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THE CHRYSOMELID BEETLES *LUPERODES BIVITTATUS*
(LECONTE) AND *VARICORNIS* (LECONTE) AND SOME
ALLIED SPECIES

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Most of the vittate and yellow-brown species of *Luperodes* Motschulsky from the United States are at present listed under the names *L. bivittatus* (LeConte) and *L. varicornis* (LeConte), respectively. There are at least five vittate species, all very similar in markings, confused with *bivittatus*, and I have found 11 of the yellow-brown species that in one collection or another have been labeled *varicornis*. Both vittate and yellow-brown species are small and inconspicuous and not particularly noteworthy, with the exception of *L. brunneus* (Crotch), which Horn synonymized with *varicornis*. *L. brunneus* is a well-known pest throughout the South on corn and cotton.

There is considerable question whether some of the species should not be removed from the genus *Luperodes*. They have certain characteristics in common with the species of that genus having black or metallic coloration, but in general are not closely related. Schaeffer has described one species, actually synonymous with *varicornis* (LeConte), as belonging to the genus *Monolepta*, mainly because of its closed anterior coxal cavities. Some of the others discussed here have closed anterior coxal cavities and are related to species from Mexico and Central America described by Jacoby and also assigned to the genus *Monolepta*.

The type of *Luperodes* is *L. alboplagiatus* Motschulsky from Ceylon, and the type of *Monolepta* is *M. pauperata* Erichson from Angola. Maulik, in treating these two groups in the Fauna of British India, states that he does not recognize the character of the coxal cavity as of generic value and unites them under the earlier name *Monolepta*. He does not make any attempt to study the genus as a whole. Laboissière, in the Supplement to the Catalogus Coleopterorum, part 78 (Galerucinae), believes "it is inadmissible" to separate the genus *Luperodes* and *Monolepta* on the character of the open or closed coxal cavities. Because I have not studied either of the two genotypes and because of the fact that they are so remote geographically from the American species, I hesitate to make any decision as to the generic position of the American species. At this time it seems wisest to leave these American species tentatively in the genus *Luperodes* under which they are listed in Leng's catalog. Later the species will no doubt be assigned to several genera. I hope this study may awaken an interest in the group that will lead some one to make observations concerning the biology and food habits. These are almost unknown except in the case of *L. brunneus* (Crotch).

KEY TO THE SPECIES OF LUPERODES

1. Elytra with sutural, lateral, or marginal vittae..... 2
 Elytra not vittate, yellow-brown, brown, or black, sometimes
 pale with dark sutural and lateral edges or with indefinite dark
 shadings along suture or sides..... 8
2. Antennae entirely dark, without pale basal or apical joints..... 3
 Antennae with basal joints usually paler, remainder usually dark
 but sometimes with last four or five joints paler..... 4
3. A sutural and lateral vitta, margin always pale, pronotum fre-
 quently with a medium dark streak..... *monorhabdus*, new species
 A sutural and marginal dark edge or vitta, but no lateral vitta,
 pronotum without median dark spot or streak.... *californicus* Schaeffer
4. Elytra with lateral margin partially or entirely dark..... 5
 Elytra with lateral margin entirely pale..... 6
5. Elytra with sutural, lateral, and marginal vittae, the last being
 present only from below humerus and uniting at apex with
 sutural vitta. Southern California..... *melanolomatus*, new species
 Elytra with sutural and marginal vittae, marginal vitta and
 frequently sutural being present only in basal part. Texas.
 *nebrodes*, new species
6. Abdomen in male with a pair of tubercles..... *tuberculatus*, new species
 Abdomen in male without tubercles..... 7
7. Elytra not depressed, somewhat convex, so that lateral vitta
 appears next to margin when viewed from above; dark beneath.
 Southern California..... *diegensis*, new species
 Elytra somewhat depressed, lateral vitta plainly not next to
 margin when viewed from above, sometimes pale beneath.
 California north of Los Angeles..... *bivittatus* (LeConte)

8. Elytra entirely black..... *flavoniger*, new species
 Elytra pale yellow or brownish, sometimes with dark sutural,
 lateral, or marginal shadings..... 9
9. Elytra entirely pale, without dark sutural, lateral, or marginal
 shadings..... 10
 Elytra brown or pale yellow, with sutural, lateral, or marginal
 dark edges or shadings..... 16
10. First tarsal joint of hind leg not so long as remainder together,
 aedeagus short and relatively broad..... 11
 First tarsal joint of hind leg approximately equal to or longer
 then rest together, aedeagus long and relatively narrow..... 13
11. Antennae in male much enlarged..... *crassicornis* Fall
 Antennae in male not much enlarged..... 12
12. Elytra very polished, head brownish..... *curvatus* Fall
 Elytra not polished, head pale..... *vandykei*, new species
13. Antennae uniformly dark, without paler basal joints. *popenoei*, new species
 Antennae with the basal joints paler than rest..... 14
14. Narrowly oblong, aedeagus spoon-shaped. New Mexico.
elachistus, new species
 Oblong oval, aedeagus not spoon-shaped, with a narrow tip..... 15
15. Aedeagus with tip long, narrowly compressed, and, when viewed
 from side, irregularly curved. Texas..... *pallidulus*, new species
 Aedeagus very narrow its entire length and when viewed from
 side somewhat arcuate but not much curved..... *brunneus*, pale form
16. Elytra rugose, semicostate. Lower California..... *rugipennis*, new species
 Elytra not costate or rugose. United States..... 17
17. Brownish..... *brunneus* (Crotch)
 Yellow, with brown shadings or edges..... 18
18. Narrowly oblong, very tiny (3 mm.). Chiricahua Mountains,
 Ariz..... *chiricahuensis*, new species
 Ovate..... 19
19. Very conspicuously and densely punctate..... *punctatissimus*, new species
 Punctate but not very conspicuously so..... 20
20. Interocular space less than half width of head, eyes large,
 Baboquivari Mountains and vicinity, Ariz..... *ocularis*, new species
 Interocular space half or more than half width of head..... 21
21. Aedeagus very narrow most of its length when viewed from
 above; elytra with suture more or less darkened and often
 with a median brownish area sometimes extending across it.
varicornis (LeConte)
 Aedeagus broader, narrowed only toward tip; elytra pale
 without dark shadings, only sutural and marginal edges
 dark..... 22
22. Aedeagus 2-parted at tip..... *brunneus*, pale form
 Aedeagus not 2-parted at tip..... *convexus*, new species

LUPERODES BIVITTATUS (LeConte)

PLATE 6, FIGURES 14, 15

Phyllobrotica bivittata LECONTE, Proc. Acad. Nat. Sci. Philadelphia, 1859, p. 81.
Luperus bivittatus LECONTE, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 209.
Luperodes bivittatus HORN, Trans. Amer. Ent. Soc., vol. 20, p. 110, 1893.

LeConte's type of *bivittatus* in the LeConte collection at Cambridge is labeled Fort Tejon and is probably the only specimen that he had

when he described the species. Following it are five other specimens, all females, with the label "Cal." and a male with the label "Cala." The type specimen, a male, is pale yellow, with a narrow sutural and moderately wide lateral vitta extending from the base over the humerus but not reaching the apex. The head is polished, impunctate, rounded, a deeper yellow than the prothorax, with the mouthparts having darker tips. The interocular space is more than half the width of the head. The antennae are pale, not extending to the middle of the elytra, the fourth joint nearly twice as long as the third. The prothorax is widest before the middle, is a third wider than long with a faint suggestion of spotting, and is polished and nearly impunctate. The scutellum is pale. The dark elytral vittae are joined about the base with a narrow dark line. The elytra are not very distinctly punctate. The body beneath is pale, the breast slightly deeper yellow-brown in coloring. The anterior coxal cavities are open.

A series of specimens in the Van Dyke collection at the California Academy of Sciences, collected at Potwisha, Sequoia National Park, Calif., altitude 2,000-3,000 feet, corresponds entirely with the LeConte type. I have examined a great many other specimens from localities in general nearer the coast and from farther north in California that present wider dark elytral vittae, a dark scutellum, and usually entirely dark undersurface. These specimens have been taken at Auburn (Placer County), Carrville (Trinity County, altitude 2,400-2,500 feet), Chico (Butte County), Davis (San Joaquin County), Fairfax (Marin County), Grass Valley (Nevada County), Lake City (Modoc County), Los Gatos (Santa Clara County), Moraga Valley (Contra Costa County), Morgan Hill (Santa Clara County), Napa County, Paraiso Springs (Monterey County), Santa Cruz Mountains (Santa Clara County), Santa Rosa, Walnut Creek (Contra Costa County), Vinehall (Contra Costa County). In all these the aedeagi appear to be very much the same. The darker and more northern and coastal specimens may be simply a color form.

There are also specimens from Graniteville (Nevada County), Cayton (Shasta County), and Eldorado County, all inland and from mountainous localities, that are somewhat intermediate, being paler in coloring, particularly of the undersurface, but not quite so pale as the type. In these, too, the aedeagus is indistinguishable from that of the specimens corresponding to the LeConte type.

LUPERODES DIEGENSIS, new species

PLATE 6, FIGURE 16

About 4-5.5 mm. in length, elongate oblong, shining pale yellowish with narrow dark elytral vittae at suture and from the humerus nearly to the apex, body beneath dark, last four or five antennal joints tending to be slightly paler than basal ones.

Head polished, deeper reddish yellow in coloring, smoothly rounded over the occiput, frontal tubercles well defined, interocular space very wide, over half the width of the head. Antennae extending nearly to the middle of the elytra, third joint shorter than fourth, in color varying from pale to reddish brown, but in darker specimens the four or five apical joints becoming paler than the basal ones. Prothorax about a third wider than long, somewhat convex, with rounded sides, shining, finely alutaceous, usually deeper reddish yellow than elytra. Scutellum usually dark. Elytra oblong, somewhat convex, elytral humeri not prominent, only faint trace of intrahumeral depression, finely punctate; pale yellow with sutural edges piceous nearly to apex, and a narrow lateral vitta extending over the humerus nearly to the apex. Body beneath usually dark with pale pubescence, legs pale, all tibiae spurred, first tarsal joint of hind leg barely as long as the remainder together. Anterior coxal cavities open. Length 4.2–5.8 mm., width 1.9–2.5 mm.

Type, male, and 6 paratypes (5 female, 1 male), U.S.N.M. No. 55110.

Type locality.—San Diego, Calif., collected January 1, 1909, by Ricksecker on the flowers of *Adenostoma*.

Other localities.—Piñon Flat, San Jacinto Mountains, collected by E. S. Ross; in the mountains near Claremont, collected by C. F. Baker.

Remarks.—This species, confused in collections with *L. bivittatus* (LeConte), seems to occur only in southern California. It is more convex than *bivittatus*, and the aedeagus is different.

LUPERODES MONORHABDUS, new species

PLATE 6, FIGURE 22

About 4.5 mm. in length, elongate oblong, moderately shining, yellow-brown, with reddish-brown antennae and usually a median spot or vitta on the pronotum, and on the elytra a sutural and a lateral vitta, the body beneath tending to be dark.

Head polished, pale, with the tips of the mouth parts slightly deeper in coloring, rounded and polished over the occiput, tubercles well defined, with a transverse depression above, interocular space over half the width of the head. Antennae reaching scarcely to the middle of the elytra, third joint not so long as fourth, all joints deep reddish brown or darker. Prothorax somewhat convex with rounded sides, scarcely a third wider than long, polished, very finely punctate, deep yellow or reddish and usually with a dark median vitta, but this sometimes lacking. Scutellum dark. Elytra oblong, somewhat convex, with moderately prominent humeri and short intrahumeral depression, shining, very finely punctate; pale, a dark sutural vitta not reaching the apex, and a lateral one extending over the humerus and about the scutellum to join the sutural one. Body beneath dark, shining, with a

pale pubescence; anterior coxal cavities open. Legs pale, each tibia spurred, first hind tarsal joint not so long as the rest together. Length 4.2-4.9 mm., width 1.8-2 mm.

Type, male, and 2 paratypes (female), U.S.N.M. No. 55111.

Type locality.—Los Angeles, Calif., collected by Coquillett.

Remarks.—The uniform color of the dark antennae, in which neither basal nor apical joints are paler, and the dark vitta that is usually present on the pronotum differentiate this species from the other vittate ones. Two specimens in the Los Angeles Museum are labeled Los Angeles County, collected by M. Albright, and "Cal.," respectively.

LUPERODES TUBERCULATUS, new species

PLATE 6, FIGURE 19

About 4 mm. in length, oblong oval, faintly shining, yellow-brown, with narrow sutural and lateral piceous vittae on the elytra. In male a pair of tubercles in the middle of the abdomen.

Head shining, pale yellow-brown, smoothly rounded over the occiput, a transverse line above the tubercles extending from eye to eye, interocular space over half the width of the head; a slight protuberance between the antennal bases. Antennae entirely pale, extending to the middle of the elytra, second and third joints about equal, fourth not so long as second and third together. Prothorax about a fourth wider than long, with arcuate sides, not very convex, surface shining, very finely punctate, entirely pale. Scutellum pale. Elytra oblong, smoothly rounded with small humeral prominences, shining very finely punctate; pale yellow-brown, with the sutural edges piceous almost to the apex, and a narrow lateral vitta extending over the humerus nearly to the apex, these two joined by a dark edge about the base and scutellum. Body beneath entirely pale. In male a pair of tubercles in the middle of the abdomen. Anterior coxal cavities open, hind tibiae spurred (others not visible). First hind tarsal joint not quite so long as the remaining ones together. Length 4-4.5 mm.; width 1.8-2 mm.

Type, male, and 3 paratypes (2 male, 1 female), the type and 1 male paratype in collection of the Los Angeles Museum, 2 paratypes in National Museum collection, U.S.N.M. No. 55112.

Type locality.—Camp Baldy, at the foot of Old Baldy Mount, San Antonio Mountains in San Bernardino County, Calif., collected June 17, 1916, by L. L. Muchmore.

Remarks.—The outstanding peculiarity of this species is the presence of a pair of well-developed tubercles on the abdomen of the male. I have not seen these on any other American beetle, although they are known to occur in such genera of the Galerucinae as *Phyllobrotica* and *Hoplasoma* in Europe and Asia.

LUPERODES MELANOLOMATUS, new species

PLATE 6, FIGURE 17

About 5-6 mm. in length, oblong, somewhat shining, pale, with very narrow dark sutural and lateral elytral stripe and with the edge of the elytra from below the humerus or in apical half darkened; breast, sometimes abdomen, and usually tibiae and tarsi and sometimes half of femora dark.

Head pale, smooth, rounded over the occiput, tubercles defined, interocular space more than half the width of the head. Antennae dark with first three basal joints pale, extending below the middle of the elytra, third joint half as long as the fourth. Prothorax about a fourth wider than long, widest anteriorly and narrowed toward the base; disk not very convex, faintly shining, very finely alutaceous, entirely pale. Scutellum reddish or piceous. Elytra oblong, not very convex, somewhat shining, very finely alutaceous and finely punctate; a dark reddish-brown or piceous sutural vitta, sometimes narrowing so that only the edges of the suture are dark, and a narrow lateral vitta extending over the humerus and base and connecting with the sutural vitta about the scutellum, the lateral vitta not reaching the apex of the elytron, but the sutural vitta usually extending to the apex and joining there with a dark marginal edge which extends to the epipleura and runs along the margin from below the humerus or sometimes from about halfway down the elytron. Body beneath in pale specimens pale with reddish-brown breast, but in darker specimens both breast and abdomen often darkened. Legs usually pale at base, often femora entirely pale, but usually the femora dark at the apex, tibiae and tarsi dark. First tarsal joint of hind leg nearly as long as the remainder together. All tibiae spurred. Length 5-6.5 mm.; width 1.8-2.2 mm.

Type, male, and 4 paratypes (2 male, 2 female), the type and 2 paratypes (1 male, 1 female) in collection of the California Academy of Sciences; 2 paratypes (1 male, 1 female) in National Museum collection, U.S.N.M. No. 55113.

Type locality.—Piñon Flat, San Jacinto Mountains, Calif., collected by E. G. Linsley and E. S. Ross, May 24 and 25, 1939.

Other localities.—Santa Rosa Park, Riverside County, Calif., collected June 22, 1940, in the Van Dyke collection; El Toro, Orange County, collected by C. Dammers, May 17, 1938.

Remarks.—There are also two old specimens in the National Museum collection labeled simply "Cal." and "S. Cal." Apparently this species is confined to southern California. It is not closely related to *L. bivittatus* (LeConte) although vittate. It belongs to an entirely different group, being allied to *L. californicus* Schaeffer and having a similarly shaped prothorax and long antennae.

LUPERODES NEBRODES, new species

PLATE 6, FIGURE 21

About 5-6.5 mm. in length, oblong, shining, pale yellow-brown, with piceous antennae, except the three basal joints, piceous sutural and lateral edges, and piceous breast and often abdomen.

Head polished, pale reddish yellow, with piceous edges of mouth-parts, rounded over the occiput, frontal tubercles slightly produced with a groove running obliquely up toward margin of eye on each side; interocular space more than half the width of the head. Antennae extending to the middle of the elytra, stout, fourth joint nearly twice as long as third, three basal joints pale, remainder piceous. Prothorax about a third wider than long, widest anteriorly, narrowing gradually to base, not very convex, pale reddish yellow, somewhat shiny, finely alutaceous. Scutellum piceous. Elytra oblong with small humeral prominences and short intrahumeral sulcus; very finely alutaceous and finely punctate, feebly shining, pale yellow-brown, with sutural edges usually dark in basal half and occasionally widened to form a dark sutural vitta not reaching the apex; lateral edges in basal part darkened sometimes. Body beneath in males with breast and abdomen dark piceous, in the three females examined the breast piceous and abdomen pale. Legs pale with tarsal joints edged with dark piceous, sometimes hind tibiae becoming dark at apex. Front coxal cavities open, all legs spurred, first tarsal joint of hind legs not so long as the rest together. Length 5.2-6.9 mm.; width 2.3-2.5 mm.

Type, male, and 10 paratypes (7 male, 3 female), U.S.N.M. No. 55114.

Type locality.—Downings Ranch, Terrell County, Tex., May 10, 1912, collected by J. D. Mitchell.

Remarks.—In general coloring this species somewhat resembles *L. californicus* Schaeffer, but it is paler and has a quite differently shaped and broader prothorax. It belongs to that group of larger species having the prothorax wider anteriorly, to which *L. californicus* belongs. In the three females the coloring of the abdomen is pale; in the males it is piceous.

LUPERODES FLAVONIGER, new species

PLATE 6, FIGURE 18

About 6 mm. long, slender, narrowly oblong, somewhat shining, entirely black except for the reddish-yellow head and three basal antennal joints, sometimes coxae and apices of joints of anterior legs deep reddish brown.

Head smooth, shining, reddish yellow, with the tips of the mouth-parts darker. Interocular space over half width of head. Antennae

extending beyond the middle of the elytra, third joint about half as long as fourth, three basal joints pale. Prothorax widest anteriorly where a little wider than long, then narrowing to base; disk not very convex, somewhat shining, finely alutaceous, entirely black. Scutellum dark. Elytra elongate oblong, not very convex, with small prominent humeri and a long intrahumeral depression, entirely black, somewhat shiny, alutaceous, and finely punctate. Body beneath entirely dark except for paler coxal joints, the pale pubescence thicker on the breast. Legs dark, apices of joints somewhat paler, all tibiae spurred, first tarsal joint of hind leg as long as the rest together. Front coxal cavities open. Length 6.2 mm.; width 2.2 mm.

Type, male, 1 paratype, female, U.S.N.M. No. 55115.

Type locality.—El Toro, Orange County, Calif., collected May 17, 1938, by C. Dammers.

Remarks.—*Luperodes semiflavus* Fall is the only other species having dark or metallic elytra and a pale head, but the prothorax, legs, and body beneath of *semiflavus* are also pale. *L. flavoniger* appears to be closely related to *L. californicus*, having a similarly shaped prothorax.

LUPERODES VARICORNIS (LeConte)

PLATE 5, FIGURE 4

Luperus varicornis LeConte, Trans. Amer. Ent. Soc., vol. 2, p. 57, 1868.

Luperodes varicornis Horn, Trans. Amer. Ent. Soc., vol. 20, p. 110, 111, 1873.

Monolepta crucigera Schaeffer, Bull. Brooklyn Inst., vol. 2, p. 249, 1906.

Luperodes marginalis Fall, Trans. Amer. Ent. Soc., vol. 36, p. 149, 1910.

The type of *Luperus varicornis* in the LeConte collection at Cambridge, a female labeled "Ariz.," is 3 mm. long and 1.8 mm. wide. The head is pale yellow, with a reddish-brown streak down the median line of the occiput; the mandibles are red-brown; there is a transverse line across the vertex and above the tubercles, and the tubercles are distinctly marked but not prominent; the occiput is finely punctate. The interocular space is about half the width of the head. The antennae are longer than half the body, pale at base, the first three joints entirely so, the fourth and remainder with darkened apical half, the second and third are nearly equal to the fourth, the rest about equal to the fourth. The prothorax is not twice so wide as long, slightly rounded at the sides, shining, very finely punctate, and pale yellow, with red-brown lateral markings along the margin and sides. The scutellum is reddish. The elytra are oval, a little wider behind the middle, shining, faintly and finely punctate, the punctation a little more distinct and less dense than on pronotum, the margin and suture reddish brown, widening at the suture to an

indefinitely defined area near the middle and also along the sides and at apex. Below, the breast is reddish brown, the abdomen a little lighter, the legs pale, abdomen lightly pubescent and punctate, the first tarsal joint of the hind leg longer than the rest, a tiny spur on the tibiae.

LeConte stated in his description that he had only one specimen and that from Arizona. Besides the type there are other specimens in his collection from Texas and Kansas, none of which is the same species as the type, and since they were undoubtedly added later, they are not of consequence in this discussion.

Schaeffer described *Monolepta crucigera* from a series of specimens taken in the Huachuca Mountains, Ariz. Apparently he did not consider at all the possibility that the species might belong in the genus *Luperodes* or might have been previously described. He placed it in the Monoleptides chiefly on account of the closed anterior coxal cavities. As he writes, the dark marking on the elytra is very variable; "in some specimens the elytra may be more properly called black with a large basal and an elongate apical spot pale." The dark sutural spot may widen in the middle of the elytra so as to extend to the lateral margin, thus forming a cross, or, again in Schaeffer's series of specimens, the elytra may appear nearly pale with only a dark sutural and lateral edge. Specimens similar to LeConte's type also occur in his series.

In his description of *Luperodes marginalis* from Alpine, Tex., Fall states that the species agrees very closely with *varicornis*, but that according to LeConte's description, *varicornis* is entirely yellow, while his own specimens had more or less of piceous markings. At the time Fall was not able to consult the LeConte collection and knew *varicornis* only from its short description, in which, it is true, no mention is made of the brownish area about the suture. In the Fall collection at Cambridge, the specimen bearing Fall's type label, a female, very similar to LeConte's type specimen, also bears the label *Monolepta crucigera*, in Fall's handwriting. Two others from Alpine, Tex., are placed in a row following two of Schaeffer's labeled in Schaeffer's handwriting *M. crucigera*. It would appear that Fall had discovered that his *marginalis* was the same as Schaeffer's earlier described species, but apparently he had never compared it with LeConte's type of *varicornis*, although he had earlier noted its strong resemblance to *varicornis*.

Among Fall's material from Alpine, Tex., both in his own collection and in some he gave to Bowditch, are some entirely pale specimens that he mentioned as immature in his description of *L. marginalis*. These are really a different species and are discussed farther on in this paper.

L. varicornis is abundantly represented in the National Museum collection by specimens collected by Nunenmacher and others at Nogales, Ariz. In a recent collection at Nogales, they were stated to be found on almond leaves and fruit. They were collected by Morrison in Arizona, and in Schaeffer's collection, besides the types from the Huachuca Mountains, there are specimens from Palmerlee, Cochise County, Ariz. Wickham collected it at Alpine, Tex., and specimens are in the California Academy of Sciences from the Chisos Mountains, Brewster County, Tex. One specimen only has appeared from New Mexico, and that was collected by F. H. Snow and is in the University of Kansas collection.

LUPERODES BRUNNEUS (Crotch)

PLATE 5, FIGURE 5

Luperus brunneus CROTCH, Proc. Acad. Nat. Sci. Philadelphia, 1873, p. 44.

Luperodes varicornis HORN, Trans. Amer. Ent. Soc., vol. 20, p. 111, in part, 1893.

Luperodes davisii LENG, Journ. New York Ent. Soc., vol. 19, p. 193, 194, 1911.

Crotch's type of *L. brunneus* may very well be a specimen in the LeConte collection bearing the label "N. C.," as Crotch stated that his specimen was from North Carolina. It is a shining brown beetle, with the head, prothorax, and legs a little paler yellow-brown and the antennae with the apices of each joint from the fourth to the apical joint dark, and is the species that is so abundant a pest throughout the South on corn, okra, and cotton.

I have not examined Leng's type of *L. davisii*, described from Georgia, but according to H. S. Barber, who has seen the type, it is the same as Crotch's species.

Since Horn's revision of the Galerucini, *L. brunneus* has been synonymized with *varicornis*. LeConte described *varicornis* from Arizona, while Crotch's species came from North Carolina. In coloration and markings the typical forms are not alike, and the aedeagi, while similar, are quite distinct. There is a pale-yellow form of *brunneus* similar in coloring to the very palest forms of *varicornis*, which is represented in the National Museum collection by specimens from Georgia (Savannah, near Townsend, and Harrison), and Kansas (Manhattan, Topeka, and Riley County). Although the aedeagi of these pale-yellow forms appear from without to be like those of the typical dark brown forms, one aedeagus, unfortunately lost, had the internal sac inflated to some extent, and this was peculiar in having a series of rather long spines projecting from it. The internal sac of the typical *brunneus* showed shorter spines. Whether this constitutes a specific difference I do not know. One of the specimens of the pale form from Kansas bore the note that it was found injuring dahlias, hollyhocks, and cornsilk, and those from Georgia

were collected on cotton. Thus the food habits appear to be pretty much the same in both pale and dark forms.

Specimens of typical *brunneus* are in the National Museum collection from North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Kansas. There are two specimens labeled New York, and a series labeled Rockport, Mass., but in both cases I doubt the authenticity of the locality label.

LUPERODES RUGIPENNIS, new species

PLATE 5, FIGURE 10

About 4 mm. in length, elongate oblong, pale yellow-brown, with reddish-brown occiput and a dark sutural, basal, and in part lateral edge on elytra, not shining, the surface of the pronotum and elytra uneven, the elytra showing traces of costation.

Head deeper in color over the occiput and alutaceous; interocular space about half the width of the head. Antennae extending beyond the middle of the elytra, with pale basal joints, second and third joints together not quite so long as fourth. Prothorax a third wider than long, with sides nearly straight; surface uneven with a depression on each side and down the middle, finely and obsoletely punctate, entirely pale yellow. Elytra with more conspicuous punctation than prothorax and with traces of irregular, poorly defined costae, the surface appearing rugose; humeri not at all prominent; entirely pale except for the sutural, basal, and lateral edges, the last usually being dark only in basal half. Body beneath entirely pale. All tibiae spurred, first hind tarsal joint a little longer than the others together. Anterior coxal cavities open. Length 3.5–4.5 mm.; width 1.5–1.9 mm.

Type, male, and 16 paratypes (5 male, 11 female), U.S.N.M. No. 55116.

Type locality.—Las Parras, Baja California, collected by W. M. Mann, October 1923.

Other localities.—Purrisima, Palmarita, San José del Cabo, Baja California.

Remarks.—The uneven, distinctly punctate surface of this species and its semicostate elytra make it easily distinguishable.

LUPERODES PALLIDULUS, new species

PLATE 5, FIGURE 12

About 3–4 mm. in length, oblong oval, very finely punctate, shining, pale yellow, occiput, sometimes lateral edge of prothorax, breast, and femora deeper in color, the antennae usually deep brown except the basal joints and the base of each joint.

Head with smoothly rounded occiput, very finely punctate, tubercles well defined, with transverse groove above running from eye to eye; interocular space half width of head, occiput deeper yellow in coloring.

Antennae extending fully halfway down elytra, second and third joints together scarcely as long as fourth, remainder a little shorter than fourth and approximately equal, three basal joints pale, the rest usually dark brown except at base. Prothorax about a third wider than long, with slightly arcuate sides, smooth, shining, very finely punctate. Scutellum pale. Elytra broadly oblong oval, not depressed, humeri marked with a short intrahumeral depression, very finely and obsoletely punctate, entirely pale. Body beneath finely pubescent, pale, sometimes breast and femora a little darker. All tibiae with spines, first tarsal joint of hind legs considerably longer than the rest together. Anterior coxal cavities closed. Length 3.2–4.3 mm.; width 1.8–2.2 mm.

Type, male, and 14 paratypes (6 male, 8 female), U.S.N.M. No. 55117.

Type locality.—Fort Sam Houston, Tex.; collected by H. H. Bishopp on rose, April 24, 1940.

Other localities.—Victoria, collected by R. A. Cushman on *Opuntia* and cotton, by C. M. Walker on cotton, and by W. E. Hinds on anemone; San Antonio (E. V. Walter), Columbus (E. A. Schwarz), Lavaca (Schwarz), Cuero (Cushman), North Braunfels (W. D. Pierce), Dallas (W. D. Pierce on *Callirrhoe involucrata*); all in Texas.

Remarks.—One of the specimens of Fall's *L. marginalis* from Alpine, Tex. (collected July 20, 1922, 4,400–6,000 feet, by Wickham), is a male of this species. It is very likely the specimen mentioned in his description of *L. marginalis* as immature and paler. But the other specimens of this species in his collection were identified as *L. varicornis* LeConte.

It is a longer, more convex, and paler insect than *varicornis*. There is no trace of dark coloring on the pronotum or elytra, although the lateral edges of the pronotum are occasionally darker. The shape of the aedeagus, with its long, irregularly curved tip, is strikingly different from that of any of the related species.

LUPERODES ELACHISTUS, new species

PLATE 5, FIGURE 9

About 3 mm. in length, oblong, slender, shining yellow-brown, with the occiput and all but the first three joints of the antennae and the body beneath reddish brown; head, pronotum, and elytra finely punctate.

Head with interocular space over half its width, occiput smoothly rounded and polished, with very fine, scattered punctures; tubercles well defined, with a marked depression above them. Antennae extending below the middle of the elytra, fourth joint twice as long as third and slightly longer than following, which are about equal, first

three pale yellow, remainder reddish brown. Prothorax about a fourth wider than long with sides nearly straight, shiny, finely and rather closely punctate. Elytra not much wider than prothorax, without depressions, humeri not prominent, shining, finely punctate. Body beneath reddish brown with legs a little paler. Anterior coxal cavities open. First hind tarsal joint as long as the rest together. Length 3-3.2 mm.; width 1.2-1.3 mm.

Type, male, and one paratype, U.S.N.M. No. 55118.

Type locality.—Las Vegas, N. Mex., collected September 8 by E. A. Schwarz and H. S. Barber.

Remarks.—This is one of the tiniest of the yellow-brown species and is distinguished from *varicornis* by its narrowly oblong shape. It has a peculiar spoon-shaped aedeagus.

LUPERODES POPENOEI, new species

PLATE 5, FIGURE 7

About 3.5 mm. in length, elongate oblong oval, finely and rather closely punctate, pale yellow, with reddish-brown occiput and entirely reddish-brown antennae; legs and body beneath often deeper brown.

Head frequently with deep reddish occiput, pale below except for the darker mandibles; finely punctate and alutaceous, tubercles separated from occiput by a deep groove, front little produced, interocular space fully half the width of the head. Antennae extending down to the middle of the elytra, fourth joint about equal to second and third together, rest a little shorter and nearly equal in length; entirely deep reddish brown. Prothorax about one and one-fourth times as broad as long, with sides only slightly arcuate, surface shining, densely and finely punctate; pale yellow, sometimes with a trace of spots. Elytra elongate, smooth, not so convex as in *brunneus*, humeri not prominent; surface shining, finely and densely punctate. Body beneath finely pubescent, breast frequently darker, tibiae of all legs with spines, hind tarsal joint about equal to the rest together. Anterior coxal cavities open. Length 3.5-4 mm.; width 1.8-2 mm.

Type, male, U.S.N.M. No. 55119.

Type locality.—Kansas.

Other localities.—Texas (Belfrage collection), Kansas (collected by F. H. Snow, E. A. Popenoe, and in the collection of C. V. Riley).

Remarks.—In this species there is no suggestion of darker markings on the pronotum or elytra, and all the joints of the antennae are of a uniform color, deep reddish or piceous without any paler basal joints. It is more oblong and less convex than is *varicornis*. In the Popenoe collection from western Kansas is one beetle labeled "*Luperus n. sp. Lec.*," which very probably was examined by LeConte himself and so determined.

LUPERODES CHIRICAHUENSIS, new species

PLATE 5, FIGURE 8

About 3 mm. in length, slender elongate oblong, pale yellow, with dark margin on prothorax, surface distinctly and densely punctate.

Head pale with a dark median streak down the occiput, interocular space a little more than half the width of the head, occiput alutaceous and distinctly punctate, a groove above tubercles not deep but well defined, extending from eye to eye. Antennae yellow-brown, gradually deepening in color toward the apical joints; extending at least to the middle of the elytra; second and third joints together about equal to fourth, remainder subequal. Prothorax about a third wider than long, sides nearly straight, surface shining and distinctly punctate, much more so than in the Baboquivari species, *L. ocularis*. Elytra more rugosely punctate than *varicornis*, a few short scattered hairs on apical half of elytra. Body beneath finely pubescent, breast and tip of abdomen a little deeper brown. Tibiae of all legs spurred, first hind tarsal joint longer than remainder together. Anterior coxal cavities closed. Length 2.6–3.3 mm.; width 1.1–1.4 mm.

Type, male, and 1 paratype, female, the type in the California Academy of Sciences, the paratype in the National Museum collection, U.S.N.M. No. 55120.

Type locality.—Texas Canyon, Chiricahua Mountains, Cochise County, Ariz., 5,000–6,000 feet, Sept. 13, 1927, collected by J. A. Kusche, in the Van Dyke collection, California Academy of Sciences.

Remarks.—This species is distinguished by its slender, oblong shape, the distinct punctation, and the fine hairs near the apex of the elytra. The aedeagus is finely pointed.

LUPERODES CONVEXUS, new species

PLATE 5, FIGURE 13

About 3–4 mm. long, oblong oval, finely punctate, shining pale yellow, with mandibles, often the sides of the pronotum, margin and suture of elytra, breast, and tip of abdomen deeper brown, antennae brown with the first three joints and the base of the others pale.

Head finely punctate and alutaceous on occiput, tubercles and carina well defined. Interocular space half the width of the head. Antennae extending fully halfway down the elytra, three basal joints pale, the rest pale at the base, fourth joint nearly as long as second and third together, rest approximately equal. Prothorax a little less than twice as wide as long, with the sides slightly arcuate, surface finely and densely punctate, pale yellow, with the lateral margin and sometimes sides brownish. Elytra oblong oval, somewhat convex, without prominent humeri, surface finely and rather densely punctate, pale yellow with the sutural and marginal edges deep brown. Body

beneath finely pubescent, breast and tip of abdomen usually deeper in color. All tibiae with a spine, the first hind tarsal joint a little longer than the rest together. Anterior coxal cavities closed. Length 3-4 mm.; width 1.8-2.2 mm.

Type, male, and 2 paratypes (1 male, 1 female), U.S.N.M. No. 55121.

Type locality.—Armstrong, Iowa, collected by Shimek, from the Wickham collection.

Other localities.—Douglas County, Kans., collected by F. H. Snow; Topcka, Kans., in the Popenoe collection; Oklahoma County, Okla., collected by W. Benedict; Champaign, Ill., collected on the flowers of *Helianthus*.

Remarks.—This species is slightly larger and more convex than *varicornis* and more densely punctate. It is distinguished by its dark sutural and lateral edges, the characters of the aedeagus, and its elytral convexity, as well as its somewhat larger size from the other pale species.

LUPERODES OCULARIS, new species

PLATE 5, FIGURE 6

About 2.5 mm. in length, elongate oblong, pale yellow-brown, with the occiput, antennae, often lateral margin of prothorax and sutural and marginal edges of elytra, and breast deeper brown; smooth, shining, finely punctate; eyes unusually large.

Head shining, with a few fine rather obsolete punctures on the occiput, groove above tubercles deep and extending from eye to eye; eyes large, the interocular space less than half the width of the head. Antennae extending at least to the middle of the elytra, second and third joints together not quite so long as the fourth, the rest subequal; the basal joints paler than the outer ones. Prothorax almost rectangular, with lateral sides nearly straight, not twice as wide as long; surface shining, very finely and rather densely punctured. Lateral sides often darkened. Scutellum pale. Elytra long, narrow, and depressed, with well-marked humeri, and intrahumeral depression; surface shining, finely and rather densely punctate. Body beneath finely pubescent. Breast usually deeper brown; all tibiae with tiny spurs; first hind tarsal joint a little longer than remainder all together. Anterior coxal cavities closed. Length 2.5-3 mm.; width 1.2 mm.

Type, male, and 8 paratypes, the type and 6 paratypes in the California Academy of Sciences, 2 paratypes (male and female) in National Museum collection, U. S. N. M. No. 55122.

Type locality.—Baboquivari Mountains, Ariz., collected on August 20, 1924, by O. C. Poling.

Other localities.—Tucson, 16 miles south of Tucson, St. Xavier Mission, Ariz., collected in July and August 1924 by E. P. Van Duzee and J. O. Martin.

Remarks.—This species is distinguished by its tiny size, narrow shape, and very large eyes. The aedeagus is very similar to that of *L. brunneus* but is not so long or so slender at the tip. Three specimens of this species are in Fall's collection at Cambridge, all from the Baboquivari Mountains, Ariz.

LUPERODES PUNCTATISSIMUS, new species

PLATE 5, FIGURE 11

About 4 mm. in length, broadly oval, feebly shining, conspicuously and densely punctate, pale yellow, a dark line down the occiput and rather indefinite darker areas on prothorax, lateral edges of prothorax, and elytra, the suture dark in one of the two specimens; antennae with the first three joints pale, the rest gradually darker at apex.

Head alutaceous, finely and densely punctate over occiput, a dark median line, tubercles well defined, interocular space not quite half as wide as head. Antennae extending beyond the middle of the elytra, first three joints pale yellow, the rest with deeper colored apex, but not black, fourth joint about twice as long as third, the rest a little shorter and nearly equal. Prothorax one and three-fourths times as wide as long, with the sides nearly straight, basal margin curved; surface somewhat coarsely and confluent punctate, pale with two lateral darker areas and dark edges in one of the two specimens. Scutellum dark in one specimen. Elytra smoothly rounded, somewhat convex, without depressions, surface densely and distinctly punctate, with finer punctures among the coarser, deeper ones. Body beneath pale, shining. Legs pale, first tarsal joint of hind leg considerably longer than rest together. Anterior coxal cavities closed(?). Length 4 mm.; width 2 mm.

Type, male, and 1 paratype, female, U. S. N. M. No. 55123.

Type locality.—Arizona, "collection C. V. Riley."

Remarks.—This species is distinguished by its conspicuous punctation, its broadly oval shape, its convex and not depressed elytra, and the characters of the aedeagus.

LUPERODES VANDYKEL, new species

PLATE 5, FIGURE 3

About 3.5 mm. in length, elongate oblong, pale yellow, with the head, undersurface, and apical joints of the antennae deeper in coloring, faintly shining.

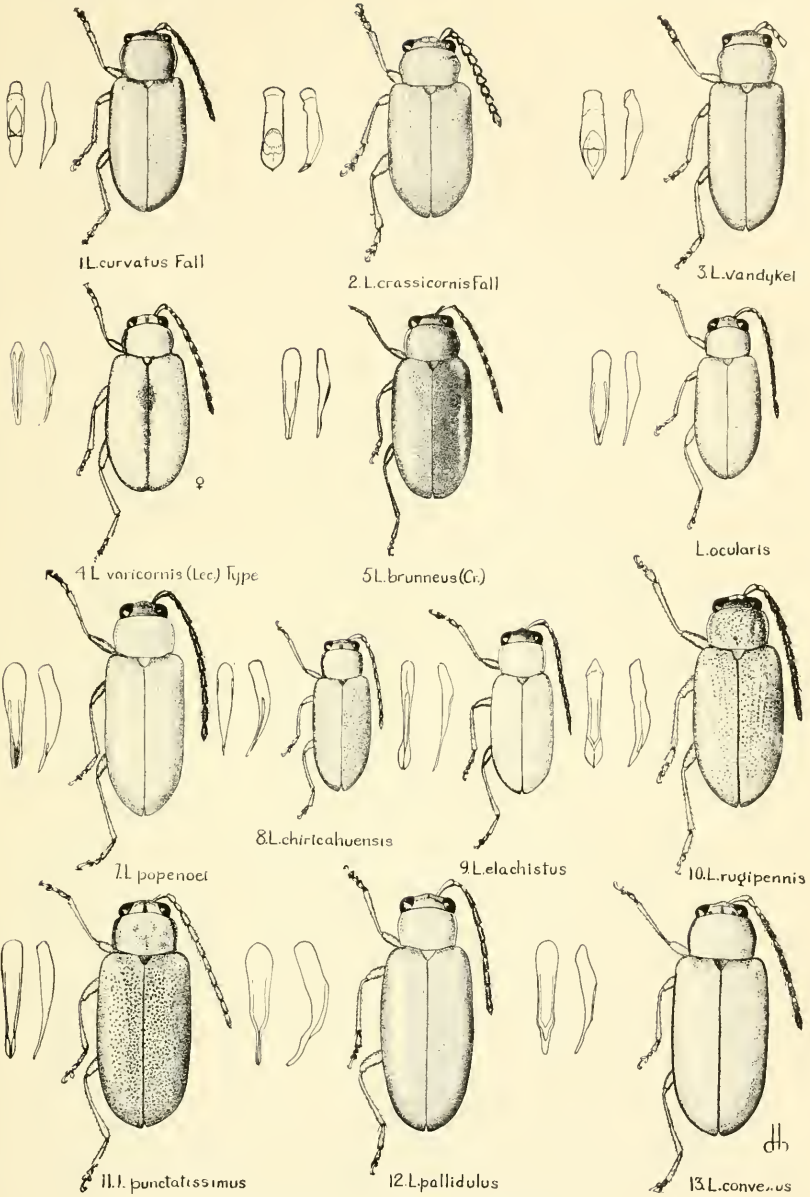
Head with the interocular space over half its width, smoothly rounded over the occiput, shining, a depression above the tubercles. Antennae pale, the second and third joints together fully as long as

fourth, remainder somewhat shorter, not reaching the middle of the elytra. Prothorax about a third wider than long, widest before the middle, surface smooth, impunctate, entirely pale. Elytra elongate oblong, with well-marked humeral prominences, surface finely alutaceous, entirely pale, lateral margin not visible from above. Body beneath shining, darker brown in color, with fine pubescence. Legs pale with deeper brown tarsal joints, all tibiae with tiny spur, first hind tarsal joint not so long as the rest together. Anterior coxal cavities closed(?). Length 3.5 mm.; width 1.3 mm.

Type, male, in the collection of the California Academy of Sciences.

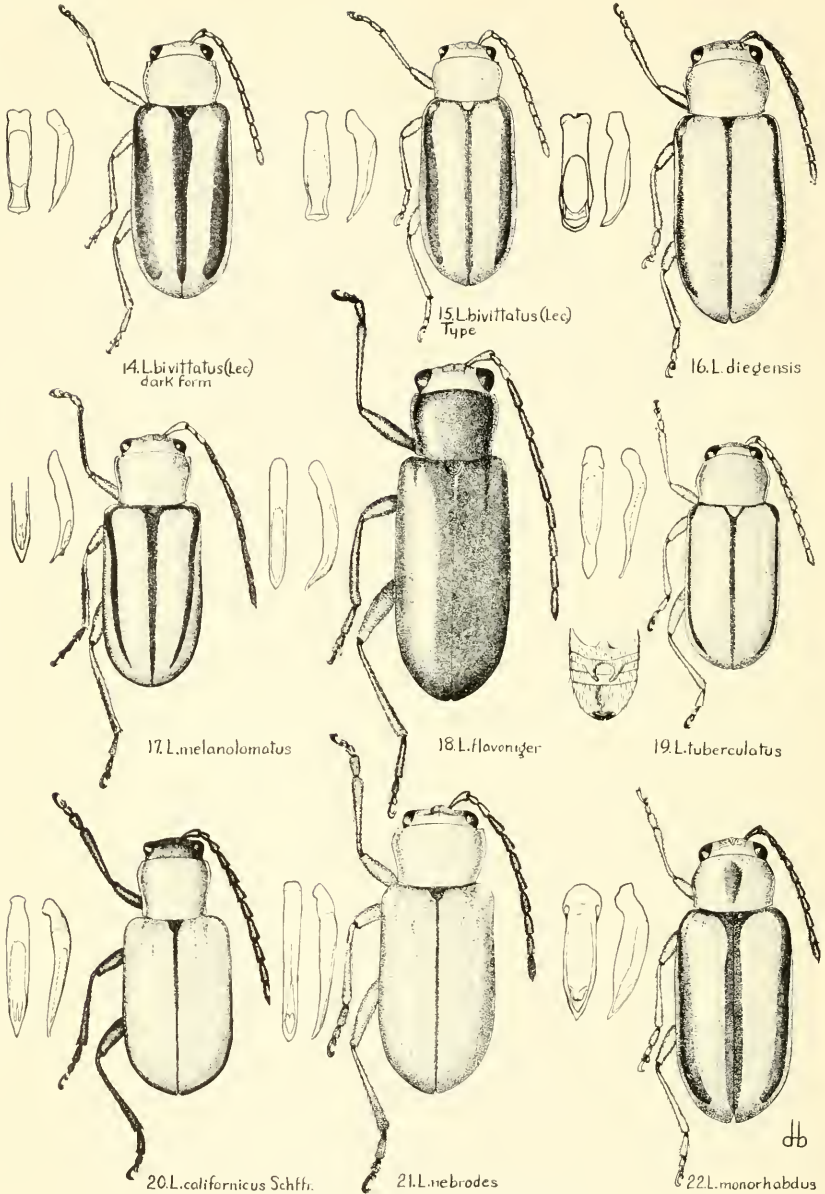
Type locality.—Olancho, Calif., collected May 19, 1917; in the Van Dyke collection, California Academy of Sciences.

Remarks.—This species, of which only a single specimen has been examined, is closely related to *L. curvatus* Fall and *L. crassicornis* Fall but not very closely allied to the *varicornis* group. It agrees with Fall's two species in having a broad head, the prothorax wider before the middle, the elytra rather convex, so that the lateral margin is not visible from above, and in having a short hind tarsal joint. The aedeagi of all three species are short and relatively broad. The male antennae are not thickened in this species as they are in *L. crassicornis*, and the beetle is not so broad as but more elongate than *L. curvatus*, with a differently shaped aedeagus.



BETLES OF GENUS LUPERODES

1, *L. curvatus* Fall, paratype from Bishop, Calif.; 2, *crassicornis* Fall, paratype from Mojave, Calif.; 3, *vandykei*, new species, type from Olancha, Calif.; 4, *varicornis* (LeConte), type from Arizona, aedeagus from specimen from Nogales, Ariz.; 5, *brunneus* (Crotch), from Hamlet, N. C.; 6, *ocellaris*, new species, type from Baboquivari Mountains, Ariz.; 7, *popenoei*, new species, type from Kansas; 8, *chiricahuensis*, new species, type from Chiricahua Mountains, Ariz.; 9, *elachistus*, new species, type from Las Vegas, N. Mex.; 10, *rugipennis*, new species, from San José del Cabo, Baja California; 11, *punctatissimus*, new species, type from Arizona; 12, *pallidulus*, new species, from Texas (Knab collection); 13, *convexus*, new species, from Topeka, Kans.



BETLES OF GENUS LUPERODES

- 14, *L. bivittatus* (LeConte), dark form from Chico, Calif.; 15, *bivittatus*, type from Fort Tejon, Calif., genitalia from specimen from Potwisha, Sequoia National Park, Calif.; 16, *diegensis*, new species, type from San Diego, Calif.; 17, *melanolomatus*, new species, from California; 18, *flavoniger*, new species, type from El Toro, Orange County, Calif.; 19, *tuberculatus*, new species, type from Camp Baldy, Calif.; 20, *californicus* Schaeffer, from Kaweah, Calif.; 21, *nebrodes*, new species, type from Downings Ranch, Terrell County, Tex.; 22, *monorhabdus*, new species, type from Los Angeles County, Calif.