history during which the majority of members have become extinct, and 2) that present distributions of taxa are based essentially on late Tertiary and Quaternary phenomena. The former assumption is not supported by the chorologic and fossil data discussed above. The latter is argued against next.

4.3.2.3. Biogeography of Nearctic Donaciinae. The following discussion is modified from Askevold (1988), developing the reasoning by which I reject the possibility that present distributions of Nearctic donaciines are derived solely from Quaternary glacial periods, and argue that faunal interchange of donaciines between continents was effected much earlier, in the Tertiary. This reasoning establishes the basis for acceptance of vicariant events as the most significant in establishing taxon relationships on the gross geographic scale, both inter- and intracontinentally.

In the Nearctic region the subfamily is most diverse in eastern North America. A typical distribution is that of *P. rufa* (Fig. 246). Only two of the 56 North American species are restricted to the west (*P. neomexicana*, Fig. 256 and *P. dubia*, Fig. 255). Other species are transcontinental, notably *P. pusilla* and *P. nitida* (Figs. 248, 258). There are few records for any North American donaciine species north of 60° north latitude: (*i.e.* *Donacia distincta* LeConte, *D. hirticollis* Kirby, *Plateumaris flavipes*, *P. aurifer*, *P. fulvipes*, and *P. germari*). Of members of *Neohaemonia*, *N. flagellata* alone approaches 54° north latitude in known distribution (Askevold 1988).

To a great extent, donaciines were displaced southward during Pleistocene glaciations, as evidenced by relictual populations of several species in refugia, in southern Cordilleran high altitude locations, and in Cuba and Honduras: *Plateumaris flavipes* in northern New Mexico at 2,740m elevation, *P. neomexicana* in the White Mountains of Arizona and the Jemez Mountains of New Mexico, *P. germari* in the Santa Rita Mountains of Arizona, *P. pusilla* in the Davis Mountains of Texas, and *P. robusta* from the Sacramento Mountains of New Mexico, *D. cincticornis* in Cuba, and *D. hypoleuca* Lacordaire in Honduras (unpubl. data), are species showing such relict populations. Relatively northern occurrences in North America of some species must be the result of post-Wisconsinan dispersal from more southern periglacial areas following climatic amelioration. As Kavanaugh (1989, pers. comm.) observed, it is counterintuitive to suggest dispersal from Beringia southward, and thence to high-altitude refugia of boreal habitats, because dispersal would must have occurred in a direction that was the reverse of the pattern of post-glacial climatic amelioration.

According to Axelrod and Raven (1985) the Cordilleran flora had become essentially modern by the Mid-Oligocene (27 mya), but representatives of the temperate trees and associated shrubs were present by Early Eocene (e.g. Abies, Picea, Pinus, Betula, Populus). Many near-modern species of Pinus were present in Mid-Oligocene (circa 27 mya) (Axelrod, 1986). If floras were already modern or near-modern in the Eocene and Oligocene, it seems logical that the phytophagous beetles that had been dependent upon these plants and the angiosperms, should also have been modern or near-modern in faunal constitution.

Mixed evergreens and deciduous hardwoods were continuously distributed from the central United States along the present axis of the Sierra Madre Oriental in the Early Tertiary (Rosen 1978). The Northern Hemisphere did not cool severely until the Eocene-Oligocene boundary (circa 36 mya), so temperate climates extended as far north as the Arctic Circle until the Middle or late Eocene (circa 36-52 mya) (Noonan, 1986). That flora was near-modern in the Eocene, and essentially modern in the Oligocene (Axelrod and Raven, 1985). In the Middle Tertiary, with uplift of the Sierra Madre and the western Cordillera, the forests shifted eastward in both Middle America and the United States. Subsequent cooling and drying resulted in a major disjunction between the North and Middle American biota, and between eastern and western North America.

Movement of forest insects into and across the Beringian and North Atlantic bridges was not fully disrupted until the Late Miocene (Matthews 1979, 1980). Before this time, the northern Palaearctic and

Nearctic regions were characterized by mixed mesophytic and coniferous forests, and exchange of faunas like donaciines, which occupy this broad biome, was conceivable. However, the North Atlantic bridges and Beringia diminished in potential for exchange of terrestrial biota after about mid-Eocene; treeless conditions prevailed there by Late Miocene, with distinctively subarctic faunas being present earlier in the Miocene. There are few species of Donaciinae which extend very far into the arctic. In fact, none are truly boreal taxa at all in the sense used by Danks and Foottit (1989); they merely overlap the boreal zone broadly, but are basically elements of warmer biotic zones. Thus, it is probable that any exchange and/or vicariance among lineages of Donaciinae must have antedated development of subarctic floras, *i.e.*, before the Miocene. That no Holarctic species of Donaciinae are known could be interpreted as supporting this hypothesis.

Following late Oligocene orogeny and consequent drying of the midcontinent, most mesophytic temperate elements became isolated in eastern North America and México (Allen 1983, Axelrod and Raven 1985, Rosen 1978). Mesophytes thus diminished in diversity in the west, and were replaced by more xerophytic plants such as *Pinus* (Axelrod 1986). Two major events thus resulted in the shift of habitats suitable to donaciines: a permanent shift southward once the Northern Hemisphere cooled about 36 mya (Eocene-Oligocene boundary), and a permanent shift eastward following cordilleran uplift (late Oligocene). Thus, intercontinental exchange of the donaciine fauna could have taken place many times over a 50-60 my span, as long as mixed mesophytic and coniferous forest habitats persisted across Beringia and/or the North Atlantic, but the continuous habitat was permanently disrupted by climatic cooling, orogeny and continental drift.

Two additional lines of reasoning cause me to reject recent geological phenomena as formative of the majority of the donaciine faunal distribution patterns. Firstly, if late Tertiary and Quaternary events were the principal cause, how can it be possible that almost all Nearctic taxa of Donaciinae are distributed in eastern North America today? It does not seem reasonable to presume that there were enough glacial refugia in eastern North America to account for the number of speciation events required to produce the number of taxa occurring there. The most species-rich phytophagous groups of beetles, Curculionidae (Anderson 1988) and Chrysomelidae, are both maximally diverse in eastern North America; this is an interesting correlation with plant distribution. As most mesophytic plants became restricted to eastern North America following uplift of the western Cordillera, the beetle taxa which fed on them should have done so also.

Secondly, data available concerning insect deposits from interglacial and periglacial deposits point to lack of appreciable evolution in this time interval. All Pleistocene donaciines I have examined are identifiable as extant taxa, where sufficient fragmentary material has been available (Askevold 1990, Elias 1985, Elias _et_ _al_. 1986, Pilny _et_ _al_. 1987, Pilny and Morgan 1987). This is supported by data from other insect groups. Coope (1970, 1979), Morgan and Morgan (1980), Schwert and Ashworth (1988) and Morgan (1989) assembled evidence showing that distributions of Coleoptera have been radically affected during the late Cenozoic by glaciation. Many species, once or repeatedly widespread, are now greatly restricted in distribution, having become extinct over much of their range, or the range has shifted greatly and repeatedly. Among the Pleistocene donaciines I have examined, some are distributed very broadly today (e.g. Plateumaris pusilla, P. flavipes) and they are common in periglacial and interglacial deposits.

Broadly distributed extant taxa must have been greatly affected many times by glaciation, but this would not necessarily have caused local to widespread differentiation sufficient to result in speciation. As Coope (1979) stated, such events must have been responsible not only for the repeated disruption of distributions, but also for the repeated introgression of temporarily ruptured ranges. The consequence of such shifts in distribution would be a tendency to panmixus of transamerican populations such that little structural differentiation could be maintained by vagile insects such as donaciines. This is well evidenced by widespread species of Donaciinae, which are transamerican in distribution, but show little or no geographic differentiation: P. flavipes, P. pusilla, P. nitida, P. germari, P. aurifer, D. subtilis, D. distincta, D. proxima. If recent phenomena, and merely glacial-age phenomena, were insufficient in duration and extent to allow or cause substantial geographic differentiation of donaciine populations, other, geologically more profound and permanent events must be invoked to explain patterns of phylogenetic differentiation seen in donaciines (and other temperate-climate insects).

Distributions of groups of arthropods showing east and west North American vicariants are correlated with Late Oligocene orogeny of the Western Cordillera by Allen (1983) and Noonan (1986, 1988a). Between the Oligocene and Late Cretaceous, eastern and western North America were continuous physically and floristically, and therefore probably faunally, so an event(s) between the Late Cretaceous and Late Eocene (40 mya) must have split this continuity. The Turgai Sea had already long divided Europe from Asia, The Mid-Continental Sea in North America since the Late Jurassic Period (163-169 mya) (Hallam 1981, Hamilton 1983). persisted until *circa* 70 mya, and the Turgai Sea until *circa* 30 mya (Hallam 1981). The history of these epicontinental seas is one of varied extent. In particular, the Mid-Continental Sea partially regressed in the Late Cretaceous (< 84 mya) (Hamilton 1983), which may have provided opportunity for introgression in the northern extremes of North America. Thus, for a period of 20 - 30 my, there were two Northern Hemisphere continents: Euramerica and Asiamerica. Europe and Asia were severed from their American counterparts in the Mid-Eocene and Late Eocene, respectively. At least with respect to Asiamerica, the nature of the connection between Asia and western North America is not agreed upon (Noonan 1986), so it is not clear that faunal exchange was in fact possible.

4.3.2.4. Biogeography of *Plateumaris*. In the late Mesozoic through to the present, rather few major geologic events, which could be considered responsible for wholesale modification and diversification of faunistic and floristic communities, have occurred. These are late Cretaceous transgression of the Mid-Continental Seaway [Hallam (1981) stated 91-97.5 my; Hamilton (1983) and Allen (1983) stated 100 my] and the late Oligocene uplift of the western Cordillera (consequences discussed above). Assuming that these two principal events were formative of a significant proportion of the Nearctic fauna, then the Nearctic component of lineages should consist of no more than four taxa if their most closely related taxa are Asian or European. This expectation is not borne out, for at least 10 biogeographic patterns of the Nearctic fauna can be found, with little agreement among them (Noonan 1988b).

The Nearctic *Plateumaris* show three to four patterns of distribution: transamerican (*e.g.* *P. pusilla*, *P. germari*, *P. nitida*), eastern (*e.g.* *P. rufa*, *P. balli*, *P. schaefferi*, *P. notmani*), western (*P. neomexicana* and *P. dubia*) and prairie (*P. robusta*). Some eastern species extend to the west, with scattered occurrences in the Cordillera (*e.g.* *P. chalcea*, *P. frosti*, *P. fulvipes*), but are otherwise principally eastern taxa.

The intercontinental relationships of these taxa are largely equivocal. Taxa that are eastern American in distribution are most closely related to taxa occurring in the eastern Palaearctic Region and Japan (see accompanying Table 4). Taxa that are transamerican in distribution are most closely related to taxa that are transpalaearctic in distribution, and no particular geographic relationship can be selected.

Thus the two groups of species comprised respectively of *P. rufa* + *P. akiensis* + *P. constricticollis* and *P. fulvipes* + *P. roscida* show a distributional relationship that correlates with an Asiamerican vicariance event. This event is the most recent of those used by Noonan (1986,1988a) and Allen (1983) to explain intercontinental relationships. The transamerican + transpalaearctic taxa such as *P. germari* + *P. weisei* could be correlated with either a Euramerican or Asiamerican event, without subsequent speciation.

Present distributions of other members of the *P. pusilla*-Group do not permit better resolution of relationships save solely by conjecture. The species pair of *P. pusilla* + *P. robusta* could have developed as a result of isolation and restriction of a population, which became *P. robusta*, in prairie refugia during glacial maxima. Similarly this could have occurred in the pair of species, *P. flavipes* + *P. aurifer*, (though not in prairie refugia). Alternatively, late Oligocene orogeny might have isolated P. pusilla and P. flavipes in the west, and P. aurifer and P. robusta in the east, with subsequent transcontinental dispersal. Neither choice is more than ad hoc, speculative and unfounded.

In the P. nitida-Group, the species pairs of P. nitida + P. frosti and P. sericea + P. shirahatai are related in a way that would require two vicariant events, one intercontinentally and one intracontinentally (one event in each of the Nearctic and Palaearctic regions). As detailed above, orogeny and Asiamerican or Euramerican events could be considered correlated with the phylogenetically advanced speciation events, but fail to account for earlier diversification that produced other taxa in these same species-groups, and even earlier, broader relationships. As in the P. pusilla-Group, the split between P. nitida and P. frosti could be correlated with either glacial advances or late Oligocene orogeny. For either probability, subsequent transamerican dispersal is required, but entirely probable in view of the time span involved.

The only group of species that might be accounted for by strict correlation with major events is the P. chalcea-Group. The species pair of P. metallica + P. dubia could easily be the product of Quaternary glaciation (see discussions of these taxa). Diversification in the group would then require only two prior events, according to the following scenario: division of the continent by the Mid-Continental Seaway produced a lineage that was or became P. chalcea, and a western lineage. The P. chalcea-lineage did not diversify further, while the other western one became more transcontinental, to be redivided by cordilleran uplift, producing P. neomexicana to the west, and P.

metallica + P. dubia to the east; this latter extending westward to be divided subsequently by glaciation to produce P. dubia.

All these scenarios or geographic histories are effectively speculative, and can at best be only tentatively correlated with possible events. That each species-group requires a different explanation, or that a unique explanation could be applied to each, is hardly surprising. Dispersal, especially intracontinentally after vicariance, must be a very chancy affair, producing a wide range of possible, if not also conflicting, distributional patterns. The idea that many present day taxa represent old lineages the origins of which extend well into the Tertiary Period is one that is developing and finding support in various groups of insects (Downes and Kavanaugh 1988, Lafontaine and Wood 1988, Schwert and Ashworth 1988, Noonan 1988a, Pollock 1988, Askevold 1988) and in other groups of donaciines as detailed herein.

Clearly there is a repetitive pattern of distribution of Donaciinae, which is mostly an eastern Nearctic - eastern Palaearctic (China or Japan) pattern of nearest relative. Such a similar (though unanalyzed) relationship, in addition to those found in Plateumaris, exists between some other species pairs, as enumerated above (and cf. Table 4). These species pairs consist of taxa that are exceptionally similar to one another, differing mostly only in genitalic details. These taxa could be added to those discussed by Allen (1983) and Noonan (1986, 1988a) as showing an Asiamerican vicariance relationship. However, for the most part, I find that more than one explanation of the geographic history of any group of species can be invoked, each correlated with events in some manner. On the whole, then, there is no objective decision that can be made, on the basis of the distribution of these extant taxa, to select one pattern over another as formative of the Nearctic fauna. What is clear, though, is that fossil and chorologic data on a global basis demonstrate that the geographic history of Plateumaris and other donaciines is rooted deeply in the Mesozoic and Cenozoic Periods. As such, it comes as no surprise that no finer resolution of vicariance becomes apparent, for many of the events that can be correlated with speciation are merely those that are most recent in the evolution of the group.

TABLE 4.

Geographic relations of Nearctic and Palaearctic counterparts of sister lineages among selected Donaciinae[1].

NEARCTIC LINEAGES		PALAEARCTIC COUNTERPARTS	
eastern	transamerican	eastern	transpalaearctic
Plateumaris rufa		*P. akiensis* and *P. constricticollis*	
P. fulvipes		*P. roscida*	
	P. germari		*P. weisei*
	P. nitida and *P. frosti*		*P. sericea* and *P. shirahatai*
Donacia assimilis		*D. bicoloricornis*	
	D. distincta	*D. hiurai*	
	D. proxima	*D. ozensis*	

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[1] Relationships among members of *Donacia* are not based on reconstructed phylogeny, but are taxa that I find more similar to one another than to other members in their respective zoogeographic regions.

FIGURE 264. Phylogenetic relationship of world genera of Donaciinae, and geographic regions of distribution. Diversity is indicated by the number of species in each region.

	PLATEUMARIS	POECILOCERA	SOMINELLA	S. RETICULATA	S. KRAATZI	DONACIELLA	"D." MICROCEPHALA	D. (DONACIOMIMA)	D. (DONACIA)	D. (CYPHOGASTER)	DONACIASTA	HAEMONIINI
NEARCTIC	17	1				1		22	10			5
W. PALAEARC.	9			1		3		52	1			4-5
E. PALAEARC.									1-2			
ASIA			2		1		1			9		
INDO-AUSTR.												
IND.SUBCONT.									1		1	
AFRICA									1		3	
MADAGASCAR											2	

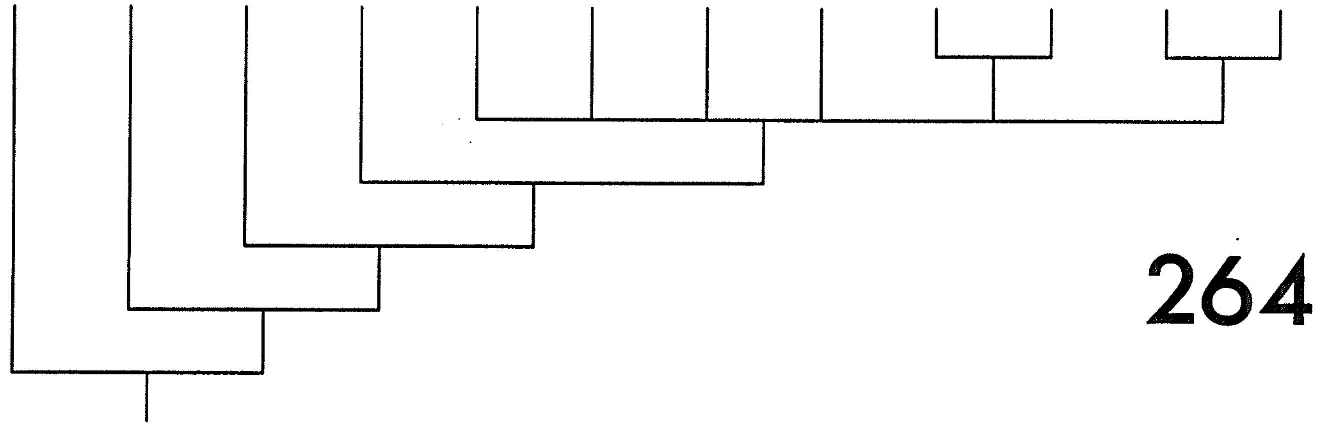

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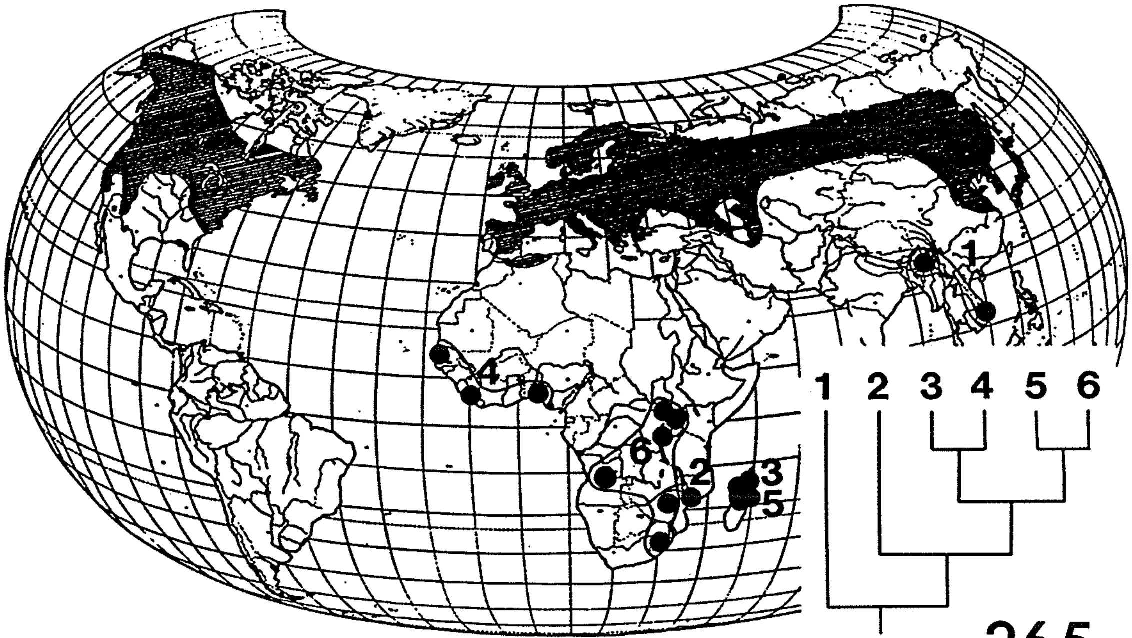
FIGURE 265. Distribution of *Plateumaris* (cross-hatched) and *Donaciasta* (dots). Nearctic distribution based on present data; Palaearctic data based on Medvedev (1973), Anonymous (1985) and Borowiec (1984). Data for distribution of *Donaciasta*, and phylogeny of its members, from Askevold (in prep.). 1 = *D. assama*; 2 = *D. dentata*; 3 = *D. perrieri*; 4 = *D. luridiventris*; 5 = *D. abortiva*; 6 = *D. goeckei*.

FIGURE 266. Distribution of nominate subgenus of *Donacia*. 1) Nearctic distribution of 10 species from Marx (1957) and unpublished data; 2) *D. crassipes* distribution from Borowiec (1984, figs. 14 and 36); 3) *D. ussuriensis* data from Medvedev (1973); 4) *D. ozensis* data from Anonymous (1985); 5) *D. recticollis* data from Jacoby (1893) and holotype and topotypical specimens examined by me; 6) Okavango Swamp species (Botswana) is undescribed. I have not examined specimens of *D. ussuriensis* to ascertain its validity; relationships of the members of *D.* (*Donacia*) have not been reconstructed.



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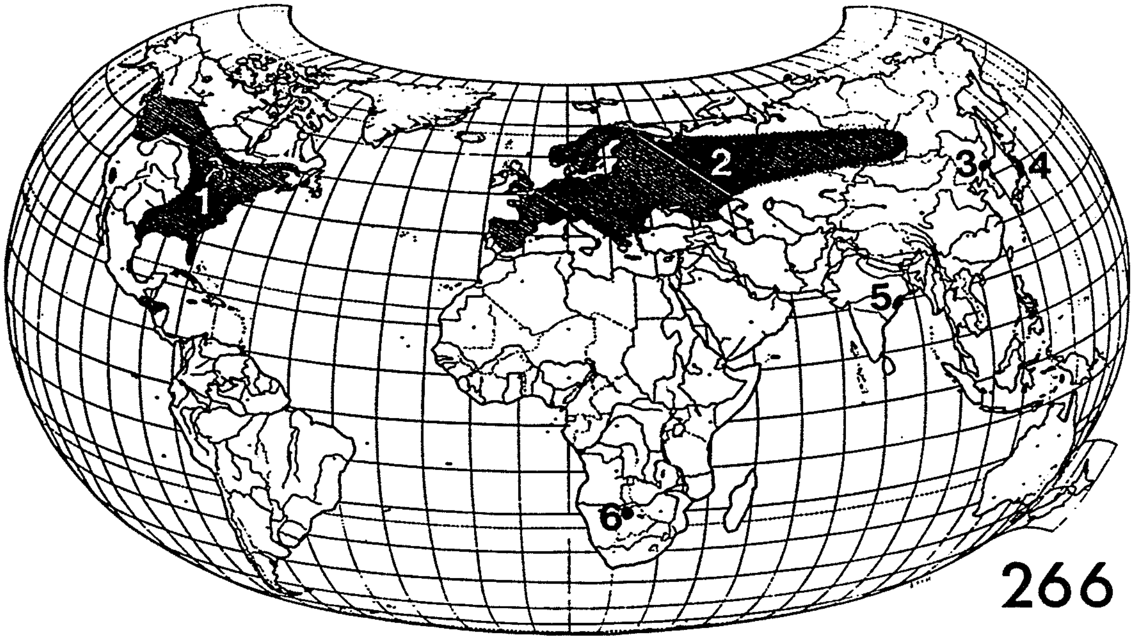

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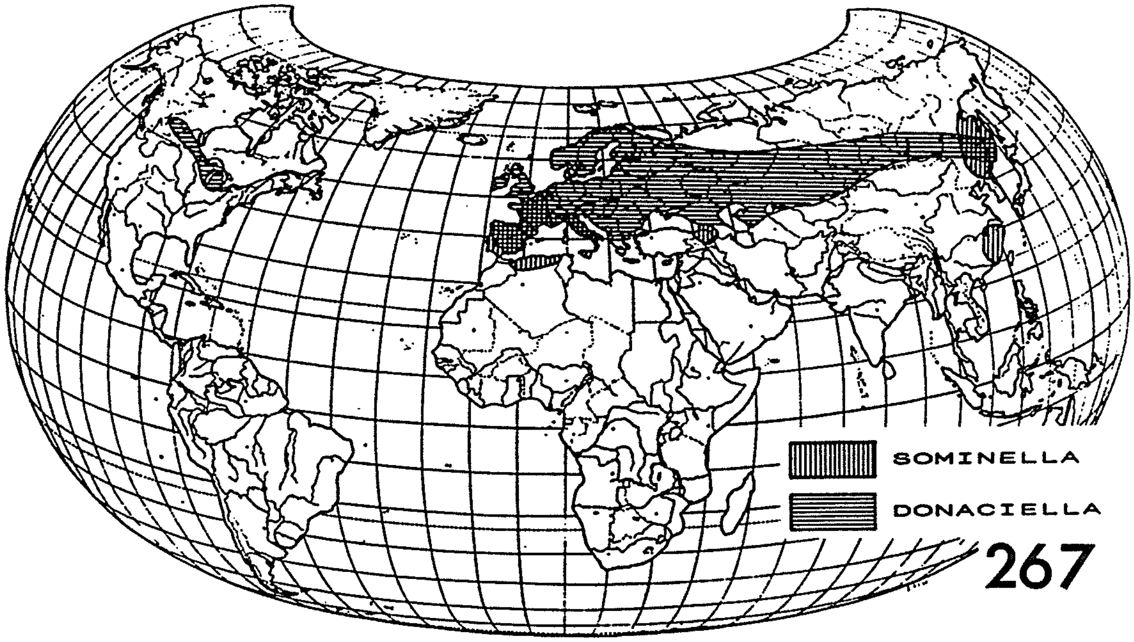
FIGURE 267. Distribution of the genera _Sominella_ and _Donaciella_; that of _Donaciella_ based on Marx (1957), Boroweic (1984) and unpublished data; that of _Sominella_ based on Goecke (1931), Gressitt and Kimoto (1961), Borowiec (1984) and unpublished data.

FIGURE 268. Distribution of genera of Haemoniini, based on data from Askevold (1988), Borowiec (1984), Anonymous (1985), Medvedev (1977) and Weise (1893). V = _Neohaemonia_ _voronovae_ (left as _incertae_ _sedis_ in Haemoniini); Nearctic distribution corresponds to _Neohaemonia_ and Palaearctic distribution corresponds to _Macroplea_.



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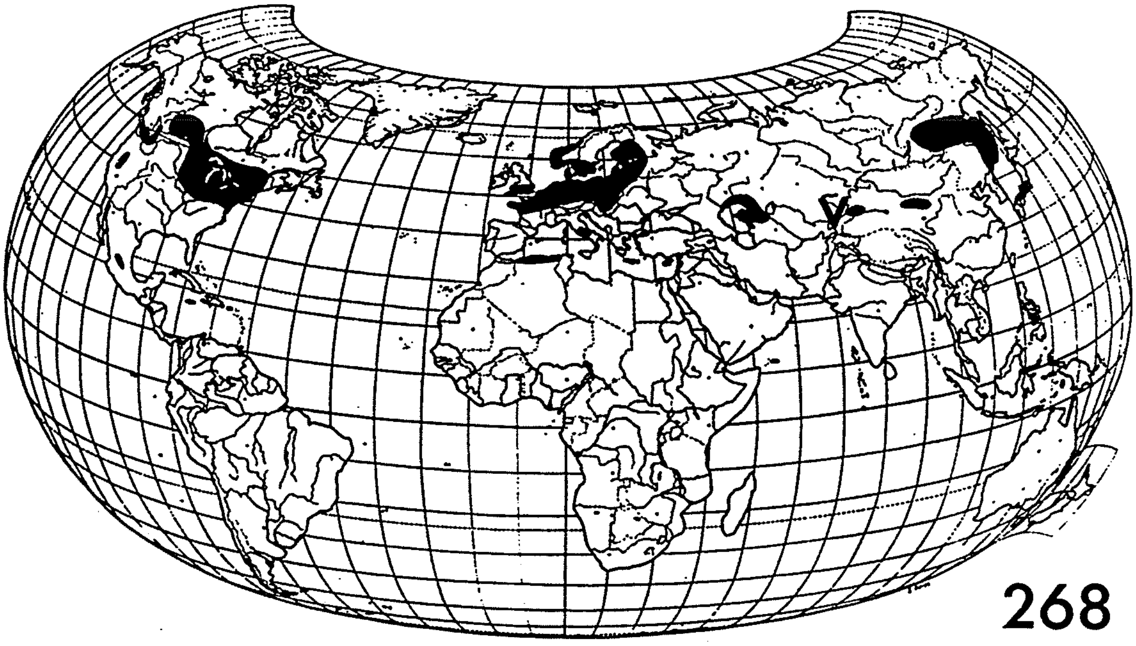

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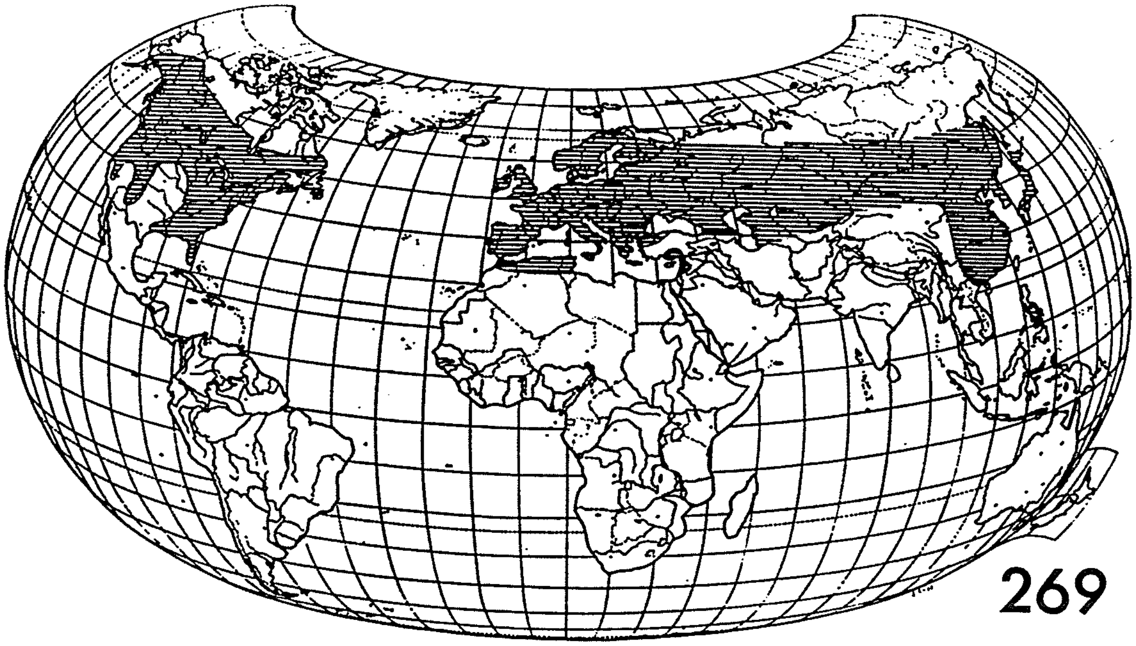
FIGURE 269. Distribution of D. (Donaciomima); Nearctic data from Marx (1957) and unpublished data; Palaearctic distribution based on Borowiec (1984) and Anonymous (1985).

FIGURE 270. Phylogenetic relationship of world species of Plateumaris Thomson, and geographic distribution of each species.



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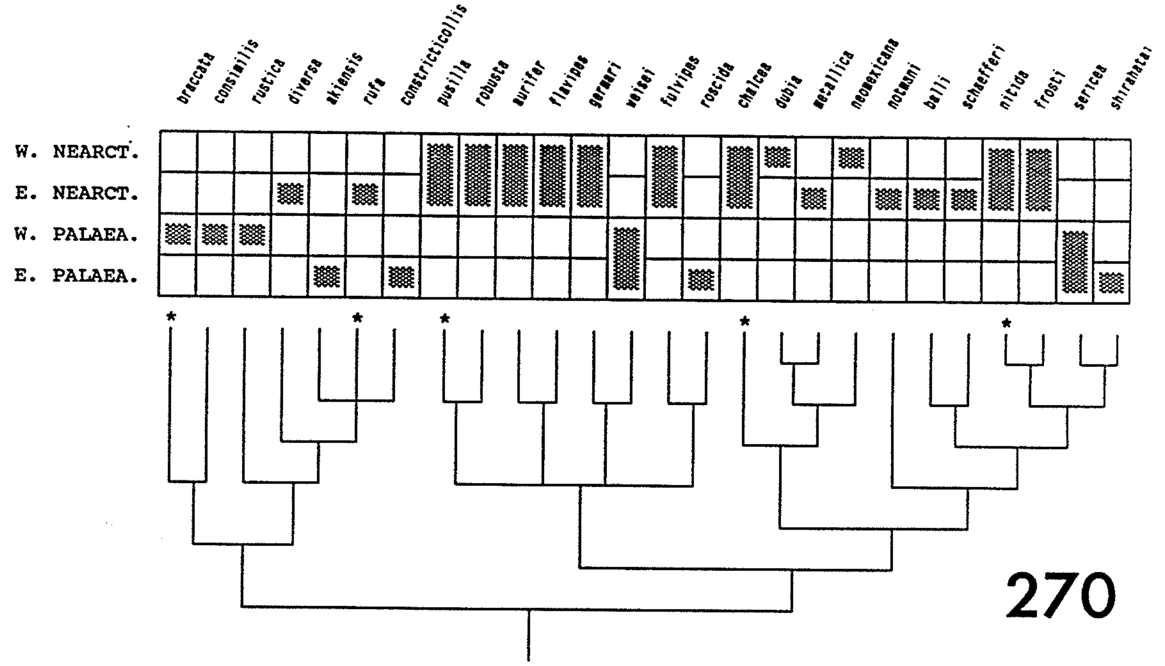

	braccata	consimilis	rustica	diversa	akiensis	rufa	constricticollis	pusilla	robusta	aurifer	flavipes	germari	weisei	fulvipes	roscida	chalcea	dubia	metallica	neomexicana	notmani	balli	schaefferi	nitida	frosti	sericea	shirahatai
W. NEARCT.								▨	▨	▨	▨	▨		▨		▨	▨		▨				▨	▨		
E. NEARCT.				▨		▨		▨	▨	▨	▨	▨		▨		▨		▨		▨	▨	▨	▨	▨		
W. PALAEA.	▨	▨	▨										▨												▨	
E. PALAEA.					▨		▨						▨		▨										▨	▨

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