The Click Beetle Subfamilies Agrypninae, Pyrophorinae, and Melanotinae (Coleoptera: Elateridae) in Missouri[1]—Part I

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ABSTRACT

This is the first of two papers on Missouri Elateridae. A key to all genera of these beetles occurring in this state is presented. The subfamilies Agrypninae, Pyrophorinae, and Melanotinae are considered in detail, and keys to species of only those three subfamilies are included herein. Fifty-one species, including two subspecies, are represented. The subfamilies Agrypninae and Pyrophorinae are included in Part I, the Melanotinae in Part II to follow.

Certain larvae of the family Elateridae, the wireworms, have long been known as important crop pests. However, in many instances, good keys to the identification of the adults (click beetles) are not inclusive, or indeed do not exist, and the literature is confused with many names which are no longer considered valid. In other words where elaterids have been worked out in some detail, there are either regionalized keys which do not apply to the Missouri fauna, or ones which are so broad in scope that the investigator is likely to become confused as to precisely what organisms are confronting him. Therefore, the three most common subfamilies of elaterids in Missouri, Agrypninae, Pyrophorinae, and Melanotinae, were studied in detail. The Argypninae and Pyrophorinae are treated herein; Part II will deal with the Melanotinae.

After a thorough study of all organisms involved, keys were constructed to genera and species. In those instances where previously written keys could be modified or adapted, they were included. If no satisfactory key existed, one was constructed for the group. Keys which are adapted from other authors' works are: key to subfamilies and genera (Arnett, 1962); *Lacon* (Arnett, 1952); *Conoderus* (Van Dyke, 1932); *Alaus* (Hatch, 1930); and *Melanotus* (Quate and Thompson, 1967).

Detailed descriptions of species have been held to a minimum, however, in a family as difficult as the Elateridae it is deemed essential

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to go into considerable detail for some species so that determinations from key characters may be more confidently verified.

Key to Subfamilies, Tribes, and Genera of Missouri Elateridae (adapted from Arnett, 1962)

1. With one or more setae on claw near base, and/or body profusely covered with scales (Fig. 4) 8
Without setae on claw near base (Figs. 1–3, 5, 6); vestiture hair-like, not composed of scales 2

2(1). Scutellum cordate (Fig. 7), pronotum usually orbicular ..... Cardiophorinae 15
Scutellum not cordate; pronotum not obviously orbicular 3

3(2). Mesepisternum reaching mesocoxa and at least touching mesotrochantin (Fig. 8) 7
Mesepisternum not touching mesocoxae (Figs. 9, 10) 4

4(3). Mesepimeron small, not touching mesocoxa (Fig. 10) ..... Negastriinae 16
Mesepimeron touching mesocoxa (Fig. 9) 5

5(4). Frons not carinate above and between antennae or, if carinate, carina not complete between eyes (Fig. 18) ..... Melanactinae, *Melanactes*
Frons carinate above and between antennae, carina complete between eyes (Figs. 16, 17) 6

6(5). Prosternal sutures double (Fig. 9); claws pectinate (Fig. 5) ..... Melanotinae, *Melanotus*
Prosternal sutures single (Figs. 8, 10); claws simple (Figs. 1, 2) ..... Hypolithinae, *Hypolithus*

7(3). Tarsal claws simple, enlarged at base, or with a single tooth (Figs. 1–3) ..... Elaterinae 17
Tarsal claws serrate, with several teeth (Fig. 6) ..... Adrastinae, *Glyphonyx*

8(1). Antennae received in deep prosternal grooves (Figs. 11, 12) ..... Agrypninae 9
Antennae not received in grooves; prosternal sutures may be excavated anteriorly ..... Pyrophorinae 11

9(8). Prosternal sutures grooved for reception of antennae for entire or nearly entire length; vestiture lying flat on body (Fig. 11) 10
Prosternal sutures grooved for reception of antennae for half or slightly more than half their length; vestiture partially erect (Fig. 12) ..... *Agrypnus*

10(9). Pronotum with a median furrow posteriorly; antennae moniliform; vestiture scales overlapping, covering entire surface and forming a colored pattern; claw without setae at base ..... *Danosoma*

Pronotum without a median furrow, or furrow extends anteriorly; antennae serrate; vestiture scales not overlapping, not covering entire surface; claw with setae at base ..... *Lacon*

11(8). Meso- and metathorax connate between metacoxae, suture not evident; large black species with iridescent scales ..... Chalcolepidiini, *Chalcolepidius*

Meso- and metathorax separate between mesocoxae, suture distinct 12

12(11). Pronotum without eyespots; body not covered dorsally by patches of white scale-like hair 13

Pronotum with two velvety eyespots; body covered dorsally by patches of white scale-like hair ..... Hemirhipini, *Alaus*

13(12). Antennae 12-segmented; flabellate in both sexes (Fig. 15) ..... Hemirhipini, *Hemirhipus*

Antennae 11-segmented; filiform or serrate in both sexes ..... Conoderini 14

14(13). Fourth tarsal segment distinctly lobed beneath (Fig. 20) ..... *Conoderus*

Fourth tarsal segment broadened and cordate beneath, but without distinct lobes ..... *Aeolus*

15(2). Lateral margin of pronotum rounded, without submarginal line (Fig. 13) ..... *Horistonotus*

Lateral margin of pronotum with submarginal line posteriorly (Fig. 14) ..... *Cardiophorus*

16(4). Tarsal claws simple ..... *Negastrius*

Tarsal claws with basal tooth (Fig. 3) ..... *Oedostethus*

17(7). Frons carinate above antennae, carina complete and usually widely separate from labrum (Fig. 16); third tarsal segment with membranous lobe beneath, but fourth never lobed (Figs. 19, 21); prosternal sutures double (Fig. 9) 18

Frons carinate or not, but if carina is widely separate from labrum and third tarsal segment is lobed, fourth is also lobed (Fig. 22), and prosternal sutures are single (Fig. 8) 20

18(17). Tarsal segments 1–3 or 2–3 with membranous lobes beneath (Fig. 22); third antennal segment broadly triangular and as large and wide as following flagellar segments, or antenna pectinate ..... Dicrepidiini 19

Only tarsal segment 3 with membranous lobe beneath (Fig. 19); third antennal segment larger than second, but never as long and wide as the following flagellar segments; antennae serrate ..... Physorhinini, *Anchastus*

19(18). Anterior margin of frons with two oblique carinae connect-

ing horizontal carina and anterior margin of frons (Fig. 23) ..... *Dicrepidius*
Anterior margin of frons without oblique carina ..... *Dipropus*
20(17). Frons carinate above antennae, carina complete between eyes (Figs. 16, 17) 21
Frons, if carinate, not complete between eyes (Fig. 18) 29
21(20). Carina of frons arcuate, bending forward between antennae and meeting labrum (Fig. 17); prosternal sutures usually double (Fig. 9); if single, antennal segments 2 and 3 both smaller than 4 ..... Ampedini 27
Carina of frons nearly straight across and well separated from labrum (Fig. 16); prosternal sutures usually single (Fig. 8); if double, antennal segments 2 and 3 smaller than 4 ..... Denticollini 22
22(21). Prosternal sutures double (Fig. 9); antennal segments 2 and 3 smaller than 4 23
Prosternal sutures single (Fig. 8); antennal segment 2 smaller than 3 25
23(22). Carina of frons thickened; metatarsal segments 1 and 2 subequal ..... *Elathous*
Carina of frons not thickened 24
24(23). First hind tarsal segment subequal to segments 2 and 3 ..... *Leptoschema*
First hind tarsal segment subequal to segment 2 ..... *Limonius*
25(22). Carina of frons weak; tarsal segments 1–4 each with a membranous lobe beneath (Fig. 22) ..... *Hemicrepidius*
Carina of frons well developed; first tarsal segment without a membranous lobe beneath 26
26(25). Tarsal segments 2–4 each with a membranous lobe beneath; mesocoxae separate ..... *Athous*
Tarsal segments without membranous lobes beneath; mesocoxae connate ..... *Denticollis*
27(21). Prosternal sutures single (Fig. 8); antennal segments 2 and 3 each smaller than segment 4 ..... *Megapenthes*
Prosternal sutures double (Fig. 9) 28
28(27). Antennal segment 2 smaller than 3 ..... *Ampedus*
Antennal segment 2 subequal to 3 ..... *Agriotella*
29(20). Carina above antenna indistinct, not definitely projecting forward toward labrum; antennal scrobe not within completely margined pit; body widest nearest apical third (Fig. 26, 27) ..... Ctenicerini, *Ctenicera*
Carina above antenna definite, projecting toward labrum; antennal scrobe surrounded by margined pit; body usually widest near middle 30
30(29). Prosternal sutures double (Fig. 9); second antennal segment definitely more than one-half length of third ..... Agriotini 31

Prosternal sutures single (Fig. 8); second antennal segment one-half or less length of third ..... Elaterini 33
31(30). Claws with a definite tooth (Fig. 3) ..... *Oxygonus*
Claws simple (Figs. 1, 2) 32
32(31). Pronotal lateral margin separate from prosternal suture anteriorly (Fig. 24) ..... *Dalopius*
Pronotal lateral margin joining prosternal suture anteriorly (Fig. 25) ..... *Agriotes*
33(30). Prosternal sutures excavate in front, anteriorly joining lateral margin of pronotum ..... *Sericus*
Prosternal sutures not excavate in front 34
34(33). Sides of mesosternal cavity parallel and nearly horizontal (Fig. 28) ..... *Parallelostethus*
Sides of mesosternal cavity divergent and sloping 35
35(34). Sides of mesosternal cavity protruding and suddenly declivous anteriorly (Fig. 30) ..... *Orthostethus*
Sides of mesosternal cavity divergent and gradually declivous anteriorly (Fig. 29) 36
36(35). Metacoxal plates slightly to moderately toothed on inner third; sides of mesosternal cavity gently rounded; stout, black species ..... *Elater*
Metacoxal plates rounded on inner third; sides of mesosternal cavity elevated to form sharp ridge; elongate to moderately broad, reddish-brown species .. *Neotrichophorus*

SUBFAMILY AGRYPNINAE

Genus *Lacon* Laporte
(Figs. 11, 31)

Lacon Laporte, 1836, Silberman Revue Entomol. 4:11.

Type species: *Elater punctatus* Herbst, 1779, Beschaft. d. Berlin Gesellschaft naturf. 4:316.

Color usually uniformly dark reddish-brown to black, one species bi-colored orange and black; vestiture scale-like, often forming colored patterns. Head with frons coarsely punctate, punctures hexagonal and approximate, usually with transverse median impression; frontal margin carinate above antenna, incomplete across middle; nasale obsolescent or obliterated. Antennae 11-segmented, segment 1 elongate, cylindrical; 2 spherical; 3-11 triangular, about as wide as long.

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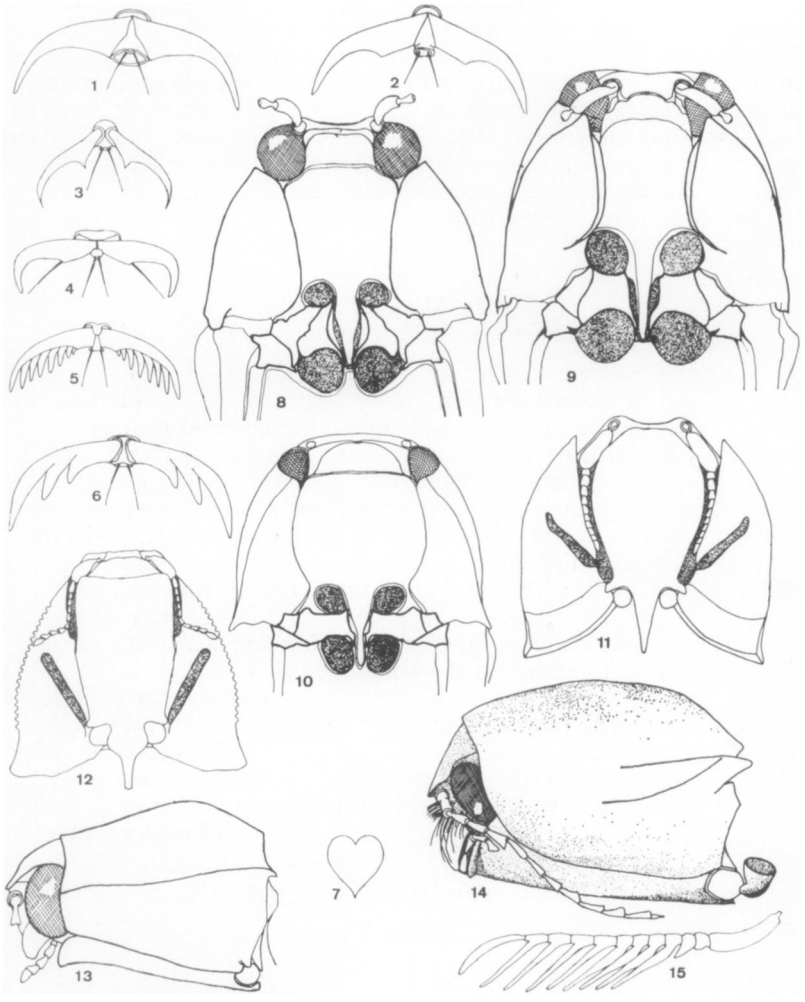
FIGS. 1–15. 1. Tarsal claw of *Parallelostethus attenuatus*. 2. Tarsal claw of *Ampedus linteus*. 3. Tarsal claw of *Oedostethus femoralis*, showing basal tooth. 4. Tarsal claw of *Conoderus lividus*. 5. Tarsal claw of *Melanotus sagittarius*. 6. Tarsal claw of *Glyphonyx testaceus*. 7. Dorsal view of scutellum of *Cardiophorus*



convexulus. 8. Pro- and mesosternum of *Hemicrepidius memnonius*, showing mesepisternum and mesepimeron touching mesocoxa, and single prosternal suture. 9. Pro- and mesosternum of *Melanotus similis*, showing mesepisternum not touching mesocoxa, and double prosternal suture. 10. Pro- and mesosternum of *Oedostethus femoralis*, showing mesepisternum and mesepimeron not touching mesocoxa. 11. Prosternum of *Lacon sparsus*, showing antennal grooves extending full length of prosternal sutures, and tarsal grooves. 12. Prosternum of *Meristhus cristatus*, showing antennal grooves extending half length of prosternal sutures. 13. Lateral view of prothorax of *Horistonotus simplex*, showing no submarginal line posteriorly. 14. Lateral view of prothorax of *Cardiophorus latiusculus*, showing submarginal line posteriorly. 15. Antenna of *Hemirhipus fascicularis*.

Pronotal punctures deep, circular, separated by slightly more than own diameter; hind angles not or only indistinctly carinate. Elytra each with 9 striae, formed by rows of punctures, alternately large and small in diameter. Prosternal groove to receive antenna present, extending almost full length of prosternal suture; mesocoxae separated; metasternum truncate anteriorly. Tibiae without apical spurs; tarsal claws setose; tarsi simple, without lobes. Punctures on venter similar to those on dorsum, vestiture scales elongate and narrow.

Fourteen species are recorded for North America of which five occur in Missouri.

Key to Missouri Species
(Adapted from Arnett, 1952, Wasmann J. Biol. 10:104)

1. Tarsal grooves on pronotal hypomera (Figs. 11, 12) 2
   No tarsal grooves (Fig. 10) ..... *avitus* (Say)
2(1). Broad specimens; pronotum with a pronounced median furrow, without tubercles or foveae; tarsal grooves usually deep and distinctly limited 3
   Narrow specimens; pronotum without a pronounced median furrow; tarsal grooves short, shallow, punctate, and not distinctly limited 4
3(2). Scales black, with a few white scales intermixed ..... *sparsus* (Candèze)
   Scales black and yellow or white forming a marmorate or marbled pattern on the body (Fig. 31) ..... *marmoratus* (Fabricius)
4(2). Elytron with punctures in rows; surface sparsely scaly; color brown ..... *impressicollis* (Say)
   Elytron with confused punctation; surface profusely scaly; color black with either side of pronotum golden ..... *discoideus* (Weber)

Lacon impressicollis (Say)

Elater impressicollis Say, 1825, Ann. Lyceum Nat. History New York 1:260.
Adelocera impressicollis, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:490.
Lepidotus impressicollis, Arnett, 1952, Wasmann J. Biol. 10:108.
Elater lepturus Say, 1839, Trans. Amer. Philos. Soc., n.s. 6:182.
Adelocera senilis Germar, 1840, Zeitschr. Entomol. 2:259.
Elater fuscus Melsheimer, 1806, Catalog of the Insects (Beetles) of Pennsylvania, Agassiz, 44. (nomen nudum).

Body color dark reddish-brown, covered with white scale-like vestiture evenly distributed over body, scales long and narrow.

Head: frons coarsely punctate, punctures approximate; median

groove present posteriorly; transverse anterior depression present; margin not complete, straight across middle, sharply projected downward; nasale obliterated. Mandible rounded on lateral face, covered with coarse punctures. Antenna received in groove on prosternum, failing to reach end of groove by about 3 segments, segment 2 small, cylindrical; 3 and following triangular, slightly longer than wide.

Pronotum flattened, coarsely punctate, longer than wide; punctures deep, circular, separated by less than their own diameter; median groove and two lateral identations present posteriorly; hind angles divergent, not carinate; sides concave before hind angles.

Elytra with rows of punctures alternating between coarse and fine, coarse about same size as those on pronotum, smaller ones half or less diameter of large ones. Venter: prosternum with well delineated antennal, tarsal, and femoral grooves, tarsal groove punctate; venter covered with punctures similar to those on dorsum.

Body length: 9–12 mm.

Specimens of this species are readily recognized by the punctate tarsal grooves, small size, and slender body form. They have been picked up in logs from March through May, and light-trapped in forest situations from June through August.

Missouri: Columbia; Jackson Co.; Louisiana; Moberly; New Hartford. March, April, May, June, July, August.

Lacon discoideus (Weber)

Elater discoidea Weber, 1801, Observationes Entomol., Kiliae, 77.
Adelocera discoidea, Hamilton, 1895, Trans. Amer. Entomol. Soc. 22:332.
Lepidotus discoidea, Arnett, 1952, Wasmann J. Biol. 10:109.
Lacon discoidea, Fattig, 1951, Emory Univ. Mus. Bull. 10:4.
Elater pennata Fabricius, 1801, Systema Eleutheratorum, Kiliae, 239.

Body color black, sides of pronotum and head orange or golden; legs and venter black, tarsi yellowish; scale-like vestiture evenly distributed over body, color corresponding to body color; scales long and narrow.

Head: frons coarsely punctate, punctures approximate; transverse depression present anteriorly, longitudinal median depression posteriorly; margin not complete across, straight in middle, projected sharply downward and obliterating nasale. Mandible with lateral face shallowly concave, covered with coarse punctures. Antenna received in groove, reaching end of groove, segment 2 small, cylindrical; 3 and following triangular slightly longer than wide.

Pronotum flattened, longer than wide; punctures deep, separated by about half their own diameter; indistinct median groove present posteriorly, foveae anteriorly and posteriorly; hind angles not divergent, not carinate; sides straight from small anterior curve to hind angles.

Elytra with punctures confused, not in definite rows. Venter: antennal, tarsal, and femoral grooves on prosternum, tarsal grooves punctate and not distinctly limited; punctures on venter smaller and scales narrower than on dorsum.

Body length: 8–9 mm.

Specimens of this species are easily recognized by the black color and golden sides of the pronotum. They have been taken in logs in cold weather, from September through March, and swept from vegetation in May and June.

Missouri: Boone Co.; Cole Co.; Kansas City; Kirksville; Louisiana; New Hartford; St. Louis. February, March, May, June, September, November, December.

Lacon sparsus (Candèze)
(Fig. 11)

Adelocera sparsa Candèze, 1865, Mem. Cour. Acad. Roy. Sci. Belgique 17:6.
Lepidotus sparsa, Arnett, 1952, Wasmann J. Biol. 10:112.

Body color black, covered with scale-like vestiture evenly distributed over body, largely black with sprinkling of yellowish or white scales; scales parallel-sided to lanceolate, not covering entire surface.

Head: frons coarsely punctate, punctures approximate; indistinct transverse depression present anteriorly, margin not complete, straight across middle; nasale obliterated. Mandibles slightly rounded laterally. Antenna received in groove, failing to reach end of groove by 3 to 4 segments; segment 2 small, cylindrical; 3 and following triangular, about as wide as long.

Pronotum convex, wider than long, moderately punctate; punctures deep and separated by about their own diameter; indistinct median groove along most of length; no foveae present; hind angles not divergent or carinate, sides concave before hind angles.

Elytra with punctures confused, not in definite rows, about same size as those on pronotum, scales largely covering surface. Venter: well delineated antennal, tarsal, and femoral grooves on prosternum, tarsal grooves with well defined edge and not punctate. Venter covered with punctures slightly smaller than those on dorsum, scales narrower.

Body length: 15–18 mm.

Specimens of *L. sparsus* are robust, with a salt-and-pepper coloration. They have been taken under bark in March.

Missouri: Boone Co.; Cole Co. March.

Lacon marmoratus (Fabricius)
(Fig. 31)

Elater marmorata Fabricius, 1801, Systema Eleutheratorum, Kiliae, 227.

Adelocera marmorata, Hamilton, 1895, Trans. Amer. Entomol. Soc. 22:332.

Body color dark brown, covered with black and yellowish-white scales forming variegated patterns across pronotum and elytra; scales lanceolate shaped.

Head: frons coarsely punctate, punctures nearly approximate; transverse depression present anteriorly; margin not complete across, straight in middle, projected sharply downward; nasale obliterated. Mandibles rounded on lateral face, covered with moderately sized punctures. Antenna received in groove, failing to reach end of groove by 1 segment; segment 2 small, cylindrical; 3 and following triangular, about as wide as long.

Pronotum convex, wider than long, coarsely punctate; punctures separated by less than their own diameter; longitudinal median groove evident for entire length; without foveae; hind angles not divergent, without carinae; sides concave before hind angles.

Elytra with punctures confused, not in definite rows, some coarse, many fine, generally separated by about half their own diameter. Venter; prosternum with antennal and tarsal grooves, tarsal grooves sharply delimited, not punctate; punctures of venter smaller, sparser and scales narrower than on dorsum.

Body length: 15–18 mm.

This species is recognized by the wavy patterns of colored scales on the body. It has been taken in logs in December and March, and swept from vegetation or light-trapped from June to August.

Missouri: Benton Co.; Boone Co.; Clay Co.; Jackson Co.; Kansas City; Pulaski Co. March, June, July, August, December.

Lacon avitus (Say)

Elater avitus Say, 1839, Trans. Amer. Philos. Soc., n.s. 6:182.
Adelocera avita, Hamilton, 1895, Trans. Amer. Entomol. Soc. 22:332.
Lepidotus avitus, Arnett, 1952, Wasmann J. Biol. 10:113.
Lacon avitus, Fattig, 1951, Emory Univ. Mus. Bull. 10:4.

Body color black, covered with black and white scales; white scales sparse on elytra and congregated to form two well-defined lateral spots on pronotum.

Head: frons coarsely punctate, punctures approximate; shallow longitudinal groove present about midway; margin nearly obliterated, straight across middle, projected sharply downward; nasale obliterated. Mandibles with lateral face slightly concave, covered with coarse punctures. Antenna received in groove, failing to reach end of groove by 1 to 2 segments; segment 2 small, cylindrical; 3 and following triangular, slightly longer than maximum width.

Pronotum convex, about as wide as long; coarsely punctate;

punctures approximate, no median groove; no foveae; hind angles divergent, with indistinct carina; sides concave before hind angles.

Elytra with punctures confused, not in definite rows, approximate, many hexagonal, smaller and shallower than those on pronotum. Venter: prosternum with antennal grooves, no tarsal grooves present; punctures on venter smaller, much more so on abdomen, and sparser; scales narrower than on dorsum.

Body length: 12–15 mm.

Fresh specimens of *L. avitus* are recognizable by the "eyespots" laterally on the prothorax. Rubbed specimens and those preserved in alcohol may have this character obscured. In these specimens, they are distinguished by the fact that the pronotum is dark red, obviously lighter than the black on the rest of the body. They have been taken in May and June by sweeping maple-sycamore forest vegetation and light-trapping in those same areas.

Missouri: Boone Co.; Jackson Co.; Randolph Co. May, June.

Genus *Danosoma* Thomson

Danosoma Thomson, 1859, Skand. Coleop. I:103.

Type-species: *Elater conspersus* Gyllenhal, 1808, Insecta Svecica 1:377 (by monotypy).

Color brown; vestiture scale-like, overlapping to cover entire surface, forming colored patterns. Head with frons coarsely punctate, punctures hexagonal and separated by about half their own diameter, usually with transverse median depression anteriorly; frontal margin straight, incomplete across middle; nasale obliterated. Antenna 11-segmented, segment 1 elongate, 2 spherical, 3–11 triangular, wider than long.

Pronotal punctures moderately deep, separated by half to entirely their own diameter; hind angles not carinate. Elytra each with 9 striae, formed by rows of punctures. Prosternal groove to receive antenna present, extending almost full length of prosternal suture; mesocoxae separated; metasternum truncate anteriorly. Tibiae without apical spurs; tarsal claws not setose; tarsi simple, without lobes. Punctures on venter similar to those on dorsum, vestiture scales overlapping.

Only one of two North American species occurs in Missouri.

Hayek (1973) separates *Danosoma* from *Lacon* by the absence of setae at the base of the tarsal claws. Since *D. obtectus* differs from the rest of the scaly pyrophorines found in the U. S., most notably by the overlapping scales, we have followed Hayek's classification.

Danosoma obtectus (Say)

Elater obtecta Say, 1839, Trans. Amer. Philos. Soc., n.s. 6:181.
Adelocera obtecta, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:490.

Lepidotus obtecta, Arnett, 1952, Wasmann J. Biol. 10:116.
Lacon obtecta, Fattig, 1951, Emory Univ. Mus. Bull. 10:4.
Lacon obtectus, Arnett, 1953, Coleop. Bull. 7:7.
Danosoma obtectus, Hayek, 1973, Bull. British Mus. (Nat. Hist.)., suppl. 20:89.

Body color brown, covered with brown and white scale-like vestiture covering almost entire surface and forming colored pattern; scales broadly rounded in shape.

Head: frons coarsely punctate, punctures separated by about half their own diameter; transverse depressions present anteriorly; margin incomplete, straight across middle, sharply projected downward; nasale obliterated. Mandible slightly concave on lateral face, covered with coarse punctures. Antenna received in groove, reaching end of groove; segment 2 small, cylindrical; 3 and following triangular, prominently produced laterally, wider than long.

Pronotum convex, wider than long, moderately punctate; punctures separated by half to entirely their own diameter; pronounced median furrow present posteriorly; hind angles sharply divergent, not carinate; sides concave before hind angle.

Elytra with punctures confused, not in definite rows, generally a little smaller than those on pronotum, separated by their own diameters; scales covering most of surface. Venter: prosternum with antennal groove, no tarsal groove present. Punctures of venter smaller and sparser than on dorsum; scales covering most of surface.

Body length: 17–22 mm.

Specimens of *D. obtecta* may be recognized by the scales which overlap to cover the entire surface and form a colored pattern.

Missouri: one specimen labeled "K.C., Mo.," no other data.

SUBFAMILY AGRYPNINAE

Genus *Agrypnus* Eschscholtz

Agrypnus Eschscholtz, 1829, Entomol. Archiv. II, 1:32.

Type species: *Elater murinus* Linnaeus (designated by Westwood, 1840, Classification of Insects 2, Synopsis. 26.)

Color uniformly dark brown or black, vestiture scale-like and partially erect, not forming colored pattern. Head with frons moderately punctate, punctures hexagonal to circular and separated by about their own diameter; frontal margin nearly obliterated; nasale obsolescent. Antennae 11-segmented; segment 1 elongate, cylindrical; 2 and 3 spherical to slightly cylindrical; 4–11 triangular, broadly produced laterally, wider than long. Palpi dark brown.

Pronotal punctures present, varying from subquadrate, contiguous, to circular and separated by more than their own diameter, deeply indented; hind angles very slightly produced posteriorly or not at all,

not carinate; pronotal margin denticulate. Elytra each with 9 striae, formed by rows of subrhomboidal punctures, varying from nearly contiguous to separated by more than their own diameter laterally. Prothoracic groove to receive antenna present, extending about halfway from head to procoxa; mesocoxae separated; metasternum truncate anteriorly. Tibiae with apical spurs. Tarsi simple, without lobes; tarsal claws setose. Punctures on venter similar to those on dorsum.

Only one species occurs in Missouri.

Hayek (1973) states that the 2 species in the U.S. for which Arnett (1952) erected the genus *Colaulon* are congeneric with *Agrypnus*. She cites several characters which intergrade between the two, and we have followed her classification. The description of *Agrypnus* given here is valid only for U.S. species, however.

Agrypnus rectangularis (Say)

Elater rectangularis Say, 1825, Ann. Lyceum Nat. Hist. New York 1:263.
Adelocera rectangularis, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:491.
Lacon rectangularis, Leconte, 1859, Complete Writings of Thomas Say, Phila., 397.
Colaulon rectangularis, Arnett, 1952, Wasmann J. Biol. 10:118.
Adelocera curtus Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:491.
Agrypnus rectangularis, Hayek, 1973, Bull. British Mus. (Nat. Hist.), suppl. 20:204.

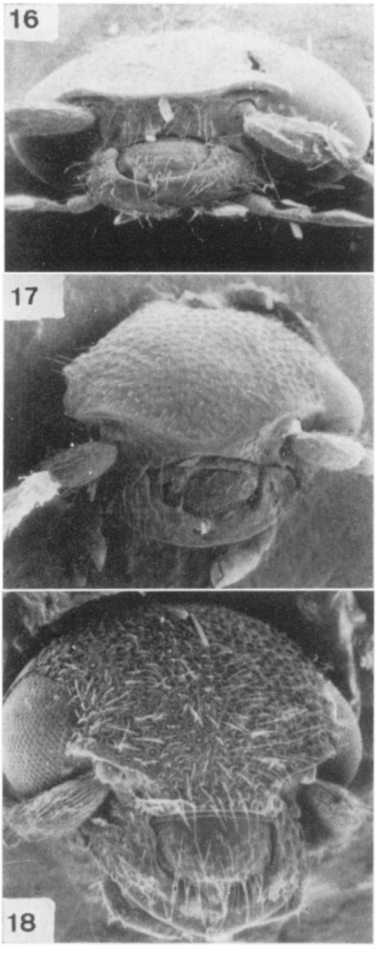
Body color dark brown, covered with narrow, scale-like, erect vestiture evenly distributed over body.

Head: frons moderately punctate, punctures separated by about their own diameters; margin nearly obliterated, straight across middle, projected sharply downward; nasale obliterated. Mandibles convex on lateral face, covered with a few coarse punctures. Antenna received in groove, exceeding end of groove by 2 to 3 segments; segments 2 and 3 small, cylindrical; 4 and following triangular, broadly produced, wider than long.

Pronotum convex, wider than long, coarsely punctate, punctures nearly contiguous; notched in middle and produced at margins anteriorly to partially surround head; margins dentate; hind angles not divergent, not produced posteriorly; sides parallel from midway back to hind angles.

Elytra with rows of subrhomboid punctures, nearly contiguous longitudinally and laterally; scales borne on interspaces. Venter: prosternum with antennal and tarsal grooves indistinctly limited and punctate; punctation of venter slightly smaller than on dorsum.

Body length: 8–12 mm.



FIGS. 16–18. 16. Head of *Athous brightwelli*, showing frontal margin complete across middle and widely separate from labrum. 17. Head of *Ampedus linteus*, showing frontal margin complete across middle and sharply projected downward to touch labrum. 18. Head of *Sericus silaceus*, showing frontal margin not complete across middle.

Members of this species are distinguishable by the straight hind margin of the pronotum and the antennal grooves which extend only half the length of the prosternal suture.

Missouri: Independence. November.

SUBFAMILY PYROPHORINAE

Genus *Alaus* Eschscholtz
(Figs. 32, 33)

Alaus Eschscholtz, 1829, Entomol. Archiv. II, 1:33.
Calais Laporte, 1836, Silberman Revue Entomol. 4:9.

Type species: *Elater oculatus* Linnaeus, 1758, Systema Naturae, ed. 10, 404.

Color usually dark reddish to black, variously covered with black and white scale-like vestiture forming patterns, especially two conspicuous eyespots on pronontum. Head with frons moderately to coarsely punctate, punctures circular and separated by less than their own diameter; frontal margin obliterated; nasale shallow. Antennae 11-segmented, segment 1 elongate, cylindrical; 2 spherical; 3 short, triangular; 4–10 subrhomboidal, 11 elongate, more slender, subdivided near tip to form a pseudosegment. Palpi black.

Pronotal punctures fine, separated by twice their own diameters; hind angles indistinctly carinate. Elytra each with 9 striae, formed by shallow impunctate grooves. No prothoracic groove for receiving antenna; mesocoxae separated; metasternum truncate anteriorly. Tibiae with apical spurs; tarsal claws setose, sulcate; tarsi simple, without lobes. Punctures on venter similar to those on dorsum.

Eight species occur in North America, two in Missouri.

Key to Missouri Species
(Adapted from Hatch, 1930, Publ. Univ. Oklahoma Biol. Surv. 2:223)

Eyespots circular in shape, separated by about their own diameters (Fig. 32), elytra mostly black, covered with small circular patches of white, scale-like hairs ..... *oculatus* (Linnaeus)

Eyespots narrow, oval in shape, separated by more than their own diameters (Fig. 33), elytra dark reddish-brown with large irregular interconnected patches of white scale-like hairs ..... *myops* (Fabricius)

Alaus myops (Fabricius)
(Fig. 33)

Elater myops Fabricius, 1791, Entomologia Systematica, Hafniae, I, 222.
Alaus myops, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:496.

Body color black, on elytra variegated black and dark red; black and white scale-like vestiture distributed to form definite patterns.

Head: frons moderately punctate; punctures separated by slightly less than their own diameters; triangular depression present anteriorly; margin obliterated, depressed in middle to form shallow nasale, nasale

3 times as wide as high. Mandibles with circular pit on lateral face. Antenna failing to reach tip of hind angle by 0.5 to 2 segments; segment 2 small, cylindrical; 3 intermediate, triangular; 4 and following subrhomboidal, 1.5 times as long as maximum width; 11 more slender, annulate at tip to form a pseudosegment.

Pronotum flattened, longer than wide, finely punctate; punctures separated by twice their own diameters; hind angles slightly divergent, with indistinct carina; sides straight from midway to hind angles.

Elytra with striae formed by shallow grooves, punctures evenly distributed over surface, fine, and separated by about their own diameters, more sparse near sutures. Venter with punctures about the same as on dorsum.

Body length: 35–45 mm.

Specimens of *Alaus myops* have very narrow eyespots, separated by twice their own diameter, which readily distinguish them from the following species. Larvae are associated with pine logs and stumps (fide T. J. Spilman, *in lit.*).

Missouri: Boone Co.; Montgomery Co. June, July.

Alaus oculatus (L.)—eyed click beetle
(Fig. 32)

Elater oculatus Linnaeus, 1758, Systema Naturae, ed. 10, Hafniae, 404.
Alaus oculatus, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:496.
Elater luscus Fabricius, 1775, Systema Entomologiae, Flensburg and Lipsiae, 284.

Body color black, covered with black and white scale-like vestiture distributed to form definite patterns including two large eyespots on pronotum, scales long and slender.

Head: frons moderately punctate; punctures separated by about their own diameters; triangular depression present anteriorly; margin obliterated, projected sharply downward; nasale obliterated. Mandibles with lateral face bearing a large circular pit. Antenna fails to reach tip of hind angle by 3 to 5 segments, segment 2 small, cylindrical; 3 intermediate, triangular; 4 and following subrhomboid, about 1.5 times as long as maximum width.

Pronotum flattened, longer than wide, finely punctate, punctures separated by about their own diameters, becoming larger and contiguous on margins; hind angles not divergent, with an indistinct carina; sides straight from midway to in front of hind angles.

Elytra each with striae formed by shallow grooves, whole elytral surface covered with fine punctures about the size of those on pronotum. Venter: punctures finer and sparser than on dorsum.

Body length: 30–45 mm.

Specimens of *A. oculatus* are distinguished by their circular pronotal eyespots (their most conspicuous features) which are separated

by about their own width. Larvae of *oculatus* are found in rotten stumps and logs of hardwoods, and can be reared in the laboratory. They are predaceous and feed on larvae of Cerambycidae. Woodruff (1971) reported 1 *oculatus* larva ate more than 200 cerambycids.

Pupae and adults have been taken in the same habitats, statewide and every month if larvae are included. Adults were observed to fly about during late June and early July.

Woodruff (1971) suggested that the coloration of *oculatus* adults is cryptic. This might account for the widespread but erratic collection records.

Genus *Hemirhipus* Berthold
(Fig. 15)

Hemirhipus Berthold, 1829, Latreille's Natürliche Familien des Thierreichs 336.

Type species: *Elater lineatus* Olivier, 1790, Entomologie, Paris, 10.

Color variegated yellow, brown, and black, patterned on elytra. Head densely punctuate, punctures separated by less than their own diameters; frontal margin carinate, complete across middle; nasale shallow. Antennae 12-segmented, segment 2 spherical; 3 small, triangular, 4–11 each produced laterally into a large fleshy lobe, 12 a long fleshy lobe; both sexes with antennae pectinate.

Pronotal punctures small and separated by their own diameter; median protuberance present along hind margin; hind angles indistinctly carinate. Elytra each with 10 striae. No prothoracic grooves for receiving antennae; mesocoxae separated; metasternum grooved longitudinally. Tibiae with apical spurs, tarsal claws with seta present; tarsi simple, without lobes. Punctures on venter of body similar to those on dorsum.

Only one species is known to occur in North America and Missouri.

Hemirhipus fascicularis (Fabricius)
(Fig. 15)

Elater fascicularis Fabricius, 1787, Mantissa Insectorum, Hafniae, 171.
Hemirhipus fascicularis, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:485.
Elater venosus Laporte, 1836, Silberman Revue Entomol. 4:234.

Body color of head, prothorax, venter, and legs brown; elytra variegated yellow, brown, and black; moderately long whitish vestiture distributed evenly over body.

Head: frons moderately to densely punctate; punctures separated by slightly less than their own diameter; margin dark brown, straight across middle, complete, somewhat projected downward; nasale shallow, twice as wide as high. Mandibles projected forward so as not to

have lateral surface, covered with punctures. Antennae extending only about 0.3 to 0.4 length of pronotum, segment 2 small, cylindrical; 3 small, slightly produced; 4 and following produced into long, fleshy lobes; pectinate in both sexes.

Pronotum flattened, densely punctate; punctures small, separated by about their own diameters; median protuberance present posteriorly; hind angles not divergent, projected strongly posteriorly, with indistinct carina; sides straight and slightly divergent from small anterior curvature to hind angles.

Elytra each with striae of circular punctures, separated by their own diameter or slightly less; interspaces 3 times as wide as puncture width. Venter with punctures smaller than those on dorsum; metasternum with longitudinal furrow; vestiture similar to dorsum.

Body length: 17–25 mm.

The pectinate, 12-segmented antennae, and variegated elytra readily distinguish members of this species. It has been recorded throughout Missouri, most frequently in light traps in June and July.

Genus *Chalcolepidius* Eschscholtz

Chalcolepidius Eschscholtz, 1829, Entomol. Archiv. 2:32.
Type species: *Chalcolepidius zonatus* Eschscholtz, 1829.

Color usually black, covered with iridescent scale-like vestiture. Head with frons finely, densely punctate, punctures circular and separated by about their own diameters; frontal margin obliterated, not carinate; nasale obsolescent or obliterated. Antennae 11-segmented, segment 2 extremely short, cylindrical; 3 short, laterally produced; 4–10 produced into long, fleshy lobes in male, triangular in female; 11 subdivided to form a pseudosegment.

Pronotum finely and densely punctate, a fovea present laterally about midway; hind angles not carinate. Elytra each with 9 striae formed by rows of punctures. No prothoracic grooves for receiving antennae; meso- and metathorax connate, with no apparent suture; mesocoxae separated; metasternum truncate anteriorly. Tibiae with apical spurs; tarsal claws setose; tarsi simple, without lobes. Punctures on venter of body same as on dorsum.

Only one species of the 13 in North America is known to occur in Missouri:

Chalcolepidius viridipilis (Say)

Elater viridipilis Say, 1825, Ann. Lyceum Nat. Hist. New York 1:257.
Chalcolepidius viridipilis, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:495.
Chalcolepidius prasinus Erichson, 1841, Germar Zeitschr. 3:85.

Body color black, covered with iridescent green scale-like vestiture sparsely distributed over body.

Head: frons finely, densely punctate, punctures separated by about their own diameters; margin obliterated, protuberant above antennae, depressed in center; nasale obliterated. Mandibles with vertical oblong furrow on lateral face, covered by punctures. Antennae fail to reach tip of hind angle of pronotum by 1 to 2 segments; segment 2 extremely short, cylindrical; 3 short, laterally produced; 4 and following produced, triangular in female, lobed in male, 11 annulate to form a pseudosegment.

Pronotum finely, densely punctate, punctures separated by about their own diameters, becoming contiguous on sides; lateral fovea about halfway back; hind angles not divergent, not carinate; sides straight from small anterior curvature to hind angles.

Elytra each with striae formed by indistinct punctures, separated by about their own diameters; interspaces about 4 times puncture width, finely punctate. Venter with punctures about same as dorsum, occasionally becoming teardrop shaped.

Body length: 22–30 mm.

Missouri: Dent Co.; Ranken; St. Louis Co. August.

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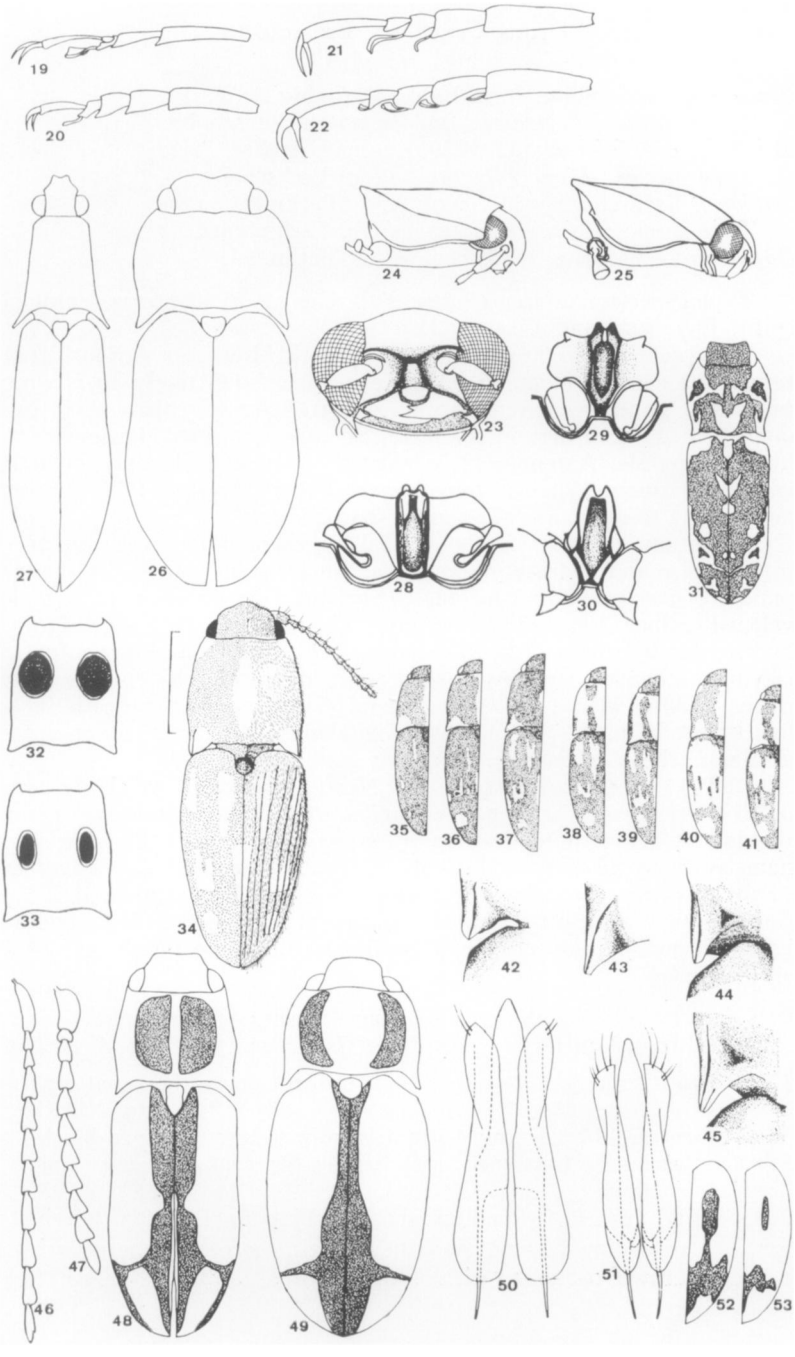
FIGS. 19–53. 19. Metatarsus of *Anchastus binus*, showing third segment with fleshy lobe beneath. 20. Metatarsus of *Conoderus lividus*, showing fourth segment with fleshy lobe beneath. 21. Metatarsus of *Dicrepidius corvinus*, showing second and third segments with fleshy lobes beneath. 22. Metatarsus of *Hemicrepidius memnonius*, showing first through fourth segments with fleshy lobes beneath. 23. Head of *Dicrepidius palmatus*, showing oblique carinae connecting to frontal margin. 24. Prothorax of *Dalopius spretus*, showing pronotal lateral margin separate from prosternal suture anteriorly. 25. Prothorax of *Agriotes oblongicollis*, showing pronotal lateral margin joining prosternal suture anteriorly. 26. Body outline of *Ctenicera inflata*. 27. Body outline of *Ctenicera bivittata*. 28. Mesosternal cavity of *Parallelostethus attenuatus*. 29. Mesosternal cavity of *Neotrichophorus carolinensis*. 30. Mesosternal cavity of *Orthostethus infuscatus*. 31. Color pattern of *Lacon marmoratus*. 32. Pronotal outline of *Alaus oculatus*, showing circular eyespots. 33. Pronotal outline of *Alaus myops*, showing oval eyespots. 34. Dorsal view of *Conoderus bellus* (scale line = 1.0 mm). 35–41. Color patterns of *Conoderus bellus*. 42. Hind angle of *Conoderus bellus*. 43. Hind angle of *Conoderus aversus*, showing carina abruptly divergent anteriorly, and pronotal lateral margin straight. 44. Hind angle of *Conoderus auritus*, showing carina subparallel to pronotal lateral margin, and lateral margin sinuate. 45. Hind angle of *Conoderus vespertinus*, showing bicarinate condition. 46. Antenna of *Conoderus vespertinus*, showing second and third segments subequal. 47. Antenna of *Conoderus auritus*, showing segment three longer than two. 48. Body outline of *Conoderus vespertinus*, showing color pattern and elytra dehiscent posteriorly. 49. Body outline of *Conoderus auritus*, showing color pattern and elytra in contact posteriorly. 50. Male genitalia of *Aeolus amabilis*. 51. Male genitalia of *Aeolus mellillus*. 52. Elytron of *Aeolus mellillus comis*, showing color pattern. 53. Elytron of *Aeolus mellillus mellillus*, showing color pattern.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Genus *Conoderus* Eschscholtz
(Figs. 4, 34–49)

Conoderus Eschscholtz, 1829, Entomol. Archiv. 2:31.
Types species: *Conoderus fuscofasciatus* Eschscholtz.
Monocrepidius Eschscholtz, 1829, Entomol. Archiv. 2:32.
Type species: *Monocrepidius pallipes* Eschscholtz.
Oophorus Eschscholtz, 1833, Zool. Atlas, Berlin, 93.
Type species: *Monocrepidius pallipes* Eschscholtz.
Oophorus Eschscholtz, 1833, Zool. Atlas, Berlin, 93.

Types species: *Elater elegans* Fabricius, 1775, Systema Entomologiae, Flensburg and Lipsiae, 230.

Body color unicolorous light tan to dark brown, or variously patterned orange-brown and black. Head with frons finely to coarsely punctate; punctures circular and separated by less than their own diameters. Frontal margin complete, carinate, projected downward obliterating nasale. Antennae 11-segmented; segment 1 elongate, cylindrical; 2 spherical; 3 slightly longer than 2; 4 longer than following segments, 4-11 triangular. Palpi lighter than body.

Pronotum with or without shallow median groove, punctures present, size and distribution variable, but frequently with two distinct puncture sizes present; hind angles variously developed, with well developed carinae, frequently bicarinate. Elytra each with 9 striae formed by circular to subquadrate punctures. No prothoracic groove for receiving antennae; mesocoxae separated; metasternum truncate anteriorly. Tibiae with apical spurs, tarsal claws setose, tarsi with fleshy lobe on short fourth segment, extending along fifth. Punctures on venter similar to those on dorsum, smaller in size.

Only 14 species are recorded for North America of which six occur in Missouri. From the economic standpoint, this is an important genus, the larvae being quite destructive to roots of crops. Three species, namely *C. amplicollis* (Gyllenhal), *C. falli* Lane, and *C. vespertinus* (Fabricius) are recognized as major pests and have approved E.S.A. common names: Gulf wireworm, southern potato wireworm, and tobacco wireworm, respectively. The life histories are poorly or not at all known.

Key to Missouri Species
(Adapted from Van Dyke, 1932, Proc. Calif. Acad. Sci., ser. 4, 20:294)

1. Size 12 mm long or more; light brown color without patterns ..... *lividus* (DeGeer)
   Size rarely exceeding 9.5 mm; medium-dark brown to black, variously patterned with yellow or orange, rarely unicolorous 2
2(1). Hind angles of pronotum short and broad (Fig. 42), barely extending beyond pronotal margin; size 3–4 mm; dark brown, patterned with orange ..... *bellus* (Say)

Hind angles narrow and well defined (Figs. 43–45), extending well beyond pronotal margin; size 5–9.5 mm 3

3(2). Carina of hind angle abruptly divergent anteriorly from lateral margin of pronotum (Fig. 43); pronotal punctation distinctly of more than one size, especially on sides; sides of pronotum straight in front of hind angles ..... *aversus* (Leconte)

Carina parallel with lateral margin or only gradually divergent anteriorly (Figs. 44, 45); pronotal punctures usually all subequal in size; sides of pronotum sinuate in front of hind angles 4

4(3). Second and third antennal segments subequal (Fig. 46), clearly shorter than fifth; pronotal punctation fine and dense; elytra dehiscent posteriorly (Fig. 48); body dorsoventrally compressed, long and thin in outline; size 7–9.5 mm ..... *vespertinus* (Fabricius)

Third antennal segment clearly longer than second, nearly as long as fifth (Fig. 47); punctation coarse; elytra in contact posteriorly (Fig. 49); broadly convex, stout beetles, size 5–6.5 mm 5

5(4). Pronotum with two lateral dark spots, rarely unicolorous black; elytral striae consist of a series of deep punctures; fourth antennal segment very little longer than following; carina of hind angle convergent with pronotal lateral margin anteriorly; body dark underneath ..... *auritus* (Herbst)

Pronotum with one median dark spot; elytral striae consist of deeply impressed grooves; fourth antennal segment clearly longer than following; carina of hind angle parallel with margin of pronotum or slightly divergent anteriorly; body light underneath ..... *suturalis* (Leconte)

Conoderus lividus (DeGeer)
(Fig. 4)

Elater lividus DeGeer, 1774, Mém. l'histoire des Insectes, Stockholm, 162.

Monocrepidius lividus, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:482.

Conoderus lividus, Van Dyke, 1932, Proc. Calif. Acad. Sci., ser. 4, 20 (9):294.

Elater castaneus Olivier, 1790, Colèoptères, Paris, 30.

Elater castanipes Herbst, 1806, Käfer, Pauli, X, 23.

Elater elongatus Beauvois, 1805, Insectes . . . Amérique, Paris, 78.

Monocrepidius elongatus, Chevrolat, 1852, Bull. Soc. Nat. Moscou 1852:629.

Elater lobatus Say, 1823, J. Acad. Nat. Sci. Phila. 3:175.

Monocrepidius lobatus, Germar, 1840, Zeitschr. Entomol. 2:228.

Body color light tan to medium brown; covered with fine white vestiture evenly distributed over body.

Head: frons finely punctate, punctures round, separated by their own diameter or slightly less; margin dark brown and nearly straight across, projected downward and nearly touching labrum; nasale 4 to 5 times as wide as high. Mandible with lateral face slightly concave, covered with teardrop-shaped punctures. Antennae failing to reach tip of hind angle by 0.5 to 1 segment; segment 2 small; 4 and following triangular, about twice as long as maximum width.

Pronotum flattened, with a shallow median depression; slightly longer than wide; punctures usually fine at center, with occasional larger puncture interspersed, separated by less than their own diameter, approximate at sides; hind angles divergent, with 2 carinae, lateral carina parallel with pronotal margin, median one much shorter; sides markedly concave before hind angle.

Elytra each with rows of punctures forming striae, separated by their own diameters; interstrial area 2 times as wide as puncture diameter. Venter concolorous with dorsum. Lobe of fourth tarsal segment large, extending half length of fifth.

Body length: 12–15 mm.

Specimens of *Conoderus lividus* are characterized by the plain brown color and the pronotum with very fine punctation, giving it a velvety appearance. They have been taken commonly at lights and in cornfields throughout the warmer months, in all major corn-growing regions of the state.

Conoderus aversus (Leconte)
(Fig. 43)

Monocrepidus aversus Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:482.

Conoderus aversus, Van Dyke, 1932, Proc. Calif. Acad. Sci., ser. 4, 20(9):294.

Monocrepidius scutellaris Dejean, 1837, Cat. Coléop. coll. Dejean, Paris, III, 98.

Monocrepidius puellus Dejean, 1837, Cat. Coléop. coll. Dejean, Paris, III, 98.

Body color dark chocolate brown, hind angles lighter; light color often extended between hind angles and forward as a thin stripe medially along pronotum; scutellum lighter; fine yellowish vestiture evenly distributed over body.

Head: frons moderately finely punctate; punctures separated by about their own diameters, interspaces appearing extremely minutely punctate or granulose; margin dark brown, nearly straight across; nasale 3 to 4 times as wide as high. Mandible with lateral edge smooth, a few sparse hairs present. Antennae failing to reach tip of

hind angle by 0.5 to 1.5 segments; segment 2 small, 3 intermediate; 4 longer than 5; flagellar segments elongate, slender, about twice as long as maximum width.

Pronotum slightly flattened, about as long as wide; punctures at center small, separated by slightly more than their own diameter, larger punctures interspersed; interspaces granulose; hind angles not divergent, single carina divergent from pronotal margin anteriorly; sides concave before hind angle.

Elytra each with strial punctures usually separated by less than their own diameter; interstrial area 3 to 3.5 times as wide as puncture diameter. Venter lighter than dorsum; fourth tarsal lobe extending more than half length of fifth.

Body length: 6.0–7.5 mm.

Missouri: Boone Co.; Lincoln Co. June, July.

Conoderus auritus (Herbst)
(Figs. 44, 47, 49)

Elater auritus Herbst, 1806, Käfer, Pauli, X, 145.
Monocrepidius auritus, Germar, 1844, Zeitschr. Entomol. 5:148.
Conoderus auritus, Van Dyke, 1932, Proc. Calif. Acad. Sci., ser. 4, 20:295.
Oophorus crassicollis Melsheimer, 1844, Zeitschr. Entomol. 5:214.
Elater dilectus Say, 1825, Ann. Lyceum Nat. Hist. New York 1:262.
Monocrepidius caseyi Leng, 1918, J. New York Entomol. Soc. 26:206.

Head and venter dark brown to black, legs light; pronotum and elytra varying from unicolorous black to medium brown marked with black maculations; vestiture evenly distributed over body, both white and black hairs present.

Head: frons moderately to finely punctate in center, punctures separated by about their own diameter, becoming coarse and approximate on margins; margin dark brown, nearly straight across, slightly indented in center; nasale 2.5 times as wide as high. Mandible shallowly concave on lateral face, covered with oval punctures. Antennae exceeding tip of hind angle by 0.5 to 1 segment; segment 2 small; 4 longer than following, flagellar segments triangular, about 1.5 times as long as maximum width.

Pronotum convex, rounded in lateral view, as wide to slightly wider than long; punctures at center fine, separated by more than their own diameter, becoming larger and closer on sides; punctures on hind angles extremely fine; hind angles parallel, not divergent, with a single carina parallel with lateral edge, not extending beyond base of hind angle; sides concave before hind angle.

Elytra each with striae formed by rows of punctures, separated by less than their own diameter; interspaces twice as wide as puncture widths. Venter dark; lobe of fourth tarsal segment extending about 0.3 length of fifth.

Body length: 6.0–7.5 mm.

Specimens of this species vary from medium brown, marked with black, to completely melanic.

Missouri: Butler Co.; Columbia; Easley; Independence; Jasper Co.; New Hartford; North Central; Ranken; Sedalia; St. Louis. January, March, April, May, August, September, October, November.

Conoderus suturalis (Leconte)

Monocrepidius suturalis Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:482.

Conoderus suturalis, Van Dyke, 1932, Proc. Calif. Acad. Sci., ser. 4, 20(9):294.

Body color dark reddish-orange, legs lighter; head, narrow median line on thorax, sutures of elytra, occasionally broadened to include 1.5 to 2 interstrial areas, shoulder of elytron, and scutellum dark brown; body covered with very short, fine, white vestiture evenly distributed over body.

Head: frons moderately to coarsely punctate; punctures separated by about their own diameters; margin gently rounded; nasale about 2½ to 3 times as wide as high. Mandible flat on lateral face, with sharply elevated ridge along ventral edge, sparsely covered with round punctures. Antennae exceeding tip of hind angle by 0 to 1 segment; segment 2 small; 3 intermediate; 4 longer than 5; flagellar segments triangular, about 1.5 times as long as maximum width.

Pronotum coarsely punctate, punctures separated by slightly less than their own diameter, extremely fine punctures on interspaces; hind angles divergent, carinate, carinae parallel to pronotal edge; sides concave before hind angle.

Elytral striae with punctures separated by much less than their own diameters; interstrial areas twice as wide as puncture width; suture stripes broadened posteriorly, in some specimens covering 5 interstrial areas. Venter of pronotum and abdomen light; meso- and metasterna dark; lobe of fourth tarsal segment about half length of fifth.

Body length: 6.5–7.5 mm.

Missouri: Columbia; St. Louis. January, April.

Conoderus vespertinus (Fabricius)—tobacco wireworm (Figs. 45, 46, 48)

Elater vespertinus Fabricius, 1801, Systema Eleutheratorum, Kiliae, 240.

Monocrepidius vespertinus, Dejean, 1837, Cat. Coléop. coll. Dejean, Paris, 98.

Conoderus vespertinus, Van Dyke, 1932, Proc. Calif. Acad. Sci., ser. 4, 20(9):294.

Elater finitimus Say, 1839, Trans. Amer. Philos. Soc., n.s. 6:179.
Monocrepidius serotinus Germar, 1840, Zeitschr. Entomol. 2:227.
Monocrepidius texanus Candèze, 1859, Monogr. Élat. II, Liége, 262.
Monocrepidius peninsularis Candèze, 1889, Ann. Soc. Entomol. Belgique 33:26.

Body color dark reddish-orange, pronotum with two lateral patches and elytra with suture and outer margin black; black areas expanded to dominate body color in some specimens; body covered with short, white vestiture evenly distributed over body.

Head: frons coarsely punctate; punctures separated by much less than their own diameter, approximate on sides; margin dark brown, nearly straight across, projected downward; nasale 4 times as wide as high. Mandible gently rounded on lateral face, bottom edge sharply projected covered with numerous round punctures. Antennae exceeding tip of hind angle by 0.5 to 2 segments; segment 2 small; 3 intermediate; 4 longer than 5; 5 and following triangular, twice as long as maximum width.

Pronotum flattened, about as long as maximum width, finely to moderately punctate; punctures separated by less than their own diameter, becoming extremely fine toward hind angles; hind angles slightly or not divergent, with 2 carinae, lateral carina parallel with pronotal margin, median one much shorter; tip of hind angle often indented between carinae; sides concave before hind angle.

Elytral punctures oval and nearly contiguous; interstrial areas 2 to 3 times puncture width; suture stripe broadened behind, attaining outer edge; black areas expanded in some specimens to form pattern with only isolated spots of red-orange on elytra. Fourth tarsal lobe not quite half length of fifth segment.

Body length: 7.5–9.5 mm.

C. *vespertinus* is common throughout Missouri and has been taken in large numbers in light traps.

Conoderus bellus (Say)
(Figs. 34–42)

Elater bellus Say, 1823, J. Acad. Nat. Sci. Phila. 3:168.
Monocrepidius bellus, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:484.
Conoderus bellus, Van Dyke, 1932, Proc. Calif. Acad. Sci., ser. 4, 20(9):294.
Monocrepidius variegatus Steinheil, 1875, Coleoptera, Hefte 14:123.

Body color variously patterned in orange and chocolate brown; white vestiture evenly distributed over body.

Head: frons finely punctate; most punctures separated by nearly twice their own diameter; interspaces rugose; margin black, straight

across, sharply projected downward; nasale nearly obliterated, 4 to 5 times as wide as high. Mandible with lateral face flat, covered with minute punctures. Antennae failing to reach tip of hind angle by none to 1 segment; segments 2 and 3 small, cylindrical; 4 and following triangular, slightly longer than maximum width.

Pronotum highly convex; wider than long; coarsely punctate; punctures separated by about their own diameter, larger than those on head; interspaces rugose; hind angles parallel, not protuberant, short and broad, not projecting caudad; carina parallel with pronotal margin; sides straight before hind angle.

Elytral striae with punctures often contiguous; interspaces slightly wider than puncture width. Venter generally dark, legs and antennae light; fourth tarsal lobe extending less than half length of fifth tarsal segment; metatrochanter lobed.

Body length: 3.0–4.5 mm.

Specimens of this species have been taken in large numbers, sometimes by the hundreds, both in light traps and cornfield sweeps from May to July. The coloration is extremely variable as shown in Figures 35–41.

Genus *Aeolus* Eschscholtz
(Figs. 50–53)

Aeolus Eschscholtz, 1829, Entomol. Archiv. II:33; Arnett 1962, Beetles of the United States: 504 (*Drasterius* not North American, *fide* Arnett, 1962).

Type species: *Elater scriptus* Fabricius, 1801, Systema Eleutheratorum, Kiliae, 244.

Body color yellowish-orange and black, with median black spots on pronotum and elytra, covered with white vestiture evenly distributed over body. Head with frons coarsely punctate, punctures separated by less than their own diameter; frontal margin complete, projected downward to conceal nasale. Antenna 11-segmented; segment 1 elongate, cylindrical; 2 spherical; 3 short, cylindrical; 4–11 triangular, longer than wide.

Pronotal punctures large, separated by less than their own diameters; hind angles well developed and carinate. Elytra each with 9 striae, formed by rows of circular punctures separated by about their own diameter, extremely variable in some specimens. No prothoracic grooves for receiving antennae; mesocoxae separated; metasternum truncate anteriorly. Tibiae with apical spurs; tarsal claws toothed, setose; tarsi with fourth segment cordate beneath, not lobed. Punctures on venter similar to those on dorsum.

Of the 14 species recorded for North America, only two occur in Missouri although one is represented by two subspecies.

Key to Missouri Species

1. Length 3.5–4.5 mm; genitalia as in Fig. 50 ... *amabilis* (Leconte)
   Length 5.0–7.5 mm; genitalia as in Fig. 51 ... *mellillus* (Say) 2
2(1). Two distinct and separate black spots on each elytron, not connected (Fig. 53) ... ssp. *mellillus* (Say)
   Black spots on each elytron connected by a thin bar to form one large irregular patch (Fig. 52) ... ssp. *comis* (Leconte)

Aeolus amabilis (Leconte)
(Fig. 50)

Monocrepidius amabilis Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:485.
Drasterius amabilis, Blatchley, 1910, Coleoptera of Indiana, Indianapolis, 736; Schenkling, 1925, Coleopterorum Catalogus, vol. 11, pars 80, p. 136.
Aeolus amabilis, Thomas, 1941, J. New York Entomol. Soc. 49:238.
Drasterius elegans Fabricius, 1792, Entomologia systematica, Hafniae, I, 230. (preoccupied)

Body color red-orange, legs and antennae yellowish; head, median spot on pronotum, and anterior and posterior portions of elytra black; whitish vestiture evenly distributed over body.

Head: frons coarsely punctate; punctures separated by less than their own diameter; margin black, slightly rounded, projected downward; nasale 3 to 4 times as wide as high. Mandible with lateral face slightly rounded, covered with coarse, contiguous punctures. Antennae failing to reach tip of hind angle by 2 segments; segments 2 and 3 small; flagellar segments triangular, about 1.5 times as long as maximum width.

Pronotum convex, about as long as wide; coarsely punctate; punctures separated by less than their own diameter; hind angles slightly divergent, projecting strongly caudad; carina straight and well developed.

Elytra each with rows of circular punctures separated by less than their own diameter; interspaces equal to or less than puncture width. Venter dark.

Body length: 3.5–4.5 mm.

Missouri: Bethany; Butler Co.; Callaway Co.; Ranken; St. Louis Co. February, March, October, November.

Aeolus mellillus mellillus (Say)
(Figs. 51, 52)

Elater mellillus Say, 1839, Trans. Amer. Philos. Soc., n.s. 6:173.
Drasterius mellinus, Fattig, 1951, Emory Univ. Mus. Bull. 10:7. (missp.)

Aeolus mellillus mellillus, Brown, 1933, Can. Entomol. 65:133.
Elater dorsalis Say, 1823, J. Acad. Nat. Sci. Phila. 3:167 (*nec* Paykull, 1800, Fauna Suecica, Uppsala, 4).
Cryptohypnus dorsalis, Germar, 1844, Zeitschr. Entomol. 5:147.
Monocrepidius dorsalis, Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:485.
Drasterius dorsalis, Dietrich, 1945, Cornell Univ. Agri. Exp. Sta., Mem. 269:268.
Drasterius elegans Herbst, 1806, Käfer, Pauli, X, 132 (*nec* Fabricius, 1792, Entomologia systematica, Hafniae, I, 230).

Body color yellowish-orange, legs and antennae lighter; head, median spot of pronotum, scutellum, anterior and posterior regions of elytra black; covered with white vestiture evenly distributed over body.

Head: frons coarsely punctate, punctures separated by less than their own diameter; front margin black, nearly straight across, slightly indented at center, projected downward; nasale about 4 times as wide as high. Mandible with lateral face flat, covered with coarse, contiguous punctures. Antennae exceeding tip of hind angle by up to 1 segment; segments 2 and 3 small, subequal; flagellar segments triangular, 4 longer than 5; 5 and following about twice as long as maximum width.

Pronotum flattened, about as long as wide, coarsely punctate; punctures separated by about own diameter; hind angles divergent, with two carinae, lateral one parallel to pronotal margin, median one shorter, occasionally indistinct; sides concave before hind angle.

Elytra each with rows of circular punctures, nearly contiguous; interspaces usually less than one puncture diameter; anterior and posterior spots of elytra well separated, forming two distinct markings; venter variable, usually at least prosternum light colored.

Body length: 5.0–7.5 mm.

This and the following form are separated by the markings on the elytra, as shown in Figures 52 and 53.

Mayr (1969) claims that it may be purposeless to attempt to call a distinct form a subspecies in an area of overlap: "Where two subspecies meet, intermediate or hybrid populations may occur which combine the characters of both subspecies. It would be misleading in such a case to say that two subspecies overlap in this area, since the species is represented in this area only by a single population, no matter how variable."

Be that as it may, we feel it is useful to follow Brown's (1933) classification of *Aeolus mellillus* to separate the forms, since their separation into either ssp. *mellillus* or ssp. *comis* may be readily attained and often proves useful.

Missouri: Bates Co.; Callaway Co.; Cape Girardeau Co., Columbia; Henry Co.; Jasper Co.; Kansas City; Lawrence Co.; New Madrid

Co.; North Central; Pettis Co.; Randolph Co.; Ray Co.; St. Charles Co.; Ste. Genevieve Co.; St. Louis Co. January, June, July, November, December.

Aeolus mellillus comis (Leconte)
(Fig. 53)

Monocrepidius comis Leconte, 1853, Trans. Amer. Philos. Soc., n.s. 10:484.
Aeolus mellillus comis, Brown, 1933, Can. Entomol. 65:133.

Same as *mellillus*; elytra with anterior and posterior markings joined by narrow band of black to form one continuous black patch.

Body length: 5.0–7.5 mm.

Characters for distinguishing *comis* are given in the preceding discussion of *mellillus*.

Missouri: Adair Co.; Butler Co.; Lawrence Co.; Marion Co.; Nodaway Co.; Ray Co.; Saline Co.; Ste. Genevieve Co.; Spickard; Vernon Co. June, July, November, December.

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