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### The Scarabaeoid Beetles of San Diego County, California Part II. Diagnosis of Families Lucanidae and Scarabaeidae (Subfamilies Aphodiinae and Scarabaeinae) with comments on Part I

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ABSTRACT.—Part I of The Scarabaeoid Beetles of San Diego County, California (McPeak and Oberbauer 2008), considered the Glaresidae, Trogidae, Pleocomidae, Geotrupidae, Ochodaeidae, Hybosoridae, and Glaphyridae. Part II adds the Lucanidae and a fourth species of Ochodaeidae to the San Diego fauna and presents data on 44 species of Scarabaeidae, subfamilies Aphodiinae (38) and Scarabaeinae (6).

#### INTRODUCTION

Part I of The Scarabaeoid Beetles of San Diego County, California (McPeak and Oberbauer 2008) treated the Glaresidae, Trogidae, Pleocomidae, Geotrupidae, Ochodaeidae, Hybosoridae, and Glaphyridae. Part II diagnoses 44 species of the family Scarabaeidae (subfamilies Aphodiinae and Scarabaeinae). In addition, M. J. Paulsen and D. C. Hawks (personal communication, 2007) brought to our attention that *Sinodendron rugosum* Mannerheim (Lucanidae) occurs in San Diego County. This family should have been included in Part I, so we provide a diagnosis of the Lucanidae in this paper. In addition, Paulsen (2007) published nomenclatural changes and described two new genera of Nearctic Ochodaeidae while Part I was in press. We discuss these changes in this paper and add a fourth species of ochodaeid to the San Diego County fauna.

#### METHODS AND MATERIALS

The results of Part II are based on examination of 2932 specimens from the following private and museum collections:

|       |  |
|-------|--|
| CAS   | California Academy of Sciences                         |
| DCH   | David C. Hawks Collection                              |
| JS    | Jim Saulnier Collection                                |
| LACM  | Los Angeles County Museum of Natural History           |
| PKL   | Paul K. Lago Collection                                |
| PSC   | Paul Schroeder Collection                              |
| PS    | Phil Soto Collection                                   |
| RHM   | Ron H. McPeak Collection                               |
| SBMNH | Santa Barbara Museum of Natural History                |
| SDNHM | San Diego Natural History Museum                       |
| UCB   | University of California, Berkeley                     |
| UCD   | University of California, Davis                        |
| UCR   | University of California, Riverside                    |
| USNM  | United States National Museum, Smithsonian Institution |
| WBW   | William B. Warner Collection                           |
| WSU   | Washington State University                            |
| WFBM  | William F. Barr Museum, University of Idaho            |

#### KEY TO THE FAMILIES OF THE SCARABAEOIDEA OF SAN DIEGO COUNTY

The key to families of the Scarabaeoidea of San Diego County Part I (McPeak and Oberbauer 2008:6–7) should be modified to include the family Lucanidae. The following revised key (modified from Ratcliffe and Jameson 2005) reflects the addition of this family.

1. Antennae with unopposable antennomeres (Fig. 1) ..... LUCANIDAE
- 1'. Antennae with opposable antennomeres (Fig. 2) ..... 2
2. Antennae with 11 antennomeres ..... 3
- 2'. Antennae with 7–10 antennomeres ..... 4
3. Large setose beetles. Males 24.5–34.2 mm long; females 34.0–39.5 mm long, heavier bodied than males. Males with elongate antennal club, with 5 antennomeres (fifth antennomere reduced); hind wings well-developed; females with antennomeres of antennal club short, hind wings reduced to vestigial stubs ..... PLEOCOMIDAE
- 3'. Smaller, males and females 8.5–19.8 mm. Both sexes with antennal club round, with 3 antennomeres, and with well-developed hind wings ..... GEOTRUPIDAE (Bolboceratinae)
4. Longer mesotibial spur pectinate along edge. Reddish-brown,

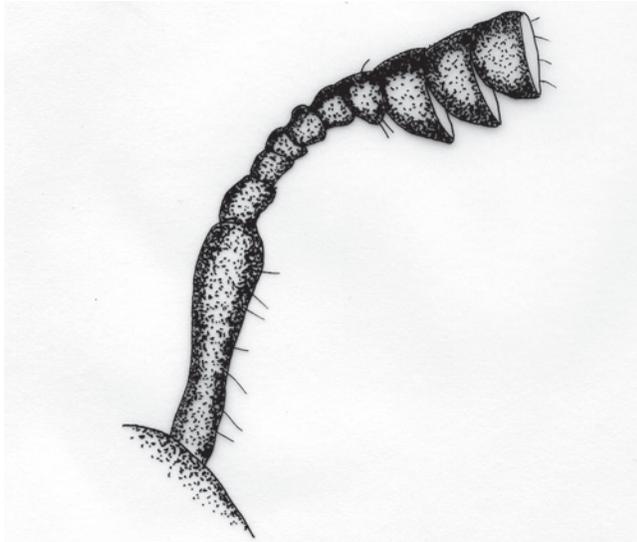


Figure 1. Unopposable antenna, *Sinodendron rugosum* Mannerheim, family Lucanidae. 100× actual size. Figure courtesy of D. A. Glantz.

- yellowish-brown, or bicolored with pale elytra and black pronotum and head. Length 3.9–8.5 mm ..... OCHODAEIDAE
- 4'. Mesotibial spur not pectinate. Color variable. Length 2.7–33.0 mm ..... 5
5. First club antennomere cup-shaped to receive second club antennomere. Antennal club with 3 antennomeres. General color reddish-brown. Length 4.8–6.9 mm ..... HYBOSORIDAE
- 5'. First club antennomere not cup-shaped to receive second club antennomere. Antennal club with 3–7 antennomeres ..... 6
6. Abdomen with five visible ventrites; upper surface of body dull and rough, with warts and ridges or tiny tubercles ..... 7
- 6'. Abdomen with six visible ventrites; upper surface of body variable ..... 8
7. Eyes not divided by canthus. General color brown to black, with body surface warty or ridged. Abdomen visible ventrally, not hidden by expanded legs. Length 5.5–14.0 mm ..... TROGIDAE
- 7'. Eyes divided by canthus. General color reddish-brown. Femora and tibiae enlarged to cover abdomen in retracted position. Length 3.5–5.2 mm ..... GLARESIDAE
8. Elongate setose beetles resembling bees. Elytra short and divergent at apex ..... GLAPHYRIDAE
- 8'. Not elongate and setose. Elytra longer and not diverging at apex ..... SCARABAEIDAE

FAMILY LUCANIDAE Latreille, 1804  
STAG BEETLES

The following diagnosis is based on Ratcliffe (2002). Lucanids are usually elongate, weakly convex, subdepressed, or cylindrical. Color testaceous to reddish-brown to black. Antennae geniculate or straight, with 10 antennomeres and with a club of 3–7 antennomeres, and all antennomeres are unopposable and tomentose (Fig. 1). Clypeus and labrum fused to frons. Mandibles produced beyond apex of labrum, usually prominent. Males of many species have enlarged mandibles, while females lack enlarged mandibles. Pronotum weakly convex, base narrower than elytral base, lacking ridges, tubercles, horns, or sulci. Protibia dentate on outer margin, apex with one spur; meso- and metatibia with ridges, apex with 2 spurs. Abdomen with 5 visible sternites.

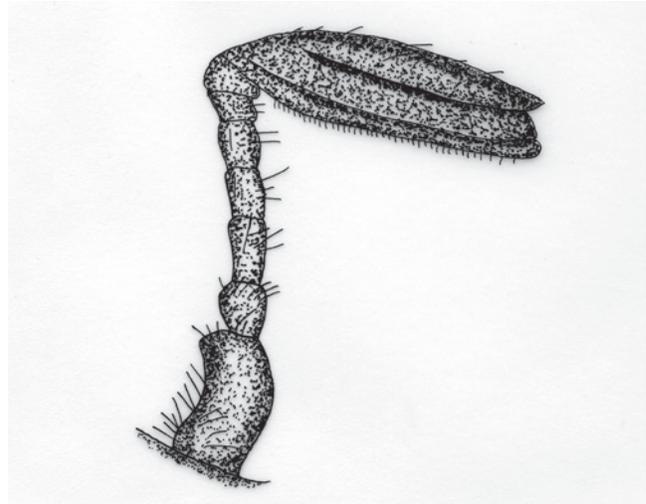


Figure 2. Opposable antenna, *Paracotalpa puncticollis* LeConte, family Scarabaeidae. 100× actual size. Figure courtesy of D. A. Glantz.

There are approximately 1000 species of lucanids worldwide with more species found in Asia than elsewhere (Krajčik 2001). Three subfamilies and 24 species of stag beetles occur in the Nearctic Realm (Smith 2009). *Sinodendron rugosum* belongs to the subfamily Syndesinae.

Lucanids are usually associated with decaying wood and logs in coniferous and deciduous forests. Some adults are attracted to lights at night; others feed on sap flows; and a few feed on flowers (Ratcliffe 2002). Eggs are generally laid in crevices in logs or bark, and larvae eat decaying wood.

Subfamily Syndesinae MacLeay, 1819

Syndesinids are characterized as follows: Body elongate, cylindrical; eyes lack a canthus; antenna straight (not geniculate) with a weakly lamellate club; prosternal process narrow (Ratcliffe 2002).

Genus *SINODENDRON* Hellwig, 1891

Males of the genus *Sinodendron* have a long, median head horn, and females have a median tubercle. In both sexes the mandibles are small and inconspicuous.

*Sinodendron rugosum* Mannerheim  
(Figs. 1, 3–5)

*Diagnosis*—Length 10.0–15.0 mm; width 5.0–5.5 mm. Color black, shiny. Male with anterior margin of head produced in a curved horn (Fig. 3); pronotum with anterior declivous portion densely punctate before a transverse ridge that is produced in the middle as a subtruncate lobe. Female's head with median tubercle (Fig. 4); midline of pronotum elevated in a low impunctate carina and variable prominence about 2/5 the way between median carina and lateral margin. In both sexes elytra roughly, coarsely, and irregularly punctate (Hatch 1971).

*Distribution*—Recorded from British Columbia, Canada; Washington, Idaho, Oregon, and California.

*San Diego County Locality Records*—We examined 1 specimen and obtained data from a second (Fig. 5) (D. C. Hawks, personal communication.): San Diego, no date, (California Beetle Project 0036735) (1 SBMNH); Mt. Palomar, 23 Jul 1973 (1 DCH).

*Temporal Distribution*—July (1).



Figure 3. Male *Sinodendron rugosum* Mannerheim. 14.0 mi. W Madras, Jefferson Co., Oregon. Dug from rotten alder log, 28 February 1969. Scale 1.0 mm. Photo by G. A. Hanley.

*Remarks*—*Sinodendron rugosum*, known as the rugose stag beetle, lives in isolated wet canyons of the Transverse and Peninsular ranges in southern California (Evans and Hogue 2006). The species is common in the Northwest and breeds in wet, rotten wood (especially logs). Larvae have been found in alder, ash, California laurel, cherry, cottonwood, maple, oak, poplar, water birch, and willow (Ritcher 1966). Females of a closely related European species (*Sinodendron cylindricum* Linnaeus) bore tunnels in decaying wood, while the male uses his deeply concave pronotum to push out the borings. Males of *S. rugosum* may also use their deeply concave pronotum to push out borings made by the female.

FAMILY OCHODAEIDAE Mulsant and Rey, 1871  
SAND-LOVING SCARAB BEETLES

Three species of ochodaeids were treated in Part I: *Ochodaeus mandibularis* Linell, *Ochodaeus californicus* Horn, and *Parochodaeus peninsularis* (Horn). Paulsen (2007) made nomenclatural changes and described two new genera of Nearctic ochodaeids while Part I was in press. We wish to reflect these changes in Part II and add a fourth species, *Codocera gnatho* (Fall), to the San Diego County fauna.

Paulsen (2007) proposed a new genus, *Cucochodaeus*, to distin-



Figure 4. Female *Sinodendron rugosum* Mannerheim. Spencer Creek, Douglas Co., Oregon. Dug from rotten alder, 23 April 1964. Photo by J. MacGown.

guish New World ochodaeids having nine antennomeres, an unmodified propygidium, no stridulatory peg, head declivous behind the eyes, and the anterior margin of the pronotum produced behind the eyes (not simply concave). *Ochodaeus mandibularis* Linell belongs in the new genus. Paulsen (2007) placed *O. mandibularis* Linell into synonymy with *O. sparsus* (LeConte). The new name for the San Diego species, therefore, is *Cucochodaeus sparsus* (LeConte).

Paulsen (2007) also recognized *Codocera* Eschscholtz, 1821, as

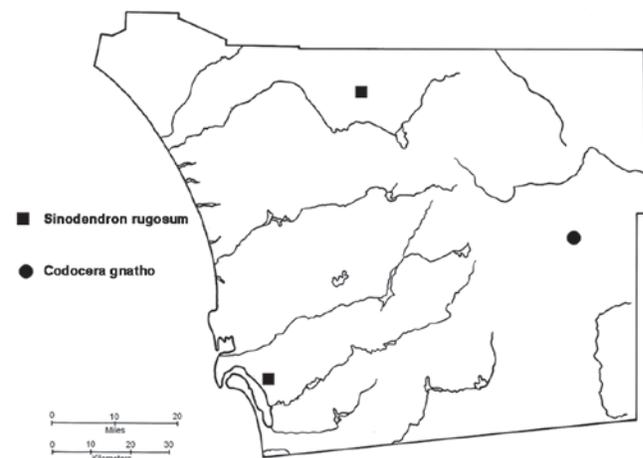


Figure 5. Distribution, *Sinodendron rugosum* and *Codocera gnatho*.

a valid genus. This genus possesses a platelike, ventrally produced mentum in males, has strongly projecting mandibles, and lacks propygidial modifications. *Codocera gnatho* (Fall, in Fall and Cockerell, 1907) is a new record for San Diego County. Paulsen (2007) also transferred *Ochodaeus californicus* Horn to *Parochodaeus*. Therefore, we recognize the four species of ochodaeids currently known from San Diego County as *Codocera gnatho*, *Cucochodaeus sparsus*, *Parochodaeus californicus*, and *P. peninsularis*. The following key reflects these nomenclatural changes.

Key to the Ochodaeidae of San Diego County  
(modified from Paulsen 2007)

- 1. Antenna with 9 antennomeres ..... *Cucochodaeus sparsus* (LeConte)
- 1'. Antenna with 10 antennomeres ..... 2
- 2. Sutural angle of elytra dentiform; propygidium with pair of tubercles at midline that interlock with dentiform apices: *Parochodaeus* Nikolayev ..... 3
- 2'. Sutural angle of elytra not dentiform; propygidium lacking tubercles at midline (Fig. 6) ..... *Codocera gnatho* (Fall)
- 3. Eyes small, approximately 1/7 distance between eyes; body bicolor, head and thorax black, elytra dull brownish-yellow ..... *Parochodaeus californicus* (Horn)
- 3'. Eyes large, approximately 1/3 to 1/4 distance between eyes; body unicolored, head, thorax, and elytra yellowish-brown to reddish-brown ..... *Parochodaeus peninsularis* (Horn)

***Codocera gnatho*** (Fall)  
(Figs. 5, 6)

**Diagnosis**—Length 5.5–7.5 mm; width 2.4–3.3 mm. Color light yellowish-brown (Fig. 6). Mentum of male is platelike and ventrally produced. Anterior clypeal tubercle present in the female, sometimes contiguous with the anterior clypeal margin in the male.

**Distribution**—*Codocera gnatho* is reported from California, Arizona, New Mexico, Texas, as well as Durango, Mexico (Paulsen 2007), and Baja California, Mexico (R. H. McPeak, personal observation).

**San Diego County Locality Records**—2 specimens examined from one locality (Fig. 5): Anza-Borrego Desert State Park, Mathew Canyon area, 33° 06.2' N, 116° 10.2' W (CBP0025869, CBP0025902) (2 SBMNH).

**Temporal Distribution**—No date (2).

**Remarks**—The life history and immature stages of this beetle are unknown. The species has been taken at blacklight.

FAMILY SCARABAEIDAE Latreille, 1802  
SCARAB BEETLES

Scarab beetles are speciose and conspicuous in the Nearctic Region. Many adults are relatively large, brightly colored, have elaborate cephalic and pronotal ornamentation, and have unusual life histories. The family includes over 27,800 species with a variety of life histories and adaptations (Ratcliffe et al. 2002).

In San Diego County scarabs are extremely variable, 2.7–33.0 mm in length, black to metallic in color, with or without vestiture, and with or without armature on the head or prothorax. Antennae have 7 to 10 antennomeres with an opposable club of 3 to 7 antennomeres.

Key to the Subfamilies of the Scarabaeidae in San Diego County

- 1. Pygidium completely covered (or nearly so) by apex of elytra; length 2.7–8.5 mm ..... APHODIINAE
- 1'. Pygidium nearly or completely exposed; length greater than

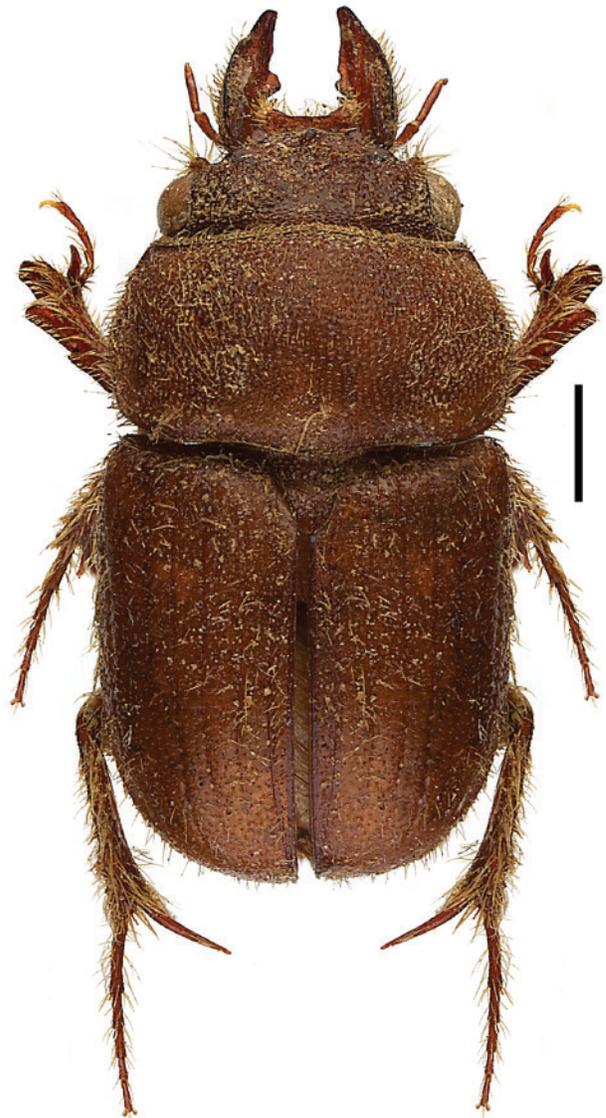


Figure 6. *Codocera gnatho* (Fall). 63 mi. E Yuma, Yuma Co., Arizona. Collected at blacklight, 2 October 1961. Scale 1.0 mm. Photo by G. A. Hanley.

- 5.0 mm ..... 2
- 2. Antennal insertion visible from above; clypeus with sides constricted medially before the eyes ..... CETONIINAE
- 2'. Antennal insertion not visible from above; clypeus with sides not constricted ..... 3
- 3. Abdominal sternites distinctly narrowed at midline; length of all sternites shorter than length of metasternum ..... SCARABAEINAE
- 3'. Abdominal sternites even, not narrowed at midline; length of all sternites longer than length of metasternum ..... 4
- 4. Claws of meso- and metatarsi unequal in length and independently movable (exception: in *Leptohoplia* all legs have only one claw or one claw is greatly reduced); tarsomere 5 at apex with ventral, median, longitudinal cleft ..... RUTELINAE
- 4'. Claws of meso- and metatarsi equal in length and not independently movable (exception: *Hoplia* has only one claw on metatarsi); tarsomere 5 at apex lacks ventral, median, longitudinal cleft, instead having 2 parallel clefts either side of midline on ventral side ..... 5



Figure 7. Exposed mandibles of *Aegialia crassa* LeConte, tribe Aegialiini. 100× actual size.

- 5. Claws of meso- and metatarsi simple; base of pronotum and elytra subequal in width; apex of metatibia always with 2 spurs; mandibles often exposed in dorsal view ..... DYNASTINAE
- 5'. Claws of meso- and metatarsi cleft, toothed, or simple (if simple, base of pronotum much narrower than base of elytra); apex of metatibia with 1 or 2 spurs or spurs absent; mandibles hidden in dorsal view ..... MELOLONTHINAE

Subfamily Aphodiinae

The Aphodiinae are small, less than 10 mm (in San Diego County), and more or less elongate beetles. The head has a dilated clypeus that usually covers most mouthparts (sometimes with tips of mandibles exposed). Antenna with 9 antennomeres; club pubescent, of 3 antennomeres. Abdomen with 6 visible sterna. Tarsal claws rarely reduced.

The Aphodiinae are a worldwide subfamily with very diverse morphology and habits. Many species feed on dung, others are detritivores, a few are turf pests, and some larvae are reported to feed on ant larvae (Gordon and Skelley 2007).

Key to the Tribes of Aphodiinae in San Diego County (modified from Gordon and Skelley 2007)



Figure 8. Head and pronotum of *Platytomus micros* (Bates), tribe Psammodiini. 100× actual size. Photo courtesy of A. R. Hardy.

- 1. Elytral base lacks marginal bead; pygidium entirely flat, unmodified by grooves or ridges; femora never grooved on apical or posterior margins .....2
- 1'. Elytral base with marginal bead; pygidium modified with basal longitudinal groove that receives the elytra at rest, pygidium often with central transverse ridge and apical eroded area; femora often with grooved margins .....3
- 2. Labrum and mandibles clearly visible beyond clypeus (Fig. 7) ..... Tribe AEGIALIINI
- 2'. Labrum and mandibles concealed beneath clypeus ..... Tribe APHODIINI
- 3. Pronotum with transverse furrows separated by swellings, furrows sometimes weak with only traces of impressions remaining, visible at least near eyes; clypeus granulate (Fig. 8) ..... Tribe PSAMMODIINI
- 3'. Pronotum without transverse swellings; clypeus rarely granulate ..... Tribe EUPARIINI

Tribe Aegialiini

Most species of this tribe are robust, with stout legs used for burrowing. They appear to be detritivores in sandy soil or leaf litter (Gordon and Skelley 2007) and have sclerotized and prominent mandibles, which are reduced in other aphodiines. Stebnicka et al. (2004) reported 4 genera and 32 species of North American aegialiines. Keys to the North American species are presented in Gordon and Cartwright (1988), Gordon (1990), and Gordon and Rust (1997). Four species of *Aegialia* are known from San Diego County.

Genus *AEGIALIA* Latreille, 1807

Gordon and Cartwright (1988) discussed four subgenera of *Aegialia* in North America, of which *Aegialia* (*Aegialia*) Latreille is the only one that occurs in San Diego County. Beetles of this subgenus have a pronotum approximately 1/3 as long as the elytra, and the pronotal surface near the posterior angle is impunctate, or nearly so. The four species of *Aegialia* reported from San Diego County are *Aegialia crassa* LeConte, *A. latispina* LeConte, *A. punctata* Brown, and *A. spinosa* Gordon and Cartwright.

Key to the Aegialiini of San Diego County (modified from Gordon and Cartwright 1988)

- 1. Pronotum with basal marginal line strong, entirely visible ..2
- 1'. Pronotum with basal marginal line absent or interrupted .....3
- 2. Apical flange on metafemur strongly produced, inner angle hooked or abruptly angulate. Length 3.4–4.8 mm (Fig. 9) ..... *Aegialia spinosa* Gordon and Cartwright
- 2'. Apical flange on hind femur with inner angle rounded or obsolete. Length 3.6–4.8 mm (Fig. 10) ..... *Aegialia punctata* Brown
- 3. Pronotum densely and coarsely punctate throughout. Length 3.5–5.0 mm (Fig. 11) ..... *Aegialia latispina* LeConte
- 3'. Pronotum lacking punctation anteriorly and laterally; or, if punctation present, then fine and indistinct. Length 4.0–5.0 mm (Fig. 12) ..... *Aegialia crassa* LeConte

*Aegialia crassa* LeConte (Figs. 7, 12–14)

*Diagnosis*—Length 4.0–5.0 mm; width 1.7–1.9 mm. Color black, except profemur reddish. Form oval, very broad posteriorly (Fig. 13). Head densely granulate, not punctate (Fig. 7). Pronotum lacking punctation anteriorly and laterally, or punctation, if present, fine and indistinct (Fig. 12). Pronotal base without marginal line. Metatibia robust, wide, with numerous surface denticles and 2 rows of denticles



Figure 9. Hindfemur of *Aegialia spinosa* Gordon and Cartwright.



Figure 10. Hindfemur of *Aegialia punctata* Brown.

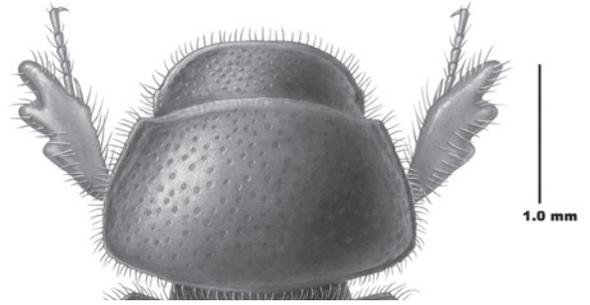


Figure 11. Head and pronotum of *Aegialia latispina* LeConte. Figure courtesy of Smithsonian Institution.

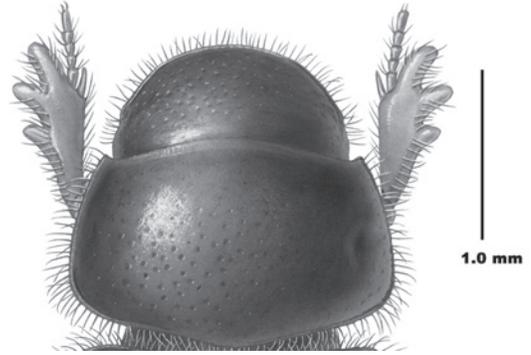


Figure 12. Head and pronotum of *Aegialia crassa* LeConte. Figure courtesy of Smithsonian Institution.



Figure 13. *Aegialia crassa* LeConte. Coastal sand dunes, Clatsop Co., Oregon, 1 May 2004. Scale 1.0 mm. Photo by G. A. Hanley.

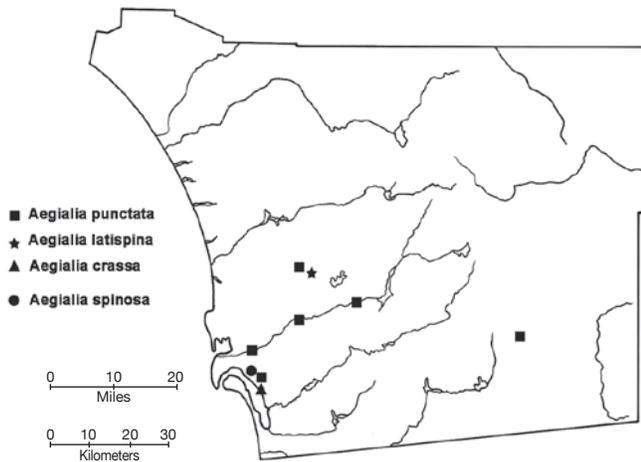


Figure 14. Distribution, *Aegialia crassa*, *A. latispina*, *A. punctata*, and *A. spinosa*.

on inner margin from base to apex; one incomplete carina in apical 2/3; apical spurs strongly spatulate, both spurs slightly shorter than first 3 tarsomeres combined.

*Distribution*—From southeastern British Columbia, Canada to Baja California, Mexico (Gordon and Cartwright 1988).

*San Diego County Locality Records*—Stebnicka (1977) listed *Aegialia crassa* from San Diego (Fig. 14), but we have not seen specimens from here.

*Temporal Distribution*—No data available.

*Remarks*—*Aegialia crassa* is a common species on some dunes along the Pacific coast and in Oregon and Washington is readily taken crawling on the surface of the sand during all months of the year (R. H. McPeak, personal observation). This species is readily distinguished from the other San Diego County species of *Aegialia* that lacks a basal pronotal line (*A. latispina*) by the reduced punctuation on the pronotum and extremely short and robust meso- and metatibia.

***Aegialia latispina* LeConte**  
(Figs. 11, 14, 15)

*Diagnosis*—Length 3.5–5.0 mm; width 1.5–2.0 mm. Color dark brown or reddish-brown. Form elongate (Fig. 15). Head densely granulate and lacking punctuation. Pronotum coarsely punctate (Fig. 11), base lacking marginal line. Mesotibia short, extremely wide at apex, without complete transverse carina; apical spurs slender, outer spur as long as first 3 tarsomeres. Metatibia relatively slender, strongly widened at apex, without complete transverse carina; apical spurs slender, somewhat spatulate, spurs subequal in length.

*Distribution*—From Washington to southern California, Arizona, New Mexico, and Colorado (Gordon and Cartwright 1988).

*San Diego County Locality Records*—Moore (1937) listed 8 specimens in the Blaisdell collection from San Diego County. We saw a single Blaisdell specimen from Poway in the CAS collection (Fig. 14).

*Temporal Distribution*—No date (1 CAS).

*Remarks*—The slender body form, coarsely punctate pronotum, and lack of a basal marginal line on the pronotum distinguish this species.

***Aegialia punctata* Brown**  
(Figs. 10, 14, 16)

*Diagnosis*—Length 3.6–4.8 mm; width 1.5–1.6 mm. Form elongate, oval, widest in posterior third (Fig. 16). Color reddish-brown to piceous; prosternum and leg always paler than remainder of venter. Head granulate, lacking punctuation. Pronotum smooth, distinctly punctate except in lateral fourth, discal punctuation moderately coarse;



Figure 15. *Aegialia latispina* LeConte. Dufur Farm, Dufur Valley Road, Wasco Co., Oregon. Pitfall trap in *Thomomys talpoides* burrow, 6 April 2005. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 16. *Aegialia punctata* Brown. 5 mi. W of Marietta Sand Dunes, Mineral Co., Nevada, 6 June 1980. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 17. *Aegialia spinosa* Gordon and Cartwright. 1.5 mi. E of Avery Park, Klickitat Co., Washington. Sifting sand, 20 November 2011. Scale 1.0 mm. Photo by G. A. Hanley.

base with marginal line. Apical flange of metafemur with inner angle rounded or obsolete (Fig. 10). Metatibia slender to slightly robust with some scattered surface denticles; apical spur foliaceous, outer spur as long as first 3.5 tarsomeres, inner spur as long as first 3 tarsomeres.

*Distribution*—Recorded from California, North Dakota, Utah, and Baja California, Mexico (Gordon and Cartwright 1988).

*San Diego County Locality Records*—18 specimens examined (Fig. 14): San Diego, no date (3 CAS); Mission Valley, sand, 4 Mar 1929 (5 CAS); Mission Valley, 4 Mar 1933 (1 SDNHM); Old Mission Dam, 12 Feb 1977 (1 SDNHM); Poway, no date (3 CAS); El Monte Oaks, river edge, 22 Aug 1928 (1 SDNHM) and 17 Mar 1929 (2 SDNHM); Naval Weapons Station (Fallbrook Annex), flying, 2 Mar 1994 (1 RHM); Cibbets Flat Campground, flying, 8 Apr 1989 (1 RHM).

*Temporal Distribution*—February (1), March (9), April (1), August (1).

*Remarks*—This species is similar to *Aegialia spinosa* except the apical flange on the metafemur has the inner angle rounded or obsolete in *A. punctata* and hooked or right-angled in *A. spinosa* (Gordon and Cartwright 1988). We have taken the species flying during the day and by sifting sand in riparian habitats.

*Aegialia spinosa* Gordon and Cartwright  
(Figs. 9, 14, 17)

*Diagnosis*—Length 3.4–4.8 mm; width 1.4–1.7 mm. Form elongate, oval, widest in posterior third (Fig. 17). Dorsal color brown to nearly

black. Head granulate, lacking punctuation. Pronotum smooth, discal punctuation coarse, separated by a diameter or less, becoming fine and sparse laterally; base with marginal line. Metafemur with apical flange strongly produced, inner angle reflexed and spinose (Fig. 9). Metatibia moderately robust with some scattered surface denticles, incomplete transverse carina in apical third; apical spurs foliaceous, outer spur as long as first 3 tarsomeres, inner spur as long as first 2.5 tarsomeres.

*Distribution*—Recorded from Washington, Idaho, Oregon, and California (Gordon and Cartwright 1988).

*San Diego County Locality Records*—Gordon and Cartwright (1988) listed the species from San Diego (Fig. 14).

*Temporal Distribution*—No dated records are available for San Diego County specimens.

*Remarks*—The strongly produced apical flange on the metafemur is usually spinose and distinguishes this species from other San Diego County species of *Aegialia*.

Tribe Aphodiini

Approximately 170 genera and nearly 2000 species of aphodiine beetles are recognized worldwide, with over 250 species currently known in North America north of Mexico. Until recently, most North American species were included in the genus *Aphodius*. Moore (1937) listed 11 species of *Aphodius* in San Diego County. Gordon and Skelley (2007) considered the supraspecific taxonomy of the group, recognizing 54 genera, several of which they described as new. We follow their classification and recognize 18 genera and 22 species of aphodiine beetles in San Diego County.

The tribe Aphodiini is characterized as follows: Aphodiinae with spurs on metatibia separated, allowing the basal tarsal segment to articulate between them (Fig. 18). Meso- and metatibia usually have



Figure 18. Metatibia with metatibial spurs separated allowing basal tarsal segment to articulate between them. *Aphodius fimetarius* (Linnaeus).

oblique transverse carinae. Pygidium entirely smooth, unmodified. Clypeus variously modified, covering labrum and mandibles. Elytra lacks basal margin; humeral denticles usually lacking but present in a few species. Our descriptions of genera and species reflect the work of Gordon and Skelley (2007).

San Diego County aphodiines are detritivores and dung-feeders. Many species are associated with rodents: pocket gophers (*Thomomys bottae*), ground squirrels (*Spermophilus* spp.), kangaroo rats (*Dipodomys* spp.), and wood rats (*Neotoma* spp.). The San Diego aphodiine fauna includes three European species: *Aphodius fimetarius* (Linnaeus), *Calamosternus granarius* (Linnaeus), and *Otophorus haemorrhoidalis* (Linnaeus). Jerath (1960) described larvae of several species of the Aphodiini that occur in San Diego County. Moore (1937) listed a single specimen of *Aphodius coquilletti* in the Blaisdell collection from San Diego County, but we were unable to locate it and so do not include the species in this treatment.

Key to the Aphodiini of San Diego County  
(modified from Gordon and Skelley 2007)

1. Scutellum large, more than 1/6 as long as elytra. Length 4.1–5.4 mm (Fig. 19)...*Otophorus haemorrhoidalis* (Linnaeus)
- 1'. Scutellum small, 1/6 or less length of elytra.....2
2. Elytra with distinct humeral tooth.....3
- 2'. Elytra lacking humeral tooth.....6
3. Anterior margin of clypeus with distinct tooth each side of median emargination; clypeal surface distinctly setose. Length 3.1–4.5 mm (Fig. 20).....*Luxolinus luxatus* (Horn)
- 3'. Anterior margin of clypeus rounded; clypeus not setose.....4
4. Head and pronotum mostly black, anterior margin of head and anterior pronotal angles brown; elytra yellow except lateral and apical declivities black. In *Neotoma* nests. Length 4.5–6.0 mm (Fig. 21).....*Caligodorus vandykei* (Barrett)
- 4'. Color reddish-brown to black. Length 5.7–8.2 mm: *Stenothorax* Schmidt.....5
5. Pronotum rectangular, posterior angles bisinuate. Wings fully developed. In *Neotoma* nests. Length 5.7–8.0 mm (Fig. 22).....*Stenothorax sparsus* (LeConte)
- 5'. Pronotum constricted in basal half; anterior angles broadly explanate. Wings not developed. In pocket gopher (*Thomomys* spp) burrows. Length 6.6–8.2 mm (Fig. 23).....*Stenothorax ovipennis* (Horn)
6. Clypeus with distinct, long, dense lateral fringe of setae, visible dorsally. Head lacking median frontal tubercle.....7
- 6'. Clypeus at most with sparse fringe of setae (frontal lobe often fringed). Head with or without frontal tubercle.....11
7. Body robust, color dark reddish-brown; elytral fold with deep setose groove at base: *Dellacasiellus* Gordon and Skelley.....8
- 7'. Body shape and color variable; elytral fold lacking deep setose groove at base.....9
8. Clypeus distinctly toothed and clypeal surface distinctly punctate throughout. Elytron shiny, intervals flat and finely punctate. Species occurs in the desert. Length 7.2–8.0 mm (Fig. 24).....*Dellacasiellus glamisensis* Gordon and Skelley
- 8'. Clypeus usually angulate or with poorly developed teeth. Clypeal surface mostly impunctate except for fine punctation laterally. Distributed from the coast to lower mountains (<1200 m) and at Scissors Crossing. Length 7.0–8.3 mm (Fig. 25).....*Dellacasiellus pseudofucosus* Gordon and Skelley
9. Clypeal teeth spiniform. Color pale yellowish-brown to dark reddish-brown. Protibia with apical tooth large and projecting at right angle to axis of tibia. Length 4.8–6.1 mm (Fig. 26).....*Cinacanthus militaris* (LeConte)
- 9'. Clypeal teeth at most strongly angulate, rarely appearing



Figure 19. *Otophorus haemorrhoidalis* (Linnaeus). Rural SW Minot, Ward Co., North Dakota. Cattle dung, 1 October 1997. Scale 1.0 mm. Photo by G. A. Hanley.

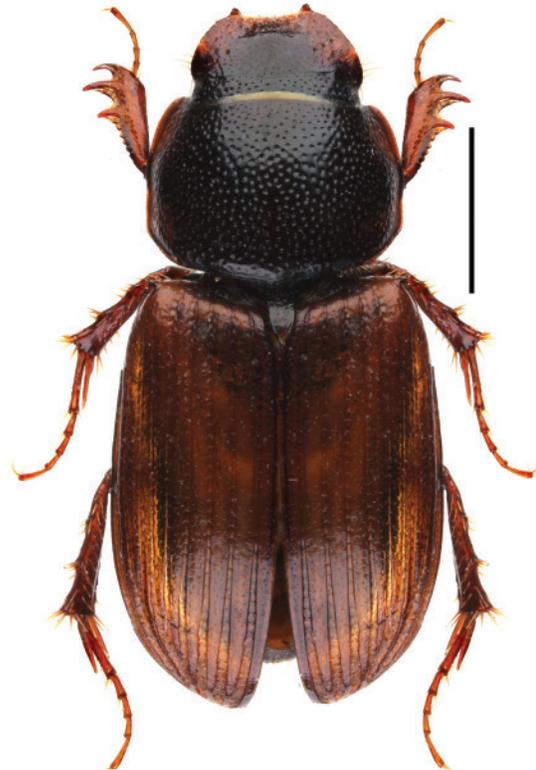


Figure 20. *Luxolinus luxatus* (Horn). Mission Valley, 1.0 mi. E of Hwy. 5 on Friars Rd. In flight, 27 December 1992. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 21. *Caligodorus vandykei* (Barrett). Pine Canyon, 6.0 mi. W of Lake Hughes, Los Angeles Co., California. Berlese *Neotoma* nest, 27 November 1978. Scale Scale 1.0 mm. Photo by G. A. Hanley.



Figure 23. *Stenothorax ovipennis* (Horn). 1.0 mi. W Warner's Ranch. Ethylene glycol can trap, 23 September 1978–7 January 1979. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 22. *Stenothorax sparsus* (LeConte). 9704 Canyon Country Lane, Escondido, blacklight trap, 19 December 1991. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 24. *Dellacasiellus glamisensis* Gordon and Skelley. Borrego Springs, at lights, 1 January 1986. Photo by J. MacGown.

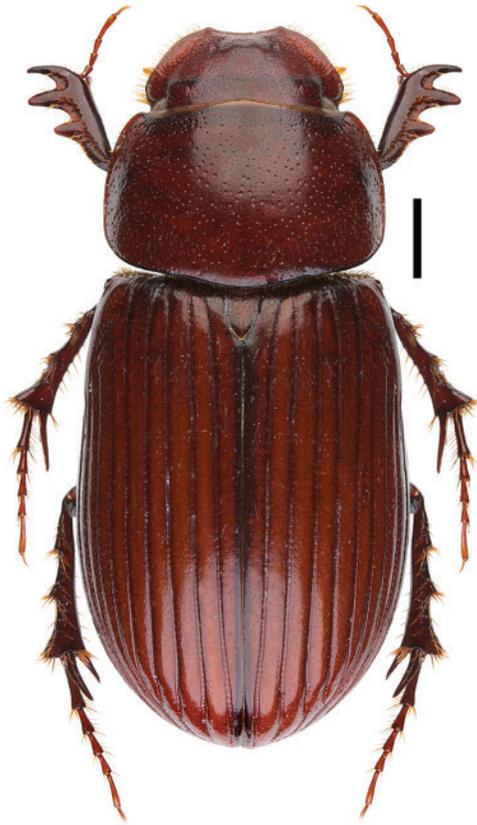


Figure 25. *Dellacasiellus pseudofucosus* Gordon and Skelley. 7989 La Brusca Way, Carlsbad. Blacklight, 5–15 April 1988. Scale 1.0 mm. Photo by G. A. Hanley.

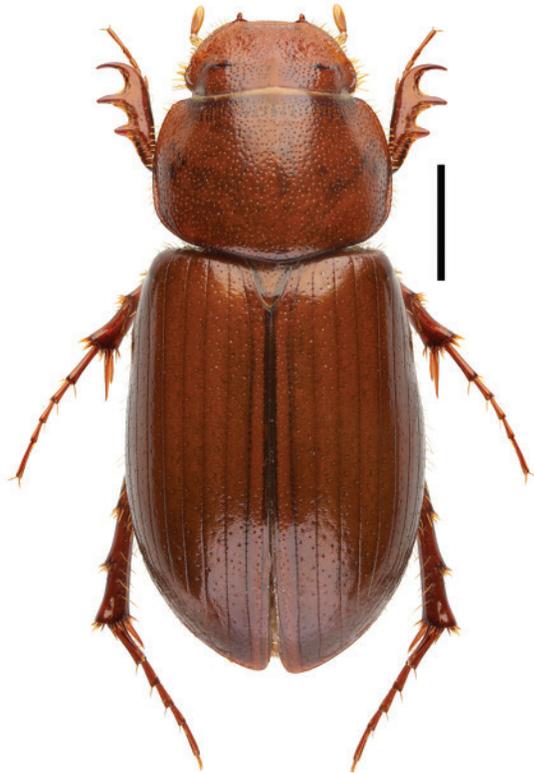


Figure 26. *Cinacanthus militaris* (LeConte). W side of Lake Hodges, Escondido, blacklight trap, 22–31 May 2003. Scale 1.0 mm. Photo by G. A. Hanley.

- spiniform. Color variable. Protibia with apical tooth not enlarged, projecting more anteriorly ..... 10
- 10. Clypeal margin strongly angulate-toothed, with additional angle lateral of prominent medial teeth; elytra yellowish with distinct black markings. Length 2.7–3.5 mm (Fig. 27) ..... *Rugaphodius rugatus* (Schmidt)
- 10'. Clypeal anterior margin very strong, triangular tooth each side of median emargination. Color pale yellowish-brown, except head and pronotum slightly darker. Length 5.5–7.5 mm (Fig. 28) ..... *Tetraclipeoides acutissimus* (Gordon)
- 11. Meso- and metatibial apices fringed with short, more or less equal spinules ..... 12
- 11'. Meso- and metatibial apices fringed with distinctly long and unequal spinules, usually alternating long and short; apical spinules frequently broken or worn; if so, consider those on the transverse carina of the tibia ..... 21
- 12. Pronotum lacking basal marginal line; elytra yellowish or testaceous, with central third and sutural interval brown. Length 3.5–5.8 mm (Fig. 29) ..... *Labarrus pseudolividus* (Balthasar)
- 12'. Pronotum with basal marginal line. Size and color variable... ..... 13
- 13. Scutellum parallel-sided or convergent toward the base, frequently depressed below elytral surface; pronotal punctation widely spaced; frontal tubercle present. Dorsum entirely black; pronotum often with obscurely defined red area laterally; or head and pronotum black, elytra dark brown; or entirely light reddish-brown. Length 3.4–6.0 mm (Fig. 30) ..... *Calamosternus granarius* (Linnaeus)
- 13'. Scutellum parallel-sided or diverging toward base, usually triangular, not depressed below elytral surface; pronotal



Figure 27. *Rugaphodius rugatus* (Schmidt). San Luis Rey, 25 December 1995. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 28. *Tetraclypeoides acutissimus* (Gordon). La Puerta (i.e., Mason Valley), September 1925. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 30. *Calamosternus granarius* (Linnaeus). Lindgren, Ward Co., North Dakota, 15 June 2010. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 29. *Labarrus pseudolividus* (Balthasar). Borrego Springs Resort, 26–31 August 2001. Scale 1.0 mm. Photo by G. A. Hanley.

- punctuation evenly distributed, usually closely spaced; frontal tubercle present or not ..... 14
- 14. Clypeus with 2 spiniform teeth each side of median emargination. Color black except anterior pronotal angles dark red; elytra yellow with black maculations. Length 3.8–5.0 mm (Fig. 31)..... *Maculaphodius conspersus* (Horn)
- 14'. Clypeus rounded or weakly angulate on each side of middle ..... 15
- 15. Elytra with first interval yellow, other intervals yellow with dark brown to black maculations ..... 16
- 15'. Elytra black or red, frequently with numerous small black marks or large pale spots ..... 17
- 16. Clypeal surface rugose; margin angulate on each side of median emargination. Metatibia of male laterally compressed with distinct flattened lateral surface. Length 3.2–4.5 mm (Fig. 32)..... *Pardalosus slevini* (VanDyke)
- 16'. Clypeal surface not rugose; margin rounded on each side of median emargination. Length 3.8–6.0 mm (Fig. 33) ..... *Pardalosus pardalis* LeConte
- 17. Body black, entire elytra and anterior pronotal angles red; head surface shiny, frontal suture with distinct median tubercle (usually trituberculate); pronotum of male with distinct median apical depression. Length 6.5–8.0 mm (Fig. 34) ..... *Aphodius fimetarius* (Linnaeus)
- 17'. Body and elytra usually same color; if notably contrasting, then elytra with distinct markings; frontal suture often lacking median tubercle; pronotum lacking depression; size variable..... 18
- 18. Clypeal surface with transverse ridge; elytra lacking color pattern. Length 3.3–4.0 mm (Fig. 35) ..... *Planolinoides neotomae* (Fall)



Figure 31. *Maculaphodius conspersus* (Horn). Shady Cove, Jackson Co., Oregon, in deer dung, 28 March 1972. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 33. *Pardalosus pardalis* (LeConte). 1.0 mi. W of Warner's Ranch. Ethylene glycol can trap, 23 September 1978–7 January 1979. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 32. *Pardalosus slevini* (VanDyke). 8.0 mi. S of Julian on Hwy. S1, 8 April 1980. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 34. *Aphodius fimetarius* (Linnaeus). SE Minot, Ward Co., North Dakota, 8 August 1999. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 35. *Planolinoides neotomae* (Fall). 8 mi. S Julian on Hwy. S1, Berlese of *Neotoma* nest, 4 April 1980. Scale 1.0 mm. Photo by G. A. Hanley.

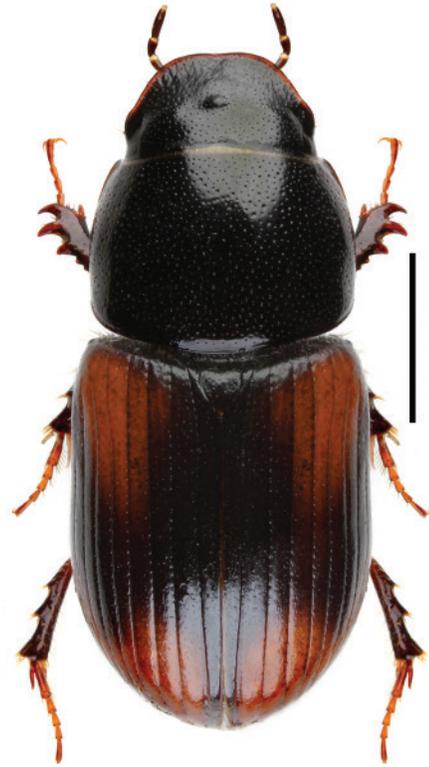


Figure 36. *Planolinellus vittatus* (Say). Near Burlington, Ward Co., North Dakota. Cattle dung, 23 April 1998. Scale 1.0 mm. Photo by G. A. Hanley.

- 18'. Clypeal surface without transverse ridge; elytron with or without color pattern. Size variable ..... 19
- 19. Clypeal margin semicircular; frontal suture with pronounced median tubercle; elytra black with variably sized red marks at humerus and apex, often nearly entirely red. Length 3.2–4.4 mm (Fig. 36) ..... *Planolinellus vittatus* (Say)
- 19'. Clypeus broadly rounded on each side; frontal suture lacking median tubercle ..... 20
- 20. Pronotal base without marginal line medially; second and fourth elytral intervals dull; metatibia with oblique carina reduced. Length 3.9–5.0 mm (Fig. 37).... *Liothorax subaeneus* (LeConte)
- 20'. Pronotal base with marginal line medially; metatibia with oblique carina well developed. Length 4.3–5.1 mm (Fig. 38) ..... *Liothorax consociatus* (Horn)
- 21. Anterior margin of clypeus with small triangular tooth each side of median emargination. Length 3.6–4.2 mm (Fig. 39) ..... *Xeropsamobeus desertus* (Van Dyke)
- 21'. Clypeus broadly angulate on each side of median emargination. Length 4.1–5.2 mm (Fig. 40)..... *Geomyphilus ungulatus* (Fall)

Genus *APHODIUS* Illiger, 1798

This Old World genus is represented in the New World by one invasive species, *Aphodius fimetarius* (Linnaeus), found in surface dung deposits. It is now probably the most frequently collected aphodiine in North America.

*Aphodius fimetarius* (Linnaeus)  
(Figs. 18, 34, 41)

*Diagnosis*—Length 6.5–8.0 mm; width 3.0–3.8 mm. Head and pronotum black except anterior pronotal angles reddish-yellow;

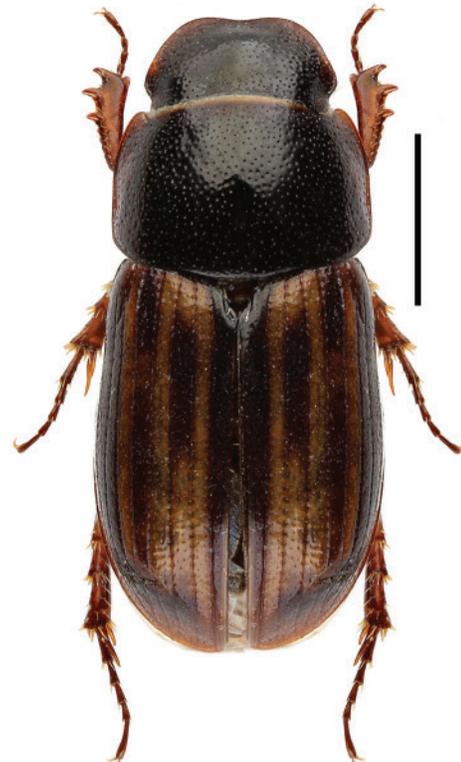


Figure 37. *Liothorax subaeneus* (LeConte). 4.0 mi. W of Sonora Pass, Tuolumne Co., California. Moss along stream, 30 June 1973. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 38. *Liothorax consociatus* (Horn). Laguna, 12 May 1929. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 40. *Geomyphilus ungulatus* (Fall). Pomona, Los Angeles County, California, 19 November 1971. Scale 1.0 mm. Photo by G. A. Hanley.

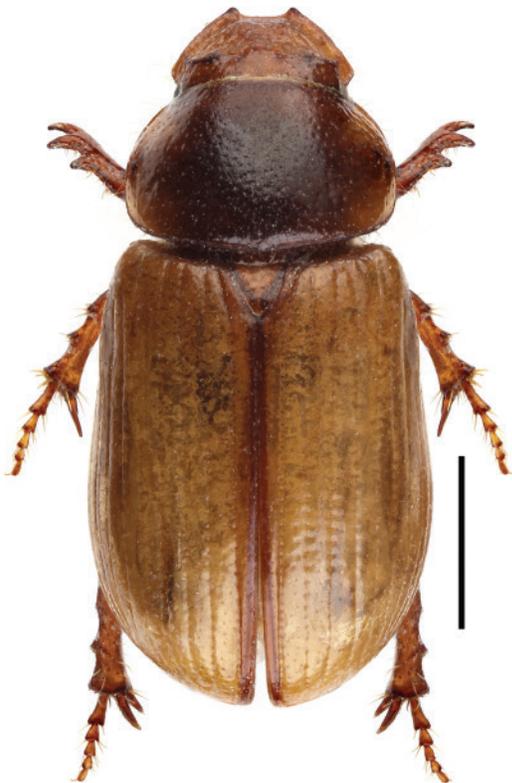


Figure 39. *Xeropsamobaeus desertus* (VanDyke). Borrego Springs, sand dunes at dump area 2 mi. E of Borrego Valley Airport, blacklight at dusk, 8 February 1992. Scale 1.0 mm. Photo by G. A. Hanley.

elytra red (Fig. 34). Pronotum with posterior angles obliquely and sinuately truncate; that of the male has an anterior median depression, that of the female lacks the depression. Male's protibial spur unmodified, inferior mesotibial spur modified. Apex of metatibia fringed with short, equal spinules.

*Distribution*—*Aphodius fimetarius* is native to Europe, Asia, and north Africa (Schmidt 1922). In North America, it occurs from southeastern to southwestern Canada, through most of the United States (except the Rocky Mountain area), and in northern Mexico.

*San Diego County Locality Records*—262 specimens examined (Fig. 41): San Diego County, 7 May 1946 (1 UCB); Lower Otay

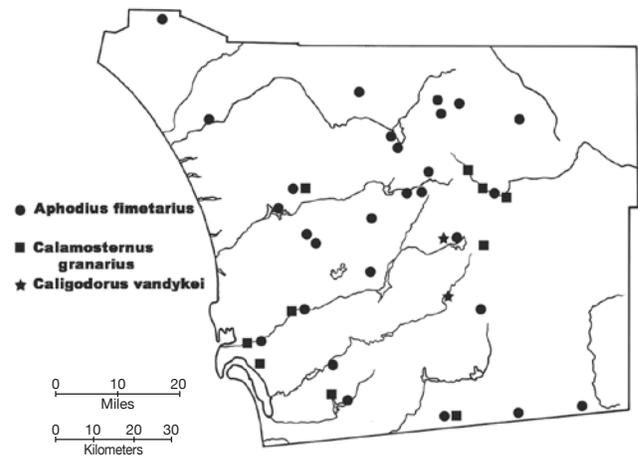


Figure 41. Distribution, *Aphodius fimetarius*, *Calamosternus granarius*, and *Caligodorus vandykei*.

Lake, 2 Feb 1977 (16 SDNHM), 3 Apr 1977 (4 SDNHM); 1.0 mi. NE Sweetwater Reservoir, 29 May 1970 (1 RHM); Mission Valley, bovine dung, 11 Feb 1933 (4 SDNHM), 13–15 Apr 1934 (12 SDNHM); Mission Gorge, 17 Apr 1953 (2 SDNHM), 16 Jun 1981 (2 SDNHM); Lake Poway, 7 Apr 1977 (1 SDNHM); Lake Hodges, 20 Jun 1977 (1 SDNHM); Potrero, 26 Apr 1980 (9 SDNHM), 8 Feb 1991 (2 RHM); Lake Morena, 15 Mar 1992 (8 RHM); San Pasqual, San Pasqual Road and Hwy 78, 22 Feb 1992 (6 SDNHM, 15 RHM), 26 Apr 1992 (25 RHM); San Pasqual, Wild Animal Park, 7 Feb 1993 (25 RHM); Ramona, 3.6 mi. E on Hwy 78, bovine dung, 4 Jul 2002 (1 RHM); Santa Ysabel, 12 Nov 1971 (7 UCD); Santa Ysabel, 3.0 mi. N, dung, 14 Nov 1971 (9 CSCA); Lake Henshaw, 5 Dec 1981 (3 SDNHM), 21 Nov 1954 (3 UCD); Lake Henshaw, 0.5 mi. W jct Hwy 76 and Hwy 79, bovine dung, 5 Jul 2002 (15 RHM); Lake Henshaw valley, Hwy 79 and Hwy S22, 1160 m, 1 Jun 1991 (1 RHM); Tenaja, Sky Ranch, 25 Apr 1992 (1 RHM); San Luis Rey Campground, 31 Jan 1965 (2 UCB); Witch Creek, 8 Mar 1934 (1 SDNHM); Alvarado Creek, 21 May 1953 (1 SDNHM), 3 Jun 1953 (1 SDNHM); Warner Springs, 3 Jul 1993 (1 RHM); Warner Springs, 2.0 mi. N, 4 Jul 1956 (2 UCD, 2 UCB); Warner Springs, 3.0 mi. N, 17 May 1964 (1 CSCA); Cuyamaca, 12 Jun 1936 (1 SDNHM), 25 May 1979 (1 SDNHM); Harris Ranch Road, 9 Apr 1983 (5 SDNHM); Mt. Palomar, 28 Jun 1963 (2 UCB), 12 Aug 1973 (1 LACM); Barona Indian Reservation, 28 Feb 1982 (1 SDNHM); Jacumba, 5 mi. W on Hwy 94, bovine dung, 26 May 2003 (13 RHM); Campo, 1.7 mi. E on Hwy 94, bovine dung, 26 May 2003 (6 RHM); Los Coyotes Indian Reservation, 0.5 mi. N of gate, 1191 m, bovine dung, 6 Jul 2002 (4 RHM); Noble Canyon, 1405 m, bovine dung, 22 May 1993 (4 RHM); Scissors Crossing, 14 Mar 1953 (2 UCB), 17 Apr 1992 (1 RHM), 7 Feb 1993 (25 RHM); Borrego, 29 Feb 1939 (2 UCR); Borrego Desert, 25 Mar 1952 (1 CAS).

**Temporal Distribution**—January (2), February (96), March (12), April (60), May (28), June (8), July (25), August (1), November (19), December (3).

**Remarks**—This invasive species is a generalist and is commonly found in bovine and horse dung in open pastures and lightly shaded areas, throughout San Diego County up to 1405 m above sea level. Eggs are deposited in the dung mass where larvae then develop. Pupation occurs in the soil beneath the dung mass. *Aphodius fimetarius* has also been found breeding in potatoes (Emden 1941). Among the California species of Aphodiinae, *Aphodius fimetarius* is easily recognized by its red elytra. The species is not taken at lights.

#### Genus *CALAMOSTERNUS* Motschulsky, 1859

*Calamosternus* contains 25 Old World species, one native Mexican species, and one widespread immigrant species in the New World (Gordon and Skelley 2007). Clypeus rugose, with transverse ridge; frontal suture trituberculate. Elytra with first stria straight, not angled near scutellum. Scutellum pentagonal and depressed. Apex of metatibia fringed with short, equal spinules. In male, protarsal spur and inferior mesotibial spur unmodified.

#### *Calamosternus granarius* (Linnaeus) (Figs. 30, 41)

**Diagnosis**—Length 3.4–6.0 mm; width 1.5–2.8 mm. Color black dorsally, pronotum often with obscurely defined red area laterally, or head and pronotum black, elytra dark brown or entirely bright reddish-brown (Fig. 30). Anterior margin of clypeus broadly rounded; frontal suture strongly trituberculate in male and weakly so in female. Pronotal basal line complete. Scutellum pentagonal, depressed.

**Distribution**—*Calamosternus granarius*, originally from Europe, is now nearly cosmopolitan in distribution. It occurs throughout North America from southern Canada to Mexico.

**San Diego County Locality Records**—216 specimens examined (Fig. 41): San Diego, no date (4 SDNHM); San Diego, 27 Mar 1944 (1 CSCA); Mission Valley, 27 Apr 1926 (1 SDNHM), 9 Sep 1928 (1 SDNHM), 28 Mar 1930 (3 SDNHM), 11–25 Feb 1933 (41 SDNHM), 4 Mar 1933 (1 SDNHM), 14 Jan 1944 (11 UCB); Mission Gorge, 19 Feb 1982 (1 SDNHM); Upper Otay Lake, 5 Feb 1977 (2 SDNHM); Potrero, 0.6 mi. W Potrero Valley Road and Hwy 94, bovine dung, 8 Feb 1991 (1 SDNHM); San Pasqual Road and Hwy 78, Wild Animal Park, bovine dung and flying, 22 Feb 1992 (3 RHM, 12 SDNHM), 7 Feb 1993 (10 RHM); Scissors Crossing, 17 Apr 1992 (10 RHM), 7 Feb 1993 (15 RHM); San Felipe Valley, 9.0 mi. NW Scissors Crossing on Hwy S2, blacklight, 1 Jun 1991 (37 RHM, 15 WFBM), 17 Apr 1992 (36 RHM); Sentenac Canyon, Anza-Borrego Desert State Park, 27 Aug 1993 (1 RHM); Mason Valley, 23 Apr 1926 (10 SDNHM).

**Temporal Distribution**—January (11), February (85), March (5), April (57), June (52), August (1), September (1).

**Remarks**—*Calamosternus granarius* is polyphagous, feeding on dung, carrion, and compost (Landin 1961). In San Diego County, adults are commonly found in bovine dung and are taken abundantly at light. Eggs are deposited in the food source, where the larvae develop, then pupate in the soil beneath. The species has been implicated in damage to turf grass (Sears 1978, Smitley et al. 1998) and has been found with native aphodiines in prairie dog burrows (Gordon and Skelley 2007).

#### Genus *CALIGODORUS* Gordon and Skelley, 2007

All three species of the North American genus *Caligodorus* occur in California, but only *Caligodorus vandykei* (Barrett) occurs in San Diego County. The genus is characterized as follows: Clypeal apex without teeth. Pronotum not strongly explanate in anterior half. Elytra with humeral angles dentate; lateral intervals alutaceous. Protibia with small accessory tooth under tarsal insertion.

#### *Caligodorus vandykei* (Barrett) (Figs. 21, 41)

**Diagnosis**—Length 4.5–6.0 mm; width 2.2–3.0 mm. Head and pronotum black, except anterior margin of head and anterior pronotal angles brown; elytra yellow except lateral and apical declivities black; dorsal surface alutaceous, slightly shiny (Fig. 21). Pronotum with intermixed coarse and fine punctation. Elytral punctation distinct.

**Distribution**—From central California to San Diego County.

**San Diego County Locality Records**—5 specimens examined (Fig. 41): Descanso, 29 Jan 1965 (1 USNM); Cuyamaca, 10 Apr 1950 (2 WFBM, 1 RHM, 1 USNM).

**Temporal Distribution**—January (1), April (4).

**Remarks**—This species occurs in *Neotoma* nests and has also been taken in Tulare County by skimming the surface of forebays in irrigation flumes (Gordon and Skelley 2007).

#### Genus *CINACANTHUS* Schmidt, 1913

Schmidt (1922) included several Old World species in the genus along with *Cinacanthus militaris* (LeConte). Old World species lack key characters of *Cinacanthus* and will likely be transferred to other genera (Gordon and Skelley 2007). *Cinacanthus* appears to associate with rodent burrows, and several species are attracted to lights.

*Cinacanthus* is characterized as follows: Body completely fimbriate with short setae. Anterior margin of clypeus with a spiniform tooth on each side of median emargination, the tooth usually arising from beneath margin; entire clypeal surface usually rugose. Pronotum laterally explanate and basal line complete. Protibial apex truncate; apical tooth perpendicular to axis of tibia; protibial spurs set opposite the middle tooth; spur very small and concealed beneath tibia in male, longer and evident in female. Metatibia fringed with unequal spinules.

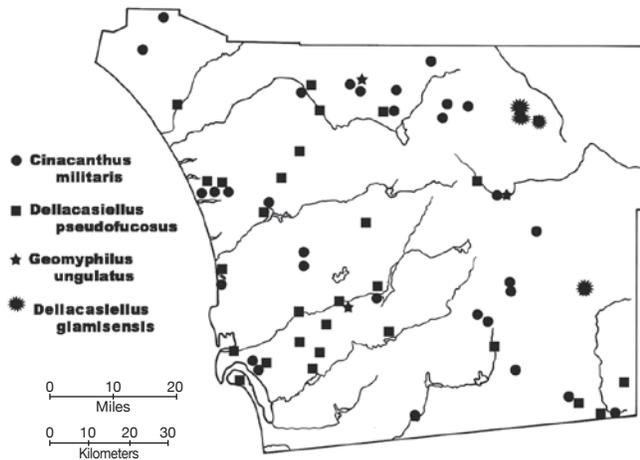


Figure 42. Distribution, *Cinacanthus militaris*, *Dellacasiellus glamisensis*, *D. pseudofucosus*, and *Geomyphilus unguatus*.

***Cinacanthus militaris* (LeConte)**  
(Figs. 26, 42)

**Diagnosis**—Length 4.8–6.1 mm; width 2.1–3.0 mm. Color pale yellowish-brown to dark reddish-brown except the sutural margin of the elytra is dark brown (Fig. 26). Head with anterior margin straight or emarginate between teeth; clypeus and apical half of epistome granulate or rugose; vertex punctate. Pronotum with entire surface finely punctate, with coarse punctures interspersed; lateral margin feebly crenate, not or only slightly explanate. Elytra glabrous; surface micropunctate or alutaceous with coarse punctation; each interval with 2 irregular rows.

**Distribution**—*Cinacanthus militaris* occurs in Washington, Oregon, Nevada, California (Gordon and Skelley 2007) and Baja California, Mexico (R. H. McPeak, personal observation).

**San Diego County Locality Records**—94 specimens examined (Fig. 42): San Diego County, no date (2 CAS); San Diego, 15 May 1910 (1 CAS); Balboa Park, Florida Canyon, 3 May 2008 (1 SBNHM); Torrey Pines State Reserve, 22–23 May 1992 (1 RHM); Encinitas, El Camino Real and Olivenhain Road, blacklight, 26 May 1991 (3 RHM); Encinitas, Suerte del Este and Escondido Creek, blacklight, 7 May 1991 (1 RHM); Carlsbad, 7989 La Brusca Way, blacklight trap, 1–31 Mar 1988 (4 RHM), Mar 1989 (1 RHM), 8–31 May 1991 (2 RHM), 15–31 Jul 1991 (1 RHM), 12 Aug 1991 (1 RHM), 1–15 Apr 1992 (1 RHM); Camp Pendleton, San Mateo Valley, blacklight, 9 May 1992 (2 RHM); Poway, no date (1 CAS); Poway, Old Coach Road, blacklight, 14 Jun 1991 (1 RHM); Poway, 14050 Riverbend Road, blacklight, 14 May 1993 (1 RHM); Potrero, 2 Jul 1926 (1 SDNHM); Barrett Junction, 1.4 mi. E on Hwy 94, 4 May 1991 (2 RHM); El Capitan Dam, 19 May 1990 (1 RHM); Del Dios, 9047 Willow Lane, blacklight trap, 9 Jul 1992 (1 RHM), 22–31 May 2003 (18 RHM); Tenaja, 0.8 mi. W of Sky Ranch on S801, 25 Apr 1993 (1 RHM); Pine Valley, 1220 m, blacklight, 3 Aug 1991 (3 RHM), 18 Jun 1993 (5 RHM); Pine Valley, 1.2 mi. up Pine Creek Road, blacklight, 18 Jun 1993 (1 RHM); Palomar Mtn, 3–29 Jul 1976 (3 SDNHM), 7 Aug 1965 (1 USNM); Palomar Mtn County Park, 1704 m, blacklight, 24 Aug 1991 (4 RHM); Palomar Mtn Lodge, 1722 m, blacklight, 24 Aug 1991 (1 RHM); Palomar Mtn, Love Valley Trailhead on S7, 1100 m, blacklight, 22–23 May 1992 (1 RHM); Palomar Mtn, 4.2 mi. W Hwy 79 on 9S07, 5 Jul 1992 (2 RHM); Pauma Valley, 5.9 mi. W Pauma Village on Hwy 76, blacklight, 2 Jun 1994 (1 RHM), 22 May 2003 (1 RHM); Jacumba, 947 m, blacklight, 9 Jun 1994 (1 RHM); Boulevard–Manzanita, 3 Jul 1979 (1 RHM), 9 Jun 1994 (1 RHM); Laguna, 27 Jul 1964 (5 CAS); La Posta, 6 Aug

1994 (3 RHM); Mt. Laguna, 1298 m, 3 Jun 1974 (1 RHM); Scissors Crossing, 1 Jun 1991 (1 RHM); Pinyon Mtn Valley, Anza-Borrego Desert State Park, 1100 m, blacklight, 26 Apr 1992 (1 RHM); Warner Springs, 15 Jun 1925 (1 CAS); Warner Springs, 1.5 mi. W on Hwy 79, 885 m, 5 Jul 1992 (1 RHM); Chihuahu Valley, 3.6 mi. E Hwy 79, 1267 m, blacklight, 28 May 2003 (2 RHM); Hot Springs Mtn, 1893 m, blacklight, 18 Jul 1992 (3 RHM), 6 Jul 2002 (2 RHM).

**Temporal Distribution**—March (5), April (3), May (37), June (13), July (20), August (15).

**Remarks**—This species has been collected in food-storage chambers of pocket gophers (*Thomomys* spp.), burrows and nests of *Thomomys bottae*, burrows of the California or Beechey ground squirrel (*Spermophilus beecheyi*), and at light (Gordon and Skelley 2007). In San Diego County *Cinacanthus militaris* is taken commonly at light and blacklight from the coast to the highest mountains (1893 m) but does not occur at lower elevations in the Anza-Borrego Desert.

Genus *DELLACASIELLUS* Gordon and Skelley, 2007

*Dellacasiellus* is characterized as follows: Body fimbriate with short setae. Clypeus usually with a triangular tooth or angulation each side of median emargination. In some species the angulations are weak. Elytra with base of striae 3–5 modified. Elytral fold with deep setose groove at base.

All species appear to be nocturnal and are taken readily at light, although *Dellacasiellus pseudofucosus* flies also in the late afternoon (R. H. McPeak, personal observation). All species are probably associated with rodent burrows.

***Dellacasiellus glamisensis* Gordon and Skelley**  
(Figs. 24, 42)

**Diagnosis**—Length 7.0–8.2 mm; width 3.4–4.0 mm. Color dark reddish-brown. Clypeal surface distinctly punctate throughout; two apical teeth strongly evident; lateral margin slightly emarginate outside of apical tooth. Pronotal surface smooth, polished, fine punctation widely spaced throughout; coarse punctures separated by 1–3 times their diameter laterally, becoming widely scattered medially; coarse punctures about 4–5 times larger than fine punctures. Elytra shiny, intervals flat and finely punctate. Basal line feebly evident in median half.

**Distribution**—Southwestern Arizona and southeastern California.

**San Diego County Locality Records**—25 specimens examined from the following locations (Fig. 42): Borrego, Palm Canyon, Mar (1 CAS); Borrego Springs, at lights, 1 Jan 1986 (16 PSC); Borrego Springs, blacklight, 27 Apr 1991 (1 SDNHM); Borrego Springs, lights, 8 Feb 1992 (4 SDNHM), 14 Mar 1992 (2 RHM); Well of the Eight Echoes, Anza-Borrego Desert State Park, 22 Feb 1992 (1 SDNHM).

**Temporal Distribution**—January (16), February (5), March (3), April (1).

**Remarks**—*Dellacasiellus glamisensis* is a desert species, and Gordon and Skelley (2007) recorded it only from areas of deep sand. It differs from *D. pseudofucosus* by having more punctation on the clypeus, well-developed clypeal teeth, and coarse punctures on the pronotum that are 4–5 times larger than fine punctures, and slight differences in the shape of the male's tibial spurs. The species has been collected in *Thomomys* burrows near El Centro, Imperial County (P. E. Skelley, personal communication).

***Dellacasiellus pseudofucosus* Gordon and Skelley**  
(Figs. 25, 42)

**Diagnosis**—Length 7.0–8.3 mm; width 3.6–4.4 mm. Color dark reddish-brown. Clypeal surface strongly alutaceous, mostly impunctate except for fine punctation laterally, apex angulate or with teeth (usually poorly developed) (Fig. 25). Pronotum alutaceous, finely punctate

throughout, coarse punctures large, about 8–10 times larger than fine ones. Basal line visible in median third. Elytral intervals impunctate.

*Distribution*—Recorded from California and Baja California, Mexico (R. H. McPeak, label data).

*San Diego County Locality Records*—196 specimens examined from the following locations (Fig. 42): San Diego, 6 Apr 1921 (1 SDNHM); San Diego, Belt Street at Coronado Bridge, flying, Jan 1971 (1 RHM); Coronado, North Island, 2 Mar 1930 (1 SDNHM); Point Loma, Loma Portal, 7 Dec 1954 (1 SDNHM); Pacific Beach, 3 Dec 1954 (1 SDNHM); Del Mar, Portifino Drive and Carmel Valley Road, blacklight, 11 Jun 1994 (1 RHM); Del Mar, 12 Mar 1959 (1 USNM); Carlsbad, 7989 La Brusca Way, blacklight trap, 15–30 Apr 1987 (8 RHM), 1–31 Mar 1988 (8 WSU, 35 RHM), 1–31 Mar 1989 (17 RHM), 1–5 Apr 1989 (5 RHM), 8 May 1991 (1 SDNHM), 3–6 Feb 1992 (3 SDNHM, 1 RHM), 10–19 Feb 1992 (13 RHM), 1–13 Mar 1992 (19 RHM, 1 SDNHM), 1–15 Apr 1992 (16 RHM); Loveland Reservoir area, blacklight trap, 18–26 Mar 1993 (1 RHM); Sweetwater River, 0.5 mi. S Jamacha, 19 Feb 1964 (1 RHM); Spring Valley, lights, 22 Jan 1971 (2 RHM); Old Mission Dam, 16 Feb 1964 (1 SDNHM); La Mesa, 19 Feb 1956 (1 UCR); Santee, no date (in Gordon and Skelley 2007); Bostonia, flying, 20 Apr 1930 (1 SDNHM); Lakeside, lights, 20–21 Apr 1969 (3 RHM); Camp Pendleton, in gopher mound during day, 21 Feb 1992 (1 SDNHM); El Capitan Dam, blacklight, 3 Mar 1990 (1 SDNHM); Encinitas, Suerte del Este and Escondido Creek, 7 May 1991 (1 SDNHM); Escondido, 9407 Canyon Country Lane, blacklight trap, 3–8 Feb 1992 (1 RHM, 5 SDNHM), 20–29 Feb 1992 (1 RHM, 11 SDNHM), 1–5 Mar 1992 (1 SDNHM), 15–28 Mar 1992 (1 RHM, 3 SDNHM); Del Dios, 9847 Willow Lane, blacklight trap, 22–31 May 2003 (4 RHM); Pala, 1.6 mi. E on Hwy 76, in riverbed, blacklight, 4 May 1991 (8 SDNHM); Pauma, 14 Mar 1957 (1 RHM); Jacumba, blacklight, 5 Apr 1991 (1 SDNHM); Meyer Creek, In-Ko-Pah Gorge, 14 Mar 1982 (1 SDNHM); Boulevard–Manzanita, 31 Mar 1979 (1 SDNHM), 31 May 1979 (1 SDNHM); Boulevard–Manzanita, lights, 9 Jun 1994 (1 LACM); Ramona, 13 Mar 1993 (1 RHM); Valley Center, blacklight, 21 Mar 1993 (1 RHM); Mt. Palomar, Love Valley Trailhead, 1100 m, blacklight, 17 May 1992 (1 RHM); Cibbets Flat, 9 May 1987 (1 SDNHM); San Felipe Valley, 5.3 mi. W Scissors Crossing, flying late afternoon, 22 Mar 2001 (4 RHM).

*Temporal Distribution*—January (3), February (39), March (98), April (35), May (17), June (2), December (2).

*Remarks*—All California specimens of genus *Dellacasiellus* have historically been identified as *Aphodius fucosus*. Consequently, past literature references to “*A. fucosus*” apply, in part, to *D. pseudofucosus*. *Dellacasiellus pseudofucosus* is distinguished from *D. fucosus* by the distinctly punctate clypeus, punctate hind femur, and long, curved setae on the male’s metatrochanter. Their distributions also differ; *D. fucosus* occurs from northern California to the Central Valley while *D. pseudofucosus* is a southern species that occurs from the Los Angeles Basin southward (Gordon and Skelley 2007).

*Dellacasiellus pseudofucosus* has been taken from burrows of pocket gophers and Beechey ground squirrels. It is commonly taken at light during the winter and spring from the coast to the mountains. The four Scissors Crossing specimens and one from Bostonia are the only ones from San Diego County collected in flight during the day. The Scissors Crossing specimens differ from other county specimens by having coarser punctation in the median area of the pronotum.

#### Genus *GEOMYPHILUS* Gordon and Skelley, 2007

*Geomyphilus* is associated with rodent burrows; the majority of species prefer those of pocket gophers, family Geomyiidae, hence the generic name (Gordon and Skelley 2007). The genus is characterized as follows: Body glabrous, usually shiny. Pronotum wider than long; basal line present, always complete. Metatibial apex fringed with long, unequal spinules.

#### *Geomyphilus ungulatus* (Fall) (Figs. 40, 42)

*Diagnosis*—Length 4.7–5.7 mm; width 1.8–2.1 mm. Color reddish-brown except lateral 1/6 of pronotum, metafemur, and abdomen yellow; elytra yellow except sutural margin narrowly piceous (Fig. 40). Clypeus slightly granulate, wrinkled; anterior margin broadly angulate on each side of median emargination. Pronotum with shallow depressions near posterior angles; surface moderately but densely punctate with fine and coarse punctation interspersed, coarse punctures larger in lateral 1/4. Elytral intervals finely but distinctly punctate. The male’s protibial spur is slender, elongate, and sinuate; its metatrochanter bears one long seta; its metafemur has 2 or 3 short setae near the trochanter. Metatarsus longer than metatibia.

*Distribution*—*Geomyphilus ungulatus* occurs in California from Yolo County southward (Gordon and Skelley 2007).

*San Diego County Locality Records*—14 specimens examined (Fig. 42): Scissors Crossing, in gopher burrow, 11 Apr 1973 (4 RHM, 7 JS); Lakeside, 14 Jan 1977 (1 RHM); Palomar Mtn Observatory, dug from gopher chamber, 1695 m, 28 Apr 1992 (2 RHM).

*Temporal Distribution*—January (1), April (13).

*Remarks*—*Geomyphilus ungulatus* was reared by Jim Saulnier from *Thomomys dung* (personal communication in Gordon and Skelley 2007).

#### Genus *LABARRUS* Mulsant and Rey, 1870

Characterized as follows: Scutellum pentagonal, depressed. Clypeus flat, shiny, without ridge or convexity; frontal suture trituberculate in male with median tubercle pronounced. Basal pronotal line entirely obsolete. Male’s protibial and mesotibial spurs similar to those of female.

Three species of *Labarrus* occur in the New World, two in North America: *Labarrus lividus* (Olivier), an immigrant species, and *L. pseudolividus* (Balthasar), possibly native (Gordon and Skelley 2007). Most North American specimens previously identified as *L. lividus* are actually *L. pseudolividus* (Gordon and Skelley 2007).

#### *Labarrus pseudolividus* (Balthasar) (Figs. 29, 43)

*Diagnosis*—Length 3.5–5.8 mm; width 1.6–2.5 mm. Dorsal color primarily yellowish or testaceous, except the head has the vertex and a median stripe from vertex to clypeal apex dark brown (Fig. 29). Pronotum with dorsal area dark brown, brown area extending to anterior pronotal margin. Elytra with nebulous yellowish-brown median area extending from near base to apical declivity. Inferior mesotibial spur slender, not internally concave.

*Distribution*—North America from Maryland to Florida, west to Iowa, Kansas, Nevada, and California, and south to Mexico. The species also occurs in Central and South America and may be cosmopolitan (Gordon and Skelley 2007).

*San Diego County Locality Records*—371 specimens examined (Fig. 43): San Diego County, 16–22 Sep 1969 (4 CSCA), 14 Oct 1969 (11 CSCA); Imperial Beach, mudflats, blacklight, 3 Oct 1970 (11 CSCA); San Ysidro, 12 Jul 1951 (1 SDNHM), 15 Jul 1956 (2 SDNHM), 3 Sep 1957 (1 SDNHM), 23 Jul 1958 (1 SDNHM), 7 Oct 1958 (2 SDNHM), 20 Oct 1969 (1 CSCA); Chula Vista, 30 Oct 1934 (1 CSCA), 14 Oct 1969 (4 CSCA), 18 Jul 1981 (1 SDNHM); National City, 14 Oct 1955 (1 SDNHM); San Diego, Sep 1928 (1 SDNHM), 10 May 1930 (4 SDNHM), 15 May 1931 (1 SDNHM), 18 Aug 1932 (2 SDNHM), 5 Aug 1966 (1 CSCA); San Diego, light, 16 Apr 1934 (18 SDNHM); Balboa Park, 1 Jul 1930 (2 SDNHM), 11 Sep 1931 (1 SDNHM), 22 Nov 1998 (1 RHM); Mission Valley, 23 May 1931 (1 SDNHM), 15 Jun 1931 (3 SDNHM), 11 Sep 1931 (6 SDNHM), 24

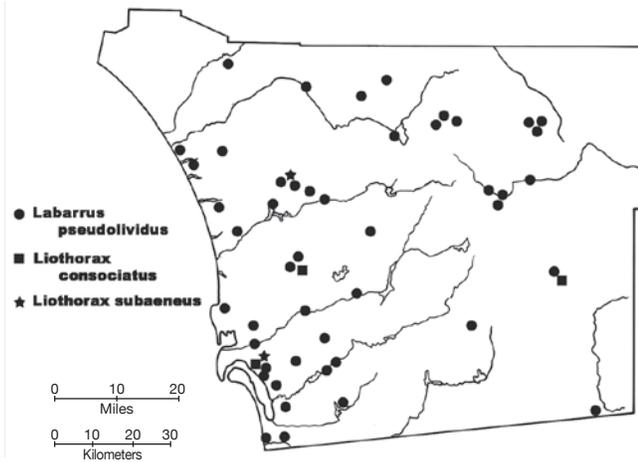


Figure 43. Distribution, *Labarrus pseudolividus*, *Liothorax consociatus*, and *L. subaeneus*.

Dec 1931 (1 SDNHM), 24 Dec 1932 (2 SDNHM), 2–11 Aug 1933 (10 SDNHM); Mission Valley, bovine dung, 14 Aug 1932 (6 SDNHM), 7 Sep 1932 (1 SDNHM), 22 Feb 1933 (2 SDNHM), 21 Oct 1933 (6 SDNHM); Kearney Mesa, 30 Jul 1977 (1 SDNHM); La Jolla, 21 Oct 1988 (21 SDNHM); Del Mar, 4 Jul 1940 (45 LACM); Rancho Santa Fe, 8 Aug 1958 (5 LACM); Carlsbad, 10 Sep 1957 (1 SDNHM), 16 Jul 1958 (1 SDNHM); Carlsbad, 7989 La Brusca Way, blacklight trap, 1–31 Mar 1988 (1 RHM), Mar 1989 (1 RHM), 26 May 1991 (10 RHM), 15–29 Feb 1992 (1 RHM); Oceanside, bovine dung, 27 Aug 1932 (2 SDNHM); Otay, 1 Oct 1957 (1 SDNHM); Otay Valley, 1 Jul 1957 (1 SDNHM), 22 Jun 1957 (1 SDNHM); Lower Otay Lake, bovine dung, 2 Feb 1977 (1 SDNHM); 1.5 mi. NE Sweetwater Reservoir, 17–31 May 1970 (2 RHM); 1.0 mi. NE Sweetwater Reservoir, 27 May 1970 (5 RHM); Lemon Grove, 26 Aug 1936 (1 CSCA); El Monte Oaks, 3 Aug 1934 (1 SDNHM); El Cajon, 18 Nov 1941 (1 CSCA); 4.8 mi. ESE El Cajon, Cottonwood Golf Course, 30 Mar 1969 (1 RHM); Old Mission Dam, 8 Jul 1976 (1 RHM); Poway, 12 Jul 1978 (1 SDNHM); Poway, 14050 Riverbend Road, blacklight, 14 May 1993 (1 RHM); San Pasqual, light, 29 Jun 1977 (19 SDNHM); San Pasqual Valley, 1 Jul 1980 (2 SDNHM); Escondido, 25 Apr 1956 (1 SDNHM), 25 Jun 1956 (1 SDNHM), 2 Jul 1956 (2 SDNHM), 15 Jul 1958 (2 SDNHM), 27 Aug 1958 (3 SDNHM), 24 Sep 1958 (2 SDNHM), 22 Oct 1958 (1 SDNHM); San Pasqual, Wild Animal Park, blacklight, 19 Jun 1991 (15 RHM); Del Dios, blacklight trap, 22–31 May 2003 (4 RHM); Vista, 7 Aug 1947 (1 UCD); Fallbrook, 11 Jul 1992 (47 RHM); Jacumba, 20 Jul 1978 (4 SDNHM), 26 Aug 1978 (2 SDNHM); Warner Springs, 12 Jul 1924 (1 SDNHM), 27 Jun 1925 (8 SDNHM); Warner Springs, 3.0 mi. W, 17 May 1964 (1 CSCA); Warner Springs, 1.5 mi. W, 885 m, blacklight, 5 Jul 1992 (6 RHM); Pala, 1.6 mi. E on Hwy 76, blacklight, 4 May 1991 (1 RHM); Pine Valley, 1221 m, blacklight, 3 Aug 1991 (1 RHM), 18 Jun 1993 (6 RHM); Ramona, 3.6 mi. E on Hwy 78, bovine dung, 4 Jul 2002 (4 RHM); Lake Henshaw, 5 Jul 2002 (1 RHM); Mt. Palomar, 21 Jun 1959 (2 UCD); Oak Grove, 30 Sep 1961 (2 CAS); Scissors Crossing, 5.0 mi. NW, 24 Aug 1969 (2 CAS); Scissors Crossing, 2.2 mi. SW, in juniper and mesquite, 885 m, blacklight, 1 Aug 1992 (1 RHM); Scissors Crossing, blacklight, 30 Mar 2001 (1 RHM), 30 Aug 2001 (1 RHM); Tamarisk Grove, Anza-Borrego Desert State Park, blacklight, 18 Sep 1992 (1 RHM), 25 Aug 2001 (1 RHM); Vallecito, 14.0 mi. SE Scissors Crossing on Hwy S2, blacklight, 7 Jun 1970 (2 RHM); Borrego, 25 Apr 1964 (1 CAS); Borrego Springs, Yaqui Pass Rd. and Borrego Springs Rd., blacklight, 26–30 Aug 2001 (1 RHM); Borrego Springs Golf Course, blacklight, 26–31 Aug 2001 (10 RHM).

*Temporal Distribution*—February (2), March (4), April (19), May (30), June (57), July (126), August (49), September (18), October (60), November (2), December (3).

*Remarks*—This species is probably the most commonly collected aphodiine in southern North America at lights and in open pastures, where it consumes bovine dung (Gordon and Skelley 2007). Moore (1937) listed *Labarrus pseudolividus* as *Aphodius lividus*, occurring throughout San Diego County year round.

#### Genus *LIOTHORAX* Motschulsky, 1859

The genus *Liothorax* was revised by Dellacasa et al. (2007) and contains 10 species, of which two occur in San Diego County, *L. consociatus* (Horn) and *L. subaeneus* (LeConte). The genus is characterized as follows: Scutellum pentagonal, usually depressed. Epistome with large, smooth, median convexity; frontoclypeal suture lacking tubercles. Inferior mesotibial spur of male unmodified. Apex of metatibia fringed with short, equal spinules.

#### *Liothorax consociatus* (Horn) (Figs. 38, 43)

*Diagnosis*—Length 4.3–5.1 mm; width 1.7–1.9 mm. Pronotum and head black, occasionally with obscure red area near lateral margin; elytra typically have the first six intervals yellow and black or dark brown but vary from entirely brown or black to entirely yellow (Fig. 38). Surface of elytra shiny. Pronotal punctation coarse, much coarser than that on elytral intervals. Elytra with striae punctures coarse, each 2 times as large as single puncture on interval. Male's protibial spur slender, hooked inward at apex.

*Distribution*—Southern California from Los Angeles to San Diego.

*San Diego County Locality Records*—175 specimens examined (Fig. 43): San Diego County, no date (2 CAS); San Diego, Apr 1879 (1 USNM); Poway, no date (4 CAS); Laguna (likely in the meadow near Big Laguna Lake on Mt. Laguna), 12 May 1929 (161 SDNHM, 7 RHM).

*Temporal Distribution*—April (1), May (168).

*Remarks*—Gordon and Skelley (2007) suggested that this species' habits may be similar to those of *Liothorax alternatus* (Horn), a species collected in meadows, near streams, ponds, and damp soil rich in organic matter. A massive flight of *L. alternatus* was observed at Kirk, Klamath County, Oregon (Joe Schuh, personal communication in Gordon and Skelley 2007). Although Gordon and Skelley (2007) suggested that *L. consociatus* is restricted to coastal southern California, the large series from Laguna reveals that it occurs in the mountains as well.

#### *Liothorax subaeneus* (LeConte) (Figs. 37, 43)

*Diagnosis*—Length 3.9–5.0 mm; width 1.8–2.3 mm. Head black except narrowly, obscurely red along anterior and lateral margins; pronotum black, usually with greenish tinge; elytra typically with narrow basal margin, first 4 intervals and apical declivity yellow, remaining area brown to black (Fig. 37). Pronotum without basal line medially, pronotal punctation fine, not larger than that on elytral intervals. Elytra with striae punctation fine, equal to or slightly larger than that on intervals. Male's protibial spur hooked inward at apex. Metatibia with oblique carinae reduced.

*Distribution*—From northern Oregon to southern California, with an isolated record from British Columbia, Canada (Gordon and Skelley 2007).

*San Diego County Locality Records*—2 specimens examined (Fig. 43): San Diego, Balboa Park, 17 Mar 1927 (1 SDNHM); Escondido, sweeping alfalfa, 15 Mar 1954 (1 UCR).

*Temporal Distribution*—March (2).

*Remarks*—Gordon and Skelley (2007) suggested that this species' habitat preference may be similar to that of *Liothorax alternatus*, damp soil near streams, ponds, and meadows. The specimen collected by sweeping alfalfa in Escondido may have been an incidental catch and not indicative of habitat preference.

Genus *LUXOLINUS* Gordon and Skelley, 2007

Gordon and Skelley (2007) considered *Luxolinus* an unusual genus characterized by dentate humeral angles, explanate lateral pronotal margins, a dorsally pubescent clypeus, and an anterior margin of the clypeus with distinct teeth.

*Luxolinus luxatus* (Horn)  
(Figs. 20, 44)

*Diagnosis*—Length 3.1–4.5 mm; width 1.3–1.9 mm. Head and pronotum dark reddish-brown except apical and lateral margin of head, lateral pronotal margin and elytra paler reddish-brown (Fig. 20). Anterior margin of clypeus with a distinct tooth each side of median emargination; clypeal surface distinctly setose. Pronotal punctures uniform, separated by a diameter or less. Elytra with punctures on intervals fine, nearly invisible.

*Distribution*—Central California and the San Francisco Bay area south to San Diego; Arizona.

*San Diego County Locality Records*—48 specimens examined (Fig. 44): Mission Valley, collected in flight during morning, 1.0 mi. E Interstate 5 on Friars Road, 27 Dec 1972 (4 JS, 2 RHM); Mission Valley, 12 Dec 1972 (2 JS); Carlsbad, 7989 La Brusca Way, black-light, 29 Jan 1992 (1 RHM); Cuyamaca State Park, 7 Apr 1930 (1 LACM); La Mesa, at gopher digging, Jan 1953 (20 CAS); Cuyamaca Mts., Noble Camp, 1250 m, in nest chamber of *Thomomys bottae*, 13 May 1973 (12 JS, 2 RHM); Palomar Observatory, gopher chamber, 1695 m, 28 Apr 1992 (1 RHM); Scissors Crossing, 11 Apr 1972 (3 JS). Blaisdell collected a specimen at Poway (Moore 1937).

*Temporal Distribution*—January (21), April (5), May (14), December (8).

*Remarks*—*Luxolinus luxatus* is a rodent-burrow associate and has been taken with the valley pocket gopher (*Thomomys bottae*) and at the entrance of burrows of *Spermophilus* sp. (Gordon and Skelley 2007). In San Diego County the species occurs from near sea level to 1695 m.

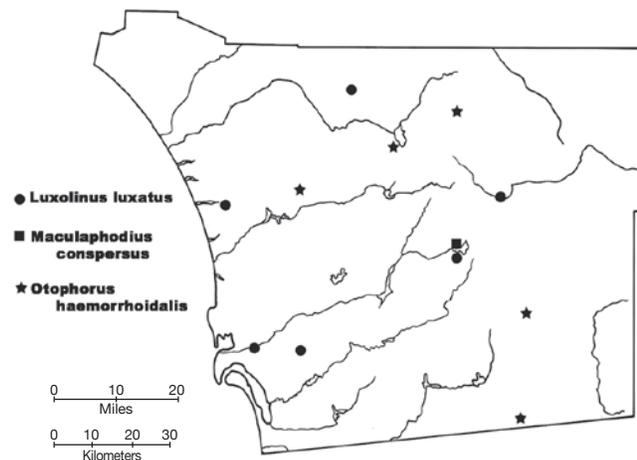


Figure 44. Distribution, *Luxolinus luxatus*, *Maculaphodius conspersus*, and *Otophorus haemorrhoidalis*.

Genus *MACULAPHODIUS* Gordon and Skelley, 2007

This monotypic genus, which bears little resemblance to any other North American aphodiine genus, was characterized as follows by Gordon and Skelley (2007): Clypeal anterior margin with 2 spiniform teeth on each side of median emargination (4 teeth total); epistome heavily rugose, with transverse ridge. Protibial and mesotibial spurs of male modified. Apex of metatibia fringed with short, robust, equal spinules.

*Maculaphodius conspersus* (Horn)  
(Figs. 31, 44)

*Diagnosis*—Length 3.8–5.0 mm; width 1.8–2.2 mm. Color black except anterior pronotal angles dark red; elytra yellow with black maculation on intervals 2–6, apical declivity and lateral intervals black; legs dark reddish-brown (Fig. 31). Anterior margin of clypeus with 2 spiniform teeth each side of median emargination. Pronotum with surface slightly alutaceous, punctuation of uniform size. Elytra finely strigose, punctuation fine, dense on intervals. Metasternum coarsely and densely punctate. Meso- and metafemur distinctly punctate. The male's protibial spur is long, broad, sinuate apically, and slightly deflexed downward.

*Distribution*—Oregon and California south to San Diego County.

*San Diego County Locality Records*—2 specimens examined (Fig. 44): Cuyamaca, 10 Apr 1950 (2 WFBM).

*Temporal Distribution*—April (2).

*Remarks*—This species has been taken on deer dung in Oregon and in the San Bernardino Mountains in California. It is easily recognized because of the quadridentate clypeal apex and maculate elytra.

Genus *OTOPHORUS* Mulsant, 1842

This monotypic genus is native to the Palearctic Region and is an immigrant to North America. *Otophorus haemorrhoidalis* (Linnaeus) is well established from Canada through the United States to Mexico (Gordon and Skelley 2007).

*Otophorus haemorrhoidalis* (Linnaeus)  
(Figs. 19, 44)

*Diagnosis*—Length 4.1–5.4 mm; width 2.1–2.6 mm. Frontal lobes auriculate; frontal suture tuberculate with male more strongly tuberculate (Fig. 19). Scutellum elongate, greater than 1/6 elytral length. Elytra black, with apex red, or apex and humerus red, striae deep and broad.

*Distribution*—This European immigrant occurs in North America from southeastern Canada to southern British Columbia south to northern Florida, California, and Mexico (Lobo 1994).

*San Diego County Locality Records*—59 specimens examined (Fig. 44): San Pasqual, San Pasqual Road and Hwy 78, bovine dung, 16 Jun 1991 (1 RHM); Mt. Laguna, meadow off Hwy S1 at 1557 m, bovine dung, 4 Jul 2002 (36 RHM); Lake Henshaw, 0.5 mi. W jct Hwy 76 and Hwy 79, bovine dung, 5 Jul 2002 (6 RHM); Los Coyotes Indian Reservation, 0.5 mi. above gate, 1190 m, bovine dung, 6 Jul 2002 (15 RHM); Campo, 1.7 mi. E on Hwy 94, bovine dung, 26 May 2003 (1 RHM).

*Temporal Distribution*—May (1), June (1), July (57).

*Remarks*—*Otophorus haemorrhoidalis* is a euryphagous surface dung feeder that is adapted to open, unshaded areas (Gordon and Skelley 2007). Adults and larvae of this diurnal species are frequently taken in bovine dung. Moore (1937) did not mention *O. haemorrhoidalis* in his list of San Diego County beetles. This species is relatively common in some areas of San Diego County today and may have become established in the county after 1937.

Genus *PARDALOSUS* Gordon and Skelley, 2007

Members of the genus share a similar external form, clypeal rugosity, and color pattern (Gordon and Skelley 2007). The genus is characterized as follows: Body brown to black, usually contrasting with yellowish-brown elytra bearing black markings. Body not laterally fimbriate, having at most a few scattered setae at the base of the elytra near the pronotum. Head strongly punctate; clypeus often rugose. Metatibial apex fringed with unequal setae. Two species occur in San Diego County: *Pardalosus pardalis* (LeConte) and *P. slevini* (Van Dyke).

***Pardalosus pardalis*** (LeConte)  
(Figs. 33, 45)

**Diagnosis**—Length 4.3–6.0 mm; width 2.1–2.9 mm. Color pale yellowish-brown; elytra yellow with brown maculation. Form elongate (Fig. 33). Clypeus broadly rounded on each side of median emargination. Pronotum with fine and coarse punctation interspersed; female densely punctate, male sparsely so. Elytra shiny, intervals impunctate or with punctation barely visible. Metatibia not flattened in apical fourth; apex fringed with short, stout, unequal spinules. Metatarsus as long as metatibia; basal tarsomere longer than superior tibial spur.

**Distribution**—From southern Idaho to southern British Columbia, Canada, and south to San Diego.

**San Diego County Locality Records**—2 specimens examined (Fig. 45): Warner's Ranch, 1.0 mi. W, 824 m, ethylene glycol can trap, 23 Sept 1978–7 Jan 1979 (1 CAS); Mason Valley, 5 Mar 1937 (1 LACM).

**Temporal Distribution**—March (1), September to January (1).

**Remarks**—Gordon and Skelley (2007) described *Pardalosus pseudopardalis*, not previously distinguished from *P. pardalis*. Two San Diego County specimens were sent to Paul Skelley, who identified them as *P. pardalis*. This extends the species' known distribution from central California south to San Diego County.

*Pardalosus pardalis* feeds on dung and larvae and has been reported as injurious to turf grass in British Columbia, Canada, Washington, and Oregon (Hatch 1971). Gordon and Skelley (2007) suggest that *P. pardalis* may also be a detritivore.

***Pardalosus slevini*** (Van Dyke)  
(Figs. 32, 45)

**Diagnosis**—Length 3.2–4.5 mm; width 1.5–2.2 mm. Head and pronotum dark brown except anterior margin of head and lateral margin of pronotum paler reddish-brown; elytra yellow with black maculation (Fig. 32). Clypeus with surface rugose; margin angulate on each side of emargination. Pronotum with fine and coarse punctation. Metatibia of male is laterally compressed with a distinctly flattened lateral surface.

**Distribution**—California from Monterey County south to San Diego County.

**San Diego County Locality Records**—12 specimens examined (Fig. 45): Alpine, *Quercus* litter, 6 Dec 1981 (3 LACM, 1 RHM); Alpine, *Ceanothus/Adenostoma* litter, 6 Dec 1981 (1 LACM); Julian, 8.0 mi. S on Hwy S1, Berlese from *Neotoma* nest, 8 Apr 1980 (5 CSCA, 1 RHM); Descanso Ranger Station, 31 Mar 1961, in *Neotoma* nest, (1 UCB).

**Temporal Distribution**—March (1), April (6), December (5).

**Remarks**—*Pardalosus slevini* is associated with nests of wood rats (*Neotoma* sp.) (Fall 1932, Davis 1934).

Genus *PLANOLINELLUS* Dellacasa and Dellacasa, 2005

The genus *Planolinellus* is characterized as follows: Head with anterior margin semicircular; clypeus alutaceous; frontal suture with

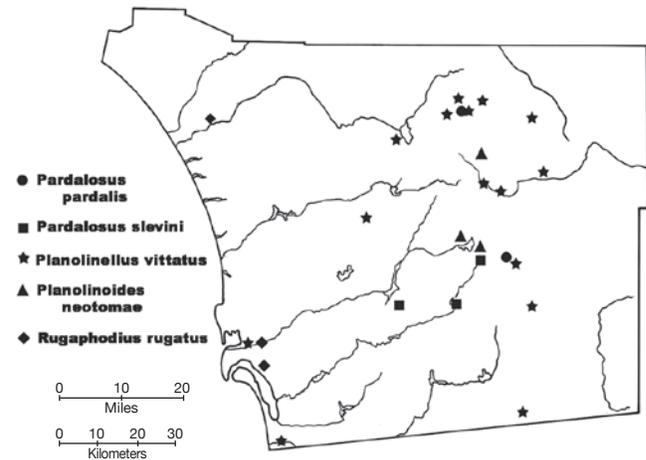


Figure 45. Distribution, *Pardalosus pardalis*, *P. slevini*, *Planolinellus vittatus*, *Planolinoides neotomae*, and *Rugaphodius rugatus*.

pronounced median tubercle. Apex of metatibia fringed with short, equal spinules.

***Planolinellus vittatus*** (Say)  
(Figs. 36, 45)

**Diagnosis**—Length 3.2–4.4 mm; width 1.4–1.8 mm. Head and pronotum mostly black, pronotum usually with obscure red spot medially near lateral margin. Elytra usually entirely pale red with nebulous brown stripe along sutural and lateral margins, but varying from entirely red to entirely dark reddish-brown (Fig. 36). Anterior margin of clypeus lacking teeth, apex essentially semicircular. Frontal suture trituberculate, median tubercle pronounced in male.

**Distribution**—*Planolinellus vittatus* occurs throughout southern Canada and most of the United States and northern Mexico. Though it has always been considered a native of North America, it is also found in the Old World (Dellacasa and Dellacasa 2006).

**San Diego County Locality Records**—204 specimens examined (Fig. 45): "Monument" (presumably Monument 258, on international border overlooking Pacific Ocean in current Border Field State Park), 18 May 1929 (2 SDNHM); Mission Valley, 20–30 May 1929 (3 SDNHM), 20–30 May 1931 (3 SDNHM), 11 Sep 1931 (3 SDNHM), 24 Dec 1932 (9 SDNHM), 26 Jan 1934 (1 CSCA); Mission Valley, dung, 11 Feb 1933 (1 SDNHM), 11–21 Oct 1933 (32 SDNHM); Ramona, 30 Mar 1958 (2 UCR); Laguna Mtn, 19–31 Jul 1924 (3 SDNHM), 12–26 Aug 1924 (11 SDNHM), 29 Sep 1924 (1 SDNHM), 11 May 1929 (1 SDNHM), 2 Jun 1929 (2 SDNHM); Lake Henshaw, 0.5 mi. W jct Hwy 76 and Hwy 79, bovine dung, 5 Jul 2002 (3 RHM); Campo, 1.7 mi. E on Hwy 94, bovine dung, 26 May 2003 (9 RHM); Los Coyotes Indian Reservation, 0.5 mi. above gate, 1191 m, bovine dung, 6 Jul 2002 (1 RHM); Warner Springs, 6–28 Jul 1925 (33 SDNHM); Warner Springs, 2.0 mi. N, 4 Jul 1956 (5 LACM); Warner Springs, 3.0 mi. W, 17 May 1964 (1 CSCA); Scissors Crossing, 4 May 1988 (1 UCR); San Felipe Valley, bovine dung, 20 May 1928 (21 SDNHM), 20 Jun 1928 (49 SDNHM, 1 CSCA); Mason Valley, 23 Apr 1926 (1 SDNHM); Mason Valley, bovine dung, 8 Mar 1928 (2 SDNHM); Tamarisk Grove, Anza-Borrego Desert State Park, 14 Jun 1961 (1 RHM); Borrego Springs, 25 Feb 1939 (1 LACM), 25 Feb 1959 (1 UCR).

**Temporal Distribution**—January (1), February (3), March (4), April (1), May (41), June (53), July (45), August (11), September (4), October (32), December (9).

**Remarks**—This species is euryphagous and feeds on all types of dung. It prefers open pastures but tolerates shaded areas (Gordon and Skelley 2007). Larvae and adults have been taken in bovine and horse

dung. Adults are taken at light but not in large numbers (Ratcliffe and Paulsen 2008). Moore (1937) listed this species as “found throughout the county all year in dung.”

Genus *PLANOLINOIDES* Dellacasa and Dellacasa, 2005

The genus *Planolinoides* is characterized as follows: Body not fimbriate. Dorsal surface at least partly alutaceous, opaque; apical declivity of elytra always opaque. Apex of hind tibia fringed with short, equal spinules. Basal metatarsomere shorter than superior tibial spur, as long or nearly as long as tarsomeres 2 and 3 combined.

***Planolinoides neotomae*** (Fall)  
(Figs. 35, 45)

**Diagnosis**—Length 3.3–4.0 mm; width 1.2–1.9 mm. Frontal suture with median tubercle barely evident in male and obsolete in female. Elytra brown, shiny, except the apical declivity is lightly alutaceous; striae strongly impressed and strial punctation large and distinct (Fig. 35). Inferior mesotibial spur of male unmodified.

**Distribution**—From southern Oregon south at least as far as San Diego County (Gordon and Skelley 2007).

**San Diego County Locality Records**—23 specimens examined (Fig. 45): Cuyamaca State Park, Berlese of *Neotoma* nest, 8 Apr 1980 (2 CSCA, 1 RHM); Julian, 8.0 mi. S on Hwy S1, Berlese of *Neotoma* nest, 8 Apr 1980 (18 CSCA, 1 RHM); San Felipe Hills, 1038 m, 13 Mar 1981 (1 CSCA).

**Temporal Distribution**—March (1), April (22).

**Remarks**—*Planolinoides neotomae* is an obligate resident of *Neotoma* nests. The species is easily distinguished in San Diego County because of its small size, deeply striate elytra, and habitat preference (Gordon and Skelley 2007).

Genus *RUGAPHODIUS* Gordon and Skelley, 2007

This genus contains a single species, *Rugaphodius rugatus* (Schmidt), with no close relatives in the Old World or in North America (Gordon and Skelley 2007). *Rugaphodius* is characterized as follows: Anterior margin of clypeus has a nearly spiniform tooth on each side of median emargination, margin moderately to strongly angulate on lateral side of each tooth; epistome very rugose.

***Rugaphodius rugatus*** (Schmidt)  
(Figs. 27, 45)

**Diagnosis**—Length 2.7–3.5 mm; width 1.3–1.8 mm. Head and pronotum dark reddish-brown except anterior pronotal angles paler; elytra yellow with brown or black maculations; venter reddish-brown, legs yellowish-brown (Fig. 27). Clypeal margin strongly angulate-toothed, with additional angle lateral of medial teeth.

**Distribution**—Coastal California from Santa Cruz to San Diego (Gordon and Skelley 2007).

**San Diego County Locality Records**—3 specimens examined (Fig. 45): San Diego, no date (1 SDNHM); Mission Valley, bovine dung, 10 Feb 1930 (1 SDNHM); San Luis Rey, 25 Dec 1995 (1 PSC).

**Temporal Distribution**—February (1), December (1).

**Remarks**—This species is similar in general appearance to small specimens of *Pardalosis* but differs in color pattern and clypeal development. It also superficially resembles *Maculaphodius conspersus* but has a bidentate clypeal apex with a small triangular tooth on the lateral margin.

In Los Angeles County, J. Saulnier (personal communication in Gordon and Skelley 2007) found adults and larvae numerous 2–3 inches deep in soil of a horse pasture that was plowed annually. *Ru-*

*gaphodius rugatus* has also been collected at the entrance of ground squirrel burrows and in a nest of the southern fire ant, *Solenopsis xyloni* McCook (label data). Gordon and Skelley (2007) suggested that this species is probably a detritivore.

Genus *STENOTOTHORAX* Schmidt, 1913

*Stenothorax* occurs in the Nearctic Region, with the exception of a single species that occurs in Japan and the Russian Far East. Twenty-three species have been described thus far from North America, and additional species will likely be discovered.

*Stenothorax*, previously referred to as the “*cadaverinus* group” of *Aphodius*, is the only North American genus of Aphodiini that has flightless species (Gordon and Skelley 2007). Some species are restricted to nests of wood rats and tree squirrels; others have been collected in pocket gopher and ground squirrel burrows, while some are taken in nests of mice and thatch ants (*Formica* sp.).

The genus is characterized as follows: Pronotum narrower at the base than at the apex; posterior angles obsolete, truncated, or rounded. The head lacks a frontal suture, and the humeral angles of the elytra are rounded to dentate.

***Stenothorax ovipennis*** (Horn)  
(Figs. 23, 46)

**Diagnosis**—Length 6.6–8.2 mm; width 2.8–4.0 mm. Color dark reddish-brown to black (Fig. 23). Clypeus not rugose, surface densely, finely punctate; anterior angles broadly rounded. Pronotum constricted in basal half; anterior angles broadly explanate; base with complete marginal line. Elytra with strial punctures nearly obsolete; intervals finely punctate; humerus dentate. Metasternum short. Wings not developed. Male’s protibial spur thickened, bent inward in apical 1/3. Inferior mesotibial spur short, bent inward at apical 1/3.

**Distribution**—California from Monterey and Kern counties to San Diego.

**San Diego County Locality Records**—19 specimens examined (Fig. 46): La Mesa, no date (in Gordon and Skelley 2007); Descanso Ranger Station, light, 25 Mar 1961 (1 UCB); Burnt Rancheria Campground, 14 Feb 1964 (1 USNM); Cuyamaca Mts., Noble Campground, 1252 m, refuse chamber of pocket gopher burrow, 13 May 1973 (2 JS, 2 RHM); Palomar Observatory, 1695 m, gopher chamber, 28 Apr 1992 (5 RHM); Julian, 8.0 mi. S on Hwy S1, 8 Apr 1980 (1 CAS); S of Interstate 8 on Hwy S1 (Buckman Springs Rd.), 32° 42.39' N, 116° 29.45' W, pitfall trap baited with human dung under oak tree, 7–12 Dec 2007 (1 WBW); San Felipe Hills, Berlese *Neotoma* nest, 19 Jan 1980 (4 CAS); Warner’s Ranch, 1.0 mi. W, 824 m, pitfall trap, 23 Sep–7 Jan 1979 (2 RHM).

**Temporal Distribution**—January (4), February (1), March (1), April (6), May (4), September to January (2), December (1).

**Remarks**—This species has been taken in pocket gopher burrows and reared from pocket gopher dung by J. Saulnier (personal communication in Gordon and Skelley 2007). In Los Angeles County A. V. Evans (personal observation) found several individuals beneath a dead Beechey ground squirrel and walking on snow before dawn.

***Stenothorax sparsus*** (LeConte)  
(Figs. 22, 46)

**Diagnosis**—Length 5.7–8.0 mm; width 2.7–3.7 mm. Color dark reddish-brown to black. Clypeus smooth, finely punctate medially; anterior angles broadly rounded (Fig. 22). Pronotum rectangular, slightly constricted posteriorly; anterior angles slightly explanate in male; posterior angles bisinuate; base with complete marginal line. Elytra with strial punctation moderately impressed, widely separated; humerus dentate; intervals on apical declivity weakly tectiform. Metasternum of

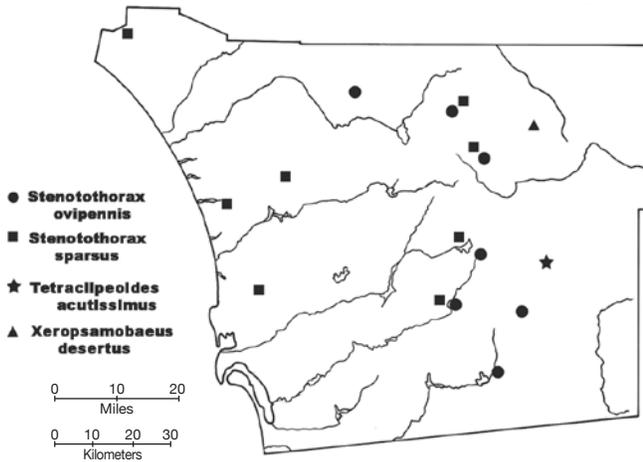


Figure 46. Distribution, *Stenothorax ovipennis*, *S. sparsus*, *Tetraclypeoides acutissimus*, and *Xeropsamobaeus desertus*.

normal length. Wings fully developed. Male’s protibial spur abruptly hooked inward. Inferior mesotibial spur short, strongly curved inward.

**Distribution**—From southwestern Oregon to southern California.

**San Diego County Locality Records**—58 specimens examined (Fig. 46): Air Station Miramar, 4 Nov 1996 (3 RHM); Encinitas, 0.25 mi. SW El Camino Real and Olivenhain Road, *Neotoma* nest, 16 Feb 1992 (2 RHM); Camp Pendleton, Talega Canyon, *Neotoma* nest, 28 Mar 1992 (2 RHM); Escondido, 9407 Canyon Country Lane, 490 m, blacklight trap, 29–30 Feb 1991 (1 RHM), 30 Nov 1991 (1 RHM), 10–18 Dec 1991 (26 RHM); Descanso Ranger Station, *Neotoma* nest, 31 Mar 1961 (2 UCB); San Felipe Hills, *Neotoma* nest, 19 Jan 1980 (15 CSCA); San Felipe Hills, 1038 m, 25 Apr 1980 (1 CSCA), 13 Mar 1981 (2 CSCA); Cuyamaca State Park, Berlese *Neotoma* nest, 8 Apr 1980 (2 CSCA); Warner Springs, 947 m, 28 Feb 1985 (1 CSCA).

**Temporal Distribution**—January (15), February (4), March (6), April (3), November (4), December (26).

**Remarks**—This species lives in nests of wood rats (*Neotoma*), where it feeds on dung (Gordon and Skelley 2007). It is taken during late fall and winter at light.

Genus *TETRACLIPEOIDES* Schmidt, 1913

Several species of *Tetraclypeoides* are associated with rodent burrows, while others are probably detritivores (Gordon and Skelley 2007). The genus is characterized as follows: Clypeal anterior margin with one or more teeth or sharp angulations each side of median emargination, or completely lacking teeth; margin between teeth or angulations thickened, often with V-shaped notch; frontal suture carinate, not or slightly tuberculate. Male’s inferior mesotibial spur modified.

*Tetraclypeoides acutissimus* Gordon  
(Figs. 28, 46)

**Diagnosis**—Length 5.5–5.7 mm; width 2.6–3.6 mm. Color pale yellowish-brown, except head and pronotum slightly darker (Fig. 28). Clypeal margin with very strong triangular tooth each side of median emargination; margin between teeth thickened; frontal suture feebly indicated; epistome flat, sparsely punctate. Elytra glabrous. Ventral surface with long, sparse pubescence. Protibial spur of male robust, thickened; apex rounded, abruptly curved inward. Male’s inferior mesotibial spur long, slender, curved inward at apex.

**Distribution**—Recorded from Nevada, Arizona, and California.

**San Diego County Locality Records**—5 specimens examined (Fig. 46): La Puerta (i.e., Mason Valley), Oct 1925 (1 SDNHM, 4 CAS).

**Temporal Distribution**—October (5).

**Remarks**—The biology of this species is unknown, though Gordon and Skelley (2007) reported a series from Mohave County, Arizona, that was collected at the mouths of kangaroo rat burrows (*Dipodomys* sp.).

Genus *XEROPSAMOBÆUS* Saylor, 1937

Members of this genus are sand dwellers that vary tremendously in many characters. *Xeropsamobæus* is characterized as follows: Body form robust, psammodiiform; body laterally fimbriate with long setae except in apical half of elytra. Color entirely yellowish-brown or with dark head and pronotum. Clypeus coarsely punctate to heavily rugose. Metatarsus shorter than metatibia, tarsomeres short.

*Xeropsamobæus desertus* (Van Dyke)  
(Figs. 39, 46)

**Diagnosis**—Length 3.7–4.5 mm; width 2.0–2.4 mm. Color yellowish-brown except head and pronotum darker reddish-brown; pronotal disc dark brown; elytra yellow with sutural margin narrowly brown (Fig. 39). Anterior margin of clypeus with small, triangular, tooth on each side of median emargination. Metatibia widened, not apically flared.

**Distribution**—Known from Arizona and California.

**San Diego County Locality Records**—102 specimens examined (Fig. 46): Borrego Springs, sand dunes near dump, blacklight at dusk, 8 Feb 1992 (102 RHM).

**Temporal Distribution**—February (102).

**Remarks**—*Xeropsamobæus desertus* is active in winter and restricted to sand (Andrews et al. 1979). It is active in late afternoon and evening at several southern California sand dunes where it may be observed in flight and walking on the dunes’ slip-faces. Hardy (1977) also collected *X. desertus* at light and sifted specimens from sand excavated from the base of a partially buried palo verde tree (*Cercidium floridum* Benth.). Most specimens of the large series collected at the Borrego Springs dunes were taken at blacklight at dusk; few were taken at night (R. H. McPeak, personal observation). Gordon and Skelley (2007) suggested that this species is a detritivore, but specific data are lacking.

Tribe Eupariini

The tribe Eupariini is primarily tropical, with 74 species in seven genera found in North America (Gordon and Skelley 2007). Numerically, *Ataenius* Harold is the most common genus in North America at light; Cartwright (1974) provided descriptions and a key to the tribe, while Stebnicka (2007) provided descriptions and color photos of the New World species. Our diagnoses are based on these sources. Eight species of *Ataenius* occur in San Diego County.

Tribe Eupariini is characterized as follows: Mandibles covered by clypeus. Pronotum lacking grooves or ridges. Elytral base bordered in all San Diego species. Pygidium modified, with transverse ridge and longitudinal groove at base (elytral locking mechanism). Metatibia slender. Metatibial spurs not separated by metatarsus.

Key to the Eupariini of San Diego County  
(modified from Cartwright 1974)

1. Base of pronotum noticeably lobed. Length 4.5–6.0 mm (Fig. 47) ..... *Ataenius lobatus* Horn
- 1'. Base of pronotum not noticeably lobed ..... 2
2. Clypeal margin sharply denticulate on each side of median emargination ..... 3
- 2'. Clypeal margin broadly rounded each side of median emargination ..... 4

- 3. Color ferruginous. Pronotum coarsely, sparsely, and irregularly punctate with fine punctation intermixed. Abdomen with very little punctation. Length 3.3–4.5 mm (Fig. 48) ..... *Ataenius desertus* Horn
- 3'. Color reddish-brown to piceous. Pronotal punctation more or less of uniform size and distribution. Abdomen closely punctate; punctation moderate and gradually becoming slightly larger outward to sides. Length 3.9–4.0 mm (Fig. 49) ..... *Ataenius hesperius* Cartwright
- 4. Punctuation of head united in short longitudinal lines. Body slender and elongate. Length 2.8–3.5 mm (Fig. 50) ..... *Ataenius gracilis* (Melsheimer)
- 4'. Head punctuation simple; body not slender. Size 3.6–5.5 mm ..... 5
- 5. Anterior disc of pronotum with very fine punctation only. Meso- and metafemur without posterior marginal line. Body strongly shiny. Length 4.8–5.2 mm (Fig. 51) ..... *Ataenius stephani* Cartwright
- 5'. Anterior disc of pronotum with mixed punctation. Meso- and metafemur with posterior marginal line. .... 6
- 6. Meso- and metafemur with strong posterior marginal line half distance from apex of femur to trochanter; pronotal punctation mixed minute to medium-sized. Length 3.6–5.5 mm (Fig. 52) ..... *Ataenius spretulus* (Haldeman)
- 6'. Meso- and metafemur with posterior marginal line not strong; pronotal punctation mixed coarse and minute ..... 7
- 7. Pronotum with scattered mixed, very fine and very coarse punctation throughout; base of pronotum strongly margined. Length 3.7–5.3 mm (Fig. 53) ..... *Ataenius californicus* Horn
- 7'. Pronotal surface with mixed punctation evenly distributed, very fine punctation throughout and moderately coarse punc-



Figure 48. *Ataenius desertus* Horn. 2.9 mi. S of San Pedro, Baja California Sur, Mexico, 9 August 1994. Scale 1.0 mm. Photo by G. A. Hanley.

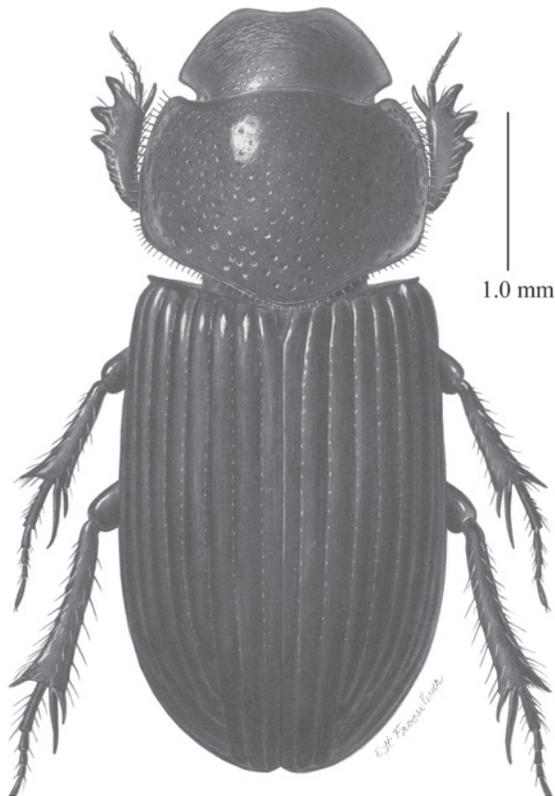


Figure 47. *Ataenius lobatus* Horn. Figure courtesy of Smithsonian Institution.



Figure 49. *Ataenius hesperius* Cartwright. 4 mi. N Clarksdale, Yavapai Co., Arizona, 16 July 1985. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 50. *Ataenius gracilis* (Melsheimer). Anza-Borrego Desert State Park, 21 April 1951. Scale 1.0 mm. Photo by G. A. Hanley.

tation less regularly spaced and gradually smaller toward anterior disc at middle, where usually lacking entirely; base of pronotum not as strongly margined as in *A. californicus*. Length 3.6–4.9 mm (Fig. 54) .....  
 ..... *Ataenius platensis* (Blanchard)

***Ataenius californicus* Horn**  
 (Figs. 53, 55)

*Diagnosis*—Length 3.7–5.3 mm; width 1.6–2.1 mm. Clypeus broadly rounded on each side of wide and moderately deep anterior emargination (Fig. 53). Head transversely wrinkled anteriorly, very finely punctate above median convexity. Pronotum with sides and base strongly margined; pronotal surface with scattered, mixed, very fine and very coarse punctation throughout. Abdominal sterna with widely scattered very fine punctation at middle, outer third with increasingly close, coarse punctation to sides. Meso- and metafemur with posterior femoral line fine 1/4 to 1/3 of distance from apex of femur to trochanter and usually best seen from behind. Males have the spur of the protibia hooked inward and the fifth abdominal sternum shortened medially. Metatibia with a short accessory spine.

*Distribution*—Recorded from Arizona, California, Utah, Nevada (Stebnicka and Lago 2005) and Baja California, Mexico (label data).

*San Diego County Locality Records*—4 specimens examined (Fig. 55): San Felipe Valley, 6 Oct 1934 (1 SDNHM); Borrego, 9 Sep 1963 (2 RHM); Borrego Springs, 12 Jun 1965 (1 UCR).

*Temporal Distribution*—June (1), September (2), October (1).

*Remarks*—*Ataenius californicus* is similar to *A. stephani*. The pronotum of *A. californicus* has a thicker marginal line and the anterior disc bears coarse punctation, while the pronotum of *A. stephani* has a thinner marginal line and the anterior disc lacks coarse punctation (Stebnicka and Lago 2005). In the female, clypeal wrinkles are more distinct and punctures of the pronotum are usually coarser and closer.

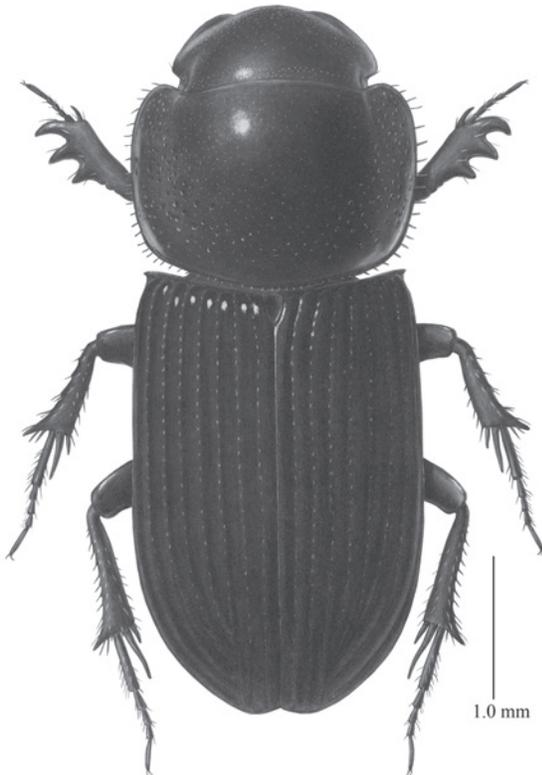


Figure 51. *Ataenius stephani* Cartwright. Figure courtesy of Smithsonian Institution.



Figure 52. *Ataenius spretulus* Haldeman. 7989 La Brusca Way, Carlsbad, blacklight, 12 August 1991. Scale 1.0 mm. Photo by G. A. Hanley.

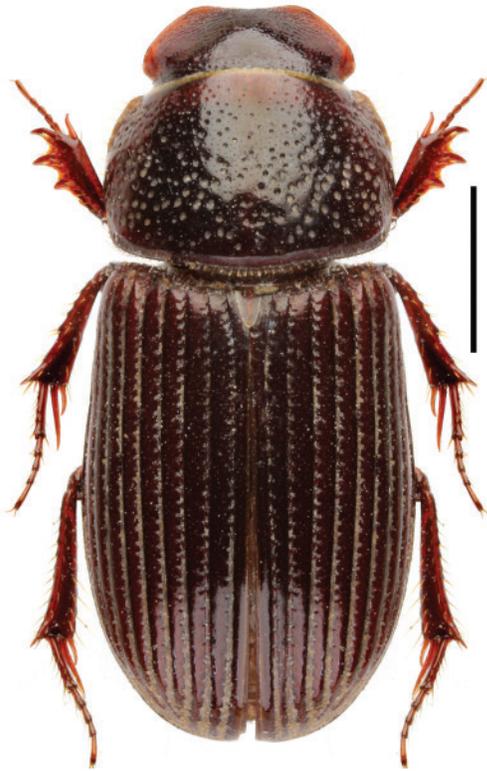


Figure 53. *Ataenius californicus* Horn. 7.0 mi. N of Glamis, Imperial Co., California, 10 September 1974. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 54. *Ataenius platensis* (Blanchard). 7989 La Brusca Way, Carlsbad, blacklight trap, 15–31 July 1991. Scale 1.0 mm. Photo by G. A. Hanley.

*Ataenius californicus* has been reported as damaging roots of seedling sugar beets in California, is a casual feeder on fly larvae, and is an excavator of animal dung (Cartwright 1974). The species has also been taken at blacklight.

*Ataenius desertus* Horn  
(Figs. 48, 55)

**Diagnosis**—Length 3.3–4.7 mm; width 1.5–2.0 mm. Castaneous. Clypeus with strong, sharp, triangular teeth on each side of median anterior emargination; surface transversely granulate-rugose (Fig. 48). Pronotum strongly margined laterally and basally; pronotal surface with mixed coarse and fine punctation throughout. Abdominal sterna with very shallow, indistinct, moderate punctation from side to side, those at sides bearing very fine, semi-erect setae. Meso- and metafemur usually without or with only a very short trace of posterior femoral line at apex of femur. Metatibia with very short, triangular, accessory spine.

**Distribution**—Recorded from Kansas, New Mexico, Texas, Utah, Nevada, Arizona, California, and northern Mexico.

**San Diego County Locality Records**—7 specimens examined (Fig. 55): Jacumba, 20 Jul 1984 (1 RHM); bridge over San Felipe Creek, Sentenac Canyon, Anza-Borrego Desert State Park, blacklight, 27 Aug 1993 (1 RHM); La Puerta, Jul 1911 (5 SDNHM).

**Temporal Distribution**—July (6), August (1).

**Remarks**—Nothing is known about the biology of this species. *Ataenius desertus* is commonly taken at light and blacklight in Baja California and Baja California Sur, Mexico (R. H. McPeak, personal observation).

*Ataenius gracilis* (Melsheimer)  
(Figs. 50, 55)

**Diagnosis**—Length 2.8–3.6 mm; width 1.0–1.3 mm. Piceous, legs and sometimes anterior margin of head and pronotum reddish; antenna testaceous. Body elongate, sides parallel (Fig. 50). Clypeus rounded on each side of broad, shallow, median emargination. Head with elongate punctation united in lines and dense everywhere. Pronotum with base and sides finely margined, without marginal setae; surface closely punctate and punctation generally moderate in size, a little finer near the lateral and anterior margins, midline distinct and deeper over basal half, the punctation here practically uniting in a narrow row. Abdominal sterna with fine to moderate, evenly spaced punctation. Posterior femoral line shorter than 1/3 length of femur. Metatibia without accessory spine.

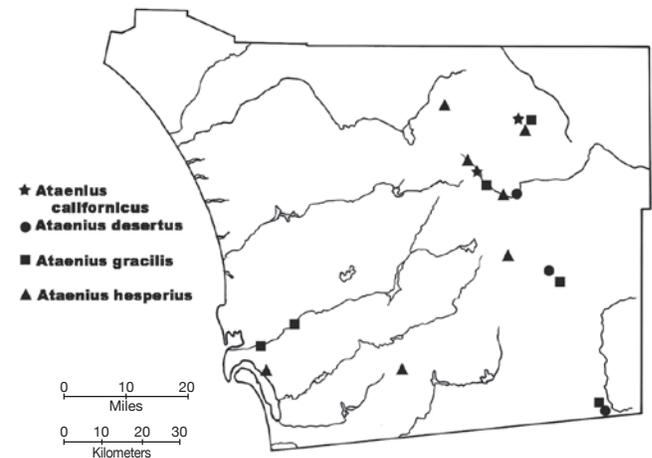


Figure 55. Distribution, *Ataenius californicus*, *A. desertus*, *A. gracilis*, and *A. hesperius*.

*Distribution*—This widely distributed species occurs in most eastern and midwestern states, as well as Texas, New Mexico, Arizona, and California, in Quebec and Ontario, Canada, throughout Central and South America, in the Galapagos Islands, West Indies, Micronesia, Vietnam, Thailand, and Indonesia (Stebnicka 2007).

*San Diego County Locality Records*—150 specimens examined (Fig. 55): Mission Valley, 24 Dec 1932 (1 SDNHM), 1 Apr 1934 (1 SDNHM); Mission Gorge, 9 Apr 1939 (1 SDNHM); Jacumba at Interstate 8, 26 Jul 1980 (1 RHM); La Puerta, Oct 1925 (2 SDNHM); San Felipe Valley, 6 Oct 1934 (96 SDNHM), 26 Oct 1934 (2 UCB); San Felipe Valley, light, 20 May 1928 (1 SDNHM); Anza-Borrego Desert State Park, 21 Apr 1951 (26 UCD, 4 RHM); Borrego Springs, 23 Apr 1951 (3 CAS, 1 LACM); Borrego, 28 Apr 1955 (11 UCB).

*Temporal Distribution*—April (47), May (1), July (1), October (100), December (1).

*Remarks*—In its elongate body form and small size *Ataenius gracilis* is similar to *Pleurophorus caesus*, but the characters listed under each species will distinguish them. *Ataenius gracilis* is taken at light and blacklight. Nothing is known about its biology.

***Ataenius hesperius* Cartwright**  
(Figs. 49, 55)

*Diagnosis*—Length 3.9–4.0 mm; width 1.6 mm. Piceous, shiny; anterior pronotal angles, margins of head, and legs dark reddish-brown (Fig. 49). Clypeus anteriorly broadly and moderately emarginate between small sharp teeth; anterior quarter of clypeus strongly shiny, granulate-rugose. Pronotum margined and fimbriate with very fine, short, widely spaced setae; surface everywhere densely and moderately punctate, narrowly finer along middle anterior margin. Mesosternum shagreened, with moderately dense, short, decumbent setae. Abdominal sterna closely punctate; punctation moderate and gradually becoming slightly larger outward to sides. Posterior femoral line very short at apex of femur. Metatibia without accessory spine.

*Distribution*—Recorded from Louisiana, Nebraska, Kansas, Colorado, Arizona, and California.

*San Diego County Locality Records*—13 specimens examined (Fig. 55): San Diego, no date (4 SDNHM); Lyons Valley, 27 May 1927 (1 SDNHM); Warner Springs, 14 Jul 1925 (3 SDNHM); San Felipe Valley, light, 20 May 1928 (2 SDNHM); Sentenac, Anza-Borrego Desert State Park, 20 May 1925 (1 SDNHM); Mason Valley, 28 Apr 1929 (1 SDNHM); Borrego Springs, 12 Jun 1965 (1 UCR).

*Temporal Distribution*—April (1), May (4), June (1), July (3).

*Remarks*—*Ataenius hesperius* has been taken at light and mercury vapor light. Nothing is known of its life history.

***Ataenius lobatus* Horn**  
(Figs. 47, 56)

*Diagnosis*—Length 4.9–5.8 mm; width 2.2–2.6 mm. Dark reddish-brown to piceous, shiny; antenna light yellow. Clypeus rounded on each side of wide, moderately deep median emargination (Fig. 47). Surface of anterior half of clypeus transversely wrinkled. Pronotum strongly lobed basally; sides and base margined, crenate, and fimbriate, the setae moderately long. Surface of pronotum with evenly distributed, very fine punctation mixed with less evenly distributed coarse punctation that is less numerous over central disc. Mesosternum shagreened with fine alutaceous sculpture and short, fine appressed setae. Abdominal sterna smooth and shiny but with scattered, minute punctures from side to side, a few setigerous. Posterior femoral line of meso- and metafemur about 3/4 the length of the femur but not sharply defined. Metatibia with a very strong accessory spine.

*Distribution*—Known from Nevada, Arizona, California, Baja California Sur, Mexico (Stebnicka 2007) and Baja California, Mexico (R. H. McPeak, personal observation).

*San Diego County Locality Records*—14 specimens examined (Fig. 56): Hwy 78 bridge over San Felipe Creek, Sentenac Canyon, Anza-Borrego Desert State Park, blacklight, 27 Aug 1993 (12 RHM); La Puerta Valley, Jul 1911 (1 SDNHM); Tamarisk Grove, Anza-Borrego Desert State Park, blacklight, 25–29 Aug 2001 (1 RHM).

*Temporal Distribution*—July (1), August (13).

*Remarks*—*Ataenius lobatus* is very common in Baja California and Baja California Sur, Mexico, where it is taken at light and blacklight (R. H. McPeak, personal observation). Nothing is known about its biology.

***Ataenius platensis* (Blanchard)**  
(Figs. 54, 56)

*Diagnosis*—Length 3.6–4.9 mm; width 1.5–2.0 mm. Shiny, piceous; legs and anterior margin of pronotum and head frequently with red coloration. Clypeus broadly rounded on each side of median emargination; surface transversely wrinkled (Fig. 54). Pronotum noticeably crenate at posterior angles; punctation on surface mixed, with evenly distributed, very fine punctation throughout, moderately coarse punctation less regularly and usually not closely spaced toward sides and base, and coarse punctation usually lacking in center of disc anteriorly. Mesosternum shagreened with fine alutaceous sculpture and fine, short, decumbent setae. Abdominal sterna very finely punctate at middle to coarsely, deeply, and closely punctate at sides. Posterior femoral line of metafemur usually half or less than half the length of the femora. Metatibia with short accessory spine.

*Distribution*—*Ataenius platensis* is one of the most common species of *Ataenius* in North America, occurring from the southeastern United States to the Southwest. It also occurs in Central and South America to Argentina and in the West Indies (Stebnicka 2007).

*San Diego County Locality Records*—30 specimens examined (Fig. 56): San Diego, 1 Jun 1959 (1 WFBM), 29 Aug 1959 (1 WFBM), 22 Sep 1969 (1 CSCA), 10 Feb 1977 (1 SDNHM); La Mesa, 21 May 1956 (1 SDNHM); Mission Gorge, 22 May 1980 (1 SDNHM); Tierrasanta, 15–30 Sep 1995 (2 SDNHM); El Cajon, blacklight trap, 2–6 Aug 1992 (1 RHM); Del Mar, 13 Aug 1958 (1 SDNHM); Carlsbad, 7989 La Brusca Way, blacklight trap, 1–31 Mar 1988 (3 RHM), Mar 1989 (1 RHM), 15 Apr 1992 (1 RHM), 15–31 Jul 1992 (1 RHM); Vista, 7 Aug 1947 (1 UCD); Poway, 14050 Riverbend Road, 14 May 1993 (1 RHM); Escondido, Lake Dixon, 4–8 Jun 1981 (12 SDNHM).

*Temporal Distribution*—February (1), March (4), April (1), May (3), June (13), July (1), August (4), September (3).

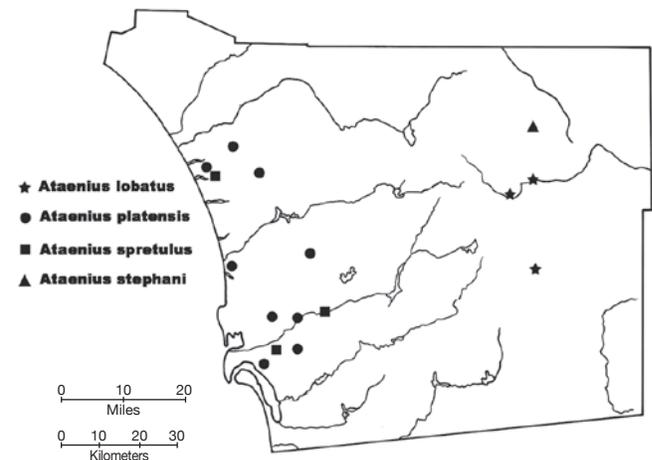


Figure 56. Distribution, *Ataenius lobatus*, *A. platensis*, *A. spretulus*, and *A. stephani*.

*Remarks*—*Ataenius platensis* has been taken at light (Evans and Hogue 2006) and in blacklight traps, as well as from beneath partly dried or day-old bovine dung (Cartwright 1974). It appears to be restricted to the coastal plain in southern California (Evans and Hogue 2006).

***Ataenius spretulus* (Haldeman)**  
(Figs. 52, 56)

*Diagnosis*—Length 3.6–5.5 mm; width 1.7–2.4 mm. Shiny black, legs and clypeal margin reddish; or head and pronotum dark, elytra reddish-brown. Clypeus broadly rounded on each side of median emargination. Sides and base of pronotum strongly margined, sides fimbriate-crenate at anterior and posterior angles, crenations barely visible and setae short and inconspicuous, middle third or more of margin without setae (Fig. 52). Surface of pronotum with evenly spaced, minute to fine punctation throughout and very irregularly placed, scattered coarse punctures interspersed, usually relatively few on anterior disc in middle. Fifth sternum with very fine punctation and a single, very large, deep, elongate pore at extreme sides. Metafemur with strong posterior marginal line along outer half. Metatibia with strong accessory spine.

*Distribution*—*Ataenius spretulus* occurs throughout the United States and in northern Mexico.

*San Diego County Locality Records*—7 specimens examined (Fig. 56): San Diego State University, 19 Oct 1976 (4 SDNHM); Old Mission Dam, 6 Nov 1976 (1 SDNHM); Carlsbad, 7989 La Brusca Way, blacklight, 12 Aug 1991 (2 RHM).

*Temporal Distribution*—August (2), October (4), November (1).

*Remarks*—The shiny black *Ataenius spretulus* is a pest of turf grass over much of the United States (Evans and Hogue 2006). Larvae feed underground and cause damage by pruning roots, resulting in patches of thinning turf that eventually turn brown. Westcott et al. (2006) reported a relatively recent introduction of *A. spretulus* into southern Oregon, where damage to turf was attributed to this species. Adults are attracted to lights and blacklight.

***Ataenius stephani* Cartwright**  
(Figs. 51, 56)

*Diagnosis*—Length 4.8–5.8 mm; width 2.2 mm. Shiny, piceous, legs reddish-brown. Clypeus rounded on each side of median emargination (Fig. 51). Pronotum with sides mostly invisible from directly above; marginal line strong and deep; surface with mixed punctation, very finely, evenly punctate over anterior medial area and narrowly so inside marginal groove, elsewhere with additional scattered, very coarse punctation, which is sparser and more irregularly spaced in middle basal area, more concentrated laterally. Abdominal sterna smooth and shiny, punctation minute and scattered at middle, then gradually fine to coarse at sides. Meso- and metafemur without marginal line. Metatibia with short accessory spine.

*Distribution*—Arizona, California, and Mexico south to Jalisco and Baja California Sur (Stebnicka and Lago 2005).

*San Diego County Locality Records*—75 specimens examined (Fig. 56): Borrego Springs, Borrego Springs Resort Golf Club, blacklight, 26–31 Aug 2001 (69 RHM, 6 PKL).

*Temporal Distribution*—August (75).

*Remarks*—Stebnicka and Lago (2005) reported the first record of this species for California and San Diego County. W. B. Warner (personal communication in Stebnicka and Lago 2005) related that turf-grass companies in Arizona and California sent him specimens of *Ataenius stephani* to identify. The species has become a common lawn insect in Phoenix, Arizona. Warner speculated that intrusion into California was facilitated through transport of sod for golf courses. The large series McPeak took in San Diego County was at a golf course.

*Ataenius stephani* is similar to *A. californicus* (see remarks on the latter). The terminal spur of the protibia is hooked inward in the male and pronotal punctation is usually less dense in the male than in the female.

Tribe Psammodiini

The majority of psammodiines are apparently sand-dwellers and are probably detritivores (Gordon and Skelley 2007). There are currently 43 species in ten genera in North America, and keys are in Cartwright (1948, 1955), Gordon and Cartwright (1980), Gordon and Pittino (1992), and Rakovič (1984). The tribe Psammodiini is characterized as follows: Head strongly convex, surface with tubercles. Mandibles covered by clypeus. Pronotum with ridges or grooves, which may be reduced to weak impressions (Figs. 8, 57). Pygidium modified with transverse ridge and longitudinal groove at base (elytral locking mechanism). Femur with grooves on anterior and posterior margins. Metatibial spurs not separated by metatarsus.

Key to the Psammodiini of San Diego County  
(modified from Gordon and Pittino 1992)

1. Body form globose, widest in apical half of elytra. Metatibia with one strong, almost transverse carina. Length 2.8–3.4 mm (Fig. 57) ..... *Tesarius mcclayi* (Cartwright)
- 1'. Body form elongate. Metatibia lacking carina ..... 2
2. Pronotal sculpture complete, with 4 distinct transverse ridges, narrowly ... interrupted medially. Length 3.0–4.2 mm (Fig. 58) ..... *Rhyssemus californicus* Horn
- 2'. Pronotal sculpture incomplete, with at most 3 transverse, usually vestigial ridges and furrows (Fig. 8) ..... 3
3. Metatarsus elongate, at least as long as tibia; tarsomeres 1–4 cylindrical, first segment very long, narrow, and slightly



Figure 57. *Tesarius mcclayi* (Cartwright). Fort Stevens State Park, Clatsop Co., Oregon, 7 November 2003. Scale 1.0 mm. Photo by G. A. Hanley.

- widened apically. Body elongate, sides subparallel. Length 2.7–3.3 mm (Fig. 59) ..... *Pleurophorus caesus* (Panzer)
- 3'. Metatarsus somewhat to noticeably shortened, visibly shorter than tibia, basal 1 or 2 tarsomeres short, weakly to visibly broad, slightly asymmetrically widened apically; body short, suboval. Length 2.7–2.8 mm (Fig. 60) .....  
 ..... *Platytomus micros* (Bates)

Genus *PLATYTOMUS* Mulsant, 1842

The genus *Platytomus* contains some of the smallest Scarabaeidae known. There are 24 species worldwide, and six species are widely distributed in the United States. Using the traditional name *Pleurophorus*, Cartwright (1948) provided a key to Nearctic species of *Platytomus*. Pittino and Mariani (1986) transferred all North American species of *Pleurophorus* except *Pleurophorus caesus* (Panzer) to *Platytomus*.

*Platytomus micros* (Bates) occurs in San Diego County and can be distinguished from other Psammodiini in the county by the lack of setae on the base and sides of the pronotum and by the coarse punctation (not tubercles) on the pronotum in combination with the less elongate body form.

*Platytomus micros* (Bates)  
 (Figs. 8, 60, 61)

**Diagnosis**—Length 2.7–2.8 mm; width 1.0 mm. Oblong, slightly wider behind. Color dark reddish-brown to piceous, legs somewhat lighter; antennae testaceous. Head strongly convex; clypeus moderately, deeply emarginate, rounded on each side of emargination (Fig. 60). Pronotum with anterior angles obtuse, posterior angles broadly rounded; postapical groove deep in the anterior angles,



Figure 59. *Pleurophorus caesus* (Panzer). 1.5 mi. SW of Coachella Bridge, Algodones Dunes, Imperial Co., California, 12 April 1979. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 58. *Rhyssemus californicus* Horn. Onyx, Kern Co., California. Mercury-vapor light and blacklight, 17 June 1989. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 60. *Platytomus micros* (Bates). 2.9 mi. SW of San Pedro, Baja California Sur, Mexico. Blacklight, 9 August 1994. Scale 1.0 mm. Photo by G. A. Hanley.

continued inward almost to the middle in a series of large, closely placed punctures (Fig. 8) and leaving a wide, finely punctate apical margin. Disc between lateral foveae of pronotum interspersed with scattered coarse punctation; lateral foveae and usually a basally, feebly impressed median line indicated by large, more or less confluent punctation; lateral and basal marginal groove deep and well defined.

**Distribution**—*Platytomus micros* occurs in California, Arizona, Nevada, Utah, Texas, Florida, Mexico, and Guatemala (Cartwright 1948). The species is common in Baja California and Baja California Sur, Mexico (R. H. McPeak, label data).

**San Diego County Locality Records**—17 specimens examined (Fig. 61): San Diego Co., no date (1 RHM); San Diego, no date (2 SDNHM, 2 CAS); San Diego, at light, 15 Jun 1931 (1 SDNHM); Coronado, 10 Feb 1890 (1 CAS), 10 Feb 1891 (1 CAS); Mission Valley, 24 Apr 1930 (2 CAS); Lakeside, collected on beet, 5 Apr 1930 (1 RHM); Vista, 7 Aug 1947 (1 UCD); Warner's, 9 Jul 1925 (1 SDNHM); Jacumba, at Interstate 8, 5 Aug 1981 (1 SDNHM); Borrego, 23 Apr 1951 (1 LACM); Borrego Springs, 3 April 1951 (1 LACM); Borrego Springs, Borrego Estates Golf Course, blacklight, 26 Aug 2001 (1 RHM).

**Temporal Distribution**—February (2), April (5), June (1), July (1), August (3).

**Remarks**—*Platytomus micros* is taken at light and blacklight. Nothing is known about its biology. Moore (1937) listed this species as *Diastictus parvulus*.

#### Genus *PLEUROPHORUS* Mulsant, 1842

*Pleurophorus* is a primarily Old World genus with 32 species worldwide (Ratcliffe and Paulsen 2008). *Pleurophorus caesus* is widely distributed in the United States and occurs in San Diego County.

#### *Pleurophorus caesus* (Panzer) (Figs. 59, 61)

**Diagnosis**—Length 2.7–3.3 mm; width 1.0–1.1 mm. Body form slender and elongate (Fig. 59). Color black, shiny. Apex of clypeus reddish-brown; antenna yellowish-brown. Clypeus distinctly verrucose; apex subangulate on either side of median emargination. Surface of pronotum with sparse, large punctation; basal half with weak, longitudinal depression with a few large punctures within; a deeply impressed groove extends from anterior angle nearly to center of disc. Marginal groove on base and sides of pronotum deep. Elytra with deep striae, punctate. Surface of pygidium roughened; apex with

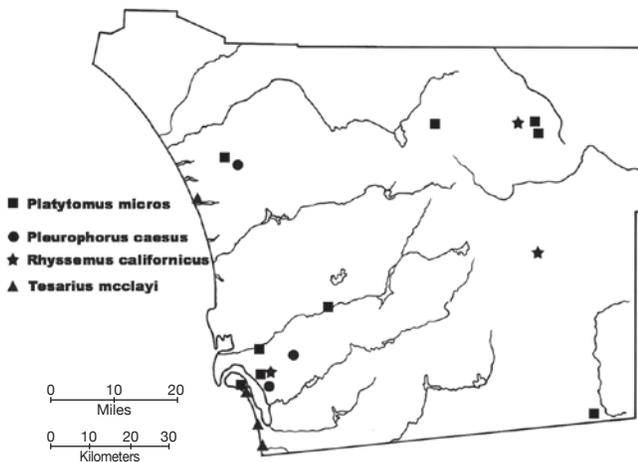


Figure 61. Distribution, *Platytomus micros*, *Pleurophorus caesus*, *Rhyssalus californicus*, and *Tesarius mcclayi*.

2 long, pale yellowish setae. Metafemur with femoral line distinct and visible from beneath.

**Distribution**—*Pleurophorus caesus* is nearly cosmopolitan.

**San Diego County Locality Records**—8 specimens examined (Fig. 61): San Diego, on weeds, 25 Apr 1944 (1 RHM); La Mesa, on stems of string beans, 21 Oct 1944 (1 RHM, 1 CSCA); Vista, 14 Jul 1941 (5 UCR).

**Temporal Distribution**—April (1), July (5), October (2).

**Remarks**—*Pleurophorus caesus* is often confused with *Ataenius gracilis*, which it resembles in body shape, size, and color. *P. caesus* has large, sparse punctation on the pronotum and a verrucose clypeus, while *A. gracilis* has a closely punctate pronotum and a clypeus with punctures united, forming lines. On 11 Jun 1934 larvae were collected in soil around roots of *Zinnia* plants in a nursery at San Francisco, California (Jerath and Ritcher 1959).

#### Genus *RHYSEMUS* Mulsant, 1842

*Rhyssalus* species are small, dull-colored, tuberculate beetles. The genus contains over 50 species, most of which occur in Asia and Europe (Ratcliffe and Paulsen 2008). Fourteen species occur in the New World, six of which are known from the United States. *Rhyssalus californicus* Horn occurs in San Diego County.

#### *Rhyssalus californicus* Horn (Figs. 58, 61)

**Diagnosis**—Length 3.0–4.2 mm; width 1.4–2.0 mm. Elongate, parallel-sided, widest at middle of elytra (Fig. 58). Color black, except clypeus, ventral surface of head, legs, last abdominal sternum, and elytral suture reddish-brown. Surface of head tuberculate; anterior clypeal margin emarginate between angulate angles. Pronotum densely tuberculate with 4 distinct transverse ridges; all ridges narrowly interrupted medially; lateral and basal borders narrowly margined, with fringe of flattened setae. Elytra with distinctly impressed striae, closely punctate. Pygidium scabrous, dull.

**Distribution**—California and Arizona.

**San Diego County Locality Records**—5 specimens examined (Fig. 61): Old Town, 31 Mar 1928 (1 SDNHM); Poway, no date (in Gordon and Cartwright 1980); San Pasqual Canyon, no date (in Gordon and Cartwright 1980); La Puerta, Oct 1925 (3 SDNHM); Borrego, 8 Apr 1948 (1 UCR).

**Temporal Distribution**—March (1), April (1), October (3).

**Remarks**—The female of this species is similar to the male except the pygidium is wider and the penultimate abdominal sternum is slightly longer at the middle. Specimens have been collected in sandy areas along stream margins near Visalia, California (Gordon and Cartwright 1980).

#### Genus *TESARIUS* Rakovič, 1981

The genus *Tesarius* is characterized as follows: Head granulate; eyes either missing or vestigial, not visible from above. Pronotum with two pairs of lateral impressions; some species also have coarse punctation arranged in rows along vestigial transverse furrows. Hind wings absent. Metatibia with one or two heavy, almost transverse carinae. There are five species of *Tesarius*, four of which occur in North America. *Tesarius mcclayi* (Cartwright) occurs in San Diego County.

#### *Tesarius mcclayi* (Cartwright) (Figs. 57, 61)

**Diagnosis**—Length 2.8–3.4 mm; width 1.1–1.2 mm. Color reddish-brown. Clypeus moderately and deeply emarginate (Fig. 57). Eyes very small and degenerate. Posterior angles (and base) of pronotum

tum weakly crenate and fimbriate; base and sides margined; surface with moderately coarse punctation arranged for the most part in two shallow, transverse grooves; median line shallow but distinct over basal half. Elytra nearly globular; humeri not dentate; sides fimbriate with long, fine setae. Abdominal sterna minutely crenate in front, each with a medially interrupted anterior row of well-separated, setigerous punctation bearing long fine setae. Meso- and metafemur with distinct marginal line. Meso- and metatibia with complete oblique ridges.

*Distribution*—Along the coast of California from San Francisco to San Diego (Cartwright 1955) and Baja California, Mexico (R. H. McPeak, label data).

*San Diego County Locality Records*—20 specimens examined (Fig. 61): Imperial Beach, associated with *Heliotropium curassavicum* Linnaeus, 27 Aug 1970 (1 USNM); mouth of Tijuana River, 26 Dec 1976 (13 UCB); Coronado, 19 Jan 1929 (2 SDNHM); Batiquitos Lagoon, sifted under *Salix*, 3 Dec 1981 (4 LACM).

*Temporal Distribution*—January (2), August (1), December (17).

*Remarks*—Cartwright (1955) reported 304 specimens from “around the roots of grasses on the sand dunes” of Playa del Rey, Los Angeles County, and a single specimen collected from beneath kelp at Newport, Orange County, California. Specimens were collected “on *Croton* and *Ambrosia*” from coastal sand dunes at Cantamar (between Tijuana and Ensenada), Baja California, Mexico (R. H. McPeak, label data). Moore (1937) listed one of the two specimens from Coronado (SDNHM 13245) as *Psammobius caelatus*.

Subfamily Scarabaeinae

Members of the subfamily Scarabaeinae are commonly called dung beetles because many species feed on dung of mammals, other vertebrates, and invertebrates. Some scarabaeines also feed on carrion, mushrooms, rotting fruit, and decomposing plant material. The subfamily includes slightly over 5000 described species in 234 genera (Gill 2002). There are 19 genera and 125 species in the Nearctic Region (Smith 2009). Six species occur in San Diego County.

Dung beetles have been introduced to Australia and the southern United States to help remove bovine dung from pastures and reduce the numbers of flies associated with dung. The burial of feces by dung beetles is also important in destroying infective forms of parasitic worms. Four species of San Diego County scarabaeines (*Onthophagus gazella* (Fabricius), *O. taurus* (Schreber), *Euoniticellus intermedius* (Reiche), and *Onitis alexis* (Klug)) were introduced to California to control flies and assist with burial of dung produced by cattle.

Some species of scarabaeine dung beetles feed and breed directly in the dung pad (endocoprids). Others excavate chambers beneath or adjacent to the dung (paracoprids). Still others remove chunks of the dung, form them into balls, and roll them away for burial (telecoprids).

Four tribes of the Scarabaeinae occur in San Diego County: the Canthonini, Oniticellini, Onitini, and Onthophagini.

Key to the Scarabaeinae of San Diego County  
(modified from Gill 2002)

- 1. Basal metatarsomere longer than next 3 tarsomeres combined; meso- and metatibia strongly and often abruptly expanded apically. Length 6.4–18.8 mm (Fig. 62) ..... 2
- 1'. Basal metatarsomere shorter than next 3 tarsomeres combined; meso- and metatibia slender, curved, only slightly expanded apically. Length 6.2–7.6 mm (Figs. 63, 64) .....  
..... *Canthon simplex* LeConte
- 2. Scutellum visible, although small ..... 3
- 2'. Scutellum completely hidden ..... 4
- 3. Body elongate; pronotum lacking basal pits; antenna with 8 antennomeres. Length 8.0–8.9 mm (Fig. 65) .....  
..... *Euoniticellus intermedius* (Reiche)

- 3'. Body oval, robust; pronotum with pair of basal pits near midline; antenna with 9 antennomeres. Length 12.8–18.8 mm (Fig. 66) ..... *Onitis alexis* Klug
- 4. Anterior margin of clypeus emarginate or slightly emarginate in male and female. Male and female with slight to pronounced pronotal swelling [may be tubercles in female *Onthophagus gazella* (Fabricius)] ..... 5
- 4'. Anterior margin of clypeus spatulate in male, rounded in female. Body oval. Color black, sometimes with greenish sheen. Male major with long, curved head horns that sweep over pronotum. Male minor with head horns small or lacking. Female lacks head horns. Male and female lack pronotal swelling. Length 7.0–11.2 mm (Figs. 67–70) .....  
..... *Onthophagus taurus* (Schreber)
- 5. Body elongate. Color black or reddish-brown. Clypeus emarginate. Clypeal and pronotal punctation with prominent setae. Male major with two nearly vertical head horns; male minor may or may not have two small horns. Female lacks head horns. Male and female with pronounced pronotal swelling. Length 6.4–7.5 mm (Figs. 71–73) .....  
..... *Onthophagus cartwrighti* Howden
- 5'. Body oval, robust. Color greenish or coppery black, with pale band around sides and base of pronotum; elytra light brown. Male with pair of short, slightly curved, head horns and slight pronotal swelling. Female lacks head horns and usually has a pair of pronotal tubercles. Length 8.8–12.2 mm (Figs. 74–76) ..... *Onthophagus gazella* (Fabricius)

Tribe Canthonini

The tribe Canthonini is distinguished from other New World scarabaeine tribes by having slender, slightly curved middle and posterior tibia that are barely expanded apically. The slender curved legs are an adaptation for grasping, pushing, and pulling a dung ball. Adults have no horns or carinae on the head or pronotum. There are

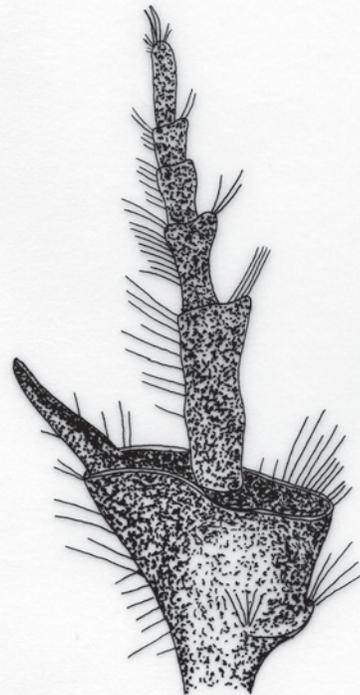


Figure 62. Metatarsus with basal segment longer than next 3 segments, *Onitis alexis* Klug. 100× actual size. Figure courtesy of D. A. Glantz.



Figure 63. Metatarsus with basal segment shorter than next 3 segments, *Canthon simplex* LeConte. 100× actual size. Figure courtesy of D. A. Glantz.

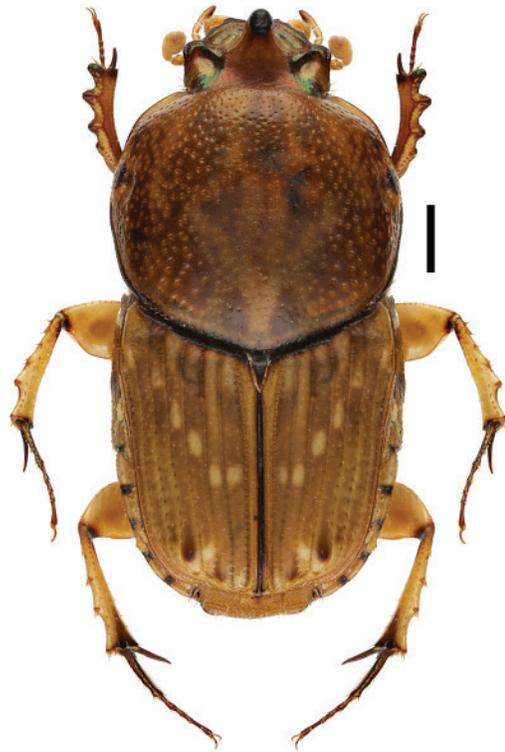


Figure 65. Male *Euoniticellus intermedius* (Reiche). San Pasqual Road and Hwy 78, San Pasqual, cattle dung, 22 February 1992. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 64. *Canthon simplex* LeConte. Chocolate Summit, 6 April 1995. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 66. Female *Onitis alexis* Klug. 1.0 mi. W of Wild Animal Park, San Pasqual, cattle dung, 2 June 1991. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 67. Male major *Onthophagus taurus* (Schreber). Los Coyotes Indian Reservation, 0.5 mi. above gate, 6 July 2002. Scale 1.0 mm. Photo by G. A. Hanley.

18 genera of Canthonini in the New World, but only one occurs in San Diego County.

Genus *CANTHON* Hoffmannsegg, 1817

There are approximately 125 species of *Canthon* in the New World, distributed from southern Canada to Argentina. Nineteen species occur in North America, but only a single species, *Canthon simplex* LeConte, is found in San Diego County.



Figure 68. Head and pronotum, male major, *Onthophagus taurus* (Schreber). Photo by J. MacGown.

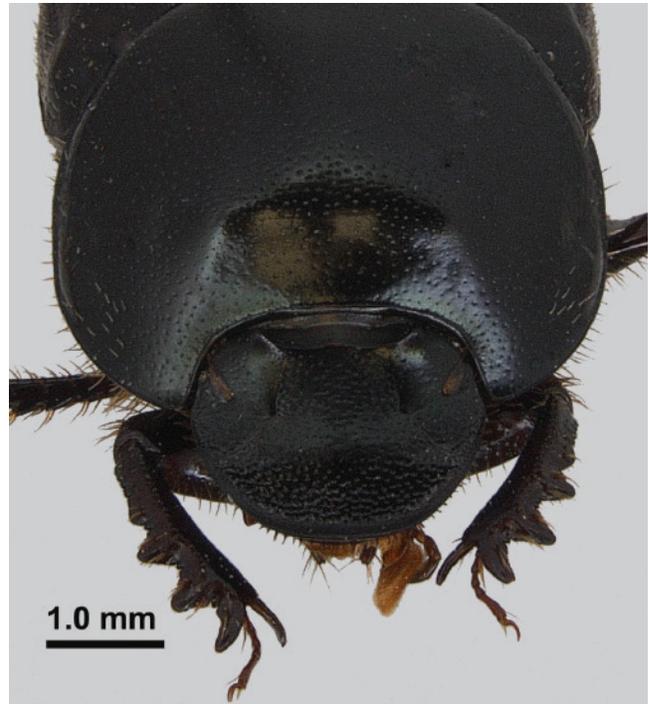


Figure 69. Head and pronotum, male minor, *Onthophagus taurus* (Schreber). Photo by J. MacGown.

*Canthon simplex* LeConte  
(Figs. 63, 64, 77)

*Diagnosis*—Length 6.2–7.6 mm; width 3.7–4.5 mm. Color black. Clypeus tridentate on each side of median emargination, reflexed (In Fig. 64 tridentate structure is worn, not evident). Head behind clypeus, pronotum, and elytra microgranulate, opaque, and faintly punctate. Elytra with 8 feebly impressed striae. Metatibia slender with single spur.

*Distribution*—Washington, Oregon, Idaho, Montana, California; British Columbia and Alberta, Canada, and Baja California, Mexico.

*San Diego County Locality Records*—274 specimens examined (Fig. 77): San Diego Co., no date (9 SDNHM), 20 Mar 1959 (1



Figure 70. Head and pronotum, female *Onthophagus taurus* (Schreber). Photo by J. MacGown.



Figure 71. Male *Onthophagus cartwrighti* Howden. 2.9 mi. SW San Pedro, Baja California Sur, Mexico, blacklight, 9 August 1994.

UCR); “Monument” (presumably Monument 258, on international border overlooking Pacific Ocean in current Border Field State Park), 9 Feb 1928 (2 SDNHM); National City, 24 Apr 1934 (1 SDNHM); San Diego, 22 Apr 1921 (3 SDNHM), 21 Apr 1929 (2 SDNHM), 20 Jun 1978 (1 SDNHM); Mission Valley, 29 Apr 1930 (3 SDNHM), 10 May 1930 (2 SDNHM), 20 Jul 1935 (1 SDNHM); Mission Gorge,

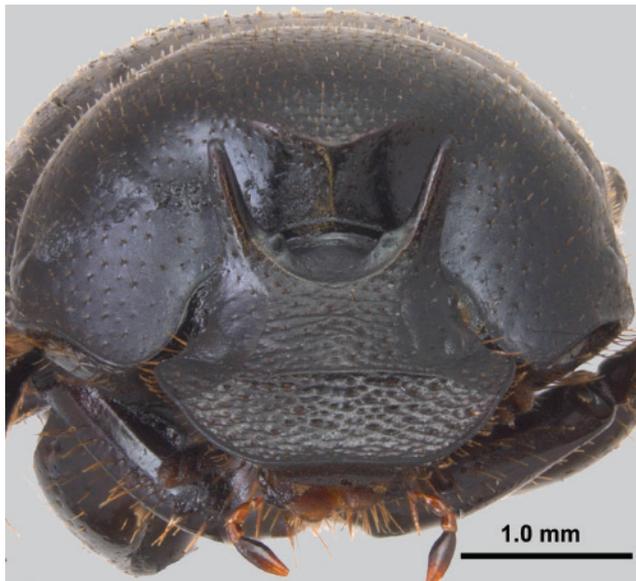


Figure 72. Head and pronotum, male *Onthophagus cartwrighti* Howden. Photo by J. MacGown.



Figure 73. Head and pronotum, female *Onthophagus cartwrighti* Howden. Photo by J. MacGown.

12 May 1976 (1 SDNHM), 24 Feb 1979 (1 SDNHM), 10 Mar 1979 (1 SDNHM), 19 May 1979 (1 SDNHM), 12 Apr 1980 (2 SDNHM); Mission Gorge Dam, 10 May 1934 (7 SDNHM), 14 Jun 1977 (13 SDNHM), 9 Jun 1978 (1 SDNHM), 21 Jun 1979 (1 SDNHM); Mission Gorge Dam, dung, 1 Jun 1993 (4 RHM); Spring Valley, 18 Apr 1957 (2 CSCA); Spring Valley, 1.0 mi. E Sweetwater Reservoir, 17 May 1970 (1 RHM); 2.5 mi. NE Sweetwater Reservoir, 23 May 1970 (5 WSU); Lakeside, 1 May 1951 (2 RHM); Otay Mesa, 24 Mar 1978 (2 SDNHM); Otay Mountain, Little Cedar Canyon, 17 Jun 1978 (1 SDNHM); Otay Mountain, Little Cedar Canyon, pitfall trap, 20–25



Figure 74. Male *Onthophagus gazella* (Fabricius). 15 km S of San Blas, Nayarit, Mexico, 15 July 1987. Scale 1.0 mm. Photo by G. A. Hanley.



Figure 75. Head and pronotum, male *Onthophagus gazella* (Fabricius). Photo by J. MacGown.

Feb 1997 (1 RHM); Carlsbad, SE, 14 Apr 1992 (1 RHM); Camp Pendleton, San Mateo Creek, 5.0 mi. NE Interstate 5, 10 Apr 1993 (1 RHM); Camp Pendleton, Las Pulgas, 18 Apr 1993 (2 RHM); United States International University (currently Alliant International University, near Miramar), 16–30 Apr 1973 (2 SDNHM); Lake Hodges, 25 Jun 1977 (1 SDNHM), 13 Apr 1992 (1 RHM); Potrero, 26 Apr 1980 (2 SDNHM); Tecate Peak, 1186 m, 2 Jun 1981 (1 SDNHM); Tecate Mtn, 10 Apr 1982 (2 SDNHM); Garnet Peak, 17 Jun 1980 (1 SDNHM); Lake Poway, 27 May 1990 (2 SDNHM, 1 UCB); Rainbow Valley, Interstate 15, 4 Apr 1981 (1 SDNHM); Bonsall, 25 May 1991 (1 RHM); Bonsall, on dead common kingsnake (*Lampropeltis getula*), 27 May 1991 (1 RHM); Bonsall, on coyote dung, 27 May 1991 (6 RHM), 28 May 1991 (30 PS); Margarita Peak, 22 Apr 1982



Figure 76. Head and pronotum, female *Onthophagus gazella* (Fabricius). Photo by J. MacGown.

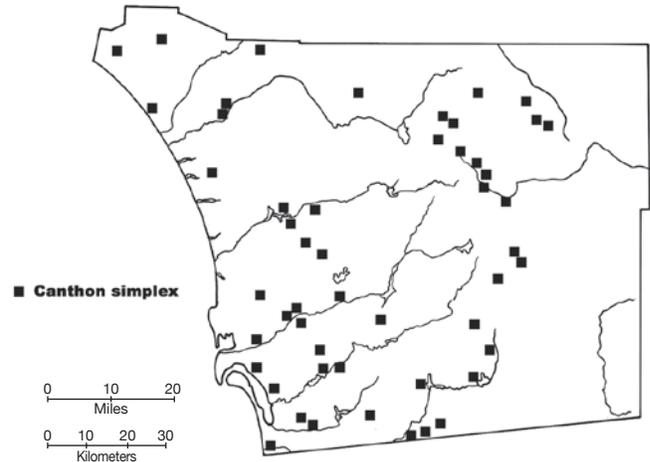


Figure 77. Distribution, *Canthon simplex*.

(1 SDNHM); Lake Barrett, W, 11 Jun 1983 (8 SDNHM, 8 UCB); Lake Morena, bovine dung, 15 Mar 1992 (2 RHM); San Pasqual, Wild Animal Park, 2 Jun 1991 (1 PS); Lake Henshaw valley, Hwy 79 and Hwy S2, 1 Jun 1991 (6 RHM); Chocolate Summit, 6 Apr 1995 (8 SDNHM); Palomar Mtn, 22 Jun 1940 (1 UCR); Pine Valley, 4.0 mi. NW on Hwy S1, 5 Jul 1963 (4 UCB); Warner's Ranch, Jul 1919 (3 SDNHM), 7 Jun 1921 (1 SDNHM); Warner Springs, 23 May 1953 (2 SDNHM), 8 Jun 1971 (1 CSCA); Buckman Springs, 18 May 1927 (1 CAS); San Felipe Valley, 20 May 1928 (50 SDNHM, 2 UCB), 27 May 1933 (1 SDNHM), 27 Mar 1934 (6 SDNHM), 4 May 1934 (3 SDNHM), 6 Jun 1940 (2 UCB), 19 May 1982 (1 SDNHM), 1 Jun 1991 (2 RHM); San Felipe Valley, bovine dung, 7 Jun 1940 (9 UCB); Scissors Crossing, 10.0 mi. NW, 6 Jun 1968 (1 UCR); Scissors Crossing, 1 Jun 1991 (2 RHM); Mason Valley, 18 Feb 1928 (15 SDNHM); Borrego, 6 May 1939 (1 UCR), 8 Jul 1939 (1 UCR), 10 Apr 1952 (1 UCB); Indian Canyon, Anza-Borrego Desert State Park, 9 Jun 1948 (1 UCB).

**Temporal Distribution**—January (1), February (19), March (12), April (35), May (121), June (67), July (9).

**Remarks**—*Canthon simplex* is the only dung-rolling scarab in San Diego County, where it occurs from the coast to the desert. Adult beetles carve out a piece of horse or bovine dung and fashion it into a ball, in which the female places a single egg. The dung ball is rolled away from the source and buried. Rolling involves one to several beetles pushing with the body by rearing up or straightening out the hind legs and pulling while grasping the surface of the ball (Hatch 1971). The dung ball provides both food and shelter for the developing grub. *Canthon simplex* also uses and rolls pellets of the Beechey ground squirrel (Evans and Hogue 2006). In San Diego County beetles have been observed feeding on coyote scat and a dead kingsnake.

#### Tribe Oniticellini

Most of the 14 genera and 165 species of this tribe are found in Africa and Asia. An African species, *Euoniticellus intermedius* (Reiche), was introduced into California and Texas and has spread into northern Mexico (Gill 2002). The tribe Oniticellini is characterized as follows: body elongate, flattened (most species); pronotum lacks basal pits near the midline; scutellum visible; antenna with 8 antennomeres.

#### Genus *EUONITICELLUS* Janssens, 1953

This genus contains 19 species, 18 of which are endemic to Africa; one species is restricted to the Caribbean (Davis et al. 2008).

Most species are yellowish or light brown with darker brown markings. The elytral apices bear a row of erect setae. The pronotum is often nearly as long or longer than the elytra.

***Euoniticellus intermedius* (Reiche)**  
(Fig. 65, 78)

**Diagnosis**—Length 7.0–9.0 mm; width 3.2–4.2 mm. Color of head and pronotum light brown; pronotum with distinctive symmetrical markings; elytra lighter and with several white dots; legs yellow (Fig. 65). Pronotum with scattered coarse punctation throughout. Male with single blunt head horn; anterior portion of pronotum swollen. Female lacks head horn and swelling of pronotum.

**Distribution**—*Euoniticellus intermedius* is a native of sub-Saharan Africa and was introduced to Australia. Live individuals were acquired from Australia during the 1960s for release in California in 1974 (Blume 1984). *Euoniticellus intermedius* is now well established in Texas, Florida (Almquist 2002), California, Baja California, and Baja California Sur, Mexico, and occurs throughout mainland Mexico at least as far south as Chiapas (Morales et al. 2004)

**San Diego County Locality Records**—26 specimens examined (Fig. 78): Encinitas, Olivenhain and Rancho Santa Fe Rd., bovine dung, 7 Jul 1991 (1 RHM); El Capitan Dam, 29 May 1988 (8 SDNHM, 2 UCB); Escondido, 25 Aug 1984 (2 SDNHM); San Pasqual, San Pasqual Rd. and Hwy 78, bovine dung, 16 Jun 1991 (1 RHM), 22 Feb 1992 (2 RHM); Jacumba, 7 Nov 1984 (10 SDNHM).

**Temporal Distribution**—February (2), May (10), June (1), July (1), August (2), November (10).

**Remarks**—*Euoniticellus intermedius* is diurnal and attracted to bovine dung for 24 to 36 hours after deposition. Blume (1984) described its life history and nidification in central Texas as follows: Adults feed in the dung pad before oviposition and in periods of extremely low soil moisture. At the onset of sexual maturity, a male and female beetle, working together or separately, dig a burrow beneath the dung pad to a depth of 7–15 cm. The female constructs a brood mass at the bottom of the burrow, while the male provides her with bits of dung obtained from the dung pad. The brood mass averages 14–19 mm in length, and the centrally located egg chamber is large enough to accommodate the adult beetle. The egg is glued to the end at the bottom of the egg chamber. After ovipositing, the female leaves the chamber and closes the exit hole with dung. The number of brood masses constructed in a given nest is highly variable and depends on availability and quality of dung, competition for food, soil moisture, and temperature. When conditions are no longer good

for nest building, the adults separate and fly in search of a new source of dung where they find partners and resume nidification.

Tribe Onitini

This Old World tribe consists of 200 species in 18 genera. Gill (2002) characterized it as follows: Body oblong, robust. Pronotum with pit on each side of midline near base. Scutellum small but visible. Elytra with prominent lateral carina. Antenna with 9 antennomeres. Protarsi lacking in both sexes. Meso- and metatibia strongly expanded at apex.

Genus *ONITIS* Fabricius, 1798

This is the largest genus in the tribe with over 150 described species in Asia, Africa, and Europe. *Onitis alexis* Klug is established in San Diego County.

***Onitis alexis* Klug**  
(Fig. 62, 66, 78)

**Diagnosis**—Length 12.8–18.8 mm; width 6.3–8.9 mm. Pronotum metallic green or coppery, elytra light brown (Fig. 66). Head of male with small tubercle between eyes; profemur with small spine on anterior edge; metafemur with spine on posterior border. Head of female with small horn between eyes; pro- and metafemur lack spine.

**Distribution**—The species is native to Africa and southern Europe and has been successfully introduced to Australia and the United States.

**San Diego County Locality Records**—138 specimens examined (Fig. 78): Encinitas, Rancho Santa Fe Rd. and Olivenhain, bovine dung, 7–15 Jul 1991 (22 RHM); Escondido, 19 Aug 1984 (2 UCB), 25 Aug 1984 (1 SDNHM); San Pasqual, Cloverdale Ranch, 1.0 mi. W Wild Animal Park, 2 Jun 1991 (1 RHM); San Pasqual, San Pasqual Rd. and Hwy 78, bovine dung, 2–5 Jun 1991 (23 PS), 16 Jun 1991 (35 RHM); Escondido, San Pasqual High School, 19 Aug 1984 (3 SDNHM); El Capitan Dam, 29 May 1988 (10 UCB), 5 Jun 1988 (3 UCB); Ramona, 3.6 mi. E on Hwy 78, bovine dung, 4 Jul 2002 (3 RHM); Lake Henshaw, 0.5 mi. NW Jct. Hwy 76 and Hwy 79, bovine dung, 5 Jul 2002 (6 RHM); Los Coyotes Indian Reservation, 0.5 mi. N of gate, bovine dung, 6 Jul 2002 (1 RHM); Mason Valley, 0.9 mi. E Butterfield Ranch, blacklight, 30 Jun 2002 (1 RHM).

**Temporal Distribution**—May (10), June (90), July (32), August (6).

**Remarks**—*Onitis alexis* is the largest dung beetle in California and is easily distinguished from other scarabaeines by its large size and coppery or metallic green pronotum with two distinct pits located in the center near the posterior margin. The species was introduced into California in an effort to control dung-breeding flies and reduce dung pats in pastures.

Tribe Onthophagini

The world fauna includes more than 2200 species in 34 genera (Gill 2002). The tribe is characterized as follows: Body 2–12 mm in length and oval or elongate. Head and/or pronotum often with horns or carinae. Antenna with 9 antennomeres. Scutellum hidden. Elytra with 7 discal striae. Tarsi and tarsal claws present on all legs. Meso- and metatibia broadly expanded at apex.

Genus *ONTHOPHAGUS* Latreille, 1807

*Onthophagus* is the largest genus of Scarabaeinae in the world with approximately 130 species known from the New World, 40 of which occur in North America from southern Canada to northern Mexico (Gill 2002). One native and two introduced species occur in San Diego County.

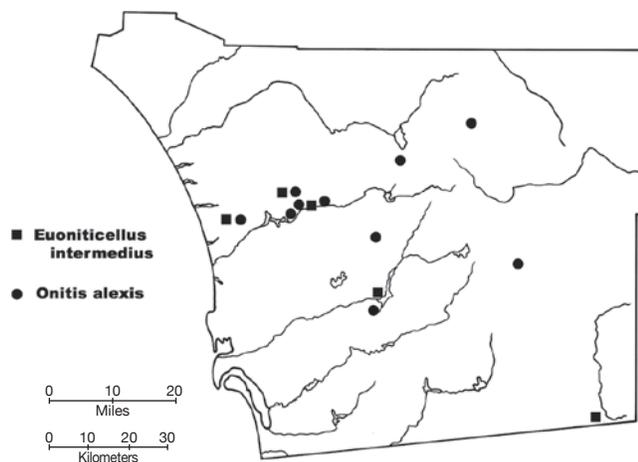


Figure 78. Distribution, *Euoniticellus intermedius*, and *Onitis alexis*.

***Onthophagus cartwrighti*** Howden  
(Figs. 71–73, 79)

**Diagnosis**—Length 6.4–8.1 mm; width 3.4–3.8 mm. Clypeus reflexed, rounded, with median emargination; posterior margins with distinct carina; frons coarsely punctate with minute setae (Fig. 71). Male major with two nearly vertical head horns with inner basal swellings or not (Fig. 72). Male minor with two small horns or not. Clypeus of female less reflexed than that of male; disc transversely rugose, posterior marginal carina more elevated; vertex behind eyes with distinct carina that lacks horns (Fig. 73). Swelling of pronotum more pronounced and wider in the female than in the male.

**San Diego County Locality Records**—4 specimens examined or referenced from literature (Fig. 79): Scissors Crossing, 30–31 Jul 1964 (Howden 1973); San Felipe Creek, in dung chamber of the woodrat *Neotoma bryanti*, 18 Sep 1976 (J. Saulnier, 1 RHM); Blair Valley, Anza-Borrego Desert State Park, 24 Aug 1984 (1 RHM).

**Temporal Distribution**—July (2), August (1), September (1).

**Remarks**—Rare in San Diego County, *Onthophagus cartwrighti* is more common in Baja California Sur, Mexico, where it is taken at light and blacklight (R. H. McPeak, personal observation).

***Onthophagus gazella*** (Fabricius)  
(Figs. 74–76, 79)

**Diagnosis**—Length 8.8–12.2 mm; width 4.0–6.5 mm. Body oval, robust. Pronotum greenish or coppery black, with pale band around sides and base; elytra light brown (Fig. 74). Ventral face of femur light brown with obvious dark blotch. Anterior margin of clypeus reflexed with slight median emargination. Clypeal carina developed in both sexes. Frontal carina lacking in male (Fig. 75) and well developed in female (Fig. 76). Male major with two widely separated vertical horns that curve inward (Fig. 75); male minor with 2 smaller horns or protuberances. Female lacks horns (Fig. 76). Male with slight anterior pronotal swelling. Female with flattened tubercle on each side of anterior pronotal depression (Fig. 76) or lacking distinct tubercles.

**Distribution**—*Onthophagus gazella* is an Afro-Asian species that has been introduced to many tropical, subtropical, arid and semi-arid regions of the world to control bovine dung in pastures (Fincher et al. 1983, Kohlmann 1994). In North America, the species was first introduced to Texas in 1972 and later to California (1975–1977) and the southeastern United States. It has also been introduced in Grenada, Uruguay, Brazil, and Easter Island. The species has dispersed rapidly and is now well established in Arizona, throughout Mexico, and in Central America. In the U. S., it ranges throughout

the Southeast and has been collected north to Kansas and Tennessee (Hoebeke and Beucke 1997).

**San Diego County Locality Records**—San Diego, no date (Kohlmann 1994); Escondido (Kohlmann 1994; A. V. Evans, personal communication); Valley Center (Kohlmann 1994), Santa Ysabel (Kohlmann 1994) (Fig. 79).

**Temporal Distribution**—No records are available.

**Remarks**—Though *Onthophagus gazella* was introduced to San Diego County between 1975 and 1977, we are not certain it has become established. S. Haskins and R. H. McPeak sampled bovine dung and pastures throughout San Diego County for many years without encountering a single example of *O. gazella*, though we have collected many specimens of the three other introduced species (*Euoniticellus intermedius*, *Onitis alexis*, and *Onthophagus taurus*). It is probable that *Onthophagus gazella* did not become established after the initial introductions.

***Onthophagus taurus*** (Schreber)  
(Figs. 67–70, 79)

**Diagnosis**—Length 7.0–11.2 mm; width 3.5–5.5 mm. Color black (sometimes with green sheen) or head and pronotum black and elytra dark reddish-brown; legs dark reddish-brown (Fig. 67). Anterior margin of clypeus spatulate or rounded in male and rounded in female. Clypeal and frontal carinae developed in female (Fig. 70) but lacking in male (Figs. 68, 69). Male major with long, curved head horns that sweep over pronotum (Fig. 68); male minor with small or no head horns (Fig. 69). Female without head horns. Pronotum of male and female lacking anterior swelling, although major males have curved, lateral, longitudinal depressions that accommodate the horns.

**Distribution**—*Onthophagus taurus* is native to southern Europe and Asia Minor. It was introduced to the southeastern United States in the early 1970s and spread very rapidly. It occurs from Louisiana and Florida, east and north through Missouri, Ohio, Pennsylvania, and New York (Hoebeke and Beucke 1997). It is widely established in California and occurs in Baja California, Mexico.

**San Diego County Locality Records**—206 specimens examined (Fig. 79): Carlsbad, 7989 La Brusca Way, 13 Mar 1993 (2 RHM); Carlsbad, 7989 La Brusca Way, dog dung, 5 Jul 1991 (2 RHM); Carlsbad, Rancho Santa Fe Rd. and Olivenhain, bovine dung, 15 Jul 1991 (3 RHM); Santee, 20 Nov 1986 (1 RHM), 20 May 1987 (1 CSCA), 21 Jul 1998 (1 RHM); El Capitan Dam, 29 May 1988 (33 SDNHM, 18 UCB); Escondido, 1 Jun 1986 (20 SDNHM, 15 UCB); San Pasqual, San Pasqual Rd. and Hwy 78, bovine dung, 2–19 Jun 1991 (23 RHM); Lake Morena, N side, bovine dung, 15 Mar 1992 (5 RHM); Ramona, 3.6 mi. E on Hwy 78, bovine dung, 4 Jul 2002 (2 RHM); Noble Canyon, 1405 m, 22 May 1993 (3 RHM); Matagal Creek, 3 Jul 1983 (5 SDNHM, 5 UCB); Warner Springs area, Hwy 79 and Hwy S2, bovine dung, 25 Aug 1991 (6 RHM); Warner Springs area, 0.4 mi. N of S2 on Hwy 79, bovine dung, 1 Jun 1991 (12 RHM); Los Coyotes Indian Reservation, 0.5 mi. N of gate, bovine dung, 6 Jul 2002 (3 RHM); Lake Henshaw, 0.5 mi. NW Hwy 79 on Hwy 76, bovine dung, 5 Jul 2002 (5 RHM); Julian, 1.0 mi. N, bovine dung, 11 Oct 1992 (1 RHM); Hot Springs Mtn, 1313 m, 3 Jul 1993 (1 RHM); Jacumba, 5.0 mi. W on Hwy 94, bovine dung, 26 May 2003 (8 RHM); Campo, 1.7 mi. E on Hwy 94, bovine dung, 26 May 2003 (7 RHM); Scissors Crossing, 1 Jun 1991 (1 RHM); San Felipe Valley, 9.0 mi. NW of Scissors Crossing on Hwy S2, bovine dung, 1 Jun 1991 (23 RHM).

**Temporal Distribution**—March (7), May (70), June (94), July (27), August (6), October (1), November (1).

**Remarks**—*Onthophagus taurus* is well established in San Diego County from the coast to the mountains (1405 m). This species is diurnal and does not come to light. Specimens are generally collected in bovine dung and occasionally in dog dung.

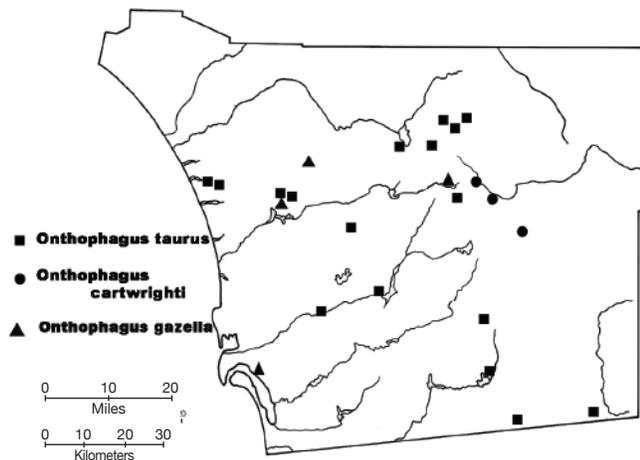


Figure 79. Distribution, *Onthophagus cartwrighti*, *O. gazella*, and *O. taurus*.

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