

Family Buprestidae

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The Buprestidae or flatheaded or metallic wood borers are so named because of the flattened anterior portions of the body of the larvae and the frequent metallic sheen of the adults. The larvae bore in woody plant tissue or mine beneath the bark mostly of dying or dead trees, but the species of *Brachys* and *Taphrocerus* are leaf miners. The larvae of most species occur only in certain parts of the host, such as roots, stems, twigs, cones, etc. Lumber trees and cut logs are commonly infested and some species, especially of *Trachykele*, *Buprestis*, *Chrysobothris* and *Melanophila*, are of economic importance.

Key to Genera

- 1 Antennae free, not received in a groove
- 2 Tarsal claws simple or feebly lobed at base
- 3 Prosternal process extending between procoxae well beyond their hind margins and usually expanded behind these coxae
- 4 Profemur not toothed; front margin of prosternum truncate
- 5 Scutellum not visible; pronotum with 3 small deep pits along basal margin
 3. TRACHYKELE Mars.
- 5' Scutellum visible; pronotum without deep basal pits
- 6 Prosternal process distinctly widened behind procoxae; first segment of metatarsus with plantula occupying not more than approximately 1/2 the length of the segment
- 7 Metepimera triangular, not concealed at side; elytral sculpturing variable but not uniformly granulose; mentum entirely corneous
- 8 Outer segments of antennae with sensory pores concentrated on outer lateral half of each surface; elytral apices not prolonged or extending beyond apex of abdomen
- 9 Elytra slightly but uniformly roughened, occasionally substriate; pronotum not sulcate; front of head with a pair of supra-antennal ridges
 1. HIPPOMELAS Lap.
- 9' Elytra with longitudinally elevated smooth areas; pronotum bisulcate; front of head without supra-antennal ridges
 2. CHALCOPHORA Sol.

*Acknowledgment must be made and thanks given for the valuable assistance received from several persons. Dr. W.J. Chamberlin, formerly of Oregon State University, is responsible for the information presented under *Chalcophora*,

- 8' Outer segments of antennae with sensory pores apparently scattered over each surface; elytral apices usually prolonged, extending beyond apex of abdomen
- 10 Scutellum circular; pronotum longitudinally sulcate at middle
4. DICERCA Esch.
- 10' Scutellum broader than long; pronotum with a median longitudinal ridge or smooth line
5. POECILONOTA Esch.
- 7' Metepimera partly covered by anterior extension of abdomen at sides; elytra usually granulose
- 11 Mentum coriaceous in front; base of pronotum lobed at middle; distance between eyes greater across lower front than upper front; elytra frequently maculate
7. MELANOPHILA Esch.
- 11' Mentum entirely corneous; base of pronotum subtruncate; eyes with inner margins subparallel; elytra not maculate
8. ANTHAXIA Esch.
- 6' Prosternal process not distinctly widened behind procoxae; first segment of metatarsus with plantula extending nearly the entire length of the segment
6. BUPRESTIS L.
- 4' Profemur with a conspicuous median tooth; front margin of prosternum frequently lobed
9. CHRYSOBOTHRIS Esch.
- 3' Prosternal process extending between procoxae to about their hind margins, not expanded posteriorly
- 12 Elytra with strongly elevated smooth costae; tarsi with plantulae only on segment 4
10. POLYCESTA Sol.
- 12' Elytra not costate; tarsi with plantulae on segments 1 to 4
11. CHRYSOPHANA LeC.
- 2' Tarsal claws cleft at base
- 13 Scutellum not visible; elytra subtruncate at base; body usually flattened and subtrapezoidal
12. ACMAEODERA Esch.
- 13' Scutellum visible; elytra strongly bilobed at base; body cylindrical
13. AGRILUS Curtis
- 1' Antennae received in a groove on underside of prothorax
- 14 Body ovate; prosternal process with a deep groove in front of apex; elytra with conspicuous patches of brown and whitish and with a sublateral carina extending from humerus to apex
14. BRACHYS Sol.
- 14' Body elongate; prosternal process not grooved; elytra with faint white lines, not carinate
15. TAPHROCERUS Sol.

Subfamily Buprestinae

Tribe Buprestini

1. Hippomelas Lap.

- 1 Front of head convex; pronotum more or less uniformly punctured, without conspicuous smooth callosities; middle segments of antennae short, triangular; protrochanter not toothed (subg. NANULARIA Csy.). Pronotum coppery; elytra brown with sutural and lateral margins narrowly darkened; 7-12.5 mm.; s Id. (12 mi. nw Terreton in Jefferson Co., 10 mi. n Salmon

Trachykele, Polycesta and Chrysophana; Dr. G. H. Nelson reviewed the key to the species of Dicerca; Dr. M. H. Hatch provided a great deal of bibliographical material; and Prof. F. M. Beer, Oregon State University, and R. L. Westcott, Oregon Department of Agriculture, supplied a large number of specimens and important collection data.

in Lemhi Co., 2 mi. nw Oreana in Owyhee Co.)

BRUNNEATA Knull

Adults and larvae taken in Id. associated with *Eriogonum microthecum* and *Eriogonum* sp.

- 1' Front of head oblique, concave above clypeus; pronotum with large conspicuous callosities; middle segments of antennae elongate, feebly serrate; protrochanter with a small but distinct tooth at apex on inner margin (subg. GYASCUTUS LeC.). Pronotum and elytra brassy-green to blue green, occasionally bicolored; 16.5-26.5 mm.; sw Id. (Pl. VI, fig. 1)

FULGIDA Barr

Adults from the foliage of willow (*Salix*) and sweet clover (*Melilotus alba*) and Russian thistle (*Salsola Kali*) and in Japanese beetle traps. Larvae and dead adults in the roots of shadscale (*Atriplex confertifolia*). Barr 1969: 321 (3).

2. Chalcophora Sol.

Shining black with a bronze luster; upper surface roughly sculptured; elytra with costae irregularly expanded, smooth; pronotum bisulcate; epistoma narrowly and deeply emarginate; s B.C., Wn., Id., Or. (Pl. VI, fig. 2)
(sculptured pine borer) ANGULICOLLIS LeC.

Breeds in *Pinus ponderosa*, *P. contorta*, *Pseudotsuga menziesii*, *Abies grandis* and *A. concolor*. LeConte 1859b:190 (4); 1869:370 (1); 1878:472 (3). Walker 1866:310. Horn 1872:388 (3). Ulke 1875:819 (4). Holland 1888:91 (1). Hamilton 1889:138 (1); 1894a:391 (1). Fauvel 1889:144 (1). Evans 1906:98 (1). Harvey 1906b:3 (1). Fletcher and Gibson 1909:109 (1). Brittain 1913:16 (1). Anderson 1914:58 (1) (Chalcophaga). Bush 1914:60 (1). Chamberlin 1924:186 (4); 1926:128-129 (1234). Hardy 1927a:C32 (1); 1942:11 (1). Stace Smith 1929:71 (1). Beer and Hatch 1941:103 (123). Leech 1947a: 108 (1). Benoit, Ann. Soc. Ent. Quebec 8, 1963:108-111 (1). *oregonensis* Fitch, 4th Rep. Ins. N. Y., Tr. N. Y. St. Ag. Soc., 1858:702 (4). Casey 1909a:80 (23). Kerremans, Mon. Buprest. 4, 1909-1910:33-34 (24). *prominens* Csy. 1914c:355 (1). *antennalis* Csy. 1914c:360 (3). *pallida* Kerr., Ann. Soc. Ent. Belg. 59, 1919:48 (1).

3. Trachykele Mars.

- 1 Emerald green; upper surface somewhat coarsely punctate with a few slightly depressed and more or less smooth dark-colored spots; 11.3-17 mm.; w B.C., w Wn., w Or. (Pl. VI, fig. 3)

(western cedar borer) BLONDELI Mars.

Larvae bore in the wood of *Thuja plicata* in the Pacific Northwest. Several species of *Cupressus* and *Juniperus* as well as *Libocedrus decurrens* are hosts in California. Burke, Yearb. USDA 1909-1910:409-410 (24); Proc. Ent. Soc. Wash, 22, 1920:74 (24); USDATech. Bull. 48, 1928:1-15 (124). Gibson 1914:116 (1). Chamberlin 1924:187 (4); 1926:241-242; 1949:50-52. Hardy 1927a:C33 (1). Hopping, Can. Ent. 59, 1927:201-204 (1); 64, 1932: 189-191 (1); Can. Dept. Agr. Pamph. 94, 1928:1-17 (1). Craighead and Middleton, USDA Misc. Publ. 74, 1930:9 (2). Beer and Hatch 1941:107 (12). *opulenta* auct. (nec Fall) Fall 1906a:162-163, 165 (2). Casey 1909a:178 (1). Chamberlin 1917:130 (2); 1924:186 (4); 1926:243 (124); 1949:50 (24). Hardy 1927a:C33 (1). Keen 1938:150 (24); 1952:190 (24). Beer and Hatch 1941: 107 (12).

- 1' Violet bronze, upper surface more finely punctate, the dark areas longer, more velvety in appearance and tending to form transverse lines; 13-17 mm.; se B. C., w Wn., n Id., Or. NIMBOSA Fall

Hosts include *Abies grandis*, *A. concolor*, *A. magnifica* and *Tsuga mertensiana*. Fall 1906:164, 166 (1). Chamberlin 1917:131 (24); 1924:187 (4); 1926:242-243 (124); 1949:52 (4). Van Dyke, Pan-P. Ent. 2, 1926:126 (4). Stace Smith 1927:C40 (1). Keen 1938:150 (24); 1952:190 (1234). Beer and Hatch 1941:108 (12).

4. *Dicerca* Esch.

- 1 Elytra with apices deeply notched; pronotum more or less evenly convex; 12.5-18.8 mm.; w Or. LURIDA (F.)
This species was apparently introduced in the Corvallis, Oregon area many years ago and several collections were made between 1924 and 1930, The population at Corvallis may now be extinct because no recent collections are known. Chamberlain 1924:185 (4); 1926:187-189 (4); 1928:93; 1932:833 (4).

- 1' Elytra with apices shallowly emarginate, subtruncate, narrowly rounded, or acutely produced at suture; pronotum with a pair of longitudinal ridges at middle that form an elongate median depression
2 Elytra usually clothed with long fine hairs, especially near sides, the apices usually acutely produced at suture; pronotum at most with a shallow indistinct subbasal depression between lateral margins and longitudinal ridges; 12-22 mm.; se B. C., Wn., Id., Or. HORN Cr.

Recorded from a wide variety of hosts including: *Symphoricarpus racemosus*, *Ceanothus cuneatus*, *C. integerrimus*, *Rhamnus californica*, *Rhus diversiloba*, *R. glabra occidentalis*, *Alnus rhombifolia*, *A. tenuifolia*, *Cercocarpus parvifolius*, *C. ledifolius*, *Prunus domestica* and *P. avium*. Chamberlain 1924:185 (4); 1926:185 (234). Keen 1938:149 (234); 1952:190. Beer and Hatch 1941:104 (2). Van Dyke 1942:114 (234).

- 2' Elytra indistinctly clothed with short hairs, the apices shallowly emarginate, subtruncate, or narrowly rounded; pronotum usually with a broad irregular subbasal depression between lateral margin and longitudinal ridges
3 Elytra irregular, with numerous elongate and sharply defined callosities and intervening roughened or punctured areas, not distinctly costate, the apices usually not distinctly prolonged; upper body surface blackish with a purplish or brownish cast, occasionally cupreous
4 Last abdominal sternite broadly rounded (female) or truncate (male) at apex, its disc bearing a pair of smooth longitudinal ridges; prosternum with front margin emarginate at middle, broadly lobed near sides; elytra with apices somewhat prolonged, divaricate, usually coppery and of a different color from remainder of surface; 14.2-18 mm.; s B. C., Wn., Id., Or.

PECTOROSA LeC.

Hosts: *Prunus* spp. LeConte 1857:45 (4); 1859b:203 (4). Fletcher and Gibson 1908:126 (1). Casey 1909a:165 (4). Chamberlin 1917:130 (4) (*pecterosa*); 1920:244 (4); 1924:185 (4) (*pecterosa*); 1926:191 (34) (*pecterosa*); 1932:833 (2) (*pecterosa*). Criddle 1922:63 (1). Beer and Hatch 1941:106 (234). Johansen and Brannon 1955:3 (2).

- 4' Last abdominal sternite tridentate or narrowly rounded (female) or emarginate (male) at apex, disc convex; prosternum with front margin subtruncate or shallowly emarginate at middle, not lobed near sides; elytra with apices usually not prolonged, divaricate, or coppery; hosts: conifers

- 5 Head with a broad irregular depression in front, vertex convex, with a pair of elongate irregular callosities at middle; pronotum without a distinct broad depression behind front angles; elytra with callosities usually not strongly elevated, tending to merge into intervening areas which are irregularly punctured and transversely roughened, third interval from suture usually without a conspicuous strongly elevated callosity at base, suture behind scutellum coarsely and densely punctured, not conspicuously elevated; mesotibiae of male toothed near middle; last abdominal sternite of female tridentate at apex; 12-20 mm.; s B. C., Wn., Id., Or. (Pl. VI, fig. 4)

TENEBROSA Kby

Recorded from numerous coniferous hosts including *Abies*, *Pinus*, *Thuja* and *Picea* as well as *Pseudotsuga menziesii*. LeConte 1877:108. Brodie 1888:214 (1). Holland 1888:91 (1). Harvey 1906b:4 (1). Casey 1909a:155 (1). Chamberlin 1917:130 (4); 1924:185 (4); 1926:198 (1234). Stace Smith 1929:71 (1). Keen 1938:149 (4); 1952:190 (234). Beer and Hatch 1941:105 (2). Some references to this species may apply to *crassicollis* LeC. or *sexualis* Cr.

- 5' Head with a broad irregular depression in front and a distinct depression at front of vertex which are separated by a transverse more or less smooth irregular ridge; pronotum usually with a broad depression behind front angles; elytra with callosities strongly elevated, not merging into intervening areas which are densely uniformly punctured, third interval from suture with a conspicuous callosity always present at base, suture behind scutellum usually smooth, strongly elevated; male mesotibia not toothed
- 6 Elytra with the basal and the following callosity of the third interval connected by a narrow smooth ridge; last abdominal sternite of female narrowly rounded at apex; 16.3-17.5 mm.; s B. C., e Wn., Id., w Or.

SEXUALIS Cr.

Crotch 1873e:87 (4). LeConte 1878:472 (3). Fletcher 1906:101 (1). Harvey 1906b:4 (1). Gibson 1914:116 (1). Chamberlin 1917:130 (4) (*sexualis*); 1924:185 (4); 1926:195 (1234); 1949:50 (4). Hardy 1927a:C33 (1); 1942:11 (1). Keen 1938:149 (24); 1952:190 (24). Beer and Hatch 1941:105 (12). Some references to this species may apply to *crassicollis* LeC. or *tenebrosa* Kby.

- 6' Elytra with the basal and the following callosity of the third interval separated by a punctured area; last abdominal sternite of female tridentate; 13.8-17.8 mm.; s B. C., Wn., n Id., Or.

CRASSICOLLIS LeC.

LeConte 1857:45 (2); 1859b:202 (2); 1869:370 (1). Casey 1909a:155 (24). Keen 1938:149 (24); 1952:190. *crassicollis hesperica* Csy. 1909a:155 (2). Some references to this species may apply to *sexualis* Cr. or *tenebrosa* Kby.

- 3' Elytra not conspicuously irregularly sculptured, in part evenly costate, the apices usually distinctly prolonged; body above brassy or coppery, shining, occasionally darkened
- 7 Metasternum with the longitudinal carina between the antecoxal pieces distinctly grooved; body robust, shining, coppery; mesotibia of male with a well-developed subbasal tooth; 16.5-19.7 mm.; se B. C., e Wn., Id., e Or.

HESPEROBOREALIS Hatch et Beer

Hosts: *Alnus* spp. and *Betula* spp. Hatch and Beer, Pan.-Pac. Ent. 14, 1938:151 (2). Beer and Hatch 1941:104 (2).

- 7' Metasternum with the longitudinal carina between the antecoxal pieces not or, at most, finely grooved; hosts: *Populus* spp.
- 8 Mesotibia of male with a well-developed subbasal tooth; body elongate, brassy, darkened; pronotum width to median length approximately 1.62 to 1; seventh

antennal segment longer than broad; 13.3-23 mm.; se B. C., e Wn., Id., e Or. (Pl. VI, fig. 5)

TENEBRICA Kby.

Casey 1909a:149 (1). Beer and Hatch 1941:104 (2). *divaricata* Say. Brittain 1913:16 (1) (*divaricata*). Ruhman 1915:11 (1). Chamberlin 1932:833 (4). *prolongata* LeC. 1878:47a (3). Harvey 1906b:4 (1). Casey 1909a:149 (1). Brittain 1913:16 (1). Chamberlin 1924:185 (4); 1926:192 (134). Stace Smith 1929:71 (1). Keen 1938:149 (1234); 1952:190 (234). *prolongata longipennis* Csy. 1909a:150 (1). Several of the above references may apply to other species occurring in the area.

8' Mesotibia of male simple or with a slight dilation near base; body robust, coppery; host: *Populus tremuloides*

9 Pronotum width to median length approximately 1.6 to 1; seventh antennal segment as broad as long; 15-16 mm.; ne B. C.

CALLOSA Csy.

Benoit, Can. Dept. For. Bi-mon. Prog. Rep. 21, 1965:2 (1).

9' Pronotum width to median length approximately 1.75 to 1; seventh antennal segment longer than broad; 14.7-20.7 mm.; se B. C., Id., e Or.

FROSTI Nel.

Nelson, Col. Bull. 17, 1963:65 (134).

Two specimens of *D. caudata* LeC. labeled "Victoria, B. C." are in the Canadian National Collection at Ottawa. The authenticity of the labels is questioned and, until verified, this species is not considered a member of the Pacific Northwest fauna.

Nelson reports that *vancouveri* Csy. 1909a:148 is based on a probably mislabeled specimen of the eastern *divaricata* Say.

5. Poecilonota Esch.

1 Scutellar costae basally impunctate for a distance at least equal to scutellar width, never rugose; elytral apices deeply notched; pronotum frequently with irregular smooth elevated areas on both sides of the middle; 9-15 mm.; sw B. C., w Wn.

FRASERI Chamb.

Host: *Salix* sp. Chamberlin 1922:64 (1); 1926:228 (1). Hardy 1927a:C33 (1). Beer and Hatch 1941:106-107 (12). Evans 1957:32-34 (12).

1' Scutellar costae basally punctate and/or rugose; elytral apices notched or subtruncate; pronotum without conspicuous smooth elevated areas on either side of middle

2 Elytral apices prolonged, usually notched and usually divergent; pronotum with sides slightly arcuate, usually broadest behind middle; body width usually less than 39% of body length as measured from anterior pronotal margin to elytral apices; 9.8-17.9 mm.; se Id., ne B. C.

CYANIPES Say

Hosts: aspen and cottonwood (*Populus* spp.). Evans 1957:28-30 (13).

2' Elytral apices occasionally prolonged and divergent, but usually subtruncate or oblique; sides of pronotum strongly arcuate, usually broadest at or in front of middle; body width usually greater than 39% of length as measured from anterior pronotal margin to elytral apices

3 Lateral carina of prosternal process usually terminating at anterior angle of procoxal cavity; elytra with lateral margins subangulate; abdomen frequently conspicuously pubescent; 11.9-19.4 mm.; se B. C.

FERREA Melsh.

Hosts unknown. Evans 1957:34-35 (1).

- 3' Lateral carina of prosternal process usually extending in front of anterior angle of procoxal cavity and diverging slightly from it; elytra with lateral margins sinuate; abdomen not conspicuously pubescent
- 4 Upper surface usually dark bronze in color; elytra with apices prolonged and divergent; male with lateral margins of pronotum in lateral view usually slightly sinuate near base; lateral lobe of male genitalia broadly rounded before apex; female with terminal abdominal sternite shorter than equilateral; 9-18 mm.; sw Id., Or. CALIFORNICA Chamb.
Recorded from aspen and cottonwood (*Populus* spp.). The B. C. record in the literature must refer to another species. Evans 1957:26-28 (4). *cyanipes* var. *californica* Chamb. 1922:57-58 (34); 1924:186 (4); 1926:228 (34). Stace Smith 1929:71 (1). *cyanipes* auct. (nec Say). Chamberlin 1926:226-227 (13) (*caynipes*).
- 4' Upper surface usually blackish bronze in color; elytra with apices feebly prolonged but usually divergent; male with lateral margin of pronotum usually straight or evenly arcuate in lateral view; lateral lobe of male genitalia sinuate before apex; female with terminal abdominal sternite equal to or longer than base; 10.9-22.2 mm.; s B. C., e Wn., s Id., w Or. (Pl. VI, fig. 6) MONTANA Chamb.
Recorded from aspen and cottonwood (*Populus* spp.). Chamberlin 1924:186 (4); Pan-P. Ent. 1, 1925:187 (34); 1926:229 (34). Beer and Hatch 1941:106 (24). Stace Smith, Proc. Ent. Soc. B. C. 45, 1949:20 (1). Evans 1957:25-26 (1234).

6. Buprestis L.

- 1 Head and pronotum immaculate, often with reddish reflections; abdomen, when maculate, with yellow spots, the first sternite occasionally feebly sulcate at middle; epipleuron usually bearing a tiny tooth on margin about in line with the metacoxa; protibia of male simple or toothed
- 2 Elytra without yellow spots or markings; protibia of male simple
- 3 Each elytron with 5 widely spaced costae including the short sutural costa, the apex truncate, occasionally with a sutural tooth; 12.3-20.1 mm.; s B. C., Wn., Id., Or. (Pl. VI, fig. 7)
(golden buprestid) AURULENTA L.
Hosts include *Thuja plicata*, *Abies grandis*, *Pseudotsuga menziesii*, *Pinus ponderosa*, *P. jeffreyi*, *P. lambertiana*, *P. contorta* and *P. flexilis*.
Walker 1866:310. Holland 1888:91 (1). Prov. Mus. 1898:75 (1). Evans 1906:98 (1). Bush 1914:60 (1). Nicolay and Weise 1918:82-84 (1234). Chamberlin 1924:188 (4); 1926:104-106 (1234); 1947:3 (1234); 1949:53-55 (1234). Hardy 1927a:C33 (1); 1942:12 (1); 1948:33 (1). Stace Smith 1929:71 (1). Spencer 1930:7-10 (1); 1954:33 (1); Proc. Ent. Soc. B. C. 60, 1963:45 (1). Exline and Hatch 1934:450 (2). Knowlton and Thatcher 1936:277 (2). Beer and Hatch 1941:110-111 (12). Helfer 1941:140-142 (1234). Swezey, Bishop Mus. Bull. 172, 1942:53 (2). Linsley, Jr. Ec. Ent. 36, 1943:348-349 (14); Pan-P. Ent. 20, 1944:53 (2). Smith, Can. Ent. 94, 1962:586, 672 (1). *lauta* LeC. 1854:174; 1857:17, 43 (4); 1859b:210 (24); 1869:371 (1); 1878:472 (3). Harvey 1906b:4 (1). Casey 1909a:120 (14). Chamberlin 1917:133 (4). *radians* LeC. 1854:17 (2); 1857:17, 44 (2); 1859b:210 (4). Brodie 1888:214 (1). Casey 1909a:121 (4). *tacomae* Csy. 1909a:121 (2). *nupta* Csy. 1909a:122 (3). *affinis* Csy. 1909a:123 (4).
- 3' Each elytron with 6 to 10 closely placed costae, including the short sutural costa

- 4 Elytra uniformly brassy green to blue or purplish, 4 striae on each side of suture distinctly elevated and usually extending to apices; pronotum usually with a sublateral depression at about basal third; 13-21 mm.; w and s B. C., Wn., Id., Or.
LANGI Mann. (cf. 9)
Larvae are known to work in the wood of *Pseudotsuga menziesii*; adults are commonly found on the foliage of *Salix* spp.
LeConte 1857:17, 42 (2); 1859b:206 (24); 1869:370. Brodie 1888:214 (1). Wickham 1903a:51 (4). Hamilton 1894:29 (124). Harvey 1906b:4 (1). Bush 1914:60 (1). Hardy 1927:C23 (1); 1927a:C33 (1). Chamberlin 1928:94 (1); 1949:55 (14). Stace Smith 1929:71 (1). Spencer 1930:8-9 (1). Hopping 1933:86-87 (1). Keen 1938:149 (234). Furniss 1939:7 (2). Beer and Hatch 1941:111 (12). Helfer 1941:152-154 (1234). Beer 1949:81-82 (4). *fasciata* var. *langi* Mann. Wickham 1893:226 (1). Nicolay and Weiss 1918:103-104 (124). Knowlton and Thatcher 1936:277 (2). *striata* var. *langi* Mann. Wickham 1893:229 (1). *ornata* Walk. 1866:310, 324. LeConte 1870:401. Casey 1909a:112 (1). *lyrata* Csy. 1909a:103 (1). *callida* Csy. 1909a:110 (4). *crenata* Csy. 1909a:110 (4). *leviceps* Csy. 1909a:111 (2). *viridimicans* Csy. 1909a:112 (1). *incolumis* Csy. 1909a:112 (1). *oregona* Csy. 1909a:113 (4). *obliqua* Csy. 1909a:113 (1). *fasciata* auct. (nec. F.) Bush 1914:60 (1). Chamberlin 1924:189 (4); 1926:109-112 (1234). Hardy 1948:33 (1).
- 4' Elytra green to bluish to purple with the lateral and usually the sutural margins broadly coppery or reddish, 1 or more of the 4 striae on each side of suture not distinctly elevated or not extending to apices; pronotum usually without a sublateral depression
- 5 Pronotum trapezoidal, sides usually straight, disc not sulcate, frequently broadly cupreous at middle; elytra blue-green to purple, sides not cupreous, the sublateral striae weakly elevated, the apices truncate or subemarginate; 12-16 mm.; e Wn., sw Id., e Or.
CONNEXA Horn
Hosts are *Pinus ponderosa* and *P. jeffreyi*. Horn 1875:148 (4). Casey 1909a:111 (4). Nicolay and Weiss 1918:102 (34). Chamberlin 1924:189 (4); 1926:107-108 (34). Keen 1938:149 (34); 1952:189 (3). Beer and Hatch 1941:108-109 (23). Helfer 1941:150-151 (234)
- 5' Pronotum with sides usually arcuate, the disc usually feebly sulcate and narrowly cupreous at middle; elytra green to blue green, usually with the suture and sides cupreous, the sublateral striae distinctly elevated
- 6 Elytra approximately twice as long as broad, the base feebly bisinuate, the apices rounded or subtruncate; 16-21 mm.; se B. C., Wn., Id., e Or.
INTRICATA Csy.
Breeds in *Pinus contorta*. Helfer 1941:128, 146-149 (14). Keen 1952:189 (1). *contortae* Hopping 1933:84-85 (1). Beer and Hatch 1941:110 (124). *murrayanae* Hopping, Pan-P. Ent. 10, 1934:174 (1).
- 6' Elytra less than 1 3/4 as long as broad, the base strongly bisinuate, the apices truncate or emarginate; 12-15 mm.; s B. C., Wn., Id., Or.
(Pl. VI, fig. 8)
ADJECTA LeC.
Hosts: *Pinus ponderosa*, *P. jeffreyi*, *P. contorta* and *Picea engelmanni*. LeConte 1854:17 (2); 1857:17; 43 (2); 1859b:210 (4); 1869:371 (1). Saunders, Cat. Bupr. 1871:39 (4). Harvey 1906b:4 (1). Casey 1909a:118 (2). Gibson 1911:114 (1). Chamberlin 1917:133 (2); 1924:188 (4); 1926:103 (124); 1932: 334 (4). Nicolay and Weise 1918:84 (1234). Hardy 1927a:C33 (1). Stace Smith 1929:71 (1). Pratt and Hatch 1938:192 (2). Beer and Hatch 1941:109 (12). Helfer 1941:128, 149-150 (1234). Beer 1949:82 (4). Ross, Jr. Ent. Soc. B. C. 65, 1968:11 (1). *brevis* Csy. 1909a:118 (1). Brittain 1914:16

- (1). Stace Smith 1930:24 (1). Beer and Hatch 1941:109 (12).
 2' Elytra with yellow spots or markings; protibiae of male usually each with a recurved or erect tooth
 7 Elytra predominantly yellow to pale brown with a narrow to broad dark-green to purple sutural stripe that may be irregularly expanded behind middle, apical margins usually reddish; epipleura toothed on female, not toothed on male; legs greenish with brown tarsi; abdomen occasionally with a pair of yellow spots on last sternite; protibia of male with a subapical notch and a short subapical tooth; 11-22 mm.; Wn., Or. (Pl. VII, figs. 1 and 2)

VIRIDISUTURALIS Nic. et Weise

Larvae work in the wood of *Populus fremontii*, *P. trichocarpa*, *P. deltoides*, *P. hastata* and *Alnus rhombifolia*. Nicolay and Weiss 1918:100-101 (4). Garnett 1922:11 (4). Chamberlin 1924:189 (4); 1926:128 (24). Keen 1938:149 (4); 1952:189 (24). Beer and Hatch 1941:112 (24). Helfer 1941:177-179 (4).

- 7' Elytra greenish to purple with yellow spots; legs unicolorous
 8 Elytra with numerous small yellow spots that may be partially coalescent, apices rounded to acute; epipleura not toothed; ventral surface frequently with yellow spots or markings; each protibia of male with a subapical recurved tooth; 8-17 mm.; s B. C., Wn., Id., Or. (Pl. VI, fig. 9)

CONFLUENTA Say

Recorded from *Populus tremuloides* and *P. deltoides*. Brittain 1913:16 (1). Chamberlin 1924:189 (4); 1926:106-107 (134). Beer and Hatch 1941:112 (12). Helfer 1941:181-183 (124). Hardy, Proc. Ent. Soc. B. C. 43, 1947:46 (1); 1948:33 (1).

- 8' Elytra with not more than 3 pairs of yellow spots, apices bidentate; epipleura toothed; ventral surface immaculate
 9 Elytra with 1 to 3 pairs of pale yellow spots that do not attain lateral margins, subbasal spots not reaching to curving around humeral umbone, reddish markings absent; protibia of male not toothed; 13-21 mm.; w and s B. C., Wn., Id., Or.
 9' Elytra with 3 pairs of yellow spots, the anterior pair elongate and extending between humeral umbone and epipleuron, the posterior 2 pairs transverse, frequently attaining lateral margins where they are usually reddish; protibia of male with a subapical recurved tooth; 14-20 mm.; w Wn., w Or.

GIBBSI LeC.

Hosts: *Quercus californica* and *Q. garryana*. LeConte 1857:17, 42 (2); 1859b:205 (2); 1878:472 (3). Casey 1909a:108 (2). Nicolay and Weise 1918:101 (24). Chamberlin 1924:189 (4); 1926:112-113 (24); 1932:833 (4); 1949:55 (4). Hinman and Larson 1935:150 (4). Keen 1938:149 (24); 1952:189. Beer and Hatch 1941:112 (24). Helfer 1941:175-177 (24). Beer 1949:82 (4).

- 1' Head with orange or yellowish markings in front or beneath; pronotum with an orange spot or stripe at front angles; abdomen usually with orange spots, first sternite sulcate at middle; epipleura not toothed; male protibia with a subapical recurved tooth
 10 Elytra with yellowish spots or markings that occasionally may be small and faintly indicated
 11 Ventral surface of thorax with conspicuous and numerous orange markings; pronotum with hind angles orange; elytra with markings transverse, variable in size and usually broken or interrupted, the second and third costae usually joined at about apical fourth; 12.5-21 mm.; se B. C., e Wn., Id., e Or.

NUTTALLI Kby

- Recorded from *Pinus ponderosa* and *Pseudotsuga menziesii*. Chamberlin 1926:120 (134). Stace Smith 1929:71 (1). Beer and Hatch 1941:113 (34). Helfer 1941:167-169 (124). *consularis* auct. Chamberlin 1926:121-122 (134). Hopping 1933:87-88 (1). *alternans* auct. Nicolay and Weiss 1918:97 (2). Chamberlin 1926:121 (234). Stace Smith 1930:24 (1). Beer and Hatch 1941:113 (2). *contorta* Csy. 1909a:95 (2). *gravidula torva* Csy. 1901a:96 (2).
- 11' Ventral surface of thorax usually immaculate; pronotum without orange markings at hind angles; elytra with spots usually large, tending to be somewhat linear, frequently coalesced longitudinally and not individually broken, second and third costae obsolete apically, not distinctly joined; 14-23 mm.; se B. C., Wn., Id., Or. LAEIVENTRIS LeC. (cf. 13')
- Hosts include *Pinus ponderosa*, *P. contorta*, *P. lambertiana*, and *Pseudotsuga menziesii*. Evans 1906:98 (1). Casey 1909a:93 (2). Nicolay and Weiss 1918:98 (24). Chamberlin 1924:189 (4); 1926:113 (1234). Stace Smith 1929:71 (1). Keen 1938:149 (234); 1952:189. Beer and Hatch 1941:113 (123). Hardy 1955:B49 (1). *mutalli laeviventris* LeC. Helfer 1941:128, 134, 170-173 (24). *pugetana* Csy. 1909a:94 (2).
- 10' Elytra immaculate
- 12 Subovate; elytra shining, coppery green to bluish and purplish black; pronotum with a non-elevated smooth median line; male abdomen with a small spot rarely present at sides of fourth sternite and with a pair of large spots on fifth sternite; abdomen of female with or without lateral and/or sublateral spots on third and fourth sternites, and with a pair of large spots on fifth sternite; metacoxa of male immaculate, of female occasionally with 1 or 2 pairs of small spots; lateral lobes of male genitalia broadly constricted before apices; 15-21 mm.; se B. C., Wn., n and sw Id., Or. SUBORNATA LeC.
- Hosts: *Pinus ponderosa* and *Pseudotsuga menziesii*. Ulke 1875:819 (4). Casey 1909a:98 (3). Gibson 1915:137 (1). Criddle 1925:81 (1). Chamberlin 1924:188 (4). Stace Smith 1929:71 (1). Beer and Hatch 1941:114 (2). Helfer 1941:163-165 (124). *maculiventris subornata* LeC. Nicolay and Weiss 1918:92-93 (4). Chamberlin 1926:118 (24). *maculiventris* auct. Harvey 1906b:4 (1). Chamberlin 1926:116-117 (4).
- 12' Elongate; elytra dull to slightly shining, greenish black to black; pronotum with a smooth median line which is usually feebly elevated; lateral lobes of male genitalia broadly rounded or subparallel before apices
- 13 Third antennal segment truncate at apex; abdomen of male rarely with a small spot at sides of second sternite, frequently with a small spot at sides of third and fourth sternites and with a pair of large spots on fifth sternite that may be joined; abdomen of female frequently with a small spot at sides of second and/or third and/or fourth sternites and with a pair of large spots on fifth sternite that may be joined; metacoxae of male immaculate, of female rarely with a pair of small spots; lateral lobes of male genitalia broadly rounded; 15-23 mm.; s B. C., Wn., n and sw Id., Or. (Pl. VII, fig. 3) RUSTICORUM Kby.
- Adults have been reared from *Pinus ponderosa*, *Pseudotsuga menziesii* and *Abies grandis*. LeConte 1857:17 (4); 1857a:8 (4); 1859b:208-209 (24); 1869:370 (1). Walker 1866:310. Horn 1972:388 (3). Harvey 1906b:4 (1). Casey 1909a:99 (2). Bush 1914:60 (1). Chamberlin 1924:188 (4). Hardy 1927a:C33 (1); 1942:12 (1); 1948:33 (1). Stace Smith 1929:71 (1). Hopping 1933:85 (1). Beer and Hatch 1941:113-114 (12). Helfer 1941:165-167 (1234). Rees, Proc. Ent. Soc. Wash. 43, 1941:210 (2). *maculiventris rusticorum*

Kby. Nicolay and Weiss 1918:91-92 (1234). Chamberlin 1926:118-119 (1234). *adducta* Csy. 1909a:103 (1234).

- 13' Third antennal segment slightly prolonged at apex; abdomen of male rarely with a small spot at sides of second and/or third sternites, occasionally with a small spot at sides and rarely with a small spot at middle of fourth sternite, and with a pair of medium-sized spots on fifth sternite that are rarely joined; abdomen of female with a small spot at sides of first sternite, with lateral and occasionally sublateral spots on second, third, and fourth sternites, without markings on fifth sternite; metacoxa of male rarely with a pair of small spots, of female occasionally with a pair of small spots; lateral lobes of male genitalia subparallel before apices; 14-23 mm.; se B. C., Wn., Id., Or. LAEVIVENTRIS LeC. (cf. 11')

7. *Melanophila* Esch.

- 1 Head and thorax with smooth callosities (subg. XENOMELANOPHILA Sloop). Elytra tricolored, predominantly pale yellow with basal and lateral margins reddish and with large black submarginal and discal spots or markings; 13. 5-16 mm.; e Or. MIRANDA LeC.
Adults have been found ovipositing in bark crevices of recently burned juniper (*Juniperus* sp.) branches and trunks in e Or. Horn 1882:102-103 (4). Chamberlin 1924:188 (4); 1926:219 (4). Sloop 1937:18.
- 1' Head and thorax without conspicuous callosities; elytra unicolorous or bicolored
- 2 Pronotum with disc very finely punctured or feebly granulose; elytra glabrous, the apices sometimes pointed; mesosternum with a sensory pit contiguous to outer margin of coxal cavity; tarsi with stiff bristles laterally; metatibia margined with a row of short stiff bristles (subg. MELANOPHILA s. str.)
- 3 Elytra black with yellowish spots, the apices rounded; 9-11 mm.; e Wn., n and se Id., Or. (charcoal beetle) CONSPUTA LeC.
Hosts: *Pinus ponderosa*, *P. murrayana*, *P. radiata* and *P. attenuata*. Chamberlin 1924:190 (4); 1926:214 (4). Sloop 1937:6. Beer 1940:15 (4). Barr and Linsley 1947:162 (4).
- 3' Elytra black, the apices pointed
- 4 Elytra with feebly indicated irregular discal contours, the apices acute; 7-13 mm.; s B. C., Wn., n and se Id., Or. (Pl. VII, fig. 4)
ACUMINATA DeG.
Hosts: *Pinus* spp., *Abies* spp., *Picea* spp. Fauvel 1889:144 (1). Bush 1914:60 (1). Chamberlin 1924:188 (4); 1926:209 (1234). Hardy 1927:C23 (1); 1927a:C34 (1); 1942:12 (1). Stace Smith 1929:71 (1). Beer and Hatch 1941:117 (2). Barr and Linsley 1947:165. *appendiculata* F. LeConte 1878:472 (3). Hamilton 1894:29 (1); 1894a:391 (1). *longipes* Say. LeConte 1877:108. Holland 1888:91 (1). Hamilton 1889:138 (1). Harvey 1906b:4 (1). *atropurpurea* auct. (nec. Say) Horn 1882:104 (4). Keen 1891:282 (1). Wickham 1893:226 (1). Hamilton 1894:29 (1).
- 4' Elytra more or less convex, the apices acuminate; 6-12 mm.; sw B. C., Wn., Id., Or. OCCIDENTALIS Oben.
Beer 1940:15 (4). Barr and Linsley 1947:163 (24). *acuminata* auct. (nec DeG.) Chamberlin 1928:95.
- 2' Pronotum with disc transversely strigose or distinctly punctured; elytra with fine short hairs, the apices rounded; mesosternum without a sensory pit; tarsi with only fine hairs; metatibiae without a row of bristles (subg. PHAENOPS Lac.)

- 5 Elytra green or blue green to purplish, immaculate; lateral carina of pronotum usually entire; 8-14 mm.; se B. C., Wn., n and sw Id., Or.

GENTILIS LeC.

Recorded from *Pinus ponderosa*, *P. lambertiana*, *P. jeffreyi* and *P. contorta*. LeConte 1878:472 (3). Harvey 1906b:4 (1). Gibson 1913:126 (1); 1914:116 (1). Chamberlin 1924:189 (4); 1926:218 (234). Beer and Hatch 1941:115 (2). *prasina* LeC. Walker 1866:310.

- 5' Elytra bronze to black, frequently maculate; lateral carina of pronotum usually interrupted in front of middle
- 6 Pronotum with disc transversely strigose or strigosely punctured; elytra somewhat irregularly contoured and frequently with 1 or 2 feebly indicated costae
- 7 Pronotum with disc coarsely strigose and punctured; lateral lobes of male genitalia strongly expanded apically; venter strongly shining; clypeus deeply notched at middle of front margin; 10-11.2 mm.; e Wn., se Id., Or.; rare

LECONTEI Oben.

Sloop 1937:17 (*leconti*). *Le Contei* (sic!) ab. *oregonica* Oben. 1944:321 (4). *Le Contei* (sic!) ab. *burkei* Oben. 1944:321 (4).

- 7' Pronotum with disc finely strigose, usually not conspicuously punctured; lateral lobes of male genitalia weakly expanded behind middle; venter shining; clypeus shallowly notched at middle of front margin; 8-12 mm.; se B. C., Wn., Id., Or. (Pl. VII, fig. 5)

(flathead fir borer) DRUMMONDI Kby.

Hosts include: *Pseudotsuga menziesii*, *Larix occidentalis*, *Abies nobilis*, *A. grandis*, *A. concolor*, *A. nigra*, *A. magnifica*, *A. lasiocarpa*, *A. amabilis*, *Picea engelmannii*, *P. glauca*, *P. sitchensis*, *Tsuga heterophylla*, *T. mertensiana*. LeConte 1857:17 (4); 1857a:7 (4); 1859b:213 (24); 1869:371 (1); 1877:108; 1878:472 (3). Brodie 1888:214 (1). Holland 1888:91 (1). Harvey 1906b:4 (1). Brittain 1913:16 (1). Bush 1914:60 (1). Chamberlin 1917:134 (4); 1924:188 (4); 1926:214 (1234). Hardy 1927:C23 (1); 1927a:C33 (1); 1942:12 (1); 1944a:D31 (1); 1948:33 (1); 1955:B49 (1). Stace Smith 1929:71 (1). Sloop 1937:16 (4). Beer and Hatch 1941:116 (2). Ross, Jr. Ent. Soc. B. C. 65, 1968:13 (1). *drummondi* ab. *lanchesteri* Oben. 1943-1944:320 (4). *drummondi* ab. *quirsfieldi* Oben. 1943-1944:320 (4).

- 6' Pronotum with disc transversely punctured, not strigose; elytra more or less evenly convex, not costate
- 8 Elytra immaculate, rather densely clothed with short inconspicuous hairs; upper surface usually bicolored with pronotum shining coppery green or bronzy green and elytra darkened; 6-9 mm.; se B. C., e Wn., n and se Id., e Or.

INTRUSA Horn

Hosts: *Pinus ponderosa*, *P. flexilis*, *P. lambertiana*, *P. attenuata*. Chamberlin 1924:189 (4); 1926:219 (4). Beer 1940:14 (4). Beer and Hatch 1941:115 (2).

- 8' Elytra usually with 1 to 3 pairs of small yellowish spots, sparsely clothed with short inconspicuous hairs; upper surface with basic coloration usually uniform dark bronze; 7-9 mm.; e Wn., sw Id., Or.

(California flathead borer) CALIFORNICA VanD.

Hosts: *Pinus ponderosa*, *P. jeffreyi*, *P. sabiniana*, *P. attenuata*. Chamberlin 1924:189 (4); 1926:213 (34); 1949:56 (4). Hatch 1938a:185 (2). Keen 1938:134 (34); 1952:171 (234). Beer and Hatch 1941:115 (23). *pini-edulis* auct. (nec Burke) Chamberlin 1920:244 (4); 1924:189 (4); 1926:221 (4).

The occurrence of *M. aeneola* Melsh. in the Pacific Northwest as recorded by Gibson 1917:149 requires verification.

8. *Anthaxia* Esch.

Assignment of available names to populations occurring in the Pacific Northwest is based primarily on an interpretation of the species as given in the recent revision of Cobos 1958. The synonymy proposed in this revision is accepted until type material can be examined. Prior literature records pertaining to distribution and hosts are, for the most part, based on erroneously determined specimens.

- 1 Body slender; elytra glabrous or with very short inconspicuous pale hairs, the lateral margins strongly sinuate, narrowed near middle; sides of abdomen frequently pulverulent and visible when viewed from above (subg. *HAPLANTHAXIA* Reitt.)
- 2 Inner margins of eyes oblique, converging toward vertex; body unicolorous, the males green, the females blackish bronze; 4-6 mm.; s B. C., Wn., Id., Or. (Pl. VII, fig. 6) *DELETA* LeC. subsp. *DELETA* LeC.
Gibson 1911:114 (1). Criddle 1922:63 (1). Chamberlin 1917:135 (4); 1924:190 (4); 1926:89-90 (134); 1932:835 (1234). Beer and Hatch 1941:117 (123). Cobos 1958:78 (134).
- 2' Inner margins of eyes parallel for the most part; body usually bicolored, elytra dark, brassy or bronzy with base greenish, sides of pronotum and front of head usually greenish; 4.5-6 mm.; se Id., s Or.
DELETA LeC. subsp. *PSEUDOTSUGAE* Chamb.
Chamberlin 1929:109 (4). Cobos 1958:78 (234).
- 1' Body broader, frequently ovate; elytra more or less uniformly clothed with short stiff hairs which may be inconspicuous and usually are dark, the lateral margins sinuate; sides of abdomen not pulverulent and not visible when viewed from above (subg. *ANTHAXIA* s. str.)
- 3 Distance between eyes 3 times the width of the eyes; antennal segments 2 and 3 subequal; 4.2 mm.; e Or. *WALLOWAE* Oben.
Obenberger, *Casopsis* C. Spol. Ent. 39, 1942:128 (4). Cobos 1958:124 (4).
- 3' Distance between eyes not more than approximately twice the width of the eyes; third antennal segment longer than second segment
- 4 Pronotum usually with a pair of discal depressions and a single depression at each side, the reticulations distinctly microreticulate internally, not granulate
- 5 Dull coppery; front of head sparsely clothed with indistinct subflattened white hairs, distinctly reticulate; pronotal disc with reticulations hexagonal and distinct; elytra not asperate, irregularly rugose or with somewhat meshlike sculpture with pits and creases, distinctly microreticulate; meso- and metatrochanters of male not toothed; 5-6 mm.; se B. C., Wn., n and sw Id., Or. *AENESCENS* Csy.
Cobos 1958:100 (14).
- 5' Black, occasionally with a brassy cast, shining; front of head conspicuously clothed with suberect dark-brown hairs, the reticulations indistinct; pronotal disc with reticulations more or less transverse and frequently weakly developed; elytra with numerous uniformly distributed asperities, not microreticulate; meso- and metatrochanters of male each with a short acute tooth; 4.5-8.5 mm.; s B. C., Wn., Id., Or. (Pl. VII, fig. 7)
EXPANSA LeC.

This is the commonest species of *Anthaxia* occurring in the Pacific North-

west. Adults occur on flowers of many different plants and larvae probably develop in the twigs and small branches of conifers. LeConte 1857:44 (4); 1859:214 (4). Cobos 1958:91 (1234). *oregonensis* Oben., Caspis C. Spol. Ent. 39, 1942:127 (4).

4' Pronotum without discal depressions, occasionally with a depression near each side, the reticulations not distinctly microreticulate internally, usually granulate

6 Tarsi and antennae brown; venter brassy green; body rather slender; front of head dark brassy green sparsely clothed with short suberect pale brown hairs, convex, uniformly reticulate; vertex darkened, the reticulations dense and confused; pronotum dark brown with coppery reflections on apical half, convex, the sides broadest near front, the surface uniformly reticulate except near hind angles which are more or less smooth, the reticulations not granulate internally; elytra brown, feebly shining with some coppery reflections, moderately clothed with short subdepressed brown hairs, the surface slightly rugose with numerous uniformly distributed tiny asperities, the apices finely serrate; meso- and metatrochanters not toothed; 3.9 mm.; n Id. TARSALIS Barr sp. n.

Holotype male in Cal. Acad. of Sci. on indefinite loan from the Univ. of Id.: Harvard, Latah County, Idaho, June 11, 1959 (J. E. Henry). A unique species in the coloration of the tarsi, antennae and ventral surface and in the absence of trochantel teeth. Its affinities appear to be with *helferi* Cob.

6' Tarsi and antennae blackish; venter not brassy green; pronotal reticulations usually not uniform and usually granulate internally

7 Blackish; pronotum with discal reticulations small, somewhat irregular and distinct except on front half where they become very dense and confused, the apical half subflattened or with a shallow longitudinal depression, the sides more or less evenly arcuately rounded, the hind angles faintly reddish or greenish; front of head feebly convex, with conspicuous moderately long suberect dark-brown hairs and with many small somewhat-confused reticulations; lateral margins of elytra feebly serrate on apical third

8 Front of head moderately clothed with short suberect dark brown hairs; venter black; body moderately robust; front of head black with a purplish cast becoming greenish near clypeus, slightly depressed at middle, uniformly reticulate; vertex dull black with a purplish cast, faintly depressed at middle, the reticulations dense and confused; pronotum dull black with a purplish cast, aeneous and shining along sides near middle, not pulverulescent, the front half distinctly convex, the apical half subflattened at middle and with a broad shallow depression near sides, the reticulations regular on apical half and with more or less distinct medial granules, the reticular ridges not distinctly branched near sides; elytra dull black with a purplish cast, moderately but indistinctly clothed with short subdepressed dark-brown hairs; the sides subparallel, the surface irregular and distinctly rugose with numerous uniformly distributed small asperities which become less distinct on apical half, the apices not serrate; meso- and metatrochanters not toothed; 4.8 mm.; w Or. SCULPTURATA Barr sp. n.

Holotype, sex not known, in Cal. Acad. of Sci.: McMinnville, Oregon, May 2, 1936. The sculpture and shape of the pronotum and overall coloration are key characters that may be used in the recognition of this species.

8' Front of head with conspicuous rather long suberect dark-brown hairs; venter blue black, blue or greenish

9 Hind margin of last abdominal sternite broadly rounded; elytra irregularly

contoured with numerous evenly distributed somewhat-smoothed asperities; reticular ridges of pronotum not forming distinct tree-like branches near sides; venter blue black to blue or green; meso- and metatrochanters of male each with a small acute tooth; 5-7.5 mm.; s B. C., Wn., Id., Or.

RETIFER LeC.

Uncommon on the flowers of various Compositae. Recorded also from flowers of *Eriodictyon* sp. and *Ceanothus* sp. Known to breed in *Pinus ponderosa*, *P. contorta* and *P. attenuata*. It undoubtedly breeds in other species of pines likewise. Cobos 1958:97 (14).

- 9' Hind margin of last abdominal sternite broadly emarginate; pronotum with disc subflattened apically, the reticular ridges branched from base near sides, the hind angles faintly reddish; elytra not distinctly irregularly contoured, with densely placed and evenly distributed somewhat-roughened asperities; venter dull blue, the abdominal sternites slightly cupreous at sides; meso- and metatrochanters not toothed; 6.7 mm.; sw Or.

EMARGINATA Barr sp. n.

Holotype of uncertain sex in Cal. Acad. of Sci., Prospect, Oregon, May 20, 1938 (F. M. Beer). A damaged specimen resembling *retifer* LeC. in form and structure but unique in the emargination of the last abdominal sternite.

- 7' Usually dark brown or coppery, occasionally bronzy green or blackish; pronotum with discal reticulations uniform and not distinctly granulate or transverse or elongate and usually with conspicuous internal granulations, the sides broadest near front or at middle, the hind angles often conspicuously reddish or greenish; front of head convex or flattened or medially depressed, pubescence and reticulations variable; lateral margins of elytra entire or serrate apically
- 10 Metasternum and first abdominal sternite bronzy, bronzy black or black, occasionally with a faint aeneous tinge
- 11 Sides of pronotum broadest near front
- 12 Pronotum convex except for a broad shallow depression near hind angles, the reticular ridges near sides forming tree-like branches that arise from a smooth area at base; head coppery brown, moderately clothed with short suberect dark-brown hairs; front of head with a small median depression, uniformly reticulate, the reticular ridges thickened and flat; vertex feebly depressed at middle, the reticulations becoming elongate and confused; pronotum black, coppery and shining along sides especially behind middle, distinctly pulverulent at hind angles, subflattened on disc, the discal reticulations on apical half tending to radiate out from an elongate median area in front of base, the reticular ridges fine and delicate, the median granules of the discal reticulations poorly developed, those of the lateral reticulations more conspicuously developed; elytra moderately but indistinctly clothed with short subdepressed dark-brown hairs, the sides subparallel, the surface irregular and rugose with numerous uniformly distributed small asperities, the apices not serrate; meso- and metatrochanters with a small acuminate tooth on inner margin; 4.2-5.9 mm. (type 5 mm.); se Id.

CUPRIOLA Barr sp. n.

Holotype male in Calif. Acad. of Sci. on indefinite loan from the Univ. of Id. and 111 paratypes from 21 miles ne of Preston, Franklin County, Idaho, June 15, 1968 (W. F. Barr), collected from flowers of *Agoseris grandiflora*, *Prunus virginiana*, *Chaenactis douglasii*, *Senecio* sp. and *Hackelia* sp.; 12 additional paratypes from 22 mi. ne Preston, Franklin Co., Id., June 21,

1966 and July 12, 1965 (R. L. Westcott) on flowers of *Senecio* sp. and *Calochortus* sp. Paratypes in the collections of F. M. Beer, M. H. Hatch, J. N. Knull, G. H. Nelson, R. L. Westcott, W. F. Barr, Cal. Acad. of Sci., U. S. Nat. Mus. and the Univ. of Id.

Related to *A. helferi* Cob., but differs in the shape of the pronotum, the more weakly developed reticular ridges on the pronotal disc, the more densely sculptured elytra and the presence of pulverescence at the hind angles of the pronotum. The female lacks a tooth on each trochanter.

- 12' Pronotum with an extensive but shallow depression on each side of middle, the reticular ridges not branch like; head reddish, sparsely clothed with very short subdepressed white hairs, the front roughened subflattened and uniformly reticulate with its reticular ridges thickened, the vertex feebly depressed at middle with its reticulations confused and indistinct; pronotum coppery red, not pulverulent, its reticulations large and not radiating from the central area or granulate, the reticular ridges thickened, elytra moderately but indistinctly clothed with short subdepressed dark brown hairs, the sides subparallel, the surface except for roughening and densely placed asperities at extreme base more or less smooth with only a few sparsely placed small asperities, the apices not serrate; meso- and metacoxae not toothed; 4 mm.

Anthaxia sp.

A single female from 22 mi. ne Preston, Franklin Co., Id., July 12, 1965, R. L. Westcott, may represent an undescribed species. It cannot be assigned a name until more material is available.

- 11' Sides of pronotum broadest at or near middle
- 13 Dark coppery in color; pronotum usually with reddish reflections anteriorly and laterally, the reticulations more or less uniform but occasionally with a faintly indicated sublateral branching; front of head feebly depressed; elytra without conspicuous rugosities or asperities; meso- and metatrochanters of male each with a short acute tooth; male genitalia short and stout; 3-3.5 mm.; e Wn., se Id. (Craters of the Moon National Monument), e Or. (Klamath Falls)
- HELPERI Cob.
- Idaho specimens were collected on the flowers of *Eriogonum depressum* and *Chrysopsis villosa. inornata*, Beer and Hatch 1941:118 (2).
- 13' Dark brown usually with coppery reflections at sides of pronotum and elytra; pronotum with or without conspicuous sublateral branching; male genitalia elongate
- 14 Pronotum evenly convex, usually without a shallow depression at sides, the reticular ridges usually not forming tree-like branches near sides; meso- and metatrochanters of male with a small acute tooth; 3.7-4.5 mm.; se B. C., e Wn., Id., Or.
- SIMIOLA Csy.
- Common in s Id., where it is associated with *Cercocarpus ledifolius*. Adults occur on a variety of flowers. Cobos 1958:110 (4). Furniss and Barr, Id. Agr. Exp. Sta. Res. Bull. 73, 1967:23 (3).
- 14' Pronotum convex with a shallow depression at sides, the reticular ridges forming conspicuous tree-like branches near sides; meso- and metatrochanters of male without teeth; 4-4.7 mm.; sw Or.

Anthaxia sp.

Two specimens, Prospect, Or., May 20, 1938, F. M. Beer, and Grants Pass, Or., May 15, 1940, F. M. Beer, appear distinctive in the pronotal sculpturing and the secondary sexual characters and are unlike any of the western species known to me. However, I prefer to await additional material before naming this species.

- 10' Metasternum and first abdominal sternite brilliant blue or blue green to dull blue black; occasionally the apical abdominal sternites may be somewhat bronzy and the sides of the sternites brownish or cupreous
- 15 Pronotum with disc convex, not subflattened or depressed longitudinally, the reticulations more or less uniform in size and shape and not granulate internally
- 16 Upper surface green to blue green; meso- and metatrochanters of male not toothed; 4-6.5 mm.; se B. C., sw Id., Or. PRASINA Horn
On flowers of dandelion, *Rosa* sp., and *Balsamorhiza sagittata* in sw Id. Cobos 1958:100 (4). *aeneogaster* var. *prasina* Horn. Stace Smith 1949:14 (1).
- 16' Upper surface not green; meso- and metatrochanters of male each with a small acute tooth
- 17 Upper surface bronzy to blackish; pronotum evenly convex, occasionally with a small lateral depression near sides which are unusually broadest at middle; 4-5.5 mm.; Or. CALIFORNICA Oben.
- 17' Upper surface coppery; pronotum with a large lateral depression, sides broadest in front of middle; 4.7 mm.; se Or. *Anthaxia* sp.
A single male from Klamath Falls, Or., June 24, 1931, R. L. Furniss, is best placed near *helferi* Cob. The shape of the pronotum, color of the ventral surface, presence of large pronotal reticulations, and pronotal depressions appear to be distinctive features. More material is needed.
- 15' Pronotum longitudinally depressed or subflattened at middle; pronotal reticulations not uniform, transverse at middle or smaller and more densely placed anteriorly or with reticular lines conspicuously branched laterally or poorly developed on disc, the granulations usually distinct
- 18 Black; pronotum broadest near front, with a conspicuous depression at sides, subflattened medially; pronotal reticulations transverse on apical half at middle, small and somewhat confused and densely placed on anterior half, uniformly hexagonal and distinct laterally, the reticular lines not forming tree like branches near sides; head with a cupreous cast, front feebly convex and with rather long suberect coarse dark brown hairs; reticulations on head uniform, hexagonal, densely placed; front margin of clypeus truncate; elytra moderately and indistinctly clothed with short subdepressed dark brown hairs, rugose with numerous uniformly distributed asperities, the basal half somewhat irregularly contoured, the apical half with a faint indication of a discal costa, the lateral margins subparallel to apical third, thence rather abruptly converging to the narrowly rounded apices and feebly serrate on apical fourth; ventral surface shining, dark blue; metasternum with coppery reflections; meso- and metatrochanters not toothed; 4.4 mm.; sw Id. FURNISSI Barr sp. n.
Holotype male in Cal. Acad. of Sci. on indefinite loan from the Univ. of Id. from Krassel Ranger Station on the south fork of the Salmon River, Valley Co., Id., M. M. Furniss; reared from stump of a Douglas fir in 1958. Readily recognized by the shape and sculpturing of the pronotum and by the absence of trochanteral teeth. It is named after M. M. Furniss as a slight token of appreciation for his valuable assistance and the many favors he has offered me.
- 18' Dark brown; pronotum broadest at middle, not conspicuously depressed at sides, the reticular ridges usually distinctly tree like near sides; front margin of clypeus emarginate or notched; meso- and metatrochanters of male toothed
- 19 Ventral surface brilliant blue; elytra with a few white hairs on outer margin

of humerus; front of head obliquely flattened on upper half, narrowly longitudinally depressed between upper margins of eyes, the reticulations distinct, becoming elongate on upper portion of front, the reticular ridges broad and flattened on upper half, the pubescence consisting of moderately long suberect brown hairs on upper half and subdepressed white hairs on lower half; clypeus with front margin emarginate; pronotum with sides evenly arcuate, except obtusely angulate at apical third, broadest at middle, the disc feebly longitudinally depressed and more or less uniformly reticulate except that it is conspicuously transversely reticulate on apical half; reticular ridges of the pronotum associated with internal granulation, form indistinct tree-like branching near sides, and weakly developed medially on front half; sides of the pronotum on apical half and a small area in front of scutellum cupreous; elytra moderately shining, unevenly contoured, rather densely roughened, without distinct asperities, and uniformly clothed with short suberect dark-brown hairs except for white hairs at humeri, the sides subparallel to about apical third and thence broadly arcuately narrowed to apices, feebly finely serrate on apical fourth; meso- and metatrochanters each with a small acuminate tooth; 6-7.2 mm. (holotype 6.8 mm.); se Wn.

HATCHI Barr sp. n.

Holotype male (Hatch collection) and one male and 2 female paratypes: Wawawai, Whitman Co., Wash., Aug. Paratypes in collections of M. H. Hatch and W. F. Barr. This species, which is named in honor of Dr. M. H. Hatch, can be recognized by its color, by the slope of the head, by the pronotal and elytral sculpturing and by the presence of white hairs near the elytral humeri. The female lacks toothed trochanters. The type series is remarkably uniform in structure and appearance. *A. hatchi* is most closely related to *aeneogaster* Cast. et Gory.

- 19' Ventral surface blue or blue green, frequently darkened; elytra without white hairs, conspicuously asperate; front of head, at most, feebly flattened
- 20 Elytra unevenly contoured; pronotum without conspicuous sublateral branching, the reticulations on the disc and near the sides with granulations; clypeus shallowly arcuately emarginate in front; meso- and metatrochanters of male each with a large acuminate tooth; 4.5-7 mm.; s B. C., Wn., Id., Or.

AENEOGASTER Cast. et Gory

Uncommon. Adults occur on flowers and the larvae work in the branches and twigs of conifers, especially *Pinus* spp. Cobos 1958:106 (1234). The many references to this species in the literature cannot be considered accurate.

- 20' Elytra normally contoured; pronotum with conspicuous sublateral branching that is more or less subparallel, granulate reticulations restricted to basal area of disc; clypeus rather deeply triangularly emarginate; meso- and metatrochanters of male each with a distinct acute tooth; head conspicuously clothed with short suberect dark hairs, the reticulations indistinct and flattened and densely placed, the front faintly depressed at middle between 2 feebly elevated swellings, the upper portion subflattened and somewhat oblique; pronotum with sides evenly arcuately rounded except for a slight angulation in front of base, broadest at middle, the disc with somewhat transverse or lunulate reticulations that become more hexagonal anteriorly, a small broken longitudinal smooth area evident in front of clypeus, the reticulations between the sides and the sublateral branching nearly hexagonal; elytra shining, densely roughened and with numerous small asperities, uniformly clothed with short subdepressed brown hairs, the sides subparallel

to apical third and then broadly arcuately narrowing to the apices which are indistinctly serrate on apical fourth; ventral surface dark dull blue green; 4.4-5.3 mm. (holotype 4.4 mm.); sw Or. CONFUSA Barr sp. n.

Holotype male in Cal. Acad. of Sci.: Grants Pass, Oregon, May 4, 1938, F. M. Beer. Two paratypes, Murphy, Or., Jan. 21, 1940, F. M. Beer; 1 paratype 5 mi. w Grants Pass, Or., May 28, 1966, F. M. Beer; 2 paratypes Siskyou Pass, Jackson Co., Or., 4500', July 15, 1930, H. A. Scullen. Paratypes in the collections of Ore. St. Univ., W. F. Barr and F. M. Beer. The pronotum is nearly evenly convex in several specimens and the sublateral branching, although always conspicuous, may be somewhat reticulate. The female lacks toothed trochanters. This species may be the *A. simiola* Csy. form *paraeneogaster* Cob. 1958:111, which was described without designation of type or geographical distribution.

Tribe Chrysobothrini

9. Chrysobothris Esch.

- 1 Fourth antennal segment approximately 1/4 as long as third segment; first metatarsal segment without a plantula or apical membranous area; side margins of last abdominal sternite entire; elytra not pubescent or conspicuously sculptured
- 2 Elytra purplish to blue black with 1 to 3 pairs of foveae; venter green to blue with reddish reflections laterally; male antennae serrate; 5.5-9 mm.; se B. C. (Creston), n Id. (Central Grade in Nez Perce Co.)

AZUREA LeC.

This well-known eastern species has been rarely collected in the Pacific Northwest. Specimens have been reared from *Rhus glabra* and *Salix* sp. in Idaho and found on *Populus* sp. in B. C.

- 2' Elytra brownish cupreous to bright green or blue, without foveae, but with violaceous spots or transverse fasciae that frequently are joined longitudinally; venter uniformly dark bronze to green to blue
- 3' Upper surface blue or blue-green; profemoral tooth broad, rounded at apex, serrate on outer margin; clypeus deeply and more or less triangularly emarginate at middle of front margin; male antennae serrate; 6.5-9.5 mm.; w Or. (8 mi. ne Gold Hill in Jackson Co.) LUCANA Horn

Collected from *Ceanothus cuneatus*.

- 3' Upper surface brownish cupreous to bright green; profemoral tooth narrow, acute at apex, not serrate; clypeus broadly shallowly evenly emarginate at middle of front margin; male antenna biramosa; 8-10 mm.; s Id. (5 mi. se Malta in Cassia Co.; 4 mi. e Idaho in Cassia Co.; 5 mi. se Grand View in Owyhee Co.), e Or. (30 mi. ssw Vale in Malheur Co.)

BIRAMOSA (Fish.) subsp. BIRAMOSA (Fish.)

In Idaho this subspecies has been reared from the roots of *Atriplex confertifolia*, *A. nuttalli* and *A. canescens*.

- 1' Fourth antennal segment at least 1/2 as long as third segment; first metatarsal segment with at least a small indistinct plantula or ventral membranous area at apex; side margins of last abdominal sternite in part serrate or irregular, if entire the elytra are distinctly pubescent or are conspicuously sculptured with irregular elevated smooth areas and longitudinal costae
- 4 Abdominal sternites brassy green to bright green with or without reddish or cupreous reflections laterally

- 5 Body above uniformly green to blue; abdomen green
- 6 Elytra clothed with inconspicuous hairs, not distinctly costate; pronotum uniformly punctured; 5-9.5 mm.; w Or. **CYANELLA** Horn
 Host: *Eriogonum nudum*. Chamberlin 1917:139 (4); 1924:192 (4); 1926:145 (4). Beer 1940:15 (4). Fisher 1942:30-32 (4). The records of this species' breeding in *Pinus ponderosa* are undoubtedly erroneous.
- 6' Elytra glabrous with a pair of strongly elevated apical costae along suture; pronotum usually with sparsely punctured areas near middle; 7-11 mm.; e Or. **VIRIDICYANEA** Horn
 Hosts: *Juniperus occidentalis*, *J. scopulorum*, *Libocedrus decurrens* and *Chamaecyparis lawsoniana*. Chamberlin 1924:191 (4); 1926:176 (4). Fisher 1942:100-102 (4). Keen 1952:47 (4). The records of this species' developing in Douglas fir and Jeffrey pine must be verified.
- 5' Body above blackish or brownish, occasionally with intervening bluish or greenish areas on elytra; abdomen brassy green to green with reddish or cupreous markings or reflections laterally
- 7 Prosternum densely pubescent
- 8 Abdomen bright green; elytra with densely punctured areas usually distinctly green; male genitalia broadly rounded and distinctly curved upward at apex; 9.5-14.4 mm.; se B. C., w Wn., w Or. **SYLVANIA** Fall (cf. 47')
 Host: *Pseudotsuga menziesii*. Van Dyke, Ent. News 27, 1916:412 (4). Chamberlin 1917:139 (4); 1920a:151-154 (4); 1924:192 (4); 1926:173 (4). Hardy 1927a:C34 (1). Beer and Hatch 1941:124 (12). Fisher 1942:187-188 (14). Keen 1952:191 (14).
- 8' Abdomen green with a brassy luster; elytra with densely punctured areas usually purplish; male genitalia subtruncate at apex, not curved upward; 8-12 mm.; se B. C., e Wn., Id., e Or. **LARICIS** VanD. (cf. 36' and 47')
 Adults have been collected from *Larix occidentalis*, *Pinus contorta* and *Pseudotsuga menziesii*. Van Dyke, Ent. News 27, 1916:409 (4). Chamberlin 1917:138 (4); 1924:192 (4); 1926:159 (34); 1932:834 (4). Beer and Hatch 1941:123 (24). Fisher 1942:184 (34). Some of these references may apply to other species.
- 7' Prosternum sparsely pubescent or glabrous
- 9 Elytra with punctured areas cupreous to black, callosities usually small and numerous, apices coppery; front of head of male greenish gold; median lobe of male genitalia broadly rounded at apex; 10.5-13 mm.; se B. C., e Wn., Id., e Or. **CARINIPENNIS** LeC.
 Known to be associated with *Pseudotsuga menziesii*; records of other hosts must be verified. Evans 1906:98 (1). Harvey 1906b:4 (1). Gibson 1913:126 (1). Bush 1914:60 (1). Chamberlin 1926:141 (1234). Hardy 1927a:C34 (1). Stace Smith 1929:71 (1). Beer and Hatch 1941:124 (12). Fisher 1942:189 (1234).
- 9' Elytra with punctured areas aeneous to green, usually with 3 pairs of large irregular callosities, apices not coppery; front of head of male green; median lobe of male genitalia narrowly rounded at apex; 10-13 mm.; sw B. C., w Wn., w Or. **PSEUDOTSUGAE** VanD.
 Reared from *Pseudotsuga menziesii* and commonly found on several species of Abies in which development may also take place. Reported from *Pinus ponderosa*, *P. jeffreyi* and *Tsuga mertensiana*, but some of these hosts must be verified. Chamberlin 1924:192 (4); 1926:166 (4). Hardy 1927a:C34 (14); 1942:12 (1); 1948:33 (1). Beer and Hatch 1941:123 (1). Fisher 1942:191 (34). Keen 1952:191 (34). The Idaho literature records probably refer to *carinipennis* LeC.

- 4' Abdominal sternites blackish, brownish, purplish or cupreous, occasionally brassy with a greenish luster
- 10 Elytra clothed with short hairs that usually are inconspicuous and frequently are restricted to the lateral and apical areas
- 11 Third antennal segment not serrate; pronotum distinctly convex and usually with a pair of slightly elevated small callosities on disc; profemoral tooth usually elongate and acute to acuminate, serrate on outer margin; front of head of male green; hind margin of last abdominal sternite of female broadly rounded except for a small tooth near sides
- 12 Venter shining, brassy with purplish reflections laterally; clypeus usually arcuately emarginate; 7.7-9.2 mm.; sw Or. CHAMBERLINIANA Fish.
Adults have been collected from *Ceanothus cuneatus*. Fisher, Proc. Ent. Soc. Wash. 50, 1948:40.
- 12' Venter brownish; clypeus triangularly emarginate; 7.2-9 mm.; s Id., e Or. DELETA LeC.

In s Id. larvae have been found boring in the roots of *Artemisia tridentata* and *A. tripartita*. Adults have been collected from *Purshia tridentata*. Literature records of this species breeding in ponderosa pine undoubtedly refer to other species. Chamberlin 1924:193 (4); 1926:146 (4). Fisher 1942:38 (34).

- 11' Third antennal segment narrowly triangularly serrate; pronotum usually not distinctly convex and usually without discal callosities; profemoral tooth most often blunt and indistinctly serrate on outer margin; front of head of male usually not green; hind margin of last abdominal sternite of female broadly rounded and shallowly emarginate at middle
- 13 Venter shining black; elytra black to brownish black, foveae absent, costae absent or faintly indicated apically
- 14 Pronotum depressed or flattened at middle; clypeus deeply triangularly emarginate; profemoral tooth serrate along outer margin; front of head black, occasionally with a slight brownish cast; 10-12 mm.; e Or.

WESTCOTTI Barr

Reared from *Eriogonum compositum*. Barr 1969:120 (4).

- 14' Pronotum convex; clypeus shallowly arcuately emarginate; profemoral tooth entire along outer margin; front of head of male with a golden cast, of female with a cupreous cast; 6.3-7 mm.; se Id. HORNINGI Barr
Found on *Eriogonum depressum*. Barr 1969:117 (3).
- 13' Ventral surface shining bronzy or coppery; elytra coppery to brown with 1 to 3 pairs of foveae usually distinct but occasionally absent and with 1 to 4 costae present on each elytron and extending at least from middle to apex, occasionally reduced or absent
- 15 Elytra shining dark brown with 1 to 3 pairs of red foveae, lateral margins sparsely and finely serrate apically, apices usually reddish; head with vertex reddish; male with front green; 6.5-11 mm.; se B. C., e Wn., Id., Or. (Pacific flathead borer) MALI Horn (cf. 27')

A large number of native and introduced trees and shrubs are known as hosts including representatives of the following genera that occur in the Pacific Northwest: *Acer*, *Arbutus*, *Arctostaphylos*, *Alnus*, *Ceanothus*, *Cercocarpus*, *Populus*, *Prunus*, *Quercus*, *Rubus*, *Salix*, *Ulmus* as well as most of the cultivated fruit and nut trees.

Burke, Jr. Econ. Ent. 12, 1919:326-330 (4). Chamberlin 1917:139 (4); 1920:244 (4); 1924:193 (4); 1926:162 (24). Lovett and Mote 1926:2 (4). Newcomer, USDA Circ. 270, 1933:32 (2). Beer and Hatch 1941:125 (2).

Fisher 1942:55 (24). Fenton, Okla. Ag. Exp. Sta. Bull. B-259, 1942:4 (4).
 Johansen and Brannon 1955:1 (2). *deleta* Horn (nec LeC.) 1886a:99 (2).
 Fisher 1942:39 (2).

- 15' Elytra less shining, brassy, coppery or brown, the foveae when evident not reddish, the lateral margins indistinctly serrate or entire apically, the apices not reddish; head with vertex usually not reddish; male with front darkened, bronzy to green
- 16 Sides of abdominal sternites usually densely punctured; front of head of male shining yellow green to green; 7-8.7 mm.; w Or.

POTENTILLAE Barr

Collected from *Potentilla* sp. near Corvallis. Barr 1969:123 (4). A female from Roxy Ann Peak, Jackson Co., Or. with coarsely densely punctured elytra and faintly reddish elytral apices is placed here with reservation.

- 16' Abdominal sternites uniformly sparsely punctured; front of head of male not strongly shining and, when green, darkened or with a strong bronzy or coppery cast
- 17 Elytra without discal foveae; costae when evident present along suture on apical half
- 18 Coppery; pronotum with disc usually coarsely densely punctate, sides usually broadest near front; front of head of male with a greenish or golden cast; 5.7-8.4 mm.; w Or. (Pl. VII, fig. 8) ROGUENSIS Beer
- Rearred from and found on *Eriogonum compositum*. Beer, Pan-P. Ent. 43, 1967:18 (4).

- 18' Brown, occasionally with a coppery or purplish cast; pronotum with disc more sparsely and somewhat transversely punctured, frequently with a slightly elevated small smooth area on each side of middle, sides usually broadest at middle and usually subparallel from about basal third to near front; front of head of male dark; 6.4-9.4 mm.; w Wn., e Or. (Pl. VIII, fig. 1)

FRAGARIAE Fish.

Rearred from cultivated strawberry, *Fragaria* sp., and also from *Eriogonum compositum*. Fisher, Proc. Ent. Soc. Wash. 32, 1930:149 (23); 1942:49 (234). Chamberlin 1932:835 (234). Hanson and Webster 1938:38 (2). Beer and Hatch 1941:126 (23). Johansen and Brannon 1955:4 (2). *pubescens* auct. (nec Fall) IPSB 1929:104 (24). *deleta* auct. (nec LeC.) Chamberlin 1926:146 (2). Beer and Hatch 1941:119 (2). Several of the above records and especially those from Id. probably are referable to *oregona* Chamb.

- 17' Elytra with 1 to 3 pairs of moderately distinct discal foveae and with 1 to 4 pairs of costae present on apical half and frequently on disc
- 19 Coppery, occasionally coppery brown; elytra with costae indistinct or interrupted, pubescence short; profemoral tooth usually short, blunt and entire; front of head of male coppery; 6.2-8.2 mm.; s Id.

IDAHOENSIS Barr

Found on *Eriogonum ovalifolium* and *Eriogonum* spp. Barr 1969:124 (3). Four small specimens from 12 mi. nw of Terreton, Jefferson Co., Id. and 1 from Craters of the Moon National Monument, Id. on *Eriogonum microthecum* and *E. umbelliferum* are tentatively assigned here. They have the elytra irregularly roughened, the costae more or less evident on the disc and the pubescence longer than in most specimens of *idahoensis*.

- 19' Brown, occasionally with a coppery cast; elytra with costae usually conspicuous and at least 1 pair entire, the pubescence longer; profemoral tooth usually well developed, acute and serrate on outer margin; front of head of

male greenish, somewhat darkened or with a golden cast; 6.4-10.1 mm.;
se B. C., e Wn., Id., e Or. OREGONA Chamb.

Reared from *Geranium* sp. and found on *Potentilla flabelliformis* and
Eriogonum spp. which may also serve as hosts. Chamberlin, Pan-P. Ent.
10, 1934:38 (4). Fisher 1942:53 (24). *planomarginata* Chamb. 1938:10 (4).
Fisher 1942:53.

10' Elytra glabrous

20 Clypeus with front margin narrowly triangularly emarginate or acutely incised
at middle

21 Clypeus with front margin acutely notched at middle and with a tooth on each
side of notch; protibia of male with a triangular tooth at apical third; 7.5-10
mm.; e Wn., n and sw Id., e Or. SEMISCULPTA LeC.

Hosts: *Pinus ponderosa*, *P. jeffreyi*, *P. contorta* and *P. lambertiana*.
Fisher 1942:83 (24). *contigua* LeC. Horn 1886a:80 (24). Chamberlin 1924:
190 (4); 1926:144 (234). *purpurifrons* Mots. Beer and Hatch 1941:120 (23).
Chamberlin (in litt.) indicated that he designated a specimen from Grant
Co., Or., July 9, 1914, *Pinus contorta*, W.J. Chamberlin collector as a
paratype of *burkei* Chamb., but neglected to include it with his original
description. I have examined this specimen, which is in the OSU collection;
in my opinion it is *semisculpta* LeC.

21' Clypeus with front margin triangularly emarginate and not toothed

22 Prosternum with front margin lobed; elytra with conspicuous elevated smooth
areas, the sutural costae usually straight; protibia of male with a rounded
elongate dilation in front of apex; 7.3-19.3 mm.; sw Id., e Or.

LILACEOUS Chamb.

Adults have been collected from *Juniperus occidentalis* and *J. scopulorum*.
Chamberlin 1924:190 (4); 1926:160 (4). Fisher 1942:136 (4). *juniperimus*
Chamb. 1924:192 (4); 1926:158 (4). Fisher 1942:137 (4). New synonymy.

22' Prosternum not lobed in front; elytra with elevated areas sparsely punctured,
sutural costae usually curved or sinuate apically; protibia of male with a
row of small acute teeth; 11.5-14 mm.; s B. C., Wn., Id., Or. (Pl. VIII,
fig. 2) (flathead apple tree borer) FEMORATA (Ol.) (cf. 26)

Many species of trees and shrubs serve as hosts of this widely distributed
species, including the following genera in the Pacific Northwest: *Populus*,
Acer, *Juglans*, *Salix*, *Quercus*, *Ulmus*, *Celtis*, *Cercis*, *Sorbus*, *Malus*,
Prunus, *Amygdalus* and others. LeConte 1857:17 (4); 1859b:231 (4).

L[owther], Wash. Farm. 42 (24), 1919:13 (2). Chamberlin 1924:190 (4).
Lovett and Mote 1929:2 (4). Hardy 1927a:C34 (1); 1942:12 (1). Newcomer,
USDA Circ. 270, 1933:32 (2). Beer and Hatch 1941:120 (12). Johansen and
Brannon 1955:1 (2).

20' Clypeus with front margin broadly triangularly or arcuately emarginate at
middle

23 Pronotum with surface more or less uniform, occasionally longitudinally
depressed at middle, the callosities when present small and not extending
entire length and not present near sides

24 Elytra with smooth elevated callosities

25 Each elytron with basal margin evenly rounded; prosternum with front margin
narrowly lobed; protibia of male with a rounded subapical dilation; 8-13.5
mm.; se Id. (12 mi. ne Howe, Butt Co.); reared from *Juniperus* sp.

TEXANA LeC.

25' Each elytron with basal margin angulate near humerus; prosternum not lobed
in front; protibia of male with an acute subapical tooth; 6.5-10 mm.; ne Id.

IGNICOLLIS Horn

In the Pacific Northwest this species would be expected to occur in *Juni-*
perus spp. Fisher 1942:94 (3).

- 24' Elytra without smooth elevated callosities
 26 Elytral foveae usually conspicuous, transverse and with irregular margins; prosternum not lobed in front; protibia of male with a row of small acute teeth; 11.5-14 mm.; s B. C., Wn., Id., Or. FEMORATA (OL.) (cf. 22')
 26' Elytral foveae when present small and rounded; prosternum with front margin lobed; protibia of male with a subapical tooth or dilation
 27 Clypeus usually shallowly and broadly emarginate in front; front of head brassy or greenish; pronotum approximately 2 1/2 times longer at middle than distance between eyes at vertex; protibia of male strongly notched before subapical dilation; 9-14.5 mm.; sw B. C., w Wn., Or.

NIXA Horn

Reared from *Libocedrus decurrens* and collected from *Thuja plicata* and *Juniperus occidentalis*. Chamberlin 1917:138 (4); 1924:193 (4); 1926:164 (4); 1932:834 (14). Hardy 1927a:C34 (1). Beer and Hatch 1941:121 (12). Fisher 1942:156 (4). Keen 1952:47 (4).

- 27' Clypeus rather deeply and broadly emarginate in front; front of head variable in color, usually coppery or reddish in females and greenish in males; pronotum less than twice as long at middle as distance between eyes at vertex; protibia of male not notched; 6.5-11 mm.; se B. C., e Wn., Id., Or.
 MALI Horn (cf. 15)
 23' Pronotum with surface irregular and uneven, usually with median and lateral depressions and conspicuous callosities on each side of middle and near sides
 28 Antennal segments 4 to 11 in part distinctly yellowish; protibia of male broadened apically but not conspicuously dilated; 12-18 mm.; s B. C., Wn., Id., Or.
 DENTIPES (Germ.)

Commonly attacks many species of *Pinus* and may breed in other species of conifers likewise. Horn 1886a:87 (4). Brittain 1913:16 (1). Chamberlin 1924:191 (4); 1926:147 (234). Stace Smith 1929:71 (1). Beer and Hatch 1941:121 (12).

- 28' Antennal segments 4 to 11 variable in color but not partly yellowish; protibia of male usually with a distinct subapical dilation
 29 Pronotum transversely rugose at middle without a median depression but with irregular depressions on each side of middle and near sides; ventral surface, legs, head and pronotum clothed with long erect hairs; 10.5-14.5 mm.; Wn., n and sw Id., Or.
 DOLATA Horn

Reared from *Abies concolor*, *Pinus ponderosa*, and *Pseudotsuga menziesii* and collected from *Larix occidentalis*, *Pinus contorta*, *P. jeffreyi* and *P. lambertiana*. Horn 1886a:87 (4). Chamberlin 1917:136 (4); 1924:191 (4) (*dolota*); 1926:149 (4); 1932:834 (2). Beer 1940:16 (4); 1949:83 (4). Beer and Hatch 1941:124 (2). Fisher 1942:148 (34). Keen 1952:191 (4).

- 29' Pronotum irregularly punctured at middle, usually with a median depression and 2 or 3 shallow depressions on each side of middle and near sides; abdomen and legs clothed with short subrecumbent hairs; thoracic sterna and head frequently with longer suberect hairs; pronotum with short erect hairs only at sides near hind angles
 30 Males: protibia with a subapical dilation; last abdominal sternite with hind margin very broadly and deeply emarginate; front of head greenish or yellowish
 31 Metatibia slightly bowed; abdominal sternites with a concentration of small densely placed punctures adjoining the sublateral smooth raised areas; ely-

tral apices usually coppery; 9-13 mm.; se B. C. (Mara, McGillivray, and 15 mi. n Elko) SCABRIPENNIS Cast. et Gory (cf. 42)

This predominantly eastern species has been recorded from species of *Pinus*, *Tsuga* and *Picea*. Some western species of these genera probably serve as hosts in the Pacific Northwest. The records of the occurrence of this species in Or. and Wn. under the name *proxima* Kby. by Chamberlin 1929:111 and Beer and Hatch 1941:123 undoubtedly refer to other species.

- 31' Metatibia straight; abdomen more or less uniformly punctured; elytral apices usually not coppery
- 32 Front of head entirely or in part golden in color and usually with tiny sparsely placed punctures which may be somewhat obscured by stout forward-curving short white hairs; protibia with subapical dilation short, evenly rounded without a deep notch before the dilation; 11-17 mm.; s B. C., Wn., n and sw Id., Or. GRANDIS Chamb. (cf. 51)
Hosts: *Pinus contorta*, *P. jeffreyi*, *P. monticola* and *P. ponderosa*. Chamberlin 1938:14 (4). Fisher 1942:155 (4). *monticola* auct nec Fall. Chamberlin 1926:164 (4); 1932:834 (1). Beer and Hatch 1941:122 (12). Fisher 1942:158 (134).
- 32' Without the above combination of characters
- 33 Protibia with subapical dilation abruptly constricted before its apex; front of head with lower portion green and upper portion faintly yellowish; 9.5-13 mm.; s B. C., Wn., n and sw Id., Or. CAURINA Horn (cf. 53')
Adults have been reared from *Pinus contorta*, *P. jeffreyi*, *P. lambertiana* and *P. ponderosa* and collected from *Abies concolor*, *Larix occidentalis*, *Pseudotsuga menziesii* and *Tsuga mertensiana*. Horn 1886a:92 (4). Harvey 1906b:4 (1). Gibson 1914:116 (1). Chamberlin 1917:135 (4); 1924:192 (4); 1926:142 (124). Hardy 1927a:C34 (1). Beer and Hatch 1941:122 (12). Fisher 1942:161 (1234).
- 33' Protibia with subapical dilation evenly rounded or sinuate, not abruptly constricted apically; front of head usually unicolorous
- 34 Mesotibia with subapical dilation sinuate along inner margin; abdomen brassy to purplish in color, shining, frequently with a greenish luster, the last sternite with sublateral ridge absent or weakly developed
- 35 Median lobe of genitalia narrowly rounded or acute at apex and distinctly curved upward; elytral apices usually coppery; front of head usually bronzy green; prosternum with front margin subtruncate; protibia not distinctly notched in front of subapical dilation; 7.5-13 mm.; se B. C., e Wn., Id., e Or. (Pl. VII, fig. 9) TRINERVIA (Kby.) (cf. 46)
The literature records, some of which may refer to other species, indicate the following hosts: *Pinus edulis*, *P. flexilis*, *P. ponderosa*, *P. strobus*, *Picea* sp. and *Pseudotsuga menziesii*. LeConte 1857:17 (4); 1859b:235 (24); 1869:371 (1). Hamilton 1894:29 (1). Harvey 1906b:4 (1). Brittain 1913:16 (1). Chamberlin 1926:174 (4). Hardy 1927:C24 (1); 1948:33 (1). Stace Smith 1929:71 (1). Beer and Hatch 1941:119. Fisher 1942:178 (1234).
- 35' Median lobe of genitalia broadly rounded or subtruncate at apex and not curved; elytral apices usually not coppery; front of head green to golden; prosternum with a broad feebly developed median lobe
- 36 Lateral lobes of genitalia robust and blunt apically; front of head usually bright green; protibia usually with a distinct notch before subapical dilation; 9-12 mm.; sw B. C., Wn., Or. BEERI Barr (cf. 49)
Barr 1969:128 (124).
- 36' Lateral lobes of genitalia rather slender and pointed apically; front of head

usually yellow green to golden; protibia without a distinct notch before subapical dilation; 8-12 mm. ; se B. C. , e Wn. , Id. , e Or.

LARICIS VanD. (cf. 8' and 49')

34' Mesotibia with subapical dilation gradually and evenly expanded; abdomen purplish to dark purplish, last sternite with a weakly to strongly developed submarginal ridge

37 Front margin of prosternum with a well-developed median lobe; 10-12 mm. ; se B. C. BLANCHARDI Horn (cf. 46')

The occurrence of this eastern species in the Pacific Northwest is based on a single specimen from Creston, B. C. identified by Chamberlin which can, perhaps, more properly be assigned to the recently described *columbiana* Barr.

37' Front margin of prosternum truncate or with a feebly developed median lobe

38 Protibia with a distinct notch before subapical dilation; sutural costae of elytra strongly elevated apically, straight and not joined with the other costae; lateral lobes of genitalia distinctly expanded before apex

39 Subapical dilation of protibia rounded; front margin of prosternum with a feebly indicated median lobe; median lobe of genitalia strongly narrowed apically and rounded at apex; 9-12 mm. ; se Id.

BREVILOBOIDES Barr (cf. 52)

Reared from *Pinus flexilis*. Barr 1969:126 (3).

39' Subapical dilation of protibia sinuate; front margin of prosternum truncate; median lobe of genitalia gradually narrowed apically and broadly subtruncate at apex; 11-13 mm. ; Or. FALLI VanD. (cf. 53)

Adults have been reared from *Pinus contorta* and collected from *P. jeffreyi* and *P. ponderosa*. Fisher 1942:180 (4). Keen 1952:191 (4).

38' Protibia usually not notched before subapical dilation; sutural costae usually slightly elevated apically and irregularly curved or joined with other costae; lateral lobes of genitalia more or less parallel or narrowing before apex; if the protibia is notched or the sutural costa of the elytra is elevated apically and straight, the body is more than 13 mm. long

40 Ventral surface of abdomen brassy with a greenish luster; protibia with a feebly developed dilation; 11. 7-14 mm. ; se B. C. , e Wn.

COLUMBIANA Barr (cf. 45)

Collected from *Pinus contorta* and *P. ponderosa*. Barr 1969:131 (12).

40' Ventral surface of abdomen purple

41 Protibia with a notch before the sinuate subapical dilation; genitalia elongate; 15-19 mm. ; se B. C. , e Wn. , n and sw Id. , e Or.

VULCANICA LeC. (cf. 47)

Hosts unknown. LeConte 1861:346 (2). Fall, Jr. N. Y. Ent. Soc. 18, 1910:48 (2). Beer and Hatch 1941:119 (2). Fisher 1942:169 (2). *canadensis* Chamb., Pan-P. Ent. 10, 1934:37 (4). Fisher 1942:165 (14). New synonymy.

41' Protibia not notched, subapical dilation evenly rounded; genitalia robust; 13. 3-17 mm. ; Or. (Diamond L. in Douglas Co. , Todd L. in Deschutes Co.)

CALIFORNICA LeC. (cf. 50)

Reared from *Pinus jeffreyi* and *P. ponderosa* Chamberlin's references (1924:191; 1926:141) recording this species from Or. probably refer to other species.

30' Females: protibia without a conspicuous subapical dilation; last abdominal sternite with hind margin notched, shallowly emarginate or subtruncate; front of head coppery or darkened

42 Side of abdominal sternites densely punctured; 9-13 mm. ; se B. C.

SCABRIPENNIS (Cast. et Gory) (cf. 31)

- 42' Abdomen more sparsely uniformly punctured
- 43 Last abdominal sternite with hind margin feebly to deeply notched at middle
- 44 Last abdominal sternite thickened and roughened apically
- 45 Last abdominal sternite with hind margin shallowly notched at middle, the hind angles rounded; 11.7-14 mm.; se B. C., e Wn.
COLUMBIANA Barr (cf. 40)
- 45' Last abdominal sternite with hind margin deeply notched at middle, the hind angles more or less acute
- 46 Prosternum with front margin at most feebly lobed at middle; abdomen usually brassy with a greenish cast and with purple reflections along sides; elytra usually coppery at apices; 7.5-13 mm.; se B. C., e Wn., Id., e Or.
TRINERVIA (Kby.) (cf. 35)
- 46' Prosternum with front margin strongly lobed at middle; abdomen uniformly purplish or coppery; elytra not coppery at apices; 10-12 mm.; se B. C.
BLANCHARDI Horn (cf. 37)
- 44' Last abdominal sternite not thickened apically
- 47 Last abdominal sternite with hind angles in dorsal view curved inward; 15-19 mm.; se B. C., e Wn., n and sw Id., e Or. VULCANICA LeC. (cf. 41)
- 47' Last abdominal sternite with hind angles narrowly rounded; 9.5-14.4 mm.; sw B. C., w Wn., w Or. SYLVANIA Fall (cf. 8)
- 43' Last abdominal sternite with hind margin broadly emarginate, subtruncate or lobed at middle
- 48 Abdomen shining to brilliant, coppery, occasionally with greenish reflections along sides or at hind margins of sternites 1 to 4
- 49 Elytra with sutural costae usually angulate and joined with a discal costa in front of apex to form a "Y", 3 irregular callosities evident on each elytron; hind margin of last abdominal sternite usually subtruncate with a small smooth area at middle and usually with a broad projecting angulate or notched median lobe or plate; 9-12 mm.; sw B. C., Wn., Or.
BEERI Barr (cf. 36)
- 49' Elytra with sutural costa straight or slightly arcuate, usually not forming a distinct "Y" with a discal costa in front of apex, the callosities not distinctly separated but irregularly swollen and somewhat meshlike; hind margin of last abdominal sternite arcuately emarginate, punctured, occasionally with a median plate-like structure LARICIS VanD. (cf. 8' and 36')
- 48' Abdomen coppery, purplish or dark purplish, the hind margins of sternites 1 to 4 occasionally darkened
- 50 Front margin of prosternum truncate; abdomen never dark purplish, the hind margin of the last sternite shallowly, arcuately to triangularly emarginate, the hind angles rounded; 13.3-17 mm.; Or. CALIFORNICA LeC. (cf. 41')
- 50' Front margin of prosternum feebly to conspicuously lobed at middle; abdomen coppery to dark purplish, the hind margin of the last sternite usually more deeply triangularly emarginate, frequently with a deflexed plate at middle, the hind angles acute
- 51 Front margin of prosternum with a conspicuous lobe at middle; abdomen coppery to purplish; 11-17 mm.; s B. C., Wn., n and sw Id., Or.
GRANDIS Chamb. (cf. 32)
- 51' Front margin of prosternum at most feebly lobed at middle; abdomen usually dark purplish
- 52 Densely punctured areas of upper surface grayish or purplish; hind margin of last abdominal sternite without a deflexed plate at middle of emargination; known only from Craters of the Moon National Monument, se Id.; 9-12 mm.;
BREVILOBOIDES Barr (cf. 39)

- 52' Densely punctured areas of upper surface golden, brownish or purplish; hind margin of last abdominal sternite usually with a deflexed plate at middle of emargination; widely distributed in Pacific Northwest but not in se Id.
- 53 Densely punctured areas of upper surface golden or brownish; last abdominal sternite with deflexed plate of hind margin convex; occurring only in s Or. in the Pacific Northwest; 11-13 mm. FALLI VanD. (cf. 39')
- 53' Densely punctured areas of upper surface brownish or purplish; last abdominal sternite with deflexed plate of hind margin flattened and transverse; widely distributed in the Pacific Northwest; 9.5-13 mm.

CAURINA Horn (cf. 33)

C. breviloba Fall and *C. monticola* Fall have been recorded from several areas of the Pacific Northwest. However, I believe these records to be based on misidentified or incorrectly labeled specimens. The former is known primarily from the Rocky Mountain states and several of the southwestern states and the latter only from southern California.

Subfamily Acmaeoderinae

Tribe Polycestini

10. Polycesta Sol.

Bronzy black to black; elytra coarsely punctured, with prominent costae; front of head with a longitudinal carina; hind margins of abdominal sternites not noticeably prolonged at sides; tarsal claws not toothed; 9-19.5 mm.; w Or. (Pl. VIII, fig. 3) CALIFORNICA LeC.

Oregon specimens have been reared from *Quercus garryana* and *Garrya fremontii*. Other recorded hosts are *Arbutus menziesii*, *Cercocarpus parvifolius*, *Quercus kelloggii*, *Pyrus malus*, *Acer macrophyllum*, *Ceanothus cuneatus* and *Salix* sp. Washington records (Beer and Hatch 1941:101-102; Barr 1949:24-30) are in error. Chamberlin 1924:193 (4); 1926:230 (4); Jr. N. Y. Ent. Soc. 41, 1933:42-43 (4). Beer 1940:13 (4); 1949:82 (4). Barr 1949:24-30 (4).

Tribe Acmaeoderini

11. Chrysophana LeC.

- 1 Disc of pronotum with punctures separated by intervals which are about equal in width to the diameter of the punctures; venter shining cupreous; 9-12 mm.; w Or. (flathead cone borer) CONICOLA VanD.

Larvae have been reported in the cones of *Pinus attenuata* and *P. coulteri*. Van Dyke 1937:105. *placida conicola*, Keen 1958:36 (4). *placida* auct. Burke, Proc. Ent. Soc. Wash. 22, 1920:75 (4).

- 1' Disc of pronotum more closely and more finely punctate, the punctures separated by intervals which are not as wide as the diameter of the punctures; venter bright, shining green; 6-10.5 mm.; s B. C., Wn., Id., Or. (Pl. VIII, fig. 4) PLACIDA LeC.

The larvae mine stumps, limbs, trunks and tops of dying and dead conifers. Hosts: *Pinus contorta*, *P. jeffreyi*, *P. ponderosa*, *P. flexilis*, *P. monticola*, *P. lambertiana*, *P. monophylla* and probably other pines, *Tsuga mertensiana*, *Abies lasiocarpa*, *A. concolor*, *A. magnifica*, *Pseudotsuga menziesii* and

Thuja plicata.

LeConte 1854:17 (4); 1857:17 (4); 1859b:220 (4). Saunders, Cat. Buprestidae 1871:46 (4). Holland 1888:91 (1). Fletcher 1903:97 (1). Kerremans, Mon. Buprestidae 1, 1904:404 (4). Harvey 1906b:4 (1). Gibson 1913:126 (1). Chamberlin 1917:166 (24); 1924:194 (4); 1926:177 (124). Criddle 1922:63 (1). Hardy 1927a:C32 (1); 1942:11 (1). Stace Smith 1929:71 (1). Beer and Hatch 1941:101 (12). Leech 1943:26 (1). Guppy, Col. Bull. 4, 1950:5 (1).

12. *Acmaeodera* Esch.

- 1 Last visible abdominal sternite with a subapical plate or a distinct subapical elevation
- 2 Elytra blackish bronze with numerous small irregular yellowish spots scattered over entire surface and several small submarginal red spots in front of apex, the front angles in side view acute and obliquely anteriorly directed; 8.1-12.8 mm. ; se Id. (Lava Hot Springs) SPARSA Horn
Commonly occurs on flowers in the mountains of the southwestern states in late summer and early fall.
- 2' Elytra variable in color, when with submarginal and subapical red spots then without numerous small yellowish spots over entire surface, the front angles in side view not distinctly obliquely anteriorly directed
- 3 Last visible abdominal sternite with sides strongly reflexed and recurved ventrally at base; elytra with markings consisting of several small irregular yellow or reddish spots and a median spot usually slightly enlarged or transverse; pronotum uniformly densely coarsely punctured; 6-10 mm. ; w Or. DOLOROSA Fall
Recorded by Beer from the wood of *Arctostaphylos viscida*. In California adults are commonly taken on flowers. Beer 1944:107 (4). *fenyesei* Fall.
- 3' Last visible abdominal sternite with sides normally reflexed; elytral markings variable, rarely in the form of small irregular yellow or reddish spots; pronotum without uniform punctation
- 4 Lateral margins of pronotum visible from above throughout; elytra with seventh interstitial space usually feebly elevated from base to behind middle
- 5 Elytra with markings large and yellow, those on basal half tending to be irregular and elongate and on apical half smaller and transverse; 7.5-12 mm. ; w Wn., w Or. (Pl. VIII, fig. 5) CONNEXA LeC.
Known to breed in *Quercus* spp. Adults occur commonly on a variety of flowers. The e Wn. records for this species by Beer and Hatch refer to *idahoensis* Barr. Chamberlin 1924:194 (4); 1926:13-14 (4). Beer 1940:14 (4); 1944:106 (4). Beer and Hatch 1941:102 (24). Barr 1941:69 (4).
- 5' Elytra with markings small and yellow or orange, tending to be irregular and transverse; 8.5-12.5 mm. ; se Id. KNOWLTONI Barr
Adults have been recorded from the flowers of *Penstemon cyananthus*, *Rosa* sp., *Calochortus* sp., *Senecio* spp., *Helianthus nuttalli*, *Cirsium* sp. and *Chrysothamnus nauseosus*. Barr 1969:328 (3).
- 4' Lateral margins of pronotum not visible from above or visible only in front of middle; elytra with seventh interstitial space at most feebly elevated at base
- 6 Elytra brassy to dark brown with markings entirely red or with large submarginal red spots and associated yellow spots
- 7 Brassy; elytra with 4 or 5 large transverse bicolored spots that are yellow

internally and externally and red medially, occasionally unicolorous red; pronotum immaculate; abdominal sternites clothed with long white hairs; 7.5-8.8 mm.; sw Id., Or.

PURSHIAE Fish.

Larvae bore in stems and branches of *Purshia tridentata*. Beer 1944: 108 (4) (*purschiae*). Barr 1969:13 (3).

- 7' Dark brown to cupreous; elytra with 3 or 4 large irregular or broken transverse spots, usually unicolorous reddish, rarely yellowish on disc; pronotum occasionally with a submarginal spot in front of base; abdominal sternites clothed with short dark hairs; 8.8-10.8 mm.; w Or.

PLAGIATICAUDA Horn

Larvae bore in stems and branches of *Arctostaphylos* spp. Beer 1940: 14 (4); 1944:108 (4). Barr 1941:69 (4).

- 6' Elytra brassy to black, usually with variable yellow markings or predominantly yellow, when red markings are present they consist of several small spots along sides behind middle and are associated with a few small usually irregular transverse yellow spots

- 8 Pronotum convex, without discal flattening or a depression but with a large yellow spot at each lateral margin; elytra yellow with irregular black spots or fasciae, occasionally immaculate; front margin of prosternum slightly retracted from front angles of pronotum; hind angles of abdominal sternites 2 to 4 subrectangular; 4.8-7 mm.; s Id.

IMMACULATA Horn

Larvae work in the roots of *Eurotia lanata*. Adults have been found in the flowers of *Opuntia* spp., *Sphaeralcea* spp., and on the foliage of the larval host. Barr 1969:16 (3) *pulchella* auct., Weld, Proc. Ent. Soc. Wash. 58, 1956:56 (3).

- 8' Pronotum with disc flattened or feebly longitudinally depressed; elytra variable in color, usually dark with yellow markings; front margin of prosternum distinctly retracted from front angles of pronotum; hind angles of abdominal sternites 2 to 4 acute

- 9 Base color of upper surface bronzy; pronotum more or less trapezoidal, broadest at base and with a yellow spot at each lateral margin on basal half; elytra with yellow markings most extensive on basal half; 6-10 mm.; w Or.

HEPBURNII LeC.

Adults are common on flowers, especially Compositae. Larvae are reported to work in *Quercus* spp. Beer 1944:107 (4).

- 9' Base color of upper surface blackish; pronotum usually broadest in front of base, sides usually arcuate, lateral yellow spot when present small; elytral markings yellowish, occasionally in part reddish, uniformly distributed or most extensive on apical half

- 10 Last abdominal sternite with a subapical thickened elevation which is usually irregularly punctured; pronotum black without a metallic luster; elytral markings consisting of small irregularly transverse yellowish spots and frequently with several small reddish spots along sides near apex

- 11 Subcylindrical; pronotum broadest at or behind middle, the sides strongly arcuate, the disc convex with a faintly indicated median depression; last abdominal sternite with subapical elevation usually not undercut at apex; 5.8-7 mm.; w Or.

NEXA Fall

Adults have been collected from the branches of *Ceanothus cuneatus* and *Quercus* spp., which may serve as hosts. Larvae have been reared from *Cercocarpus betuloides*. *angelica* Fall var. *nexa* Fall. Beer 1944:106 (4).

- 11' Robust; pronotum usually broadest at or near base, the sides straight or feebly arcuate, the disc broadly subflattened; last abdominal sternite with

subapical elevation usually undercut at apex, occasionally platelike; 5.8-9 mm.; w Or.

ANGELICA Fall

Larvae bore in the wood of *Ceanothus cuneatus* and *Quercus californica*. Adults are found on the branches of the larval hosts and on various flowers, especially *Lotus* sp. and *Eriodictyon* sp. Beer 1940:14 (4). Barr 1941:106 (4).

10' Last abdominal sternite with a smoothly margined subapical plate that may be small in size; pronotum black, usually with a distinct metallic luster; elytral markings never in part reddish, usually large and irregular

12 Pronotum black with a purplish luster, the discal punctures shallow or with their margins not sharply defined; disc of elytra with silvery hairs bent or somewhat crooked, usually about as numerous as the dark hairs, the markings transverse or somewhat labyrinthicate; 5.8-7.8 mm.; s Id., e Or.

BISHOPIANA Fall

Larvae are reported from *Atriplex canescens* and Idaho specimens have been reared from the roots and main branches of *A. confertifolia*. Adults have been found on flowers of *Sphaeralcea* sp., *Achillea* sp., *Rosa* sp., *Tetradymia glabrata* and *Townsendia* sp. Chamberlin 1929:111 (4); 1932:835 (4). Beer 1944:106 (4).

12' Pronotum black with an aeneous or brassy luster, the discal punctures sharply defined and deep; disc of elytra with silvery hairs when present erect to sub-erect and less numerous than the dark hairs

13 Elytra with dark-brown or blackish hairs, the markings tending to be more or less transverse; pronotum immaculate; spot toward each lateral margin; abdominal sternites 2 to 4 usually sparsely and shallowly punctured; 8.8-11.5 mm.; s Id. (4 mi. s of Bruneau, Owyhee Co.), e Or. (Cave Cr. near Durkee in Baker Co.)

ACUTA LeC.

13' Elytra with brown or pale hairs, the markings tending to be irregular or elongate; pronotum occasionally with a small sublateral yellow spot; toward each lateral margin abdominal sternites 2 to 4 more densely and deeply punctured

14 Broader, more robust; elytra subflattened, markings labyrinthicate; 6.1-10.5 mm.; w Or.

LABYRINTHICA Fall

Beer 1944:107 (4).

14' Narrower, more elongate; elytra subconvex, the markings tending to be linear; 5.5-9.5 mm.; w Or.

RETIFER LeC.

Larvae work in the wood of *Quercus* spp.; adults occur on various flowers. *acuta* auct. Chamberlin 1926:10 (2) (*actua*). Van Dyke 1942:102 (2). Beer 1944:105 (4).

1' Last visible abdominal sternite without a subapical plate or elevation

15 Pronotum without entire lateral margin or with distinct front angles; elytra clothed with very short hairs, the markings vittate or irregular; abdomen microreticulate, without distinct punctures; 4.5-6.8 mm.; s B. C., Wn., n and sw Id., w Or.

GEMINA Horn

Adults are found on flowers of *Eriogonum* spp. or resting on the ground or on rocks; larval habits unknown. Chamberlin 1924:194 (4); 1926:20 (4); 1932:835 (4). Beer 1944:107 (4). var. *nebulosa* Horn. Beer 1944:107 (4).

15' Pronotum with lateral margins and front angles distinct; elytra clothed with long dark hairs, the markings forming distinct to irregular fasciae or spots; abdomen distinctly punctured

16 Elytra blue to blue black with 2 or 3 pairs of frequently transverse red spots extending from lateral margins behind middle; pronotum with lateral margins

not distinctly visible from above; 6.7-9.8 mm.; w Or.

MARIPOSA Horn

Adults occur on *Ceanothus cuneatus* which is probably the host. Beer 1944:108 (4).

- 16' Elytra bronzy to bronzy black, the markings usually yellow, if reddish they are small and irregular; pronotum with lateral margins entirely or in part visible from above
- 17 Elytra with small irregular reddish markings, the seventh interstitial space feebly elevated on basal half; 8-12 mm.; se B. C., Wn., Id., Or.

VANDYKEI Fall

Hosts: *Ceanothus integerrimus*, *C. velutinus* and *Quercus wislizenii*; adults in Idaho have been collected from flowers of *Rosa* sp. and the foliage of *Cercocarpus ledifolius*. Fall 1899:23 (2). Kerremans, Mon. Bupres. 2, 1906:143 (2). Chamberlin 1924:194 (4); 1926:40 (24). Beer and Hatch 1941:103 (2). Beer 1944:109 (4). Leech 1947a:106 (1).

- 17' Elytra with markings consisting of large rounded or transverse yellow spots or irregular fasciae, the seventh interstitial space not elevated
- 18 Elongate, subflattened; pronotum brown or brassy, immaculate, the lateral margins visible from above throughout except occasionally at extreme base, the disc usually sparsely punctured; elytra brown or brassy, the markings rounded or transverse spots; abdomen brown or darkened, with a brassy luster
- 19 Elytra with 3 or 4 pairs of large round spots along the sides from behind the umbone to near the apices and which may be joined longitudinally; pronotum with irregular silvery hairs present near sides; 7.1-9.2 mm.; w Or.

SINUATA VanD. subsp. SEXNOTATA VanD.

Host: *Ceanothus cuneatus*; adults can be found on its foliage. Barr 1941-69 (4). *simuata* var. *sexnotata* VanD. Beer 1940:14 (4); 1944:109 (4).

- 19' Elytra with 3 pairs of smaller transverse spots behind middle along sides and occasionally with a small additional spot on each side in front of middle; pronotum with pubescence at sides uniformly dark; 7-9 mm.; w Or. (Medford)

SIMULATA VanD.

In California associated with *Quercus* sp.

- 18' Robust, subconvex; pronotum black, occasionally with a bronzy luster, rarely with a small yellow spot at sides, the lateral margin visible from above in front of middle, the disc usually densely punctured; elytra black, the markings usually in the form of 4 irregular or broken fasciae; abdomen black; 7-12.7 mm.; se B. C., e Wn., Id., Or. IDAHOENSIS Barr

Larvae occur in the wood of *Cercocarpus ledifolius* and *Celtis occidentalis*; adults on flowers of *Balsamorhiza* spp., *Eriophyllum* sp., *Achillea millefolium*, *Erysimum* sp. and *Taraxacum* sp. Barr 1969:331 (1234) *variegata* auct. Fall, 1899:23 (1). Harvey 1906b:4 (1). Chamberlin 1924:194 (4); 1926:40-41 (34); 1929:111 (4); 1932:835 (124). Beer 1940:109 (4); 1944:109 (*variegata*); 1949:83 (3). Beer and Hatch 1941:102 (2). Barr 1941:69 (4). *connexa* pars, Beer and Hatch 1941:102 (2).

The Pacific Northwest records of *flavosticta* Horn (Chamberlin 1926:20), *quadrivittata* Horn (Chamberlin 1929:111), and *tubulus* (F.) (Chamberlin 1926:39) are based on erroneously labeled or misidentified specimens.

Subfamily Agrilinae

Tribe Agrilini

13. *Agrilus* Steph.

- 1 Antennae serrate from fourth segment
- 2 Pygidium with a projecting carina
- 3 Elytra with pubescent spots that in some species may be faintly indicated
- 4 Elytra blackish, not strongly shining, the pubescent spots golden; front of head densely pubescent, the surface usually obscured; 7-11 mm.

GRANULATUS (Say)

Hosts include *Populus nigra* var. *italica* and *P. deltoides*. This common eastern species was recorded from Id. by Chamberlin 1926:64; its occurrence in the Pacific Northwest has yet to be verified.

- 4' Elytra cupreous to greenish or blue, strongly shining, the pubescent spots whitish; front of head not densely pubescent, the surface visible
- 5 Abdominal sternites with more or less distinct pubescent spots along sides; male with first abdominal sternite flattened at middle, the basal half of the second sternite feebly depressed at middle; 5.5-7 mm.

FULMINANS Fish.

Host: *Salix* spp. Van Dyke 1942:124 (14). Ritcher, Col. Bull. 9, 1955:16 (4).

- 5' Abdominal sternites with pubescence forming at most very feebly indicated spots along sides; male with first abdominal sternite feebly concave at middle, the second sternite with a broad moderately deep depression at middle; 7.5-9.75 mm.; se B. C., e Wn., n and sw Id., Or. POPULI Fish.
- Host: *Populus* spp. Fisher 1928:150-153 (1). Chamberlin 1932:836 (4). Beer and Hatch 1941:127 (12). *niveiventris* auct. Chamberlin 1924:193 (4); 1926:71 (14). *trichocharpae* Chamb. 1929:112-113 (124).

- 3' Elytra uniformly pubescent, without spots
- 6 Head and pronotum red, elytra black; pronotum clothed with golden hairs at middle and sides, the prehumeral carinae absent; prosternum with front margin broadly rounded; 8-9.75 mm.; se B. C., e Wn., n and sw Id., Or.

VITTATICOLLIS Rand.

Hosts: *Amelanchier canadensis*, *Crataegus* spp., *Pyrus* spp., *Prunus* spp. Chamberlin 1917:169 (4); 1924:193 (4); 1926:85-86 (4). Gibson 1919:111 (1). Fisher 1928:104-107 (4). Beer and Hatch 1941:126-127 (2). Stace Smith 1945:14 (1).

- 6' Body above blackish, head and pronotum sometimes with coppery reflections; pronotum inconspicuously clothed with short whitish hairs, the prehumeral carinae distinct; prosternum with front margin emarginate
- 7 Male genitalia with lateral lobes narrowed apically, blunt at apices, the bevel of the inner margin of each lobe broad ventrally; vertex and pronotum of male and entire head of female usually with coppery reflections; 5.5-13 mm.; se B. C., n Id.

(bronze birch borer) ANXIUS Gory

Hosts: *Betula* spp. Gibson 1919:111 (1). Evenden IPSB 1921:181 (3). Chamberlin 1924:193 (3); 1926:49-51 (3). Fisher 1928:164 (14). Keen 1938:36 (3); 1952:46 (1). Beer and Hatch 1941:127 (14). Barter and Brown 1950:246-247 (13). Benoit 1965:772. MacAloney, USDA For. Pest Leaflet 111, 1968:1 (3). Several of the above references may refer to *livragus* Bart. et Brown.

- 7' Male genitalia with lateral lobes more strongly narrowed apically, pointed at apices, the bevel of the inner margin of each lobe narrow ventrally; head and pronotum with at most indistinct coppery reflections; 6.8-11.5 mm.; se B. C., e Or. LIRAGUS Bart. et Brown
Host: *Pupulus* spp. Barter and Brown 1950:247-248 (14). Benoit 1965:769.
- 2' Pygidium without a projecting carina
- 8 Elytra bronzy green to blue with white pubescent spots; pronotum punctured and with a broad deep median depression extending from base to near front margin, the prehumeral carinae absent; head deeply grooved between eyes; 9-13 mm.; se B. C., e Wn., Id., Or. (Pl. VIII, fig. 6)
WALSINGHAMI Cr.
Host: *Chrysothamnus nauseosus*. Crotch 1873e:95 (4). Horn 1891:312 (34). Chamberlin 1924:195 (4); 1926:86 (34). Fisher 1928:176-178 (134). Beer and Hatch 1941:128 (13).
- 8' Without the above combination of characters
- 9 Front margin of prosternum broadly rounded; pronotum not depressed near sides, the prehumeral carinae feebly developed; elytral apices finely serrate; 4-6.2 mm.; e Wn., n Id., w Or. HYPERICI Creutz.
Host: *Hypericum perforatum*. CIPR 1955:242 (1). This European species has been introduced into several areas of the Pacific Northwest for the control of its host, which is an important poisonous rangeland weed. Harris et al., Can. Ent. 101, 1969:2 report that the species has not survived in B. C.
- 9' Front margin of prosternum subtruncate or feebly emarginate; pronotum with a broad shallow depression at sides
- 10 Elytral apices finely serrate; pronotum with sides nearly straight, gradually expanded anteriorly, the prehumeral carinae well-developed; anterior tarsal claws with teeth feebly turned inward; 5.7-7.5 mm.; w Or. ARBUTI Fish.
Hosts: *Arctostaphylos* spp. and *Arbutus menziesii*. Fisher 1928:50-53 (4). Chamberlin 1932:836 (4). Keen 1952:46 (4). *manzanitae* Chamb. 1929:113 (4).
- 10' Elytral apices coarsely serrate; pronotum with sides arcuate, broadest in front of middle, the prehumeral carinae feebly developed or obsolete; anterior tarsal claws with teeth not turned inward
- 11 Body coppery to bronzy green and bronzy black; 4.75-8.5 mm.; s B. C., Wn., Id., Or. (Pl. VIII, fig. 7) POLITUS (Say)
Hosts include *Salix* spp. and *Acer* spp. Harvey 1906b:4 (1). Chamberlin 1924:194 (4); 1926:77 (1234); 1932:836 (4). Hardy 1927a:C34 (1). Fisher 1928:213-218 (1). Stace Smith 1929:71 (1). Beer and Hatch 1941:128 (2).
- 11' Body blue; 6-9 mm.; s B. C., Wn., Id., Or. BURKEI Fish.
Host: *Alnus* spp. Chamberlin 1924:194 (4) (*burkei*). *politus burkei* Fish. Chamberlin 1926:56 (14). Fisher 1928:219-220 (14) (*politus burkei*). Keen 1952:46 (24) (*politus burkei*). *politus* var. *burkei* Fish. Beer and Hatch 1941:129 (12).
- 1' Antennae serrate from fifth segment
- 12 Pronotum feebly rugose; head indistinctly grooved between eyes; abdominal sternites with pubescence rather fine and sparse at middle, becoming coarser and forming spots along sides; elytra with a pair of indistinct longitudinal pubescent vittae; 6-7.2 mm.; s Id., e Or. PUBIFRONS Fish.
Larvae bore in the roots of *Chrysothamnus viscidiflorus*; adults occur on the foliage and flowers of the host. Fisher 1928:237-239 (3). Chamberlin

1932:836 (34). Barr 1969:16 (34).

- 12' Pronotum distinctly rugose; head longitudinally grooved between eyes; abdominal sternites uniformly and densely clothed with coarse hairs; elytra with a pair of distinct longitudinal pubescent vittae; 4.5-6 mm.; s Id. (3 mi. n Murphy in Owyhee Co.; 12 mi. w Mt. Home; 2 mi. w Bridge in Cassia Co.)

FELIX Horn

In Id. larvae occur in the stem and roots of *Grayia spinosa* and *Atriplex confertifolia*; adults are found on flowers of *Sphaeralcea* spp.

14. *Brachys* Sol.

Broadly ovate; head and pronotum black, occasionally with an aeneous luster; elytra black with a bluish or purplish or brassy luster, feebly roughened and finely punctured especially on the basal half, the pubescence irregularly arranged, mostly fulvous, occasionally gray or cinereous, denser on apical third; abdomen shining, sparsely clothed with very short white hairs, the hind margin of the last sternite broadly rounded, not fringed with long hairs; 3-4.5 mm.; se B. C. (7 mi. n Oliver), e Wn. (Tieton) (Pl. VIII, fig. 8)

AEROSUS Melsh.

Because of the poor state of knowledge of the components of this genus the present identification is tentative. The B. C. record is based on a specimen in the Canadian National Collection in Ottawa and has been determined by G. B. Vogt as "*Brachys* sp. of *aerosus* Melsh. complex." The Wn. record is based on a specimen in the USNM. I have seen neither specimen. The B. C. specimen was collected from black birch. Beer and Hatch 1941: 129 (2).

15. *Taphrocerus* Sol.

Black, head and pronotum with a faint aeneous tinge; pronotum widest at base, with a broad shallow depression in front of base on both sides of middle, the surface apparently with large shallow punctures and very sparsely clothed with short recumbent white hairs; elytra without a lateral carina, slightly roughened at base, with an indistinct paired cluster of hairs at about apical fourth and with the serially arranged punctures large and deep on anterior half becoming small and shallow on apical half; 3.4 mm.; e Wn. (Crab Creek, 10 mi. w Moses L., May 5, 1949, G. H. Nelson) (Pl. VIII, fig. 9)

Taphrocerus sp.

Additional specimens are needed before a species identification can be made.

Suborder Phytophaga

(Tetramera Leach 1815, Pseudotetramera Westwood
1839, Phytophaga LeConte and Horn 1883, Cerambycoidea
Leng 1920, Chrysomeloidea Crowson 1953)

Key to Families

- 1 Antennae with basal segment usually evidently enlarged, the outer segments usually scarcely enlarged (except Chrysomelidae Camptosomata); eyes variable; elytra each usually with a more or less evident epipleuron, seldom strongly abbreviated exposing the hind wings; metacoxae narrow, narrower toward the sides, or parallel; pygidium usually covered by elytra or, if

- exposed, usually not declivous (except Chrysomelidae Camptosomata)
- 2 Antennae longer or shorter than body, inserted close to inner margin of eye and frequently on frontal prominences; pronotum usually narrower than elytra, usually with side margins; body usually elongate; metafemora never enlarged for jumping; eyes entire or emarginate or divided; head prolonged behind eyes; tibiae with a pair of evident spurs CERAMBYCIDAE
- 2' Antennae frequently shorter than body, when longer the metafemora are enlarged for jumping; antennae not inserted on frontal prominences; pronotum narrower than or as wide as elytra, rarely with side margins; body elongate or oval; metafemora sometimes enlarged for jumping; eyes usually entire, rarely (Crioceris) emarginate; head prolonged behind the eyes or not so; tibiae usually without spurs, when present they are either difficult to observe and, except in Syneta, the head is not prolonged behind the eyes (certain Galerucinae) or (Orsodacninae) the antennae are inserted at an appreciable distance from the eye CHRYSOMELIDAE
- 1' Antennae with basal segment scarcely enlarged, the outer segments beginning with about the fifth subequally enlarged; elytra without epipleura, abbreviated behind and exposing a declivous pygidium; metacoxae large, broadly and more or less evenly arcuate behind; antennae shorter than body; pronotum with distinct side margins, the base subequal to base of elytra; body oval, the ventral surface strongly convex; head not prolonged behind eye; tibiae with inconspicuous spurs; antennae inserted adjacent to the very deep ocular canthus BRUCHIDAE

These 3 families are biologically specialized as larvae: the Cerambycidae mostly for life in the wood of living or dying trees; the Chrysomelidae for life on or in the leaves or on the roots of plants or in the stems of herbaceous plants; the Bruchidae for life in the seeds of plants, especially the Leguminosae.