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TAXONOMIC NOTES, NEW RECORDS, AND A KEY TO THE ADULTS OF NORTH AMERICAN BYRRHIDAE (COLEOPTERA)

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Abstract.—Synonyms, lectotype designations, holotype recognitions and taxonomic notes are provided for North American Byrrhidae not treated elsewhere. Twenty-one names are reduced to junior synonym status, three junior synonyms are recombined, and one name is moved from subspecies to species status. Lectotypes are designated for 11 species described by T. L. Casey, G. H. Horn, J. L. LeConte, and W. F. Erichson. Holotype data is given for all species not previously reviewed. *Byrrhus pilula* L. is newly recorded from Canada, and *Sierraclava cooperi* Johnson is newly recorded from Mexico. A key is presented for the identification of the subfamilies, genera, and species of Byrrhidae known to occur in North America.

Key Words: Coleoptera, Byrrhidae, North America, taxonomy

The taxonomy of the North American Byrrhidae has not been fully treated since Casey (1912) monographed the family. Casey described 46 species and subspecies, of which I consider 3 to be valid. In contrast, he described 6 genera and all are considered valid. Since Casey's monograph, *Sierraclava* (Johnson 1982) has been the only genus added, 5 new species have been described (Johnson 1985, 1986, 1991), 2 have been species recognized and reported as immigrants from Europe (Johnson 1990), and one additional species is herein newly reported as a member of the North American byrrhid fauna.

During the course of continuing taxonomic and ecological studies on the Byrrhidae, a number of synonymies, lectotype designations, and name corrections were found to be necessary, and which could not be incorporated into revisionary studies in a timely manner. In addition, *Byrrhus pilula* L. is now recorded from North America for the first time, *Sierraclava cooperi* Johnson is newly reported from Mexico, and a key to the known and recognized taxa in North America is provided. These data are provided here due to delays in preparing an adequate monograph on the North American byrrhids, and the need to complete nomenclatorial clarifications for final preparation of the Byrrhidae fascicle for the United States Department of Agriculture Coleoptera Catalog (R. D. Gordon, editor), as well as clarifying names for use by other workers.

Generally, only new synonymical data is presented here unless inclusion of previous synonymies is felt pertinent for clarity. Further, only the more important taxonomic and faunistic references are cited under each synonymy. Synonymical data and comments in *Simplocaria* are presented elsewhere (Johnson, submitted).

Types mentioned are reposited in the following institutions: Museum of Comparative Zoology, Cambridge (MCZ); U.S. National Museum of Natural History, Washington, D.C. (USNM); Zoologisches Museum Humboldt-Universität, Berlin,

DDR (ZMHU); The Natural History Museum, London (BMNH); Canadian National Collection, Ottawa (CNC); and the Carnegie Museum of Natural History, Pittsburgh (CMNH). All specimens personally examined have my own handwritten designation or determination labels attached. Types of all species have been examined except where noted.

Amphicyrta chrysomelina Erichson

Amphicyrta chrysomelina Erichson 1843: 40, of Casey 1912: 64, Hatch 1961: 301 (pars). Holotype, female: "9438; TYPUS; chrysomelina, Koching Mont., Oregon, Willcox; Zool. Mus. Berlin" (ZMHU).

Amphicyrta chrysomelina oblonga Casey 1912: 64 **New Synonym.** Holotype, female: "Cal; Casey bequest 1925; Type USNM 48378; oblonga Csy" (USNM).

Amphicyrta chrysomelina parvuliceps Casey 1912: 65 **New Synonym.** Holotype, male: "Cal; Casey bequest 1925; Type USNM 48379; parvuliceps Csy" (USNM).

Casey's specimens of *A. oblonga* and *A. parvuliceps* are typical examples of *A. chrysomelina.* Several hundred specimens of *A. chrysomelina* have been examined from throughout its range, and I can find no morphological or bionomical evidence for segregating local populations into several species or subspecies. Coloration differences noted by Casey (1912) are the same seen by specimens discolored by decomposing fatty tissues or specimens subjected to prolonged exposure to killing agents such as sodium cyanide.

Amphicyrta dentipes Erichson

Amphicyrta dentipes Erichson 1843: 40, Casey 1912: 65. Lectotype, sex not confirmed: "9437; TYPUS; Amphicyrta dentipes Esch., Californ. Esch.; Amphicyrta Esch. Er.; Zool. Mus. Berlin 1984" (ZMHU). Paralectotype: "California Eschsch. Nr. 9437; TYPUS; Zool. Mus. Berlin" (ZMHU).

Amphicyrta chrysomelina (pars) of Hatch 1961: 301.

Amphicyrta elongata Casey 1912: 65 **New Synonym.** Holotype, female: "Cal; Casey bequest 1925; Type USNM 48380; elongata Csy" (USNM).

Amphicyrta gentilis Casey 1912: 66 **New Synonym.** Lectotype here designated, sex not confirmed: "Cal; Casey bequest 1925; Type USNM 48381; gentilis Csy" (USNM). Paralectotypes: 4, same data (USNM).

Amphicyrta gentilis ventricosa Casey 1912: 66 **New Synonym.** Holotype, female: "Cal; Casey bequest 1925; Type USNM 48382; ventricosa Csy" (USNM).

Amphicyrta nevadensis Casey 1912: 66 **New Synonym.** Holotype, female: "Nev.; Casey bequest 1925; Type USNM 48383; nevadensis Csy" (USNM).

Amphicyrta dentipes is a highly variable species in size and coloration, and these were the primary traits considered by Casey. None of the character states involving size or color are useful for unequivocal delimitation of species or subspecies. Variations examined do suggest some geographic regionalization, but there is extensive intergradation.

Lioligus nitidus (Motschulsky)

Simplocaria nitida Motschulsky 1845: 362, of Mannerheim 1852: 341, LeConte 1854: 116. Type not seen; probably lost (Kelenikova, in litt.)

Lioligus nitidus (Motschulsky), of Casey 1912: 62, Hatch 1961: 300.

Lioligus keeni Casey 1912: 61, of Hatch 1961: 301 **New Synonym.** Lectotype here designated, male: "Metlakatla, B. Col., Keen; Casey bequest 1925; Type USNM 48385; keeni Csy." Paralectotypes: 3, same data (USNM).

Lioligus striolatus Casey 1912: 61, of Hatch 1961: 300 **New Synonym.** Lectotype here designated, female: "Metlakatla, B. Col., Keen; Casey bequest 1925; Type USNM 48384; striolatus Csy." Paralectotypes: 11, same data (USNM).

Lioligus aequabilis Casey 1912: 62, synonymy by Hatch 1961: 301. Holotype, female: "Br. C.; Casey bequest 1925; Type USNM 48386; aequabilis Csy." (USNM).

Specimens attributable to *L. nitidus* have been examined from throughout the composite range of its synonyms and I can find no morphological or ecological justification for recognizing more than one species. Characters given by Casey in separating his "species" are highly variable, and are minor variations in sculpture, body dimensions, and coloration.

Although the type has apparently been lost, a neotype is not designated due to this species being readily identified on morphological and distributional factors in conjunction with Motschulsky's description and denoted locality of provenance. There is no available evidence suggesting nomenclatural confusion.

Lioligus pallidus Casey

Lioligus pallidus Casey 1912: 62.

Lioligus nitidus, of Hatch 1961: 301. Lectotype here designated, sex not confirmed: "ID.; Casey bequest 1925; Type USNM 48387; pallidus Csy." Paralectotype: "Coeur d'Alene, Idaho" (USNM).

The pallid coloration of the type is due to its teneral condition. Typical *L. pallidus* specimens are piceous with an olivaceous sheen dorsally, whereas *L. nitidus* is brilliantly viridescent or aeneo-viridescent. Other traits for separating these two species are in the key below.

Exomella pleuralis Casey

Exoma pleuralis Casey 1908: 282, of Casey 1912: 37.

Exomella pleuralis (Casey), of Casey 1914: 378, Hatch 1961: 299, Johnson & Russell 1978: 159, Johnson 1985: 155. Lectotype here designated, sex not confirmed: "Metlakatla, B. Co., Keen; Casey bequest 1925; Type USNM 48357; pleuralis Csy." (USNM). Paralectotypes: 10, same data (USNM).

Two series of specimens with identical labelling, less the bequest and cataloging labels, are reposited in the CNC and the BMNH. These may be syntypical with the lectotype series, but are not so treated here due to a lack of confirming evidence.

Morychus oblongus (LeConte)

Pedilophorus oblongus LeConte 1857: 39, of Wickham 1903: 181.

Morychus oblongus (LeConte), of Casey 1912: 8, Hatch 1961: 295. Lectotype here designated, male: "medium blue disc indicating the Oregon Territory; Type 2293; Pedilophorus oblongus LEC., acuminatus ≠ LEC." (MCZ). Paralectotype: same data (MCZ).

Morychus insulsus Casey 1912: 8, synonymy by Hatch 1961: 295. Holotype, sex not confirmed: "Vernon, B.C., VI, Venables; Casey bequest 1925; Type USNM 48324; insulsus Csy" (USNM).

Pedilophorus subcupreous Fall 1907: 225.

Morychus subcupreous (Fall), of Casey 1912: 9, synonymy by Hatch 1961: 295. Holotype, male: "Aberdeen, Wash.; subcupreous TYPE; MCZ Type 24474; H.C. Fall Collection; Pedilophorus subcupreous Fall" (MCZ).

Morychus insulsus represents a blue-green color variant of the typical *M. oblongus* which is rarely seen in living material, but is commonly induced by prolonged exposure to sodium cyanide. The type of *M. subcupreous* is only a slightly larger and slightly less brilliantly aeneous representative of *M. oblongus.*

Morychus aeneolus (LeConte)

Pedilophorus aeneolus LeConte 1863: 74, of Wickham 1903: 181.

Morychus aeneolus (LeConte), of Casey 1912: 8. Holotype, female: "Neb.; Pedilophorus aeneolus LEC.; Henry Ulke Coll. CMNH Acc. No. 1645" (CMNH).

Pedilophorus subsetosus Fall 1907: 225 **New Synonym.**

Morychus subsetosus (Fall), of Casey 1912: 14, Hatch 1961: 295. Holotype, female: "Kalispell, Mont., June 13, Wickham; subsetosus TYPE; Type MCZ 24475; H.C. Fall Collection; Pedilophorus subsetosus Fall" (MCZ).

Pedilophorus lateralis Fall 1907: 225 **New Synonym.**

Morychus lateralis (Fall), of Casey 1912: 9. Holotype, female: "N.M., Las Vegas, head of Daily Can.; 6.26.01; T.D.A.C.; lateralis TYPE; Type MCZ 24473; Pedilophorus lateralis Fall" (MCZ).

Pedilophorus hesperus Wickham 1903: 182 **New Synonym.**

Morychus hesperus (Wickham), of Casey 1912: 9. Holotype, female: "Leadville, Col., H.F. Wickham, July 7-14 96, 10,000–11,000 ft.; Wickham Collection 1933; TYPE; Pedilophorus hesperus Wickham" (USNM).

Morychus albertanus Brown 1932: 8 **New Synonym.** Holotype, sex not confirmed: "Crow's Nest Pass, Alberta, June 7, 1930, J.H. Pepper; No. 3246" (CNC).

The various synonyms for this species reflect slight variations of integument color and patterns of pubescence. Minor sculptural variations occur, but none correlate with discreet populations. Slight variations and distributional patterns of genitalic characters and pubescence support the synonymies, but also suggest the presence of clines over large geographic areas.

Byrrhus cyclophorus Kirby

Byrrhus cyclophorus Kirby 1837: 117, of El Moursy 1970: 329. Holotype, female: "Type; N.Amer.; 5828a; Byrrhus cyclophorus Kirby, N. Amer., 5828, Rev. Wm. Kirby (BMNH).

Byrrhus fasciatus, of El Moursy 1970: 330 **New Combination.**

The application of the name *B. fasciatus* is here restricted in its application only to North American *Byrrhus* determined as such by El Moursy (1970) and previous catalogers (Hamilton 1894a, b; Dalla Torre 1911; Leng 1920). Interestingly, neither of the monographers of North American Byrrhidae, LeConte (1854) or Casey (1912), applied the name *B. fasciatus* to any native species. El-Moursy had incorrectly recognized *B. fasciatus* as occurring in North America, for reasons unknown to me. My examination of the type of *B. cyclophorus* and conspecific specimens from throughout North America, typical *B. fasciatus* from Europe, and reference to taxonomic treatments by Johnson (1966), Paulus (1979), and earlier authors, clearly shows the regional misapplication of this name.

Byrrhus geminatus LeConte

Byrrhus geminatus LeConte 1854: 114, of El Moursy 1970: 330, Fiori 1982: 437. Holotype, female: "Light blue disc with two converging tangential cuts indicating the northern shore of Lake Superior; Type 2297; B. geminatus LEC., L. Sup." (MCZ).

Byrrhus pettiti Horn 1870: 76, synonymy by El Moursy 1970: 330, Fiori 1982: 438. Lectotype here designated: Female; "Can.; B. pettiti Horn; Lectotype 3260" (MCZ). Paralectotype: same data (MCZ).

Neither El Moursy (1970) or Fiori (1982) examined the type material of *B. pettiti,* and did not designate a type; however, they did correctly synonymize it with *B. geminatus.* The label reading "Lectotype 3260" is apparently a cataloging label and has no taxonomic standing, and was apparently placed on the specimen while the Horn Collection was held by the Academy of Natural Sciences, Philadelphia (A. Newton, pers. comm).

Byrrhus kirbyi LeConte

Byrrhus kirbyi LeConte 1854: 114, of El Moursy 1970: 331. Holotype, female: "light blue disc with two converging tangential cuts indicating the northern shore of Lake Superior" (MCZ).

Byrrhus fulvovestitus Casey 1912: 27, of El Moursy 1970: 329. **New Combination.**

Neither LeConte nor any subsequent worker labelled the above designated specimen of *B. kirbyi* in a manner indicating its identity or status. The entire byrrhid series in the LeConte collection was examined and only one specimen was found which fit LeConte's description and possessed the correct label for the type locality. The specimen had been placed next to specimens of *B. concolor* Kirby and *Porcinolus undatus* (Melsheimer) in an unlabelled series, possibly for comparative purposes. This specimen is herein considered LeConte's unique type of *B. kirbyi,* and has been so labelled.

El Moursy (1970) provided a lectotype designation, but incorrectly syonymized *B. fulvovestitus* with *B. cyclophorus,* apparently under the impression that *Byrrhus* females are not determinable to species. Casey's specimens are badly rubbed and slightly narrow in form, but otherwise are typical *B. kirbyi.*

Byrrhus pilula Linnaeus

Recently, a series of Byrrhidae from northern Canada was gifted, with a request for determination by J. Pilny, Waterloo University, Ontario. Included were 78 specimens of a *Byrrhus* which could not be accurately assigned to any described or recorded North American species; however, its close affinity with *B. americanus* LeConte was evident. Further investigation has shown that these specimens are conspecific with examples of *B. pilula,* of British and Austrian provenance.

North American specimens ascribed to *B. pilula* have been seen from the following locality: Canada, Northwest Territories, Keewatin, Lat +62.41 Long +97.03, Whatever Lake, June 1989. All specimens were collected by pitfall traps in tundra and riparian habitats. Specimens are in my collection and representatives will be deposited in the USNM and CNC.

Until now, *B. pilula* has been considered only a Eurasian species (Dalla Torre 1911, Winkler 1926, Fiori 1951, Horion 1955, Bonadona 1975). The lack of previous recognition of this species in North America is ascribed to inadequate series of material, especially males, and to the failure of the most previous byrrhid workers to appreciate the potential of Holarctic distributions in the family (see also Johnson, submitted). Further complication of determination can be ascribed to a close relationship of *B. pilula* and *B. americanus,* as indicated by aedeagal morphology, and a general difficulty of correlating unassociated *Byrrhus* females with males; this latter difficulty may also help explain occasional confounding of *B. pilula* with *B. cyclophorus* by previous workers.

Porcinolus undatus (Melsheimer)

Byrrhus undatus Melsheimer 1844: 117.

Byrrhus murinus Fabricius 1794: 437, of LeConte 1854: 115.

Porcinolus undatus (Melsheimer), of Casey 1912: 33. Holotype, female: "Melsh.; undatus M.; murinus; [red torn paper]" (MCZ).

Byrrhus glabellus Melsheimer 1844: 117, of Casey 1912: 33. Holotype, sex not confirmed: "Melsh.; glabellus *Melsh.; [red torn paper]" (MCZ).

Porcinolus crescentifer Casey 1912: 32 **New Synonym.** Holotype, sex not confirmed: "Baldwin, Kansas; Casey bequest 1925; Type USNM 48354; crescentifer Csy" (USNM).

Porcinolus hystrix Casey 1912: 33 **New Synonym.** Lectotype here designated, sex not confirmed: "Aweme, Manitoba, S. Criddle, 23.VI.10; Casey bequest 1925; Type USNM 48355; hystrix Csy." Paralectotype: same data (USNM).

All of the Melsheimer and Casey names represent simple color pattern variations of the pubescence. *Porcinolus undatus* is distributed from the Atlantic coast to the east-

ern slopes of the Rocky Mountains, with the western specimens being slightly smaller. The transelytral crescentiform pattern is highly variable from well colored and contiguous to indistinctly colored and broken in outline.

Cytilus alternatus (Say)

Byrrhus alternatus Say 1825: 186, of LeConte 1854: 115.

Cytilus alternatus (Say, of LeConte 1870: 398, Casey 1912: 18. Type not found, presumed lost (LeConte 1859, Lindroth & Freitag 1969).

Byrrhus trivittatus Melsheimer 1844: 117, original synonymy by LeConte 1854: 115, LeConte 1877: 108, Casey 1912: 18, Hatch 1961: 297. Holotype, sex not confirmed: "Melsh.; varius; red torn paper; trivittatus 'Melsh.'" (MCZ).

Cytilus nigrans Casey 1912: 19 **New Synonym.** Holotype, female: "Little River, Colroy, NFLD, July 10–18 '07; Casey bequest 1925; Type USNM 48331; nigrans Csy" (USNM).

My interpretation of *C. alternatus* is based on LeConte's understanding of this species as represented by his specimens at the MCZ. The type of *Cytilus nigrans* is badly rubbed of pubescence, as noted by Casey (1912), while that of *C. trivittatus* lacks aeneous or viridescent elytral patches. Otherwise these specimens are typical examples of *C. alternatus.*

Cytilus mimicus Casey

Cytilus mimicus Casey 1912: 18 **New Status.**

Cytilus alternatus mimicus Casey 1912: 18. Lectotype here designated, sex not confirmed: "Cal.; Casey bequest 1925; Type USNM 48329; mimicus Csy" (USNM). Paralectotypes: 2, same data (USNM).

Cytilus alternatus longulus Casey 1912: 18, Hatch 1961: 297 **New Combination.** Lectotype here designated, sex not confirmed: "W.T.; Casey bequest 1925; Type USNM 48330; longulus Csy" (USNM). Paralectotypes: 10, same data (USNM).

Cytilus mimicus differs from *C. alternatus* by its larger size and more elongate form, slight differences in aedeagal structure, and habitat. This proposed new status for *C. mimicus* is an attempt at better recognition of two ecologically segregated, but geographically sympatric forms of *Cytilus* in North America, which are difficult to diagnose morphologically. Considerable effort is still required for a full evaluation of both species and their relationship to Eurasian species.

Curimopsis echinata (LeConte)

Syncalypta echinata LeConte 1850: 224, of LeConte 1854: 114.

Curimopsis echinata (LeConte), of Casey 1912: 34, Johnson 1986: 42. Holotype, female: light blue disc indicating the Lake Superior region (MCZ).

Curimopsis brevicollis Casey 1912: 35, of Hatch 1961: 299, synonymy noted by Johnson 1986: 42. Holotype, male: "W.T.; Casey bequest 1925; Type USNM 48356; brevicollis Csy." (USNM).

Morphological differences between *C. brevicollis* and *C. echinata* used by Casey (1912) seem to be allometric and sexual. The identical aedeagi and female gonocoxites of the types and other specimens support this synonymy.

Curimopsis albonotata (LeConte)

Syncalypta albonotata LeConte 1861: 344.

Curimopsis albonotata (LeConte), of Casey 1912: 34, Hatch 1961: 299, Johnson 1986: 42. Holotype, female: "W.T.; *S. albonotata* LEC.; Type 2302" (MCZ).

Syncalypta grisea LeConte 1879: 514.

Curimopsis grisea (LeConte), of Casey 1912: 35, synonymy noted by Johnson 1986: 42.

Curimopsis brevicollis, Hatch 1961: 299. Holotype, female: "Garland, Col., 19.6; 376; S. grisea LEC.; Type 2300" (MCZ).

It is difficult to understand why LeConte did not observe the quite obvious similarity of these two species. His own descriptions indicate only minor color shading and size differences between the specimens, and direct comparison reveals these same differences. Conspecificity is supported by genital morphology.

Sierraclava cooperi Johnson

This species was originally recorded (Johnson 1982) from the vicinity of Sequoia National Park, in the southern Sierra Nevada, California, U.S.A. Since then, additional material has accumulated from 8 new disparate locations through central and southern California, as well as a new country record from Baja California Norte, Mexico. These new records [abbreviated data] are: U.S.A., California, Amador Co., Electra, Mokelumne River; Calaveras Co., 3 mi south of Mokelumne Hill; Fresno Co., 3 mi northeast of Auberry, 8 mi southwest of Auberry, and 9 mi east of Coalinga; Riverside Co., Lamb Canyon, 2 mi northwest of Gilman Hot Springs; San Benito Co., 18.4 mi northwest of New Idria, and 1.8 mi southwest of [New] Idria; Mexico, Baja California Norte, 10.7 km east of El Rosario, Lat +30.04.35 Long +115.38.25, 11.7 km east of El Rosario, Lat +30.04.30 Long +115.37.55, and 14.7 km east of El Rosario, Lat +30.04.10 Long +115.36.00. Most specimens were collected in pitfall traps during late winter and spring months. California specimens were collected largely by the staff of the California Department of Food and Agriculture, Sacramento, and the Mexico specimens by William H. Clark, College of Idaho, Caldwell.

The apical portion of the penis of the Mexican specimens is much less broadened and spatulate than of northern specimens from Sierran localities, and specimens from Coast Range sites are intermediate in penial form. Coast Range and Mexican specimens have been found in desert or semidesert communities dominated by *Juniperus-Artemisia* scrub, *Adenostoma* chaparral, or mixed sarcophyllous scrub, while Sierran specimens were found in *Quercus-Pinus* woodlands. Whether the morphological and habitat differences can be refined to indicate two allopatric species is still being investigated.

Key to the Adults of North American Byrrhidae

1a. Antennae filiform, compressed; palps with ultimate segment securiform; appendages not retractile; tarsomere 3 with large fleshy lobe; integument appearing glabrous, rufocastaneus to piceous ..... Amphicyrtinae 2

1b. Antennae short, clavate or capitate; palps with ultimate segment fusiform or pyriform 3

2a. Usually larger, 8–12 mm, elongate; integument usually rufocastaneus with metallic cupreous sheen, occasionally with viridescent reflections; coastal coniferous forests of Oregon and northern California ..... *Amphicyrta chrysomelina* Erichson

2b. Usually smaller, 5–10 mm, ovoid, occasionally inflated posteriorly; integument rufopiceous to piceous, without metallic sheen; prairies and oak-pine woodlands of central California and southwestern Oregon ..... *Amphicyrta dentipes* Erichson

3a. Antennae capitate; body small (0.9–2.6 mm), shallowly to moderately convex; appendages closely retractile; dorsum with clavate or truncate bristles ..... Syncalyptinae 4

3b. Antennae clavate; body various (1.9–8.7 mm), moderately to strongly convex; ovate to elongate; appendages not or partially received into fossae; dorsum with decumbent to erect fine setae ..... Byrrhinae 10

4a. Length 2.4–3.2 mm; ovoid, dorsum with appressed scale-like setae and erect bristles . 5

4b. Length 0.9–2.1 mm; ovate, strongly convex; elytral striae punctate; dorsum with bristles only; northern U.S. and southern Canada, Europe ..... *Chaetophora spinosa* (Rossi)

5a. Ovate to oval, shallowly to moderately convex, lateral margins arcuate; striae on disc shallowly impressed, or serially punctate . 6

5b. Elongate, strongly convex, parallel-sided; elytra with striae deeply punctate and impressed, sulciform; central and southern California, Baja California Norte ..... *Sierraclava cooperi* Johnson

6a. Length 2.1–2.8 mm; subparallel laterally; appressed squamae linear; median lobe of aedeagus slender, narrowly acuminate api-

cally; Alaska ..... *Curimopsis setulosa* (Mannerheim)

6b. Length 2.8–3.2 mm; oval in lateral outline; aedeagus not as above 7

7a. Dorsal squamae round, set into round punctures; 3.0–3.2 mm; subparallel laterally; western and northern U.S., Canada ..... *Curimopsis albonotata* (LeConte)

7b. Dorsal squamae more-or-less linear to narrowly subtriangular, emergent from small usually barely evident punctures; usually smaller 8

8a. Body oval, rounded laterally; striae not impressed as lines or shallow sulci, usually represented by rows of punctures; south-central U.S. ..... *Curimopsis strigosa* (Melsheimer)

8b. Body elongate, subparallel laterally; striae narrowly, shallowly impressed, not evidently punctate 9

9a. Length 2.9–3.2 mm; appressed squamae short, subtriangular; elytral apical declivity long, gradually sloping; sutural stria at declivity shallowly impressed; northeastern U.S., Canada, Alaska ..... *Curimopsis moosilauke* Johnson

9b. Length 2.8–2.9 mm; appressed squamae longer, linear; elytral apical declivity shorter, abruptly sloping; sutural stria at declivity distinctly and deeply impressed, sulcate; northern U.S., Canada, Alaska ..... *Curimopsis echinata* (LeConte)

10a. Frontal margin beaded, occasionally reflexed and carinate; mesosternum strongly reduced except for median fossa; palps with ultimate segment fusiform to narrowly pyriform; metacoxae small, distant from elytral margin; elytra often connate 11

10b. Frontal margin rounded or truncate, never reflexed, beaded or carinate; mesosternum distinct laterad of median fossa; palps with ultimate segment compressed or cylindrically pyriform; metacoxae flattened, nearly reaching elytral margin; elytra not connate 19

11a. Elytra separate and metathoracic wings present; integument rufopiceous to piceous, occasionally with submetallic reflection; mesocoxae moderately separated 12

11b. Elytra connate, metathorax apterous; mesocoxae widely separated 14

12a. Form short, ovate, slightly depressed dorsally; elytral pubescence long, moderately dense, evenly distributed; elytral stria becoming evanescent at midlength; northeastern U.S., southeastern and southwestern Canada ..... *Simplocaria semistriata* (F.)

12b. Form elongate, ovoid; elytral pubescence tessellate; elytral striae complete or becoming evanescent preapically 13

13a. Length 3.5–4.5 mm; pronotal punctures fine and sparse on disc; elytral striae becoming evanescent towards apex; pubescence decumbent; northern Canada, Greenland, Eurasia ..... *Simplocaria elongata* J. Sahlberg

13b. Length 2.8–3.5 mm; pronotal punctures moderate on disc; elytral striae complete to apex; pubescence recumbent to suberect; northern U.S., Canada, Greenland, Eurasia ..... *Simplocaria metallica* (Sturm)

14a. Pubescence simple, slender, fine; epipleura flat; integument shining to metallic 16

14b. Pubescence stout, recurved; epipleura deeply emarginate to receive femoral knee; integument brunneous 15

15a. Length 1.8–2.3 mm; lateral elytral margin crenate anteriorly; coastal Oregon, Washington, British Columbia ..... *Exomella pleuralis* (Casey)

15b. Length 2.3–2.4 mm; lateral elytral margin smooth throughout; northern Idaho ..... *Exomella merickeli* Johnson

16a. Epipleura broad, extending length of elytron; dorsal integument piceous to olivaceous, shining 17

16b. Epipleura narrow, attenuating and terminating before second visible abdominal sternite; dorsal integument viridescent 18

17a. Larger, 3.2–4.1 mm, lateral margins inflated; integument piceous, shining, occasionally with submetallic reflections; pubescent sparse to moderate, short to long; north-coastal California to southeastern Alaska, and west of Cascade Range crest in Oregon, Washington, British Columbia ..... *Lioon simplicipes* (Mannerheim)

17b. Smaller, 2.9–3.6 mm, lateral margins weakly rounded; integument piceous, olivaceous, without submetallic reflections; pubescence moderately dense, long; northern Idaho .. *Lioon nezperce* Johnson

18a. Length 2.4–2.6 mm; dorsal integument bright viridescent; west of Cascade Range crest in Oregon, Washington, British Columbia ... *Lioligus nitidus* (Motschulsky)

18b. Length 2.2–2.4 mm; dorsal integument olivaceous with evanescent viridescent reflections; northern Idaho .. *Lioligus pallidus* Casey

19a. Frontal margin truncate and thickened; abdominal sternite 1 without crural modifications 20

19b. Frontal margin obtusely rounded; abdominal sternite 1 with distinct crural depressions or fossae 22

20a. Form subparallel, moderately convex dorsally; piceous, without metallic patches or reflections; pubescence long; decumbent, with erect black setae; northern U.S., Canada, Greenland ... *Tylicus subcanus* (LeConte)

20b. Form ovoid to subparallel laterally, strongly convex dorsally; piceous, frequently with cupreous or viridescent patches or intervals; pubescence short, appressed, without erect setae 21

21a. Form ovoid, short; integument rarely with cupreous or viridescent patches; pubescence black and cinereous, tessellate on alternate elytral intervals; transcontinental ..... *Cytilus alternatus* (Say)

21b. Form elongate to subparallel; elytra usually with viridescent patches or intervals; pubescence pale cinereous, rarely tessellate; montane western U.S. and Canada ..... *Cytilus mimicus* Casey

22a. Tarsomere 4 with membranous ventral lobe; dorsal integument shining, usually viridescent and/or cupreous 23

22b. Tarsi simple; dorsal integument opaque or shining, piceous to black 27

23a. Form ovate; aeneous to viridescent; punctures obsolescent or coarse and forming rugose patches on elytra; pubescence minute or moderately long and patchy, usually mixed cinerous and rufobrunneous 24

23b. Form subparallel; piceous with viridescent reflections to cupreous; punctures fine to moderate; pubescence moderately long, evenly distributed 26

24a. Length 6.5–10.0 mm; dorsal punctures fine; subglabrous, pubescence minute; aeneous to viridescent, with elytra bearing distinct aeneous and viridiaeneous vittae; northern Idaho, northeastern Washington, western Montana, southeastern British Columbia ..... *Eusomalia lecontei* (Wickham)

24b. Length 3.2–4.0 mm; punctures coarse, pubescence usually evident, moderately long 25

25a. Dorsal punctures small to moderately coarse, simple, forming rugose patches with little suggestion of strial formation, or smooth with finely punctate striae on elytra; aeneous to viridiaeneous, often vittate on elytra; north-coastal California to Sitka, Alaska, west of Cascade Range crest in Oregon, Washington, British Columbia ..... *Listemus acuminatus* (Mannerheim)

25b. Dorsal punctures large, coarse, umbilicate, not condensing into rugose patches on elytra; piceous, with only faint aeneous reflections; northern Idaho, northeastern Washington ..... *Listemus kootenai* Johnson

26a. Integument piceous, frequently with viridescent reflection; punctures moderate to dense; pubescence cinereous with dark brunneous patches; montane western U.S., Canada ..... *Morychus aeneolus* (LeConte)

26b. Integument aeneous to cupreous, occasionally with viridescent reflections; punctures fine to moderately dense, moderately to sparsely distributed; pubescence mixed rufobrunneous and cinereous; western U.S. and Canada ..... *Morychus oblongus* (LeConte)

27a. Form oval to subparallel, strongly convex dorsally; pubescence simple, appressed ... 28

27b. Form ovate, shallowly convex dorsally; pubescence including erect, bristle-like setae; central and eastern U.S., southern Canada ..... *Porcinolus undatus* (Melsheimer)

28a. Pronotal and elytral integument shining between moderate sized punctures; sparsely and finely microreticulate 29

28b. Pronotal and elytral integument dulled due to dense, fine to coarse microreticulation or micorugosities; punctures small, often obliterated 32

29a. Pronotal punctures smaller, well separated on disc by interspaces greater than own diameter 30

29b. Pronotal punctures larger, separated by less than own diameter; northern U.S., Canada ..... *Byrrhus geminatus* LeConte

30a. Punctures of head coarse, confluent, rugose; similar but shallower on elytra 31

30b. Punctures of head large and shallow on frons; deep and moderately dense on elytra; northern U.S., Canada .. *Byrrhus cyclophorus* Kirby

31a. Punctures on pronotal disc small, subequal or only slightly larger in diameter than base of seta; northeastern U.S., southeastern Canada ..... *Byrrhus americanus* LeConte

31b. Punctures on pronotal disc larger, 2–3× wider than seta; northern Canada, Eurasia ..... *Byrrhus pilula* L.

32a. Punctures on elytra larger, distinct; sculpturing weak 33

32b. Punctures on elytra minute, often obliterated; sculpturing transverse, reticulate, microrugose, or undulating; northeastern U.S., Canada ..... *Byrrhus concolor* Kirby

33a. Length >6.5 mm; elytral punctures smaller, dense but separated, rarely rugulose; northern and western U.S., Canada ..... *Byrrhus kirbyi* LeConte

33b. Length <6.0 mm; elytral punctures dense, usually coalesced, rugulose; western U.S. and Canada ..... *Byrrhus eximius* LeConte

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Literature Cited

Bonadona, P. 1975. Les *Byrrhus* (sensu lato) de France (Col., Byrrhidae). L'Entomologiste 31(6): 193–209.

Brown, W. J. 1932. New species of Coleoptera, II. Canadian Entomologist 64: 8–9.

Casey, T. L. 1908. A new genus of Byrrhidae. Canadian Entomologist 40: 281–282.

———. 1912. Descriptive catalogue of the American Byrrhidae. Memoirs on the Coleoptera 3: 1–69.

———. 1914. Miscellaneous notes and new species. Memoirs on the Coleoptera 5: 378.

Dalla Torre, K. W. von 1911. Fam. Byrrhidae, pp. 5–36. *In* Schenkling's Coleopterorum Catalogus, pars 33. W. Junk, Berlin.

El Moursy, A. A. 1970. The taxonomy of the Nearctic species of the genus *Byrrhus* Linnaeus (Coleoptera: Byrrhidae). Quaestiones Entomologica 6: 327–338.

Erichson, W. F. 1843. [revisionary notes and miscellaneous species descriptions]. *In*Steffhany, G., ed., Tentamen Monographiae Generis Byrrhi. Zeitschrift für die Entomologie 4: 1–42.

Fall, H. C. 1907. The Coleoptera of New Mexico: Descriptions of new species. Transactions of the American Entomological Society 33: 145–272.

Fiori, G. 1951. Alcuni Appunti sui *Byrrhus* L., s.str., Europei: II Contributo alla conoscenza della famiglia Byrrhidae (Coleoptera). Bolletina de Institut Entomologia Universite, Bologna 18: 293–304.

———. 1982. *Byrrhus geminatus* LeConte: Specie ad ampia geonemia olartica, XIII Contributo all conoscenza della famiglia Byrrhidae (Coleoptera). Bolletina de Museo Divisio Storia Naturella, Verona 9: 437–447.

Forster, J. R. 1771. Novae Species Insectorum. Centuria I. T. Davies & B. White, London.

Hamilton, J. 1894a. Catalogue of the Coleoptera of Alaska, with the synonymy and distribution. Transactions of the American Entomological Society 21: 1–38.

———. 1894b. Catalogue of the Coleoptera common to North America, northern Asia, and Europe with distribution and bibliography. Transactions of the American Entomological Society 21: 345–416.

Hatch, M. H. 1961. The Beetles of the Pacific Northwest, part III: Pselaphidae and Diversicornia I. University of Washington Press, Seattle.

Horion, A. 1955. Faunistik der Mitteleuropäischen Käfer: Sternoxia, Fossipedes, Macrodactyla, Brachymera. Entomologische Arbeiten 4: 222–249.

Horn, G. H. 1870. Contribution to the coleopterology of the United States. Transactions of the American Entomological Society 3: 69–142.

Johnson, C. 1966. The British species of the genus *Byrrhus* L., including *B. arietinus* Steffahny (Col., Byrrhidae) new to the British list. Entomological Monthly Magazine 101: 111–115.

Johnson, P. J. 1985. A new species of *Exomella* from Idaho, with notes on the biology of *Exomella pleuralis* (Casey) (Coleoptera: Byrrhidae). Coleopterists Bulletin 39(2): 151–157.

———. 1986. A new species and a key to the Nearctic species of *Curimopsis* Ganglbauer (Coleoptera: Byrrhidae). Coleopterists Bulletin 40(1): 37–43.

———. 1990. Notes on the naturalization of two species of European Byrrhidae (Coleoptera) in North America. Journal of the New York Entomological Society 98(4): 434–440.

———. 1991 (In press). Taxonomic reviews of *Lioon* Casey and *Listemus* Casey, with descriptions of two new species (Coleoptera: Byrrhidae). Proceedings of the Entomological Society of Washington.

———. (submitted). Synonymical notes for some species of the *metallica*-group of *Simplocaria* Stephens (Coleoptera: Byrrhidae). Entomologica Fennica.

Johnson, P. J. and L. K. Russell 1978. Notes on the rediscovery, habitat, and classification of *Exomella pleuralis* (Casey) (Coleoptera: Byrrhidae). Coleopterists Bulletin 32(2): 159–160.

Kirby, W. 1837. Northern zoology, part IV, Insecta, pp. iii–xxxix, 1–325. *In* Richardson, J., ed., Fauna

Boreali-Americana: Or the Zoology of the Northern Parts of British America . . . Josiah Fletcher, Norwich.

LeConte, J. L. 1850. General remarks on the Coleoptera of Lake Superior, pp. 224–225. *In* Agassiz, J. L. R. and J. E. Cabot, eds., Lake Superior: Its Physical Character, Vegetation, and Animals, Compared with Those of Other and Similar Regions. Gould, Kendall, Lincoln, Boston.

———. 1854. Synopsis of the Byrrhidae of the United States. Proceedings of the Academy of Natural Sciences, Philadelphia 7: 114–117.

———. 1857. Report upon insects collected on the survey, Zoological Report, part I, pp. 1–72. *In* Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean. War Dept. Route near the 47th and 49th Parallels, Explored by I. I. Stevens, Governor. Washington, D.C. (1860 reprint)

———. 1859. The Complete Writings of Thomas Say on the Entomology of North America, Vol. 1. New York.

———. 1861. New species of Coleoptera inhabiting the Pacific district of the United States. Proceedings of the Academy of Natural Sciences, Philadelphia 13: 338–359.

———. 1863. New species of North American Coleoptera, part I. Smithsonian Miscellaneous Collections 6(167): 1–92.

———. 1870. Synonymical notes on North American Coleoptera. Annals and Magazine of Natural History, ser. 4, 6: 394–409.

———. 1877. List of Coleoptera. Reports on Progress, Canadian Geological Survey, 1875–76, 5: 107–109.

———. 1879. The Coleoptera of the alpine Rocky Mountain regions, part II. Bulletin of the United States Geological and Geographical Survey of the Territories 5(3): 499–520.

Leng, C. W. 1920. Catalogue of the Coleoptera of America, North of Mexico. John D. Sherman, Mount Vernon, New York.

Lindroth, C. H. and R. Freitag 1969. North American ground-beetles (Coleoptera: Carabidae, excluding Cicindelinae) described by Thomas Say: Designation of lectotypes and neotypes. Psyche 76(3): 326–361.

Mannerheim, C. G. 1852. Zweiter Nachtrag zur Kaefer-fauna der North-Amerikanischen Laender des Russischen Reiches. Bulletin de la Société Impériale de Naturalistes, Moscou 25(4): 283–387.

Melsheimer, F. W. 1844. Descriptions of new Coleoptera of the United States. Proceedings of the Academy of Natural Sciences, Philadelphia 2: 98–118.

Motschulsky, V. 1845. Observations sur le Musee Entomologique de L'Université Impériale de Moscou. Bulletin de la Société Impériale de Naturalistes, Moscou 18(4): 332–387.

Paulus, H. F. 1979. Familie: Byrrhidae, pp. 328–351. *In* Freude, H., K. W. Harde, and G. A. Lohse, eds., Die Käfer Mitteleuropas, vol. 6. Goecke & Evers, Krefeld.

Say, T. 1825. Descriptions of new species of coleopterous insects. Journal of the Academy of Natural Sciences of Philadelphia 5: 160–204.

Wickham, W. F. 1903. The North American species of *Pedilophorus*. Canadian Entomologist 35: 179–182.

Winkler, A. 1926. Catalogus Coleopterorum Regionis Palëarcticae. Wien.