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

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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)

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5. SYSTEMATICS OF THE NEW WORLD GENUS POECILOCERA SCHAEFFER.

As a result of reconstruction of relationships of genera of Donaciinae, I found that Poecilocera would have to be resurrected from synonymy with Sominella. Therefore, I redescribe Poecilocera and its single included member, below.

The name Poecilocera was first proposed for a subgenus of Donacia (sensu lato) by Schaeffer (1919) to accommodate a single Nearctic species, Donacia harrisii LeConte. As Schaeffer observed, this species possesses character states similar to Plateumaris, but also to Donacia. The name Plateumaris had not yet achieved common use as a genus name among North American coleopterists by the time Schaeffer revised the Nearctic Donaciinae (1919, 1925). Thus, Poecilocera was not recognized as a genus either. Goecke (1931) was the first and last author to examine the generic assignment of Donacia harrisii, and transferred it to the genus Sominella on the basis of gross similarity and antennomere proportion. Marx (1957) followed Schaeffer (1925) and considered Poecilocera a subgenus of Donacia, while Monrós (1959) considered Sominella (including D. harrisii) a subgenus of Plateumaris. Recent authors (i.e. Jolivet 1970, Borowiec 1984), retained genus status of Sominella, with D. harrisii placed in it.

5.1. ELEVATION OF POECILOCERA TO GENUS STATUS.

Adult specimens of Poecilocera are characterized primarily by plesiomorphic character states: small eyes, undeveloped vertexal calli, lack of pubescence on pronotal hypomeron, rounded elytral apices (or apex depressed, and therefore appearing emarginate), robust, tapering tegmen, lack of subbasal angulation of median lobe, teeth of mandibles approximate, and mesosternal process narrow.

Adult specimens of Sominella also share most of these plesiomorphic states, but shape of elytral apex and hypomeral pubescence vary; the tegmen is slender, and mandible with apical teeth a little divergent. These character states are derived in relation to the states possessed by Poecilocera (and Plateumaris), and are shared with other genera of Donaciini and the Haemoniini.

Additionally, specimens of P. harrisii have a slightly developed hypomeral pubescent area, which I consider tentatively a state intermediate between that shown by Plateumaris and most of the Donaciini and Haemoniini. Among the species placed in Sominella, a variety of states occur; specimens of S. longicornis lack hypomeral pubescence; those of S. reticulata have only a very few inconspicuous setae and could be equally considered as lacking, or having poorly developed, hypomeral pubescence; specimens of S. macrocnemia are much like those of P. harrisii in this character, while those of S. kraatzi have hypomeral pubescence fully developed, as in other Donaciini. I argued (Askevold 1988) that this character may have been important in donaciine evolution, its presence being apomorphic (but lost independently in the ancestor to Macroplea).

Goecke's (1931) observation that Sominella species [i.e., S. macrocnemia (F. von Waldheim) and S. longicornis (Jacoby)] are convincingly similar to P. harrisii is true. General similarity in body form and appearance would lead to the conclusion that they are congeneric: small eyes, antennomere 3 equal to or longer than 4, coarse but sparse transverse rugae on elytra, and apical teeth of mandibles approximate in Poecilocera, only a little divergent in Sominella. Specimens of S. longicornis have the apical sutural interval somewhat

narrowed, similar to that of P. harrisii and members of Plateumaris, but this is not shared by specimens of S. macrocnemia or the two other species I tentatively place in the genus.

Character states possessed by members of Sominella therefore constitute a mosaic of plesiomorphic and derived states. Derived states suggest placement in Donaciini + Haemoniini, while the plesiomorphic states show affinity to the Plateumarini. Plesiomorphies cannot be used to reconstruct relationships (Hennig 1966, Kavanaugh 1972), so despite substantial similarity of P. harrisii to members of Sominella, I cannot consider them contribal or congeneric. Retention of P. harrisii in Sominella would render the latter paraphyletic. Therefore, I remove P. harrisii from Sominella and place it in a monobasic genus, for which the name Poecilocera was made available by Schaeffer (1919).

5.2. TREATMENT OF POECILOCERA.

Poecilocera Schaeffer (1919). **NEW STATUS**

Donacia (Poecilocera) Schaeffer (1919:308, 1925:120).

Sominella, ex parte: Goecke (1931, 1960a:10), Jolivet (1970:61), Wilcox (1975:3), Borowiec (1984:454).

Sominaella: Monrós and Bechyné (1956:1121).

UNJUSTIFIED EMENDATION

Plateumaris (Sominaella), ex parte: Monrós (1959:94,107).

UNJUSTIFIED EMENDATION

TYPE SPECIES. Donacia harrisii LeConte, 1851, by monotypy.

ETYMOLOGY. Not stated by Schaeffer. The name could be based on the Greek poecil, meaning variegated or coloured, and keras, meaning horns

(or antennae) (Jaeger 1955). This may be the meaning Schaeffer intended, but such characters are not at all distinctive among donaciines.

DIAGNOSIS. Elytral apex emarginate or truncate, sutural interval narrowed before apex, lower margin explanate; pronotum with pubescence of anterior lateral parts of prosternum extending slightly and sparsely onto hypomeron which is otherwise entirely glabrous; apical teeth of mandibles approximate; mesosternal process narrow between mesocoxae; eyes small, vertex not raised; median lobe without basal angulation, tegmen robust and tapering; ovipositor with ventral and dorsal valves of equal length, and with subapical surface finely setose.

INCLUDED TAXON.

Poecilocera harrisii (LeConte 1851:316) **NEW COMBINATION**

Figures 7, 10, 14, 271, 272.

Donacia harrisii LeConte (1851:316).

Donacia harrisii: Crotch (1873:20), Leng (1891:172).

Donacia harrisi: Jacoby and Clavareau (1904:8), Clavareau (1913:21), Wilcox (1954:372).

Donacia (Poecilocera) harrisi: Schaeffer (1919:308, 1925:120), Marx (1957:196).

Sominella harrisi: Goecke (1931:159), Jolivet (1970:61), Wilcox (1975:3), Borowiec (1984:454).

Plateumaris (Sominaella) harrisi: Monrós (1959:107).

TYPE SPECIMEN. HOLOTYPE ♀, MCZ Type #4244. The holotype female bears the labels: "[pink disc] ♀, Type #4244 [red], D. Harrisii."

Information about type: The single specimen of Donacia harrisii in the LeConte Collection is the holotype.

TYPE LOCALITY. The LeConte pink disc indicates "Middle States, N.Y.", although LeConte states "Penn. rarissime".

ETYMOLOGY. Evidently named after T.W. Harris, from whom LeConte states he obtained the specimen under the manuscript name D. inermis Harris.

TAXONOMIC HISTORY. Poecilocera harrisii has been long recognized by authors, there being no taxon with which to confuse it, although the Donacia harrisi [sic] that Blatchley (1910) recognized was subsequently described by Schaeffer (1925) as D. (Plateumaris) diversa. Donacia harrisii became emended to D. harrisi, it seems first by Jacoby and Clavareau (1904), and has been spelled as such since. Schaeffer recognized that D. harrisii was unusual among North American donaciines, and erected the subgenus Donacia (Poecilocera) to accommodate it. Goecke (1931) then moved it to the genus Sominella Jacobson on account of antennomere proportions, and there it has remained in treatments by European authors, but has been assigned to Donacia by most American authors.

DIAGNOSIS. Elytral apex emarginate or truncate, sutural interval narrowed before apex, lower margin explanate; eyes small, vertex not raised, apical teeth of mandibles approximate; pronotum with pubescence of anterior lateral parts of prosternum extending slightly and sparsely onto hypomeron which is otherwise entirely glabrous; elytra and disc of pronotum transversely rugose; mesosternal process narrow; metafemur extremely robust, almost hemispherical, ventral margin of metafemur of o^ and metatibia of both sexes with denticles; colour above coppery, below entirely dark to entirely reddish; elytron of some specimens with epipleuron and/or suture narrowly reddish.

DESCRIPTION. LENGTH. Males: 6.90 - 7.74 mm, females: 8.23 - 8.64 mm **COLOUR.** Coppery brown dorsally, similar ventrally, but with abdomen, pygidium, antennae and tarsi of most specimens fulvous.

PRONOTUM. Pubescence of prosternum extending only slightly onto area of hypomeron, there composed only of a few scattered setae; anterolateral and posterolateral tubercles of tactile setae of most specimens fulvous; disc of moderate to fine punctures and punctulae that are confluent over much of disc to form transverse rugae, like elytra but denser; disc of some specimens partly microreticulate in areas of diminished punctation.

HEAD. Eyes small, round; occiput hardly constricted, eyes therefore not markedly protruding, temporal area very short behind eyes and oblique to axis of head; mandibles with apical teeth approximate, of subequal length, mandibles therefore slender in apical and lateral views.

APPENDAGES. LEGS. Metafemur metallic in apical half or more, reddish basally, tibia and tarsus reddish. Metafemur of male specimens with two subapical ventral spines and most specimens with several large denticles along ventral margin, that of female specimens without these; ventral margin of metafemur straight, dorsally curved, therefore appearing almost hemispherical; metatibia conspicuously denticulate along ventral margin in both sexes, meso- and metatibia of both sexes without tibial tubercle, mesotibia of both sexes with small mucro, about same size as that of protibia. **ANTENNAE.** Entirely reddish, antennomere 3 equal to or slightly greater than length of 4.

ELYTRA. Coppery brown; strial punctures united transversely by strigations over most of the surface, these rather uniformly transverse except in areas of antemedial and postmedial depressions; intervening strial intervals more or less uniformly and densely punctulate; apex

truncate, that concavely depressed, therefore appearing a little emarginate; epipleuron a little translucent, in indirect lighting therefore reddish in most specimens; sutural interval poorly delimited except near apex, the beads that delimit it developed only toward apex, the inner sutural bead approximating the outer lateral bead of sutural interval some distance from apex, exposing lower sutural margin, that reddish fulvous.

MALES. Pygidium broadly emarginate; tegmen broad, robust; median lobe without subbasal angulation; BSB of endophallus extremely long, about half as long as median lobe; basal abdominal sternum flat, not impressed as is usual in this sex in donaciines.

FEMALES. Pygidium broadly emarginate; dorsal and ventral valves of ovipositor of equal length, both setose around apical area; apical sternum broadly truncate.

SEXUAL DIMORPHISM. Specimens of P. harrisi are sexually dimorphic in size, armature of metafemur, and shape of apical abdominal sternum.

VARIATION. Labrum, clypeus and antennal calli vary from fulvous to colour of rest of head; pro- to metasternum and anterior margin of pronotum fulvous in some specimens, in some specimens entire venter dark.

NATURAL HISTORY. Few host records were found accompanying pinned specimens, but some collected by C.A. Frost indicate that P. harrisii occurs on sedges (probably Carex and Scirpus species). Carex was reported by Schaeffer (1925) according to collections made by Frost. Dates of collection are typically May to July. Judging by these data, the species probably overwinters in the adult stage, as do the species of Plateumaris and many Donacia, especially of the subgenus Donaciomima.

DISTRIBUTION (Fig. 272). UNITED STATES: CT, MA, NH, NJ, NY, VT; Schaeffer (1925) also gives MI and PA, but I have not seen these specimens. The locality given for PA was not found in PA, but in NY, and I suppose this was an error by Schaeffer.

PHYLOGENETIC RELATIONS. Specimens of Poecilocera are most similar to those of Plateumaris and Sominella because they show several primitive character states. However, I cannot demonstrate a sister-taxon relationship between Poecilocera and either of these other two genera. I also cannot show a clear relationship between Poecilocera and the Donaciini and Haemoniini, so I place Poecilocera and Plateumaris together in the grade tribe Plateumarini.

SPECIMENS EXAMINED. 108 males and females, plus holotype.

UNITED STATES. CONNECTICUT: Fairfield Co.: Wilton, vi.24.1930, L. Lacey (AMNH 1); **New London Co./Windham Co.:** Pachaug State Forest, vi.29.47 (PMY 1).

MASSACHUSSETTS: Berkshire Co.: Sheffield, vi.21.30 (MCZ 1); **Middlesex Co.:** Arlington, June.27.1897 (MCZ 1); Boston, no date (MCZ 1); Framingham, v.29 (USNM 1), 21.v.11 (UAE 1, MCZ 2, UMMA 2), vii.8.1917 (CAS 1), v.19.12 (UMMA 2); Natick, vi.8.46 (NMDC 1), vii.10.1926 (CAS 2), vi.18.49 (CAS 1), vi.16.1949 (CAS 1, USNM 1, UCR 2), vi.20.1950, "on sedge (or grass) in wet meadow" (OSUC 2), vi.20.50, "coll'd on heads of a sedge" (MCZ 1), vi.20.50 (UMMA 2); Sherborn, 28.vi.24 (CNC 1), vi.20.1931 (NMDC 1), vi.28.24 (USNM 3, ISAC 2), vii.1927 (USNM 4), vii.5 (USNM 1), 29.vi.24 (UAE 1, MCZ 2), v.16.09 (MCZ 1, UANH 2), vi.27.15 (UAE 1), vii.4.1924 (MCZ 1), vi.16.1923 (MCZ 1), vii.2.17 (UMMA 1), vi.22.15 (UMMA 1); Sudbury, vi.15.19 (MCZ 1), July.10.1892 (MCZ 1); Tyngsboro, 7.4.97 (MCZ 3), no date (MCZ 3). **Norfolk Co.:**

Dover, II.22 (USNM 1); Wellesley, June.11.'95 (MCZ 1); **Suffolk Co.:** Winchendon, vi.28 (CMP 1); **Worchester Co.:** Berlin, vi.23.1937 (MCZ 2, OKS 1), vi.25.1937 (MCZ 2), 6.18.40 (UMMA 2), vi.26.1937 (CAS 1), vii.1.1935 (USNM 2), vi.13.15 (UMMA 1), vii.1.1937 (CAS 7); Southboro, vi.22.24 (MCZ 2); **Locality not found:** Mt. Tom, Jy.'73 (MCZ 2), no date (MCZ 2); **Miscellaneous:** "Mass." no dates (WEEM 1, CAS 1).

MICHIGAN: Wayne Co.: Detroit (ex Schaeffer 1925).

NEW HAMPSHIRE: Rockingham Co.: Dover, vii.7.1934 (UNH 1); Exeter, vi.23.24 (MCZ 2); **Strafford Co.:** Milton, June.26-7.'09 (MCZ 1).

NEW JERSEY: Morris Co.: Boonton, vi.12.01 (USNM 1); **Miscellaneous:** "N.J." no dates (MCZ 4).

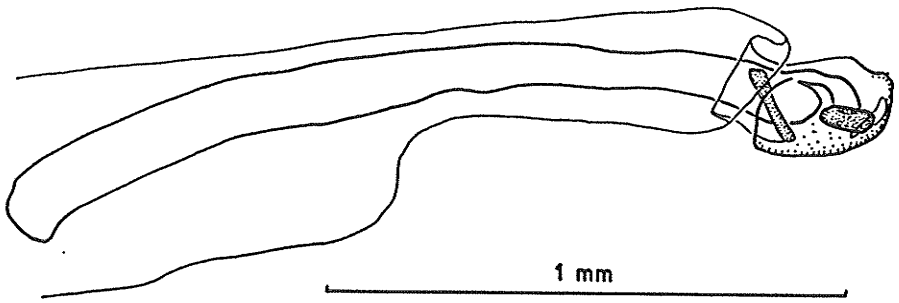
NEW YORK: Delaware Co.: Hamden [ex Schaeffer 1925, but stated as a locality in Pennsylvania; **Rockland Co.:** Suffern, no date (CUCC 1); **Tompkins Co.:** McLean, no date (USNM 1); **Miscellaneous:** "N.Y." no date (USNM 1).

VERMONT: Bennington Co.: East Dorset, vi.4.1957 (CVCC 1), June.11/15.1935 (CVCC 1, ISAC 1).

MISCELLANEOUS SPECIMENS: "Drac." 6.18.91 (MCZ 4); no data (FMNH 2).

FIGURE 271. Lateral aspect of endophallus of Poecilocera harrisii.

FIGURE 272. Known distribution in North America of Poecilocera harrisii (LeConte) based on specimens examined, and on published records (Schaeffer 1925). Each dot represents one collection record, or a group of very close records.



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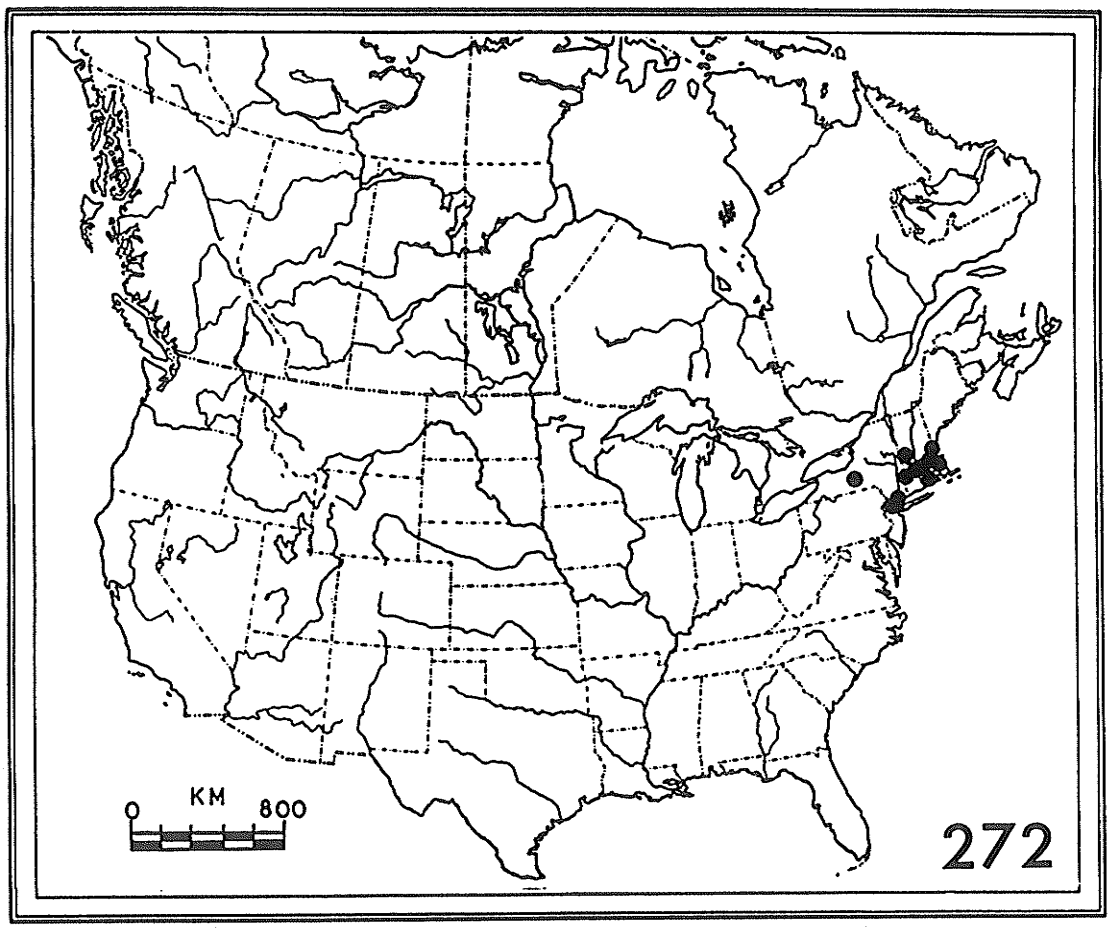

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6. RECONSTRUCTED PHYLOGENY AND RECLASSIFICATION OF GENERA OF DONACIINAE.

This chapter details my reconstructed phylogeny and reclassification of the genera of Donaciinae. The Haemoniini were discussed by Askevold (1988), and so I present only characters that define the Haemoniini and bear on the remaining genera and their relationship to the monophyletic Haemoniini. In analyzing the characters that might be useful in reconstructing the relationships of genera of Donaciinae, I found that some characters became difficult to interpret phylogenetically as more of the sagroids were examined to establish polarity. Some characters that I thought were synapomorphic for Donaciinae alone occur widely among other sagroids. Therefore I needed to examine sagroid subfamily relationships in order to establish the nearest out-group for Donaciinae to select for polarization of characters within Donaciinae. Analysis of sagroids is considered first, followed by analysis of donaciine genera and examination of a problem about species placed in Sominella. Finally, generic taxa and the tribal classification are listed, and tribes are diagnosed.

6.1. RELATIONSHIP OF DONACIINES TO OTHER SAGROID SUBFAMILIES.

The sagroid subfamilies are those that share a similarity with the Sagrinae; these subfamilies are traditionally the Sagrinae, Criocerinae and Donaciinae, and are placed close to one another in classifications (e.g. Seeno and Wilcox 1982). Schmitt (1985, 1988) considered these three subfamilies as comprising to a single, monophyletic group, but the matter is not resolved satisfactorily.

Schmitt (1985, 1985) has been the only author to approach the problem of relationship by methods of phylogenetic systematics; his work is therefore the most satisfactory point at which to begin. Polarity of certain synapomorphic characters, or inclusiveness of taxa by such synapomorphies, is affected by the preceding primary hypothesis, that donaciines are derived from a lineage of sagrines, and that criocerines are independently derived from sagrines. A discussion of donaciine generic relationships must first establish that the general hypothesis of progression of character states in donaciines is valid despite ambiguities about relationships of sagroid subfamilies. That is, the relatively few characters polarity of which is affected by out-group choice do not alter the relationships of donaciine genera significantly by having reversed polarity.

Some authors have considered Bruchidae to belong among the sagroids (e.g. Mann and Crowson 1981, 1983b, 1983c, Crowson Chen (1986) included the Bruchidae in this group (named the Crioceridae) 1960). Chen (1986) included the Bruchidae in this group (named the Crioceridae). Other authors have found no support for such close relationship structure in particular, I find little to support a close relationship. Bruchids have an internal sac structure and retraction musculature that bears little resemblance to any sagroids I have examined (based on figures in Kingsolver 1970, Borowiec 1987). I considered certain bruchid characteristics, but I find that they do not have much bearing either on relationships of sagroid subfamilies or on phylogeny of donaciine genera for the purpose of analyzing character polarity in sagroids.

6.1.1. Problematic characters.

I have been troubled by some characters used here, and some by Schmitt (1985) to reconstruct the relationship among the Sagrinae, Criocerinae and Donaciinae. These characters are principally (1) ligular lobes, (2) tibial spurs, (4) BSB of endophallus, (6) basal angle of median lobe, (10) mandibular teeth, and (24) frontal grooves. Each of these characters is considered below, to rationalize sagroid subfamily relationships and selection of out-group.

1. Ligular lobes. The non-bilobed ligula is possessed by both criocerines and donaciines (and most other chrysomelids save a few apparently primitive groups, e.g. Syneta, Orsodacne, Aulacoscelinae and Megalopodinae). It is more parsimonious to consider a single, rather than parallel, reduction of ligular lobes among closely related groups, and so it is arguable that the state found in criocerines and donaciines is synapomorphic. However, the character is one of reduction or loss, which appears to have occurred many other times in Chrysomelidae. Therefore, I hypothesize that among sagroids, this reduction has occurred independently in criocerines and donaciines.

2. Tibial spurs. Presence of two articulated spurs on all tibiae is probably the ground plan state in Chrysomelidae, but is retained in a few groups such as Megalopodinae and some Syneta (Synetinae). Three states are found in sagroids: criocerines retain the 2-2-2 state (some taxa with reduction), while donaciines are 1-1-0 and sagrines have no articulated spurs. If criocerines and donaciines are derived from sagrines, then they too should lack tibial spurs, by implication of Dollo's Law, and so this character presents a difficult problem in

logic. It is unlikely that criocerines and donaciines re-evolved spurs. It is easier to consider that the reduced state, 1-1-0, is derived from the 2-2-2 state of an ancestor common to donaciines and criocerines, while sagrines independently lost tibial spurs subsequent to divergence from the crioceriform lineage early in sagroid evolution. I have no explanation of this problem, in view of other characters that suggest alternate hypotheses of sagroid relationships.

4. BSB of endophallus. Criocerines examined possess a BSB or a BSB-like sclerite. Figures of male genitalia of criocerines (White, in preparation), and those examined, show a structure that is similar to that of donaciines. I infer this probably occurs in all criocerines. However, such a sclerite was not found in the sagrines examined. Therefore, it is tempting to consider presence of a BSB as synapomorphic for Criocerinae + Donaciinae, but I am unconvinced of homology.

6. Median lobe, basal angulation. Criocerines possess a prominent angulation, in the same location as is found in many donaciines. If criocerines were considered an out-group, then absence of this structure in donaciines would have to be considered apomorphic. Plateumaris and Poecilocera could then be considered sister taxa on the basis of shared loss, with two species of Sominella, Donaciasta, and Sagrinae having independently lost this structure. However, shape and prominence of the angulation in criocerines is very different from that of donaciines, and I conclude they are independently derived.

10. Mandibular teeth. Among criocerines, most taxa examined possess a mandible which is distinctly bidentate apically, like that of donaciines (a few are tridentate). The mandible of criocerines is somewhat more robust, and less sickle-shaped than is found in Plateumaris and

Poecilocera. All sagrines examined have a unidentate mandible, like that found in cerambycids, bruchids, and megalopodine chrysomelids. It is therefore tempting to consider the bidentate state synapomorphic for Criocerinae + Donaciinae. However, on the basis of selection of Sagrinae (Atalasis) as out-group, the bidentate mandible must be considered independently derived in criocerines. Similarly, the more complex mandible found in most other chrysomelids is also independently derived.

24. Frontal grooves. I consider this term in a more restricted sense than have other authors, as detailed in section 3.4. The lower ^-shaped portion of these grooves occurs in many sagroids, even many donaciines except some more highly derived taxa, despite contrary claims (e.g. Schmitt 1985). Some of the more highly derived donaciines have slightly developed frontoclypeal grooves, but they are found in many taxa and should be considered part of the ground plan of donaciines. The upper, V-shaped portion of the grooves, or "ocular grooves", are structures that vary in development among sagrines and criocerines. These furrows are not present in all sagrine genera (see Section 3.4 and Table 6). They also appear to vary greatly in development among criocerine groups. In some Donaciinae these furrows are indicated by an indistinct glabrous line or shallow furrow (distinct in Donaciasta) that extends from near the antennal bases to behind the eyes, much like in some criocerines. At best, frontoclypeal and ocular grooves could be considered part of the ground plan of sagroids, or even variously derived within sagroids, but not of use in resolving relationships at the subfamily level.

6.1.2. Out-group to the Donaciinae.

Definition of an out-group to donaciines is somewhat problematic. If one were to echo Crowson's (1945) view that Sagrinae are a stem-group, then only one or a few genera of sagrines should be considered valid for proximal out-group purposes. Using Sagrinae as a whole would be misleading, for character state polarity would be ambiguous for the most part. The same could be said of the Criocerinae, if they were derived from Sagrinae independently of Donaciinae.

The principal purpose of this discussion is to rationalize use of Atalasis as closest out-group to Donaciinae. My preliminary view of relationships among the three sagroid subfamilies was that among Atalasis, the rest of Sagrinae, and Criocerinae, Atalasis possesses more derived character states in common with Donaciinae and should therefore be considered the closest out-group.

Results of analysis of sagroid groups (Table 5) using PAUP varied according to which out-group was defined. If either Criocerinae or Atalasis was defined as hypothetical out-group, PAUP presented Atalasis as sister taxon to Donaciinae because fewer character transformations were required WITHIN Donaciinae than between the three groups. However, if an additional hypothetical out-group (i.e. the remainder of Sagrinae) was defined, then PAUP selected Criocerinae as sister taxon to Donaciinae, based partly on a number of shared loss characters, or losses in Donaciinae from the plesiomorphic state in Criocerinae.

Several characters are suggestive that Criocerinae are indeed the sister group to Donaciinae: tibial spurs, mandibular teeth, ligular lobes, median lobe angulation and possibly the endophallic sclerites. Other characters suggest a group of sagrines is the sister taxon: male

sexual characters, pubescent scutellum and humerus, toothed metafemora, and elytral suture explanate (at least primitively). However, none of these characters can be considered shared-derived (at least at this taxonomic level) because they constitute part of the ground plan of the sagroids, from which many character states can be derived.

The possible character state distributions, and relationships of sagroids, are presented in Figures 273 and 274. I am not satisfied that sagroid relationships are well resolved, but select sagrines as out-group as the hypothesis to proceed with. However, I note that characters whose polarity would be reversed by selection of criocerines as out-group would not alter the general donaciine generic relationships.

TABLE 5.

CHARACTERS USED TO ASSESS PHYLOGENETIC RELATIONSHIP OF SAGROID SUBFAMILIES.

CHARACTERS** (1-30 from Table 7)		CRIOCERINAE state	code	**SAGRINAE state	code	ATALASIS state	code	DONACIINAE state	code
1. Ligular lobes		absent	1	GP- present	0	present	0	absent	1
2. Tibial spurs	GP-	2-2-2	0	0-0-0	A	0-0-0	A	1-1-0	B
4. BSB		present ?	1	absent	0	absent	0	present	1
5. ELD		present ?	1	abs./pres.	0/1	present	1	present	1
6. Median lobe angulation		present	1	GP- absent	0	absent	0	abs./pres.	0/1
9. Elytral suture explanate		no (yes)	1/0	GP- yes/no	0/1	yes	0	yes/no	0/1
10. Mandibular teeth		bidentate	1	GP- unidentate	0	unidentate	0	bidentate	1
24a. Frontoclypeal groove		present	1	GP- present	1	present	1	present	1
30b. Tegmen, dorsal cap		reduced	1	GP- no	0	no	0	no	0
33. ơf Sexual characters		no	1	GP- yes/no	0/1	yes	0	yes	0
34. Pronotal lateral margin		absent	1	GP- absent	1	absent	1	absent	1
35. MEG		present	1	abs./pres./	0/1	present	1	present	1
36. Basal sac sclerites		present	1	GP- present	1	present	1	present	1
37. Scutellum pubescent		no	1	GP- yes/no	0/1	yes	0	yes	0
38. Humeral pubscence	GP-	no	*	GP- yes/no	*	no	*	yes	*

** Characters 30b to 37 are presented here for subfamilial level character assessment; for details of Sagrinae genera, see Table 6, for Donaciinae see Table 7. A and B = separate reductions from ground plan state.
GP- = probable groundplan state. * = polarity undetermined.

TABLE 6.

ASSESSMENT OF SOME PHYLOGENETIC CHARACTER STATES OF SAGRINAE.

Character	DIAPHANOPS	CARPOPHAGUS	POLYOPTILUS	MEGAMERUS	MECYNODERA	SAGRA	AMETALLA	ATALASIS
4. ELD	?	?	-	-	?	NH	NH	1
5. BSB	?	?	-	-	?	NH	NH	0
9. Elytral suture	0	1	0	0	0	0	1	0
24. Ocular groove	no	yes(I)	no	no	no	yes	no	no
30b. Tegmen	0(?)	0(?)	0(?)	0(?)	0(?)	0	0	0
33. of Sexual characters	?	?	1	1	?	1	1	1
34. Pronotal lateral margin	1	1	1	1	1	1	1	1
35. MEG	?	?	-	-	?	1	NH	1
36. Basal sac sclerites	?	?	?	?	?	1	1	1
37. Scutellum pubescent	yes	yes	yes	yes	yes	no	yes	yes
38. Humeral pubescence	yes	yes	no	no	no	no	yes	no

Characters stated as **yes/no** are not polarized.
I = character more or less present, but incomplete in development.
? = state unknown because no male specimens examined.
- = internal sac without sclerites.
NH = sac sclerite not homologized.

FIGURE 273. Hypothesis 1. Phylogenetic relationship of Donaciinae to Criocerinae and Sagrinae. Apomorphic states for this hypothesis are listed. The genus Atalasis is assumed to be the sister taxon to Donaciinae if apomorphic states in characters 1,4,6 and 10 in Criocerinae are considered independently derived.

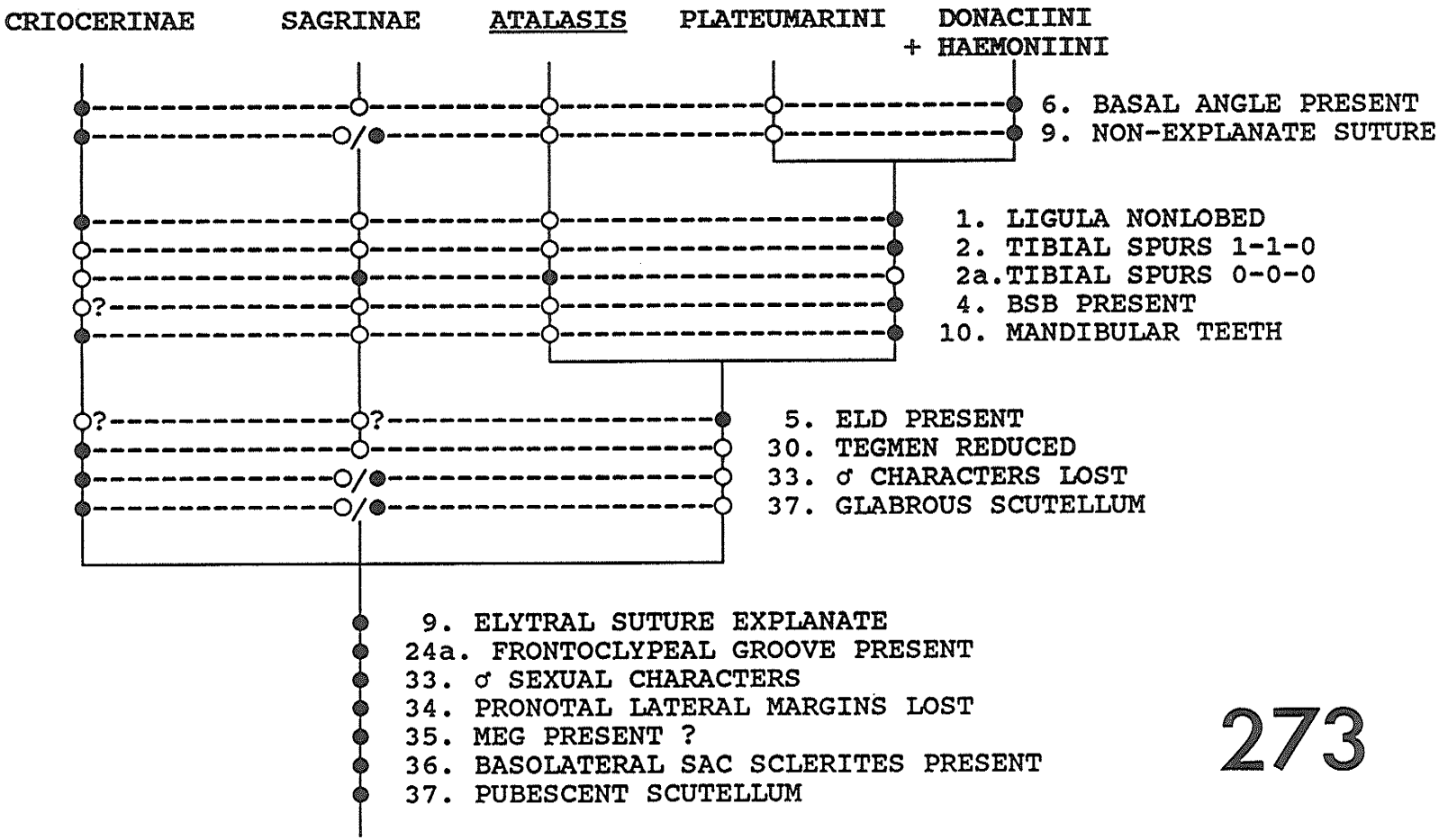
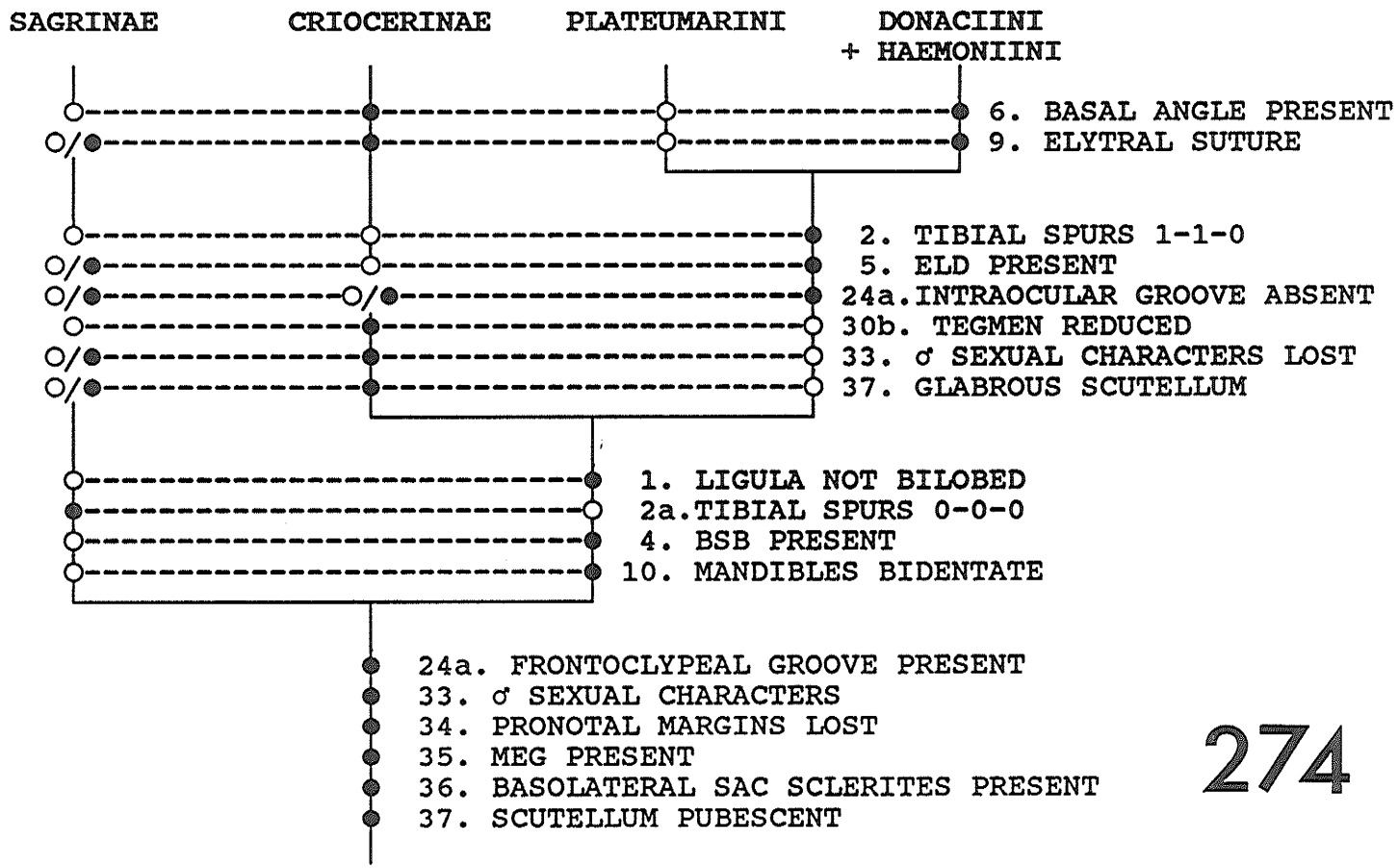

CRIOCERINAE
SAGRINAE
ATALASIS
PLATEUMARINI
DONACIINI
+ HAEMONIINI
6. BASAL ANGLE PRESENT
9. NON-EXPLANATE SUTURE
1. LIGULA NONLOBED
2. TIBIAL SPURS 1-1-0
2a. TIBIAL SPURS 0-0-0
4. BSB PRESENT
10. MANDIBULAR TEETH
5. ELD PRESENT
30. TEGMEN REDUCED
33. ♂ CHARACTERS LOST
37. GLABROUS SCUTELLUM
9. ELYTRAL SUTURE EXPLANATE
24a. FRONTOCLYPEAL GROOVE PRESENT
33. ♂ SEXUAL CHARACTERS
34. PRONOTAL LATERAL MARGINS LOST
35. MEG PRESENT ?
36. BASOLATERAL SAC SCLERITES PRESENT
37. PUBESCENT SCUTELLUM

FIGURE 274. Hypothesis 2. Relationship of Donaciinae to Criocerinae and Sagrinae. Apomorphic states for this hypothesis are listed. The Criocerinae is assumed to be the sister taxon to Donaciinae because characters 1, 4 and 10 could be considered synapomorphic for the grouping Criocerinae + Donaciinae. This hypothesis requires reversal of character 6 in Plateumarini and most Sagrinae, or homplasy of 6 between Donaciini and Criocerinae. Reduction of character 2 is more easily derived from the criocerine type than from the sagrine type.


SAGRINAE
CRIOCERINAE
PLATEUMARINI
DONACIINI
+ HAEMONIINI
6. BASAL ANGLE PRESENT
9. ELYTRAL SUTURE
2. TIBIAL SPURS 1-1-0
5. ELD PRESENT
24a.INTRAOCULAR GROOVE ABSENT
30b. TEGMEN REDUCED
33. ♂ SEXUAL CHARACTERS LOST
37. GLABROUS SCUTELLUM
1. LIGULA NOT BILOBED
2a.TIBIAL SPURS 0-0-0
4. BSB PRESENT
10. MANDIBLES BIDENTATE
24a. FRONTOCLYPEAL GROOVE PRESENT
33. ♂ SEXUAL CHARACTERS
34. PRONOTAL MARGINS LOST
35. MEG PRESENT
36. BASOLATERAL SAC SCLERITES PRESENT
37. SCUTELLUM PUBESCENT

6.2. RECONSTRUCTED PHYLOGENY OF WORLD GENERA OF DONACIINAE.

Characters used in analysis of phylogenetic relationships of genera are coded in two ways. The plesiomorphic state is coded as 0, and states in a transformation series are coded as 1,2,3, in progressively derived apomorphic states. Some characters that have independently derived apomorphic states (e.g. tegmen, ovipositor) or are hypothesized to be independently derived (e.g. tibial spurs, host plants) are divided into component characters (e.g. 24a-b, 27a-c, 30a-b).

Character 1. Ligula of labium. Two states: plesiomorphic, ligula membranous and bilobed; apomorphic, ligula not membranous, not bilobed. Among members of Sagrinae and some other subfamilies the ligula is bilobed and membranous (Crowson 1945), while in those of Donaciinae and Criocerinae this is not so. The derived, non-membranous, non-bilobed state could be considered synapomorphic for Criocerinae + Donaciinae, though Schmitt (1985) did not consider this possibility. The derived state should be considered a reduction from the plesiomorphic state, and therefore could have occurred independently in many lineages. Tentatively I consider it synapomorphic for the Donaciinae; on the basis of the hypothesis that donaciines are derived directly from a sagrine lineage, and not from a common ancestor of Criocerinae + Donaciinae, the non-bilobed ligula must be considered independently derived in criocerines.

Character 2. Tibial spurs. Three states: plesiomorphic, all tibiae with articulated spurs; apomorphic, only pro- and mesotibia with one spur each, metatibia without spur; apomorphic, all spurs lost. Criocerinae generally possess two apical spurs (Schmitt 1985), as do several

seemingly plesiomorphic chrysomelid groups, and other chrysomeloids, and is probably a ground plan state retained by criocerines. All donaciines possess only a single spur on the pro- and mesotibia, and none on the metatibia, while Sagrinae are spurless [i.e. Sagrinae as defined now, Seeno and Wilcox (1982), not as by Crowson (1945)]. Thus I postulate the state found in donaciines as synapomorphic for Donaciinae. Since this character is one of reduction, it is less informative of relationships of the sagroid groups. See discussion above (Section 6.1) concerning this character.

Character 3. Larval spiracular hooks. Three states: plesiomorphic, spiracular hooks on eighth abdominal segment absent; apomorphic 1, spiracular hooks present; apomorphic 2, spiracular hooks elongate. Donaciine larvae have long been known for their modified spiracles of the eighth segment, unique to donaciines. In members of D. (Donacia) and D. (Cyphogaster) these hooks are much more elongate than in other taxa; their state in Donaciasta is unknown. I hypothesize that greatly elongate hooks are synapomorphic for these two subgenera of Donacia, and that their length is related to use of host plants, the Nymphaeaceae. Larvae of Donaciasta may also be associated with Nymphaeaceae and therefore may have similar hook length.

Character 4. BSB of endophallus. Two states: plesiomorphic, BSB absent; apomorphic, BSB present. In the sagrines examined, no sclerite resembling a BSB was found, but a similar sclerite is present among Criocerinae. I hypothesize that presence of a BSB is synapomorphic at least for Donaciinae, and possibly for all sagroids. This structure was discussed in detail in the section on endophallic structure (section 3.2.2); implications for analysis of sagroids were discussed above (Section 6.1).

Character 5. ELD of endophallus. Three states: plesiomorphic, ELDs absent; apomorphic 1, ELDs present, moveable, basally articulated with BSB, and easily distinguishable; apomorphic 2, ELDs contiguous at least apically, usually from base to apex, enclosing the MEG. This character was discussed in detail in the section on endophallic structure (section 3.2.3). Among sagrines and criocerines examined, in particular specimens of Atalasis, two sclerites that resemble the ELDs of Plateumaris are visible. Thus I hypothesize that the state possessed by Plateumaris, with ELDs separate and articulating, is plesiomorphic. In most other donaciines the ELDs are at least apically contiguous, and are generally contiguous from base to apex, enclosing the MEG. The contiguous state I hypothesize is synapomorphic for all members of Donaciini + Haemoniini. I could not interpret the state found in Poecilocera harrisii because I was not able to homologize all endophallic sclerites with those of other genera.

Character 6. Basal angulation of median lobe. Two states: plesiomorphic, basal angulation of median lobe absent; apomorphic 1, basal angulation present; apomorphic 2, basal angulation lost. In sagrines, Plateumaris and Poecilocera the median lobe does not have an angulation subbasally, and this state is hypothesized as plesiomorphic. Among Criocerinae and most Donaciini (except Donaciasta and some members of Sominella) and Haemoniini, a basal angulation is present; its absence in Donaciasta and some members of Sominella is hypothesized as a secondary loss. Reasons for polarity are discussed above, in Section 6.1.

Character 7. Underside of median lobe. Two states: plesiomorphic states, surface of underside of median lobe smooth, striate, or with

single carina; apomorphic, underside of median lobe with longitudinal furrow or flattened. The apomorphic state is present only in members of Donacia s.str. and D. (Cyphogaster), and is hypothesized as synapomorphic for these two subgenera of Donacia.

Character 8. Elytral apex (Figs. 10-13). Three states: plesiomorphic, apex of elytron rounded; apomorphic 1, elytral apex truncate; apomorphic 2, elytral apex with large spine at outer angle. The elytral apex of most sagroids and Plateumaris is rounded. That of Sominella reticulata is also rounded, which I consider homoplastic. Poecilocera and Donaciini have truncate elytra, or with some slight modification, while Haemoniini are characterized by truncate elytra with an apical spine. The truncate condition I hypothesize is synapomorphic for Poecilocera + Donaciini + Haemoniini.

Character 9. Sutural interval of elytron (Figs. 10-13). Two states: plesiomorphic, sutural interval of elytron narrowing subapically, the inner and outer beads convergent and exposing an explanate lower sutural margin; apomorphic, inner and outer beads convergent only at apex, lower sutural margin only narrowly exposed. The state hypothesized as plesiomorphic is present in Plateumaris, this similar in Poecilocera; it is also present in most sagrines (cf. Table 5), as well as a few criocerines, and is certainly a ground plan character.

Character 10. Mandibular teeth. Four states: plesiomorphic, mandible apically with single tooth, outer margin curved uniformly; apomorphic 1, mandible with two apical teeth, profile slender, apical teeth approximate, no prominent occlusal edge, the outer margin forming uniform curve; apomorphic 2, apical profile slightly explanate, the ventral apical tooth displaced from apex, forming short cutting edge,

and outer margin rounded or slightly angulate; apomorphic 3, apical teeth more dramatically divergent and forming a long, finely serrate occlusal cutting edge, and outer margin distinctly angulate.

Sagrines (and cerambycids and bruchids) have only a single blunt apical tooth; the mandible is sickle-like, and this is certainly the ground plan state. Both criocerines and donaciines typically have two apical teeth, and this state is considered derived. I hypothesize that presence of two teeth is synapomorphic at least for Donaciinae, and possibly for Donaciinae + Criocerinae.

In specimens of Plateumaris and Poecilocera, the apical teeth are slender, and the lateral surface is uniformly rounded; in the Donaciini and Haemoniini the apical teeth are at least slightly divergent. The ventral tooth is shorter and somewhat displaced basad, forming at least a short cutting occlusal edge. The mandible, therefore, is not so slender in profile, and rounded or a little angulate externally. I hypothesize that this state is synapomorphic for Donaciini + Haemoniini. In members of D. (Donacia) and D. (Cyphogaster), the apex is greatly explanate, the ventral tooth markedly displaced ventrally and basad forming a prominent, serrate cutting edge; the outer margin in these taxa is prominently angulate. I hypothesize that this condition is synapomorphic for these two subgenera of Donacia.

One could consider several independent characters as comprising this series, but I think they are integrated as a single functional system that is related to host plant type and ovipositional behaviour. This is especially true of those members which are Nymphaeaceae-associated (i.e., Donacia s. str.) Females of these species cut a hole in the leaf surface (floating) and lower the abdomen through this hole to oviposit.

It seems a mandible of this shape, and with a serrate occlusal edge, would be effective in cutting a hole in a flat surface. Leaves of Nymphaeaceae are thick, and a long occlusal edge would be necessary in order to puncture the leaf.

Character 11. Hypomeral pubescence (Figs. 14-17). Four states: plesiomorphic, pubescence above procoxa absent, hypomeron glabrous above sternal-hypomeral suture; apomorphic 1, sparse setae present; apomorphic 2, prominent quadrate pubescent area present above procoxa, may occupy entire hypomeron, but generally only half; apomorphic 3, hypomeral pubescence lost.

Askevold (1988:393, 407) discussed the hypothesized adaptive significance of supracoxal pubescence among Donaciinae, and presented a simplified transformation series of absence as plesiomorphic, and presence as derived, with Macroplea as having secondarily lost this pubescence. However, Poecilocera harrisii, Sominella macrocnemia, and S. reticulata possess some sparse, inconspicuous pubescence that could be considered intermediate between complete absence in Plateumaris and Sominella longicornis and other Donaciini and Haemoniini. I have found no single synapomorphy to define Sominella as a monophyletic unit; I tentatively group the four species together in Sominella on the basis of gross similarity, and exclusion from other Donaciini, but note that alternative equally parsimonious explanations are possible (cf. Table 5, and Figs. 276-278).

Character 12. Clypeal length. Two states: plesiomorphic, clypeus short; apomorphic, clypeus elongate. The clypeal length in donaciines is typically short, such that the mandibular articulation is proximal to the antennal bases. In Donaciasta the clypeus is elongate, the

clypeogenal suture longer; in Neohaemonia mandibular insertion is slightly removed from the antennal bases, but in Macroplea it is much like that of Donaciasta. I hypothesize the derived state to have arisen independently in Donaciasta and Haemoniini.

Character 13. Clypeal depression. Two states: plesiomorphic, surface of clypeus flat or somewhat convex; apomorphic, clypeus with triangular or ⊥-shaped depression. The derived state occurs only in members of Donaciasta (most specimens), in which there is a shallow transverse furrow just above the clypeolabral suture.

Character 14. Pygidial shape, ♀. Two states: plesiomorphic, pygidium apically broadly rounded or emarginate, more or less quadrate in overall shape; apomorphic, pygidial apex acute or narrowly rounded, more or less triangular and elongate in overall shape. The pygidium of female donaciines is typically rounded or emarginate apically (extensive homoplasy in states), and in overall shape the tergum is rather quadrate. In members of D. (Donacia) and D. (Cyphogaster), the pygidium is elongated, in overall shape much longer than broad, and with apex acute or narrowly rounded. This state is considered synapomorphic for these two subgenera of Donacia.

Character 15. Dorsal colour. Two states: plesiomorphic, metallic in colour; apomorphic, metallic pigmentation lost or reduced, colour therefore piceous, rufous, or testaceous. Donaciines are typically brightly metallic in colour, dorsally and ventrally. A few species of Plateumaris may be piceous or testaceous, as are several D. (Donaciomima), but in most of these taxa only some specimens lack metallic colour, while most or many are typically metallic. In many Donacia exclusive of D. (Donaciomima), specimens are entirely rufous or

testaceous, or they may have a slight metallic sheen, while some are entirely metallic (e.g. D. crassipes, D. ozensis, D. proxima), or are largely metallic with some reduction of metallic colour [e.g. many D. (Cyphogaster)]. Haemoniini are also typified by lack of metallic colour, for which the state is considered synapomorphic as a consequence of development of a fully aquatic life history (Askevold 1988). Similarly, loss of colour in other groups, including Donaciasta (Askevold in prep.), several D. (Donaciomima) and most other Donacia should be considered independently achieved, but synapomorphic for Donaciasta, and for Haemoniini.

Character 16. Abdominal tubercles, male. Two states: plesiomorphic, males without pair of glabrous tubercles medially on basal abdominal sternum; apomorphic, with pair of small glabrous tubercles medially on basal abdominal sternum. Males of D. (Cyphogaster) possess a pair of small, glabrous tubercles medially on the basal abdominal sternum. These structures are unique to the subgenus D. (Cyphogaster), with the exception of D. (Donaciomima) dentata. In this latter species the tubercles probably are derived independently; Goecke (1934) suggested that they are not homologous.

Character 17. Tarsal claw segment. Two states: plesiomorphic, length of claw-bearing segment shorter; apomorphic, claw-bearing segment elongate. Askevold (1988) discussed this character, and considered the elongate claw segment as synapomorphic for Haemoniini.

Character 18. Ovipositor, subapical setae. Two states: plesiomorphic, setae on sternum and tergum VIII; apomorphic, setae of sternum and tergum VIII absent. Taxa with a sclerotized ovipositor also lack the fine setae present in other groups of donaciines (see next character).

Loss of setae from these segments is considered to have occurred independently in Plateumaris and Donaciella, but it is synapomorphic for each of these genera. It seems that taxa which oviposit within plant tissue, as members of Plateumaris, at least, appear to do, would not need sensory setae on the ovipositor surface because they would tend to be abraded anyway.

Character 19. Ovipositor sclerotized. Two states: plesiomorphic, tergum and sternum VIII pliable, not sclerotized markedly, and truncate apically; apomorphic, tergum and sternum VIII prominently sclerotized and apically acute, sternum VIII often with serrate apical margins. Members of Plateumaris possess the most heavily sclerotized ovipositor. Two species of Donaciella, the Nearctic species, D. pubicollis, and the Palaearctic species, D. clavipes, possess an ovipositor that is similar to that of Plateumaris. Two other species of Donaciella, D. cinerea and D. tomentosa, have the ventral valve acute, and more heavily sclerotized than is usual among Donacia. I consider the state possessed by Plateumaris as synapomorphic for the genus, and the state found in Donaciella as independently derived. The less developed state in the species of Donaciella is probably intermediate between the plesiomorphic state and the more highly derived state found in the other two members of the genus.

Character 20. Ovipositor valve length. Two states: plesiomorphic, dorsal valve (tergum VIII) and ventral valve (sternum VIII) of equal length; apomorphic, ventral valve longer than dorsal valve. Donaciines, as well as other sagroids, normally have the tergum and sternum VIII of an equal length, and not functioning as discussed in the previous character (#19). The elongate ventral valve (sternum VIII) is clearly a derived character state.

Character 21. Mesosternal width. Two states: plesiomorphic, mesosternum narrow between mesocoxae; apomorphic, mesosternum, especially of female specimens, broad between mesocoxae, wider than half the mesocoxal diameter. The mesosternum of sagroids is typically narrow, and this state is retained by most donaciines. Members of D. (Donacia) and D. (Cyphogaster), especially females, possess a broad mesosternum; therefore these insects are broader across the humerus than is typical of other donaciines. This broader body form occurs similarly in a number of taxa of Donacia and in Donaciasta, but very prominently so in members of D. (Donacia) and D. (Cyphogaster). In general, it seems the species that live on plants with floating leaves are broader in body shape, and have a broader mesosternal process, but among species of D. (Donaciomima) there is considerable variation. However, the species of the former two subgenera of Donacia are typically so prominently widened that I consider the extreme state they possess as synapomorphic for members of those two subgenera.

Character 22. Metafemoral tooth. Two states: plesiomorphic, metafemoral tooth present; apomorphic, metafemoral tooth absent. Most sagrines, and donaciines, have an acute tooth on the metafemur, and this is certainly a ground plan state. Few criocerines possess a femoral tooth. Males of Poecilocera, some species of D. (Donaciomima), and most species of D. (Donacia) and D. (Cyphogaster), possess a second, shorter tooth more proximally placed. A number of taxa have independently lost the tooth, e.g. some members of Plateumaris, or the tooth is small or absent in some specimens of some species. Loss of metafemoral tooth is generally associated with decrease of metafemoral diameter. All members of the Haemoniini lack the metafemoral tooth, and therefore have very slender

metafemora; this state is considered synapomorphic for the tribe Haemoniini. Similarly, species of Donaciella lack a tooth (and have slender metafemora), though some specimens of D. clavipes possess a small tooth; I tentatively consider the state in Donaciella as synapomorphic for members of the genus.

Character 23. Pronotal punctures. Three states: plesiomorphic, punctation of pronotal disc fine or absent; apomorphic 1, pronotal disc more or less uniformly coarsely punctate; apomorphic 2, pronotal punctation diminished or lost completely.

Pronotal punctation is a variable character state among donaciines, and evidently it is subject to considerable homoplasy. Members of Plateumaris show a range of prominence of punctation, while all Sominella, Donaciasta and most D. (Donaciomima) are prominently punctate. Pronotal punctation in most Donaciella is concealed by pubescence, though punctation is somewhat finer. Coarse punctation could be considered independently derived in the various groups of Donaciini (i.e., at least three times). Alternatively, it is more parsimonious to consider that coarse punctation is synapomorphic for Donaciini + Haemoniini, and that such punctation was lost no more than twice [not counting a few otherwise typical members of D. (Donaciomima)], perhaps once as synapomorphic for the Haemoniini, and once in the other two subgenera of Donacia. Members of D. (Donacia) and D. (Cyphogaster) show no coarse punctation that is uniformly distributed in a way that typifies other Donaciini. Largely on the basis of character correlation, lack of coarse punctation in D. (Donacia) and D. (Cyphogaster) is hypothesized as synapomorphic for these two sugenera. Askevold (1988) discussed punctation in Haemoniini, and suggested that

diminished punctation was probably independent in the various groups of Haemoniini; whether independently lost or acquired by the taxa of Haemoniini that do or do not possess pronotal punctation requires the same degree of homoplasy. Thus, I consider the state of diminished punctation as synapomorphic for the Haemoniini, with subsequent independent additional reduction among other members of the tribe.

Character 24. Frontal grooves. Three states: plesiomorphic, frontal grooves absent; apomorphic (24a), frontal grooves complete, with grooves deep and connected with ocular grooves; apomorphic (24b), grooves mesad of eyes somewhat to well developed, extending behind eyes.

Schmitt (1985, 1988) hypothesized that the members of Criocerinae and Sagrinae are sister taxa on the basis of the single character of presence of crossed frontal grooves (Character 24a). He noted that such complete grooves are not typical of all Sagrinae, but that they are typical of Criocerinae. However, he interpreted the character as synapomorphic for the two groups, stating that frontal grooves are absent from members of Donaciinae and the bruchids. However, many donaciines do possess the lower, frontoclypeal half, and to some extent also the upper, ocular part of these grooves. Donaciines merely lack the X-shaped complete furrows and have prominent antennal calli (as do some sagrines that lack the X-shaped part). Similarly, most genera of sagrines do not have ocular and frontoclypeal grooves typical of Sagra. In fact, of sagrines examined (Table 6), Sagra alone possesses complete frontal grooves, and Carpophagus has short ocular grooves. Therefore I think a reassessment of this character is needed. The frontal and ocular grooves may indeed be derived, but cannot be synapomorphic for Sagrinae + Criocerinae exclusively, as Schmitt (1985, 1988) suggested.

In Donaciasta, a narrow groove extends from near the antennal callus to behind the eye, and may be unique to this genus, among donaciines.

Character 25. Egg bursters. Two states: plesiomorphic, egg bursters present in first instar larvae; apomorphic, egg bursters lost.

Cox (1988) reviewed the occurrence of egg bursters in the Chrysomeloidea, stating that Donaciinae examined lack them; however, only larvae of D. (Donaciomima) semicuprea and D. (Donaciomima) bicolor were examined. Cox (1988, p. 415) suggested that absence of egg bursters in the donaciines "may be correlated with the specialized extrachorion of the eggs." He supposed that first instar larvae must bite through the chorion in order to ingest bacteria that are contained in the extrachorion (i.e., the gelatinous matrix into which Donaciini and Haemoniini oviposit). This loss correlates well with most Haemoniini and Donaciini, which oviposit under water in a gelatinous matrix. However, females of Plateumaris (but Poecilocera and Sominella oviposition behaviour unknown) do not oviposit in this way, and so their larvae may not achieve bacterial transmission in this way. While sagrines have not been investigated for egg bursters, criocerines do possess them, and oviposit on foliage. Primitive donaciines (i.e. Plateumaris) also oviposit on foliage (or insert their eggs into plant tissue), as opposed to under water in extrachorion. Thus I question whether primitive donaciines have egg bursters, namely Plateumaris, possibly Poecilocera and even Sominella. If so, then egg bursters should be found in the same location as in criocerines and bruchids (i.e., on abdominal segment 1, dorsad of spiracle). Thus, I tentatively hypothesize that lack of eggbursters in donaciines is synapomorphic for Donaciini + Haemoniini. This interpretation is consistent with other

characters that define the same grouping of genera, and with the historical scenario I have constructed summarizing the evolution of Donaciinae.

Character 26. Oviposition glands. Two states: plesiomorphic, paired glands opening into common oviduct absent or not modified; apomorphic, sac-like glands, hypothesized to produce a gelatinous extrachorion, present.

Mann and Crowson (1983a) found that "gelatinous glands" are absent from females of Plateumaris sericea (as P. discolor), but present in those of D. (Donacia) crassipes. These scanty data are hardly sufficient, but I observe that they are consistent with other characters, notably ovipositor and mandibular structure, egg bursters, oviposition behaviour, and host plants. Lack of such a gland is tentatively considered plesiomorphic, and I predict that most, if not all, Donaciini and Haemoniini should have them.

In another publication, Mann and Crowson (1983b) refered to "vaginal pouches", which were described as occurring in what seems to be the same position as their "gelatinous glands" (Mann and Crowson 1983a). They (Mann and Crowson 1983b) thought that these "pouches" are organs of symbiont transmission, though this may not preclude production of an ovipositional matrix. Their claim that vaginal pouches are absent from Donaciinae (Mann and Crowson 1983b) is contradicted by their recognition of "gelatinous glands" (Mann and Crowson 1983a) if the organs in question are in fact the same. Further, Stammer (1935) investigated symbiont transmission in donaciines, and found that "Mitteldarmblindsäcke" (four blind sacs of midgut, at junction of mid- and foreguts) of larvae harbour the bacteria, and that in the adult

beetles bacteria are restricted to swellings of Malpighian tubules of females. At present, for want of more complete data, I postulate the above character sequence of absence = plesiomorphic, and presence = apomorphic. I observe that if this interpretation is correct, this character would be consistent several other characters that I have suggested are integrated and related to other structures, general behaviour and host plant associations.

Character 27. Host plants. Four states: plesiomorphic, hosts principally Cyperaceae; apomorphic a, hosts Gramineae; apomorphic b, hosts Nymphaeaceae; apomorphic c, hosts Zosteraceae and Haloragaceae. Each of the states, a, b and c, I postulate are derived host associations relative to the plesiomorphic association with vertical-emergent plants; each represents an independent shift to plant taxa in the same (Gramineae, for example) or another category (Nymphaeaceae, Potamogetonaceae) of growth form.

As discussed at length in the chapter on host plant associations, I have postulated that host plant growth form is an important feature in the evolution of donaciines. I postulated that donaciines are primitively associated with plants the leaves of which are vertical and emergent from the water and which occur along water body margins; specimens of Plateumaris, Poecilocera and many D. (Donaciomima) use these plants. Also using vertical plants, are specimens of Donaciella (Gramineae), and Plateumaris braccata (Gramineae); I hypothesize use of grasses as synapomorphic for the genus Donaciella. Members of D. (Donacia) and D. (Cyphogaster) are restricted to floating plants, exclusively to the Nymphaeaceae. Members of Donaciasta also appear to be restricted to floating plants, on the basis of two host records, from

Potamogeton (Bertrand 1965) and "Nymphaea and Trapa natans" (unpubl. data). The Haemoniini are restricted to the Zosteraceae (with some records from Haloragaceae) (Askevold 1988).

Host plant data are useful in the ecological definition of certain genera and subgenera, but are not useful in grouping of genera, with the possible exception of state C, hosts of the Zosteraceae and Haloragaceae. In an ecological and adaptive sense, taxa using these plants are conceivably derived from an intermediate group, state B. That is, the floating-leaf category could be considered phylogenetically and adaptively intermediate between the vertical and submerged plants. Such a progression in donaciine phylogeny is supported by the character of colour loss (character 15) that is shared by Haemoniini, Donaciasta and many D. (Donacia) and D. (Cyphogaster), and a few D. (Donaciomima).

Character 28. Metatibia ventrally explanate. Two states: plesiomorphic, metatibia ventrally with at most prominent denticles; apomorphic, metatibia ventrally prominently carinate or explanate, producing a large tooth in many males. Some species of Donacia (especially s. str.) have prominent denticles ventrally on the metatibia, as do some species of D. (Donaciomima). Otherwise, donaciines have no modification of the tibial underside except in two species of Sominella: S. longicornis and S. macrocnemia, especially males, have prominently carinate metatibiae, varying from having an explanate carina to a prominent tooth about midlength. I consider this structure synapomorphic for this species pair.

Character 29. Ratio of antennomeres 3:4. Two states: plesiomorphic, antennomere 3 shorter than antennomere 4; apomorphic, antennomere 3 as long as or longer than 4. Typically among donaciines, antennomere 3 is

much shorter than 4. However, some specimens of Poecilocera, most specimens of Sominella longicornis and S. macrocnemia, and many specimens of S. reticulata and S. kraatzi have antennomere 3 as long as or longer than 4. The derived state is considered synapomorphic for at least S. macrocnemia + S. longicornis, and possibly independently derived in some specimens of other taxa. PAUP analysis selected character 29 as synapomorphic for Donaciinae exclusive of Plateumaris, with reversal at the node connecting the remaining Donaciini + Haemoniini, but I find such an explanation unsatisfactory. Rather, I must consider the state occurring homoplastically in at least Poecilocera, and possibly in S. reticulata and S. kraatzi also. However, it could also be argued that this character is synapomorphic for all four species of Sominella, but this would require homoplasy in some other characters that I weight more heavily.

Character 30. Form of tegmen. I consider two independent characters of this structure, divided into characters 30a and 30b. Four states: plesiomorphic, parameres complete, forming a ring around the median lobe, with dorsal cap robust; apomorphic 1 (30a), dorsal cap slender, of more or less uniform width and thickness; apomorphic 2 (30a) dorsal cap slender, but broadened; apomorphic (30b), dorsal cap portion absent. Sagroids exclusive of Criocerinae possess a complete tegmen. Criocerines appear to have lost the dorsal cap portion, leaving only a V-shaped ventral strut portion, much like in Alticinae and Galerucinae. I consider the reduced tegmen synapomorphic for the Criocerinae. Within donaciines, Plateumaris and Poecilocera have a robust dorsal cap similar to that of sagrines, and this is undoubtedly the plesiomorphic state. Donaciini and Haemoniini have a slender and thin dorsal cap, while in D.

(Donacia) and D. (Cyphogaster) the cap is wide, but thin. I consider the slender state synapomorphic for Donaciini + Haemoniini, and the widened state synapomorphic for the two subgenera of D. (Donacia).

Character 31. Epipleuron. Two states: plesiomorphic, epipleuron more or less angulate from humerus to near apex; apomorphic, epipleuron flattened or rounded, not more prominent than the outer interval. Most donaciines possess an angulate epipleuron, which is elevated and more prominent than the flat outer interval. Several groups possess a flattened epipleuron, for which the state appears to be synapomorphic. Members of Donaciella, D. microcephala, D. (Donacia) and D. (Cyphogaster) possess this state, as do a few species of D. (Donaciomima) and S. kraatzi. The degree to which the epipleuron is flat varies within these groups, so I cannot consider the character synapomorphic for these groups together, even though character 32 (eye size) is consistent with such a grouping.

Character 32. Eye size. Two states: plesiomorphic, eyes small and round; apomorphic, eyes large and oval or round. Most donaciines have eyes rather small in relation to overall head size or length of occiput. Several groups in Donaciini have very prominent, large eyes, and it is tempting to consider the state synapomorphic for these groups: Donaciella, D. microcephala, D. (Donacia) and D. (Cyphogaster), and a few unrelated species of D. (Donaciomima). Rather, I choose to consider the state synapomorphic for D. (Donacia) + D. (Cyphogaster), and as an independent synapomorphy for Donaciella.

Character 33. Male abdominal apex. Two states: plesiomorphic, basal sternum and apical sternum without medial depression in males; apomorphic, abdominal apex and basal sternum with broad depression in

males. All male donaciines can be recognized by adominal depressions medially on the basal sternite, and apically on the apical sternite. The same condition occurs in some sagrines (Table 6), but not among criocerines I examined. I consider presence of this depression synapomorphic for Donaciinae + Atalasis and perhaps some other sagrines.

Character 34. Pronotal lateral margin. Two states: plesiomorphic, pronotum laterally margined; apomorphic, lateral margin absent. All sagroids lack a lateral margin of the pronotum, whereas most Coleoptera possess a lateral margin. While the character is therefore one of loss, it could be considered synapomorphic for the sagroid subfamilies. Lack of this margin also occurs in widely unrelated chrysomelids: some Galerucinae (e.g. Cyclotrypema), many Eumolpinae (e.g. most, if not all, Adoxini), Orsodacninae, Zeugophorinae and Megalopodinae; the latter three are generally considered relatively primitive groups.

Character 35. MEG. Two states plesiomorphic, ejaculatory duct (flagellum) slender, unmodified; apomorphic, flagellum shortened, not exceeding the median lobe in length, more heavily sclerotized and sheathed with membrane. Many chrysomelids possess an elongate flagellar structure that protrudes from the median lobe; it is sclerotized, but is not part of an internal sac complex as in donaciines. In sagroids examined, the ejaculatory duct is not elongate, but forms part of a sclerotized complex on the internal sac apex. This ground plan seems to characterize sagroids, as far as I can ascertain, and I consider this state synapomorphic for the sagroid subfamilies.

Character 36. Basal sac sclerites. Two states: plesiomorphic, basal sac sclerites absent or slightly developed; apomorphic, basal sac sclerites well developed as a sac-retracting mechanism (see Figs. 4-6, and

discussion, section 3.2.1). I am not familiar with detailed internal sac structure in chrysomeloids other than those I have examined (sagroids and bruchids). However, the median lobe of many chrysomelids seems to possess apical structures about the orifice, that appear much like those of sagroids (internal sac in repose). In sagroids, when the internal sac is everted, these structures can be seen as basal sclerites on the sac, an elongate one dorsally, and one or more on each side which I interpret as functioning to facilitate sac retraction. Bruchids appear not to possess such sclerites (cf. Borowiec 1987), and so I suggest that presence of basal sac-folding sclerites is synapomorphic for the sagroids (not including bruchids).

Character 37. Pubescence of scutellum. Two states: plesiomorphic, scutellum pubescent; apomorphic, scutellum glabrous. Most sagrines possess a pubescent scutellum (see Table 6), as do all donaciines, while criocerines (at least most) have a glabrous scutellum. Two explanations are possible, either the pubescent scutellum is part of the ground plan of sagroids, and it is lost from some sagrines and the criocerines, or the pubescent scutellum is derived within sagroids, and synapomorphic for Donaciinae + some other sagrines. Partly on the basis of the common = primitive criterion (i.e., widespread among sagroids), I conclude that it is a ground plan character, lost from criocerines and a few sagrines. Also it is more reasonable to infer that a few groups lost pubescence, rather than requiring multiple independent derivations of pubescence among sagroids.

Character 38. Pubescence of humerus. The character is not polarized and was not used for analysis of relationships of sagroid subfamilies, but states are detailed in Table 6 for sagrines, to which could be added

Criocerinae without, and Donaciinae with, humeral pubescence. Humeral pubescence is probably also a ground plan character, variously lost from Criocerinae and sagrines.

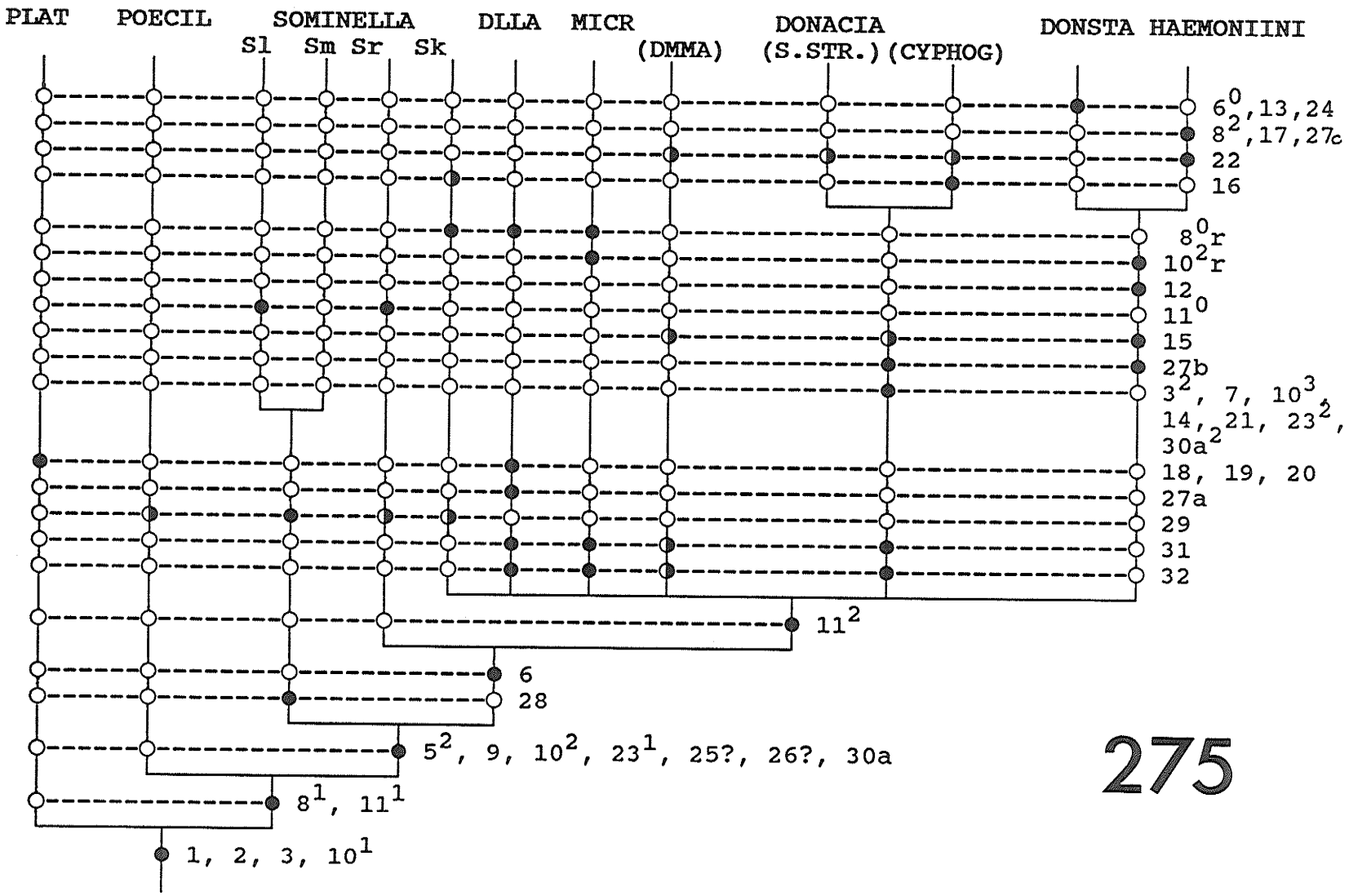
TABLE 7.

MATRIX OF CHARACTER STATES USED IN PHYLOGENETIC RECONSTRUCTION OF GENERA OF DONACIINAE.

Character	SAGRIN	CRIOC	PLATEUM	POECIL	SOMIN	DONLLA	MICR	DONDON	DONCYP	DONMMA	DONSTA	HAEMONIINI
1. Labial ligula	0	1	1	1	1	1	1	1	1	1	1	1
2. Tibial spurs	0	0	1	1	1	1	1	1	1	1	1	1
3. Larval hooks	0	0	1	1	1	1	?	2	2	1	?	1
4. BSB	0(-1?)	1	1	1	1	1	1	1	1	1	1	1
5. ELD	1	1	1	1	2	2	2	2	2	2	2	2
6. M.L bas. ang.	0	1	0	0	0-1	1	1	1	1	1	0(R)	1
7. M.L furrowed	0	0	0	0	0	0	0	1	1	0	0	0
8. Elytral apex	0	0	0	1	1	1	0(R)	1	1	1	1	2
9. Sut. interval	0-1	0-1	0	0	1	1	1	1	1	1	1	1
10. Mandib. teeth	0	1	1	1	2	2	1(R)	3	3	2	2	2
11. Hypom. pubesc.	0	0	0	1	0-2	2	2	2	2	2	2	2'-3
12. Clypeus length	NA	NA	0	0	0	0	0	0	0	0	1	1'
13. Clyp. depress.	NA	NA	0	0	0	0	0	0	0	0	1	0
14. ° pygid.	0	0	0	0	0	0	0	1	1	0	0	0
15. Dorsal colour	0	0	0(1)	0	0	0	1	0-1	0-1	0(1)	1	1
16. Abd. tubercles	0	0	0	0	0	0	0	0	1	0(1)	0	0
17. Claw segment	0	0	0	0	0	0	0	0	0	0	0	1
18. Ovipos. setae	NA	NA	1	0	0	1	0	0	0	0	0	0
19. Ovipos. scler.	0	0	1	0	0	1	0	0	0	0	0	0
20. Valve length	NA	NA	1	0	0	1	0	0	0	0	0	0
21. Mesost. width	0	0	0	0	0	0	0(1)	1	1	0(1)	0(1)	0
22. Metafem. tooth	0	1(0)	0(1)	0	0	1(0)	0(1)	0(1)	0(1)	0(1)	0	1
23. Pronot. punct.	NA	NA	0	0	1	1	1	2	2	1	1	1
24. Ocul. groove	0(1)	0(1)	0	0	0	0	0	0	0	0	1	0
25. Egg bursters	NA	NA	0(?)	0(?)	1(?)	1(?)	1(?)	1(?)	1(?)	1	1(?)	1(?)
26. Ovipos. gland	NA	NA	0	0(?)	1(?)	1(?)	1(?)	1	1(?)	1	1(?)	1(?)
27a. Hosts	NA	NA	0	0	0(?)	1	?	0	0	0	0	0
27b. Hosts	NA	NA	0	0	0(?)	0	?	1	1	0(1,2)	1,2	2
28. Metatibia expl.	0	0	0	0	0(1)	0	0	0	0	0	0	0
29. Antenn. 3:4	0	0	0	0(1)	1	0	0	0	0	0	0	0
30a. Tegmen	0	0	0	0	1	1	1	2	2	1	1	1
31. Elyt. epipl.	0	NA	0	0	0-1	1	1	1	1	0(1)	0	0
32. Eyes large	NA	NA	0	0	0	1	1	1	1	0(1)	0	0

SAGRIN = Sagrinae; **CRIOC** = Criocerinae; **PLATEUM** = Plateumaris; **POECIL** = Poecilocera; **SOMIN** = Sominella; **DONLLA** = Donaciella; **MICR** = Donacia microcephala Daniels; **DONDON** = Donacia (Donacia); **DONCYP** = Donacia (Cyphogaster); **DONMMA** = Donacia (Donaciomima); **DONSTA** = Donaciasta.
1: state unknown in Neohaemonia voronovae Medvedev; **?**: state unknown. **R**: postulated reversal to plesiotypic state, 0 or 1. **NA**: character not assessed, not relevent to analysis. **(1)** or **(0)**: some members possess state in parenthesis, = homoplasy. **Characters 33-38** are presented in Table 5, because they bear upon subfamilial relationships.

Figure 275. Reconstructed phylogeny of genera and some problematic taxa of Donaciinae. ●= apomorphic character states; O= plesiomorphic character states; half-circles= specimens (or taxa) with both states occurring in that taxon. PLAT = Plateumaris, POECIL = Poecilocera; Sl = Sominella longicornis, Sm = Sominella macrocnemia, Sr = Sominella reticulata, Sk = Sominella kraatzi; DLLA = Donaciella; MICR = "Donacia" microcephala; DMMA = D. (Donaciomima); CYPHOG = Donacia (Cyphogaster); DONSTA = Donaciasta.


PLAT
POECIL
SOMINELLA
Sl
Sm
Sr
Sk
DLLA
MICR
(DMMA)
DONACIA
(S.STR.)
(CYPHOG)
DONSTA HAEMONIINI
6^0, 13, 24
8^2, 17, 27c
22
16
8^0r
10^2r
12
11^0
15
27b
3^2, 7, 10^3, 14, 21, 23^2, 30a^2
18, 19, 20
27a
29
31
32
11^2
6
28
5^2, 9, 10^2, 23^1, 25?, 26?, 30a
8^1, 11^1
1, 2, 3, 10^1

6.3. PROBLEMS IN CLASSIFICATION OF SOME GENERA.

The reconstructed phylogeny of donaciine genera is partly well resolved. Some groupings, like the Haemoniini (see Askevold 1988) and the pair of subgenera D. (Donacia) and D. (Cyphogaster), are well defined by many synapomorphies. The relationship of Haemoniini to Donaciasta is supported by at least one structural character (12) as well as by host plant association (27); an additional character (#15), loss of dorsal colour, supports this arrangement.

No synapomorphy was found for taxa grouped in D. (Donaciomima) and Sominella. Both genera are recognized on the basis of general similarity of included members. Donacia microcephala and Neohaemonia voronovae Medvedev also remain problematic, and of uncertain relationship within Donaciini and Haemoniini, respectively. The relationships I have not been able to resolve satisfactorily are discussed in greater detail, below.

6.3.1 Problem of phylogeny and classification of Sominella. On the basis of characters examined, no single primary synapomorphy was found for the group to which four species are here assigned, Sominella, except perhaps character 29 (antennomere 3:4 ratio). Even if character 29 was considered a primary synapomorphy, this arrangement would require homoplasy in characters 11 and 6 (Fig. 270). The species placed in Sominella have a general facies that suggests their combination into one genus: occiput not constricted behind eye (or only slightly), eye therefore not protruding, elongate antenna, femora coarsely and closely punctured, vertexal calli at most slight, elytron sparsely but coarsely rugose.

Other characters constitute a confusing array of plesiomorphic and apomorphic characters: characters suggesting inclusion in the rest of Donaciini (elytral apex, median lobe angulation, hypomeral pubescence) by some taxa, but others retaining or reverting to plesiomorphic states in these characters. The elytral apex of these species varies: narrowly truncate in S. longicornis, toothed and emarginate in S. macrocnemia, produced into a narrowly rounded apex in S. kraatzi, and typical of Donaciini in S. reticulata. Median lobe and hypomeral characters are detailed in Table 8 and Figures 276-278.

There is no satisfactory resolution for the purposes of classifying these taxa. I am reluctant to erect a new monobasic genus to accommodate S. reticulata, while Pseudodonacia Reitter is available for S. kraatzi. Therefore I expand Sominella to include four species that are similar in general facies, and that can be excluded from other genera in Donaciini. Therefore, the genus constitutes a paraphyletic group as now defined by phylogenetic reconstruction.

6.3.2. Placement of Donacia microcephala Daniel and Daniel. Donacia microcephala is described from the Middle East, but is not known from other regions. I examined a series of specimens from Iran. Specimens of D. microcephala possess most character states of Donaciini, with the notable exception of mandibular structure: the mandibles are slender in width and profile, a probable reduction from the state typical of Donaciini. Specimens of the Nearctic D. (Donaciomima) pubescens LeConte are similar to those of D. microcephala in being totally pubescent dorsally; additionally, specimens of both species have rounded elytral apex, flat epipleuron, and are testaceous in colour. The species of

Donaciella are similar to these two species in the flattened epipleuron, most species with rounded elytral apex, and dorsal pubescence in some species. Most species of D. (Donacia) and D. (Cyphogaster) have extremely dense ventral pubescence, through which the fine punctures are not visible; this also so for D. microcephala and a few species of D. (Donaciomima). Donaciella and D. (Donacia) and D. (Cyphogaster) are similar to D. microcephala in size of eyes and general lack or poor development of antennal and vertexal calli. There was no single character that I considered strong evidence of inclusion in any of the presently recognized generic taxa of Donaciini as they are currently defined, though D. microcephala has several characters that suggest inclusion in Donaciella. I am reluctant to erect a monobasic genus because relationships are not well resolved.

6.3.3. Problem of placement of Neohaemonia voronovae Medvedev. I have not examined specimens of this species. Askevold (1988) suggested it does not belong in any described genus, but the problem remains unresolved.

TABLE 8.

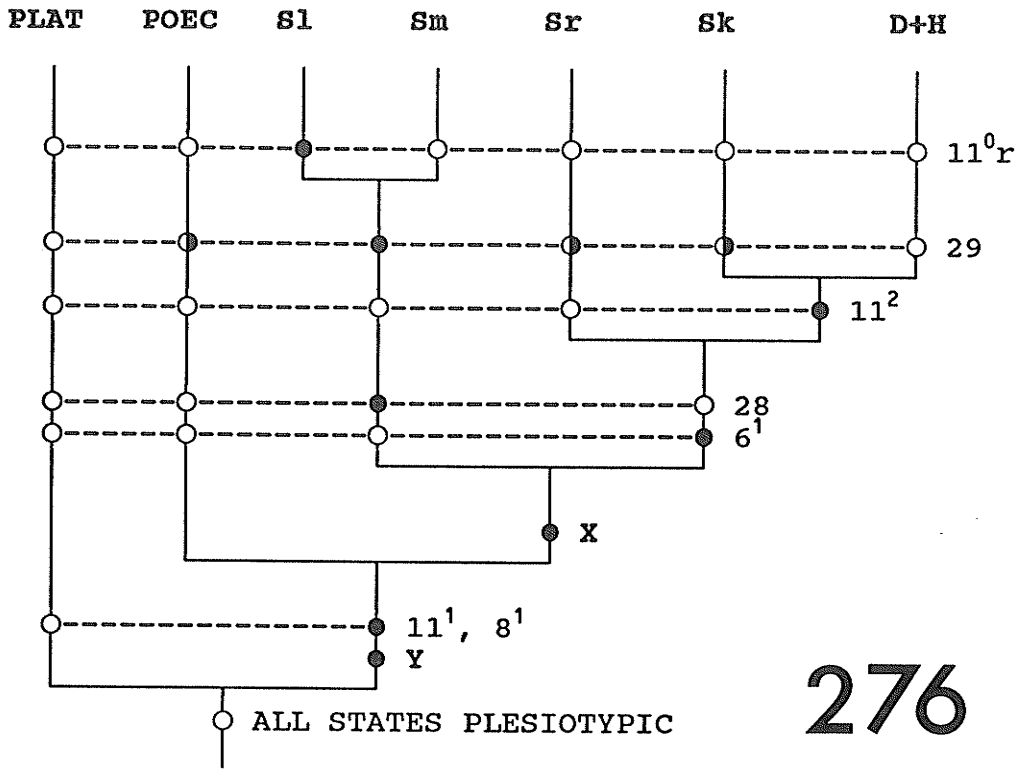
DETAILS OF CHARACTER STATE DISTRIBUTION OF SOME HOMOPLASTIC CHARACTERS IN DONACIINAE.

	PLATEUMARIS	POECILOCERA	SOMINELLA				DONACIINI + HAEMONII
			longicornis	macrocnemia	reticulata	kraatzi	
6. Median lobe angulation	0	0	0	0	1	1	1
11. Hypomeral pubescence	0	1(0)= 1	0	1	1(0)=1	2	2(1)=2
28. Metatibial explanation	0	0	1	1	0	0	0
29. Antennomeres 3:4	0	0(1)=0	1	1	1(0)=1	1(0)=1	0

Characters and their states are taken from Table 7, with specific states in species of "Sominella" inserted. See discussion of characters in Section 6.2. for analysis of polarity. Value in parenthesis (e.g. 1(0)=1) = some specimens of that taxon, or some taxa in the group, have alternate character state, and "=1" or "=2" indicates subsequent decisions about polarity.

FIGURE 276. Probable relationship of members previously assigned to Sominella to remaining Donaciini. **X** and **Y** indicate apomorphies defining these clades (see Fig. 275). ●= apomorphic states, O= plesiomorphic states, and half-circles = specimens with both states occurring in this taxon. In this hypothesis, S. reticulata and Pocilocera harrisii are assumed to possess the derived state of character 11. Character 29 is selected by PAUP analysis to be derived at branch Y, and reversed on the D+H branch. PLAT= Plateumaris, POEC= Poecilocera, Sl= Sominella longicornis, Sm= Sominella macrocnemia, Sr= Sominella reticulata, Sk= Sominella kraatzi, D+H= rest of Donaciini + Haemoniini; **r**= postulated reversal to plesiomorphic state, O; **h**= postulated homoplastic occurrence of derived state, 1.

FIGURE 277. Possible relationship of members assigned to Sominella to remaining Donaciini. **X** and **Y** indicate apomorphies defining these clades (see Fig. 275). ●= apomorphic states, O= plesiomorphic states, and half-circles = specimens with both states occurring in this taxon. In this hypothesis, S. reticulata and Poecilocera harrisii are assumed to possess the plesiomorphic state of character 11. PAUP analysis did not select possible monophyly of Sominella based on character 29 because of additional tree length caused by greater required homoplasy in characters 11 and 6; character 29 was selected by PAUP analysis to be derived at branch Y (or X if P. harrisii does not possess 29), and reversed at the D+H branch. PLAT= Plateumaris, POEC= Poecilocera, Sl= Sominella longicornis, Sm= Sominella macrocnemia, Sr= Sominella reticulata, Sk= Sominella kraatzi, D+H= rest of Donaciini + Haemoniini; **r**= postulated reversal to plesiomorphic state, O; **h**= postulated homoplastic occurrence of derived state, 1.


PLAT
POEC
Sl
Sm
Sr
Sk
D+H
11^0r
29
11^2
28
6^1
X
11^1, 8^1
Y
ALL STATES PLESIOTYPIC

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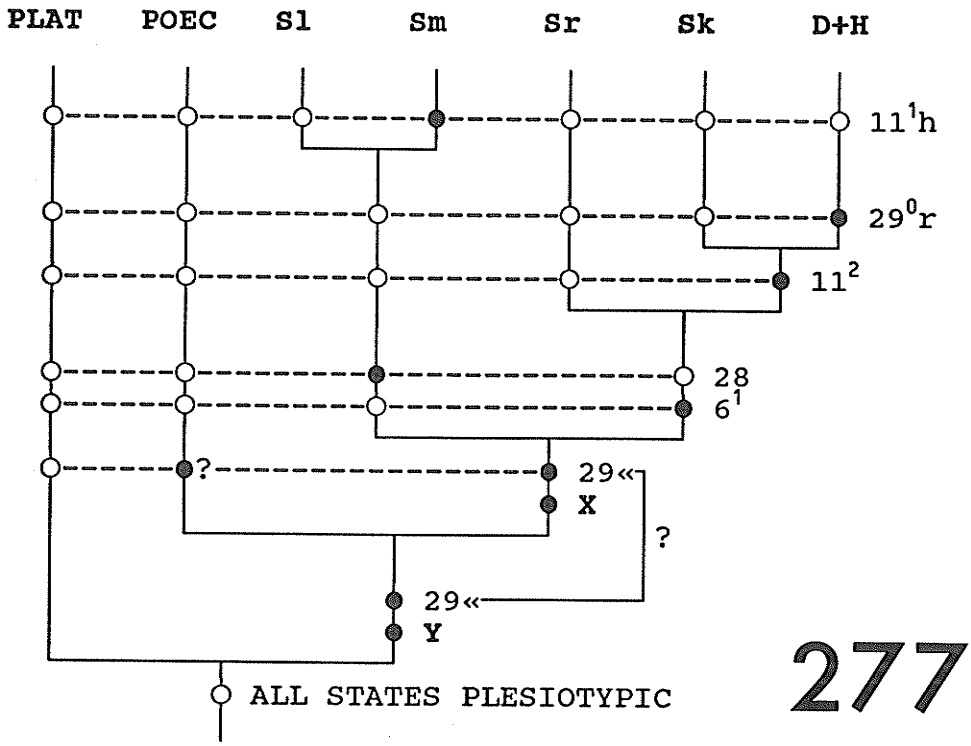
PLAT
POEC
Sl
Sm
Sr
Sk
D+H
11^1h
29^0r
11^2
28
6^1
?
29«
X
?
29«
Y
ALL STATES PLESIOTYPIC

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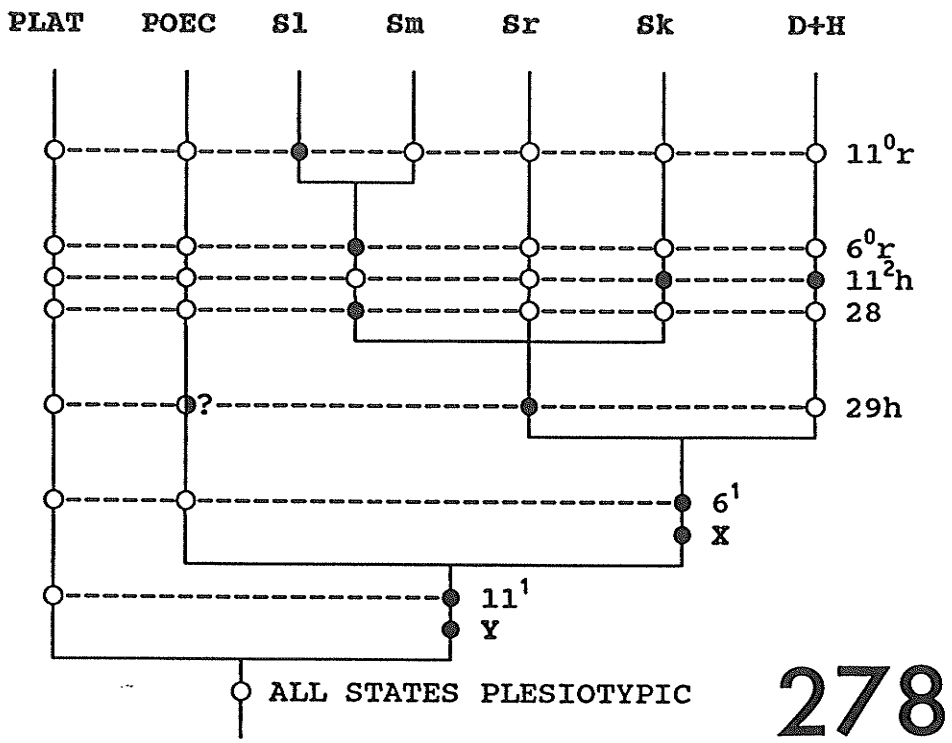
FIGURE 278. Possible relationship of members previously assigned to Sominella to remaining Donaciini. The derived state of character 11 is assumed to be possessed by P. harrisii and S. reticulata. PAUP analysis did not select possible monophyly of Sominella based on character 29 because of additional tree length caused by greater required homoplasy in characters 11 and 6. PLAT= Plateumaris, POEC= Poecilocera, Sl= Sominella longicornis, Sm= Sominella macrocnemia, Sr= Sominella reticulata, Sk= Sominella kraatzi, D+H= rest of Donaciini + Haemoniini. For other apomorphies of branches X and Y, see Figure 275. **r**= postulated reversal to plesiomorphic state, 0; **h**= postulated homoplastic occurrence of derived state, 1.


PLAT
POEC
Sl
Sm
Sr
Sk
D+H
11^0r
6^0r
11^2h
28
?
29h
6^1
X
11^1
Y
ALL STATES PLESIOTYPIC

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6.4. RECLASSIFICATION AND TREATMENT OF WORLD GENERA.

This chapter is summarizing my ideas about higher classification of Donaciinae, though some details concerning genera of the tribe Haemoniini were previously treated (Askevold 1988) and are not repeated here. Both Old and New World supraspecific taxa are included, tribes are characterized and diagnosed, and genera and subgenera are keyed (Old and New World taxa separately). Also included is a complete synonymical list of New World donaciines, to summarize the many taxonomic changes made here in one location.

6.4.1. Reclassification of genera of Donaciinae.

The classification proposed herein suffers from inadequacy of phylogenetic resolution, and should be viewed as provisional. Clearly, problems at both the generic and tribal levels persist because of lack of resolution of relationships, subjectivity of character assessment, and perhaps also because I am not inclined to recognize multiple monobasic genera.

Paraphyletic tribes. For tribal classification, it is clearly desirable to recognize only monophyletic taxa (Donoghue and Cantino 1988). However, among the tribes of Donaciinae, this is possible only for Haemoniini. To adhere strictly to cladistic classification, I would have to follow either a complicated and cumbersome arrangement, or none at all. Lack of a tribal classification would hinder discussion of such aspects as host plant relationship. I regard the reconstructed phylogeny as not fully resolved and consider that the classification derived from it is justifiably not fully resolved either.

The relationship of Plateumaris and Poecilocera is largely based on plesiomorphy; additional characters may show them to be sister taxa, but there is no particular reason to expect this. I group them here on the basis of symplesiomorphy, structurally and in host plant use. Thus the Plateumarini constitutes a paraphyletic, grade-based taxon. Poecilocera could be placed in Donaciini just as readily on the basis of host relations because many taxa in Donaciini are associated with the same plants as are Plateumarini. However, it bears greater resemblance to Plateumaris, albeit plesiomorphically, and I am more comfortable with this assignment at this time.

The tribe Donaciini is a broad mixture of generalized to specialized groups, and would be holophyletic only if Haemoniini were not recognized as a distinct tribe. Haemoniini consists of members that are profoundly different from other lineages of donaciines, both ecologically and structurally, and I am reluctant to reject this group as a useful taxon.

For Plateumarini and Donaciini then, two paraphyletic taxa are recognized. There is an inherent danger that such groups will be treated as monophyletic by subsequent investigators (Donoghue and Cantino 1988), but this classification should be recognized for what it represents: a provisional one that could be a staging-point for subsequent investigations. Many published classifications in chrysomelids have no apparent structural basis. Available classifications of almost all chrysomelid groups must therefore be regarded as fully unsubstantiated and effectively uninvestigated. The classification of Donaciinae proposed here is a solution to certain problems but creates others; however, it puts Donaciinae on a better foundation than is available for other subfamilies of chrysomelids. My

classification can be reexamined and modified in the future as it becomes supplemented by additional and new kinds of data.

Paraphyletic genera and subgenera. Donacia s. str. may be paraphyletic because I have no synapomorphy for the group; the grouping of this subgenus and D. (Cyphogaster) is clearly defined, but without a synapomorphy for the nominate subgenus I cannot rule out the possibility that D. (Cyphogaster) could have arisen from some group within it. Similarly, D. (Donaciomima) is very likely a paraphyletic group from which the major lineage of the other two subgenera could have diverged ecologically and structurally, and become specialized to Nymphaeaceae-hosts. Among these subgenera, D. (Cyphogaster) alone is defined by a synapomorphy. Therefore, that these relationships exist is virtually a certainty for, as Disney (1989) observed, residual paraphyletic groups remain when the rank of a subset of species within a genus is raised to the generic level. The remainder, which belong in the group bearing the original genus name, cannot be defined by a synapomorphy. As long as relationships and limits of these groups remain confused, I am inclined to accept a relatively status quo approach rather than to elevate all apparently defined lineages to generic status. The problem of Sominella was discussed above.

Summary of reclassification. In summary, reclassification of donaciine genera herein proposed has resulted in the following changes (exclusive of taxonomic changes with New World Plateumaris).

1. The previous subgeneric classification of Plateumaris and its congeners is rejected as unsubstantiated; type species designations are corrected.

2. Poecilocera is removed from Sominella as a monobasic genus, including only P. harrisii (LeConte).

3. Donacia reticulata and D. kraatzi are transferred to Sominella from Donacia, and Pseudodonacia and Plateumaroides (both based on D. kraatzi) are removed from synonymy with Donacia and transferred to synonymy with Sominella.

4. Donaciella is elevated to generic status, removed from Donacia, and D. pubicollis, D. tomentosa, D. cinerea and D. clavipes are transferred to it from Donacia.

5. Donacia microcephala is removed from Donacia and placed as incertae sedis in Donaciini.

6. Donacia s. str. is restricted to include 10 Nearctic and five Palaearctic taxa; 52 Palaearctic taxa and 22 Nearctic taxa left in Donacia are placed in the subgenus Donaciomima.

7. Donaciomima Medvedev (1973) apparently was described as a subgenus of Plateumaris; it was transferred to synonymy with Donacia s. str. by Borowiec (1984). It is here removed from synonymy with Donacia s. str., and reinstated to subgeneric rank, as one of three subgenera within Donacia.

8. Of the Nearctic D. (Donaciomima) species, one is undescribed, D. limonia is removed from synonymy with D. biimpressa, and D. tuberculata is revalidated and removed from synonymy with D. rufa because D. rufa is transferred to Plateumaris.

9. Prodonacia, a monobasic genus, was placed in synonymy with Donacia (s. str.) by Borowiec (1984). This name is removed from synonymy with Donacia and is placed as a junior subjective synonym of Donaciasta, and the only included species, Donacia assama (=Prodonacia shishona) is transferred to Donaciasta.

10. Donaciocrioceris Pic, a monobasic genus, was recognized by authors subsequent to Pic, but is here placed as a junior subjective synonym of Donaciasta; the single included species, Donaciocrioceris dentatus, is transferred to Donaciasta. Other, revised synonymies for all members of Donaciasta are not presented here because they are the subject of another publication (Askevold, in prep.).

11. Neohaemonia voronovae is left as incertae sedis in Haemoniini (Askevold 1988).

12. Several species level taxonomic changes are made affecting the Palaearctic fauna (i.e. synonymies proposed) other than those that are effected by shifts in generic synonymies, or transferrals as stated above, based mostly on examination of primary type specimens. These are (senior, valid name stated first):

Plateumaris sericea = P. discolor;

P. weisei = P. hirashimai = P. morimotoi;

P. rustica = P. affinis;

Donacia clavareaui = D. fukiensis [in D. (Donaciomima)];

D. fennica = D. ochroleuca = D. flavidula [in D. (Donaciomima)];

D. transversicollis = D. tuberfrons [in D. (Cyphogaster)];

D. recticollis = D. clarki [in D. (Donacia)];

Macroplea pubipennis = M. piligera = M. incostata [this synonymy was previously suggested by Hellén (1937) but was not adopted by subsequent authors].

6.4.2. Treatment of tribes, and synonymical list of supraspecific taxa of Donaciinae. Details of classification of Donaciinae as proposed herein, based on phylogenetic analysis of the genera (Section 5.2), are treated below. Jolivet (1970:1) listed all suprageneric names based on Donacia Fabricius; these are not relisted here but authorship of Donaciinae, and therefore Donaciini, is established as attributable to Kirby by implication of ICZN (1985) Articles 33b(ii), 43(a) and 36(a) bearing on the matter of family-group name authorship. Below, each tribe is diagnosed and included generic names are listed. Generic names for fossils proposed by Haupt (1956) are incorporated on the basis of my interpretation of their original descriptions. Type species designations are stated for all taxa and have been verified or corrected by me, by reference to original literature.

DONACIINAE Kirby, 1837:22.

Donaciadae Kirby, 1837:22.

TRIBE PLATEUMARINI **NEW TRIBE**

TYPE GENUS. Plateumaris Thomson, 1859.

DIAGNOSIS. Sutural margin of elytron explanate apically, the inner sutural bead sinuate far from apex and joining with outer bead, and elytral apex rounded in most species; hypomeron of pronotum glabrous (or with few scattered setae); mandible with apical teeth approximate, lacking serrulate occlusal edge; median lobe without basal angulation, tegmen robust and tapering. Hosts typically Cyperaceae, but also a few other emergent plant types.

INCLUDED SUPRASPECIFIC TAXA.

Plateumaris Thomson (1859:154). Type species Donacia nigra Fabricius (1792), by original designation.

Juliusina Reitter (1920:41). Type species Prionus braccatus Scopoli (1772), designation by Monrós (1959). **NEW SYNONYMY**

Euplateumaris Iablokoff-Khnzorian (1966:121). Type species Leptura sericea Linnaeus, 1758, by original designation.

Donacocia Gistel (1857:12). Type species Donacocia aenea Gistel (1857:12), by monotypy. See discussion in Appendix 11. **REJECTED**

Poecilocera Schaeffer (1919:308). Type species Donacia harrisii LeConte (1851), by monotypy. **NEW STATUS**

TRIBE DONACIINI Kirby (1837).

TYPE GENUS. Donacia Fabricius (1775).

DIAGNOSIS. Sutural margin of elytron more or less straight to apex, the beads meeting only at extreme apex, apex truncate in most species; hypomeron with broad pubescent area in most species; mandible with apical teeth slightly to greatly divergent, then forming long, serrulate occlusal edge; median lobe with basal angulation in most species, tegmen thin and slender in most species. Hosts various, including Cyperaceae.

INCLUDED SUPRASPECIFIC TAXA.

Sominella Jacobson (1908:622). Type species Donacia macrocnemia Fischer v. Waldheim (1824), by original designation.

Pseudodonacia Reitter (1920:27). Type species Donacia kraatzi Weise (1882), by monotypy. **NEW SYNONYMY**

Plateumaroides Khnzorian (1962:116). Type species Plateumaroides fastuosa Khnzorian (1962), (= Donacia kraatzi Weise, 1882), by monotypy. **NEW SYNONYMY**

Pseudonacia Jolivet (1970:9). **UNJUSTIFIED EMENDATION**

Sominaella Monrós & Bechyné (1956:1121). **UNJUSTIFIED EMENDATION**

Donaciella Reitter (1920:38). Type species Donacia tomentosa Ahrens (1810), designation by Monrós (1959:94) **NEW STATUS**

Donacia (Donacia) Fabricius (1775:195). Type species Donacia crassipes Fabricius (1775), designation by Curtis (1834), not Chapuis (1874).

Eodonacia Haupt (1956:54). Type species Eodonacia goeckei Haupt (1956), by original designation. **NEW SYNONYMY**

Donacia (Cyphogaster) Goecke (1934:219). Type species Donacia provosti Fairmaire (1885), designation by Chen (1941).

Hemidonacia Haupt (1956:60). Type species Hemidonacia insolita Haupt 1956, by monotypy. **NEW SYNONYMY**

Donacia (Donaciomima) Medvedev (1973:876). Type species Donacia clavareaui Jacobson (1906), by original designation. **NEW STATUS**

Donaciasta Fairmaire (1901b:233) (replacement name). Type species Donacilla perrieri Fairmaire, by ICZN (1985) Art. 67h.

Donacilla Fairmaire (1901a:127) (not Lamarck, 1818).

Type species Donacilla perrieri Fairmaire (1901a), by monotypy.

Donaciocrioceris Pic (1936:10). Type species Donaciocrioceris dentatus Pic (1936), by monotypy **NEW SYNONYMY**

Prodonacia Chen (1966:144). Type species Prodonacia shishona Chen 1966, by monotypy. **NEW SYNONYMY**

Donacia microcephala Daniel and Daniel (1904:89).

INCERTAE SEDIS IN DONACIINI

TRIBE HAEMONIINI Chen (1941).

TYPE GENUS. Haemonia Dejean (1821).

DIAGNOSIS. Dorsum testaceous; legs almost entirely testaceous, metafemur toothless, slender, tarsi very elongate, with reduced ventral pubescence; elytron apically with spine at outer angle (most species); hypomeron with pubescent area above coxa (lost in Macroplea, character state within N. voronovae unknown); mandible with apical teeth divergent, forming serrate occlusal edge; median lobe with basal angulation, tegmen slender. Hosts Zosteraceae and Haloragaceae.

INCLUDED SUPRASPECIFIC TAXA.

Macroplea Samouelle (1819:211). Type species Donacia zosterae Fabricius (1801), designation by Curtis (1830).

Apelma Billberg (1820:53). Type species Donacia zosterae Fabricius (1801), designation by Barber and Bridwell (1940).

Haemonia Dejean (1821:114). Type species Donacia zosterae Fabricius (1801), designation by Thomson (1859:154) [not Barber and Bridwell (1940)].

Neohaemonia Székessy (1941:148). Type species Haemonia nigricornis Kirby (1837), by original designation.

Neohaemonia voronovae Medvedev (1977). **INCERTAE SEDIS IN HAEMONIINI**

NOMEN INCERTAE SEDIS IN DONACIINAE:

Arundinarius Voet (1806:31) **REJECTED**

6.4.3. Key to tribes, genera and subgenera of Old World Donaciinae.

1.a. Elytron with outer apical angle prolonged as a spine; if only with obtuse or acute angulation (M. pubipennis), then elytra and pronotum with conspicuous sparse, long setae; apical tarsomere elongate, up to as long as basal 3 together, and tarsus with markedly reduced pubescence; elytra, pronotum and legs testaceous or brownish, with black strial punctures (most taxa); hosts Zosteraceae and Haloragaceae ..... **HAEMONIINI... 2.**

b. Elytron with outer apical angle not markedly produced, but truncate, rounded, or emarginate, pubescent or not; apical tarsomere shorter than remaining segments together, tarsi typically with dense and plush pubescence below; elytra and pronotum typically metallic, but colour various; host plants various, but few use Zosteraceae ..... 3.

2.a. (1) Pronotal disc without individually distinct punctures; elytron with strial punctures black; taxa geographically widespread, from Europe to Japan (Fig. 268) ..... **Macroplea** Samouelle.

b. Pronotal disc with individually distinct punctures; elytron with strial punctures not black; known only from Lake Ugii-Nur, Ara-Khankai Aimak, Mongolia (Fig. 268); generic assignment not established ..... **Neohaemonia voronovae** Medvedev.

3.a. (1) Elytron with inner bead of sutural interval sinuate well before apex, joining with outer bead to form single bead, and exposing broad, explanate sutural margin below (Figs. 9,10); pronotal hypomeron without broad pubescent area above procoxa; median lobe without subasal angulation, and tegmen robust and tapering (Figs. 6,7); ovipositor of females strongly sclerotized, serrate in most

species, and with acute apex; hosts typically Cyperaceae, some species using Acorus, Caltha, Iris, Phragmites. (Plateumaris Thomson, single Palaearctic genus) ..... **PLATEUMARINI.**

b. Elytron with beads of sutural interval meeting only near apex, or obscured, the interval more or less uniformly wide to near apex, and explanate margin not broadly exposed (Figs. 11-13); pronotal hypomeron typically broadly pubescent above procoxa [except some Sominella, and some Donacia (Donaciomima), inconspicuously in some Donaciasta]; median lobe with prominent subbasal angulation (except Donaciasta) (cannot be seen if uncleared!), tegmen typically slender, more or less parallel-sided, not thick; ovipositor of females not strongly sclerotized or apically serrate and acute (except Donaciella); hosts various. ..... **DONACIINI... 4.**

4.a. (3) Specimens from Madagascar or Africa south of 15° north latitude ..... 5.

b. Specimens not from tropical Africa or Madagascar ..... 6.

5.a. (4) Elytron with interval 8 slightly to markedly costate, some intervals with confused punctation (except D. dentata); frons and vertex with calli distinct and largely glabrous (except D. dentata); metatibia not markedly carinate or denticulate below; punctures of pronotal disc, if individually distinct, not confluent to form irregular rugae. Distribution widespread, Senegal to Uganda, south to South Africa, and Madagascar ..... **Donaciasta** Fairmaire.

b. Elytron with interval 8 not costate, intervals with punctation not confused; frons and vertex uniformly pubescent, without distinct calli; metatibia markedly explanate and denticulate below; punctures of pronotal disc not individually distinct, the disc irregularly

rugose. (Known only from single male from Botswana)

..... **Donacia (Donacia)** sp., undescribed.

6.a. (4) Pronotum and elytra uniformly pubescent, like head and underside; mesosternal process slender between mesocoxa; elytral epipleuron flat, or rounded and slightly raised, at most angulate at extreme base by humerus ..... 7.

b. Pronotum and elytra not pubescent (except, as far as I am aware, pronotum of most specimens of D. hirtihumeralis, S. kraatzi, D. clavareaui and D. kweilina, and specimens of at least one unidentified species from China); mesosternal process typically broader, often half or more width of mesocoxae (especially ♀♀); epipleuron prominently angulate in most taxa from below humerus to near apex [except members of D. (Donacia) and D. (Cyphogaster)] . 8.

7.a. (6) Body dorsally and ventrally bronzish or bright pale green; mandible distinctly and broadly bidentate apically; metafemur rather slender, hardly clavate, and generally without a tooth; female ovipositor of most species with acute, sclerotized ventral valve; hosts typically Gramineae; distribution more northern Palaearctic ..... **Donaciella** Reitter (part).

b. Entire body dorsally and ventrally testaceous, pronotal disc at most broadly darkened in middle; mandibles unidentate, therefore slender and sickle shaped; metafemur toothed; female ovipositor blunt, not sclerotized; host plant unknown; known only from the Middle East, generic assignment undetermined

..... **Donacia microcephala** Daniel and Daniel.

8.a. (6) Labrum with apex broadly and deeply emarginate ..... 9.

b. Labrum with apex broadly rounded ..... 11.

9.a. (8) Pronotal disc of most specimens with fine, short pubescence; metafemur without subapical ventral tooth; pronotum wider across posterior margin than across anterior margin; elytral apex narrow and rounded. Known only from a few localities east of the Black Sea (Fig. 267) ..... **Sominella kraatzi** (Weise).

b. Pronotal disc without distinct setae; metafemur of most specimens with subapical tooth, if without then legs largely rufous; pronotum of most specimens wider across anterior margin than across posterior margin; elytral apex various, most specimens with apex broadly truncate. Geographically more widespread ..... 10.

10.a. (9) Elytron with epipleuron flat or slightly rounded from behind humerus to near apex; dorsum pale metallic green or bronzish ..... **Donaciella clavipes** (Fabricius).

b. Elytron with epipleuron angulate from behind humerus to near apex; dorsum with colour various, testaceous or brown (D. fennica and some specimens of D. malinowskyi), very dark green (some specimens of D. malinowskyi), or pale green (most specimens of D. semicuprea), but these with elytron laterally reddish ..... **Donacia (Donaciomima)** Medvedev (part).

11.a. (8) Pronotal disc more or less uniformly coarsely punctured (most taxa), and intervening spaces alutaceous or not; elytral disc typically coarsely rugose, and generally metallic in colour [except members of Donaciasta, and some members of Donacia s.str. and D. (Cyphogaster)]; female pygidium rounded or emarginate apically, similar to that of male in length; mandibular teeth not especially prominently divergent apically, and outer margin typically more or less uniformly arcuate; head of uniform colour, metallic to piceous;

epipleuron typically raised and angulate along upper edge adjacent to outermost stria; hosts Cyperaceae and other emergent plants, some use Zosteraceae, Nymphaeaceae and Trapaceae ..... 12.

b. Pronotal disc at most punctulate, typically shiny (alutaceous in D. crassipes, partly alutaceous with some basal punctures in D. inopinata), and smooth, or finely rugulose; elytral disc largely smooth and shiny, and punctulate, with few coarse rugae (varies), and testaceous or brown in colour (except D. crassipes, D. ussuriensis, D. lenzi, D. ozensis, and many D. provostii); female pygidium prolonged and more or less triangular, acute or narrowly rounded at apex, very different from males; mandibular teeth very prominently explanate and divergent, the lower tooth directed ventrally and inwards, forming a broad, cutting edge; head typically with pair of small red spots behind eyes on occiput (except D. ozensis; D. ussuriensis and D. yuasi unknown), may be expanded to cover entire occiput or head; epipleuron typically rounded or flat, at most angulate near humerus; hosts Nymphaeaceae ..... 14.

12.a. (11) Dorsum entirely metallic; underside metallic, legs and antenna largely metallic (some species with underside of femora rufous); antennae densely and uniformly pubescent. Distribution from Europe to Japan, some in China. Hosts various, few using Zosteraceae, but not known from Nymphaeaceae or Trapaceae ..... 13.

b. Dorsum except head brown or testaceous, at most somewhat piceous with pale metallic tinge; underside, antenna and legs largely rufous; antenna sparsely pubescent basally. Known only from three localities in southeast Asia (see Fig. 265). Host plant unknown,

probably Trapaceae Zosteraceae, or Nymphaeaceae

..... **Donaciasta assama** (Goecke).

13.a. (12) Pronotal hypomeron without dense patch of pubescence above coxa (sparse setae in S. macronemia and S. reticulata), the hypomeron very coarsely rugose longitudinally (Figs. 15,16); elytral apex various, narrow and rounded (S. reticulata), toothed at inner apical angle, some specimens also at outer angles (S. macrocnemia) (Fig. 12), or narrowly truncate (S. longicornis) (Fig. 11); specimens of latter two species with metatibia explanate to prominently toothed ventrally; elytral disc typically shiny, punctulate or not, but not coarsely and densely rugose (except S. longicornis); vertex of head flat or depressed, without pair of calli; antennomere 3 typically long, in most specimens of S. macrocnemia and S. longicornis, and some specimens of S. reticulata, with 3 as long as or longer than 4 ..... **Sominella** Jacobson (part).

b. Pronotal hypomeron typically with pubescent patch above coxa (Fig. 17) (but reduced in most specimens of D. flemola), and hypomeron generally not so coarsely rugose; elytral apex generally broadly truncate (Fig. 13), and disc generally densely rugose, shiny in some; metatibia at most denticulate along ventral margin; most specimens with calli of vertex convex to prominently raised; antennomere 3 not as long as 4

..... **Donacia (Donaciomima)** Medvedev (part).

14.a. (11) Male specimens without pair of small shiny tubercles on abdomen. Distribution from Europe to Japan (3 species), and northern India (D. recticollis) (Fig. 266)

..... **Donacia (Donacia)** Fabricius (part).

b. Male specimens with pair of small glabrous tubercles at middle of basal abdominal sternum. Distribution from Japan to S.E. Asia, including Nepal, India and Sri Lanka, Java, Singapore, New Guinea, and northern Australia ..... **Donacia (Cyphogaster)** Goecke.

6.4.4. Key to genera and subgenera of New World Donaciinae.

1.a. Prothorax of most specimens with broad, finely pubescent area above procoxa (Fig. 17), disc of some specimens conspicuously pubescent also; sutural interval of elytron with inner and outer beads convergent only at apex, forming a short apical carina in some specimens, the lower sutural margin narrow, not explanate; eyes of most specimens set off from vertex by distinct sulcus, vertex of many specimens with two distinct calli; median lobe sub-basally with distinct angulation, tegmen thin and slender, and of uniform width (Fig. 8) ..... 3.

b. Prothorax without conspicuous broad pubescent area above procoxae (but cf. Plateumaris aurifer); sutural interval of elytron with sutural bead sinuate, and convergent with inner bead some distance from apex (sutural bead sinuate), exposing the lower, internal, explanate margin of elytron (Figs. 9,10); vertex of head more or less flat in most specimens; median lobe sub-basally without angulation, tegmen robust, tapering apically (Figs. 6,7) ..... 2.

2.a. (1) Apex of elytron broadly rounded; antennomere 3 shorter than 4; metatibia and metafemur not denticulate on underside, metafemur untoothed or with only one tooth; underside metallic or not, but not largely rufous, except for all or apex of abdominal sterna, reddish;

females with strongly sclerotized, acute ovipositor, in some specimens distinctly serrate, dorsal valve shorter than ventral valve ..... **Plateumaris** Thomson

b. Apex of elytron truncate or emarginate; antennomere 3 as long as or longer than 4; metatibia and metafemur (especially males) distinctly denticulate on underside, metafemur of males with both a subapical ventral and a ventromesal tooth, females with only subapical ventral tooth; underside largely rufous; ovipositor of females not strongly sclerotized or acute, dorsal and ventral valves of equal length ..... **Poecilocera** Schaeffer

3.a. (1) Outer apical angle of elytron with distinct spine; metafemur slender and untoothed, apical tarsomere elongate, about as long as preceding tarsomeres combined; legs, thorax, and elytron pale brown, most of underside, tarsi, scutellum, antenna, strial punctures, and head (except vertex), black ..... **Neohaemonia** Székessy

b. Outer apical angle of elytron not toothed; metafemur of most specimens distinctly clavate, in most specimens with 1 or 2 subapical ventral teeth, apical tarsomere much shorter than preceding tarsomeres combined; colour not as above, most specimens dorsally metallic, not entirely pale brown (except D. hirticollis, D. cuprea, D. pubescens, D. tuberculata) ..... 4.

4.a. (3) Pronotal disc distinctly and finely pubescent AND legs entirely rufous, at most with indistinct infuscation; metafemur without distinct subapical tooth below; epipleuron of elytron rounded along its entire length; elytral apex broadly rounded, apical punctation close, coarse, entirely confused; female with acute, sclerotized ovipositor; host Phragmites ..... **Donaciella** Reitter.

b. Pronotal disc glabrous, if pubescent then elytral apex truncate (D. hirticollis), or elytra pubescent (D. pubescens); legs rufous to entirely metallic, metafemur of most specimens with one or more subapical teeth; epipleuron of elytron rounded or distinctly angulate; elytral apex truncated, with obtuse to acute outer angle, punctures of striae finer, more widely spaced, and more or less regular in arrangement apically; hosts other than Phragmites ..... 5.

5.a. (4) Occiput of most specimens with two reddish spots (except most specimens of D. edentata-Group, two species), in many specimens spots expanded to cover as much as entire occiput; legs (except D. proxima) with no more than dorsum of metafemur darkened; pronotal disc without coarse punctures, but many specimens with very fine transverse to irregular rugae, OR surface granulate, alutaceous, OR smooth and shiny between punctures; mesosternal process, especially in females, broad between the mesocoxae, at least half as broad as diameter of mesocoxal cavities; ventral punctation obscured, hidden by density of pubescence; pygidium of most female specimens more or less elongately triangular, apically acute or narrowly rounded; host Nymphaeaceae ..... **Donacia (Donacia)** Fabricius.

b. Head more or less unicolourous, not reddish in most specimens (except D. cuprea, D. tuberculata, and D. pubescens); legs entirely dark to entirely red, but not with only dorsum of metafemur dark; pronotal disc with coarse punctures, punctures typically contiguous to confluent laterally to form coarse to moderate rugae (except 2 pubescent species and D. caerulea-Group); mesosternal process no more than half diameter of mesocoxal cavities; ventral coarse punctation visible, at most obscured by pubescence (except D. cuprea); pygidium

of females broadly rounded or emarginate, not elongate; hosts mostly Cyperaceae, Sparganiaceae, Zosteraceae, some use Nymphaeaceae (D. megacornis-Group, two species) ..... **Donacia (Donaciomima)** Medvedev.

6.4.5. Synonymical List of New World Members of Donaciinae (non-fossil taxa). The following list includes all described extant New World Donaciinae; within genera, taxa are listed alphabetically. Principally, the list serves to summarize, in one location, the many taxonomic changes that have resulted from the present monograph, as well as those recently published (Askevold 1987a,b, 1988). Details of historical use of species names are not given. ! = type examined or lectotype designated by me; !* = neotype designated by me.

PLATEUMARINI ASKEVOLD

Plateumaris Thomson, 1859.

! P. aurifer (LeConte, 1851).	**NEW STATUS**
P. balli Askevold	**NEW SPECIES**
P. chalcea (Lacordaire, 1845).	**NEW STATUS**
! D. flavipes var. lodingi Schaeffer, 1925.	**NEW SYNONYMY**
! D. flavipes var. shoemakeri Schaeffer, 1925.	**NEW SYNONYMY**
! P. diversa (Schaeffer, 1925).	
P. dubia (Schaeffer, 1925).	
! D. dubia Schaeffer, 1925.	
! D. idola Hatch, 1938.	**NEW SYNONYMY**
! P. flavipes (Kirby, 1837).	**ALTERED CONCEPT**
! D. wallisi (Schaeffer, 1925).	**NEW SYNONYMY**
! P. frosti (Schaeffer, 1925).	**NEW STATUS**
! D. emarginata var. frosti Schaeffer, 1925.	
! P. fulvipes (Lacordaire, 1845).	

! P. germari (Mannerheim, 1843).

! D. flavipennis Mannerheim, 1843. **NEW SYNONYMY**

! D. dives LeConte, 1851.

! D. serricauda Schaeffer, 1919.

!* P. metallica (Ahrens, 1810).

! D. femoralis Kirby, 1837.

! D. cataractae Newman, 1838.

! D. parva Lacordaire, 1845.

! D. nana Melsheimer, 1847.

!* D. indica Melsheimer, 1847 (not Clark, 1866:1).

! D. gentilis LeConte, 1851.

! P. neomexicana (Schaeffer, 1925).

! D. longicollis (Schaeffer, 1925). **NEW SYNONYMY**

! D. vermiculata (Schaeffer, 1925). **NEW SYNONYMY**

! P. nitida (Germar, 1811). **ALTERED CONCEPT**

! D. emarginata Kirby, 1837. **NEW SYNONYMY**

D. binodosa LeConte, 1851:316 (cf. Suffrian, 1872) **UNJUSTIFIED EMENDATION**

! D. juncina Couper, 1864. **NEW SYNONYMY**

! D. emarginata var. pacifica Schaeffer, 1925. **NEW SYNONYMY**

! P. notmani (Schaeffer, 1925).

! P. pusilla (Say, 1827).

D. rugifrons Newman, 1838 (probable synonymy).

! D. pyritosa LeConte, 1857(1860). **NEW SYNONYMY**

P. robusta (Schaeffer, 1919). **NEW STATUS**

! D. pusilla var. robusta Schaeffer, 1919, 1925.

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

!* D. rufa Say, 1827.

! D. affinis Kirby, 1837 (not Kunze, 1818). **NEW SYNONYMY**

! D. sulcicollis Lacordaire, 1845. **NEW SYNONYMY**

! D. kirbyi Lacordaire, 1845. **NEW SYNONYMY**

! D. jucunda LeConte, 1851. **NEW SYNONYMY**

P. schaefferi Askevold **NEW SPECIES**

D. nitida, sensu Schaeffer, 1925.

Poecilocera Schaeffer, 1919. **NEW STATUS**

P. harrisii (LeConte, 1851). **NEW COMBINATION**

! D. harrisii LeConte, 1851.

DONACIINI KIRBY

Donaciella Reitter, 1920. **NEW STATUS**

D. pubicollis (Suffrian, 1872). **NEW COMBINATION**

D. pubicollis Crotch, 1873 (not Suffrian, 1872).

Donacia (Donacia) Fabricius, 1775.

! D. cincticornis Newman, 1838.

! D. lucida Lacordaire, 1845.

! D. rufipennis Lacordaire, 1845.

! D. pulchella LeConte, 1851.

D. antillarum Suffrian, 1864.

D. cincticornis var. tenuis Schaeffer, 1925.

D. cincticornis var. tryphera Schaeffer, 1925.

! D. edentata Schaeffer, 1925.

! D. hypoleuca Lacordaire, 1845.

! D. militaris Lacordaire, 1845.

D. floridae Leng, 1891.

! D. palmata Olivier, 1795.

! D. palmata angustipes Marx, 1957. **questionable status**

D. parvidens Schaeffer, 1919.

! D. piscatrix Lacordaire, 1845.

! D. carolina Lacordaire, 1845.

! D. cuprea Melsheimer, 1847 (not Kirby, 1837).

! D. alutacea LeConte, 1851.

! D. congener LeConte, 1851.

! D. proxima Kirby, 1837.

! D. episcopalis Lacordaire, 1845.

! D. californica LeConte, 1861.

! D. rufescens Lacordaire, 1845.

D. texana Crotch ,1873.

D. texana var. minor Schaeffer, 1925.

Donacia (Donaciomima) Medvedev, 1973. **NEW STATUS**

! D. assimilis Lacordaire, 1845.

! D. glabrata Schaeffer, 1919 (not Solsky, 1872).

! D. biimpressa Melsheimer, 1847.

! D. aurichalcea Melsheimer, 1847.

! D. torosa LeConte, 1851.

!* D. caerulea Olivier, 1795.

* D. aequalis Say, 1824.

! D. confusa Lacordaire, 1845 (not LeConte, 1851).

! D. confusa LeConte, 1851 (not Lacordaire, 1845).

D. canadensis Askevold **NEW SPECIES**

! D. cazieri Marx, 1957.

!* D. confluenta Say, 1827.

! D. cuprea Kirby, 1837 (not Melsheimer, 1847).

D. curticollis Knab, 1905 (not Haupt, 1956).

! D. dissimilis Schaeffer, 1925.

! D. distincta LeConte, 1851.

! D. distincta occidentalis Mead, 1938.

! D. fulgens LeConte, 1851.

! D. hirticollis Kirby, 1837.

! D. rudicollis Lacordaire, 1845.

! D. liebecki Schaeffer, 1919.

! D. pallipes Lacordaire, 1845 (not Kunze, 1818).

! D. limonia Schaeffer, 1925 **NEW STATUS**

! D. magnifica LeConte, 1851.

D. megacornis Blatchley, 1910.

D. megalocera Weise, 1913.

! D. porosicollis Lacordaire, 1845.

! D. pubescens LeConte, 1868.

! D. rugosa LeConte, 1878.

D. subtilis Kunze, 1818 (replacement name for D. aenea Ahrens).

!* D. aenea Ahrens, 1810 (not Hoppe, 1795, Gistel, 1857).

!* D. quadricollis Say, 1827.

! D. aerea Lacordaire, 1845 (not Schrank, 1798).

! D. subtilis magistrigata Mead, 1938.

! D. tuberculata Lacordaire, 1845. **NEW STATUS**

! D. rutila Melsheimer, 1847.

! D. tuberculifrons Schaeffer, 1919.

! D. vicina Lacordaire, 1845 (not Haupt, 1956).

HAEMONIINI CHEN

Neohaemonia Székessy, 1941.

! N. flagellata Askevold, 1988

! N. flohri (Jacoby, 1884).

! N. melsheimeri (Lacordaire, 1845).

! N. minnesotensis Askevold, 1988

! N. nigricornis (Kirby, 1837).

! Haemonia americana Guérin-Méneville, 1844.

TOTAL: 3 tribes, 5 genera, 2 subgenera, 56 species.

7. HOST PLANT RELATIONSHIPS OF THE DONACIINAE.

In this chapter I integrate the available data about structure and behaviour of donaciine beetles with what is known of their host plant associations. The taxonomic literature about Chrysomelidae is replete with factual reports of what species are collected on what plants. In virtually none of this literature could a reasonable attempt be made to organize these data and to interpret them in a meaningful way because so little is known about the generic level phylogeny of almost all chrysomelids. Fortunately, knowledge of donaciines has progressed to a state permitting such an analysis, for two reasons. Firstly, a phylogeny of genera such as is hypothesized herein is essential to any beetle-host plant analysis; secondly, host plant associations are relatively well known. Those that are not known, such as hosts of Sominella kraatzi and the undescribed species of Donacia from Botswana, can be inferred on the basis of donaciine phylogeny.

Host-plant data reported in this chapter were partly gathered during field work to study North American donaciines, obtained from other collectors, or taken from literature. It should be noted that many species of Donaciinae may be associated with a variety of plant species. Use of plants may vary geographically, or may vary according to the kinds of plants available. Many species will also rest temporarily upon a variety of plants. Thus, I distinguish between adventitious and principal records, the former disregarded, the latter incorporated below.

These data are summarized in the accompanying tables (Tables 9 and 10). The phylogeny of groups of Donaciinae hypothesized above is

reflected in the sequence of genera and tribes of Donaciinae as listed in Table 9. I discuss each of the host plants categories below, according to the donaciine taxa associated with them, and some of their structural adaptations and behaviours that I think are related to association with these plant types.

7.1. VERTICAL-EMERGENT CATEGORY.

Members of the most plesiomorphic donaciine genera, Plateumaris and Poecilocera, are restricted to host plants which occur along the margins of water bodies. These marginal plants are generally Cyperaceae (Carex, Scirpus, Eleocharis) and Juncaceae (Juncus), but also Sparganiaceae and Araceae, the aquatic members of which grow vertically and are generally fully emergent from the water surface.

Members of Plateumaris are largely restricted to Cyperaceae, and hence to a vertical emergent plant category of hosts. Females of Plateumaris species oviposit above the water surface, and have a highly sclerotized ovipositor with an acute apex; members of Plateumaris lack a modified ovipositional gland, that Mann and Crowson (1983a) suggested produces a gelatinous matrix into which members of Donacia lay eggs under the water surface. I have no data about internal glandular structure of Poecilocera harrisii, or members of Donaciella. nor have I data about ovipositional behaviour of either, but Hoffman (1939, 1940a,b) stated that females of Donaciella pubicollis oviposit under water and into a gelatinous matrix.

Most groups of Donacia (Donaciomima) are also associated with plants in this category, while a few Nearctic species in the D. (Donaciomima) megacornis-Group are associated with Nymphaeaceae. Members of Donaciella are restricted to Gramineae, especially the genus Phragmites.

7.2. FLOATING CATEGORY.

The more highly derived D. (Donacia), D. (Cyphogaster), and a species group (above) of D. (Donaciomima), are restricted to plants of the Nymphaeaceae. Members of Donaciasta are recorded from Nymphaea and Trapa natans (unpubl. data), and donaciine larvae collected in Madagascar, supposedly from Potamogeton, are almost certainly larvae of Donaciasta (Bertrand 1965). I have assigned these plants to a floating leaf category in which the plants are submerged except for some apical floating leaves. The leaf petioles arise in a cluster from the apex of a robust spongy tuber or rhizome in most Nymphaeaceae. Larvae of D. (Donacia) are clustered for part of their life cycle, as more mature larvae, between the leaf petiole bases. Larvae of D. (Donacia) have unusually elongate spiracular hooks (Hoffman 1940, pers. obs.), a structure perhaps related to thickness of the rhizome. Members of D. (Cyphogaster) also have elongate spiracular hooks according to figures of larvae of some Japanese species of this subgenus, and they are also restricted to these plants (Anonymous 1985). Mann and Crowson (1983a) stated that species of D. (Donaciomima) they examined had modified accessory glands that they suggested produce the gelatin that these species oviposit into, under water. By inference, I deduce that all or most members of Donaciini, and Haemoniini, possess this gland, and that the gland is an important adaptation related to subsurface oviposition.

7.3. FLOATING-SUBMERGED CATEGORY.

This category of plants is represented by Zosteraceae and Haloragaceae, of which some apical leaves may be floating, but most leaves are under water along the stem of the plant. Members of Haemoniini are restricted to these plants, and spend much of their adult

life submerged along the stems or under floating leaves. Askevold (1988) discussed adaptations of Haemoniini to their subsurface habits. Several species-groups of D. (Donaciomima) also use them, but do so in a fashion similar to species that are Nymphaeaceae-associated (i.e. D. assimilis-Group, D. magnifica, D. hirticollis, and a few Palaearctic taxa).

7.4. EVOLUTION OF DONACIINES WITH RESPECT TO HOST PLANTS.

7.4.1. Pattern of host associations in relation to phylogeny of donaciines.

Highly derived groups within Donaciinae [especially D. (Donacia), D. (Cyphogaster), and perhaps Donaciasta] are associated with the relatively plesiomorphic dicotyledonous Nymphaeaceae (Table 9). In contrast, many species of Plateumaris, Poecilocera harrisii, Donaciella and D. (Donaciomima) are associated with the more highly derived and more recently evolved monocotyledons, the Cyperaceae and Gramineae. The third group of plants, also monocots, are used by Haemoniini and some members of D. (Donaciomima).

The hypothesis one would expect to corrobrate in an analysis of host-parasite relationships would be that phylogenetic relationships of the beetles should correlate with patterns of diversification of the hosts. Accordingly, genera of Donaciinae that are Nymphaeaceae-associated should be the more plesiomorphic structurally, and should be found to occupy the more primitive phylogenetic position among donaciine genera. That is, a relationship of primitive beetle to primitive plant and derived beetle to derived plant is expected. It is very likely this expectation that has been responsible for the classification of donaciines that is found in catalogues (i.e. Borowiec 1984, Jolivet 1970, Jacoby and Clavareau 1904, Clavareau 1913).

This pattern clearly is not met by the Donaciinae. Most taxa are associated with rather highly derived plants in the family Cyperaceae, and some with the Gramineae. Even the most plesiomorphic groups of Donaciinae including Plateumaris, and Poecilocera, and many members of D. (Donaciomima) are principally Cyperaceae-associated, though also using similar plants in the Juncaceae. A few members have exploited some other plants: Plateumaris chalcea using Acorus calamus (Araceae), P. sericea using Iris (Amaryllidaceae) and others, P. braccatus using Phragmites (Gramineae), D. (Donaciomima) magnifica and D. (Donaciomima) hirticollis using Potamogeton (Zosteraceae) or certain Sparganium, members of the D. (Donaciomima) subtilis-Group using principally Sparganium (Sparganiaceae), and members of the D. (Donaciomima) megacornis-Group using Nymphaeaceae.

There is a more or less discrete phylogenetic hiatus between donaciine groups that exploit vertical-emergent plants and those that use floating or submerged plants. One substantial structural-ecological gap I perceive is between the group of D. (Cyphogaster) + D. (Donacia) and the rest of Donacia that I have placed in D. (Donaciomima). Members of D. (Cyphogaster) and D. (Donacia) are structurally distinct from those of D. (Donaciomima), and have exploited a relatively derived ecological zone, which required a variety of structural modifications. Members of Donaciasta seem to have independently exploited the same plant groups, as has a species-group of D. (Donaciomima), mentioned above. A second, greater, hiatus exists between the Donaciini and Haemoniini. The latter group progressed to greater aquatic specialization and plastron development, the ancestor of which probably shifted to a different group of plants (Zosteraceae), which are also

monocots [there are records of some Palaearctic Macroplea species associated with Myriophyllum (Haloragaceae), a dicot].

This observed pattern does not bear out the initial hypothesis, the expected pattern being that that primitive beetles coevolved with, and became progressively coadapted to, host plants. Therefore, an alternative explanation must be invoked: that is, evolution of new plant types did not guarantee that the beetle phytophages diversified in parallel fashion. I suggest that growth form of potential hosts has been more important in diversification of donaciines than has the progressive appearance of increasingly derived host plant taxa. I think this explanation is supported by field observations. It is not uncommon to find some species ovipositing on plants other than their principal hosts, but then these plants usually have a similar growth form (same host category type, Table 9 and 10). For example, D. (Donaciomima) hirticollis has a marked preference for Potamogeton, but many females oviposit on the slender, floating leaves of Sparganium angustifolium Michx. Similarly, species of Plateumaris commonly land on, or oviposit, on several different Cyperaceae, even Iris (Amaryllidaceae). Species may vary geographically in the specific host plant used, as Marx (1957) found with several species of D. (Donaciomima). However, they restrict themselves to hosts that are in the habitus categories I have erected. If one takes into consideration aspects of structural and behavioural adaptations of the donaciines, there is a pattern of logical progression from relatively primitive donaciines inhabiting A type plants, to more derived donaciines using B and C type plants. For "B" type plants, evidently there has been a transition from "A" plants independently by a number of groups: D. (Donaciomima) megacornis-Group, D. (Donacia), D.

(Cyphogaster), and possibly Donaciasta. Members of other species-groups shifted to other plants with floating leaves (C plants), but could probably have used B plants just as readily. These groups seem to be excluded from the Nymphaeaceae, tending not to occur on these plants except adventitiously. This transition to C plants seems to have been made independently by several groups of D. (Donaciomima) and by the Haemoniini.

7.4.2. Consideration of host-phylogeny pattern.

The observed pattern of host association and phylogeny suggests some unexplained problems with the hypotheses of geographic history that I have formulated for Neohaemonia (Askevold 1988), and for Plateumaris herein. These hypotheses extend interpretations of the phylogenetic history of Donaciinae well into the Cretaceous. Such a time frame may antedate the evolution of plants donaciines use presently. This is potentially a disturbing problem, for if earliest Donaciinae (Plateumaris?) existed before any Cyperaceae, which they almost certainly did, then what plants did they use? If among the extant genera of donaciines there are taxa (e.g. Plateumaris) that were associated with other aquatic plants before Cyperaceae evolved, then why are none of these associations preserved among extant taxa today? Alternatively, why are none of these taxa extant if they were so associated at one time?

Several possible explanations can be explored. Firstly, the reconstructed phylogeny of Donaciinae genera could be based on incorrectly polarized characters. If so, then perhaps the phylogeny should be reversed or at least rooted at a group within the Donaciini such as D. (Donacia) or D. (Cyphogaster). This would produce a

phylogeny with the taxa closest to the base of Donaciinae being associated with the more primitive aquatic dicot plants, while the genus Plateumaris would be more derived, and monocot-associated. I reject this possibility because of my level of confidence in the reconstructed phylogeny of donaciine genera.

Secondly, perhaps we simply do not know enough about the details of angiosperm phylogeny and classification. My premise about relative primitiveness, and therefore recency of ancestry, of the plants donaciines use is derived from traditional plant classifications in textbooks (e.g. Cronquist 1981, Dahlgren 1980); these are based on a Magnoliid theory, which originated around the turn of the century (Crane 1985). A more recent view holds that certain monocotyledons are a heterogenous (i.e. polyphyletic) assemblage of plants that retain a large number of primitive characters (Stewart 1983, Crane 1985). However, this allowance does not seem to account for the phylogenetically wide divergence among plant taxa inhabited by donaciines.

Thirdly, perhaps we merely lack an adequate fossil record of angiosperms. Some early Mesozoic plant fossils are enigmatic, but have angiosperm-like characters; however, no plant fossils that are unequivocally angiospermous are known from the pre-Cretaceous (Crane 1985). The prevailing view of angiosperm phylogeny maintains that angiosperms arose early in the Mesozoic followed by low diversity and a delayed radiation in the mid-Cretaceous (Crane 1985). If the actual, rather than the apparent, history of angiosperm groups such as the Cyperaceae extends well into the early Cretaceous, then perhaps the earliest Donaciinae were in fact Cyperaceae-associated. Descendants

could have radiated to a variety of other aquatic plants types without regard for plant taxon, but with selection for the adaptive zone each plant type represented.

Fourthly, primitive donaciines might not have been associated with any plants now used. That is, original associations may have been with various aquatic non-angiosperms, or some other angiosperm group. As other aquatic plant groups arose and became available, donaciines exploited these plants. Alternatively, the hosts once used by donaciines underwent extinction, and the donaciines were able to shift hosts and thus avoided extinction. By such a scenario, primitive donaciines would have selected the most suitable aquatic plants available. Such a hypothesis should be substantiated by completely indiscriminate use of aquatic plants by early donaciines, though perhaps constrained by particular requirements of host plant characteristic. However, if host selection was indiscriminate, why would Plateumaris and Poecilocera and many D. (Donaciomima) be virtually restricted to Cyperaceae, which are among the most highly derived angiosperms (deduced from placement in classifications, e.g. Dahlgren 1980, Cronquist 1981). Non-cyperaceous plants such as Iris, Typha, Caltha, Acorus, Sparganium, and Phragmites, are common emergent aquatic plants. They, or similar plant types, might have been as readily available as Cyperaceae to early donaciines yet only some of these are used, and by only a few taxa. It seems to me these other groups might just as readily have been selected by early donaciines, unless there were historical constraints and some degree of protracted cohabitation with cyperaceous hosts.

Another explanation could be that primitive (but representing extant lineages), donaciines underwent a wholesale shift away from early host

types to the present types. However, such a hypothesis of host shift requires total abandonment of former host taxa, and there is no reason to expect such a phenomenon to occur. One should find that some taxa remain with an ancestral association, even though many may find new host types (Brooks 1985). Thus, among extant donaciines there should be taxa that are still associated in a manner that constitutes an ancestral type.

I regard the genera Plateumaris or Poecilocera as most primitive, and as probably having retained original host associations in most of their members. However, this creates a conflict among data of chorology, fossils and reconstructed phylogeny of genera of Donaciinae. That the most primitive donaciines are associated with the more highly derived angiosperms is not by itself problematic, but the hypothesized time of origin of donaciines significantly antedates development of host plants that are used today.

No ecologically intermediate groups between terrestrial sagroids and the aquatic donaciines are known for some indication of what early donaciines were like. In some structural respects, donaciines are more similar to criocerines, but as far as is known, they are as ecologically divergent as donaciines are from sagrines.

Any attempt to explain evolution of donaciines by conventional means will revert to inference that there has been a great deal of extinction of early lineages. Invoking such statements simplifies our understanding of historical associations because we can always simply claim the links are missing, and therefore speculate about what must have occurred. I find this path of least resistance somewhat unpalatable because unrelated sources of data suggest otherwise, placing

the age of origin of these beetle groups well into an earlier period of angiosperm radiation (discussed in section on biogeography of Plateumaris, section 4.3.2).

These data are of two kinds, fossils and vicariance biogeography; both are detailed above, where I develop my arguments about the geographic history of donaciines. Essentially, these data have been important in placing our understanding of the evolution of donaciines, and probably some other insects in a deeply temporal context. I do not think understanding of other evolutionary aspects, such as beetle-host plant relationships has caught up with this geological context.

7.4.3. Summary of pattern of evolution of Donaciinae.

I have come to conceive the evolution of donaciines as having occurred in several stages, each stage representing an ecological and adaptive zone. I think there have been three such adaptive zones, which donaciines have been able to exploit. The general pattern observed, is similar to one that Erwin (1981) discussed in relation to Carabidae, termed taxon pulses.

Donaciines must have evolved from terrestrial ancestors. The first and basal, zone, must therefore have been the invasion of the aquatic habitat by donaciines. In this zone, donaciines radiated to occupy a variety of aquatic vascular plants, but the plants exploited were evidently marginal plants. Such plants would appear to be relatively terrestrial in growth habit. The genera Plateumaris, Poecilocera, Sominella, Donaciella, and most species of the subgenus Donaciomima use these plants. About 100 species of donaciines, using about 22 genera of host plants, are known, representing the largest proportion of donaciine diversity.

The second adaptive zone is exploited by only about 38 species of donaciines, and using only about 6 genera of plants. These plants are more entirely aquatic in growth form, demanding more refined adaptations to aquatic life on the part of donaciines. Among the donaciines inhabiting basal zone plants, some lineages comprising the tribe Donaciini must have evolved defensive behaviour, ovipositional behaviour and glands that would be preadaptations for living on floating leaves. In particular, members of these groups have an improved plastron system, as illustrated by increased pronotal supracoxal pubescence.

At least two strategies are exemplified by donaciines that use plants with floating leaves. Some members of D. (Donaciomima) oviposit along the margin of floating leaves (most members of this genus use marginal plants), while members of D. (Donacia) and D. (Cyphogaster) cut a hole in the floating leaf, through which to oviposit. These species, as far as is known, oviposit in a gelatinous matrix; this is supposed to be the means of bacterial transmission from adult to larvae, because the larvae are said to consume some of this matrix when hatching (Cox 1988).

In general, species that inhabit these plants spend as much time beneath the water surface, under floating leaves, and will frequently escape beneath the plant rather than fly away, when disturbed. Thus, among the tribe Donaciini, there is a trend toward increased time spent underwater, most which is exemplified in a few species of D. (Donaciomima), D. (Donacia) and D. (Cyphogaster). Among these groups, there is a trend to loss of metallic colouration for, if such species are spending much of their time underwater, why be of a metallic colour to camouflage from predators such as birds? Little is known about behaviour of Donaciasta, but the same can be surmised of this group

because they use these hosts, and also show a similar trend to loss of metallic colour.

With increased specialization to more prolonged aquatic habits among several, unrelated lineages in the tribe Donaciini, some lineage, which appears to have been most closely related to Donaciasta, became adapted even more completely to aquatic habits. This lineage, the Haemoniini, lost all metallic colouration, developed a more refined plastron with reduced length of pubescence, reduced tarsal width and pubescence for decreased bouyancy, and longer tarsal claws. In addition, the haemoniines possess a spine on the apex of the elytron, suggesting that this is an adaptation to increased streamlining for an insect that spends most of its time under water (possibly in lotic habitats).

Exploitation of this habitat was accomplished by at least one lineage of donaciines, principally the Haemoniini. Diversity of Haemoniini is low, with only about 10 species in three genera, and using only about five genera of host plants.

Therefore, several patterns are evident. More primitive donaciines are associated with highly derived angiosperms. More highly derived donaciines are increasingly adapted to aquatic habits, and are associated with plants that have a growth form suitable to these donaciines irrespective of their phylogenetic position with in angiosperms. Donaciine evolution could be viewed as an inverted cone of diversity: the greatest diversity of donaciines are relatively primitive in their use of aquatic plants, while a lesser diversity has succeeded in more aquatic specialization. diversity

TABLE 9.

RELATIONSHIP OF DONACIINES AT GENERIC AND SUBGENERIC LEVELS TO CATEGORIES OF HOST PLANT HABITUS BASED ON GROWTH FORM.

PLANT HABITUS	A. VERTICAL & EMERGENT	B. FLOATING LEAVES	C. FLOATING & SUBMERGED
PLANT TAXA IN CATEGORIES[1]	Alismaceae Araceae Amaryllidaceae Butomaceae Cyperaceae Gramineae Juncaceae Pontederiaceae *Ranunculus* Typhaceae		
	Sparganiaceae	Trapaceae Nymphaeaceae some *Sparganium*	Zosteraceae Haloragaceae?
ADAPTIVE ZONE	PRIMITIVE >>>----------> DERIVED		
DONACIINAE TAXA:			STRUCTURE: PRIMITIVE
A. Plateumarini			
Plateumaris	■		
Poecilocera	■		
B. Donaciini			
Sominella	■		
Donaciella	■		
Donacia s.g.			
(*Donaciomima*)	■	■	a
(*Donacia*)		■	
(*Cyphogaster*)		■	
Donaciasta		■	b
C. Haemoniini			
N. voronovae			■
Macroplea			■
Neohaemonia			■
			DERIVED

[1]: according to their assignment in Table 10.
a: denotes taxa associated with these plants, but not occupying lower submerged parts.
b: denotes unverified record, but is an association stated in the literature.

TABLE 10.

HOST PLANTS OF THE DONACIINAE AND ASSIGNMENT TO GROWTH FORM CATEGORY.

PLANT HABITUS CATEGORY	A. VERTICAL/ EMERGENT	B. FLOATING LEAVES	C. FLOATING & SUBMERGED LEAVES
PLANT FAMILIES:			
Alismaceae:	Alisma, Sagittaria.		
Amaryllidaceae:	Iris.		
Araceae:	Acorus calamus, Peltandra, Orontium.		
Butomaceae:	Butomus.		
Cyperaceae:	Carex, Eriophorum, Eleocharis, Scirpus.		
Gramineae:	Phragmites, Glyceria, Leersia, Phalaris, Scolochloa.		
Juncaceae:	Juncus.		
Pontederiaceae:	Pontederia cordata.		
Ranunculaceae:	Caltha palustris.		
Sparganiaceae:	Sparganium.	some Sparganium.	
Typhaceae:	Typha.		
Nymphaeaceae:		Nymphaea, Nelumbo, Brasenia, Nuphar.	
Trapaceae:		Trapa natans.	
Zosteraceae:			Zostera, Ruppia, Potamogeton, Zanichellia.
Haloragaceae:			Myriophyllum.

Sources: Anonymous (1985), Borowiec (1984), Gruev and Tomov (1984), Marx (1957), Mohr (1966), Scherer (1978), Wilcox (1979), Otto (1985) and unpublished data.

8. CONCLUDING REMARKS AND THE FUTURE.

I have exerted myself to give detailed study to the donaciines, particularly their classification. Before this work had proceeded very far, I had developed the naive notion that, surely, this work would be definitive. But, as should be predictable if much at all has been learned, problems beget questions which occasionally beget solutions, but mostly they render new and different problems. And having arrived at this juncture, I have generated far more questions and problems than I have solutions, and my paltry efforts will go unnoticed by the beetles that will inevitably survive me.

While I would like to believe that my contributions to systematics of the Donaciinae have been significant, the potential for subsequent endeavour is far from exhausted. Considerable basic taxonomic research remains, especially among the Palaearctic donaciines. Immature stages of donaciines are effectively unknown, but as Pollock (1988) showed, characters of immatures can offer significant data in resolution of phylogenetic relationships. Relationships among chrysomelid subfamilies have not been analyzed by any author using phylogenetic methods (except Schmitt 1985, 1988), and study of donaciines has been a good introduction to the problems that must be overcome.

Host plant relationships of donaciines are an aspect to which I have given rather superficial consideration. Integration of data about secondary plant compounds may lend important resolution to this problem. The remaining Tertiary fossils need to be examined (i.e., the Eocene Brown Coal taxa), for they are certainly misunderstood. Internal, glandular structure of donaciines may offer some characters useful in

resolving relationships, as well as understanding the way of life of donaciines. A broad study of many taxa may yield useful data.

Donaciines offer excellent opportunities for other kinds of biological research. Ecologically, how do donaciines, which in some locations exist in great abundance and species richness, partition the plant resources, if at all? Geographic variation could be investigated using other techniques. Some species, such as the geographically variable P. pusilla, P. neomexicana and D. cincticornis could offer excellent opportunities for detailed analysis of geographic variation using biochemical techniques. What exactly do donaciine larvae use their spiracular hooks for? How do they construct their pupal cocoon and of what substances? On what do larval donaciines feed? The list, for an imaginative biologist and naturalist, is indefinite. I am amazed that donaciines have not become the object of intense scrutiny by more investigators, because they are so common, observable, and adults are pleasing to the eye

9. REFERENCES CITED.

Ahrens, A. 1810. Beiträge zu einer Monographie der Rohrkäfer. Neue Schriften der naturforschenden Gesellschaft zu Halle 1:9-48.

Allen, R.T. 1983. Distribution patterns among arthropods of the North Temperate deciduous forest biota. Annals of the Missouri Botanical Garden 70:616-628.

Anderson, R.S. 1987. Systematics, phylogeny and biogeography of New World weevils traditionally of the tribe Cleonini (Coleoptera: Curculionidae: Cleoninae). Quaestiones Entomologicae 23:431-709.

----------. 1988. The Curculionidae of the Queen Charlotte Islands (Insecta: Coleoptera). Canadian Journal of Zoology 66:2406-2414.

Anonymous. 1985. Atlas of the Japanese Donaciinae (Guide for identification of the fossil donaciine beetles.) Fossil Insect Research Group for the Nojiri-ko Excavation. Osaka Museum of Natural History, Osaka. 182 pp. [in Japanese]

Arnett, R.H. 1968. The Beetles of the United States. (A manual for identification). American Entomological Institute, Ann Arbor, Michigan. xii + 1112 pp.

Ashlock, P.D. 1974. The uses of cladistics. Annual Review of Ecology and Systematics 5:81-99.

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

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

----------. 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.

----------. 1990. Tertiary fossil Donaciinae of North America: implications for classification and evolution of the Donaciinae (Coleoptera: Chrysomelidae). Canadian Journal of Zoology, in press.

----------. in preparation. A restudy of the austral genus Donaciasta Fairmaire (Coleoptera: Chrysomelidae: Donaciinae): systematics, reconstructed phylogeny, and geographic history.

Axelrod, D.I. 1986. Cenozoic history of some western America pines. Annals of the Missouri Botanical Garden 73:565-641.

---------- and P.H. Raven. 1985. Origins of the Cordilleran flora. Journal of Biogeography 12:21-47.

Ball, G.E. 1977. Editorial - comments about a few words in the biological sciences. Quaestiones Entomologicae 13:1-4.

Ball, I.R. 1976. Nature and formulation of biogeographical hypotheses. Systematic Zoology 24:407-430.

Balsbaugh, E.U., Jr. and Hays, K.L. 1972. The Leaf Beetles of Alabama. Bulletin Alabama Agriculture Experimental Station #441:2-223.

Balthasar, V. 1934. Ein Beitrag zur Kenntnis der Palaearktischen Donaciini. Entomologisches Nachrichtenblatt 8:128-130.

Barber, H.S. and J.C. Bridwell 1940. Dejean catalogue names (Coleoptera). Bulletin of the Brooklyn Entomological Society 35:1-12.

Bayer, L.J., and H.J. Brockman. 1975. Curculionidae and Chrysomelidae found in aquatic habitats in Wisconsin. The Great Lakes Entomologist 8:219-226.

Becker, E.C. 1974. Designation of lectotypes for 13 species of Coleoptera described by Couper in 1864 and 1865. Annales de la Société Entomologique de Québec 19:62-73.

Beller, S. and M.H. Hatch, 1932. Coleoptera of Washington: Chrysomelidae. University of Washington Publications in Biology 1:65-144 + 1 plate.

Bertrand, H. 1965. Contribution à l'étude des premiers états des Coléoptères aquatiques de la région éthiopienne (7e. note). Bulletin de l'Institut français d'Afrique noire (Ser. A, No.4) 27:1336-1393.

Billberg, G.J. 1820. Enumeratio Insectorum in Museo Billberg. Stockholm, Gadel 4:1-138.

Blatchley, W.S. 1910. An illustrated descriptive catalogue of the Coleoptera or Beetles (exclusive of the Rhynchophora) known to occur in Indiana. Nature Publ. Co., Indianapolis. 1386 pp.

Bock, W.J. 1974. Philosophical foundations of classical evolutionary classification. Systematic Zoology 22:375-392.

Borkent, A. 1979. Systematics and bionomics of the species of the subgenus Schadonophasma Dyar and Shannon (Chaoborus, Chaoboridae). Quaestiones Entomologicae 15:122-255.

Borowiec, L. 1984. Zoogeographical study on Donaciinae of the world (Coleoptera, Chrysomelidae). Polskie Pismo Entomologiczne 53:433-518.

---------- 1987. The genera of seed-beetles (Coleoptera, Bruchidae). Polskie Pismo Entomologiczne 57:3-207.

Brigham, W.U. 1982. Chrysomelidae. Pp 10.112-10.136, In Brigham A.R., W.U. Brigham, and A. Guilka, (Editors) Aquatic Insects and Oligochaetes of North and South Carolina. Midwest Aquatic Enterprises, Mahomet, Illinois. 837 pp.

Brivio, C. and E.U. Balsbaugh, Jr. 1984. New genitalic characters for distinguishing Donacia subtilis Kunze and D. fulgens LeConte (Coleoptera: Chrysomelidae). The Coleopterists' Bulletin 38:305-311.

Brooks, D.R. 1985. Historical ecology: a new approach to studying the evolution of ecological associations. Annals of the Missouri Botanical Gardens 72:660-680.

Brown, W.J. 1951. The American specie of Phratora Chev. (Coleoptera: Chrysomelidae). The Canadian Entomologist 83:121-130.

Brundin, L. 1966. Transantarctic relationships and their significance, as evidenced by chironomid midges, with a monograph of the subfamilies Podonominae and Aphroteniinae and the austral Heptagyiae. Almquist and Wiksell, Stockholm. 472 pp + 30 plates.

----------. 1972. Phylogenetics and biogeography. Systematic Zoology 21:69-79.

Chapuis, F. 1874. Genera des Coléoptères, Vol. 10 In Lacordaire, T. Histoire naturelle des insectes. 455 pp, plates 111-123. Paris [not seen, cited in Jolivet 1970:5].

Chen, S.H. 1941. Notes on donaciine beetles. Sinensia 12:1-17.

---------- 1966. Notes on Chinese Donaciinae. Acta Entomologica Sinica 15:137-147.

---------- 1986. Fauna Sinica. Insecta. Coleoptera Hispidae. Science Press, Beijing. [only a few select pages were examined; a full bibliographic citation is not available].

Clark, C. 1986. Homoplastic - an appropriate choice. Systematic Zoology 35:142-143.

Clark, H. 1866. A catalogue of Phytophaga (Coleoptera, Pseudotetramera). Appendix. Williams & Norgate, London and Edinburgh. 1 + 88 pp.

Clavareau, H. 1913. Sagrinae, Donaciinae and Criocerinae, In Junk, W. and S. Schenkling, (Editors) Coleopterorum Catalogus 51:1-103.

Coope, G.R. 1970. Interpretations of Quaternary insect fossils. Annual Review of Entomology 15:97-120.

---------- 1979. Late Cenozoic fossil Coleoptera: evolution, biogeography, and ecology. Annual Review of Ecology and Systematics 10:247-267.

Couper, W. 1864. Paper V. List of Coleoptera and Diptera taken at Quebec, and other parts of Lower Canada. Transactions of the Library and Historical Society of Quebec. New Series, Part 2. Session of 1863-64:75-93.

Cox, M.L. 1988. Egg bursters in the Chrysomelidae, with a review of their occurrence in the Chrysomeloidea and Curculionoidea (Coleoptera). Systematic Entomology 13:393-432.

Crane, P.R. 1985. Phylogenetic analysis of seed plants and the origin of angiosperms. Annals of the Missouri Botanical Garden 72:716-793.

Cronquist, A. 1981. An integrated system of classification of flowering plants. Columbia University Press, New York. xviii + 1262 pp.

----------. 1987. A Botanical critique of cladism. The Botanical Review 53:1-52.

Crotch, G. R., 1873. Materials for the study of the Phytophaga of the United States. Proceedings of the Academy of Natural Sciences of Philadelphia 25:19-83

Crowson, R.A. 1945. A revision of the chrysomelid group Sagrinae (Coleoptera). Transactions of the Royal Entomological Society of London 97:75-115.

---------- 1960. The phylogeny of Coleoptera. Annual Review of Entomology 5:111-134.

Curtis, J. 1830. British Entomology; being illustrations and descriptions of the genera of insects found in Great Britain and Ireland: containing coloured figures from nature of the most rare and beautiful species, and in many instances of the plants upon which they are found. Volume VII. Privately published, London [4] + #290-337. [Note: not paginated, instead each species treatment and plate are numbered sequentially].

---------- 1834. ibidem. Volume XI, loc. cit. [6] + #482-529.

Dahlgren, G. 1980. A revised system of classification of the angiosperms. Botanical Journal of the Linean Society 80:91-124.

Daniel, K. and J. Daniel. 1904. Neue paläarktische Koleopteren. Münchener koleopterologische Zeitung 2:76-93. [this reference not seen, citation in Monrós 1959]

Danks, H.V. 1988. Systematics in support of entomology. Annual Review of Entomology. 33:271-296.

---------- and R.G. Foottit. 1989. Insects of the boreal zone of Canada. The Canadian Entomologist 121:625-690.

Dejean, P.F.M.A. 1821. Catalogue de la collection de Coléoptères de M. la baron Dejean. Crevot, Paris. 8. viii + 136 pp.

---------- 1837. Catalogue de la collection de Coléoptères de M. le Comte Dejean. Troisième Édition, Paris. xiv + 503 pp.

DeJong, R. 1980. Some tools for evolutionary phylogenetic studies. Zeitschrift für Systematic und Evolutionsforschung 18:1-23.

Derksen, W. and U. Scheiding. 1963. Index Litteraturae Entomologicae Series II: Die Welt-Literature über die gesamte Entomologie von 1864

bis 1900. Deutsche Akademie der Landwirtschaften zu Berlin. I. A-E, XII + 697 pp.

----------. 1965. ibidem, loc. cit. II F-L, 678 pp.

----------. 1968. ibidem, loc. cit. III M-R, 528 pp.

----------. 1972. ibidem, loc. cit. IV S-Z, 482 pp.

Dietz, R.S. and J.C. Holden. 1970. Reconstruction of Pangea: breakup and dispersion of continents, Permian to Present. Journal of Geophysical Research 75:4939-4956.

Disney, R.H.L. 1989. Antidote to taxonomic instability. Nature 342:488.

Donoghue, M.J. and P.D. Cantino. 1988. Paraphyly, ancestors, and the goals of taxonomy: a botanical defense of cladism. The Botanical Review 54:107-126.

Downes, A.J. and D.H. Kavanaugh. 1988. Origins of the North American insect fauna. Introduction and commentary. Pp 1-11, In Downes, A.J. and D.H. Kavanaugh, Editors, Origin of the North American Insect Fauna. Memoirs of the Entomological Society of Canada 144.

Duvivier, A. 1885. Quatre Phytophages nouveaux. Annales de la Société Entomologique de Belgique 29(C.R.):CXVI-CXIX. [reference not seen].

Eberhard, W.E. 1985. Sexual selection and animal genitalia. Harvard University Press, Cambridge. 244 pp.

Elias, S.A. 1985. Paleoenvironmental interpretations of Holocene insect fossil assemblages from four high-altitude sites in the front range, Colorado, U.S.A. Arctic and Alpine Research 17:31-48.

Elias, S.A., S.K. Short, and P.U. Clark. 1986. Paleoenvironmental interpretations of the late Holocene, Rocky Mountain National Park, Colorado, U.S.A. Revue de Paléobiologie 5:127-142.

Erwin, T.L. 1981. Taxon pulses, vicariance, and dispersal: an evolutionary synthesis illustrated by carabid beetles. pp 159-196. In Nelson, G. and D.E. Rosen, Editors Vicariance Biogeography. A Critique. Columbia University Press xvi + 593 pp.

Fabricius, J.C. 1775. Systema Entomologicae, sistens insectorum classes, ordines, genera, species, adjectis synonymis, locis, descriptionibus, observationibus. Korte, Flensburgi et Lipsiae. 8. [30] + 832 pp [not seen]

---------- 1792. Entomologia Systematica emendata et aucta, secundum classes, ordines, genera, species adjectis synonimis, locis, observationibus. C.G. Proft, Hafniae. Tomus I. Pars I. xx + 1-330 pp, Pars II. 1-538 pp. [not seen]

---------- 1801. Systema Eleutheratorum, ordines, genera, species, adjectis locis, observationibus, descriptionibus. Volume II. Bibliopol. acad., Kiliae, 687 pp. [not seen]

Fairmaire, L. 1885. [untitled]. Bulletin de la Société Entomologique de France (6)5:64-65.

---------- 1901a. Descriptions de Coléoptères Nouveaux, de Madagascar. Bulletin de la Société Entomologique de France 1901:126-128.

---------- 1901b. Matériaux pour la faune Coléoptèrique de la région Malgache. Revue d'Entomologie 20:101-248.

Fischer von Waldheim, G. 1824. Entomographia Imperii Rossici; Genera Insectorum systematicae exposita et analysi iconographica instructa Volumen II. Moscow. 262 pp, 40 plates.

Freitag, R. 1969. A revision of the species of the genus Evarthrus LeConte (Coleoptera: Carabidae). Quaestiones Entomologicae 5:89-212.

Gaedike, R. 1975. Register. In Derksen, W. and U. Scheiding, 1975. loc. cit.

Germar, E.F. 1811. II. Nachträge zu Ahrens Monographie der Rohrkäfer. Neue Schriften der Naturforschenden Gesellschaft zu Halle I:26-38.

Gistel, J.N.F.X. 1857. Achthundert und zwanzig neue oder unbeschriebene wirbellose Thiere. Vacuna 2:513-606. [Also published separately, Straubing, Schorner, 1857. 8:94 pp, under the title "Vacuna oder die Geheimnisse aus der organischen und leblosen Welt." The former is usually cited.]

Goecke, H. 1931. Die Gattung Sominella Jacobson (Col. Chrys. Donaciini) (1. Beitrag zur Kenntnis der Donaciinen). Entomologische Blätter für Biologie und Systematik der Käfer. 27:152-161, 1 plate.

---------. 1934. Revision asiatischer Donaciinen (Col. Chrys.). I. (3. Beitrag zur Kenntnis der Donaciinen). Koleopterologische Rundschau 20:215-230, 1 plate.

---------. 1937. Bemerkungen zu (7. Beitrag zur Kenntnis der Plateumaris Weisei Duvivier (Col. Chrys.). (7. Beitrag zur Kenntnis der Donaciinen). Festschrift zum 60. Geburtstage von Professor Dr. Embrik Strand (Riga) 2:371-372 + plate 26.

---------. 1941. Monographie der Schilfkäfer. I. Die Literatur. (12. Beitrag zur Kenntnis der Donaciinen). Decheniana 100B:127-151.

---------. 1943. Monographie der Schilfkäfer II. Die fossilen Funde und ihre Bestimmung (13. Beitrag zur Kenntnis der Donaciinen). Nova Acta Leopoldina (N.F.) 12:339-380 + 1 plate.

---------. 1957. [untitled, taxonomic notes 1576-1578]. Entomologische Blätter für Biologie und Systematik der Käfer. 53:124-125.

---------. 1960a. Monographie der Schilfkäfer III. Die Gattungen und Arten der Donaciinae (Col. Chrys.) und Ihre Verbreitung. Entomologische Blätter für Biologie und Systematik der Käfer. 56:1-19.

---------. 1960b. Zur Gattungsystematik der Donaciinae (Col.Chrys.) 19. Beitrag zur Kenntnis der Donaciinae. Entomologische Blätter für Biologie und Systematik der Käfer 56:164-165.

Gressitt, J.L. and S. Kimoto. 1961. The Chrysomelidae (Coleopt.) of China and Korea. Part 1. Pacific Insects Monograph 1:1-299.

Gruev, B. and V. Tomov. 1984. Coleoptera, Chrysomelidae. Part 1. Orsodacninae, Zeugophorinae, Donaciinae, Criocerinae, Clytrinae, Cryptocephalinae, Lamprosomatinae, Eumolpinae. Fauna Bulgarica 13:1-218. [in Bulgarian]

Guérin-Méneville, F.E. 1844. Iconographie du Règne Animal de G. Cuvier, représentation d'après nature de l'une des espèces les plus remarquables et souvent non encore figurées, de chaque genre d'animaux. Tome III. Paris, J.B. Baillière, 1829-1844. 8. 576 pp, 104 plates.

Hallam, A. 1981. Relative importance of plate movements, eustasy, and climate in controlling major biogeographical changes since the Early Mesozoic. pp 303-330 In Nelson, G. & D.E. Rosen, Editors Vicariance Biogeography. A Critique. Columbia University Press, New York. xvi + 593 pp.

Hamilton, W. 1983. Cretaceous and Cenozoic history of the Northern Continents. Annals of the Missouri Botanical Garden 70:440-458.

Hardwick, D.F. 1950. Preparation of slide mounts of Lepidopterous genitalia. The Canadian Entomologist 82:231-235.

Harusawa, K. 1985. Armature of internal sac of aedeagus. Pp 120-125 In Anonymous (Editors), loc. cit.

Hatch, M.H. 1938. A new species of Donacia from Washington. Pan-Pacific Entomologist 14:110-112.

---------- 1971. The Beetles of the Pacific Northwest Part V. Rhipiceroidea, Sternoxi, Phytophaga, Rhynchophora, and Lamellicornia. University of Washington Publications in Biology Vol. 16. xiv + 662 pp.

Haupt, H. 1956. Beitrag zur Kenntnis der eozänen Arthropodenfauna des Geiseltales. Nova Acta Leopoldina (N.F.) 18: 90 pp.

Hellén, W. 1937. Über die Haemonia=Arten Finnlands (Col.). Notulae Entomologicae 17:1-4.

Hennig, W. 1965. Phylogenetic Systematics. Annual Review of Entomology 10:97-116.

---------. 1966. Phylogenetic Systematics. University of Illinois Press, Urbana. 263 pp.

Heppner, J.B. and G. Lamas. 1982. Acronyms for world museum collections of insects, with an emphasis on Neotropical Lepidoptera. Bulletin of the Entomological Society of America 28:305-315.

Hoffman, C.E. 1939. Morphology of the immature stages of some northern Michigan Donaciini (Coleoptera: Chrysomelidae). Papers of the Michigan Academy of Science Arts and Letters 25:243-290 + plates I -X.

-------- 1940a. Limnological relationships of some Northern Michigan Donaciini (Chrysomelidae: Coleoptera). Transactions of the American Microscopical Society 19:259-274.

-------- 1940b. The relation of Donacia larvae (Chrysomelidae: Coleoptera) to dissolved oxygen. Ecology 21:176-183.

Hoppe, D. H. 1795. Enumeratio Insectorum elytratorum circa Erlangam indigenarum secundum systema Fabricianum observationibus iconibusque illustrata. Palm, Erlangae. iv + 70 pp + 1 plate.

Horn, W. and I. Kahle 1935. Über entomologische Sammlungen (Ein Beitrag zur Geschichte der Entomo-Museologie) Teil I. Sonderdruck von Entomologische Beihefte, Berlin-Dahlem Band 2: pp 1-160, plates I-XVI.

---------- 1936. ibidem, Teil II. loc. cit. 3:161-296, plates XVII-XXVI.

---------- 1937. ibidem, Teil III. loc. cit. 4:VI + pp 297-536, plates XXVII-XXXVIII.

Horn, W. and S. Schenkling. 1928. Index Litteraturae Entomologicae. Serie I: Die Welt-Literature über die gesamte Entomologie bis inklusive 1863. Dr. Walter Horn, Berlin-Dahlem. I, pp 1-352 + 1 plate; II, pp 353-704 + 1 plate; III, 1928 pp 705-1056 + 1 plate.

----------. 1929. ibidem, IV loc. cit. XXI + pp 1057-1426 + 1 plate

Hull, D.L. 1979. The limits of cladism. Systematic Zoology 28:416-440.

Humphries, C.J. and L.R. Parenti. 1986. Cladistic Biogeography. Oxford Monographs on Biogeography No. 2., Clarendon Press, Oxford. xii + 98 pp.

Iablokoff-Khnzorian, S.M. 1966. Considérations sur l'édéage des Chrysomelidae et son importance phylogénique. L'Entomologiste 22:115-137.

International Commission on Zoological Nomenclature. 1985. International Code of Zoological Nomenclature, Third Edition. University of California Press, Berkeley and Los Angeles. xx + 338 pp.

Jacobson, G.G. 1894. Adnotationes de Chrysomelidis nonnullis novis vel parum cognitis. Horae Societatis Entomologicae Rossicae 28:242-245.

----------. 1906. Donacia clavareaui spec. nova. Annales de la Société Entomologique de Belgique 50:311-312.

----------. 1908. De tribus generibus novis Chrysomelidarum faunae rossicae. Horae Societatis Entomologicae Rossicae 38:619-662, Plate VII.

Jacoby, M. 1884. Beschreibung neuer Phytophagen. Stettiner entomologische Zeitung 45:126-128.

---------. 1885. Descriptions of phytophagous Coleoptera of Japan, obtained by George Lewis during 1880 and 1881, 1. Proceedings of the Royal Zoological Society of London 1885:190-211, 1 plate. [reference not seen].

---------. 1893. Descriptions of some new species of Donaciinae and Criocerinae contained in the Brussels Museum and that of my own. Annales de la Société Entomologique de Belgique 37:261-271.

Jacoby, M. and H. Clavareau, 1904. Coleoptera Phytophaga Fam. Donacidae. In P. Wytsman, Genera Insectorum 21:1-14, 1 plate.

Jaeger, E.C. 1955. A source-book of biological names and terms. 3rd Edition, fourth printing. Charles C. Thomas, Publ. Springfield, Illinois. xxxv + 323 pp.

Jolivet, P. 1970. Donaciinae. In Junk, W. (Editor). Coleopterorum Catalogus Supplementum. Pars 51. Fasc. 2. 71 pp. W.O. Steel, Gravenhage.

Karren, J.B. 1972. A revison of the subfamily Chlamisinae of America North of Mexico (Coleoptera: Chrysomelidae). University of Kansas Science Bulletin. 49:875-988.

Kasap, H. and R.A. Crowson 1980. The female reproductive organs of Bruchidae and Chrysomelidae (Coleoptera). Türkiye Bitki Koruma Dergisi 4:85-102.

Kavanaugh, D.H. 1972. Hennig's principles and methods of phylogenetic systematics. The Biologist 54:115-127.

Khnzorian, S.M. 1962. [see also Iablokoff-Khnzorian]. New species of Coleoptera from Transcaucasus. Academy of Sciences of Armenian SSR Zoological Institute, Zoological Papers. 12:99-124.

Kimoto, S. 1963. Descriptions of new species of the Chrysomelidae from Japan, with notes on some known species. Fragmenta Coleopterologica 3/4:13-18. [not seen, cited in Kimoto 1981].

---------. 1971. [cf. Kimoto, S. and I. Hiura 1971].

---------. 1981. New or little known Japanese Donaciinae (Coleoptera: Chrysomelidae). Bulletin of the Osaka Museum of Natural History 34:23-26.

---------. 1983. Revisional study on Megalopodinae, Donaciinae and Clytrinae of Japan (Coleoptera: Chrysomelidae). Entomological Review of Japan 38:5-23.

Kimoto, S. and I. Hiura 1971. A list of chrysomelid specimens preserved in the Osaka Museum of Natural History, III (Insecta, Coleoptera). Bulletin of the Osaka Museum of Natural History 25:1-26. [not seen, see ex Kimoto 1983, loc. cit.]

Kingsolver, J.M. 1970. A study of male genitalia in Bruchidae Proceedings of the Entomological Society of Washington 72:370-386.

Kirby, W. 1837. Part the fourth and last. The Insects In Richardson, J. Fauna Boreali-Americana; or the Zoology of the Northern Parts of British America: containing descriptions of the objects of natural history collected on the late northern land expedition under command of Cpt. Sir John Franklin, R.N. Norwich. xxxix + 325 pp, + 8 plates.

Knab, F. 1905. A new species of Donacia. Proceedings of the Entomological Society of Washington 7:122-123.

Kolossow, J. 1930. Annotationes de quibusdam Donaciini. Coleopterologisches Centralblatt 5:28-29.

Kunze, G. 1818. I. Beiträge zur Monographie der Rohrkäfer. Neue Schriften der naturforschenden Gesellschaft zu Halle. 2:1-56.

Lacordaire, Th. 1845. Monographie des coléoptères subpentamères de la famille des phytophages. Tome 1. Mémoires de la Société Royale des Sciences de Liège. Tome 3 (pt.1). xiii + 740 pp.

Lafontaine, J.D. and D.M. Wood. 1988. A zoogeographic analysis of the Noctuidae (Lepidoptera) of Beringia, and some inferences about past Beringian habitats. Pp 109-123. In Downes, A.J. and D.H. Kavanaugh, Editors, Origin of the North American Insect Fauna. Memoirs of the Entomological Society of Canada 144.

LeConte, J.L. 1850. IV, General remarks upon the Coleoptera of Lake Superior. Pp 201-242 + plate 8, In Agassiz, J.L.R. Lake Superior: Its physical character, vegetation and animals compared with those of other and similar regions, with a narrative of the tour by J. Elliot Cabot, and contributions by other scientific gentlemen. Gould, Kendall and Lincoln, Boston. x + 428 pp + plates 1-8 + 8 unnumbered landscapes.

----------. 1851. Synopsis of the species of Donacia (Fabr.) inhabiting the United States. Proceedings of the California Academy of Sciences 5:310-316.

----------. 1857. No. 1. Report upon insects collected on the Survey, pp 1-72 in Report of Explorations and Surveys, to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean, made under the direction of the Secretary of War in 1853-5. Volume XII Book II. Washington, T.H. Ford 1860.

----------. 1861. New species of Coleoptera inhabiting the Pacific district of the United States. Proceedings of the Academy of Natural Sciences of Philadelphia 16:338-359.

----------. 1868. New Coleoptera collected on the Survey for the extension of the Union Pacific Railway, E.D. from Kansas to Fort Craig, New Mexico. Transactions of the American Entomological Society 2(1868-1869):49-59.

----------. 1878. Additional descriptions of new species of Coleoptera, pp 373-434 In Schwarz, E.A. The Coleoptera of Florida. Proceedings of the American Philosophical Society 17:353-472.

----------. 1961. Letter from LeConte to Alexander Agassiz. The Coleopterists' Bulletin 15:128.

Leng, C. W. 1891. Revision of the Donaciae of Boreal America. Transactions of the American Entomological Society 18:159-176.

LeQuesne, W.J. 1969. A method of selection of characters in numerical taxonomy. Systematic Zoology 18:201-205.

Lindroth, C.H. 1953. Kirby's types of North American Carabidae (Coleoptera). Proceedings of the Royal Entomological Society of London (B) 22:167-177.

----------. 1957a. The principal terms used for male and female genitalia in Coleoptera. Opuscula Entomologica 22:241-256.

----------. 1957b. The best method for killing and preserving beetles. The Coleopterists' Bulletin 11:95-96.

----------. 1969. The ground beetles of Canada and Alaska, Taxonomist's Glossary of Part 1. Opuscula Entomologica, Supplementum 35:I-XLVIII.

---------- and E. Palmén. 1956. Coleoptera. In Tuxen, S.L., Editor. Taxonomist's Glossary of Genitalia in Insects. E. Munksgaard, Copenhagen. 284 pp.

Linnaeus, C. 1758. Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio Decima. Laurentii Salvii, Holmiae. 824 pp. [photographic facsimile, published by British Museum (Natural History), 1939].

Maddison, W.P., M.J. Donoghue, and D.R. Maddison. 1984. Outgroup analysis and parsimony. Systematic Zoology 33:83-103.

Madge, R.B. 1967. A revision of the genus Lebia Latreille in America north of Mexico (Coleoptera: Carabidae). Quaestiones Entomologicae 3:139-242.

Mann, J.S. and R.A. Crowson. 1981. The systematic positions of Orsodacne Latr. and Syneta Lac. (Coleoptera: Chrysomelidae), in relation to characters of larvae, internal anatomy and tarsal vestiture. Journal of Natural History 15:727-749.

----------. 1983a. Observations on the internal anatomy and classification of Donaciinae (Col., Chrysomelidae). Entomologist's Monthly Magazine 119:17-27.

----------. 1983b. On the occurrence of mid-gut caeca, and organs of symbiont transmission in leaf beetles (Coleoptera: Chrysomelidae). The Coleopterists' Bulletin 37:1-15.

----------. 1983c. On the internal male reproductive organs and their taxonomic significance in the leaf beetles (Coleoptera: Chrysomelidae). Entomologia Generalis 9:75-99.

----------. in preparation. Some observations on the genitalia of Sagrinae (Coleoptera: Chrysomelidae). unpublished manuscript, 1990.

Mannerheim, C.G. 1843. Beitrag zur Kaefer-Fauna der Aleutischen Inslen, der Insel Sitkha und Neu-Californiens. Bulletin de la Société Impériale des Naturalistes de Moscou. 16:175-314.

----------. 1852. Zweiter Beitrag zur Kaefer-Fauna der Nord-Amerikanischen Laender der russischen Reiches. Bulletin de la Société Impériale des Naturalistes de Moscou. 25:283-387.

Marx, E.J.F. 1957. A Review of the subgenus Donacia in the Western Hemisphere (Coleoptera: Donaciidae). Bulletin of the American Museum of Natural History 112:191-278.

Matthews, J. V., Jr. 1979. 2. Tertiary and Quaternary environments: historical background for an analysis of the Canadian insect fauna. pp 31-86 In Danks, H.V. Editor. Canada and its Insect Fauna. Memoirs of the Entomological Society of Canada No. 108, 573 pp.

---------- 1980. Tertiary land bridges and their climate: backdrop for development of the present Canadian insect fauna. The Canadian Entomologist 112:1089-1103.

Maulik, S. 1935. Coleoptera. Chrysomelidae. (Galerucinae). The Fauna of British India, including Ceylon and Burma. Today and Tomorrow's

Printers and Publishers, New Delhi. 1979 reprint. xv + 648 pp + 1 plate + 1 folding map.

Mayr, E. 1963. Animal species and Evolution. Belknap Press, Harvard University. xiv + 797 pp.

--------. 1974. Cladistic analysis or cladistic classification? Zeitschrift für Zoologische Systematik und Evolutionsforschung 12:94-128.

Mead, A.R. 1938. New subspecies and notes on Donacia with key to the species of the Pacific States. The Pan-Pacific Entomologist 14:113-120.

Medvedev, L.N. 1973. New Leaf Beetles from Palaearctic. Entomological Review of Washington 52:562-568. [Translated from: Entomologicheskoe Obozrenie 52:876-885.]

----------. 1977. Discovery of a representative of American genus Neohaemonia Szék. (Coleoptera, Chrysomelidae) in Mongolia. Doklady Akademii Nauk CCCP 236:488-490 [translated from: Akademii Nauk SSSR Doklady Biol. Sci. 236:447-449.]

Melsheimer, F.E. 1847. Descriptions of new species of Coleoptera of the United States. Proceedings of the California Academy of Sciences 3:158-181.

Mohr, K.H. 1966. 88. Fam. Chrysomelidae. In Freude H., K.W. Harde, and G.A. Lohse. Die Käfer Mitteleuropas. Goecke & Evers Verlag, Krefeld. Volume 9:95-280.

Monrós, F. 1959. Los Generos de Chrysomelidae (Coleoptera). Opera Lilloana III:5-337 + 3 plates.

Monrós, F. and J. Bechyné. 1956. Über einige verkannte Chrysomeliden-Namen. Entomologische Arbeiten aus dem Museum G. Frey 7:1118-1137

Morgan, A.V. 1989. Late Pleistocene zoogeographic shifts and new collecting records for Helophorus arcticus Brown (Coleoptera: Hydrophilidae) in North America. Canadian Journal of Zoology 67:1171-1179.

Morgan, A.V. and A. Morgan. 1980. Faunal assemblages and distributional shifts of Coleoptera during the Late Pleistocene in Canada and the northern United States. The Canadian Entomologist 112:1105-1128.

Mukerji, D. and M.A.H. Bhuya. 1937. Reproductive system of the bruchid beetles, Bruchus quadrimaculatus Fabr., and B. chinensis L. (Bruchidae - Coleoptera). Journal of Morphology 61:175-214.

Müller, G. 1949-1953. I Coleotteri della Venezia Giulia. Volume II: Coleoptera Phytophaga (Cerambycidae, Chrysomelidae, Bruchidae). Trieste, Centro Sperimentale Agrario e Forestale 4:485 pp.

Neff, N.A. 1986. A rational basis for a priori character weighting. Systematic Zoology 35:110-123.

Nelson, G. and N. Platnick. 1981. Systematics and Biogeography. Cladistics and vicariance. Columbia University Press xi + 567 pp.

Newman, E. 1838. Entomological Notes. The Entomological Magazine V (1838): 532 pp, plates. 17-18.

Noonan, G.E. 1986. Distribution of insects in the Northern Hemisphere: Continental Drift and Epicontinental Seas. Bulletin of the Entomological Society of America 32:80-84.

----------. 1988a. Faunal relationships between eastern North America and Europe as shown by insects. Pp 39-53, In J.A. Downes and D.H. Kavanaugh, Editors, Origin of the North American Insect Fauna. Memoirs of the Entomological Society of Canada 144.

----------. 1988b. Biogeography of North American and Mexican insects, and a critique of vicariance biogeography. Systematic Zoology 37:366-384.

Nyholm, T. 1948. Zur Systematik der nordeuropäischen Donacien. Proceedings of the 8th International Congress of Entomology, Stockholm. pp 156-163.

Olivier, A.G. 1795. Entomologie, ou Histoire Naturelle des Insectes, avec leur caractères generiques et spécifiques, leur description, leur synonymie, et leur figure enluminée. Coléoptères. Tome 4, no. 75. Paris, Baudonin.

Otto, C. 1985. Effects of temporal and spatial variations in food and availability on life cycle and palatability of a chrysomelid beetle. Aquatic Insects 7:19-28.

Panzer, G.W.F. 1795. Entomologia germanica exhibens insecta per germaniam indigena secundum classes, ordines, genera, species adiectis synonymis, locis, observationibus. I. Eleuterata. Norimbergae, Felsecker.

Pic, M. 1936. Nouveautés diverses. Mélange Exotico-Entomologiques 47:10-16.

Pilny, J. and A.V. Morgan. 1987. Paleoentomology and paleoecology of a possible Sangamonian site near Innerkip, Ontario. Quaternary Research 28:157-174.

Pilny, J., A.V. Morgan and A. Morgan. 1987. Paleoclimatic implications of a Late Wisconsinan insect assemblage from Rostock, southwestern Ontario. Canadian Journal of Earth Sciences 24:617-630.

Platnick, N.I. 1976. Drifting spiders or continents?: vicariance biogeography of the spider subfamily Laroniine (Araneae: Gnaphosidae). Systematic Zoology 25:101-109.

Platnick, N.I. and G. Nelson. 1978. A method of analysis for historical biogeography. Systematic Zoology 27:1-16.

Pollock, D.A. 1988. Classification, reconstructed phylogeny, and zoogeography of Pytho Latreille (Coleoptera: Heteromera: Pythidae) based on study of larval, pupal, and adult stages. Unpublished M.Sc. thesis, University of Manitoba.

Powell, E.F. 1941. Relationships within the family Chrysomelidae, as indicated by the male genitalia of certain species. American Midland Naturalist 25:148-195.

Raven, P.H. and D.I. Axelrod. 1974. Angiosperm biogeography and past continental movements. Annals of the Missouri Botanical Garden 61:539-673.

Reitter, E. 1920. Bestimmungs-Tabelle der europäischen Donaciini, mit Berücksichtigung der Arten der paläarktischen Region. Wiener entomologische Zeitung 38:21-43.

Rosen, D. E., 1978. Vicariant patterns and historical explanation in biogeography. Systematic Zoology 27:159-188.

Sachtleben, H. 1961. Nachträge zu "Walter Horn and Ilse Kahle: Über entomologische Sammlungen". Beiträge zur Entomologie 11:481-540.

Samouelle, G. 1819. The entomologist's useful compendium; or an introduction to the knowledge of British insects, comprising the best means of obtaining and preserving them, and a description of the apparatus generally used; together with the genera of Linné, and the modern method of arranging the Classes Crutacea, Myriapoda, Spiders, Mites and Insects, from their affinities and structure, according to the views of Dr. Leach. Also an explanation of the terms used in entomology; a calendar of the times of appearance and usual

situations of 3,000 species of British insects; with instructions for collecting and fitting up objects for the microscope. Thomas Boys, London 496 pp + 12 plates.

Say, T. 1824. Descriptions of Coleopterous insects collected in the late Expedition to the Rocky Mountains, performed by order of Mr. Calhoun, Secretary of War, under the command of Major Long. Journal of the Academy of Natural Sciences of Philadelphia 3:403-462.

-------. 1827. Descriptions of new species of Coleopterous Insects inhabiting the United States. Journal of the Academy of Natural Sciences of Philadelphia 5:237-284, 293-304.

Schaeffer, C. 1919. Synonymical and other notes on some species of the family Chrysomelidae and descriptions of new species. Journal of the New York Entomological Society 27:307-340.

----------. 1925. Revision of the new world species of the tribe Donaciini of the Coleopterous family Chrysomelidae. Brooklyn Museum Science Bulletin 3:45-165.

Schenkling, S. 1922. Nomenclator coleopterologicus. Eine etymologische Erklärung sämtlicher Gattungs- und Artennamen der Käfer der deutschen Fauna sowie der angrenzenden Gebiete. Gustav-Fischer Verlag, Jena. iv + 249 pp.

Scherer, G. 1978. Chrysomelidae: Donaciinae. pp 319-322, In Illies, J. Editor Limnofauna Europaea]. Gustav-Fischer Verlag, Stuttgart. xvii + 532 99. [in German]

Schmitt, M. 1985. Versuch einer phylogenetischen-systematischen Analyse der Criocerinae (Coleoptera, Chrysomelidae). Zoologische Beiträge (N.F.) 29:35-85.

----------. 1988. 28. The Criocerinae: biology, phylogeny and evolution. Pp 475-495, In Jolivet, P., E. Petitpierre, and T.H. Hsiao, (Editors). Biology of Chrysomelidae. Kluwer Academic Publishers.

----------. 1989. Claims and limits of phylogenetic systematics. Zeitschrift für Zoologische Systematik und Evolutionsforschung 27:181-190.

Schönherr, C.J. 1817. Synonymia insectorum, vol. 1, part 3. Skara, pp 1-306.

Schrank, F. von Paula. 1781. Enumeratio Insectorum Austriae indigenorum. August. Vindelicor., Klett. 9+ 548 pp, 4 plates. [reference not seen].

----------. 1798. Fauna Boica. Nürnberg. (Ingolstadt, Landshut) 1:293-720.

Schwert, D.P. and A.C. Ashworth. 1988. Late Quaternary history of the northern beetle fauna of North America: a synthesis of fossil and distributional evidence. Pp 93-107, In J.A. Downes and D.H. Kavanaugh, Editors, Origin of the North American Insect Fauna. Memoirs of the Entomological Society of Canada 144.

Scopoli, J.A. 1772. Annus historico naturalis. Lipsiae, Hilscher. Ann. 5, 128 pp.

Seeno, T.N. and J.A. Wilcox. 1982. Leaf Beetle Genera (Coleoptera: Chrysomelidae). Entomography 1:1-221.

Semenov, A. 1895. Coleoptera asiatica nova. V. Horae Societatis Entomologicae Rossicae 29:251-270.

Shapiro, A.M. and A.H. Porter. 1989. The lock-and-key hypothesis: evolutionary and biosystematic interpretation of insect genitalia. Annual Review of Entomology 34:231-245.

Sharkey, M.J. 1989. A hypothesis-independent method of character weighting for cladistic analysis. Cladistics 5:63-86.

Sharp, D. and F. Muir. 1912. Anatomy of the male genital tube in Coleoptera. Transactions of the Royal Entomological Society of London 60:477-742, plates 42-78.

Silfverberg, H. 1974. The west Palaearctic species of Galerucella Crotch and related genera (Coleoptera, Chrysomelidae). Contributions to the study of Galerucinae 6. Notulae Entomologicae 54:1-11.

----------. 1982. Revision of the group Prosmidiites (Coleoptera, Chrysomelidae, Galerucinae). Helsing Yliopiston Monistuspalvelu Painatusjaos, Helsinki. Academic Disseration, Zoological Museum.

Smith, E.H. 1979. Techniques for the dissection and mounting of the male (aedeagus) and female (spermatheca) genitalia of the Chrysomelidae (Coleoptera). The Coleopterists' Bulletin 33:93-103.

Solsky, S. 1872. Coléoptères de la Sibérie orientale. Horae Societatis Entomologicae Rossicae 8:232-277.

Spanton, T.G. 1988. The Cicindela sylvatica Group: geographical variation and classification of the Nearctic taxa, and reconstructed phylogeny and geographical history of the species (Coleoptera: Cicindelidae). Quaestiones Entomologicae 24:51-161.

Stammer, H.J. 1935. Studien an Symbiosen zwischen Käfern und Mikroorganismen. I. Die Symbiose der Donaciinen (Coleopt. Chrysomel.). Zeitschrift für Morphologie und Ökologie der Tiere 29:583-608.

Stewart, W.N. 1983. Paleobotany and the evolution of plants. Cambridge University Press, New York. x + 405 pp.

Strand, E. 1916. Über der in Gistel's "Achthundert und zwanzig neue oder unbeschriebene wirbellose Thiere" (1857) behandelte Insekten. Archiv für Naturgeschichte (A) 28:75-101.

Suffrian, E. 1864. Synonymische Miscellaneen. Stettiner entomologische Zeitung 25:86-88.

----------. 1872. Synonymische Miscellaneen. Stettiner entomologische Zeitung 33:11-22.

Suzuki, K. 1969. Comparative morphology and evolution of the hind wing of the family Chrysomelidae (Coleoptera) I. Homology and nomenclature of the hind wing venation in relation to the allied families. Kontyu&'x1671. 37:32-40.

Swofford, D.L. 1985. Phylogenetic analysis using parsimony, version 2.4.1. Unpublished documentation.

Székessy, V. 1941. Die zur Gattung Haemonia Latr. gestellten Arten aus Amerika (Coleopt, Chrysomelidae). Münchner entomologische Gesellschaft, Mitteilungen, 31:148-154.

Tanner, V.M. 1927. A preliminary study of the genitalia of female Coleoptera. Transactions of the American Entomological Society 53:5-50 + 15 plates.

Thomson, C.G. 1859. Skandinaviens Coleoptera, Synoptisk Bearbetade I. Berlingska, Lund. iv + 1-161 + 1-290.

----------. 1866. Skandinaviens Coleoptera, Synoptisk Bearbetade 8, Berlingska, Lund. 409 pp.

Tominaga, O. and K. Katsura. 1984. Studies on the Japanese Donaciinae (Coleoptera: Chrysomelidae) 2. Notes on geographical diversity of Plateumaris constricticollis, with descriptions of an allied new species. Bulletin of the Osaka Museum of Natural History No.37:25-40, plate 8.

Torre-Bueno, J.R. de la 1978. A glossary of Entomology. 5th Edition. New York Entomological Society, New York. ix + 336 + 9 plates + 36 pp.

Voet, J.E. 1806. Catalogus Systematicus Coleopterorum. Tomus II. G. Bakhuysen, Haag. [Published simultaneously in three languages: Latin, pp 1-82; French, pp 1-85; Dutch, pp 1-87, plus index, 20 pp.]

Watrous, L.E. and Q.D. Wheeler. 1981. The out-group comparison method of character analysis. Systematic Zoology 30:1-11.

Weise, J. 1881-1893. Chrysomelidae. In Erichson, W.F.. Naturgeschichte der Insekten Deutschlands 6, XIV + 1161 pp, 1 plate. Berlin, Nicolai. [books have cover date of publication of 1893, but parts appeared as follows: 1881, 1-192; 1882, 193-368; 1884, 369-568; 1886, 569-768; 1888, 769-960; 1893, I-XIV + 961-1161, 1 plate.]

---------. 1900. Beschreibungen von Chrysomeliden u. synonymische Bemerkungen. Archiv für Naturgeschichte 66:267-296.

---------. 1912. Beitrag zur Kenntnis der Chrysomeliden. Archiv für Naturgeschichte Abt. A2, 78:76-98.

---------. 1913. Synonymische Bemerkungen. Wiener entomologische Zeitung 32:17-18.

Wheeler, Q.D. 1986. Character weighting and cladistic analysis. Systematic Zoology 35:102-109.

White, R.E. 1968. A review of the genus Cryptocephalus in America North of Mexico (Chrysomelidae: Coleoptera). United States National Museum Bulletin 290. 124 pp.

----------. in preparation. Revision of the Criocerinae of America North of Mexico (Coleoptera: Chrysomelidae) (unpublished manuscript).

Wilcox, J.A. 1954. Leaf Beetles of Ohio, (Coleoptera: Chrysomelidae). Ohio Biological Survey Bulletin 3:353-506.

----------. 1965. A synopsis of the North American Galerucinae (Coleoptera: Chrysomelidae). Bulletin of the New York State Museum and Science Service 40:1-226.

----------. 1975. Checklist of the beetles of North and Central America and the West Indies. Vol. 8, fam. 129, Chrysomelidae. Flora and Fauna Publications, Gainesville, Florida. 166 pp.

----------. 1979. Leaf beetle host plants in northeastern North America (Coleoptera: Chrysomelidae). North American Beetle Fauna Project, January 1979. Flora and Fauna Publications. 30 pp.

Wiley, E.O. 1978. The evolutionary species concept reconsidered. Systematic Zoology 27:17-26.

----------. 1981. Phylogenetics: the theory and practise of phylogenetic systematics. John Wiley, New York xv + 439 pp.

----------. 1988. Vicariance Biogeography. Annual Review of Ecology and Systematics 19:513-542.

Zaitsev, F.A. 1930. K Rasprostranyu na Kavkaze vidov Tribi Donaciini (Coleoptera, Chrysomelidae). Bulletin de Musée de Georgie (Tiflis, Musei Gruzii) 5:105-114.

10. APPENDIX.

LOCALITY DATA OF SPECIMENS OF PLATEUMARIS EXAMINED.

The following five appendices include detailed locality data taken from specimens of those species of Plateumaris of which I examined a large amount of material. I arbitrarily decided that data from taxa of which I examined 1,200 or more specimens would be presented here. These species are Plateumaris flavipes, P. germari, P. nitida, P. pusilla, and P. rufa, in this alphabetic sequence. Data for the remaining 12 species are detailed at the end of each species' taxonomic treatment in Section 4.1.5.

Appendix 10.1.

Locality data for Plateumaris flavipes (Kirby)

CANADA:
ALBERTA:

Bilby, 12.vii.24, O Bryant (UAE 2), 20.vi.24,25,26.vi.24,12.vii.24, O Bryant (CAS 15);
Banff 15,16.vi.1918, Van Dyke Coll'n (CAS 15); 26.vi.1922, CBD Garrett (CAS 2; CNC 7); 23.vi.1922 (2), 18.vi.1922 (1), 21.vi.1922 (1), 9.vi.1922 (1), CBD Garrett (CNC); 9.vii.1928, O Bryant (CAS 2), vi.16.1918 (USNM 1), 23.vi.1922, CBD Garrett (NFRC 1);
Banff Nat. Pk., Eisenhower Jct., 4700', 6.vii.55, WJ Brown (CNC 4);
Bucklake Crk., 0.7 km.E, Hwy. #39, 20.vi.1982, Carex, IS Askevold (ISAC 1);
Busby, 9.6 km. W. 13.vi.1982, Carex/Eleocharis, IS Askevold (ISAC 1);
Calgary, Sarcee Reserve, vi.4.1928, "blue-grass", O Bryant (CAS 1);
Carway, 1 mi. N., Rt.2, vii.5.1984, RS & VC Zack (WSU 1);
Chipman, vi.19.22, FS Carr (CAS 2; UAE 2; UADB 4), vi.10.22, FS Carr (MSUE 1);
Crestomere, 12 km.W., Hwy. #53, 26.vi.1982, Carex, IS Askevold (ISAC 7);
Cypress Hills, 25.vi.1921, FS Carr (UADB 1);
Cypress Hills, Battle Crk., 23.vi.1955 (UAE 1);
Dogpound, 5 km.w., Hwy.#22, 23.vi.1980, RE Roughley (ISAC 4);
Dogpound, 13.vii.1981, C v.Nidek (CVNC 1);
Drumheller, 21.vi.54, BJ & JL Carr, (CARR 1);
Edmonton (all FS Carr): 9,14,20.vi.1918, 15,20.vi.1928, 9.13,14.vi.1917 (CAS 10), 14.vi.1918 (CNC 1), vi.1915 (USNM 1), 1.vii.20 (CNC 1), 19.vi.22 (CNC 1), 15,18,29,26.vi.1928 (UAE 7), 7,14,16,20.vi.1918 (UAE 6), 4,23.vi.1917 (UAE 3), no date (CAS 2), 9.vi.1917 (CUIC 2;MCZ 2;UGA 1), 8.vi.1918 (CUIC 4;CNC 1;MCZ 3;UADB 4;WEEM 2), 7.vi.1918 (CNC 1;WEEM 2), 23.vi.1917 (MCZ 1;WEEM 1), 14,15.vi.1928 (CNC 2),

6.vi.1918 (UGA 1), vi.8 (MCZ 1), v.6.23 (MCZ 1), vi.14 (MCZ 1), vi.20 (MCZ 3), 11.vi.1920 (MCZ 1), vi.9.17 (AMNH 1), vi.14.17 (AMNH 1), 15,20.vi.1928 (AMNH 2), vi.29.1921 (UIM 1);
Elkwater, 10.vi.1956, S Peck (CNC 2);
Empress, 4.vi.1926, FS Carr (UAE 1);
Ft. Fitzgerald, 15.vi.1988, BF & JL Carr (CARR 1);
Fort Saskatchewan, 10.vi.22 (CAS 1);
Fox Creek, 18.vi.1980, C v.Nidek (CVNC 1);
George Lake, 53°54'N., 114°06'W., 15.vi.1982, Carex/Eleocharis, 15.vi.1982 (ISAC 5);
Ghost Dam, 1.vii.64 lot 1, BJ & JL Carr (CARR 1), 9.vi.1980 lot 1, BJ & JL Carr (CARR 1), 20.vi.1973, GJ Hilchie (UAE 1), 6.vi.1972, BJ & JL Carr (CARR 1), 16.vi.1981 lot 3, BJ & JL Carr (CARR 2);
Gull Lake, 8,11,22.vi.1929, EH Strickland (UAE 3);
High Prairie, 8.vi.1931, EH Strickland (UAE 1);
High River, vi.25.1927, O. Bryant (CAS 1);
Irricana, 4.2 km.N., Hwy. #9, 27.vi.1982, Carex/Eleocharis, IS Askevold (ISAC 2);
Kananasksis, vi.26.1928, O. Bryant (CAS 1);
Little Red Deer R., 10 km. S. Westward Ho, 26.vi.82, Carex, IS Askevold (ISAC 1);
Lost Lake, Tp.28 Rge.5 W.5, 23.vi.1981, C. v.Nidek (CVNC 10);
McMurray, vi.22.1953, WJ Brown (CNC 1);
Mundare, 10.vi.1922, FS Carr (UAE 4;CAS 2;MCZ 4);
Marlboro, 1 mi. E., 7.vi.1973, GGE Scudder (CNC 4);
Nordegg, 25.vi.1921 (5), 5.vii.1921 (1), 10.vii.1921 (3), J McDunnough (CNC);
W. of Rimbey, 10.5 km.S. Jct. Hwy. #53 & #766, 26.vi.1982, Carex, IS Askevold (ISAC 5);
Ponoka, 1.vii.24, FS Carr (CAS 1);
St. Albert, 12.vii.24, FS Carr (CAS 1);
Seba Beach, 5.4 km.S., Hwy. #759, 20.vi.1982, Carex/Typha, IS Askevold (ISAC 7);
Sibbold Flats, Tp.23, Rge.6, W.5, 6.vi.1987, C & A v.Nidek (CVNC 22);
Strathmore, 19 km. E., 9.vi.1980, RE Roughley (ISAC 1);
Sundre, 13.vi.1960, BF & JL Carr (CARR 1);
Tomahawk, 5 km.N., Hwy. #759, 20.vi.1982, Carex/Typha/Equisetum, IS Askevold (ISAC 4);
68/17, W. 4 Mer, 30.v.1985, BF & JL Carr (CARR 6);
Tp./Rge./W.5 Mer [all BF & JL Carr (CARR)]:
28/5, 9.vii.1972 (3), 19.vi.1977 (2), 2.vii.1975 (1), 6.vii.1981 (2), 10.vi.1981 (2); 30/6, 20.vi.1978 (4); 30/9, 13.vii.1973 (1); 35/7, 14.vi.1980 (3); 36/9, 13.vii.1973 (3); 37/3, 16.vi.1973 (1); 37/5, 16.vi.1973 (1); 37/18, 6.vii.1972 (1), 16.vi.1973 (1), 18.vii.1973 (1); 102/9, 6.vi.1988, (7); 103/10, 8.vi.1988 (40);
Tp.37, Rge.5, W. 5 Mer., 6.vi.1973, D & M Larson (MUIC 1);
Tp.28, Rge.5, W. 5 Mer., 21.vi.1973 GJ Hilchie (GJHC 3);
Tp.68, Rge.2, W. 6 Mer., 4.viii.1975, GJ Hilchie (GJHC 1);
Vilna, 14.vi.1922, FS Carr (UAE 1);
Wabamun L., 31.vii.1929,2,14.viii.1929, EH Strickland (UAE 11);
Wabamun L. Prov. Pk., 13.vi.1982, Carex & Typha, IS Askevold (ISAC 1);
Waterton Lakes N.P., km 9 Chief Mtn. Hwy., 5000', 28.vi.1980, JM Campbell (CNC 1), Belly R., Chief Mtn. Hwy. 4500', 18.vi.1980, JM Campbell (CNC 1), lake at park entrance, 4300', 21.vi.1980, JM Campbell (CNC 1);

BRITISH COLUMBIA:
Alaska Hwy., km.1246, at Andy Cr., 59°59'N., 132°06'W., 13.Jun.1982, ROM field Pty. (ROMC 24);
Alaska Hwy., mile 246, 11.vii.1979, BF & JL Carr, (CARR 21);
Chilcotin, 3.vi.29, GJ Spencer (UBC 1);
Columbia Lake, 18.v.58, Stace Smith (UNCZ 1);
Golden, 27.v.1976, BF & JL Carr (CARR 2);
Haines Rd., 2 km.s. Y.T., 2.vi.1981, CS Guppy (UBC 1);
Invermere, 6 km. n., 24.v.1981, sweep Carex, IS Askevold (ISAC 1);
Penticton, Ellis Crk., 1340m., 24.vi.1983, SG Cannings (UBC 1);
Summit Lake, mi. 392 Alaska Hwy., 4200', 21.vii.1959 (6), 31.vii.1959 (1), RE Leech (CNC);
Swan Lake, mi. 743 Alaska Hwy., 22.vi.i.58. GE Ball (UAE 1);
Tetsa River, Alaska Hwy., 16.vi.1982, Cannings & Wilkie (UBC 2);
Tupper, 25.v.81, Vasington & Cannings (UBC 1);
Tutshi R., km. 485 Skagway Rd., 13.vii.1982, SG Cannings (UBC 1);
Victoria, Liebeck Coll'n. (MCZ 2);

LABRADOR:
Carter Basin, 53°29'N, 59°52'W., 28/31.vii.1958, emergent vegetn, tidal marsh (2), 5.viii.1958 (3), 4-8.viii.1958 (1), 6.viii.1958, swamp pool (2) BSES Expd. Brit. Mus. (BMNH);
Goose Bay, 17.vi.1948, WW Judd (CNC 1);
Minipi drng, Anne Marie L., 29.vi.1983 (MUIC 2);
Minipi drng, Burned L., July.22.1984, Butt & Larson (MUIC 1);
Wabush Airport, 17.vii.1981, D Larson (MUIC 1);

MANITOBA:
Akudlik, 5 km. S. Churchill, July.2-3.1981, Ashworth, Schwert & Keller (ASRC 23);
Aweme [all N. Criddle]: 17.vi.08 (CAS 1;MCZ 1), vi.15 (USNM 4), vi.10.08 (USNM 1;MCZ 2), vii.6 (USNM 1), 3.vii.1917 (CNC 1), 6.vi.1922 (CNC 1), vi.7 (MCZ 1);
Bird's Hill Prov. Park, 19.June.1984, IS Askevold (ISAC 2);
Brokenhead River, x-ing Hwy. 15, 20 km E. Anola, 13.May.1985, IS Askevold (ISAC 2), 18.v.1985, IS Askevold (ISAC 28), 26.May.1985, IS Askevold (ISAC 4), 30.May.1985, IS Askevold (ISAC 13), 31.v.1984, Carex, IS Askevold (ISAC 5), 7.vi.1984, Carex, IS Askevold (ISAC 2), 6.vi.1984, Carex, DA Pollock (JBWM 6), June.3.1984, Scrapnecks (ISAC 5), 6.vi.1986, IS Askevold ISAC 6), 7.vi.1986, IS Askevold (ISAC 8), 23.v.1987, Carex & Scirpus, IS Askevold (ISAC 11);
Cedar Lake, vii.8,12.1936, June 28,29.1936, CT Parsons (MCZ 5);
Churchill: June.18.1976, TD Galloway (JBWM 1), 25.vi.1930, O Bryant (CAS 6), 20/30.vii.1949, JB Wallis (CNC 3), 29.vi.1948, GE Shewell (CNC 1), 14.vii.1947, B Hocking (CNC 2), 29.vi.1937, WJ Brown (CNC 1), 9.vii.1937, WJ Brown (CNC 2), 29.vii.1950, HJ Teskey (CNC 1), 19.vii.1950, HJ Teskey (CNC 4), 29.vi.1948, WR Richards (CNC 3), 23.vii.1950, JA Shemanchuk (CNC 2), 13.vii.1950, JA Shemanchuk (CNC 4), vi.28.1952, JG Chilcott (CNC 2), 19.vii.1949, JB Wallis (JBWM 1), N. Study Center, Jul.6-14.1983, Pilny & Motz (UWAT 1);
Clearwater L., 18.vi.51, "Larch" (NFRC 1);
Duck Mtn. Prov. Park, 12.Jun.1962, DW Barr (ROMC 1);
Duck Mtn. Prov. Park, @ 5 mi. N. Wellman Lake Cpgd, 19-24.June.1981, Ashworth, Schwert & Keller (ASRC 2), Loat Lake, @ 51°50', 100°55', June.19-24.1981, Ashworth, Schwert & Keller (ASRC 1);
Farnworth Lake, nr. Churchill, vi.20,vii.14,1952, JG Chilcott (CNC 6);

Fort Churchill, 22.vii.1952, JG Chilcott (CNC 3), July.15.1951, HJ Teskey (CNC 1), 23.vi.1952, CD Bird (CNC 1);
Gillam, 24.vii.49, JB Wallis (CNC 1,JBWM 2,CNC 2), 20.vii.1949, JBW (CNC 2), 18.vii.1950, JF McAlpine (CNC 5), 1.vii.1950, WJ Brown (CNC 5), 4.vii.1950, WJ Brown (CNC 1), 4.vii.1950, JF McAlpine (CNC 1), 5.vii.1950, WJ Brown (CNC 20), 3.vii.1950, WJ Brown (CNC 9), 25.vii.1950, WJ Brown (CNC 6), July.12.1983, Pilny & Motz (UWAT 4);
Goose Cr., June.20.1976, TD Galloway (JBWM 1);
Grass River Prov. Park, Iskwasum Lake, 54°38',101°00', 25-30.vi.1981, Ashworth, Schwert & Keller (ASRC 2), Wekusko Falls, Hwy. #392, 20.vi.84, DA Pollock (JBWM 3);
Hayward Cr, Hwy.#391, 20.vi.1984, DA Pollock (JBWM 1);
Hazel, 2 km. E. June.10.1984, Scrapnecks (ISAC 1);
Husavick, 9.vii.17, LA Roberts (CNC 1,JBWM 1), 3.vii.17, LA Roberts (CNC 4,JBWM 1), 6.vii.1917, LA Roberts (CNC 1;JBWM 10), 4.vii.1917, LA Roberts (JBWM 28), 13.vii.17, LA Roberts (JBWM 1);
International Peace Gardens, Turtle Mtn. For. Res., 17.vii.1958, RB Madge (CNC 1);
Jackson, 11 km N, 13.vii.1985, BF & JL Carr (CARR 1);
Mile 13, Hudson's Bay Railway, 19.vi.1917, JBW (INHS 2);
Mile 17, HBRy., 2.vii.1917, JBW (FMNH 1);
Mile 155, HBRy, 4.vii.1917, JBW (CNC 5,UMMA 2);
Mile 214, HBRy., 6.vii.17, JBW (UAE 1,CAS 1, USNM 2,GJHC 1,MCZ 1);
Mile 256, HBRy., 12.vii.17, JBW (CUIC 1,MCZ 2);
Mile 332, HBRy., 19.vii.17, JBW (MCZ 1), 13.vii.17, JBW (USNM 2);
Molson, 10 km. SE., June.10.1984, Scrapnecks (ISAC 26);
Moon Lake, Riding Mtns., 20.vi.1948, JBW (CNC 1);
Onah, 11.vii.1918, LH Roberts (JBWM 1,MCZ 1), 24.v.12, JBW (MCZ 1);
Red Deer Lake, N. of Barrows, 3.vii.1982, Eleocharis, IS Askevold (ISAC 4);
creek, b/n Red Deer River & Overflowing River, Hwy. #10, 19.vi.1984, DA Pollock (JBWM 48);
Rembrant, v.21, Milligan (UAE 6,CAS 2,USNM 2,EGRC 1,CNC 1,MCZ 3,CUIC 1);
creek, b/n Simonhouse and Smaller Lakes, Hwy. #391, 20.vi.1984, DA Pollock (JBWM 1);
Stockton, 20.vi.1925, RM White (CNC 4);
Telford, 8.7.1964 (NFRC 1);
Thompson, 150 km. N., Hwy. 391, 12.vii.1985, BF & JL Carr (CARR 1);
Tp.65, Rge.13, W. 1 Mer., 10.vii.1985, BF & JL Carr (CARR 10);
Tp.66, Rge.17, W. 1 Mer., 10.vii.1985, BF & JL Carr (CARR 70);
Tp.73, Rge.6, W. 1 Mer., 10.vii.1985, BF & JL Carr (CARR 2);
Tp.79, Rge.3, W. 1 Mer., 12.vii.1985, BF & JL Carr (CARR 5);
Tp.81, Rge.26, W. 1 Mer., 11.vii.1985, BF & JL Carr (CARR 1);
Victoria Beach, 15.vi.1986, sweep Carex IS Askevold (JBWM 8);
Warkworth Lake, nr. Churchill, vi.21.1952, JG Chillcott (CNC 5);
Winnipeg, 15.vi., JBW (UADB 1), 13.vii.1926, E Criddle (CNC 1);
Zed Lake, 13.vii.1985, BF & JL Carr (CARR 8);
Zed Lake, 76 km. W., 14.vii.1985, BF & JL Carr (CARR 2);

NEW BRUNSWICK: Kouchibouguac N.P., 20.vi.1977, SJ Miller (CNC 1), 16.vi.1977, GA Calderwood (CNC 4);

NEWFOUNDLAND:

Cooks Harbour, NW Nfld, 15.vii.1949, Lindroth (CNC 5), 7 km.S.E., July.2.1980, Brennan & Larson (MUIC 1);
Flowers Cove, NW Nfld., 23-25.vii.1949, Lindroth (CNC 1);

Gander, 6.vii.1949, RA Henniger (CNC 4), 1.vii.1949, WJ Brown (CNC 4), 5.vii.1949, WJ Brown (CNC 6);
Gros Mourne Pk., Ferry Bk., Caleghan Tr., June.21.1979, Larson/Swales (MUIC 2,CNC 1), nr. Rocky Harbour, 19.vi.1979, Larwson/Swales (MUIC 1);
Howley, 2 mi. N, June.13.1979, Larson/Swales (MUIC 2,CNC 1);
L'Anse-au-Meadow, 3 mi.SE, viii.4.1972, JM & BA Campbell (CNC 3);
Millertown, June.26.1980, Brennan & Larson, (MUIC 4,CNC 2), Jct. Rd. nr. Hwy. #370, June.26.1979, Brennan & Larson (MUIC 4);
St. Anthony, vicinity, viii.3.1972, JM & BA Cambell (CNC 1);
Saint John's, Long Pond, 7.vii.1979 (MUIC 3);
Twillingsgate, NE Nfld., 8.vii.1951, Lindroth (CNC 1);
Upper Humber R., Jct. Hwy. #430, June.12.1979, Larson/Swales (MUIC 1);

NORTHWEST TERRITORIES:

Aklavik, 30.vi.1956, EF Cashman (CNC 1), [following =O. Bryant, coll.]: July.4.1931, Lot.244 (CAS 207), June.26.1931, Lot.242 (CAS 72), July.1.1931, Lot.243 (CAS 3), July.8.1931, Lot.245 (CAS 3), July.12.1931, Lot.284 (CAS 1);
Cameron R., crossing Hwy. #4, 18.vii.1981, BF & JL Carr (CARR 3), 19.vii.1981, BF & JL Carr (CARR 2);
Et-then Is., Gt. Slave Lake, 18.viii.1947, (CUIC 6);
Ft. McPherson, 11.vii.1957, SD Hicks (CNC 1);
Ft. Simpson, no date (MCZ 1), 5 km. SE. 17.vi.72, A Smetana (CNC 1);
Great Slave Lake, vii.19.07 (AMNH 1);
Hearne Lake, 62°20', 113°08', 20.vi.1961, GW Scotter (UAE 1);
Hodgeson Lk., Norman Wells, 3,4.vii.1969, GE Shewell (CNC 3);
Inuvik, vicin. 134°00', 68°31', 29.vi.1972, A Smetana (CNC 1);
11 km.N. Jct. Hwy. Hwy. 1 & 3, Tp. 4 Rge. 2 W.5, 11.vi.1988, BF & JL Carr (CARR 4);
Lac Maunoir, N.Shore NWT, 22.vii.1969, GE Shewell (CNC 2);
Norman Wells, 16.vi.1949, SD Hicks (CNC 3), 2.vii.1969, GE Shewell (CNC 2);
Prosperous L., 12.vii.82, Buhay & Miller (UWAT 4);
Rabbitskin R., 23 mi. SE Ft. Simpson, 12.vi.72, A Smetana (CNC 5), 19.vi.72, A Smetana (CNC 1);
Simpson Is., Grt. Slave Lk., 15.vi, 5,19.vii.1964, D Larson (UAE 8);
Wholdaia Lake, 4.vii.1966, JG Chilcott (CNC 1);
Yellowknife, v.29.1953, JG Chilcott (CNC 3), Kam Lake, 20.vi.1966, GE Shewell (CNC 6);

NOVA SCOTIA:

Cape Breton Highlands National Park, Freshwater Lake, TP7, PG990691, 25.vi.1983, LeSage (CNC 1);

ONTARIO:

Cape Henrietta Marie, 55°, 82°30', July.22.1948, WY Watson (ROMC 26);
Favourable Lake, Lat. 53°N, 16.vi.1938, GM Nest (ROMC 1);
Ft. Severn, 56°N., 15.vii.1940, CE Hope (ROMC 10);
Jellicoe, lake on W. side Hwy. #71, vi.3.1966, IM Smith (ROMC 1);
Moosonee, 12 mi. NE., 1.vii.1973, JM Campbell & R Parry (CNC 3);
Pickle Lake, 14 mi. S., Campbell & Parry (CNC 1);
Prince Edward Co., 5.vii.25, Brimely (CNC 1), 15.vi.1938, Brimely (CNC 1);

QUEBEC:

Mistassini Pass, 13.vii.1956, JR Lansway (CNC 2);
Mt. Albert, vi.19.1954, WJ Brown (CNC 1);
Rupert House, 21.vi.1949, DP Gray (CNC 1);

SASKATCHEWAN:

Attons Lake, Cutknife, 3.vi.1940, AT Brooks (CNC 2);
Big Sandy Lake, 30.vi.1970, RR Hooper (SPMC 1);
Boland Lake, 29.vi.1977, E. Maw (ISAC 2);
Caribou Lake, 18.vi.1976, DH Smith (SPMC 1);
Cowan R., at Hwy. #55, 4.vii.1982, Carex, IS Askevold (ISAC 1);
Cypress Hills, 15.vi.1977, RR Hooper (SPMC 1);
Flotten R. at Hwy. #104, 27.vi.1976, DH Smith (SPMC 1);
Fox Ck., 20.vi.1975, D Larson (MUIC 1);
Greenbush, 18.vi.1975, RR Hooper (CNC 1), 18,19.vi.1975, RR Hooper (SPMC 4);
Hasbala Lake, 30.vi.1973, RR Hooper (SPMC 1);
Jct. Hwy. #2 & #165, 27-30.vi.1985, C. v.Nidek (CVNC 27), 2.vii.85, BF & JL Carr (CARR 32), 4.vii.85, BF & JL Carr (CARR 2), 28,29.vi.85, BF & JL Carr (CARR 3);
73 km.N. Jct. Hwy. #2 & #165, C. v.Nidek (CVNC 3), 1.vii.85, BF & JL Carr (CARR 3);
Lake Athabasca, S.Shore, nr. Cantara L., 14.vii.1978, RR Hooper (SPMC 1,CNC 1);
La Plonge, 3.vii.85, BF & JL Carr (CARR 5);
La Ronge, 25.vi.85, BF & JL Carr (CARR 6), Lac La Ronge, 17-26.vi.1985, C. v.Nidek (CVNC 11), 25 km.S., 22.vi.1985, C. v.Nidek (CVNC 2);
Madge Lake, 15.vi.1944, CC Shaw (SPMC 1);
Meadow Lake Park, 25.vi.1979, RR Hooper (SPMC 1);
Nipawin Lake, 17.vi.1976, DH Smith (SPMC 1);
North Battleford, Murray Lake, 15.vi.1962, DW Barr (ROMC 6);
Patterson Lake (NE Cor.), 25,27.vi.1975, RR Hooper (SPMC 3,CNC 1);
Prince Albert, 100 km.N., 7-10.vi.1985, C. v.Nidek (CVNC 3);
Shellbrook Riv., 3 km.N. Shellbrook, 4.vii.1982, Carex, IS Askevod (ISAC 4);
Stony Rapids, 7.vii.1964, RR Hooper (SPMC 1);
Tp. 56, Rge. 27, W.2 Mer, 21.vi.85, BF & JL Carr (CARR 36);
Tp. 68, Rge. 1, W.2 Mer, 9.vi.85, BF & JL Carr (CARR 4);
Waskesiu, at Hwy. #2, 21.vi.85, BF & JL Carr (CARR 13);
Weyakin, 20 km.S., 29.vi.1985, C. v.Nidek (CVNC 6), 40 km. S. 13.vi.1985, C. v.Nidek (CVNC 20);

YUKON:

Aishihik R., 14 km. N. Canyon, 60°59', 137°02', 21.vii.1981 CS Guppy (UBC 13);
Alaska Hwy., mi 681, 21.vi.1958, GE Ball (UAE 1), mi. 684, 1.vii.1968, BF &JL Carr (CARR 2), mi 1012, vii.6.1952, CP Alexander (MCZ 2), mi 1044, 27.vi.1958, GE Ball (UAE 9), mi. 1120, vii.6.1968, Campbell/Smetana (CNC 1), mi. 1192, nr. Snag Jctn., vii.6.1968, Campbell/Smetana (CNC 1), Snag Jct., 23.vi.1981, CS Guppy (UBC 1), km. 1800, at Swede Johnson Cr., 61°35', 139°25', 22.Jun.1980, ROM Fld. Pty. (ROMC 11);
British Mtns., "Teal Lake" 400m., 68°54', 140°23', 16.vi.1984, "treading around edge of lake", JM Campbell 84-4A (CNC 5);
Cadzow L., 67°33', 139°, 14.vii.1981, SG Cannings (UBC 16);
Carmacks, 18 km. S., 5.vi.1980, B. Gill (UBC 8);
Dempster Hwy., mi. 29.5, 2800', 24.vii.1978, Campbell/Smetana Campbell/Smetana (CNC 1), mi. 75.5, 3400', 19.vii.1978, Campbell & Smetana (CNC 1), mi. 147.0, 1900', 22.vii.1978, Campbell & Smetana (CNC 1), mi. 152.5, 20.vii.1978, Campbell & Smetana (CNC 1), mi. 236,

Eagle R., 1400', 21.vii.1978, Campbell & Smetana (CNC 8), mi. 274, 4.vii.1979, BF & JL Carr (CARR 1);
Donjek R., 18 km. W. on Alaska Hwy., 61°44', 139°53', 23.vi.1981, CS Guppy (UBC 6);
Dragon L., 5 km. N, 62°36', 131°18', 10.vi.1981, CS Guppy (UBC 2);
Elsa, Halfway Lakes, 1.vii.1980, RA Cannings, B Gill (UBC 1,CNC 1);
Gravel Lake, 63°48', 137°53', CS Guppy (UBC 14);
Hansen Lake, 9 mi. SW, Keno, 17.vii.1968, Campbell & Smetana (CNC 1);
Klondike Hwy., km. 337, 5.vi.1980, B Gill (UBC 4), km. 626, sm lake N. side Hwy., 63°47', 137°46', 29.Jun.1980, ROM Fld. Pty. (ROMC 3), 16.Jun.1981, ROM Fld. Pty. (ROMC 26);
Kluane L., Cultus Bay, 17.vi.1984, J Krebs (UNCZ 3);
Kluane N.P., Slims R. Flats, 21.vii.1979, GGE Scudder (UBC 1);
Koidern (km 1874 Alaska Hwy.), 29.v.1980, RA Cannings (UBC 3), 6.vi.1979, SG Cannings (UBC 1), 31.v.1979, GGE Scuudder (UBCZ 2);
Kookatsoon L., 27.vi.1981, CS Guppy (UBC 1);
Kusawa L. Rd., 1 km. S. Alasaka Hwy., 68°56', 136°03', 26.vi.1981, CS Guppy (UBC 2);
La Force, 132°20', 62°41', 3300', 28.vi.1960, JEH Martin (CNC 1);
Long's Ck., 61°54', 140°14', 23.vi.1981, CS Guppy (UBC 11);
Mayo, Halfway lakes, 1.vii.1980, B Gill (UBC 7);
McQuesten, 13.vii.1980, RA Cannings (UBC 1), McQuesten Lake, 15 km. SW Keno, 19.vii.1968, Campbell/Smetana (CNC 1);
Ogilvie R., Elephant Rock, 23.vi.1980, RJ Cannings, B. Gill (UBC 2,CNC 2);
Old Crow, 29.vi.1983, RA Cannings (UBC 2), 30.vi.1983, RA Cannings (UBC 2), 2.vii.1983, RA Cannings (UBCZ 1); 6 km. E., 67°34', 139°41', 10.vii.1981, SG Cannings & CS Guppy (UBC 18), 9 km. W. of Black Fox Ck., 15.vii.1981, SG Cannings & CS Guppy (UBC 13), 28 km. N., 67°49', 139°52', SG Cannings & CS Guppy (UBC 7), 2 km. SW, 67°25', 140°05', 5.vii.1983, RA Cannings (UBC 5), Old Crow, YT Refugium Project, Klokut Archeol. Site, 6 km.N., 67°54', 136°36', 19.vii.1977, Morlan, Matthews & Roughley (JBWM 2);
Otter Lake, 130°25', 62°30', 4000', 17.vii.1960, EW Rockburn (CNC 4);
Pine Cr., mi 1012 Alaska Hwy., vii.4.1952, CP Alexander (MCZ 1);
Pine Cr., Haines Jct., 25.vi.1981, CS Guppy (UBC 7);
Rancheria, 7 km. E., 60°04', 130°29', 5.viii.1981, CS Guppy (UBC 6);
Reflection Lakes, Alaska Hwy. mi 1160, vii.8.1952, CP Alexander (MCZ 1);
Sguanga L., km. 1368 A.H., 28.vi.1981, CS Guppy (UBC 1);
Slims R. delta, 21.vi.1982, Wilkie & Cannings (UBC 23);
Stewart Crossing, 24 km.S., 26.vii.1980, RJ Cannings (UBC 1);
Swim Lakes, 62°13', 133°, 3200', 15-18.vi.1960, Rockburn, Martin (CNC 21);
Tack L., 6 km. SE, 67°28', 139°41', 9.vii.1981, CS Guppy (UBC 28);
Watson L., 11 km. NW., 13.vi.1981, CS Guppy (UBC 3);
Whitehorse, 22.vi.1949, JK Horie (UBC 1), 30.vi.1948, WR Mason (CNC 2);
east of White River Bridge, Alaska Hwy., July.7.1981, Carex & Sphagnum pools, A. Morgan (UWAT 69);
Von Wilzek Lakes, 2.vii.1980, B Gill (UBC 1);

U.S.A.:

ALASKA: Alaska Hwy., mi. 1304, 29.vi.1958, Lindroth (CNC 1), 19.vi.1958, Lindroth (CNC 1), 29.vi.1958, GE Ball (UAE 1), mi. 1442,

30.vi.1958, Lindroth (CNC 1), mi. 1249, Deadman Lk., 6-7.vii.1968, Campbell/Smetana (CNC 4);
Bremner River, 6/20/1958, PE Shepherd (WSU 2), June.23.1958, PE Shepherd (WSU 2), July.6.1958, PE Shepherd (JECW 10);
Brooks Range, Unnamed Lake, 66°03', 147°32', 12.vii.1981, Cuynar (RNEL 1);
Circle, 3-4.vii.1958, Carex marsh, GE Ball (UAE 1);
Denali Hwy., mi. 102, 12.vii.1978, Sematana/Campbell (CNC 3);
Donnelly Dome, Richardson Hwy., 15.vii.1985, SG Cannings (UBC 1);
Katmai, vii.8.17, JS Hine (CAS 2);
Kenai Pen., Kenai, 23.vi.1951, WJ Brown (CNC 1), 1.5 mi.SW Soldotna, 10.vi.1978, Smetana/Becker (CNC 6), 15 mi. E. Sterling, 14.vi.1978, Smetana/Becker (CNC 1);
Kodiak Is., s. end Pinguish L. 57°29'40'', 154°13'20'', June.20-21, Carex marsh, GE Ball (AMNH 12);
Lake Telida, Kuskokum River region, summer 1949, GD Schumann (AMNH 5);
Matanuska Valley, vi.27.1952, vii.8.1950, CO Berg (AMNH 3,CUIC 67), Matanyska Expl. Sta., 11.vi.1944, JC Chamberlain (USNM 1);
Moon Lake, vii.4.1955 (NMDC 3,PUL 9)
Popoff Isl., July.10.'99, T Kincaid (USNM 1);
Port Heiden, 27/ ,GE Ball (UAE 1);
Taylor Hwy., mi. 6, vii.3.55, Montgomery 1955 Alaska Trip (NMDC 1);
Unalakleet, 12.vi.1961, R Madge (CNC 6);

COLORADO:

Boulder Co.: Lily Lake, July.1937, HG Rodeck (UCM 1);
Nederland, 29.vi.1961, 8500', BH Poole (CNC 1);
Redrock Lake, nr. Ward, 10.vi.1939, UN Lanham (UCM 7);
Rocky Mtn. Nat'l. Park: Dream Lake, 10,000', vii.18.1941, CP Alexander (NMDC 1); Glacier Basin, 8700', 24.vii.1933 (CNC 1,MCZ 5), 8600', vii.10.1955, CP Alexander (MCZ 1), vi.16.1943, CP Alexander (NMDC 1);
Science Lodge, W. Boulder, 25.vii.1941, J. Stamm (UCM 1), 19.vi.1939, UN Lanham (UCM 1);
"Univ. Camp", 28.vii.1941, Bullock (UCM 1);
Chaffee Co.: Buena Vista, 7800', 22-23.vi.1961, BH Poole (CNC 1);
Gunnison Co.: Gunnison, 7500', June.26-30.1885, R Hayward coll'n (MCZ 4);
Larimer Co.: Rocky Mtn. Nat'l. Pk., Etes Park, 9000', 7/24/33, EB Andrews (CAS 2);
Summit Co.: Breckenridge, no date (CMP 2);
Teller Co.: Divide, 8800', vi.23.34, CP Alexander (MCZ 5);
Localities not found: Hot Spg's, H Klages Coll'n (CMP 2);
Pingree Park, 9.vii.1938 (PUL 1);
Timber Crk. Camp, Rocky Mtn. Nt. Pk., vi.22.53, LW Quate (DEUN 1);

IDAHO:

Bonneyville Co.: Idaho Falls, H Klages Coll'n (CMP 2);
Fremont Co.: Cave Falls Rd., Targhee Nat. For., 12 km.W. Wyo. border, 17.vi.1986, BF & JL Carr (CARR 1);

MAINE:

Penobscot Co.: Orrington, v.20.57 (UCS 1);

MINNESOTA:

Clearwater Co.: Itasca State Pk., June.11.1937, "sweeping swale", HR Dodge (WSU 1), June.15.1937, "Sweeping swale", HR Dodge (WSU 2), July.9.1960, A Raske (CNC 1), June.15.1937 (DEFW 1);
Hennepin Co.: County Record no date (USNM 1);

Isanti Co.: Beckman Lake, Co. Rd. #56, 23.v.1978 (DEFW 2);
Kittson Co.: County Record no date OW Oestland (DEFW 1);
Mille Lacs Co.: County Record, May.27.1937, RH Daggy (DEFW 1);
Otter Tail Co.: County Record no date (USNM 1);
St. Louis Co.: Duluth, no date (INHS 2);
Localities not found: "St. Anth. Park", no date (USNM 1);

MONTANA:
Carbon Co.: E. Rosebud Lake, 27.vi.1961, B Vogel (UCM 52);

NEW MEXICO:
Colfax Co.: Black Lakes, T24N, R16E, Sec.32, 21.vi.1983, Sweep Carex, IS Askevold (ISAC 1);

NEW YORK:
Erie Co.: Buffalo, no date H Klages Coll'n (CMP 2);

UTAH:
Dagget Co.: Hwy. 44, 9 mi.W. Jct. 191, 29.vi.1986, BF & JL Carr (CARR 5);
S.E. of Manila, 28.vi.1986, C. & A. v.Nidek (CVNC 20);
Spirit Lake, Uinta Mtns., 30.vi.1986, BF & JL Carr (CARR 14);
Duchesne Co.: Wasatch Nat'l. For., 23.viii.1971, AV & JM Provonsha (PUL 1);
Summit Co.: Lily Lake, 31.vii.1979, SM Clark (SMCL 2);
Mirror Lake, Uinta Mtns., no date CM Tanner (UIM 2);
Tryol Lake, Uinta Mtns., no date VM Tanner (UIM 1);
Uinta Co.: Sims Peak Camp., 21.viii.1983, MF Whiting (SMCL 2);

WYOMING:
Albany Co.: Snowy Range Mts., July.10.1949, DG Denning (UWL 7), Aug.31.1947, DG Denning (UWL 1);
Carbon Co.: Como, 8900', 6.?.43, Schffr colln (USNM 1), 8000' no date (DEFW 1);
Medicine Bow Mts., July.17.1937, CH Steevers (FMNH 2);
Silver Lake, Snowy Range Mts, 10,000', Aug.13.1957, GF Knowlton (DEFW 4);
Johnson Co.: County Record, July.17.1941, OT Jones (UWL 3);
Sheridan Co.: Sibley Lake, Bighorn Mtns., 6.27.77, AC Ashworth (ASRC 3), vi.13.1987, G. Fanske (NDSU 1);
Teton Co.: Togwottee Pass, 17.vii.1961, "along grassy lake shore", JG Chilcott (CNC 2);
Yellowstone Nat. Park Co.: County Records, vi.24.55, EW Hamilton (DEUN 1), 22.vii.1920, AA Nichol (DEFW 1);
Localities not found: Mirror L., Snowy Range Mts., Aug.13.1957, GF Knowlton (WSU 1);

Appendix 10.2.

Locality data for Plateumaris germari (Mannerheim).

CANADA:

ALBERTA:

Banff N.P., 1.vii.1937 (OSUC 1);
Coleman, 1/6.vii.1981, C v.Nidek (CVNC 3), 4.vii.1981, BF & JL Carr (CARR 5);
Crestomere, 8 km.W, Hwy. 53, 26.vi.1982, IS Askevold (ISAC 1);
Edmonton, 19.vi.22, FS Carr (CNC 1), 23.vi.17, FS Carr (UAE 1);
nr. Flatbush, Pembina R., 21.vi.1964, Allen, Ball & Whitehead (UAE 1);
Ft. Fitzgerald, 15.vi.1988, BF & JL Carr (CARR 1);
Gull Lake, 8,11,19.vi.1929, EH Strickland (UAE 1);
Smith Lake, Banff NP, 15.vii.1977, JM & BA Cambell (CNC 1);
Sundre, 29.vi.1960, BF & JL Carr (CARR 9);
Tomahawk, 5 km.N., Hwy.759, 20.vi.1982, IS Askevold (ISAC 1);
Following "Tp./Rge./W. 5 Mer." all BF & JL Carr:
5/3/W.5, 20.vi.1976 (CARR 15);
6/3/W.5, 2.vii.1961 (CARR 2);
8/5/W.5, 14.vii.1961 (CARR 1);
24/8/W.5, 4.vi.1968 (CARR 1);
27/3/W.5, 8.vii.1972 (CARR 1);
35/7/W.5, 14.vi.1980 (CARR 1);
37/5/W.5, 16.vi.1973 (CARR 1);
42/16/W.5, 17.vii.1973 (CARR 1);
63/2/W.6 Mer, 4.viii.1975, GJ Hilchie (GJHC 1);
64/11/W.4 Mer, 2.viii.1986, BF & JL Carr (CARR 1);
Waterton Lakes N.P., Lake at Park Entrance, 4200', 11.vi.1980, JM Campbell (CNC 1), mi. 3, Chief Mtn. Hwy., 4500', 6.vi.1980, JM Campbell (CNC 2), Maskinonge Lk., 4200', 9.vi.1980, JM Campbell (CNC 3);

BRITISH COLUMBIA:

Agassiz, 2.v.1926 (1), 10.iv.1926, (5) R. Glendenning (CAS);
Alaska Hwy., mile 627, 1.vii.1955, BF & JL Carr (CARR 2);
Alberni, 48 mi.W., v.24.1968, Campbell/Smetana (CNC 2);
Allison Pass, E.C. Manning Prov. Pk., on Hwy. #3, 19.June.1969, ROM Field Pty. (ROMC 1);
Alta Lake, viii.25.1935, WG Mathers (CAS 1), 1.viii.1975, JM & BA Campbell (CNC 1);
Bear Lake, Prince George, 22.vi.1985, SG Cannings (UBC 10);
Bear Lake, W. of S. end, 56°3'N,126°55'W., 13.vii.1941, 4500' elev., GB Leach (CNC 1);
Bowser, vi.8.1955, WJ Brown (CNC 1);
Burns Lake, vi.13.1958, GE Ball (UAE 1);
Copper Mtn., 25.vi.1929, G. StaceSmith (OSUC 1), 24.vi.1929, 4300', Carex rostrata, G Stace Smith (PMV 2, UBC 23), 3.vi.1929, Carex rostrata, G Stace Smith (CAS 1);
Creston, 21.v.33, 26.v.46, G Stace Smith (UBC 2), 12,17.v.1980, Carex, IS Askevold (ISAC 3);
Falkland, 18.vii.1944, HB Leech (UCR 4);
Falkland, Spa Lake, 5000', 18.vii.44, HB Leech (UBC 1, CNC 2);
Forbidden Plateau, Mariwood Lake, 4000', 8,12.viii.1950, R Guppy (OSUC 16, UBC 3, PMV 2);
Golden, 27.vi.1976, BF & JL Carr (CARR 20);
Graham Is., 9 km.N. Tlell, 8.v.1984, GGE Scudder (UBC 1);

Heckman Pass, Tweedsmuir Pk., 19.vii.78, RA Cannings (UBC 4);
Hwy. 37, 355 km. north Jct. Hwy. 16, 13.viii.1983, BF & JL Carr (CVNC 6);
Iona Is. 16.vi.1981, SG Cannings (UBC 1);
Lac le Jeune, 7.July.1950, J Weintraub (CNC 2);
Lumby, 25.v.1944, HB Leech (UBC 1);
Manning Pk. 6400', June.29.1973, HJ Teskey (CNC 3);
McBride, 1.v.1915 (UMMA 1, MSUE 1);
Metlakatla, 1915, JH Keen (BMNH 3);
Moresby Camp, v.30.1957, E MacDougall (CNC 9);
Moyie, 6.vii.47, G Stace Smith (UBC 1);
Oliver, 3.v.1923, CB Garrett (CNC 1);
Penask Lake, 4660', 6.vii.1932, GJ Spencer (CNC 5, UBC 5);
Pender Harbour, v.20,23.28, GR Hopping (CNC 1, CAS 3), 24.v.31, HB Leech (CNC 1), v.21.1928, RT Turner (CNC 3);
Penticton, Ellis Crk., 24.vi.83, SG Cannings (UBC 1);
Pete Lake, 57°56', 131°56', 19.viii.1960, R Pilfrey (CNC 2);
Port Hardy (Suquash), vi.22.52, R Guppy (OSUC 4);
Prince George, 6,16.vi.1959 (UBC 2);
Quesnel, 29.vi.47, GJ Spencer (UBC 1);
Rogers Pass, 10 mi.E., Glacier N.P., vi.17.1968, Campbell & Smetana (CNC 21);
Skutz Falls, 3.vi.1920, AW Hanham (PMV 1);
Slim Creek, 53°44'N, 121°10'W, 13.vi.1982, D Wilkie & SG Cannings (UBC 1);
S. Pender Isl., 29.iv.79, RA Cannings (UBC 2);
S. Vancouver Isl., 15.vi.1950, R Guppy (OSUC 1);
Steveson, June.18.1948, MC Lane (OSUC 1);
Stoner, 23.v.1981, SG Cannings (UBC 1);
Summerland, 14.vi.1933, AN Gartrell (CNC 1);
Taft, 22.viii.1982, RA Cannings (PMV 1);
Suquash L., N. VI, 22.vi.52, R Guppy (UBC 1);
Tsawassen, v.19.1968, Campbell & Smetana (CNC 1);
Tyee, 27 mi.E. Prince Rupert, 24.vi.1960, BS Heming (CNC 1), 8.vi.1958, Lindroth (CNC 1), 24.vi.1960, JG Chilcott, RJ Pilfrey (CNC 5);
Tyee, 1.3 mi.NW, vi.8.1958, GE Ball (UAE 1);
UBC Res. Forest, Haney, 8.vi.1985, SG Cannings (UBC 1);
Vancouver, 2.vi.1925, KF Auden (INHS 1), 15,22.v.1930, HB Leech (CNC 3, CAS 4), 13.vi.56, G Stace Smith (UBC 1), 13.vi.1936, JK Jacob (PMV 1), 17.vi.30, GJ Spencer (UBC 10), 5.v.31 HB Leech (CNC 5), 15.v.1930, HB Leech (CNC 1);
Vancouver, Stanley Park, v.30.30, HB Leech (CNC 2);
Victoria, 9.vi.1923, KF Auden (INHS 2, CNC 1)), no date, AW Hanham (PMV 2);
Wellington, 1.vi.1949, R Guppy (MCZ 2, OSUC 1, PMV 4, UBC 8), 5.vi.1948, R Guppy (OSUC 3), June.7.1949, "ex Pond Lily fls.", R Guppy (OSUC 1);

LABRADOR:

Goose Bay, 1.vii.1950, B Hocking (CNC 1);
Minipi Drng, Anne Marie Lake, 1.vii.1983, July.27,28.1984, Brett & Larson (MUIC 2);
Minipi Drng, Burned Lake, July.22.1984, Brett & Larson (MUIC 5);
Minipi Drng, Little Hairy L., June.26.1983 (MUIC 2);
Minipi Drng, Petch's Pd., vi.29.1983 (MUIC 4);
Wabush Airport, 17.vii.1981, D Larson (MUIC 12,CNC 4);

Wahnahnish L., nr Wabush, July.15-17.1981, Colbo & Larson (MUIC 1, CNC 1);

MANITOBA:

Brokenhead Riv., at Hwy. #15 20 km.E. Anola, 31.v.1984, Carex, IS Askevold (ISAC 1), 26.v.1985, Carex, IS Askevold (ISAC 4), 30.v.1985, Carex, IS Askevold (ISAC 20); 6-7.vi.1986, Carex, IS Askevold (ISAC 14), 23.v.1987, Carex & Scirpus, IS Askevold (ISAC 14);
Duck Mtn. Prov. Pk., @5 mi.N. Wellman Lake Cpgd., June.19-24.1981, Ashworth Schwert & Keller (ASRC 1);
Gillam, 20,24.vii.1949, JB Wallis (CNC 2), July.12.1983, Pilny & Motz (UWAT 1);
Grass River Prov. Pk., Wekusko Falls, Hwy.#392, 20.vi.1984, DA Pollock (JBWM 9);
Hudson's Bay Railway, mile 256, vii.13, JB Wallis (USNM 2), mile 332, 13.vii.17, JB Wallis (USNM 2, MCZ 2);
Molson, 5 km.E., 10.June.1984, Scrapnecks (ISAC 3);
Molson, 10 km.SE, June.10.1984, Scrapnecks (ISAC 5);
Moon Lake, Riding Mtn., 28.vi.48 "on sedge", JB Wallis (JBWM 1);
Onah, 9.vii.18, Criddle (CNC 1);
Piquitenay, 22.vii.1917, JB Wallis (MCZ 1);
Red Deer Lake, N. of Barrows, 3.vii.1982, "sweeps of Carex, Scirpus & Eleocharis," IS Askevold (ISAC 4);
creek, b/n Red Deer Riv. & Overflowing Riv., Hwy. #10, 19.vi.1984, DA Pollock (JBWM 2);
creek, b/n Simonhouse & Smaller Lakes, Hwy. #391, 20.vi.1984, DA Pollock (JBWM 1);
Tp. 73, Rge. 6, W. 1 Mer, 10.vii.1985, BF & JL Carr (CARR 1);
Tp. 79, Rge. 3, W. 1 Mer, 12.vii.1985, BF & JL Carr (CARR 8);

NEW BRUNSWICK:

Fredericton, 17.vi.1981, DR Ward (ISAC 1);
Kouchibouguac Nat. Park, 5.vi.1978, DB Lyons (CNC 3), 16.vi.1978, DB Lyons (CNC 4);

NEWFOUNDLAND:

Buchans Jct., Hwy.370, June.25.1980, Brennan & Larson (CNC 1, MUIC 29);
Deer Lake, W. Nfld., 1-2.vi.1951, Lindroth (CNC 1), 3.vii. Nobb (MCZ 1);
Deer Lake, nr. Beaver Ponds, June.13.1979, Larson & Swales (MUIC 2);
Gander, July.1979 (MUIC 1);
Glenwood, 5 mi.S, 23.vi.1978 (CUIC 2);
Grand Codroy Prov. Pk., June.15.1979, Larson & Swales (MUIC 2);
Gros Morne Pk., nr. Rocky Harbour, 19.vi.1979, Larson & Swales (MUIC 18, CNC 1);
Gros Morne Pk., nr. Interpretation Centre, 19.vi.1979, Larson & Swales (MUIC 1);
Little River, SW Nfld., Jul.18.1905, (MCZ 1);
Little River, Codroy, Jul.10-18.1907, (MCZ 1);
Millertown, Jct. Rd. nr.Jct. Hwy.370, June.26.1980, Brennan & Larson (MUIC 4, CNC 1);
Port aux Basques, S. Nfld, 30.vi.1949, E Palmen (CNC 1);
Portland Crk., 5.5 mi.S, 1.viii.1972, JM Campbell (CNC 3);
Portugal Cove South, Trepassey Bay, 4.vi.1981, Larson & Langer (CNC 1);
Roddickton, 20 km.W., July.5.1980, Brennan & Larson (MUIC 2);
St. Anthony, vicinity, 3.viii.1972, JM & BA Campbell (CNC 5);
St. Barbe, NW Nfld., 26.vii.1949, E. Palmen (CNC 4);
St. John's, Long Pond, May.10.1980 (MUIC 1);

St. John's, Oxen Pond, 7.vii.1975, "sweeping bog veget.", "sweeping grass", 7-8.vii.1975, CE Holmes (MUIC 2);
Searston Sandspit & Barachois, June.16.1979, Larson & Swales (MUIC 1);
South Branch, W. Nfld, 4.vii.1949, E. Palmen (CNC 11);
Stephenville Cross., W. Nfld., vii.1949, H Krogerus (CNC 1);
Torbay, 6.vi.1984 (MSUE 1);
Twillingsgate, NE Nfld., 5.vii.1951, Lindroth (CNC 1);
Victoria Lake, C. Nfld, 11-13.vi.1951, Lindroth (CNC 1);
Wiltondale, 5 mi.NW, 31.vii.1972, JM & BA Campbell (CNC 3);

NORTHWEST TERRITORIES:

Great Slave Lake, 9,12,15.vi.1964, D Larson (UAE 12);
11 km.N. Jct. Hwy. 1 & 3, Tp. 4 Rge. 2 W.5, 11.vi.1988, BF & JL Carr (CARR 6);
Martin River, 10 mi.W. Ft. Simpson, 20.vi.1972, A Smetana (CNC 1);
Pearson Point, Gt. Slave Lake, 10-18.vii.1947, (CUIC 7);
Powder Point, Hwy. #4, 17.vii.1981, BF & JL Carr (CARR 2);

NOVA SCOTIA:

Cape Breton Highlands National Park, Grand Falaise, 30 m., PG566704, 5 km.N. 9.vi.1983, H Goulet (CNC 2); CBNP, Two Island Lake, 24.vi.1983, Y Bousquet (CNC 2);
Lawrencetown, 19-20.vii.1967, WJ Brown (CNC 3);
Springfield, 10 km.N., 20.vi.1981, "sweeping flowers", LeSage (CNC 1);

ONTARIO:

Cochrane, 3.vi.1973, S Bower (UGIC 1);
Dyers Bay, 2.vi.1955, DH Pengelly (UGIC 2);
Fort Severn, (56°N, 87°38'W], 14.vii.1940, CE Hope (ROMC 17);
French Lake, Quetico Prov. Pk., 9-10.Jun.1971, ROM Fld. Pty. (ROMC 2);
Geraldton, June.22.1982, J Pilny (UWAT 1);
Geraldton, L. Kenagamisis at Hwy.#11, Thunder Bay Dist., vi.14.1966, IM Smith (ROMC 1);
Jellicoe, lake on W. side Hwy.#11, Thunder Bay Dist., vi.13.1966, IM Smith (ROMC 3);
Kiruna Lake, 54°30'N 84°55'W, 24.Jul.1981, E Fuller (ROMC 2);
Lake Nipigon, Macdiarmid, 15.vi.22, N.K.B. (ROMC 2);
Marmora, 23.v.1952, JC Mitchell & JR McGillis (CNC 17);
Ottawa, 25.v.1952 (CNC 1);
Peggy Lake, 17.2. mi.NW. Ignace, Rt.17, 17.Jun.1971, ROM Fld. Pty. (ROMC 1);
Pickle Lake, 14 mi.S., 20.vi.1973, Campbell & Smetana (CNC 5);
Prince Edward Co.,[all JF Brimely] 3/6/19, (MCZ 1, CNC 2, CUIC 4), 1.vi.19 (USNM 1, CNC 3), 29.v.66 (CNC 1), 28,29.v.1919 (CNC 2);
Rainy Riv. Distr., 10.vii.1924, JF Brimely (CNC 1);
Ridgeway, v.30.1891, Van Dyke (CAS 2);
Savant Lake, 4 mi.S., 23.vi.1973, Campbell & Smetana (CNC 8);
Toronto, 10.6.86, Wm Brodie (ROMC 2);
Turkey Point, 6.vi.1956, WJ Brown (CNC 1);

QUEBEC:

Bradore Bay, 6,8.vii.1930, WJ Brown (CNC 10), 19.vii.1929, WJ Brown (CNC 1);
Chibougimi, Ab., 1.vii.70, G Chantal (NMDC 3, CLCH 3), 24.vii.1915, G Beaulieu (CNC 1);
Duparquet, 27.vi.1943, G StaceSmith (CNC 1);
Gatineau, 5.vi.1984, L Huggert (UZIL 3);
Gt. Whale R., 28.vi.1949, JR Vockeroth (CNC 2);
Hebertville, 20 mi.S., 27.vi.1970, EC Becker (CNC 4);

Iles-de-la-Madeleine, Cap-aux-Meules, 6.vii.1985, LeSage (CNC 49); Dune du Nord, 5.vii.1985, LeSage (CNC 2); Grosse Ile, 5.vii.1985, LeSage (CNC 2); Havre-Aubert, 30.vi.1985, LeSage (CNC 1); Portage-du-Cap, 6.vii.1985, "Typha / Carex swamp", LeSage (CNC 51);
James Bay, east coast, vii.1920, F Johanson (CNC 1);
Knowlton's Landing, 18.6.1928, WJ Brown (CNC 3);
Lanoraie, Berthier, 17.v.75, C Chantal (CLCH 1);
Mare du Sault, Laurentides park, 2550 ft., vii.11.1952, F Klots & P Rindge (AMNH 3);
Rupert House, 4.viii.1949, EJ LeRoux (CNC 13);
St. Anne Lake, 12.vii.1933, WJ Brown (CNC 1);

SASKATCHEWAN:

Cantara Lake, N.W. corn., 13.vii.1978, R Hooper (SPMC 1);
Cowan River, x-ing at Hwy.#55, 4.July.1982, sweeps Carex, IS Askevold (ISAC 4);
Deschambault Lake, 2.vii.1978, R Hooper (SPMC 1);
Hwy. #155, 189 km.N. La Loche, 4.viii.1984, BF & JL Carr (CARR 1);
Jct. Hwy.# 2 & 165, 22-30.vi.85, C & A v.Nidek (CVNC 1), 28,29.vi.1985, BF & JL Carr (CARR 7);
La Ronge, 25.vi.1985, BF & JL Carr (CARR 1);
Milliken Lake, NW corn., 4.vii.1978, R Hooper (SPMC 1);
Nemeiben Lake, N. La Ronge, 14-17.vi.1985, C & A v.Nidek (CVNC 1);
Torch River, N. of Love, 18.vi.1982, D Burton (ISAC 2);
Waskesiu, July.25.1949, ET Reeder (CNC 1);
Weyakwin, 40 km.S. 13.vi.1985, C & A V.Nidek (CVNC 1);
Wollaston Lake, vii.1979, L Dredge (ASRC 1);

YUKON:

Dempster Hwy., mi. 122, 2000', 20.vii.1978, Smetana & Campbell (CNC 1);
Dempster Hwy. mi. 236, Eagle River, 1400', 21.vii.1978, Smetana & Campbell (CNC 1);
Watson Lake, 11 km.NW, 13.vi.1981, CS Guppy (UBC 1);

U.S.A.:

ALASKA:

Anchorage, 15 mi.N., 9.vii.1958, Lindroth (CNC 1);
Denai St. Park, Byers Lk., 26.vi.1978, Smetana & Campbell (CNC 8);
Kenai Mts., 15 mi.N. Seward, 400', 29.v.1978, Smetana & Becker (CNC 14);
Kenai Pen., 3 mi.NW Jct. Hwy. #1 & 9, 400', 18.vi.1978, Smetana & Becker (CNC 22);
Kenai Pen., Johnson L. cpgrd., 7 mi.SE Kasiloff, 11.vi.1978, Smetana & Becker (CNC 24);
Kenai Pen., Moose Pass, 6.vii.1951, WJ Brown (CNC 1);
Kenai Pen., 1.5 mi.SW Soldotna, 10.vi.1978, Smetana & Becker (CNC 3);
Kenai Pen., 15 mi.E. Sterling, 14.vi.1978, Smetana & Becker (CNC 7);
Sitka, no date (BMNH 2);

ARIZONA:

Santa Cruz Co.: Lochiel, vi.4.1952, Cazier, Gertsch & Schrammel (AMNH 1);

CALIFORNIA:

El Dorado Co.: Tallac, June (CMP 1), vii.5. (MCZ 2), no date (WEEM 1);
County records, no date (UADB 1, MCZ 2, CAS 2);
Lassen Co.: Facht, vi.5.21, JO Martin (AMNH 3, BPBM 1, CNC 1, CAS 2);
Marin Co.: Mill Valley, v.1.1955, PH Raven (CAS 1);

Mariposa Co.: camp, nr. Tioga Rd. & Yosemite Creek, 8200', vii.9.37, E Herald (CAS 1); Yosemite Creek, 6 mi.W. June.1945, HP Chandler (CAS 3);
Mono Co.: Toiga Lodge, Mono Lake, June.22.1929, EP van Duzee (CAS 1);
Nevada Co.: nr. Hobart Mills, 23.vi.1962, RL Westcott (LACM 3);
Russel Vly., vi.26.1964, Slobodchikoff (CAS 7);
Shotgun L., Bowman Mt., 6500', 7.13.23, JO Martin (AMNH 1,CAS 3);
Sacramento Co.: Sherman Island, iv.20.1958, TN Seeno (CDAS 1);
Siskiyou Co.: Copper Cr., 5000', 15.July.1971, J Kraemer (CDAS 1);
Grass Lake, Luther Pass, vi.26.1930, AT McClay (NMDC 2; CAS 7;CNC 3;UIM 1;EGRC 20);
Luther Pass, vi.15.30, AT McClay (MCZ 3);
Young's Valley, 4600' July.26.1971, E Aagaard (CDAS 3);
Sonoma Co.: Bennett Mtn., nr. marshy lake, 22.v.1955, D Rubtzoff (CAS 1);
nr. Forestville, iv.30.1955m, PH Raven (CAS 1);
Trinity Co.: Carrville, vi.10.1913 (USNM 1), xi.10.1913, Van Dyke (CAS 2);
Eagle Creek, v.28.1949, AT McClay (AMNH 4);
Trinity Riv. Camp, v.28.1949, AT McClay (AMNH 2), 3.vi.1951, (LACM 4);
Tuolumne Co.: Yosemite Nat. Park, Bridal Viel Crk, 7000', vii.8,13.1950, CP Alexander (MCZ 2);
Yosemite N.P., Tioga Rd. E. Murphy Dome, 27.viii.1967, PS Bartholomew (CAS 1);
Localities not found: Floating Is., Fallen Leaf Lake, vii.1899, Van Dyke (CAS 54);
Floating Is. Lake, Lake Tahoe, vii. (USNM 4,AMNH 1), vii.1899, Van Dyke, (CAS 11);
Miscellaneous: L. Tahoe, vi.1900, Van Dyke (CAS 10);
Yosemite Nat.Pk., NW53t15R21E, 21.vii.1946, H Chandler (CAS 4);
COLORADO:
Locality not found: RM Boy's Camp, Rocky Mtn. Nat. Park, 11.vii.1933, H Rodeck (UCM 1);
CONNECTICUT:
Tolland Co.: Storrs, v.9.70, Wharton (TAMU 1);
IDAHO:
Blaine Co.: Pettit L., 12.vii.1968, BF &JL Carr (CARR 13);
Boise Co.: Banner Summit, Hwy. 217, 7.vii.1986, BF & JL Carr (CARR 3);
Bull Trout L., vii.24.67, EJ Allen (UIM 1);
Clearwater Co.: Elk River, vi.9.1962, RE Stecker (SJSU 1);
Custer Co.: Stanley Lake, Sawtooth Mtns., July.23.1952, B Malkin (FMNH 1);
Elmore Co.:
Dixie, vi.10.1960, BA Foote (SJSU 1,UIM 5), vi.17.1957, WF Barr (UIM 1);
Hwy. 20, 5 km.E. Prairie Jct., 30.v.1986, BF & JL Carr (CARR 1);
27 km.S. Prairie, 31.v.1986, BF & JL Carr (CARR 1);
Fremont Co.: Cave Falls Rd., Targhee Nat. For., 12 km.W. Wyo. border, 17.vi.1986, BF & JL Carr (CARR 1);
Warm River Springs, Targhee Nat. For., 11.vi.1986, C & A v.Nidek (CVNC 18);
Lemhi Co.: vi.21.1966, DS Horning (UIM 1);
Oneida Co.: Salyer Cow Camp, 30.vi.1971, GF Knowlton (EMUS 3);
Valley Co.: McCall, June.24.1938, MC Lane (OSUC 23,UIM 5);
Rice Peak Lookout Trail, 6/15/69, MJ Anderson (CDAS 1);

Zena Creek, vi.14.1966, LS Hawkins (UIM 1);
Localities not found: Alturas Lake, Sawtooth Mtns., July.22.1952, B Malkin (OSUC 1,FMNH 1);
Krassel, 8.9.56, MM Furniss (UWL 1);
ILLINOIS:
Miscellaneous: "Ill." no date (INHS 2);
INDIANA:
Saint Joseph Co.: Pine, v.10.09, E Liljeblad (UMMA 1);
MAINE:
Franklin Co.: Weld, vi.23.1938, CA Frost (CAS 2), 28,29.vi.1938, CA Frost (CUIC 4,MCZ 3);
Kennebec Co.: County record: 3.June.1967, AE Brower (UNH 2);
Lincoln Co.: Wiscasset, vi.16.26, AC Weed (FMNH 1);
Oxford Co.: Bethel 15.vi.24, JG Gehring (MCZ 1);
Norway, no date, SI Smith (PMY 7);
Penobscot Co.: Enfield, vii.11.39, LP Grey (CAS 4);
Orono, vi.1920, H Klages (CMP 3), vi. RJ Sim (MCZ 6);
2 mi.SW Orono, 28.v.1982, DS Chandler (UNH 2);
Sommerset Co.: Fairfield, 6.vi.1986, "treading in small pond", RE Nelson (RNEL 1);
MASSACHUSSETTS:
Hampden Co.: Wales, [all CA Frost], vi.16 (USNM 2), 13.vi.09 (UMMA 4,CUIC 1, MCZ 1), vi.12.09 (MCZ 1), vi.20.09 (MCZ 1), vi.18.06 (MCZ 1), vi.28, NS Easton (MCZ 2);
Hampshire Co.: Cummington, May.30.1903, F Knab (USNM 1,AMNH 1);
Middlesex Co.: Stoneham, 13.vi.1909, FA Sheriff (CAS 2);
MICHIGAN:
Alcona Co.: County records: vi.2.51, RR Dreisbach (AMNH 2, MSUE 13);
Alger Co.: Island Lake, 13.June.1977, Flynn & Mahar (MSUE 2);
Cheboygan Co.: Douglas Lake, 6.vii.1917, MH Hatch (UMMA 1);
County records: 6.3.57, RR Dreisbach (MSUE 1,AMNH 2,UMMA 1);
Grand Traverse Co.: County record: 5.27.50, RR Dreisbach (MSUE 2);
Houghton Co.: Calumet, no date, A Agassiz (MCZ 1);
Iosco Co.: County records: v.30.51, RR Dreisbach (UMMA 1);
Kalkaska Co.: County record, 5.28.50, RR Dreisbach (MSUE 1);
Keweenaw Co.: Isle Royale, no date (MCZ 3);
Mackinac Co.: Naubinway, Oct.1.1920, S Moore (UMMA 1);
St. Helena's, 26.v.1922, S Moore (UMMA 2);
St. Ignace, may.30.1922, S Moore (UMMA 1);
Manistee Co.: County record: vi.22.57, RR Dreisbach (UMMA 1);
Oceana Co.: Pentwater, 21.vii.16, E Liljeblad (UMMA 1,USNM 1);
Roscommon Co.: County record, 13.vii.1943 RR Dreisbach (UMMA 1);,
Wexford Co.: County record, 5.14.35, RR Dreisbach (UMMA 1);
MINNESOTA:
Clearwater Co.: Itasca State Park, 29.v.1934, CE Mickel (DEFW 1), 29.v.1942, JH Hughes (DEFW 1), 15.vi.1937, HR Dodge (DEFW 2), vi.26.68, R Gunderson (SCSU 1);
Lake Co.: 1 mi.E. Isabella, 6.30.1979, R Gunderson (SCSU 3);
5 mi.E. Isabella, 7.1.1979, R Gunderson (SCSU 1);
Pope Co.: County record, 15.vii.1928, DG Denning (DEFW 1);
MONTANA:
Carbon Co.: E. Rosebud Lake, 12.vi.1961, B Vogel (UCM 7), 19.vi.1961, SM Sutton (UCM 2), 27.vi.1961, B Vogel (UCEC 3);
Gallatin Co.: Bozeman, Aug.23.1961, E Wiegand (MTSU 1);
NEVADA:

Mineral Co.: Truman Mdw., 1 mi.S., 6 mi.W. Montgomery Pass, 7200', vi.24.80, D Giuliani (CDAS 6);

NEW HAMPSHIRE:

Coos Co.: Mt. Washington, Tuc. R. vi.24.30, Darlington (MCZ 3);

Grafton Co.: Kinsman L., White Mtns., vi.21.30, Darlington (MCZ 1); Rumney, vi.27.1924 (MCZ 1);

Rockingham Co.: Northwood, vi.1.1979 (UNH 1);

Localities not found: Cornish, May.16.25, R Hayward (MCZ 1); Three Mile Id., 08.v.27, F Blanchard (MCZ 3);

NEW JERSEY:

Burlington Co.: Leb. State For., Shinn's Branch, 4/30/49, EJF Marx (AMNH 1);

Ocean Co.: Lakehurst, v.31.12 (AMNH 1), 5.3 (RUNB 1);

NEW YORK:

Kings Co.: Rockaway Bch., v.25.02 (USNM 1);

Tompkins Co.: Caroline, May.30.1917, EG Andreson (DEUN 1); McLean Bogs, 31.v.19, H Dietrich (CUIC 1); McLean Res., Grassy Bog 2, 2.vii.24 (CUIC 1); McLean Res., Inlet Brook, 2.vii.24 (CUIC 1);

Localities not found: Manitou Beach, 14.vi.1905, JL Zabriskic (AMNH 1);

OREGON:

Baker Co.: Anthony Lake, 16 mi.W. North Powder, 7100', 13.July.1964, Schuh & Lattin (OSUC 1);

Benton Co.: Corvallis, 10 mi.S., May.5.1950, V Roth (OSUC 2), 6.June.1957, DR Smith (OSUC 1);

Clackamas Co.: Mt. Hood, Government Camp, 1.viii.1974, A & D Smetana (CNC 4), July.6.1938, MC lane (OSUC 7), 4000', June.2.1939, MC Lane (OSUC 2); Salmon River near Jct. Hwy.26 & 35, 27.June.1985 (SMCL 4); Still Creek Forest Camp, 1 mi.E. Gov. Camp, nr. Mt. Hood, July.14.1956, PO Pritcher (OSUC 1), 20.June.1968, Wiggins, Smith & Yamamoto (ROMC 9); Trillium Lk., Mt. Hood N.F., 4000', 30.vii.1979, JM & BA Campbell (CNC 1);

Clatsop Co.: Cannon Beach, June.12.1927, EC Van Dyke (CAS 1);

Curry Co.: Flores Lake, 12 mi.W. Port Osford, 26.vii.1967, K Goeden (ODAC 1);

Deschutes Co.: 2 mi. SW of Black Butte, 24.vi.1963, K Goeden (ODAC 1); Elk Lake, 3.vii.38, K Fender (CAS 7,OSUC 4,UMMA 3,CNC 6,AMNH 2,FMNH 12,MSUE 2); Sparks Lake, 5428 ft., Aug.8.1935, HA Scullen (NMDC 1);

Douglas Co.: Diamond Lake, July.2.1951, B Malkin (FMNH 1,OSUC 1); Reedsport, Umpqua Lt. House, May.25.1952, V Roth (OSUC 1); Tahkenitch Pond, 11 mi.S. Florence, 26.v.1972, L Ryker (OSUC 1);

Grant Co.: Hoodoo Cr. R.S., June.12.1939, MC Lane (OSUC 6); Moon Meadows, July.12.1939, MC Lane (OSUC 1);

Harney Co.: Fish Lake, Steens Mts., July.14-16.1953, Roth & Beer (OSUC 1);

Hood River Co.: Mt. Hood, vii.2.27, Darlington (MCZ 18); S. Mt. Hood, vii.2.37 (MCZ 15); Mt. Hood, Hood Meadows, June.2.1939, MC Lane (OSUC 1); Mt. Hood, Hood River Meadows, 4500', July.6.1938, ELS Jones (UIM 3);

Jackson Co.: Butte Falls, 6.7.41, Schuh & Gray (AMNH 1);

Dead Indian Soda Springs, v.18.68, Oman (OSUC 1), 1 mi.W, May.18.1962, W Barnett (OSUC 1);
Jefferson Co.: 8 mi.N. Camp Sherman, 12.vi.1965, K Goeden (ODAC 1);
Metolius Riv., May.27.1950, KM Fender (OSUC 1), vi.16.45 (OSUC 6);
Josephine Co.: Jerome Prairie, 5 mi.WSW Grants Pass, 1.vi.1977, RL Westcott (ODAC 5);
Selma, 4 mi.W., bog, May.18.1962 (OSUC 1);
Klamath Co.: Crater Lake, 7/24/38 (OSUC 1);
Klamath, no date, H Klages (CMP 1);
Meryl Cr., 7 mi.NW Bly, no date, Vertrees & Schuh (UGA 3);
Lake Co.: Fremont N.F., Quartz Mtn., 5000', June.12.1962, MC Lane (OSUC 1);
Fremont N.F., Warner Canyon, June.12.1962, MC Lane (OSUC 5);
Hart Mtn. NWR, Blue Sky, 4.vi.1977, N Cobb (OSUC 1);
Lakeview, Willow Cr. Camp., 27.vi.1984, BF & JL Carr (CARR 4);
Silver Lake, 1.vii.1984, BF & JL Carr (CARR 2);
Summer Lake, 15.vi.1984, R Danielsson (UZIL 1);
Lane Co.: Florence, 7 mi.N., 1.May.1962, J Schuh (UGA 1);
Lake Cleowox, 3 mi.S. Florence, Mrch.12.1958, J Schuh (AMNH 1);
Munsel Lake, nr. Florence, May.26.1952, Roth & Malkin (OSUC 1);
bet. Siltcoos Lk. & Florence Lk., iv.15.1934, Howell & Rose (CAS 9,AMNH 5);
Lincoln Co.: DeLake, May.5.1939, MC Lane (OSUC 1);
Marion Co.: Breitenbush Lake, vi.23.1940, RE Reider (NMDC 1,AMNH 4);
Cascades, Brietenbush, July.20.1974, R Bell (UVDZ 1);
Tillamook Co.: Boyer, 5/8,28.1938, KM Fender (OSUC 2);
Umatillo Co.: Battle Mtn., 27.v.1984, BF & JL Carr (CARR 20);
Wallowa Co.: Blue Mts. Mottet R.S., 4500', June.27.1936, MC Lane (OSUC 15);
Wasco Co.: Bear Springs, 26.v.1940, KM Fender (FMNH 3,CAS 5), May.18.1940, KM Fender (OSUC 1), 26.v.1946, B Malkin (UIM 1), June.12.1961, MC Lane (OSUC 1);
Localities not found: Alvord Desert, 20.vi.1984, BF & JL Carr (CARR 1);
Malheur For. Res., Canyon Mtns., 26.vi.33, GR Englehardt (CUIC 1,MCZ 5,AMNH 1);
Tierra Del Mar, 18.iv.1949 (OSUC 1);
Todd Lake, 6150', vii.5.1948, CP Alexander (MCZ 1)
Winema N.F., Walker Prairie, June.15.1962, MC Lane (OSUC 1);

PENNSYLVANIA:
Miscellaneous: "N. East Pa." vii.21, H Klages (CMP 1);

UTAH:
Beaver Co.: Beaver, 27.vi.1967, GF Knowlton (EMUS 11);
Cache Co.: Hyde Park, 5.vi., Knowlton & Stains (EUMS 1);
Logan, May.1952, LC Raniere (EMUS 1);
Millard Co.: Delta, 20.v.1941, Knowlton & Harnston (EMUS 1);
Summit Co.: Kamas, 19.vi.1940, GF Knowlton (EMUS 1);
Utah Co.: Mt. Nebo Loop, 3.vii.1972, Knowlton & Hanson (EMUS 1);

VERMONT:
Chittendon Co.: Burlington, iv.20.1952, FG Werner (UVDZ 4);
Lamoille Co.: Judevine Brk., 3 mi.NW. of Johnson, June.11.1962, J & R Bell (UVDZ 2);

WASHINGTON:
King Co.: Bothell, iv.10.49, (OSUC 1);
Duvall, v.2,9,31.31 (OSUC 3);

32 km.N. Fall City, 23.v.1982, RE Nelson (RNEL 4);
Lk. Marie, Apr.27.1944, MC Lane (OSUC 1);
Seattle, 5.8.12 (OSUC 6), 5.20.11 (OSUC 1), 5.23.13 (OSUC 1), 5.8.10 (OSUC 1), 5.v.1956, S Softky (OSUC 1);
Seattle, U. of Wash. arboretum, 25.iv.1979, "on Salix", RE Nelson (RNEL 1), 23.iv.1979, RE Nelson (RNEL 2),
Stillwater, Feb.11.1934 (OSUC 2);
Kittitas Co.: Thorp, June.1969, D Harris (CDAS 1);
Lewis Co.: Mt. Rainier Nat'l Park, Stevens Cyn. Gate, 19.June.1986, DG Furth (PMY 1);
Pacific Co.: Nahcotta, May.10.1954 (OSUC 1);
Pierce Co.: Fort Lewis, 10.v.1946, PH Arnaud (CAS 1);
Mt. Rainier, vii.20.27, Darlington (MCZ 5);
Mt. Rainier Nat. Pk., Longmire, May.23.1952, MH Hatch (OSUC 1), 19.June.1986, DG Furth (PMY 18);
Mt. Rainier Nat. Pk., Ohanapecosh, 4.July.1969, ROM Fld. Pty. (ROMC 2), July.9.67 (UIM 8);
San Juan Co.: Orcas Island, May.31.1948, T Waellendorf (WSU 7);
Orcas Island, Meran St., Pk., Lily Pad Lake, 6.vii.1974, PH Arnaud (CAS 1);
Snohomish Co.: Ruggs Lake, vi.1.1934, JL Wilson (OSUC 2);
Silvana, Stillagamish Riv., May.26.1968, R Nagle (SDNH 1);
Thurston Co.: Olympia, no date (OSUC 1);
Rainier, May.25.1965, B Thomson (OSUC 1);
Whatcom Co.: Marietta, June.18.1944, MJ Forsell (OSUC 10), vii.18.1944, RD Shenefelt (WSU 1);
Locality not found: Mt. Constitution, 17.Jul. (WSU 1);

WISCONSIN:
Bayfield Co.: County record, no date (USNM 1);
Miscellaneous: "Wis." no date (CUIC 1,DEFW 1);

WYOMING:
Yellowstone National Park: Obsidian Cliff, vi.27.1941, CP Alexander (MCZ 1);
Yellowstone Nat. Park, vi.24.55, EW Hamilton (DEUN 8), vii.1935, JE Blum (EGRC 1,LACM 2);
Yellowstone, Nat. Pk., Norris Geyser Basin, 16.v.1930, JS Alexander (UMMA 2);
Yellowstone Nat. Pk., Old Faithful, June.24.1936, MH Hatch (OSUC 4);
W. Yellowstone, vi.16.30, Van Dyke (CAS 1);

MEXICO:
"Mexiko", no date (SMNS 1);

Appendix 10.3.

Locality data for Plateumaris nitida (Germar).

CANADA:

ALBERTA:

Beaver Mines Lake, 17-20.vi.1987, C & A v.Nidek (CVNC 1);
Bucklake Creek, 0.7 km.E. on Hwy.#39, 20.vi.1982, Carex, IS Askevold (ISAC 16);
Busby, 9.6 km. W., 13.vi.1982, sweep Carex & Eleocharis, IS Askevold (ISAC 3);
Calgary, Sarcee Reserve, vi.4.1928, "blue-grass", O Bryant (CAS 2);
Calgary, Fish Creek, 19.vi.1973, lot 1, BF & JL Carr (CARR 2);
Coalspur, 8.vii.49, "raspberry" (NFRC 1);
Dogpound, campgrd 22.5 km.w., 11.vi.1980, RE & ML Roughley (ISAC 14);
Edmonton, 16.vi.1919, FS Carr (MSUE 1);
nr. Gregoire Lake, s. Ft. McMurray, 3.vi.1985, C & A v.Nidek (CVNC 1);
Fox Creek, 18.vi.1980 Cr Nidek (CVNC 2);
George Lake, 53°54'N, 115°28'W, 15.vi.1982, ex Carex/Eleocharis, IS Askevold (ISAC 20);
Lamoral, vii., (UAE 1);
Little Red Deer River, 10 km.s. Westward Ho, 26.vi.1982, sweep Carex, IS Askevold (ISAC 23);
Raven River, 20 km. N. James River Bridge, 22.vi.1982, sweep Carex, IS Askevold (ISAC 60);
Seba Beach, 5.4. km S. on Hwy.#759, 20.vi.1982, Carex/Typha, IS Askevold (ISAC 7);
nr Seba Beach, 20.vi.1982, sweep Carex, IS Askevold (ISAC 2);
Tomahawk, 5 km. N. on #759, 20.vi.1982, IS Askevold (ISAC 19);
Sundre, 29.ix.1963, lot 3, BF & JL Carr (CARR 1), 29.vi.1964, lot 2, BF & JL Carr (CARR 1);
73 / 17, W.4 Mer., 5.vi.84, BF & JL Carr (CARR 2);
42./26./W.4, 9.vi.1985, BF & JL Carr (CARR 1);
Tp./ Rge./, W. 5 Mer:
5 / 3, 20.vi.1976, BF & JL Carr (CARR 3);
24 / 8, 4.vi.1961, BF & JL Carr (CARR 3);
32 / 2, 14.vi.1980, BF & JL Carr (CARR 1);
35 / 7, 14.vi.1980, BF & JL Carr (CARR 2);
37 / 5, 16.vi.1973, BF & JL Carr (CARR 1);
40 / 8, 15.vi.1980, BF & JL Carr (CARR 1);
61 / 18, 16.vi.1976, BF & JL Carr (CARR 2);
102 / 9, 6.vi.1988, BF & JL Carr (CARR 5);
103 / 10, 8.vi.1988, BF & JL Carr (CARR 1);
112 / 20, 8.vi.1988, BF & JL Carr (CARR 2);
Tp.24, Rge W5, 4.vi.1961, JF Brimley (CNC 4);

BRITISH COLUMBIA:

Agassiz, 5,16,27.v.1927, HH Ross (3); 12.iv.1922 (1), 10.iv.1926 (1), R Glendenning (CNC), 7.ii.1931, H Leech (CNC 1), 15.iv.1926, 18.vii.1926, HH Ross (INHS 4);
Alaska Hwy., mi.496, 20.vi.1979 lot 2, BF & JL Carr (CARR 2);
Alaska Hwy., mi 497, 30.vi.1955 lot 4, BF & JL Carr (CARR 6);
Banfield, 22.vi.1977, GGE Scudder (CNC 1);
Cawston, 27.v.1917, WRS Metclafe (CNC 7);
Crescent Valley, w., 26.v.1967, J Shepard (UBC 1);
Essondale, 10.5.69, W Lazorko (UZIL 1);

Golden, 1 km.w. on Hwy #1, 15.vi.1979, beaver pond, mountain stream, RE & ML Roughley (ISAC 1);
Goldstream, 3.vi.1923, KF Auden (CNC 1);
Harrison, 9.6.1895, AH Lanham (PMV 2);
Hope, 12 mi.e., vi.2.1968, Cambell & Smetana (CNC 1);
Hope Trail, 4.vii.1930, G StaceSmith (UBC 3);
Lakelse Lake, 24-25.vi.1974, GGE Scudder (UBC 2), 14.vi.1960, CH Mann (CNC 4);
Lakelse Lake, 300', 14.vi.1960, R Pilfrey (CNC 1);
Lakelse Lake nr Terrace 300', 27.vi.1960, WW Moss (CNC 2);
Liard Hot Springs, 24.v.1981 ex Carex, Vasington & Cannings (UBC 9);
Liard R. Hot Springs, 20.vi.1958 #297, Lindroth (CNC 1), 16.vi.1982 (3), 17.vi.1982 "ex Smilacina et al" (4), D Wilkie & SG Cannings (UBC);
Lumby, 25.v.1944, HB Leech (LACM 2, UCR 2);
Macmillan Prov. Pk., 10 mi.E. Alberni, v.26.1968, Cambell & Smetana (CNC 1);
108 mile House, vi.6.1983, "sedge pd", RS & VL Zack (WSU 2);
Mission, 11.v.1932, GR Hopping (UBC 2, CAS 2);
Mission City, 15.vi.1953, E Mason (CNC 1), 22.vi.1953, SD Hicks (CNC 1);
Nanaimo Biol Sta., June.28.1920, EP VanDuzee (CAS 2);
Oliver, 8.v.1924, PN Vroom (CNC 1), 28.iv.1923 (1), 3,6,16.v.1923 (7), CB Garrett (CNC);
Pender Harbor, 18.v.1930, RT Turner (UBZC 2, CNC 2, CAS 1), 15,20,24.v.1928 , GR Hopping (UBC 5), 20,24.v.1928, GR Hopping (CNC 13);
Pitt Meadows, 15.v.1973, GGE Scudder, (UBC 7);
Port Hardy, 17.vi.1952, R Guppy (UBC 1, OSUC 2);
Prince George, 9,13.vi.1959, GGE Scudder (UBC 2);
Prince Rupert, 11,12.v.1926, R Hopping (UBC 4, CAS 1, CNC 1, MCZ 14), v.2.26, R Hopping (USNM 1);
Quamicham Lake, V.I., AH Lanham (PMV 2);
Quatse L. [n. V.I.], 14.vi.1952, R Guppy (UBC 1), 4.vi.1952, R Guppy (OSUC 2);
Queen Charlotte Isl., 5.3 km. SW of Tow Hill, 22.viii.1983, "treading floating Sphagnum & Carex patches", JM Campbell (CNC 3);
Quesnel, 25. vii.1949, GJ Spencer (UBC 2);
Revelstoke, 10.vi.84, Lot 4 BF & JL Carr (CARR 1);
Robson, June.20.1960 (NMDC 1);
Rossland, 24.iv.1922, KF Auden (INHS 1);
Salmon Arm, vi.12.39, DH Leech (CAS 1);
Salmon Valley, 19.vii.1969 lot 4, BF & JL Carr (CARR 2);
Saturna Is., 20.4.1899, AH Lanham (PMV 1);
Snowshoe Crk., 27.vi.1979, RJ Cannings (UBC 1);
S. Pender Is., 29.Apr.1979, RA Cannings, (UBC 1);
S. Vanc. Is., J Chapman (CNC 1);
Stoner, 23.v.1981, ex Carex, SG Cannings (UBC 8);
Sumas [perhaps actually in Washington?], 26.iv.1924, KF Auden (CAS 1, INHS 1);
Sumas Prairie, 3.iv.1933, R Hopping (CNC 1);
Terrace, ME Clark (UBC 2, CNC 2, MCZ 2, AMNH 2), W.W.H. (UBCZ 1);
Terrace "airport", 3.viii.1960, BS Heming (CNC 1);
Tyee, s.e. Prince Rupert, 8.vi.1958, #255 Lindroth (CNC 1);
UBC Res. Forest, Haney, 8.vi.1985, SG Cannings (UBC 4);

Vancouver, 18.v.1936, Livingston (PMV 2), 11.v.1926, GH Larnder (PMV 1), 17.v.1930, GJ Spencer (CNC 1), 23.v.03 (PMV 1), 22.v.30, H Leech (CAS 1, CNC 1), 31.v.1931 H Leech (CNC 1), 5.v.1931, H Leech (CAS 1, UBC 3, CNC 6), 15.v.1935, "yellow Arum", GP Holland (CNC 10), vii.21 (UADB 1), v.18, Liebeck Coll'n. (MCZ 1);
Vancouver, Stanley Park, v.30.30, H Leech (CNC 3, CAS 1);
Vanderhoof,15.vi.1962, GGE Scudder (UBC 7);
10 mi. E. Vanderhoof, Rt. 16, vi.7.1983, "sedge pd.", RS & VL Zack (WSU 2);
17 mi. E. Vaderhoof, Rt.16, vi.7.1983, ditch, RS & VL Zack (WSU 1);
Vernon, 14.v.1920, MH Ruhman (UBC 1, CNC 1), v.15.1920, R Hopping (CAS 2, CNC 1);
Victoria, 30.4.00, (UAE 2), 1.6., Hubbard & Schwarz (USNM 1), 9.vi.1923, KF Auden (CNC 1, INHS 1), eastern branch (CNC 1);
Todd Inlet, v.6.1928, WHA Preece (CNC 1);
Victoria, Prospect Lake, May.3.1930, MH Hatch (OSUC 6);
Wellington, V.I., 1,7.June.1950, R Guppy (UBC 5), June.7.1949, "ex pond lily fls.", R Guppy (OSUC 6), 18.June.1950, R Guppy (OSUC 2), 1.vi.49, R Guppy (OSUC 3), 17.x.1950, R Guppy (OSUC 1);
Localities not found:
Beaver Lake,[which one?], 15.v.1935, JK Jacob (PMV 3);
Fraser Lake, 13.vi.1958, #274 Lindroth (CNC 1);
Port Kells, 23.iv.2979 lot 6, BF & JL Carr (CARR 3);
Miscellaneous: "Br. Col." (AMNH 5);

LABRADOR:
Carter Basin, 53°29'N.,59°52'W., 5.viii.1958, BSES Exped. Brit. Mus. 1958-490 (BMNH 1);
Goose Bay, 13.vii.1948, WE Beckel (CNC 1), July 29-30.1984 Larson & Morris (MUIC 1);
Minipi drng., Green L. Portage, 29.vi.1983 Lot.4, (MUIC 7);

MANITOBA:
Birch Ck., 33 km.s. Mafeking on Hwy.# 10, [date lost], sweep Carex, IS Askevold (ISAC 9)
Birds Hill Prov. Park, 6.viii.1983, ex Scirpus microcarpus, IS Askevold (ISAC 13);
Brokenhead River, at Hwy.#1, 26.x.1982, Burton & McGinnis (JBWM 5), 26.vi.1981, TD Galloway (JBWM 2), 18.v.1977, TD Galloway (JBWM 4), 6.vii.83, sweep Carex, IS Askevold (ISAC 1)
Brokenhead River, at Hwy. #15, 20 km. e. of Anola, 6.vi.1984, DA Pollock, (JBWM 1), May.18.1985 (11), May.26.1985 (8), May.30.1985 (6), sweep Carex, IS Askevold (ISAC), 23.v.1987, Carex & Scirpus, IS Askevold (ISAC 2);
Duck Mtn. Prov. Park, Loat Lake 51 50'N,100 55'W, June.19-24/81, Ashworth., Schwert, Keller (ASRC 4), 5 mi. n. Wellman L. Cpgd., June.19-24/81, Ashworth, Schwert & Keller, (ASRC 15);
E. Braintree, 9-6-68, "Salix" (NFRC 1);
Gillam, 5,7.vii.1950, JF McAlpine (CNC 2), 1.vii.1950, WJ Brown (CNC 2);
Grass Riv. Prov. Park., Iskwasum L. 54°38'N,100°00'W., Ashworth Schwert & Keller (ASRC 4), Wekusko Falls, Hwy.#392, 20.vi.1984, DA Pollock (JBWM 6);
Hazel, 2 km.e. June.10.1984, Scrapnecks (ISAC 24);
HBRy, mile 214 [Hudson's Bay Railway], 6.vii.1917, JB Wallis (CNC 2, MCZ 1), 27.vii.1917, JB Wallis (MCZ 1, CNC 1);
Kississing, 4.vi.55, "Spruce" (NFRC 1);

Molson, June.10.1984, Scrapnecks (ISAC 1);
Pine River, small creek n. of on Hwy#10, 22.vi.1984 ex Carex, DA Pollock (JBWM 5);
Red Deer Lake, N. of Barrows, 3.vii.1982, Carex, IS Askevold (ISAC 1);
crk., b/n Red Deer R. & Overflowing R., on Hwy#10, 19.vi.1984, DA Pollock (JBWM 2);
Seven Sisters, June.30.1983, W Ralley (JBWM 1), 22.vi.1982, TD Galloway (JBWM 1);
Tp.76. Rge.6 W.1, 10.vii.1985 lot 2, BF & JL Carr (CARR 1);
Tp.79. Rge.3 W.1 Mer., 12.vii.1985 lot 2, BF & JL Carr (CARR 2);
Tp.81. Rge.1. E.1 Mer., 11.vii.1985 lot 3, BF & JL Carr (CARR 2);
Tp.81. Rge.2. E.1 Mer., 10.vii.1985 lot 4 (8), lot 5 "picked off Rose blossoms" (9), BF & JL Carr (CARR);
Westray, 4 km.n., RR x-ing Hwy #10, 21.vi.1984, DA Pollock (JBWM 2);
Miscellaneous material: "Manatoba Can." (CMP 1);

NEW BRUNSWICK:

Bathurst, vi.13, JN Knull (CMP 1), vi.15, JN Knull (CMP 2), vi.20, JN Knull (AMNH 1, CNC 4);
Kouchibouguac N.P.: 12.vi.1978, "code 7043W", SJ Miller (CNC 1), 23.vi.1977, "code 536884L/ &69M, SJ Miller (CNC 10), 23.vi.1977, "code 5355Y", JR Vockeroth (CNC 2), 16.vi.1978, "code 7071Y", DB Lyons (CNC 1);
Tabusintac, 22.vi.1939, WJ Brown (CNC 1);

NEWFOUNDLAND:

Aldery Pond, 30.x.1943 "Picea mariana", F.I.Survey (CNC 2);
Avalon Pen., C.Bay South, 24.vi.78, D Larson (MUIC 1);
Avalon Pen., Colinet, 4.x.1980 (CNC 1, MUIC 4);
Avalon Pen., Portugal Cove, Indian Meal Line, 4.vii.82, (MUIC 4);
Badger, C.Nfld, 22-25.vi.1951, Lindroth N:o 69 (CNC 5);
Badger, 3 km.w. on Hwy#370, June.26.1980, Brennan & Larson, Lot 1 (1), Lot 2 3), Lot 4 (5), (MUIC);
Broad Cove, nr Ck. Stn., 30.vi.78, D Larson (MUIC 1);
Catamaran Ck. Park, June.27.1980, Brennan/Larson (MUIC 1);
Cow Head, NW NFLD, 7.viii.1949, H Krogerus (CNC 2), 7.8.1949, Ernst Palmen N:o 206 (CNC 40);
Cox L., w. Badger, 26.vi.1980 Brennan/Larson lot 4 (CNC 1);
Deer l., beaver ponds nr., 13.vi.1978 lot 3, Larson & Swales (MUIC 1);
Ferryland, Oct.5.1980, J Sirois (MUIC 5), Aug.1934, ST Brooks (CMP 1);
Gander: 30.vi.1949, WJ Brown, (CNC 10, AMNH 2), 24.vi.1949, WJ Brown (CNC 14), 29.vi.1949, RA Henninger (CNC 4);
Goulds, 23.6.1953, RF Morris (MUIC 1);
Gros Morne Pk., nr Rocky Harbour, June.19/79 lot 4. Larson & Swales (MUIC 1);
Harmon Field: 17.vi.1949, WJ Brown (CNC 1), 16.vi.1949 (2), 20.vi.1949 (1), 24.vi.1949 (2), 15.vii.1949 (3), FG DiLabio (CNC);
Harry's River, W.Nfld.: 6.vii.1949, E Palmen N:o 112 (CNC 4), vii.1949, H Krogerus (CNC 1), 5-8.vii.1949, Lindroth N:o 69 (CNC 4);
Holyroad [=Holyrood?], 6.vii.1965, WJ Brown (CNC 5);
Howley, 2 mi.N., 13.vi.1979 lot 4, Larson & Swales (MUIC 2);
Little River, Codroy, July.10-18.07, PG Bolster Coll'n., (MCZ 3);
Little River, s.w. Nfld., July.18.1905, PG Bolster Coll'n., (MCZ 2);
Logy Bay, 5.vi.81, D Larson (MUIC 1);
North Harbour, N. of at Jct. Hwys #91 & #92, 20.ix.81, Biol 4150 (MUIC 1);

Quin L. nr Red Indian L., June.25.1980 lot 7, Brennan & Larson (MUIC 1);
Roddickton, 20.km w., July.3.1980 lot 4, Brennan & Larson (MUIC 3);
St. John's: vii.9.1949, FG DiLabio (AMNH 1, CNC 16), vii.16.1949, WJ Brown (AMNH 2, CNC 4), 9.vi.1949, WJ Brown (CNC 2), 12.vii.1949, WJ Brown (CNC 5), 14.vii.1949, WJ Brown (CNC 2), 25.vi.1965 (1), 26.vi.1965 (1), 27.vi.1965 (14), WJ Brown (CNC), 17.x.1977, D Larson (MUIC 1), 20.ix.80, Northcott (MUIC 1), Oct.1977, Biol 4140 (MUIC 1), 29.vi.1953, RF Morris (MUIC 1), 30.vi.1950, RF Morris (MUIC 1),;
St. John's, Baird Pl., 7/10/1977, W Parsons (MUIC 1);
St. John's, Burton's Pond, 6.v.1981 (MUIC 1);
St. John's, Long Pond, 3.vii.1979, D Larson (CNC 1), 25.x.1980 (MUIC 1), 7.vii.1979 (MUIC 1), 13.vi.1981, D Larson (MUIC 5), 28.iii.1979, D Larson (MUIC 1),;;
St. John's, Oxen Pond, 7.July.1975 "sweeping bog vegetation" (3), "sweep grass near lake" (3). CE Holmes (MUIC),;
St. John's, Pippy Pk., 30.v.1981 (MUIC 4), 1.xi.1978, D Larson (MUIC 1),;
St. John's, "ridge road", 12.ix.1980 (MUIC 1);
Searston sandspit & Brachois. June.17/1979 lot 2, Larson & Swales (MUIC 2);
South Branch, W. Nfld., 3.vii.1949 N:o 107 (3), 4.vii.1949 N:o 109 (75), Ernst Palmen (CNC);
Spruce Brook, W.Nfld, 8-9.vii.1949, E Palmen N:o 125 (CNC 1);
Stephenville Crossing, 20.vi.1949, WJ Brown (CNC 1);
Table Mountain, S.Nfld, 29/vi.1949, E Palmen N:o 86 (CNC 1);
Terra Nova Ntl. Pk., N. entrance, 21.vi.1978 lot 3 (MUIC 1);
Terra Nova Ntl. Pk., Salton, 21.vi.1978 (MUIC 1);
Topsail, 2.vii.1965, WJ Brown (CNC 4);
Waterford Bridge, SE Nfld, 5/vi/1949, E Palmen N:0 14 (CNC 2);

NORTHWEST TERRITORIES:

Ft. Simpson, Harris River, 15.vi.1972, A Smetana (CNC 4);

NOVA SCOTIA:

Albert Bridge, Mira River, 26.vi.1983, LL26 sweeping Ranunculus and weeds, edge Mira River, L LeSage (CNC 9);
Baddeck, 30.vi.1936, TN Freeman (CNC 2);
Bedford, Halifax Co., 19.vi.1969 "on flowers of Viburnum trilobum", P Ward (CNC 2);
CBNP (Cape Breton Nat. Park): following all (CNC), sites within the park.
CBNP, Base French Mountain PG585763, 10.vi.1983 "swp. Spirea", L. LeSage LL159 (1);
CBNP, Fishing Cove Rov. TP57 PG655780, 11.vii.1983 "sweep marginal vegetation", L LeSage LL164 (3);
CBNP, French Mountain TP58 PG629791, 10.vii.1983 Carex & Scirpus, L LeSage LL158 (7);
CBNP, Freshwater Lake TP7 PG990691, 27.vi.1983 "sweeping Scirpus", L LeSage LL7 (1);
CBNP, Grand Falaise .5 km. N PG566704, 30m. 9.vi.2983, H Goulet (CNC 3);
CBNP, Grande Anse Riv. TP50 PG732858, 8.vii.1983 "swp veget'n along riv. in decid. for.", L LeSage LL141 (CNC 6);
CBNP, Ingonish TP26 PG986688, 1.vii.1983 "v. small creek entrance, spring fed", L LeSage LL79 (13), Ingonish TP5 PG984706, 27.vi.1983, "sweep Sparganium", L LeSage (CNC 6);

CBNP, Mackenzie Mtns. TP54 PG657685, 8.vi.1983 "sweep Scirpus & Juncus in ditch", L LeSage LL146 (1);
CBNP, Paquets Lake, 3 km. w., 380m., PG935886, 17.ix.1984 "sifting moss", Campbell & Davies (CNC 2);
CBNP, Paquette Lake TP34, 2.vii.1983 "sweep Ericaceae, Carex & Scirpus", L LeSage LL94 (CNC 1);
CBNP, Pleasant Bay, 17-27.vi.1984, Smetana (CNC 22), 10.vi.1984, Goulet (CNC 3);
Cape North, Cape Breton, vi.24.31, (MCZ 2);
Halifax, 10.vi.1915, 27.vi.1915, J Perrin (CNC 2);
Highlands N.P., Two Island Lake, 24.vi.1983, Y. Bousquet (CNC 1);
Kentville, 3.vi.1923, RP Gorham (CNC 1), 20.vi.1947, WJ Brown (CNC 2);
Lawrencetown, Halifax Co., 19-20,vii.1967, WJ Brown (CNC 1);
MacNab's Island, 2.vii.1914, Entomological Branch (CNC 1);
Newport, vi.11,13.1947, WJ Brown (CNC 4);
Port Maitland, 26.vi.1947, WJ Brown (CNC 4);
South Ohio, vi.30.1947, WJ Brown (CNC 6);

ONTARIO:

Algonquin Park, June.23.1961, T v. Quyuh (UGIC 7);
Almonte, 18.v.1951 "marsh marigold", JF McAlpine (CNC 1);
Arkell, June.6.1956, DH Pengelly (UGIC 1);
Armstrong, 52 mi. S., 27.vi.1973, R Parry & JM Cambell (CNC 5);
Barrie, June.1.1973, RJ Hellewell (UGIC 1);
Beaverly Swamp, 3.vi.1982 "Cornus stolonifera", L LeSage (CNC 1);
Belfountain, 2,9.vi.1975. N Wilcox (UGIC 8);
Bell's Corners, v.17.1962, SD Hicks (CNC 1), 21.v.1982, M Davis (CNC 15), 27.v.1982, M Davis (CNC 3);
Brittania, 17.v.1949, R deRuette (CNC 1);
Bruce Pen, 4.vii.1947, G Steyskal (UCR 2);
Campden, 9.6.1941, SD Hicks (CNC 3), ix.6.41 (AMNH 4), 27.5.1942, SD Hicks (CNC 1);
Chaffey's Locks, 9.vi.81, D Ward (ISAC 3), 25.v.1961, GK Morris (UGIC 1);
Chalk River, 7.vi.1960, HF Howden (CNC 2);
Clinton, May.5.1925, GM Stirrett (CNC 1);
Cochrane, July.13.1973, S Bower (UGIC 1);
Coldstream, v.23.22, AA Weed (CNC 1), v.23.1922, vi.22.1922, AA Wood (CNC 2);
Constance Bay, 7.vi.1965, DD Munroe (CNC 3);
Dorset, P.S., 4.vi.1961, GK Morris (UGIC 1);
Elmira, Salem Creek, 2.xi.1977, L LeSage (CNC 4);
Guelph: following all (UGIC): v.23.1979 KL Bailey (9); v.31.1979 D Lewis (9); v.31.1979 S Beierl (8); v.24.1979 KL Runciman (4); v.21.1977 DN Conture (1); v.16.1977 K Barber (2); 23.5.1979 (15); May.31.1979 KL Bailey (3); June.6.1979 KL Bailey (1); vi.6.1979 D Lewis (3); v.23.1979 D Lewis (1); v.23.1979 S Beierl (4); July.20.1961 T v. Quyuh (1); 28,31/May/1975 GJ Umphrey (3); 26.vi.1978 SM Bell (1); v.23.1978 WA Attwater (1); Boy Scout camp on Caltha palustris June 1977 WA Attwater (1); June.2.1970 DH Pengelly (1); v.23.1979 B Merchant (3); vi.6.1978 M Lichtenberg (2); 14,17.v.1979 L Templin (2); 31.v.1974 RE Roughley (2); v.16.1974 A Konecny (2); May.28.1976 JM Heraty (2); May.28.1976 MJ Sparkey (2); 17.vi.1978 D McCorquodale (1);
Hastings, May.14.1977, JW McCreadie (UGIC 1);
Hastings Co., 12.x.57 (1), 4.vi.1939 (6), JF Brimley (CNC);

Hespeler, June.6.1961, T v. Quyuh (UGIC 4), May.22.1975, N Wilcox (UGIC 1);
Irondale, 15-31.vii.1928, LJ Milne (CNC 1);
Kendal, Durham Co., vi.16.1967, IM Smith (ROMC 1);
Kenny Lake, small pond opp., Algoma Dist., vii.72, AC Ashworth (ASRC 9);
Kearney, 1.5.09, MC VanDuzee Coll'n. (CAS 1);
Kinburn, 14.v.1968, JEH Martin (CNC 8);
Kitchener, June.5.1946, FL Caesar (CNC 1);
"L. Sup. Pk.", May.24.1972, BD Beam (UGIC 1);
Little Current, 9.vii.1961, G Brumpton (CNC 1);
London, W Saunders (UGIC 2);
Maple, June.8.'18, S Logan (ROMC 1);
Marmora, 23.v.1952, JC Mitchell (CNC 12), 20.v.1952, JC Mitchell (CNC 2), 23.v.1952, JR McGillis (CNC 10);
Maynooth, 25.v.1951, JF McAlpine (CNC 10);
Mer Bleue, Ottawa, ix.17.1956, HF Howden (CNC 1), v.7.1928, WJ Brown (CNC 6); 2.vi.1927: CH Curran (CNC 15, AMNH 1), FP Ide (CNC 5), GS Walley (CNC 6); 8.vi.1927, GS Walley (CNC 4); 13.vi.1979, DP Schwert (ASRC 2); 17.ix.1957, HF Howden (CNC 1); 6.vi.1928, JA Adams (CNC 2); 7.vi.1928, GH Fisk (CNC 2); 31.v.1923, CH Curran (CNC 2);
Milton, 28.v.1974, RE Roughley (UGIC 1);
Moffat, Aug.4.1961, T v. Quyuh (UGIC 1);
Moose Factory, 19.vi.1949, PJ Lachaine (CNC 3);
Moossonee, 30.vi.1973, R Parry & JM Cambell (CNC 1);
Newmarket, 27.4.1970, GA Sturgeoner (UGIC 1);
One-Sided Lake, 19.vi.1960, Kelton & Whitney (CNC 1);
Orillia, 28.v.1921, CH Curran (CNC 2), 16.v.1927, CH Curran (CNC 1);
Ospringe, June.'50, SE Brown (UGIC 1);
Ottawa, v.27.1960, HF Howden (CNC 1); no date (ROMC 2); no date W Simpson (CNC 1), 4.vii.12, FG Ouellet (JLLC 1);
Ottawa, Black Rapids, 19.v.1927, WJ Brown (CNC 1);
Oxford Mills, 24.vi.1984, L Huggert (UZIL 1);
Petawawa, Forestry Station, v.28.1959, JR Vockeroth (CNC 4);
Preston, no date (CNC 1);
Priceville, June.3.1958, DH Pengelly (UGIC 1);
"Pr. Edw. Co.", 10.vii.32, JF Brimley (CNC 1), 20.vi.1945 JF Brimley (CNC 1), 5.vi.32, JF Brimely (CNC 1), 7.vi.36, JF Brimley (CNC 4); 2.vi.1937, JF Brimley (CNC 1);
Rainy R. District, 14.vi.1924, JF Brimley (CNC 1);
Renfrew Co., 20.vi.65, JF Brimley (CNC 1);
Rockwood, June.8.1946 "flowers Cornus stolonifera", FL Caesar (CNC 1), 8.5.1946, SD Hicks (CNC 2);
Rushing R. Prov. Park, Kenora Distr., 14.June.1971, ROM field party #710407 (ROMC 1);
Sault Ste. Marie, 5-6.vii.61, G Brumpton (CNC 1);
Sudbury, no date (CNC 1);
Thessalon, 15.vi.1963, RG Brumpton (UGIC 7);
Toronto, 26.vi.1930, LJ Milne (CAS 2); 5.23.1896, RJ Crew (CUIC 1); 6.17.1895, RJ Crew (CUIC 2); no date, RJ Crew (CUIC 3); 16.vi.1928, EC Oakley (ROMC 2);
Toronto, High Park, June.16.1897 (ROMC 6);
Turkey Point Prov. Park, Spooky Hollow, 4.vi.1979, L Masner (CNC 2);
Vermilion Bay, 10.11.1960, Kelton & Whitney (CNC 13);
W. Secretary, Point Au?], 18.x.1945, FIS (CNC 1);

PRINCE EDWARD ISLAND: Glenroy, 26.vi.1985, LeSage & Rochon (CNC 1); Rollo Bay, 26.vi.1985, L LeSage (CNC 2);
QUEBEC: Anc. Lorette, 21.vi.1969, C Chantal (NMDC 1;CLCH 6); Baie James, N. Matagami km. 85, 20.vi.1985, H. Goulet (CNC 4), km. 427, 16.vi.1985, H. Goulet (CNC 9); Campells' Bay, Papineau, 25.vi.80, JL. LaLiberte (JLLC 1); Cap Rouge, 3.vi.64, C Chantal (CLCH 1); Corey Hill, 17,29.vi.1927, WJ Brown (CNC 2); Destor, 2.x.1942, G StaceSmith (CAS 1); Dosquet, 15.vi.1968, C Chantal lot 6 (CDAS 1), 30.v.70, C Chantal (CLCH 1), 13.vi.77, C Chantal (CLCH 1), 24.vi.77 C Chantal (CLCH 1); Dosquet, Lotbinière, 28.v.76 (3), 30.v.70 (1), 10.vi.75 (1), JL LaLiberte (JLLC); Duparquet, 15.vii.40, 5.vi.42, 21.vi.44, G StaceSmith (CAS 3); Ellis Bay, Anticosti Is., July.24.'81 (MCZ 1); Escoumins, 29.vi.81, C Chantal (CLCH 1); Gaspe, 25.vi.1954, WJ Brown (CNC 28); Harrington Lk., Gatineau Pk., 8.vi.1954, HJ Huckel (CNC 2); Ile d'Anticosti, Port Menier, Dupl. 9.vii.73, & (CLCH 1); Ile Orleans, 12.vi.63, C Chantal (CLCH 1); Iles-de-la-Madeleine, Portage du Cap, 6.vii.1985, Typha/Carex swamp. L. LeSage (CNC 3); Iles-de-la-Madeleine, Havre-Aubert, 30.vi.1985, L. LeSage (CNC 2); Joliette, vi., (UAE 1); Kazubazua, 6-10.vi.1927, WJ Brown (CNC 4); Knowlton, 21.vii.1929, LJ Milne (CNC 3), 5.vi.1930, LJ Milne (CNC 1), 14.6.1928, WJ Brown (CNC 20), 12.6.1928, WJ Brown (CNC 6); 12.vi.1928 (1) 28.vi.1928 (1), JH Fisk (CNC); 13,14,29.vi.1928, JA Adams (CNC 3); Knowlton's Landing, 18.6.1928, WJ Brown (CNC 1); Lac Cache, 20.vi.1987, C. Chantal (CLCH 2); Lac Lois, (Abi.), 5.vii.1978, L LeSage (CNC 1); L. Pinks, Parc Gatineau, 4.vi.1980, L LeSage (CNC 1); Lac Renaud, Parc Gatineau, June.25.1975, R Sexton (UWAT 1); Lac Trs. Saumons, L'Islet, 11.vi.66, (1), 23.vi.1958 (1), C Chantal (CLCH); Lac Taylor, Parc Gatineau, June.15.1975, Aug.6.1976, R Sexton (UWAT 3); Laniel, 23.vi.1971, EC Becker (CNC 3), 1.vi.1963, LA Kelton (CNC 1); Lavaltrie, vi.24.19, LS Slevin Coll'n (CAS 1); Limbour, Touraine, 6.vi.1973, R Sexton (CNC 1); Magdalen Is., 7. Liebeck Coll'n. (MCZ 2); Montreal, 20.vi.02, F Knab Coll'n., (USNM 2), vi. (UAE 1); Mt. Lyall, 19.vii.1933, 1500', WJ Brown (CNC 1); Natashquan, 1,5.viii.1929, WJ Brown (CNC 2); Parke Reserve, Kam. Co., 4.vii.1957, GE Shewell (CNC 4); Pte.-du-Lac, St.-Maurice, 8.vi.68 JL LaLiberte (JLLC 2), 8.vi.68, C Chantal (CLCH 1); Potton Springs, Jly.1-4.'20, PG Bolster (MCZ 1), 4.vi.1928, JA Adams (CNC 1); Riv. Ecorces, 1.vii.67, C Chantal (CLCH 1); Riviere-du-Loup, 21.v.1983, L LeSage (CNC 1); St. Catherine, Port., 16.vi.68, (4), 29.v.60 (2), C Chantal (CLCH); Saint-Cyrille (Drummond), 22.v.1981, L LeSage (CNC 8);

St.-Etienne, Lévis, 22.vi.74, JL LaLiberte (JLLC 5), 7.ix.80, Piétinage marais, (2), 1.vi.74 (1), 4.vi.72 (1), 11.vi.72 (1), 6.vi.81 (1), 6.vi.72 (1), 3.vi.74 (1), C Chantal (CLCH);
St. Jerome, vi.25.1961, JC Aube (NMDC 1);
St.-Maynard, Portneuf, 3.vi.62, JL LaLiberte (JLLC 1);
Ste. Croix, 4.vi.1969, JC Aube (NMDC 1);
Sainte-Foy, 26.vi.1966, C Chantal (CDAS 2;CLCH 4); 19.vi.66, C Chantal (CLCH 1); 9.vi.34 (2), 12.vi.32 (1), 28.vi.33 (1), 17.vii.35 (3), JL Laliberte (JLLC);
Sept-Iles, 17.vi.1987, C Chantal (CLCH 1);
Thunder River, 17-28.vi.1930, WJ Brown, (CNC 15);
Villeroy "Lth", 10.vi.67, C Chantal (CDAS 1;CLCH 5);
Wakefield, 13.vi.1948, SD Hicks (CNC 1);
Woburn, 19.vi.1923, CH Curran (CNC 2);
Miscellaneous: "Quebec" (ROMC 1);

SASKATCHEWAN:
Bainbridge, 25.vi.1985, R Hooper (SPMC 1);
Big Sandy Lake, 30.vi.1970, RR Hoooper (SPMC 1);
Deschambault Lake, 2.vii.1970, RR Hooper (SPMC 2);
Fox Creek, 20.vi.1975, D Larson (MUIC 1);
Hwy.165, 66 km. W. jct. #2, 27.vi.1985 lot 1, BF & JL Carr (CARR 2);
Jct. Hwy.#2 & 165W, 27-30.vi.1985, C & A v.Nidek (CVNC 35), 2.vii.1985, lot 1 (2), 28.vi.1985 lot 5 (1), lot 3 (2), 29.vi.1985 lot 2 (2), 22.vi.1985 lot 1 (3), BF & JL Carr (CARR);
La Ronge, 21.vi.1985, lot 3 (1), 25.vi.1985 lot 6 (4), BF & JL Carr (CARR); La Ronge, Lac la Ronge, 17-26.vi.1985, C & A v.Nidek (CVNC 7); 105 km.N. La Ronge, Hwy.102, 23.vi.1985, C & A v.Nidek (CVNC 1);
McDougal Creek, 17.vi.1975, D Larson (CNC 1, MUIC 3);
McDougal Creek at Hwy.#120, May.31.1977, DH Smith (SPMC 5);
Nemeiben Lake, n. La Ronge, 14-17-vi.1985, C & A v.Nidek (CVNC 3);
Prince Albert, 100 km.N., 7-10.vi.1985, C & A v.Nidek (CVNC 1);
Puskwakan River at Hwy.#106, July.17.1975, DH Smith (SPMC 1);
Scarth R., 18.vi.1975, D Larson (MUIC 1);
Smeaton, 2/7.1968, "Balsam Spruce" (NFRC 1);
Tp.15, Rge.10, W.2 Mer., 8.vii.1985 lot 4, BF & JL Carr (CARR 9);
Tp.56, Rge.27., W.2. Mer, 21.vi.1985 lot 2 (1), lot 5 (5), BF & JL Carr (CARR);
Tp.64, Rge.11., W.2. Mer, 8.vii.1985 lot 2, BF & JL Carr (CARR 2);
Waskesiu at Hwy.#2, 21.vi.1985 lot 2, BF & JL Carr (CARR 3);
Weyakwin, 20 km.s., 29.vi.1985, C & A v.Nidek (CVNC 3);

U.S.A.:
CALIFORNIA:
Alpine Co: Luther Pass, vii.8.1934, WK Thraikill (UIM 6), 12.vii.1982, WH Tyson (CDAS 3);
Woodfords, vi.20.57, vi.17.1959, "swept fr. grass", RP Allen (CDAS 3);
Butte Co.: Cherryhill Campground, 5 mi. NE Butte Meadows, 24-27.v.1974, FG Andrews (CDAS 26);
El Dorado Co.: Blodgett For., 13 mi. E. Georgetown, vi.19.67, RL Stoltz (UIM 3), vi.25.67, AJ Gilbert (CDAS 4);
Peavine Camp, vii.6.53 (MSUE 3);
Peavine Creek, Sec.12, T11N, R14E, vii.6.53, HA Hacker (MSUE 1);
Yellow Jacket Camp, 7 mi. S., 29.June.80, on Veratrum californicum, LG Bezark (ISAC 34);

Tallac, July, Fenyes Coll'n (CAS 1), viii.1899, Van Dyke Coll'n. (CAS 2);
County Records: "El Dorado Co.", vi.7.77, MA Ivie (MTSU 2);
Fresno Co.: Cherry Gap nr. Hume, vii.17.1952, Cazier, Gertsch, & Schrammel collrs. (AMNH 2);
Huckleberry Meadow, 6500', July.11,25.1912, R Hopping Coll'n (CAS 3);
Huntington Lake, vi.14.1977, Gilbert & Griffin (CDAS 7);
County records: vii.26.19, 8000 ft., Nunenmacher (FMNH 1), 6.21.EF Scott (CDAS 1);
Glenn Co.: Plaskett Mdw. Sta., 30.vi.1964, DC Reutz (CAS 1);
Humbolt Co.: Blocksburg: BP Bliven Coll'n., (CAS): June.11.'33 (1), June.18.'33 (3), May.21.'33 (1), May.13.'33 (1), v.30.'37 (1), v.3.'36 (3), Apr.8.'34 (1);
Eureka, 22.5.PHS Barber (USNM 1);
County Records: iv.25.11, Nunenmacher (FMNH 1);
Lassen Co.: Facht, vi.5.21, JO Martin (CAS 7, AMNH 2);
Manzanita Lake, Lassen N.Pk., vi.10,13.41, AJ Walz (UIM 2), 6.14.41, HP Chandler (CAS 1);
Susanville, 17 mi.NW, 17.June.1974, DR Harris (CDAS 1);
Los Angeles Co.: County Records: M Albright (LACM 3);
Madera Co.: Chilkoot Lake, 1 air mi. W., 7120', 10.viii.1971, HB Leech (CAS 1);
Northfork, v.31.1920, H Dietrich (USNM 1), 15.vi. (UMMA 4, CNC 3, INHS 3), v.23.1920, H Dietrich (CUIC 1);
Marin Co.: Keyhoe Beach, Tomales Bay, 5.12.57, D Giuliqni (CAS 3);
Mill Valley, v.1.1955, PH Raven (CAS 1);
County Records: (CAS 1);
Mariposa Co.: Miami Ranger Sta., vi.4.1942, AJ Walz (UIM 1);
Wawona, iii.6.1942, "Eriogonum", (CDAS 1);
Yosemite Nat. Park: Big Meadows, 3800-4000', vi.1.1938, W Frinfrock (CAS 1), v.25.1938, vi.1.1938, C.T. Sierra (CDAS 22);
Chinquapin, 9 km.E. 17.vi.1945, BE White (CAS 7);
Ilelouette, Yosemite, 7'15. HG Champion (BMNH 2);
Yosemite Valley, v.22.1922, Van Dyke (CAS 2);
Modoc Co.: County Records: Van Dyke Coll'n (CAS 3);
Napa Co.: Pope Valley, 1.Apr.1975, JB Johnson (MSUE 1);
Nevada Co.: Grass Valley 4000', 5/4/46, HP Chandler (CAS 1), 17.v.1966, RP Allen (PUL 1);
Hobart Reservoir, 1 mi. NNW of Hobart Mills, 20.June.80, DR Harris (CDAS 3);
Sagehen Crk., 05.viii.1971, DP Levin (LACM 1), 15.vii.1970, DS Chandler (LACM 1), 14.vii.1962, RL Wescott (LACM 1), 30.vi.1962, RL Wescott (LACM 3), 19.June.1985 (SMCL 3);
Sagehen Crk, nr. Hobart Mills, 25.vi.1954, SW Hitchcock, (UCS 1);
Truckee, vi.11.1939, CT Sierra (CDAS 6);
County Records: 5.17.18, ER Leach (CAS 1);
Placer Co.: Gold Run, v.1.76, MA Ivie (MTSU 3);
Floating I., L. Tahoe, vii.1899, Van Dyke Coll'n. (CAS 1), 12.vi.1930, 6300', AT McClay (WEEM 1);
Forest Hill, iv.1898, Van Dyke Coll'n (CAS 5);
Lake Tahoe, vi.1900, Van Dyke Coll'n (CAS 1);
County Records: Blanchard Coll'n (MCZ 3), Liebeck Coll'n (MCZ 3), FA Eddy Coll'n (MCZ 1), Van Dyke Coll'n (BPBM 1, CAS 3), Schffr. Coll'n (USNM 1), CA Fox (CAS 1), v.20.18, ER Leach coll'n (CAS 1), R Hopping Coll'n (CAS 1), June 7,4.1913, EJ Branigan (CDAS 5);

Plumas Co.: Benner Creek, 6 mi. NW of Chester, 11.June.65, TL Erwin (SJSU 1);
Cromberg, vi.7-12.1973, FL Blanc (CDAS 2);
Quincy, 18.v.1939, coll ex grass, WW Wiard (CDAS 1);
San Fransisco Co.: Lake Merced, (CUCC 2), iv.29.08, Van Dyke Coll'n (CAS 1);
San Fransisco: 11.iii.1910, Van Dyke Coll'n. (CAS 1), x.11., Blaisdell in Liebeck coll'n (MCZ 2);
County records: Mch.26.1915, R Hopping (CAS 1); Dec, FE Blaisdell (CAS 3); Apr., Koebels Coll'n (CAS 2);
San Mateo Co.: San Bruno, iv.14.1937, Cushner (MCZ 1), 16.v.1957, Cushner (CAS 3);
San Bruno Mts., v.30.57, D Rentz (CAS 5);
Shasta Co.: Harrison Gulch R.S., N.Fork Beegum Mtn., vi.7.75, RE Somerby (CDAS 2);
Killark P.H., Whitmore 3000', 13.v.1949, HP Chandler (CAS 1);
Viola, 4 mi.W, v.20.41, Pinus ponderosa (UIM 1);
County Records: Frost Coll'n (MCZ 2), ER Leach (CMP 4), Schffr coll'n (USNM 1);
Siskiyou Co.: Bartle, vi.18.1942, WM Pearce (CAS 2);
Dunsmuir: July.1974, E Giesbert (LACM 1), F Blanchard Coll'n (MCZ 6), Liebeck Coll'n (MCZ 1), Wickham (INHS 4, USNM 2, UMMA 3), JA Kusche (CAS 4), (CDAS 1);
Tate, 23.vi.1954, 3500', HP Chandler (CAS 1);
Young's Valley, July.4.1971, 4600', E Angaard (CDAS 1);
County Records: Liebeck Coll'n (MCZ 2);
Sonoma Co.: Bodega Bay, 24.v.1969, DP Levin (LACM 1);
Forestville, marsh nr., v.14.55, PH Raven (CAS 2); Sonoma, (LACM 1);
Vic. Rohnert Park, vi.16.1983, AJ Gilbert (CDAS 4);
County Records: (DEFW 2);
Trinity Co.: Carrville, 4,10,29.vi.1913, Van Dyke Voll'n (CAS 9), vi.10 (USNM 1);
Eagle Creek, v.28.1949, AT McClay (AMNH 3);
Junction City, v.13.1973, TR Haig (CDAS 5);
Plummer Springs, 2.vi.18 (CNC 1, UADB 1), vi.1,2.18, R Hopping Coll'n, (CAS 13), vi.2.18, Schffr Coll'n (USNM 4), vi.2.18, Liebeck Coll'n (MCZ 3);
Trinity R. Camp, vi.1.1951, AT McClay (AMNH 1), vi.3.1951, AT McClay (AMNH 5);
Weaverville, vii.2.1975, "ex Thistle", EL Paddock (CDAS 2);
Tulare Co.: Bass Lake, 24.iv.27 (CNC 1);
General Grant Park, 7.Jan.35, AL Melander (MCZ 2);
Giant Forest: 22.Aug.'17 (CUIC 1), 7.21.'53, A & H Dietrich (CUIC 18);
Kings Canyon, 7.4.56, CS Papp (LACM 1);
Round Meadow, July.1-15.05, R Hopping Coll'n. (CAS 4, FMNH 2);
Grants Park, 7.29.23 (SDNH 2), 10.vi.28 (CNC 1);
Mtn. Meadow Rch., head Coffee Ck., 8-10/vii.1969, 5100', D Levin (LACM 1);
Quaking Aspen, 7.12.79, Scirpus macrocarpus (CDAS 3);
Sequoia, 27.June.1960, Faulkner (SDNH 6);
Sequoia Lake, 19.vi.27 (CNC 1);
Sequoia Nat. For., 7.3.56, CS Papp (LACM 1);
Sequoia National Park: 6500', 22.July.1953, A & H Dietrich (CUIC 4, AMMNH 2), 5000-7000', 19.vi.1929, AT McClay (WEEM 1), 3000-5000', vi.24.37, AT McClay (MCZ 1);

Crescent Meadows, 7000-9000', June.19.1929, Van Dyke Coll'n (CAS 28, BPBM 1);
Horseshoe Meadow, 22.vi.67, Stecker & Martin, (SJSU 2);
Whitaker For., 26.69, Stecker & Martin, (SJSU 1);
Trinity Center, 8 mi.S. May.17.1953, RK Benjamin (INHS 1);
Tuolumne Co.: Coffee Creek, Big Flat, vi.23.31, Van Dyke Coll'n (CAS 6);
Strawberry, vi.19.51, JL Maliars (CDAS 1), 20.vi.1951 (1), 21.vi.1951 (2), 23.vi.1951 (3), 25.vi.1951 (3), EL Silver (LACM);
County Records: vi.1891, Van Dyke Coll'n (CAS 1);
Localities Not Found: Cole, 3.July.04, A Fenyes (CAS 1);
Davis Meadow, R.R. Flat, 2800', June, Blaisdell-Letcher (CAS 1);
Deer Ck. Meadow, Chico-Chester Rd., 6.17.56, PS Bartholomew (CAS 3);
Millwood, v.12.30 (UAE 3);
Placerville, 6.'15, HG Champion (BMNH 2);
Platte Cañon, 9.v. (USNM 1);
Shasta Springs, v.23 (USNM 1);
Sugar Pine, A. Fenyes (CAS 1);

COLORADO:
Boulder Co.: Boulder, v.28.24 (CUIC 1);
Boulder,5800', June.5.1961, BH Poole (CNC 7);
Boulder, 6 mi. W., 7000', 7.June.1963, Vogel & Lanham (UCM 9);
Longs Pk. Inn. 9000 ft., 13,15.vii.1926, Van Dyke (CAS 4);
Lyons, 5000', vi.25.62, R & K Dreisbach (MSUE 1);
Muskee L. N. of Nederland, 23.vi.1939, UN Lanham (UCM 1);
Routt Co.: Steamboat Springs, 6800', x.1.1944, Bryant (CAS 3);
Weld Co.: Riverside, 4 mi. E. Raymond, vii.6,8.1962, GH Nelson (CDAS 2);
Localities not found: Rocky Mountain Nat. Park 9000', FE Winters (CAS 1), July, FE Winters (CAS 1), no date (BMNH 3); 8700', Glacier Basin, 1.vii.37, Van Dyke Coll'n (CAS 2), 1.vii.37, Andrews (MCZ 6); near Fall R. entrance, circa 8000', vi.16.1959 , GE Ball & family (UAE 3);

CONNECTICUT:
New London Co.: Groton, no date (UZIL 2);
Tolland Co.: Storrs, X.13.1979 (UVDZ 1);

IDAHO:
Adams Co.: New Meadows, 9 mi. N., vi.7.76, DF Veirs (UIM 1);
Bear Co.: 26 km.NE ofJct. Hwy.34 & 36, 21.vi.1986, BF & JL Carr (CARR 5);
Bear Lake Co.: Liberty, 4 mi. NW, 15.vii.1976, WT Hanson (EMUS 1);
Boise Co.: Gardena, 23.v.1986, BF & JL Carr (CARR 3);
5 km.N. Gardena, 23.v.1986, C & A v.Nidek (CVNC 3);
Bonner Co.: Pack River, 11 mi. NE of Sandpoint, v.18.66, WF Barr (UIM 2);
Priest River, 11 mi. N., v.5.1966, MA Brusven (UIM 1(;
Priest River Exp.For., vi.2.1959, WF Barr (UIM 4);
Saddle Cr, 2 mi. N Priest Lake, v.5.66, MA Brusven (UIM 1);
Sandpoint, 19.vi.1973, NM Downie (PUL 1), 6.17.1974, NM Downie (NMDC 1);
Schweitzer Basin, 1500m., vii.4.1983, NM Downie (NMDC 1);
Cassi Co.: Basin, 4 mi. E. Fairchild Creek, vi.19.1961, JE Henry (UIM 1);
City of Rocks, vi.23.1978, ST Rose (UIM 2);
Elba-Basin Pass, vi.22.1959, WF Barr (UIM 1);
Hereford g.s., iv.13.66, EJ Allen (UIM 1);

Clearwater Co.: Elk River, v.19.63, WF Barr (UIM 5, OSUC 3);
1 mi. N. Elk River, 26.may.1985, RS & VL Zack (WSU 2);
Elmore Co.: Dixie, vi.10.60, BA Foote (UIM 3, SJSU 1);
Franklin Co.: Club River Canyon, Thomas Spring, 12.vi.1973, Knowlton & Hanson (EMUS 4);
Fremont Co.: Cave Falls Rd., Targhee Nat. For., 12 km. W. Wyo. border, 17.vi.1986, BF & JL Carr (CARR 2);
Warm River Cpgrd., 16.vi.1986, BF & JL Carr (CARR 2);
Warm River Springs, 11.vi.1986, C & A v.Nidek (CVNC 5);
Idaho Co.: Whitebird, June.30.1907, JM Aldrich (UIM 3);
Kootenai Co.: Cataldo, 2 mi.W., v.21.70, WF Barr (UIM 9);
Twin Lakes, v.21.1970. WF Barr (UIM 1);
Latah Co.: Deary, vi.25.1962, RE Stecker (SJSU 1);
Juliaetta, 5.16.1936, 1083' alt., RE Miller (UIM 1), no date, H Klages Coll'n (CMP 1);
Laird Park, vii.3.1962, RE Stecker (SJSU 1);
Lemhi Co.: Baker, 1 mi. e., vi.21.1966, DS Horning (UIM 1);
Nez Perce Co.: Myrtle, iv.28.1961, RE Stecker (SJSU 1);
Webb, v.5.1970, WF Barr (UIM 4);
Owyhee Co.: Murphy Hot Sprgs., vi.20.1965, Barr, Westcott & Hawkins (UIM 24);
Shoshone Co.: Clarkia, vi.19.1949, AJ Walz (UIM 1);
Teton Co.: Tetonia,4 mi.w., vi.23.1964, WF Barr (UIM 2, OSUC 1);
Twin Falls Co.: Rock Creek R.S., 19 mi. S., Rock Crk. Canyon, vii.19.1952, WF Barr (UIM 10), July.18.1952, Malkin & Barr (OSUC 2);
Rock Creek R.S., Magic Mtn., 6400', July.18,19.1952, Malkin & Barr (FMNH 3, SJSU 1);
Valley Co.: Cascade, 23.v.1986, BF & JL Carr (CARR 1);
Cascade, 2 mi. NE, vi.10.1967, EJ Allen (UIM 1);
Cascade, 3.3 mi. NW, vi.10.1967, LS Hawkins (UIM 10);
McCall, June.24.1938, MC Lane (OSUC 14, UIM 4);
Warm Lake, vi.25.1959, WF Barr (UIM 1);
Zena Creek, vi.14.1966, RL Penrose (UIM 1);
Localities not found:
Cub River Canyon, S. Idaho, Jul.11.53, Knowlton, Hanson & Cross (OSUC 1); 11 mi. N. of W.Springs, 8.3.50, Dreisbach & Schwab (MSUE 1);

ILLINOIS:
LaSalle Co.: Starved Rock State Park, iv.18.1971, "on marsh marigold", Reaver & Hollander (FMNH 52);

INDIANA:
Noble Co.: County Record: May.1965, ES Sangstad (NDSU 1);

MAINE:
Aroostook Co.: Ashland, 18.June.1967, "sphagnum bog", AE Brower (UNH 3);
Fort Kent, June.16, AE Brower (UNH 1);
Madawaska June.8, AE Brower (UNH 1);
Umsaskis Lake, T11,R12, vi.9.78, GA Dunn (UNH 4);
Cumberland Co.: Brunswick, 27.Jun.75, Mann (MCZ 1);
Franklin Co.: County Record: vii.'24 (AMNH 5);
Hancock Co.: Bar Harbor, June.1936, AE Brower (UNH 2);
Kennebec Co.: Wayne, 3.June.1967, AE Brower (UNH 2);
Lincoln Co.: County Record: July.1946, S Emslie (AMNH 1);
Oxford Co.: Aziscoos Lake, vii.8.16, CA Frost (MCZ 1);
Bethel, 11.vi.1924, JG Gehring (MCZ 4);
Norway, 1864-65, SI Smith (PMY 3);

Penobscot Co.: Millinocket, Oct.4.1940, AE Brower (UNH 1);
Orono, 11.vi.'87 (UNH 1),v.1965 (INHS 3), vi.1920 RJ Sim (RUNB 4, CMP 4), vi, RJ Sim (MCZ 7), 31.May.1914, HM Parshley (MCZ 1), 14.vi.1971, S Malcolm (UCS 1);
Orono, 4 mi. W., v.28.1982, "sweep vegetation" DS Chandler (UNH 1);
Passadumkeag, vi.10.1939, LP Grey (CAS 2);
Springfield, June.8.1946, "beaten from fir" (UNH 1);
Piscataquis Co.: Capens, vii.11.1907 (CAS 1);
Greenville, vi.16.21, CA Frost (USNM 2);
Kineo, June, A Fenyes Coll'n (CAS 1);
Sommerset Co.: Fairfield, "treading in small pond", RE Nelson (RNEL 11);
44.594°N, 69.699°W, 25.xii.1982, RE Nelson (RNEL 1);
Washington Co.: E.Machias, June, A Fenyes coll'n (CAS 1);
Enfield, vi.11.1939, B Potts Coll'n (CAS 5);
Meddybemps, 22.vi.22, RJ Sim (CMP 1), 7.17.22, RJ Sim (MCZ 1);
Round Pond, MoorHorn Wild, AC Ashworth (ASRC 2);
Whitneyville, June.5. (UNH 1);
Localities not found: Duck Lake, June.22.'35, N Hill (MCZ 1);
Grafton, June.7, AE Brower (UNH 1);
Guerette, vi.23.44 (UNH 1);
Lincoln Tract, vi.5.71 (UNH 2);
Tim Pond Plantation, vi.22.22, CA Frost (MCZ 4), 22.vi.1922, "spikes of Mayola flowers" CA Frost (CAS 1), 23.vi.22 "spikes of Mayola flowers" CA Frost (CUIC 1);
Wales, vii.10.13, CA Frost (MCZ 1);

MASSACHUSETTS:
Barnstable Co.: Woods Hole, AL Melander (WSU 1);
Hampshire Co.: Cummington, May.30.1903, F Knab (USNM 6, AMNH 1);
Middlesex Co.: Cambridge, vi.11.1923 (MCZ 1);
Holliston, v. (UMMA 2);
Lexington, v.22.'24 (RUNB 1);
Sherborn, AP Morse coll'n (MCZ 1);
Wilmington, v.31.25, CA Frost (MCZ 1);
Norfolk Co.: Brookline, Blaisdell coll'n (CAS 1); no date (CMP 1);
Milton, 17.v.1903 (UADB 3, MCZ 1, BMNH 2), May (MCZ 1);
Milton, Blue Mille, May.31.1941, H Clench (MCZ 1);
Suffolk Co.: Boston, May (WSU 1);
Dorchester, Jun.17.1907, PG Bolster coll'n. (MCZ 1);
Miscellaneous: "Mass" JW Green coll'n (CAS 1); "Mass. U." (MCZ 1);

MICHIGAN:
Alger Co.: Stoney Creek, 13.June.1977, Flynn & Mahar (MSUE 1);
County records: 6.19.55 (3), vi.6.59 (1), vi.5.46 (1), RR Dreisbach (MSUE); vii.4.46 RR Dreisbach (UMMA 1);
Antrim Co.: County Records: 5.29.50, RR Dreisbach (MSUE 1, UMMA 1);
Baraga Co.: Ogemaw River, 8 mi. S. L'Anse, 10.July.1964, RB Willson (MSUE 3);
Charlevoix Co.: Beaver Isl., June.15.1926, S Moore (UMMA 8);
County Records: 5.28.55, RR Dreisbach (UMMA 1, AMNH 2, MSUE 1);
Cheboygan Co.: Topinabee, 4 mi. N, 2.vii.1962 C Brivio (PIME 3);
County Records: 6.3.57. RR Dreisbach (AMNH 1, MSUE 1, UMMA 1); 10.viii.1952, PJ Spangler (WEEM 1); 30.vi.1952, I Kraeger (WEEM 1);
Chippewa Co.: Sault St. Marie, 14 mi. S., 12.June.1977, Flynn & Mahar (MSUE 2);
nr. Trout Lake, 4-5.June.1977, DK Young (EGRC 5);

White Fish Point, L.S., Hubbard & Schwarz (USNM 8), (UVDZ 1);
County Records: vi.7.59, RR Dreisbach (UMMA 1);
Clare Co.: County Records: RR Dreisbach: 6.11.44 (UMMA 1, MSUE 1), v.16.51 (MSUE 2, AMNH 1), 5.18.58 R & K Dreisbach (MSUC 1);
Clinton Co.: T5N, R4W, sec.14, May.28.1967, RJ Martinat (MSUE 1);
Crawford Co.: Frederic, May.21.1955, RL Fischer (MSUE 1);
Delta Co.: Escanaba, Jun.24.1958, RA Scheibner (AMNH 4, MSUE 235); Jun.27.1958, RA Scheibner (MSUE 18);
County Records: vi.11.60, R & K Dreisbach (MSUE 1);
Emmet Co.: County Records: 5.27.60, R & K Dreisbach (MSUE 1);
Gladwin Co.: County Records: RR Dreisbach (MSUE, all): 6.25.50 (2), v.24.59 (1), 5.25.35 (2), 1.4.49 (1);
Gogebic Co.: Bessemer, 5 mi.S., 22.June.1964, RB Willson (MSUE 1);
Hwy. U.S. #2, 6.5 mi.E. Jct. US#2 & M-64, vi.23.1973, IJ Cantrall (UMMA 1);
County Records: 6.29.55, RR Dreisbach (UMMA 1); 6.15.60, R & K Dreisbach (MSUE 1);
Grand Traverse Co.: County Records: 5.27.50, RR Dreisbach (UMMA 1, MSUE 3);
Gratiot Co.: County Records: 5.25.58, R & K Dreisbach (MSUE 2, AMNH 2, UMMA 1);
Houghton Co.: County Records: 6.20.60, R & K Dreisbach (MSUE 1);
Iron Co.: Golden Lake, 19.June.1964, RB Willson (MSUE 2);
County Records: 6.13.60, R & K Dreisbach (MSUE 1);
Kalkaska Co.: County Records: 5.28.50, RR Dreisbach (MSUE 2, AMNH 1, UMMA 1); 5.26.57, R & K Dreisbach (MSUE 1); 5.24.54, RR Dreisbach (MSUC 2);
Keweenaw Co.: Ahmeek, 8.July.1964, RB Willson (MSUE 1);
Copper Harbour, June.19.1957, RW Hodges (MSUE 8), vi.25.1940 CW Sabrosky (MSUE 4);
Isle Royale, 25.June.1965, DE Bixler (MSUE 11); no date (MCZ 1); July.24.1957, RW Hodges (MSUE 3);
Isle Royale: Benson Creek, 26.June.1964 (16); Daisy Farm, 27.June.1964 (6), McCargo Core, 2/July.1964 (2), RB Willson (MSUE); Mt. Ojibway, 21.June.1965, DE Bixler (MSUE 1);
Mohawk, Gratiot River, 7.July.1964, RB Willson (MSUE 1);
Mackinac Co.: Hessel, 10 mi. W., 12.June.1977, Flynn & Maher (MSUE 1);
Naubinway, June.7.1922, S Moore (UMMA 7);
St. Ignace, June.26.1927, (1), May,30.1922 (3), S Moore (UMMA);
T43N, R12W, Sec.22, 29.May.1964, RW Husband (MSUE 1);
County Records: R & K Dreisbach: 6.7.57 (UMMA 1, AMNH 4, MSUE 1), vi.4.59 (MSUE 2), vi.7.60 (MSUC 1);
Marquette Co.: Huron Mountain Club, Cranberry Bog, 10-15.June.1974, Young & Arnold, (EGRC 1);
Midland Co.: County Records: 6.9.35, RR Dreisbach (MSUE 1);
Oakland Co.: Bloomfield, May.1.1930 (13), May.13.1928 (5), S Moore (UMMA);
Cooper Woods, May.1.1927, S Moore (UMMA 9);
County Records: v.6.1928, AW Andrews (AMNH 3, MSUE 2,); v.4.29 (UMMA 2, SDNH 4); v.23.1928 (1), vi.22.24 (1), AW Andrews (UMMA);
Ontonagon Co.: Bruce Crossing, 5 mi.N., 23.June.1964, RB Willson (MSUE 4);
Osceola Co.: County Records: v.10.41 (UMMA 1); RR Dreisbach: 5.23.53 (AMNH 1, 5.27.50 (MSUE 3), v.21.38 (MSUC 2), 6.14.52 (MSUC 1), v.16.51 (MSUE 1);

Roscommon Co.: Houghton Lake, v.21.1955, RW Hodges (MSUE 4);
County Records: .vii.13.1943, AW Andrews (UMMA 1); R & K Dreisbach: 5.31.57 (UMMA 1, MSUE 1); 5.26.57 (MSUC 2, AMNH 1); 5.18.58 (AMNH 2, MSUE 2);
Schoolcraft Co.: Manistique, June.10.1923, S Moore (UMMA 3);
T42N, R16W, Sec.14, 19.June.1969, RJ Martinat (MSUE 2);
County Records: 4.vii.47 (1), 6.18.55 (1), RR Dreisbach (UMMA); R & K Dreisbach: 6.24.60 (1), vi.5.59 (2), vi.8.60 (3) (MSUE);
Washtenaw Co.: County records: 11.vi.1923, MH Hatch (OSUC 1);
Wexford Co.: County Records: RR Dreisbach: 5.14.55 (UMMA 1, AMNH 2, MSUE 1), 4.14.57 (MSUE 3);

MINNESOTA:
Clearwater Co.: Itasca State Park: June.22.1960, A. Raske (CNC 3); 30.v.1936 AB Gurney (DEFW 1); 31.v.1941 Hageman (DEFW 1); 15.vi.1937 HR Dodge (DEFW 1); 22,24.vi.1954 CS Li (DEFW 2); 29.v.1942 JH Hughes (DEFW 4); 20.vi.1957 FW Stehr (DEFW 2); 24.vi.1961 (DEFW 1); 31.v.1928 B & LW Orr (DEFW 12); 2.vi.1931 LW Orr (DEFW 1); 18.vi.1928 LW Orr (DEFW 1); 1.vi.1936 R Cottrell (DEFW 1); 22.June.1960 R Gunderson (SCSU 2); vi.24.68 R Gunderson (SCSU 1); vi.25.68 R Gunderson (SCSU 1); vi.23.68 R Gunderson (SCSU 1); vii.2.68 R Gunderson (SCSU 1); Jun.23.1937, "sweeping swale", HR Dodge (WSU 2);
Cook Co.: County Record: 20.vi.1924 (DEFW 1);
Crow Wing Co.: Jenkins, v.22.1952, on flowers of Caltha palustris, RL Fischer (DEFW 2);
Hennepin Co.: County Record?: "tamarack swamp", 20.v.1922 Wm.E. Hoffman, AA Nichol (DEFW 3);
Lake Co.: Isabella, 8 mi.s. ix.14.1979 R Gunderson (SCSU 1), 5 mi.e. 7.1.1979 R Gunderson (SCSU 2), 5 mi.e. vi.27.1976 R Gunderson (SCSU 5), 5.5 mi.e. 7.1.1979 R Gunderson (SCSU 3), 1.6 mi.e. 6.30.1979 R Gunderson (SCSU 1);
Ramsey Co.: St. Paul, Battle Creek, 20.v.1922, WmE Hoffman (DEFW 2);
St.Louis Co.: Duluth [no date] (INHS 1);
Duluth, Chester Park, 10.2.1963 "damp soil", K Lundmark (SCSU 1);
Eaglesnest, May.25.1959, 5.31.1961, 6.10.1959, WV Balduf (INHS 3);
Eaglesnest, (Ely) 6.vi.1962, WV Balduf (INHS 1);

NEVADA:
Washoe Co.: Incline Village, vii.9.1964 WK Thrailkill (UIM 2);
Crystal Bay, 3 mi.N., vi.14.64 Smith & Baker (OSUC 1);
Miscellaneous: "Nev." F.A. Eddy Coll'n. (MCZ 2);

MONTANA:
Flathead Co.: Bigfork, 3000', June.13.1967, L Russell (MTSU 1);
Glacier N.P., Fish Creek Camp 4200', July.23.1967, L Russell (MTSU 1);
Gallatin Co.: Bozeman, June.13.1903, 4400' (MTSU 1);
Missoula Co.: Lolo, 3400', June.26.1967, L Russell (MTSU 1);
Seeley L. 3500', June.15.1967, L Russell (MTSU 5);
Ravalli Co.: Stevensville 3400', June.28.1967, L Russell (MTSU 1);

NEW HAMPSHIRE:
Carroll Co.: Intervale, vi.28.1926, SA Shaw (UNH 1);
Bretton Woods, 6.30.09, Van Duzee (CAS 4), vi.14.1924, SA Shaw (UNH 1);
Colebrook, vi.7.1973, DJ Corey (UNH 1);
Gorham, vi.1.41, EL Bell (AMNH 1);
Mt. Washington, 1874, Van Duzee (MCZ 2); vi.24.1913 (MCZ 1); no date (MCZ 1); June.3-6.1886 (MCZ 1); summit of, 6239 ft., vii.1-10 (MCZ 2);
Pittsburg, vi.22.1954, RL Blickle (UNH 2);

Coos Co.: Beaver Brook Falls, 3 mi.N.E. Colebrook, v.28.1986, DS Chandler (UNH 5);
Hurlbert Swamp, 4 mi.E. West Stewartstown, vi.12.1986, DS Chandler (UNH 2), v.28.1986, DS Chandler (UNH 1);
Moose Falls Cpgd., NW Second Connect. Lake, vii.23.1986, DS Chandler (UNH 1);
Norton Pool, 3 mi.NE East Inlet Dam, vii.9.1986, DS Chandler (UNH 1); 4 mi. NE Pittsburg, Black Lake Road, v.27.1986, DS Chandler & JF Burger (UNH 2);
Coos & Grafton Cos.: White Mtns, no date, G. Dimmock (MCZ 2), no date, Woods (MSUE 2);
Grafton Co.: Franconia, AT Slosson, (AMNH 3);
Hanover, CM Weed (UNH 2);
Plymouth, 14.vi.49, H Gray (AMNH 2);
Rumney, vi.15.1924, JG Gehring (MCZ 5);
Rockingham Co.: Northwood, iv.21.1982, DS Chandler (UNH 1); vi.1.1979, WJ Morse (UNH 2);
Raymond, v.30.1931, SA Shaw (UNH 1);
Strafford Co.: Durham, x.25.1977, WJ Morse (UNH 1);
1 mi.SW Durham, v.22.87, WJ Morse (UNH 1), ix.23.87, WJ Morse (UNH 1);
Sullivan Co.: Claremont, v.10, GP Engelhardt (AMNH 1);
Miscellaneous: "N.H." (CAS 1, MCZ 4);
Localities not found: Cambridge, vi.2.41, JD Sherman (AMNH 10);
Dixville, vi.9.1977, GA Dunn (UNH 1);
Mason, v.30.19, flowers, CA Frost (MCZ 2);
"Mt. Plst. Hse." July, A. Fenyes coll'n. (CAS 1);

NEW YORK:

Delaware Co.: Downsville, 8.vi.1964, LL Pechuman (CUIC 2);
Essex Co.: Mt. MacIntyre, top, 11.vi.1949 (1), 11.vi.1942 (1), 19.vi.1941 (1), H Dietrich (CUIC);
Mt. Marcy, top, 21.vi.1941, H Dietrich (CUIC 1);
Mt. Whiteface, top, 14.vi.1943, H Dietrich (CUIC 1);
Franklin Co.: Saranac L., 6.Sep.'31 (CUIC 1);
Greene Co.: Maplecrest, Catskill Mtns., 20.v.1933, "on hellebore", FM Schott (CUIC 1), 1.vii.1926, FM Schott (CUIC 2);
Hamilton Co.: 1 mi.SE Blue Mtn. Lake, Hwy.30, 8.vi.1986, DA Pollock (ISAC 7);
Raquette Lake, 11.vi.1943, H Dietrich (CUIC 1);
Herkimer Co.: Jordanville, 21.xi.1936, H Dietrich (CUIC 1);
Old Forge, 1.vii.1965, LL Pechuman (CUIC 5), 1.vii.1965, HJ Teskey (CNC 1);
Jefferson Co.: Brownsville, 27.4.1913, "on flowers of marsh marigold", LB Woodruff (USNM 4), 5.7.11 (1), 5.2.14 (21), "on Caltha", LB Woodruff (AMNH), 4.27.13 (8), 5.6.11 (9), 5.5.11 (6), LB Woodruff (AMNH);
Saint Lawrence Co.:
Canton, v.30.35 (OSUC 1);
Sullivan Co.: Bridgeville, 9.vi.1964, LL Pechuman (CUIC 5);
Tompkins Co.: Caroline, 18.v.1944 (CUIC 1);
Freeville, 27.iv.'21 (CUIC 1);
Ithaca, 15.v.1915 (DEFW 1);
McLean, 29.v.1915 (DEFW 2);
McLean Res., May.27.1958 (UIM 2);
McLean Res., Argus Brook, 18.vi.1924 (CUIC 2);
McLean Res., Mud Pond, 21.v.1939, EJ Gerber (CUIC 1);

Washington Co.: Granville, 26.v.1936, H Dietrich (CUIC 1);
Westchester Co.: Bronxville, 2.v.14 (UMMA 4);
Miscellaneous: "N.Y." (DEFW 1);
"New York" Ashton Coll'n. (PUL 11);
Localities not found: Mosholu, iv.30.1900 (AMNH 7), v.9. (AMNH 8), v.9. W Beutenmuller (CUCC 7), 30.iv.1900 W Beutenmuller (CUCC 4);
Stony Clove, Ctskl Mts., July.1910 (AMNH 1);
Up-Saranac, vii.14.28, JW Green (CAS 2);

OREGON:

Baker Co.: Baker, 7.vi.1934, JH Baker (CUIC 1);
Homestead, Apr.17.1940, MC Lane (OSUC 1);
Benton Co.: Corvallis, April.1959, PF Torchio (EMUS 8); v.2.15, WJ Chamberlain (UMMA 1);
5 mi.NW of Corvallis, May.12.1963, DR Smith (OSUC 1), May.3.1963, DR Smith (OSUC 1);
"Corv. Watershd." 16.May.1970, R Turnbow (EGRC 1);
Mary's Peak, May.14.1963, "Rotary trap" (OSUC 1); Mary's Peak Cpgrd, nr. Parker Cr., Philomath, 14.June.1968 (4), 2.June.1968 (1), Wiggins, Smith & Yamamoto (ROMC);
McDonald For., 8 mi. N. Corvallis, May.16.1952, Roth & Birge (OSUC 1);
Sulfur Springs, 1.June.1970, R Turnbow (EGRC 1); Sulfur Springs, 7 mi. N. Corvallis, May.14.1963, DR Smith (OSUC 3);
3 mi. NE. Summit, Apr.11.1962, DR Smith (OSUC 2);
3.5 mi. NE. Summit, Oct.17.1963, DR Smith (OSUC 2);
Clatsop Co.: Brownsmead, May.9.1936, K Gray (AMNH 3;MSUE 1);
Hammond "12211", 15.vi.45 (USNM 1);
Seaside, June.20.1964, July.7.1966, R Nagle (SDNH 2);
Crook Co.: Big Summit Peak, Ochoco N.F. 4500', June.10.1962, MC Lane (OSUC 12);
25 mi.SW. Mitchell, 14.June.1986, DG Furth (PMY 1);
Curry Co.: Pistol River, June.18.1952, B Malkin (FMNH 1); 21.vi.1953, B Malkin (FMNH 2); May.28.1952, Malkin & Roth (FMNH 1;OSUC 1); vii.7.51, B Malkin (OSUC 1);
Del Norte Co.: Klamath, iv.28.1936 AT McClay (WSU 4);
Deschutes Co.: Indian Ford Creek, Sisters, June.6.1957, B Malkin (FMNH 1;OSUC 1); Indian Ford Cr., 5 mi.w. Sisters, 3.vi.1965, FP Larson (ODAC 1);
Grant Co.: Clear Creek, Hwy.26, 27.June.1985 (SMCL 5);
Dixie Pass, June.1.1957, 5200', B Malkin (FMNH 10;OSUC 11);
Dixie Pass, Malheur N.F., June.23.1961, Wood, Karren & Bright (VPI 3;EMUS 3);
Granite, 5500', June.21.1941, MC Lane (OSUC 3);
Hoodoo Crk., R.S., June.12.1939, MC Lane (OSUC 2);
8-10 mi. N. Seneca, July.13.1953, V Roth (OSUC 1);
4 mi.N. Strawberry Lk., June.10.1955, J Schuh (MSUE 2);
Harney Co.: Wrights Point, 8.vi.1951, JE Davis (ODAC 1);
Hood River Co.: Mt. Hood, nr. Barlow Pass 4000', 29.vi.1974, A Smetana (CNC 1);
Mt. Hood, nr. Bear Springs RS, June.12.1961, MC Lane (OSUC 12); June.15.1962, 3000', MC Lane (OSUC 3);
Mt. Hood, Gov't. Camp 4000', July.6.1938, EW Jones (UIM 2); June.2.1939, MC Lane (OSUC 5), July.6.1938, MC Lane (OSUC 6);
Mt. Hood, River Meadows 4000', June.21.1958, MC Lane (OSUC 1);

Mt. Hood, nr. Still Ck., Still Ck. For. Camp. "sweep at seepage area", 20.June.1968, Wiggins, Smith & Yamamoto (ROMC 3);
Mt. Hood, 17 mi. SE., 13.vii.1962, K Goeden (ODAC 8);
Jackson Co: Ashland, v.20.41, AT McClay (UCR 2;CNC 2); Apr.26.1941, LG Gentner (OSUC 1);
Brownsboro, vi.13.1941, LG Gentner (OSUC 1);
Butte Falls, v.22.1941, AT McClay (AMNH 2); 6.7.41, Schuh & Gray (AMNH 2); v.22.1941, LG Gentner (OSUC 9);
Butte Falls, 8 mi.W., May.10.1963 (2), May.20.1965 (1) MC Lane (OSUC);
S. of Butte Forest Camp, 15.iv.1941, LG Gentner (OSUC 12);
Copper, 4 mi.N., v.19.62 (OSUC 1);
Dead Indian Soda Spgs., 1 mi.W., May.18.1962, W Barnett (OSUC 1);
Eagle Point, iv.17.1936, LG Gentner (MCZ 1;OSUC 1) iv.19.1936, LG Gentner (MCZ 2;OSUC 1); 13.iv.1941, LG Gentner (OSUC 1); 4.21.1940. LG Gentner (USNM 1);
Grizzly Ridge, 22.vi.1975, Hanson & Knowlton (EMUS 1);
Little Butte Crk., 15 mi. E. Brownsboro, S.F., 2300' 21.May.1960, GB Pitman (OSUC 1);
Little Butte Creek, Hwy.#140, 23.vi.1974, A & D Smetana (CNC 1);
Little Butte Creek, south fork, June.15.1941, LG Gentner (OSUC 7); Little Squaw Lk, 7 mi.E. Copper, R3W T41S Sec2, 3200', 22.May.1964 DR Smith (OSUC 23);
Medford, Nov.1.1953, "under trash", LG Gentner (OSUC 1);
10 mi.S. Ruch, May.19.1962, (OSUC 1);
Santian Pass, June.24.1945, KM Fender (OSUC 1);
Squaw Lake, 7 mi.E. Copper, 19.May.1962, W Barnett (OSUC 3);
Squaw Lakes, v.12.1973, LG Gentner (OSUC 2);
Union Creek, 7-20.viii.1950, 3100-3500', B Malkin (FMNH 1);
Whiskey Creek Campgrd, on Hwy#62, 15 km.E. Union Creek, 1460m., 27.vii.1974, PJ Arnaud (CAS 1);
Jefferson Co.: Camp Sherman, 12.vi.1965, "sweeping plants along Metolius R.", K Goeden (ODAC 1);
Metolius River, vi.14.45 (OSUC 1); My.27.1950, KM Fender (OSUC 1);
Mt. Jefferson, Hunts Cove @5000', July.25.1907, JC Bridwell (OSUC 1);
Josephine Co.: Grants Pass, 29.iv.1964, K Goeden (ODAC 1);
Murphy, 4.21.1934, TM Beer (OSUC 1);
4 mi. W. Salma, Illinois Riv., R8W T38S Sec8, 23.May.1960 DR Smith (OSUC 1);
Takilma, 10 mi. SE. 2.June.1972, Oman (OSUC 2);
Wilderville, Apr.11.1951, LG Gentner (OSUC 8);
Klamath Co.: Bly, June.13.1945, KM Fender (OSUC 2);
Crater Lake N.P., Bndy Spgs, 5.vii.57, DH Huntzinger (SJSU 3);
Lake of the Woods, 22.vi.1975, Hanson & Knowlton (EMUS 1);
Lake of Woods, Klamath Falls Rd., vi.11.45, KM Fender (OSUC 14); Meryl Creek, 7 mi. NW. Bly, 1.vi.1962, "meadow", Vertrees & Schuh (UGA 1);
Odell Lake, 3 mi.SE. 6.8.41, Schuh & Gray (AMNH 4;MSUE 4);
Upland Meadows, Ashland Lake o' the Woods Rd., June.1.1945, KM Fender (OSUC 3);
Lake Co.: Ana Riv, just below EResv., 3 mi.NE. Summit Lk. P.O. 3.July.1964, Lattin & Schuh (OSUC 1);
16 mi.E. Bly, Quartz Crk., 5500', JD Lattin (OSUC 1);
12 mi.SW. Silver Lake, 15.July.1962, RW Matthews (MSUE 6);
Silver Lake, 1.vii.1984 lot 2, BF & JL Carr (CARR 15);
Lane Co.: Florence, iv.14.1931, J Wilcox (OSUC 1);
Florence, Munsel Lake, May.26.1931, V Roth (OSUC 2;MTSU 1);

H.J. Andrews Exp. For., McRae Ck., 1800', v.13.1984, "sift fern + grass litter in spring", DS Chandler (UNH 3);
H.J. Andrews Exp. For., nr. clearcut 502, v.13.1983, 2000' "sweeping", DS Chandler (UNH 3);
H.J. Andrews Exp. For., Lookout Ck., 1950', v.17.1984, "berlese moss in swamp", DS Chandler (UNH 1);
Middle Fork, Willamette R., 19.v.42, Townsend (FMNH 2);
Noti Bog, 5 mi.N., v.24.63, DR Smith (OSUC 3); bet. Siltcoos Lk, Florence Lk., iv.15.24, Howell & Rose (AMNH 4;CAS 20);
Lincoln Co.: Neotsu, 4.23.1939, KM & DM Fender (OSUC 1);
Marion Co.: Cascades, Breitenbush, July.20.1974, R Bell (UVDZ 1);
Morrow Co.: Blalock, 25.v.1951, AB Black (ODAC 2);
Multnomah Co.: Portland, 1927, EW Jones (DEFW 1);
Tillamook Co.: Boyer, 5/13/36, (AMNH 4); May.5.1939, MC Lane (OSUC 3); 5/29/36 (OSUC 1); 5/iii/38 (OSUC 1); 5/31/36 (OSUC 2);
Umatilla Co.: Meacham, June.15.1938, MC Lane (OSUC 1);
Milton, May.26.1939, MC Lane (OSUC 1);
Union Co.: Union, June.19.1938, MH Hatch (OSUC 1);
Wallowa Co.: Joseph, 35 mi.north, vi.21.68, Oman (OSUC 7);
7 mi. E. Minam, June.9.1971, WJ Turner (WSU 1);
Wallowa, 7 mi.W., v.17.49, JE Davis (OSUC 3;ODAC 1);
Wasco Co.: Bear Springs, 26.v.1940, KM Fender (FMNH 1;CAS 3); May.18.1940 KM Fender (OSUC 43); Jct. Hwy.#216 & 26, 10.vi.1963, "sweeping plants margin of stream", K Goeden (ODAC 2);
Warm Sprgs. Ind. Res., 26.vi.1975, Hanson & Knowlton (EMUS 1);
Washington Co.: Forest Grove, iv.13.41, Frost coll'n (MCZ 1);
Hillsboro, Apr.1.1919, LP Rockwood (OSUC 3);
Yamhill Co.: Amity, 15 mi.W., 8.vii.1954, AB Black (ODAC 1);
Meadow L., 17.v.1946, JG Needham (CUIC 15);
McInnville, v.20.41, Frost coll'n, (MCZ 1);
McInnville, Peavine Ridge (nr), June.4.1946 (2), vi.1.1945 (3), 1.vii.1946 (2), KM Fender (OSUC);
Localities not found: Albert Lake, June.7.1958, Vertrees & Schuh (MSUE 1);
Blue Mts., Tollgate Rd., 25.v.1939, MC Lane (OSUC 1);
Buckhorn Min. Springs, May.19.1960, LG Gentner (OSUC 1);
Granver, Apr.12.41, CH Storkey (OSUC 1);
Marion Forks, 30.June.1962, Eickwort & Matthews (MSUE 72);
Ochoco N.F. vi.25.41 (OSUC 4);
Olney, 13,14,15.vi.1940, Van Dyke coll'n (CAS 7);
Pacific Cn., 5.26.31 (OSUC 1);
Powder Rv., May.17.1951, JE Davis (OSUC 1);
Quartz, 19.ix.1954, Black & Davis (ODAC 1);
Winema N.F., Walker Prairie, June.13.1962, MC Lane (OSUC 5);

PENNSYLVANIA:
Allegheny Co.: County record, no data (CMP 1);
Westmoreland Co.: Jeannette, vii.7, HG Klages (CMP 1);
Miscellaneous: "Penn.", coll'n WG Dietz (MCZ 3);

RHODE ISLAND:
Trenton, v.16.37, NS Easton (MCZ 1);

SOUTH DAKOTA:
Brookings Co.: Brookings, H Klages Coll'n (CMP 1);
Custer Co.: Custer St. Pk., vi.17.1955, WA Drew (MSUE 31);

Sylvan L., Black Hills Nat. For., 6600', 15.vi.1953, CP Alexander (CUIC 1);
1 mi.E. Rifle Pt. Historical Site, 11.vi.1975 (PUL 2);
Lawrence Co.: 4 mi. W. Cheyenne Crossing, Black Hills, 18.June.1966, EU Balsbaugh (NDSU 1);
Cheyenne Crossing, 18.June.1966, EU Balsbaugh (NDSU 1);
13-14.July.1974, DK Young (MSUE 1);
Roubaix Camp, Black Hills Nat. For., 7.15.1957 (7), 7.16.1957 (2), H & H Dietrich (CUIC);
Pennington Co.: Ditch Creek, 4 mi. S. Deerfield, Black Hills, 19.June.1966, EU Balsbaugh (NDSU 1);
Horsethief Lake, Black Hills, June.25.1983, Carex, IS Askevold (ISAC 24), June.25.1978, on Smilacina stellata & Iris missouriensis, LeDoux & Pennell (WEEM 7;EGRC 36);
Rapid City, 11.June.1968, VM Kirk (NDSU 5); 7.1.24, GA Chandler (UWM 5);
Black Hills, Rd.#110, 1 mi. E. of #117, 19.June.1966, EU Balsbaugh (NDSU 2);
Miscellaneous: "Bk. Hills", viii.1.67 (SJSU 1);

UTAH:
Box Elder Co.: Clear Creek CG., Sawtooth N.F., vii.12.1971, 6400', R Hardy (CDAS 1), 19.July.1984, MF Whiting (SMCL 2);
Cache Co.: Ant Balley, 6.vii.1976, GF Knowlton (EMUS 1);
Blacksmith Fork Cnyn., 24.vi.1964, WJ Hanson (2), 14.vi.1977, GF Knowlton (1) (EMUS);
Porcupine Res., 6.vi.1973, GF Knowlton (EMUS 1);
Kane Co.: Glendale, 3 mi.N., 17.vi.1982, WJ Hanson (EMUS 4);
Kanab, 6 mi.N., 15.vi.1978, Hanson & Knowlton (EMUS 1);
Orderville, 2 mi.N., 15.vii.1967, HR Burke (TAMU 1);
Rich Co.: Garden City, 16.vii.1955, "on Sedge", SL Wood (CNC 1);
Garden City, 6.6.1938, Knowlton & Hanson (EMUS 1);
Lakota, 21.v.1949, Ma & Knowlton (EMUS 2);
Weber Co.: Head, Beaver Creek, 21.vii.1976 GF Knowlton (6), 19.vii.1979 GF Knowlton (1), 6.vii.1976 Hanson (1), 7.vii.1977 Hanson & Knowlton (2), 1.viii.1980 Hanson, Knowlton & Clemone (1) (EMUS);
Miscellaneous: Great Salt Lake, June.8.'15, MC VanDuzee (CAS 1;MCZ 1);
Locality not found: Avon, 24.vii.1942, GF Knowlton (EMUS 1);

VERMONT:
Chittendon Co.: Williston, 1 mi.S., June.8.1961,"peat bog", Bell & Potash (UVDZ 1);
Essex Co.: Brunswick, Rte. 105, Bear Mt. Motel, 20.vi.1971, LL Pechuman (CUIC 1);
Ferdinand, Rte. 105, 22.vi.1971 (1), 17.vi.1975 (3), LL Pechuman (CUIC);
Lamoille Co.: Mt. Mansfield, Summit, Stowe, July.20.1960, Bell & Chiolino (UVDZ 1);
Washington Co.: Appalachian Gap, Buel's Gore, Stark Mt. Mad River Skilift, vi.27.79, 3100', HP Wimmer (UVDZ 1);
Windham Co.: Wilmington, Lower Haystack Pond, July.4.1963, "swampy shore", R & E Mills (UVDZ 1);
Localities not found:
Mt. Tabor, Ten Kiln Brook, June.26.1965, "swamp", Bell & Moldenke (UVDZ 4);

VIRGINIA:
Miscellaneous: "Va", Liebeck Coll'n, (MCZ 1);

WASHINGTON:
Asotin Co.: Fields' Spr. SP, 4 mi. S. Anatona, 3500-4000 ft., 7 vi.1973, S Berkenkamp (WSU 3);
Chelan Co.: Icicle Creek, 15 km.SW. of Leavenworth, 1.vi.1981, RE Nelson (RNEL 4);
Clallam Co.: Forks, vii.2.1920, Van Dyke (CAS 1);
Ozette R., May.26.1932 (OSUC 1);
Sappho, 2.5 mi.NE, near Beaver Lake, July.16.1978, L & N Herman (AMNH 1);
Columbia Co.: Dayton, June 1932, L Turner (WSU 6);
nr. Tucannon Fish Hat., ca. 13 mi. SW Pomeroy, 15.May.1985, RS Zack (WSU 31);
nr. Tucannon Fish Hat., ca. 20 mi. E. Dayton, 2650 ft., 12.May.1979, WJ Turner (WSU 1);
Cowlitz Co.: Kelso, May.12.'48, R Koeffler (WSU 1);
Gray Harbour Co.: L. Quiniault, v.31.1914, Van Dyke (CAS 1);
Rayonier Park, 5 km. N. Humptulips, 27.vi.1974, PH Arnaud (CAS 1);
Island Co.: Coupeville, 6.17.98 (WSU 2);
Jefferson Co.: Port Townsend, v.1914, (1), vi.1914 (1), May (1), A Seaton (MCZ);
King Co.: Bothell, Apr.26.1942 (2), Apr.30.1957 (1), MH Hatch (OSUC);
Cedar Mountian, v.23.1941 (OSUC 2), May.12.1939 (1), May.9.1941 (1), v.20.35 (1), MH Hatch (OSUC), v.9.40, RH Fester (OSUC 1), 5.22.19_, v.11.1939, E.C.C. (WSU 1), DR Orson (OSUC 1);
Duvall, v.17.31 (OSUC 3);
Fall City, 3.2. km.N., 23.v.1982, RE Nelson (RNEL 7);
Martha Lk., 5.23.41, JJ Davis (WSU 1);
Redmond, May.29.1964 (1), May.11.1966 (1), May.8.1966 (1), Apr.30.1966 (1), R Nagle (SDNH);
Renton, 5.31.13 (OSUC 1);
Renton, Cedar River, v.20.1948 (OSUC 1), v.22.1952 (OSUC 2), Ap.5.1960 (OSUC 2), v.24.1949, J Muller (OSUC 1), May.22.1952, MH Hatch (OSUC 1), May.29.1945, MH Hatch (OSUC 1), May.8.1958, MH Hatch (OSUC 1), v.22.1941, Campbell (OSUC 1);
Seattle: 5.11.96 (OSUC 2), iv.11.1930 (OSUC 1), 4.20.98 (OSUC 1), 1.iv.1900, Salix (OSUC 1), 5.3.1935 (OSUC 1), 5.17.96 (OSUC 2), 5.1.98 (OSUC 1), 18.v.193_ (OSUC 1), 5.16.99 (OSUC 1), 4.21.02 (OSUC 3), 5.18.9 (OSUC 1), U.W. campus 15.v.1954 (OSUC 1), xv.v.1954 (OSUC 1), 4.21.14 (OSUC 1), 5.1.14 (OSUC 1), 22.iv.12 (OSUC 1), v.11., Liebeck Coll'n (MCZ 3), May.1951 (7), 19.vi.1954 (1), 10.v.1953 (1), Sep.25.1954 (1), B. Malkin (FMNH), no date (MTSU 1);
Snoqualmie R., Snoqualmie Falls, May.13.1928, MH Hatch (OSUC 1);
Tiger Mt. St. Forest, 15.May.1988, "on Lysichitum americanum" ME Rice (EGRC 8);
Kitsap Co.: Pilgrim Hirs, 6 mi. SW. Fort Orchard, 5.June.1986, DG Furth (PMY 2);
Lewis Co.: Morton, vi.17.1972, FG Andrews (CDAS 5);
Mt. Rainier Nat'l Park, Stevens Cyn. Gate, 19.June.1986, DG Furth (PMY 2);
Mason Co.: Skokomish R., 5.20.92 (OSUC 1);
Spillman Camp, 21.v.1949 (CNC 1);
Pacific Co.: Bay Center, Aug.15.1931 (OSUC 1);
Ft. Canby SP, nr. Ilwaco, vi (13-15).73, WJ Turner (WSU 3), vi.(11-13).1971, DN Ferro (WSU 5);
Nahcotta, May.2,3.1953 (OSUC 2);

Ocean Park, Loomis Lake, Aug.12.1954, MH Hatch (OSUC 1), July.31.1938 (OSUC 1);
Pierce Co.: Fort Lewis, v.10.1946, vi.12.1945, PH Arnaud (CAS 2);
Lakeview, v.15.1938, J. Veazie (OSUC 1);
Longmire, Mt. Rainier N.P., May.23.1952, MH Hatch (OSUC 8;MTSU 1); May.31.1963, 2700', MC Lane (OSUC 1);
Longmire, Mt. Rainier N.P., just S. Fish Ck. on Westside Rd., 15.Jun.1969, ROM Field Party (ROMC 1), 19.June.1986, DG Furth (PMY 6);
Mt. Rainier N.P., Ohanapecosh at Jct. Rtes. 706 & 143, 4.July.1969, large pond, ROM Field Pty. (ROMC 8);
Summer, June.9.1933, EW Jones (UIM 1);
Tacoma, vi.12.1935, JL Wilson (OSUC 1), 3.Apr.1931, Wm.W. Baker (OSUC 2; MTSU 1), R Hayward Coll'n (MCZ 2);
San Juan Co.: Moran St. Park, Oreasis, viii.14.64, AR Gittins (UIM 1);
Skagit Co.: Sedro, v.26.43, F.B. (OSUC 1);
Skamania Co.: Mt. St. Helens, Toutle Rv. at Spirit Lake, 3100', 5.vii.1974, A. Smetana (CNC 1);
Snohomish Co.: Chase Lk., iv.28.1938, M Fields (OSUC 1);
Darrington, May.15.1932 (OSUC 2);
Ruggs Lk., vi.1.1934, JL Wilson (OSUC 1);
Silvana, Stillagamish Riv., May.28.1968, R Nagle (SDNH 7);
Silver Lake, 5.31.39, D Pike (OSUC 1);
Sultan, Apr.31.1931 (4), May.14.1931 (1), MH Hatch (OSUC), May.13.1931, V Tartar (OSUC 1);
Stevens Co.: Deer lakes, nr. Chewelah, Aug.3.1972, MT James (WSU 1);
Thurston Co.: Offut L., June.5.1948, MH Hatch (OSUC 1);
Olympia, May.26.1934, Harriet & Exline (OSUC 1), no date (OSUC 2);
St. Clair Lk., 5.vi.1948, MH Hatch (OSUC 1);
Scatter Creek, May.3.1931 (OSUC 1);
Tenino, Hubbard & Schwarz (USNM 2);
Walla Walla Co.: Walla Walla, Apr.13.1945, May.13.1938, MC Lane (OSUC 2);
Whatcom Co.: Mt. Baker N.F., Bagley Ck. nr. Silver Fir Campgr., @2000', 10.vii.1974, A & D Smetana (CNC 13);
Yakima Co.: Nile, 1 mi.N., 17.vi.1973, NE Woodley (EGRC 1);
Localities not found: Kooskooskie, iv.7.1949, iv.22.1949, CE Horner (OSUC 2);
Nielson L., May.23.1930, MH Hatch (OSUC 9);
Stevens Pres., vi.25.1955 (LACM 1);

WISCONSIN:
Manitowoc Co.: Point Beach, 7.vi.1969, "skunk cabbage", LJ Bayer (UWM 3);
Polk Co.: Baker [Collector or locality?], July (CMP 1);

WYOMING:
Albany Co.: Laramie, July.12.1948, DG Denning (UWL 2);
Laramie, Pole Mt., July.25.1947 (1), July.25.1950 (1), DG Denning (UWL);
Pole Creek Campgrd., Medicine Bow N.F., T25N, R71W, Sec.19, 8300' elev., 6-7.vii.1974, DK Young (EGRC 1), JB Johnson (MSUE 3);
Med. Bow Nat. For., 8600', 1/2.vii.1979, C. v.Nidek (CVNC 27);
Carbon Co.: Medicine Bow Mts., July.17.1937, CH Seevers (FMNH 3);
Johnson Co.: Middle Fork Camp., Big Horn Nat. For., 7.19.57, A & H Dietrich (CUIC 1);

Lincoln Co.: canyons, near Cookeville, 25.vi.1986, C & A v.Nidek (CVNC 1);
Pine Cr. Road, Cookeville, 25.vi.1986, BF & JL Carr (CARR 3);
Localities not found: Dale Creek, 8000', vii.5.1909, FH Shoemaker (CAS 1);
Miscellaneous: W. Yellowstone, vi.6.30, Van Dyke (CAS 4;AMNH 1);
Jennies L., 6.33, ES Ross Coll'n (CAS 1);

Appendix 10.4.

Locality data for Plateumaris pusilla (Say).

CANADA:

ALBERTA: Ardmore, 6 km.E., Eleocharis/Scirpus, IS Askevold (ISAC 3);
Banff, June, A Fenyes colln (CAS 2), July.9.1928, O Bryant (CAS 5), 18,26.vi.1922, CBD Garrett (CNC 9), 21.vi.1922, CBD Garrett (NFRC 1);
Battle Cr., Cypress Hills, vi.23.1955 (UAE 6);
Battle River, x-ing Hwy. #21, 8/16.vi.1980, C & A v.Nidek (CVNC 4);
Beaver Mines Lake, 17-20.vi.1987, C & A v.Nidek (CVNC 17);
Bellevue, 22.vi.1980, RA Cannings (PMV 6);
9.6 km.W. Busby, 13.vi.1982, sweep Carex & Eleocharis, IS Askevold (ISAC 12);
Calgary, 19,28.vi.1960, BF & JL Carr (CARR 2);
1 mi.N. Carway, Rt.2, vii.5.1984, RS & VL Zack (WSU 1);
Chipman, 19.vi.1922, FS Carr (UAE 2, UADB 1, MCZ 1);
Cochrane, 19.vi.1960, BF & JL Carr (CARR 2);
Coleman, 4.vii.1981, BF & JL Carr (CARR 1), @1450 m. 1/6.vi.1981, C v.Nidek (CVNC 3);
8 km.W. Crestomere, Hwy.#53, 26.vi.1982, sweep Carex, IS Askevold (ISAC 6);
Cypress Hills, 13.vi.28, FS Carr (SDNH 2, PMV 1), 6.25.1927, FS Carr (UMMA 3, MCZ 4), 4.vi.1922, FS Carr (UAE 1), 3.vi.1925, FS Carr (UAE 2),
5 km.W. Dogpound, Hwy.22, 11.vi.1980, RE Roughley (JBWM 1);
Edmonton, 1,9.vi.1921, FS Carr (UAE 2), viii.16.1959, FS Carr (UIM 1), vi.29.1921, FS Carr (UMMA 1);
Elkwater, 15.vi.1929, JH Pepper (CNC 1);
Fox Creek, 18.vi.1981, C v.Nidek (CVNC 3);
Frank, 18.vi.1962, KC Herman (CNC 1);
George Lake, 53°54'N, 114°06'W, 15.June.1982, Carex / Eleocharis, IS Askevold (ISAC 38);
Jumpingpound Creek, 17.x.1959, BF & JL Carr (CARR 1);
Kananaskis, 26.vi.1928, O Bryant (CAS 1);
Little Red Deer River, 10 km.S. Westward Ho, 26.vi.1982, sweep Carex, IS Askevold (ISAC 34);
8 mi.E. Morley, 3.July.1962, KC Herman (CNC 1);
7.5 mi.E. Onoway, Sturgeon R., 4.vii.1979, Roughley & Shaw (JBWM 1);
Pincher, v.28, FS Carr (UAE 1);
Pincher Creek, Beauvais Lake, 14-16.vi.1987, C & A v.Nidek (CVNC 14);
Ponoka, 1.vii.1924, FS Carr (UAE 3);
Red Deer, 17.vi.1985, BF & JL Carr (CARR 5);
W. of Rimbey, 10.5 km.S. Jct.Hwy.53 & 766, sweep Carex, IS Askevold (ISAC 18);
Rivière Que Barre, 15.vi.1982, sweep Carex, IS Askevold (ISAC 33);
River Biche, Hwy.63X, 8.vi.1985, C & A v.Nidek (CVNC 1);
St. Albert, 12.vii.1924, FS Carr (UAE 4);
Sarcee Reserve, Calgary, June.4.1928, "blue grass", O Bryant (CAS 20);
Seba Beach, 5.4 km.S. on Hwy.759, 20.vi.1982, Carex/Typha, IS Askevold (ISAC 22);
Sherwood Park, 7/20.ixn.1978, C v.Nidek (CVNC 21);
nr. Sherwood Pk, Tp.51, Rge.22, S.29, 14/23.v.1980, C v.Nidek (CVNC 14);

Sturgeon Riv. at Lac Ste. Anne, 50°43'N, 114°20'W, 1-3.vi.1982, Richardson (ISAC 2);
Sundre, 29.vi.1960, BF & JL Carr (CARR 1);
Tomahawk, 5 km.N. on #759, 20.vi.1982, IS Askevold (ISAC 3);
Tp. / Rge. / W. 4 Mer:
68 / 17, 30.v.1985, BF & JL Carr (CARR 4);
Tp. / Rge. / W. 5 Mer:
5 / 3, 20.vi.1976, BF & JL Carr (CARR 1);
6 / 1, 15.vi.1974, GJ Hilchie (GJHC 1);
7 / 1, 15.vi.1974, GJ Hilchie (GJHC 4);
9 / 3, 16.vi.1974, GJ Hilchie (GJHC 1);
21 / 3, 16.vi.1962, BF & JL Carr (CARR 3);
24 / 8, 4.vi.1968, BF & JL Carr (CARR 1);
27 / 5, 10.ix.1977, BF & JL Carr (CARR 1);
28 / 5, 21.vi.1973, GJ Hilchie (GJHC 1);
30 / 6, 20.vi.1978, BF & JL Carr (CARR 3);
32 / 2, 14.vi.1980, BF & JL Carr (CARR 1);
37 / 5, 16.vi.1973, BF & JL Carr (CARR 1);
112 / 20, 8.vi.1988, BF & JL Carr (CARR 4);
30 km W. Turner Valley, 7.vi.1987, C & A v.Nidek (CVNC 7);
Twin Butte, 10.vi.62, K Herman & W Mason (CNC 15);
Vilna, 14./vi.1922, FS Carr (UAE 2);
Wabamun Lake Prov. Pk., 13.vi.1982, Carex, IS Askevold (ISAC 2);
Waiparous, 12.vii.1953, BF & JL Carr (CARR 1);
nr. Warburg, 20.June.1982, Carex/Sagittaria, IS Askevold (ISAC 3);
Waterton, 11.vii.1930, FS Carr (UAE 2), 6,7.June.1962, KC Herman (CNC 3);
Waterton Lakes N.P., 16.vi.1952, AR Brooks (CNC 1), July.1-5.1980, July.14-20.1980, HJ Teskey (CNC 2), Chief Mtn. Hwy., 4.vii.1980, 4500' flight intercept, HJ Teskey (CNC 1), nr. Hwy.6, 4.4 km SE Jct. #5, 6.vi.1980, IM Smith (CNC 1), nr. Park entrance, 4400', 16.vi.1980, JM Campbell (CNC 2);

BRITISH COLUMBIA:

Barkerville, 29.vi.48, ER Buckell (UBC 1);
Barkley L., Riske Ck., 6.vi.78, Eleocharis, RA Cannings (UBC 6);
Bowser, vi.21.1955, JR McGillis (CNC 4), vi.15.1955, WJ Brown (CNC 4);
Caribou - Springhouse & Westwick L., 4.vii.1962, GGE Scudder (UBC 26), Springhouse, 4.vii.1962, GGE Scudder (UBC 17), Westwick L., 3,15.vii.1962, GGE Scudder (UBCZ 2);
Caribou, Colpitt L., 7.vi.59, GGE SCudder (UBC 1);
Chaperon Lk., 18.vi.32, "sedge", GJ Spencer (UBC 5, CNC 3, AMNH 1);
Chilcotin, 1.vi.59, 14.vii.1962, GGE Scudder (UBC 6);
Chilcotin, #24, 21.vi.1961, GGE Scudder (UBC 2);
Clinton, 14.vi.1938, GS Walley (CNC 2);
Columbia L., 18.vi.1958, G Stace Smith (UBC 1);
Cranbrook, 10.vi.1957, G Stace Smith (CUIC 7), 26.v.1976, GF Knowlton (EMUS 1);
Creston, 21.vi.1945, G Stace Smith (UBC 1);
Duncan, vi.9.55, R Coyles (CNC 8), vi.20.1955, WJ Brown (CNC 17), vi.9.1955, Coyles & McGillis (CNC 3);
3 km. SE. Dunster, 13.vi.1982, Wilkie & Cannings (UBC 1);
Erie, 11.vi.1984, BF & JL Carr (CARR 16);
Erie (nr Salmo), 6.vi.1961, GGE Scudder (UBC 15);
Erie Lake, 2.vi.1973, GGE Scudder (CNC 3);

Errington, VI, 15.v.38, 21.v.50, GH Larnder (PMV 2), 20.vi.1929, R Hopping (CAS 1);
Faulkland, June.30.1941, JS Martin (OSUC 3);
Fernie Prov. Pk., 13.vi.79, RE Roughley (JBWM 2);
Galiano Is., 16.vi.74, GGE Scudder (UBC 3);
Grohman Narrows Prov. Park (nr. Nelson), May-June 1980, "Carex & Eleocharis, and many specimens on surrounding Buttercups in adjacent field", IS Askevold (ISAC 300);
Guichon Cr., 13 mi.S. Savona, June.25.1941, JS Martin (OSUC 4);
Hat Creek, 3.vii.1933, RD Bird (CNC 1);
Jaffrey, 10.vi.1957, G Stace Smith (CNC 3), 8.vi.55, G Stace Smith (UBC 1);
Kamloops, 18.vi.1954, "Mentha and Potentilla", GJ Spencer (CNC 1);
Kelsey Bay, VI, 13.vii.1974, GGE Scudder (UBC 1);
Kennedy L., S.VI., 15.vi.51, R Guppy (UBC 1, PMV 1, OSUC 1);
Lac du Bois, Kamloops, 18-22.vi.1954, "lake Juncus", GJ Spencer (UBC 15, CNC 1);
Lac la Hache, San José R., 1.vii.1947, on Carex, GA Hardy (PMV 3);
Lister, 12.vi.1958, G Stace Smith (UBC 7);
10 mi. to Merritt, 13.vi.1963, GJ Spencer (CNC 1);
Miracle Beach, nr. Oyster River, 11.vi.1955, R Coyles (CNC 1);
Moyie, 6.vii.1947, Juncus, G Stace Smith (CAS 9, UBC 21, MCZ 2, AMNH 3), vi.25.37, FB (OSUC 8);
Nanaimo, vi.2.55, WJ Brown (CNC 1);
Nanaimo Biol. Sat., 28.June.1920, EP Van Duzee (CAS 33);
Nanaimo Field Stn., 25.vi.1920, EP Van Duzee (PMV 1);
Nicola, 10,19.vii.1932, GJ Spencer (UBC 6);
Ootsa Lake, 14.vi.1945, HB Leech (UCR 2, LACM 2);
Pass lake, 26.July.1946, GB Rich (CNC 7);
Penask L., 6.viii.1932, GJ Spencer (UBC 1);
Penticton, Ellis Crk., 1340m. 24.vi.83, SG Cannings (UBC 1);
Prince George, 15.vi.1962, GGE Scuder (UBC 1);
Quesnel, 25.vi.49, GJ Spencer (UBC 15), 27.vi.1948, ER Buckell (CNC 9);
Radium, 6.vi.1953, BF & JL Carr (CARR 23);
Saanich, 30.v.1930, WH Preece (CNC 1);
Salmon Arm, 1931 (CNC 1);
Salmon Valley, 13.vii.1969, BF & JL Carr (CARR 1);
Sicamous, July.3.1890, R Hayward (MCZ 2);
S.Pender Isl, 27.vi.1979, RA Cannings (UBC 1);
Sproat Lake, vi.22.1955, WJ Brown, Coyles & McGillis (CNC 43);
"Teleg. Crk.", 30.viii.1960, RJ Pilfrey (UGIC 2);
38 mi.E. Tofino, VI., Rt.4, small pond, 21.Jun.1969, ROM Fld. Pty. (ROMC 1);
Tunnel Mtn., no date (AMNH 6);
Upper Hat Creek, 3.vii.1933, RD Bird (CNC 1);
Vancouver, Stanley park, 26.v.67, KM Stuart (CNC 1);
10 mi.E. Vanderhoof, #16, vi.6.83, RS & VL Zack (WSU 8);
Victoria, 8.vi.23, HF Auden (CNC 3, UBC 6), June.13 (UMMA 5), June.1923 (UMMA 1); 9.vi.1923, HF Auden (INHS 6);
Victoria, Prospect Lake, May.3.1930, MH Hatch (OSUC 23);
Victoria, Quick's Bottom, 25.vi.1981, RA Cannings (PMV 3);
LABRADOR: Carter Basin, 53°29'N, 59°52'W., 4-8.viii.1958, BSES Expd. Brit. Mus. (BMNH 1);
Goose Bay, 22.vi.1950, B Hocking (CNC 1);

MANITOBA:
Aweme, 10.vi.1908, E Criddle (USNM 1), 6.vi.1922, N Criddle (CNC 10);
Berens River, 9.vii.1935, WJ Brown (CNC 1);
Brokenhead River, x-ing Hwy. #15, 20 km.E. Anola, 31.v.1984, Carex, IS Askevold (ISAC 1), 6.vi.1984, Carex, DA Pollock (JBWM 5), 18.May.1985, IS Askevold (ISAC 11), 26.May.1985, IS Askevold (ISAC 30), 30.May.1985, IS Askevold (ISAC 13); 6.vi.1986, IS Askevold (ISAC 32), 7.vi.1986, IS Askevold (ISAC 33), 23.v.1987, Carex & Scirpus, IS Askevold (ISAC 17);
Dubas Crk., x-ing Hwy.59 N. of Winnipeg, 4.vi.85, IS Askevold (ISAC 3);
Duck Mtn. Prov. Pk, @5 mi.N. Wellman Cpgd., June.19-24.81, Ashworth, Schwert & Keller (ASRC 1);
Glenlea, June.23.1974, TD Gallowy (JWBM 1);
Goose L., 20.vi.55, "W. Spruce" (NFRC 1);
Grass River Prov. Park, 16 km.W. Iskwasum L., 54°38'N, 101°00'W, 25-30.June.1981, Ashworth, Schwert & Keller (ASRC 2);
Hayward Ck., Hwy.#391, 20.vi.84, DA Pollock (JBWM 1);
H.B. Ry., mile 214, 6.vii.1917, JB Wallis (CUIC 3, MCZ 3), vii.1 (USNM 1);
H.B. Ry., mile 256, 12.vii.1917, JB Wallis (CNC 1);
Husavick, 17.vii.1916, JB Wallis (MCZ 1);
13 km.E. Lake Manitoba Narrows, 2.July.1982, sweep Carex & Eleocharis, IS Askevold (ISAC 1);
26 km.W. Lake Manitoba Narrows, 2.July.1982, Carex, Eleocharis, Scirpus, IS Askevold (ISAC 1);
10 km.SE. Molson, June.10.1984, Scrapnecks (ISAC 12);
Norway House, 22,28.vi.1938, WJ Brown (CNC 8);
Overflow, 10/6.1968, "Picea mariana" (NFRC 1);
Red Deer Lake, N. of Barrows, 3.vii.1982, sweep Eleocharis, IS Askevold (ISAC 8);
creek, b/n Red Deer River & Overflowing River, Hwy. #10, 19.vi.84, DA Pollock (JBWM 2);
Sandilands For. Reserve, 13.June.1975, MCA Madder (JBWM 2), Sept.9.1975, 18.v.1977, TD Galloway (JBWM 6);
10km.SE. Selkirk, June.10.1984, Scrapnecks (ISAC 6);
Tp.65, R.10 W. 1 Mer, 10.vii.85, BF & JL Carr (CARR 3);
Tp.66, R.10 W. 1 Mer, 17.vii.85, BF & JL Carr (CARR 2);
Tp.66, R.17 W. 1 Mer, 10.vii.85, BF & JL Carr (CARR 1);
Treesbank, 15.vi.1923, HA Robertson (CNC 1);
Tyndall, 113.vi.1984, IS Askevold (ISAC 1), June.10.1984, Scrapnecks (ISAC 5);
Wawboden, July.1.1930, O Bryant (CAS 1);

NEW BRUNSWICK:
Fredericton, 17.vi.1981, LeSage & Ward (CNC 1);
Hatfield Point, 18.vi.1981, DR Ward (ISAC 11), 18.vi.1981, L LeSage (CNC 15);
Jemseg, 18.vi.1981, "sur "Potentilla simplex", LeSage & Ward (CNC 18);
Kingston, 10.viii.1926, CA Frost (CNC 1);
McDonald Point, 18.vi.1981, LeSage & Ward (CNC 19);
Mechanic's Lake, vii.30.1926 (MCZ 3, CAS 3, CUIC 1, CNC 1);

NEWFOUNDLAND:
Avalon Pen., Colinet, Oct.4.1980 (MUIC 2);
Cox L., W. Badger, 26.June.1980, Brennan & Larson (MUIC 4, CNC 1);
Deer Lake, beaver ponds nr., 13.vi.1979, Larson & Swales (MUIC 2);
Grand Codroy Prov. Park, 15.vi.1979, Larson & Swales (MUIC 19);

Harmon Field, 16,17,22,24,25.vi.1949, EG DiLabia (CNC 41);
Jonathan Pond Park, 16.vii.1977, D Larson (MUIC 2);
Lake St. George, Cornerbrook, vii.29.1972, JM Campbell (CNC 1);
Little River, SW Nfld., Jul.8,12-17.1905, PG Bolster (MCZ 1),
Little River, Codroy, Jul.10-18.07, PG Bolster (MCZ 2);
Lomond, W.Nfld., 3.vii.1949, Lindroth (CNC 2);
St. Fintans, W. Nfld., 3.vii.1949, Lindroth (CNC 2);
St. George's R., N. branch, June.17.1979, Larson & Swales (MUIC 4);
St. John's, 26.vi.1965, WJ Brown (CNC 2);
St. John's, Long Pond, 21.9.84, S Dupuis (MSUE 1), 7.vii.1979 (MUIC 3, CNC 1), 9.25.1980 (MUIC 1), 3.July.1979, D Larson (MUIC 1), 13.June.1981, D Larson (MUIC 2);
Salmonier Line, 3 km.N. Wildlife Park, Sept.19.1981, (MUIC 16, CNC 1);
Spearston, barrowpit, 16-17.vi.1979, Larson & Swales (MUIC 3);
Spruce Brook, 27.7.14, EM Walker (ROMC 2);
Stephenville Cross., W. Nfld., vii.1949, Krogerus (CNC 9);
Upper Humber R., Jct. Hwy.#430, 12.vi.1979, Larson & Swales (MUIC 5);

NORTHWEST TERRITORIES:

Cameron R. crossing, Hwy. #4, 19.vii.1981, BF & JL Carr CARR 4);
11 km.NW. Jct. Hwy. 1 & 3, Tp 4, Rge 2 W.5, 11.vi.1988, BF & JL Carr (CARR 1);
Kakisa River, 21.vi.1973, J Belicek (CNC 1);
Keewatin Dist., Fort Hope, no date (CUCC 1);
Norman, 20.viii.1929, O Bryant (CAS 1);

NOVA SCOTIA:

(CBNP=Cape Breton National Park):
CBNP, French Lake PG633770, 24-30.vi.1984, fen, Teskey (CNC 1), 10.vii.1983, Carex & Scirpus, LeSage (CNC 67);
CBPN, Freshwater Lake, 27.vi.1983, swp. Scirpus, 27.vi.1983, L LeSage (CNC 13), "sweeping marginal bushes (Ericaceae)", 27.vi.1983, LeSage (CNC 4), 29.vi.1983, "sweeping Solidago, Rumex, Alnus, etc.", LeSage (CNC 6), 1.vii.1983, Scirpus, LeSage (CNC 30);
CBNP, Grande Anse Riv., 8.vii.1983, "sweeping veg'tn along river in decid. forest", LeSage (CNC 9);
CBNP, at Ingonish, 27.vi.1983, "sweeping Sparganium", LeSage (CNC 12);
CBNP, Jigging Cove L., 30.vi.1983, "sweeping Ericaceae around lake", LeSage (CNC 1);
CBNP, MacKenzie Mountain, 8.vi.1983, "sweeping Scirpus & Juncus in ditch", LESage (CNC 77);
CBNP, Mouth Warren Br., 30.vi.1983, "in marginal Carex", LeSage (CNC 6);
CBNP, Paquette Lake, 2.vii.1983, "sweeping Ericaceae, Carex, Scirpus", LeSage (CNC 5);
Cape North, vi.24.31, G Fairchild (MCZ 3);
Petite Rivière, 22.vii.1935, J McDunnough (CNC 2);

ONTARIO:

Bell's Corners, 27.v.1982, M Davis (CNC 4), 28-9.vi.1971, EG Munroe (CNC 1);
Chaffey's Locks, 9.vi.1981, DR Ward (ISAC 1), 9,10.vi.1981, LeSage & Ward (CNC 6);
Coldstream, v.23.22, AD Wood (CNC 2);
Constance Bay, 26.IX.1982, L Huggert (UZIL 1);
Elmira, June.1962, AF Johnson (UGIC 1);
English River, Rt. 17, English Lake, vii.3.1984, RS & VL Zack (WSU 2);
French L., Quetico Prov. Pk., 9-10.Jun.1971, ROM Fld. Pty. (ROMC 1);

Geraldtown, vi.22.82, Pilney & Motz (Elias 1);
Glen Williams, 10.vi.52, GB Wiggins (ROMC 1);
Guelph, vi.6.1979, KL Bailey (UGIC 3), 22.vi.1950, LL Pechuman (CUIC 2);
Hastings Co., 10.vii.1938, JF Brimely (CNC 1);
sm. pond opp. Kenny Lake, Algoma Dist., vii.72, AC Ashworth (ASRC 4);
Kinburn, 20.vi.1965, JEH Martin (CNC 1);
Kukatusa Div. #65, 14.vi.1960, Salix sp., F.I.S. (CNC 1);
Lake Esnogami, 28.vi.1900 (ROMC 3);
Macdiarmid, L. Nipigon, 3.vii.23, N Bigelow (ROMC 1);
Mattice, vi.19.82, Pilney & Motz (, UWAT 1, Elias 1);
3 mi.E. Michicopoten Hrbr., vii.72, AC Ashworth (ASRC 1);
Millgrove, July.1949, H Calhoun (UGIC 3);
Moar Lake, 16.vii.1961, HE Milliron (CNC 1);
Moose Creek, 10 mi.S. Sioux Lookout, vi.17.1973, Campbell & Parry (CNC 1);
Nipigon, 15.7, Entomol. Branch (CNC 2), June, Fenyes (CAS 1), July.8.1912, K Jennings (CMP 7), vii.5.1912, OE & G Jennings (CMNH 1);
Nobel, vi.28, RC Casselberry (AMNH 6);
Orient Bay, Lake Nipigon, vi.4.23, N Bigelow (MCZ 1, ROMC 21);
Oxford Mills, 24.VI.1984, L Huggert (UZIL 11);
Poplar Lodge, L. Nipigon, 17.vi.21, 23.viii.23, N Bigelow (ROMC 2);
Prince Edward Co. (JF Brimely): 7.vi.1939, (CARR 1), 2.v.43 (CNC 1), 5.vi.40 (CNC 1), 7.vi.36 (CNC 1), 10.v.50 (CNC 1), 20.vi.45 (CNC 2), 8.vi.1937 (CNC 1), 4.v.58 (CNC 1);
Quetico Prov. Pk., 8-19.viii.1983, CB Barr (LSU 1);
Rainy River Dist., 4.vii.1924, Brimely (CNC 1);
Schomberg, 6.vi.1964, RS Scott (ROMC 1);
Singhampton, 5.vii.1930, WE Ricker (ROMC 1);
Sioux Lookout, 2.vii.'47, WY Watson (ROM 1);
South March, vi.30.1959, SD Hicks (CNC 7);
Spider bay, July.22.1914 "on Dulichium arundinaceum", H Klages (CMP 4);
Strathroy, June.12.1923, HF Hudsen (CNC 1);
Toronto, 7.6.'90, Wm Brodie (ROMC 3), 5.15.94, Wm Brodie (ROMC 1);
Whitesand, L. Nipigon, 27.vii.23, N Bigelow (ROMC 1);

QUEBEC:

Berthier, v.29, Liebeck colln (MCZ 1);
Cap-des-Rosiers, 30.vi.1974, D Roy (CNC 1);
Cap Rouge (C Chantal coll'r), 6.vi.64 (CLCH 1), 26.vi.65 (CLCH 1), 27,28.vi.64 (CLCH 2), 10.vii.65 (CLCH 1);
Cascapedia River, 13.vii.1933, CC Smith (CNC 1);
Covey Hill, 17,29.vi.1927, WJ Brown (CNC 4);
Duparquet, 1,2,8,12,19,21,26-28.vii.1935,1936, "on Eleocharis palustris & on Cornus", G Stace Smith (CAS 56), 1.vii.1936, G Stace Smith (FMNH 1, BPBM 1);
Gracefield, 14.vi.1937, O Peck (CNC 2);
Hemmingford, 26.vi.1923, CH Curran (CNC 9);
Hull (Gat.), 20.x.1979, L LeSage (CNC 1);
Ile d'Anticosti, L. Valiquette, 21.vii.73, C Chantal (CLCH 2);
Ile d'Anticosti, Prt-Meiner, 23.viii.73, C Chantal (CLCH 1);
Knowlton's Landing, 18.vi.28, WJ Brown, GA Fisk (CNC 3);
Mistassini Pass, 14,18.vii.1956, JR Lansway (CNC 13);
Montreal, no date, F Knab (USNM 1), FJA Morris (UGIC 1);

Mt. St. Hilaire, vii.09, 1.vii.05, F Knab (USNM 11), vii.09 (UGIC 2, CNC 2);
Natashquan, 1,3,5,8.viii.1929, WJ Brown (CNC 11);
Potton Springs, Jly.1-4.'20, PG Bolster (MCZ 1);
Rouville Co., 12.vii.02, F Knab (USNM 2);
Rupert House, 21.vi.1949, DP Gray (CNC 13);
St. Augustin, 6.vi.64, C Chantal (CLCH 1);
St. Chrystome, 21.vi.1927, WJ Brown (CNC 3);
St. Johns Co., vii, G Chagnon (MCZ 1);
Valcartier, Port., 9.x.65, C Chantal (CLCH 1);

SASKATCHEWAN:

Attons Lake, Cut Knife, 11.vi.1940, AR Brooks (CNC 1);
Big Sandy Lake, 20.vii.1976, RR Hooper (SPMC 1);
Cantara Lake (NW Corn.), 13.vii.1978, RR Hooper (SPMC 3);
Cowan R. at Hwy.#55, July.4.1982, sweep Carex, IS Askevold (ISAC 1);
Cypress Hills, 15.vi.1977, RR Hooper (CNC 1);
Deschambault Lake, 20.vii.1970, RR Hooper (SPMC 1);
Hwy. 969, 73 km.N Jct. #2, 1.vii.85, BF & JL Carr (CARR 1);
Jumbo Lake, 5-6-64 "Betula papyrifera" (NFRC 1);
Jct. Hwy.#2 & 165W, 28.vi.85, BF & JL Carr (CARR 5);
La Ronge, 25.vi.85, BF & JL Carr (CARR 1);
25 km.S. La Ronge, 22.vi.1985, C & A v.Nidek (CVNC 1);
Leather Riv., 13 km.W. Tisdale, 3.vii.1982, sweep Eleocharis, IS Askevold (ISAC 3);
Nemeiben Lake, N. La Ronge, 14-17.vi.1985, C & A v.Nidek (CVNC 1);
100 km.N. Prince Albert, 7-10.vii.1985, C & A v.Nidek (CVNC 3);
Red Deer Riv. at Hwy.#3, July.3.1982, sweep Sparganium, IS Askevold (ISAC 5);
Shellbrook Riv., 3 km.N. Shellbrook, 4.vii.1982, Carex, IS Askevold (ISAC 1);
Stony Rapids, 7.vii.1964, RR Hooper (SPMC 2);
Waskesiu Lake, 8.vii.1939, AR Brooks (CNC 24);
Waskesiu & Hwy.#2, 21.vi.85, BF & JL Carr (CARR 3);
20 km.S. Weyakwin, 29.vi.1985, C & A v.Nidek (CVNC 2);
40 km.S. Weyakwin, 13.vi.1985, C & A v.Nidek (CVNC 23);

YUKON:

18 km.NW Donjek R., on Alaska Hwy., 61°44'N, 139°53'W, 23.vi.1981, C Guppy (UBC 1);

U.S.A.

ALASKA:

mi. 1249 Alask Hwy., Deadman Lake, 6-7.vii.1968, Campbell & Smetana (CNC 3);

CALIFORNIA:

Alameda Co.: County record: May.1915, MC Van Duzee (CUIC 1);
Alpine Co.: Indian Creek Lake, 15.vi.1979, GE Bohart (EMUS 3);
Woodfords, vi.17.1958 (CDAS 1), v.28.1957, RP Allen (CAS 2);
Amador Co.: County record: no date (DEFW 1);
Butte Co.: 5 mi.NE Butte Meadows, Cherry Hill Cpgrd, v.24-27.1974, FG Andrews (CDAS 4);
Delnorte Co.: County record: v.27.10, Nunenmacher (FMNH 1);
Eldorado Co.: Bridal Viel Falls Picnic Area, 18.may.1980, LG Bezark (ISAC 2);
Fallen Leaf Lake, 14.vii.1982, WH Tyson (CDAS 1);
13 mi.E. Georgetown, Blodgett For., vii.2.67, RL Stoltz (UIM 1);
Peavine Crk., T.11N, R.14E, Sec.12, vii.6.53, H Attacker (MSUE 2);

Tallac, July, Fenyes (CAS 1, AMNH 1), no date, Fenyes (CMP 3), vii.5, Fenyes (MCZ 2);
County record: no date (CAS 2);
Fresno Co.: Fresno, 18,20.iii, EA Schwarz (USNM 4), i.18.28 (SDNH 2);
Huntington Lake, 7000', July.3, EP Van Duzee (CAS 1), vi.14.1977, Gilbert & Griffin (CDAS 6);
Kearney Park, Fresno, x.21.19 (AMNH 11);
Shaver Lake, vii.13.1946, BE White (CAS 1);
Ward Lake, nr. Florence Lake, vi.18.46, BE White (CAS 4);
Humbolt Co.: Blocksburg, v.25.41, GP Bliven (CAS 2), v.30.37, BP Bliven (CAS 9), vi.10.1935, HJ Rayner (CAS 1);
Fort Seward, 6.4.1935, EW Baker (AMNH 1), vi.3.1935, HJ Rayner (CAS 1);
County record: iv.25.11, Nunenmacher (FMNH 3, CAS 1);
Inyo Co.: Bishop, June (CAS 8), June, Fenyes (MCZ 2), no date (AMNH 2);
Kern Co.: Lebec, 5.12.1916, JO Martin (CAS 1);
Tejon Canyon, May.12.1927, EC Van Dyke (CAS 5, AMNH 1);
Lake Co.: Clear L., v.1895, Van Dyke (CAS 4);
Lassen Co.: Facht, 5.vi.21, JO Martin (CAS 40, AMNH 2, BPBM 1);
Hallelujah Jct., vi.22.1964, C Slobodchikoff (CAS 1);
2 mi.S. Olema, 7.iv.1957, Menke & Stange (LACM 32);
Poison Lake, vi.13.11, AJ Walz (UIM 3);
Westwood, 17.vi.1959, Kelton & Madge (CNC 2);
Los Angeles Co.: County record: no date, Coquillet (USNM 1);
Madera Co.: Bates, iii.27.17 (AMNH 1);
Jackass Mdws., 7000', 7.31.1945, HP Chandler (CAS 1);
Mugler Mdws., 7000', 7.31.1946, HP Chandler (CAS 2);
Soquel Basin, 5000', 7.4.1946, HP Chandler (CAS 1);
Marin Co.: Alpine Lake, 3.16.47, D Giuliani (CAS 11);
Fairfax, v.1.1949, D Giulinai (CAS 3);
Lake Laguntias, iv.12.58, DC Rentz (CAS 4, MSUE 2), v.18.58 (CAS 2);
2 mi.S. Olema, 7.iv.1957, Menke & Stange (LACM 32);
Phoenix Lake, x.5.1940, JW Tilden (CAS 10), iv.28.1940, JW Tilden (SJSU 1);
Point Reyes, May.22.1925, HH Keifer (CAS 9);
County record: v, Liebeck colln (MCZ 2);
Mariposa Co.: Yosemite, 27.vii (LACM 1), vii.2.31, AT McClay (MCZ 1, WSU 2), 8.35, ES Ross (CAS 4), 2.vi.31, AT McClay (CNC 8);
Yosemite N.P., 9 km.E. Chinguapin, 17.vi.1945, BE White (CAS 2);
Yosemite Valley, July.5.1931, I Wilson (LACM 1, UMMA 4), v.22.1921, Van Dyke (CAS 17);
Yosemite Valley, Gov't. Center, 4000', 4,27.v.39, Tiemann (LACM 5);
Mendocino Co.: Willits, vi.9.1932 (CAS 1);
Merced Co.: Cressey, iv.18.1946, BE White (CAS 1);
2.5 mi.E. Cressey, iv.17.1978, Gilbert & Andrews (CDAS 9), iv.26.1976, Gilbert & Griffin (CDAS 2);
Dos Palos, 5.17.1942, PH Arnaud (CAS 2);
Kearney Rch., v.11.39 (CAS 30);
Merced, 15.v.1934, O Bryant (CAS 7), 5.iv.1944, BE White (CAS 7), 15.iv.1945, BE WHite (FMNH 4), ix.1942, WF Barr (UIM 1);
Snelling, iv.17.1953, RP Allen (CDAS 1, CAS 4), iv.29.1967, RP Allen (CDAS 1), iv.16.1945, BE White (CAS 19);
Modoc Co.: Eagle Peak, 7778', no date (WEEM 1);
Eagle Peak Mdws., 7050', vi.2.1931 (CAS 10, CNC 4);
County record: v.29.13, Nunenmacher (FMNH 1);

Mono Co.: Coleville, v.28.1939, M Cazier (AMNH 1);
Monterey Co.: County record: no date, Klages coll'n (CMP 4);
Napa Co.: St. Helena, iv.3.1952, RP Allen (CAS 1); County record: no date (UCR 1);
Nevada Co.: Grass Lake, 23.July.1956, PS Bartholomew (CAS 5), 6.23.1956, PS Bartholomew (CAS 104);
Grass Valley, July.12.1962, K Orlica (OSUC 1);
nr. Hobart Mills, 23.vi.1962, RL Westcott (LACM 2);
Hobart Reservoir, 1 mi.NNW Hobart Mills, 20June.1974, DR Harris (CDAS 5);
Sagehen Creek, 19.June.1985 (SMCL 2);
Sagehen Ck., nr. Hobart Mills, vi.24.1964, SG Seminoff (CDAS 1), 15.viii.1971, DP Levin (LACM 5), 14.vii.1962, RL Westcott (LACM 1), vi.24.1970, RF Lagun (WSU 1);
Truckee, vii.17.1939, CT Sierra (CDAS 37), 15.vi.1939 (LACM 48), vi.11.1939, CT Sierra (CDAS 4), July.6.1927, EP Van Duzee (CAS 2);
Orange Co.: Santa Ana, 3.31 (LACM 1);
Placer Co.: Gold Run, vi.18.36, MA Emburg (CAS 2, LACM 1);
Plumas Co.: Quincy, 18.v.1959, WW Ward (CDAS 2);
Sacramento Co.: Carmichael, 17.v.1958, RF Wilken (CDAS 1);
Sherman Island, iv.20.1958, TN Seeno (CDAS 5);
San Bernardino Co.: Victorville, iv (CAS 3);
San Diego Co.: Cibbits Public C.G., 4200', 5/7.v.78, C Bellamy (CDAS 9);
Mt. Palomar, v.28.1965, FG Andrews (CDAS 1);
San Diego, no date, Ricksecker (SDNH 2);
County record: Apr.'15, MC Van Duzee (CUIC 2);
San Mateo Co.: Postola Valley, 4.v.17, F Muir & WM Giffard (CAS 1);
Searsville Lake, 5.v.1953, PH Arnaud (CAS 3);
Santa Clara Co.: Palo Alto, iv.29.28, JO Martin (CAS 1);
San Jose, 4.16.40 (SJSU 2);
Shasta Co.: Killark P.H., Whitmore 3000', 13.v.1949, HP Chandler (CAS 1);
Manzanita Lake, Lassen N.Park, v.21.41, AJ Walz (UIM 1);
Shingletown, vi.2.41, AJ Walz (UIM 4);
Summit Lake, 2.July.1947, CH Spitzer (CAS 3), 23.vii.1950, LW Quate (CDAS 6);
Sierra Co.: Loyalton, 16.v.1956, ex Agropyron cristatum, W Ward (PUL 1);
Siskiyou Co.:
Grass Lake, 5000', vii.4.1952, Cazier, Gertsch & Schrammel (AMNH 31), 17.vi.57, DH Huntzinger (SJSU 3, MSUE 3), 22.vi.1974, A & D Smetana (CNC 1);
Luther Pass, Grass Lake, 26.vi.1930, AT McClay (LACM 1);
N. of Weeds, 11.June.56, JG Edwards (SJSU 2);
2 mi.N. Weed, xi.23.1971, "berlese oak litter", TR Haig (CDAS 3);
Sonoma Co.: Bennet Mtn., nr. marshy lake, 23.iv.1955, PH Raven (CAS 45, BPBM 1);
Bennet Mtn. Lake, W. of Kenwood, 1180', 26.v.1963, HB Leech (CAS 58);
nr. Duncan Mills, 14.v.1955, PH Raven (CAS 1);
Forestville, v.17.1937, AT McClay (CDAS 1, EGRC 39), 6.vi.1936, AT McClay (EMUS 4), 2.iv.36, AT McClay (LACM 1), vi.26.1938, AT McClay (CDAS 2);

Glen Ellen, 6.vi.1936, AT McClay (EMUS 2), v.18.1938, AT McClay (CDAS 1);
marsh, 3 mi.W. Kenwood, 8.vi.1962, P Rubtzoff (CAS 1);
4 mi.W. Kenwood, 17.vi.1961, DC Rentz (CAS 1);
Santa Rosa, no date (LACM 2), iv.16 "in buttercups" (MCZ 2);
Sebastopol, v.11.96, AT McClay (CDAS 1), 25.v.36, AT McClay (CUIC 1, MCZ 1), 26.iv.1936, AT McClay (EMUS 1)
Sugarloaf Ridge St. Pak., 7.April.1985, LG Bezark (ISAC 2);
County record: no date (AMNH 1);
Tehama Co.: N. Fork Battle Cr., 4 mi.W. Viola, 14.vii.1953, "ex Mt. Azalea", WC Day (CAS 1);
S. Fork Battle Cr., 1000', v.5.1984, DS Chandler (UNH 15);
Wilson Lake, 5300', 27.vi.1966, CW O'Brien (EMUS 8, VPI 6);
Trinity Co.: Carrville, vi.10.1913, Van Dyke (CAS 16);
Tulare Co.: Giant Forest, July.13,14,21.1922,1923,1928, CL Fox (CAS 3);
Kaweah, 12.iv.1931, Wapner (CNC 3);
Sequoia, 27.June.1960, Faulkner (SDNH 5);
Sequoia N.P., Crescent Meadows, 7000-9000', vi.19.29, Van Dyke (CAS 33, AMMH 2), vi.24.1929, AT McClay (LACM 5, CDAS 10), Huckleberry Meadow, 6000', 28.V.1984, R. Baranowski (UZIL 2);
Tuolumne Co.: Haiden Lake, 7575', no date (CUIC 4);
Ventura Co.: S. Emidio cn., vi.3.1904, Van Dyke (CAS 4);
Localities not found: Alpine Dam, 4.10.33, ES Ross (AMNH 1);
Myers, 6300', vi.25.1930, AT McClay (NMDC 1);
Placerville, 6.'16, HG Champion (BMNH 1);
Sandhill Road, Stanford U., 3.30.52, PSB (CAS 1);
Yosemite, Pothole Meadows, 7550', 2.vi.32, AT McClay (CUIC 1, LACM 1);
Warners Hot Springs, 5.4.40, GP MacKenzie (LACM 11, UCR 2, MCZ 2);
Miscellaneous: Lake Tahoe, 31.vii (LACM 1);
Sequoia Nat. Park, 5000'-7000', 19.vi.1929, AT McClay (CAS 1, LACM 2, UAE 4, WEEM 3), 24.vi.1929, AT McClay (CNC 1), 6200', 6.June.1935, AL Melander (MCZ 2), vi.14.1929, AT McClay (SDNH 1);

COLORADO:
Boulder Co.: Glacier Lake, S. of Ward, 8.vii.1939, UN Lanham (UCM 1);
Longs Pk. Inn, 13,15.vii.1926, EC Van Dyke (CAS 27);
Muskee Lake, nr. Nederland, 22.vi.1937, H Rodeck (UCM 1), 23.vi.1939, UN Lanham (UCM 1);
2 mi. SW. Nederland, 5.vii.1939, Rodeck & Lanham (UCM 13);
5 mi.E. Nederland, 7500', 2.vii.1961, JG Chilcott (CNC 1);
W. Science Lodge, 19.vi.1940, UN Lanham (UCM 1);
Delta Co.: Grand Mesa, 8.vii.1938, Bauer & Lanham (UCM 4);
Gunnison Co.: Gothic, 9500', July.24.1961, T Hicks (PMY 3);
La Plata Co.: Electra Lake, F4367, "about 37°33'M, 107°48'W, 8400 ft.", vi.28-vii.1.'19 (AMNH 22); Electric Lake, F4367P, "about 37°33'M, 107°48'W, 9000 ft.", June.28-30.'19 (AMNH 21);
Larimer Co.: Estes Park, 26.June.1971, VM Kirk (NDSU 1), 8500', Aug.31 (AMNH 1, CAS 4);
Montezuma Co.: Mancos, 24.vii.1970, BF & JL Carr (CARR 1);
Localities not found: Hartsell, 20.June.1940, AL Melander (MCZ 4);
Pingree Park, 9.vii.1938, 9.vii.1938 (PUL 1);
San Juan Mtns., Evergreen, vi.27.1955, CP Alexander (MCZ 1);
Miscellaneous: Rocky Mtn. Nat. Park, July.194?, FE Winters (CAS 10, AMNH 2), 9000', no date, FE Winters (AMNH 1);
"U. Camp" (Boulder), 20.vi.1941, Weeth (UCM 1);

CONNECTICUT:
Litchfield Co.: Litchfield, 6.5.05, LB Woodruff (AMNH 1);
New Haven Co.: So. Meriden, vi.4.1937, HL Johnson (CAS 2);
Locality not found: Mt. Washington, Tom Lake, 14.vi.1924, Chamberlain (CUIC 5);
IDAHO:
Adams Co.: 9 mi.N. New Meadows, vi.7.76, xi.28.1976, DF Viers (UIM 2);
Benewah Co.: Plummer, x.7.32, RD Shenefelt (WSU 1);
Rocky Point, vi.24.1962, P & RE Stecker (SJSU 11);
Boise Co.: Bull Trout Lake, vii.24.67, EJ Allen (UIM 13);
Bonner Co.: 1 mi.N. Cocotalla, v.9.60, AR Gittins (UIM 1);
Coolin, Priest Lake, July.17.1927, EC Van Dyke (CAS 16, AMNH 2);
Pack River, 11 mi.NE Sandpoint, v.18.66, WF Barr (UIM 6);
Priest's Lake, 1897, WJ Gerhard colln (FMNH 2), no date (AMNH 1);
Priest River Exp. For., vi.2.1954, WF Barr (OSUC 2, UIM 11);
Round Lake, v.20.70, WF Barr (UIM 1);
Sagle, vi.3.1950, NM Downie (NMDC 1), v.30.1949, NM Downie (NMDC 3);
Sandpoint, 6.19.1973, NM Downie (NMDC 7, PUL 5);
Boundary Co.: Paradise Valley, vi.23.60, RE Stecker (UIM 1);
Camas Co.: 12 mi.S. Fairfield, vi.15.67, LS Hawkins (UIM 1);
Canyon Co.: Caldwell, 5.17.1950, 2375 ft. (UIM 1), 5.7.69, MJ Anderson (CDAS 7);
Caribou Co.: 5 mi.E. Wayas, vi.23.1967, HC Manis (UIM 1);
Cassia Co.: Raft R. Narrows, 8.vii.1978, GF Knowlton (EMUS 9);
Clearwater Co.: Grangemont, 3.24.36, C Wakeland (UIM 16, OSUC 1);
Custer Co.:
Stanley Lake, Sawtooth Mtns., July.23.1952, B Malkin (OSUC 1, FMNH 1);
Elmore Co.: 5 km.N. Mountain Home, 1.vi.1986, C & A v.Nidek (CVNC 2);
Fremont Co.: Cave Falls Rd., Targhee Nat. For., 12 km.W. Wyo. border, 17.vi.1986, BF & JL Carr (CARR 4);
Warm River Springs, Targhee Nat. For., 7-18.vi.1986, C & A v.Nidek (CVNC 28);
Warm River Cpgrd., 16.vi.1986, BF & JL Carr (CARR 5);
Idaho Co.: Whitebird, June.30.1907, JM Aldrich (UIM 7);
Whitehouse pond, on N. side Rt. 12, W. Lolo Pass, 24.Jun.1968, Wiggins, Smith & Yamamoto (ROMC 1);
Kootenai Co.: 2 mi.W. Cataldo, v.21.70, WF Barr (UIM 11);
Coeur d'Alene, no date, Hubbard & Schwarz (USNM 1), no date (UMMA 1);
21 mi.S. Coeur d'Alene, vi.1961.23, on Salix, RE Stecker (SJSU 2),
Kelso Lake, vi.2.57, WF Barr (UIM 3, OSUC 1);
Lake Coeur d'Alene, vi.24.1962, RE Stecker (UIM 1), S. end, vi.24.62, "on sedges", RE Stecker (UIM 11);
Latah Co.: Deary, v.30.1951, NM Downie (NMDC 1), 2775 ft., 5.25.1952, HC Manis (UIM 1);
Moscow, 2.vi.1908, ET Cresson (CAS 7), 23.Sept.1927, HA Waters (USNM 1), v.17.10, JM Aldrich (UIM 5, OSUC 2), May.25, "on flowers of Cowslip", JM Aldrich (UIM 2), 2500', May.25.1960 (UIM 1), no date (CUIC 1, DEFW 2, MCZ 2, UIM 2);
Moscow Mtn., 3500-4800', v.23.1979, K Hosman (OSUC 2);
Troy, vii.1952, WF Barr (UIM 2);
Spring Valley Res., no date, AL Antonelli (UIM 7);
Nez Perce Co.: Cottonwood Crk., 5 Mi. S. Myrtle, v.9.1964, ER Logan (UIM 1);
Owyhee Co.: 6 mi.SE. Grasmere, vii.6.1965, RL Westcott (UIM 1);
Mary's Creek, 6 mi.SE. Grasmere, vii.6.1965, AR Gittins (UIM 1);

Shoshone Co.: Clarkia, v.i.19.1949, AJ Walz (UIM 6);
Teton Co.: Tetonia, vi.23.1964, WF Barr (UIM 3);
Twin Falls Co.: Salmon Falls Creek, 6 mi.S. Castleford, vi.18.1965, LS Hawkins (UIM 14), vi.23.1966, RL Penrose (UICM 2);
Valley Co.: 2 mi. NE. Cascade, vi.10.1967, EJ Allen (UIM 3);
3.3 mi.NW. Cascade, vi.10.1967, LS Hawkins (UIM 5);
5 mi.S. Cascade, vi.9.60, JE Henry (UIM 3);
3 mi. W. McCall, vii.4.1959, HW Homan (UIM 1);
Smith's Ferry, June.23.1938, MC Lane (UIM 3, SJSU 1, OSUC 10);
2 mi.N. Warm Lake, vi.25.59, WF Barr (UIM 13, OSUC 1);
Washington Co.: 8 mi.S. Cambridge, 14.June.1959, DR Smith (OSUC 1);
Miscellaneous: Hwy. 34, 26 km.E. Wayan, 20.vi.1986, BF & JL Carr (CARR 3);

MAINE:
Aroostook Co.: Stockholm, 7.18.29, EJF Marx (AMNH 4);
Kennebec Co.: Belgrade, 44.434°, 69.844°, 22.vi.1983 (RNEL 1);
Monmouth, vi.28, CA Frost (OKS 4);
Oxford Co.: Bethel, 11,15,20.vi.1924, JG Gehring (MCZ 4);
Norway, 1864-65, SI Smith (PMY 5);
Paris, vi.11.25, vi.28, CA Frost (CAS 6), 26.vi.1944, CA Frost (CUIC 2), vi.13.10, CA Frost (MCZ 3), 28.Nov, CA Frost (MSUE 4), vi.28.32, CA Frost (DEUN 4), vi.11.25, CA Frost (INHS 1);
Penobscot Co.: Orono, v.1963 (INHS 2);
Washington Co.: Meddybemps, vi.20.22 (CMP 1);

MASSACHUSETTS:
Bristol Co.: Fall River, vi.25.29, NS Easton (MCZ 1);
Essex Co.: Lawrence, 26.v.1923, EL mank (CUIC 3);
Nahant, vi.3.1935, Darlington (MCZ 1);
Nantucket, vi.7.27 (CAS 3, MCZ 1), vi.25.26 (MCZ 1);
Hampden Co.: Springfield, 21.May.1903, F Knab (USNM 4);
Wales, vi.18.06, CA Frost (UAE 1), vi, CA Frost (UMMA 1), vii.20.06, CA Frost (MCZ 1);
Middlesex Co.: Ashland, 6/10/49, CA Frost (AMNH 1);
Cambridge, 21.2.74, 18.3.74, 10,11,24.1.74 (MCZ 6), no date (MCZ 2);
Framingham, vi.8,vi.9, CA Frost (USNM 2), v.30.06, CA Frost (UAE 1), 20.v.1944, CA Frost (CUIC 1), 2.vi.46, CA Frost (CUIC 1, MCZ 1), v.26.44, CA Frost (CUIC 1, CNC 1), 6.2.45, CA Frost (UCR 2), vi.9, CA Frost (DEFW 1), v.21.11, CA Frost (MCZ 1);
Holliston, v.5.23, JH Emerton (MCZ 1);
Lowell Jc., vo.9.07, FA Sherriff (MCZ 1);
Sherborn, May.30.'95, AP Morse (MCZ 1), x.15.1922, "sifting", CA Frost (MCZ 1), 6.11.49, CA Frost (AMNH 1), v.30.1929, CA Frost (SDNH 1), v.20.34, CA Frost (CAS 1), 2.vi.23, CA Frost (CUIC 1);
Stoneham, vi.13, Sherriff (CAS 1);
Sudbury, 27.v.23, CA Frost (CAS 1);
Tyngs, no date, F Blanchard (MCZ 5), no date (USNM 1);
Wilmington, v.31.25, CA Frost (MCZ 1);
Norfolk Co.: Brookline, no date, (CAS 2); no date (MCZ 2);
Wellesley, 21.v.20 (CAS 1);
County record: Apr./June, R Hayward (MCZ 3);
Plymouth Co.: Hanson, 30.vi.07, Jun.22.1919, PG Bolster (MCZ 3);
Suffolk Co.:
Dorchester, Jun.17.1907, PG Bolster coll'n. (MCZ 2);

Worchester Co.: Southboro, 30.v.23, CA Frost (CAS 1, MCZ 1), 5.28.38, JG Thorndike (AMNH 1);
Winchendon, June.29.1892, AP Morse (MCZ 2);

MICHIGAN:

Arenak Co.: County records: 30.v.1951, RR Dreisbach (UMMA 1);
Calhoun Co.: Battle Creek, v.19.'32, H.H. (MSUE 2);
Cheboygan Co.: Douglas Lake, July.2.31, C.W.S. (MSUE 1), vi.13.1917, MH Hatch (UMMA 1, OSUC 1), 9.vii.1920, MH Hatch (UMMZ 1), 3.vii.1936, CD Lyman (UMMA 1);
Duncan Bay, 28.vi.1938 (UMMA 1);
County records: vii.3.37, RR Dreisbach (MSUE 1), vi.23.1949, JO Corliss (PMHN 1), 6.19.1949, JD Lattin (OSUC 2), 24.vi.54, SA Brask (UMMA 1), 27.vi.35, DS Shetter (UMMA 1), July.35 (UMMZ 1), 10.vii.1945, F Long (FMNH 1);
Chippewa Co.: Whitefish Point, no date, Hubbard & Schwarz (USNM 8), 25.vii.14 (UMMA 1);
Emmet Co.: Maple River, 24.vi.1952, PJ Spangler (WEEM 3);
Houghton Co.: Houghton, 7.July.1964, RB Willson (MSUE 3);
Iosco Co.: County records: 2'.vi.1951, RR Dreisbach (UMMA 1);
Keweenaw Co.: Copper harbour, June.27.1957, RW Hodges (MSUE 11);
Isle Royale, Beson Creek, 26.June.1964, RB Willson (MSUE 2);
Luce Co.: Pike Lake, Forest Reserve, 18.vi.1925, J Metzelner (UMMA 2);
Mackinac Co.: Brevort, June.22.1956, RD Niemczyk (MSUE 1);
Cedarville, vi.1929 (CMP 2);
10 mi.W. Hessel, 12.June.1977, Flyn & maher (MSUE 1);
Pine River, June.23.1924, S Moore (UMMA 1);
St. Helena Is., May.26,28.1922, S Moore (UMMA 3);
St. Ignace, May.30.1921, S Moore (UMMA 9);
County records: 4.vii.36, RR Dreisbach (UCS 1), vi.7.60, RR Dreisbach (MSUE 3);
Macomb Co.: E. of Memphis, 21.vi.1967, C Brivio (PIME 1);
Marquette Co.: Huron Mountain Club, Cranberry Bog, 10-15.June.1974, D Young &R Arnold (EGRC 7);
Midland Co.: Midland, June.6-7.1936, CW Sabrosky (MSUE 1):
County records: v.29.37, RR Dreisbach (MSUE 1), 29.vi.37, RR Dreisbach (UCS 1);
Missaukee Co.: County records: 6.22.58, RR Dreisbach (MSUE 1, AMNH 1, UMMA 1);
Montgomery Co.: County records: 7.5.45, RR Dreisbach (UMMA 1);
Ontonagon Co.: Lake Gogebic, 23.vi.1938, JR Bailey (UMMA 1);
Roscommon Co.: Houghton Lake, v.21.1958, RW Hodges (MSUE 17);
County records: 5.18.58, RR Dreisbach (AMNH 1), 6.5.55, RR Dreisbach (UMMA 1);
Washtenaw Co.: County records: vi.11.1923, MH Hatch (OSUC 1);
Wayne Co.: Detroit, vii, vi.1924, H Klages (CMP 4);
Wexford Co.: County records: 6.5.49, RR Dreisbach (AMNH 1, MSUE 2), 6.28.47, RR Dreisbach (MSUC 1);

MINNESOTA:

Cass Co.: Gull Lake, 19.v.1941, G Kretzschmar (DEFW 2);
Clearwater Co.: 1.6 mi.W. Isabella, 6.30.1979, R Gunderson (SCSU 2);
5 mi.E. Isabella, vi.27.1976 R Gunderson (SCSU 1);
9 mi.WNW. Isabella, 7.1.1979R Gunderson (SCSU 1);
14 mi.WNW. Isabella, E of Chub L., vii.1.1979, R Gunderson (SCSU 1);

Itasca St. Park, vi.17,18,19.1968, R Gunderson (SCSU 8), 27.v.1936, R Gottrell (DEFW 1), 29.v.1934, CE Mickel (DEFW 3), 30.v.1953, DJ Pletsch (DEFW 1);
Cook Co.: Grand Marais, 20.vi.1940, G Kretzschmar (DEFW 3);
Kanabec Co.: Mors, 16.vi.1922, WmE Hoffman (DEFW 1);
Lake Co.: Basswood Lake, Q-S WRC Sec.9, Twp.64N, Rge.10W, 13.vii.1957, EF Cook, B Ebel, Namba (DEFW 17);
Mille Lacs Co.: Vineland, 24.v.1941, G Kretzschmar (DEFW 1);
Otter Tail Co.: Maplewood State Park, May.27.1983, Carex, IS Askevold (ISAC 1);
Red Lake Co.: Plummer, 2.vi.1933, D Denning (DEFW 1);
MONTANA:
Carbon Co.: E. Rosebud Lake, 12.vi.1961, B Vogel (UCM 5);
Flathead Co.: Big Fork, June.14.1904 (MTSU 1), 3000', June.13.1967, L Russell (OSUC 8);
Gallatin Co.: Three Forks, vi.18.1959, AR Gittins (UIM 1);
Glacier Co.: 2 mi.E. Babbs, no date, AJ Allen (UIM 2);
County record: May.1957 (MTSU 1);
Lake Co.: Flathead Lake, Missoula Mt., 1913 (PMY 1);
Ronan, 2700', June.11.1967, L Russell (OSUC 3);
Swan L., 3200', June.14.1967, L Russell (OSUC 2);
14 km.S. Swan L., 3200', June.14.1967, L Russell (OSUC 21);
Missoula Co.: Frenchtown, 300', June.10.1967, L Russell (OSUC 1);
10 km.W. Ovando, 3400', June.15.1967, OSUC 1);
Seeley L., 3500', June.15.1967, L Russell (OSUC 2);
Ravalli Co.: Canyon Creek, 5.23.34 (MTSU 1);
Girds Creek, 6.3.34, L Jellison (UGA 1);
Hamilton, 4.25.1929 (MTSU 1);
Locality not found: Johns Lake bog, Glacier Nat. Park, 4500', July,20.1967, L Russell (OSUC 1);
NEVADA:
Elko Co.: Deeth, 25.vi.1956, Knowlton, Roberts & Hanson (EMUS 2);
County record: 1.vi.1968, " on Lepidium", GE Bohart (EMUS 1);
Washoe Co.: Reno, no date, (USNM 2, UMMA 1, CAS 2, MCZ 4, AMNH 6), Verdi, 18.vi.1964, SG Seminoff & CN Slobodchikoff (CAS 1, CDAS 14);
Locality not found: Miguel Meadows, 8.vii.1938 (CAS 2);
Miscellaneous: "Nev." or "Nevada", no dates (USNM 2, MCZ 1);
NEW HAMPSHIRE:
Grafton Co.: Plymouth, 14.vi.49, A Bray (AMNH 1); Rumney, vi.13,15,29.1924, vii.4.1924, JG Gehring (MCZ 10);
Hillsboro Co.: Antrim, 24.v.30 (OSUC 1), vi.25.33, CA Frost (CAS 5);
Rockingham Co.: Northwood, vi.1.1979, WJ Morse (UNH 1);
Strafford Co.: Dover, 6.5.1936, BG Markos (UNH 1);
Durham, 6.7.1936, "on lily pad", BG Markos (UNH 1), v.3.46, RL Blickle (UNH 1);
Sullivan Co.: Claremont, vii.10.11 (USNM 1), v.10, GP Engelhardt (AMNH 1);
NEW MEXICO:
Otero Co.: Cloudcroft, vi.27.40, DE Hardy (AMNH 1);
NEW YORK:
Columbia Co.: Lake Charlotte, 26.vi.1920 (CUIC 1);
Franklin Co.: Cereys, x.12.28, WJ Gerhard (FMNH 1);
Hamilton Co.: 1 mi.SE Blue Mtn. Lake, Hwy.30, 8.vi.1986, DA Pollock (ISAC 34);
Herkimer Co.: Old Forge, 1.vii.1965, LL Pechuman (CUIC 1);

Lewis Co.: Black River, Lowville, 23.June.1921, H Notman (CAS 1);
Tug Hill, 21.vi.1966, LL Pechuman (CUIC 5);
Oswego Co.: Pulaski, 20.vi.25, PP Babiy (CUIC 1);
St. Lawrence Co.: Canton, vi.5.1935, NM Downie (NMDC 4, UIM 4), June.2.1933 (OSUC 3);
Rossie, v.30.1941, NM Downie (NMDC 1), 6.13,17,18.1965, NM Downie (NMDC 3), v.31.41 (FMNH 3, NDSU 6);
Tompkins Co.: Ithaca, 12.vi.1917, H Dietrich (CUIC 1), 23.v.1896 (CUIC 1);
Locality not found: Barnum Pond,13.vi.1933, H Dietrich (CUIC 3);

OREGON:
Baker Co.: Durkee, vi.16.47, KM Fender (OSUC 1);
0.3 mi.S. Durkee, H'way 30, June.28.1952, B Malkin (FMNH 1, OSUC 1);
Sumpter, 28.v.1984, BF & JL Carr (CARR 4);
Benton Co.: Coffin Butte, 10 mi.N. Corvallis, 1.14.60 (OSUC 1);
Corvallis, no date, GF Moznette (OSUC 8, BMNH 1), vi, 1900, Klages coll'n (CMP 3), 6.7, 6.8, Liebeck coll'n (MCZ 2), 6.4.98 (OSUC 1), v.17,20.14 (UMMA 2), no date (CUIC 6), 27.v.1896, 6.10.98, 30.v.1898 (DEFW 3), v.23.45, G Bennett (OSUC 4), v.5.39, GG Black (OSUC 1), May/June.1963, J Rogers (OSUC 2);
Corvallis, Peoria Rd., 5.16.41, Schuh & Gray (AMNH 10, MSUE 2);
2 mi.N. Corvallis, v.14.63, AJ Skorper (OSUC 1), v.9.45, "on red clover" (USNM 2);
10 mi.S. Corvallis, May.1963, J Rogers (OSUC 1);
20 mi.S. Corvallis, WL Finley Wildlife Refuge, 20.v.27, "ex blue camas", J Lattin (OSUC 1);
McFadden's Pond, 10 mi.S. Corvallis, March.7.1963, DR Smith (OSUC 2), 27.iv.51, G Wood (OSUC 1);
WL Finley Wildlife Refuge, v.14.1983, "berlese grass sod", DS Chandler (UNH 1);
3.5. mi.NE. Summit, Oct.17.1963, J Lattin (OSUC 1);
Clatsop Co.: Cannon Beach, June.12.1927, EC Van Dyke (AMNH 1);
Hammond, 15.vi.'45 (USNM 25);
Coos Co.: Fairview, 5 mi.NE. Coquille, v.31.59, vi.6.59, J Rogers (OSUC 7);
Hauser, 6.v.1939, LG Gentner (USNM 2, CNC 1), 6.v.39, MC Lane & LG Gentner (OSUC 17), v.18.1947, WD Blehm (EGRC 2);
Crook Co.: Big Summit Peak, Ochoco N.F., June.10.62, MC Lane (OSUC 10);
Curry Co.: Flores Lake, 12 mi.N. Port Oxford, 26.vii.1967, K Goeden (ODAC 3);
Deschutes Co.: Cline Falls State Pk., June.13-14.1951, B Malkin (OSUC 6, FMNH 4);
Elk Lake, vii.3.38, KM Fender (CAS 5, AMNH 1, CNC 2, FMNH 5, UMMA 1);
Indian Ford, H'way #20, 20.vi.64, K Goeden (ODAC 1);
3 mi.S. La Pine, 15.June.1974, DR Harris (CDAS 1);
Tumalo St. Pk., 7 mi.NW Bend, 3325', 20.v.61, J Lattin (OSUC 1);
Douglas Co.: Diamond Lake, 15.vii.1927, EH Nast (CAS 1), July.4.1934, LG Gentner (OSUC 1);
Siltcoos Outlet, June.6.1957, B Malkin (FMNH 5, OSUC 3);
Sutherlin, v.6.1938, AT McClay (LACM 10);
Umpqua R., (rocky shoreline of), S. of Elkton on R.138, 7.June.1968, Yamamoto & Smith (ROMC 3);
Grant Co.: 8-10 mi.N. Seneca, July.13.1953, V Roth (OSUC 25);

Harney Co.: Fish Lake, Steen Mtns., July.14-16.53, Rok & Beer (OSUC 2);
Malheur Lake, vi.19.47, KM Fender (OSUC 1);
Page Spring City, May.14-15.1976, NE Woodley (WSU 7);
Pueblo Mtns., v.23.50, KM Fender (OSUC 1);
Steen Mts, 22,23,25.vi.1922, Van Dyke (CAS 32), June.24-25.1922, WJ Chamberlain (OSUC 22, CMP 2);
Home Co.: Catlow Valley, v.22.50, KM Fender (OSUC 8);
Hood River Co.: Mt. Hood, Bear Spr. R.S., 12.vi.61 (OSUC 1);
Jackson Co.: Brownsboro, June.13.1940, LG Gentner (OSUC 10);
Butte Falls, 6.7.41, Schuh & Gray (CAS 1, MSUE 5, AMNH 11), May.22.1941, LG Gentner (OSUC 37), vii.3.1953, LG Gentner (OSUC 19), July.4.1941, LG Gentner (OSUC 10), 22.v.1941, AT McClay (CDAS 5);
Eagle Point, May.23.1937, LG Gentner (WSU 1), Apr.17.1939, LG Gentner (OSUC 1), Apr.19.1936, LG Gentner (MCZ 1, OSUC 3), 21.iv.1940, LG Gentner (OSUC 9, CNC 1, USNM 1), 28.iv.1935, LG Gentner (CUIC 1);
Medford, Touvelle St. Pk., v.18.68, Oman (OSUC 5), May.18.1968, H. Meister (TAMU 2), v.10.1969, T. Duprik (TAMU 6);
Prospect, vi.11.1938, AT McClay (CDAS 7), June.10.1939, Apr.30.1939, LG Gentner (USNM 2, MCZ 3, OSUC 29), v.5.39, AT McClay (NDSU 14), 30.iv.39, LG Gentner (CNC 1);
Jefferson Co.: Hanson's Resort, no date, Van Dyke (CAS 2);
Josephine Co.: 2 mi.S. Galice, 6.v.62, DR Smith (OSUC 1);
Klamath Co.: 10 mi.w. Beatty, gravel pit, July.2.64, JD Lattin (OSUC 1);
Bly, vi.13.45, KM Fender (OSUC 20);
5 km.W. Bly, no date, R Danielsson (UZIL 4);
Bly Mts., vi.13.45, KM Fender (OSUC 14);
7.5 mi. S. Fort Klamath, 8.v.1968, Smetana & Campbell (CNC 1);
2 mi.S. Keno, 7.vi.1977, RL Westcott (ODAC 8);
10 mi.W. Klamath Falls, June.16.52, V Roth (OSUC 3), 5.28.39 (OSUC 9);
Klamath Lake, 5.29.39 (OSUC 2), 6.29.39 (UIM 2);
Lake of the Woods, 4.vii.1934, Van Dyke (CAS 10), 11.June.1939, LG Gentner (OSUC 8, CNC 1, USNM 1, MCZ 1), June.11.1929, LG Gentner (OSUC 7);
Lake of the Woods, Rainbow Cp., 4900', 23.v.58, BD Ainscough (OSUC 1), 23.v.1958, "Abies contorta, JD Lattin (OSUC 3);
Lake of the Woods, 10 mi.SE Rocky Point, v.21.58, PO Ritcher (OSUC 1);
Sprague R., 12 mi.E. Chiloqiuin, vii.1-3.51, B Malkin (OSUC 3, FMNH 2);
Upper Klamath Lake, 3 mi.Cr., May.30.1960, J Schuh (MSUE 3);
County record: 5.vi.1941, ER Leech (CAS 1);
Lake Co.: Blue Crk. at Hwy. #140, 25.vi.1984, BF & JL Carr (CARR 4);
Chandler St. Pk., v.27.1957, B Malkin (OSUC 5, FMNH 5), vi.29-30.51, B Malkin (OSUC 1, FMNH 1), 21.vi.1961, DR Smith (OSUC 4);
Chandler Wayside, 17 mi.N. Lakeview, 4300', 2.vii.64, J Lattin & J Schuh (OSUC 1);
Crooked Creek, 7.vi.1958, Vertrees & Schuh (MSUE 3, UGA 1);
Crooked Creek, 19 mi.N. Lakeview, 6.7.55, T Schuh (MSUE 1);
High Tablelands, nr. Warner L., 21.vi.1922, Van Dyke (CAS 1);
Lakeview, Willow Cr. camp, 27.vi.1984, BF & JL Carr (CARR 2);
Silver Lake, 1.vii.1984, BF & JL Carr (CARR 1);
County record: v.25.13, Nunenmacher (RUNB 2);
Lane Co.: Eugene, 10,11,18.26.v.42, B Malkin (FMNH 4), 6.vi.42, B Malkin (FMNH 1);
Florence, 14.vi.1952, B Malkin & R Leeper (FMNH 1);

Siltcoos Lake, 20.vi.1934, Bryant (CAS 13), 28.v.52, PO Ritcher (OSUC 34);
West Lake, 22.July, GC Eickwort (MSUE 17);
Lincoln Co.: DeLake, v.5.1939, MC Lane (OSUC 8);
Linn Co.: Albany, 28.iv.1958, J Capizzi (ODAC 1);
Malheur Co.: Harper, v.21.35, v.10.38, MC Lane (OSUC 2);
Tillamook Co.: 2 mi. SE. Pacific City, v.1.73, Lattin (OSUC 1);
Tierra Del Mar, 13.vi.72, Lattin (OSUC 7);
Umatilla Co.: 10 mi.N. Dale, 29.vii.1962, K Goeden (ODAC 7);
near Ukiah, vi.23.35, J Schuh (AMNH 5, MSUE 3);
Union Co.: Perry, 14.vi.1984, BF & JL Carr (CARR 15);
Union, 17.vi.1939, GF & KM Knowlton (EMUS 1);
Wasco Co.: Jct. Hwy.#216 & 26, 10.vi.1963, K Goeden (ODAC 2);
The Dalles, June.23.82 (MCZ 3);
Washington Co.: Forest Grove, My.5.1919, LP Rockwood (OSUC 1), v.13.38, SE Crumb (OSUC 1);
Gaston, May.23.1933, EW Jones (UIM 2);
Gaston, Wabata Lake, May.17.1929 (OSUC 1);
Wheeler Co.: Mitchell, June.5.1957, B Malkin (OSUC 1);
Yamhill Co.: McInnville, June.8.1942, KM Fender (OSUC 3), May.2,3,7.1944, KM Fender (OSUC 5), 5.21.40, KM Fender (OSUC 4), Apr.27.53, KM Fender(OSUC 1), 5.8.39, KM Fender (OSUC 1), 5.2.36, May.1938 (OSUC 3);
Yamhill, 5.35, ES Rose (CAS 1);
County record: 5.35, ES Ross (AMNH 1);
Localities not found: Clear Lake, July.1.1941, KM Fender (OSUC 9);

PENNSYLVANIA:
Westmoreland Co.: Jeannette, vi.21, HG Klages (CMP 1);
Locality not found: Starlight, v.18.21 (USNM 1), vi.17.21 (UMMA 1), vi.14.21 (CUIC 1), vi.13,14,18.21 (AMNH 7);

RHODE ISLAND:
Newport Co.: Portsmouth, no date, NS Easton (CAS 1);
Tiverton, 3.June.1916, M Bowe (PMY 1);
Providence Co.: Greenville, 30.May.1922, M Bowe (PMY 3);

VERMONT:
Chittendon Co.: 2 mi.W. Jonesville, Gillette Rt., 800', 5.June.1973, DH Kavanaugh & H Goulet (CAS 6);
Windham Co.: Jacksonville, 19.vi.1938, E Pratt (DEFW 1);
Laurel Lake, Jacksonville, 20.vii.1939, E Pratt (DEFW 1);

TEXAS:
Brewster Co.: 17 mi.S. Alpine, vii.12.58, WF Barr (UIM 1);

UTAH:
Beaver Co.: Beaver Valley, vii.6 (USNM 1);
Minersville, 23.v.1961, GF Knowlton (EMUS 1);
Pine Valley, 12.vi.1951, DW Davis (EMUS 1);
Box Elder Co.: Brigham, 2.vi.1945, GF Knowlton (DEFW 1);
Deweyville, 6.7.37, GF Knowlton (EMUS 1);
Honeyville, 29.iv.1934, GF Knowlton & Bixhoff (EMUS 2);
Perry, 29.iv.1941, GF Knowlton (EMUS 1);
Raft River, Upper Narrows, 20.vi.1979, SM Clark (SMCL 18);
County record: 29.v.1965, KJ Capelle (EMUS 1);
Cache Co.: Amalga, 31.v.1937, DE Hardy (EMUS 3), 19.vi.1937, Harmston & Smith (EMUS 2);

Cache Junction, May.28.1947, GF Knowlton (AMNH 1), 28.v.1944, GF Knowlton (EMUS 1);
Cornish, 15.vi.1968, GE Bohart (EMUS 1);
Hyde Park, 4.v.1939, GF Knowlton (EMUS 1);
Hyrum, 22.iv.37, W Berseth (EMUS 1);
Logan, 11.10.1941, JR Fowler (EMUS 2, AMNH 1), 13.vi.1944, GF Knowlton (DEFW 1), 5.7.1941, RS Roberts (EMUS 1);
Tony Grove Cany., 7800', 26-31.vii.1975, "malaise trap", GF Knowlton & Hanson (EMUS 1);
Trenton, 10.vi.1944, GF Knowlton (DEFW 1);
Garfield Co.: Panguitch, 15.vi.1948, GF Knowlton & Wood (EMUS 1);
Grand Co.: Warner Cpgrd., Monti Lasal N.F., 9200', 8.vii.1976, JM Campbell (CNC 1);
Iron Co.: Parowan Cyn., June.20.1960 (VPI 3);
Juab Co.: Chicken Creek Res., 10.vi.1964, WJ Hanson (EMUS 1);
Kane Co.: Duck Creek camp, 7.vii.1964, GF Knowlton (EMUS 5);
Millard Co.: Beaver Mtn. Utah Exp. Sta., 29.v.1938, DE Hardy (EMUS 2);
Delta, May.20.1941, GF Knowlton & Harmston (EMUS 2, AMNH 1);
Piute Co.: Junction, 24.v.1940, GF Knowlton (EMUS 3, AMNH 2);
Rich Co.: Wasatch Mts., 26.vii.1921, GO Wiley (DEFW 1);
Sevier Co.: Fish Lake, 8600', vii.17.1949, WJ & JW Gertsch (AMNH 1);
Utah Co.: American Fk. Camp, 25.vii.1973, GF Knowlton)EMUS 1);
Lehi, 31.X.1980, SM Clark (SMCL 1);
Orem, 5.14.1937 (EMUS 1);
Payson, 21.vi.1945, PE Telford (EMUS 1);
Provo, vi.13-19.1913 (CAS 16, AMNH 5);
Provo Canyon, 26.vii.1945, GF Knowlton (DEFW 2);
Wasatch Co.: Heber, 29.v.1941, GF Knowlton & Harmston (EMUS 1), 19.vii.1966, GF Knowlton (EMUS 1);
Wayne Co.: Freemont, 16.vi.1948, GF Knowlton & Wood (EMUS 1);
Weber Co.: N. Ogden, 26.iv.1931, GF Knowlton (EMUS 1);
Locality not found: Fur West, Medow, 19.v.38, GF Knowlton & Hardy (EMUS 1);
Heber, 26.v.1944, GF Knowlton, Stoddard & Bates (EMUS 3, AMNH 1);
Slaterville, 19.v.1946, GF Knowlton (EMUS 1);

WASHINGTON:

Gray Harbor Co.: Copalis Beach, June.7.1961 (OSUC 8);
Markham, vi.27.1949, RD Shenefelt (WSU 1);
Jefferson Co.: Port Townsend, June, A Seaton (MCZ 1);
King Co.: Seattle, vi.4 (MCZ 2), no date, O.B.J. (OSUC 2), iv.6.11 (OSUC 1), 5.22.13 (OSUC 1), iv.5.11 (OSUC 2);
Kittitas Co.: Roza, v.19.57, MH Hatch (OSUC 2);
Thorp, 8.June.1969, D Harris (CDAS 6);
Lewis Co.: Mt. Rainier Nat'l Park, Stevens Cyn. Gate, 19.June.1986, DG Furth (PMY 14);
Scatter Creek,May.3.1951 (OSUC 7);
Okanagan Co.: Bonaparte Lake, 3600', 18.vi.1954, B Malkin & D Boddy (FMNH 19);
Pacific Co.: Ilwaco, 25.v.1981, C v.Nidek (CVNC 1), Jun.23.1916, A Spuler (WSU 2);
Long Beach, June.10.1957, J & S Burner (OSUC 2);
Nahcotta, May.22.53 (OSUC 1);
Seaview, Jun.30.25, A Spuler (WSU 1);
Pierce Co.: Camp Lewis, 16.v.32 (OSUC 2);
Camp Lewis Pond, 23.vii.32 (OSUC 1);

McChord Field (lake near), vi.15.1940, SE Crumb (OSUC 6);
McKenna, 5.vi.48, MH Hatch (OSUC 1);
Ohanopecosh, Mt. Rainier Nat. Pk., Jct. Rtes. 706 & 143, 4.Jul.1969, ROM Fld. Pty. (ROMC 22);
Parkland, 5.27.62, R Heyer (LACM 2), 15.v.1952, V Newhouse (WSU 1, PUL 1);
Spanaway Lake, 5.26.62, R Heyer (LACM 1);
Steilacoom Lake, v.26.34, JL Wilson (OSUC 1);
Tacoma, no date (MCZ 3);
San Juan Co.: Orcas Isl., Killebrew Lake, v.21.62, Hatch & McCorkle (OSUC 2);
San Juan Isl., Griffin Bay (golf c.), v.15.62, Hatch & McCorkle (OSUC 1);
Spokane Co.: Cheney, 5.27.42 (OSUC 1);
Cheney, Turnbull Slough, v.19.46, MH Hatch (OSUC 17), 5.30.47, RW Rogers (OSUC 1);
Spangle, 24.May.1898, CV Piper (WSU 17, USNM 2);
Spokane, no date (LACM 1, CUIC 5);
Thurston Co.: Millersylvania St. Pk., 8.v.60, MH Hatch (OSUC 1);
Olympia, vi.10.35 (OSUC 1);
Rainier, Oct.7.1963, B Thomson (OSUC 1);
St. Clair L., 5.vi.48, MH Hatch (OSUC 1);
Tenino, v.2.1931, T Kincaid (OSUC 13);
Vail, nr. Rainier, Jun.1.1965, B Thomson (OSUC 9);
Whitman Co.: Pullman, 17.May.'09, JA Hyslop (CNC 1), v.12.71, RG Baker (WSU 1), March.30.'07,8.May.'12, 10.May.07, 18.May.'07, 24.May.'01, 24.May.'09, May.30, 31.May, 1,7,10.June.'07, no date (WSU 17);
Union Town, May.16 (UIM 2);
Wawawai, 8.v.35, MC Lane (OSUC 1);
Yakima Co.: Palouse, no date (WSU 6);
Palouse R., 3 mi. W. Palouse, v.22.1973, DA Honebrink (WSU 1);
Toppenish, v.22.1931, KE Gibson (UIM 1);
N. Yakima, June.24.1903, E Jenne (WSU 1);
Yakima, v.15.22, SE Keen (OSUC 1);
Locality not found: Almota, no date (WSU 1);
Kamiadl, 5.9.34, LT Turner (WSU 1);

WYOMING:

Teton Co.: Hoback Jctn., 12 mi.S. Jackson, 19.vi.1986, BF & JL Carr (CARR 4);
Togwotee Pass, 25.vi.1979, AC Ashworth (ASRC 18);
Yellowstone National Park Co.: Old Faithful, June.24.1936, NH Hatch (OSUC 5);
"Yellowstone", 6.22.1944, GP Mackenzie (UCR 2), 22.vii.20, AA Nichol (DEFW 1);
"Yellowstone Nat. Park, vi.24.55, EW Hamilton (DEUN 3), vii.1935, JE Blum (EGRC 22);

Appendix 10.5.

Locality data for Plateumaris rufa (Say).

CANADA:
NEW BRUNSWICK:
Bathurst, vi.15, JN Knull (CMP 1), 13,15,20.vi, JN Knull (CNC 2);
Greys Mills, 12.ix.1922, EP Gorhan (CNC 1);
Hatfield Point, 18.vi.1981, DR Ward (ISAC 5);
Kouchibouguac N.P., 5.vi.1978, DB Lyons (CNC 1), 14.vi.1977, SJ Miller (CNC 1), 23.vi.1977, SJ Miller (CNC 3), 12.vi.1978, DB Lyons (CNC 1);
Shemogue, 15.vi.1964, GGE Scudder (CNC 1);
Tabusintac, 12,22.vi.1939, WJ Brown (CNC 2);
NOVA SCOTIA:
Albert Bridge, 26.vi.1983, "sweep Ranunculus & weeds, Mira Riv.", L LeSage (CNC 1);
Baddeck, 30.ii.1936, TN Freeman (CNC 1);
Bridgetown, 20.vi.81, DR Ward (ISAC 1);
Cape Breton Highlands nat. Park, Grand Falaise, 30 m. PG566705, 5 km.N., 9.vi.1983, Goulet (CNC 2); CBHNP Pleasant Bay, 12-24.vi.1984, Goulet & Smetana (CNC 68); CBHNP South Hbr. Beach PG960944, 3.vi.1983, H Goulet (CNC 1);
Cape North, vi.24.31, G Fairchild (MCZ 2);
Digby, no date, J Russell (INHS 1);
Tatamagouche, 17.vi.1941, FH Chermock (CAS 2);
ONTARIO:
Ancaster, 21.iv.1962, JEH Matrin (CNC 1);
Arkell, 6.vi.56, DH Pengelly (UGIC 1);
Barcet Crk., Algoma Distr., no date, AC Ashworth (ASRC 1);
Belfountain, 15.vi.1976, EA Innes (UGIC 2);
Bobcaygeon, 1.vi.31, J McDunnough (CNC 1);
Bothwell, 25.v.1926, GS Walley (CNC 1);
Brittania, 17.vi.1948, SD Hicks (CNC 1);
Brittania Hts., v.29.1959, SD Hicks (CNC 1), 20.v.1959, SD Hicks (CNC 6);
7 km. SW Carleton Place, 16-30.V.19821, Huggert, Masner & Goulet (UZIL 2);
Chaffey's Locks, 9.vi.1981, DR Ward (ISAC 10), 9.vi.1981, L LeSage (CNC 1);
Chatteron, 24.vi.1954, 22.v.1956, JC Martin (CNC 2);
Coldstream, v.23.22, AA Wood (CNC 3);
Coldwater, May.25.1968, WA Wilson (UGIC 1);
Dorest, P.S., 4.vi.1961, GK Morris (UGIC 2);
Elmira, Salem Creek, 11,31.x.1974, L LeSage (CNC 2), 13.v.1977, L LeSage (CNC 1), 2.vi.1982, L LeSage (CNC 11);
Everton, Sept.16.1968, PW Arntfeld (UGIC 1);
Foxboro, 5.June.61, CJ Edwards (UGIC 2);
Gravenhurst, Oct.13, Sept.12.13, JS Carr (UAE 2);
Greenville, 18.5.1979, B Wit (UGIC 1);
Guelph [various student collectors]: v.31.1979 (UGIC 14), v.28.1976 (UGIC 1), v.26.1978 (UGIC 1), v.14.1979 (UGIC 4), vi.6.79 (UGIC 3), May.28.76 (UGIC 1), v.23.79 (UGIC 4), 23.5.1979 (UGIC 2), 31.Mar.75 (UGIC 1), 3.vi.75 (UGIC 3), 15,xi.1928, CR Crosby (CUIC 1);
Grimsby, no date (CNC 1);
Hastings Co.: 2.vi.40, JF Brimely (CNC 1), 4.vi.03, Evans (CNC 1);

Hedworth, 6.vi.1976, MJ Sharkey (UGIC 1);
Hespeler, 20.v.1959, DH Pengelly (UGIC 2);
Hilton Beach, 8.vii.61, G Brumpton (CNC 1);
Kearney, 7.5.09, 7.9.09, MC Van Duzee (CAS 2);
Lake Simco, DeGrassi Point, 22.viii.1917, EM Walker (ROM 1);
Lobo, v.19.25, AA Wood (CNC 1);
Marmora, 23.v.1952, JC Mitchell (CNC 1), 26.5.48, JF McAlpine (CNC 1), 23.v.1952, JR McGillis (CNC 8), 20.v.1952, JR McGillis (CNC 1);
Mer Bleue, vi.6.28, JA Adams (CNC 1), 2.vi.1927, GS Walley (CNC 1), 7.vi.1923, R Ozburn (CNC 1)
Moffat, Aug.14.1961, T Van Quynh (UGIC 1);
Newmarket, 24.vi.1970, 20.v.1970, GA Surgeoner (UGIC 3);
Norval, 24.June.69, RW Cameron (UGIC 1);
Ottawa, 18.v.1947, R de Ruette (CNC 4), 4.vii.12, FG Ouellet (JLLC 2);
20 mi.N.W. Ottawa, 17.v.1963, H Rutz (CNC 1);
Petawawa, Forestry Station, 28.v.1959, JR Vockeroth (CNC 1);
Priceville, 26.May.1959, DH Pengelly (UGIC 3), 3.vi.58, DH Pengelly (UGIC 1);
Rockwood, 23.v.1946, SD Hicks (CNC 2);
Strathroy, 30.5.1927, HF Hudson (CNC 6);
Sundridge, 13.vii.1961, G Brumpton (CNC 1);
Thessalon, 15.vi.1963, RG Brumpton (UGIC 2);
Toronto, 7.1 (RUNB 2), no date (MCZ 1, CAS 8), 2.3.95, RJ Crew (CAS 1), v.26.1922, vi.6.1922 (OSUC 2), 26.5.1886, W Brodie (ROM 9), 23.5.86, W Brodie (ROM 3), 7.6.1900, W Brodie (ROM 1), 7.6.1890 (ROM 1), 13.6.1892 (ROM 1), 5.6.1892 (ROM 1), 22.5.1898 (ROM 1), 8.6.95 (ROM 1), 6.6.93 (ROM 1), 4.vi.1927, EC Oakley (ROM 1), 16.vi.1928, EC Oakley (ROM 1), 23.11.07, RJ Crew (ROM 1),10.xi.08, RJ Crew (UMMA 4), 5.16.1896, RJ Crew (CUIC 2), 27.x.1894, RH Crew (CUIC 1);
Toronto, Cedarvale, Mar.27.1926, C Hope (ROM 3);
Waterloo, 4,7,9,11,12,14,15,16,19,26,30,31.x.1976, L LeSage (CNC 17), 3,7.xi.1976, L LeSage (CNC 2), 11.iii.1977, L LeSage (CNC 3), 10,12.iv.1977, L LeSage (CNC 2), 20,22,25.x.1977, L LeSage (CNC 5);

QUEBEC:

Arthabasca, 3.vi.30, JL Laliberté (JLLC 1), 21.vii.32, JL Laliberté (JLLC 2), 18.vi.66, C Chantal (CLCH 1);
Campbell's Bay, Papineau, 25.v.40, JL Laliberté (JLLC 1);
Cote-des-neiges, no date (MCZ 1);
Dosquet, 30.v.70, JL Laliberté (JLLC 1);
Duchesnay, 20.vi.47, R Lambert (CNC 1);
Freleighsburg, Missisquoi, 27.vii.82, JL Laliberté (JLLC 1);
Gaspé, vi.22.1954, GP Holland (CNC 3);
Gatineau, 5.vi.1984, L Huggert (UZIL 2);
Gatineau Pk., Breckenridge Stn., v.16.1954, SD Hicks (CNC 1);
Gracefield, 12.vi.1937, O Peck (CNC 1);
Hull, 24,26,27.v.1923, CH Curran (CNC 5, NFRC 1);
I. Orleans, 11,12.vi.63, C Chantal (CLCH 2);
Joliette, vi.22, LS Slevin coll'n (CAS 5);
Kazubazua, 6-10.vi.1927, WH Brown (CNC 4);
Knowlton, 6,9,21.vii.1929, LJ Milne (CNC 11), 12,13,14,15.6.1928, GH Fisk (CNC 14), vi.12,14,29.1928, JA Adams (CNC 6), 12,14.6.1928, WJ Brown (CNC 16);
Knowlton's Landing, 18.6.28, WJ Brown, GH Fisk (CNC 6);
Lachute, vi.5.35, J Ouellet (MSUE 3);
Lac William, Még., 19.ix.70, C Chantal (CLCH 1);

Lavaltrie, vi.14,24.19, LS Slevin coll'n (CAS 5), vi.22, LS Slevin coll'n (CAS 2), 24.v.1922, J Ouellet (CNC 3, AMNH 1);
Lorette, Québ., 26.vi.33, JL Laliberté (JLLC 1);
Luskville Falls, 6.X.1982, L Huggert (UZIL 3);
Mégantique, 6-7.vii.1916 (CUIC 1);
Montreal, no date (LACM 3);
Montreal Isl., no date, Ouellet (CAS 1);
Orsainville, 6.v.65, C Chantal (CLCH 1);
Parc Gatineau, Lac Ramsey, 10.vi.1982, L LeSage (CNC 1), 28.v.71, C Chantal (CLCH 1);
Pte. du Lac, St. Maurice, 8.vi.68, C Chantal (CLCH 1), 16,20.vii.26, JL Laliberté (JLLC 3);
Potton Springs, vii.4.1928, GH Fisk (CNC 1);
Roddick Lake, 28.vi.1982 (UZIL 1);
Rigaud, 2.6.1941, (SNMB 3), no date (WEEM 1), iv.24 (MCZ 1);
St.-Augustin, Portneuf, 24.vi.54, JL Laliberté (JLLC 2);
St.-Cyrille, (Drum.), 22.v.1981, 17.vi.1978, L LeSage (CNC 2), 17.v.1980, L LeSage (CNC 2);
St. Hilaire, v. (CNC 1);
St.-Raymond, Portneuf, 3.vi.62, JL Laliberté (JLLC 1);
Ste. Angele, (Mask.), 11.vi.1978, L LeSage (CNC 1);
Ste.-Catherine, Port., 16.vi.1968, C Chantal (CDAS 2, CLCH 6, NMDC 1, ISAC 2), 29.v.60, C Chantal (CLCH 2);
Sainte-Foy, Québ., 29.v.76, JL Laliberté (JLLC 1), 29.vi.43, JL Laliberté (JLLC 1), 2.vii.42, JL Laliberté (JLLC 1), 24.vi.23, JL Laliberté (JLLC 1), 10.vii.35, JL Laliberté (JLLC 1);
Wakefield, 13.vi.1948, SD Hicks (CNC 1);

U.S.A.:

CONNECTICUT:

Litchfield Co.: Canaan, 9.vi.1920, Chamberlain (UMMA 2, SDNH 2);
Cornwall, 9.vi.1920, Chamberlain (CNC 4, CUIC 4, PMY 2), 14.iii.1921, Chamberlain (USNM 3), vi.8.22,Chamberlain (CNC 1, CAS 3), 21.v.1922, 9.vi.1920, Chamberlain (UAE 10), 5,9.vi.1922, Chamberlain (CAS 5), 1,2,23.vi.1920, Chamberlain (CUIC 6), 230.ix.1920, Chamberlain (CUIC 1), vi.14.1920, Chamberlain (AMNH 1), v.31.1922, Chamberlain (AMNH 1), xi.3.24, "sifting hill-side alder swamp", LB Woodruff (AMNH 1);
Lakeville, June.1923, H Bunting (PMY 3);
Litchfield, 17.4.1925, LB Woodruff (AMNH 1), 5.30.03, LB Woodruff (AMNH 5);
Salisbury, 26.May.1933, MP Zappe (MCZ 2);
Middlesex Co.: Essex, May.1932 (UCS 1);
New Haven Co. Orange, 22.v.1980, PW Kovarik (TAMU 1);
So. Meriden, 22.v.1937, HL Johnson (BPBM 1);
New London Co.: Groton, 1/6/1948, A Jansson (UZIL 2), no date, A Jansson (UZIL 6);
Lyme, May.24.18, WS Fisher (USNM 1);
New London, no date, KP Jansson (UZIL 1);
Stonington, 15.vi.1977, Thurston (UCS 1);
Tolland Co.: Storrs, 1.v.1954, Stephany (UCS 1), 6.v.20, JA Manter (UCSE 1), 2.iii.1953, FR Tano (UCS 1);
Localities not found: Lanternhill, 5/6/1948, A Jansson (UZIL 1);

DISTRICT OF COLUMBIA:

Miscellaneous: "D. Col.", no date, H Klages (CMP 1);

ILLINOIS:

Kane Co.: Elgin, May.29.23, ML Bristol (INHS 6), v.27.1923, M Bristol (AMNH 2);
McHenry Co.: Algonquin, no date, Nason (INHS 4);
Miscellaneous: "Ill.", no date (INHS 2, MCZ 1);
INDIANA:
Marion Co.: County records: 4.21.93, W.S.B. (PUL 1), 4.26.96, W.S.B. (PUL 1), 5.1.21, W.S.B. (PURC 2, UWM 1);
Porter Co.: County record: 9.7.97, W.S.B. (PUL 1);
Starke Co.: County record: 5.41.04, W.S.B. (PUL 1);
Tippecanoe Co.: Lafayette, May.1918, JM Aldrich (USNM 1);
KANSAS:
Douglas Co.: County record: no date, FH Snow (CMP 2);
MAINE:
Aroostook Co.: Oxbow, 10.vi.1971 (UCS 1);
Hancock Co.: Bar Harbour, vi.23.1934, AE Brower (CMP 2);
Kennebec Co.: Augusta, May.31.1946, AE Brower (UNH 1);
Monmouth, x.10.20, CA Frost (OSUC 1, MCZ 2), vi.20,07, CA Frost (MCZ 1);
Lincoln Co.: New Harbour, Mt. Desert, June.7.24, R Hayward (MCZ 1);
Oxford Co.: Bethel, no date, JG Gehring (MCZ 2), 11,15,16,20.vi.24, JG Gehring (MCZ 12);
Norway, no date (MCZ 3), 1864-65, SI Smith (PMHN 6);
Paris, 13.vi.1910, CA Frost (LACM 1), 12.vi.25, CA Frost (FMNH 1);
Peru, no date, F Knab (USNM 1);
Penobscot Co.: Enfield, vi.11.39, LP Gray (CAS 2);
Orono, vi.1920, RJ Sim (CAS 1, CMP 4, RUNB 2), v.1965 (INHS 1), vi, RJ Sim (UADB 1, MCZ 5);
2 mi.SW Orono, v.28.1982, "malaise trap", DS Chandler (UNH 2), v.28.1982, DS Chandler (UNHC 2), v.28.1982, "Sweep Alder", DS Chandler (UNH 1);
Passadumkeag, vi.11.39, LP Gray (CAS 1);
Sommerset Co.: Fairfield, 6.vi.1986, "treading in small pond", RE Nelson (RNEL 1);
Fairfield, Martin Stream, 6.vi.1986, "treading", RE Nelson (RNEL 1);
Washington Co.: Meddybemps, 6.23.22, MB & RJ Sim (CMP 1);
York Co.: Old Orchard, 23.vi.00, PG Bolster (MCZ 1);
Saco, June.24.1900, PG Bolster (MCZ 3);
MARYLAND:
Garrett Co.: Herrntn Mnr., 6/10/53, EJF Marx (AMNH 3);
MASSACHUSSETTS:
Barnstable Co.: Cape Cod, 30.v.1932 (CAS 1);
Berkshire Co.: Lenox, x.14.1893, Van Dyke (CAS 1), Oct.11.1898, Bradford (LACM 3), June.18--, Bradford (AMNH 10);
Bristol Co.: Dighton, v.27, NS Easton (SDNH 2);
Swansea, v.5.06, NS Easton (MCZ 2), v.8.41, NS Easton (MCZ 2);
Essex Co.: Haverhill, 5.27.53, C Hoessler (RUNB 3), 6.8.1951, C Hoessler (RUNJ 1);
Lawrence, 26.v.1923, EW mank (CUIC 1);
Manchester, June, R Hayward (MCZ 1);
Salisbury, 11.vi.1928 (CUIC 1);
Hampden Co.: Wales, vi.20, CA Frost (UADB 3), vi.13.09, CA Frost (MCZ 1);
W. Springfield, 9.6.'95 (WEEM 1), 1.June.1903, F Knab (USNM 2);
Middlesex Co.: Ashland, 6.10.49, CA Frost (AMNH 9);

Arlington, viii.1914, H Klages (CMP 1), June.1897, C Bullard (MCZ 1), I.13.24, Darlington (MCZ 1), iii.26.26, "moss roots", Darlington (MCZ 1), xii.9.1924, "moss roots" (MCZ 1), iii.20.1924 (MCZ 2), ii.2.1923 (MCZ 1), ii.23.1925 (MCZ 1), 10.3.19 (RUNB 1), no date (RUNB 1);
Cambridge, iv.14.14 (WSU 3), Jan.1874, GR Crotch (MCZ 4), 21.2.74, 10.1.74, v.8.1920, vi.4.1923, vi.10.1923 (MCZ 9), no date (MCZ 2, UVDZ 1);
Concord, vi.11.24 (RUNB 1);
Framingham, 26.v.1912, CA Frost (UMMA 2), 20.iv.08, CA Frost (CNC 1), vi.8.07, CA Frost (MCZ 1), v.28.12, CA Frost (MCZ 2), 5.23.05 (FMNH 1), 7.vi.24 (FMNH 1);
Holliston, v.5.1923, JH Emerton (CAS 2), May (MCZ 2);
Holyoke, June.9.95, F Knab (USNM 1);
Hopkinton, vi.1.13, MC Van Duzee (CAS 1), vi.3.23, CA Frost (MCZ 2, INHS 2), vi.1.13, CA Frost (MCZ 3);
Lexington, 6.28.20 (RUNB 1);
Lowell, no date, F Blanchard (MCZ 1);
Natick, 2.vi.47, CA Frost (UCR 1), 6.16.49, CA Frost (AMNH 3), 7.vi.25, CA Frost (FMNH 6), no date, CA Frost (LACM 4);
Sherborn, vi.5.32, CA Frost (CAS 1), xi.18.23, "sifting", CA Frost (CAS 1), 6.11.49, 5.17.49, CA Frost (AMNH 5), 6.11.25 (FMNH 1), v.30.25 (FMNH 3), iv.4.1926, CA Frost (INHS 4);
Tyngs, 11.xii.6, Emerton (MCZ 2), no date, F Blanchard (MCZ 1);
Tyngsboro, v.1902, Van Dyke (CAS 1);
Waverly, 5.16.24, "under stone" (MCZ 1), no date (AMNH 1);
Wayland, Jn.6.'31, JP Bill (MCZ 1), vi.8.1930, CA Frost (MTSU 2);
Norfolk Co.: Blue Hills, 4.vi.22, LJ Bottimer (CNC 1), 14.vi.1915, WJ Clench (UMMA 1), 3.vi.16, CT Brues (MCZ 1);
Brookline, no date (CAS 3, CUCC 1),
Milton, 5.vi.1922, WJ Clench (UMMA 1), 30.v.99, PG Bolster (MCZ 1), June.5.1919, PG Bolster (MCZ 1);
Wellesley, June.2.1891, AP Morse (MCZ 1), May.27.1891, AP Morse (MCZ 2), 30.v.08, Bolster (MCZ 1);
County record: no date, R Hayward (MCZ 3);
Plymouth Co.: Humarook, May.16.1932, June.5.1933, CE White (MCZ 3);
Kingston, June.10.1950, AE Brower (UNH 2);
Pembroke, June.15.1919, Bolster (MCZ 2);
Suffolk Co.: Boston, June (WSU 1), no date (MCZ 3, AMNH 1);
Dorchester, May.30.1898, Bolster (MCZ 1), 17.vi.07, Bolster (MCZ 9);
Forest Hills, Nov.11.1903, AP Morse (MCZ 1), 13.vi.1926, JG Myers (CNC 1);
Worchester Co.: Southboro, vi.17, v.21, CA Frost (USNM 2), v.30.23, CA Frost (MCZ 1), June.5.1940, JG Thorndike (AMNH 1);
Worchester, no date (MCZ 1);
Localities not found: Beach Bluff, 21.vi, HM Parshley (CAS 1);
Freetown, vii.1.'06, NS Easton (MCZ 1), v.30.04, NS Easton (MCZ 1);
Mt. Tom St. Pk., vi.8.1946, AR Lewis (UNH 1);
Wollaston, Dec.25.1895, FH Sprague (MCZ 1);

MICHIGAN:

Alger Co.: Stoney Creek, 13.June.1972, D Flynn & J Mahar (MSUE 1);
County record: 6.19.55, RR Dreisbach (UMMA 1);
Antrim Co.: County record: 5.29.50, RR Dreisbach (UMMA 1, MSUE 1);
Benzie Co.: Beulah, 6.15.1943, CW Sabrosky (MSUE 4);
Calhoun Co.: Battle Creek, Biol. Pres., v.22.30 (MSUE 1);
Cheboygan Co.: Cheboygan, 6.19.28, W Clanton (UMMA 1);

Douglas lake, v.29.1939, IJ Cantrell (UMMA 1);
Chippewa Co.: 14 mi.S. Sault Ste. Marie, 12.June.1977, D Flynn & J Mahar (MSUE 1);
White Fish Point, 24.vii.14 (UMMA 1);
County records: 7.vi.59, R & K Dreisbach (UMMA 1, AMNH 2), 6.3.57, R & K Dreisbach (MSUE 2);
Clare Co.: County records: 6.11.49, RR Dreisbach (MSUE 3), v.16.51, RR Dreisbach (MSUC 2), v.23.59, RR Dreisbach (MSUE 1), 6.1.52, RR Dreisbach (MSUC 2), 5.24.58, R & K Dreisbach (MSUE 3);
Crawford Co.: T.26N., R.2W., Sec.33, 3.vi.53 (UMMA 1);
Delta Co.: Escanaba, June.24.1958, RA Schubner (MSUE 9);
Dickinson Co.: County record: 8.29.52, RR Dreisbach (UMMA 1);
Gladwin Co.: County records: 5.25.1936 (UMMA 1), v.24.59, RR Dreisbach (AMNH 1, MSUE 1), 6.14.53, RR Dreisbach (MSUE 3);
Gogebic Co.: Watersmeet, 2.6 mi.W., on old US #2, June.23.1973, IJ Cantrell (UMMA 1);
Grand Traverse Co.: Fife lake, 7.June.1967, JE McPherson (MSUE 1);
Traverse City, 6.17.1943, CW Sabrosky (MSUE 1);
County record: 5.27.50, RR Dreisbach (UMMA 1, MSUE 5);
Gratiot Co.: County record: 5.25.58, R & K Dreisbach (MSUE 1);
Houghton Co.: Houghton, 29.May.'37 (MSUE 1);
Ingham Co.: Okemos, vi.11.1971, JA Jackman (MSUE 1);
Ionia Co.: County record: v.20.59, R & K Dreisbach (AMNH 1);
Isabella Co.: County record: 6.5.45, RR Dreisbach (UMMA 1, MSUE 2);
Kalamazoo Co.: Portage, 30.Nov.71, DK Young (EGRC 1), 17.May.1975, DK Young (EGRC 2);
Kalkaska Co.: County records: 5.28.50, RR Dreisbach (UMMA 1), 3.vi.39, RR Dreisbach (UCR 1), 6.23.51, RR Dreisbach (MSUE 1), 6.17.51, RR Dreisbach (MSUE 2), 5.28.50, RR Dreisbach (MSUC 6), 6.19.49, RR Dreisbach (MSUE 1), v.30.39, RR Dreisbach (MSUC 1);
Lake Co.: Pine R., 7.ix.47, TH Hubbell (UMMA 2);
County records: 9.vi.40, RR Dreisbach (UCR 1), 5.20.39, RR Dreisbach (MSUE 1), vi.8.40, RR Dreisbach (MSUC 1);
Livingston Co.: E.S. George Reserve, vi.7.1936, S Moore (UMMA 1), v.27.1934, S Moore (UMMA 1), 25.vi.1947, K Bohnsack (UMMZ 2), 11.Nov.1949, K Bohnsack (UMMA 1);
E.S. George Res., Pinckney, 6.8.47, B Summerville (AMNH 8);
Luce Co.: County record:vi.7.59, R & K Dreisbach (AMNH 2);
Mackinac Co.: County record: 6.18.55, RR Dreisbach (UMMA 1);
Macomb Co.: E. of Memphis, 14,17,19,26.v.1972, C Brivio (PIME 13), 21.v.1973, C Brivio (PIME 5);
Stony Creek Park, 6.v.1977, C Brivio (PIME 1);
Marquette Co.: Ives lake, Huron Mtn. Club, 10-15.June.1974, Young & Arnold (EGRC 1);
Mecosta Co.: County records: 6.5.40, RR Dreisbach (UMMA 1), 6.17.50, RR Dreisbach (MSUE 1);
Missaukee Co.: Lake City, June.17,24.1948, D Bray (MSUE 4);
County records: 6.4.44, RR Dreisbach (UMMA 1), 5.15.54, RR Dreisbach (MSUE 1), 6.4.49, RR Dreisbach (MSUC 1);
Montcalm Co.: Flat River Game Area, 14.May.1955, RL Fischer & RW Hodges (MSUE 4);
County record: 5.15.54, RR Dreisbach (UMMA 1);
Oakland Co.: Bloomfield, May.13.1928, S Moore (UMMA 4), May.11.1930, S Moore (UMMA 2), 7.vi.09 (MSUE 1, UMMZ 13, UADB 4), June.7.1919, AW Andrews (MCZ 2);

Cooper Woods, May.1.1927, S Moore (UMMA 14);
County records: v.4.29, AWAndrews (MSUE 2, SDNH 4, UMMA 1), v.13.1928, AW Andrews (UMMA 1), 18.iv.30 (UMMZ 1);
Oceana Co.: Pentwater, vi.9.1936, CW Sabrosky (MSUE 1);
Osceola Co.: County records: 21.v.38, RR Dreisbach (UCR 1) 6.11.49, RR Dreisbach (MSUE 1), 6.14.52, RR Dreisbach (MSUE 1), 6.4.49, RR Dreisbach (MSUC 1), v.21.38, RR Dreisbach (MSUE 1);
Roscommon Co.: County records: 5.26.57, R & K Dreisbach (MSUE 5, UMMA 1), 13.vii.1943, AW Andrews (UMMA 1);
Schoolcraft Co.: Manistique, 12.June.1960. RA Scheibner & RJ Snider (MSUE 11); County record: Sept.24.1923, S Moore (UMMA 1);
Washtenaw Co.: Ann Arbor, v.17.1918, TH Hubbell (UMMA 15), 5.20.28, W Clanton (UMMA 1);
Barton Pond, Ann Arbor, 17,18.v.1918, TH Hubbell (OSUC 2), v.22.1919, TH Hubbell (UMMA 2);
Cavanaugh lake, v.24.1919, TH Hubbell (UMMA 1);
Freedom Twp., May.2.1922, FM Gaige (UMMA 1);
Kavanaugh Lake, v.30.1919, MH Hatch (UMMA 2);
Lima Twp., v.30.1920, MH Hatch (OSUC 1);
Sharon, May.2.1922, MH Hatch (UMMA 7), May.29.1926, MH Hatch (UMMA 4), May.2.1922, TH Hubbell (UMMZ 4);
Sylvan Twp., v.30.1920, MH Hatch (OSUC 1, UMMA 1);
Willis, May.6.1934, S Moore (UMMA 1);
Wexford Co.: County records: 5.14.55, RR Dreisbach (UMMA 1), 4.14.57, RR Dreisbach (AMNH 1);

MINNESOTA:
Hennepin Co.: "low prairie", 27.v.1922, WR Hoffmann (DEFW 1);
"tamarack swamp", 20.v.1922, AA Nichol (DEFW 1);
Mille Lacs Co.: Mille Lacs lake, 2.vi.1937, D Murray (DEFW 1);
Olmstead Co.: County record: no date, CN Ainslie (DEFW 1);
Pine Co.: Mouth, Snake River, 19.v.1951 (DEFW 1);
Ramsey Co.: Battle Creek, St. Paul, 20.v.1922, A Hertig (DEFW 9);
St. Louis Co.: Eaglesnest (Ely), 5.31.1961, 4.June.1963, 3.vii.1962, WV Balduf (INHS 3);

NEBRASKA:
Nuckolls Co.: Superior, no date (LACM 2);

NEW HAMPSHIRE:
Carroll Co.: N. Conway, vi.15.46, CA Frost (MCZ 1);
Coos Co.: Beaver Brook Falls, 3 mi.E. Colebrook, x.18.1986, "sift alder & grass leaf litter", DS Chandler (UNH 1), v.28.1986, "sweep", DS Chandler (UNH 3);
Hurlbert Swamp, 3 mi.E. Stewartstown, vi.20/21.83, "malaise", Burger & Morse (UNH 1), x.17.1986, "sweep", DS Chandler (UNH 1), v.28.1986, "sweep", DS Chandler (UNH 3);
Hurlbert Swamp, 4 mi.E. Stewartstown, X.18.1986, "sift grass & tree leaf litters", DS Chandler (UNH 2), vi.12.1986, DS Chandler (UNH 13);
Mt. Washington, June, AP Morse (MCZ 1), vi.25.30, CA Frost (OKS 1), no date, A Nicholay (USNM 1, UAE 2);
Mt. Washington, Carriage Rd., 2500', vi.14.16, CW Johnson (MCZ 1);
White Mtns., no date ,Woods (MSUE 1);
White Mtns., "Glen", 1500', June.2-6.1886, R Hayward (MCZ 5);
Grafton Co.: Franconia, no date ,AT Slosson (AMNH 2), no date (MCZ 1);
Rumney, vi.12,13.1924, JG Gehring (MCZ 7);
Merrimack Co.: Franklin, 6.26.22 (RUNB 1);
Rockingham Co.: Exeter, vi.6.25, Darlington (MCZ 1);

Hampton, v.30.1903, SA Shaw (UNH 1);
Strafford Co.: Dover, 5.27.1936, BG Markos (UNH 1), 6.4.36, 6.9.36, 5.26.36, BG Markos (EGRC 4);
Sullivan Co.: Claremont, v.10 (INHS 2);
Localities not found: Cambridge, vi.2.41, JD Sherman (AMNH 3);
Mason, v.30.19, CA Frost (MCZ 1, CNC 1);
NEW JERSEY:
Bergen Co.: Hillsdale, v.15.1921, v.7,28.1922, ED Quirsfeld (USNM 5), 1.x.1931, ED Quirsfeld (MCZ 1);
Ramsey, no date, EA Bischoff (AMNH 1, FMNH 3), v.30.17, LB Woodruff (AMNH 1), xii.1.12 (AMNH 3), 30.v.09 (AMNH 1);
Camden Co.: Ateo, vi, Liebeck coll'n (MCZ 1);
Collingswood, Apr., May, F Knab (CAS 4);
Hadden Hts., 5.27.35, LJ Bottimer (ISAC 1);
Merchantville, 3.30, 3.11, Liebeck coll'n (MCZ 3), iii.10, WJ Gerhard coll'n (FMNH 4);
Gloucester Co.: Westville, no date, R Hopping (CAS 1), v.4, Liebeck coll'n (MCZ 2), 5.4 (AMNH 1), 5.23 (RUNB 1);
Hudson Co.: Arlington, no date, EA Bischoff (FMNH 1, CUIC 1);
Middlesex Co.: N. Brunswick, vi.35 (RUNB 1);
Ocean Co.: Lakehurst, v.4.12 (AMNH 1);
Point Pleasant, 6 (RUNB 4), 1.vii.1917, Schott (CUIC 1);
Sussex Co.: Hopatcong, no date (AMNH 9);
Locality not found: Greenwood Lake, June.10.1917, FM Schott (AMNH 1);
NEW YORK:
Bronx Co.: Van Cortland Park, no date, Shoemaker (USNM 1), 3,6.vi.39, B Malkin (FMNH 3);
Cattaraugus Co.: Mix Creek Valley, 11.vi.1915 (CUIC 5);
Rock City, 7,9.vi.1915 (CUIC 2);
Chenango Co.: Oxfd. twp., Mud Pond, 23.vi.1965, LL Pechuman (CUIC 1);
Clinton Co.: Black Brook, 11.vi.1916 (CUIC 2);
Peru, 8.vi.1916, Crosby & Forbes (CUIC 1);
Cortland Co.: Labrador Lake, 14.v.1921 (CUIC 1);
Erie Co.: Buffalo, no date, FM Webster (NDSU 1), no date (CMP 1);
Colden, 6.7.1908, MC Van Duzee (CAS 6);
Essex Co.: Moriah Center, v.21.1955, MH Hatch (OSUC 2);
Mt. MacIntyre, vi.13.1935, NM Downie (NMDC 1);
Mt. Maray, 21,22.vi.1941, H Dietrich (CUIC 2);
Franklin Co.: Coreys, x.12.28, WJ Gerhard (FMNH 2);
Greene Co.: Hunter, 24.May.1947, (UAE 2), 20,24.v.1947 (USNM 3);
Hamilton Co.: 1 mi.SE Blue Mtn. Lake, Hwy. 30, 8.vi.1986, DA Pollock (ISAC 3);
Herkimer Co.: Cold Brook, 22,30.vi.1940, H Dietrich (CUIC 3);
Jordanville, 21.ix.36, H Dietrich (CUIC 2);
Newport, May.2-3.1902 (LACM 1);
County record: 1.viii.65, RA Morse (CUIC 1);
Jefferson Co.: Brownsville, 6.4.10, LB Woodruff (AMNH 1);
Monroe Co.: Rochester, 5.vi.1932 (LACM 3);
Oneida Co.: Trenton Falls, 5,6.vi.1921, Leanord & Forbes (CUIC 1);
Orange Co.: Bear Mt., 2.vi.40, B Malkin (FMNH 3);
Bear Mt. St. Pk., Bear Mtn., 12.v.1936, LL Pechman (CUIC 2);
Pine Isld., 30.v.14, FM Schott (CUIC 1);
Oswego Co.: St. Mary's Pond, 28.v.1965, LL Pechman (CUIC 2);
Putnam Co.: Patterson, 29.v.1935, H Dietrich (CUIC 6);
Rockland Co.: Pearl River, no date, KP Jansson (UZIL 1);

Ramapo, vi.3.05 (AMNH 2), no date, Beutenmu&"ller (CUCC 10), 5.30 (RUNB 2);
Ramapo Mts., no date, Beutenmüller (CUCC 5), no date (AMNH 1);
Suffern, May.30.1899, EG Love (CAS 2, UCS 2), no date (CUCC 1);
St. Lawrence Co.: Canton, v.20,23.1936, NM Downie (NMDC 2, OSUC 1), vi.5.1936, NM Downie (NMDC 1), vi.5,11.1936 (OSUC 3), June.5.1936 (WSU 4), May.23.1936 (WSU 1), June.4.1933 (JECW 1);
Cranberry Lake, vi.23.1922, MH Hatch (OSUC 1);
Parishville, Apr.12.1974, May.24.1975, June.11.1978, M O'Brien (UMMA 3);
Rossie, 6.13.1970, NM Downie (NMDC 1), 5.28.1975, NM Downie (NMDC 1), 6.19.1965, NM Downie (NMDC 1);
Schoharie Co.: Charlotte, 20.vi.1907, JL Zabriski (AMNH 1);
Suffolk Co.: Babylon, 18.vii., GD Bradford (LACM 1);
East Hampton, 8.vi.1949, R Latham (CUIC 1);
Orient, 31.v.1930, R Latham (CUIC 1);
Sullivan Co.: Bridgeville, 9.vi.1964, LL Pechuman (CUIC 4);
Yulan, 22.v.1979, AM O'Brien (UMMA 2);
Tompkins Co.: Danby, 18.x.1924, CR Crosby (CUIC 2), 6.v.1934, H Dietrich (CUIC 1), 7.vi.1967, LL Pechuman (CUIC 1), 21.v.1916, Caltha palustris, EG Anderson (CUIC 2);
Caroline, May.30.1917, EC Anderson (DEUN 1);
Freeville, 31.v.1954, 5.vi.1917, H Dietrich (CUIC 4);
Groton, v.29,31.1953, NM Downie (NMDC 2);
Ithaca, 19.v.1947, GE Ball (UAE 2), 14.v.1919, H Dietrich (CUIC 17), 2.vi.1935, H Dietrich (CUIC 2), 9,30.v.1895 (CUIC 2), 31.v.1935, H Dietrich (CUIC 1), 5.vi.1966, R Poole (CUIC 1), 4.v.13, HH Knight (DEFW 4), 27.vi.1912 (DEFW 1), 14.May.1918, H Dietrich (AMNH 1), viii.1912, H Klages (CMP 2);
Ithaca, Caroline, 29.iv.1917, H Dietrich (CUIC 1), 8.vi.46, JC Bradley (CUIC 4);
Ithaca, Ringwood, 20.v.1919, H Dietrich (CUIC 1);
Ludlowville, 9.vi.1967, LL Pechuman (CUIC 3);
0.5 mi.N. Maclean Bog, Hwy.13, 1100', 31.v.1973, DH Kavanaugh & H Goulet (CAS 1);
McLean, 10.12.34, CR Crosby (CUIC 1), 29.v.15 (DEFW 4);
McLean Bog, Hemlock Woods, 2.v.1964, LC Cole (CUIC 1);
McLean Bogs, 5.30.1921 (CUIC 1), 17.iv.1925 (CUIC 1);
McLean Res., 6.vi.1963, LL Pechuman (CUIC 1), 16.v.1953, J Williams (CUIC 1), May.27.1958 (UIM 6);
McLean Res., Inlet Brook, 22.v.1925, 6.4.1925 (CUIC 2);
Michigan Hollow, 5 mi.S. Danby, 12.vi.1971, G & K Eickwort (CUIC 1);
N. Lansing, vi.8.1940, NM Downie (NMDC 2), 5.29.1976, NM Downie (NMDC 2), 6.6.1957, NM Downie (NMDC 1), 6.9.1962, NM Downie (NMDC 1), 1.vi.1963, LL Pechman (CUIC 1);
Slaterville, Wildflower Pres., 2.v.1964, LC Cole (CUIC 1);
Warren Co.: Bolton, 8.vi.1933, H Dietrich (CUIC 1);
Westchester Co.: Armonk, 7,15.vi.24, EHP Squire (UAE 3);
White Plains, 31.v.1925, EHP Squire (UAE 1);
Wyoming Co.: Pike, no date (MCZ 2, WEEM 1), 1899, N.Y.S. coll (PMY 1);
Portage, May.30.1888 (CAS 2), 24.v.1914, HH Knight (DEFW 15);
Localities not found: Concord, 5.18 (UGIC 1);
Moon Brook, 5.30.41, RE Crabhill (WEEM 1);
Ramages, no date (USNM 2);
Slaterville, Ellis, 13.vi.'04 (CUIC 1);

Somers, v.24.35, WC Wood (AMNH 1);
Vandalis, Chipmunk Swamp, 8-10.vi.1915 (CUIC 1);
NORTH CAROLINA:
Buncombe Co.: Black Mtns., v.15,16,17.1912, Beutenmüller (CUCC 4), v.25 (AMNH 2), v.15,16 (AMNH 7);
Transylvania Co.: 12 mi. NW. Brevard, 6.8.1971, "malaise", M Atyeo & L Cole (UGA 2);
OHIO:
Fairfield Co.: Barneby Center, 19.April.1986, SM Clark (SMCL 14), 10.May.1986, SM Clark (SMCL 4), 12.may.1984, SM Clark (SMCL 5), 11.May.1985, SM Clark (SMCL 1), 14.May.1984, SM Clark (SMCL 1);
Franklin Co.: Columbus, v.30, JN Knull (CMP 1);
Hamilton Co.: "Cin", 4.12.2, Schffr coll'n (USNM 1);
Jackson Co.: Rock Run, 4.23.38, JG Hughes (UGA 4), 14.v.1939, JH Hughes (UGA 1), 18.v.40, JH Hughes (UGCA 10);
White's Gulch, 18.v.1940, JH Hughes (UGA 3);
Knox Co.: County record: 5.2.42 (UCR 4);
PENNSYLVANIA:
Allegheny Co.: Pittsburg, v.30.37, CA Frost (CAS 1, MCZ 2), 6.20.1924, Chernock (CNC 3), vi.2,9,21, H Klages (CMP 6), viii.2,4, H Klages (CMNH 2), no date (MCZ 2);
N. side Pittsburg, v.30.1925, H Klages (CMP 9);
West View, 5.30.28 (TAMU 4, JBWM 2), vi.6.26, Blaisdell (CAS 2), 5/30/28 (TAMU 2);
County records: v.18.1913, EA Klages (CUIC 1), no date (CMP 3);
Lackawanna Co.: Chinchilla, v.26.09, Blaisdell (CAS 1);
Lancaster Co.: Penryn, 2.vi.61, EU Balsbaugh (NDSU 1);
Monroe Co.: Effort, vi.6.31, JW Green (CAS 7);
Mt. Pocono, vi.1.1919, A Nicolay (USNM 1);
Pocono Lake, vi.11.11, JW Green (CAS 1);
Tannersville, vi.2.49, JW Green (CAS 2);
Northampton Co.: Wind Gap, v.28.31, JW Green (UAE 8, CNC 1), v.28.31, vi.18,25.31, JW Green (CAS 9), v.25.32, JW Green (AMNH 8), v.24.31, JW Green (FMNH 10);
Pike Co.: Milford, 30.v.-1.vi.1941, B Malkin (FMNH 1);
Westmoreland Co.: Jeannette, vi.21,23, HG Klages (CMP 2);
Powdermill Nat. Res., 28.v.1965, ND Richmond (CMP 1);
Localities not found: Alford, 5.vi.1961, LL Pechuman (CUIC 2);
Belfast, v.27.37, vi.14.49, JW Green (CAS 2);
Water Gap, no date, C Palm (AMNH 3);
RHODE ISLAND: Kent Co.: Spring Green, Warwick, 15.June.1924, M Bowe (PMY 1);
Warwick, 3.v.22, 7.vi.22, EE Calder (UMMA 2);
Providence Co.: Chepachet, 5.30.21 (PMY 1);
Cumberland, 25.Apr.1914, M Bowe (PMY 1);
Greenville, v.30.22 (PMY 1);
Providence, vi.15.06, JV Nylen (PMY 1);
VERMONT: Addison Co.: Ferrisburg, mouth Lewis Creek, vi.12.1974, RT Bell (UVDZ 1);
S. Starksboro, iv.21.1976, M Langworthy (UVDZ 1);
Bennington Co.: East Dorset, June.7,11.15.1935, CT Parson (UVDZ 22), x.5.1940, CT Parson (UVDZ 1), vi.25.1941, CT Parsons (UVCC 5);
Caledonia Co.: Lyndon, June.13.'14, (NMDC 1, WSU 3);
Chittendon Co.: Burlington, W. Van Scoix, 19.May.49, UVM (UVDZ 1);
Charlotte, 10.24.1968, Hare (UVDZ 1);

Colechester, ix.23.1921, WF Winchell (UVDZ 1);
Gillete Pond, Richmond, May.10.1970, Bell/Davidson (UVDZ 1);
Jonesville, Gillette Pond, vi.16.1974, R Davidson (UVDZ 1);
Westford, May.30.1970, M Bouffard (UVDZ 1), Oct.6.1969, S Bouffard (UVDZ 2);
Essex Co.: Ferdinand, Rte. 105, 12.vi.1973, 22.vi.1971, LL Pechuman (CUIC 2);
Granby, vii.1.68, E Souteire (UVDZ 1);
Lamoille Co.: Bear Pond, Stowe, Mt. Mansfield, July.24.1962, RT Bell (UVDZ 1);
Morrisville, Oct.11.1958, J Calcagui (UVDZ 1);
Mt.Mansfield, Summit, Stowe, July.20.1966, RT Bell & Chiolino (UVDZ 1);
Orleans Co.: E. Charleston, 12.vi.1968, MH Deyrap (CUIC 2);
Greensboro, 8.4.82, D Tobi (UVDZ 1);
Jay, July.15.1981 (MCZ 1);
North Troy, May.8.1951, W Merriam (UVDZ 1);
Washington Co.: Waterbury, x.8.1966, LG Joslyn (UVDZ 1);
Windham Co.: Putney, Johnson Marsh, June.30.1962, R Mills (UVDZ 1);
Westminster West, 26.v.1960, MS Wilson (OKS 1);
Locality not found: Fayston, May.24.70, M Bouffard (UVDZ 1);
VIRGINIA: Miscellaneous: Jeff. Nat. For., vi.12.54, RL Fischer (MSUE 17);
WEST VIRGINIA:
Preston Co.: Cranesville, 6.11.53, EJF Marx (AMNH 1);
WISCONSIN:
Bayfield Co.: Bayfield, no date, Wickham (UMMA 1);
Door Co.: County record: 25.vi.1948, CL Fluke (UWM 1);
Florence Co.: County record: 27.vi.1958, "on Acer saccharinum", J Kapler (UWM 1);
Manitowoc Co.: Point Beach, 7.Jun.1969, C Porter & LJ Bayer (UWM 1);
Polk Co.: Amery, 6.10.11, ED Ball (UWM 2);
St. Croix Fl., 6.11.16, JG Sanders (UWM 1);
County record: July, H Klages (CMP 2);
Sauk Co.: Panfreys Geln, 3.vi.1965, TR Yowke (WEEM 1);
Vilas Co.: County record: 16.vi.1949, R Jones (EGRC 1);

11. APPENDIX.

PLATEUMARIS THOMSON, 1859, PROPOSED CONSERVATION UNDER THE PLENARY POWERS (INSECTA: COLEOPTERA).

This section was written in cooperation with Dr. Hans Silfverberg (UMHF), who has agreed to coauthor publication of this application to the Commission. I was not familiar with the process of preparing such an application which requires a strict format and rigourous structure. Though I have written most of this section, I must acknowledge Dr. Silfverberg's assistance in ensuring it was properly written.

This application is being submitted in order to suppress a long unused name, Donacocia Gistel, 1857, in favour of a long-used name, Plateumaris Thomson, 1859, its junior subjective synonym.

1. Donacocia was first used by Gistel (1857:12), with a single included name, Donacocia aenea Gistel. Gistel commented that the species was "zu D. discolor" (=Donacia discolor Panzer, now placed in Plateumaris Thomson, 1859). This comparison has not been observed by subsequent authors except Strand (1916).

2. Plateumaris was first used by Thomson (1859:154), who designated Donacia nigra Fabricius, 1792, as type species. Strand (1916) was the first to observe that the original date of publication by Thomson was 1859, not 1866, as most subsequent authors cited. It seems that Strand (1916), though cited, was not carefully read, and is inaccurately cited by subsequent authors. Donacia nigra has been listed as a junior synonym of Prionus braccatus Scopoli, 1772, ever since Schönherr (1817).

3. None of Gistel's species names within Donaciinae were recognized by Jacoby and Clavareau (1904), Clavareau (1913), Goecke (1960), or Jolivet

(1970). Monrós and Bechyné (1956), Monrós (1959), and Jolivet (1970) listed Donacocia Gistel in synonymy of Donacia Fabricius, and Donacocia aenea Gistel as junior subjective synonym of Donacia semicuprea Panzer. These three authors cited Strand (1916) as prior authority for this synonymy. Strand (1916), however, observed "Donacocia scheint n. n. für Donacia, auctorum zu sein." He correctly pointed out that Gistel explicitly and only compared his Donacocia aenea with Donacia discolor Panzer, and that Donacocia must therefore have priority over Plateumaris. It is not known why authors subsequent to Strand (1916) have made this error, which has led to incorrect synonymization of Donacocia with Donacia. Jolivet (1970) cited Donacocia as an inadvertent emendation of Donacia by Gistel, but Gistel's names are valid nonetheless.

4. Horn and Kahle (1935) stated the remains of Gistel's collection are preserved in München. Monrós and Bechyné (1956) stated no type material of Gistel could be found there, and concluded that his material is lost. Therefore, in the absence of evidence to support synonymization of Donacocia aenea Gistel with Donacia semicuprea Panzer, Gistel's comparison with Donacia discolor Panzer must be considered critical in assessing synonymization of Donacocia with Plateumaris.

5. Donacocia Gistel, 1857, is therefore the senior synonym, and strict adherence to priority would demand that it be used for Plateumaris Thomson, 1859. However, Donacocia has never been used as a valid name since Gistel's work, while Plateumaris is a well known name, used by all subsequent authors cited here, and also, for instance, by those cited in the appendix. Furthermore, six other genus-group names in Donaciinae begin with Donac-, five of which are available and valid. To replace Plateumaris with Donacocia now would only create more confusion.

The International Commission of Zoological Nomenclature is therefore asked:

(1) to use its plenary powers to suppress the generic name Donacocia Gistel, 1857, for the purposes of the Law of Priority, but not for those of the Law of Homonymy;

(2) to place on the Official List of Generic Names in Zoology the name Plateumaris Thomson, 1859 (gender: feminine), type species by original designation, Donacia nigra Fabricius, 1792;

(3) to place on the Official List of Species Names in Zoology the name braccatus Scopoli, 1772, as published in the binomen Prionus braccatus (valid name of the type species of Plateumaris Thomson, 1859); and

(4) to place on the Official Index of Rejected and Invalid Generic names in Zoology the name Donacocia Gistel, 1857, as suppressed under (1) above.

REFERENCES CITED.

Clavareau, H. 1913. Sagrinae, Donaciinae and Criocerinae, In Junk, W. and S. Schenkling, Coleopterorum Catalogus 51:1-103.

Fabricius, J.C. 1792. Entomologia Systematica emendata et aucta, secundum classes, ordines, genera, species adjectis synonimis, locis, observationibus. C.G. Proft, Hafniae. Tomus I. Pars I. xx + 1-330 pp, Pars II. 1-538 pp. [not seen]

Gistel, J.N.F.X. 1857. Achthunderd und zwanzig neue oder unbeschriebene wirbellose Thiere. Vacuna 2:513-606.

Goecke, H. 1960. Monographie der Schilfkäfer III. Die Gattungen und Arten der Donaciinae (Col. Chrys.) und Ihre Verbreitung. Entomologische Blätter für Biologie und Systematik der Käfer. 56(1):1-19.

Horn, W. and I. Kahle, 1935. Über entomologische Sammlungen (Ein Beitrag zur Geschichte der Entomo-Museologie). Teil I, pp 1-160 + 16 pls.

Jacoby, M. and H. Clavareau, 1904. Coleoptera Phytophaga Fam. Donacidae In Wytsman, P. Genera Insectorum 21:1-14, 1 pl.

Jolivet, P. 1970. Coleopterorum Catalogus Supplementa Pars 51, Fasc. 2, Donaciinae. W. Junk, Gravenhage. 71 pp.

Monrós, F. 1959. Los Generos de Chrysomelidae (Coleoptera). Opera Lilloana III:5-337.

Monrós, F. and J. Bechyné, 1956. Über einige verkannte Chrysomeliden-Namen. Entomologische Arbeiten aus dem Museum G. Frey 7:1118-1137

Schönherr, C.J. 1817. Synonymia insectorum, vol. 1, part 3. Skara, pp 1-306.

Scopoli, J.A. 1772. Annus historico naturalis. Lipsiae, Hilscher. Ann. 5, 128 pp.

Strand, E. 1916. Über der in Gistel's "Achthundert und zwanzig neue oder unbeschriebene wirbellose Thiere" (1857) behandelte Insekten. Archiv für Naturgeschichte Abt. A, 28:75-101.

Thomson, C.G. 1859. Skandinaviens Coleoptera, Synoptisk Bearbetade 1. Berlingska, Lund. iv + 1-161 + 1-290.

Thomson, C.G. 1866. Skandinaviens Coleoptera, Synoptisk Bearbetade 8, Lund. 409 pp.

APPENDIX: Additional references to show current use of Plateumaris.

Gressitt, J.L. and S. Kimoto. 1961. The Chrysomelidae (Coleopt.) of China and Korea. Part 1. Pacific Insects Monograph, vol. 1:1-299.

Gruev, B. and V. Tomov. 1984. Coleoptera, Chrysomelidae. Part 1. Orsodacninae, Zeugophorinae, Donaciinae, Criocerinae, Clytrinae,

Cryptocephalinae, Lamprosomatinae, Eumolpinae. Fauna Bulgarica 13:1-218.

Kimoto, S. 1983. Revisional study on Megalopodinae, Donaciinae and Clytrinae of Japan (Coleoptera: Chrysomelidae). Entomological Review, Japan 38:5-23.

Lindroth, C.H. 1960 (ed.) Catalogus Coleopterorum Fennoscandiae et Daniae. Lund, pp 1-476.

Lopatin, I.K. 1977. Žuky-listoedy Srednej Azii i Kazakhstana. Opredeliteli po faune SSSR 113:1-270.

Medvedev, L.N. and D.S. Shapiro. 1965. 76. Sem. Chrysomelidae - Listoedy. Opredeliteli po faune SSSR 89:419-474.

Medvedev, L.N. and N.V. Voronova. 1979. K faune listoedy (Coleoptera, Chrysomelidae) Mongolii, 3. Nasekomye Mongolii 6:97-134.

Mohr, K.H. 1966. 88. Fam. Chrysomelidae, In Freude, H., K.W. Harde, and G.A. Lohse, (Eds.) Die Käfer Mitteleuropas 9:95-280.

Pope, R.D. 1977. 3. Coleoptera and Strepsiptera, In Kloet, G.S. and W.D. Hincks, A checklist of British Insects (ed. 2). Handbook for the identification of British Insects 11(3):1-105.

Seeno, T.N. and J.A. Wilcox. 1982. Leaf Beetle Genera (Coleoptera: Chrysomelidae). Entomography 1:1-221.

PLATE 4 — = 0.1mm