INSECTA MUNDI

A Journal of World Insect Systematics

0174

Review of the genus *Orizabus* Fairmaire in the United States of America (Coleoptera: Scarabaeidae: Dynastinae)

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Date of Issue: April 22, 2011

CENTER FOR SYSTEMATIC ENTOMOLOGY, INC., Gainesville, FL

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Insecta Mundi 0174: 1-42

Published in 2011 by
Center for Systematic Entomology, Inc.
P. O. Box 141874
Gainesville, FL 32614-1874 U. S. A.
http://www.centerforsystematicentomology.org/

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Printed copies deposited in libraries (ISSN 0749-6737)
Electronic copies in PDF format (On-Line ISSN 1942-1354, CDROM ISSN 1942-1362)

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Review of the genus *Orizabus* Fairmaire in the United States of America (Coleoptera: Scarabaeidae: Dynastinae)

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Abstract. The *Orizabus* Fairmaire (Coleoptera: Scarabaeidae: Dynastinae: Pentodini) of the USA are reviewed. *Orizabus pinalicus* **new species** and *O. mcclevei* **new species** are described. **Lectotypes** are here designated for eight species names: *Bothynus pyriformis* LeConte, *Pseudaphonus lucidus* Casey, *Orizabus snowii* Horn, *Orizabus cultripes* Fairmaire, *Orizabus isodonoides* Fairmaire, *Orizabus sallei* Fairmaire, *Orizabus fontinalis* Casey, and *Orizabus ponderosus* Casey. Illustrations of diagnostic characters and a key to the five included species are presented. The Mexican species *O. isodonoides* and *O. rubricollis* Prell are also illustrated for comparison to the new species.

Introduction

The US species of the pentodontine genus *Orizabus* Fairmaire (Coleoptera: Scarabaeidae: Dynastinae) were reviewed (as *Cheiroplatys* Hope) by Saylor in 1946, and the entire genus was reviewed by Endrödi (1969, 1985) who recognized eight species as valid. Since then, Morón (1981), Delgado and Deloya (1990), Dechambre (1993), Ratcliffe (1994) and Delgado (2008) described one additional Mexican species each, Morón et al. (2003) described two more Mexican species, and recently Ratcliffe and Cave (2006, 2010) added nine Mexican and Central American species, and provided the most recent key to the genus. Ratcliffe and Cave (2010) also retrieved *O. ligyroides* from synonymy, bringing the total number of recognized species to 25.

With the two new species described herein, the USA fauna now consists of five species, all of which also occur (or are expected to occur) in Mexico.

Methods

Lengths and widths are dorsal view, straight-line measurements rounded to the nearest 0.5 mm, taken along the midline from the clypeal apex to the visible pygidial apex. Orientations for surfaces on appendages are given as if the appendages are extended in axes perpendicular to the longitudinal body axis (*sensu* Torre-Bueno 1978); the normally exposed (ventrally facing) faces of the posterior femora are therefore anterior, the femorotibial "knee" opens ventrally, and so forth. Numbering of elytral striae and intervals follows Vaurie (1960), so the sutural stria is the "first" stria, and the interval adjacent to it is the "first" interval; the next stria (moving toward the epipleuron) would be the second, and so forth.

Because of the high intraspecific variation present in many species, and the known presence of phenotypically similar "sister" species within the genus, lectotypes are designated for species originally described from syntype series so that the names are each fixed to a single specimen to preserve nomenclatural stability. Labels on lectotypes are cited verbatim within quotation marks, with a single slash denoting a new line on a label and a double slash denoting a new label. Additional information (e.g. label color) not printed on labels is included in brackets. Hand written labels or portions thereof are followed by [H]; typewritten labels or portions thereof are followed by [T].

Synonymies do not include mere listing of a species in a checklist. Original designators of synonymies here followed are cited in parentheses after the abbreviation "syn.". Primary types of all species described from US specimens were examined, as well as those of Fairmaire's (1878) species currently synonymized with *O. clunalis*.

Codens for collections are as follows: **ASUT** = Arizona State University, Tempe; **BYUC** = M.L.Bean Life Science Museum, Brigham Young University, Provo; **CASC** = California Academy of Sciences, San Francisco; **CNCI** = Canadian National Collection, Ottawa; **CSUC** = Colorado State University, Ft. Collins; **CUIC** = Cornell University, Ithaca; **EMEC** = Essig Museum of Entomology, University of California,

Berkeley; **FSCA** = Florida State Collection of Arthropods, Gainesville; **LACM** = Los Angeles County Museum of Natural History; **MCZC** = Museum of Comparative Zoology, Harvard University, Cambridge; **MNHN** = Muséum national d'Histoire naturelle, Paris; **MTEC** = Montana State University, Bozeman; **OSUC** = Ohio State University, Columbus; **SEMC** = Snow Entomological Museum, University of Kansas, Lawrence; **TAMU** = Texas A & M University, College Station; **UAIC** = University of Arizona, Tucson; **UCDC** = University of California, Davis; **UCRC** = University of California, Riverside; **UNSM** = University of Nebraska State Museum, Lincoln; **USNM** = National Museum of Natural History, Washington; and the private collections of: **BCRC** = B. C. Ratcliffe, Lincoln, Nebraska; **CBBC** = C. B. Barr, Berkeley, California; **CSWC** = C. S. Wolfe, Fort Worth, Texas (deceased); **DACC** = D. Ahart, Phoenix, Arizona; **DCCC** = D. Carlson, Sacramento, California; **DGMC** = D. G. Marqua, Fort Davis, Texas; **EGRC** = E. G. Riley, College Station, Texas; **HAHC** = H. F. & A. Howden (now accessioned to Canadian Museum of Nature, Ottawa); **JEWC** = J. E. Wappes, San Antonio, Texas; **JHUC** = J. Huether, Geneva, New York; **JSCC** = J. W. Saulnier, Indio, California; **JSHC** = J. S. Hunter III, Columbia, Missouri; **PHSC** = P. H. Sullivan, Sierra Vista, Arizona; **RACC** = R. A. Cunningham, Chino, California; **SMCC** = S. McCleve, Douglas, Arizona; and **WBWC** = W. B. Warner, Chandler, Arizona.

Diagnostic Characters and Definition of Terms

"Clypeal carina" is the transverse carina present in the apical one-third of the clypeus. It is formed by a medial continuation of the lateral marginal reflexion which does not continue marginally (past the carina) to the true clypeal apex. In some species the carina is apparently apical, and careful examination is required to find the obsolescent ("true") clypeal apex.

"Frontoclypeal tubercle" is the medial tumosity of the posterior clypeal margin, often also involving the adjoining frontal margin. It is present in all species and varies in shape among (and sometimes within) species from spiniform to conical to transversely subcarinate; in one (Mexican) species it is modified into a distinct, transverse carina.

"Marginal bead" of the pronotum is the narrow, raised marginal portion external to and defined by an incised submarginal line or row of coalescent punctures. In many species it is effaced along the posterior pronotal edge; in a few species it may be either complete or effaced. On the middle of the anterior pronotal margin it may be simple, weakly constricted, or posteriorly broadened into an obtuse angle or raised tubercle.

The protibiae also have important characters for separating species and species groups. In some species the protibiae are sexually dimorphic: edentate and blade-like in males and tridentate with the apex oblique in females. In other species both males and females have similar, tridentate protibiae with the apex oblique or transversely rounded, or (in some Mexican and Central American species) both sexes may have edentate, blade-like protibiae.

As with all fossorial scarabs, cephalic and tibial characters may be modified or lost through wear (*e.g.* tibial teeth as in Fig. 32). Very worn specimens of species or sexes with tridentate tibiae may appear to have the tibiae edentate; however in all such cases the characters are obviously worn. In extreme cases the protibiae may be worn to mere "nubs" (tarsi completely lost) and the clypeal carina and frontoclypeal tubercle may become completely effaced, indicated only by the abraded "scar" of their former basal connection.

Taxonomy

Orizabus Fairmaire 1878: 260, Horn 1885: 124, Prell 1914: 202, Casey 1915: 222, Endrödi 1969: 80, 1985: 243, Morón 1981: 129, Delgado and Deloya 1990: 301, Ratcliffe 1991: 272, 1994: 91, Dechambre 1993: 342, Ratcliffe and Cave 2006: 201, 2010: 1, Ratcliffe and Paulsen 2008: 450, Delgado 2008: 53. Genotype: *Orizabus cultripes* Fairmaire (1878), designated by Casey (1915: 178).

Cheiroplatys, Bates 1888: 320 (nec Hope 1837: 34), Fall 1905: 272, Arrow 1937: 37, Saylor 1946:16, Ritcher 1966: 138, Young 1969: 927.

Pseudaphonus Casey 1915: 210 (syn. with *Cheiroplatys*, Arrow 1937: 35), Ritcher 1944: 28. Genotype: *Bothynus pyriformis* LeConte (1847) by original designation.

Aztecalius Casey 1915: 228 as subgenus of *Orizabus* (syn. with *Cheiroplatys*, Saylor 1946: 17). Genotype: *Orizabus isodonoides* Fairmaire (1878) by original designation.

Diagnosis. Small to medium sized Pentodontini with oval to pyriform shape, convex; color reddish brown to black. Head with reflexion of lateral margins extending transversely across clypeus (not continuing on apical margin) to form straight to arcuate (in dorsal view) carina, carina obviously subapical to apparently apical, entire to strongly bidentate. Frontoclypeal suture with medial tubercle or transverse ridge. Antenna usually 10-segmented (9-segmented in some Mexican species). Mandibles lobiform to subrectangular, edentate, mostly to entirely covered by clypeus. Pronotum unmodified or with posterior edge of anterior marginal bead posteriorly produced at middle into triangular tubercle or point (or with free tubercle immediately behind anterior marginal bead at middle), anterior portion of disc often depressed behind tubercle. Elytron distinctly punctate-striate in nearly all species. Pygidium convex, smooth to punctate-scabrous (especially in lateral angles). Protibia with dorsal margin edentate (blade-like), bidentate, or tridentate; sexually dimorphic in many species.

Remarks. *Orizabus brevicollis* Prell was described from specimens supposedly collected in California and Mexico, and Endrödi (1969) designated a "California" specimen as lectotype. Despite intensive collecting in California during the nearly 100 years since Prell's (1914) description, no additional U.S. nor Baja California peninsular records have surfaced, yet many additional specimens have been collected in mainland Mexico. Prell's "Kalifornien" record probably refers to one of the several mainland Mexican localities called "California"—I have seen other mainland Mexican scarab species similarly labeled—or came from mislabeled specimens. In any event, the species should be removed from US faunal lists.

Key to *Orizabus* species of the United States of America

1. Clypeal carina usually entire, at most weakly emarginate in anterior view; protibia tridentate (when not worn) in both sexes with apex truncate to transversely rounded (Fig. 5-7, 35); male genitalia with paramera relatively thin, laterally dentate (Fig. 20, 21, 33, 34); body usually smaller (12 to 19 mm long), strongly convex, pyriform **2**

— Clypeal carina usually obviously bidentate in anterior view (unless worn; Fig. 1, 2, 12, 13, 37); female protibia tridentate, with apex oblique (Fig. 10, 37, 38); male with protibia blade-like, edentate (Fig. 8, 9, 12, 36); male genitalia and shape different; body normally longer than 19 mm **3**

2(1). Clypeal carina apparently apical, in dorsal view often weakly angulate with angle opening anteriorly (Fig. 6, 32); pronotum with posterior marginal bead more or less effaced and anterior marginal bead not angulately broadened at middle; antennal club as long as or shorter than distance between frontoclypeal tubercle and clypeal carina (Fig. 6, 32); paramera with lateral tooth just anterior to middle, tooth often appressed (Fig. 33, 34) ..... ***O. pyriformis* (LeConte)**

— Clypeal carina obviously subapical, in dorsal view straight (Fig. 5); pronotum with posterior marginal bead complete or only shortly interrupted at middle, anterior marginal bead with posterior edge angularly broadened at middle; antennal club obviously longer than distance between clypeal carina and frontal tubercle (Fig. 5); paramera with lateral tooth at about apical third (Fig. 20, 21) ..... ***O. mcclevei* new species**

3(1). Posterior edge of anterior pronotal bead usually not posteriorly prolonged at midline, in females bead often slightly narrowed at midline (Fig. 10); pronotal disc simply convex, without broad depression in anterior half (Fig. 8); male paramera with apex incised (Fig. 30); length usually less than 22 mm ..... ***O. pinalicus* new species**

— Posterior edge of anterior pronotal bead in male posteriorly prolonged at midline into triangular tubercle (Fig. 1, 3, 36), in female usually at least obtusely angulate (bead medially broader; Fig. 37, 38); pronotal disc often with broad depression behind tubercle (lacking in most females);

male paramera without apical incisure (Fig. 26-29); length usually more than 22 mm but smallest individuals of similar size **4**

4(3). Clypeus parabolic, with lateral margins straight to weakly convex; clypeal carina obviously subapical, with teeth apices separated by about a dorsal eye width or more (Fig. 1, 37) .... ***O. clunalis* (LeConte)**

— Clypeus strongly narrowed, subtriangular, with lateral margins straight or weakly concave; clypeal carina apparently apical, with teeth narrowly separated (much less than a dorsal eye width) such that clypeal carina appears cleft (Fig. 3, 38) ..... ***O. ligyroides* Horn**

***Orizabus clunalis* (LeConte)**
Fig. 1, 2, 26, 28, 36, 37; Map 1

Aphonus clunalis LeConte 1856: 23. **Type**. Holotype female (MCZC #5720); type locality: "...found by Dr. Thos. H. Webb, of the Boundary Commission, and probably in the valley of the Gila." Given the species' habitat, this locality is most probably in mountainous pine forests of the east central portion of modern-day Arizona or adjacent area of New Mexico.

Cheiroplatys clunalis Bates 1888: 321, Fall 1905: 272, Saylor1946: 17, Young 1969: 927.

Orizabus clunalis Casey 1915: 226, Endrödi 1969: 85, 1985: 243, Morón 1981: 131, Delgado and Deloya 1990: 301, Morón et al. 2003: 7, Delgado 2008: 56, Ratcliffe and Cave 2006: 206, 2010: 1.

Orizabus cultripes Fairmaire 1878: 261, Bates 1888: 321 (syn. Saylor 1946: 17). **Type**. **Lectotype** male (MNHN) here designated, labeled "Orizabus / cultripes / Fairm. / Orizaba[H] // Museum Paris / collection Léon Fairmaire / 1906[T, blue label] // SYNTYPE[T, red label] // LECTOTYPE[T] / Orizabus / cultripes / Fairmaire / des. W. B. Warner[H, red label]."

Orizabus marginatus Fairmaire 1878: 262, Horn 1885: 125 (syn. Bates 1888: 321). **Type**. Type (apparently) not seen. Four specimens purportedly from the type series were received from MNHN, including three Sallé specimens labeled as syntypes, and one Palmer specimen with Bates (1888) "Biol. Cent. Amer." labels. All four specimens were 22-23 mm long vs. Fairmaire's description of "Long. 26 à 28 mill;" therefore no lectotype was designated from this series.

Orizabus sallei Fairmaire 1878: 262 (syn. Bates 1888: 321). **Type**. **Lectotype** male (MNHN) here designated, labeled "Jalapa / Mexico[T] // ex museo / A. Sallé / 1897[T] // Museum Paris / ex coll. / R. Oberthur [T, blue label] // Orizabus / Sallei Fair[H] // LECTOTYPE[T] / Orizabus / sallei / Fairmaire / des. W. B. Warner[H, red label]."

Orizabus snowi Horn 1885: 124 (syn. Bates 1888: 321). **Type**. **Lectotype** male (MCZC #3704) here designated, labeled "New Mexico / F. H. Snow [T] // Type No. [T] 3704 [H] / Orizabus / snowi [H]/ G. H. Horn [T, red label] // *Orizabus* / *Snowi* / Horn [H] // LECTOTYPE [T] / *Orizabus* / *snowi* / Horn [H] / des. W. B. Warner [T] , 1994 [H, red label]." Although Horn described this species from a series, the only other specimen associated with the lectotype in the Horn collection now at MCZC is labeled "Ari.". The LeConte collection (MCZC) contains one specimen from "S. Fe Canon, N.M., 7000 ft., Aug., 1880 (Snow)" and two unlabeled specimens determined as *O. snowi* which may be syntypes. Type locality: New Mexico.

Orizabus fontinalis Casey 1915: 225 (syn. Saylor 1946: 17). **Type**. **Lectotype** male (USNM #48608) here designated, labeled "NM [T] // Casey / bequest /1925 [T] // Type USNM [T] / 48608 [H, red label] // *fontinalis* / Csy. [H] // LECTOTYPE [T] / *Orizabus* / *fontinalis* / Casey / des. W. B. Warner, 1994 [H, red label]". One female syntype is also present in the Casey collection (USNM). Type Locality: Jemez Springs, New Mexico.

Orizabus frontalis Saylor (*nomen nudum*) 1946: 17, nec Casey 1915: 225.

Orizabus ponderosus Casey 1915: 225 (as "*ponderosae*"; syn. Saylor 1946: 17). **Type**. **Lectotype** male (USNM 48607) here designated, labeled "Albuquerque / N. M.: Snow / August 1894 [T] // Casey / bequest / 1925 [T] // Type USNM [T] / 48607[H, red label] // *Orizabus* / *ponderosus* / Csy. [H] // LECTOTYPE / *Orizabus* / *ponderosus* / Casey / des.W. B. Warner, 1994 [H, red label]". Twelve syntypes (5 male, 7 female) are present in the Casey collection (USNM).

Diagnosis. Length 19.0 to 26.0 mm, width 11.0 to 14.5 mm. Large for genus, parallel sided to wider behind but not distinctly pyriform. Clypeus parabolic with apex broadly rounded; clypeal carina obviously subapical, bidentate, teeth rounded, usually separated by more than a dorsal eye width (Fig. 1, 37); maximum dorsal eye width usually less than 1/4 of minimum dorsal interocular width. Pronotum with posterior marginal bead distinct (in all US specimens examined). Male with dorsal margin of protibia edentate, bladelike; pronotum anteromedially with perceptible to large depressed area, anterior marginal bead posterodorsally prolonged at midline into triangular tubercle; paramera (Fig. 26, 28) without apical incisure, but with weak lateral tooth subapically, apex incompletely sclerotized, appearing "fleshy".

Female with dorsal margin of protibia tridentate, its apex oblique (Fig. 37); pronotum with posterior margin of anterior marginal bead varying from subangularly broadened to forming tubercle as in males, disc without or with weak anteromedial depressed area behind tubercle.

US Distribution. See Map 1. Many records from AZ, NM, and western TX. Single "state only" records were seen from Colorado and Kansas (the latter in the Horn collection at MCZC); but because no recent material from those states was seen, I consider the data as suspect until confirmed. Endrödi's (1985) Ohio record is erroneous, and several old "El Paso," TX, records possibly were extended from mountains in the vicinity as the desert habitat in El Paso is unlikely to support this species.

Specimens Examined. 1074; see appendix for locality data.

Remarks. *Orizabus clunalis*, although similar in size and general habitus to *O. ligyroides*, may be immediately differentiated from that species by its parabolic clypeus and obviously subapical clypeal carina with widely spaced teeth. *Orizabus ligyroides* has a triangular clypeus and apparently apical carina with contiguous teeth. Additionally, specimens of *O. ligyroides* tend to have larger eyes (maximum dorsal width usually between one-third to one-fourth of minimum dorsal interocular width), and the clypeus (posterior to the carina) in lateral view is much thicker than in specimens of *O. clunalis*, and have a stronger marginal carina (fresh specimens). In *O. clunalis* the clypeus is only about half as thick (in lateral view) as that of *O. ligyroides*, the marginal carina often being weak or effaced (compare Fig. 1-4).

The US populations of *O. clunalis* form a subcontinuous cline in gross morphology from west to east where western populations are typical (muted pronotal fossa and tubercle, smooth pygidium; Fig. 1, 37), and eastern populations are of the "*snowi*" form originally described by Horn as a distinct species. The latter form (Fig. 36) tends to have a deeper pronotal depression, more pronounced pronotal and cephalic tubercles, and a moderately punctate pygidium. Some females from the Chisos Mountains in Texas lack the angular expansion of the anterior pronotal marginal bead, and have shorter antennal clubs than specimens from more western (or northern) localities. Males from the same series, however, are easily referred to *O. clunalis*.

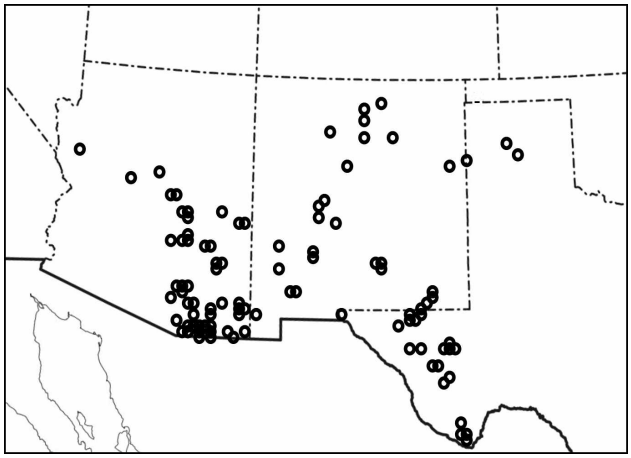
Additionally, a small, reddish brown form of this species (which Casey (1915) described as "*O. fontinalis*") occurs sporadically in New Mexico and occasionally elsewhere. Macroscopically this form looks very different (color, size) from "typical" *O. clunalis*; but it does not differ otherwise in any important characters, and usually forms only a part of any one population, with intergrades to the more typical form for the area.

Saylor listed both *O. marginatus* and *O. snowi* as "New Synonymy" in his 1937 revision; however, previously Bates (1888) had clearly established both synonymies. Several morphologically distinct forms from south of the US border are currently placed under "*clunalis*" in collections, and the species as defined at present appears to possibly represent a species complex. Detailed analysis of material from south of the US border may reveal a need to revise the above synonymy. Several neotropical species (under the current classification) are also very similar externally to *O. clunalis*; but with the removal of *O. ligyroides* from synonymy, the US populations appear to be conspecific.

Cheiroplatys verticalis Fall (1905:272) was listed by Saylor (1946) as a new synonym of *O. clunalis*, a status that was accepted by subsequent authors. However, as correctly noted by Casey (1915), the holotype of *C. verticalis* is actually a small female *Xyloryctes jamaicensis* (Drury). Saylor (1946) also incorrectly listed *Orizabus parvitarsis* Casey (1915:227) as a synonym of *O. clunalis*. Examination of Casey's

holotype female revealed that, except for having a complete posterior pronotal marginal bead, it is referable to *Orizabus rubricollis* Prell.

In the US this species usually inhabits pine, oak, and juniper woodlands, mostly at elevations of 1500 m and higher (up to 3000m or more) where it may be attracted to lights at night. In oak and juniper zones it is sympatric with *O. ligyroides*, which replaces *O. clunalis* at lower elevations. Young (1969) described feeding activity of a swarm of *O. clunalis* on *Pinus engelmannii* Carr at 7200 ft (2200 m) in the Chiricahua Mountains, Arizona. The beetles apparently emerged from the soil at dusk and fed on the pine needle tips for 25 minutes before dispersing. Given that this species is common in pine forests but rapidly becomes rare as one descends through lower elevation life zones, in Arizona it may be primarily a pine feeding species. However, I have also taken large numbers of *O. clunalis* in prairie habitat near Tucumcari, New Mexico, and there are a few records from similarly unforested areas of western Texas. I have seen three locality records that appear to be from the Gulf Coast areas of southeastern Texas. The data labels on two of these specimens appear to be from student collections, so pending reliable verification, these records are assumed to be erroneous.



Map 1. *Orizabus clunalis*.

***Orizabus ligyroides* Horn**
Fig. 3, 4, 27, 29, 38; Map 2

Orizabus ligyroides Horn 1885:125, Ratcliffe and Cave 2010:1. **Type**. Holotype female (MCZC #3705); type locality: "...collected by Mr. Morrison in Arizona".

Diagnosis. Length 19.0 to 27.5 mm, width at humeri 9.0 to 12.5 mm, widest width 11.0 to 16.0 mm. Large for genus, parallel sided to wider behind but not distinctly pyriform. Clypeus subtriangular, with apex narrowly rounded; clypeal carina apparently apical, distinctly bidentate, teeth rounded, contiguous such that carina appears medially cleft (Fig. 3, 38). Maximum dorsal eye width usually between 1/3 and 1/4 of minimum dorsal interocular width. Pronotum with posterior marginal bead distinct (in all US specimens examined). Male with dorsal margin of protibia edentate, bladelike; pronotum anteromedially with perceptible to large depressed area, anterior marginal bead posterodorsally prolonged at midline into conical tubercle; paramera without apical incisure, essentially identical to those of *O. clunalis*, but with lateral subapical "tooth" (a short carina) usually less evident, and apex usually more oblique (Fig. 27, 29).

Female with dorsal margin of protibia tridentate, its apex oblique; pronotum with posterior margin of anterior marginal bead subangularly broadened or forming tubercle as in male, disc without or with weak anteromedial depressed area.

US Distribution. AZ, NM, southwestern KS, western TX. The New Mexico, Texas, and Kansas localities are all new state records.

Specimens Examined. 1135; see appendix for locality data.

Remarks. Bates (1888) apparently synonymized *O. ligyroides* as the female of *O. clunalis*, a status that has been carried on by all subsequent authors until Ratcliffe and Cave (2010) recently resurrected *O. ligyroides* without comment. In fact, the type specimens of both species are females. *Orizabus ligyroides* inhabits desert grassland, prairie, and oak and juniper woodland habitats at elevations between about 1000 and 1800 m. In intermediate elevations (oak and juniper woodland) it may be taken at light along with *O. clunalis* which it resembles in size and genital form. It may immediately be differentiated from

that species, however, by its thicker (in lateral view), subtriangular (in dorsal view) clypeus and apparently apical clypeal carina with contiguous teeth (compare Fig. 1-4, 36-38).

The different habitat preferences of *O. ligyroides* and *O. clunalis* are illustrated by comparing locality records for both species from the Cave Creek drainage in the Chiricahua Mountains, Arizona. The proportion of specimens collected from the vicinity of Portal at the canyon's mouth, versus the proportion of specimens collected near or above the AMNH Southwestern Research Station five miles up the canyon, is essentially reversed for the two species (Table 1). Collecting bias between the species is not a factor as the adults are of similar size and color, and had not been recognized as distinct since Bates' (1888) synonymy. Portal is at the ecotone between mesquite-creosote bush grassland that surrounds the mountains and oak-juniper woodland which begins at the mountain base and is replaced by pine forest at higher elevations. The Southwestern Research Station is located in mixed juniper-oak-pine association. *Orizabus ligyroides* also occurs in the desert grasslands below Portal; however, the grasslands are relatively poorly collected. Portal *O. clunalis* records may result from beetles flying downhill from more montane locations; high elevation habitats are only a short distance "as the crow flies" from lowland habitats because of the mountain's steep grade. Or, these records may represent *O. clunalis* following the cooler riparian habitat of Cave Creek to a lower elevation; Portal is also essentially the end of the dense broadleaf canopy that occurs along the more montane portions of the creek.

Table 1. Habitat preferences of *O. ligyroides* and *O. clunalis* illustrated by comparing locality records from the Cave Creek drainage in the Chiricahua Mountains, Arizona.

elevation:	1400-1600 m	1600-1800 m	>1800 m
species	Portal & vic.	SWRS & vic.	above SWRS
O. clunalis	72	77	52
O. ligyroides	551	53	0

Given the differences in clypeal shape and habitat type from that of *O. clunalis*, *O. ligyroides* adults probably do not feed on coniferous plants. Common plants where most *O. ligyroides* have been found include grasses, mesquite (*Prosopis* sp.), juniper (*Juniperus* sp.) and oaks (*Quercus* sp.).

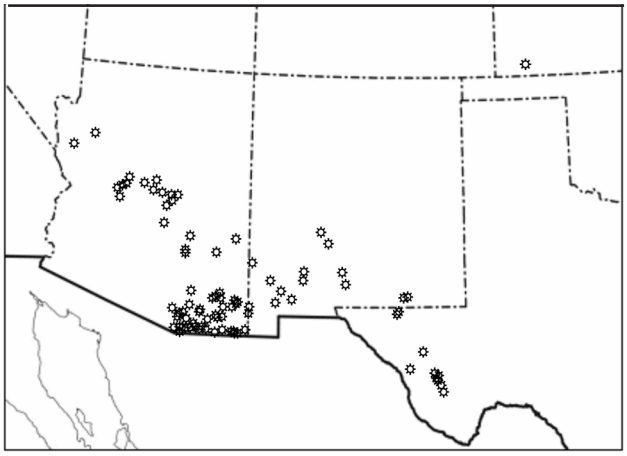
Interestingly, the *O. pyriformis-O. mcclevei* pair is analogous to the *O. ligyroides-O. clunalis* pair, with the grassland species (*O. pyriformis*) having a more angular clypeus with apical carina, and the more montane *O. mcclevei* having a parabolic clypeus with subapical carina. Perhaps the narrowed clypeus and apparently apical carina is an adaptation for feeding on grasses.

Orizabus pinalicus new species

Fig. 8, 10, 12, 13, 22, 30

Types. Holotype male and allotype female labeled: "Pinal Peak, Gila Co., Ariz., 7600', in oak + aspen litter, J. C. Bequaert".

Paratypes (23 males, 35 females) from the following localities: USA: Arizona: "Gila Co., Pinal Mts., vi, F. H. Parker"; same except "vii-20-1947"; same except "vii-31-1936"; same except "viii-7-1938" (6); same except "viii-21-1935" (8); same except "viii-22-1935" (2); same except "ix-1-1932"; same except "ix-7-1936" (5); same except "ix-19-1935"; same except "vii, Duncan, Parker"; same except "vi-4-1933, elev. 7800 ft." (2); same except "vii-7-1979, sawmill"; same except "viii-17-1932, R. A. Flock" (3); same except "vi-12-1932, 7000 ft."; same except "vi-26-1932" (2); same except "vii-9-1936, E. D. Ball"; "base of Pinal Mts., D. K. Duncan" (2); "Gila Co., Pinal Mts., Pinal Peak, 2304m, vi-27-1979, S. McCleve"; "Globe, vii-1930, Duncan Coll."; same except "vi-5-1964, Stephan leg."; same except "viii-1937, Parker" (2); "Payson, ix-3-1938, at light"; "Gila Co., (Sierra Ancha Mts.), Workmen Ck., 21 mi. S. Young, viii-7-1988, W.B.Warner"; "Gila Co., 8 mi. S. Wkmn Cr. [=Workmen Ck.], 5-8-1964, J. Williams"; "Graham Co., Graham Mt.,



Map 2. *Orizabus ligyroides*.

viii-1972, R. Lenczy"; "Graham Co., Pinaleno Mt., Wet Cn., ix-16-1972, D. Richman"; "Graham Co., Pinaleño Mts., Wet Cyn., vi-12-1979, 1840 m, S. McCleve"; "Graham Co., Pinaleno Mts., Hwy. 366, 9.7 mi. W jct. Hwy. 191, Wet Canyon, vi-18-1994, E. Barchet, ex pit fall trap"; "Wet Cyn., Peña Lena [sic] Mts., iv-7-1961, F. Werner"; "Graham Mts., Wet Cyn., vi-21-1975, K. Stephan"; same except "vi-24-1972" (2); "Graham Mts., viii-9-1955, 7000', Butler-Noon"; "Graham Co., Galiuro Mts., Ash Cyn., viii-16-17-1982, 1600 m, S. McCleve, G. E. Ball, D. Maddison".

Additional specimens examined but not designated as paratypes (6): Arizona: "Cochise Co., Portal, viii-4-1973, L. L. Lampert, light" (FSCA); "Cochise Co., Chiricahua Mts., Ash Spring, vii-9-1976, at light, McCleve & Daneker" (SMCC). Texas: "Chisos Mts., vi-1931"; "Chisos Mts., Juniper Canyon, vii-8-1928, F. M. Gaige" (USNM); same except "vii-11-1928" (USNM); "Brewster Co., Big Bend Park, vii-7-1937, R. H. Baker" (USNM).

Holotype and allotype are deposited in the Florida State Collection of Arthropods, Gainesville. Paratypes or specimens are deposited in the collections of ASUT, CASC, CNCI, FSCA, SEMC, TAMU, UAIC, UCDC, BCRC, HAHC, SMCC, RACC, and WBWC.

Diagnosis. Clypeal carina bidentate, teeth separated by more than a dorsal eye width; protibia of male edentate, of female tridentate with apex oblique; anterior margin of pronotum not posteriorly expanded, disc without broad concavity behind anterior margin; male with paramera apically incised.

Description. Holotype male, length 18.5 mm, width at humeri 8.0 mm, widest width (apical fourth of elytra) 10.5 mm. Color dark reddish brown; body elongate, rounded behind, sides rather straight and converging from posterior one-fourth of elytra to anterior one-third of pronotum. Head closely punctatorugulose except at base and in narrow area along posterior base of transverse clypeal carina. Clypeus subsemicircular, outer margin weakly reflexed behind transverse carina, sinuate at base of ocular canthus; transverse carina at apical one-fifth of clypeus, carina obtusely emarginated to form two widely separate lobes, highest laterally; frontoclypeal suture subangulate (angle opening anteriorly) to low medial tubercle, clypeal side of tubercle slightly overhanging front. Eyes small, in dorsal view maximum width about one-sixth as wide as minimum dorsal interocular width. Pronotum about one-sixth wider than long, broadest near posterior angles, lateral margins converging but rather straight until more rapidly converging in anterior one-third; posterior margin vaguely trilobed, anterior angles slightly obtuse; posterior angles broadly rounded but nearly right; marginal bead continuous, inner edge of posterior bead angularly emarginate at middle, inner edge of anterior marginal bead not posteriorly produced; disc without anteromedial fovea; contiguously variolately punctate anteriorly, punctures becoming smaller and sparse posteriorly; midline nearly impunctate in posterior half. Scutellum parabolic, impunctate. Elytron distinctly umbilicately striate-punctate, impunctate between striae except in more or less single rows in anterior half of first interval, posterior half of second interval, between humeral and apical umbones in third interval, and in posterior two thirds of fourth and fifth intervals. Epipluron distinct to about apical one-fifth, of nearly even width throughout. Pygidium convex, transversely subtriangular, basal margin convexly arcuate; apex narrowly truncate; subapical edge of disc forming transverse gibbosity which overhangs excavated apical submargin; disc scabriculously punctulate, sculpture strongest basally (especially in basal angles), surface becoming smoother and shiny medioapically. Venter with thoracic sternites and coxae densely setigerously punctate, setae ferrugineous; metasternite glabrous medially. Abdominal sternites each with transverse row of setigerous punctures, row mediodiscal in basal sternites, apicomarginal in apical sternite, medially effaced in penultimate three sternites; penultimate sternite about twice as long as each more proximal sternite; apical sternite apicomedially emarginate. Protibia with dorsal margin edentate, blade-like, apex acute (Fig. 8). Metatibia with submedial transverse carina distinct, but with ventral terminus not forming angular tooth. Paramere (Fig. 22, 30) apically notched because of ventrally excavated "shelf" in apical one-fourth, shelf in lateral view lunulate.

Allotype female: length 20.0 mm, width at humeri 9.0 mm, widest width 11.5 mm. Similar to male except abdomen more convex; pygidium less convex, with free submargin impressed each side of apex; apical abdominal sternite longer and not apicomedially emarginate. Protibia tridentate with apex oblique (Fig. 10).

Variation. Paratypes: Length male 17.0 to 19.5 mm, female 17.0 to 21.5 mm; width at humeri male 7.5 to 8.0 mm, female 7.0 to 9.5 mm; widest width male 10.5 to 11.0 mm, female 10.0 to 12.0 mm. Color varies widely from (most commonly) medium reddish brown to piceous. Surface sculpture varies moderately in intensity. Body shape varies between more parallel-oblong to moderately pyriform. Many males have the area immediately proximal to the external parameral "shelf" set with one to several small mucronate tubercles.

Non-paratypes: The two large, piceous female specimens collected in the Chiricahua Mts., Arizona, (Portal and Ash Spring) differ from more northern specimens in having smoother and less convex elytral striae and intervals, finer punctuation, and in having the first interval punctate in the anterior two-thirds. The Chisos Mts., TX, males have the anterior pronotal marginal bead posteriorly expanded slightly at the midline in the form of a small deflexed angle. The Chisos Mts. specimens also are larger than average (males = 19.5 to 21.5 mm, female = 22.5 mm long), have the frontoclypeal tubercle spiniform, and the males have larger mucronate tubercles in the area immediately proximal to the parameral "shelf". The darker color and stronger armature are similar to differences seen in males of *O. clunalis* and *O. pyriformis* from that general area and may be parallel adaptations to the local environment.

Etymology. This species is named both for the type locality and its common habitat described by the Spanish locality name, "pinal" or pine forest.

US Distribution. Mountains of southeastern and central AZ, and western TX; expected to occur in the mountains of southern New Mexico, and Sonora and Chihuahua, Mexico, as well.

Remarks. Among the US species of *Orizabus*, *O. pinalicus* is distinguished by the following combination of characters: obviously subapical, broadly bilobed clypeal carina; complete pronotal marginal bead that is not tuberculate nor (usually) angularly expanded at its anterior midpoint; apically acute/oblique protibiae which are edentate in males and tridentate in females, and the unique male genitalia.

Orizabus pinalicus is similar in external facies to the Mexican species *O. rubricollis* Prell, especially the Chisos Mts. specimens here provisionally included in *O. pinalicus*. They differ in being more pyriform and smaller on average, in having a complete posterior pronotal marginal bead (*O. rubricollis* has the posterior marginal bead effaced normally), and in minor sculptural differences. The general male genital form of both species (Fig. 22, 25, 30, 31) is also similar in that the paramera are both apically and more proximally cleft or toothed; however, the apical cleft is much less developed, and the "shelf" which forms the teeth is much shorter and more appressed in *O. pinalicus*. In *O. rubricollis* this structure is nearly perpendicular to the (in dorsal view) thinner paramera, and in lateral view it is arcuate (in *O. pinalicus* it is nearly straight). Additionally, females of *O. rubricollis* have edentate protibiae as in males (Fig. 11); *O. pinalicus* females have tridentate protibiae (Fig. 10). Interestingly, a species in a related genus, *Xyloryctes splendidus* Prell, also has paramera similar to those of *O. rubricollis*; the parameral similarity of *O. pinalicus* and *O. rubricollis* may be coincidental. Additional material from the mountains of northern Mexico is needed to provide evidence of the true relationship of these two taxa.

As with the Chisos Mts. specimens, the two females from the Chiricahua Mountains, Arizona, appear to be slight variants of this species, but could represent a distinct taxon. Additional material which includes males from the area should clarify the status of that population.

This species rarely, if ever, comes to light. It is a mountain species collected primarily above 1600 m in pine forests or along riparian areas in juniper woodland. I collected one female on an overcast day at about noon on a dirt road through ponderosa pine forest. The beetle was upside down and slowly flailing its legs as it attempted to right itself. Numerous *O. clunalis*, but no additional specimens of *O. pinalicus*, were collected at light that night in the same locality.

***Orizabus pyriformis* (LeConte)**
Fig. 6, 16, 17, 32-34; Map 3

Bothynus pyriformis LeConte 1847: 88. **Type**. **Lectotype** female (MCZC #3718) here designated, labeled "[pale green disc] // Type [T] / 3718 [H, red label] // *Aphonus* / *pyriformis* / Lec. [H] // LECTOTYPE [T] / *Bothynus* / *pyriformis* / LeConte [H] / des. W. B. Warner [T], 1994 [H, red label]." The LeConte

collection contains two specimens with data similar to those of the lectotype; these specimens are here considered syntypes. Type locality: "Habitat ad furcationem fluminis Platte : habitat etiam in Oregon." The type locality is here restricted to: Nebraska, forks of the Platte River.

Aphonus pyriformis, LeConte 1856: 21.

Pseudaphonus pyriformis, Casey 1915: 211.

Cheiroplatys pyriformis, Saylor 1946: 18; Ritcher 1966: 138.

Orizabus pyriformis, Endrödi 1969: 89, 1985: 246, Morón 1981: 136, Delgado and Deloya 1990: 305, Ratcliffe 1991: 272, Dechambre 1993: 342, Ratcliffe and Paulsen 2008: 451, Ratcliffe and Cave 2010: 11.

Pseudaphonus debiliceps Casey 1915: 211 (syn. Saylor 1946: 18). **Type**. Holotype female (USNM #48610); type locality: Colorado.

Pseudaphonus ovalis Casey 1915:212 (syn. Saylor 1946: 18). **Type**. Holotype (USNM #48611); type locality: Ft. Wingate, New Mexico.

Pseudaphonus repens Casey 1915:212 (syn. Saylor 1946: 18). **Type**.Holotype female (USNM #48613); type locality: Santa Fe, New Mexico.

Pseudaphonus lucidus Casey 1915:213 (syn. Saylor 1946: 18). **Type**.**Lectotype** female (USNM #48614) here designated; labeled "COLO [T] / 506 [H] // Casey / bequest / 1925 [T]// Type USNM [T] / 48614 [H, red label] // *lucidus* / Csy. [H] // LECTOTYPE / *Pseudaphonus* / *lucidus* / Casey / des. W. B. Warner, 1994 [H, red label]". Four (2 males, 2 females) of the additional specimens in the Casey collection have data consistent with Casey's description (they are also the only others with USNM type labels); these four are here considered to be syntypes.

Pseudaphonus puncticollis Casey 1924:335 (syn. Saylor 1946: 18). **Type**.Holotype female (USNM #48612); type locality: Denver, Colorado.

Diagnosis. Length 12.5 to 19.0 mm; width at humeri 6.0 to 9.0 mm, widest width 8.0 to 12.0 mm. Body shiny, very convex and pyriform (Fig. 16, 17), reddish brown to piceous. Head strongly narrowed to rounded or truncate apex; clypeal carina high, straight to shallowly emarginate in anterior view, in most specimens anteriorly concavely weakly angulate in dorsal view, straight in others; apparently apical to slightly subapical (Fig. 6, 32). Pronotum strongly narrowed to acute or subacute anterior angles; disc without anterior fovea, densely punctate, especially anterolaterally; anterior margin with posterior edge of bead not posteriorly prolonged at midline; posterior margin subtrilobate, with bead mostly to entirely effaced. Elytron with strial punctures coarse, shallow, umbilicate. Pygidium densely punctulate to punctatorugulose, punctures usually becoming sparser apically. Male with dorsal margin of protibiae tridentate as in female, apex transversely rounded (subtruncate). Paramera thin in dorsal view, submedially weakly dentate on external margin (Fig. 33, 34).

US Distribution. NE, SD, WY, CO, NM, TX, KS, AZ. The Arizona, Kansas, South Dakota, Texas, and Wyoming localities are all new state records.

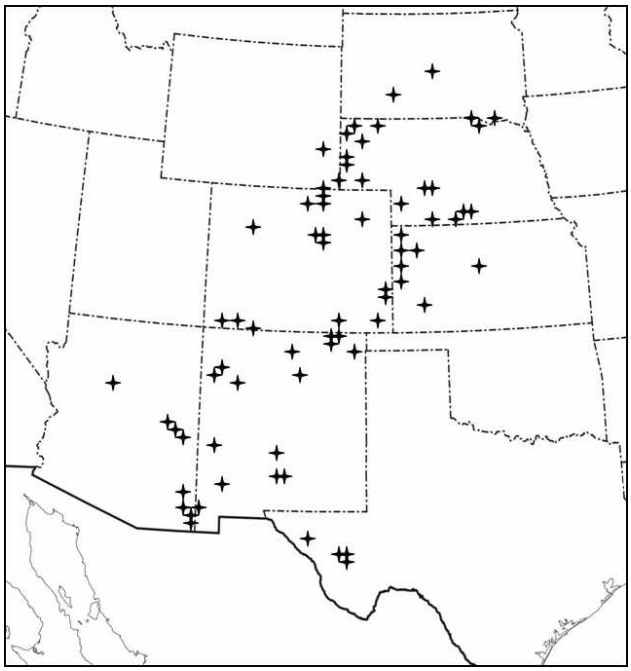
Specimens Examined. 239; see appendix for locality data.

Remarks. *Orizabus pyriformis* is easily told from other US species except *O. mcclevei* by its smaller size, strongly pyriform shape, more densely sculptured pygidium, and protibiae which are apically subtruncate to transversely rounded and tridentate in both sexes. From *O. mcclevei* (and other species) it may be separated by the usually obtusely angulate (in dorsal view) and apparently apical clypeal carina, pronotum with mostly to completely effaced posterior marginal bead, longer paramera with weak submedial tooth, and antennal club which is shorter than the clypeus. Additionally, the frontoclypeal tubercle and prosternal process are usually more conical in *O. pyriformis* (though the frontoclypeal tubercle is occasionally transversely so), whereas in *O. mcclevei* the tubercle is normally broader and transversely subcariniform, and the prosternal process is usually more laterally compressed apically. In very worn specimens of *O. pyriformis*, the clypeal tubercle (and adjacent frontoclypeal suture) may appear as a rounded-- though obviously abraded-- transverse carina. It is possible that Saylor's (1946) Colorado record for *O. isodonoides* refers to such a specimen.

Specimens of *O. pyriformis* from the southern extent of its range (*e.g.*, Fig. 6) tend to have a broader clypeal apex (especially in females) and hence a longer clypeal carina. Male genitalia of specimens from the most southern localities also tend to have apically more subfalcate paramera.

The unusual facies of this species--reminiscent of the genus *Aphonus* LeConte--prompted Casey (1915) to erect a separate genus (*Pseudaphonus*) to receive it. Unpublished DNA evidence developed by D. Hawks and A. B. T. Smith (2005, pers. com.) indicates that *O. pyriformis* may indeed belong with *Aphonus* rather than *Orizabus*. The "*Aphonus* phenotype characters" (transversely rounded protibial apex, pyriform shape, distinct genital form) are also shared by *O. mcclevei*, *O. isodonoides*, and *O. ratcliffei* Delgado. Further work on the *Aphonus-Orizabus-Xyloryctes* complex of genera may result in a different placement of these species; however, that determination is beyond the scope of the present paper.

The larva was described by Ritcher (1944, 1966). *Orizabus pyriformis* is primarily a grassland species and has been taken at light, but remains relatively uncommon in collections.



Map 3. *Orizabus pyriformis.*

Orizabus mcclevei **new species**

Fig. 5, 14, 15, 20, 21, 35

Types. Holotype male and allotype female labeled: "NM: Hidalgo Co., Peloncillo Mts., Clanton Draw, vii-7-1991, 5500', UV lite [sic], S. McCleve".

Paratypes (36 males, 46 females) from the following localities: USA, Arizona: "Cochise Co., Douglas, vii-3-1971, at light, S. McCleve"; "Cochise Co., Rucker Canyon, vii-28-1977, D. Ahart"; "Cochise Co., Chiricahua Mts., N. Fork Rucker Cyn., vii-1-1978, at light, S. McCleve"; "Cochise Co., Guadalupe Canyon, elev. 4300 ft., vii-26-1976, P. Jump". Colorado: "Baca Co., Sand Canyon, vii-13-1991, W. Cranshaw, M. Kippenhan, B. Kondratieff, D. & M. Leatherman, & P. Opler" (3); "Costilla Co., H Rd., 3 mi. E of Mesita, viii-21-1993, Kondratieff, Al-Ayedh & Stone"; "Las Animas Co., Purgatoire River, Lockwood Arroyo, vii-2-1989, B. Kondratieff & J. Welch"; "Powers Co., Two Buttes Dam, vii-21-1990, U.V.L., P. A. Opler". New Mexico: same data as holotype (3); same except "vii-6-1988, R. Gordon" (2); "Cherry Cr. campground N of Silver City, 7100 ft. elev., vii-25-1972, at light, S. McCleve"; same except: "vii-26-1972"; "Grant Co., Silver City, vii-1973, R. Lenczy" (5); "Roberts Lake, 30 mi. NE Silver City, 6100', viii-1-3-1973, E. Lindquist"; "Corona, vi-20-1952, R.H. & L. D. Beamer, W. LaBerge, A. Wolf, C. Liaug, C. Winer" (3); "Otero Co., James Canyon campground, Lincoln National Forest, BL, viii-19-1982, R. Turnbow"; "Valencia Co., 20 mi. W Los Lunas, Carrizon Arroyo, viii-1-20-1977, S. & J. Peck" (2); "Las Vegas, Near Hot Springs, 7000 ft., vii-1882, F. H. Snow"; "Pecos, viii-18"; "Albuq., Wickham"; "Placitas, viii-9-1972, P. M. Jump"; "Sierra Co., N fork of Palomas Creek, 33 mi. N of Williamsburg, viii-10-1990, R. Durfee"; "Socorro Co., 22 mi. E San Antonio, sand hills, vii-25-1996, Wappes & Huether (5)"; same except: "vii-25-26-1996" (10); "Santa Rosa, viii-11-1973, R. Battelle". Texas: "Tex."; "Jeff Davis Co., Davis Mountain Resort, 5800 ft, v-25-1994, D. G. Marqua"; same except: "v-28-1994"; same except: "vi-14-1994" (2); same except: "vi-16-1991"; same except: "vi-22-1992"; same except: "vi-26-1992; same except: "vii-4-1993"; same except: "vii-5-1992"; same except: "vii-14-1994" (5); same except: "vii-22-1991"; same except: "vii-23-1986"; same except: "vii-23-1993"; same except: "viii-3-1991"(2); same except: "viii-3-1990"; same except: "viii-6-1991"; same except: "viii-18-1987"; same except: "viii-22-1993"; same except: "D. Marqua house, viii-8-1992, BL, W. Godwin, E. Riley, D. Marqua"; same except: "Davis Mtns. Resort area, vii-15-1994, C.

Wolfe"; "Jeff Davis Co., Davis Mtns., Madera Cyn., vii-9-1993, D. G. Marqua"; "Jeff Davis Co., Madera Canyon rest stop, vi-11-1991, C. S. Wolfe" (3); "Jeff Davis Co., vic. Davis Mts., vii-19-22-1995, J. Huether" (2). Mexico, Durango: "Hwy. 45, 5 mi. N Rodeo, 6 mi. W, vii-16-1984, 4980 ft., S. McCleve & P. Jump, UVL".

Holotype and allotype are deposited in FSCA. Paratypes are deposited in the collections of ASUT, BCRC, CNCI, CSUC, DACC, DGMC, CSWC, EGRC, EMEC, FSCA, HAHC, JHUC, MCZC, RACC, SEMC, SMCC, TAMU, UAIC, UCRC, UNSM, USNM, and WBWC.

Diagnosis. Head with clypeal carina transverse, straight; antennal club longer than distance between frontoclypeal tubercle and clypeal carina; anterior pronotal margin at middle with bead posteriorly prolonged into obtuse angle; protibia tridentate, with apex transversely rounded to subtruncate; paramera laterally dentate at about apical third.

Description. Holotype male, length 15.5 mm, width at humeri 7.5 mm, widest width (apical one-third of elytra) 9.5 mm. Color reddish brown; body convex, pyriform (Fig. 14). Head with frons and clypeus punctatorugulose; frontoclypeal tubercle transverse, about two-thirds as wide as frontoclypeal suture, in anterior view obtusely angulate to medial summit. Clypeus parabolic, expanding behind antennal insertions, apex reflexed; clypeal carina transverse, edentate, obviously subapical (slightly proximal to apical fourth of clypeus). Antennal club five-fourths length of clypeus, elongate-luniform in apical view. Pronotum half as long as elytra, disc confluently variolately punctate anteriorly, punctures becoming smaller and sparser posteriorly, mostly impunctate along midline; anterior angles subobtuse, marginal bead complete except posterior margin anterior to scutellum where bead is continued as line of discrete punctures; posterior edge of anterior marginal bead posteriorly broadened to obtuse angle at midline. Scutellum parabolic, impunctate, midline weakly impressed. Elytra broad (length 11:9 width), distinctly umbilicately striate-punctate, impunctate between striae except in more or less single rows in basal two-thirds of first interval, posterior half of second interval, between humeral and apical umbones in third interval, and in posterior half of fourth and fifth intervals. Epipleuron distinct to about level of pygidium, of nearly even width throughout. Pygidium convex, transversely subtriangular, basal margin convexly arcuate; apex narrowly truncate; subapical edge of disc forming transverse gibbosity overhanging excavated apical submargin; free (=apical) margin with bead complete; disc scabriculously punctulate in basal half, shallowly sparsely punctulate in apical half. Venter with prosternite glabrous except anteromedial apex and on conical but laterally compressed prosternal process, other thoracic sternites, episternites, mesepimera and posterior coxae densely villously punctulate, setae ferrugineous; metasternite glabrous medially. Abdominal sternites each with transverse row of setigerous punctures, row mediodiscal in basal sternites, apicomarginal in apical sternite; penultimate sternite about twice as long as each more proximal sternite; apical sternite apicomedially emarginate. Legs: protibia with apex narrowly rounded-truncate (Fig. 5), ventral spur arising at about middle, nearly half as long as tibia; dorsal margin tridentate, apical 2 teeth closer together than middle and basal teeth; basal tooth slightly proximal to middle of tibia. Metatibia with submedial transverse carina distinct, but with ventral terminus not forming angular tooth. Paramera (Fig. 20, 21) in lateral view narrowed to about half width of base and deflexed in apical half, with weak dorsal tooth at about apical third; in dorsal view strongly narrowed and very thin in apical half.

Allotype female: length 17.0 mm, width at humeri 8.0 mm, widest width 10.5 mm. Similar to male except abdomen more convex; pygidium less convex, with free submargin impressed each side of apex; apical abdominal sternite longer and not apicomedially emarginate.

Variation. Length (males and females) 15.5 to 18.0 mm, width at humeri 7.0 to 9.5 mm, widest width 9.0 to 11.5 mm. Other than in size and slight differences in surface sculpture, the specimens examined show little variation. The male from Durango is less heavily punctate and has the lateral pronotal margins slightly more arcuate than in US specimens, but otherwise (including genitalia) is similar.

Etymology. I am pleased to name this new species in honor of Scott McCleve of Douglas, Arizona, who first provided me with specimens of this new species.

Remarks. This species is similar in size, shape, and general genital form to *O. pyriformis*, however it is easily differentiated from that species by its longer antennal clubs, obviously subapical and straight clypeal carina, broadly transverse frontoclypeal tubercle, shorter, more deflexed paramera, and pronotum with (usually) subobtuse anterior angles, angularly broadened (at midline) anterior marginal bead, and a more or less complete posterior marginal bead. *Aphonus texanus* Gill and Howden is also similar in size and dorsal facies, but has a more finely and densely sculptured ("shagreened") pygidium, different male genitalia, obsolescent frontoclypeal tubercle, and tridentate (when not worn) clypeal carina. *Orizabus mcclevei* also is somewhat similar to *O. isodonoides*; however, *O. isodonoides* has broader antennal clubs (in apical view), a transverse carina instead of a clypeal (albeit transverse) tubercle, pronotum lacking the medially broadened anterior marginal bead, in males a medial pronotal tubercle separate from and immediately posterior to the anterior marginal bead with a more or less distinct and broad concavity posterior to the tubercle (Fig. 18), and less strongly deflexed paramera which in dorsal view are more strongly "bowed" and have the external tooth more developed (Fig. 23, 24).

Nothing is known of the biology of *O. mcclevei* other than that it is attracted to lights at night, and that it is primarily (but not entirely) a montane species.

***Orizabus isodonoides* Fairmaire**
Fig. 7, 18, 19, 23, 24

Orizabus isodonoides Fairmaire 1878: 263; Horn 1885: 125, Endrödi 1969: 86, 1985: 244, Morón 1981: 135, Delgado and Deloya 1990: 305, Morón et al. 2003: 7, Delgado 2008:56, Ratcliffe and Cave 2010: 1. **Type**. **Lectotype** male (MNHN) here designated; labeled "Toluca [T] // Type [T] // *Orizabus isodonoides* Fair. [H] // Mexico / Salle coll. [T] // *Orizabus* / *isodonoides* / apud Sallé Fairm.[H] // H.W.Bates / Biol. Cent. Amer.[T] // museum Paris / ex coll. / R. Oberthur[T, blue label] // syntype[T, red label] // LECTOTYPE[T] / *Orizabus* / *isodonoides* / Fairmaire / des. W. B. Warner[H, red label]". Fairmaire apparently described this species from a series of specimens based on the measurements he gave ("—Long. 14 à 16 mill."); however, the lectotype is the only syntype I examined.
Cheiroplatys isodonoides, Bates 1888: 322, Fall 1905: 272, Saylor 1946: 18.
Orizabus (*Aztecalius*) *isodonoides*, Casey 1915: 228.

Remarks. Saylor's (1946) record of *Orizabus isodonoides* Fairmaire from Colorado is suspect, and so is not included in the key above. I have not been able to locate this specimen in the USNM nor in the Saylor material at CASC, and do not believe the species occurs north of Mexico. Because Saylor based the record on a single female, and specifically mentioned "the two large and entire clypeal carinae are distinctive," it is probable that he misidentified a specimen of *O. mcclevei* (e.g. compare Fig. 15 and 19), or a worn specimen of *O. pyriformis*. If *O. isodonoides* does indeed occur in the US, it can be told from other species by its distinct, transverse frontoclypeal *carina* (instead of tubercle) even in fresh specimens (Fig. 7), uni- or bisinuate dorsal margins of the male protibiae (tibiae with two or three weak lobes), different pronotal shape (Fig. 18, 19), broader, subovate (in apical view) antennal lamellae, and in males (all but the very smallest individuals), a noticeable anteromedial pronotal tubercle that is *separate* from the anterior marginal bead (Fig. 7, 18), as well as the paramera (Fig. 23, 24). The anterior marginal bead is *not* angularly wider at the middle, and in males (and some females) a broad depression is usually evident behind the pronotal tubercle.

Acknowledgments

I thank the following institutions and individuals for graciously loaning specimens from their personal collections or providing access to material in their care: R. D. Gordon and N. Vandenberg (USNM), L. Kimsey (UCDC), P. Perkins (MCZC), A. Smetana (CNCI), J. Liebherr (CUIC), the late M. A. Cazier (ASUT), C. A. Olson (UAIC), E. G. Riley (TAMU), M. C. Thomas and P. E. Skelley (FSCA), the late J. Ashe (SEMC), C. B. Barr (EMEC), S. Frommer (UCRC), R. R. Snelling (LACM), C. A. Triplehorn (OSUC), M. A. Ivie (MTEC), S. M. Clark (BYUC), D. Kavanaugh and N. Penny (CASC), B. C. Kondrotieff (CSUC), D. Ahart, D. Carlson, R. Cunningham, H. F. Howden, J. Huether, D. G. Marqua, S. McCleve, B. C. Ratcliffe, J. W. Saulnier, P. H. Sullivan, J. S. Hunter, J. E. Wappes, and the late C. S. Wolfe. I am

indebted to R.-P. Dechambre (MNHN) for a loan of Fairmaire types, and to M. C. Thomas and P. E. Skelley for allowing me access to the FSCA imaging system via which the figures were obtained. Brett C. Ratcliffe, M.J. Paulsen, and P. K. Lago kindly reviewed drafts of the manuscript and offered valuable suggestions for its improvement.

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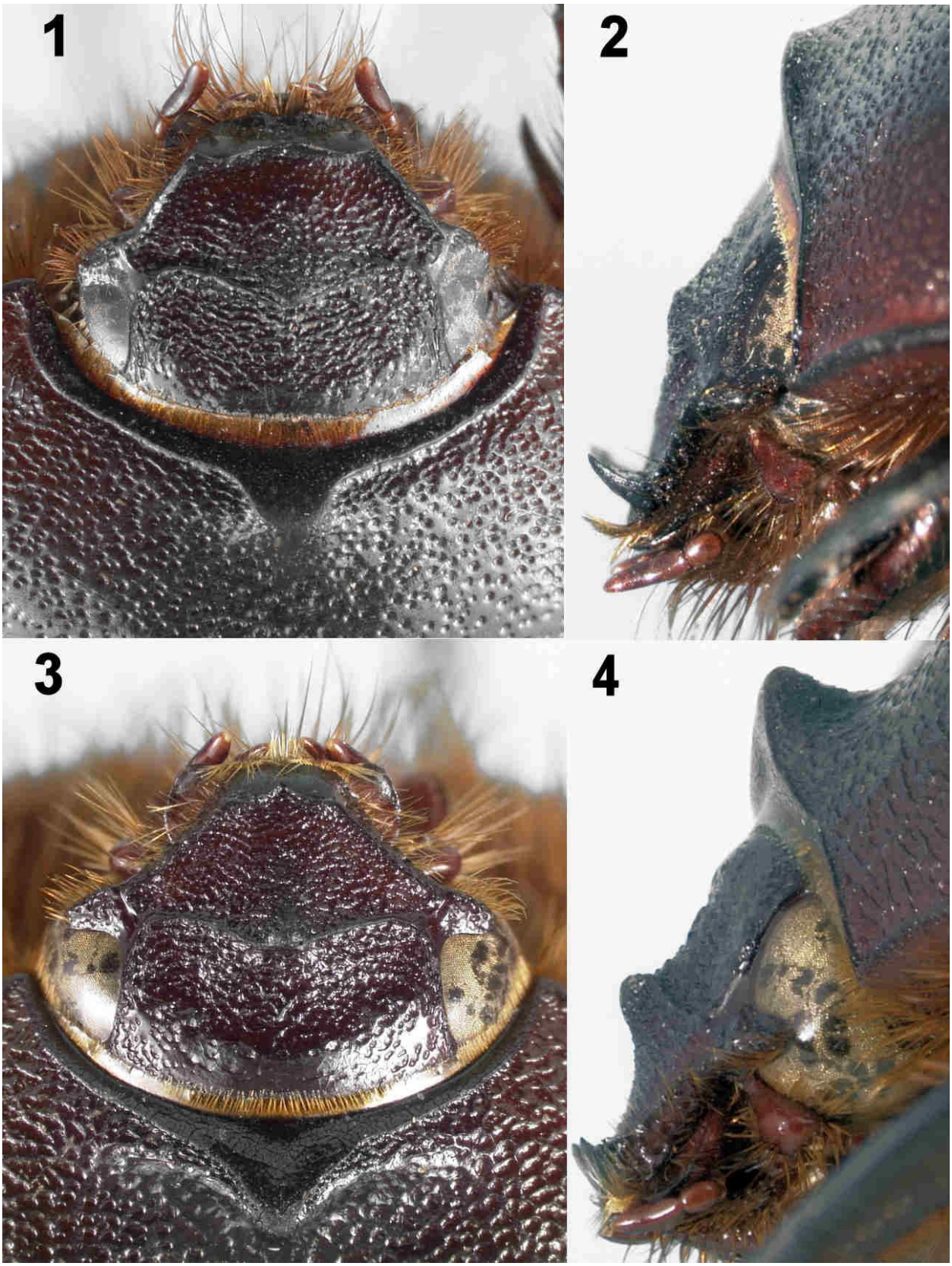
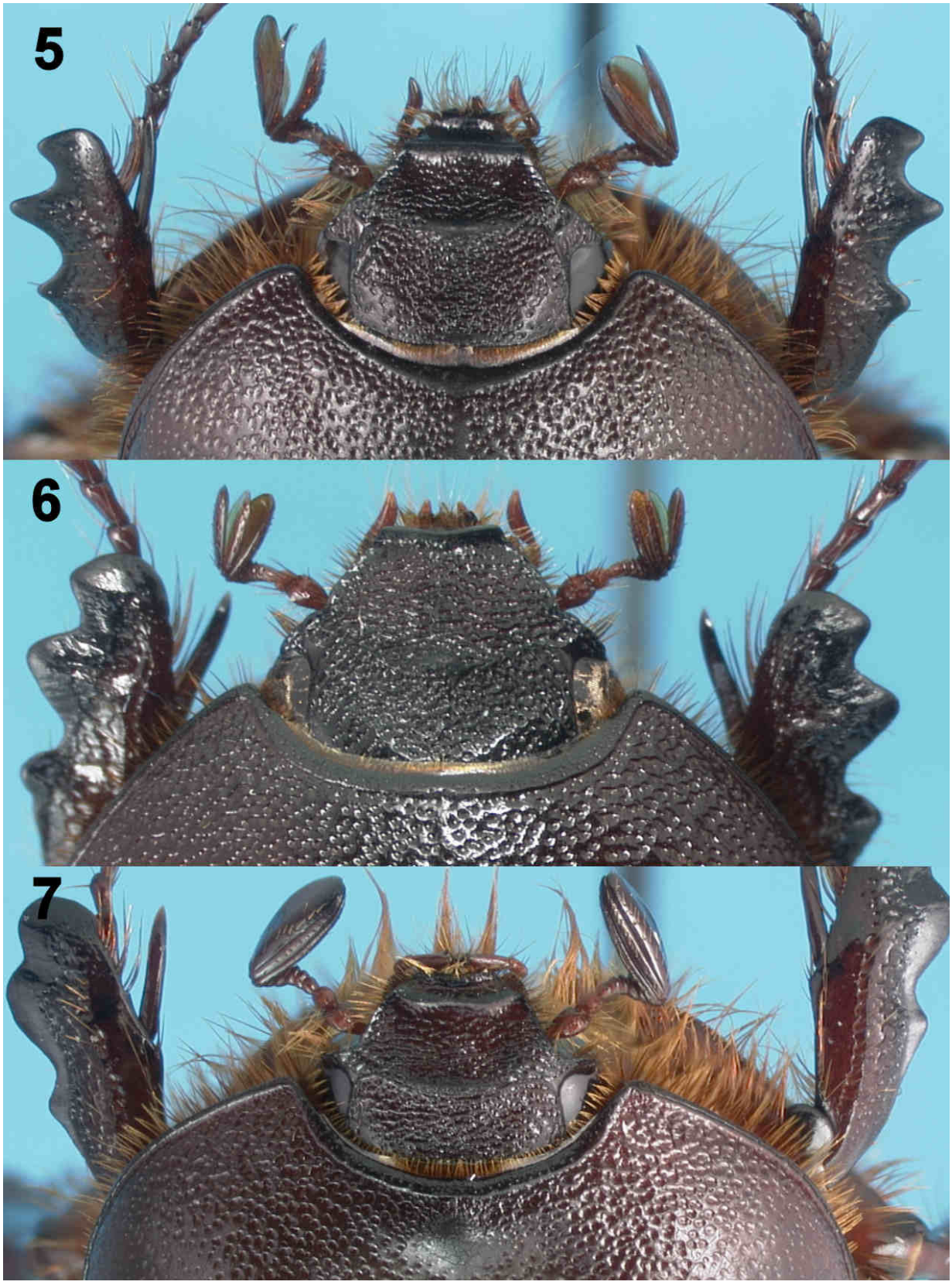
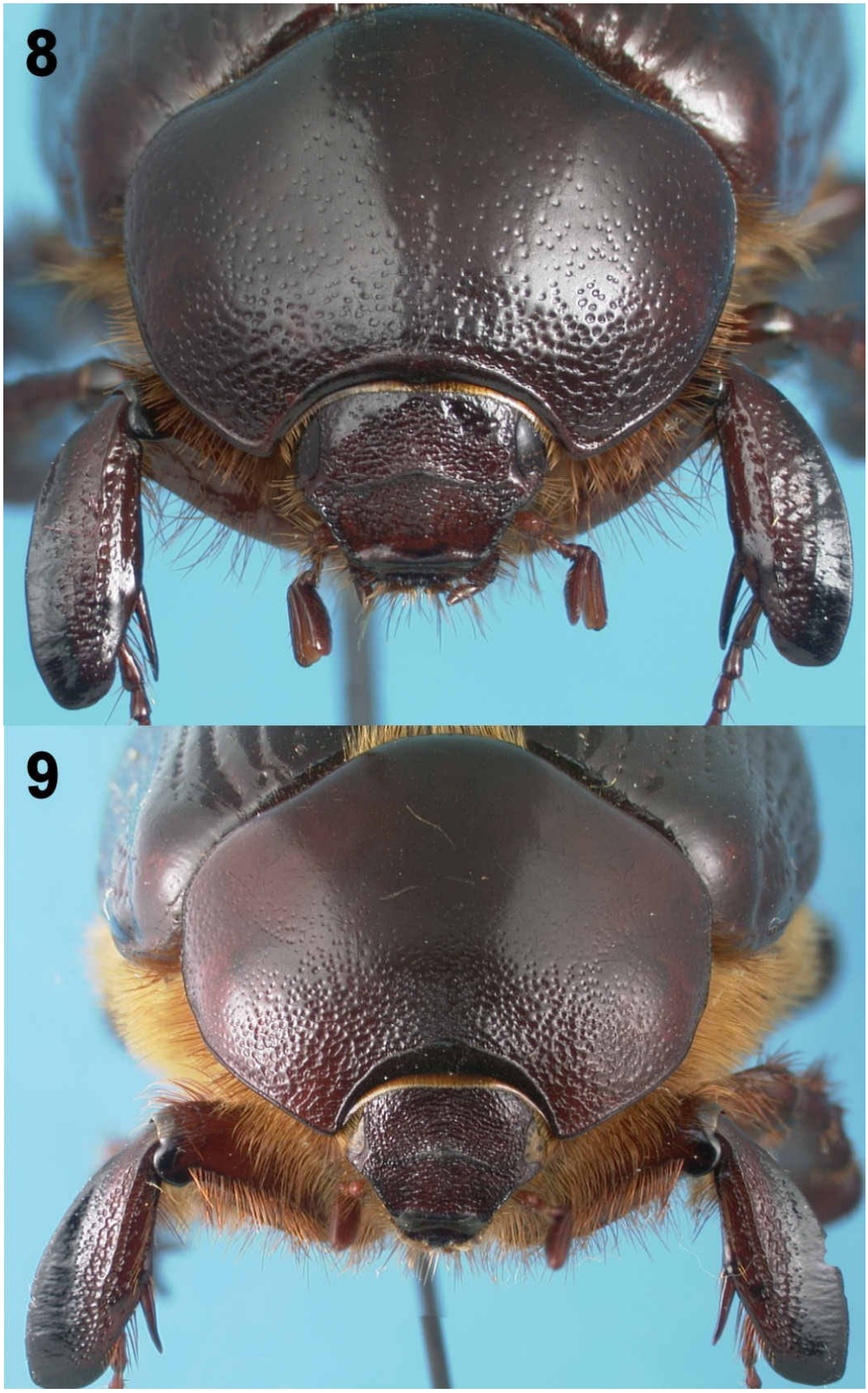


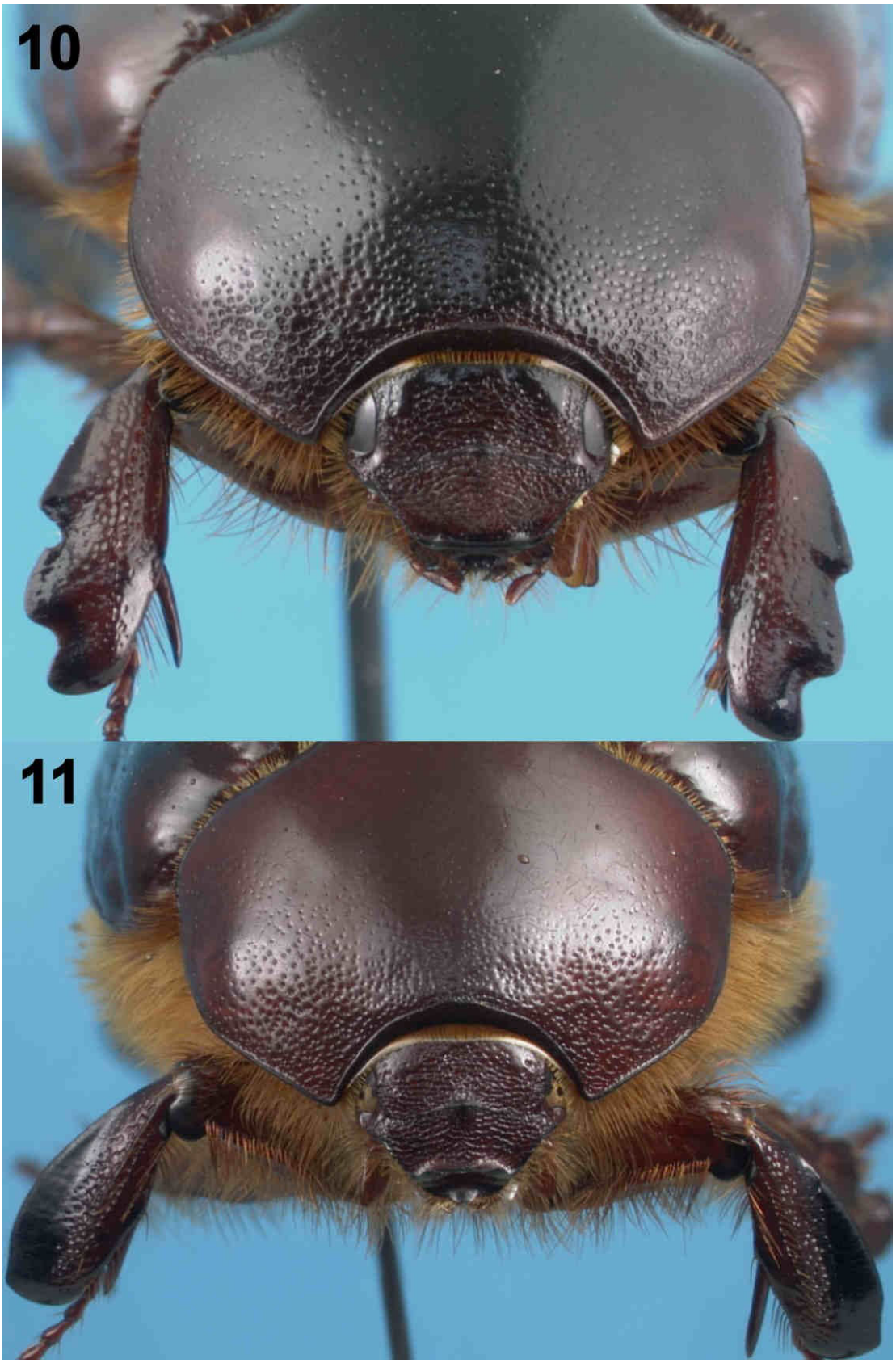
Figures 1-4. Dorsal and right lateral views of head and anterior third of pronotum: **1-2)** *O. clunalis*. **3-4)** *O. ligyroides*.



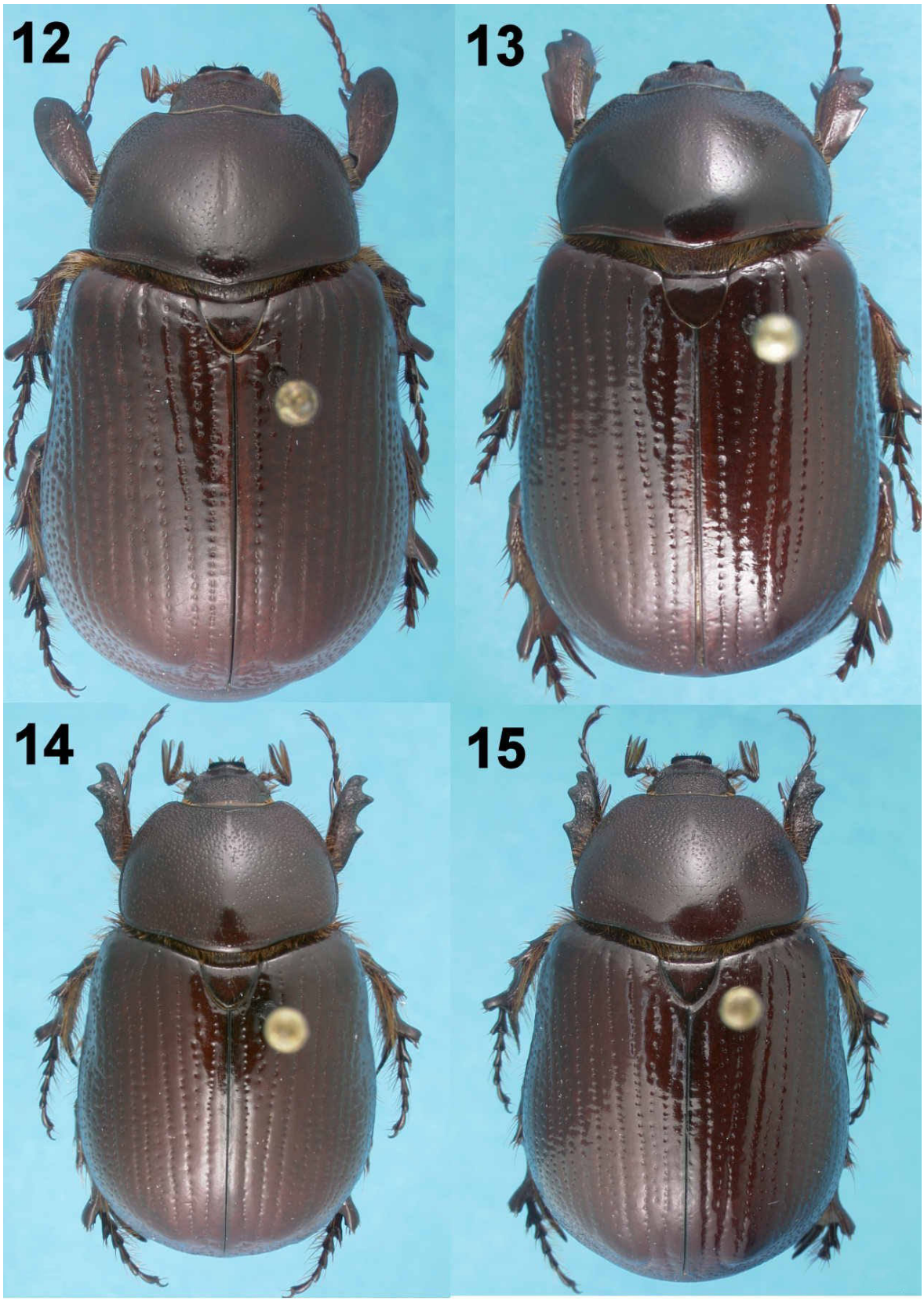
Figures 5-7. Dorsal views of head and anterior third of pronotum (males): **5)** *O. mcclevei* holotype. **6)** *O. pyriformis* (Texas). **7)** *O. isodonoides*.



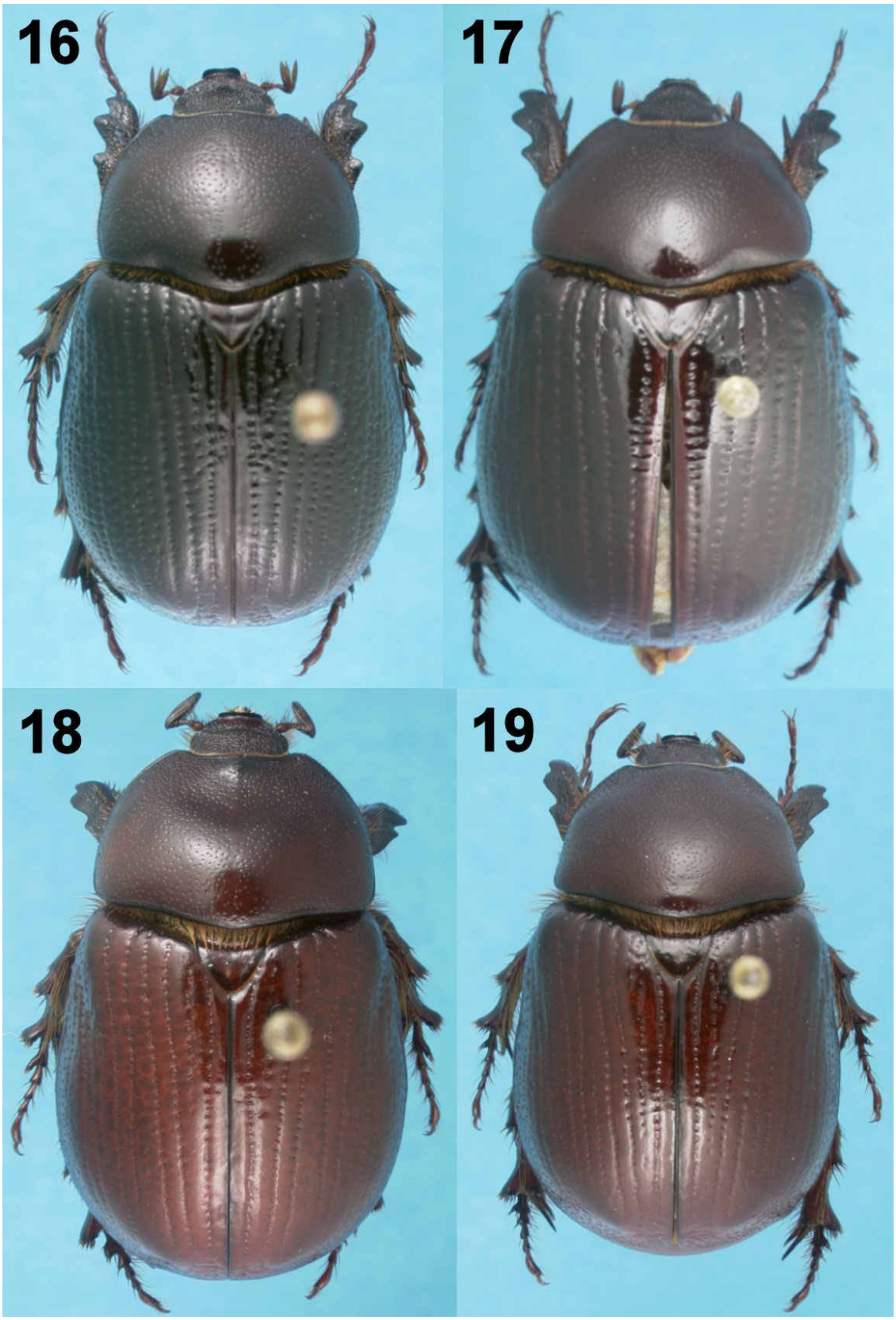
Figures 8-9. Dorsoanterior views of male head and pronotum: **8)** *O. pinalicus* holotype. **9)** *O. rubricollis*.



Figures 10-11. Dorsoanterior views of female head and pronotum: **10)** *O. pinalicus* allotype. **11)** *O. rubricollis*.

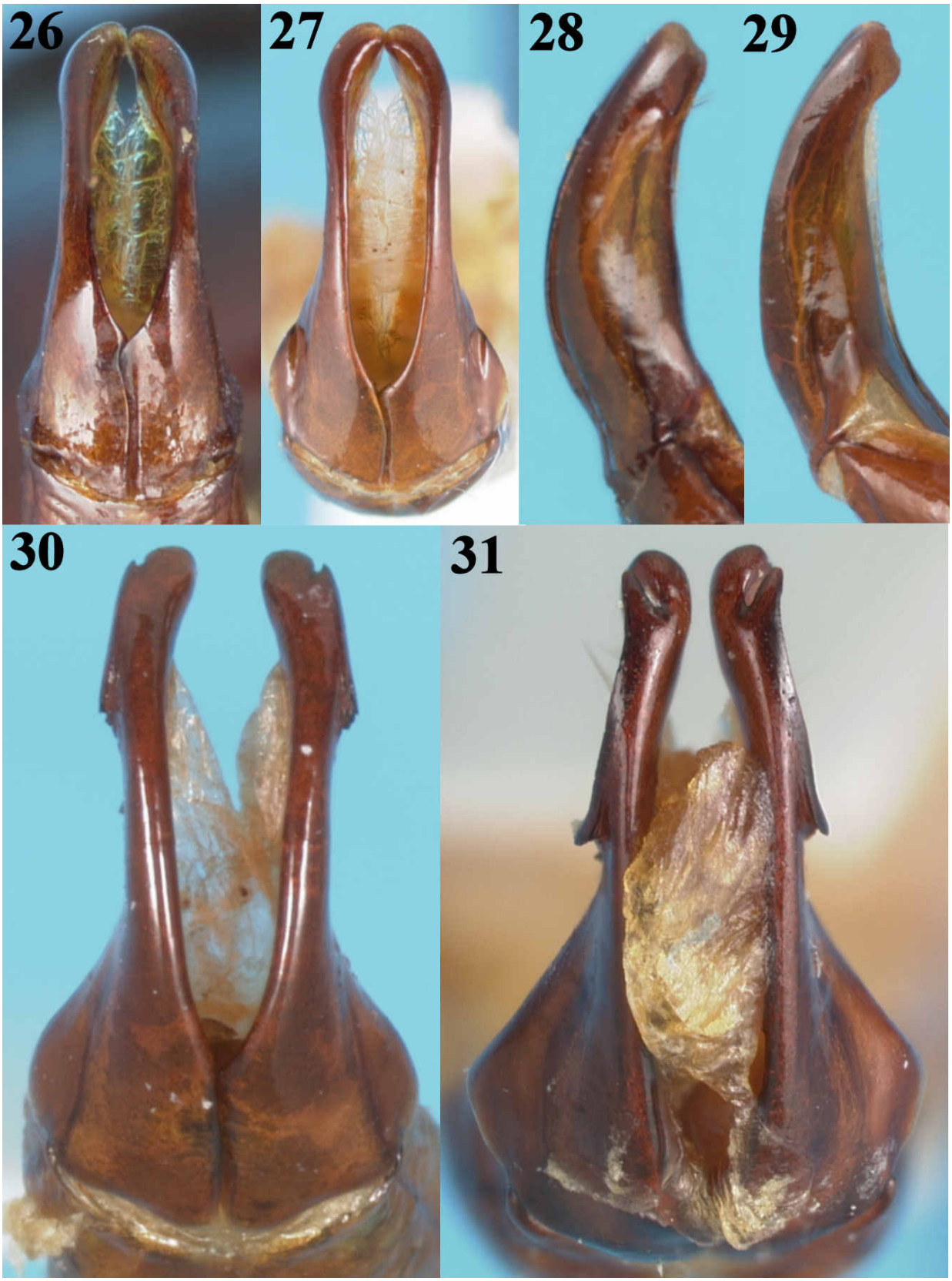


Figures 12-15. Dorsal habitus: **12)** *O. pinalicus* holotype. **13)** *O. pinalicus* allotype. **14)** *O. mcclevei* holotype. **15)** *O. mcclevei* allotype.

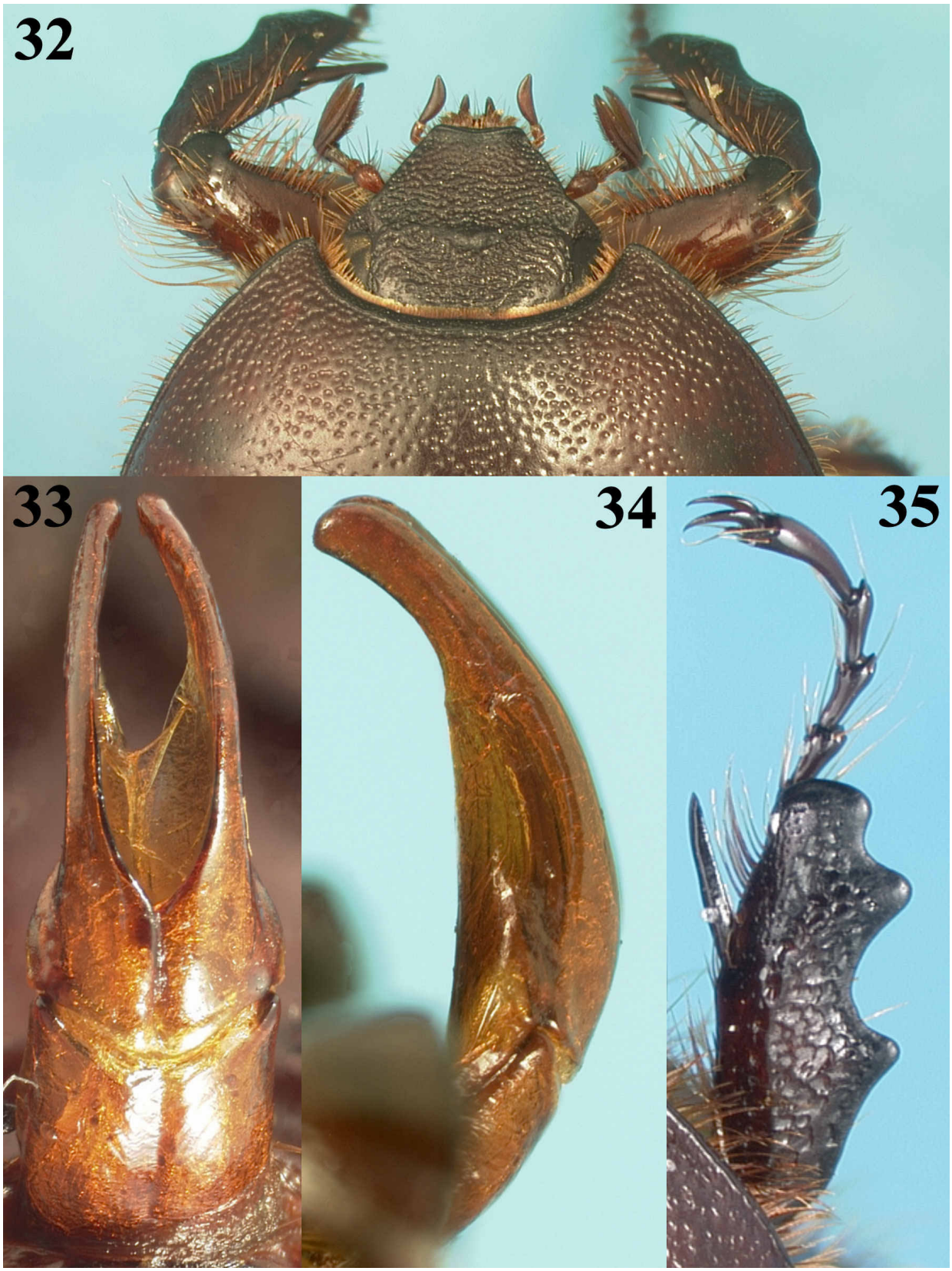


Figures 16-19. Dorsal habitus: **16)** *O. pyriformis* male. **17)** *O. pyriformis* female. **18)** *O. isodonoides* male. **19)** *O. isodonoides* female.

Figures 20-25. Dorsal and lateral views of paramera: **20-21)** *O. mcclevei* holotype. **22)** *O. pinalicus* holotype. **23-24)** *O. isodonoides*. **25)** *O. rubricollis*.

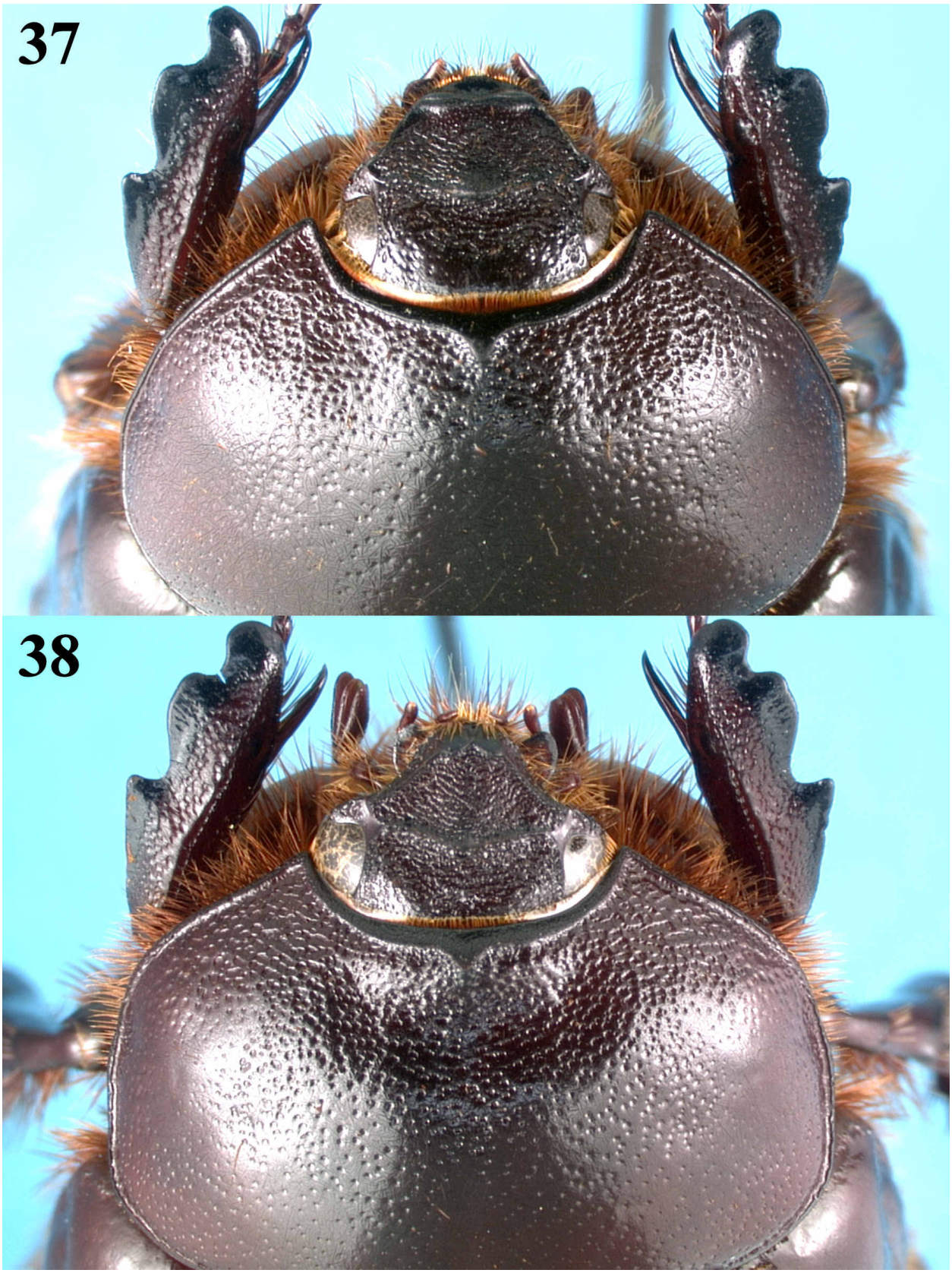


Figures 26-31. Dorsal and lateral views of paramera: **26, 28)** *O. clunalis*. **27, 29)** *O. ligyroides*. **30)** *O. pinalicus* holotype. **31)** *O. rubricollis*.



Figures 32-35. *Orizabus* spp. **32-34)** *O. pyriformis*: **32)** Female (Colorado) dorsal view of head and anterior pronotum. **33-34)** Dorsal and lateral views of paramera. **35)** *O. mcclevei* allotype, dorsal view of right protibia.

Figure 36. *Orizabus clunalis*: Anterolateral view of male (Texas) head and pronotum.



Figures 37-38. Dorsal view of female head and anterior pronotum: **37)** *O. clunalis* (Arizona), **38)** *O. ligyroides*.

APPENDIX

In the distribution data that follow, multiple records for the same locality with the same general information are grouped, with names and dates from different labels separated by semicolons. If more than a single specimen for a given date or collector has been seen, the number of specimens is noted parenthetically following the given datum. Where there are more than three collectors in grouped data, the collectors are listed as "various" if sufficient room for the names is lacking. In long series from one locality where one or two collectors predominate, those collectors may be listed before "various."

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus pyriformis* (LeConte)**							
2	no data						
1	AZ		Chiricahua M.	vii-14-1936			J.N.Knull
1	AZ		Showlow	viii-29-1958			M.W.Nielson
2	AZ		White Mts.	vii; x-193			D.K.Duncan
1	AZ	Cochise Co.	Apache	ix-8-1970			P.H.Sullivan
3	AZ	Cochise Co.	Price Cn., Chiricahua Mt.	vii-1981			R.Lenczy
1	AZ	Cochise Co.	San Simon	vi-29-1956			M.A.Cazier
2	AZ	Coconino Co.	Rt. 40, Williams Ranger Station	iv-27-1996		7200'	J. Saulnier
1	AZ	Navajo Co.	1 mi. E Lakeside	viii-12-1978	at light		S.McCleve
1	AZ	Yavapai Co.	Prescott	viii-22-1978			D.Ahart
9	CO						
1	CO		Arboles	v-26-1935		6000'	
1	CO		Denver				
1	CO		Denver	vi-13-1938			R.W.L.P.,C.W.D.
1	CO		Happy Canyon	v-5-1929			
1	CO		Hartman	vi-14-1937	at light		
4	CO		So. Park Rgn.	viii-25			E.J.Oslar
1	CO	Baca Co.		vi-1939			R.Landburg
1	CO	Conj. Co.	Valley Upper San Juan	viii-13-15-1885			
1	CO	Custer Co.					T.D.A.Cockerell
2	CO	Garfield Co.	Glenwood Spr.				Wickham
2	CO	Huerfano Co.	Lathrops St. Pk., 3 mi. W Walsenburg	vii-28-30-1977	grass-sage-juniper	2100m	S.Peck
2	CO	Jefferson Co.	Golden	iv-1938; ix-6-1937			RotgerC.R.
3	CO	La Plata Co.	vicinity of Durango	vii-23-viii-8-1885		55-7000 ft.	
1	CO	Larimer Co.	CR 44H along Buckhorn Ck.,3.1 mi. W of CR 27; viii-19-1993				D.Leatherman
2	CO	Larimer Co.	Ft. Collins	vi-17-1901; vi-24-1922			
2	CO	Larimer Co.	Horsetooth Mtn. Trail	v-12-1993			S.Fitzgerald
1	CO	Larimer Co.	Lory St. Park	iv-10-1977		6000'	D.L.Wagner
1	CO	Los Animas Co.	Spool Ranch, Gotera Cyn.	v-24-1994			P.A.Opler
1	CO	Los Animas Co.	15 mi. NE of Trinidad	iv-5-1991			D.Leatherman
1	CO	Montezuma Co.	Mesa Verde National Park	vi-1927			C.Cottam
1	CO	Washington Co.	Akron	vii-24-1931	at light		
1	CO	Weld Co.	Greeley	1988	blt		E.Bernklay
6	CO	Weld Co.	Pawnee Natl. Grassland	vi-15 (2); vii-6; vii-11; vii-12; vii-29	pitfall, blt (5)		various

No.	State	County	Locality	Date	Misc. Data	Collectors
***Orizabus pyriformis* (LeConte), continued**						
2	CO	Weld Co.	Pawnee Natl. Grasslands, CPER	vi-12-1988	pitfall trap	T.A.Ebert
1	CO	Weld Co.	Pawnee Grassland Pasture, Nunn	1976		R.Kumar,J.Lloyd
2	CO	Weld Co.	Pawnee Grassland Pasture Range, Nunn	iv-30-1971	under dead *Circium* plants	L.Rogers
1	CO	Weld Co.	Central PlainsExp. Range, 8 mi. N Nunn	viii-30-1976		J.A.Scott
6	KS					
1	KS	Cheyenne Co.			3300 ft.	F.X.Williams
2	KS	Cheyenne Co.	Wheeler	vi; vii		M.Slagle
1	KS	Cheyenne Co.	St. Francis	vi-13-1924		A.F.Slatterthwait
1	KS	Finney Co.	Garden City	viii-10-1970		G.F.Hevel
1	KS	Thomas Co.			3150 ft.	F.X.Williams
4	KS	Greeley Co.			3550 ft.	F.X.Williams
1	KS	Russell Co.		viii-1921		
1	KS	Sherman Co.			3690 ft.	F.X.Williams
1	KS	Wallace Co.		viii-11-1926; viii-16-1926		W.Benedict (2)
3	KS	Wallace Co.			3000 ft.	F.H.Snow
1	KS	Wallace Co.			3440 ft.	F.X.Williams
1	NE		Eustis	vi-15-1943	gr.	H.Howden
2	NE		Harrisburg	viii-4; viii-5		R.H.Wolcott (2)
1	NE	Boyd Co.	Spencer	vii-2-1931		G.E.Hudson
8	NE	Box Butte Co.		vi-12-1971 (3); vii-2-1971 (3); vii-2-1975 (2)		
3	NE	Box Butte Co.	Alliance	vi-28-1971	at light	
3	NE	Chase Co.	Imperial	vi-11-1992		C.&K.Messenger
2	NE	Cheyenne Co.		vi-17-1971; vi-19-1975		
1	NE	Custer Co.	Ansley	vi-30-1949		P.&C.Vaurie
4	NE	Custer Co.	Broken Bow	vi-11-1954		W.Burkholder
1	NE	Dawes Co.	Crawford	viii-9		R.H.Wolcott
2	NE	Furnas Co.	Oxford	vi-4-1918		
5	NE	Holt Co.	Spencer Dam	vi-15-21-1974		
2	NE	Kearney Co.	Minden	v-18-1918; viii-4-1952		R.R.Dreisbach; R.W.Dawson
1	NE	Phelps Co.	Holdridge (sic)	vi-26-1947		
3	NE	Red Willow Co.	McCook	v-31-1971 (2); vi-11-1971 at lights (3)		B.C.Ratcliffe (3)
3	NE	Scotts Bluff Co.	Mitchell	vii-16-1915; vii-20-1916; vii-24-1916		L.M.Gates; C.E.Mickel (2)
1	NE	Sheridan Co.	Gordon	vii-20-1955	at light	D.W.S.Sutherland
1	NE	Sioux Co.				

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus pyriformis* (LeConte), continued**							
1	NE	Sioux Co.	Agate	vi-9-1924			H.J.Ball
4	NE	Sioux Co.	Monroe Canyon	vii-6-1971; vii-10-1971 (3) at light (4)			B.C.Ratcliffe (4)
1	NE	Sioux Co.	Pine Ridge	v-31-1901			R.H.Wolcott
8	NM						
3	NM		Bent	vi-1-15-1927 (2); vi-15-30-1927			
1	NM		Ft. Wingate				J.D.Sharman
7	NM		Koehler	(5); viii-11-1913	V.L.Wildermuth (5); W.R.		Walton; D.J.Caffrey
5	NM		prairie near Koehler	(2); viii (3)			H.F.Wickham
2	NM		Koehler Junct.	viii-12-13-1913; ix-26-x-10-1913			E.R.Kalmbach (2)
2	NM		Lake Burford	vi-5-1918; vi-17-1918			A.Wetmore (2)
21	NM		Maxwell	iv-22-1917; v-7-1917 (2); v-26-1917; vi-2-1917; vii-4-1916 (3); vii-14-1915 (2); vii-26-1950 (7); vii-26-1950 (3); vii-26-1950			various
1	NM		Pinedale, Navaho [sic] Res.	vii-21-1948			L.C.Wyman
1	NM	Catron Co.	10 mi. N. Apache Cr.	vii-24-1972			W.E..&C.A.Triplehorn
3	NM	Colfax Co.	Raton	viii-25-1970	at lights		B.C.Ratcliffe
1	NM	Dona Ana Co.	W. side Isaacks Lake, Jornada Range	viii-15-1989	UVBL	4200'	G.Forbes
3	NM	Grant Co.		viii-1932			R.T.Kellogg
4	NM	Grant Co.	Silver City	vii-1973			R.Lenczy
1	NM	Hidalgo Co.	Lordsburg	vii-2-1956	at light		H.&A.Howden
1	NM	Hidalgo Co.	10 mi. N Rodeo	viii-6-1968			L.D.&M.D.Anderson
1	NM	Lincoln Co.	Rt. 42, 32.6 mi. SE Co. rd. NF	ix-15-1979			G.S.Forbes
1	NM	Lincoln Co.	Carrizozo	ix-10-1961			P.D.Hurd
1	NM	McKinley Co.	3 mi. N Prewitt	vii-10-1978			G.Ettershank
1	NM	Rio Arriba Co.	Heron Bay St. Pk.	vi-5-1981	MV light		M.Kaulbars
1	NM	San Miguel Co.	Las Vegas	vi-9-1947			E.C.Nord
1	NM	San Miguel Co.	Las Vegas HS	viii-19-1901			Barber & Schwarz
2	NM	Taos Co.	Taos	no date; vii-10-1929			G.P.Engelhardt
1	NM	Torrance Co.		ix-1925			C.H.Martin
2	NM	Torrance Co.	Laguna de Perro, off US 60	viii-1-1993			S.Fitzgerald, et al
2	NM	Union Co.	Clayton Lk., 12 mi. NW Clayton	vii-15-1959	at light		R.F.Smith
3	SD		Badlands at Cedar Pass	vi-13-1953			C.P.Alexander
1	SD	Bon Homme Co., 5 mi.N.	Running Water	vii-16-22-1994	at blacklight		S.W.Lingafelter
1	SD	Haakon Co.	Nowlin	vii-11-14-1991			M.L.Jameson
2	TX						

No.	State	County	Locality	Date	Misc. Data	Collectors
***Orizabus pyriformis* (LeConte), continued**						
1	TX		Davis Mts.	vi-24-1956		D.J.&J.N.Knull
1	TX	Hudspeth Co.	Sierra Blanca	vii-16-1936		D.L.Tiemann
4	TX	Jeff Davis Co.	13 mi. E. Alpine	viii-1-2003	5700'	W.D.Shepard
2	TX	Jeff Davis Co.	Loop 166, Wood Picnic Area	vii-17-1996	5500'	J.E.Wappes
2	TX	Jeff Davis Co.	Madera Canyon Rest Stop	vii-9-1993; vii-11-1991		C.S.Wolfe (2)
1	WY		Yoder	vi-15-1970		A.E.Parshall
1	WY	Laramie Co.	Cheyenne	viii-9-1974		
1	WY	Laramie Co.	Pine Bluffs	iv-20-1985		P.A.Opler
1	WY	Platte Co.	Guernsey	v-15-1944		

Specimens reviewed from collections of: ASUT, BYUC, CNCI, CSUC, CSWC, DACC, EMEC, HAHC, JEW, JSCC, MCZC, OSUC, PHSC, SEMC, TAMU, UAIC, UCRC, UNSM, USNM, SMCC, WBWC.

***Orizabus clunalis* (LeConte)**

9	no data					
1	AZ					
9	AZ		Chiricahua M.	viii-2-1961; viii-6-1961; viii-14-1962 (2); viii-15-1959; viii-18-1961; viii-24-1062; viii-28-1962; ix-4-1962		D.J.&J.N.Knull(8); W.E.&C.A.Triplehorn
1	AZ		Madera Cyn.	viii-8		
1	AZ		Madera Cyn., Bog Spring	viii-3-1988	5080'	
6	AZ		Stray Horse Camp, White Mts.	vii-1-1937		D.Meadows
3	AZ	Apache Co.	E. Fork of Black R., ca.10 mi. S of Big L.	vii-30-31-1993	UV light	W.B.Warner
4	AZ	Cochise Co.	Canelo	vii-28-1958; viii-12-1955 (2); viii-15-1956		at light (2) G.D.Butler (3); Morley
2	AZ	Cochise Co.	S Fork Campground, Coronado Nat. For.	viii-9-1972		S.I.&S.L.Frommer
2	AZ	Cochise Co.	Chiricahua Mts., Cave Ck. Cyn.	vii-30-1988(2); viii-5-1986(2)	5000'	
5	AZ	Cochise Co.	South Fork of Cave Creek	viii-2-1975(2); viii-21-1965(3)		UV light(5), 1930-2030 hrs near stream(2) 5400'(3) S.Frommer(2)
1	AZ	Cochise Co.	Cave Ck. Cn., Herb Martyr Dam, Chiricahua Mts.,	viii-10-20-1966	6000'	F.G.Werner family
1	AZ	Cochise Co.	Sunny Flat Cp., Cave Cr. Cyn., Chiricahua Mts.,	ix-7-1964	at light	W.Turner
1	AZ	Cochise Co.	Idlewilde Camp, Chiricahua Mts.	viii-9-1993		A.V.Evans
1	AZ	Cochise Co.	Onion Saddle, Chiricahua Mts. (3156/10916)	vii-18-19-1983	B&S(PineOakWd)2320 m	E.L.&K.W.Sleeper
24	AZ	Cochise Co.	Onion Saddle, Chiricahua Mts.	vii-10-1967(7); vii-12-1967(4); vii-15-1966(10); vii-29-1967; viii-6-1966; viii-7-1966	UV light(24) 7600'(24)	various

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus clunalis* (LeConte), continued**							
12	AZ	Cochise Co.	Onion Saddle Rd. @ E Turkey Creek, Chiricahua Mts., viii -3-1967; viii -19-1967(10); viii -22-1967		UV light(12)	6400'(2)	R.G.Beard(2); G.L.Godfrey(10)
1	AZ	Cochise Co.	3 mi. SW Paradise (Chiricahua Mts.)	viii-1-1967			D.J.Culver
1	AZ	Cochise Co.	Pinery Cyn., Chiricahua Mts.	viii-12-1976		6940'	P.Jump
1	AZ	Cochise Co.	Pinery Cyn., Chiricahua Mts.	viii-23-1952		6800'	C.D.&G.F.MacNeill
3	AZ	Cochise Co.	Pinery Canyon Forest Camp, Chiricahua Mts., viii-26-1967		UV light	6950'	R.G.Beard
1	AZ	Cochise Co.	Mouth of Pinery Cyn., Chiricahua Mts.	xi-1-1951			C.D.&G.F.MacNeill
42	AZ	Cochise Co.	Portal vii-1968; vii-28-viii-6-1966(2); vii-28-ix-3-1973(29); viii-1-1980; viii-4-1971; viii-4-1973; viii-13-1972; viii-15-1971; viii-16-1965; viii-22-1958; viii-26-1969(2); viii-28-1964		at light, UV light	4700'	various
1	AZ	Cochise Co.	Portal & vic.			4778'	
3	AZ	Cochise Co.	nr. Portal	viii-21-1978	UV light	4000-4700'	Cooper
8	AZ	Cochise Co.	Cave Creek Ranch	viii-3-1965; viii-3-1972 (4); viii-4-1972; viii-10-1972; viii-17-1972	UV light(8)	5000'	D.Carlson(7)
2	AZ	Cochise Co.	Portal, Cave Creek Ranch	viii-1-3-1972; viii-29-30-1971			E.G.Linsley(2)
2	AZ	Cochise Co.	0.5 mi. W Portal	viii-16-1971			D.Carlson
1	AZ	Cochise Co.	1 mi. S Portal, Cave Creek Ranch	viii-12-1971			E.G.Linsley
12	AZ	Cochise Co.	1 mi. S Portal vi-26-1965; vii-10-1965;vii-13-1965; vii-18-1965; vii-20-1965; vii-25-1965; vii-29-1965; viii-4-1965; viii-8-1965(3);_viii-31-1965		at light(11)		M.A.Cazier (et al)(10); W.Rosenberg
1	AZ	Cochise Co.	2 mi. SW Portal	viii-16-1973	blacklight		R.Turnbow
1	AZ	Cochise Co.	2 mi. SW Portal, Stewart Camp	viii-2-3-1973		4800'	R.Coville
1	AZ	Cochise Co.	4 mi. SW Portal	viii-16-1973	at light	5400'	Cazier family
2	AZ	Cochise Co.	4 mi. W Portal, Sunny Flat	viii-27-1979	blacklight		C.W.Melton
3	AZ	Cochise Co.	4.5 mi. SW Portal vii-4-8-1981; vii-9-12-1981; vii-17-24-1981		UVBL(3)	5400'(3)	K.&M.Cazier(3)
8	AZ	Cochise Co.	5 mi. W Portal	viii-16-1964; viii-22-1964(2); viii-25-1964; viii-28-1964(4)	at light(8)	5000'(8)	L.D.Anderson
1	AZ	Cochise Co.	5 mi. SW Portal viii-1-1975; viii-2-1975(2); viii-3-1975(2); viii-7-1975; viii-12-1975(4); viii-13-1975(5);	viii-15-1975(3)	UVBL(18)	5400'(18)	M.A.Cazier(18)
60	AZ	Cochise Co.	Southwestern Res. Sta.(=SWRS), 5 mi. SW Portal ; vii-12-1969(2); vii-17-1979(2); vii-22-1979(2); vii-23-1963; vii-24-1963; vii-24-1960(7); vii-24-1961; vii-28-1959(2); viii-1971; viii-2-1961(4); viii-4-1961(4); viii-4-1959(4); viii-5-1965; viii-6-1958; viii-6-1961; viii-6-1965; viii-7-1961; viii-14-1959(7); viii-14-1971; viii-15-1961; viii-15-1973; viii-15-1971; viii-15-1980; viii-17-1958; viii-18-1965(2); viii-18-1973; viii-18-1977(2); viii-19-1973; viii-19-1980; viii-21-1973(2); viii-31-1965; x-2-1959		UV light(5); at light	5300'(2); 5400'(3)	various
2	AZ	Cochise Co.	3.2 mi. E. SWRS	viii-4-1972; viii-15-1971		BL	D.Carlson(2)
5	AZ	Cochise Co.	Rustler Park, Chiricahua Mts.(3154/10917)	vii-17-18-1983	BL, (PineFirFst)	2590 m	E.L.&K.W.Sleeper

No.	State	County	Locality	Date	Misc. Data	Collectors
***Orizabus clunalis* (LeConte), continued**						
9	AZ	Cochise Co.	Rustler Park, Chiricahua Mts	vii-1972(5); vii-20-1972; vii-27-1972; viii-2-1973(2) at light(4) 8500'(2) var.		
1	AZ	Cochise Co.	Rucker Forest Cmp., Chiricahua Mts.	vii-14-15-1983	BL, (PineOkStrmsd) 1980m	E.L.&K.W.Sleeper
1	AZ	Cochise Co.	Stewart Cgd., Chiricahua Mts., Coronado NF,	viii-8-9-1987	MV/BL	C.B.&J.E.Barr
5	AZ	Cochise Co.	E Turkey Creek, Chiricahua Mts.	viii-25-1967		Pendleton&Ziff
1	AZ	Cochise Co.	E. Turkey Creek, Chiricahua Mts.	viii-13-1967	UV light, pine-oak	6400' R.G.Beard
1	AZ	Cochise Co.	Cochise Stronghold	vii-22-1985		P.K.Lago
4	AZ	Cochise Co.	Cochise Stronghold, Dragoon Mts.	vii-26-1982	BL	D.Colby
2	AZ	Cochise Co.	Dragoon Mts., Cochise Stronghold	viii-2-1948	at light, oak-juniper zone	W.Nutting, F.Werner
2	AZ	Cochise Co.	~1 mi.NE FR45, Dragoon Mts., Middlemarch Cyn.,	viii-2-1997	UV light	W.B.Warner, F.Skillman
3	AZ	Cochise Co.	Coronado Nat'l Memorial HDQS	vii-1-1984(2); viii-11-1969	at light	R.R.Snelling
3	AZ	Cochise Co.	Guadalupe Cyn., 29 mi. E Douglas	viii-15-16-1972	bl. lite trap	J.Doyen
2	AZ	Cochise Co.	Ft. Huachuca			
2	AZ	Cochise Co.	Huachuca Cyn.	viii-24-1950		R.L.Langston
26	AZ	Cochise Co.	Huachuca Mts.	no date(2); vii(2); viii-ix-1905; viii-1-1927(11); viii-19-1950 (5); viii-10-1953; vii-18-1936; ix-1-1927(2); ix-3-1959		various
9	AZ	Cochise Co.	Ash Cyn. [Huachuca Mts.]	vii-5-1981; viii-18-1982; ix-2-1984(7)		various
5	AZ	Cochise Co.	Carr Can., Huachuca Mts. at light(2)	viii-15-1949(2); viii-20-1985; viii-20-1987; vii-14-1976 5200'(2); 7400'	various	
3	AZ	Cochise Co.	lower Carr Cyn. [Huachuca Mts.]	viii-3-1989		R.W.Duff
1	AZ	Cochise Co.	Copper Cyn., Huachuca Mts.	viii-3-1989	blacklight, 6000'	Y.F.Hsu,M.Prentice&J.Powell
1	AZ	Cochise Co.	Garden Cyn., Huachuca Mts.	viii-20-1969		
4	AZ	Cochise Co.	Ida Cn., Huachuca Mts.	vii-15-1980(2); vii-19-1980(2)		M.Hetz, Waring
190	AZ	Cochise Co.	Miller Cn., Huachuca Mts.,	vii-1974(7); vii-2-1974; vii-4-1974(3); vii-4-1974;vii-5-1974(5); vii-5-1974; vii-6-1974; vii-7-1974(4); vii-7-1974(4); vii-8-1974(2); vii-8-1974(2); vii-9-1974; vii-10-1974(2); vii-11-1974(4); vii-12-1974; vii-13-1974(4); vii-13-1974(22); vii-14-1974(26); vii-15-1974(3); vii-16-1974(5); vii-17-1974; vii-17-1974(11); vii-18-1974(2); vii-19-1980(6); vii-20-1974(6); vii-21-1974(2); vii-22-1974(4); vii-23-1974(2); vii-23-1974(2); vii-24-1985; vii-26-1974(11); vii-27-1974; vii-27-1974(9); vii-29-1974(2); vii-29-1974(2); vii-30-1974(2); vii-30-1984(2); vii-30-1974; viii-3-1974(2); viii-3-1974; viii-4-1984; viii-5-1972; viii-6-1972; viii-6-1974(2); viii-6-1974(2); viii-8-1993(2); viii-10-11-1982; viii-11-1974; viii-15-1974; viii-18-19-1987(8); viii-24-1965	UV light(4)	various
2	AZ	Cochise Co.	Miller Cyn., Huachuca Mts.	vii-28-1989	UV light	ca.6000' W.B.Warner
4	AZ	Cochise Co.	Miller Cyn. (mid cyn. nr. ruins)	vii-19-1987	UV	W.B.Warner
1	AZ	Cochise Co.	Palmerlee			
1	AZ	Cochise Co.	Palmerly [sic]	viii		
1	AZ	Cochise Co.	Parker Cyn., Huachuca Mts.	viii-9-1969		

No.	State	County	Locality	Date	Misc. Data	Collectors
***Orizabus clunalis* (LeConte), continued**						
14	AZ	Cochise Co.	Park. Cyn. Lake, S side Huachuca Mts	viii-10-1975(12); viii-22-1975; vii-18-1989		various
50	AZ	Cochise Co.	Ramsey Canyon, Huachuca Mts.	no date(4); vii-28-1959(13); vii-1974(23); vii-11-1955;viii-1973(2); viii-1-1955(2); viii-6; ix-5-1953(2); ix-5; ix-6-1959	15 Watt blacklight	various
1	AZ	Cochise Co.	Reef, Huachuca Mts.	viii-27-1953		G.D.Butler
1	AZ	Cochise Co.	upper Sunnyside Cyn., Huachuca Mts.	viii-20-1993		T.Hibbitts
1	AZ	Cochise Co.	Sunnyside, W side Huachuca Mts.	vii-17-1958	15 Watt black light	L.M.Martin
2	AZ	Cochise Co.	Sunnyside	viii-31-1981	6234'	D.C.Darling
1	AZ	Cochise Co.	Sonoita	ix-10-1930		Volney, Douglas
2	AZ	Cochise Co.	French Joe Cyn., Whetstone Mts.	vii-11-1979; viii-4-1979		Olson,Ballowitz; M.Hetz
1	AZ	Coconino Co.	Sedona	vii-20-1970		R.Dunn
4	AZ	Gila Co.	Globe	vii-16-1953; viii-8-1953; viii-23-1956	at light (2)	Duncan, Parker (4)
5	AZ	Gila Co.	Payson	viii-1969(2); viii-12-1960(2); ix-1976		D.Rich(2); R.Lenczy
2	AZ	Gila Co.	Payson, Bear Flat	vii-31-1965		T.Taylor
1	AZ	Gila Co.	base of Pinal Mts.	vi-1930		Parker & Duncan
2	AZ	Gila Co.	Rye	viii-23-1977; viii-28-1976		D.Ahart(2)
6	AZ	Gila Co.	Sierra Ancha Mts.	no date (2); viii(4)		D.K.Duncan & Parker
1	AZ	Gila Co.	Parker Cyn., Sierra Ancha Mts.	vii-24-1986	at light	W.B.Warner
50	AZ	Gila Co.	Workmen Cyn., 21 mi.S Young, Sierra Ancha Mts.	vii-23-24-1986(42); vii-28-29-1986(2); viii-16-17-1991(3); viii-20-1947(3)	UV(42); at light(2)	W.B.Warner(47); L.R.Gillogly(3)
2	AZ	Gila Co.	Six Shooter Cyn. [=near Globe]	ix-1-1972		D.Carlson
2	AZ	Gila Co.	Star Valley	viii-23-1977; viii-24-1989	at light	W.B.Warner; D.Ahart
2	AZ	Gila/Graham Co., San Carlos R., San Carlos Indian Res.		viii-16-1987	MV/BL	C.B.&J.E.Barr
1	AZ	Graham Co.	Marijilda Cn., Graham Mts.	viii-9-1955		Butler,Noon
2	AZ	Graham Co.	Noon Cr., Mt. Graham	vii-28-1954; viii-1-1957	lt.	F.G.Werner; G.D.Butler
3	AZ	Graham Co.	Stockton Pass, Pinaleno Mts.	viii-4-1948	at light, oak-juniper zone, 5440 ft.	W.Nutting,F.Werner
2	AZ	Greenlee Co.	E. Fork of Black R.	vii-4-1981		C.A.Olson
1	AZ	Navajo Co.	4 mi. n of Whiteriver, White Mts.	vii-20-22-1948	at lights, pine zone-mesophytic creek, 5140'	W.Nutting,F.Werner
1	AZ	Pima Co.	Sta. Catalina Mts., Molino Basin	vii-29-1973	4400'	D.S.Chandler
1	AZ	Pima co.	Sta. Catalina Mts., Hk.Hwy. mi. 12, Bear Cn.,	vii-14-1961	UV lt. trap	Werner,Nutting
2	AZ	Pinal Co.	Jct. Devil's Cyn. & US Hwy. 60	vii-26-1989	at UV light	A.V.Evans,W.B.Warner
2	AZ	Pinal Co.	Peppersauce Cyn., Santa Catalina Mts.	vii-25-1948; viii-14-1984		W.Nutting; Olson
1	AZ	Pima Co.	Green Vy., 19 mi. S Tucson	ix-3-1964	at light	W.Turner
1	AZ	Pima Co.	Box Cyn., Santa Rita Mts.	vii-20-1985		G.P.Bruyea

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus clunalis* (LeConte), continued**							
1	AZ	Pima Co.	lower Madera Cyn. [Santa Rita Mts.]	iv-vii-1980			J.Cope
1	AZ	Pima Co.	Peppersauce Cyn.	vii-10-1981			D.B.Thomas
1	AZ	Pima Co.	Sabino Canyon	ix-5-1961			R.Townsend
1	AZ	Pima Co.	8 mi. N Vail	viii-30-1962	UV lt. trap		F.Werner,W.L.Nutting
1	AZ	Santa Cruz Co.		viii-4-1927			R.H.Beamer
1	AZ	Santa Cruz Co.	Duquesne	viii-11-1993			A.V.Evans
2	AZ	Santa Cruz Co.	Madera Canyon, Santa Rita Mts.	viii-24-1949; ix-13-1959			L.M.Martin; J.G.Franclemont
1	AZ	Santa Cruz Co.	Parker Cn. Lake, SW sl. Huachuca Mts.	viii-12-13-1968			F.Werner
1	AZ	Santa Cruz Co.	Patagonia	ix-5-1964	at light		W.Turner
5	AZ	Santa Cruz Co.	Sonoita	vii-28-1963(3); viii-11-1975; viii-11-1987	at light(4)		various
1	AZ	Santa Cruz Co.	jct. Sycamore Cyn. & USFS Rd. 61	viii-11-1993	at light		A.V.Evans
1	AZ	Yavapai Co.	Prescott				
1	AZ	Yavapai Co.	Yarnell	viii-9-1971			
1	CO						
10	NM						F.H.Snow(5)
1	NM		Sierra Blanca Mt.	vii-1963			R.Lenczy
3	NM		Jemex [=Jemez?] Springs	vii-28-1931; viii-26-1931(2)			
9	NM		Jemez Sp.				
16	NM		1 mi. S. Ruidoso	vii-8-1972			R.L.Berry
1	NM		White Sands	viii-19-1962			W.E.&C.A.Triplehorn
17	NM	Bernalillo Co.	Albuquerque	no date(2); viii(3); viii-1894(7); viii-28-1894(3); ix; ix-16-1908			M.L.Linell(2); F.H.Snow(8)
1	NM	Catron Co.	Taylor Cr., below Wall Lake, Gila NF	vii-24-1994	blacklight		B.Kondratieff,R.Durfee
1	NM	Eddy Co.	Carlsbad				H.&C.Edwards
1	NM	Eddy Co.	Carlsbad Cav. N. Pk., Carlsbad	iv-1961			R.T.Hoskins
1	NM	Eddy Co.	Sitting Bull Canyon	viii-18-1969	blacklight		R.Turnbow
5	NM	Eddy Co.	White City	vii-20-1936(2); vii-21-1936; vii-27-1975(2)	at lights	3600'(2)	various
2	NM	Grant Co.	Cherry Cr. Camp	vii-9-1973			P.M.Jump
46	NM	Grant Co.	Cherry Creek Rec. Area, nr. Silver City	vii-9-1963	blacklight		P.J.Spangler
1	NM	Grant Co.	Iron Creek C. G.	viii-1-1977		6900'	J.P.&K.E.Donahue
1	NM	Grant Co.	Silver City	vii-28-1938			
2	NM	Hidalgo Co.	Rodeo	ix-11-12-1959		4000'	H.E.Evans
1	NM	Lincoln Co.	Sierra Blanca NW of Ruidoso	viii-15-1975		8000'	S.&J.Peck
1	NM	Luna Co.	Deming	vii-8-1936			R.Martin
6	NM	Otero Co.	Cloudcroft, Sacramento Mts.	no date; vi-11-1902; vi-27-1940; vii-3-1917; viii-4-1903(2); 9000'(2); various			

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus clunalis* (LeConte), continued**							
1	NM	Otero Co.	Mayhill	vi-26-1962	under log		B.C.Ratcliffe
2	NM	Quay Co.	Tucumcari	ix-13-1994			M.S.Hunter
5	NM	Quay Co.	37 mi. E of Tucumcari	viii-4-1990			W.B.Warner
1	NM	Rio Arriba Co.	Echo Ampitheater, Carson Nat'l Forest	vii-23-1984			C.B.Barr
1	NM	Rio Arriba Co.	Ghost Ranch	vii-29-31-1959			L.A.Carruth
3	NM	Sandoval Co.	Cochiti Cyn., 8 mi. N Cochiti Lake	vii-13-1985			P.K.Lago
5	NM	Sandoval Co.	Jemez Springs vii-12-1923; vii-24-1923(2); viii-30-1927; ix-10-1927			6400'(2); 7000'(1)	
1	NM	San Miguel Co.	Las Vegas	1898			
1	NM	Santa Fe Co.	Pojoaque	viii-20-1973			
2	NM	Santa Fe Co.	S. Fe Canon	viii-1880		7000'	Snow
1	NM	Sierra Co.	Iron Crk. Camp	vii-18-1987	Hg light		Morris & Sites
1	NM	Sierra Co.	9.5 mi. N Truth or Cons.	viii-3-1968			R.C.Biggam
2	NM	Socorro Co.	I-35 Lajoya Rest Area	viii-14-1996			J.E.Wappes
5	NM	Socorro Co.	Rt. 25, mile marker 167 rest stop	viii-17-19-1994			J.Huether
1	NM	Socorro Co.	22 mi. E San Antonio, Sandhills	viii-13-14-1996			J.E.Wappes
1	NM	Socorro Co.	Socorro	vii-22-1933			W.Benedict
1	NM	Socorro Co.	La Joya Wildlife Pres., 20 mi. N Socorro	viii-5-14-1976			W.Rubink
7	NM	Taos Co.	Ojo Caliente	vii-11-1959; viii-13-1962(6)			J.M.Linsley(7)
1	TX		Cedar Lake				
2	TX		Kingsville (Cornell Univ. Lot 912, sub 461)				C.T.Reed
1	TX		Palo Duro Canyon	viii-16-1977			W.F.Chamberlain
1	TX		Pine Springs	vii-12-16-1928			W.Benedict
2	TX		Toyahvale	vii-13-1975			W.F.Chamberlain
1	TX		NM-TX state line on Hwy. 62 & 180	x-16-1953			R.H.Reid
2	TX		Chisos Mtns.	viii-3-1962			W.E.&C.A.Triplehorn
5	TX	Brewster Co.	Alpine vii-5-1976; vii-18-1976; vii-24-1974(2); viii-20-1926		streetlights(3)	6000'	J.R.Green(4)
1	TX	Brewster Co.	Big Bend N.P.	vii-30-1984			M.E.Rice
4	TX	Brewster Co.	Big Bend Nat. Park, Chisos Basin	vii-17-20-1972(2); vii-31-1975(2)	at light(2)		W.E.&C.A.Triplehorn(2)
2	TX	Brewster Co.	Chisos Mtns., Big Bend Natl Park	viii-31-ix-2-1986			East,Kovarik,Haack
2	TX	Brewster Co.	"The Basin" in Big Bend National Park	vii-22-1985			S.J.Hanselmann
3	TX	Brewster Co.	Basin Cpgrd, Big Bend NP	viii-19-20-1991; ix-19-1993(2)			D.Sundberg(2); C.A.&L.S.Triplehorn
1	TX	Brewster Co.	Panther Pass, Chisos Mts., Big Bend NP	vii-21-1967	at UV light	5830'	R.G.Beard
2	TX	Culberson Co.	Guadalupe Mtns. Nat. Park	ix-1-1985; ix-3-4-1986			E.V.Gage; East,Kovarik,Haack
2	TX	Culberson Co.	Guadalupe N.P., Pine Springs	ix-9-1985			

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus clunalis* (LeConte), continued**							
1	TX	Culberson Co.	Guadalupe Nat'l Pk., Pine Springs Cgd.	viii-3-4-1987	at lights		C.B.Barr
1	TX	Culberson Co.	Oasis Truck Stop, 18 mi. E of Van Horn	viii-2-1989			T.Hibbitts
1	TX	Culberson Co.	Van Horn	vii-28-1985	white light		J.Hutchings
3	TX	El Paso Co.	El Paso	no date(2); vii-26-1958			Wickham; J.Hafernik
2	TX	Hudspeth Co.	Salt Falt	viii-13-1983	at light		E.V.Gage
1	TX	Hudspeth Co.	sand dunes 20 mi. E of Guadalupe Mt. NP, Rt. 62/180,	iii-10-1990 [col. dead]			J.Welch, B.Kondratieff
13	TX	Jeff Davis Co.		vii-4-1953(4); vii-6-1953(4); vii-12-1950(5)			D.J.&J.N.Knull
30	TX	Jeff Davis Co.	Davis Mts.	no date (23); viii-1-1928(4); viii-11-1962(2); ix-2-1940			various
1	TX	Jeff Davis Co.	Davis Mtns. State Park	viii-22-1982			S.J.Hanselmann
1	TX	Jeff Davis Co.	Davis Mtns. Resort	viii-6-1993; viii-16-1993; ix-2-1992; ix-10-1993, 5800'(4)			D.G.Marqua(4)
13	TX	Jeff Davis Co.	Ft. Davis vi-16-1976; vii-2-1973; vii-2-3-1966(2); vii-6-1976; vii-14-1956; vii-20-1974; vii-26-1976; vii-28-viii-2-1966; viii-2-1964(2); ix-1-1928(2)	under street light at night(3); at light			various
1	TX	Jeff Davis Co.	2 mi. W. Fort Davis	ix-21-1971			D.P.Levin
1	TX	Jeff Davis Co.	vic. Davis Mts.	vii-19-22-1995			J.Huether
1	TX	Jeff Davis Co.	Indian Lodge	vii-12-14-1994	lights		J.R.&M.B.Wolfe
1	TX	Jeff Davis Co.	Limpia Cyn.	vi-27-1967			B.A.Tilden
5	TX	Potter Co.	Bushland	vii-24-viii-13-1976	ex light trap		C.E.Rogers
1	TX	Randall Co.	Palo Duro Canyon St. Pk.	viii-10-1978			C.B.Barr
2	TX	Reeves Co.	Balmorhea	viii-17-1969; viii-18-1969	blacklight(2)		Board&Hafernik(2)
79	TX	Reeves Co.	Balmorhea State Park	vii-7-1963	blacklight		P.J.Spangler
2	TX	Reeves Co.	Lk. Balmorhea S.P.	viii-11-1979	at light		J.Liebherr

Specimens reviewed from collections of: ASUT, CBBC, CSUC, CSWC, CUIC, DACC, DCCC, DGMC, EMEC, HAHC, JHUC, JSHC, LACM, MCZC, MTEC, OSUC, RACC, SEMC, TAMU, UAIC, UCRC, USNM, WBWC

Orizabus ligyroides Horn

6	no data						
4	AZ		Warren	vii-22-1969			A.E.Michelbacher
15	AZ	Cochise Co.	Benson vi-21-1941; vii-10-1945; vii-16-1947(2); vii-24-1941(2); vii-27-1945; vii-29-1945; viii-2-1941(4); viii-10-1945; viii-16-1977		at light(4)		various
1	AZ	Cochise Co.	Canelo	vi-21-1958			G.D.Butler
1	AZ	Cochise Co.	Cochise	viii-15-1972	at window	4200'	R.E.Acciavatti
2	AZ	Cochise Co.	Entr. to Coronado Nat. Mem. (2 mi.E.HDQS)	vii-18-1987	at light		W.B.Warner
2	AZ	Cochise Co.	3 mi. E Douglas	viii-7-1968	blacklight		G.C.Batista

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus ligyroides* Horn, continued**							
3	AZ	Cochise Co.	7 mi. E Douglas	viii-3-1967	blacklight		D.J.Culver
1	AZ	Cochise Co.	8 mi. W Douglas	vii-16-1978			S.Nittmann
2	AZ	Cochise Co.	10 mi. E Douglas	viii-3-1967			L.D.Anderson
1	AZ	Cochise Co.	14 mi. NE Douglas	viii-6-1967	blacklight		R.E.Frisbie
3	AZ	Cochise Co.	32 mi. E Douglas, 0.4 mi. NE of entry into Guadalupe Cyn., viii-1-1967, UV light, 4200'				R.G.Beard
1	AZ	Cochise Co.	Fort Huachuca	vii-31-1950			
12	AZ	Cochise Co.	Guadalupe Cyn., Peloncillo Mts.	vii-1-1976; vii-24-1085; vii-28-1982(2); viii-2-1969; viii-8-1983; viii-24-1978(4); viii-26-1967(2)	BL(4)	4300'	C.A.Olson & various
2	AZ	Cochise Co.	Huachuca Mts.	vii			D.K.Duncan
15	AZ	Cochise Co.	Ash Ca yon [Huachuca Mts.]	viii-3-1984(7); viii-18-1982(2);ix-2-1984(6)			various
9	AZ	Cochise Co.	Huachuca Mts., 5131 Bannock St., Pueblo del Sol, vii-8-1981; vii-21-1981; vii-28-1985; vii-29-1985; vii-30-1982; viii-3-1985; viii-4-1982; viii-26-1982; ix-5-1987		U.V.light(9)		R.S.Wielgus(9)
24	AZ	Cochise Co.	Miller Canyon, Huachuca Mts. vii-3-1974; vii-4-1974(3); vii-5-1974(4); vii-7-1974; vii-14-1974; vii-17-1974;vii-20-1974(2);vii-22-1974(2); vii-24-1974(3); vii-25-1974; vii-27-1974; vii-29-1974; vii-30-1974; viii-2-1974;viii-3-1974		5000'(24)		E.R.Hoebeke(19); T.L.McCabe(5)
1	AZ	Cochise Co.	Ramsey Canyon, Huachuca Mts.	viii-18-1966	at light		L.D.Anderson
1	AZ	Cochise Co.	Parker Cyn. Lk., Rd. 83	vii-27-1993			S.Fitzgerald, et al
1	AZ	Cochise Co.	5.8 km NW Parker Cyn. Lk., 3129	vii-9-10-1983	1076 m (PinJnpOak)		E.L.& K.W.Sleeper
13	AZ	Cochise Co.	Chiricahua Mts.	vii-14-1961(2); vii-14-1968; vii-23-1959; vii-31-1965; viii-7-1957; viii-24-1962(2); ix-8-1973; ix-11-1962			A.Strawn(4); D.J.&J.N.Knull(9)
8	AZ	Cochise Co.	Cave Creek Canyon, Chiricahua Mts.	vii-23-1978(4); vii-24-26-1976; vii-30-1988; viii-4-1986(2); 5000'(3)			D.Hawks(5)
1	AZ	Cochise Co.	S Fork of Cave Creek, Chiricahua Mts.	viii-21-1965	UV light	5400'	G. W. Forister
1	AZ	Cochise Co.	Idlewilde Camp, Chiricahua Mts.	viii-9-1993			A.V.Evans
1	AZ	Cochise Co.	NE sl. Chiricahua Mts.	vii-22-1949	at light	5000'	F.Werner,W.Nutting
444	AZ	Cochise Co.	Portal vii-1966; vii-1968(14); vii-19-1964(2); vii-1972(33); vii-8-viii-6-1966(2); vii-6-1968; vii-7-1967(5); vii-10-1979; vii-12-1964(15); vii-13-1964(8); vii-14-1963(2); vii-14-1964(4); vii-16-1964(4); vii-16-1965(4); vii-17-1964(18); vii-19-1964(3); vii-20-1964(3); vii-21-1964(5); vii-21-1981; vii-22-1966; vii-22-1976(3); vii-23-1964(2); vii-24-1964(4); vii-26-1964(3); vii-26-1966; vii-27-1963; vii-28-1966; vii-29-1964(5); vii-29-1965(2); vii-29-1966(7); vii-29-1975(2); vii-30-1964(3); vii-30-1965(15); vii-30-1975; vii-31-1975; vii-31-1988; viii-1(3); viii-1-1963; viii-1-1965; viii-1-1971; viii-1-1975(7); viii-1-3-1973; viii-2; viii-2-1964(6); viii-2-1965; viii-2-1975; viii-3-1964(6); viii-3-1965;viii-3-1975(7); viii-4-1964(2); viii-4-1968(3); viii-4-1973; viii-5-1972(3); viii-5-1974(5); viii-6-1963(5); viii-6-1964(6); viii-6-1965(4); viii-6-1971(5); viii-6-1973; viii-6-1983(11); viii-7-1964(3); viii-7-1965(11); viii-7-1971(34); viii-7-1993(7); viii-8-1964; viii-8-1972; viii-9-1964(10); viii-10-1964(2); viii-10-1973(2); viii-11-1964(14); viii-11-1965; viii-12-1964(10); viii-13-1964(5); viii-13-1972(7); viii-14-1964; viii-14-1972(3); viii-15-1964; viii-15-1968(3); viii-15-1971; viii-16-1964(10); viii-17-				

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus ligyroides* Horn, continued**							
			1964(4); viii-17-1972; viii-18-1971; viii-19-1965(32); viii-19-1977; viii-19-1979; viii-20-1964(2); viii-20-21-1974(7); viii-21-22-1972; viii-22-1965; viii-24-1964; viii-24-1968; viii-26-1964(2); viii-27-1964; viii-29-1965; ix-18-1976(4)				
			at light(254), UV light(11), white light(4), pitfall trap,			4700'(165); 4778'	various
23	AZ	Cochise Co.	Portal (Cave Creek Ranch) viii-1-3-1972(6); viii-3-1965; viii-5-1965; viii-16-1965; viii-16-18-1971; viii-21-1966; viii-29-30-1971(2); viii-4-1972; viii-10-1972(2); viii-12-1966; viii-17-1972(2); viii-21-1966; viii-27-1972(3)				
				at UV blacklight(14)		5000'(3)	various
1	AZ	Cochise Co.	nr. Portal	viii-21-1978	UV light	4000-4700'	Cooper
3	AZ	Cochise Co.	vic. Portal Ranger Station, Chiricahua Mts., viii-9-1966		at UV light	4950'	R.G.Beard
1	AZ	Cochise Co.	0.5 mi. W of Portal	viii-16-1971			D.Carlson
7	AZ	Cochise Co.	0.7 mi. W. Portal, Silver Creek Wash, Chiricahua Mts., vii-29-1967, UV light,			4870'	R.G.Beard
174	AZ	Cochise Co.	1 mi. S Portal no date; vii-1973; vii-12-1965(2); vii-20-1965; vii-21-1965(4); vii-23-1965(10) vii-24-1965; vii-25-1965; vii-26-1965(4); vii-28-1965(6); vii-29-1965(15); vii-30-1965(13); vii-31-1965(3); viii-2-4-1969; viii-4-1965(9); viii-5-1965; viii-6-1965(22); viii-7-1965(4); viii-10-1965(2); viii-10-1970; viii-12-1969; viii-18-1965(4); viii-19-1965(7); viii-21-1965(2); viii-21-1966; viii-23-1965(6);viii-28-ix-3-1973(41); viii-29-31-1969		at light(116)	4800'(116)	J.H.&J.M.Davidson, M.A.Cazier(116); various
1	AZ	Cochise Co.	2 mi. N Portal	viii-3-1977			D.C.Lightfoot
4	AZ	Cochise Co.	3.2 rd. mi. N Portal on San Simon Rd.	vii-28-1992			A.V.Evans
1	AZ	Cochise Co.	4 mi. W Portal, Chiricahua Mts.	viii-3-6-1964		5300'	D.R.Davis
4	AZ	Cochise Co.	5 mi. W Portal viii-19-1964; viii-22-1964; viii-25-1964; viii-28-1964				L.D.Anderson(4)
45	AZ	Cochise Co.	Southwestern Research Station, 5 mi. SW Portal vii-17-1979; vii-23-1954; vii-19-1960; vii-24-1978(2); vii-31-viii-2-1964; viii-1-1967(2); viii-1-1968(3); viii-3-1969; viii-4-1959; viii-8-1967(5); viii-9-1965(5); viii-10-1965; viii-14-1971(2); viii-16-1973; viii-18-1980; viii-19-1973; viii-19-1954; viii-22-1973; viii-25-1967(3); viii-26-1973; viii-27-1973(2); viii-28-1973; viii-29-1973; viii-30-1973; viii-30-1959; viii-31-1965; ix-7-1959; ix-12-1973(2); at light(3); UV light(12)			5300'; 5400'(4)	various
2	AZ	Cochise Co.	Stewart Camp, Cave Crk. Cyn., Chiricahua Mts., viii-7-1990				D.Rubinoff
2	AZ	Cochise Co.	San Pedro R. nr. Hereford	viii-20-1994	UV		C.A.Olson
15	AZ	Cochise Co.	Rio San Pedro, 0.5 mi. W of Hereford vii-8-1974; vii-9-1974(2); vii-10-1974; vii-15-1974; vii-22-1974(2); vii-22-1974; vii-23-1974(3); vii-27-1974(4)				T.L.McCabe(9); E.R.Hoebeke(4)
4	AZ	Cochise Co.	Sierra Vista vii-23-1969; viii-5-1991; viii-2-1991(2)				A.E.Michelbacher; C.V.Covell Sr.(3)
2	AZ	Cochise Co.	Sierra Vista vic.	ix-2-1984			S.Ziff
14	AZ	Cochise Co.	Texas Canyon vii-12-14-1980(5); viii-1972(2); viii-1978(5); viii-8-1993(2)				various
3	AZ	Cochise Co.	Texas Cyn. L., Dragoon Mts.	vii-22-1983			Olson,Burne
7	AZ	Cochise Co.	18 mi. W. Wilcox (TX Cyn. at The Thing) vii-30-1988				
1	AZ	Cochise Co.	"The Thing" gas sta. lights on I-10 in Texas Cyn. viii-25--1988 col. dead				A.Zvirgzdins
3	AZ	Cochise Co.	3.5 rd. mi. SE of Tombstone on US 80 viii-10-1974				A.V.Evans
7	AZ	Cochise Co.	E side of Whetstone Mtns., 10.5 mi. n jct. AZ 82 vii-10-1993 UVBL				W.B.Warner

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus ligyroides* Horn, continued**							
12	AZ	Cochise Co.	Willcox	vii-20-1979(2); vii-24-1970(3); viii-1976; viii-1972(2); viii-1-1971; viii-29-1970; ix-3-1957; ix-11-1969			various
1	AZ	Cochise Co.	1.8 mi. S Willcox	viii-22-1979			D.Brzoska
8	AZ	Coconino Co.	Sedona	viii-20-1970(4); viii-24-28-1964; viii-29-1963(2); viii-29-1964		at light	various
1	AZ	Gila Co.		viii-24-1967			
1	AZ	Gila Co.	East Verde R., 5 mi. N. Payson	x-7-1967			F.S.Truxal, L.M.Martin
17	AZ	Gila Co.	Globe	vii(3); vii-1930; vii-17-1957; vii-19-1957; vii-22-1957; vii-27-1956; vii-29-1959; viii(2); viii-4-1956; viii-10-1962; viii-11-1956; viii-1937(2); viii-8-1953	at light(2)		D.K.Duncan&/or F.H.Parker(17)
1	AZ	Gila Co.	24 mi. N Globe, Jones Water Camp	ix-15-1969			S.&J.Peck
1	AZ	Gila Co.	Payson	ix-9-1975			D.Ahart
2	AZ	Gila Co.	base of Pinal Mts	v; vi-1930			D.K.Duncan; Parker&Duncan
1	AZ	Gila Co.	Pioneer Pass	viii-5-1972		5100’	Sumlin
10	AZ	Gila Co.	Rye	viii-28-1976			D.Ahart
1	AZ	Gila Co.	Sierra Ancha Mts.	viii			D.K.Duncan
1	AZ	Graham Co.	Bonita Creek	viii-17-1976	u.v.light	3500’	D.S.Chandler
1	AZ	Graham Co.	Stockton Pass Cmp.	viii-7-1974			A.V.Evans
1	AZ	Greenlee Co.	Eagle Cr. Canyon	vii-28-1975			
6	AZ	La Paz Co.	Ehrenberg [questionable record]	v-28-1943			
4	AZ	Maricopa Co.	Sunflower	vii-23-1977; viii-25-1982; viii-27-1983; viii-30-1992			W.B.Warner(4)
1	AZ	Maricopa Co.	Sunflower, Sycamore Creek	vii-26-1992	at light	1200m	H.&A.Howden
1	AZ	Maricopa Co.	Phoenix [questionable record]	viii-10-1946			
3	AZ	Mojave Co.	Peach Springs	viii-26-1964	at light		W.Turner
2	AZ	Mojave Co.	Pinyon Pines Estates, Hualapai Mts.	viii-25-1978	BL	5100’	D.Carlson
1	AZ	Pima Co.	26 mi. E Tucson	viii-8-1970		2400-2600’	D.Richman
2	AZ	Pima Co.	Continental	vii-27-1989; viii-12-1989			A.V.Evans,W.B.Warner
2	AZ	Pima Co.	Box Canyon, Santa Rita Mts.	vii-20-1985; viii-3-1988			G.P.Bruyea
1	AZ	Pima Co.	mouth of Box Cyn. at bridge, Sta. Rita Mts., viii-9-1967		at UV light		R.G.Beard
1	AZ	Pima Co.	Sta. Rita Mts., Florida Cn.	vii-2-1993	UV		Olson,Hall
1	AZ	Pima Co.	N end Rosemont Area, Barrel Cn., Section 28, 31D48-53’N, 110D42-47’W Anthrax Mine Inventory, 1975-1976	vii-ii-1976,		4600’	J.Busacca,C.Olson
1	AZ	Pima Co.	Sta. Rita Mts., Sycamore Canyon, Aramax Mine Survey, vi-29-vii-8-1981, light trap				J.C.Burne
3	AZ	Pima Co.	Whetstone Mts., Nogales Springs	vii-26-1977		4400-4600’	Olson,Hetz
25	AZ	Santa Cruz Co.	Madera Canyon	viii-1993			
1	AZ	Santa Cruz Co.	Nogales	viii-7-1952			D.J.&J.N.Knull

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus ligyroides* Horn, continued**							
1	AZ	Santa Cruz Co.	Patagonia Mts., Sycamore Ck.at Duquesne Rd.,	vii-10-20-1003			W.B.Warner
1	AZ	Santa Cruz Co.	W sl. Patagonia Mts.	viii-9-1956			G.D.Butler,F.G.Werner
2	AZ	Santa Cruz Co.	Peña Blanca Lake	viii-10-1976			O.Hawks
2	AZ	Santa Cruz Co.	vic. Peña Blanca Lake	vii-21-1985			G.P.Bruyea
4	AZ	Santa Cruz Co.	Sonoita	vii-28-1963(3); viii-19-1993	at lt.(3)		M.L.Noller(3); T.Hibbitts
2	AZ	Santa Cruz Co.	jct. Sycamore Cyn. & USFS Rd. 61	viii-11-1993	at light		A.V.Evans
1	AZ	Santa Cruz Co.	nr. Washington Camp, 0.3 rd. mi. SW jct. USFS roads 61 & 128,	viii-11-1993			A.V.Evans
3	AZ	Yavapai Co.	Chino Valley	viii-19-1961; viii-20-1961(2)			Bowlan(3)
1	AZ	Yavapai Co.	4 mi. N Clarkdale	vii-16-1985			A.E.Zuccaro, Jr.
1	AZ	Yavapai Co.	Kirkland	viii-4-1970			AZ Comm. of Ag.Survey
1	AZ	Yavapai Co.	Peeples Val.	viii-18-1939			F.H.Parker
9	AZ	Yavapai Co.	Prescott	no date(4); viii-1977; viii-6-1984(2) ix-5-1965; ix-12-1969	at lights(2)		various
34	AZ	Yavapai Co.	Granite Dells, 4 mi. N of Prescott	viii-6-1970; viii-20-1970(7) viii-21-1970; viii-22-1970(3); viii-23-1970; viii-25-1970(5); viii-26-1970(5); viii-27-1970(5); viii-30-1970; ix-1-1970(2); ix-3-1970; ix-8-1970; ix-12-1970			L.M.Martin(34)
1	AZ	Yavapai Co.	Rimrock	vii-22-1972			B.C.Ratcliffe
2	AZ	Yavapai Co.	Wilhoit	viii-30-1982			
1	AZ	Yavapai Co.	Yarnell	viii-25-1975			D.Ahart
2	KS	Morton Co.	Rolla, Hwy. 56 roadside	vii-8-1989			J.Huether
1	NM						
5	NM		Glenwood	viii-30-1957			A.W.Vazquez
2	NM	Eddy Co.		vii-1962			W.D.Edmonds
1	NM	Eddy Co.	Carlsbad Caverns, Park Hq'rs	vii-1951			
1	NM	Eddy Co.	White City	vii-20-1936			D.L.Tiemann
2	NM	Grant Co.	Silver City	vii-22-1936; viii-12-1966			R.H.Beamer; D.Jennings
1	NM	Hidalgo Co.	P.O.Cyn., Peloncillo Mts.	viii-15-1968			
7	NM	Hidalgo Co.	Rodeo	viii-4-1967(3); viii-6-1965; viii-6-2001	at light(6)	4100'	L.D.Anderson(4)
1	NM	Hidalgo Co.	10-16 km N Rodeo	vii-28-1992	at light	1300m	H.&A.Howden
1	NM	Luna Co.	Deming	viii-15			
6	NM	Luna Co.	26 mi. W of Deming	viii-11-1971			Richer & Carlson
1	NM	Otero Co.	24 km SW Alamogordo (rt. 82)	viii-24-1992	lt.		H.&A.Howden
1	NM	Sierra Co.	1.5 mi. N Truth or Cons.	viii-3-1968			R.C.Biggam
1	NM	Socorro Co.	I-35 Lajoya Rest Area	viii-14-1996			J.E.Wappes
1	NM	Socorro Co.	22 mi. E San Antonio, Sandhills	viii-13-14-1996			J.E.Wappes

No.	State	County	Locality	Date	Misc. Data		Collectors
***Orizabus ligyroides* Horn, continued**							
1	TX		Valentine	vii-7-1917			
8	TX	Brewster Co.	Alpine	vii-1-15-1926; vii-3-1976; vii-11-1974; vii-18-1976; vii-26-1976; viii-1-15-1926; viii-13-1986; ix-1-1926	streetlights(2)	6000'	J.R.Green(4); C.S.Wolfe
1	TX	Brewster Co.	Davis Mts.	viii-1-1928			
1	TX	Culberson Co.	Guadalupe Mtns.				
1	TX	Culberson Co.	Guadalupe Mtns. Nat. Park	ix-1-1985			E.V.Gage
1	TX	Culberson Co.	Guadalupe N. P., Pine Springs	ix-9-1985			
1	TX	Jeff Davis Co.	Indian Lodge, Davis Mtns. St. Pk.	viii-23-1992			C.Wolfe
1	TX	Jeff Davis Co.	Courthouse, Ft. Davis	viii-2-1989			T.Hibbitts
1	TX	Jeff Davis Co.	13 mi. S Ft. Davis	vi-18-1976	at blacklight		J.R.Green
2	TX	Jeff Davis Co.	vic. Ft. Davis St. Pk.	vii-17-18-1996; vii-24-1996			Wappes&Huether; J.E.Wappes
3	TX	Jeff Davis Co.	vic. Davis Mts.	vii-19-22-1995			J.Huether
1	TX	Jeff Davis Co.	I-10, 4 mi. E of Kent	vii-24-1993			T.Hibbitts

Specimens reviewed from collections of: ASUT, CSUC, CSWC, CUIC, DACC, DCCC, EMEC, HAHC, JHUC, JEW, LACM, MCZC, MTEC, OSUC, RACC, SEMC, TAMU, UAIC, UCRC, UNSM, USNM, WBWC.