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Synoptic revision of the United States scarab beetles of the subfamily Dynastinae, No. 3: Tribe Oryctini (part)

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ENTOMOLOGY.—*Synoptic revision of the United States scarab beetles of the subfamily Dynastinae, No. 3: Tribe Oryctini (part).*[1]

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This paper is the third in the series covering the United States dynastine scarab beetles and includes the four genera differentiated in the following key:

1. Apex clypeus acute and definitely *bidentate*, the teeth often worn and nearly obsolete..2
   Apex clypeus acute, either sharply or bluntly so, but never bidentate.....3
2. Mandibles definitely *tridentate* externally, the basal tooth often worn and barely visible; thorax not more than two-thirds the length of the elytra; color rufous to rufocastaneous or rufopiceous.....*Ligyrus* Burmeister
   Mandibles *bidentate* externally (caution: examine from below and laterally to avoid counting the lacinia teeth as third teeth of the mandible); thorax about three-fourths the length of the elytra; color always black. *Euetheola* Bates
3. Thorax never foveate; mandibles large and evenly rounded externally, never toothed; coloration piceous to piceocastaneous, rarely rufocastaneous.....*Aphonides* Rivers
   Thorax always foveate at midapex, and with midapical tubercle; mandibles tridentate externally; coloration bright rufous and strongly shining.....*Oxygrylius* Casey

Genus **Ligyrus** Burmeister

Ligyrus Burmeister, 1847, p. 542; Casey, 1915 p. 178; Ritcher, 1944, p. 25 (larvae); Hayes, 1917, p. 253 (biology).
Tomarus Erichson, 1847, p. 95.
Ligyrodes Casey, 1915, p. 178; Arrow, 1937, p. 35.
Grylius Casey, 1915, p. 189.
Anagrylius Casey, 1915, p. 204.
Ligyrellus Casey, 1915, p. 206.
Euligyrus Casey, 1915, p. 185.

This American genus includes 52 species, according to Arrow (1937), but many of them are not valid; of the 37 names now being used for our United States species (30 of them Casey's), there are in reality only six valid species, one of these being formerly known only from Mexico and the other a West Indian species probably recorded from the States by error.

KEY TO UNITED STATES LIGYRUS

(Males have last abdominal sternite emarginate apically)

1. First elytral interval very wide next to scutellum, and very smooth, usually entirely impunctate, rarely with a dozen or so very minute and highly scattered punctures; male front claw simple and not enlarged; color rufous to piceous; size large (18–27 mm); known from Baja California and Mexico, to Honduras; rare in Arizona (Fig. 1, *i*).....*laevicollis* Bates
   First elytral interval always coarsely and moderately densely punctured.....2
2. Most of discal thoracic area very smooth and with scattered, very fine punctures; clypeal base with two widely separated tubercles; male front claws simple; color piceous; size large (21–25 mm); Florida (Fig. 1, *j*). *subtropicus* Blatchley
   Size variable, rarely as large as 18 mm; puncturation of thorax very variable but center basal area always with at least a dozen or so coarse punctures.....3
3. Basal clypeal carina always erect and distinct (unless worn) and never interrupted at middle; male front claws always *simple* and not enlarged; pygidium very densely, finely, and scabrosely punctate both near and *at* basal corners and often the same along basal margin; rest of pygidial disc polished and finely punctate but very variable in density of puncturation; mid-apex of thoracic disc almost always with a small fovea immediately behind the small marginal tubercle; widespread over United States, Baja California, and northern Mexico (genitalia, Fig. 1, *e*)...*gibbosus* (DeGeer)
   Basal carina of clypeus always noticeably interrupted at middle, and usually widely so, frequently appearing bituberose; male front claws simple or enlarged; pygidial puncturation very variable, if scabrose then very grossly so.....4
4. Male front claws simple and not enlarged; pygidial puncturation at corners very coarse but punctures usually not contiguous except right at corners, puncturation of disc very coarse and only moderately dense; West Indies (probably not United States) (genitalia, Fig. 1, *f*).....*cuniculus* Fabricius
   Male front claws *enlarged* and the inner claw larger and reflexed; pygidial puncturation of female not as above.....5
5. Pygidial puncturation exceedingly dense and scabrose over nearly all the disc, only a small midapical area less densely punctured; Eastern United States, rare to Arizona (genitalia, Fig. 1, *h*).....*relictus* Say
   Pygidial puncturation very coarse but not at all dense and with smooth areas between the punctures even right at the pygidial basal angles; United States (Texas) and Mexico to Costa Rica (genitalia, Fig. 1, *g*)..*sallei* Bates

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Ligyrus relictus Say

Ligyrus relictus Say, 1825, p. 194; Horn, 1875, p. 143; Casey, 1915, p. 183 (*Ligyrodes*); Ritcher, 1944, p. 22 (*Ligyrodes*) (larvae).
Ligyrodes clypealis Casey, 1915, p. 181. (New synonymy.)
L. parviceps Casey, 1915, p. 182. (New synonymy)
L. quadripennis Casey, 1915, p. 182. (New synonymy.)
L. vernicollis Casey, 1915, p. 182. (New synonymy.)
L. dawsoni Casey, 1924, p. 334. (New synonymy.)

Rather widely distributed in the midwestern and eastern States; I have seen specimens from Rhode Island, New Jersey, Pennsylvania, Iowa, Indiana, Kansas, and Nebraska. It occurs also rarely west of Kansas and I have seen specimens from Arizona. The larvae feed in old manure piles and soils rich in humus. The male enlarged front claw, the large size, and dark color will readily place the species over much of its range. The genus *Ligyrodes* erected for this species by Casey is not valid, since the characters apply only to the male sex and so females could not be properly placed.

Ligyrus sallei Bates

Ligyrus sallei Bates, 1888, p. 318.
L. aztecus Casey, 1915, p. 184. (New synonymy.)
L. propinquus Casey, 1915, p. 183. (New synonymy.)

This common Central American (Mexico, Guatemala, Nicaragua, and Costa Rica) species occurs sparingly in the United States; I have seen specimens from Brownsville, Tex. It can be confused in the male only with *relictus*, since both have the enlarged front claw, but the male genitalia are quite different, and the color of *sallei* is more rufous and more highly polished.

Ligyrus cuniculus (Fabricius)

Geotrupes cuniculus Fabricius, 1801, p. 20.
Heteronychus tumulosus Burmeister, 1847, p. 101; Bates, 1888, p. 315 (*Ligyrus*); Casey, 1915, p. 205 (*Anagrylius*); Arrow, 1900, p. 181 (*Ligyrus*).
Ligyrus antillarum Beauvois, 1805, p. 104.

This common West Indian species was said to be from "Nord-America, Sud-Carolina" and "Westindien, St. Domingo," and the original description was based on a specimen obtained from a dealer. Since the species is well known in the West Indies but has apparently not since been taken in the United States, it is time to remove it from our lists. Should it ever occur, the male genitalic drawings will readily place the species. Bates records it from Mexico, British Honduras, and South America, but these records may refer to other, allied species.

Ligyrus gibbosus (DeGeer)

Scarabaeus gibbosus DeGeer, 1774, p. 322; Casey, 1915, p. 204 (*Ligyrus*); Ritcher, 1944, p. 25 (larvae) (*Ligyrus*); Comstock, 1880, p. 274 (biology); Hayes, 1917, p. 253 (biology).
Podalgus variolosus Burmeister, 1855, p. 121.
P. juvencus Burmeister, 1855, p. 121.
Geotrupes juvencus Fabricius, 1775, p. 32.
Ligyrus juvencus Burmeister, 1855, p. 542.
L. morio LeConte 1848, p. 20; Horn, 1875, p. 143.
Bothynus obsoletus LeConte, 1848, p. 87. (New synonymy.)
B. neglectus LeConte, 1848, p. 87. (New synonymy.)
Ligyrus puncticauda Casey, 1915, p. 195. (New synonymy.)
L. arizonensis Casey, 1915, p. 201. (New synonymy.)
L. brevipes Casey, 1915, p. 202. (New synonymy.)
L. breviusculus Casey, 1915, p. 196. (New synonymy.)
L. lacustris Casey, 1915, p. 196. (New synonymy.)
L. californicus Casey, 1915, p. 203. (New synonymy.)
L. laticollis Casey, 1915, p. 203. (New synonymy.)
L. curtipennis Casey, 1915, p. 199. (New synonymy.)
L. effetus Casey, 1915, p. 200. (New synonymy.)
L. farctus Casey, 1915, p. 200. (New synonymy.)
L. laetulus Casey, 1915, p. 197. (New synonymy.)
L. laevicauda Casey, 1915, p. 202. (New synonymy.)
L. laticauda Casey, 1915, p. 197. (New synonymy.)
L. longulus Casey, 1915, p. 193. (New synonymy.)
L. parallelus Casey, 1915, p. 194. (New synonymy.)
L. remotus Casey, 1915, p. 194. (New synonymy.)
L. rubidus Casey, 1915, p. 198. (New synonymy.)
L. lucublandus Casey, 1915, p. 199. (New synonymy.)
L. scitulus Casey, 1915, p. 203. (New synonymy.)
L. spissipes Casey, 1909, p. 283. (New synonymy.)
L. texanus Casey, 1915, p. 195. (New synonymy.)
L. virginicus Casey, 1915, p. 193. (New synonymy.)
L. bicorniculatus Casey, 1915, p. 198. (New synonymy.)

The great variability in size, color, and sculpturing, as well as the worn surface commonly found in this species due to its digging habits (giving the specimens a superficially

different appearance), probably was instrumental in causing Casey to name every trifling variant. The specimens also vary greatly depending on the richness of the food supply in the larval state; thus I have seen large series in which the specimens were all much reduced in size and very similar, but which had all been collected soon after emergence from a small

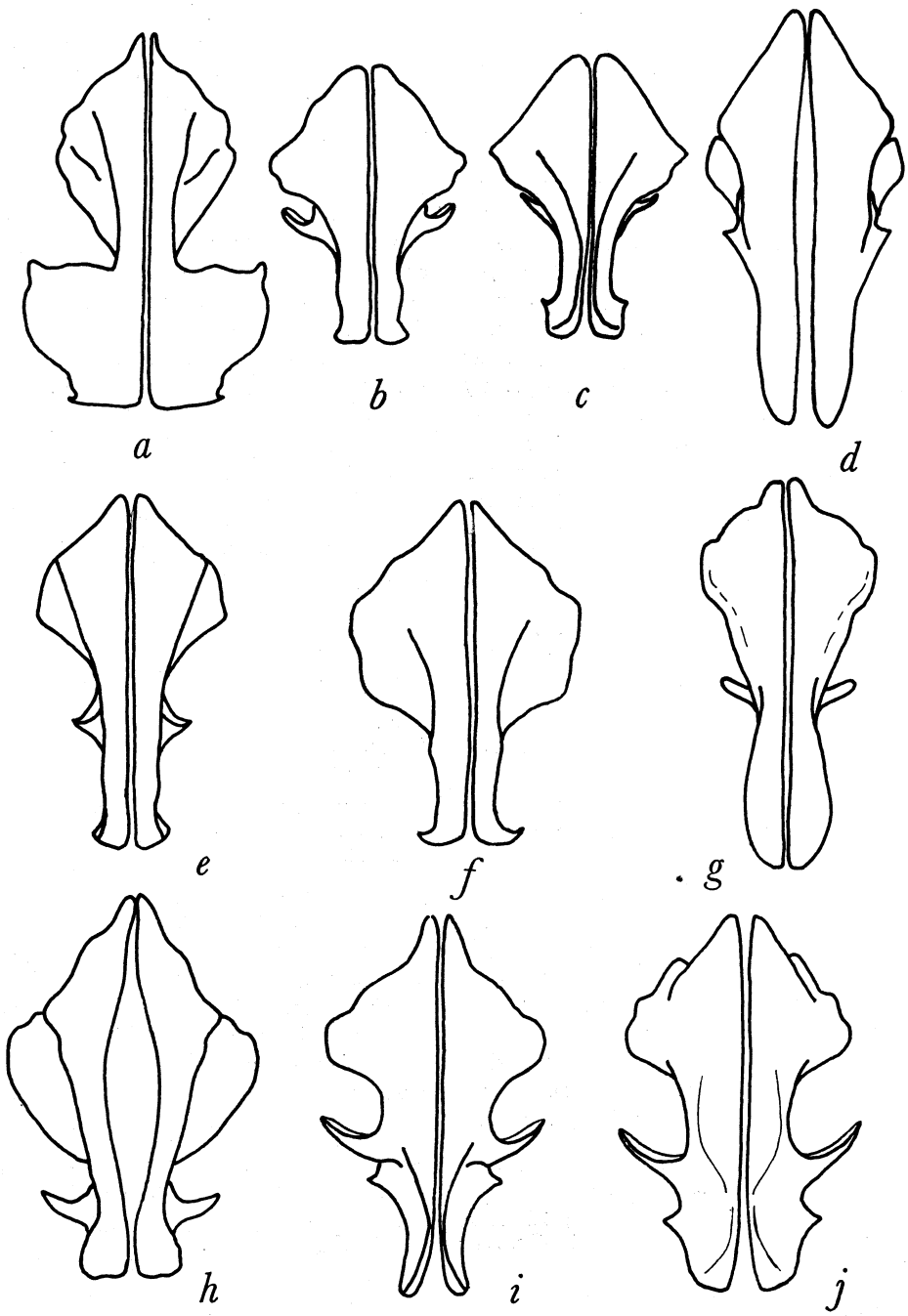

FIG. 1.—Male genitalia: *a*, *Oxygrylius ruginasus*; *b*, *Euetheola rugiceps*; *c*, *E. subglabra*; *d*, *Aphonides dunnianus*; *e*, *Ligyrus gibbosus*; *f*, *L. cuniculus*; *g*, *L. sallei*; *h*, *L. relictus*; *i*, *L. laevicollis*; *j*, *L. subtropicus*.

manure pile where the food (when they were larvae) had been very scanty; others taken from rich soil are frequently large and dark-colored. I have studied over 1,300 specimens of this species, including all Casey's types; these ranged from Baja California and northern Mexico throughout nearly the entire United States.

Commonly known as the carrot-muck beetle, this species breeds in all types of soil rich in organic matter, and both adults and larvae are known to feed underground on many plants; some of the latter are of considerable economic importance, as for example sugar-beets, potatoes, carrots, and other root vegetables, as well as the well-known rubber substitute *Guayule*. Owing to the digging habits the foretibia and head parts are frequently greatly worn; I have seen dozens of examples in which the foretibia were reduced to a mere stub of one-fourth their former length (all teeth and tarsi completely worn away), and the apical clypeal teeth and head carina completely worn smooth.

Ligyrus subtropicus Blatchley

Ligyrus subtropicus Blatchley, 1922, p. 30.
L. blatchleyi Cartwright, 1944, p. 34. (New syn.)

Known only from Florida (commonest at Miami). Cartwright in his description and discussion of *blatchleyi* in the final analysis gives only one character for the separation of his species from *subtropicus* and that is the punctation of the thoracic impression. In my topotype series from the original type series and collected by the same collector, there is an individual that exactly matches Blatchley's description of his unique female from Dunedin, Fla.; he says the thoracic depression is punctate with fine punctures as fine as the rest of the thoracic punctation, and from studies of many hundreds of *Ligyrus* I have noted that this character is just as variable in really large series as are the clypeal differences, and I am forced to consider these as one species.

Ligyrus laevicollis Bates

Ligyrus laevicollis Bates, 1888, p. 316; Schaeffer, 1909, p. 384; Casey, 1915, p. 190 (*Grylius*); Cartwright, 1944, p. 35.
L. bryanti Rivers, 1891, p. 97; Casey, 1915, p. 190 (*Grylius*).

Schaeffer was the first to synonymize *bryanti* and *laevicollis*, and rightfully so. Casey then resurrected the species, and, *bryanti* being rare in collections, no one has studied it adequately since. I have examined and dissected series including small, rufous, highly polished specimens from Baja California measuring 18 mm long, to large piceous or black, semidull specimens as large as 28 mm, including part of River's original series, and all the specimens are the same in all essential characters, including the male genitalia. It has been seen from Baja California and west coastal Mexico as far south as Acapulco; also recorded by Bates as far south as British Honduras. I have seen one female, 29 mm long, from Phoenix, Ariz. (August), which other than the size is exactly the same as Baja California specimens. The smoothness of the impunctate first elytral interval is very characteristic of this species.

Genus **Oxygrylius** Casey

Oxygrylius Casey, 1915, pp. 178, 208; Ritcher, 1944, p. 27 (larvae).

Only one species belongs in this genus, which is valid since the apex of the clypeus is sharply pointed (and thus unidentate) in both sexes.

Oxygryilus ruginasus (LeConte)

Ligyrus ruginasus LeConte, 1856, p. 20; Horn, 1875, p. 143; Casey, 1915, p. 209 (*Oxygrylius*); Bates, 1888, p. 316.
Oxygrylius peninsularis Casey, 1915, p. 209. (New synonymy.)

I have examined large series from all parts of Baja California, northern Mexico and Sonoran regions (Posa and Los Mochis in Sinaloa), New Mexico, and Airzona; also recorded from California. Rare in the United States, very common in Baja California from June through October; in one series of 216 specimens from Baja California, all specimens possess both the thoracic fovea and tubercle, and differ among themselves mainly in size and color.

Genus **Aphonides** Rivers

Aphonides Rivers, 1889, p. 6; Casey, 1915, p. 230.
Anoplognatho Rivers, 1889, p. 101.

One species only is known of this genus, and nothing seems to be known of the earlier stages.

Aphonides dunnianus (Rivers)

Anoplognatho dunnianus Rivers, 1889, p. 102; Casey, 1915, pl 229.

An unusual, uncommon, and aberrant species. The very large and externally rounded mandibles, the very high transverse clypeal carina, the very dense and long clypeal margin of hairs, and cribrately punctate mentum (ligula), with its dense and long hairs, readily distinguish the species. The female pygidium is large and transversely tumid at the middle; that of the male is very large and evenly convex. The species is known only from Arizona and Texas but will probably prove to occur in New Mexico and northern Mexico also. The males appear to be quite rare, even more so than the females. Small female *Strategus cessus* may be distinguished from females of this species by their thoracic fovea and square mandibles, and they also have an interrupted basal clypeal carina.

Genus **Euetheola** Bates

Euetheola Bates, 1888, p. 314; Casey, 1915, pp. 178, 186.

Five species of *Euetheola* have been described, of which only two occur in the United States. The genus is close to *Ligyrus*, but the species are more oblong-parallel, the thorax is noticeably longer, and the mandibles when viewed from above are only bidentate. The male front tarsi in *rugiceps* are enlarged but small and simple in *subglabra*.

Euetheola rugiceps (LeConte)

Bothynus rugiceps LeConte, 1856, p. 21; Casey, 1915, p. 187 (*Euetheola*); Baerg and Palm, 1932, p. 207 (biology, also many other references, see Arrow, 1937, p. 36); Ritcher, 1944, p. 24 (larvae).

This sugarcane beetle, or rough-headed cornstalk beetle, is very commonly and widely distributed in the Southeastern States. I have seen specimens from Georgia, Kentucky, and Texas. Phillips and Fox (1924) indicate that vegetable matter in poorly drained, or dark and heavy soils is the main larval habitat, as well as grasslands. The species may also attack corn and cornstalks. The male genitalia are close to those of *Ligyrus gibbosus*, but the parameres are shorter and the lateral teeth are larger and more reflexed.

Euetheola subglabra (Schaeffer)

Ligyrus subglabra Schaeffer, 1909, p. 383; Casey, 1915, p. 188 (*Euetheola*).

Differs from *rugiceps* mainly in the practically impunctate (punctures minute and discernible only under high magnification) thoracic disc, as well as by the second and third alternate elytral intervals having a single row of punctures rather than being confusedly punctate. I have seen a single male from Sinaloa in northern Mexico, collected in July; the species was described from a unique specimen from Nogales, Ariz., but to my knowledge it has not since been taken in the United States. The species is very distinct in the genus.

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