41. BUPRESTIDAE Leach 1815

by C. L. Bellamy and G. H. Nelson

Family common name: The metallic wood boring or jewel beetles

Adults of these hard bodied, generally glossy, iridescent-colored beetles are easily recognized by the hypognathous head, mostly serrate antennae, transverse metasternal suture and connate first two abdominal sterna.

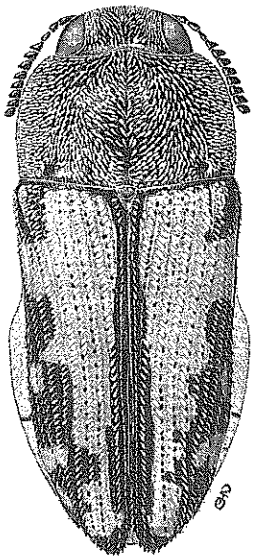


FIGURE 1.41. *Acmaeoderoides knulli* Nelson (from Nelson 1968)

Description: Shape cylindrical to flattened, elongate-ovoid, generally convex above, or cuneiform; size 3 to 100 mm or more in length, mostly less than 20 mm; color various, often bright iridescent hues, or dark-colored with patterned or irregular pigmented maculae; vestiture absent or variously covered with setae and sometimes broad scale-like setae.

Head greatly deflexed, resting on the prosternum, retracted into the prothorax, but mostly as broad as the anterior portion of pronotum; surface punctate or rugose punctate. Antennae with 11 antennomeres, mostly serrate, some males flabellate or pectinate; inserted some distance from the eyes and mandibles, on the front within distinct frontoclypeal cavities. Anteclypeus sometimes visible, labrum small, distinct, often bilobed and setose distally; mandibles small, stout basally, curved, the apices acute; maxillary palpi with four palpomeres, filiform; mentum quadrate to triangular; ligula mostly not prominent; labial palpi with three palpomeres, filiform. Eyes lateral, moderate to large, greatly elongate-oval to reniform, inner margins sometimes strongly converging.

Pronotum slightly broader than the head; shape irregularly quadrate, sometimes narrowed in front; lateral margins mostly carinate, carinae sometimes incomplete from posterior angle; surface punctate to rugose; hypomeron broad; prosternum long and broad, produced posteriorly between the coxae and inserted in the mesosternal cavity or the cavity is composed of the short mesosternal lobes laterally and the metatsternum distally; procoxal cavities open behind. Metasternum mostly with the vestige of a transverse suture near the posterior coxal plates. Legs with the trochantins of the fore- and middle legs exposed; anterior coxae small, oval, separate; middle coxae small, flat, almost quadrate, separate; hind coxae large, transverse, with thick plates; trochanters small, triangular; femora subparallel to fusiform; tibiae slender, sometimes dentate or spinose, the apical spurs moderate; tarsal formula 5-5-5, tarsi slender, some of the tarsomeres bilobed, distal tarsomeres each with ventral pulvillus; claws simple, appendiculate or bifid. Scutellum triangular to cordifrom, moderate to small. Elytra entire except in *Hesperorhipis*, apically rounded and often with one or more apical spines, rarely expose the pygidium; striae punctate or carinate; intervals smooth or rugose; margins, especially apical portion serrate to serrulate; epipleural fold indistinctly separate or with fine carina separating it from disc, broad basally. Wing venation with 2A with three branches; wedge cell, when present, acute apically with only one vein coming from it. Folding pattern of the wing with area A and B normally reduced to slender crumples, area C about half the length of the wing, frequently fused more or less completely with area D which is either open to the costa or reduced to a slender crumple; area H always well marked and reaching the margin for the full width, very slender and nearly longitudinal in the more typical forms; commonly with one chevron-like apical fold, but may be two, or absent; anal lobe highly variable, but never free.

Abdomen with five visible sterna, the first and second connate; sutures shallow, sometimes partly obsolete laterally; surface smooth, punctate, or rugose. Male genitalia of a modified trilobed type; the median lobe a flat, dorsal plate, nearly parallel-sided, the apex acute to transverse, grooved deeply ventrally; parameres sometimes highly modified from swollen to having projecting lateral lobes and sensory setae distally, parameres surround most of the median lobe, fused to the pars basalis; pars basalis fused, forming a basal plate. Female genitalia with the valvifers reduced to a large and strong baculum; coxite dorsally with a baculum, the membranous part fan-shaped; stylus greatly reduced, proctiger large with two baculli which extend around to the ventral surface where they meet and articulate with the basal parts of the valvifers.

Larvae with the segments flattened, or oval, deeply notched and tapering behind; thorax enlarged, body long, slender, subcylindrical (flat-headed wood borers), or enlarged, club-like head and thorax may or may not be enlarged (leaf miners); rarely with the mid-abdominal segments the widest, length 5 to 50 mm or more; vestiture mostly absent; color cream to near white, sometimes with yellow, orange, or brown pigment spots. Head small, depressed, more or less retracted into the prothorax. An-

Acknowledgments. The authors of the chapters on Schizopodidae and Buprestidae thank Svatopluk Bílý, Jerry Davidson, Henry Hespenheide, Ted MacRae and Rick Westcott for comments and contributions which improved the text.

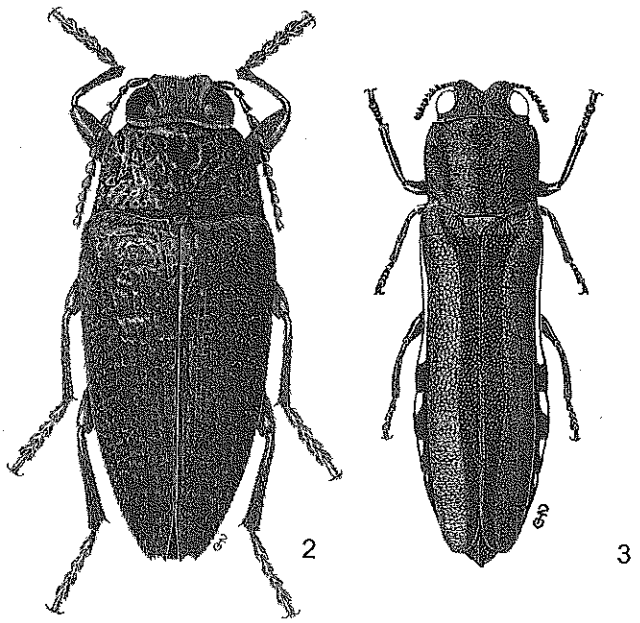
tennae three-segmented. Labrum arcuate, free; mandibles stout, toothed, spoon- shaped; maxillae with two-segmented palpi and a lobe-like mala; labium small, with ligula prominent, spatulate; labial palpi small, one-segmented, or absent. Stemmata absent. Thorax without legs; dorsally with a distinct V-shaped groove. Abdomen ten-segmented, mostly with two fleshy lobes apically; some with tenth segment sometimes with a pair of sharp, sclerotized, toothed forks or forceps laterally. Spiracles cribriform, mostly crescent-shaped, on the mesothorax and abdominal segments one to eight. The only key to larvae was that by Burke (1917) and is not repeated here. The eggs may be enormous; in the collection of exotic beetles at the Academy of Natural Sciences in Philadelphia are a few eggs glued to a piece of cardboard. These eggs measure 3.5 by 5 mm and likely belong to Asian or African species of either *Sternocera* or *Julodis*. Otherwise, little has been reported yet on the eggs of this family.

The important studies regarding wing folding patterns and wing venation have been used by various authors in altering classification studies and proposals (Forbes 1922, 1926, 1942; Good 1925). The work of Sharp and Muir (1912) compared male genitalia and the study by Tanner (1927) detailed female genitalic structure.

Habits and habitats. The larvae burrow through roots and logs, from within the bark to within the cambium layers, or are leaf and stem miners of herbaceous and woody plants, including grasses. Most of the wood boring species attack dying trees or dying/dead branches on healthy trees, only a few bore into green wood. Some produce galls on alder, roses, blue beech, ironwood, and hazelnut; a few live in pine cones or herbaceous plants. Some adults are active and very strong flyers (*e.g. Gyascutus* and *Chrysobothris*) and some make a loud buzzing noise as they fly, while others are slow and even approach being clumsy (*e.g. Chalcophora*, *Texania*, and *Buprestis*). The adults feed on foliage of their hosts or visit flowers to feed on energy-rich pollen or nectar except for some species of *Chrysobothris* and *Agrilus* which feed on fungus. With the often hirsute body and flower visiting habit, many species, particularly in the large genus *Acmaeodera*, serve as potential pollinators.

A number of recent papers on distribution and biology have helped fill in many gaps of understanding about many Nearctic species. These include works by Barr (1971), Bellamy (1982), Nelson (1959, 1960, 1962, 1965, 1967, 1968a, 1987), Nelson and MacRae (1990), Nelson and Westcott (1976), Nelson *et al.* (1981), Walters (1975, 1976), Walters and Bellamy (1982, 1990), Westcott (1990, 1991) and Westcott *et al.* (1979, 1989). State or regional synopses have been given by Barr (1971) for the Pacific Northwest, Bright (1987) for Alaska and Canada, Cazier (1951) for northcentral Mexico, Knull (1925) for Pennsylvania, MacRae (1991) for Missouri, Vogt (1949) for the lower Rio Grande valley, Texas and Wellso *et al.* (1976) for Michigan. The recent checklist by Davies (1991) listed the species known from Canada and Alaska.

Status of the classification. The classification of the family is becoming better understood, although a complete modern phylogenetic perspective is lacking. Some of the genera are fairly well known, but the classification of genera and their placement



FIGURES 2.41-3.41. 2. *Gyascutus* (*Stictocera*) *caelatus* (LeConte) (from Nelson and Bellamy 1996, with permission of Taylor & Francis Ltd.); 3. *Agrilus* (*Engyaulus*) *pulchellus* Bland (from Nelson and Westcott 1991).

in higher taxa is still being contested. In terms of our phylogenetic understanding of the buprestids, it seems to be now generally agreed that there are five major lineages: schizopodines, julodines, polycestines, buprestines and agrilines. Some prefer that these five groups should be assumed to be the subfamiles of Buprestidae, but there are compelling data to argue for familial status for one or two of these groups as well. This five lineage concept is rather stark in contrast to the last major subfamily scheme proposed by Cobos (1980) where he outlined 13 subfamilies and suggested a 14th, which altered things substantially from the revision of LeConte (1860). Few attempts to apply real phylogenetic analysis techniques to the family, as a whole or groups of taxa within, have been conducted, but these are emerging slowly and will undoubtedly increase as we try to make sense of such a large group of beetles. There are approximately 15,000 species placed within about 450 genera. The last global accounting of the family came in the six buprestid parts of the Coleopterorum Catalogus by Obenberger (1926, 1930, 1934a, 1934b, 1936, 1937) with a summary of the higher categories provided by Bellamy (1985). The most recent higher system has been proposed by Holynski (1993) in which he suggested four subfamilies, 12 tribes and about 64 subtribes, but many of the proposals first brought forward there are untested, or intuitively unsupportable, so further refinement is necessary. This classification was the first attempt to organize the entire family since that by Kerremans (1893). Here, to some extent, we use the subtribal system of Holynski, although some changes are proposed that differ from his original scheme. The newest attempt at predicting the natural classification by Kolibac (2001) suggested some very different placements at the higher levels in a three-lineage, six-subfamily scheme, but considering the relatively small sample of

taxa used in his phylogenetic analysis, the resolution gained in his study is not robust enough for us to completely accept his conclusions. The most recent assessment of the classification was presented for the Nearctic region by Nelson (1982). A catalogue of the North American fauna by Nelson is nearly complete, while a complete world catalogue and bibliography by Bellamy is still in preparation.

The julodines are a large group composed of six genera and many species distributed from the southern Palaearctic and Oriental to the Cape region of South Africa. The largest two genera, *Julodis* and *Sternocera*, are found as far west as Pakistan and Southeast Asia, respectively. Interestingly, they are not present on Madagascar. The bodies of these insects are nearly cylindrical, tapering to the posterior end, from about 1 to 7 or 8 cm in length. This group is arguably supported at the family level too.

The remaining three main lineages comprise the majority of buprestid taxa and are virtually cosmopolitan. The polycestines and buprestines generally have very typical larvae, each with a strongly dorsoventrally flattened thoracic region, or ambulatory plate (Burke 1917), a feature that spawned the dubious moniker flat-headed wood-borers. The typical adult body is said to be bullet-shaped, but rather they are mostly flattened dorsoventrally and tapering towards the rear end. They are very active flyers, especially during the warmth of the day and are quick to escape both predators and collectors. Many species are found feeding on the foliage of their larval host plants and many other species visit flowers to feed and to rendezvous with others looking to mate. The range of host plants is rather broad and includes many families of gymnosperms and dicot angiosperms. Many species seem to be generalist feeders as larvae, often known to inhabit several plant hosts, sometimes developing in a variety of dead wood. Both groups are known from every biogeographical region and most every habitat.

The main differences between the polycestines and buprestines are found in larvae and adults. The polycestine larvae, as far as is known, possess a single central line or groove on the dorsal first thoracic segment, while in the buprestines this line is either "Y" or "V" shaped. In the adults, the main dividing characteristic is found in the structure of the sternal cavity. The polycestines have the prosternal process received distally by lateral lobes of the mesosternum, whereas in the buprestines and agrilines the sternal cavity involves the anteromedial portion of the metasternum.

Polycestine tribes. Six tribes contain Neartic genera: Mastogeniini, Acmaeoderini, Polyctesini, Thrincopygini, Polycestini, and Tyndarini. In the past, Thrincopygini, Acmaeoderini and Mastogeniini were recognized as subfamilies. All but Acmaeoderini contain a single subtribe in the Nearctic region. The placement of Mastogeniini is still somewhat a matter of conjecture without any known larvae, but the most recent discussion by Bellamy (1996b) indicates a polycestine placement.

Buprestine tribes. Eight tribes are included in this lineage: Chalcophorini, Hippomelanini, Psilopterini, Dicercini, Buprestini, Melanophilini, Anthaxiini and Chrysobothrini. The Chalcophorini, once accorded subfamily rank, contain two subtribes for Nearctic species: Chalcophorina and Agaeocerina, originally proposed at tribal rank. The Hippomelanini were originally proposed at subtribe level and is monotypic; this taxon is endemic to North America (including Mexico). The Psilopterini contain the nominate subtribe and Sphenopterina, once accorded subfamily rank. The Dicercini contain the nominate subtribe and Phrixiina. The Melanophilini are monotypic. The Buprestini have Nearctic taxa placed in two subtribes: Buprestina and Trachykelina. The Anthaxiini are composed of the nominate subtribe and Xenorhipina. The Chrysobothrini have two subtribes: the nominate taxon and Actenodina.

The agriline lineage is comparable in size and taxonomic diversity to the polycestine/buprestine lineage and perhaps exceeds it. These beetles are generally smaller, often very small, mostly subcylindrical or flattened and cuneiform or wedge-shaped. The larvae differ significantly in that they lack the proventriculus of the alimentary canal, indicating a very different way of handling food. The larvae also share a modification to the caudal segment, always in one way or another, bilobed, bifurcate and sometimes with this paired terminus sclerotized. The adults are most always collected from the foliage of their host plants and most seem to be very host specific. In fact, within this group, there are some very pronounced coevolutionary trends apparent with entire species-groups utilizing only one genus of host plant. The agrilines are also known from every biogeographical region and most every habitat, with leaf-mining taken precedence over wood-boring forms in the moist tropical areas as the larvae are much less exposed to the threat of fungal infection. *Agrilus* is one of the largest genera in the animal kingdom with more than 2,700 described species. There are no known associations in *Agrilus* with gymnosperms. Other members of this group utilize monocotyledonous plants as larval hosts (i.e. Poaceae and Cyperaceae)

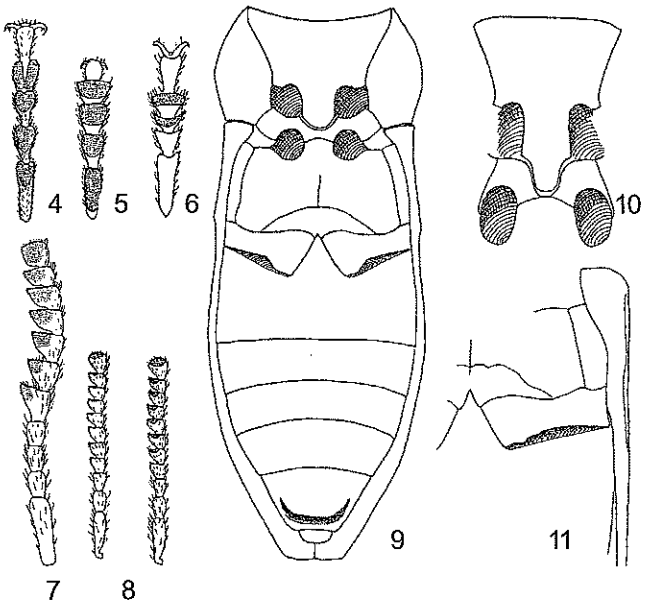
Agriline tribes. The Agrilinae are composed of four tribes: Coraebini, Agrilini, Aphanisticini and Trachyini. The Coraebini are monotypic with *Eupristocerus* in the nominate subtribe. The coraebines are the most generically diverse group in the family, but with most of this diversity found in the Old World. The Agrilini contain two subtribes: Rhaeboscelina and Agrilina. The Aphanisticini are added to the Nearctic fauna with the recent discovery of an Asian species in Texas and Florida (Wellso and Jackman 1995, Peck and Thomas 1998). The tribe Trachyini contains mostly small, often cuneiform, leaf- or stem-mining beetles, with all four subtribes present in the Nearctic fauna: Trachyina (for the adventive *Trachys troglodytiformis* Obenberger), Brachyina, Leiopleurina and Pachyscelina. It is now thought from preliminary studies of larvae that this grouping is highly artificial and that leaf-mining may have evolved independently several times in the family and may represent a repeated evolutionary outcome at the distal end of several otherwise widely separated lineages (S. Bílý, pers. comm.).

Higher taxon additions and changes. The basic structure of the higher classification has evolved from the general system of Lacordaire (1857), with more specific changes from LeConte and Horn (1883), Kerremans (1893), Nelson (1982) and Holynski (1993). The tribes or subtribes that have more recently been de-

fined and which contain, partly, Nearctic genera are: Agaeocerina Nelson 1982 (originally as tribe of Buprestini); Hippomelanina Holynski 1993 (originally as a subtribe); Trachykelina Holynski 1988 (originally in Anthaxiini); Rhaeboscelidina Cobos 1976; Brachydina Cobos 1979; Pachyschelina Cobos 1979; and Leiopleurina Holynski 1993. Higher level recombinations or synonymies are: Chalcophorinae Lacordaire as a synonym of Buprestinae by Toyama (1987) and Dicercini Kerremans as a synonym of Psilopterina Lacordaire by Holynski (1993). The placement of Polycestina Lacordaire under Buprestini was refuted by Bellamy (1996b) and later by Volkovitsh and Hawkeswood (1999). Bílý (2000) reviewed the Anthaxiini and Melanophilini, proposing a subtribal structure which differed from that proposed earlier by Holynski (1988). The Coraebini have been phylogenetically reviewed by Kuban *et al.* (2001).

Generic additions, changes and placements. Recently described generic taxa for the Nearctic region include: *Acmaeoderopsis* Barr 1974; *Anambodera* Barr 1974; *Barrellus* Nelson and Bellamy 1996; *Beerellus* Nelson 1982; *Lepismadora* Velten 1987; and *Squamodera* Nelson 1996. Previously described genera recently added to the regional fauna are *Aphanisticus* Latreille 1810; *Leiopleura* Deyrolle 1864; *Micrasta* Kerremans 1893; *Sphaerobothris* Semenov-Tian-Shanskij and Rikhter 1934; and *Sphenoptera* Dejean 1833. Recent status changes or subgeneric elevations are: *Paratyndaris* Fisher 1919 was reduced to a subgenus of *Tyndaris* Thomson 1857 by Cobos (1980), which we do not support; *Texania* Casey 1909 was validated with the recognition of *Chalcophorella* Kerremans 1903 as a strictly Palaearctic genus by Obenberger (1942a); *Nanularia* Casey 1909 and *Ampheremus* Fall 1917 were recognized as valid genera by Bellamy (1987); *Gyascutus* LeConte 1859, with *Stictocera* Casey 1909 as its subgenus, and *Prasinalia* Casey 1909 were elevated from subgenera of *Hippomelas* Laporte and Gory 1837 by Nelson and Bellamy (1996); *Lampetis* Dejean 1833, subgenus *Spinthoptera* Casey 1909 contain the Nearctic species formerly placed in *Psiloptera* Solier 1833 according to Kurosawa (1993); *Spectralia* Casey 1909 was validated with the recognition of *Cinyra* Laporte and Gory 1837 as a Neotropical taxon; *Cypriacis* Casey 1909 was recognized as distinct from *Buprestis* L. 1758 by Kurosawa (1988); *Phaenops* Dejean 1833 and *Xenomelanophila* Sloop 1837 were recognized as distinct from *Melanophila* Eschscholtz 1829 by Cobos (1987); and *Agrilaxia* Kerremans 1903 was again recognized at the genus level by Bright (1987) and later by Bílý and Bellamy (1999). The placement of *Acmaeoderoides* Van Dyke 1942 in Ptosimina by Holynski (1993) was refuted by Bellamy and Westcott (1996). The placement of *Chrysophana* LeConte 1859 in Bubastina Obenberger by Holynski (1993) was refuted by Bellamy (1996c). The placement of Ptosimina under Acmaeoderini follows proposals by Volkovitsh and Hawkeswood (1999). Kuban *et al.* (2001) removed *Lepismadora* to the Agrilini, where it awaits subtribal placement.

Three recent rulings by the ICZN affected buprestid nomenclature. A very unstable situation was corrected (ICZN 1994) when type species were designated for *Buprestis* and *Chrysobothris*, Eschscholtz 1829. The fixation of the name *Poecilonota* Eschscholtz 1829 by type species designation (ICZN 1996a) reduced



FIGURES 4.41 - 11.41. 4, *Schizopus laetus* LeConte, metatarsus of male, ventral view; 5, *Beerellus taxodii* Nelson, metatarsus of female, ventral view; 6, *Polycesta angulosa* Duval, metatarsus of female, ventral view; 7, *Acmaeodera gibbula* LeConte, antenna; 8, *Ptosima gibbicollis* (Say), antenna, dorsal (left), ventral (right); 9, *Thrincopyge ambiens* (LeConte), thorax and abdomen, ventral view; 10, *Chalcophora georgiana* (LeConte), thoracic sternal areas; 11, *Polycesta angulosa* Duval, metasternal area, female. (All from Nelson 1982)

Descarpentriesiola Lerault 1983 to junior synonymy. A controversy between specialists from Europe and North America was solved with the designation of type species for *Melanophila* and *Phaenops* (ICZN 1996b).

Distribution. There are slightly more than 14,600 valid species known from the majority of the world's temperate and tropical biogeographical zones, making this family the eighth largest beetle family. There are 762 species and 26 subspecies currently listed for North America, north of Mexico, a substantial increase on those listed by Chamberlin (1926). The state of understanding for Mexican taxa does not allow a clear accounting for species found in the southern extent of the Nearctic area, although a general introduction and species estimates were given by Hespenheide (1996).

Key to Nearctic Genera

1. Sternal cavity for reception of prosternal process formed entirely by the mesosternum (Fig. 9) (subfamily Polycestinae) 2
— Sternal cavity for reception of prosternal process attaining or formed in part by metasternum (Fig. 10) 12

Polycestinae

2(1). Metacoxal plates distinctly dilated medially; last visible abdominal sternum with deep groove around apical half (Fig. 9) (Thrincopygini, Thrincopygina) ..... *Thrincopyge*

— Metacoxal plates not distinctly dilated medially (Fig. 11); last visible abdominal sternum without deep groove around apical half 3

3(2). Lobulated antennomeres with sensory pores diffuse, without vestiges of fossae or depressions on either surface (Fig. 7) (Acmaeoderini) 4

— Lobulated antennomeres with sensory pores in part concentrated in fossae on one or both surfaces, at least on apical segments (Fig. 8) 8

4(3). Scutellum visible; elytra free; epipleuron more or less hypertrophied toward base (Acmaeoderoidina) ..... *Acmaeoderoides*

— Scutellum not visible; elytra fused; epipleuron not hypertrophied toward base (Acmaeoderina) 5

5(4). Ventral surface clothed by a dense tomentum largely obscuring the surface..... *Squamodera*

— Ventral surface variously clothed otherwise 6

6(5). Pronotum without or with only faint indication of margin; front angles of pronotum in side view are rounded; suture between abdominal sterna one and two readily visible ..... *Anambodera*

— Pronotum distinctly margined at least in part; front angles of pronotum in side view are angled; suture between abdominal sterna one and two obliterated or faint 7

7(6). Abdominal sterna three to five in females clothed differently than rest of body, consisting of dense long recurved hairlike setae .... *Acmaeoderopsis*

— Abdominal sterna three to five in females not distinctively clothed ..... *Acmaeodera*

8(3). Articulating base of pronotum with row of rasplike grooves (Fig. 12) (Acmaeoderini, Ptosimina) .... *Ptosima*

— Articulating base of pronotum without row of rasplike grooves 9

9(8). Elytral apices not rounded, provided with special armiture (Fig. 14); epipleuron completely covering metepisternum (Fig. 15) (Tyndarini, Tyndarina) ..... *Paratyndaris*

— Elytral apices rounded or more or less serrate (Fig. 13); epipleuron not completely covering metepisternum (Fig. 16) 10

10(9). Tarsomeres 1-4 with plantulae below (Fig. 5) (Polyctesini: Polyctesina) 11

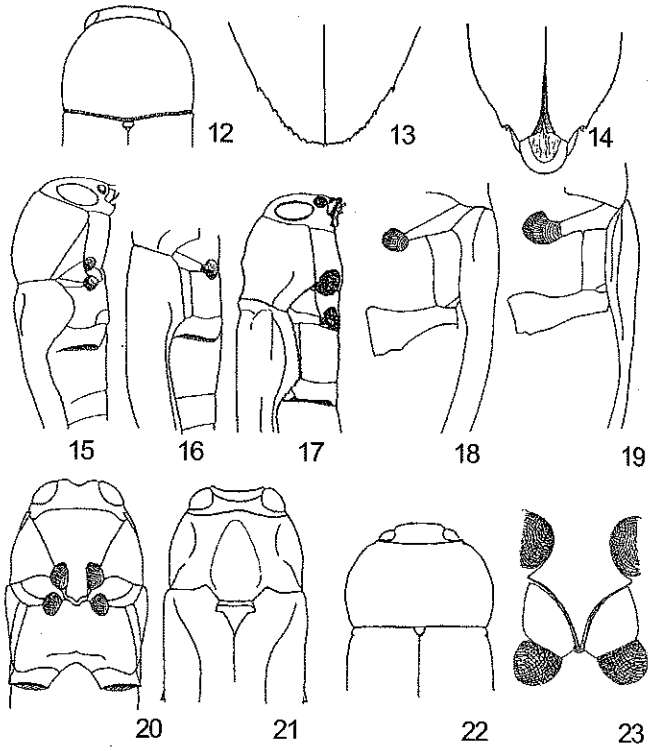
— Only tarsomere 4 and in some 3 with plantulae below (Fig. 6) (Polycestini)..... *Polycesta*

11(10). Epipleural lobe rounded, covering all but anteroinferior angle of metepisternum (Fig. 17) ..... *Beerellus*

— Epipleural lobe truncate leaving most of metepisternum exposed (Fig. 16)..... ..... *Chrysophana*

12(1). Metacoxal plates dilated medially or not, but only slightly longer medially than laterally, with anterior margin mostly sinuate (Fig. 20) 13

— Metacoxal plates distinctly dilated medially, mostly cut off laterally by prolongation of abdomen, with anterior margin rather straight, posterior margin oblique (Fig. 18) (Buprestinae)..... 16



FIGURES 12.41 - 23.41. 12, *Ptosima gibbicollis* (Say), head and pronotum, dorsal view; 13, *Polycesta elata* LeConte, elytral apices; 14, *Paratyndaris olneyae* (Skinner), elytral apices; 15, *P. olneyae*, lateral view; 16, *Chrysophana placida* (LeConte), lateral view; 17, *Beerellus taxodii* Nelson, lateral view; 18, *Dicerca hesperoborealis* Hatch and Beer, meso-metasternal area; 19, *Buprestis maculativentris* Say, meso-metasternal area; 20, *Agrilus cavifrons* Waterhouse, ventral view; 21, *A. cavifrons*, dorsal view; 22, *Mastogenius robustus* Schaeffer, dorsal view; 23, *Chrysobothris octocola* LeConte, thoracic sternal areas. (Figures 12 - 22 from Nelson 1982).

13(12). Thorax truncate at base (Fig. 22) (Mastogeniini, Mastogeniina) 14

— Thorax lobed at base (Fig. 21) (Agrilinae) 44

14(13). Prosternum with distinctly limited antennal cavities, and carinae on each side of middle .... *Trigonogya*

— Prosternum without distinctly limited antennal cavities, and without carinae on each side of middle 15

15(14). Eyes parallel, size less than 1.5 mm, subcylindrical ..... *Micrasta*

— Eyes converging slightly above, size more than 1.5 mm, body flattened above and below .... *Mastogenius*

Buprestinae

16(12). Prosternum obtusely angulate behind coxae (Fig. 10); frons not contracted by insertion of antennae 17

— Prosternum acutely angulate behind coxae (Fig. 23); frons contracted by insertion of antennae (Chrysobothrini) 42

17(16). Antennae with sensory foveae absent (sensory pores dispersed) or placed on ventral surface of antennomeres 18

— Antennae with sensory foveae placed on distal surface of antennomeres 33

18(17). Elytral epipleuron with denticle wedging between mesepimeron and rounded posterolateral angle of metepisternum (Fig. 18) 19

— Elytral epipleuron with lower margin more or less straight, without denticle (Fig. 19) (Buprestini, Buprestina) 31

19(18). Body subcylindrical in cross section; sensory pores diffuse on both surfaces of antennae; protrochanter mostly with sharp tooth (Fig. 30); antennomere 11 mostly with terminal notch (Fig. 31) (Hippomelanini, Hippomelanina) 20

— Body oval in cross section; sensory pores of antennae otherwise; protrochanter without sharp tooth; antennomere 11 without terminal notch. 25

20(19). Antennomeres 4-10 compact, triangular, not flattened (Fig. 28); inner margin of eyes parallel (Fig. 24); elytral apices rounded to slightly emarginate (Fig. 25) 24

— Antennomeres 4-10 elongate, subserrate or, in part parallel-sided, strongly flattened (Fig. 39); inner margin of eyes converging above (Fig. 40); elytral spices moderately emarginate and bidentate (Fig. 1) 21

21(20). Surface sculpture irregular, with conspicuous raised callosities; protibia arcuate (Fig. 29); antennomere 11 of male with strong terminal notch (Fig. 31) ..... *Gyascutus*

— Surface sculpture uniform, without conspicuous raised callosities; protibia weakly arcuate or straight (Fig. 32); antennomere 11 of male mostly without strong terminal notch (Fig. 34) 22

22(21). Epipleuron with small marginal tooth near metacoxa (Fig. 37); tarsomere 1 of male about 2X as long as 5; metacoxa of male with acute tooth along inner margin (Fig. 35) ..... *Prasinalia*

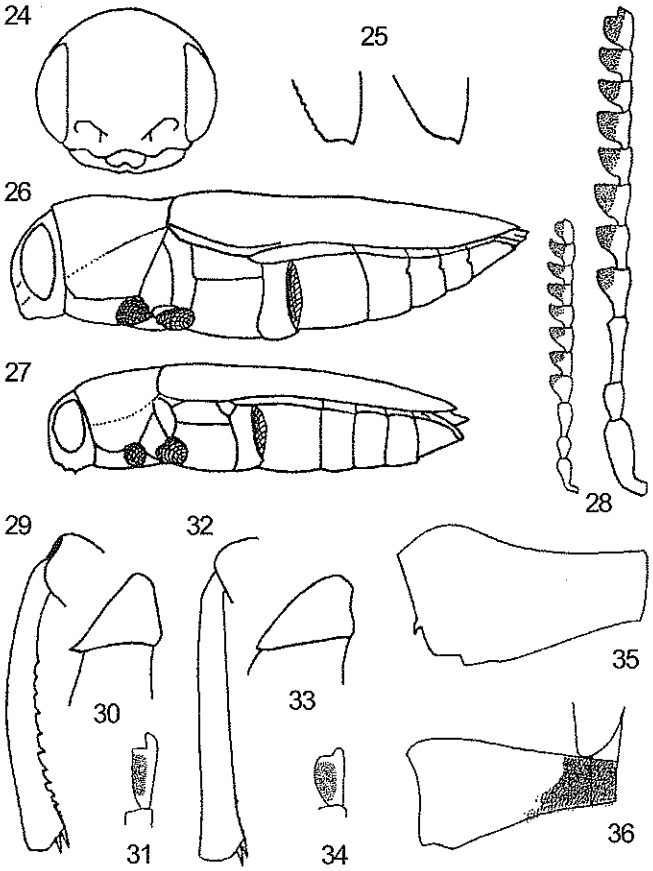
— Epipleuron not toothed (Fig. 38); tarsomere 1 subequal to 5 or shorter; metacoxa of male without acute tooth along inner margin (Fig. 36) .. 23

23(22). Protrochanter without distinct tooth (Fig. 33); antennomeres 4-10 of males parallel-sided (Fig. 39) ..... *Hippomelas*

— Protrochanter with distinct acute tooth (Figs. 41, 45); antennomeres 4-10 of male triangular with roundly truncate margin (Fig. 42) ..... *Barrellus*

24(20). Lateral margin of pronotum carinate in posterior half; epipleuron carinate basally; hind margin of abdominal sterna 2-4 notched near sides (Fig. 26) ..... *Nanularia*

— Lateral margin of pronotum without carina; epipleuron without sublateral carina; hind margin of abdominal sterna 2-4 entire (Fig. 27) ..... *Ampheremus*



FIGURES 24.41 - 36.41. 24, *Nanularia*, head, anterior view; 25, *Nanularia*, left, *Ampheremus*, right, elytral apices; 26, *Nanularia*, lateral view; 27, *Ampheremus*, lateral view; 28, *Ampheremus*, left, *Nanularia*, right, antennae; Figs. 29 - 31, *Gyascutus* (*s. str.*) *planicosta* (LeConte), 29, protibia; 30, protrochanter; 31, antennomere 11; Figs. 32 - 34, *Hippomelas sphenicus* (LeConte), 32, protibia; 33, protrochanter; 34, antennomere 11; 35, *Prasinalia cuneata* (Horn), metacoxa of male; 36, *Gyascutus* (*Stictocera*) *caelatus* (LeConte), metacoxa of male. (From Nelson and Bellamy 1996, with permission of Taylor & Francis Ltd.).

25(19). Metacoxal plates slightly dilated medially, hind margin weakly oblique (Fig. 43); antennae mostly not extending beyond anterior third of pronotum when laid alongside, outer antennomeres transverse (Fig. 46) (Chalcophorini, Agaeocerina) .... *Agaeocera*

— Metacoxal plates strongly dilated medially, hind margin strongly oblique (Fig. 18); antennae mostly extending beyond anterior third of pronotum when laid alongside, outer antennomeres mostly elongate triangular (Fig. 47) 26

26(25). Terminal segment of maxillary palpi slender (Fig. 45) 27

— Terminal segment of maxillary palpi broadened (Fig. 44) 29

27(26). Elytral apex sharply bidentate; last visible abdominal sternum with thin rectangular lobe filling apical emargination between sharp lateral teeth (Dicercini, Phrixiina) ..... *Spectralia*

— Elytral apex rounded and/or unidentate; last visible abdominal sternum not as above (Chalcophorini, Chalcophorina) 28

28(27). Pronotum unisulcate; apical third of elytral margins strongly serrate ..... *Texania*
— Pronotum bisulcate, midline more or less costuliform; apical third of elytral margins entire or finely serrate ..... *Chalcophora*

29(26). Metatarsomere 1 longer than 2; outer antennomeres regularly triangular (Fig. 47) (Dicercini, Dicercina) 30
— Metatarsomere 1 subequal in length to 2; outer antennomeres somewhat to distinctly truncate along external margin (Fig. 48) (Psilopterini, Psilopterina) ..... *Lampetis*

30(29). Scutellum rounded; pronotum variably longitudinally sulcate in midline ..... *Dicerca*
— Scutellum broader than long; pronotum with median longitudinal ridge or smooth line .... *Poecilonota*

31(18). Prosternal process not or only slightly widened behind front coxae 32
— Prosternal process strongly widened behind front coxae (Fig. 50) ..... *Juniperella*

32(31). Elytra not striate but regularly costate; prosternum impressed and punctate along middle .... *Cypriacis*
— Elytra striate; prosternum convex or flattened along middle ..... *Buprestis*

33(17). Scutellum invisible; antennal grooves closed; epistoma with broad lateral lobes (Buprestini, Trachykelina) ..... *Trachykele*
— Scutellum visible; antennal grooves open anteriorly; epistoma without distinct lateral lobes . 34

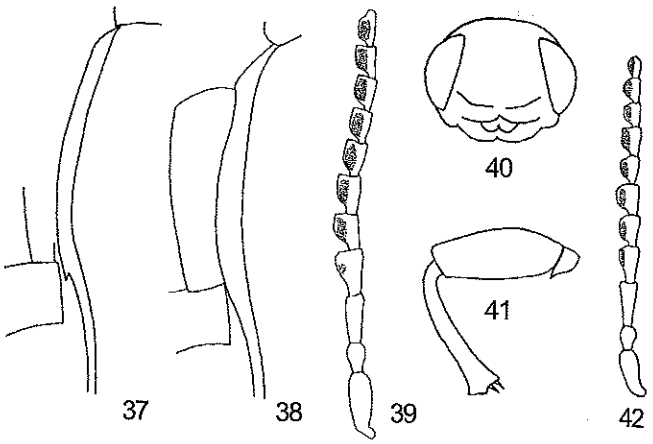
34(33). Scutellum transverse anteriorly, acuminate posteriorly; protibia with one apical spur (Buprestini, Sphenopterina) ..... *Sphenoptera*
— Scutellum small, not as above; protibia with two spurs 35

35(34). Mentum coriaceous in front; prothorax sinuate at posterior margin; punctation of pronotum simple (Melanophilini, Melanophilina) 36
— Mentum entirely corneous; prothorax commonly truncate; punctation of pronotum variable (Anthaxini) 38

36(35). With mesothoracic pits next to lateral margin of middle coxal cavities (Fig. 51); flattened; glabrous ..... *Melanophila*
— Without mesothoracic pits 37

37(36). Flattened; glabrous; apices of elytra acute; head and pronotum with smooth facets .... *Xenomelanophila*
— More convex; elytra with fine, short hairlike setae; apices of elytra not acute; head and pronotum without smooth facets ..... *Phaenops*

38(35). Pronotum truncate at base; antennae serrate in both sexes (Anthaxiina) 39



FIGURES 37.41 - 42.41. 37, *Prasinalia cuneata* (Horn), left epipleuron; 38, *Hippomelas sphenicus* (LeConte), left epipleuron; 39, *H. aeneocupreus* Kerremans, antenna of male; 40, *H. saginatus* (Mannerheim), head, anterior view; Figs. 41 - 42, *Barrellus femoratus* (Knull), 41, front leg of male; 42, antenna of male. (From Nelson and Bellamy 1996, with permission of Taylor & Francis Ltd.)

— Pronotum mostly sinuate at base; antennae of male pectinate (Xenorhipina) 40

39(38). Body elongate, slender, *Agrilus*-like; pronotum with posteromedial depression; vestiture completely lacking; pygidium with margin serrate . *Agrilaxia*
— Body short, more robust, not *Agrilus*-like; pronotum without posteromedial depression; often with vestiture on head, elytra; pygidial margin entire ..... *Anthaxia*

40(38). Pronotum broadly evenly rounded at sides without lateral margins ..... *Trichinorhipis*
— Pronotum quadrate with lateral margins 41

41(40). Posterior coxal plates scarcely narrowed laterally (Fig. 52) ..... *Xenorhipis*
— Posterior coxal plates triangular, hind margin strongly oblique (Fig. 53) ..... *Hesperorhipis*

42(16). Tarsomere 3 prolonged on each side into a long, divergent spine that extends beyond tarsomere 4 (Fig. 54) (Actenodina) ..... *Actenodes*
— Tarsomere 3 truncate at apex, not extending beyond tarsomere 4 (Fig. 55) (Chrysobothrina) . 43

43(42). Eyes close together on vertex, space between them equal or less than width of eye; elytra with distinct foveae and more or less prominent carinae along main veins; tooth on front femur right or acute angled ..... *Chrysobothris*
— Eyes widely separated on vertex, space between them almost twice or more than width of eye; elytra with distinct carinae and inconspicuous foveae; tooth on front femur short, obtuse .... *Sphaerobothris*

Agrilinae

44(13). Tarsi elongate, at least half as long as tibia; legs neither flattened nor tightly folding (Agrilini) 45

— If tarsi longer than 2/5 of tibiae, legs flat, tightly folding against body 48

45(44). Pronotum with entire marginal carina and one submarginal carina (Fig. 56) (Agrilini, Agrilina) .... *Agrilus*

— Pronotum without submarginal carina, some without any lateral carina (Fig. 57) 46

46(45). Frons with deep longitudinal groove; pronotum without lateral carinae; body covered by squamose setae; ovipositor with ventral pair of opposing setal brushes (Agrilini) ..... *Lepismadera*

— Frons without deep longitudinal groove; pronotum with lateral carinae; body sparsely setose; ovipositor without ventral brushes 47

47(46). Antennae in repose received in sulci in hypomera ventral to pronotal marginal carinae; anterior prosternal margin arcuately produced medially (Agrilini, Rhaeboscelina) ..... *Paragrilus*

— Antennae free in repose; anterior prosternal margin feebly bilobed (Coraebini) ..... *Eupristocerus*

48(44). Propleura without sulci for antennae; if femora without sulci for tibiae, then either supraantennal pits absent, or propleural suture double (Aphanisticini, Aphanisticina) ..... *Aphanisticus*

— Propleura with deep sulci for antennae; or femora without sulci for tibiae; supraantennal pits present, and propleural suture simple (Trachyini) 49

49(48). Tibiae not markedly flattened 50

— Tibiae strongly flattened; scutellum large, triangular (Pachyschelina) ..... *Pachyschelus*

50(49). Propleura without antennal sulci (Trachyina) .... *Trachys*

— Propleura with deep sulci for antennae (Fig. 58) 51

51(50). Prosternal process rounded or truncated apically (Leiopleurina) ..... *Leiopleura*

— Prosternal process pointed at apex (Fig. 58) (Brachyina) 52

52(51). Body broad, ovate, less than 2.0X longer than wide; elytra with sublateral carina extending from humerus to near apex; prosternal process sulcate (Fig. 58) ..... *Brachys*

— Body narrow, elongate, at least 2.4X longer than wide; elytra without sublateral carina; prosternal process not sulcate ..... *Taphrocerus*

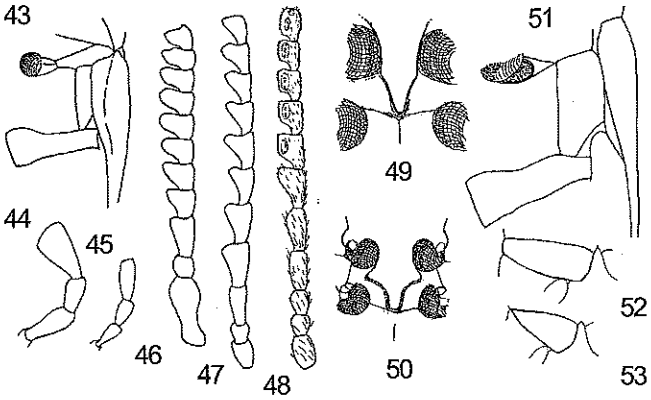
Classification of the Nearctic Genera

Buprestidae Leach 1815

Polycestinae Lacordaire 1857

Polycestini Kerremans 1902

Polycestina Théry 1928



FIGURES 43.41 - 53.41. 43, *Agaeocera g. gentilis* (Horn), metasternal area of male; 44, *Dicerca querci* Knull, maxillary palpus; 45, *Buprestis* (*s. str.*) *maculativentris* Say, maxillary palpus; 46, *Agaeocera g. gentilis*, antenna of male; 47, *Poecilonota thureura* (Say), antenna of female; ig. 48, *Lampetis* (*Spinthoptera*) *webbii* (LeConte), antenna of female; 49, *Buprestis* (*s. str.*) *rufipes* (Oliver), prosternal area of male; 50, *Juniperella mirabilis* Knull, prosternal area of female; 51, *Melanophila acuminata* (DeGeer), meso-metasternal area; 52, *Xenorhipis brendeli* LeConte, metacoxa of female; 53, *Hesperorhipis mirabilis* Knull, metacoxa of female. (Figures 43 - 48, 51 from Nelson 1982)

Polycesta Solier 1833, 12 spp., Pennsylvania, Alabama, Arkansas, Florida, Missouri, Oklahoma, Texas, Arizona, and California (key to spp., Barr 1949; notes, Cobos 1981).

Subgenus *Arizonica* Cobos 1981
Subgenus *Nelsonella* Cobos 1981
Subgenus *Tularensia* Nelson 1997

Polyctesini Cobos 1955

Polyctesina Cobos 1955

Chrysophana LeConte 1859, 2 spp., Arizona, California, Colorado, Idaho, Oregon, Washington and British Columbia (key to spp., Barr in Hatch 1971).

Beerellus Nelson 1982, 1 sp. *B. taxodii* Nelson 1982, from *Taxodium*, Georgia.

Thrincopygini LeConte 1861

Thrincopygina LeConte 1861

Thrincopyge LeConte 1858, 2 spp. in *Dasylirion* and *Nolina* (Agavaceae) Texas, New Mexico, Arizona (key to spp., Nelson 1980).

Acmaeoderini Kerremans 1893

Acmaeoderina Kerremans 1893

Acmaeodera Eschscholtz 1829, 144 spp., widely distributed, mostly in southwestern United States, many visit flowers (key to spp., Fall 1899).

Squamodera Nelson 1996, 4 spp., Arizona, California, and Nevada (key to spp., Nelson 1996).

Acmaeoderopsis Barr 1974, 12 spp., Arizona, California, New Mexico, and Texas.

Anambodera Barr 1974, 6 spp., Arizona, California, Idaho, Nevada, Oregon, and Washington.

Ptosimina Kerremans 1902

Ptosima Serville in Dejean 1833, 4 spp., eastern and midwestern United States to Texas (key to spp., Nelson 1978; notes, Cobos 1980)

Acmaeoderoidina Cobos 1955

Acmaeoderoides Van Dyke 1942, 11 spp., Arizona, California, and Texas (key to spp., Nelson 1968b, 1970, 1999).

Tyndarini Cobos 1955

Tyndarina Cobos 1959

Paratyndaris Fisher 1919, 15 spp., Arizona, California, Florida, New Mexico, Oklahoma, and Texas (key to spp., as *Ancylotela*, Barr 1972; as subgenus of *Tyndaris* Thomson 1857 by Cobos 1980; revision in preparation, Nelson and Bellamy).

Ancylotela Auctorum
subgenus *Barberia* Cobos 1980, of *Tyndaris* (unavailable)
subgenus *Knulliella* Cobos 1980, of *Tyndaris*
subgenus *Tucsonia* Cobos 1980, of *Tyndaris* (unavailable)

Mastogeniini LeConte and Horn 1883

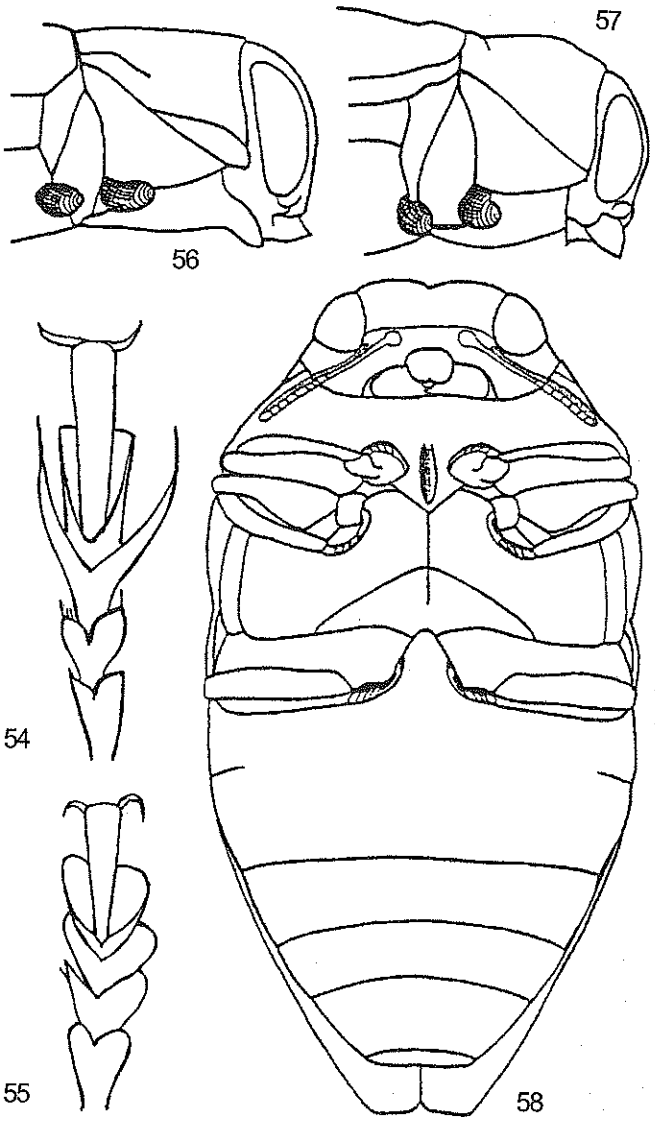
Mastogeniina LeConte and Horn 1883

Mastogenius Solier 1850, 5 spp., Connecticut, New Jersey, Indiana, Florida, Texas, and Arizona (key to spp., Nelson 1985; notes, Bellamy 1991).

Haplostethus LeConte 1859

Trigonogya Schaeffer 1919, 1 sp., *T. reticulaticollis* (Schaeffer 1904), Texas.

Micrasta Kerremans 1893, 1 sp. *M. oakleyi* Fisher 1935, described from Puerto Rico, has been collected in Florida (Nelson *et al.* 1996).



FIGURES 54.41 - 58.41. 54, *Actenodes calcarata* (Chevrolat), protarsus; 55, *Chrysobothris octocola* LeConte, protarsus; 56, *Agrilus cavifrons* Waterhouse, lateral view; 57, *Eupristocerus cogitans* (Weber), lateral view; 58, *Brachys floccosus* Mannerheim, ventral view. (Figures 56.41 - 58.41 from Nelson 1982)

Buprestinae Leach 1815

Chalcophorini Lacordaire 1857

Chalcophorina Lacordaire 1857

Chalcophora Solier 1833, 5 spp., generally distributed in coniferous forests throughout North America (Vol. 1, Color Fig. 9).

Texania Casey 1909, 3 spp., New York, Pennsylvania, Indiana, Southeastern United States, Louisiana, and Texas (key to spp., as *Chalcophorella*, Casey 1909; review, Obenberger 1942a; notes, Nelson 1982).

Chalcophorella auctorum

Agaeocerina Nelson 1982

Agaeocera Waterhouse 1882, 2 spp., Arizona, California, New Mexico, and Texas.
Anataxis Casey 1909

Hippomelanini Holynski 1993

Hippomelanina Holynski 1993

Hippomelas Laporte and Gory 1837, 4 spp., Arizona, New Mexico and Texas. (key to spp., Nelson and Bellamy 1996).

Prasinalia Casey 1909, 2 spp., Arizona and California (key to spp., Nelson and Bellamy 1996).

Gyascutus LeConte 1859, 12 spp., Arizona, California, Idaho, Nevada, New Mexico, Oregon, Texas, and Utah (key to spp., Nelson 2000).
subgenus *Stictocera* Casey 1909

Barrellus Nelson and Bellamy 1996, 1 sp., *B. femoratus* (Knull 1941), California.

Nanularia Casey 1909, 7 spp., Arizona, California, Idaho, Nevada, Texas, and Utah (key to spp., Bellamy 1987)

Ampheremus Fall 1917, 1 sp., *A. cylindricollis* Fall (1917). Arizona, California, Nevada, and New Mexico.

Psilopterini Lacordaire 1857

Psilopterina Lacordaire 1857

Lampetis Dejean 1833, 3 spp., Arizona, Colorado, Kansas, Louisiana, New Mexico, Oklahoma, and Texas (key to spp., Nelson 1986; notes, Kurosawa 1993).
Psiloptera auctorum
subgenus *Spinthoptera* Casey 1909

Sphenopterina Lacordaire 1857

Sphenoptera Dejean 1833, 1 sp., *S. jugoslavica* Obenberger 1926, introduced from eastern Europe to control diffuse knapweed, *Centaurea diffusa*, in the Pacific Northwest (notes, Nelson 1982; Rees *et al.* 1996).
subgenus *Chilostetha* Jakovlev 1889

Dicercini Kerremans 1893

Dicercina Kerremans 1893

Dicerca Eschscholtz 1829, 24 spp., occurs widely from Alaska, most Canadian Provinces and U.S. states (key to spp., Nelson 1975).
Stenuris Kirby 1837

Poecilonota Eschscholtz 1829, 9 spp., widely distributed (key to spp., Evans 1957).
Analampis Dejean 1836
Polydora Gistel 1848
Descarpentriesiola Lerault 1983

Phrixiina Cobos 1975

Spectralia Casey 1909, 6 spp., Arizona, California, northeastern United States to North Carolina, and Texas (key to spp., Chamberlin 1920).
Cinyra auctorum

Buprestini Leach 1815

Buprestina Leach 1815

Buprestis Linnaeus 1758, 18 spp., generally distributed; bore into such trees as beech, cottonwood, maple, and oak, as well as various conifers (key to spp., Helfer 1941).
Ancylocheira Eschscholtz 1829
Anoplis Kirby 1837
Gymnota Gistel 1834
subgenus *Stereosa* Casey 1909
subgenus *Knulliobuprestis* Kurosawa 1988

Cypriacis Casey 1909, 8 spp., generally distributed, hosts as in *Buprestis* (key to spp., Helfer 1941).
subgenus *Nelsonocheira* Kurosawa 1988

Juniperella Knull 1947, 1 sp., *J. mirabilis* Knull 1947, California.

Trachykelina Holynski 1988

Trachykele Marseul 1865, 6 spp., Arizona, Virginia, North Carolina, Georgia, Texas, New Mexico, California, Oregon, Washington, and British Columbia (notes, Fall 1906; key to spp., Burke 1920) (Vol. 1, Color Fig. 1).

Melanophilini Bedel 1921

Melanophilina Bedel 1921

Melanophila Eschscholtz 1829, 5 spp., generally distributed (key to spp., Sloop 1937; Cobos 1987).
Apatura Laporte and Gory 1838 (part)
Oxypteris Kirby 1837

Phaenops Dejean 1833, 15 spp., generally distributed (key to spp., Sloop 1937).

Xenomelanophila Sloop 1937, 1 sp., *X. miranda* (LeConte 1854), Arizona, Colorado, New Mexico, Oregon, Texas, and Utah (notes, Cobos 1987) (Vol. 2, Color Fig. 32).

Anthaxiini Gory and Laporte 1839

Xenorhipina Cobos 1986

Xenorhipis LeConte 1866, 3 spp., Connecticut, New York, Ohio, Pennsylvania, Illinois, and Texas (key to spp., Horn 1882; Obenberger 1939).
Lamesis Westwood 1883

Hesperorhipis Fall 1930, 4 spp., Arizona and California.

Trichinorhipis Barr 1948, 1 sp., *T. knulli* Barr 1948, California.

Anthaxiina Gory and Laporte 1839

Anthaxia Eschscholtz 1829, 36 spp., generally distributed (key to spp., Horn 1882; Obenberger 1942b; Cobos 1958; world catalog, Bílý 1997).
subgenus *Haplanthaxia* Reitter 1911 (key to spp., Cobos 1958)
subgenus *Melanthaxia* Rikhter 1945 (key to spp., Cobos 1958; revision of Nearctic spp., in prep., Bílý)

Agrilaxia Kerremans 1903, 2 spp., widely distributed. (key to spp., Cobos 1971; as valid genus, Bílý and Bellamy 1999).

Chrysobothrini Gory and Laporte 1838

Chrysobothrina Gory and Laporte 1838

Chrysobothris Eschscholtz 1829, 134 spp., generally distributed (key to spp., Fisher 1942).
Amblis Gistel 1834
Odonotomus Kirby 1837
Enocys Gistel 1856
Knowltonia Fisher 1935
Ceratobothris Pochon 1972

Sphaerobothris Semenov-Tian-Shanskij and Rikhter 1934, 2 spp., New Mexico to Arizona, California and Texas (key to spp., Bellamy and Volkovitsh 1997).

Actenodina Kerremans 1893

Actenodes Lacordaire 1857, 9 spp., widely distributed (key to spp., Nelson 1979).

Agrilinae Laporte 1835

Coraebini Bedel 1921

Coraebina Bedel 1921

Eupristocerus Deyrolle 1864, 1 sp., *E. cogitans* (Weber 1801), Eastern United States.
Coraebus LeConte 1859, not Laporte and Gory 1839

Agrilini Laporte 1835

Lepismadora Velten 1987, 1 sp. *L. algodones* Velten (1987), California (Velten and Bellamy 1987); moved to Agrilini, Kuban *et al.* (2001).

Agrilina Laporte 1835

Agrilus Curtis 1825, 171 spp., generally distributed; a few species occur on raspberries and blackberries; most species are wood borers (key to spp., Fisher 1928; notes, Bellamy 1996a). At least four immigrant species from the eastern or western Palaearctic region are established in the Nearctic fauna and one species, *A. hyperici* (Creutzer 1789), was introduced to control St. John's Wort, *Hypericum perforatum* L. Per. in the Pacific Northwest (notes, Rees, *et al.* 1996).
subgenus *Engyaulus* Waterhouse 1889 (key to spp. Nelson and Westcott 1991)

Rhaeboscelina Cobos 1976

Paragrilus Saunders 1871, 2 spp., eastern United States, Florida, and Texas (Cobos 1976).
Rhaeboscelis LeConte 1863, not Chevrolat 1837
Clinocera Deyrolle 1864, not Meigen 1803

Aphanisticini Jacquelin du Val 1863

Aphanisticina Jacquelin du Val 1863

Aphanisticus Latreille 1829, 1 ssp., *A. cochinchinae seminulum* Obenberger 1929, has recently been recorded from southern Texas (Wellso and Jackman 1995) and Florida (Peck and Thomas 1998).

Trachyini Gory and Laporte 1839

Trachyina Gory and Laporte 1839

Trachys Fabricius 1801, 1 sp., *T. troglodytiformis* Obenberger 1918 [= *T. pygmaea* (F. 1787)], naturalized on hollyhock (*Althaea rosea* (L.) Cav.) in New Jersey (Linsley 1949, Weiss 1954, Hespenheide 1968).

Pachyschelina Bøving and Craighead 1931

Pachyschelus Solier 1833, 5 spp., eastern and southern United States, Arizona, New Mexico, and Texas; leaf miners in *Croton* spp. and herbaceous spp. of Fabaceae (key to spp., Nicolay and Weiss 1920).
Metonius Say 1836

Leiopleurina Holynski 1993

Leiopleura Deyrolle 1864, 1 sp., *L. otero* (Fisher 1935), described from Cuba, has been collected in the Florida Keys (notes, Nelson *et al.* 1981).
Leiopleurella Fisher 1922
Enbrachys Fisher 1935

Brachyina Cobos 1979

Brachys Dejean 1833, 12 spp., eastern United States, Arizona, Colorado, New Mexico and Texas; species are leaf miners in various hardwoods, especially *Quercus* spp. (key to spp., Nicolay and Weiss 1923).

Taphrocerus Solier 1833, 13 spp., eastern United States to Texas, Arizona, California, and Washington; the larvae mine in *Scirpus* spp. and other Cyperaceae (key to spp., Obenberger 1934).

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