

A CATALOG
OF THE COLEOPTERA
OF AMERICA
NORTH OF MEXICO

FAMILY: ELMIDAE



UNITED STATES
DEPARTMENT OF
AGRICULTURE

AGRICULTURE
HANDBOOK
NUMBER 529-50

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FAMILIES OF COLEOPTERA IN AMERICA NORTH OF MEXICO

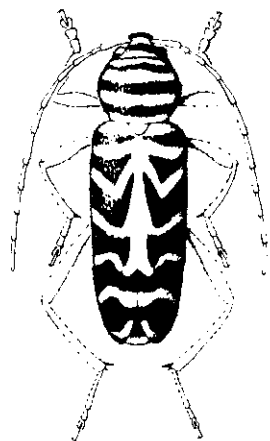
<i>Fascicle</i> ¹	<i>Family</i>	<i>Year issued</i>	<i>Fascicle</i> ¹	<i>Family</i>	<i>Year issued</i>	<i>Fascicle</i> ¹	<i>Family</i>	<i>Year issued</i>
1	Cupedidae	1979	45	Chelonariidae		98	Endomychidae	
2	Micromalthidae	1982	46	Callirhipidae		100	Lathridiidae	
3	Carabidae		47	Heteroceridae	1978	102	Biphyllidae	
4	Rhysodidae		48	Limnichidae		103	Byturidae	
5	Amphizoidae		49	Dryopidae	1983	104	Mycetophagidae	
6	Haliplidae		50	Elmidae	1983	105	Ciidae	1982
8	Noteridae		51	Buprestidae		107	Prostomidae	
9	Dytiscidae		52	Cebrionidae		109	Colydiidae	
10	Gyrinidae		53	Elateridae		110	Monommatidae	
13	Sphaeriidae		54	Throscidae		111	Cephaloidea	
14	Hydroscaphidae		55	Cerophytidae		112	Zopheridae	
15	Hydraenidae		56	Perothopidae		115	Tenebrionidae	
16	Hydrophilidae		57	Eucnemidae		116	Alleculidae	
17	Georyssidae		58	Telegeusidae		117	Lagriidae	
18	Sphaeritidae		61	Phengodidae		118	Salpingidae	
20	Histeridae		62	Lampyridae		119	Mycteridae	
21	Ptiliidae		63	Cantharidae		120	Pyrochroidae	1983
22	Limulodidae		64	Lycidae		121	Othniidae	
23	Dasyceridae		65	Derodontidae		122	Inoepilidae	
24	Micropeplidae		66	Nosodendridae		123	Oedemeridae	
25	Leptinidae		67	Dermestidae		124	Melandryidae	
26	Leiodidae		69	Ptinidae		125	Mordellidae	
27	Scydmaenidae		70	Anobiidae	1982	126	Rhipiphoridae	
28	Silphidae		71	Bostrichidae		127	Meloidae	
29	Scaphidiidae		72	Lycidae		128	Anthicidae	
30	Staphylinidae		74	Trogositidae		129	Pedilidae	
31	Pselaphidae		76	Cleridae		130	Euglenidae	
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33	Passalidae		79	Lymexylidae		132	Bruchidae	
34	Scarabaeidae		81	Sphindidae		133	Chrysomelidae	
35	Eucinetidae		82	Nitidulidae		134	Nemonychidae	
36	Helodidae		83	Rhizophagidae		135	Anthribidae	
37	Clambidae		86	Cucujidae		138	Allocorynidae	
38	Dascillidae		90	Cryptophagidae		140	Brentidae	
39	Rhipiceridae		92	Languriidae	1983	141	Platypodidae	1979
40	Byrrhidae		93	Erotylidae		142	Scolytidae	
41	Psephenidae	1983	94	Phalacridae		143	Curculionidae	1983
42	Brachypsectridae		95	Cerylonidae	1982	144	Stylopidae	
43	Artematopidae		96	Corylophidae		145	Fossil Coleoptera	
44	Ptilodactylidae		97	Coccinellidae				

¹ Missing numbers are those assigned in the computer program to families not found in the United States and Canada.

A CATALOG OF THE COLEOPTERA OF AMERICA NORTH OF MEXICO

FAMILY: ELMIDAE

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FOREWORD

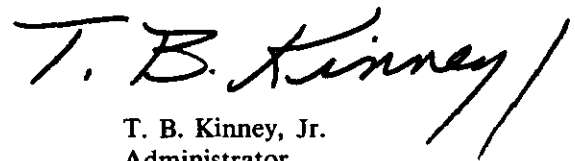
Many species of beetles are important pests of agricultural crops, stored food products, forests, wood products and structures, and fabrics. Many other species, in contrast, are beneficial in the biological suppression of pest arthropods and weeds, as well as in the decomposition of plant detritus, animal carcasses, and dung. Part of our national responsibility to American agriculture is to provide correct identification of species of American beetles so that appropriate controls can be applied.

Most information about animal species, whether agricultural, biological, or experimental, is filed under the species' scientific names. These names are therefore the keys to retrieval of such information. Because some species have been known by several names, a complete listing of these names for each species is necessary.

For the user of scientific names, an up-to-date taxonomic catalog providing currently accepted names and pertinent bibliographic and distributional data is an indispensable tool. Although taxonomic literature is constantly changing to reflect current work, the traditional published taxonomic catalog remains static with updating left to the individual user until it is revised. Production of catalogs in the past has been laborious with long printing delays resulting in data that are obsolete before being published. However, the computer now provides the capability of storing, updating, and retrieving taxonomic data; rapid publication through computer-driven typesetting machinery; and a greater degree of currentness and flexibility.

All 124 fascicles in this catalog of the beetles of America north of Mexico are produced by an original group of computer programs, designed and written during a pilot project by personnel of the Systematic Entomology Laboratory, Agricultural Research Service, and the Communications and Data Services Division, Science and Education Management Staff.

The published information is stored on computer tape, is updated periodically to reflect taxonomic progress in the family, and is available in a data base for computer searching.



T. B. Kinney, Jr.
Administrator
Agricultural Research Service

PREFACE

The Coleoptera, or beetles, are represented in the world by about 220,000 described species, of which about 24,000 occur in the United States and Canada. A comprehensive taxonomic catalog of beetles for this area has not been available except the series of world-based "Coleopterorum Catalogus" volumes (1909-present, Junk, Berlin). The Leng "Catalogue of the Coleoptera of America North of Mexico" (J. D. Sherman, Jr., Mt. Vernon, NY), which was published in 1920 with supplements to the end of 1947, is a checklist. However, it has served professional and amateur alike for nearly 60 years as the principal source of scientific names of beetles. Since 1947, many new taxa have been described and many changes in status and nomenclature have appeared in numerous scattered publications, but little effort has been made to summarize these changes.

This catalog will supplant the Leng catalog and supply additional essential information. It is produced by an original suite of storage, retrieval, and printing programs written especially for automated taxonomic catalogs.

The catalog for each family is published as a separate fascicle with its introductory text, bibliography, and index. Each family is numbered as listed, but the order of issuance of fascicles is not necessarily in numerical sequence. The publishing of separate fascicles makes data available shortly after they are assembled. Computer tapes for each fascicle are maintained for updating and necessary reprinting.

The information on each family is the responsibility of the respective author or authors. The editors modify it only to correct obvious errors and to make it conform to the requirements of the computer programs.

No original proposal for a new name, taxon, status, or classification is given, such data having been previously published, but new host and distributional data are often listed. The rules of "The International Code of Zoological Nomenclature" are followed.

The geographic scope of this catalog includes the continental United States, Canada, Alaska, Greenland, and the associated continental islands. Names of taxa found only in other regions are excluded. If the range of a species extends outside these geographic limits, this fact is indicated. Inside the back cover is a map of the 12 faunal regions based on historical and faunal criteria to simplify distribution recordings. Two-letter Postal Service style abbreviations are used for States and Provinces, and faunal regions are indicated in each distribution record by a diagonal line between groups of abbreviations.

It is not the purpose of this catalog to present a complete scheme of higher classification within the order. The familial makeup is somewhat intermediate between that of R. H. Arnett in "The Beetles of the United States" (1960-62, Catholic University Press, Washington, DC) and that of R. A. Crowson in "The Natural Classification of the Families of Coleoptera" (1967, Biddles Ltd., Guildford, England). Modifications of these two systems are largely those advocated by J. F. Lawrence based in part on suggestions by taxonomic specialists for certain families.

Generic groups and higher categories within the family are arranged phylogenetically as indicated by the author of the particular fascicle, and species group names with their respective synonyms are arranged alphabetically.

Names referable to *incertae sedis* and *nomen dubium* are listed separately at the end of the nearest applicable taxon with notations as to their status.

Each available name is followed by its author, date proposed, and page number referring to the complete bibliographic citation containing the original description. Following each generic name are

the type-species and method of its designation, necessary explanatory notes, and pertinent references on immature stages, taxonomy, redescription, ecology, and keys. After the specific name entry are the original genus (if different from the present placement), type-locality, geographical distribution by State, Province, and broad extralimital units, explanatory notes, pertinent references to immature stages, taxonomy, redescription, and ecology, depository of type-specimen and its sex, and hosts.

In addition to the list under the map of faunal regions (inside back cover), the following abbreviations are used in this catalog:

ABBREVIATIONS, GENERAL

Amer. Bor.—America Borealis	Mus.—Museum
Amer. Sept.—America Septentrionalis	N. Amer.—North America
Autom.—Automatic	Orig. des.—Original designation
C. Amer.—Central America	Preocc.—Preoccupied
Co.—County	S. Amer.—South America
Cosmop.—Cosmopolitan	Sp.—Species
Design.—Designated	Subseq. monot.—Subsequent monotypy
F.—Female	Subsp.—Subspecies
Holarc.—Holarctic	Taut.—Tautonymy
Isl.—Island	Univ.—University
M.—Male	USA—United States of America
Mex.—Mexico	Var.—Variety
Monot.—Monotypy	W. Ind.—West Indies

MUSEUMS IN THE CONTINENTAL UNITED STATES AND CANADA ¹

AMNH—American Museum of Natural History, New York	FSCA—Florida State Collection, Gainesville
ANSP—Academy of Natural Sciences, Phila- delphia, PA	HAHC—H. & A. Howden Collection, Ottawa, Canada
BYUC—Brigham Young University, Provo, UT	ICCM—Carnegie Museum, Pittsburgh, PA
CASC—California Academy of Sciences, San Francisco	INHS—Illinois Natural History Survey, Urbana
CISC—University of California, Berkeley	JGEC—J. G. Edwards Collection, San Jose, CA
CNCI—Canadian National Collections, Ottawa	KMFC—K. M. Fender Collection, McMinnville, OR
CUIC—Cornell University, Ithaca, NY	KSUC—Kansas State University, Manhattan
CWOB—C. W. O'Brien Collection, Tallahassee, FL	LACM—Los Angeles County Museum, CA
DHKC—D. H. Kistner Collection, Chico State College, CA	LSUC—Louisiana State University, Baton Rouge
ELSC—E. L. Sleeper Collection, Long Beach, CA	MCZC—Museum of Comparative Zoology, Har- vard University, Cambridge, MA
FMNH—Field Museum of Natural History, Chi- cago, IL	MSUC—Michigan State University, East Lansing
	NCSM—North Carolina State University, Raleigh
	NYSM—New York State Museum, Albany
	OSEC—Oklahoma State University, Stillwater
	OSUC—Ohio State University, Columbus
	OSUO—Oregon State University, Corvallis

¹ Abbreviations for U.S. and Canadian museums abridged from Arnett, R. H., Jr., and Samuelson, G. A., 1969, "Directory of Coleoptera Collections of North America (Canada Through Panama)," Cushing-Malloy, Ann Arbor, MI, 123 pp.

PMNH—Peabody Museum, Yale University, New Haven, CT
PSUC—Pennsylvania State Museum, University Park
PURC—Purdue University, West Lafayette, IN
RUIC—Rutgers University, New Brunswick, NJ
SEMC—Snow Museum, University of Kansas, Lawrence
SJSC—San Jose State College, CA
SLWC—S. L. Wood Collection, Provo, UT

SMSH—Stovall Collection, University of Oklahoma, Norman
TAMU—Texas A. & M. University, College Station
UCDC—University of California, Davis
UMMZ—University of Michigan, Ann Arbor
UMRM—University of Missouri, Columbia
USNM—U.S. National Museum of Natural History, Washington, DC
WSUC—Washington State University, Pullman

MUSEUMS IN FOREIGN COUNTRIES

BMNH—British Museum (Natural History), London
BPBM—Bernice P. Bishop Museum, Honolulu
GUHC—Glasgow University, Hunterian College, Scotland
HMOX—Hope Museum, Oxford, England
HNHM—Hungarian Natural History Museum, Budapest
IPZE—Institut Pflanzenschutzforschung Zweigstelle, Eberswalde, East Germany
IRSB—Institut Royal Sciences Belgique, Brussels
MFNB—Museum für Naturkunde (Humboldt), Berlin
MGFT—Museum G. Frey, Tutzing, Munich, West Germany
MHNL—Museum d'Histoire Naturelle, Lyon, France
MNHP—Museum National d'Histoire Naturelle, Paris
MNSL—Museum of Natural Sciences, Leipzig, East Germany
MZBS—Museum Zoologia, Barcelona, Spain

NHRS—Naturhistoriske Riksmuseet, Stockholm
NMPC—Narodni Museum, Prague, Czechoslovakia
SCUT—Spinola College, University of Turin, Italy
SMTD—Staatliches Museum für Tierkunde, Dresden, East Germany
UNAM—Universidad Nacional Autonoma, Mexico City
UZMC—University Zoological Museum, Copenhagen, Denmark
UZMH—University Zoological Museum, Helsinki, Finland
ZMAS—Zoological Museum, Academy of Sciences, Leningrad
ZMPA—Zoological Museum, Polish Academy of Sciences, Warsaw
ZMUL—Zoological Museum, University of Lund, Sweden
ZMUM—Zoological Museum, University of Moscow
ZSBS—Zoologische Sammlung Bayerischen Staates, Munich, West Germany

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We thank the following members of the Communications and Data Services Division, ARS: Sandra Strauss and Marianne Kingston for designing and writing the computer programs, and Margaret Seldin for developing the editing system.

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Family ELMIDAE Shuckard, 1839

By Harley P. Brown

Limniidae Stephens, 1828: 104; Elmini Erichson, 1847: 520; Elmissiens Mulsant and Rey, 1872; Elminae LeConte and Horn, 1883: 165; Helmidés Grouvelle, 1896: 75; Helmidae Grouvelle, 1900: 268; Helminthinae Ganglbauer, 1904: 108; Helminthidae Grouvelle, 1906: 145.

The elmids, commonly called riffle beetles, constitute the largest family of dryopoid beetles. Of the 110 genera described to date, 25 are represented in North America, but only 85 of the approximately 1,100 known species occur on this continent north of Mexico. Except for the Antarctic and Boreal Regions and islands remote from major land masses, all areas of the world exhibit a significant elm mid fauna.

Since elmids are both small and inconspicuous, it is hardly surprising that Linnaeus was apparently unaware of them. In fact, it was not until 1793 that an elm mid was first mentioned in scientific literature when Panzer described *Dytiscus volckmari*. Illiger (1802: 297) transferred this beetle to a new genus, *Limnius*, but failed to characterize or describe the genus. This oversight was not remedied until 1806 when Mueller provided a description. Meanwhile, in 1802 Latreille erected the genus *Elmis* for his new species, *E. maugetii*. Several authors have indicated that the first usage of *Elmis* Latreille, the type-genus of Elmidae, was 1798, but a thorough search of the indicated literature has proven this to be erroneous. Elmids were first placed in a family of their own by Stephens in 1828 and 1829 under the name Limniidae. Unfortunately, however, since he did not derive the name properly from that of a type-genus, it is invalid. His family comprised only two genera: *Georyssus*, now placed in another superfamily, and *Elmis*, in which he lumped all the British Elminae. The presently accepted name Elmidae was first used by Shuckard in 1839, but it has not been used continuously during the intervening years. At about the same time, Westwood (1839) designated the Elmidés as a subfamily of MacLeay's Parnidae. This usage prevailed during the following century, though with variations in terminology (Elminae of LeConte and Horn in 1883, Helminthinae of Ganglbauer in 1904, Helminae of Zaitzev in 1910) and under the family name Dryopidae after this was pointed out as the proper name by Grouvelle in 1900. Some workers (e.g., Bertrand 1972) prefer this scheme even now. This discussion applies primarily to the insects now placed in the subfamily Elminae.

The Larinae (LeConte 1861) were long considered closer to the present Dryopidae than to the Elminae. In much of the European literature and in Leng's catalog (1920), they were treated as a tribe (Potamophilini of Ganglbauer 1904) in the subfamily Dryopinae of the family Dryopidae. Hinton (1935, 1939) presented convincing arguments not only that they belonged in the family Elmidae but that they merited no more than tribal separation from other elmids. Revival of such names as Elminthidae or Helminthidae was effectively suppressed by Steyskal (1975).

Major early workers with European elmids included Philip Mueller, Erichson, Mulsant and Rey, Kuwert, and Ganglbauer; with tropical species, Sharp, Champion, Waterhouse, Grouvelle, and Pic; with Australian forms, Broun, King, Carter, and Zeck. Current European authorities include Berthelemy, Olmi, and Steffan. Masataka Sato replaced Nomura in Japan. Hinton and Deleve contributed enormously to our knowledge of the world elm mid fauna; Hinton dealt chiefly with neotropical and Deleve with Ethiopian and oriental groups. Bertrand is the world authority on larvae and pupae. In North America, notable workers since Say have been LeConte, Horn, Casey, Schaeffer, Fall, West, Musgrave, Chandler, and W. J. Brown. Sanderson laid the foundation for our present understanding of North American elmids. H. P. Brown, Finni, Hilsenhoff, LeSage and Harper, Nelson, and D. S. White are working on nearctic elmids.

As suggested by their taxonomic history, elmids are most closely related to dryopids, but they are not far removed from *Lutrochus* (recently considered a limnichid) or the eubriine psephenids. The georyssids, with which they were long associated, are now thought to be closer to hydrophilids, though they superficially resemble elmids.

Elm mid larvae are completely aquatic and are equipped with retractile cloacal tracheal gills. They range from vermiform to onisciform, are slow and sedentary, and feed on such plant matter as waterlogged wood, encrusting algae, and detritus. Their typical habitat is the substrate of shallow flowing streams. Adults of the subfamily Elminae share the food and habitat of their larvae. Pupation occurs in small cells in moist sand, beneath rocks, under loose bark,

or in other protected sites near the water. Adults commonly fly and may be taken at lights shortly after emergence. Once submerged, they may never return to the surface because their plastron respiration is adequate in well-aerated water. Many live more than a year, becoming heavily encrusted with mineral deposits or shaggy with peritrich ciliates. All are small, most being less than 3 mm long. Adults of the subfamily Larinae are usually larger, some giant exotics attaining a length of 11 mm; they are vastly different from Elminae in behavior and habitat. Most are found clinging to objects not far above the roiling water of cataracts or rapids, from which they fly readily and well. Some are submerged in shallow rapids.

Elmids are gaining increasing recognition as indicators of water quality in streams (Sinclair 1964, Hilsenhoff 1977).

This manuscript was received May 1976.

Boeving and Craighead, 1931; Sanderson, 1938a: 635; Hinton, 1939: 133; Sanderson, 1953b: 148 and 1954: 1; Leech and Chandler, 1956; Leech and Sanderson, 1959; Steffan, 1961: 255; Brown, 1972b.

Subfamily LARINAE LeConte, 1861

Larini LeConte, 1861: 116; Potamophilaires Mulsant and Rey, 1872; Potamophilini Ganglbauer, 1940: 100; Laridae Boeving, 1929; Larinae, Boeving and Craighead, 1931.

Boeving and Craighead, 1931; Hinton, 1939: 133; Steffan, 1961: 255.

Tribe LARINI

Genus LARA LeConte

Lara LeConte, 1852: 42. Type-species: *Lara avara* LeConte (monot.).

IMMATURE STAGES: Brown, 1972b: figs. 139-140 (larva); West, 1929b (larval type 3).

TAXONOMY: Darlington, 1929.

ECOLOGY: Brown, 1972b.

KEYS: Brown, 1972b: 26; Sanderson, 1953b.

***avara amplipennis* Darlington, 1929: 330, fig. 1c. WA: North Bend; BC WA.**

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: M.

TAXONOMY: Brown, 1972b: 26.

ECOLOGY: Brown, 1972b: 13.

HOST: Larva on submerged wood and debris.

***avara avara* LeConte, 1852: 42. CA; BC WA OR ID/ MT/ CA/ WY UT CO.**

TYPE DEPOSITORY: MCZC.

IMMATURE STAGES: Brown, 1972b: figs. 139-140 (larva); West, 1929b (larval type 3).

TAXONOMY: Brown, 1972b.

ECOLOGY: Brown, 1972b: 13.

HOST: Larva on submerged wood and debris.

***gehringi* Darlington, 1929: 329, fig. 1a. WA: North Bend; WA OR/ CA.**

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: M.

TAXONOMY: Brown, 1972b.

ECOLOGY: Brown, 1972b: 13.

HOST: Larva on submerged wood and debris.

Genus PHANOCERUS Sharp

Phanocerus Sharp, 1882: 128, pl. 4, fig. 8. Type-species: *Phanocerus clavicornis* Sharp (monot.).

IMMATURE STAGES: Brown, 1972b: figs. 141-142 (larva); Hinton, 1940b: figs. 62-83 (larva).

TAXONOMY: Brown, 1972b: 26.

REDESCRIPTION: Hinton, 1940b: 245.

ECOLOGY: Brown, 1972b: 13.

KEYS: Brown, 1972b.

clavicornis Sharp, 1882: 129, pl. 4, fig. 8. Guatemala: Coban; TX/ Mex., C. Amer.

TYPE DEPOSITORY: BMNH.

IMMATURE STAGES: Hinton, 1940b: figs. 62-83 (larva); Brown, 1972b: figs. 141-142 (larva).

TAXONOMY: Brown, 1972b: 26.

REDESCRIPTION: Hinton, 1940b: 246.

ECOLOGY: Brown, 1972b: 13.

HOST: Larva on submerged plant material.

Subfamily ELMINAE

Limniidae Stephens, 1828: 104; Elmidae Shuckard, 1839: 151; Elmini Erichson, 1847: 520; Elmissiens Mulsant and Rey, 1872; Helminae Zaitzev, 1910: 20; Helmidae Leng, 1920: 186; Elminae Hinton, 1935.

Hinton, 1939: 133 and 1940: 217; Sanderson, 1953: 148 and 1954: 1; Steffan, 1961: 255.

Tribe ANCYRONYCHINI Ganglbauer, 1904

Steffan, 1961: 348.

Genus ANCYRONYX Erichson

Ancyronyx Erichson, 1847: 522. Type-species: *Macronychus variegatus* Germar (monot.).

IMMATURE STAGES: Brown, 1972b: 60, figs. 151-152 (larva); Sanderson, 1953b: 160, figs. 43-46 (larva).

TAXONOMY: Brown, 1972b; Sanderson, 1953b (revision).

REDESCRIPTION: Bertrand and Steffan, 1963.

KEYS: Sanderson, 1953b; Brown, 1972b.

variegata (Germar), 1824: 89 (*Macronychus*). 'Boreal America'; WI MI ON PQ/ KS MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ ME VT RI CT/ TX OK/ AR LA MS AL TN GA SC NC FL.

cincta Say, 1825: 186 (*Elmis*). PA.

parumoculatus Hardy, 1852: 270 (*Hydrochus*). England: near Newcastle. Sanderson (1953) questions whether the specimen described by Hardy was even an elmid; it was certainly not *Ancyronyx*. The synonymy is derived from Leng (1920).

IMMATURE STAGES: Brown, 1972b: 60, figs. 151-152 (larva); Sanderson, 1953b: 160, figs. 43-46 (larva).

TAXONOMY: Brown, 1972b.

ECOLOGY: Brown, 1972b: 14.

HOST: Larva on submerged wood or trash.

Tribe Elmini Steffan, 1961

Elmisaires Mulsant and Rey, 1872; Elmini Steffan, 1961.

Genus AMPUMIXIS Sanderson

Ampumixis Sanderson, 1954: 3, figs. 22, 23. Type-species: *Helmis dispar* Fall (orig. des.).

IMMATURE STAGES: Sanderson, 1954: 3, figs. 69, 71; Brown, 1972b: figs. 169-171 (larva).

dispar (Fall), 1925: 180 (*Helmis*). CA: Siskiyou Co., Shasta Retreat; WA OR/ CA.

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: M.

IMMATURE STAGES: Sanderson, 1954: 3 (larva); Brown, 1972b: figs. 169-171 (larva).

Genus ATRACTELMIS Chandler

Atractelmis Chandler, 1954: 125, figs. 1-3. Type-species: *Atractelmis wawona* Chandler (orig. des.).

wawona Chandler, 1954: 125, figs. 1-3. CA: Yosemite N. P.; OR/ CA. The entire adult was illustrated by Brown, 1972b: figs. 58-59.

TYPE DEPOSITORY: CASC.

SEX OF TYPE: M.

TAXONOMY: Brown and White, 1978.

Genus CLEPTELMIS Sanderson

Cleptelmis Sanderson, 1954: 4, fig. 25. Type-species: *Elmis ornata* Schaeffer (orig. des.).

IMMATURE STAGES: Sanderson, 1954: 4 (larva); Brown, 1972b: figs. 171-172 (larva).

KEYS: Brown, 1972b: 35.

addenda (Fall), 1907: 226 (*Elmis*). NM: Pecos; OR ID/ SD/ CA NV WY UT CO/ NM.

TYPE DEPOSITORY: possibly MCZC.

ornata (Schaeffer), 1911: 120 (*Helmis*). MT; BC WA OR ID/ MT SD/ CA NV WY UT CO/ AZ NM.

TYPE DEPOSITORY: USNM.

Genus CYLLOEPUS Erichson

Cylloepus Erichson, 1847: 521. Type-species: *Limnius araneolus* Mueller (monot.).

IMMATURE STAGES: Hinton, 1940b: 365, figs. 319-329 (larva); Brown, 1977: 167, fig. 1, (larva).

TAXONOMY: Hinton, 1940b.

REDESCRIPTION: Hinton, 1940b: 342.

KEYS: Hinton, 1940b: 346; Brown, 1972b: 40.

abnormis (Horn), 1870: 38 (*Elmis*). AZ: San Pedro River; AZ/ Mex.

TYPE DEPOSITORY: possibly MCZC.

REDESCRIPTION: Sanderson, 1953a: 37 (female paratype).

parkeri Sanderson, 1953a: 38, fig. 1. AZ: Yavapai Co., Bloody Basin; AZ.

TYPE DEPOSITORY: INHS.

SEX OF TYPE: M.

IMMATURE STAGES: Brown, 1977: 167, fig. 1 (larva).

Genus DUBIRAPHIA Sanderson

Dubiraphia Sanderson, 1954: 4, figs. 26, 29. Type-species: *Elmis quadrinotata* Say (orig. des.).

IMMATURE STAGES: Brown, 1972b: figs. 143-144 (larva); Sanderson, 1954: figs. 53-55 (larva).

TAXONOMY: Hilsenhoff, 1973.

ECOLOGY: Brown, 1972b.

KEYS: Hilsenhoff, 1973.

bivittata (LeConte), 1852: 44 (*Elmis*). 'Upper Mississippi River'; AB/ WI ON/ IL IN.

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: F.

REDESCRIPTION: Hilsenhoff, 1973: 59, fig. 1d.

brevipennis Hilsenhoff, 1973: 60, fig. 1I. LA: Hammond; LA.

TYPE DEPOSITORY: SMSH.

SEX OF TYPE: M.

browni Hilsenhoff, 1973: 60, fig. 1H. OK: Leflore Co., Kiamichi River; OK.

TYPE DEPOSITORY: SMSH.

SEX OF TYPE: M.

brunnescens (Fall), 1925: 177 (*Helmis*). CA: Lake Co., Clear Lake; CA.

TYPE DEPOSITORY: MCZC.

giulianii (Van Dyke), 1949: 54 (*Simsonia*). CA: Russian River; CA.

TYPE DEPOSITORY: CASC.

minima Hilsenhoff, 1973: 59, figs. 1F, G. WI: Taylor Co., Silver Creek; WI/ MO IN OH/ MD/ OK.

TYPE DEPOSITORY: Univ. WI, Madison.

SEX OF TYPE: M.

parva Hilsenhoff, 1973: 61, fig. 1J. OK: Pontotoc Co., Buck Creek; OK.

TYPE DEPOSITORY: SMSH.

SEX OF TYPE: M.

quadrinotata (Say), 1825: 187 (*Elmis*). 'United States'; WI/ IL IN OH/ PA.

TYPE DEPOSITORY: (Lost).

REDESCRIPTION: Hilsenhoff, 1973: 58.

robusta Hilsenhoff, 1973: 59, fig. 1E. WI: Burnett Co., Mudhen Lake; WI.

TYPE DEPOSITORY: Univ. WI, Madison.

SEX OF TYPE: M.

vittata (Melsheimer), 1844: 99 (*Elmis*). PA; MB/ WI MI ON PQ/ NE KS IA MO IL IN OH KY/
NY PA NJ DE MD DC WV VA/ TX OK/ AR LA MS AL TN GA SC NC FL.

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: M.

REDESCRIPTION: Hilsenhoff, 1973: 58.

Genus ELSIANUS Sharp

Elsianus Sharp, 1882: 131, tab. 4, fig. 11. Type-species: *Elsianus robustus* Sharp (monot.).

IMMATURE STAGES: Hinton, 1940b: 276, figs. 131-163 (larvae and pupa); Brown, 1972b: figs. 165-166.

REDESCRIPTION: Hinton, 1940b: 261.

KEYS: Brown, 1972b.

moestus (Horn), 1870: 37 (*Elmis*). AZ: San Pedro River; AZ.

TYPE DEPOSITORY: MCZC?.

shoemakei Brown, 1971: 56, figs. 1-3. TX: Val Verde Co., Del Rio, San Felipe Creek; TX/ Mex.

TYPE DEPOSITORY: SSMH.

SEX OF TYPE: M.

texanus Schaeffer, 1911: 119. TX: Val Verde Co., Devil's River; NM TX/ Mex.

TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Brown, 1972b: figs. 165-166 (larva).

Genus GONIELMIS Sanderson

Gonielmis Sanderson, 1954: 5, figs. 28, 32. Type-species: *Helms dietrichi* Musgrave (orig. des.).

IMMATURE STAGES: Sanderson, 1954: 7 (larva); Brown, 1972b: 64, figs. 182-184 (larva).

dietrichi (Musgrave), 1933: 54, fig. 2A (*Helms*). MS: Dog River near Lucedale; MS AL TN GA
FL SC.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

IMMATURE STAGES: Sanderson, 1954: 7 (larva); Brown, 1972b: 64, figs. 182-184 (larva).

Genus HETERELMIS Sharp

Heterelmis Sharp, 1882: 130, tab. 4, fig. 10. Type-species: *Heterelmis obscurus* Sharp (design. by
Hinton, 1940: 371).

IMMATURE STAGES: Brown, 1972b: 60, figs. 153-155 (larva); Hinton, 1940b: 390, figs. 382-401 (larva);
Sanderson, 1953b: 162 (larva).

TAXONOMY: Hinton, 1940b: 368; Brown, 1972a: 229.

REDESCRIPTION: Hinton, 1940b: 369.

ECOLOGY: Brown, 1972b: 15.

KEYS: Brown, 1972a: 237 and 1972b: 39.

glabra (Horn), 1870: 37 (*Elmis*). AZ: San Pedro River; AZ TX/ Mex.

TYPE DEPOSITORY: MCZC?.

acicula Hinton, 1940b: 389, figs. 377-381 (synonymized by Brown, 1972a: 234). Mex.: Dist.
Temascaltepec, Tejupilco.

TYPE DEPOSITORY: BMNH.

SEX OF TYPE: M.

obesa Sharp, 1882: 131, tab. 4, fig. 10. Guatemala: Vera Paz, San Joaquin; AZ NM TX/ Mex., C.
Amer.

TYPE DEPOSITORY: BMNH.

REDESCRIPTION: Hinton, 1940b: 382, figs. 357-365.

stephani Brown, 1972a: 230, figs. 1-10. AZ: Pima Co., Santa Rita Mts., Madera Canyon; AZ.

TYPE DEPOSITORY: CNCI.

SEX OF TYPE: M.

vulnerata (LeConte), 1874: 53 (*Elmis*). TX; KS/ TX OK/ Mex.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Brown, 1972a: fig. 15.

Genus **HETERLIMNIUS** Hinton

Heterlimnius Hinton, 1935: 178, figs. 4-5. Type-species: *Helmis koebeleri* Martin (orig. des.).

IMMATURE STAGES: Brown, 1972b: figs. 185-186 (larva); Sanderson, 1954: 2, fig. 65 (larva).

REDESCRIPTION: Sanderson, 1954: 2 (restricts, redefines genus).

ECOLOGY: Brown and White, 1978: 6.

KEYS: Brown, 1972b: 43.

corpulentus (LeConte), 1874: 52 (*Elmis*). BC; BC WA OR ID/ AB MT SD/ CA NV/ WY UT CO/ AZ NM.

TYPE DEPOSITORY: MCZC.

antennatus Fall, 1907: 227 (*Elmis*) (synonymized by Fall, 1925: 181). NM: Beulah.

TYPE DEPOSITORY: MCZC.

koebeleri (Martin), 1927: 68 (*Helmis*). WA: Easton; BC WA OR/ CA.

TYPE DEPOSITORY: CASC.

Genus **HEXACYLLOEPUS** Hinton

Hexacylloepus Hinton, 1940b: 331, figs. 249-250, 252, 254. Type-species: *Elmis smithi* Grouvelle (orig. des.).

IMMATURE STAGES: Brown, 1973: 143, figs. 1-11 (larva).

ECOLOGY: Brown, 1973: 147.

ferugineus (Horn), 1870: 39 (*Elmis*). TX; NM TX OK/ Mex.

IMMATURE STAGES: Brown 1973: 146, figs. 1-11 (larva).

ECOLOGY: Brown, 1973: 147.

TYPE DEPOSITORY: MCZC.

Genus **MICROCYLLOEPUS** Hinton

Microcyloepus Hinton, 1935: 178, figs. 6, 7. Type-species: *Elmis pusillus* LeConte (orig. des.).

IMMATURE STAGES: Hinton, 1940b: 316, figs. 221-231 (larva); Brown, 1972b: figs. 156-158 (larva).

TAXONOMY: Hinton, 1940b.

REDESCRIPTION: Hinton, 1940b: 300.

KEYS: Brown, 1972b; Hinton, 1940b: 304.

browni (Hatch), 1938: 16, fig. 1 (*Heterelmis*). MT: Gallatin Co., Bridger Canyon near Bozeman; MT.

TYPE DEPOSITORY: USNM.

moapus fraxinus La Rivers, 1949a: 209. NV: Lincoln Co., Ash Springs, Pahranaagat Valley; NV.

TYPE DEPOSITORY: Univ. NV, Reno.

moapus moapus La Rivers, 1949a: 205, fig. 1. NV: Clark Co., Warm Springs (Big Pool, 1,700 ft.); NV.

TYPE DEPOSITORY: Univ. NV, Reno.

pusillus aptus (Musgrave), 1933: 56, fig. 2C (*Helmis*). VA: Dunlap Creek W. of Clifton Forge; VA/ FL.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

pusillus foveatus (LeConte), 1874: 53 (*Elmis*) (designated subspecies by Leech and Chandler, 1956: 362). Unknown, probably CA; OR ID/ CA NV.

TYPE DEPOSITORY: MCZC.

pusillus loedingi (Musgrave), 1933: 56 (*Helmis*). MS: Monger Creek near Lucedale; MS AL.

TYPE DEPOSITORY: USNM.

pusillus perditus (Musgrave), 1933: 56, fig. 2D (*Helmis*). FL: Leesburg; FL.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

pusillus pusillus (LeConte), 1852: 44 (*Stenelmis*). NY: Rapids of Niagara; MT SD/ WI ON/ CA NV/ WY UT/ NE KS IN/ NY PA MD DC WV VA/ ME CT/ AZ NM TX OK/ AR LA MS AL TN GA FL.

TYPE DEPOSITORY: MCZC?.

IMMATURE STAGES: Brown, 1972b: figs. 156-158 (larva).

pusillus similis (Horn), 1870: 38 (*Elmis*) designated subspecies by Leech and Chandler, 1956: 362. AZ: San Pedro River; AZ.

TYPE DEPOSITORY: MCZC?.

thermarum (Darlington), 1928: 5 (*Helmis*). NV: Humboldt Co., Hot Spring no. 15, Opal Mine; NV.

TYPE DEPOSITORY: MCZC.

Genus NARPUS Casey

Narpus Casey, 1893: 582. Type-species: *Narpus angustus* Casey (orig. des.).

IMMATURE STAGES: West, 1929b (larval type 7); Brown, 1972b: figs. 145-146 (larva).

KEYS: Brown, 1972b.

angustus Casey, 1893: 583. CA: Mendocino Co.; CA.

TYPE DEPOSITORY: USNM.

arizonicus (Brown), 1930a: 90 (*Helmis*). AZ: Apache Co., White Mts., Diamond Creek; AZ.

TYPE DEPOSITORY: CNCI.

concolor (LeConte), 1881: 75 (*Elmis*). NM: Santa Fe Canyon; BC WA OR/ AB/ CA NV/ WY UT CO/ AZ NM.

TYPE DEPOSITORY: MCZC?.

solutus Brown, 1933: 46 (*Helmis*). BC. Fall (1934) stated that *N. solutus* is the maculate form of *N. concolor*.

TYPE DEPOSITORY: CNCI.

SEX OF TYPE: M.

Genus NEOCYLLOEPUS Brown

Neocyloepus Brown, 1970: 2, figs. 1-21. Type-species: *Elmis sculptipennis* Sharp (orig. des.).

IMMATURE STAGES: Brown, 1970: 21, figs. 35-52 (larva).

TAXONOMY: Brown, 1970: 1.

ECOLOGY: Brown, 1970.

KEYS: Brown, 1970: 10.

boeseli Brown, 1970: 15, figs. 2-3, 5-7, 9-10, 13. TX: Val Verde Co., Devil's River, 20 mi S. Juno; AZ TX/ Mex.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

IMMATURE STAGES: Brown, 1970: 25, figs. 37-66 (larva).

Genus NEOELMIS Musgrave

Neoelmis Musgrave, 1935: 34. Type-species: *Neoelmis gracilis* Musgrave (orig. des.).

IMMATURE STAGES: Hinton, 1940b: 330 (larva); Brown, 1972b: figs. 159-160 (larva).

TAXONOMY: Hinton, 1940b.

REDESCRIPTION: Hinton, 1940b: 319.

KEYS: Hinton, 1940b: 323.

caesa (LeConte), 1874: 53 (*Elmis*). TX; TX OK.

TYPE DEPOSITORY: MCZC?.

Genus OPTIOSERVUS Sanderson

Optioservus Sanderson, 1954: 8, figs. 30, 33. Type-species: *Limnius trivittatus* Brown (orig. des.).

IMMATURE STAGES: Sanderson, 1954 (larva); Brown, 1972b: figs. 176-177 (larva); West, 1929b (larval type 9).

TAXONOMY: White, 1978b.

REDESCRIPTION: White, 1978b.

KEYS: White, 1978b.

browni White, 1978b: 64, figs. 12, 27, 32. AR: Montgomery Co., above Albert Pike Campground; AR.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

- canus** Chandler, 1954: 130. CA: San Benito Co., Chalone Creek, Pinnacles N. M.; CA.
 TYPE DEPOSITORY: CASC.
 SEX OF TYPE: M.
 REDESCRIPTION: White, 1978b: 65, figs. 11, 25.
- castanipennis** (Fall), 1925: 177 (*Helmis*). WY; WY UT CO/ NM. There are also dubious records from AZ, BC, and MT.
 TYPE DEPOSITORY: MCZC.
 SEX OF TYPE: M.
 REDESCRIPTION: White, 1978b: 66, figs. 1, 4, 5, 19.
- divergens** (LeConte), 1874: 52 (*Elmis*). CA; BC/ AB SK SD/ CA NV/ WY UT CO/ AZ NM.
 TYPE DEPOSITORY: MCZC.
 SEX OF TYPE: M.
- pecosensis** Fall, 1907: 226 (*Elmis*) (synonymized by White, 1978b: 66). NM: Pecos.
 TYPE DEPOSITORY: MCZC.
 SEX OF TYPE: F.
 REDESCRIPTION: White, 1978b: 66, figs. 6, 20.
- fastiditus** (LeConte), 1850: 217 (*Limnius*). Lake Superior: Maple Isl.; AB MB ND/ MN WI MI ON PQ/ IA IL IN/ NY.
 TYPE DEPOSITORY: MCZC.
 SEX OF TYPE: M.
 REDESCRIPTION: White, 1978b: 67, figs. 17, 18, 31.
- heteroclitus** White, 1978b: 68, figs. 8, 22. CA: Yosemite N. P., Mosquito Creek N. Wawona; CA.
 TYPE DEPOSITORY: USNM.
 SEX OF TYPE: M.
- immunis** (Fall), 1925: 178 (*Helmis*). CT: Stratford; PA NJ/ CT/ TN GA SC NC.
 TYPE DEPOSITORY: MCZC.
 SEX OF TYPE: M.
- cryophilus** Musgrave, 1932: 79, pl. 9 (*Limnius*) (synonymized by White, 1978b: 69). TN: Greenbrier, Great Smoky Mts.
 TYPE DEPOSITORY: USNM.
 SEX OF TYPE: F.
 REDESCRIPTION: White, 1978b: 69, figs. 16, 30.
- ovalis** (LeConte), 1863: 74 (*Limnius*). PA; PQ/ OH/ NY PA MD WV VA/ VT MA CT/ MS AL TN NC.
 TYPE DEPOSITORY: MCZC.
 SEX OF TYPE: M.
- ampliatus** Fall, 1925: 179 (*Helmis*) (synonymized by White, 1978b: 69). MA: Lowell.
 TYPE DEPOSITORY: MCZC.
 SEX OF TYPE: F.
 IMMATURE STAGES: LeSage and Harper, 1976a, 1976b and 1977 (life history).
 REDESCRIPTION: White, 1978b: 69, figs. 12-13, 28.
- phaeus** White, 1978b: 70, figs. 7, 21. KS: Scott Co. State Park; KS.
 TYPE DEPOSITORY: USNM.
 SEX OF TYPE: M.
- quadrinaculatus** (Horn), 1870: 37 (*Elmis*). CA: Fort Crook; BC WA OR ID/ AB MT/ CA NV/ WY UT CO.
 TYPE DEPOSITORY: ANSP.
 SEX OF TYPE: F.
 REDESCRIPTION: White, 1978b: 70, figs. 10, 24.
- sandersoni** Collier, 1972: 18. AR: Washington Co.; KS MO/ OK/ AR.
 TYPE DEPOSITORY: Univ. MN, St. Paul.
 SEX OF TYPE: M.
- ozarkensis** Collier, 1972: 17 (synonymized by White, 1978b: 71). MO: Roaring River State Park, Cassville.
 TYPE DEPOSITORY: Univ. MN, St. Paul.
 SEX OF TYPE: M.
 REDESCRIPTION: White, 1978b: 71, figs. 2, 26.

seriatus (LeConte), 1874: 52 (*Elmis*). CA; BC OR ID/ AB/ CA/ WY UT CO.

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: F.

REDESCRIPTION: White, 1978b: 72, figs. 9, 23.

trivittatus (Brown), 1930a: 91 (*Limnius*). PQ: Knowlton; WI MI ON PQ/ MO IN OH KY/ NY PA NJ MD WV VA/ VT/ MS TN SC.

TYPE DEPOSITORY: CNCI.

SEX OF TYPE: M.

REDESCRIPTION: White, 1978b: 72, figs. 15, 29.

Genus ORDOBREVIA Sanderson

Ordobrevia Sanderson, 1953b: 159. Type-species: *Stenelmis nubifer* Fall (orig. des.).

IMMATURE STAGES: Sanderson, 1953b: 160, figs. 41-42 (larva); Brown, 1972b: figs. 163-164 (larva).

nubifera (Fall), 1901: 238 (*Stenelmis*). CA: near Pasadena; WA OR/ CA.

TYPE DEPOSITORY: CASC?.

IMMATURE STAGES: Brown, 1972b: figs. 163-164 (larva).

Genus OULIMNIUS des Gozis

Oulimnius des Gozis, 1886: 9. Type-species: *Limnius tuberculatus* Mueller (monot.).

IMMATURE STAGES: LeSage and Harper, 1976a (life history), 1976b (pupa) and 1977 (larva).

TAXONOMY: Steffan, 1958: 147.

latiusculus (LeConte), 1866: 380 (*Elmis*). PA: mountains; PQ/ IN KY/ NY PA NJ DE MD WV VA/ NH VT MA RI CT/ MS AL TN GA SC NC.

TYPE DEPOSITORY: MCZC.

IMMATURE STAGES: Brown, 1972b: figs. 187-188 (larva); LeSage and Harper, 1976a (life history), 1976b (pupa) and 1977.

nitidulus (LeConte), 1866: 380 (*Elmis*). NY; NY NJ DE MD WV VA/ CT/ MS AL TN GA SC NC.

TYPE DEPOSITORY: MCZC.

Genus PROMORESIA Sanderson

Promoresia Sanderson, 1954: 9, fig. 27. Type-species: *Helmis tardellus* Fall (orig. des.).

IMMATURE STAGES: West, 1929b (larval type 8); Brown, 1972b: figs. 173-175 (larva); LeSage and Harper, 1976b (pupa).

TAXONOMY: Brown and White, 1978: 2.

ECOLOGY: LeSage and Harper, 1976a (life cycle).

KEYS: Brown, 1972b.

elegans (LeConte), 1852: 43 (*Limnius*). MA; KY/ NY PA NJ MD WV VA/ MA CT/ AL TN NC.

TYPE DEPOSITORY: MCZC.

IMMATURE STAGES: Brown and White, 1978: 5.

tardella (Fall), 1925: 179 (*Helmis*). MA: Tyngsboro; PQ/ NY PA NJ MD WV VA/ ME NH MA CT/ AL TN GA SC NC.

TYPE DEPOSITORY: MCZC.

subarctica Brown, 1930b: 241 (*Limnius*) (synonymized by Brown and White, 1978: 4). PQ: Bradore Bay.

TYPE DEPOSITORY: CNCI.

SEX OF TYPE: M.

IMMATURE STAGES: Brown, 1972b: figs. 173-175 (larva); Brown and White, 1978: 5; LeSage and Harper, 1977 (larva).

ECOLOGY: LeSage and Harper, 1976a (life history).

Genus RHIZELMIS Chandler

Rhizelmis Chandler, 1954: 126. Type-species: *Rhizelmis nigra* Chandler (orig. des.).

IMMATURE STAGES: Brown, 1972b: figs. 149-150 (larva).

TAXONOMY: Brown and White, 1978: 10.

nigra Chandler, 1954: 128. CA: Colusa Co., Paradise Creek; CA. The entire adult was illustrated by Brown, 1972b: figs. 55-56.

TYPE DEPOSITORY: CASC.

SEX OF TYPE: M.

IMMATURE STAGES: Brown, 1972b: figs. 149-150 (larva).

Genus STENELMIS Dufour

Stenelmis Dufour, 1835: 158. Type-species: *Elmis canaliculata* Gyllenhal (design. by Sanderson, 1938a: 654).

IMMATURE STAGES: Matheson, 1914; Bertrand, 1972 (pupa); Brown, 1972b: figs. 167-168; West, 1929b (larva).

TAXONOMY: Sanderson, 1938a.

REDESCRIPTION: Sanderson, 1938a.

KEYS: Brown, 1972b; Sanderson, 1938a.

antennalis Sanderson, 1938a: 695, pl. 80, fig. 19. MS: Lucedale; MS AL GA SC FL.

TYPE DEPOSITORY: INHS (Musgrave Coll.).

SEX OF TYPE: M.

beameri Sanderson, 1938a: 671, pl. 80, fig. 5. AR: Berryville; MO/ TX OK/ AR.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

bicarinata LeConte, 1852: 44. OH; KS OH/ NY PA NJ/ NM TX OK/ Mex.

TYPE DEPOSITORY: MCZC.

REDESCRIPTION: Sanderson, 1938a: 679.

calida calida Chandler, 1949: 133, fig. 1. NV: Nye Co., Devil's Hole, elev. 2,500 ft.; NV. The type-locality is a thermal pool.

TYPE DEPOSITORY: CASC.

SEX OF TYPE: M.

IMMATURE STAGES: Chandler, 1949 (larva).

calida moapa La Rivers, 1949b: 218, fig. 1. NV: Clark Co., Warm Springs (Big Pool); NV.

TYPE DEPOSITORY: Univ. NV, Reno.

ECOLOGY: La Rivers, 1949b: 222.

concinna Sanderson, 1938a: 674, pl. 80, fig. 7. NY: North River (collected in the Hudson River); PQ/ NY WV/ MA/ NC.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

convexula Sanderson, 1938a: 704, pl. 81, fig. 8. FL: De Funiak Springs; FL.

TYPE DEPOSITORY: INHS

SEX OF TYPE: M.

crenata (Say), 1824: 181 (*Elmis*). PA; WI MI ON PQ/ NF/ KS IL IN/ NY PA MD DC VA/ ME MA CT/ TX OK/ MS TN. The Say type-specimen was lost and a neotype from Guthrie, TN was designated.

TYPE DEPOSITORY: SEMC (neoholotype).

SEX OF TYPE: M.

sordida Motschulsky, 1859: 51 (synonymized by Sanderson, 1938a: 668). PA.

TYPE DEPOSITORY: ZMUM.

SEX OF TYPE: F.

IMMATURE STAGES: LeSage and Harper, 1976a (life cycle), 1976b (pupa) and 1977 (larva).

TAXONOMY: Sanderson, 1938a: 665.

REDESCRIPTION: Sanderson, 1938a: 666.

decorata Sanderson, 1938a: 701, pl. 81, fig. 4. KS: Lawrence; KS IL IN/ PA DC.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

douglasensis Sanderson, 1938a: 685, pl. 80, fig. 12. MI: Cheboygan Co., Douglas Lake; MI.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

HOST: On submerged wood.

exigua Sanderson, 1938a: 669, pl. 80, fig. 4. AR: Polk; MO KY/ OK/ AR.

TYPE DEPOSITORY: SEMC.

- SEX OF TYPE: M.
exilis Sanderson, 1938a: 680. AR: Berryville; OK/ AR.
 TYPE DEPOSITORY: SEMC.
 SEX OF TYPE: F.
- fuscata* Blatchley, 1925: 164. FL: Royal Palm Park; AL FL.
 TYPE DEPOSITORY: PURC.
 REDESCRIPTION: Sanderson, 1938a: 689.
- gammoni* White and Brown, 1976: 189, figs. 1, 2. NC: Ashe Co., S. fork New R., 3.7 km SE Jefferson; NC.
 TYPE DEPOSITORY: USNM.
 SEX OF TYPE: M.
- grossa* Sanderson, 1938a: 686, pl. 80, fig. 13. MS: Ireland; TX OK/ AR LA MS.
 TYPE DEPOSITORY: SEMC.
 SEX OF TYPE: M.
- humerosa* Motschulsky, 1859: 50. TN; MD DC/ MA/ AL TN SC.
 TYPE DEPOSITORY: ZMUM.
 SEX OF TYPE: F.
- linearis* Zimmermann, 1869: 259. SC.
 TYPE DEPOSITORY: MCZC (LeConte Coll.).
 SEX OF TYPE: M.
 REDESCRIPTION: Sanderson, 1938a: 692.
- hungerfordi* Sanderson, 1938a: 690, pl. 80, fig. 16. FL: Lacoche; GA FL.
 TYPE DEPOSITORY: SEMC.
 SEX OF TYPE: M.
- knobeli* Sanderson, 1938a: 677, pl. 80, fig. 9. AR: Hope; AR.
 TYPE DEPOSITORY: INHS (Musgrave Coll.).
 SEX OF TYPE: M.
- lateralis* Sanderson, 1938a: 672, pl. 80, fig. 6, pl. 81. AR: Berryville; MO/ PA VA/ AR MS TN.
 TYPE DEPOSITORY: SEMC.
 SEX OF TYPE: M.
- maerkelii* Motschulsky, 1854: 12. TN; WI/ MO IN/ NY PA/ MA/ AR TN.
 TYPE DEPOSITORY: ZMUM.
 SEX OF TYPE: M.
- maerkeli* Motschulsky, 1854: 12 (unjustified emendation). TN.
 REDESCRIPTION: Sanderson, 1938a: 705.
- mera* Sanderson, 1938a: 682, pl. 80, fig. 11, pl. 81. TN: Guthrie; PQ/ NY PA WV VA/ MA/ AR TN NC.
 TYPE DEPOSITORY: SEMC.
 SEX OF TYPE: M.
- mirabilis* Sanderson, 1938a: 693, pl. 80, fig. 18. CT: Cos. Cob.; CT/ GA SC NC.
 TYPE DEPOSITORY: SEMC.
 SEX OF TYPE: M.
- musgravei* Sanderson, 1938a: 698, pl. 81, fig. 3. VA: Winchester; MO IN/ NY PA WV VA.
 TYPE DEPOSITORY: SEMC.
 SEX OF TYPE: M.
- parva* Sanderson, 1938a: 688, pl. 80, fig. 14. OK: Latimer Co.; TX OK.
 TYPE DEPOSITORY: INHS (Musgrave Coll.).
 SEX OF TYPE: M.
 HOST: Waterlogged wood.
- quadrifasciata* Horn, 1870: 40. VT: Bennington Co.; MI PQ/ IN/ NY DC/ VT/ TN.
 TYPE DEPOSITORY: MCZC.
- sulcata* Blatchley, 1910: 681 (preoccupied Grouvelle, 1892). IN: Marshall Co.
 TYPE DEPOSITORY: PURC.
- blatchleyi* Musgrave, 1933: 57 (replacement name for *Stenelmis sulcata* Blatchley). IN: Marshall Co.

TYPE DEPOSITORY: PURC.

TAXONOMY: Sanderson, 1938a: 696.

REDESCRIPTION: Sanderson, 1938a: 696.

sandersoni Musgrave, 1940: 48 (replacement name for *Stenelmis tarsalis* Sanderson). VA: Winchester; ON/ IN/ WV VA/ OK/ AR TN.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

tarsalis Sanderson, 1938a: 675, pl. 80, fig. 8, pl. 81 (preoccupied *S. tarsalis* Deleve, 1937). VA: Winchester.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

sexlineata Sanderson, 1938a: 663, pl. 80, fig. 2, pl. 81. KS: Lawrence; KS IN OH KY/ TX OK/ TN.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

ECOLOGY: White, 1978a (life cycle).

sinuata LeConte, 1852: 44. GA: Tallulah; LA MS AL GA SC FL.

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: F.

REDESCRIPTION: Sanderson, 1938a: 699.

vittipennis Zimmermann, 1869: 259. SC; ND/ MN WI PQ/ KS IL IN/ NJ WV/ TX OK/ SC.

TYPE DEPOSITORY: MCZC.

REDESCRIPTION: Sanderson, 1938a: 702.

Tribe MACRONYCHINI Steffan, 1961

Macronychaires Mulsant and Rey, 1872

Genus MACRONYCHUS Mueller

Macronychus Mueller, 1806: 207. Type-species: *Macronychus quadrituberculatus* Mueller (monot.).

IMMATURE STAGES: Perez, 1863: 621 (larva, pupa and hymenopteran parasite); Brown, 1972b: figs. 178-179; West, 1929b.

TAXONOMY: Hinton, 1940a: 113.

REDESCRIPTION: Hinton, 1940a: 113.

ECOLOGY: Perez, 1863: 621; Mueller, 1806: 207.

KEYS: Hinton, 1940a: 116; Brown, 1972b.

glabratus Say, 1825: 187. 'United States'; ND/ WI MI ON PQ/ KS IA MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ ME RI CT/ TX OK/ AR LA MS AL TN GA SC NC FL.

lateralis Melsheimer, 1844: 99 (synonymized by LeConte, 1854: 217). PA.

TYPE DEPOSITORY: MCZC?.

IMMATURE STAGES: LeSage and Harper, 1976a (life cycle), 1976b (pupa) and 1977 (larva).

ECOLOGY: Davis and Finni, 1974; West, 1929a.

HOST: Submerged wood or trash.

Genus ZAITZEVIA Champion

Zaitzevia Champion, 1923: 170. Type-species: *Zaitzevia solidicornis* Champion (orig. des.).

IMMATURE STAGES: Brown, 1972b; Sanderson, 1954; Leech and Chandler, 1956; Leech and Sanderson, 1959; West, 1929a.

parvula (Horn), 1870: 41 (*Macronychus*). CA: Fort Tejon; BC WA OR ID/ AB MT SD/ CA NV/ WY UT CO/ AZ NM.

TYPE DEPOSITORY: MCZC?.

columbiensis Angell, 1892: 84 (*Elmis*) (synonymized by Sanderson, 1938b: 146). BC: Fraser River Valley. No type-specimen was designated but topotypes identified by Angell are in the ICCM.

IMMATURE STAGES: Brown, 1972b; Sanderson, 1954; Leech and Chandler, 1956; Leech and Sanderson, 1959; West, 1929a.

TAXONOMY: Sanderson, 1988b.

thermae (Hatch), 1938: 18, fig. 2 (*Macronychus*). MT: Gallatin Co., Bridger Canyon near Bozeman; MT. The habitat for *Z. thermae* is thermal springs.

TYPE DEPOSITORY: USNM.

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Names are indexed as follows:

CAPITALS: All names for taxa above the generic level;

Boldface: Valid generic and subgeneric names;

Roman: Valid specific and subspecific names;

Italic: All invalid names such as synonyms, nomina nuda, and extra-limital taxa even though valid.

Parentheses around an author's name indicate that the specific name has been transferred from its original genus. The generic name following the author's name indicates the present placement of the species. Synonyms of species-group names are listed with the original spelling.

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AB Alberta
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AR Arkansas
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CA California
CO Colorado
CT Connecticut
DC District of Columbia
DE Delaware
FL Florida
GA Georgia
GL Greenland
IA Iowa
ID Idaho
IL Illinois
IN Indiana
KS Kansas
KY Kentucky
LA Louisiana
MA Massachusetts

MB Manitoba
MD Maryland
ME Maine
MI Michigan
MN Minnesota
MO Missouri
MS Mississippi
MT Montana
NC North Carolina
ND North Dakota
NE Nebraska
NB New Brunswick
NH New Hampshire
NJ New Jersey
NM New Mexico
NS Nova Scotia
NT Northwest Territories
NV Nevada
NY New York
OH Ohio
OK Oklahoma

ON Ontario
OR Oregon
PA Pennsylvania
PE Prince Edward Island
PM St. Pierre-Miquelon
PQ Quebec
RI Rhode Island
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SD South Dakota
SK Saskatchewan
TN Tennessee
TX Texas
UT Utah
VA Virginia
VT Vermont
WA Washington
WI Wisconsin
WV West Virginia
WY Wyoming
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