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# Taxonomic revision and phylogenetic analysis of the genus *Elytroleptus* (Dugés) (Coleoptera:Cerambycidae:Cerambycinae:Trachyderini)

Traci Lee Grzymala

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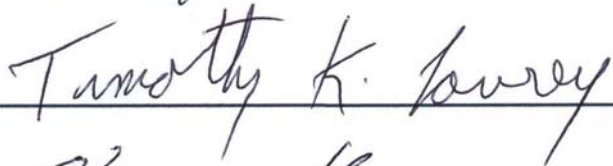
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TAXONOMIC REVISION AND PHYLOGENETIC  
ANALYSIS OF THE GENUS *ELYTROLEPTUS* DUGÉS  
(COLEOPTERA: CERAMBYCIDAE: CERAMBYCINAE:  
TRACHYDERINI)

**BY**

TRACI LEE GRZYMALA

B.S., ZOOLOGY, UNIVERSITY OF FLORIDA, 2006

THESIS

Submitted in Partial Fulfillment of the  
Requirements for the Degree of

Master of Science  
Biology

The University of New Mexico  
Albuquerque, New Mexico

August, 2009

**©2009, Traci L. Grzymala**

## **DEDICATION**

This work is dedicated to the memory of Frank Taurisano,  
my grandfather, mentor, and friend.

## **ACKNOWLEDGEMENTS**

The completion of this project would not have been possible without the integral support system of my colleagues, family, and friends. My heartfelt thanks to my major advisor, Kelly B. Miller, who supported and guided my studies from the first day to the last. My successes now and in the future are a result of his mentoring. A ‘thank you’ does not encompass the gratitude due. Thanks also to my additional committee members, Tim Lowrey and Steve Poe, for their assistance and review of this manuscript. Appreciation is also extended to the funding sources at the University of New Mexico that supported my studies (GRAC, SRAC, and the Grove Scholarship).

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My appreciation is also extended to the entire Miller Lab (especially Lauren Cleavall, Alicia Hodson, Billy Edelman, April Tafoya, and Emily Hodson) for their support and encouragement throughout graduate school.

Last, but not least, I thank my family and friends both here and afar who listened to my frustration, rejoiced in my excitement, and gave me a shoulder to lean on when needed. Though they often didn’t know the details of my experiences, they were the ones I turned to in my trying times. They are my emotional backbone and I thank them endlessly.

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**ABSTRACT**

The longhorned beetle genus *Elytroleptus* Dugés (Cerambycidae: Cerambycinae: Trachyderini) is revised to include fifteen species. One new species is described: *E. quadricostatus* **sp.n.** Grzymala & Miller. Three new synonymies are proposed: *E. dichromaticus* Linsley, 1961 = *E. divisus* (LeConte, 1884) **syn. n.**; *E. luteicollis* Skiles & Chemsak, 1982 = *E. ignitus* (LeConte, 1884) **syn. n.**; *E. peninsularis* Hovore, 1988 = *E. immaculipennis* Knull, 1935 **syn. n.** The genus is generally distributed throughout the southwestern United States, Mexico, and Central America (Guatemala, Honduras, and Nicaragua) with one species extending the range to the north and southeastern United States. The genus is of interest to both naturalists and taxonomists as several species are lycid (Coleoptera: Lycidae) mimics with three recorded as predaceous on their own models (*E. apicalis* (LeConte), *E. ignitus* (LeConte), *E. limpianus* Skiles & Chemsak). Descriptions of all species are provided with an emphasis on clarifying intraspecific polychromatic variation. A key to the adult species, distribution maps, habitus images, and illustrations of mouthparts and genitalia are provided. A phylogenetic analysis of *Elytroleptus* was performed using twenty-four adult morphological characters. Two most parsimonious trees (L=78;CI=47;RI=72) were recovered.

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## Chapter 1

### Introduction

The Cerambycidae (longhorned beetles), with approximately 35,000 described species worldwide, is one of the most species rich families within Coleoptera (Lawrence, 1982). Although diverse in coloration, body form, and adult morphology, longhorned beetles are generally somewhat cylindrical with parallel or gradually narrowed elytra. They are also characterized by long antennae in relation to body size and often by dull or cryptic coloration (Tragardh, 1930). Higher classification of the Cerambycidae is debated, but eight subfamilies are most often recognized: Anoplodermatinae Guérin-Méneville, Aseminae Thomson, Cerambycinae Latreille, Lamiinae Latreille, Lepturinae Latreille, Parandrinae Blanchard, Prioninae Latreille, and Spondylidinae Audinet-Serville. One of the largest subfamilies, Cerambycinae, is characterized by forward-projecting mouthparts, the apical maxillary palpomeres expanded or truncated apically, and the lack of grooming organs on the protibiae and mesotibiae.

The genus *Elytroleptus* Dugés (Cerambycinae: Trachyderini) as currently defined comprises eighteen extant species. The genus has a primarily southwestern United States and Mexican distribution with a few species extending their ranges into Central America (Guatemala, Honduras, and Nicaragua). Most species are found primarily in the mixed coniferous-hardwood forests of the middle altitudes of montane regions (Linsley, 1961c). One species, *E. floridanus* (LeConte) in contrast, has a large and distinct distribution from eastern Texas to Florida and along the northeastern United States to Massachusetts and New York (Fig. 37). This species is often collected along coastal shores at low elevations. Historically, the following characters have been used to define the genus: 1)

elongate, flattened form, 2) the elytra subparallel or expanded apically, 3) the antennae reaching to the middle of elytra in males, shorter in females, with the outer antennomeres serrate in both, not penicillated, and with the eleventh antennomere appendiculate.

All species in the genus *Elytroleptus* (Cerambycidae: Cerambycinae) are apparently mimics of other beetles in the families Lycidae, Cantharidae, and Cleridae (Hovore, 1988). The net-winged beetles (Lycidae) comprise a family of well-known models in numerous mimetic assemblages from the tropics and subtropics (Moore & Brown, 1989). Lycid mimicry in the Cerambycidae is common and is surpassed in frequency only by that of Hymenopteran mimicry. There are over 200 lycid mimic species spanning twenty-one tribes (Linsley, 1961a). Lycid mimicry is usually indicated with cerambycid morphology of (1) aposematic coloration, (2) a flattening of the body, (3) apical expansion of the elytra, (4) development of elytral ridges, (5) abbreviation of the antennae, (6) serration of the antennae, and (7) prolongation of the mouthparts (Linsley, 1961a). Though lycid mimicry is common, *Elytroleptus* is unique as some species (*E. apicalis*, *E. ignitus*, and *E. limpianus*) are predaceous on their own models. This behavior is unique for lycid mimics as well as for cerambycid beetles in general as they are regarded as phytophagous in the larval and adult life stages.

Although their biology is unique and interesting, study of this phenomenon is inhibited by a general lack of knowledge of the taxonomy and phylogeny of the group. The purpose of this project is to revise the genus and provide a phylogenetic hypothesis for the group based on a cladistic analysis of morphological characters.

## Nomenclatural Review

The genus *Elytroleptus* was first proposed by Dr. Eugenio Dugés (1879) upon his return from collecting in Guanajuato, Mexico. He placed two new species within this genus (*E. alfredi* Dugés and *E. luteus* Dugés) and enumerated the extreme similarities between it and the already established *Pteroplatus* Buquet since both genera contained apparent lycid mimics. Dugés separated *Elytroleptus* from *Pteroplatus* based upon the form and size of the antennae, the prothorax, the metafemurs, and last abdominal segment which is armed with a transverse brush of thick spatula-like setae.

After its initial description, *Elytroleptus* has suffered from numerous taxonomic problems most often related to their general similarity to lycids and apparently highly variable intraspecific coloration. Unfortunately the taxonomy of lycid mimics in the Cerambycidae has often been confounded due to its reliance upon few characters that appear to be artifacts of convergences on the same mimicry system. As a result, numerous authors have expressed concerns about the taxonomic placement of lycid-mimicking taxa (e.g. *Deltosoma* Thomson, *Cosmoplatidius* Gounelle, *Pteroplatus* Buquet, and *Elytroleptus* Dugés) displaying lycid mimicry. *Pteroplatus* and *Elytroleptus*, for example, are extremely similar superficially, yet their current classification places them not only in separate genera, but separate tribes [*Pteroplatus* = Pteroplatini; *Elytroleptus* = Trachyderini]. Several *Elytroleptus* species were originally described in *Pteroplatus*. This indicates the importance of finding new character systems that may be independent of the mimicry syndrome.

LeConte (1884) described four species of *Pteroplatus*. Of these, he stated that *P. rufipennis*, *P. apicalis*, and *P. ignitus* all possibly represented intraspecific color

variation, but that this would require further study to determine. Horn (1884), who published these posthumous findings of LeConte, agreed that *P. rufipennis* and *P. ignitus* represented intraspecific variation. He also remarked that *P. rufipennis* should be compared to *P. pallidus* and *E. alfredi* for further clarification.

Bates (1885) more thoroughly described *Elytroleptus*, stating that the two species Dugés described were more linear in form than those of *Pteroplatus*, but that this was not a constant character. He transferred four species from *Pteroplatus* to *Elytroleptus* (*E. octocostatus*, *E. pallidus*, *E. ignitus*, and *E. apicalis*). He synonymized *E. alfredi* with the newly transferred *E. pallidus* and described three new species (*E. longipennis*, *E. eros*, and *E. nigripennis*). Bates (1885) also mentioned that *P. floridanus* (LeConte 1862) belonged to *Elytroleptus*, but, curiously, did not list it as one of the species. In his synopsis of the Cerambycidae, Leng (1886) included the tribe Paristemiini which at the time contained the genera *Elytroleptus* and *Holopleura*. Leng (1886) listed the five species of *Elytroleptus* of North America north of Mexico as *E. floridanus*, *E. rufipennis*, *E. apicalis*, *E. ignitus*, and *E. divisus*. Bates (1892) then described *E. scabricollis*.

Several *Elytroleptus* taxa were described in the early 1900s including *E. floridanus immaculipennis* Knull, 1935, *E. grandis* Linsley, 1935, and *E. davisii* Knull, 1940. Knull (1950) described *E. lineatus*, elevated *E. immaculipennis* to species rank and described a varietal form, which he named *E. immaculipennis* var. *obliquus*. Linsley (1961b) published the first review of the tribe Pteroplatini (which at that time included *Deltosoma* Thomson, *Cosmoplatidius* Gounelle, *Pteroplatidius* Linsley, *Parathetesis* Linsley, *Corynellus* Bates, *Parevander* Aurivillius, *Pteroplatus* Buquet, *Elytroleptus* Dugés, and *Holopleura* LeConte). In this work, *E. octocostatus* was placed in the newly



proposed genus *Pteroplatidius* based upon the prothorax not constricted at the base, the elytra fringed with long setae, and the apical elytral region transversely and irregularly reticulate (Linsley, 1961b). Also, *E. longipennis* and *E. eros* were synonymized with *E. rufipennis*; *E. davisi* was placed as a subspecies of *luteus*; and two new species (*E. dichromaticus* and *E. humeralis*) were described. Linsley (1961b) also included the first key to all species of *Elytroleptus* known at that time. Linsley (1961b) stated that *E. metallicus* was *incertae sedis* with respect to the genus since the original description did not adequately position it in *Pteroplatus* where it was originally placed by Nonfried (1894) nor in *Elytroleptus* where it was transferred by Aurivillius (1912). In his major work on the Cerambycidae of North America, Linsley (1962a) included a key to the species of *Elytroleptus* north of Mexico. In the same year, Linsley (1962b) produced a separate publication that included a key to all known species. Chemsak & Linsley (1965) published a revised key to the species of *Elytroleptus*, adding information regarding polychromatism of species after reviewing Mexican specimens. They also described the new species *E. similis*.

Chemsak and Linsley (1974) transferred *Elytroleptus* from the tribe Pteroplatini into Purpuricenini and erected the new tribe, Holopleurini, where the monotypic *Holopleura* is currently placed. However, they did not discuss their reasoning for these changes.

Skiles and Chemsak (1982) described *E. luteicollis* and *E. limpianus*; *E. lineatus* was synonymized with *E. luteus davisi*; and lectotypes for *E. apicalis*, *E. ignitus*, and *E. rufipennis* were designated.

Fragoso *et al.* (1987) proposed dramatic changes to the Cerambycinae based upon patterns of the terminalia in both males and females. They erected two major new family group names, the supertribes Cerambycoina and Trachyderoinia. They reviewed the classification of the Cerambycinae and the problems encountered due to character systems suffering from numerous convergences (e.g. the occurrence of coarsely faceted and finely faceted eyes in relation to nocturnal and diurnal habits respectively). Reference was made to Chemsak and Linsley's (1974) publication where several genera were transferred to the Purpuricenini (including *Elytroleptus*). According to Fragoso *et al.* (1987), these changes were based upon 'the terminalia criterion', without more specific explanation. *Elytroleptus* was placed in the supertribe Trachyderoinia, tribe Trachyderini, and subtribe Trachyderina.

Hovore (1988) described the most recently erected species, *E. peninsularis*, from Baja California, Mexico.

### **Biological History**

All *Elytroleptus* species exhibit aposematic coloration and all are thought to engage in Lycidae, Cantharidae, or Cleridae mimicry complexes (Hovore, 1988). *E. apicalis* is part of the *Lycus fernandezi* mimicry complex. The complex consists of the Müllerian model lycid beetle sister species *Lycus fernandezi* Dugés and *L. arizonensis* Green along with the Batesian cerambycid *E. apicalis* and Batesian moths *Seryda constans* (Edwards) and *Ptychoglene coccinea* (Edwards) (Linsley *et al.*, 1961a). *Elytroleptus ignitus* is part of the *Lycus loripes* mimicry complex. This complex, similar to that of *L. fernandezi*, consists of the Müllerian model lycid sister species *L. loripes* (Chevrolat) and *L. simulans* (Schaeffer), the Batesian cerambycid *E. ignitus*, and the

Batesian moths *Eubaphe unicolor* (Robinson) and *Holomelina ostentata* (Edwards) (Linsley *et al.*, 1961a). *Elytroleptus limpianus* has been observed among aggregations of *L. simulans* (Schaeffer), which is its proposed model (Skiles & Chemsak, 1982). These relationships are not unique in themselves as lycid mimicry is well represented in the Cerambycidae spanning over 200 species in sixty genera in twenty-one tribes (Linsley, 1961a). The remarkable aspect of the life histories of *E. apicalis*, *E. ignitus*, and *E. limpianus* is their feeding habits as predators on their lycid models.

Cerambycids are generally regarded as phytophagous in both the larval and adult stages. Von Butovitsch (1939) recognized eight categories of adult cerambycid food habits: (1) flower feeders on pollen, stamens, nectar, etc.; (2) bark feeders on bark, bast, twigs, branches, trunks; (3) leaf feeders on foliage, leaf stalks; (6) fruit feeders; (7) root feeders; and (8) fungus feeders. *Elytroleptus* is the only genus in Cerambycidae known to contain predaceous species. The only other account involving possible predaceous cerambycids was documented by Bittenfield (1948) when he observed adults of *Aromia moschata* (Linnaeus) predating upon young spiders. The species of spider is unknown and the observation was not well documented. Well-documented field and laboratory accounts of *E. apicalis* and *E. ignitus* describe how these cerambycid beetles join aggregations of lycids and subsequently prey upon individuals. The cerambycids are found in these lycid aggregations in ratios of 100 lycids to one cerambycid (Eisner, 2003). A single cerambycid will mount a lycid as if proceeding to mate, holding onto the substrate with its posterior legs. The cerambycid will then use its mandibles to tear at the elytra of the lycid. Attack on lycids results in a range of outcomes from slight injury to complete ingestion. The cerambycids are not prey-specific and will attack lycids in other

complexes (e.g. *E. apicalis* has been documented attacking *L. loripes*). These *Elytroleptus* species were considered Batesian mimics, though early publications on the subject suggested that species may possibly fluctuate between Müllerian and Batesian depending on time since lycid ingestion. Eisner *et al.* (2008) performed experiments to test this hypothesis. They looked for lycidic acid, the compound thought to cause lycid distastefulness, in cerambycids before and directly after lycid ingestion. There were no traces of lycidic acid detected at any point in the *Elytroleptus* species (Eisner *et al.*, 2008). All other *Elytroleptus* species are thought to engage in mimicry complexes, but the models for these interactions are unconfirmed and their food preferences are not known.

Skiles & Chemsak (1982) reported a specimen of *E. apicalis* found in its pupal chamber in a dead twig of *Quercus* in Fort Davis, Texas. This is the only host record and the only information regarding the larval or pupal habits of any *Elytroleptus* species.

## **Materials & Methods**

### *Material examined*

1744 preserved specimens were borrowed from the public and private collections listed below. Museum acronyms follow the system proposed by Arnett *et al.* (1993). Curators, collection managers and/or contact persons are listed following individual collection information. Label data for primary type material are provided verbatim with line separation indicated by the "/" symbol. Additional label data are listed by country, state, and city for each species. United States localities are also listed by county and geographic location when applicable. All specimens evaluated in this study were determined to species and bear an identification label.

AMNH	American Museum of Natural History, New York, New York, USA (L. Herman)
BMNH	Natural History Museum, London, United Kingdom (S. Shute)
CASC	California Academy of Sciences, San Francisco, California, USA (D. Kavanaugh, V. Lee)
CMNH	Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA (R. Davidson)
CNCI	Canadian National Collections of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada (Y. Bousquet)
CUIC	Cornell University Insect Collection, Ithaca, New York, USA (J. Liebherr, E. R. Hoebeke)
DHPC	Daniel Heffern Private Collection, Houston, Texas, USA (D. Heffern)
EMEC	Essig Museum of Entomology, University of California, Berkeley, California, USA (C. Barr)
FMNH	Field Museum of Natural History, Chicago, Illinois, USA (J. Boone)
FSCA	Florida State Collection of Arthropods, Gainesville, Florida, USA (M. Thomas)
ISPC	Ian Swift Private Collection, Santa Clarita, California, USA (I. Swift)
JEWC	James E. Wappes Private Collection, San Antonio, Texas, USA (J. Wappes)
LACM	Natural History Museum of Los Angeles County, Los Angeles, California, USA (B. Brown, W. Xie)

MCZC	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA (P. Perkins)
PMNH	Peabody Museum of Natural History, New Haven, Connecticut, USA (R. Papedis)
RAAC	Robert A. Androw Collection, Gibsonia, PA, USA (R. Androw)
SEMC	Snow Entomological Museum, University of Kansas, Lawrence, Kansas, USA (Z. Falin, J. Thomas)
TAMU	Texas A&M University Insect Collection, College Station, Texas, USA (J. Oswald, E. Riley)
UCD	Bohart Museum of Entomology, University of California, Davis, California, USA (S. Heydon)
USNM	United States National Museum of Natural History, Smithsonian Institution, Washington, D. C., USA (S. Lingafelter, D. Furth)

#### *Morphological examination*

External morphology was studied using an Olympus SZ60 microscope. Habitus images were taken using a BK Plus Imaging System (Visionary Digital). Images were captured using Adobe Photoshop Lightroom v. 1.4.1 (Adobe Systems, Inc.), montaged in Helicon Focus v.4.21.5 (Helicon Soft Ltd.), and edited in Adobe Photoshop CS3 Extended v. 10.0.1 (Adobe Systems, Inc.). Morphometric data were obtained by uploading photographs into Adobe Photoshop CS3 Extended v. 10.0.1 (Adobe Systems, Inc.) and correlating the ruler tool to the lens settings of the camera. Additional morphometric data were obtained using a micrometer eyepiece. Illustrations were made in Adobe Illustrator (Adobe Systems, Inc.) using a Wacom Bamboo drawing tablet after

first importing images taken using the BK Plus Imaging System. Terminology for external morphology follows the Torre-Bueno Glossary of Entomology (1937). Genitalia terminology reflects Sharp & Muir (1912) in conjunction with Fragoso *et al.* (1987). Measurement abbreviations are listed as follows: TL, total length, measured from antennal tubercles to elytral apex; GW, greatest width across elytra; HL, head length, measured from antennal tubercle to anterior pronotal margin; HW, head width, measured from outer apices of lower lobes of eyes in anterior head view; DBE, distance between inner apices of lower lobes of eyes in anterior head view; DBA, distance between antennal insertions; PL, pronotal length measured medially between apical and basal margins; PW, pronotal width, measured at widest point, generally at the pronotal midline; EL, elytral length measured from humeral angle to elytral apex. Effort was made to measure the smallest and largest specimens available for each species in order to describe the range. One specimen of *E. luteus* was made available for dissection and was completely disarticulated. Morphological features of this species were illustrated (Figs. 1 and 2) in greater detail than for others.

#### *Distribution maps*

Distribution maps were generated for each species using ArcGIS 9 (Redlands, CA, USA). Latitude and longitude coordinates were obtained using Falling Rain Genomics, Inc. ([www.fallingrain.com](http://www.fallingrain.com)) for most city locations and Google Earth ([www.maps.google.com](http://www.maps.google.com)) was used for more detailed specific label data. When provided, latitude and longitude coordinates were used directly from label data, though this was available for few specimens. Maps were generated using solely label data. Locality information from the literature was not included unless supported by specimen data.

### *Biological data*

Biological data were based on specimen label data and the literature. Plant families and species authorities were determined using label data and entering this information into Tropicos ([www.tropicos.org](http://www.tropicos.org)).

### *Species limits*

The phylogenetic species concept is used in this study where species are the smallest aggregation of populations diagnosable by a unique combination of character states (Wheeler & Platnick, 2000). All proposed species are scientific hypotheses. The greater the number of specimens examined for each species, the stronger the hypothesis. *Elytroleptus* currently has two subspecific valid names (*E. pallidus villosus* and *E. luteus davisii*) in addition to the specific valid names. The type specimens for these subspecies were examined and each appears to fall within their respective species category. All current subspecific and previously synonymized subspecific valid names are listed along with their literature citations for each species treatment. This scope of this revision is based at the species level and subspecies are not addressed further.

## **Genus Description**

### ***Elytroleptus* Dugés**

*Elytroleptus* Dugés 1879: 182-185. Type species: *Elytroleptus alfredi* Dugés 1879: 185 (by subsequent designation of Linsley 1962: 175) [= *Pteroplatus pallidus* Thomson, 1860]; Lameere 1883: 40; Bates, 1885: 317; Leng, 1886: 31; Bradley, 1930: 240; Knull, 1946: 228; Linsley, 1961a: 632 (biol.); 1961b: 2 (key), 1962a: 175; 1962b: 1 (rev.); Chemsak & Linsley, 1965: 1923 (rev.); 1974: 182 (tax.); Fragoso *et al.*, 1987:201 (tax); Monné, 2005: 605 (cat.).



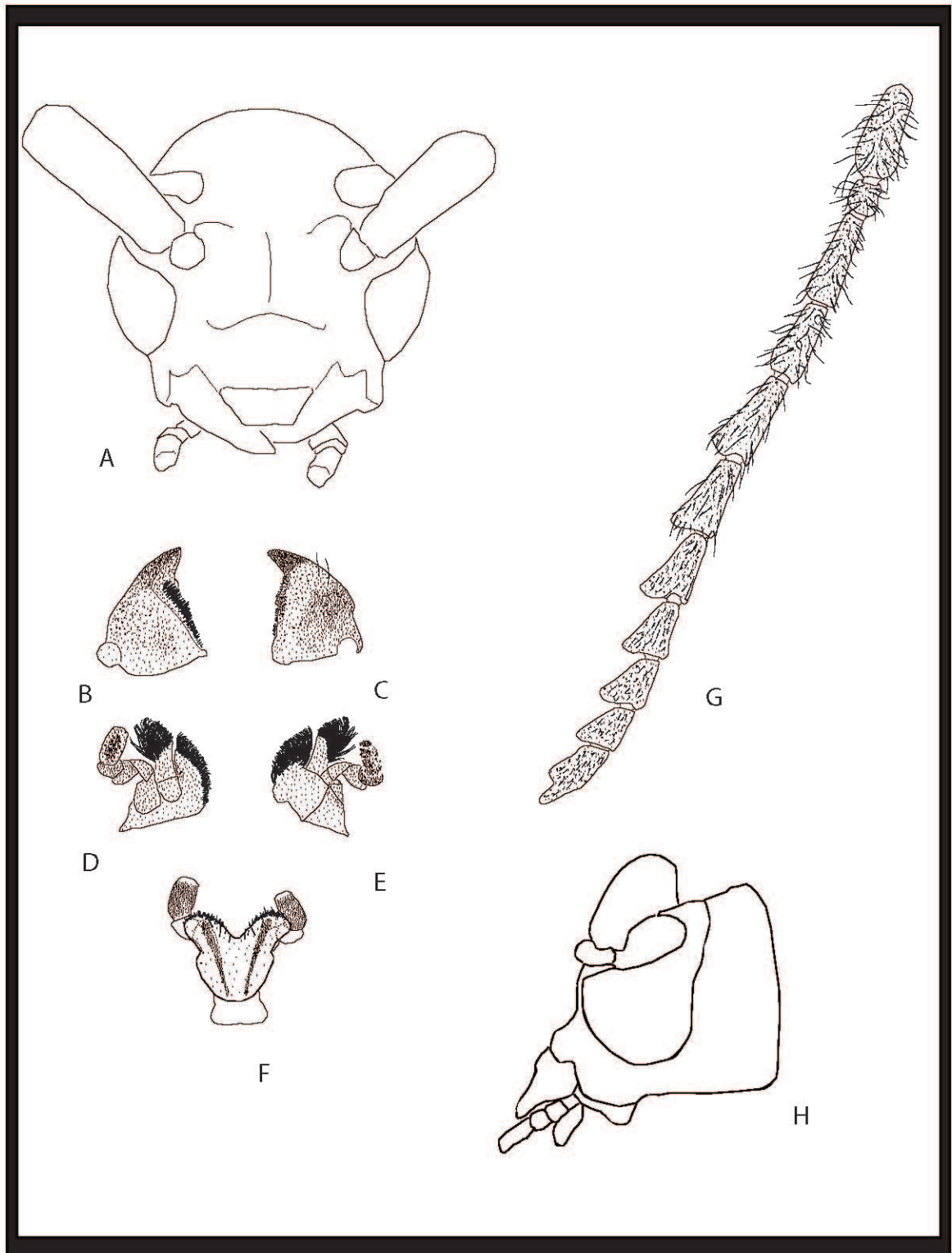


Figure 1. *Elytroleptus luteus* (A) head, anterior aspect; (B) right mandible, ventral aspect; (C) right mandible, dorsal aspect; (D) left maxilla, dorsal aspect; (E) left maxilla, ventral aspect; (F) labium, dorsal aspect (G) antennae; (H) head, lateral aspect.

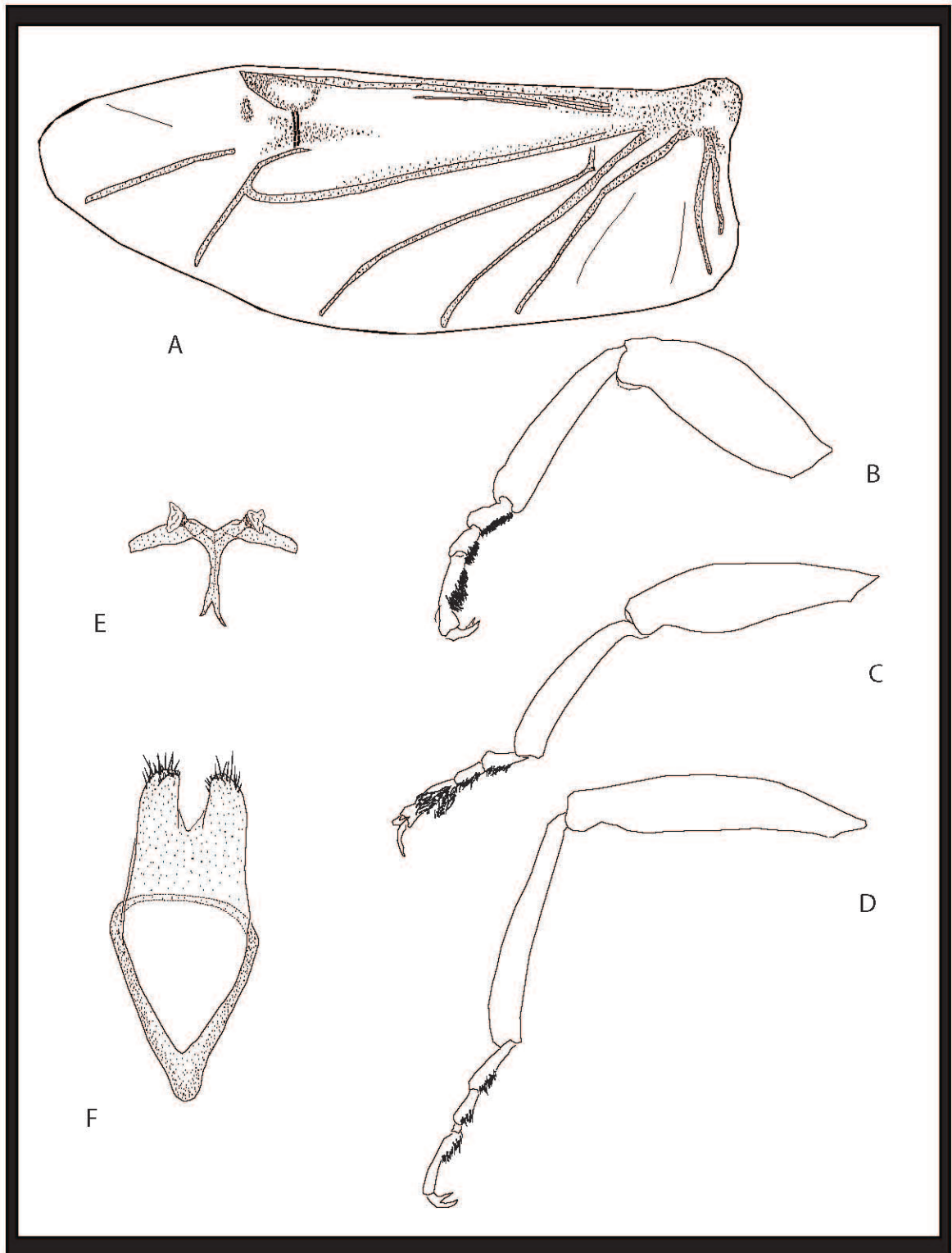


Figure 2. *Elytroleptus luteus* (A) metathoracic wing; (B) prothoracic leg; (C) mesothoracic leg; (D) metathoracic leg; (E) metendosternite; (F) genitalia, tegmen & parameres.

*Elitroleptus* Dugés 1879: 182. [Incorrect original spelling ICZN 32.4] (Unavailable Name per ICZN 24.2.3, see Remarks section below)

*Pteroplatus*; Thomson, 1860: 255; LeConte, 1873: 310; LeConte & Horn, 1883: 295.

**Diagnosis:** A phylogenetic hypothesis for relationships within the tribe Trachyderini and the subtribe Trachyderina is not currently available. A phylogenetic analysis for the genus is conducted in this revision (see below) and the monophyly of *Elytroleptus* is supported by the synapomorphies of (1) antennal length in males reaching to less than half the elytral length (Character 3, Fig. 28), (2) the eleventh antennomere appendiculate (Character 4, homoplasious, Fig. 29), (3) pronotal punctation large in diameter (Character 9, Fig. 19), (4) the pronotal width less than  $1.2 \times$  length (Character 13), (5) male sexually dimorphic pronotal punctation restricted to oval area above lateral margin (Character 15, Fig. 32), and (6) the elytral length more than  $4 \times$  the pronotal length (Character 16).

**Description:**

**Body:** Elongate, parallel or expanded apically from humeri, dorsoventrally flattened.

**Coloration:** All species with combinations of yellow, testaceous, rufo-testaceous, red, and piceous integument and pubescence.

**Sexual Dimorphism:** Males with antennae longer, antennomere serration more pronounced, and appendiculate aspect of antennomere XI longer. Females with transverse rows of spatula-like setae on abdominal sternite VIII. Males of several species with densely punctate areas on prothorax indicative of gland pores, restricted to oval area directly above pronotal lateral margins, often differently colored than remaining integument.

**Head (Fig. 1 A, G):** Slightly declined, narrower at posterior margin than width of prothorax at anterior margin, shallowly, sparsely to moderately punctate with suberect to erect pubescence arising from punctures; vertex often covered with more dense, appressed pubescence, eyes separated from prothoracic apex by width of upper eye lobe; moderate, recumbent pubescence arising from outer margins of eyes; rugose posterior to eye; antennal tubercles slightly to moderately raised and separated by approximately four  $\times$  width of an antennal socket; clypeus much wider than long; frontoclypeal suture distinct, straight to slightly concave; gular region shining, with sparse erect pubescence apically.

**Eyes:** Large, finely faceted (about 25 facets at greatest height of lower lobe; 11 facets across width of upper lobe), lower lobe occupying about 1/2 or more of head thickness; with deep emargination at insertion of antennae enclosing region clothed with moderately dense recumbent pubescence; ovate-emarginate with deep indentation at insertion of antennae which is clothed with moderately dense recumbent pubescence, 1-5 facets thick at greatest emargination point.

**Antennae (Fig. 1 F):** With eleven antennomeres, reaching to approximately 2/3 elytral length at most, less in some species, with fine, numerous punctures; antennomeres expanded apically; antennomeres I-VI covered in moderately dense, suberect to erect pubescence, becoming recumbent and shorter on antennomeres VII-XI; scape slightly shorter than antennomere V, subequal to VI, moderately curved, with shallow longitudinal, dorsal and ventral impressions; pedicel about 1/2 to 1/3  $\times$  scape length; antennomeres III and IV subequal, each 2  $\times$  pedicel length; antennomeres V-VIII decreasing in length; antennomeres VIII and IX subequal; antennomere X shorter than

IX; antennomeres V-X serrate, produced medially at apices; antennomere XI appendiculate, degree of appendiculation variable, length of appendiculation  $0.1-1.0 \times$  the width at point of appendiculation, more pronounced in males; none penicillated.

**Mouthparts (Fig. 1 B, C, D, E):** Labial palp with 4 palpomeres; apical palpomere subquadrate; palpomere II with apex strongly expanded, about  $4 \times$  width at base. Ligula broadly rounded, sparsely setose. Maxillary palp (Fig. 1D, E) with 5 palpomeres; apical palpomere subquadrate; palpomere II short, about  $1/3 \times$  length of apical palpomere, expanded apically; maxilla with distinct galea and lacinia subequal to maxillary palp length. Galea subquadrate with apex densely setose. Lacinia triangular, curved, mandible-like, densely setose at apex. Mandible (Fig. 1B, C) large, triangular; cutting surface unserrated, with medial, sclerotized, small tooth; crescent-shaped; medial margin with line of dense setae.

**Prothorax:** Pronotum constricted at base and apex, lateral margins expanded, either evenly rounded or angulated, widest medially. Shining, with punctation variable from sparse to dense and shallow to deep with short, suberect to recumbent pubescence arising from punctures; several species with two arcuate lines of dense, appressed pubescence overlying slightly raised integument, lateral to central pronotal disc, each of similar width throughout and occupying  $1/4$  of pronotal disc area, lateral margins often also clothed in dense, suberect to erect pubescence, some species with two arcuate lines of dense pubescence extending to lateral margins. Disc flattened to slightly convex. Apical and basal margins clothed with single line of moderately dense, erect pubescence, apical margin forward-projecting, basal margin rear-projecting. Anterior margin straight. Posterior margin sinuate with two slightly anterior concave regions (each laterad to

center). Procoxal cavities externally closed, internally open. Prosternum shining, sparsely punctate with suberect to erect pubescence. Prosternal process slightly declined posteriorly, width  $\frac{1}{4} \times$  procoxal width, apex generally rounded.

**Pterothorax (Fig. 2E):** Scutellum small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent pubescence.

Metendosternite as in Figure 2 E. Mesosternum shining, anterior margin sinuate, slightly projecting medially past lateral aspects. Mesosternal process extending to middle of mesocoxae, apex projecting triangularly into lateral face of mesocoxae, pubescence more dense on apex. Mesepisternum moderately punctate, with suberect to erect pubescence. Metasternum shining, sparsely punctate with suberect to erect pubescence. Metasternal sulcus distinct. Metepisternum shining, moderately punctate with suberect to recumbent pubescence, more dense posteriorly.

**Elytra:** Lateral margins nearly parallel or expanded apically; width across humeral angles slightly greater than width of pronotum at base; each elytron with three or four costae depending on species; elytra covered in moderate punctation, with erect to recumbent setae arising from each puncture, pubescence more dense on apices, punctures not linearly aligned, variable in diameter and depth between species. Punctures variable in depth and diameter basally, medially, and apically in some species. Without punctures along suture and margins of elytron, these regions slightly elevated. Each elytral apex rounded, without carinae.

**Metathoracic Wings (Fig. 2 A):** Lightly to darkly tinted, some with basal aspects light, apical aspects dark. Radial cell weakly developed. MP and RA veins distinct.

**Legs (Fig. 2 B, C, D):** Procoxa rounded. Femora slightly arcuate, metafemur more so; shining, finely, sparsely punctate with suberect to erect setae arising from punctures; swollen medially, profemur more so; apex with anterior and posterior surfaces expanded into ventrally-projecting semicircular processes, concealing articulation in lateral aspect. Tibia straight to slightly arcuate; expanded apically; shining, finely, sparsely punctate with setae arising from punctures, ventral surface of protibia moderately clothed with erect pubescence. Two tibial spurs. As in femur, apex with anterior and posterior surfaces expanded into ventrally-projecting semicircular processes concealing articulation in lateral aspect. Tarsi pentamerous; with moderate, suberect to recumbent pubescence dorsally; pubescent pads present ventrally; one seta on each lateral aspect of apical tarsomere extending to  $\frac{1}{2} \times$  length of tarsal claws. Tarsal claws simple.

**Abdomen:** Shining, sparsely punctate with suberect to erect pubescence. Five ventrites visible, each ventrite slightly wider than long; each subsequent apical ventrite decreasing slightly in width; terminal ventrite tapering toward apex, apex rounded to straight, often with slight medial impression.

**Genitalia (Fig 2 F):** Male genitalia with parameres parallel, broadly separated by  $\frac{3}{4} \times$  paramere width; separation shallow,  $\frac{1}{3}$  paramere length, to deep  $\frac{1}{2}$  length of parameres. Setal length short,  $\frac{1}{6}$  paramere length. One row of setae at apex of paramere, second row present just basal to apex, slightly sclerotized ridge occupying  $\frac{1}{2}$  of paramere width. Tergite VIII, tapering to apex, often with slight medial impression, margins clothed with moderate pubescence. Sternite VIII variably sinuate, margins clothed with sparse to moderate short pubescence. Female genitalia with sternite VIII armed with transverse rows of spatula-like setae. Tergite VIII trilobate.

**Remarks:** In the original description of the genus, Dugés first lists "*Elitroleptus* (elitro blando)" and then subsequently lists the two described species as "*Elytroleptus Alfredi*" and "*Elytroleptus luteus*". To avoid future confusion and to preserve stability of the genus name, *Elytroleptus* is selected as the correct spelling [ICZN article 24.2.3]. *Elitroleptus* is an incorrect original spelling and is unavailable for future use [ICZN article 32.4].

### Key To Adult *Elytroleptus* Species

Males, which are easier to diagnose than females, are easily distinguished by the absence of transverse rows of spatula-like setae on the last abdominal segment.

1. Pronotal disc without two distinct longitudinal bands of appressed, dense pubescence (Fig. 18 B, E; Fig. 19A, F) ..... 2
- 1'. Pronotal disc with two distinct longitudinal bands of appressed, dense pubescence, integument underlying dense pubescence often differently colored than remaining pronotum (Fig. 18 A, C, D, F, G, H; Fig. 19 B C, D, E, G) ..... 5
- 2(1). Elytra with longer, erect pubescence basally and shorter, suberect pubescence apically (Fig. 21 D, Fig. 22 D)..... 3
- 2'. Elytra with short, suberect pubescence basally and apically (Fig. 20 B, E) ..... 4
- 3(2). Elytral punctures medially deeper and larger in diameter than punctures apically and basally (Fig. 33 B); in males, prothorax without densely punctate oval areas directly dorsad of lateral margins (Fig. 32 A) (Mexico-Guatemala) .*E. scabricollis* Bates (Fig. 16)
- 3'. Elytral punctures medially similar to punctures apically and basally (Fig. 33 A); in males, prothorax with densely punctate oval areas directly above lateral margins, often



differently colored than remaining integument (Fig. 32 B) (northwestern Mexico-Honduras)..... *E. luteus* Dugés (Fig. 11)

4(2). Elytron with 4-5 punctures between suture and first costa medially (Fig. 23 E); pronotal disc with numerous deep punctures, more than 100 punctures visible; in males, prothorax without densely punctate oval areas directly dorsad of lateral margins (Fig. 32 A) (northern Mexico)..... *E. humeralis* Linsley (Fig. 7)

4'. Elytron with 2-3 (Fig. 23 B) punctures between suture and first costa at midline; pronotal disc with shallow, sparse punctures, less than 100 punctures visible; in males, prothorax with densely punctate oval areas directly dorsad of lateral margins (Fig. 32 B) (southwestern USA-northeastern Mexico) ..... *E. divisus* (LeConte) (Fig. 4)

5(1). Elytra coarsely punctate, with at most 5 rows of punctures between costae at apex of scutellum..... 6

5'. Elytra finely punctate, with more than 5 rows of punctures between costae at apex of scutellum..... 8

6(5). Elytral entirely yellow or testaceous; pronotal disc with less than 50 distinct punctures visible on entire area between two longitudinal lines of dense, appressed pubescence (central Mexico) ..... *E. similis* Chemsak & Linsley (Fig. 17)

6'. Elytral integument with black regions or entirely rufo-testaceous; pronotal disc with more than 50 distinct punctures visible on entire area between two longitudinal lines of dense, appressed pubescence ..... 7

7(6). Pronotal disc with two longitudinal lines of dense, appressed, testaceous pubescence overlying testaceous integument (eastern USA-eastern Texas) ... *E. floridanus* (LeConte) (Fig. 5)

- 7'. Pronotal disc with two longitudinal lines of dense, appressed, white to pale yellow pubescence overlying red integument (southwestern USA-west central Mexico) .....*E. immaculipennis* Knull (Fig. 9)
- 8(5). Elytra concolorous black (southwestern Mexico).....*E. nigripennis* Bates (Fig. 12)
- 8'. Elytra not concolorous black ..... 9
- 9(8). Elytral punctation larger in diameter medially than at apex of scutellum between suture and first costa (Fig. 33 B)..... 10
- 9'. Elytral punctation subequal in diameter medially than at apex of scutellum between suture and first costa (Fig.33 A) ..... 11
- 10(9). Scutellum black; pronotum black or red medially (Mexico) .....*E. pallidus* (Thomson) (Fig. 13)
- 10'. Scutellum testaceous; pronotum testaceous medially (southwestern USA-northern Mexico).....*E. ignitus* (LeConte) (Fig. 8)
- 11(9). Pronotum testaceous or rufo-testaceous medially, some specimens with small black region mediobasally within central testaceous or rufo-testaceous portion ..... 12
- 11'. Pronotum black medially, some specimens with small testaceous or rufo-testaceous region mediobasally within central black portion ..... 13
- 12(11). Elytral punctation shallow and small in diameter, 7-10 rows of punctures between suture and first costa at midline (Fig. 23 A), elytral apices of many specimens black (southwestern USA- northern Mexico).....*E. apicalis* (LeConte) (Fig. 3)
- 12'. Elytral punctation deep and moderate in diameter, 5-6 rows of punctures between suture and first costa at midline (Fig. 23 H), elytral apices never black (southwestern USA) ..... *E. limpianus* Skiles & Chemsak (Fig. 10)

13(11). Elytral apices not black (southwestern USA-Mexico)...*E. rufipennis* (LeConte)  
(Fig. 15)

13'. Elytral apices black..... 14

14(13). Elytral punctation shallow and small in diameter, 7-10 rows of punctures  
between first and second costa at midline (Fig. 23 D) (southeastern Mexico-Nicaragua) *E.*  
*grandis* Linsley (Fig. 6)

14'. Elytral punctation deep and moderate in diameter, 5-6 rows of punctures between  
first and second costa at midline (Fig. 24 C ) (central Mexico-Guatemala).....*E.*  
*quadricostatus* sp. n. Grzymala & Miller (Fig. 14)

### Species Accounts

#### *Elytroleptus apicalis* (LeConte, 1884)

(Figs. 3, 18A, 20A, 23A, 25A)

*Pteroplatus apicalis* LeConte, 1884: 24 (orig. descr.).

*Elytroleptus apicalis*; Bates, 1885: 318 (dist.); Leng, 1886: 32 (key); Linsley *et al.*,  
1961a: 19, fig. 2 (biol.); Linsley, 1961b: 10 (key); Linsley *et al.*, 1961b: 19, fig.11 (dist.);  
Eisner *et al.*, 1962: 316, figs. 1,3 (biol.); Linsley, 1962a: 176 (descr.), 1962b: 2, fig. 1  
(key); Selander *et al.*, 1963: 46 (biol.); Chemsak & Linsley, 1965: 193 (key); Skiles &  
Chemsak, 1982: 69 (lect.); Chemsak *et al.*, 1992: 82 (cat.); Noguera & Chemsak, 1996:  
402 (cat.); Monné, 2001: 70 (cat.); Eisner, 2003: 170 (biol.); Monné, 2005: 604 (cat.);  
Eisner *et al.*, 2008: 111, fig. 2 (biol.).

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the  
following combination of characters: 1) elytra expanded apically, greatest width >1.5 ×  
humeral angle width, 2) pronotum and abdomen testaceous, 3) pronotum with



Figure 3. *Elytroleptus apicalis* (LeConte) dorsal habitus, male.  
Scale bar = 1 mm.

longitudinal lines of dense appressed, testaceous pubescence, and 4) elytron with small, shallow punctures, 6-8 punctures medially between suture and costa I. This species is most easily confused with *E. ignitus* and can generally be distinguished by having the apical 1/5 of the elytra black, though this character is not constant as some individuals are concolorous. The antennae, especially in males, are greater in length than in *E. ignitus* with the eleventh antennomere extremely appendiculate (length of appendiculation 0.8-1.0  $\times$  the width at point of appendiculation). Males also have densely punctate oval areas directly above the pronotal lateral margins indicative of sexually dimorphic gland pores. The only readily apparent distinguishing character for both males and females is the degree of elytral punctation (6-8 punctures medially between suture and costa I instead of 5-6 punctures). From *E. limpianus* and *E. rufipennis*, it is distinguished by the longer antennae in males (extending past  $\frac{1}{2}$  elytral length), the testaceous scutellar pubescence instead of black, and the testaceous abdomen instead of black. From *E. grandis* it is distinguished by the central pronotal disc entirely or majority of region testaceous as opposed to black.

**Description:** Male. TL 9.1-16.8 mm, GW 3.2-6.1 mm.

Body elongate, expanded apically from humeri, dorsoventrally flattened.

*Head:* HL 0.7-1.1 mm, HW 1.4-2.3 mm, DBE 0.9-1.5 mm, DBA 0.6-0.8 mm.

Testaceous, except apices of mandibles piceous. Finely punctate with short, sparse, suberect to erect, testaceous pubescence, more dense on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles moderately raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width greater than  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower

lobe with about 25 facets at greatest height; integument ventral to lower lobe about  $0.5 \times$  eye height; deeply emarginate at antennal insertion, with 1-2 facets at greatest emargination point. Antennae black, extending to approximately  $3/5$  elytral length, scape and antennomere V subequal, scape with slight longitudinal, dorsal, median impression; pedicel about  $1/3 \times$  scape length; antennomeres III and IV subequal, each  $2 \times$  pedicel length; antennomeres VI and VII subequal, VIII and IX subequal, V-X decreasing in length; antennomere XI subequal to VI and extremely appendiculate, length of appendiculation  $0.8-1.0 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18A): PL 1.6-2.8 mm, PW 1.7-3.1 mm. Pronotum testaceous, width slightly greater than length; apical width slightly less than basal; lateral margins angulate, widest medially. Pronotal disc shining, punctate, with short, recumbent, testaceous pubescence; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying slightly raised integument, each of similar width throughout and occupying  $1/4$  of pronotal disc area; punctation on shining areas deep, individual punctures small and varying in diameter and shape, majority not clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex, sides impressed in dorsal aspect, margin apparently elevated, calli absent; lateral margins lined with recumbent and erect, moderate, testaceous pubescence. Pro-, meso- and metasternum testaceous, shining with sparse, erect, testaceous setae. Scutellum testaceous, small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent, testaceous pubescence.

*Wings* (Figs. 20A, 23A): EL 6.8-12.9mm. Elytron with basal 4/5 testaceous, apical 1/5 piceous, margin irregular. About  $4.5 \times PL$ , width at humeral angles about  $1.2 \times PW$ . Elytron expanded apically, greatest width  $>1.5 \times$  width at humeral angle. Elytron with 4 distinct costae; from suture, costa I arising from anterior margin and extending to 3/5 elytral length, costa II arising from anterior margin and extending to 4/5 elytral length, costa III more indistinct than others and arising from about 2/5 posterior to middle of anterior margin and extending to 4/5 elytral length, costa IV arising from humeral angle and extending to 4/5 elytral length; elytron with distinct but shallow punctation, 6-8 punctures medially between suture and costa I, becoming indistinct, shallower apically, subequal basally; elytron with moderate, short, suberect to recumbent pubescence, one seta per puncture, testaceous on pale-colored areas, black on dark-colored areas, outer elytral margins with pubescence more dense. Metathoracic wing bi-colored, basal 4/5 lightly tinted, apical 1/5 darkly tinted.

*Abdomen*: Testaceous, shining, finely punctate, covered in sparse, short, suberect, testaceous pubescence.

*Legs*: Testaceous with tibial apices and tarsi piceous. Femora covered in sparse, suberect, testaceous pubescence, tibia covered in sparse, suberect, black pubescence, tarsal pubescence recumbent and more dense. Metatibia slightly sinuate.

*Genitalia* (Fig. 25A): Sternite VIII with sides gradually tapering towards apex, apex truncate often with slight concavity medially. Tergite VIII mirroring shape of sternite VIII.

*Female*: TL 10.4-15.9 mm, GW 4.1-6.1 mm, HL 0.4-0.8 mm, HW 1.5-2.0 mm, DBE 0.9-1.3 mm, DBA 0.6-0.8 mm, PL 1.8-2.4 mm, PW 2.1-3.1 mm, EL 8.2-12.7 mm. As

male, except antennae extending slightly past 1/5 elytral length, antennomere XI not as strongly appendiculate. Pronotum lacking sexually dimorphic densely punctate oval areas above lateral margins. Elytron greater in length, about  $4.9 \times$  length of pronotum.

**Intraspecific variation:** Some individuals with concolorous testaceous elytra; development of elytral costa III variable; costa II and III apically convergent in some individuals; costa I curving medially; scape and basal  $\frac{3}{4}$  of remaining antennomeres testaceous; supra-orbital areas piceous; pronotal dimorphic punctate areas piceous in males; scutellum with pubescence mostly testaceous with some setae piceous; scutellum piceous; central area of pronotum piceous; lateral margins of pronotum piceous. Older specimens are sometimes faded and testaceous areas appear yellow.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. grandis* supported by the eleventh antennomere extremely appendiculate in males (Character 4) and small, shallow elytral punctation (Character 19).

**Type material:** LECTOTYPE male in MCZC with the following label data: Label 1: "Ariz.". Label 2: "Type / 3898". Label 3: "P. apicalis / Lec.". Label 4: "LECTOTYPE / Pteroplatus / apicalis / LeConte / Skiles & Chemsak, 1982".

**Type locality:** USA, Arizona.

**Specimens examined:** High quality digital images of the lectotype (habitus dorsal view, habitus lateral view, head frontal view, and labels) were viewed using the MCZC online type database (<http://insects.oeb.harvard.edu/mcz/>). Two hundred and thirteen additional specimens were examined (145 ♂, 68 ♀).



**Distribution (Fig. 35):** Southwestern USA (Arizona, New Mexico, Texas) and northern to central Mexico (Aguascalientes, Chihuahua, Coahuila, Durango, Tamaulipas, Zacatecas).

**Biology (Fig. 34A, B, C):** Flight period June through September. Adults have been collected on flowers and foliage of plants in the families Anacardiaceae (*Rhus* sp.), Asteraceae (*Solidago* sp.), Fabaceae (*Acacia* sp., *Melilotus albus* Medik., *Mimosa biuncifera* Benth.), Fagaceae (*Quercus* sp.), Ranunculaceae (*Clematis paucifolia* Nutt.), Rhamnaceae (*Condalia ericoides* (A. Gray) M.C. Johnst.), Sapindaceae (*Sapindus drummondii* Hook. & Arn.), and Sapotaceae (*Bumelia lanuginosa* (Michx.) Pers.). This species is part of the *Lycus fernandesi* mimetic complex whose members also include the model sibling species *L. fernandesi* Dugés and *L. arizonensis* Green, and two mimetic moth species, *Seryda constans* (Edwards) and *Ptychoglène coccinea* (Edwards) (Linsley *et al.*, 1961). *E. apicalis* is predaceous upon the lycid beetles in its own mimetic complex as well as those found in the mimetic complex of *E. ignitus*, which includes the sister species *L. loripes* (Chevrolat) and *L. simulans* (Schaeffer) (Eisner *et al.*, 1962). *Elytroleptus apicalis* is a Batesian mimic and does not possess the chemical component thought to cause distastefulness of lycid beetles, lycidic acid (Eisner *et al.*, 2008).

**Label data:** MEXICO. -- **AGUASCALIENTES.** Calvillo, 1 ♂, 5.vii.1984, Carroll, Schaffner, & Friedlander (TAMU). **CHIHUAHUA.** Chihuahua, 1 ♂, Wickham (MCZC). Copper Canyon, 1 ♂, 20.vii.1957, Pine, R.H. (SEMC). Hidalgo del Parral, 9 ♂, 6 ♀, 15.vii.1964, Chemsak, J.A. & Powell, J. (EMEC); 2 ♂, 15.vii.1947, Cazier (EMEC). Parrita, 1 ♂, 7.vii.1954, MacSwain, J.W. (EMEC). **COAHUILA.** Saltillo, 1 ♂, 25.iv.1960, Mathieu, J. (EMEC); 1 ♂, 9.vii.1960, Selander, R.B. & Mathieu, J.

(EMEC). **DURANGO.** Durango, 2 ♂, 4 ♀, 11.vi.1964, Martin, J.H (CNC); 1 ♂, 1 ♀, 23.vi.1964, Howden, H.F. (CNC). Louis Moya, 1 ♂, 16.vii.1970, Beer, R.E. (SEMC). Nombre de Dios, 1 ♀, 25.vi.1952, Gilbert, E.E. & MacNeil, C.D. **SONORA.** Unknown, 1 ♂, --.v,----, Morrison, H.K. (BMNH). **TAMAULIPAS.** Llera Mesa, 1 ♂, 7.vi.1961, U Kans. (EMEC). **ZACATECAS.** Fresnillo, 1 ♀, 16.vii.1954, MacSwain, J.W. (EMEC). USA. -- **ARIZONA.** *Cochise Co.* Douglas, 2 ♂, 4 ♀, 17.vii.1973, 18.vii.1974, McCleve, S. (TAMU); 2 ♂, 1 ♀, 17.vii.1973, McCleve, S. (AMNH). Portal, 1 ♂, 29.vi.1956, Scullen, H.A. (EMEC); 3 ♂, 9.vii.1960, 17.vii.1960, 21.vii.1960, Linsley, E.G. (EMEC); 3 ♂, 11.vii.1960, Statham, M. (EMEC); 1 ♂, 1.viii.1958, James, R.H. (UCD). Chiricahua Mtns., 24 ♂, 11 ♀, 2.vii.1959, 15.vii.1961, 3.vii.1961, 18.vii.1961, 10.vii.1961, 20.vii.1955, 29.vi.1961, 7.vii.1961, 22.vii.1961, 16.vii.1959, 19.vii.1952, 9.vii.1959, Knull, D.J. & J.N. (FMNH); 1 ♀, 18.vii.1987, McCleve, S. (FSCA); 2 ♀, 5.viii.1972, Stephan, K. (FSCA); 1 ♂, 6.vii.1967, Knull, D.J. & J.N. (CASC); 1 ♂, 8.vii.1967, Knull, D.J. & J.N. (CMNH); 12 ♂, 9 ♀, 6.vii.1967, 27.vii.1967, 1.vii.1967, 8.vii.1967, 14.vii.1967, 29.vii.1961, Knull, D.J. & J.N. (OSUC). Cave Creek Canyon, 1 ♂, 6.vii.1963, Raske, A. (EMEC). Texas Canyon, 1 ♂, 13.vii.1999, Skelley, P. & Thomas, M. (FSCA). Dragoon Mtns., 1 ♂, 8.vi.2000, Skillman, F.W. (FSCA); 1 ♂, 2-5.viii.1988, Androw, R. & Brattain, M. (RAAC). Stronghold, 2 ♂, 5.viii.1972, Stephan, K. (FSCA). *Gila Co.* Globe, 1 ♂, 26.vii.1948, Parker, F.H. (AMNH). *Pima Co.* Madera Canyon, 1 ♀, 14.vii.1964, AEL (FSCA); 9 ♂, 2 ♀, 17.vii.1971, 10.vii.1970, Giesbert, E. (FSCA); 1 ♀, 8.vii.1973 (JEWG); 4 ♂, 1 ♀, 4-5.vii.1986, Androw, R. & Heffern, D. (RAAC); 1 ♂, 8.vii.1973 (FMNH); 2 ♂, 11.vii.1973, Wappes, J.E. (JEWG); 1 ♀, 20.vii.1970, AEL (CUIC). Santa Rita Mtns., 1 ♂, 28.vi.2000, Skillman, F.W.

(FSCA). Box Canyon, 1 ♂, 5-6.vii.1986, Heffern, D. & Androw, R. (CMNH). 1 ♂, 5-6.vii.1986, Heffern, D. & Androw, R. (TAMU). *Santa Cruz Co.* Pena Blanca, 1 ♂, 9.vii.1973 (JEWIC). Unknown. 1 f (AMNH); 1 ♂, 1 ♀, Morrison, H.K. (CUIC); 1 ♀, Morrison, H.K. (MCZC); 1 ♀, Morrison, H.K. (USNM); 1 m (CASC); 1 ♂, Hubbard & Schwarz (USNM). **NEW MEXICO.** *Dona Ana Co.* Las Cruces, 1 ♂, 30.vi.1932, Keller, J. (FMNH). *Grant Co.* Grant, 1 ♂, 1 ♀, 1.vii.2003, Skillman, F.W. (FSCA). **TEXAS.** *Brewster Co.* Chisos Mtns., 3 ♂, 16.vi.1958, 8.vii.1955, Knull, D.J. & J.N. (FMNH); 1 ♂, 25.vi.1971, Nelson, G.H. (FSCA). Big Bend Nat. Park, 4 ♂, vi.1965, Lenczy (USNM). *Jeff Davis Co.* Fort Davis, 1 ♂, 2 ♀, 23.vi-1.vii.2004, 29.vi-4.vii.1999, Heffern, D.J. & Riley, E.G. (DHPC); 1 ♂, 1 ♀, 13-15.vi.1989, Brattain, R.M. (FMNH); 6 ♂, 4 ♀, 13-15.vi.1989, Androw, R. & Brattain, M. (RAAC); 1 ♂, 13-15.vi.1989, Androw, R. & Brattain, M. (CMNH); 2 ♂, Heffern, D.J., Huether, & Androw, R. (DHPC); 1 ♂, 17-19.vii.1991, Androw, R., Marqua, D., & Brattain, M. (RAAC); 1 ♂, 28.vi-2.vii.1986, Androw, R., Brattain, M., & Huether, J. (RAAC). Davis Mtns., 1 ♀, 28.vi-2.vii.1986, Huether, J. (FSCA); 4 ♂, 2 ♀, 24.vi.1999, 25.vi.1999, Nelson, G.H. (FSCA); 1 ♀, 13-15.vi.1989 (FSCA); 10 ♂, 3 ♀, 20.vi.1990, 22.vi.1992, 17.vi.1992, 6.vi.1992, Marqua, D.G. (TAMU); 5 ♂, 24.vi.1957, Knull, D.J. & J.N. (FMNH). Unknown. 3 ♂, 1 ♀, 15.vii.1999, 3.vii.1999, Wappes, J.E. (JEWIC). UNKNOWN. -- 1 ♀, Cazier (AMNH).

***Elytroleptus divisus* (LeConte, 1884)**

**(Figs. 4, 18B, 20B, 23B, 25B)**

*Pteroplatus divisus* LeConte, 1884: 23 (orig. descr.).



Figure 4. *Elytroleptus divisus* (LeConte) dorsal habitus, male.  
Scale bar = 1 mm.

*Elytroleptus divisus*; Leng 1886: 32 (key); Vogt, 1949: 175 (faun.); Linsley, 1961b: 11 (key); 1962a: 177 (descr.); 1962b: 11 (key, distr.); Chemsak & Linsley, 1965: 196 (key, distr.); Hovore *et al.*, 1987: 299 (distr., biol.); Chemsak *et al.*, 1992: 82 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 604 (cat.).

*Elytroleptus dichromaticus* Linsley, 1961b: 13, fig. 1 (orig. descr.); 1962b: 11(key, distr.); Chemsak & Linsley, 1965: 196 (key, distr.); Chemsak *et al.*, 1992: 82 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 604 (cat.). **New Synonymy.**

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width  $<1.5 \times$  humeral angle width, 2) pronotal punctation shallow, with individual punctures clearly delimited, 3) pronotum without longitudinal lines of dense, appressed pubescence, and 4) elytron with deep, large punctation, 3-4 punctures between suture and costa I medially. This species most closely resembles *E. humeralis* and is distinguished by the deep elytral punctation (3-4 punctures at midline between suture and costa I instead of 4-5 punctures), the shallow pronotal punctation instead of deep, and the presence of sexually dimorphic gland pores on the pronota of males.

**Description:** Male. TL 6.3-11.2 mm, GW 2.0-3.5 mm.

Body elongate, subparallel, dorsoventrally flattened.

*Head:* HL 0.3-1.0 mm, HW 1.2-1.9 mm, DBE 0.8-1.3 mm, DBA 0.5-0.9 mm.

Ferruginous except apices of mandibles piceous. Finely punctate with short, sparse, suberect to erect, testaceous pubescence; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles slightly raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width greater than  $\frac{1}{2}$

height. Eyes moderately large, finely faceted, lower lobe with about 26 facets at greatest height; integument ventral to lower lobe about  $0.4 \times$  eye height; deeply emarginate at antennal insertion, with 2-3 facets at greatest emargination point. Antennae black, extending to approximately  $3/5$  elytral length, scape and antennomere III and IV subequal, scape with slight longitudinal, dorsal and ventral, median impressions; pedicel slightly less than  $1/2 \times$  scape length; antennomeres V and VI subequal, VIII and IX subequal; antennomeres V-X decreasing in length; antennomere XI subequal to VII and strongly appendiculate, length of appendiculation  $0.6-0.79 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18B): PL 1.2-2.2 mm, PW 1.4-2.3 mm. Pronotum ferrugineous, width slightly greater than length, apical width subequal to basal width, lateral margins slightly angulate, widest medially. Pronotal disc shining, punctate, with short, erect, black pubescence arising from punctation; punctation on shining areas shallow to deep, individual punctures moderate to large in diameter, majority clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores, often piceous; pronotal disc flat to slightly convex; sides impressed slightly in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum testaceous, shining, with sparse, erect, pale yellow to testaceous setae. Scutellum ferrugineous, small, subtriangular, length subequal to width, medially impressed, with short, sparse, black pubescence.

*Wings* (Figs. 20B, 23B): EL 4.8-8.0 mm. Elytron basal  $2/5$  yellow, apical  $3/5$  black extending obliquely to meet suture, margin irregular. About  $3.8 \times$  PL, width at humeral angles about  $1.2 \times$  PW. Elytron subparallel, greatest width  $<1.5 \times$  width at humeral

angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior margin and extending to 3/5 elytral length, costa II arising from anterior margin and extending to 4/5 elytral length, costa III arising from humeral angle and extending to 4/5 elytral length; elytron with distinct deep punctation, 3-4 punctures medially between suture and costa I, becoming indistinct, shallower apically, subequal basally; elytron with sparse, short, erect pubescence, one seta per puncture, pale yellow to testaceous on pale-colored areas, black on dark-colored areas, outer elytral margins with pubescence more dense; elytral suture covered in sparse black pubescence. Metathoracic wing darkly tinted.

*Abdomen:* Dark brown to black, shining, finely punctate, covered in sparse, short, suberect, testaceous pubescence.

*Legs:* Testaceous except tarsi, apex of mesotibia, metatibia, meso- and metafemur-tibial joints black. Femora covered in short, sparse, testaceous pubescence; tibia covered in short, sparse, black pubescence; tarsal pubescence recumbent and more dense. Metatibia straight, not strongly sinuate.

*Genitalia:* Sternite VIII with sides gradually tapering towards apex, two slightly sinuate anterolateral areas (one on either side), often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female:* TL 6.7-10.9 mm, GW 2.1-3.5 mm, HL 0.6-0.8 mm, HW 1.2-1.6 mm, DBE 0.6-1.0 mm, DBA 0.5-0.8 mm, PL 1.2-2.0 mm, PW 1.3-2.2 mm, EL 4.9-8.1 mm. As male, except antennae extending slightly past 2/5 elytral length; pronotum lacking sexually dimorphic densely punctate oval area above lateral margins.

**Intraspecific variation:** Some individuals with supra-orbital areas piceous and head pubescence black. In males, sexually dimorphic punctation ranges from inconspicuous, confluent, and concolorous with pronotal disc to conspicuous, depressed, and piceous. Pronotum with some regions ferrugineous, testaceous, or black. Scutellum black. Elytra range from above description to yellow aspects testaceous or rufo-testaceous, black aspects restricted to apical 1/5 and margin laterally instead of obliquely reaching suture. Abdomen often testaceous. Leg coloration ranges from entirely piceous to no joints black.

**Remarks:** Coloration in this species is extremely variable. After examining the color variation within the species limits of *E. divisus*, I was unable to separate those specimens of *E. dichromaticus*. *E. dichromaticus* appears to represent individuals with rare coloration patterns for *E. divisus* such as concolorous elytra. Many other species in this genus contain members that exhibit both states of concolorous and bicolored elytra. The species *E. dichromaticus* is thus synonymized herein.

**Phylogenetic relationships (Figs. 50, 51):** This species is sister to *E. humeralis* supported by the homoplasious characters of the genal width greater than  $\frac{1}{2} \times$  the height (Character 1) and the integument below the lower eye lobe greater than  $0.3 \times$  the height of the lower eye lobe (Character 2).

**Type material (Fig. 52B):** *Elytroleptus divisus* HOLOTYPE male in MCZC with the following label data: Label 1: "Dallas, / Texas". Label 2: "Type / 3897". Label 3: "P. divisus / Lec.".

*Elytroleptus dichromaticus* HOLOTYPE female in CASC with the following label data: Label 1: "Queretaro / Queretaro, Mex. / VI-28-52". Label 2: E. E. Gilbert /



C. D. MacNeil / Collectors". Label 3: "HOLOTYPE / Elytroleptus / dichromaticus / Linsley". Label 4: "California Academy / of Sciences / Type 8943 / No.".

**Type locality:** USA, Texas, Dallas.

**Specimens examined:** High quality digital images of the holotype (habitus dorsal view, habitus lateral view, head frontal view, and labels) were viewed using the MCZC online type database (<http://insects.oeb.harvard.edu/mcz/>). The holotype of *E. dichromaticus* and two hundred and sixty-two additional specimens were examined (171 ♂, 91 ♀).

**Distribution (Fig. 36):** Southwestern USA (Texas) and northeastern Mexico (Coahuila, Nuevo Leon, San Luis Potosi, Tamaulipas).

**Biology:** Flight period April through July. Adults have been collected on flowers and foliage of plants in the families Fabaceae (*Acacia farnesiana* (L.) Willd., *Prosopis* sp.), Rhamnaceae (*Karwinskia humboldtiana* (Willd. ex Roem. & Schult.) Zucc., *Condalia hookeri* M.C. Johnst., *Condalia obtusifolia* (Hook. ex Torr. & A. Gray) Trel.), and Sapotaceae (*Bumelia lanuginosa* (Michx.) Pers.).

**Label Data:** MEXICO. -- **COAHUILA.** Saltillo, 1 ♂, 7.viii.1968, Bigelow, J. & Cazier, M.A. (EMEC). **NUEVO LEON.** Apodaca, 1 ♀, 23.iv.1963, Hernandez, E. (EMEC). Montemorelos, 1 ♀, 23.v.1952, Cazier, M, Gertsch, W. & Schrammel, R. (AMNH). Monterrey, Huasteca Canyon, 4 ♂, 1 ♀, 11.vii.1963, 2.vii.1963, Howden, H.F. (CNC); 6 ♂, 3 ♀, 11.vii.1963, 13.vii.1963, Arnett, R.H. & VanTassell, E.R. (FSCA); 1 ♂, 13.vii.1963, Howden, A.T. (EMEC). Vallecillo, 4 ♂, 1 ♀, 2-5.vi.1951, Evans, H.E. (EMEC). Unknown, 1 ♂, 24.vii.1938 (AMNH); 1 ♂, 2.iv.1964 (EMEC); 2 ♂, 8.vii.1986, Kovarik & Schaffner (TAMU). **SAN LUIS POTOSI.** Matehula, 1 ♀, 16.viii.1995, Van den Berghe, E. (DHPC). **TAMAULIPAS.** Bocatoma, 3 ♂, 2 ♀, 27-28.v.1979, Rice,

Marlin (TAMU). Ciudad Victoria, 3 ♂, 2 ♀, 15.vii.1955, Giuliani, D. (CASC), 1 ♂, 1.vii.1981, Miller, B, Porter, C. & Stange, L. (FSCA). Jimenez, 2 ♂, 1 ♀, 4.vi.1965, Bure, Meyer, & Schaeffner (EMEC); 12 ♂, 6 ♀, 4.vi.1965, Burke, Meyer, & Schaeffner (TAMU). Villagran, 1 ♂, 1 ♀, 7.vi.1951, Evans, H.E. (EMEC); 5 ♂, 7.vi.1951, Hurd, P.D. (EMEC); 2 ♂, 25.v.1948, Werner, F. & Nutting, W. (EMEC).

USA. -- **TEXAS**. *Bexar Co.* Leon Valley, 5 ♂, 2 ♀, 18.vi.1983, Nelson, G.H. (FSCA). San Antonio, 1 ♂, 1 ♀, 30.v.2004, Peigler, R.S. (TAMU); 1 ♂, v.1914 (CMNH). Houston, 2 ♂, 27.v.1953, 31.v.1953, Wasbauer, M. (EMEC). Salado Creek, 2 ♂, 1 ♀, 11.v.1952, Wasbauer, M. (EMEC). Unknown, 1 ♀, 25.v.1931, Parks, H.B. (TAMU). *Comal Co.* New Braunfels, 1 m (CASC). Unknown, 1 ♂, 3 f (AMNH); 1 f (MCZC). *Dallas Co.* Dallas, 1 ♀, Hubard & Schwarz (USNM); 1 m (USNM). *Dimmit Co.* Carrizo Sprgs, 2 ♂, 1 ♀, 12.v.1994, Wappes, J.E. (JEWG); 3 ♂, 12.v.1994, Giesbert, E. (FSCA). Unknown, 3 ♂, 1 ♀ (OSUC); 1 ♂ (CASC); 1 ♂, viii.1999 (USNM). *Frio Co.* Moore, 4 ♂, 6 ♀, 30.vi.1991, 18.vi.1983, Nelson, G.H. (FSCA). Pearsall, 1 ♂, 31.v.1979, Wappes, J.E. (JEWG). Unknown, 1 ♂, 27.v.1997, Nelson, G.H. (FSCA). *Hidalgo Co.* Unknown, 2 ♂, 11.v.1947, 14.vii.1946, Vogt, G.B. (USNM). *Kinney Co.* Sycamore Creek, 2 ♂, 30.v.1992, Heffern, D.J. (DHPC). Unknown, 1 ♂, 5.v.1941, Knull, D.J. & J.N. (FMNH). *Live Oak Co.* Annarose, 1 ♂, 28.iv.2008, Heffern, D.J. (DHPC). Dinero, 1 ♂, 21-22.iv.2007, Heffern, D.J. (DHPC). George West, 1 ♂, 1 ♀, 27.iv.1986, Heffern, D.J. (TAMU); 1 ♂, 27.iv.1986, Heffern, D.J. (CMNH); 2 ♂, 27.iv.1986, Heffern, D.J. (RAAC). *McMullen Co.* Tilden, 1 ♂, 11.v.1978, Wappes, J.E. (EMEC); 1 ♂, 11.v.1978, Wappes, J.E. (JEWG); 2 ♀, 11.v.1978, Downie, N.M. (FMNH). Unknown, 1 ♂, 1 ♀, 31.v.1979, Wappes, J.E. (JEWG); 3 ♂, 1 ♀, 31.v.1979,

Downie, N.M. (FMNH); 1 ♂, 11.v.1978 (JEWG); 1 ♂, 11.v.1978 (USNM); 1 ♂, 1 ♀, 1.vi.1979, Wappes, J.E. (FSCA); 2 ♂, 1 ♀, 1.vi.1979, Wappes, J.E. (JEWG); 1 ♂, 1.vi.1979, Wappes, J.E. (TAMU); 1 ♂, 1.vi.1979, Wappes, J.E. (USNM); 2 ♂, 1.vi.1979, Downie, N.M. (FMNH). *Presidio Co.* Marfa, 2 m (MCZC). Starr Co. El Sauz, 1 ♀, 10.v.1986, Heffern, D.J. (DHPC); 2 ♂, 1 ♀, 8.v.1986, Wappes, J.E. & Downie, N.M. (USNM); 5 ♂, 1 ♀, 8.v.1986, Wappes, J.E. & Downie, N.M. (JEWG); 2 ♂, 8.v.1986, Wappes, J.E. & Downie, N.M. (EMEC); 1 ♂, 1 ♀, 8.v.1986, Downie, N.M. (FMNH); 1 ♂, 1 ♀, 8.v.1986, Downie, N.M. (FSCA); 1 ♂, 2 ♀, 26.iv.1986, Wappes, J.E. (FSCA); 2 ♂, 1 ♀, 26.iv.1986, Wappes, J.E. (JEWG); 1 ♀, 26.iv.1986, Wappes, J.E. (EMEC); 1 ♂, 1 ♀, 16.v.1987, Wappes, J.E. (FSCA); 1 ♂, 29.iv.1998, Morris, R. (RAAC). Falcon, 1 ♀, 13.iv.1991, Heffern, D.J. (DHPC). Roma, 1 ♂, 1 ♀, 16.v.1977, Giesbert, E. (FSCA); 1 ♂, 1 ♀, 1.v.1982, 2.v.1982, Turnbow, R. (FSCA); 1 ♂, 10.v.1986, Heffern, D.J. (DHPC). Laredo, 1 ♂, 24.iv.1947, Vogt, G.B. (USNM). Unknown, 5 ♂, 4 ♀, 3.v.1947, 24.v.1947, Vogt, G.B. (USNM). *Uvalde Co.* Uvalde, 1 ♀, 18.v.1965 (CASC); 1 ♀, 5.v.1999, Androw, R. & Clark, S. (RAAC); 1 ♂, 14.vi.1983, Dozier, B.K. (FSCA). Unknown, 1 ♀ (SEMC); 11 ♂, 13 ♀, 11.v.1946, 3.v.1941, 23.v.1948, Knull, D.J. & J.N. (FMNH). *Webb Co.* Laredo, 1 ♂, 5.iv.1965 (LACM); 1 ♂, 20-14.v.1948, Werner, F. & Nutting, W. (MCZC). *Zapata Co.* Falcon St. Park, 2 ♀, 24.v.1997, Nelson, G.H. (FSCA); 2 ♂, 1 ♀, 7.v.1977, Riley, R.H. (TAMU). Unknown, 1 ♂, 31.v.1951, Knull, D.J. & J.N. (FMNH). Unknown. 7 ♂, 2 f (MCZC); 1 ♂, 23.iv.1914, Grant, C. (FMNH); 3 ♂, 6 f (AMNH); 1 f (CMNH); 1 ♂, 1 ♀, Schaeffer, C. (USNM); 6 ♂, Cazier (AMNH); 2 m (CASC); 1 ♂, (CMNH); 1 ♂, Smith, J.B. (USNM).  
 UNKNOWN. -- 1 ♀ (USNM).

***Elytroleptus floridanus* (LeConte, 1862)**

**(Figs. 5, 18C, 20C, 23C, 25C)**

*Pteroplatus* ? *floridanus* LeConte, 1862: 42 (orig. descr.): Bates, 1885: 317.

*Elytroleptus floridanus*; Leng, 1886: 31 (key); Knull, 1946: 228, pl. 27, fig. 117 (descr.); Linsley, 1961b: 11 (key); Linsley *et al.*, 1961a: 22 (biol.); Linsley, 1962a: 177 (descr.); 1962b: 10 (key); Chemsak & Linsley, 1965: 194 (key).

*Elytroleptus floridana* (LeConte, 1862): Chemsak *et al.*, 1992: 82 (cat.). [misspelling]

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width < 1.5 × humeral angle width, 2) pronotal lateral margins broadly rounded 3) pronotum with two longitudinal lines of dense, appressed, testaceous pubescence overlying testaceous integument, and 4) pronotum and elytra with deep, moderate to large punctation. This species most closely resembles *E. immaculipennis* and is distinguished by the longitudinal lines of dense pronotal pubescence testaceous overlying testaceous integument instead of white to pale yellow pubescence overlying red integument.

**Description:** Male. TL 6.7-9.5 mm, GW 2.0-3.3 mm.

Body elongate, subparallel, dorsoventrally flattened

*Head:* HL 0.5-0.7 mm, HW 1.0-1.5 mm, DBE 0.6-0.8 mm, DBA 0.4-0.6 mm. Piceous, except labrum, anteclypeus, and vertex with triangular area testaceous. Finely punctate with short, sparse, suberect to erect, black pubescence, except testaceous pubescence over testaceous integument areas; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles slightly raised and separated by approximate width of four antennal sockets. Genal apices generally rounded, width less than  $\frac{1}{2}$  × height. Eyes moderately



Figure 5. *Elytroleptus floridanus* (LeConte) dorsal habitus, male.  
Scale bar = 1 mm.

large, finely faceted, lower lobe with about 30 facets at greatest height; integument ventral to lower lobe about  $0.1 \times$  eye height; deeply emarginate at antennal insertion, with 1-3 facets at greatest emargination point. Antennae black, extending to approximately  $2/5$  elytral length, scape and antennomere III, IV, and V subequal; pedicel about  $1/2 \times$  scape length; antennomeres V and VI subequal; antennomeres V-IX decreasing in length; antennomere XI subequal to VII and weakly appendiculate, length of appendiculation  $0.1-0.39 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18C): PL 1.0-1.6 mm, PW 1.2-1.9 mm. Pronotum piceous, width slightly greater than length, apical width subequal to basal width; lateral margins broadly rounded, widest medially. Pronotal disc shining, punctate, with short, recumbent, black, pubescence arising from punctation; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying areas of testaceous slightly raised integument, each of similar width throughout and occupying  $1/4$  of pronotal disc area; punctation on shining areas deep, individual punctures moderately sized in diameter, evenly spaced and each individual puncture clearly delimited; oval, more densely punctate areas above lateral margin indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum piceous, shining, with sparse, suberect to erect, pale setae. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, moderate, black pubescence.

*Wings* (Figs. 20C, 23C): EL 5.2-7.2 mm. Elytron with basal  $1/5$  testaceous, apical  $4/5$  piceous extending anteriorly to obliquely meet suture, margin irregular. About  $4.5 \times$  pronotal length, width at humeral angles subequal to greatest width of pronotum. Elytron

subparallel, greatest width  $<1.5 \times$  width at humeral angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior margin and extending to  $3/5$  elytral length, costa II arising from anterior margin and extending to  $4/5$  elytral length, costa III arising from humeral angle and extending to  $4/5$  elytral length; elytron with distinct punctation, 3-4 punctures medially between suture and costa I, distinct apically, subequal basally; elytron with sparse, short, recumbent pubescence, one seta per puncture, testaceous on pale-colored areas, black on dark-colored areas, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen:* Piceous, shining, finely punctate with short, sparse, suberect, pale pubescence.

*Legs:* Piceous. Femora and tibia sparsely punctate and covered with short, erect, black pubescence. Tarsi covered with short, recumbent, black pubescence. Metatibia straight, not sinuate.

*Genitalia:* Sternite VIII sides gradually tapering towards apex, four slightly sinuate anterolateral areas (two on either side), often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female:* TL 6.8-10.7 mm, GW 2.1-3.8 mm, HL 0.5-0.6 mm, HW 1.1-1.5 mm, DBE 0.7-0.9 mm, DBA 0.5-0.6 mm, PL 1.0-1.7 mm, PW 1.4-2.2 mm, EL 5.3-8.4 mm. As male, except elytra about  $5 \times$  as long as pronotal length; sexually dimorphic oval area of dense, punctation above pronotal lateral margins absent.

**Intraspecific variation:** Elytral coloration varies from above description to only humeral angles testaceous.

**Remarks:** Though this species is extremely similar in form and coloration to *E. immaculipennis*, it maintains species status due to the consistency of the color variation coupled with its unique geographic distribution and flight period.

**Phylogenetic relationship (Figs. 50, 51):** This species resides in one of the basal nodes and is sister to *E. immaculipennis* supported by the genal width less than  $\frac{1}{2}$  the height (Character 1), recumbent pubescence on the central pronotal disc (Character 12), and distinct elytral punctation at their apices (Character 22).

**Type material:** HOLOTYPE female in MCZC with the following label data: Label 1: "Orange disc = Southern States; Gulf States; Va., N.C., S.C., eastern Tenn.?, Ga., Ala., Miss., Fla., Ark.? La.)". Label 2: "Pteroplatus ? / floridanus / Lec.". Label 3: "Type / 3896". Label 4: "Elytroleptus / floridanus / Lec.".

**Type locality:** USA

**Specimens examined:** High quality digital images of the holotype (habitus dorsal view, habitus lateral view, head frontal view, and labels) were viewed using the MCZC online type database (<http://insects.oeb.harvard.edu/mcz/>). Two hundred and seventy-one additional specimens were examined (125 ♂, 143 ♀, 3 unknown).

**Distribution (Fig. 37):** Eastern to southwestern USA (Arkansas, Florida, Georgia, Kansas, Maryland, Massachusetts, Mississippi, New Jersey, New York, North Carolina, Oklahoma, Rhode Island, South Carolina, Tennessee, Texas).

**Biology (Fig. 34D):** Flight period February through June. Adults have been collected after beating oak (*Quercus* sp. including *Quercus alba* L., *Quercus laevis* Walter, and *Quercus nana* Willd.). Two specimens have label data indicating that they were found



washed up on the beach shore. Linsley *et al.* (1961a) suggested that the lycid model for this species is *Lycus lateralis* (Melsheimer).

**Label data:** USA. -- **ARKANSAS.** Unknown, 1 ♀, (AMNH). **FLORIDA.** *Alachua Co.* Gainesville, 1 ♀, 27.v.19-7, Swaith, G. (FSCA). *Levy Co.* 1 ♂, 24-31.iii.1988, Skelly, P. (FSCA). *Miami-Dade Co.* Miami, 1 ♀, viii.---- (CMNH). *Nassau Co.* 1 ♂, 17.ii.1952, Merrill, G.B. (FSCA). *St. Johns Co.* St. Augustine, 1 f (MCZC). Unknown, 1 ♂, 17.--.1903, Hubbard & Schwarz (USNM). **GEORGIA.** *Tattal Co.* Ohoopee R., 1 ♂, 1 ♀, 24.ii.2001, Morris, R. (JEWCI) 1 ♂, 24.ii.2001, Morris, R. (RAAC). Unknown, 1 m (CMNH). **KANSAS.** *Sumner Co.* Wellington, 1 ♀, Scott, C.L. (USNM).

**MARYLAND.** *Caroline Co.* Ridgely, 1 ♀, 11.v.1941, Vogt, G.B. (USNM).

**MASSACHUSETTS.** *Bristol Co.* Fall River, 3 ♂, 1 ♀, 17.v.1906, Easton, N.S. (CASC); 1 ♀, 22.v.1908 (FMNH); 3 ♂, 3 ♀, 23.v.1904, 26.vi.1938, 24.v.1911, 17.v.1911, Easton, N.S. (MCZC); 1 ♂, 2 ♀, 23.v.1904, 31.v.1905, 1.VII.1905, Hayward, R. (MCZC); 1 ♂, Easton, N.S. (FMNH); 1 ♂, 1.vii.1913, Easton, N.S. (FSCA); 1 ♂, 24.v.1905 (MCZC); 1 ♂, 15.--.1905, Easton, N.S. (USNM). *Essex Co.* Nahant, 1 ♀, 13.vi.1936, Darlington (CNC); 1 ♀, 13.vi.1935, Darlington (FSCA); 2 ♂, 3.vi.1935, 13.v.1936, Darlington (MCZC). *Middlesex Co.* Arlington, 1 ♀, 12.vi.1924, Darlington (MCZC). Framingham, 2 ♂, 1 ♀, 14.vi.1907, 13.v.1911, Frost, C.A. (MCZC); 1 ♀, 13.v.1911, Frost, C.A. (USNM). Hopkinton, 1 ♂, 2.vi.1912, Frost, C.A. (MCZC). Malden, 1 ♀, 1.vi.1902, Frost, C.A. (MCZC). Melrose, 1 m (MCZC). Natick, 1 ♂, 9.vi.1912, Frost, C.A. (PMNH); 1 ♂, 1 ♀, 29.v.1910, Frost, C.A. (CASC); 1 ♂, 1 ♀, 29.v.1910, Frost, C.A. (CNC); 1 ♀, 5.vi.1910, Frost, C.A. (CUIC); 1 ♀, 29.v.1910, Frost, C.A. (FSCA); 2 ♂, 3 ♀, 29.v.1910, 7.vi.1942, Frost, C.A. (MCZC); 1 ♂, 29.v.1910

(FMNH); 1 ♀, --.v.1929, Wenzel (OSUC). *Norfolk Co.* Brookline, 1 ♂, 2 ♀, Bowditch (CASC); 1 ♀, 27.v.1904 (MCZC). Dover, 1 ♂, 1 ♀, 15.vi.1901 (AMNH); 1 ♀, 30.v.1902 (CASC); 10 ♂, 12 ♀, 15.vi.1901, 30.v.1902 (MCZC); 1 ♀, 15.vi.1901 (USNM); 1 ♂, 30.v.1902 (JEWG); 1 ♂, 30.v.1902, Nicolay, A (BMNH). Milton, 1 ♂, 31.v.1903 (MCZC); 1 ♀, 30.v.19-- (OSUC). Westwood, 1 ♂, 1 ♀, 30.v.1906 (SEMC); 2 ♂, 1 ♀, 1 ?, 30.v.1906 (USNM). *Plymouth Co.* Duxbury, 1 ♂, 1 ♀, 23.vi.1917, Frost, C.A. (MCZC). Humarock, 2 ♂, 1 ♀, 16.v.1932, 28.v.1933, White, C.E. (MCZC). Pembroke, 1 ♂, 1.vi.1913 (MCZC). *Suffolk Co.* Dorchester, 1 ♀, 17.vi.1907 (SEMC); 7 ♂, 1 ♀, 31.v.1908, 30.v.1910, 21.v.1911, 24.v.1903, Bolster (MCZC); 1 ♂, 21.V.1911, Bolster (FSCA); 1 ♂, 24.v.1903 (USNM). Mattapan, 1 ♀, 14.vi.1907 (MCZC). Unknown, 1 m (FMNH); 1 ♂, 21.iii.1910, Easton, N.S. (FMNH); 1 m (CASC).

**MISSISSIPPI.** *Lafayette Co.* Oxford, 1 ♀, 2.v.1949, Weems, H.V. (FSCA). **NEW JERSEY.** *Ocean Co.* Mantoloking, 8 ♂, 1 ♀, 15.v.1932, Siepmann (AMNH); 1 ♂, 5 ♀, 15.v.1932, Siepmann (CASC). Point Pleasant, 1 ♀, Sim, R.J. (CNC); 1 ♂, 3 ♀, 27.v.1926, Sim, R.J. (FMNH). Seaside Park, 1 ♀, 26.iv.1981 (RAAC); 4 ♂, 1 ♀, 26.iv.1925, Sim, R.J. & M.B. (USNM). **NEW YORK.** *Essex Co.* Jones Beach, 1 ♂, 2 ♀, 27.v.1923 (AMNH). *Kings Co.* Brooklyn, 1 ♂, vi.1935, Gerbert, E.J. (FSCA). *Nassau Co.* Long Beach, 3 ♂, 20 ♀, 7.vi.1922, 23.v.1922, v.1931 (AMNH). Massapequa, 1 ♂, 1 ♀, 23.v.1915, Shoemaker, E. (USNM). *New York Co.* Central Park, 3 ♂, 5 ♀, 23.v.1915, 26.v.1918, Woodruff, L.B. (AMNH); 2 ♂, 26.v.1918 (USNM). *Queens Co.* Far Rockaway, 2 m 4.vi.1904 (AMNH). Rockaway Beach, 2 ♂, 1 ♀, 4.vi.1911, Shoemaker, E. (USNM); 1 ♂, 4.vi.1911, Shoemaker, E. (AMNH). *Suffolk Co.* Bellport, 3 ♂, 4 ♀, Nicolay (OSUC); Huntington, 1 ♂, 2 ♀, 1 ?, 12.vi.1927, Schott, F.M.

(AMNH); 1 ♀, vi.1910 (CMNH). Melville, 6 ♂, 10 ♀, 22.v.1921 (CASC). Orient, 3 ♀, 28.v.1983, Latham, R. (CUIC). Southold, 1 ♀, 25.v.1941, Latham, R. (CUIC). Wading River, 3 ♂, 1 ♀, 30.vi.1917 (CASC); 1 ♀, 30.v.1918, Schott, F.M. (FMNH); 1 ♂, 30.v.1915, Schott, F.M. (CMNH); 1 ♂, 23.vi.1917 (UCD); 2 ♂, 23.vi.1917 (USNM); 1 ♂, 23.v.1917, Nicolay, A. (BMNH); 1 ♀, 22.vi.1919, Nicolay (OSUC). Yaphank, 2 ♀, 15.vi.1923, 17.v.1913, Woodruff, L.B. (AMNH). Shelter Island, 1 ♂, 10.v.1944, Latham, R. (CUIC). Unknown. Long Island, Goding R., 3 ♂, 3 ♀, 30.vi.1917 (CASC).

**NORTH CAROLINA.** *Moore Co.* Southern Pines, 1 ♂, 8.ii.1916, Manee, A.H. (FMNH); 1 ♂, 1 ♀, --.iv.1905, Wenzel (OSUC). *Polk Co.* Tryon, 1 ♂, 11.v.1903, Fiske, W.F. (USNM). **OKLAHOMA.** *Latimer Co.* Red Oak, 1 ♀, iii.1986, Stephan, K. (DHPC); 1 ♀, iv.1986, Stephan, K. (TAMU). **RHODE ISLAND.** *Kent Co.* Warwick, 2 ♂, 30.v.1915, Bowe, M. (PMNH). *Providence Co.* Cranston, 1 ♀, 21.v.1922, Bowe, M. (PMNH). Providence, 2 ♀, 7.vi.1908, 21.v.1922 (PMNH). Unknown. Mouton, 1 ♀, 15.vi.1924 (PMNH). **SOUTH CAROLINA.** *Horry Co.* Myrtle Beach, 1 ♂, 11.iv.1962, Kirk, V.M. (FMNH). Unknown. 1 ♂, 1 f (CMNH). **TENNESSEE.** *Hardeman Co.* Bolivar, 1 ♂, 16-20.iv.2002, Ward, R. (CMNH). **TEXAS.** *Comal Co.* 1 ♀, 5.iv.1930, Bibby, F.F. (TAMU). *Dallas Co.* Dallas, 1 f (MCZC). *Kerr Co.* Kerrville, 1 ♀, 8.iv.1959, Becker, E. & Howden, H. (DHPC); 1 ♀, 16.iv.1959, Becker, E. & Howden, H. (CNC); 1 ♀, iv.1959, Becker, E. & Howden H. (FMNH); 1 ♂, 12.iv.1965, Schaffner, J.C. (TAMU). *Mills Co.* Goldthwaite, 1 ♀, 18.iv.1979, Peigler, R.S. (TAMU). *Smith Co.* 1 ♀, 27.iii.1952, Reinhard, H.J. (TAMU). Unknown. 1 ♂, 1 ? (AMNH); 1 f (CMNH); 4 f (MCZC); 1 ♂, (USNM), 1m, 1 ♀, Belfrage (BMNH). **VIRGINIA.** 1 ♂ (SEMC).

**UNKNOWN.** 2 ♂, 29.v.1901 (FMNH).

***Elytroleptus grandis* Linsley, 1935**

**(Figs. 6, 18D, 20D, 23D)**

*Elytroleptus grandis* Linsley, 1935: 97 (orig. descr.): Linsley, 1961b: 11 (key); 1962b: 5, fig. 1 (key, descr.); Chemsak & Linsley, 1965: 195 (key); Chemsak *et al.*, 1980: 33 (distr.); 1992: 82 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 604 (cat.).

**Diagnosis:** This species is distinguished from congeners by the following combination of characters: 1) elytra expanded apically, greatest width  $>1.5 \times$  humeral angle width, 2) apices of elytra piceous, 3) central pronotal disc piceous, and 4) elytra with small, shallow punctation, 7-10 punctures between suture and costa I medially. This species most closely resembles *E. apicalis* and can be separated by the piceous central pronotal disc and the generally black abdomen instead of testaceous. From *E. quadricostatus* **sp. n.**, it is distinguished by the longer antennae and shallower, smaller punctation, 7-10 punctures at midline between suture and costa I instead of 5-6 punctures.

**Description:** Male. TL 12.7-17.3 mm, GW 5.0-7.3 mm.

Body elongate, expanded apically from humeri, dorsoventrally flattened.

*Head:* HL 0.9-1.0 mm, HW 1.7-2.3 mm, DBE 1.1-1.5 mm, DBA 0.7-0.8 mm.

Testaceous, except apices of mandibles, frons, antennal tubercles, and supraorbital areas piceous. Finely punctate with short, sparse, suberect to erect pubescence, testaceous over testaceous integument and black over piceous integument; more dense, appressed, testaceous pubescence on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles moderately raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width greater than  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 31 facets at greatest



Figure 6. *Elytroleptus grandis* Linsley dorsal habitus, male.  
Scale bar = 1 mm.

height; integument ventral to lower lobe about  $0.4 \times$  eye height; deeply emarginate at antennal insertion, with 1-3 facets at greatest emargination point. Antennae black, extending to approximately  $3/5$  elytral length, scape and antennomere III subequal, scape with slight longitudinal, dorsal and ventral, median impressions; pedicel slightly less than  $1/2 \times$  scape length; antennomere III shorter than IV, IV shorter than V; antennomeres VI and VII subequal, VIII and IX subequal; antennomeres VI-X decreasing in length; antennomere XI subequal to VI and extremely appendiculate, length of appendiculation  $0.8-1.0 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18D): PL 2.0-2.9 mm, PW 2.2-4.1 mm. Pronotum piceous, slightly wider than long, apical width slightly less than basal width, lateral margins angulate, widest medially. Central pronotal disc shining, punctate, with short, recumbent, black pubescence arising from punctation; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed testaceous pubescence overlying areas of rufo-testaceous slightly raised integument, each of similar width throughout and occupying  $1/4$  of pronotal disc area, lateral margins also clothed in dense testaceous pubescence; punctation on shining areas deep, individual punctures small and varying in diameter and shape, majority not clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex, sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum dark brown to black, shining, with sparse, erect, testaceous setae. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, sparse, black pubescence.

*Wings* (Figs. 20D, 23D): EL 9.8-13.4 mm. Elytron alternating testaceous and piceous; with basal 1/5 testaceous, medial 1/5 piceous, medial 1/5 testaceous, apical 2/5 piceous, margins between each irregular. About  $4.7 \times$  PL, width at humeral angles subequal to PW. Elytron expanded apically, greatest width  $>1.5 \times$  width at humeral angle. Elytron with 4 distinct costae; from suture, costa I arising from anterior margin and extending to 3/5 elytral length, costa II arising from anterior margin and extending to 4/5 elytral length, costa III more indistinct than others and extending from 2/5 posterior to middle of anterior margin to 4/5 elytral length, costa IV arising from humeral angle and extending to 3/5 elytral length; elytron with distinct, shallow punctures, small in diameter, 7-10 punctures medially between suture and costa I, increasingly shallower apically, subequal basally; elytron with moderate, short, recumbent pubescence, one seta per puncture, testaceous over testaceous integument, black over piceous integument, outer elytral margins with pubescence more dense. Metathoracic wing basal 4/5 lightly tinted, apical 1/5 darkly tinted.

*Abdomen*: Each ventrite piceous basally and testaceous apically; finely punctate with sparse, short, suberect, testaceous pubescence.

*Legs*: Piceous except apices of prothoracic and mesothoracic femurs. Metatibia slightly sinuate. Femora and tibia sparsely punctate covered with sparse, short, suberect, black pubescence. Tarsi moderately clothed with short, appressed, black pubescence.

*Genitalia*: Not examined for this species.

*Female*: TL 13.4-15.0mm, GW 5.5-7.0, HL 0.5-0.9mm, HW 1.8-1.9mm, DBE 1.1-1.2mm, DBA 0.7-0.8mm, PL 2.2-2.4mm, PW 2.4-2.7mm, EL 10.7-11.7mm.

As male, except pronotal disc areas of dense, testaceous pubescence extending to lateral margins, occupying 2/3 pronotal disc area; antennae only extending to 2/5 elytral length, antennomere XI less strongly appendiculate. Pronotum lacking sexually dimorphic densely punctate oval area above lateral margin.

**Intraspecific variation:** Densely pubescent regions of head and pronotum with pubescence white to pale yellow and underlying integument rufo-testaceous to red; elytron coloration of some individuals more closely resemble that of *E. apicalis* with basal 3/5 testaceous and apical 2/5 piceous; abdomen concolorous black. One male specimen with piceous elytral aspects having violaceous cast.

**Remarks:** Specimens examined have either a pronotal disc with dense, testaceous pubescence overlying testaceous integument or dense, white to pale yellow pubescence overlying rufo-testaceous to red integument. This strongly mirrors the difference between the pronota of *E. floridanus* and *E. immaculipennis*, but currently there is no other evidence (geographic distribution, flight period, etc.) to separate these two color varieties as distinct species. Additional collecting of specimens may result in the future demarcation of these two color varieties.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. apicalis* supported by the unambiguous characters of the extremely appendiculate eleventh antennomere in males (Character 4) and small, shallow elytral punctation (Character 19).

**Type material (Fig. 52D):** HOLOTYPE male in CASC with the following label data: Label 1: "Tejupilco, Mex. / Temescaltepec / VII-1 1933". Label 2: "H. E. Hinton, / R. L. Usinger / Collectors." Label 3: "HOLOTYPE". Label 4: "E.G. Linsley / Collection".



Label 5: "Elytroleptus / grandis / Linsley". Label 6: "California Academy / of Sciences / Type No. 5055".

**Type locality:** Mexico, Tejupilco, Temescaltepec.

**Specimens examined:** The holotype and eight additional specimens were examined (5 ♂, 3 ♀).

**Distribution (Fig. 38):** Western and southern Mexico (Chiapas, Jalisco), Guatemala (Baja Verapaz, Zacapa), and Honduras.

**Biology:** Flight period May and June.

**Label data:** GUATEMALA. -- **BAJA VERAPAZ.** Salama, 1 ♀, 25-31.v.1989, Giesbert, E. (FSCA). **ZACAPA.** San Lorenzo, 1 ♂, 1 ♀, 3-6.vi.1989, Giesbert, E. (FSCA); Teculután, 1 ♂, v.2000, Monson, J. (DHPC). HONDURAS. -- **COMAYAGUA.** Siguatepeque, 7.v.1977, Mankins, J.V. (USNM). **LA PAZ.** La Paz, 21.vii.1978, Mankins, J.V. (EMEC). MEXICO. -- **CHIAPAS.** Sumidero Park, 1 ♂, 19.vi.1989, Howden, H.F. (JEWG); 1 ♂, 21.vi.1989, Ratcliffe, B.C. (JEWG). **JALISCO.** Autlán, 1 ♀, 7.vii.1984, Carroll, Schaffner, & Friedlander (TAMU). **UNKNOWN.** Cuautla, 1 ♀, 4.vi.1922, Smyth, E.G. (FSCA). Cuerna, 1 ♂, v.----, Barrett (EMEC).

***Elytroleptus humeralis* Linsley, 1961**

**(Figs. 7, 18E, 20E, 23E)**

*Elytroleptus humeralis* Linsley, 1961b: 14 (orig. descr.): Linsley, 1962b: 11 (key); Chemsak & Linsley, 1965: 197 (key); Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 604 (cat.).



Figure 7. *Elytroleptus humeralis* Linsley dorsal habitus, male.  
Scale bar = 1 mm.

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width  $<1.5 \times$  humeral angle width, 2) pronotum shining without areas of dense pubescence, 3) pronotal punctation deep and 4) elytron with 4-5 punctures between suture and costa I medially. This species most closely resembles *E. divisus* and can be separated by the degree of elytral punctation (4-5 punctures between suture and costa I medially instead of 3-4 punctures), the deeply instead of shallowly punctate pronotum, the generally testaceous abdomen instead of black, and antennomere XI weakly appendiculate in males.

**Description:** Male. TL 5.7-10.2 mm, GW 1.6-3.1 mm.

Body elongate, subparallel, dorsoventrally flattened.

*Head:* HL 0.3-0.8 mm, HW 1.1-1.8 mm, DBE 0.6-1.2 mm, DBA 0.4-0.7 mm. Piceous, except vertex with subquadrate area ferrugineous and anteclypeus, labrum, maxillae, and labium testaceous. Moderately punctate with short, sparse, erect, pale yellow pubescence; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles slightly raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width greater than  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 25 facets at greatest height; integument ventral to lower lobe about  $0.4 \times$  eye height; deeply emarginate at antennal insertion, with 3-4 facets at greatest emargination point. Antennae black, extending to approximately  $\frac{3}{5}$  elytral length, scape and antennomere III, IV, VI, and VII subequal; pedicel slightly less than  $\frac{1}{2} \times$  scape length; antennomeres V-X decreasing in length, antennomere XI longer than X, subequal to antennomere VIII and weakly appendiculate, length of appendiculation  $0.1-0.39 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18E): PL 1.0-1.9 mm, PW 1.3-2.1 mm. Pronotum piceous, width slightly greater than length, apical width subequal to basal width, lateral margins slightly angulated, widest medially. Pronotal disc shining, punctate, with short, erect, pale yellow pubescence arising from punctation; punctation on shining areas deep, individual punctures moderate in diameter, majority clearly delimited; oval, more densely punctate areas above lateral margins absent; pronotal disc slightly convex; sides impressed in dorsal aspect, margin apparently elevated; 2 distinct calli present, 2 moderately raised, submedial, anterior to center. Pro-, meso-, and metasternum dark brown to black, shining, with sparse, erect, pale yellow setae. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, sparse, black pubescence.

*Wings* (Figs. 20E, 23E): EL 4.4-7.5 mm. Elytron with basal 1/5 testaceous, apical 4/5 black, extending obliquely to meet suture, margin irregular. About  $4.5 \times$  PL, width at humeral angles, subequal to PW. Elytron subparallel, greatest width  $< 1.5 \times$  width at humeral angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior margin and extending to 3/5 elytral length, costa II arising from anterior margin and extending to 4/5 elytral length, costa III arising from humeral angle and extending to 3/5 elytral length; elytron with distinct, deep punctation, 4-5 punctures medially between suture and costa I, becoming slightly shallower apically, subequal basally; elytron with short, suberect, pale yellow pubescence, one seta per puncture, overlying testaceous and black areas, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen*: Testaceous, shining, sparsely punctate with sparse, short, suberect, testaceous pubescence.

*Legs:* Piceous except apices of femurs testaceous. Femora and tibia finely, shallowly punctate; femora with short, erect, pale yellow pubescence, tibia with short, erect black pubescence; tarsi moderately clothed with short, appressed, black pubescence.

*Genitalia:* Not examined in this species.

*Female:* TL 8.1-11.5 mm, GW 2.6-3.3 mm, HL 0.5-0.8 mm, HW 1.3-1.6 mm, DBE 0.8-1.0 mm, DBA 0.5-0.7 mm, PL 1.2-2.0 mm, PW 1.7-2.2 mm, EL 6.4-8.7 mm. As male, except antennae only reaching to 3/10 elytral length; antennomeres V-XI less strongly serrate; antennomere XI less strongly appendiculate; appearance of pronotal calli much reduced.

**Intraspecific variation:** Many specimens with pronota ferrugineous, pronotal calli strongly to only slightly apparent; scutellar basal aspects testaceous; elytral integument testaceous only at humeral angles.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. divisus* supported by the homoplasious characters of the genal width greater than  $\frac{1}{2}$  the height (Character 1) and the integument below the lower eye lobe more than  $0.3 \times$  the height of the lower eye lobe (Character 2).

**Type material (Figs. 52E, F):** HOLOTYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "HOLOTYPE / Elytroleptus / humeralis / Linsley".

ALLOTYPE female in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "ALLOTYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "42 mi. S.W. / Camargo, Chih. / Mex. 4900ft. / July 15, 1947". Label 2: "D. Rockefeller / Exp. Cazier". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "20 mi. S.W. / Camargo, Chih. / Mex. 4500ft. / VII--13--47". Label 2: "D. Rockefeller / Exp. Cazier". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "20 mi. S.W. / Camargo, Chih. / Mex. 4500ft. / VII--13--47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARTYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in EMEC with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE male in EMEC with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE female in AMNH with the following label data: Label 1: "Salaices Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE female in AMNH with the following label data: Label 1: "Salaices Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE female in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE female in AMNH with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE female in AMNH with the following label data: Label 1: "20 mi. S.W. / Camargo, Chih. / Mex. 4500ft. / VII--13--47". Label 2: "D. Rockefeller / Exp. Gertsch". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE female in EMEC with the following label data: Label 1: "Salaices, Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

PARATYPE female in EMEC with the following label data: Label 1: "Salaices Chih. / Mex. VII-23-47". Label 2: "D. Rockefeller / Exp. Spieth". Label 3: "PARATYPE / Elytroleptus / humeralis / Linsley".

**Type locality:** Mexico, Chihuahua, Salaices.



**Specimens examined:** The holotype, allotype, twenty-one paratypes (14 ♂, 7 ♀), and two additional specimens (1 ♂, 1 ♀) were examined.

**Distribution (Fig. 39):** Central Mexico (Chihuahua).

**Biology:** Flight period July.

**Label data:** MEXICO. -- **CHIHUAHUA.** Salaices, 1 ♀, 23.vii.1947, Spieth (BMNH).

***Elytroleptus ignitus* (LeConte, 1884)**

**(Figs. 8, 18F, 21A, 23F, 25D)**

*Pteroplatus ignitus* LeConte, 1884: 24 (orig. descr.).

*Elytroleptus ignitus*; Bates 1885: 317 (distr.); Leng, 1886: 32 (key); Schaeffer, 1908: 330 (distr.); Knull, 1948: 83 (distr.); Linsley *et al.*, 1961a: 21, fig. 3 (biol.); Linsley, 1961b: 12 (key); Linsley *et al.*, 1961b: 21, fig. 10 (distr.); Eisner *et al.*, 1962: 316, figs. 1,2 (biol.); Linsley 1962a: 179 (descr.); 1962b: 5 (distr.); Selander *et al.*, 1963: 46 (biol.); Chemsak & Linsley, 1965: 196 (key, distr.); Skiles & Chemsak, 1982: 69 (lect.); Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Eisner, 2003: 169 (biol.); Monné, 2005: 604 (cat.); Eisner *et al.*, 2008: 111, fig. 2 (biol.).

*Elytroleptus inginitus* (LeConte), in Linsley 1962b: 4 (key) [misspelling].

*Elytroleptus luteicollis* Skiles & Chemsak, 1982: 66 (orig. descr.); Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 605 (cat.). **New**

**Synonymy.**

**Diagnosis:** This species is distinguished from all congeners by the following combination of characters: 1) elytra expanded apically, greatest width > 1.5 × humeral angle width, 2) abdomen testaceous, 3) elytral punctation large and deep, 5-6 punctures between suture and costa I medially, and 4) pronotum with shallow, moderate punctation.



Figure 8. *Elytroleptus ignitus* (LeConte) dorsal habitus, male.  
Scale bar = 1 mm.

This species most closely resembles *E. apicalis* and can be distinguished by the concolorous testaceous elytra, the shorter antennae, and moderate, deep punctation (5-6 punctures between suture and costa I medially instead of 7-10 punctures). From *E. limpianus* and *E. rufipennis*, it is distinguished by the testaceous abdomen instead of black.

**Description:** Male. TL 7.3-15.1 mm, GW 2.5-4.7 mm.

Body elongate, expanded apically from humeri, dorsoventrally flattened.

*Head:* HL 0.6-1.1 mm, HW 1.1-2.0 mm, DBE 0.7-1.3 mm, DBA 0.5-0.8 mm.

Testaceous, except apices of mandibles piceous. Finely punctate with short, sparse, suberect to erect, testaceous pubescence, more dense and appressed on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles moderately raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width approximately  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 27 facets at greatest height; integument ventral to lower lobe about  $0.4 \times$  eye height; deeply emarginate at antennal insertion, with 2-3 facets at greatest emargination point. Antennae piceous, extending to approximately  $\frac{2}{5}$  elytral length, scape and antennomere VI subequal, scape with slight longitudinal, dorsal and ventral, median impressions; pedicel slightly less than  $\frac{1}{2} \times$  scape length; antennomeres III and IV subequal, VII and VIII subequal, IX and X subequal; antennomeres V-IX decreasing in length; antennomere XI longer than X, subequal to VIII, and strongly appendiculate, length of appendiculation  $0.6-0.79 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18F): PL 1.1-2.3 mm, PW 1.4-2.9 mm. Pronotum testaceous, width slightly greater than length, apical width subequal to basal width, lateral margins angulate, widest medially. Pronotal disc shining, punctate, with short, recumbent and suberect, testaceous pubescence arising from punctation; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying slightly raised integument, each of similar width throughout and occupying  $\frac{1}{4}$  of pronotal disc area, lateral margins clothed with a line of dense appressed and erect, testaceous pubescence; punctation on shining areas shallow, individual punctures moderate to large, subequal in diameter and shape; majority clearly delimited; oval, more densely punctate areas above lateral margins absent; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum testaceous, shining, with sparse, suberect to erect, testaceous setae. Scutellum testaceous, small, subtriangular, length subequal to width, medially impressed, with short moderately dense, recumbent black pubescence.

*Wings* (Figs. 21A, 23F): EL 5.6-11.7 mm. Elytron testaceous. About  $5 \times$  PL, width at humeral angles about  $1.2 \times$  PW. Elytron expanded apically, greatest apical width  $>1.5 \times$  width at humeral angles. Elytron with 4 distinct costae; from suture, costa I arising from anterior margin and extending to  $\frac{3}{5}$  elytral length, costa II arising from anterior margin and extending to  $\frac{4}{5}$  elytral length, costa III arising from humeral angle and extending to  $\frac{4}{5}$  elytral length; elytron with distinct, large diameter punctation, 3-5 punctures medially between suture and costa I, increasingly irregular apically, noticeably smaller in diameter basally; elytron with short, suberect, testaceous pubescence, one seta per puncture, outer

elytral margins with pubescence more dense. Metathoracic wing bicolored, basal 4/5 lightly tinted, apical 1/5 darkly tinted.

*Abdomen:* Testaceous, shining, finely punctate, and covered in sparse, short, suberect, testaceous pubescence.

*Legs:* Testaceous with apices of tibiae and tarsi black. Femora and tibiae finely punctate and covered with sparse, erect, testaceous pubescence, tarsal pubescence recumbent and more dense. Metatibia slightly sinuate.

*Genitalia:* Sternite VIII sides gradually tapering towards apex, two slightly sinuate anterolateral areas (one on either side), often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female:* TL 7.9-14.8 mm, GW 2.7-5.4 mm, HL 0.7-1.0 mm, HW 1.3-1.8 mm, DBE 0.8-1.1 mm, DBA 0.6-0.8 mm, PL 1.3-2.4 mm, PW 1.5-2.8 mm, EL 5.9-11.4 mm. As male, except eleventh segment of antennae not as strongly appendiculate.

**Intraspecific variation:** Lateral margins of pronotum piceous. Pronotum with bands of dense appressed pubescence indistinct. Elytral costa III not present on many individuals; costa I apically convergent with suture.

**Remarks:** *E. luteicollis* was compared to *E. pallidus* in the original description, from which it is easily distinguished. It was not compared or contrasted to *E. ignitus*, which it more closely resembles. The only distinguishing feature between the two observed is the longitudinal bands of dense, appressed, testaceous pubescence on the pronota. This feature is not distinct on specimens of *E. luteicollis*. This can be an artifact of wear on

the specimen and as there are no other characters to distinguish between these two species, *E. luteicollis* is synonymized herein.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to a clade of *Elytroleptus* species all exemplifying lycid mimicry (*E. limpianus*, *E. apicalis*, *E. grandis*, *E. rufipennis*, *E. nigripennis*, and *E. quadricostatus*).

**Type material (Fig. 53E):** *Elytroleptus ignitus* LECTOTYPE male in MCZC with the following label data: Label 1: "Ariz.". Label 2: "Type / 3900". Label 3: "P. ignitus / Lec". Label 4: "LECTOTYPE / Pteroplatus / ignitus / LeConte / Skiles & Chemsak, 1982".

*Elytroleptus luteicollis* HOLOTYPE male in CASC with the following label data: Label 1: "Hdgo. Parral, 25 / mi. W, 6800' Chih / MEX. VII-15-64". Label 2: "Clematis / paucifolia". Label 3: "J. A. Chemsak / Collector". Label 4: "Holotype / Elytroleptus / luteicollis / Skiles + Chemsak". Label 5: "California Academy / of Sciences / Type 15069 / No.".

*Elytroleptus luteicollis* PARATYPE female in EMEC with the following label data: Label 1: "Hdgo. Parral, 25 / mi. W 6800' Chih. / MEX. VII-15-64". Label 2: "J.A. Chemsak / Collector". Label 3: "PARATYPE / Elytroleptus / luteicollis / Skiles & Chemsak".

*Elytroleptus luteicollis* PARATYPE female in EMEC with the following label data: Label 1: "Hdgo. Parral, 25 / mi. W 6800' Chih. / MEX. VII-15-64". Label 2: "J.A. Chemsak / Collector". Label 3: "PARATYPE / Elytroleptus / luteicollis / Skiles & Chemsak".

**Type locality:** USA, Arizona.

**Specimens examined:** High quality digital images of the *E. ignitus* lectotype (habitus dorsal view, habitus lateral view, head frontal view, and labels) were viewed using the MCZC online type database (<http://insects.oeb.harvard.edu/mcz/>). The *E. luteicollis* holotype, two *E. luteicollis* paratypes, and two hundred and sixty-nine additional specimens were examined (175 ♂, 94 ♀)

**Distribution (Fig. 40):** Southwestern USA (Arizona) and northeastern Mexico (Chihuahua).

**Biology (Figs. 34B, C):** Flight period June through August. Adults have been collected on flowers and foliage of plants in the families Anacardiaceae (*Rhus* sp.), Fabaceae (*Acacia* sp.), Ranunculaceae (*Clematis pauciflora* Nutt.), Rhamnaceae (*Ceanothus* sp., *Condalia ericoides* (A. Gray) M.C. Johnst.), and Sapindaceae (*Sapindus drummondii* Hook. & Arn.). This species is part of the *Lycus loripes* mimetic complex whose members include the model sibling species *L. loripes* (Chevrolat) and *L. simulans* (Schaeffer), and two mimetic moth species, *Eubaphe unicolor* (Robinson) and *Holomelina ostentata* (Edwards) (Linsley *et al.*, 1961). *E. ignitus* is predaceous upon the lycid beetles in its own mimetic complex as well as those found in the mimetic complex of *E. apicalis*, which includes the sister species *L. fernandezi* Dugés and *L. arizonensis* Green (Eisner *et al.*, 1962). *E. ignitus* is a Batesian mimic and does not possess the chemical component thought to cause distastefulness in lycid beetles, lycidic acid (Eisner *et al.*, 2008).

**Label data:** MEXICO. -- **CHIHUAHUA.** Hidalgo del Parral, 2 ♀, 15.vii.1964, Chemsak, J.A. (EMEC). Unknown, 1 ♀, 30.vi.1947, Gertsch (EMEC). **SONORA.** Unknown, 1 ♂, --.v.----, Morrison, H.K. (BMNH).

USA. -- **ARIZONA.** *Cochise Co.* Douglas, 1 ♀, 18.vii.1974, McCleve, S. (TAMU). Palmerlee, 1 f (CASC); 1 f (AMNH). Portal, 2 ♂, 1 ♀, 2.viii.1961, Linsley, E.G. (EMEC); 1 ♂, 1.viii.1958, James, R.H. (EMEC); 1 ♂, 3.vii.1956, Howden, H. (FSCA); 1 ♂, vii.1968, Lenczy (USNM); 13 ♂, 5 ♀, 6.vii.1960, 7.vii.1960, 9.vii.1960, 17, vii.1960, 19.vii.1960, 21.vii.1960, 22.vii.1960, 23.vii.1960, 24.vii.1960, 25.vii.1960, Linsley, E.G. (EMEC); 5 ♂, 1 ♀, 11.vii.1960, 15.vii.1960, Statham, M. (EMEC); 2 ♂, 25-26.vii.1975, Cicero, J.M. (FSCA). Carr Canyon, 1 ♀, 12.vii.1975, Giesbert, E. (FSCA). Chiricahua Mtns., 1 ♂, 1 ♀, 3.vii.1947, Wallace, H.S. (SEMC); 1 ♂, 1 ♀, 20.vii.1967, 8.viii.1967 (DHPC); 2 ♂, 20.vii.1967, 1.vii.1967, Knull, J.N. (FMNH); 11 ♂, 17 ♀, 26.vii.1952, 10.vii.1961, 2.viii.1952, 22.vii.1957, 12.vii.1953, 16.vii.1959, 20.vii.1955, 7.vii.1961, 9.vii.1929, 14.vii.----, 20.vii.1967, 15.vii.1961, 2.vii.1959, 29.vii.1955, 26.vii.1952, 9.vii.1959, 19.vii.1959, 18.vii.1961, Knull, D.J. & J.N. (FMNH); 1 ♀, 6.vii.1967, 1 ♂, 8.vii.1967, Knull, D.J. & J.N. (USNM); 1 ♂, vii.1908 (CASC); 6 ♂, 1 ♀, 23.vii.1992, 24.vii.1992, Androw, R. & Brattain, M. (RAAC); 26 ♂, 15 ♀, 6.vii.1967, 12.vii.1967, 10.vii.1961, 21.vii.1967, 1.vii.1967, 7.vii.1967, Knull, D.J. & J.N. (OSUC). Huachuca Mtns., 1 ♀, 18.vii.1938, Beamer, R.H. (SEMC); 1 ♀, 28.vii.1982, Jump, P. (TAMU); 1 ♂, 2 ♀, 25.vii.2000, Androw, R., Will, K., & Karns, K. (RAAC); 1 ♀, 21.vii.1905 (FMNH); 2 ♀, Schaeffer, C. (AMNH); 10 ♂, 8 ♀, 17.vii.----, 16.vii.----, 20.vii.----, 19.vii.----, 21.vii.----, Knull, D.J. & J.N. (FMNH); 2 ♀, 27.vii.1905, Schaeffer (MCZC); 2 ♂, 5 ♀, 13.vi.1905, 09.vii.----, 11.vii.----, 25.vii.1907, vii.1905, vii.1909, vi.1922 (USNM); 1 ♂, vii.1905, Cazier (AMNH); 2 ♂, vii.1913, Schaeffer, C. (AMNH); 1 ♂, vii.1909 (CASC); 1 ♂, vii.1905, Schaeffer (USNM); 2 ♂, 20.vii.1937, Knull, D.J. & J.N.; 1 ♂, 28.vii.1907, Hine, J. (OSUC). Miller Canyon, 1 ♀, 30.vii.1974, McCabe, T.



(CUIC); 1 ♀, --.vii.1920, Wenzel (OSUC). Texas Canyon, 1 ♀, 25.vii.1992, Androw, R. & Brattain, M. (RAAC). Stronghold Trl., 4 ♂, 5.viii.1972, Stephan, K. (FSCA). *Graham Co.* Fort Grant, 1 ♂, 13.--.1907, Hubbard & Schwarz (USNM); 1 f (USNM). *Pima Co.* Bear Canyon, 2 ♂, 4.viii.1948, Ball, G.E. (AMNH). Box Canyon, 4 ♂, 1 ♀, 14.vii.1999, Skelley, P. & Thomas, M. (FSCA). Madera Canyon, 8 ♂, 4 ♀, 17.vii.1971, 15.vii.1975, Giesbert, E. (FSCA); 1 ♀, 3.vii.1963, Vesterby, V.L. (UCD); 1 ♂, 8.vii.1973 (JEW). Santa Catalina Mtns., 1 ♀, 3.vii.1970, Stephan, K. (FSCA). Santa Rita Mtns., 13 ♂, 21.vii.1998, Androw, R. (RAAC); 1 ♂, 27-28.vii.1982, Wappes, J.E. (JEW). *Santa Cruz Co.* Nogales, 2 ♂, 11.vii.1919, Kushe, J.A. (CASC). Sonoita, 1 ♀, 6.vii.1986, Heffern, D. & Androw, R. (DHPC). Madera Canyon, 1 ♀, 7.vii.1975, Cicero, J.M. (FSCA); 1 ♂, 1.vii.1959, Franclemont, J.C. (CUIC); 2 ♂, 2 ♀, 21-27.vii.1947, Martin, L.M. (LACM). Santa Rita Mtns., 1 ♂, 1 ♀, Smyth, E.G. (CASC); 5 ♂, 1 ♀, Snow, F.H. (FSCA); 4 ♂, 2 ♀, 15.vi.1909, Snow, F.H. (MCZC); 1 ♂, --.vii.1924, Chamberlin, W.J. (AMNH); 1 ♂, Snow, F.H. (CUIC); 2 ♂, Snow, F.H. (FMNH); 1 ♂, Smyth, E.G. (MCZC); 22 ♂, 2 ♀, 24.vii.2000, Androw, R. & Karns, K. (RAAC); 4 ♂, 3 ♀, --.vii.----, Snow, F.H. (SEMC); 1 ♂, 21.vii.1971, Marqua, D.G. (JEW); 1 ♀, 8-10.vii.1975, Cicero, J.M. (FSCA); 1 ♂, 9-10.vii.1975, Cicero, J.M. (JEW). Unknown, 1 ♀ (CASC); 1 ♂, Snow, F.H. (MCZC); 1 ♂, 1 ♀, Morrison, H.K. (USNM).

***Elytroleptus immaculipennis* Knull, 1935**

**(Figs. 9, 18G, 21B, 23G, 25E)**

*Elytroleptus floridanus immaculipennis* Knull, 1935: 99 (orig. descr.).



Figure 9. *Elytroleptus immaculipennis* Knull dorsal habitus, male.  
Scale bar = 1 mm.

*Elytroleptus immaculipennis*; Knull 1950: 91 (descr.); Linsley, 1961b: 11 (key); 1962a: 178 (descr.); 1962b: 10 (key); Chemsak & Linsley, 1965: 196 (key, distr.); Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 605 (cat.).

*Elytroleptus immaculipennis* var. *obliquus* Knull 1950: 91 (orig. descr.); Chemsak, 1977: 174 (type); Chemsak *et al.*, 1992: 83 (cat.); Monné, 2005: 605 (cat.).

*Elytroleptus peninsularis* Hovore, 1988: 16, fig3a (orig. descr.); Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat); Monné, 2005: 606 (cat.). **New Synonymy**

**Diagnosis:** This species is separated from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width < 1.5 × humeral angle width, 2) pronotal lateral sides broadly rounded, and 3) pronotal longitudinal lines of dense appressed pubescence white to pale yellow overlying rufo-testaceous to red integument. This species most closely resembles *E. floridanus* and is distinguished by the pronotal longitudinal lines of pale pubescence overlying red integument instead of testaceous pubescence overlying testaceous integument.

**Description:** Male. TL 6.9-9.3 mm, GW 2.4-3.0 mm.

Body elongate, subparallel, dorsoventrally flattened.

*Head:* HL 0.5-0.7 mm, HW 1.2-1.5 mm, DBE 0.7-0.9 mm, DBA 0.5-0.6 mm. Piceous, except vertex with triangular red area, anteclypeus and labrum testaceous. Moderately, deeply punctate with short, sparse, suberect to erect, pale yellow pubescence, more dense and appressed on vertex; gular region glabrous; rugose posterior to lower eye lobe.

Antennal tubercles slightly raised and separated by approximate width of four antennal sockets. Genal apices generally rounded, width less than  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 28 facets at greatest height; integument

ventral to lower lobe about  $0.1 \times$  eye height; deeply emarginate at antennal insertion, with 1-2 facets at greatest emargination point. Antennae black, extending to approximately  $2/5$  elytral length; scape and antennomere VI subequal; pedicel slightly less than  $\frac{1}{2} \times$  scape length; antennomeres III and IV subequal, each  $2 \times$  pedicel length; antennomeres V-X decreasing in length; antennomeres VIII and IX subequal; antennomere X shorter than IX, subequal to pedicel, antennomere XI subequal to IV and slightly appendiculate, length of appendiculation  $0.1-0.39 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18G): PL 1.1-1.5 mm, PW 1.5-1.9 mm. Pronotum piceous, width  $1.3 \times$  length, apical width subequal to basal width, lateral margins broadly rounded, widest medially. Pronotal disc shining, punctate, with short, suberect, pale pubescence arising from punctation; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed white to pale yellow pubescence overlying slightly raised rufo-testaceous to red integument, each of similar width throughout and occupying  $\frac{1}{4}$  of pronotal disc area; punctation on shining areas deep, individual punctures moderate and subequal in diameter and shape, all clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum dark brown to black, shining, with sparse, suberect to erect, pale yellow to whitish setae. Scutellum black, small, subtriangular, length subequal to width, medially impressed with short, moderate, black pubescence.

*Wings* (Figs. 21B, 23G): EL 5.3-7.1 mm. Elytron piceous. About  $4.7 \times$  PL, width at humeral angles subequal to PW. Elytron subparallel, greatest width  $<1.5 \times$  width at humeral angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior

margin and extending to 3/5 elytral length, costa II arising from anterior margin and extending to 4/5 elytral length, costa III arising from humeral angle and extending to 4/5 elytral length; elytron with distinct punctation, 3-5 punctures at midline between suture and costa I, spacing constant; elytron with sparse, short, suberect, pale pubescence, one seta per puncture, outer elytral margins with subequal pubescence. Metathoracic wing darkly tinted.

*Abdomen:* Piceous, shining, finely punctate, with short, erect, pale pubescence.

*Legs:* Black. Femora and tibia moderately, deeply punctate, with sparse, short, erect, pale pubescence, tarsal pubescence recumbent and more dense. Metatibia straight, not strongly sinuate.

*Genitalia:* Sternite VIII sides gradually tapering towards apex, four slightly sinuate anterolateral areas (two on either side), often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female:* TL 7.9-11.4 mm, GW 2.8-3.8 mm, HL 0.6-0.8 mm, HW 1.2-1.5 mm, DBE 0.8-0.9 mm, DBA 0.5-0.6 mm, PL 1.2-1.5 mm, PW 1.7-2.2 mm, EL 6.1-9.1 mm. As male, except EL about  $5 \times$  PL; sexually dimorphic oval area of dense punctation above pronotal lateral margin absent.

**Intraspecific variation:** Pronotal bands of dense appressed pubescence extending to lateral margins to occupy 2/3 of pronotal disc. Coloration of elytra highly variable ranging from concolorous piceous to concolorous rufo-testaceous; some individuals with elytral coloration pattern as in *E. floridanus* with basal 1/5 testaceous, apical 4/5 piceous

extending obliquely to meet suture, these individuals have been previously termed the varietal form of *E. immaculipennis obliquus* (Knull, 1950).

**Remarks:** All attempts to locate the type material for *E. peninsularis* proved to be unsuccessful. Hovore's original description places the holotype female in CASC, but the specimen could not be located. Hovore enumerated differences between *E. peninsularis* and *E. immaculipennis* in the original description stating that *E. peninsularis* was different in the respects of shorter body proportions; flattened, less densely punctate pronotal disc; pale body pubescence; and more coarsely punctate elytra (4 punctures in a transverse row between discal costae) (1988). After reviewing all *E. immaculipennis* specimens available, these characters are all present and *E. peninsularis* is thus synonymized. Locating and examining the type specimen may facilitate describing differences between the two.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. floridanus* supported by the homoplasious characters of the genal width less than  $\frac{1}{2}$  the height (Character 1), recumbent central pronotal disc pubescence (Character 12), and the elytral punctuation pronounced at the apices (Character 22).

**Type material (Fig. 53A):** *Elytroleptus immaculipennis* HOLOTYPE female in OSUC with the following label data: Label 1: "Davis Mts / VII-9 Tex". Label 2: "HA Wenzel / Collector". Label 3: "Holotype". Label 4: "H. W. Wenzel / Collection". Label 5: "Elytroleptus / floridanus / subsp. / immaculipennis / Det. Knull / Knull". Label 6: (underside) "OSUC 0278211".

*Elytroleptus immaculipennis* var *obliquus* HOLOTYPE female in FMNH with the following label data: Label 1: "Davis M., / VII-3-40 Tex.". Label 2: "D. J. & J. N. /

Knull Collrs". Label 3: "J. N. Knull / Collection". Label 4: "HOLOTYPE / *Elytroleptus* / *immaculipennis* / *obliquus* Knull". Label 5: "*Elytrolepta* / *immaculipennis* / *obliquus* Knull / det. J. Knull".

**Type locality:** USA, Texas, Davis Mountains.

**Specimens examined:** The *E. immaculipennis* holotype, the *E. immaculipennis* var. *obliquus* holotype, and thirty-eight additional specimens were examined (9 ♂, 29 ♀).

**Distribution (Fig. 41):** Southwestern USA (Arizona, Texas) and Mexico (Durango, Oaxaca).

**Biology:** Flight period March through July. Individuals have been collected on foliage of plants in the family Fagaceae (*Quercus* sp. including *Quercus hypoleuroides* A. Camus). Hovore (1988) suggested that a possible model for this species would be found in the clerid genus *Pelonides* Kuwert due to the similarities in form and coloration.

**Label data:** MEXICO. -- **DURANGO.** Durango, 1 ♀, 23.vi.1964, Howden, H.F. (CNC). **OAXACA.** Mitla, 3 ♂, 3 ♀, 3-9.vii.1994, Giesbert, E. (FSCA).

USA. -- **ARIZONA.** *Cochise Co.* Paradise, 1 ♀, 5.vii.1976, Nelson, G.H. (FSCA). Carr Canyon, 1 ♀, 27.vii.1979, Giesbert, E. (FSCA). **TEXAS.** *Brewster Co.* Chisos Mtns., 2 ♀, vii.1918, Green, J.W. (EMEC); 1 ♂, 2 ♀, 8.vii.1955, 30.vii.1957, Knull, D.J. & J.N. (FMNH). *Jeff Davis Co.* Fort Davis, 1 ♀, 1.vii.1986, Androw, R., Heffern, D. & Huether, J. (RAAC); 1 ♂, 1 ♀, 13.vi.1968, 19.vi.1963, Nelson, G.H. (FSCA); 1 ♂, 2 ♀, v.1995, 20.iv.1995, 7.vii.1994, Androw, R. & Clark, S. (RAAC). Davis Mtns., 2 ♂, 10 ♀, 14.vii.1957, 19.vi.1958, 3.vii.1955, 15.vii.1955, 25.vi.1959, Knull, D.J. & J.N. (FMNH); 2 ♀, 5.vii.1990, 23.vii.1989, Marqua, D.G. (TAMU). Unknown, 2 ♀,

6.vii.1953, Knull, D.J. & J.N. (FMNH); 1 ♀, 2-3.vii.2000, Wappes, J.E. (JEW). *Smith Co.* Unknown, 1 ♂, 27.iii.952, Reinhard, H.J. (TAMU).

***Elytroleptus limpianus* Skiles & Chemsak, 1982**

**(Figs. 10, 18H, 21C, 23H, 25F)**

*Elytroleptus limpianus* Skiles & Chemsak, 1982: 67 (orig. descr., biol.): Chemsak *et al.*, 1992: 83 (cat.).

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytra expanded apically, greatest width  $>1.5 \times$  humeral angle width, 2) abdomen piceous, 3) central pronotal disc rufo-testaceous, and 4) elytron with punctation moderate in diameter, 5-6 punctures between suture and costa I medially. This species most closely resembles *E. rufipennis* and can be distinguished by the rufo-testaceous scutellar integument and the medial pronotal disc integument rufo-testaceous or testaceous, not black. From *E. ignitus*, it is distinguished by the piceous abdomen and piceous metasternum instead of testaceous, and metathoracic wings darkly tinted in entirety instead of the basal aspects lightly tinted. From *E. apicalis*, it is separated by the piceous abdomen instead of testaceous and moderately sized elytral punctation (5-6 punctures medially between suture and costa I instead of 7-10 punctures).

**Description:** Male. TL 9.7-12.7 mm, GW 3.5-4.8 mm.

Body elongate, expanded apically from humeri, dorsoventrally flattened.

*Head:* HL 0.6-0.9 mm, HW 1.5-1.8 mm, DBE 0.9-1.2 mm, DBA 0.6-0.8 mm. Rufo-testaceous, except apices of mandibles piceous. Finely punctate with short to long, sparse, suberect to erect testaceous pubescence; shorter, appressed and more dense on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles





Figure 10. *Elytroleptus limpianus* Skiles & Chemsak dorsal habitus, male.  
Scale bar = 1 mm.

moderately raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width about  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 25 facets at greatest height; integument ventral to lower lobe about  $0.3 \times$  eye height; deeply emarginate, with 3-4 facets at greatest emargination point. Antennae piceous; extending to approximately  $\frac{2}{5}$  elytral length, scape and antennomere V subequal, pedicel about  $\frac{1}{3} \times$  scape length; antennomeres III and IV subequal, each  $3 \times$  length of pedicel; antennomeres V-VIII decreasing in length; antennomeres VIII and IX subequal; antennomere X shorter than IX; antennomere XI subequal to VI, strongly appendiculate, length of appendiculation  $0.6-0.79 \times$  the width at point of appendiculation.

*Thorax* (Fig. 18H): PL 1.6-2.0 mm, PW 1.8-2.2 mm. Pronotum testaceous to rufo-testaceous, width slightly greater than length, apical width subequal to basal width, lateral margins subangulate, widest medially. Central pronotal disc shining, punctate, with short, erect, rufo-testaceous pubescence arising from punctation, becoming black basally towards scutellum; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, rufo-testaceous pubescence overlying slightly raised integument, each of similar width throughout and occupying  $\frac{1}{4}$  of pronotal disc area; punctation on shining areas deep, individual punctures small and varying in diameter and shape, majority clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro- and mesosternum testaceous to rufo-testaceous, shining, with sparse, suberect to erect testaceous setae. Metasternum dark brown to black, shining, with sparse, suberect to

erect black pubescence. Scutellum rufo-testaceous, small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent black pubescence. *Wings* (Figs. 21C, 23H): EL 7.5-9.8 mm. Elytron testaceous to rufo-testaceous. About  $5 \times PL$ , width at humeral angles about  $1.2 \times PW$ . Elytra expanded apically, greatest width  $>1.5 \times$  width at humeral angle. Elytron with 4 distinct costae; from suture, costa I arising from anterior margin and extending to  $3/5$  elytral length, costa II arising from anterior margin and extending to  $4/5$  elytral length, costa III more indistinct than others and extending from about  $2/5$  posterior of middle of anterior margin to  $4/5$  elytral length, costa IV arising from humeral angle and extending to  $4/5$  elytral length; elytron with distinct but shallow punctation, 5-7 punctures medially between suture and costa I, increasingly shallower apically, decreasing in diameter basally between scutellar apex and costa I; elytron with moderate, short, suberect, rufo-testaceous pubescence, one seta per puncture, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen*: Piceous, shining; finely punctate, covered in sparse, short, suberect, black pubescence.

*Legs*: Rufo-testaceous except tarsi piceous. Protibia, mesofemora, mesotibia, metafemora, and metatibia with black pubescence. Metatibia straight, not strongly sinuate.

*Genitalia*: Sternite VIII sides gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female*: TL 11.0-12.6 mm, GW 4.1-5.1 mm, HL 0.8-1.0 mm, HW 1.6-1.7 mm, DBE 1.0-1.1 mm, DBA 0.7-0.8 mm, PL 1.6-1.9 mm, PW 2.0-2.4 mm, EL 8.6-9.7 mm. As male, except antennae extending to 1/5 elytral length; antennomeres V-XI less strongly serrate; antennomere XI less strongly appendiculate. Pronotum lacking sexually dimorphic densely punctate oval area above lateral margin.

**Intraspecific variation:** Antennomeres I-IV rufo-testaceous basally, black apically, antennomeres V-XI black. Several male specimens with integument black on densely punctate sexually dimorphic areas.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to a clade of very precise lycid mimics (*E. apicalis*, *E. grandis*, *E. rufipennis*, *E. nigripennis*, *E. quadricostatus*) supported by the homoplasious characters of small, deep pronotal punctation (Characters 8 and 9) and the presence of sexually dimorphic prothoracic punctation in males (Character 14).

**Type material (Figs. 53B, C):** HOLOTYPE male in CASC with the following label data: Label 1: "Limpia Cyn / Davis Mtns / D. Skiles Tex / VII-6, 1979". Label 2: "HOLOTYPE / Elytroleptus / limpianus / Skiles & Chemsak". Label 3: "California Academy / of Sciences / Type No. 13678".

ALLOTYPE female in CASC with the following label data: Label 1: "Limpia Cyn / Davis Mtns / D. Skiles Tex / VII-5, 1979". Label 2: "ALLOTYPE / Elytroleptus / limpianus / Skiles & Chemsak".

PARATYPE male in EMEC with the following label data: Label 1: "Limpia Cyn / Davis Mtns / D. Skiles Tex / VII-6, 1979". Label 2: "PARATYPE / Elytroleptus / limpianus / Skiles + Chemsak".

PARATYPE female in EMEC with the following label data: Label 1: "Limpia Cyn / Davis Mts / D. Skiles Tex / VII-6, 1979". Label 2: "PARATYPE / Elytroleptus / limpianus / Skiles + Chemsak".

**Type locality:** USA, Texas, Davis Mountains, Limpia Canyon.

**Specimens examined:** The holotype, allotype, two paratypes (1 ♂, 1 ♀), and nine additional specimens were examined (7 ♂, 2 ♀).

**Distribution (Fig. 42):** Southwestern USA (Texas).

**Biology (Fig. 34C):** *E. limpianus* is the third recorded cerambycid species that is predaceous on lycid beetles. The interactions for this species are not as well examined as those for *E. apicalis* and *E. ignitus*, but the proposed model is *Lycus simulans* (Schaeffer), which it has been seen feeding upon. Flight period June and July. Individuals have been collected on flowers and foliage in the families Fagaceae (*Quercus grisea* Liebm.), and Rhamnaceae (*Ceanothus* sp., *Condalia ericoides* (A. Gray) M.C. Johnst.).

**Label data:** USA. -- **TEXAS.** *Jeff Davis Co.* Fort Davis, 1 ♀, 24.vi.1999, Nelson, G.H. (FSCA). Davis Mtns., 1 ♂, 1 ♀, 14.vi.1958, 3.vii.1955, Knull, D.J. & J.N. (FMNH); 1 ♂, 24.vi.1999, Nelson, G.H. (FSCA). Limpia Canyon, 2 ♂, 6.vii.1991, Marqua, D.G. (TAMU); 1 ♂, 4.vii.1999, Heffern, D.J. (DHPC); 1 ♂, 1 ♀, 6.vii.1979, Skiles, D. (EMEC). Unknown, 2 ♂, 3.vii.1999, Wappes, J.E. (JEWG).

***Elytroleptus luteus* Dugés, 1879**

**(Figs. 1, 2, 11, 19A, 21D, 23I, 25G)**



Figure 11. *Elytroleptus luteus* Dugés dorsal habitus, male.  
Scale bar = 1 mm.

*Elytroleptus luteus* Dugés 1879: 185. Lameere 1883: 40; Bates 1885: 317 (distr.); Chemsak & Linsley, 1965: 199 (distr.); Chemsak *et al.*, 1980: 33 (distr.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 605 (cat.).

*Elytroleptus luteus luteus*: Linsley, 1961c: 12 (key); 1962b: 12 (key); Chemsak *et al.*, 1992: 83 (cat.); Monné, 2005: 605 (cat.).

*Elytroleptus luteus davisi*: Linsley, 1961c: 12 (key); 1962a: 180, fig. 53 (key, descr.); 1962b: 12 (key); Skiles & Chemsak, 1982: 69 (syn.); Chemsak *et al.*, 1992: 83 (cat.); Monné, 2005: 605 (cat.).

*Elytroleptus davisi* Knull 1940: 558, fig. 6 (orig. descr.): Chemsak, 1977, 174 (type).

*Elytroleptus lineatus* Knull 1950: 91 (orig. descr.): Linsley, 1961c: 11 (key); 1962a: 179 (key, distr.); 1962b: 12 (key); Chemsak & Linsley, 1965: 195 (key); Chemsak, 1977: 174 (type).

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width  $< 1.5 \times$  humeral angle width, 2) pronotum lacking longitudinal lines of dense appressed pubescence, 3) shallowly punctate pronotum, 4) elytral punctation subequal medially and basally, and 5) elytra clothed with distinctly longer setae basally than apically. This species most closely resembles *E. scabricollis*, especially those individuals that possess concolorous testaceous elytra, and can be distinguished by the elytral punctation subequal medially, basally, and apically. Males also possess sexually dimorphic prothoracic gland pores.

**Description:** Male. TL 5.3-10.2 mm, GW 1.5-2.7 mm.

Body elongate, subparallel, dorsoventrally flattened.

*Head:* HL 0.5-0.7 mm, HW 0.9-1.4 mm, DBE 0.5-0.9 mm, DBA 0.4-0.6 mm.

Testaceous except apices of mandibles, supraorbital area, and venter piceous. Finely punctate with short, sparse, erect, testaceous pubescence; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles slightly raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width greater than  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 25 facets at greatest height; integument ventral to lower lobe about  $0.2 \times$  eye height; deeply emarginate at antennal insertion, with 2-3 facets at greatest emargination point. Antennae black, extending to approximately  $\frac{2}{5}$  elytral length, scape, antennomere III, and IV subequal, pedicel  $\frac{1}{3} \times$  scape length, antennomeres V-X decreasing in length, antennomeres VIII and IX subequal, antennomere XI longer than X and subequal to VI and moderately appendiculate, length of appendiculation  $0.4-0.59 \times$  the width at point of appendiculation.

*Thorax* (Fig. 19A): PL 0.9-1.8 mm, PW 1.1-1.9 mm. Pronotum testaceous, width slightly greater than length, apical width subequal to basal width, lateral margins slightly angulate, widest medially. Pronotal disc shining, punctate, with erect, testaceous pubescence arising from punctation, lacking longitudinal lines of dense, appressed pubescence; punctation on shining areas deep; individual punctures moderate and varying in shape and diameter, majority clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum black, shining, with sparse, erect, pale yellow



pubescence. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, moderate black pubescence.

*Wings* (Figs. 21D, 23I): EL 3.9-7.7 mm. Elytron pale yellow to testaceous. About  $4.2 \times$  PL, width at humeral angles about  $1.1 \times$  PW. Elytron subparallel, greatest width  $<1.5 \times$  width at humeral angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior margin and extending to  $3/5$  elytral length, costa II arising from anterior margin and extending to  $4/5$  elytral length, costa III arising from humeral angle and extending to  $3/5$  elytral length; elytron with distinct deep punctation, 4-5 punctures medially between suture and costa I, slightly shallower apically, subequal basally; elytron with sparse, testaceous, erect pubescence, one seta per puncture, becoming shorter and suberect to recumbent apically, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen*: Piceous, shining; finely punctate, covered in sparse, short, suberect, pale yellow pubescence.

*Legs*: Mesothoracic leg, metathoracic leg, and coxa of prothoracic leg piceous and shining. Prothoracic trochanter, femora, tibia, and tarsi testaceous. Metatibia slightly sinuate. Femora and tibia covered in sparse, suberect to erect, pale yellow pubescence.

Tarsi covered in sparse, recumbent, black pubescence.

*Genitalia*: Sternite VIII sides subparallel towards apex, two slightly sinuate anterolateral areas (one on either side), often with slight concavity medially. Tergite VIII subparallel towards apex, lacking sinuate areas, often with slight concavity medially.

*Female*: TL 8.1-12.0 mm, GW 2.4-3.2 mm, HL 0.7-0.8 mm, HW 1.2-1.5 mm, DBE 0.7-1.0 mm, DBA 0.5-0.6 mm, PL 1.5-2.1 mm, PW 1.5-2.2 mm, EL 5.9-9.1 mm.

As male, except antennae extending to 1/5 elytral length; antennomeres V-XI less strongly serrate; antennomere XI less strongly appendiculate. Pronotum lacking sexually dimorphic densely punctate oval area above lateral margin.

**Intraspecific variation:** Pronotum and elytra range in color from pale yellow, to testaceous and rufo-testaceous with regions of black. Several male specimens with integument black on densely punctate sexually dimorphic pronotal areas.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. scabricollis* supported by the shallow, large punctation (Characters 8 and 9) and the smaller, reduced elytral punctation basally compared to medially (Character 20).

**Type material (Figs. 52A, 53D):** *Elytroleptus lineatus* HOLOTYPE female in FMNH with the following label data: Label 1: "Davis Mts., / VI-21-49. Tex.". Label 2: "D. J. & J. N. / Knull Collrs". Label 3: "J. N. Knull / Collection". Label 4: "HOLOTYPE / Elytroleptus / lineatus Knull". Label 5: "Elytrolepta / lineatus / Knull / det. J. Knull".

*Elytroleptus luteus davisi* HOLOTYPE male in FMNH with the following label data: Label 1: "Davis M., / VI-10-39 Tex". Label 2: "D. J. & J. N. / Knull Collrs". Label 3: "J. N. Knull / Collection". Label 4: "HOLOTYPE / Elytroleptus / davisi Knull". Label 5: "Elytrolepta / luteus / davisi / Kn. / det. J. Knull".

**Specimens examined:** The *E. lineatus* holotype, the *E. luteus davisi* holotype and thirty-seven additional specimens (27 ♂, 10 ♀) were examined.

**Distribution (Fig. 43):** Guatemala (Baja Verapaz, Zacapa), Honduras (Zamorano), Mexico (Bejucos, Chihuahua, Durango, Nayarit, Oaxaca, Sonora, Temescaltepec), and the southwestern United States (Arizona, Texas).

**Biology:** Adult specimens have been collected on flowers and foliage of plants in the families Euphorbiaceae (*Croton* sp.), Loganiaceae (*Buddleia cordata* Kunth), Ranunculaceae (*Clematis paucifolia* Nutt.), Rhamnaceae (*Condalia ericoides* (A. Gray) M.C. Johnst.), and Verbenaceae (*Lippia ligustrina* (Lag.) Kuntze).

**Label data:** GUATEMALA. -- **BAJA VERAPAZ.** Salama, 1 ♂, 1 ♀, 25-31.v.1989, Giesbert, E. (FSCA); 2 ♂, 25-31.v.1989, Wappes, J.E. (JEW). **ZACAPA.** San Lorenzo, 1 ♀, 30.v.2003, Woodruff, R.E. & Monzon, J. (JEW); 1 ♂, 3-6.vi.1989, Giesbert, E. (FSCA); 1 ♂, 9.vi.1997, Giesbert, E. & Monzon, J. (FSCA). HONDURAS. -- **ZOMORANO.** Unknown, 1 ♀, 27.iv-5.v.1964, Axtell, G.A. (EMEC). **UNKNOWN.** 1 ♀, 20.x.1979, Mankins, J.V. (USNM); 1 ♀, 9.x.1978, Mankins, J.V. (USNM).

MEXICO. -- **CHIHUAHUA.** Hidalgo del Parral, 1 ♂, 15.vii.1964, Chemsak, J.A. (EMEC). **DURANGO.** Durango, 1 ♀, 31.vii.1964, Chemsak, J.A. (EMEC); 1 ♂, 12.vii.1954, MacSwain, J.W. (EMEC). Ventanas, 1 ♀, Hoge (BMNH). **NAYARIT.** Santa Maria del Oro, 1 ♂, 27.vi.1963, Doyen, J. (EMEC). **OAXACA.** Unknown, 1 ♀, 6.vi.1938, Greenfield, R. (EMEC). **SONORA.** Alamos, 1 ♂, 1 ♀, 30.vii-9.vii.1957, Westcott, R.L. (EMEC). Yecora, 4 ♂, 1 ♀, 18.vii.2005, Swift & Hovore (ISPC). **TEMESCALTEPEC.** Bejucos, 2 ♂, 5.vii.1933, Hinton, H.E. & Usinger, R.L. (EMEC). Tejupilco, 1 ♂, 1 ♀, vii.1932, Hinton, H.E. & Usinger, R.L. (EMEC). USA. -- **ARIZONA.** *Cochise Co.* Douglas, 1 ♂, viii (MCZC). *Santa Cruz Co.* Nogales, 1 ♂, 13.vii.1949, Wilson & Kaiser (USNM). **TEXAS.** *Jeff Davis Co.* Fort Davis, 1 ♂, 29-30.vi.1986, Heffern, Huether, & Androw (DHPC). Davis Mtns., 4 ♂, 24.vi.1957, 21.vi.1949, Knull, D.J. & J.N. (FMNH); 1 ♂, 25.vi.1999, Nelson, G.H.

(FSCA). Fort Davis Nat Park, 1 ♂, 4.vii.1969, Kendall, R.O. & C.A. (TAMU). *Presidio Co.* Presidio, 1 ♂, 25.vi.1968, Hafernik, J.E. (TAMU).

UNKNOWN. -- UNKNOWN. 1 m (AMNH).

***Elytroleptus nigripennis* Bates, 1885**

**(Figs. 12, 19B, 21E, 24A)**

*Elytroleptus nigripennis* Bates 1885: 318 (orig. descr.): Linsley, 1961c: 10 (key); 1962b: 8 (key); Chemsak & Linsley, 1965: 195 (key); Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 605 (cat.).

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytra expanded apically, greatest width  $>1.5 \times$  humeral angle width, 2) elytra concolorous black, 3) each elytron with 5-6 punctures between suture and costa I medially, and 4) central pronotal disc densely pubescent. This species most closely resembles *E. quadricostatus* **sp.n.** and can be distinguished by the concolorous black elytra as opposed to bicolored testaceous and black and the central pronotal disc covered in dense, black pubescence as opposed to thinly pubescent.

**Description:** Female. TL 12.3 mm, GW 4.7 mm.

Body elongate, expanded apically from humeri, dorsoventrally flattened.

*Head:* HL 0.6 mm, HW 1.5 mm, DBA 0.7 mm, DLE 0.9 mm. Black, except anteclypeus, labrum apex, apex of maxillary palp, apex of labial palp, and vertex with triangular area testaceous. Finely punctate with long, sparse, suberect to erect, black pubescence, more dense, appressed, and testaceous on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles moderately raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally



Figure 12. *Elytroleptus nigripennis* Bates dorsal habitus, female.  
Scale bar = 1 mm.

rounded, width  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with 35 facets at greatest height; integument ventral to lower lobe about  $0.2 \times$  eye height; deeply emarginate, with 2 facets at greatest emargination point. Antennae black; extending to approximately  $\frac{2}{5}$  elytral length, scape and antennomere V subequal, pedicel about  $\frac{1}{3} \times$  scape length; antennomeres III and IV subequal, each  $3 \times$  length of pedicel; antennomeres V-VIII decreasing in length; antennomeres VIII and IX subequal; antennomere X shorter than IX; antennomere XI subequal to VI, slightly appendiculate, length of appendiculation  $0.1-0.39 \times$  the width at point of appendiculation.

*Thorax* (Fig. 19B): PL 1.7 mm, PW 2.4 mm. Pronotum piceous, width slightly greater than length, apical width subequal to basal width, lateral margins subangulate, widest medially. Pronotal disc shining, punctate, with short, dense, recumbent, black pubescence on basal  $\frac{2}{3}$ , testaceous on apical  $\frac{1}{3}$ , arising from punctation; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying testaceous integument and extending to lateral margins; punctation on central pronotal disc deep, individual punctures small and varying in diameter and shape, majority not clearly delimited; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum black, shining, with sparse, suberect to erect, black setae. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent black pubescence.

*Wings* (Figs. 21E, 24A): EL 10 mm. Elytron piceous. About  $6 \times$  PL, width at humeral angles about  $1.1 \times$  PW. Elytra expanded apically, greatest width  $>1.5 \times$  width at humeral angle. Elytron with 4 distinct costae; from suture, costa I arising from anterior margin

and extending to 3/5 elytral length, costa II arising from anterior margin and extending to 4/5 elytral length, costa III more indistinct than others and extending from about 2/5 posterior to middle of anterior margin to 4/5 elytral length, costa IV arising from humeral angle and extending to 4/5 elytral length; elytron with distinct, deep punctation, 5-6 punctures medially between suture and costa I, increasingly shallow apically, decreasing in diameter basally between scutellar apex and costa I; elytron with moderate, short, suberect to recumbent, black pubescence, one seta per puncture, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen:* Piceous with violaceous cast, shining; finely punctate, covered in sparse, short, suberect, black pubescence.

*Legs:* Piceous. Femora and tibia covered in sparse, erect, black pubescence, tarsal pubescence suberect to recumbent and more dense. Metatibia straight, not strongly sinuate.

*Genitalia:* Not examined in this species.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. quadricostatus* **n. sp.** supported by the homoplasious character of the lower eye lobe integument less than  $0.3 \times$  the height of the lower eye lobe (Character 2).

**Type material (Figs. 12, 53F):** HOLOTYPE female of *E. nigripennis* in BMNH (designated by monotypy [ICZN article 73.1.2]) with the following label data: Label 1: "Type". Label 2: "Oaxaca / Mexico. / Salle Coll.". Label 3: "B.C.A., Col.V. / Elytroleptus / nigripennis / Bates". Label 4: "Elytroleptus / nigripennis / Bates".

**Type locality:** Mexico, Oaxaca.

**Specimens examined:** The unique type specimen was examined for this species.

**Distribution (Fig. 44):** Mexico (Oaxaca).

**Biology:** Flight period unknown. The proposed lycid model for this species is *Lycus sordidus* Gorham (Linsley 1961).

***Elytroleptus pallidus* (Thomson, 1860)**

**(Figs. 13, 19C, 22A, 24B, 25H)**

*Pteroplatus pallidus* Thomson 1860: 255 (orig. descr.); 1878: 7 (type); Bates, 1880: 73 (distr.).

*Elytroleptus pallidus* (Thomson, 1860): Bates, 1885: 317 (syn. *alfredi*); Linsley, 1935: 96 (distr.); Monné, 2005: 605 (cat.).

*Elytroleptus pallidus pallidus*: Linsley, 1961b: 15; 1962b: 8; Chemsak & Linsley, 1965: 198 (distr.); Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.).

*Elytroleptus pallidus villosus* Linsley, 1961b: 15; 1962b: 10; Chemsak & Linsley, 1965: 199; Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 606 (cat.).

*Elytroleptus alfredi* Dugés 1879: 185, fig. 9 (orig. descr.); Lameere, 1883: 44 (cat.).

**Diagnosis:** This species can be distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width <  $1.5 \times$  humeral angle width, 2) pronotum piceous, 3) pronotum with longitudinal lines of dense, appressed testaceous pubescence, and 4) elytral punctation smaller in diameter at scutellar apex than medially. This species most closely resembles *E. similis* and is distinguished by the elytral punctation decreasing in diameter medially to basally and apically and by the deeper, greater number of pronotal punctures.

**Description:** Male. TL 6.4-12.0 mm, GW 2.2-3.7 mm.





Figure 13. *Elytroleptus pallidus* (Thomson) dorsal habitus, male.  
Scale bar = 1 mm.

Body elongate, subparallel, dorsoventrally flattened.

*Head:* HL 0.5-1.0 mm, HW 1.1-1.8 mm, DBE 0.6-1.1 mm, DBA 0.4-0.7 mm.

Testaceous except apices of mandibles, post-ocular region, basal band, and gular region piceous. Finely punctate with short, sparse, testaceous pubescence, more dense on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles slightly raised, subtriangulate, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, with about 27 facets at greatest height; integument ventral to lower lobe about  $0.2 \times$  eye height; deeply emarginated at antennal insertion, with 1-2 facets at greatest emargination point. Antennae black, extending to approximately  $\frac{2}{5}$  elytral length, scape and antennomere V subequal; pedicel  $\frac{1}{2} \times$  length of antennomere III; antennomere III, IV, and VI subequal; antennomeres V-VIII decreasing in length; antennomeres VIII-X subequal; antennomere XI longer than X and moderately appendiculate, length of appendiculation  $0.4-0.59 \times$  the width at point of appendiculation.

*Thorax* (Fig. 19C): PL 1.0-2.0 mm, PW 1.3-2.4 mm. Pronotum piceous, width slightly greater than length, apical width subequal to basal width, lateral margins angulate, widest medially. Pronotal disc shining, punctate, with short, suberect to erect, testaceous pubescence arising from punctation; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying slightly raised testaceous integument, each of similar width throughout and occupying  $\frac{1}{4}$  of pronotal disc area; punctation on shining areas shallow, individual punctures subequal in diameter and size, majority clearly delimited; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent; lateral margins

clothed in dense testaceous pubescence. Pro-, meso-, and metasternum dark brown to black, shining, with sparse, suberect to erect testaceous setae. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent, black pubescence.

*Wings* (Figs. 22A, 24B): EL 4.9-9.0 mm. Elytron testaceous. About  $4.5 \times$  PL, width at humeral angles subequal to PW. Elytron subparallel, greatest apical width  $<1.5 \times$  width at humeral angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior margin to  $3/5$  elytral length, costa II arising from anterior margin to  $4/5$  elytral length, costa III arising from humeral angle to  $3/5$  elytral length; elytron with distinct, moderate punctation, 5-6 punctures medially between suture and costa I, increasingly irregular apically, noticeably smaller in diameter basally; elytron with sparse, short, suberect, testaceous pubescence, one seta per puncture, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen*: Piceous, shining; finely punctate, covered in sparse, short, suberect, testaceous pubescence.

*Legs*: Testaceous except coxal margins, trochanters, tibial apices, and tarsi piceous.

Femora and tibia covered in sparse, suberect, testaceous pubescence, tarsal pubescence recumbent and more dense. Metatibia straight, not strongly sinuate.

*Genitalia*: Sternite VIII sides gradually tapering towards apex, two slightly sinuate anterolateral areas (one on either side), often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female*: TL 7.5-11.7 mm, GW 2.4-3.8 mm, HL 0.6-0.8 mm, HW 1.1-1.4 mm, DBE 0.7-0.9 mm, DBA 0.5-0.8 mm, PL 1.3-1.8 mm, PW 1.5-2.2 mm, EL 5.6-8.5 mm. Some individuals with prothoracic punctation irregular, most individual punctures differing in diameter and shape, each puncture difficult to distinguish; elytron integument rufo-testaceous to testaceous.

**Intraspecific variation:** Pronotal integument coloration varies from piceous to largely rufo-testaceous, pronotal integument underlying dense testaceous pubescence piceous in some individuals; elytron costa I apically convergent with suture; antennal scape and basal  $\frac{3}{4}$  of antennomeres integument testaceous; head integument coloration varies from the above description to largely piceous; legs vary from above description to entirely piceous.

**Phylogenetic relationship (Figs. 50, 51):** This species does not have a clear sister relationship with any one particular species, but is closely placed on the cladogram to *E. pallidus*.

**Type material (Figs. 54A, B):** HOLOTYPE male of *E. pallidus villosus* in CASC with the following label data: Label 1: "Bejucos, Mex. / Temescaltepec / VII-5-33". Label 2: "H.E. Hinton / R.L. Usinger / Collectors". Label 3: "E.G. Linsley / Collection". Label 4: "HOLOTYPE / Elytroleptus / villosus / Linsley". Label 5: "California Academy / of Sciences / Type 7634 / No.".

ALLOTYPE female of *E. pallidus villosus* in CASC with the following label data: Label 1: "Bejucos, Mex. / Temescaltepec / VII-5-33". Label 2: "H.E. Hinton / R.L. Usinger / Collectors". Label 3: "E.G. Linsley / Collection". Label 4: "ALLOTYPE / Elytroleptus / villosus / Linsley".

PARATYPE male of *E. pallidus villosus* in EMEC with the following label data:  
Label 1: "Bejucos, Mex. / Temescaltepec / VII-5-33". Label 2: "H. E. Hinton, / R. L. Usinger / Collectors". Label 3: "E. G. Linsley / Collection". Label 4: "PARATYPE / Elytroleptus / villosus / Linsley".

PARATYPE female of *E. pallidus villosus* in EMEC with the following label data: Label 1: "Bejucos, Mex. / Temescaltepec / VII-5-33". Label 2: "H. E. Hinton, / R. L. Usinger / Collectors". Label 3: "E. G. Linsley / Collection". Label 4: "PARATYPE / Elytroleptus / villosus / Linsley".

PARATYPE female of *E. pallidus villosus* in EMEC with the following label data: Label 1: "Tejupilco, Mex. / Temescaltepec / VII-32". Label 2: "H. E. Hinton, / R. L. Usinger / Collectors". Label 3: "E. G. Linsley / Collection". Label 4: "PARATYPE / Elytroleptus / villosus / Linsley".

**Specimens examined:** The *E. pallidus villosus* holotype, *E. pallidus villosus* allotype, three paratypes of *E. pallidus villosus* (1 ♂, 2 ♀), and one hundred and seventy-eight additional specimens were examined (120 ♂, 58 ♀).

**Distribution (Fig. 45):** Guatemala (Baja Verapaz) and Mexico (Aguascalientes, Chihuahua, Distrito Federal, Durango, Hidalgo, Jalisco, Mexico, Oaxaca, Puebla, Temescaltepec, Zacatecas).

**Biology:** Flight period June and July. Adults have been collected on flowers and foliage of plants in the families Anacardiaceae (*Schinus molle* L.), Asclepidaceae (*Asclepias* sp.), Bignoniaceae (*Tecoma stans* (L.) Juss. ex Kunth), Cactaceae (*Opuntia* sp.), and Fabaceae (*Mimosa* sp.). Individuals have also been collected at lights.

**Label data:** GUATEMALA. -- **BAJA VERAPAZ.** Salama, 6 ♂, 7 ♀, 25-31.v.1989, Giesbert, E. (FSCA); 3 ♂, 2 ♀, 25-31.v.1989, Wappes, J.E. (JEWG).

MEXICO. -- **AGUASCALIENTES.** Aguascalientes, 1 ♀, 29.vi.1953, Vaurie, C. & P. (EMEC). Calvillo, 3 ♂, 1 ♀, 5.vii.1984, Carroll, Schaffner, & Friedlander (TAMU).

**CHIHUAHUA.** Hidalgo del Parral, 1 ♂, 15.vii.1964, Chemsak, J.A. (EMEC).

**DISTRITO FEDERAL.** Lomas de Chapultepec, 1 ♂, 28.vi.1932 (EMEC).

**DURANGO.** Durango, 1 ♀, 2 ?, Hoge, (BMNH); 1 ♂, 9 ♀, 16-24.vii.1964, Howden, H.F. (CNC); 15 ♂, 3 ♀, 22-24.vi.1964, 3.vii.1964, Howden, H.F. (CNC); 6 ♂, 3 ♀, 23-24.vi.1964, Martin, J.E.H. (CNC); 6 ♂, 3 ♀, 20.vi.1964, 13.vii.1964, Mason, W.R.M. (CNC); 3 ♂, 1 ♀, 22-27.vi.1964, Kelton, L.A. (CNC); 2 ♂, 3 ♀, 12.vii.1954, MacSwain, J.W. (EMEC); 1 ♂, 5 ♀, 17-21.vii.1964, Chemsak, J.A. (EMEC); 1 ♀, 21.vii.1972, Nelson, G.H. (EMEC); 4 ♂, 3 ♀, Wickham (USNM); 1 ♂, 15.vi.1964, McGuffin, W.C. (CNC); 1 ♂, vii.1964, Howden, H.F. (CNC); 1 ♂, 12.vii.1954, Schlinger, E.I. (EMEC); 1 ♂, 27.vi.1964, Kelton, L.A. (FSCA); 1 ♂, 23.vi.1964, Howden, H.F. (FSCA). Gomez Palacio, 1 ♂, 8.vii.1970, Jump, P.M. (FSCA); 2 ♂, same except (TAMU). Louis Moya, 1 ♂, 16.vii.1970, Beer, R.E. (SEMC). Tapias, 2 ♂, 19.vi.1961, Schebner, R.A. (JEWG).

Unknown, 2 ♂, 1 ♀, 6.vii.1995, Furth, D. & Chavarria, G. (USNM). **GUANAJUATO.** Guanajuato, 1 ♂, Salle (BMNH). **HIDALGO.** Pachuca, 19 ♂, 1 ♀, 16-17.vi.1961, U Kans Exp (EMEC); 1 ♂, 24.vi.1953, U Kans Exp (EMEC); 1 ♂, 19.VII.1963, BYERS, G.W. (SEMC). Tulancingo, 4 ♂, 1 ♀, 14.vi.1961, U Kans Exp (EMEC). **JALISCO.** Chapala, 1 ♀, 30.vi.1963, Doyen, J. (EMEC). Lagos de Moreno, 1 ♂, 1.vii.1953, Vaurie, C. & P. (EMEC); 1 ♂, 26.vii.1962, U.Kans (SEMC). Unknown, 1 ♂, 1 ♀, 26.vii.1951, Hurd, P.D. (EMEC); 1 ♂, 26.vii.1951, Evans, H.E. (EMEC). **MEXICO.** Teotihuacan, 1

♂, 13.vii.1962, Michelbacher, A.E. (EMEC); 2 ♂, 15-16.vi.1951, Evans, H.E. (EMEC); 2 ♂, 7.vii.1951, Evans, H.E. (EMEC). Texcoco, 11 ♂, 2 ♀, 20.vi.1962, Janzen, D.H. (EMEC). **OAXACA**. Diaz Ordaz, 2 ♀, 9-10.vii.1994, Giesbert, E. (FSCA). **PUEBLA**. Azumbilla, 1 ♀, 22.vii.1984, Carroll, Schaffner, & Friedlander (TAMU). **TEMESCALTEPEC**. Bejucos, 1 ♂, 1 ♀, 5.vii.1933, Hinton, H.E. & Usinger, R.L. (EMEC). Tejupilco, 1 ♂, 1 ♀, vii.1932, Hinton, H.E. & Usinger, R.L. (EMEC); 1 ♂, 24.vi.1933, Hinton, H.E. & Usinger, R.L. (EMEC). **ZACATECAS**. Fresnillo, 1 ♂, 16.vii.1954, Linsley, E.G., MacSwain, J.W., & Smith, R.F. (EMEC); 1 ♂, 8-9.vii.1964, Johnson, C.D. (EMEC). Guadalupe, 3 ♂, 28.vi.1953, Vaurie, C. & P. (EMEC). Sombrerete, 1 ♂, 13.vii.1984, McCleve, S. & Jump, P. (TAMU). **UNKNOWN**. 1 ♀, ---.1905, Fry (BMH); 1 ♀, (BMNH). Morelia, 1 ♂, 15.vii.1956, Dreisbach, R. & K. (EMEC). Teotihuacan, 1 ♂, 2 ♀, 15.vi.1951, Evans, H.E. (EMEC); 1 ♀, 6.vii.1951, Hurd, P.D. (EMEC). Unknown, 1 ♂, 5.vii.1962, Janzen, D.H. (EMEC). **UNKNOWN**. -- 1 ♂, 1 ♀, (USNM).

***Elytroleptus quadricostatus* Grzymala & Miller, sp. n.**

**(Figs. 14, 19D, 22B, 24C)**

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytra expanded apically, greatest width >1.5 x humeral angle width, 2) each elytron with 4 costae, 3) pronotal integument black with two longitudinal lines dense, appressed testaceous pubescence overlying testaceous integument, 4) elytra with moderate punctation, 5-6 punctures between suture and costa I medially, and 5) basal elytral integument testaceous. This species most closely resembles *E. grandis* and can be distinguished by the shorter antennae and larger deeper punctures



Figure 14. *Elytroleptus quadricostatus* Grzymala & Miller, new species  
dorsal habitus, female. Scale bar = 1 mm.



on the elytra, 5-6 punctures medially between suture and costa I. From *E. nigripennis* it is distinguished by the testaceous basal elytral integument and the central pronotal disc thinly covered with black pubescence.

**Description:** Female. TL 13.1-15.8 mm, GW 5.1-6.1 mm.

Body elongate, expanded apically from humeri, dorsoventrally flattened.

*Head:* HL 0.9-1.0 mm, HW 1.7-3.1 mm, DBA 0.7-0.8 mm, DLE 1.0-1.1 mm. Piceous, except vertex, anteclypeus, and, labrum testaceous. Moderately punctate with long, erect, sparse testaceous pubescence, shorter, appressed, and more dense on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles moderately raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width greater than  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with 30 facets at greatest height; integument ventral to lower lobe about  $0.2 \times$  eye height; deeply emarginated at antennal insertion, with 3 facets at greatest emargination point. Antennae black, extending to about  $\frac{1}{4}$  elytral length, scape and antennomere V subequal; pedicel about  $\frac{1}{3} \times$  scape length; antennomeres III and IV subequal, each about  $2.2 \times$  pedicel length; antennomeres V-VIII decreasing in length; antennomeres VIII and IX subequal; antennomere X slightly shorter than IX; antennomere XI about  $1.6 \times$  length of X, slightly appendiculate, length of appendiculation  $0.1-0.39 \times$  the width at point of appendiculation.

*Thorax* (Fig. 19D): PL 1.8-2.1 mm, PW 2.3-2.5 mm. Pronotum piceous, slightly wider than long, apical constriction subequal to basal constriction, lateral margins slightly angulate, widest medially. Central pronotal disc shining, punctate, with short, recumbent, black pubescence arising from punctation; laterad to center, two (one on each side)

distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying slightly raised, testaceous integument, each of similar width throughout and occupying  $\frac{1}{4}$  of pronotal disc area; punctation on shining areas deep, individual punctures small and varying in diameter and shape, majority not clearly delimited; pronotal disc flat to slightly convex, sides impressed in dorsal aspect, margin apparently elevated, calli absent; lateral margins lined with recumbent and erect, moderate, black pubescence. Pro-, meso-, and metasternum black, shining with sparse, long erect, testaceous setae.

Scutellum black, small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent black pubescence.

*Wings* (Figs. 22B, 24C): EL 10.4-12.7 mm. Elytron with basal  $\frac{2}{5}$  testaceous, apical  $\frac{3}{5}$  piceous with a violaceous cast, margin irregular. About  $5.6 \times PL$ , width at humeral angles about  $1.3 \times PW$ . Elytron expanded apically, greatest width  $>1.5 \times$  width at humeral angle. Elytron with 4 distinct costae; from suture, costa I arising from anterior margin and extending to  $\frac{3}{5}$  elytral length, costa II arising from anterior margin and extending to  $\frac{4}{5}$  elytral length, costa III arising from about  $\frac{2}{5}$  posterior to middle of anterior margin and extending to  $\frac{4}{5}$  elytral length, costa IV arising from humeral angle and extending to  $\frac{4}{5}$  elytral length; elytron with distinct, moderately deep punctation, 5-7 punctures between suture and costa I medially, becoming indistinct, shallower apically, subequal basally; elytron with moderate, recumbent pubescence, one seta per puncture, testaceous over testaceous integument, black over black integument, outer elytral margins with pubescence more dense and suberect. Metathoracic wing basal  $\frac{1}{5}$  lightly tinted, basal  $\frac{4}{5}$  darkly tinted.

*Abdomen:* Piceous, shining, finely punctate, covered in sparse, short, erect, black pubescence.

*Legs:* Piceous, except basal  $\frac{3}{4}$  of pro-femora testaceous. Femora and tibia minutely punctate, covered in sparse, erect and suberect, black pubescence, except  $\frac{3}{4}$  of pro-femora with testaceous pubescence; tarsal pubescence recumbent to suberect and more dense. Metatibia straight, not strongly sinuate.

*Genitalia:* Not examined for this species.

**Intraspecific variation:** Central frons testaceous. Elytron with basal  $\frac{4}{5}$  testaceous and apical  $\frac{1}{5}$  piceous; piceous integument lacking violaceous cast. This species is described from two female specimens. Polychromatism will likely increase once more specimens become available for examination.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. nigripennis* supported by the homoplasious character of the integument below the lower eye lobe less than  $0.3 \times$  height of the lower eye lobe (Character 2).

**Type material (Fig. 54C):** HOLOTYPE (here designated) female in FSCA with the following label data: Label 1: "Guat. Zacapa / 2 km S San Lorenzo / 5400' Jun 3-5, 1989 / E. Giesbert, Coll."

**Type locality:** Guatemala, Zacapa, San Lorenzo.

**Specimens examined:** The HOLOTYPE (here designated) and one additional specimen (♀) were examined. No males of this species are currently known.

**Distribution (Fig. 46):** Mexico (Cuautla) and Guatemala (Zacapa).

**Biology:** Flight period June.

**Etymology:** This species was named for the four costae easily seen on each elytron. Some congeners exhibit the four costae state, but they are not as apparent as in this species.

***Elytroleptus rufipennis* (LeConte, 1884)**

**(Figs. 15, 19E, 22C, 24D, 25I)**

*Pteroplatus rufipennis* LeConte, 1884: 23 (orig. descr.).

*Elytroleptus rufipennis* (LeConte, 1884): Leng, 1886: 31 (key); Fall & Cockerell, 1907: 192 (distr.); Schaeffer, 1908: 330 (distr.); Linsley, 1961b: 12 (key, syn. *longipennis*, *eros*); Linsley *et al.*, 1961a: 22 (biol.); Linsley *et al.*, 1961b: 21 (distr.); Linsley 1962a: 179 (descr.); 1962b: 7 (key, descr.); Chemsak & Linsley, 1965: 196 (key, distr.); Emmel, 1965: 14, fig. 1 (biol.); Skiles & Chemsak, 1982: 70 (lect.); Chemsak *et al.*, 1992: 83 (cat); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 606 (cat.).

*Elytroleptus longipennis* Bates, 1885: 318 (orig. descr.): Linsley, 1935: 96 (distr.).

*Elytroleptus eros* Bates, 1885: 318, pl. 21, fig. 23 (orig. descr.): Linsley, 1935: 96 (distr.); Chemsak & Linsley, 1970: 406 (lect.).

**Diagnosis:** This species is distinguished from all other congeners by the following combination of characters: 1) elytra expanded apically, greatest width  $>1.5 \times$  width at humeral angle, 2) central pronotal disc piceous, 3) pronotum with longitudinal lines of dense, appressed rufo-testaceous pubescence overlying rufo-testaceous integument, and 4) abdomen piceous. This species most closely resembles *E. limpianus*, and is easily distinguished by the black scutellar integument instead of testaceous or rufo-testaceous and the piceous central pronotal disc instead of testaceous and rufo-testaceous. It is distinguished from *E. ignitus* by the piceous pronotum and abdomen instead of testaceous



Figure 15. *Elytroleptus rufipennis* (LeConte) dorsal habitus, male.  
Scale bar = 1 mm.

along with the metathoracic wings entirely dark tinted instead of with lightly tinted regions.

**Description:** Male. TL 10.9-14.4 mm, GW 4.2-5.4 mm.

Body elongate, expanded apically from humeri, dorsoventrally flattened.

*Head:* HL 0.8-1.0 mm, HW 1.5-1.8 mm, DBE 0.9-1.1 mm, DBA 0.7-0.8 mm. Piceous, except medial vertex, frons, clypeus, and labrum rufo-testaceous. Finely punctate with short, sparse, suberect to erect, testaceous pubescence, more dense on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles moderately raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 25 facets at greatest height; integument ventral to lower lobe about  $0.4 \times$  eye height; deeply emarginated at antennal insertion, with 3-4 facets at greatest emargination point. Antennae black, extending to about  $\frac{2}{5}$  elytral length, scape and antennomere V subequal; pedicel about  $\frac{1}{3} \times$  scape length; antennomeres III and IV subequal, each  $2.5 \times$  pedicel length; antennomeres V-VIII decreasing in length; antennomeres VIII and IX subequal; antennomere X shorter than IX; antennomere XI subequal to III, strongly appendiculate, length of appendiculation  $0.6-0.79 \times$  the width at point of appendiculation.

*Thorax* (Fig. 19E): PL 1.4-2.4 mm, PW 2.1-2.8 mm. Pronotum piceous, width slightly greater than length, apical width subequal to basal width, lateral margins angulated, widest medially. Pronotal disc shining, punctate, with short, recumbent, black pubescence arising from punctation; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying areas of rufo-testaceous slightly raised integument, each of similar width throughout and

occupying  $\frac{1}{4}$  of pronotal disc area; punctation on shining areas deep, individual punctures differing in shape and diameter, majority clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum dark brown to black, shining, with sparse, short, suberect to erect black pubescence. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent, black pubescence.

*Wings* (Figs. 22C, 24D): EL 8.7-11.0 mm. Elytron rufo-testaceous. About  $5.5 \times PL$ , width at humeral angles about  $1.3 \times PW$ . Elytron expanded apically, greatest width  $>1.5 \times$  width at humeral angles. Elytron with 4 distinct costae; from suture, costa I arising from anterior margin and extending to  $\frac{3}{5}$  elytral length, costa II arising from anterior margin and extending to  $\frac{4}{5}$  elytral length, costa III more indistinct than others and extending from  $\frac{2}{5}$  (near middle of anterior margin) and extending to  $\frac{4}{5}$  elytral length, costa IV arising from humeral angle and extending to  $\frac{4}{5}$  elytral length; elytron with distinct but shallow punctation, 5-6 punctures between suture and costa I medially, increasingly irregular apically, puncture diameter decreasing slightly medially to basally; elytron with moderate short, suberect, rufo-testaceous pubescence, one seta per puncture, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen*: Piceous, shining; finely punctate, covered in sparse, short, suberect, black pubescence.

*Legs:* Piceous, except profemora, protibia, mesofemora, and metafemora testaceous medially. Femora and tibia covered in sparse, suberect to erect, black pubescence, tarsal pubescence recumbent and more dense. Metatibia straight, not strongly sinuate.

*Genitalia:* Sternite VIII sides gradually tapering towards apex, two slightly sinuate anterolateral areas (one on either side), often with slight concavity medially. Tergite VIII gradually expanding towards apex, generally rounded lacking sinuate areas, often with slight concavity medially.

*Female:* TL 11.2-15.0 mm, GW 4.2-5.3 mm, HL 0.7-1.0 mm, HW 1.6-1.8 mm, DBE 1.0-1.1 mm, DBA 0.6-0.8 mm, PL 1.7-2.1 mm, PW 2.0-2.7 mm, EL 8.8-11.9 mm. As male, except antennae extending only to 1/5 elytral length; antennomeres V-XI less strongly serrate; antennomere XI less strongly appendiculate. Pronotum lacking sexually dimorphic densely punctate oval areas above lateral margins.

**Intraspecific variation:** Elytra varying from rufo-testaceous to testaceous; central pronotal disc with testaceous regions.

**Phylogenetic relationship (Figs. 50-51):** This species is sister to the clade containing *E. nigripennis* and *E. quadricostatus* **n. sp.** supported by the elytral length more than  $5 \times$  that of the pronotal length (Character 16).

**Type material (Fig. 52C):** *Elytroleptus rufipennis* LECTOTYPE male in MCZC with the following label data: Label 1: "Ariz.". Label 2: "Type / 3899". Label 3: "P. rufipennis / Lec.". Label 4: "LECTOTYPE / Pteroplatus / rufipennis / LeConte / Skiles & Chemsak, 1982".

*Elytroleptus eros* LECTOTYPE female in BMNH with the following label data: Label 1: "Type". Label 2: "Oaxaca / Mexico. / Salle Coll.". Label 3: "Sp. figured".



Label 4: "B.C.A., Col.V. / Elytroleptus / eros / Bates". Label 5: "Elytroleptus / eros / Bates". Label 6: "LECTOTYPE / Elytroleptus / eros / Bates / Chemsak & Linsley 1970".

**Type locality:** USA, Arizona.

**Specimens examined:** High quality digital images of the *E. rufipennis* lectotype (habitus dorsal view, habitus lateral view, head frontal view, and labels) were viewed using the MCZC online type database (<http://insects.oeb.harvard.edu/mcz/>). The *E. eros* lectotype and twenty additional specimens were examined (10 ♂, 10 ♀).

**Distribution (Fig. 47):** Southwestern USA (Arizona, New Mexico) and Mexico (Chiapas, Durango, Hidalgo).

**Biology:** Flight period April through August. Specimens have been collected by sweeping grass (*Muhlenbergia longiligula* Hitchc.) and on the flowers of *Melilotus albus* Medik. and blossoms of *Bumelia lanuginosa* (Michx.) Pers. Linsley *et al.* (1961a) suggested that the lycid model for this species is *Lycus sanguinipennis* (Say).

**Label data:** MEXICO. -- **CHIAPAS.** Soyalo, 2 ♂, 18-19.iv.1959, Emmel, T.C. (EMEC). **DURANGO.** Tepalcates, 1 ♀, 6.vi.1964, Howden, H.F. (CNC). **HIDALGO.** Epazoyucan, 1 ♀, 17.vi.1961 (EMEC). **VERACRUZ.** Misantla, 1 ♀, Hoege (BMNH). USA. -- **ARIZONA.** *Cochise Co.* Portal, 1 ♀, 1m, 1.viii.1975, Nelson, G.H. (FSCA). Chiricahua Mtns., 1 ♀, 29.vii.1955, Knull, D.J. & J.N. (FMNH); 1 ♂, 22.vii.1908 (EMEC); 1 ♀, 3.vii.1947, Wallace, H.S. (SEMC); 1 ♀, 20.vii.1950, Beamer, L.D. (SEMC). Huachuca Mtns., 1 ♀, vii.1913, Schaeffer, C. (AMNH); 1 ♀, 29.vii.1983, Nelson, G.H. (DHPC); 1 ♀, 29.vii.1983, Nelson, G.H. (FSCA); 1 ♀, 18.vii.1938, Sailer, R.L. (SEMC); 1 ♀, vi.1915 (USNM). *Pima Co.* Bear Canyon, 2 ♂, 4.viii.1948, Ball,

G.E. (AMNH); 1 ♂, 11.vii.1967, Gardner, R.C., Kovacic, C.R., & Lorenzen, K. (EMEC).  
*Santa Cruz Co.* Santa Rita Mtns., 1 ♀, Snow, F.H. (MCZC); 1 ♂, --.vii.----, Snow, F.H.  
(SEMC). *Yavapai Co.* Prescott, 1 ♂, vi.vii.1994, Bowditch, F.C. (EMEC); 1 ♂,  
29.vi.1909, Kusche, A. (EMEC). **NEW MEXICO.** *San Miguel Co.* El Porvenir, 1 ♀,  
Fenyés, A. (MCZC).  
UNKNOWN. -- 1 ♂, Cazier (AMNH).

***Elytroleptus scabricollis* Bates, 1894**

**(Figs. 16, 19F, 22D, 24E, 25J)**

*Elytroleptus scabricollis* Bates, 1892: 172 (orig. descr.); Linsley, 1935: 96 (distr.); 1961c:  
10 (key); 1962b: 10 (key); Chemsak & Linsley, 1965: 196 (key); Chemsak *et al.*, 1992:  
83 (cat.); Chemsak & Noguera, 1995: 63 (biol., distr.); Noguera & Chemsak, 1996: 402  
(cat.); Toledo *et al.*, 2002: 529 (distr.); Noguera *et al.*, 2002: 624 (distr.); Monné, 2005:  
606 (cat.).

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width <1.5 × humeral angle width, 2) pronotum lacking longitudinal lines of dense pubescence, 3) pronotal and elytral pubescence long and erect, and 4) elytral punctures decreasing in diameter medially to basally. This species most closely resembles *E. luteus* and can be separated by the elytral punctures decreasing in diameter medially to basally and apically.

**Description:** Male. TL 6.0-11.9 mm, GW 2.0-3.7 mm.

Body elongate, subparallel, dorsoventrally flattened.

*Head:* HL 0.4-0.8 mm, HW 1.1-1.6 mm, DBE 0.5-0.9 mm, DBA 0.5-0.6 mm.

Testaceous except apices of mandibles, supraorbital area, and venter piceous. Finely



Figure 16. *Elytroleptus scabricollis* Bates dorsal habitus, male.  
Scale bar = 1 mm.

punctate with short, sparse, suberect to erect, testaceous pubescence; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles slightly raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 27 facets at greatest height; integument ventral to lower lobe about  $0.2 \times$  eye height; deeply emarginated at antennal insertion, with 2-3 facets at greatest emargination point. Antennae black, extending to approximately  $\frac{2}{5}$  elytral length, pedicel  $\frac{1}{3} \times$  antennomere III length, antennomeres IV-VI subequal, antennomeres VI-X decreasing in length, antennomere XI subequal to IV-VI and moderately appendiculate, length of appendiculation  $0.4-0.59 \times$  the width at point of appendiculation.

*Thorax* (Fig. 19F): PL 1.2-2.2 mm, PW 1.3-2.5 mm. Pronotum piceous, width slightly greater than length; apical width subequal to basal width, lateral margins slightly angulate, widest medially. Pronotal disc shining, punctate, with long, erect, testaceous pubescence arising from punctation; punctation on shining areas shallow, individual punctures moderate and varying in diameter and shape, majority not clearly delimited; pronotal disc flat to slightly convex; sides impressed in dorsal aspect, margin apparently elevated; 3 calli present, 2 moderately to slightly raised, anterolaterad to center (one on each side), 1 moderately raised, medial, slightly apical to pronotal basal margin. Pro-, meso-, and metasternum black, shining, with sparse, long, erect, testaceous setae. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, moderate black pubescence.

*Wings* (Figs. 22D, 24E): EL 4.4-8.9 mm. Elytron basal  $\frac{3}{5}$  yellow, apical  $\frac{2}{5}$  piceous, margin irregular. About  $4.2 \times$  PL, width at humeral angles about  $1.1 \times$  PW. Elytron

subparallel, greatest width  $<1.5 \times$  width at humeral angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior margin and extending to  $3/5$  elytral length, costa II arising from anterior margin and extending to  $4/5$  elytral length, costa III arising from humeral angle and extending to  $3/5$  elytral length; elytron with distinct deep punctation, 4-5 punctures medially between suture and costa I, increasingly irregular, shallower apically, puncture diameter distinctly decreasing medially to basally; elytron with sparse, long, erect pubescence, one seta per puncture, pale on pale areas, black on dark areas, becoming shorter apically, outer elytral margins with pubescence more dense.

Metathoracic wing darkly tinted.

*Abdomen:* Piceous, shining; finely punctate, covered in sparse, long, erect, black pubescence.

*Legs:* Piceous, except prothoracic trochanter, femora, tibia, and tarsi testaceous. Femora and tibia covered in sparse, erect, black pubescence; tarsal pubescence recumbent and more dense. Metatibia straight, not strongly sinuate.

*Genitalia:* Sternite VIII sides gradually tapering towards apex, lacking slightly sinuate areas, often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female:* TL 7.0-12.6 mm, GW 5.2-9.5 mm, HL 0.5-0.9 mm, HW 1.2-1.7 mm, DBE 0.6-1.0 mm, DBA 0.4-.07 mm, PL 1.3-2.2 mm, PW 1.4-2.5 mm, EL 5.2-9.5 mm. As male, except antennae extending only to  $1/5$  elytral length; antennomeres V-XI less strongly serrate; antennomere XI less strongly appendiculate.

**Intraspecific variation:** Head integument coloration varies from above description to all piceous except labrum, clypeus, lower frons, and triangular area on vertex. The pronota

varies greatly in coloration with some individuals entirely ferrugineous, some with a dorsal subquadrate ferrugineous area, some with two subcircular ferrugineous areas, some with two ferrugineous longitudinal lines. Some females with scutellum ferrugineous. Pronotal calli vary in visibility. Legs vary from above description to entirely testaceous.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to *E. luteus* supported by the large, shallow punctation (Characters 8 and 9) and the elytral punctation deeper and larger medially compared to basally (Character 20).

**Type material (Fig. 54D):** LECTOTYPE (here designated) female in BMNH with the following label data: Label 1: "Type". Label 2: "Iguala, / Guerrero. / Höge.". Label 3: "Elytroleptus / scabricollis / Bates". Label 4: "Elytroleptus / scabricollis / Bates". Label 5: "Sp. figured.". Label 6: "Tr.E.Soc.1892. / 92-90.".

**Type locality:** Mexico, Guerrero, Iguala.

**Specimens examined:** The lectotype (here designated) and three hundred and fourteen additional specimens were examined (211 ♂, 103 ♀).

**Distribution (Fig. 48):** Guatemala (El Progreso, Zacapa), Mexico (Chiapas, Guerrero, Jalisco, Mexico, Michoacan de Ocampo, Morelos, Nayarit, Oaxaca, Puebla, Sinaloa, Sonora, Veracruz-Llave), and Nicaragua (Matagalpa).

**Biology:** Flight period May through August. Adults have been collected on flowers and foliage of plants in the families Euphorbiaceae (*Croton culicanensis* Croizat, *Jatropha curcas* L., *Sapium* sp.), Fabaceae (*Acacia* sp.), Flacourtiaceae (*Casearia* sp.), Loganiaceae (*Buddleia* sp.), Polygonaceae (*Coccoloba* sp.), and Rutaceae (*Xanthoxylum*

sp.). Specimens have also been collected at lights. The suggested lycid model for this species is *Lycus semiustus* Chevrolat (Linsley, 1961c).

**Label data:** GUATEMALA. -- **EL PROGRESO.** Morazan, 1 ♂, 29.v-2.vi.1989, Giesbert, E. (FSCA). Estn de la Virgen, 2 ♂, 3.vi.1991, Wappes, J.E. (JEWG).

**ZACAPA.** San Lorenzo, 8 ♂, 8 ♀, 3-6.vi.1989, Giesbert, E. (FSCA); 19 ♂, 8 ♀, 1-15.vi.1991, Giesbert, E. (FSCA); 8 ♂, 3 ♀, 1-10.vi.1991, Wappes, J.E. (JEWG); 7 ♂, 3-6.vi.1989, Wappes, J.E. (JEWG); 3 ♂, 3-6.vi.1989, Wappes, J.E. (TAMU); 3 ♂, same except (USNM); 1 ♂, same except 1-10.vi.1991 (USNM). Teculután, 2 ♀, v.2000, Monzon, J. (DHPC).

MEXICO. -- **CHIAPAS.** Arriaga, 8 ♂, 1 ♀, 23.vi.1987, Giesbert, E. (FSCA); 2 ♂, 1 ♀, 18-26.vi.1987, Wappes, J.E. (JEWG); 2 ♂, same except (USNM). El Sumidero, 4 ♂, 27.vi.1990, Thomas, M.C. (FSCA). Jocote, 1 ♂, 17.vi.1987, Wappes, J.E. (TAMU). Ocozocoautla, 1 ♂, 22.vi.1987, Giesbert, E. (FSCA). **GUERRERO.** Chilpancingo, 1 ♂, 17.vii.1984, Cope, J. (DHPC); 1 ♂, 24.vi.1983, Dozier, B.K. (FSCA). Iguala, 1 ♀, 5.vii.1987, Anderson, R. (TAMU). Rio Mexcala, 2 ♂, 6.viii.1965, Nelson, G.H. (EMEC); 4 ♂, same except (FSCA); 2 ♂, same except (JEWG). Xochipala, 7 ♂, 1 ♀, 18.vii.1984, Carroll, Schaffner, & Friedlander (TAMU); 1 ♂, 14.vii.1985, Jones & Schaffner (TAMU); 3 ♂, 13.vii.1985, Jones & Schaffner (TAMU); 2 ♂, 18.vii.1985, Woolley, J.B. (TAMU); Zumpango del Rio, 1 ♀, 18.vii.1983, Chemsak, J. & Michelbacher, A. & M. (EMEC). **JALISCO.** Chamela, 6 ♀, 7-15.vii.1987, Chemsak, J. & Linsley, E.G. & J.M (EMEC); 1 ♀, 8-16.vii.1985, Chemsak, J., Katsula, H., & Michelbacher, A. & M. (EMEC); 3 ♀, 14-22.vii.1992, Chemsak, J. (EMEC); 2 ♀, 10-20.vii.1985, Giesbert, E. (FSCA); 16 ♂, 7-15.vii.1987, Chemsak, J. & Linsley, E.G. &

J.M. (EMEC); 1 ♂, 9-19.vii.1993, Wappes, J.E. (USNM). Melaque, 1 ♀, 10.vii.1987, Chemsak, J. & Linsley, E.G. & J.M. (EMEC); 1 ♀, 15-17.vii.1992, Chemsak, J. (EMEC). Pian de Barrancas, 1 ♂, 8.vii.1963, Parker, F.D. & Stange, L.A. (EMEC). Tomatlan, 3 ♂, 6 ♀, 13.vii.1985, Giesbert, E. (FSCA). **MEXICO**. Temescaltepec, 1 ♀, vii.1932, Hinton, H.E. & Usinger, R.L. (EMEC). **MICHOACAN DE OCAMPO**. Aquila, 1 ♂, 13.vii.1984, Carroll, Schaffner, & Friedlander (TAMU). **MORELOS**. Alpuyeca, 1 ♂, 2 ♀, 3.vii.1951, Evans, H.E. (EMEC); 1 ♂, 1 ♀, 3.vii.1951, Hurd, P.D. (EMEC); 1 ♀, 27.vi.1951, Hurd, P.D. (EMEC); 1 ♂, 27.vi.1951, Evans, H.E. (EMEC). Yautepec, 3 ♀, 2 ♂, 13.vii.1963, Parker, F.D. & Stange, L.A. (EMEC). **NAYARIT**. Acaponeta, 1 ♀, 4.vii.1963, Parker, F.D. & Stange, L.A. (EMEC). Ahuacatlan, 1 ♀, 18-22, vii.1951, Hurd, P.D. (EMEC). Jesus Maria, 1 ♂, 2 ♀, 5.vii.1955, Malkin, B. (EMEC). **OAXACA**. El Camaron, 1 ♀, 14.vii.1971, Clark, Murray, Hart, & Schaffner (TAMU). Juchitan, 3 ♂, 3 ♀, 5.vii.1955 (EMEC). Matias Romero, 1 ♂, 24-25.v.1969, Bright, D. & Campbell, J.M. (CNC). Tehuantepec, 14 ♂, 4 ♀, 8.vii.1955, Giuliani, D. (CASC); 2 ♂, 2 ♀, 27.vii.1963, Doyen, J. (EMEC). Zopilote, 1 ♀, 5.vi.1987 (DHPC). **PUEBLA**. Acatlan, 1 ♂, 19.vii.1955, Vaurie, P. & C. (AMNH). Tehuitzingo, 2 ♂, 2 ♀, 29.vi.1961 (EMEC); 1 ♂, 3.vii.1953 (EMEC). **SINALOA**. Choix, 1 ♂, 25.vii.1969, Sears, T.A., Gardner, R.C., & Glaser, C.S. (UCD). Culiacan, 1 ♀, 21.vii.1973, Giesbert, E. (FSCA). Elota, 8 ♂, 2.vii.1963, Parker, F.D. & Stange, L.A. (EMEC). Guamuchil, 12 ♂, 2 ♀, 7.viii.1964, Powell, J. (EMEC); 13 ♂, 7.viii.1964, Chemsak, J.A. (EMEC). Mazatlan, 3 ♂, 1 ♀, 27.vii.1964, Chemsak, J.A. (EMEC); 1 ♂, 31.vii.1972, Chemsak, J.A. & M.A. & Michelbacher, A. & M. (EMEC); 1 ♂, 1.viii.1972, Chemsak, J.A. & M.A. (EMEC); 1 ♂, 24.vii.1964, Chemsak, J.A. (EMEC); 1 ♂, 1 ♀, 24-29.vii.----, Howden, H.F. (CNC); 2 ♂,



2 ♀, 5-7.viii.1964, Howden, H.F. (CNC); 1 ♀, 27.vii.1964, Howden, H.F. (CNC); 1 ♂, 1 ♀, 25.vii.1973, Chemsak, J.A., Linsley, E.G. & Michaelbachers (EMEC); 1 ♂, 5 ♀, 4.viii.1983, Giesbert, E. (FSCA); 1 ♀, 4.vii.1984, McCleve, S. & Jump, P. (TAMU); 4 ♂, 31.vii.1964, Mason, W.R.M. (CNC); 1 ♂, 31.vii.1983, Giesbert, E. (FSCA); 2 ♂, 6.viii.1983, Giesbert, E. (FSCA). Sanalona, 1 ♀, 24.vii.1952, Lattin, J.D. (EMEC). Venodio, 2 ♀, 27.vi.1918, Van Dyke (EMEC); 1 ♂, 17.vi.1918, Kusche, A. (USNM). **SONORA.** Alamos, 1 ♀, 21.vii.1960, Loomis, R.B. & Maris, J. (EMEC); 1 ♂, 30.vii-9.viii.1957, Westcott, R.L. (EMEC). Minas Nuevas, 1 ♂, 1 ♀, 7.viii.1952, Vaurie, C. & P. (AMNH); 5 ♂, 5 ♀, same except (EMEC). Navajoa, 2 ♀, 13.viii.1959, Nutting, W.L. & Werner, F.G. (EMEC). San Bernardo, 2 ♂, 15.vii.1935 (EMEC). Yecora, 1 ♂, 1 ♀, 18.vii.2005, Swift, I. (ISPC). **UNKNOWN.** Cotaxtla, 1 ♀, 29.vi.1962 (EMEC). Cuernavaca, 1 ♀, (USNM). Tepic, 1 ♀, 24.vi.1940, Saylor, L.W. (EMEC). Unknown, 1 ♂, 4.vii.1932, Hinton, H.E. & Usinger, R.L. (EMEC); 1 ♂, vii.1932, Hinton, H.E. & Usinger, R.L. (EMEC). **NICARAGUA. -- MATAGALPA.** Unknown, 1 ♀, 28.v.2005, Van den Berghe, E. (DHPC).

***Elytroleptus similis* Chemsak & Linsley, 1965**

**(Figs. 17, 19G, 22E, 24F, 25K)**

*Elytroleptus similis* Chemsak & Linsley, 1965: 197 (orig. descr.): Chemsak *et al.*, 1992: 83 (cat.); Noguera & Chemsak, 1996: 402 (cat.); Monné, 2005: 606 (cat.).

**Diagnosis:** This species is distinguished from all other species of *Elytroleptus* by the following combination of characters: 1) elytral margins subparallel, greatest width <1.5 × humeral angle width, 2) large, deep elytron punctation, 3-4 punctures between suture



Figure 17. *Elytroleptus similis* Chemsak & Linsley dorsal habitus, male.  
Scale bar = 1 mm.

and costa I medially, 3) elytron punctation diameter subequal medially and basally, and 4) pronotum with moderate, deep punctation. This species most closely resembles *E. pallidus* and can be distinguished by the elytron punctation subequal in diameter medially and basally and the larger, fewer punctures on the pronotal disc, males also possess densely punctate oval areas above lateral margins of pronotum indicative of sexually dimorphic prothoracic punctation.

**Description:** Male. TL 7.4-9.6 mm, GW 2.3-2.8 mm.

Body elongate, subparallel, dorsoventrally flattened.

*Head:* HL 0.5-0.8 mm, HW 1.2-1.6 mm, DBE 0.8-1.0 mm, DBA 0.5-0.6 mm. Piceous, except vertex, frons, postclypeus, anteclypeus, labrum, maxilla, and labium testaceous.

Finely punctate with long, suberect to erect, sparse, testaceous pubescence; short, appressed, more dense pubescence on vertex; gular region glabrous; rugose posterior to lower eye lobe. Antennal tubercles slightly raised, subtriangular, and separated by approximate width of four antennal sockets. Genal apices generally rounded, width greater than  $\frac{1}{2} \times$  height. Eyes moderately large, finely faceted, lower lobe with about 27 facets at greatest height; integument ventral to lower lobe about  $0.1 \times$  eye height; deeply emarginated at antennal insertion, with 2-3 facets at greatest emargination point.

Antennae black, extending to approximately  $\frac{2}{5}$  elytral length, scape and antennomere V subequal; pedicel  $\frac{1}{2} \times$  antennomere III length; antennomere III, IV, and VI subequal; antennomeres V-VIII decreasing in length; antennomeres VIII-X subequal; antennomere XI longer than X and moderately appendiculate, length of appendiculation  $0.4-0.59 \times$  the width at point of appendiculation.

*Thorax* (Fig. 19G): PL 1.3-1.7 mm, PW 1.5-1.8 mm. Pronotum piceous, width slightly greater than length, apical width subequal to basal width, lateral margins angulate, widest medially. Central pronotal disc shining, punctate with long, sparse, erect, testaceous pubescence; laterad to center, two (one on each side) distinct longitudinal, arcuate lines of dense, appressed, testaceous pubescence overlying slightly raised testaceous integument, each of similar width throughout and occupying  $\frac{1}{4}$  of pronotal disc area; punctation on shining areas deep, individual punctures large and subequal in diameter and shape, majority clearly delimited; oval, more densely punctate areas above lateral margins indicative of sexually dimorphic gland pores; pronotal disc flat to slightly convex, sides impressed in dorsal aspect, margin apparently elevated, calli absent. Pro-, meso-, and metasternum dark brown to black, shining, with sparse, erect, pale yellow to testaceous setae. Scutellum piceous, small, subtriangular, length subequal to width, medially impressed, with short, moderately dense, recumbent, black and testaceous pubescence.

*Wings* (Figs. 22E, 24F): EL 5.6-7.1 mm. Elytron testaceous. About  $4.2 \times$  PL, width at humeral angles subequal to PW. Elytron subparallel, greatest width  $< 1.5 \times$  width at humeral angle. Elytron with 3 distinct costae; from suture, costa I arising from anterior margin and extending to  $\frac{3}{5}$  elytral length, costa II arising from anterior margin and extending to  $\frac{4}{5}$  elytral length, costa III arising from humeral angle and extending to  $\frac{3}{5}$  elytral length; elytron with large, deep punctation, 3-4 punctures medially between suture and costa I, becoming indistinct, shallower apically, subequal basally; elytron with sparse, short, suberect, testaceous pubescence, one seta per puncture, outer elytral margins with pubescence more dense. Metathoracic wing darkly tinted.

*Abdomen:* Testaceous, except ventral, basal aspects of segments III-VI piceous. Shining, finely punctate, covered in sparse, short, suberect, testaceous pubescence.

*Legs:* Testaceous except coxae, trochanters, basal femurs, apex of protibia, apical ½ of mesotibia, apical 4/5 of metatibia, and tarsi piceous. Femora and tibia covered in sparse, suberect pubescence, testaceous over testaceous integument, black over black integument; tarsal pubescence recumbent, black, and more dense. Metatibia slightly sinuate.

*Genitalia:* Sternite VIII sides gradually tapering towards apex, two slightly sinuate anterolateral areas (one on either side), often with slight concavity medially. Tergite VIII gradually tapering towards apex, lacking sinuate areas, often with slight concavity medially.

*Female:* TL 8.5-8.9 mm, GW 3.0-3.3 mm, HL 0.5-0.6 mm, HW 1.2-1.3 mm, DBE 0.7-0.8 mm, DBA 0.5-0.6 mm, PL 1.4-1.5 mm, PW 1.6-1.7 mm, EL 6.6-6.8 mm.

As male, except antennomeres V-XI less strongly serrate; antennomere XI less strongly appendiculate. Pronotum lacking sexually dimorphic densely punctate oval area above lateral margin.

**Intraspecific variation:** Head with testaceous basal band. Pronotal integument entirely piceous. Leg integument coloration varying from above description to largely testaceous.

**Phylogenetic relationship (Figs. 50, 51):** This species is sister to a clade of precise lycid mimics (*E. pallidus*, *E. ignitus*, *E. limpianus*, *E. apicalis*, *E. grandis*, *E. rufipennis*, *E. nigripennis*, and *E. quadricostatus*) supported by the homoplasious character of the 8th male sternite without strongly sinuate margins (Character 23).

**Type material (Fig. 54E):** HOLOTYPE male in CASC with the following label data:

Label 1: "MEX: Puebla, / Calcaloapan, 19 / mi. NW. VII-30-63". Label 2: "W. A. Foster / Collector". Label 3: "HOLOTYPE / Elytroleptus / similis / Chemsak + / Linsley". Label 4: "California Academy / of Sciences / Type 9213 / No.".

PARATYPE male in EMEC with the following label data: Label 1: "10.2 mi. W. Puebla- / Veracruz boundary, / Hgy. 150, MEX. / VII-5-62". Label 2: "Tecoma / stans". Label 3: "D.H. Janzen / Collector". Label 4: "PARATYPE / Elytroleptus / similis / Chemsak & / Linsley".

PARATYPE male in EMEC with the following label data: Label 1: "Tehuacan / Puebla, Mex. / VI-23-1951". Label 2: "H. E. Evans / Collector". Label 3: "PARATYPE / Elytroleptus / similis / Chemsak + / Linsley".

PARATYPE female in EMEC with the following label data: Label 1: "Tlacolula, Oax., / Mex. 5249 ft. / July 16, 1955". Label 2: "P. & C. Vaurie / Collectors". Label 3: "AMNH". Label 4: "PARATYPE / Elytroleptus / similis / Chemsak + / Linsley".

**Type locality:** Mexico, Puebla, Calcaloapan.

**Specimens examined:** The holotype, three paratypes (2 ♂, 1 ♀), and seven additional specimens (5 ♂, 2 ♀) were examined.

**Distribution (Fig. 49):** Mexico (Oaxaca, Puebla).

**Biology:** Flight period June and July. Adults have been collected on flowers and foliage in the family Bignoniaceae (*Tecoma stans* (L.) Juss. ex Kunth).

**Label data:** MEXICO. -- **OAXACA.** Diaz Ordaz ,1 ♂ , 1 ♀, 9-10.vii.1994, Giesbert, E. (FSCA). Miltepec, 1 ♀, 15-16.vii.1971, Clark, Murray, Hart & Schaffner (TAMU); 1 ♂, 11-12.vii.1973, Mastro & Schaffner (TAMU). Oaxaca, 1 ♂, (BMH). Tamazulapan, 1

♂, 6.vi.1949 (EMEC). Tlacolula, 1 ♀, 16.vii.1955, Vaurie, C. & P. (EMEC).  
Yanhuitlan, 1 ♀, 9.vii.1992, MacRae, T. (DHPC). Unknown, 1 ♂, 6.vi.1938, Greenfield,  
E. (EMEC). **PUEBLA**. Tehuacan, 1 ♂, 23.vi.1951, Evans, H.E. (EMEC); 1 ♂,  
22.vii.1987, Kovarik & Schaffner (TAMU). Unknown, 1 ♂, 5.vii.1962, Janzen, D.H.  
(EMEC).

***Elytroleptus metallicus* (Nonfried, 1894)**

*Pteroplatus metallicus* Nonfried, 1894: 140.

*Elytroleptus metallicus* (Nonfried, 1894); Aurivillius, 1912: 456 (cat.); Linsley, 1961b:  
15 (*incertae sedis*); Chemsak *et al.*, 1992: 83 (cat.); Monné, 2005: 605 (cat.).

The species *Pteroplatus metallicus* was described by Nonfried (1894) based upon a unique Honduran cerambycid specimen. Aurivillius (1912) transferred the specimen to the genus *Elytroleptus* where it remained until Linsley (1961b) re-evaluated the original description. Linsley (1961b) could not locate the type specimen and stated that *E. metallicus* was *incertae sedis* as it did not fit into either *Pteroplatus* or *Elytroleptus* based on the original description (the original description states that the elytra are transversely reticulated, a condition not present in any species currently placed in *Elytroleptus*).

Attempts were made in this revision to locate the type specimen by searching for Nonfried's material at German institutions. Several curators and collections managers stated that according to Horn and Kahle (1937), Nonfried's material was distributed to numerous collectors and institutions via the insect dealer H. Rolle. The type was not located during this revision and the species is not treated further in this work.

## Phylogenetic Analysis

The phylogeny of *Elytroleptus* was reconstructed using twenty-four adult morphological characters. To facilitate ease of character recognition for certain systems (e.g. mouthparts and genitalia), specimens were relaxed in a hot water bath for approximately one hour. Genitalia was extracted from the abdomen and placed in 10% KOH solution for approximately fifteen minutes to clear structures.

Ingroup taxa included all fifteen recognized species of *Elytroleptus*. *E. metallicus* (*incertae sedis*) was not included as the only information attained was the original description, which provided minimal information and did not lend to character coding. A phylogenetic hypothesis for the Trachyderini is not available, and three outgroup taxa were chosen arbitrarily from this tribe: *Batyle suturalis* (Say), *Crossidius pulchellus* LeConte, and *Tylosis maculatus* LeConte. *Holopleura marginata* LeConte, a member of the tribe Pteroplatini historically placing *Elytroleptus*, was also included and used to root the tree.

Data were analyzed using NONA (Goloboff, 1995) and the commands "hold 10,000", "50 mul\*N", and "hold/50". The Consistency Index (CI) and Retention Index (RI) were calculated in WinClada (Nixon 1999-2002). Bremer support values were calculated in NONA using the strict consensus tree and the commands "hold 10,000", suboptimal 10", and "bsupport 10".

Characters (see following) were coded for males and females and coded as nonadditive unless otherwise indicated. The data matrix (Table 1) was produced and stored in WinClada.



**1. Genal extension beyond eyes (Fig. 26):** (0) genal width less than  $\frac{1}{2}$  genal height; (1) genal width approximately  $\frac{1}{2}$  genal height; (2) genal width more than  $\frac{1}{2}$  genal height.

States 0 and 2 are seen in several species of *Elytroleptus* while state 1 was coded to encompass those species which did not fall into one of the extreme categories. This character was coded as additive.

**2. Integument below lower eye lobe in lateral view (Fig. 27):** (0) less than  $0.3 \times$  height of lower eye lobe; (1) greater than  $0.3 \times$  height of lower eye lobe.

**3. Antennal length in males (Fig. 28):** (0) reaching to less than half elytral length; (1) reaching to more than half elytral length.

**4. Eleventh antennomere in males (Fig. 29):** (0) not appendiculate; (1) slightly appendiculate, length of appendiculation  $0.1-0.39 \times$  the width at point of appendiculation; (2) moderately appendiculate, length  $0.4-0.59 \times$  the width at point of appendiculation; (3) strongly appendiculate, length  $0.6-0.79 \times$  the width at point of appendiculation; (4) extremely appendiculate, length  $0.8-1.0 \times$  the width at point of appendiculation.

The appendiculate eleventh antennomere is a synapomorphy for *Elytroleptus* and is present for both males and females, but is easier to diagnose for males. This character was coded as additive.

**5. Pronotal pubescence (Fig. 18):** (0) pronotal disc only thinly clothed with pubescence (Fig. 18 B); (1) pronotal disc thinly clothed with pubescence along with distinct longitudinal lines of dense appressed pubescence (Fig. 18 C).

**6. Pronotal lateral expansion (Fig. 18):** (0) rounded (Fig. 18 C); (1) slightly to moderately angulated (Fig. 18 F).

State 1 is best seen in female specimens as several species have males with sexually dimorphic prothoracic gland pores directly above their pronotal lateral margins, which affects their shape.

**7. *Two pronotal calli located mediolaterad of center (Fig. 30):*** (0) absent; (1) present.

**8. *Pronotal punctation depth (Fig. 18):*** (0) punctures deep (Fig. 18 E); (1) punctures shallow (Fig. 18 F).

**9. *Pronotal punctation diameter (Fig. 19):*** (0) small in diameter (Fig. 19 E); (1) small and large in diameter (Fig. 19 F); (2) large in diameter (Fig. 19 G).

**10. *Pronotal punctation clearly delimited:*** (0) majority of punctures differing in diameter, most not clearly delimited; (1) majority of punctures differing in diameter, most clearly delimited; (2) majority of punctures same diameter, most clearly delimited; (3) all punctures same diameter, all clearly delimited.

**11. *Central pronotal disc integument medial, anterior to posterior suture (Fig. 31):*** (0) integument slightly raised, punctures smaller in diameter than remaining integument; (1) integument moderately raised, punctures absent, a callus often present; (2) confluent punctate with remaining integument.

**12. *Central pronotal disc pubescence:*** (0) suberect to erect; (1) recumbent.

**13. *Pronotal width in relation to length:*** (0) width more than  $1.2 \times$  length; (1) width less than  $1.2 \times$  length.

**14. *Sexually dimorphic prothoracic punctation in males (Fig. 32):*** (0) absent; (1) present.

**15. Shape of region of dimorphic prothoracic punctation present (Fig. 32):** (0)

constrained to oval area, only above lateral margins of pronotum; (1) not constrained to oval area, above and below lateral margins of pronotum.

Those species of *Elytroleptus* with sexually dimorphic gland pores all have them restricted to oval areas directly above the pronotal lateral margins. In several species this oval area is differently colored than the surrounding integument.

**16. Elytral length in relation to pronotal length:** (0) more than 5 ×; (1) more than 4 ×; (2) more than 3 ×; (3) less than 3 ×.

This character was coded for males and females, though females in general have longer elytra in relation to their pronotal length. This character was coded as additive.

**17. Elytra expanded, dilated apically (Fig. 20):** (0) widest apical point >1.5 × width of humeral angles (Fig. 20 A); (1) widest apical point between 1 and 1.5 × width of humeral angles (Fig. 20 B); (2) widest apical point less than 1 × width of humeral angles.

States 0 and 1 characterize all *Elytroleptus* species. A few outgroups were coded as state 2.

**18. Elytral costae (Fig. 22):** (0) each elytron with 3 costae (Fig. 22 E); (1) each elytron with 4 costae (Fig. 22 B).

The fourth costa is often difficult to see in some species.

**19. Elytral punctation (Fig. 23):** (0) large, deep punctures, 3-4 punctures between suture and costa I at midline (Fig. 23 B); (1) medium, moderate punctures, 5-6 punctures between suture and costa I at midline (Fig. 23 F); (2) small, shallow punctures, 7-10 punctures between suture and costa I at midline (Fig. 23 A).

- 20. *Elytral punctation medially and basally (Fig. 33):*** (0) subequal medially and basally; (1) larger, deeper, more distinct medially than basally.
- 21. *Elytral pubescence (Fig. 20):*** (0) basal setae more erect than apical setae (Fig. 20 B); (1) all setae similarly suberect/recumbent (Fig. 20 D)
- 22. *Elytral punctation at apices (Fig. 20):*** (0) with borders around punctures distinctly raised (Fig. 20 E); (1) with borders around punctures almost confluent with puncture depth (Fig. 20 D).
- 23. *Male 8th sternite lateral side shape (Fig. 25):*** (0) with 2 strongly sinuate areas (Fig. 25 C); (1) with 1 strongly sinuate area (Fig. 25 B); (2) without strongly sinuate area (Fig. 25 A).
- 24. *Male 8th sternite size (Fig. 25):*** (0) length shorter than width (Fig. 25 C); (1) length not shorter than width (Fig. 25 A).

**Table 1.** Data matrix for fifteen ingroup and four outgroup taxa and twenty-four morphological characters used in cladistic analysis of *Elytroleptus*. Inapplicable data is coded as ‘-’, unobserved or ambiguous data is coded as ‘?’, and polymorphisms are coded as ‘\*’.

	1	10	20
<i>Holopleura marginata</i>	2110000003	2000121---	10??
<i>Batyle suturalis</i>	2010000103	2001131-00	10??
<i>Crossidius pulchellus</i>	0010001002	1001132010	10??
<i>Tylosis maculatus</i>	1010001103	100112201-	10??
<i>Elytroleptus apicalis</i>	2114110000	0111010120	1021
<i>Elytroleptus divisus</i>	2113010*22	2011021000	0011
<i>Elytroleptus floridanus</i>	0001100023	2111011000	1100
<i>Elytroleptus grandis</i>	2114110000	0111010120	10??
<i>Elytroleptus humeralis</i>	2101011022	2010-11000	01??
<i>Elytroleptus ignitus</i>	1103110122	0110-10*11	1011
<i>Elytroleptus immaculipennis</i>	0001100023	2111011000	1100
<i>Elytroleptus limpianus</i>	1103110002	0111010111	1021
<i>Elytroleptus luteus</i>	1003011110	2011011001	0110
<i>Elytroleptus nigripennis</i>	10??110000	?10??00111	10??
<i>Elytroleptus pallidus</i>	1002110122	0110-11001	*021
<i>Elytroleptus quadricostatus</i> <b>n.sp.</b>	10??110000	011??00111	10??
<i>Elytroleptus rufipennis</i>	1103110001	0111000111	1011
<i>Elytroleptus scabricollis</i>	1002011110	1010-21001	0020
<i>Elytroleptus similis</i>	1012110022	0011011000	1021

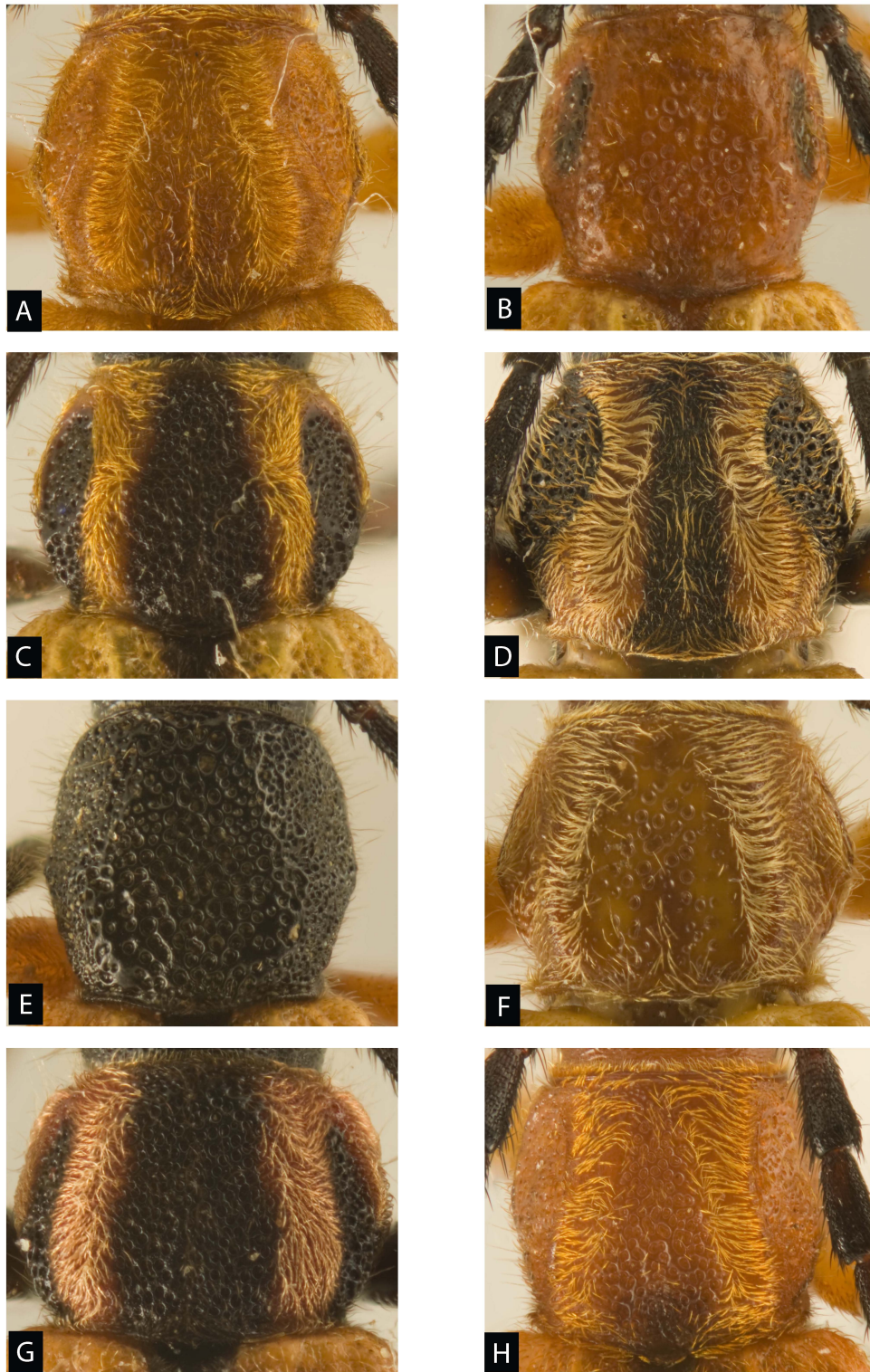


Figure 18. Close-up of pronota for (A) *E. apicalis*; (B) *E. divisus*; (C) *E. floridanus*; (D) *E. grandis*; (E) *E. humeralis*; (F) *E. ignitus*; (G) *E. immaculipennis*; (H) *E. limpianus*.



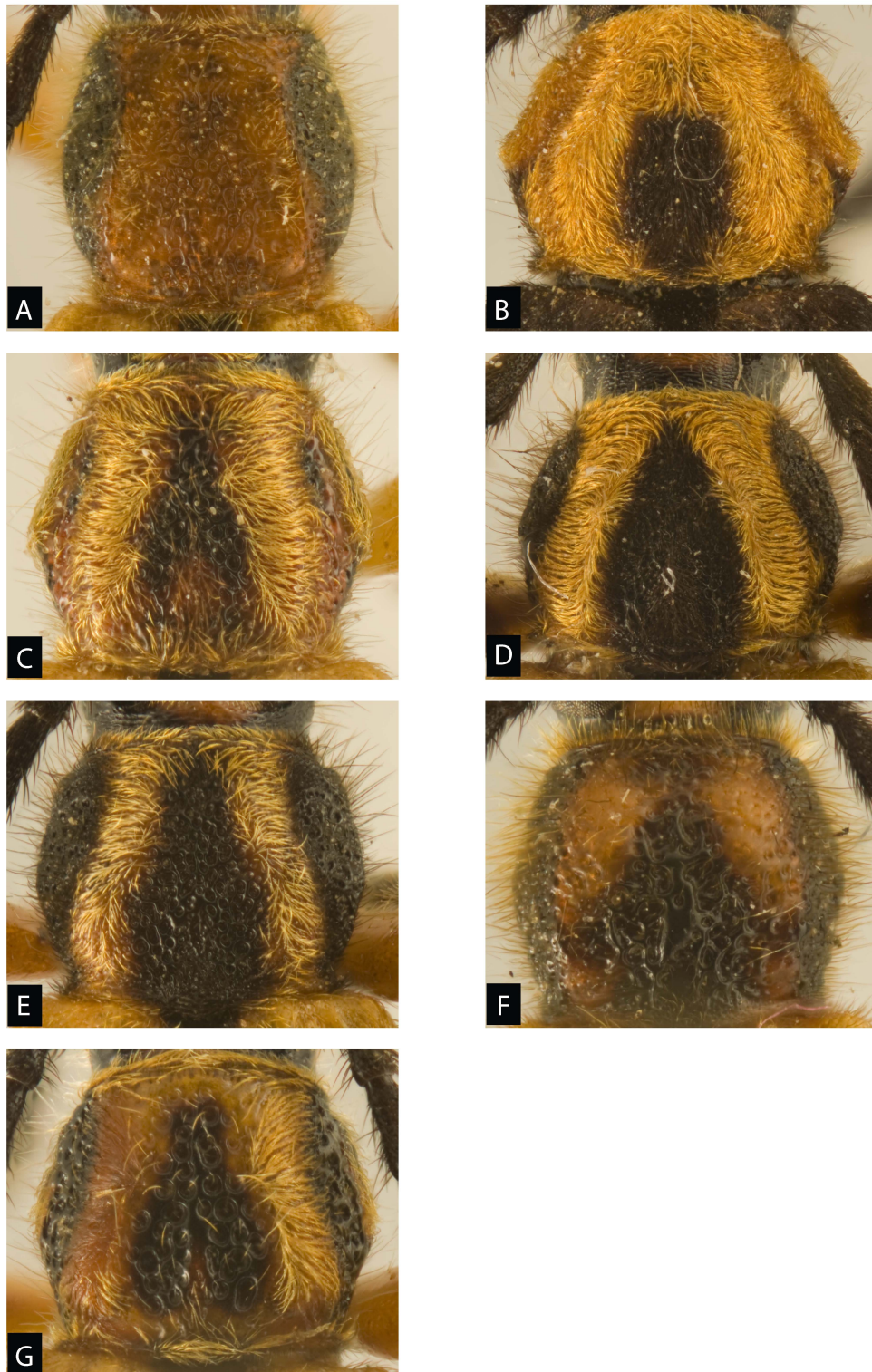


Figure 19. Close-up of pronota for (A) *E. luteus*; (B) *E. nigripennis*; (C) *E. pallidus*; (D) *E. quadricostatus*; (E) *E. rufipennis*; (F) *E. scabricollis*; (G) *E. similis*.



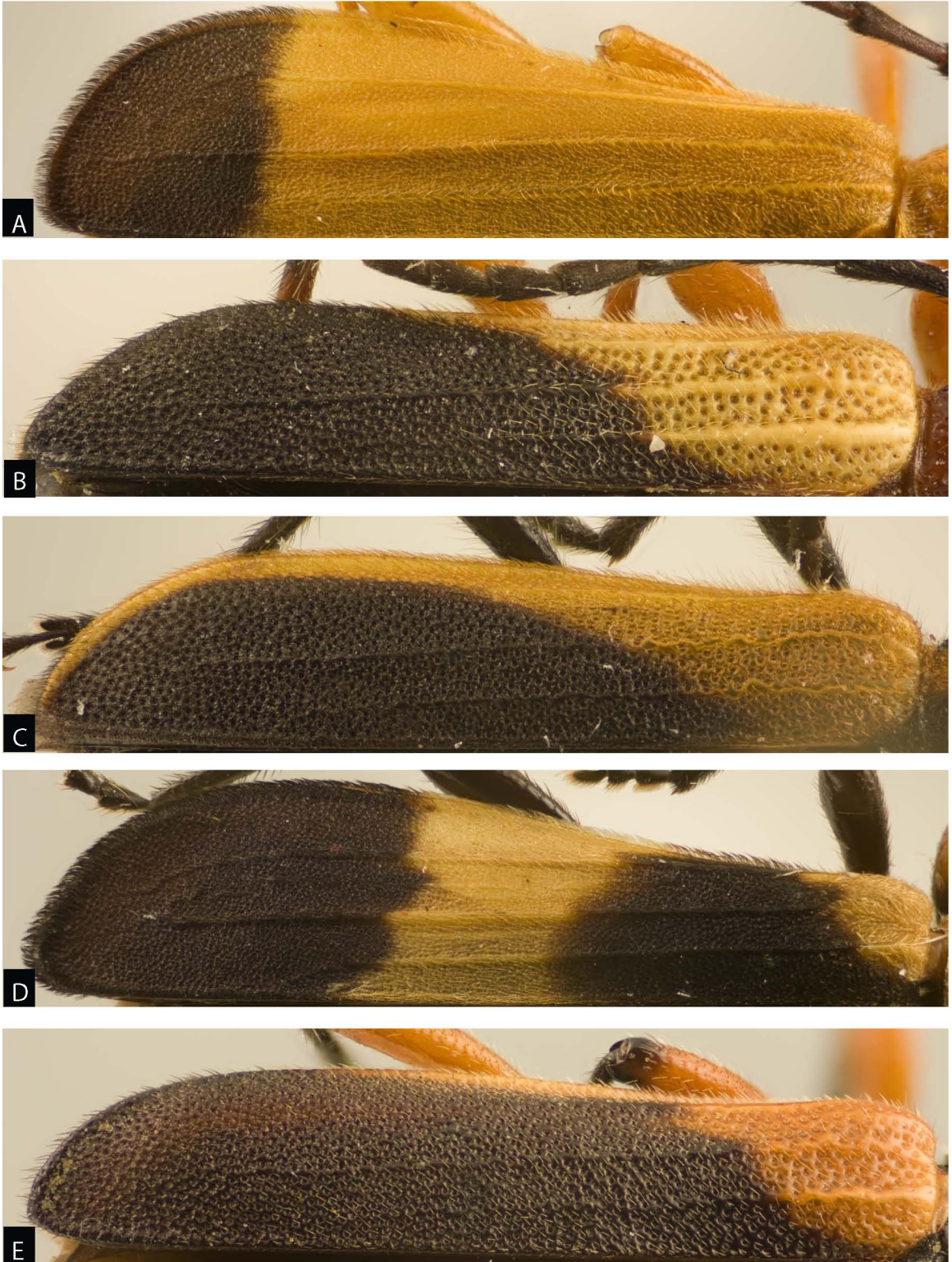


Figure 20. Left elytron, dorsal view of (A) *E. apicalis*; (B) *E. divisus*; (C) *E. floridanus*; (D) *E. grandis*; (E) *E. humeralis*.



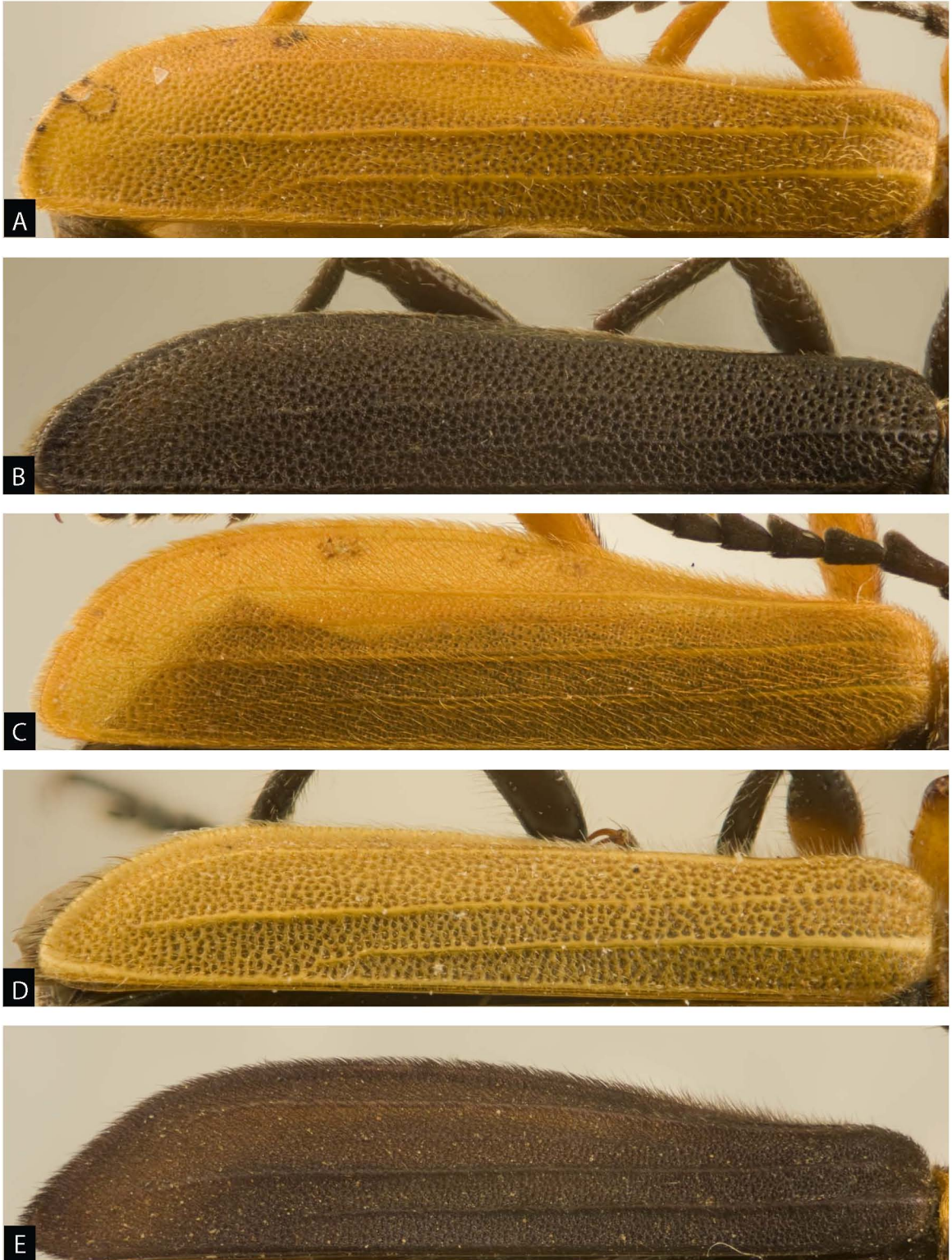


Figure 21. Left elytron, dorsal view of (A) *E. ignitus*; (B) *E. immaculipennis*; (C) *E. limpiamus*; (D) *E. luteus*; (E) *E. nigripennis*.



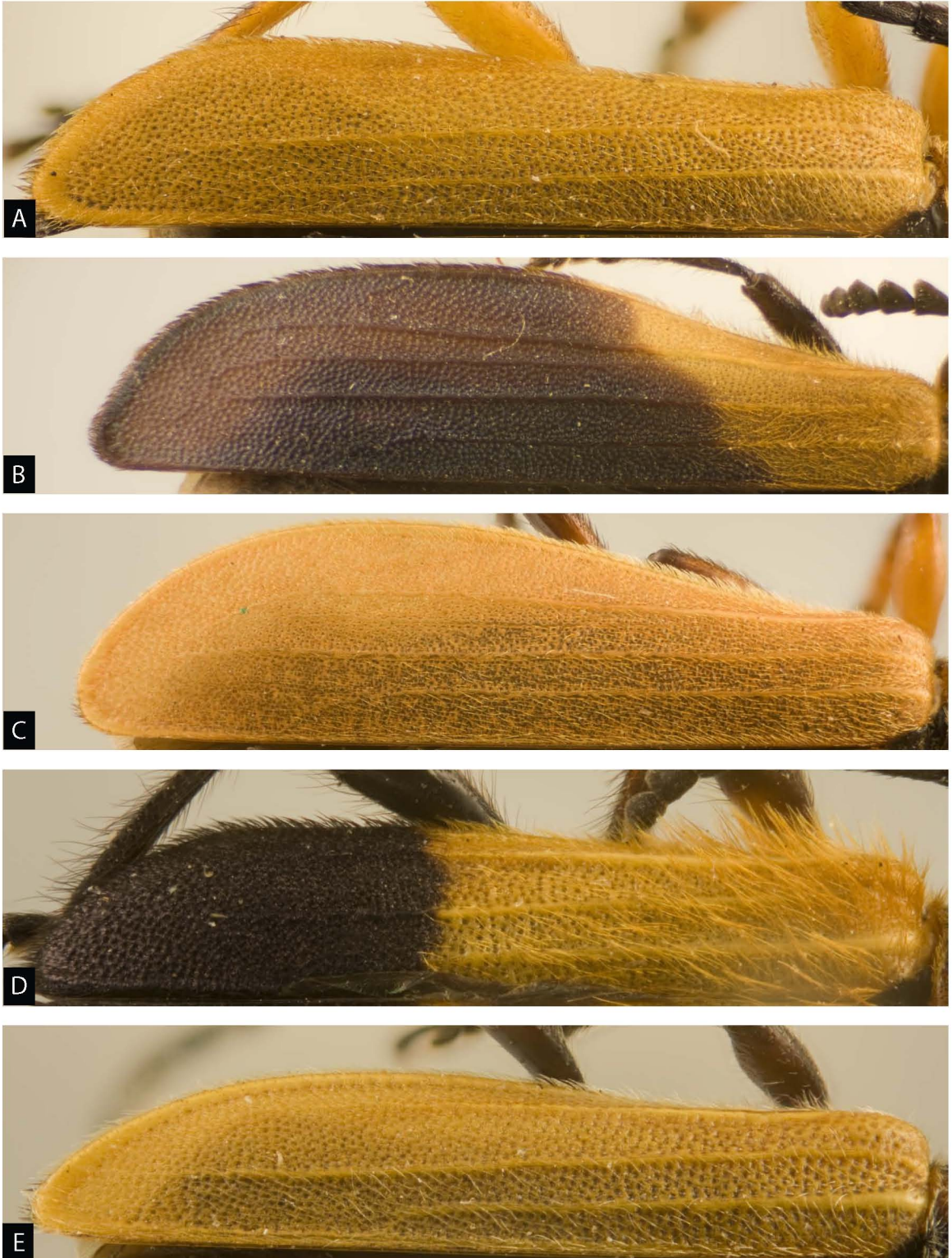


Figure 22. Left elytron, dorsal view of (A) *E. pallidus*; (B) *E. quadricostatus*; (C) *E. rufipennis*; (D) *E. scabricollis*; (E) *E. similis*.



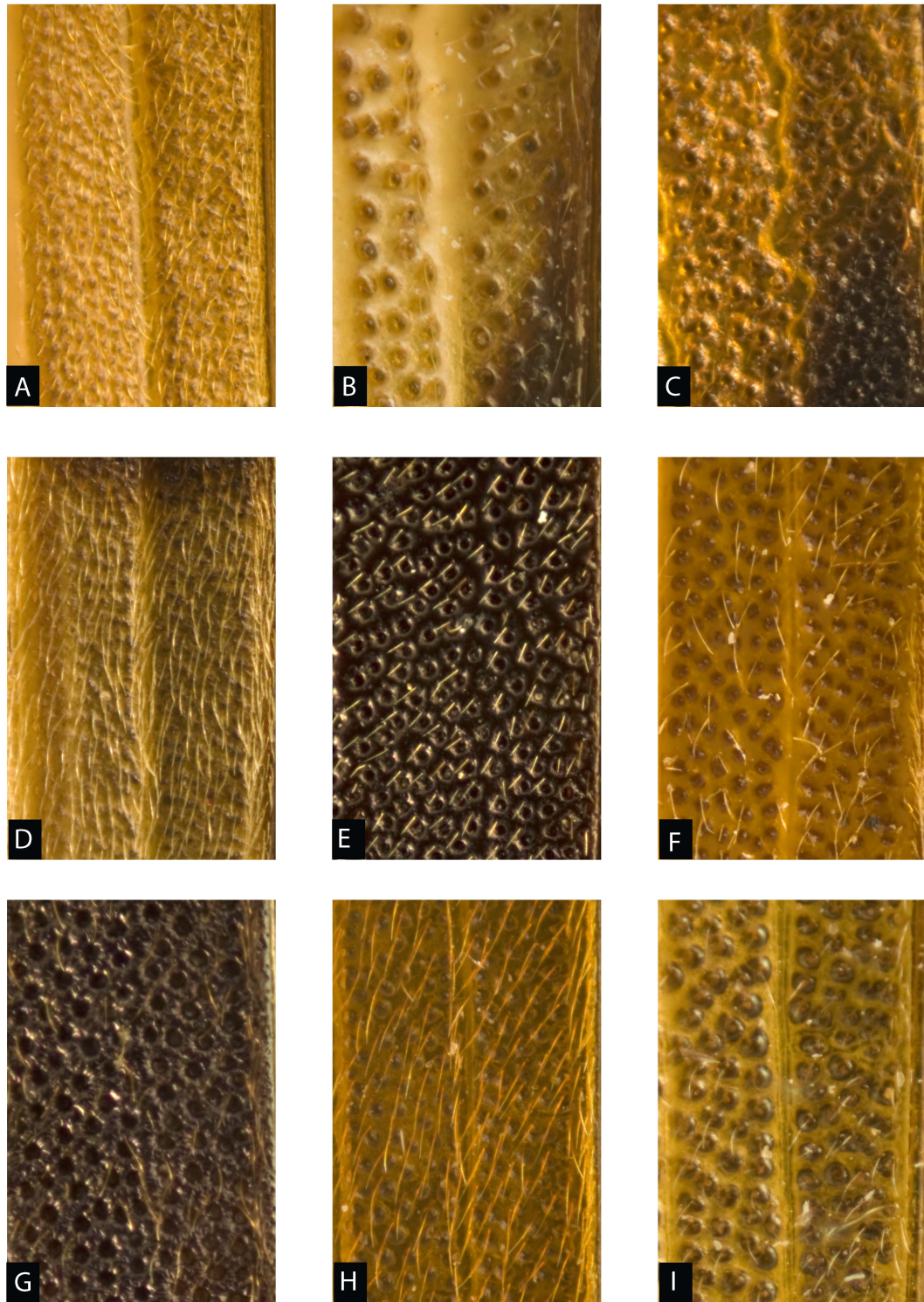


Figure 23. Close-up of elytral punctation at midline between suture and 2nd costa for (A) *E. apicalis*; (B) *E. divisus*; (C) *E. floridanus*; (D) *E. grandis*; (E) *E. humeralis*; (F) *E. ignitus*; (G) *E. immaculipennis*; (H) *E. limpianus*; (I) *E. luteus*.

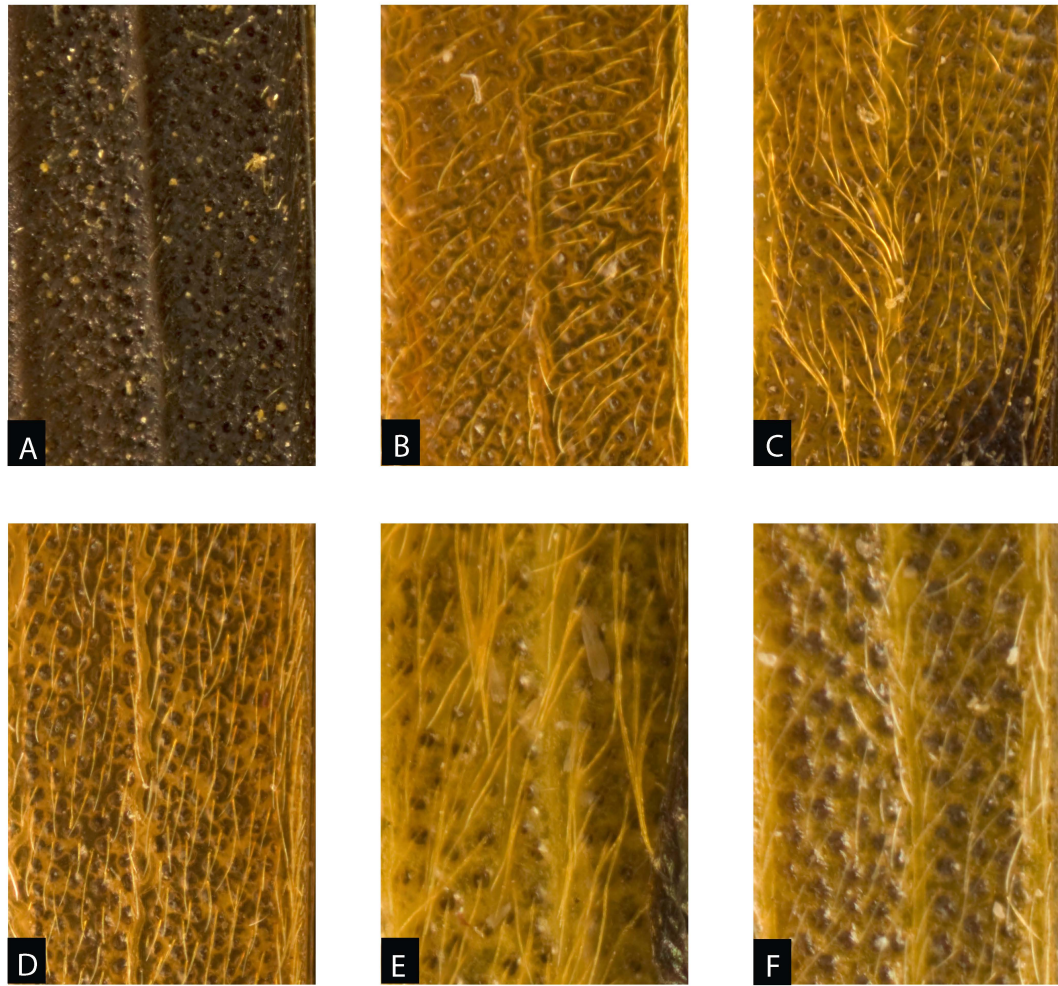


Figure 24. Close-up of elytral punctation at midline between suture and 2nd costa for (A) *E. nigripennis*; (B) *E. pallidus*; (C) *E. quadricostatus*; (D) *E. rufipennis*; (E) *E. scabricollis*; (F) *E. similis*.



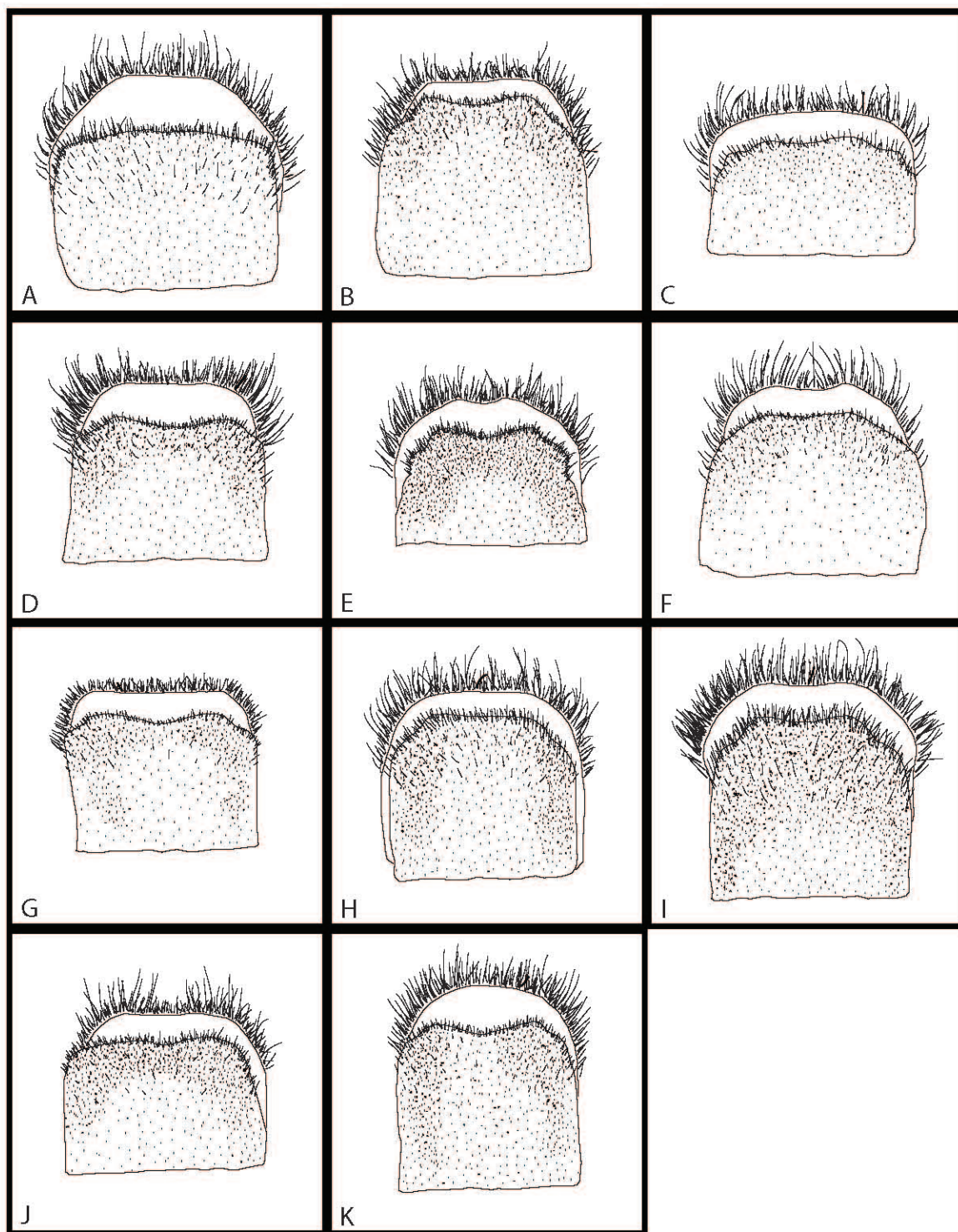


Figure 25. Male, 8th sternite ventral view for (A) *E. apicalis*; (B) *E. divisus*; (C) *E. floridanus*; (D) *E. ignitus*; (E) *E. immaculipennis*; (F) *E. limpianus*; (G) *E. luteus*; (H) *E. pallidus*; (I) *E. rufipennis*; (J) *E. scabricollis*; (K) *E. similis*.

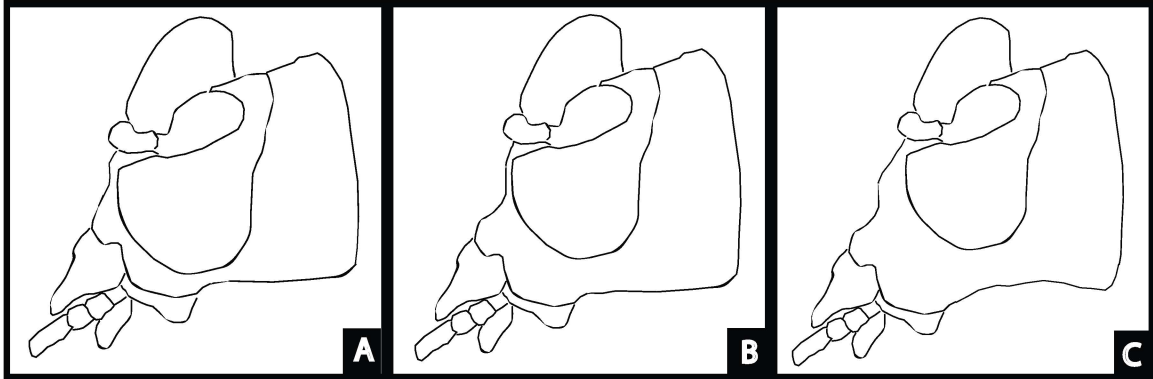


Figure 26. Character 1. Genal extension beyond eyes. (A) State 0, genal width less than  $\frac{1}{2}$  genal height; (B) State 1, genal width approximately  $\frac{1}{2}$  genal height; (C) State 2, genal width more than  $\frac{1}{2}$  genal height.

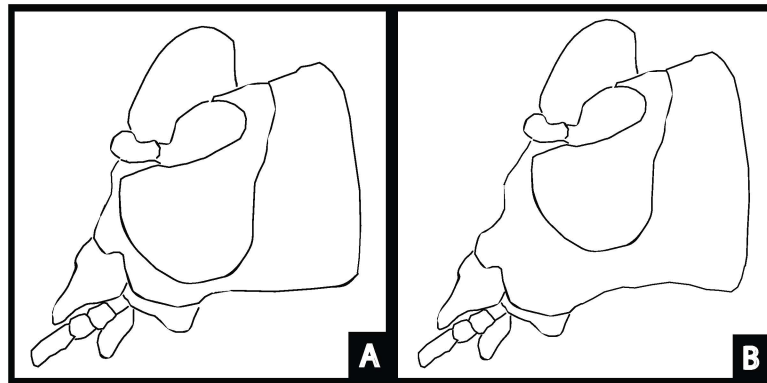


Figure 27. Character 2. Integument below lower eye lobe in lateral view. (A) State 0, less than  $0.3 \times$  height of lower eye lobe; (B) State 1, greater than  $0.3 \times$  height of lower eye lobe.

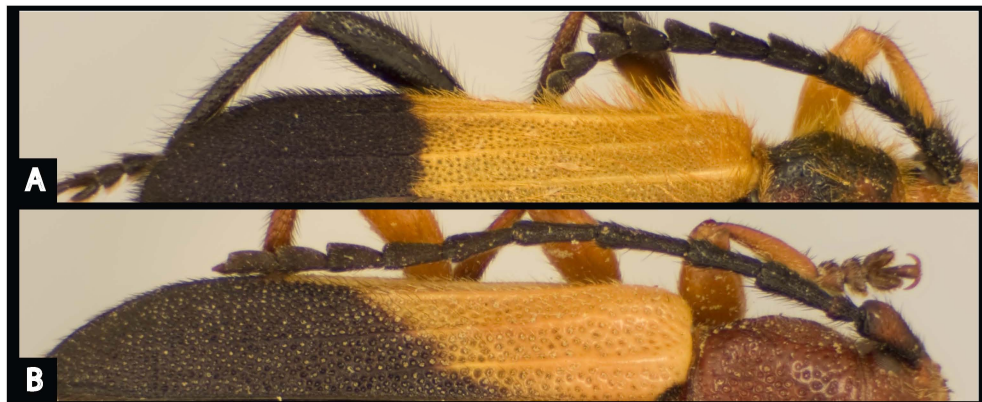


Figure 28. Character 3. Antennal length in males. (A) State 0, reaching to less than half elytral length; (B) State 1, reaching to more than half elytral length.



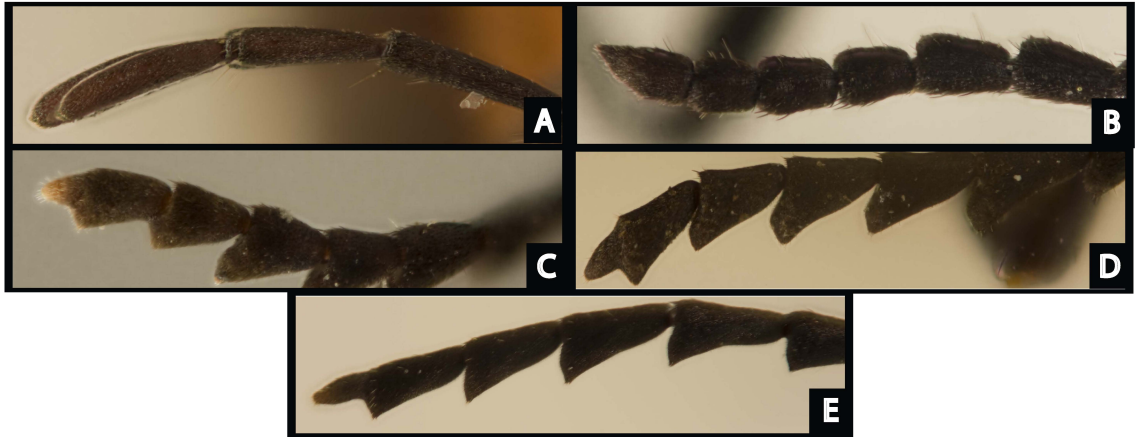


Figure 29. Character 4. Eleventh antennomere in males (A) State 0, not appendiculate; (B) State 1, slightly appendiculate; (C) State 2, moderately appendiculate; (D) State 3, strongly appendiculate; (E) State 4, extremely appendiculate.

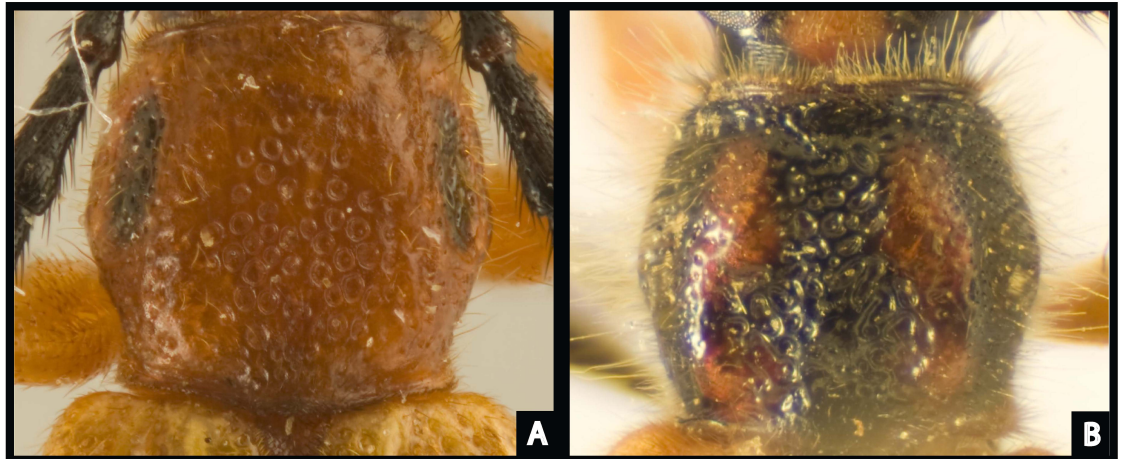


Figure 30. Character 7. Two pronotal calli located mediolateral to center (A) State 0, absent; (B) State 1, present.

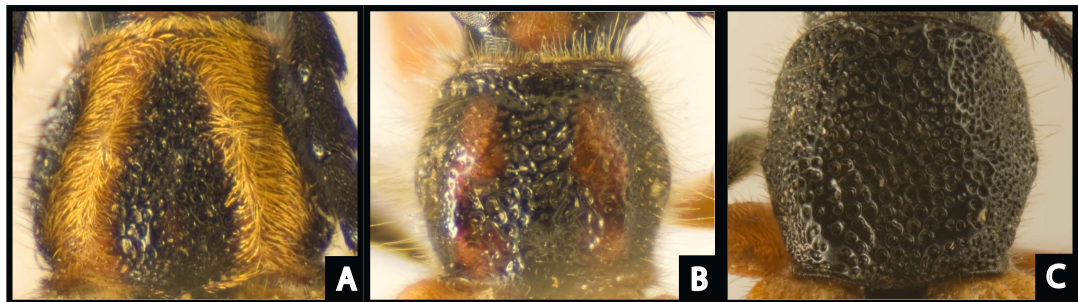


Figure 31. Character 11. Central pronotal disc integument medial, anterior to posterior pronotal suture (A) State 0, integument slightly raised, punctures smaller in diameter than remaining integument; (B) State 1, integument moderately raised, punctures absent, a callus often present; (C) State 2, confluent punctate with remaining integument.



Figure 32. Character 14. Sexually dimorphic prothoracic punctation in males (A) State 0, absent; (B) State 1, present.



Figure 33. Character 20. Elytral punctation medially and basally (A) State 0, subequal medially and basally; (B) State 1, larger, deeper, more distinct medially than basally.



## Results of Cladistic Analysis

The analysis yielded two most parsimonious trees of length 78 (CI = 47; RI = 72) (Fig. 50). The strict consensus is shown in Fig. 51. A phylogenetic analysis for the Trachyderini or Trachyderina has not yet been conducted therefore relationships between genera is currently unknown. The monophyly of the genus *Elytroleptus* within the tribe and subtribe is untested and is beyond the scope of this project. Within this analysis, the monophyly of *Elytroleptus* is supported by the synapomorphies of (1) antennal length in males reaching to less than half the elytral length (Character 3, Fig. 28), (2) the eleventh antennomere appendiculate (Character 4, homoplasious, Fig. 29), (3) pronotal punctation large in diameter (Character 9, Fig. 19), (4) the pronotal width less than  $1.2 \times$  length (Character 13), (5) male sexually dimorphic pronotal punctation restricted to oval area above lateral margin (Character 15, Fig. 32), and (6) the elytral length more than  $4 \times$  the pronotal length (Character 16). The highest Bremer support recovered in the analysis, with a value of five, supports the monophyly of *Elytroleptus*. Relatively high Bremer values were also reported for several nodes within the tree. A value of three was found for the node containing *E. floridanus* and *E. immaculipennis* with the synapomorphies of (1) pronotal disc with recumbent pubescence (Character 12, homoplasious), and (2) the elytral punctation at apices (Character 22, homoplasious) supporting the sister relationship. A value of three was also found for the node containing *E. divisus* and *E. humeralis* with the synapomorphies of (1) the genal width more than  $\frac{1}{2}$  genal height (Character 1, homoplasious, Fig. 26), and (2) the integument below the lower eye lobe in lateral view greater than  $0.3 \times$  height of the lower eye lobe (Character 2, homoplasious, Fig. 27) supporting the sister relationship. A Bremer value of four was reported for the

node containing *E. apicalis* and *E. grandis* with the synapomorphies of (1) the eleventh antennomere in males extremely appendiculate (Character 4, Fig. 29), and (2) small, shallow elytral punctation (Character 19, Fig. 23A) supporting this sister relationship.

There are two main clades within the strict consensus tree. The basal clade contains *E. floridanus* and *E. immaculipennis* while the other clade contains the remaining *Elytroleptus* species. *Elytroleptus floridanus* is fairly distinct from other species of the genus as its flight period is earlier in the year and the distribution is primarily restricted to the eastern coast of the United States. The position of this species towards the base of the cladogram suggests that *Elytroleptus* may have originated in the region of what is now the eastern United States and then diversified once reaching Mexico.

The analysis did not result in a separate clade for the recorded predaceous species of *Elytroleptus* (*E. apicalis*, *E. ignitus*, *E. limpianus*). They are however closely grouped within the tree (Fig. 51), indicating that predation may have evolved once and was subsequently lost or is simply unrecorded for *E. grandis*, *E. rufipennis*, *E. quadricostatus*, and *E. nigripennis*. Conclusions to such an effect, however, cannot be definitively stated, as feeding preferences for other species of *Elytroleptus* are unknown.

Interestingly, one of the unambiguous synapomorphies supporting the monophyly of *Elytroleptus* is the sexually dimorphic gland pores of males restricted to an oval area directly dorsad of the pronotal lateral margin (Character 15). Cerambycids with male-specific gland pores of the pronotum and prosternum have been observed and studied by several workers. Specifically, the subfamily Cerambycinae was addressed by Ray *et al* (2006) in which sixty-five species spanning twenty-four tribes were surveyed for

presence or absence of gland pores. This study reported that male-specific gland pores appeared common throughout the Cerambycinae and that the trait appeared to be evolutionarily labile as closely related species differed in presence, absence, and location of gland pores (Ray *et al.*, 2006). The results of this cladistic analysis support these findings as the presence or absence of male-specific gland pores (Character 14) was often a distinguishing character between sister taxa such as between *E. luteus* (present) and *E. scabricollis* (absent) as well as between *E. divisus* (present) and *E. humeralis* (absent). This suggests that volatile sex pheromones may play a role in mate recognition among more recently diverged species. In contrast, the distinct oval shape of the area appears to give phylogenetic signal as a synapomorphy at the level of the genus. The subfamily Cerambycinae and the tribes therein have not yet undergone a phylogenetic analysis to determine if location of male-specific gland pores is taxonomically informative. The results from the cladistic analysis of *Elytroleptus* indicate that this character may be useful at or above the genus rank and should be examined in future phylogenetic analyses of the Cerambycidae.



Figure 34. Proposed lycid models for *Elytroleptus* species, (A) *Lycus fernandezi* Dugés model for *E. apicalis*; (B) *Lycus loripes* (Chevrolat) model for *E. apicalis* and *E. ignitus*; (C) *Lycus simulans* (Schaeffer) model for *E. apicalis*, *E. ignitus*, and *E. limpianus*; (D) *Lyconotus lateralis* (Melsheimer) model for *E. floridanus*.

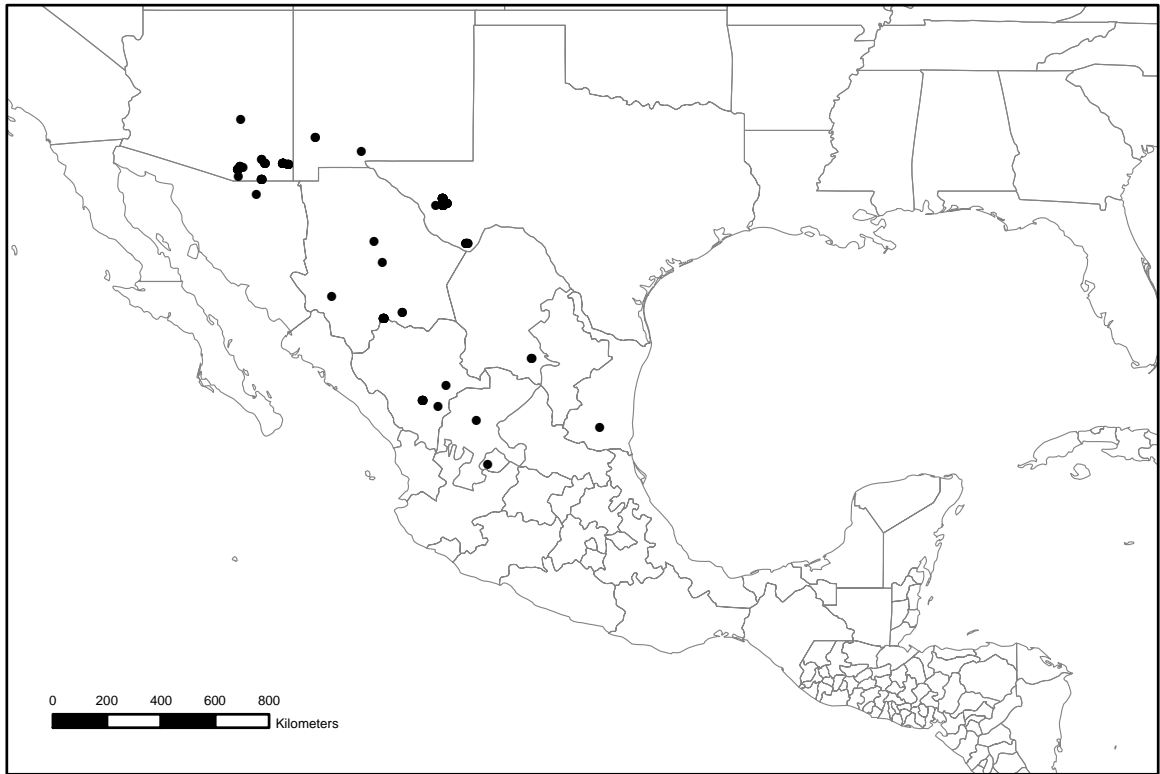


Figure 35. Geographic distribution of *Elytroleptus apicalis* (LeConte).

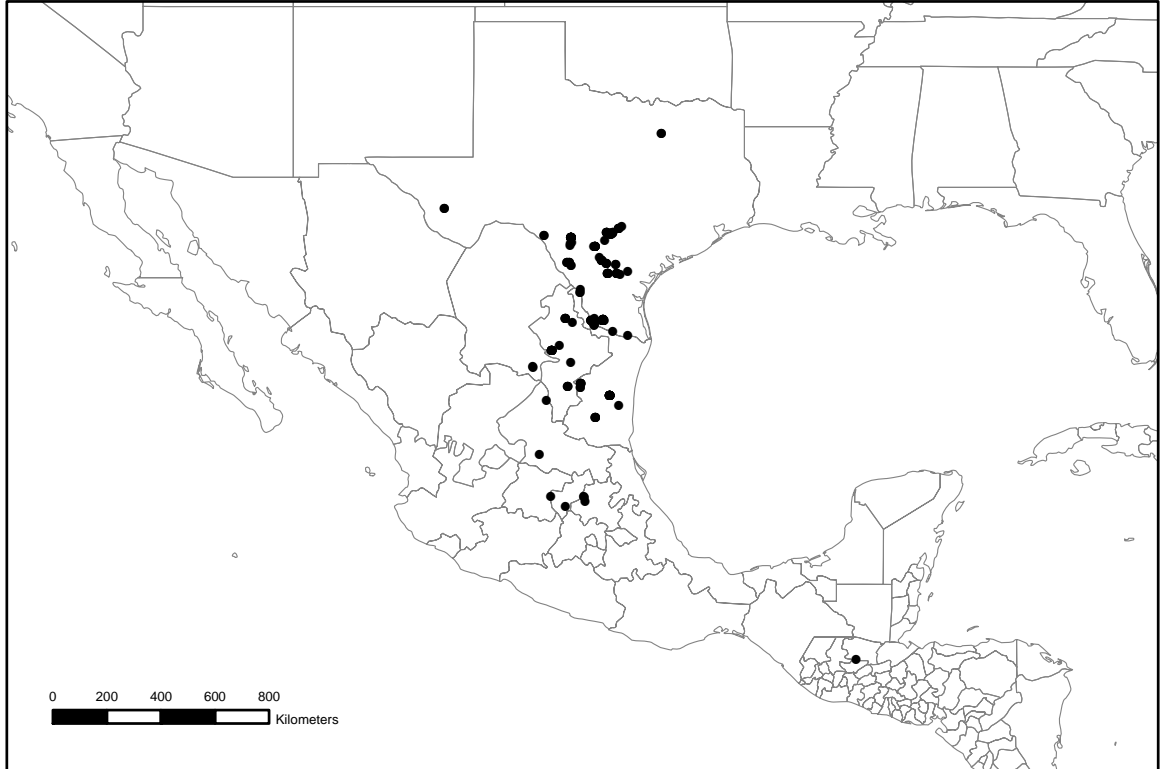


Figure 36. Geographic distribution of *Elytroleptus divisus* (LeConte).



Fig. X. Geographic distribution of *Elytroleptus floridanus* (LeConte).

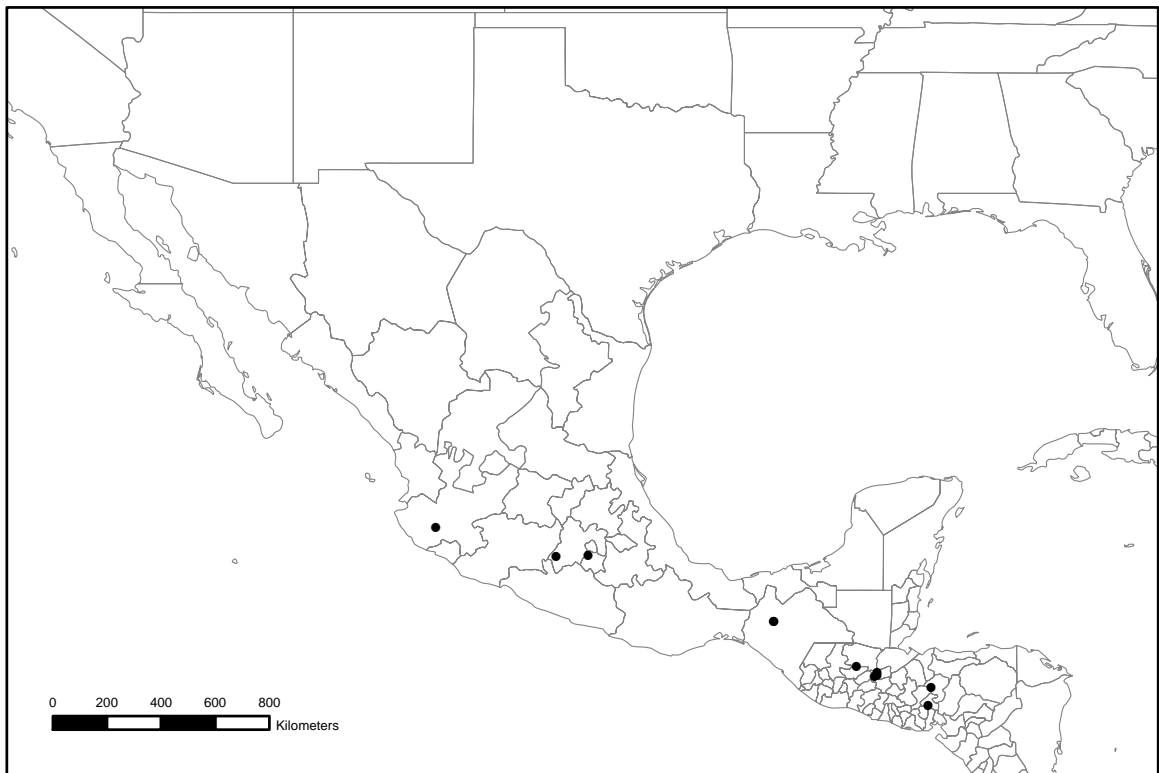


Fig. X. Geographic distribution of *Elytroleptus grandis* Linsley.

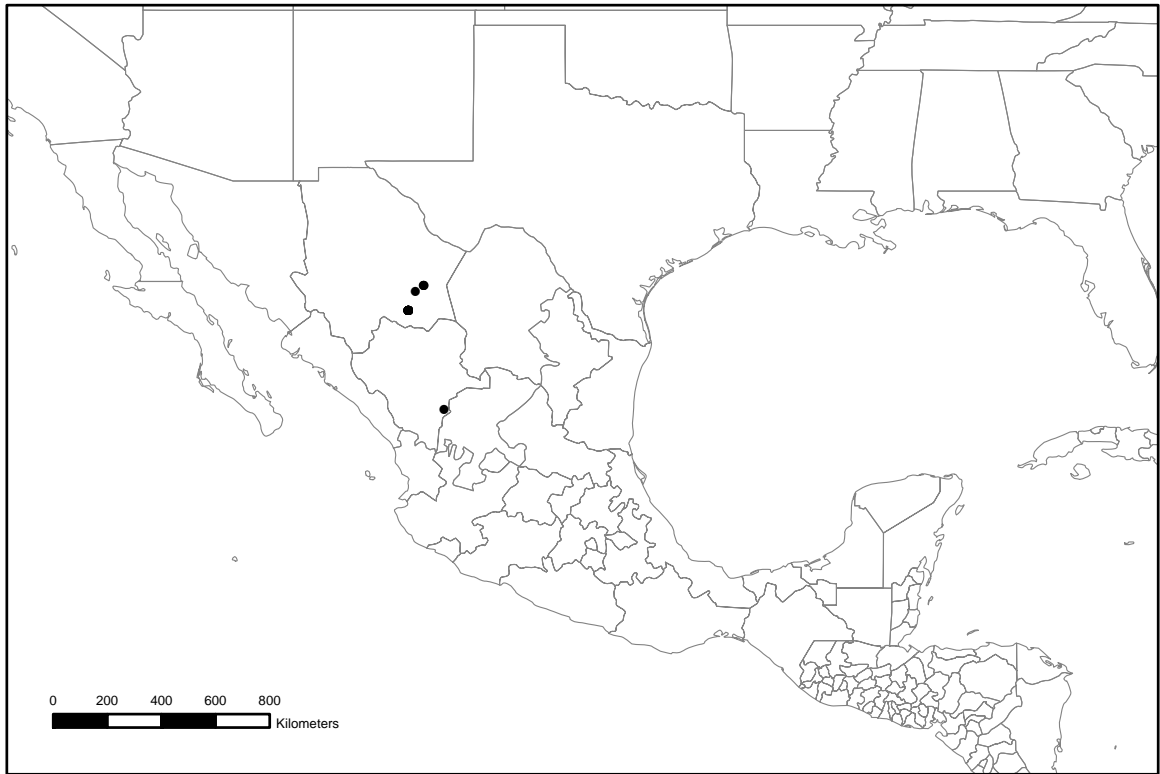


Figure 39. Geographic distribution of *Elytroleptus humeralis* Linsley.

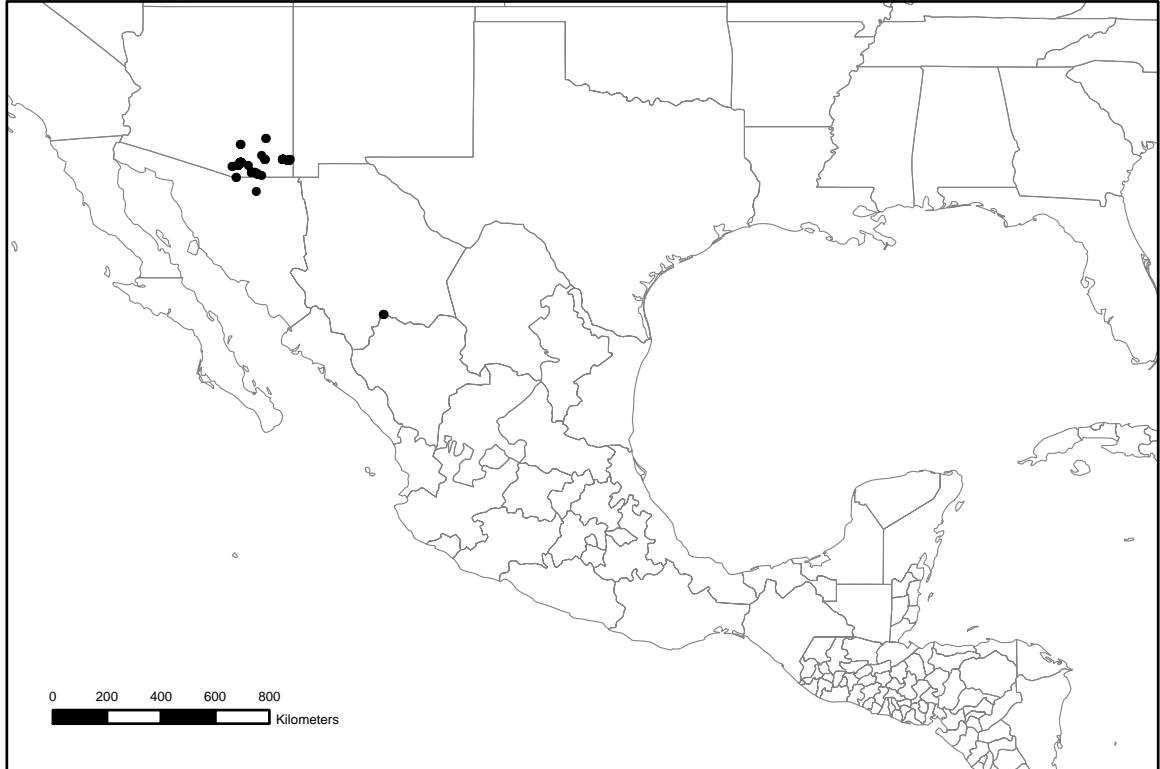


Figure 40. Geographic distribution of *Elytroleptus ignitus* (LeConte).

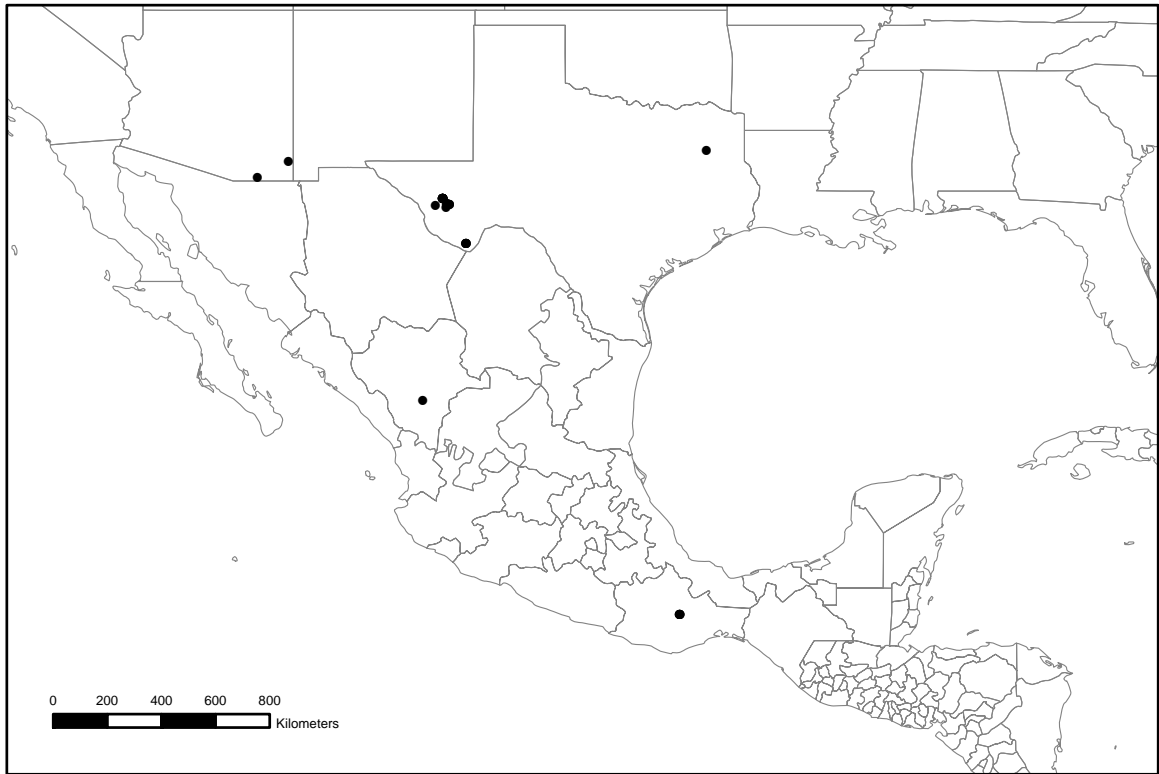


Figure 41. Geographic distribution of *Elytroleptus immaculipennis* Knull.

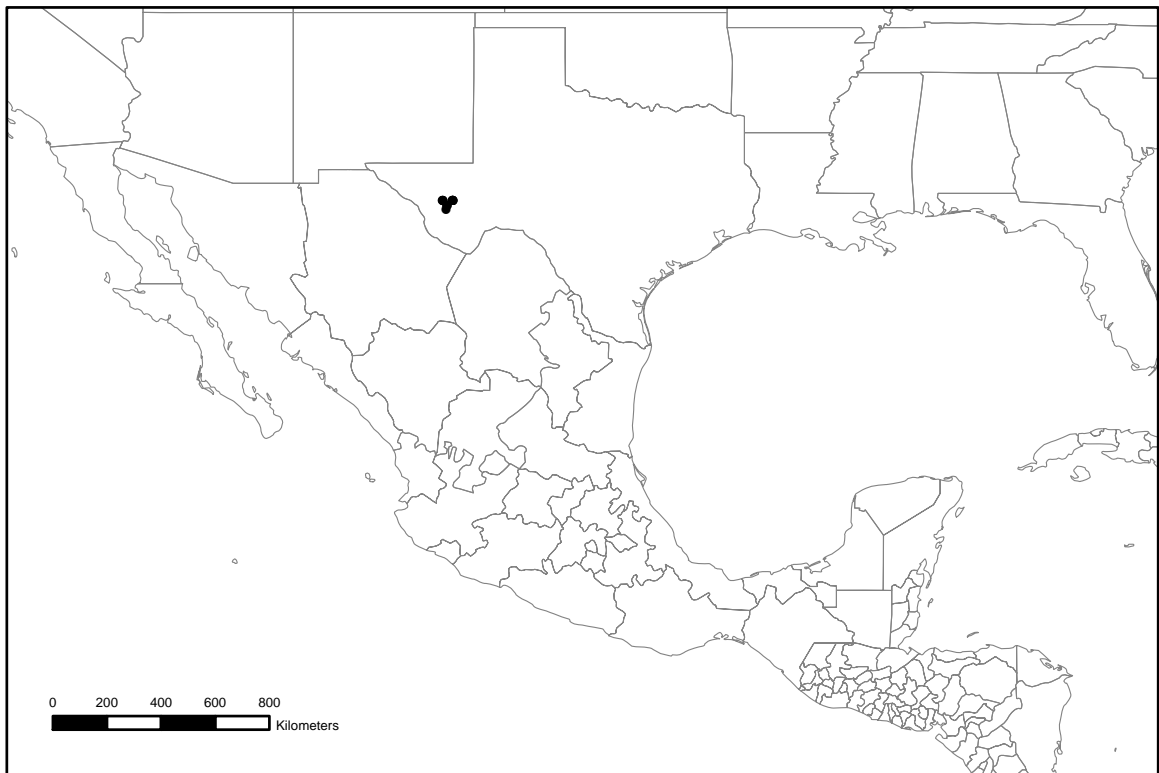


Figure 42. Geographic distribution of *Elytroleptus limpianus* Skiles & Chemsak.



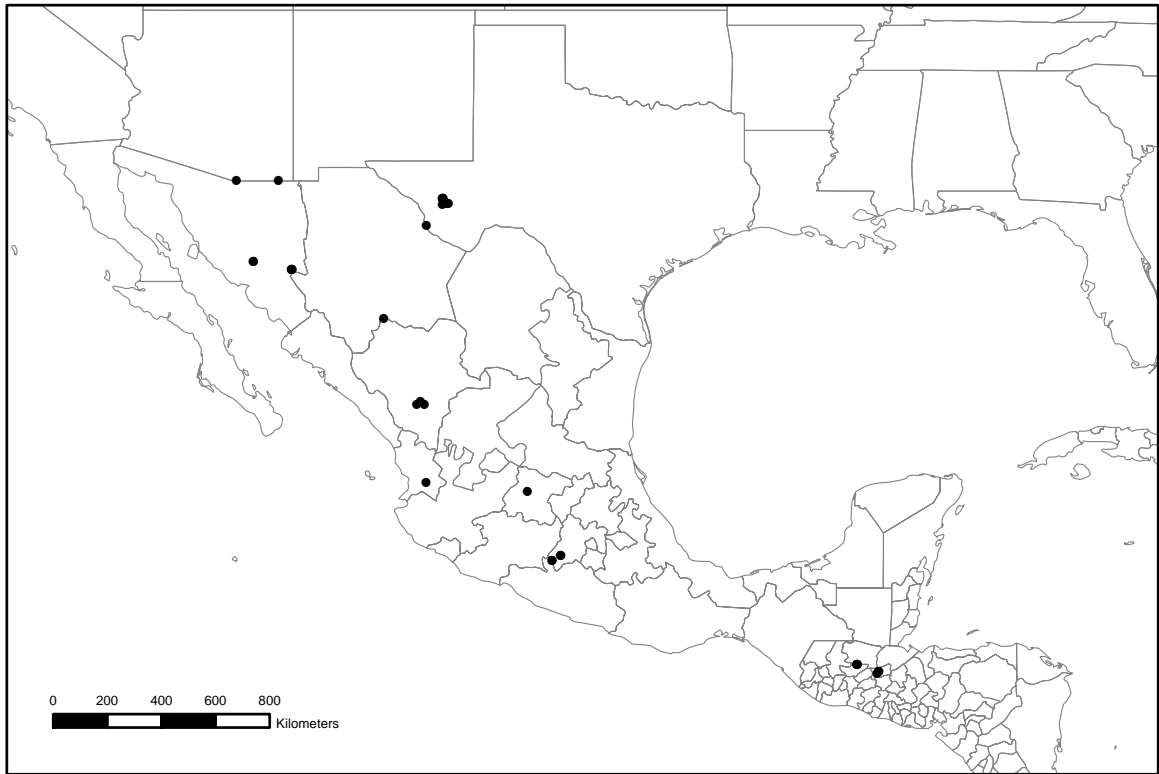


Figure 43. Geographic distribution of *Elytroleptus luteus* Dugés.

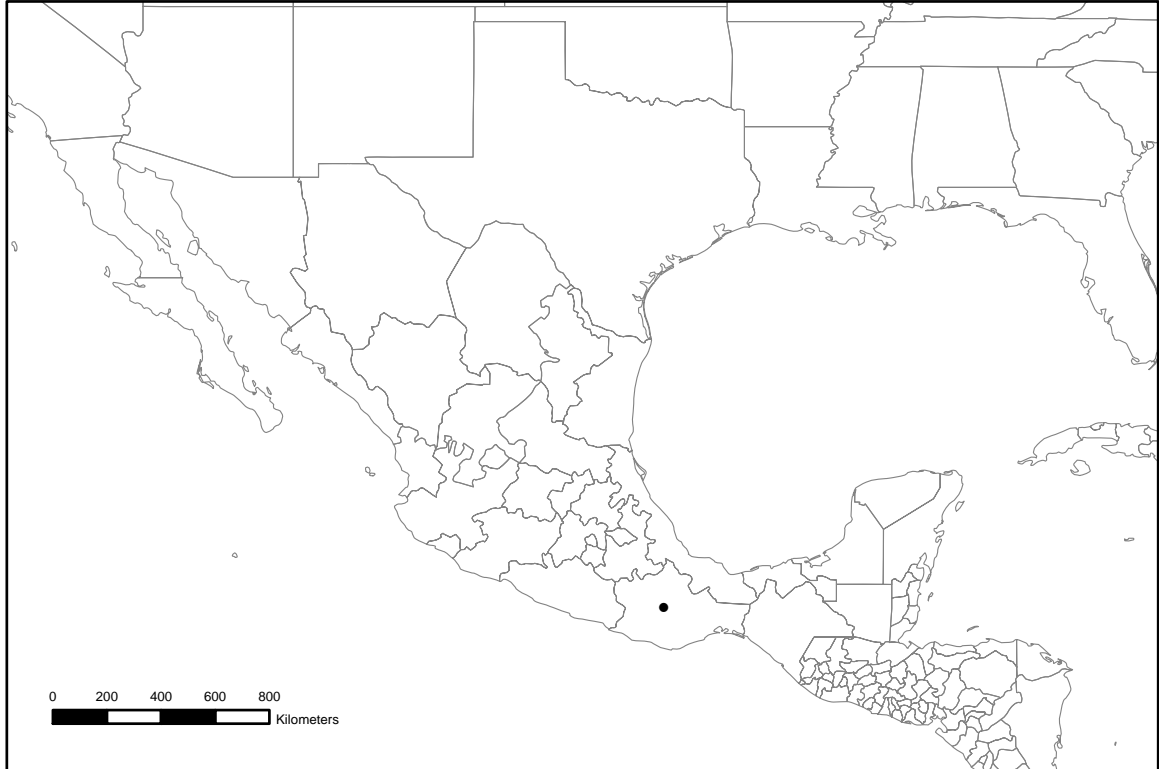


Figure 44. Geographic distribution of *Elytroleptus nigripennis* Bates.

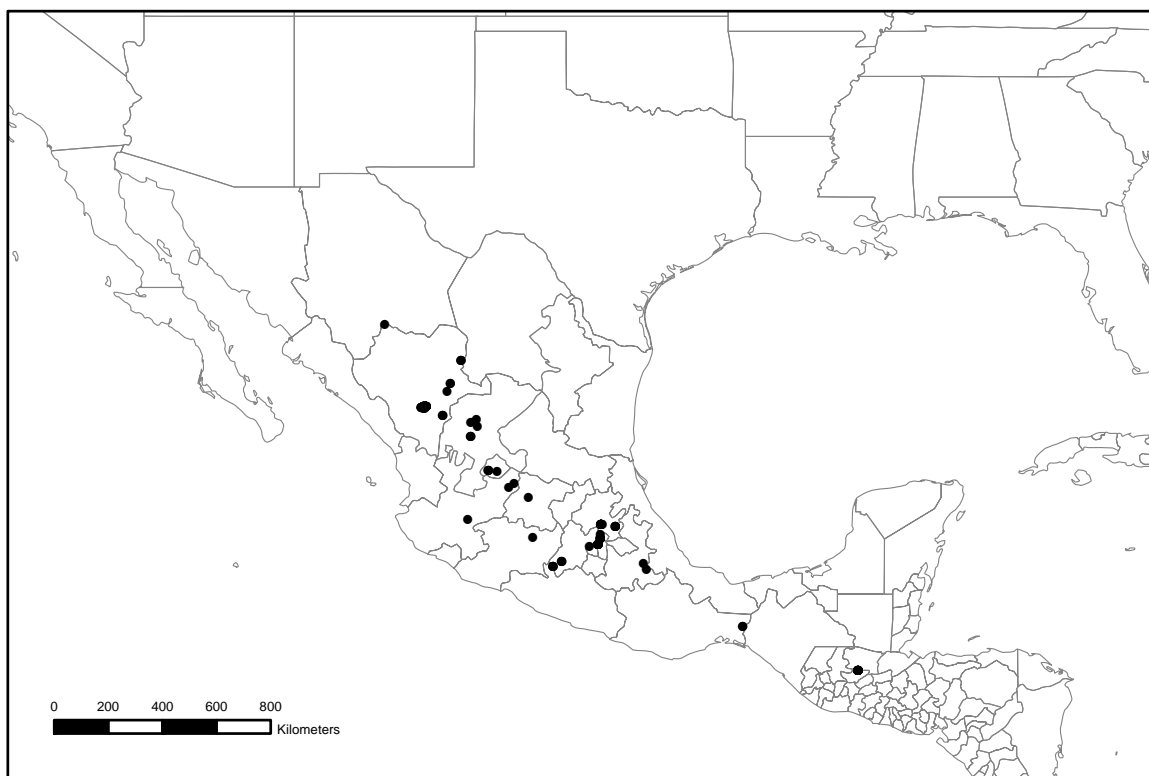


Figure 45. Geographic distribution of *Elytroleptus pallidus* (Thomson).

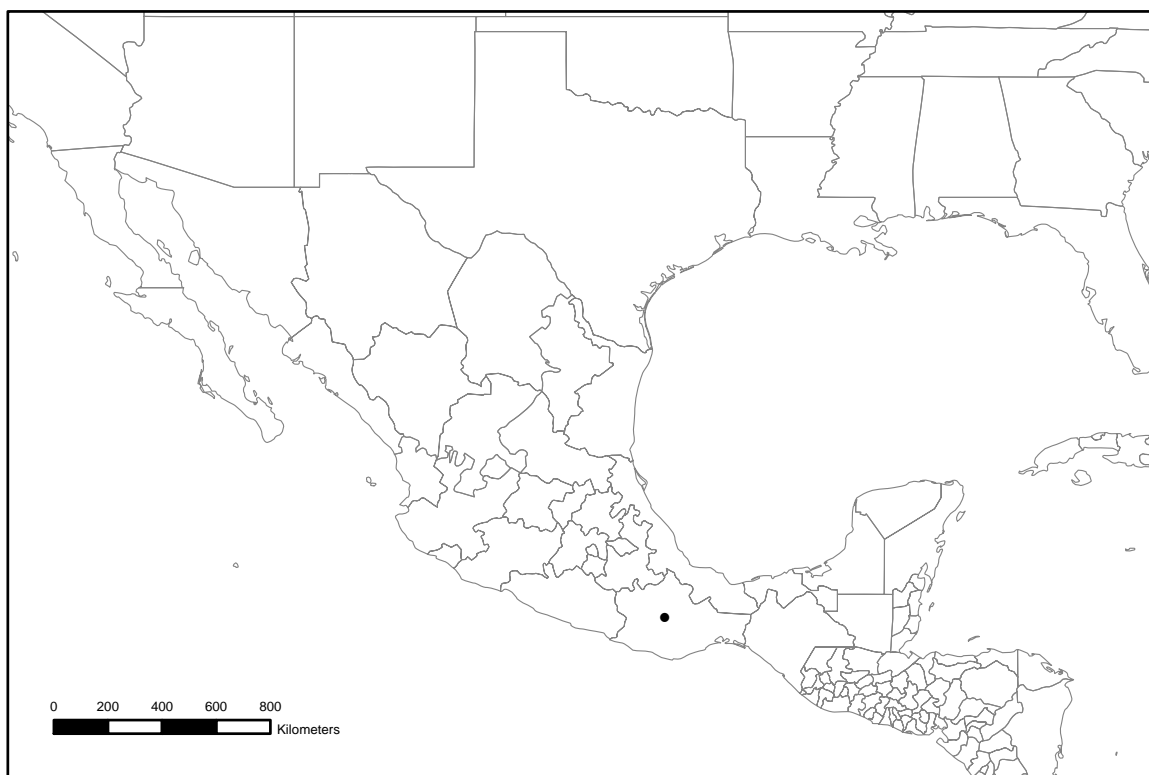


Figure 46. Geographic distribution of *Elytroleptus quadricostatus* n. sp.

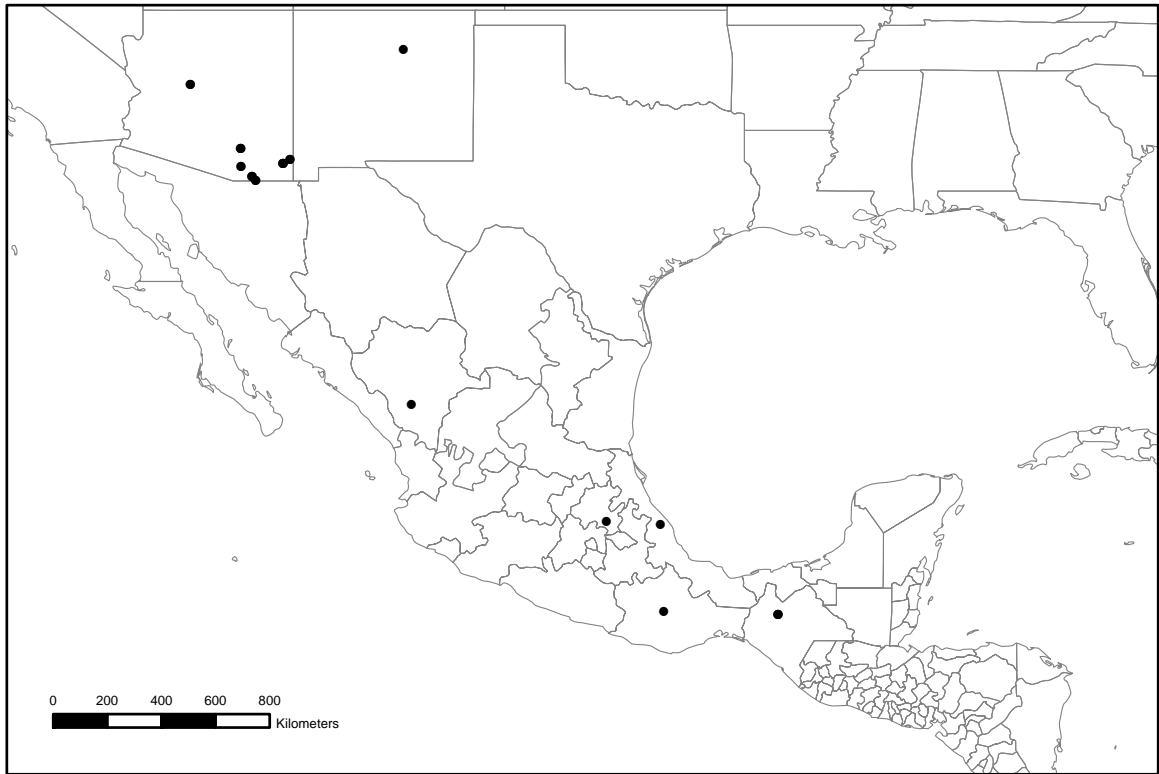


Figure 47. Geographic distribution of *Elytroleptus rufipennis* (LeConte).

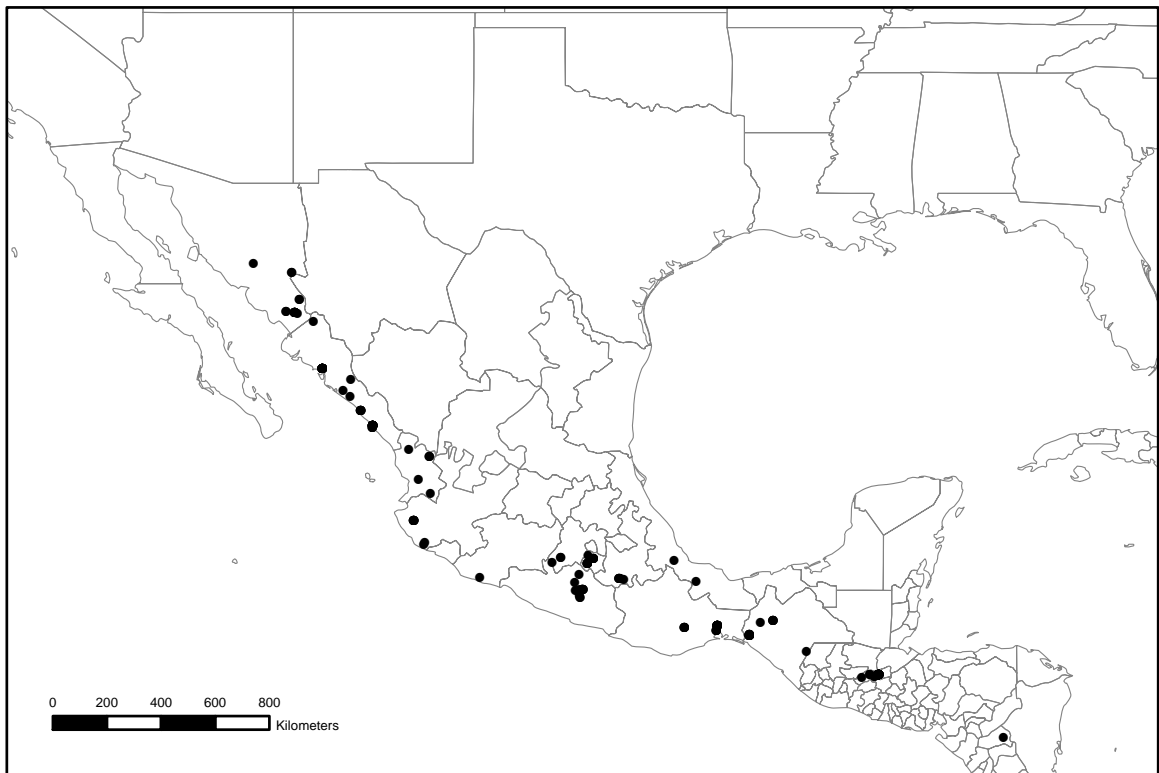


Figure 48. Geographic distribution of *Elytroleptus scabricollis* Bates.

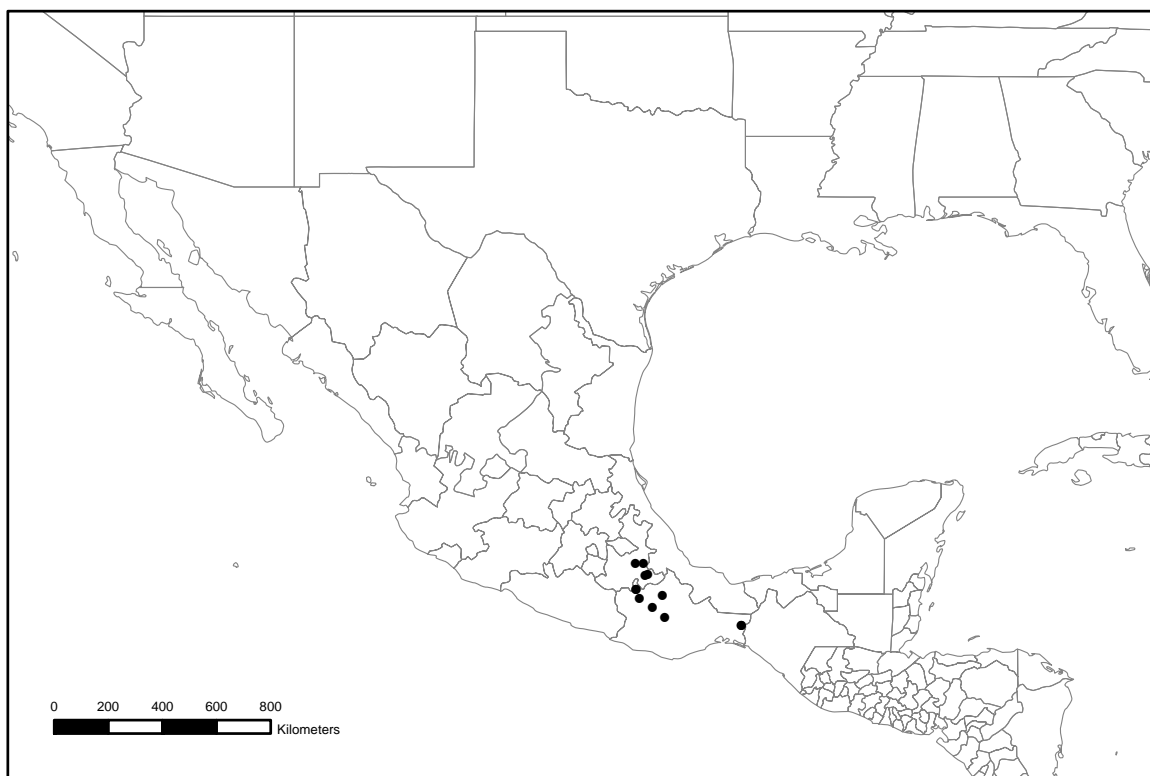


Figure 49. Geographic distribution of *Elytroleptus similis* Chemsak & Linsley.

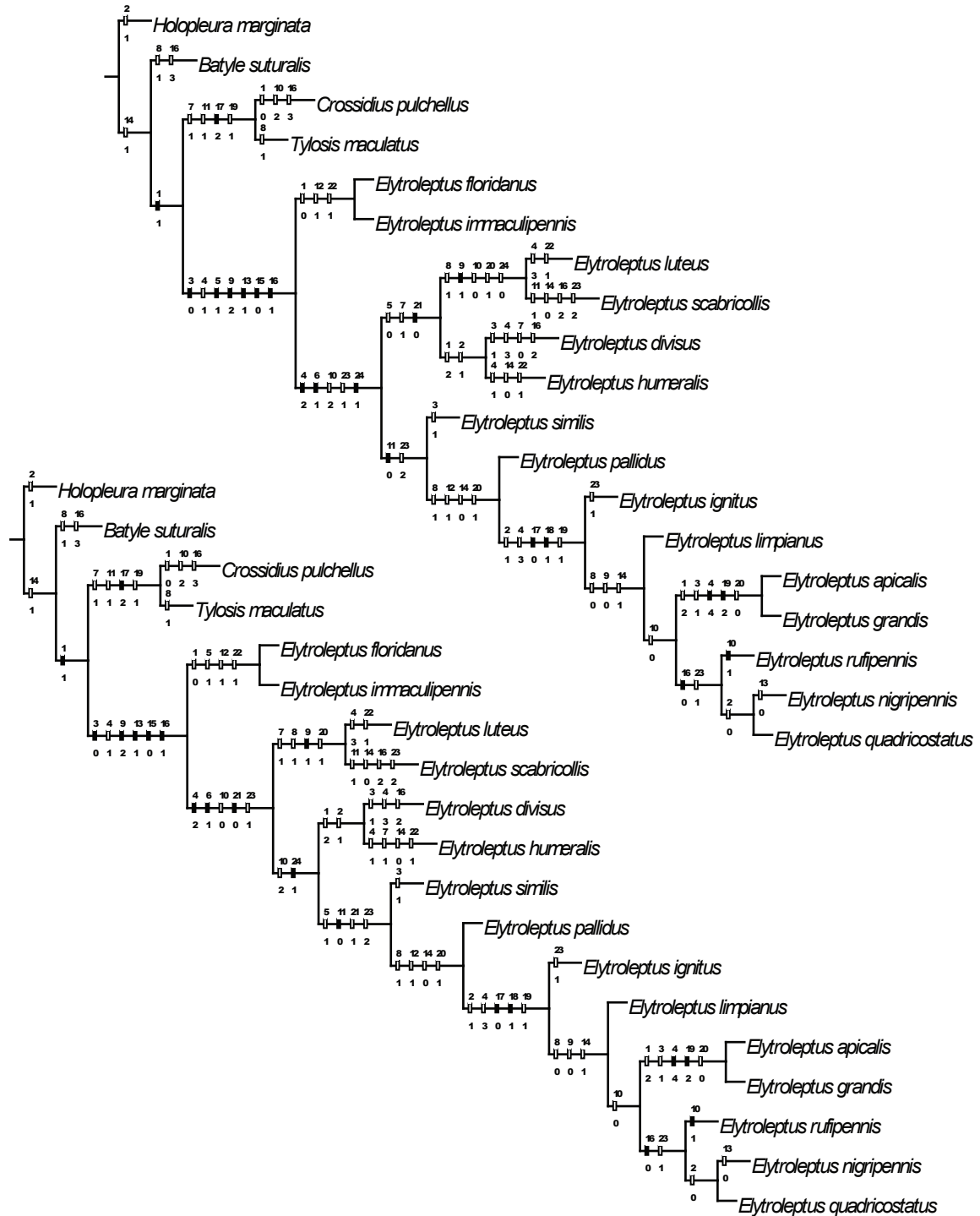


Figure 50. Two most parsimonious trees retrieved from phylogenetic analysis of *Elytroleptus* (length = 78, CI = 47, RI = 72). Numbers above branches are characters and numbers below branches are character states. Characters were mapped using ACCTRAN (fast) optimization. Black hash marks indicate nonhomoplasious character state changes, white hash marks indicate homoplasious character state changes or reversals.

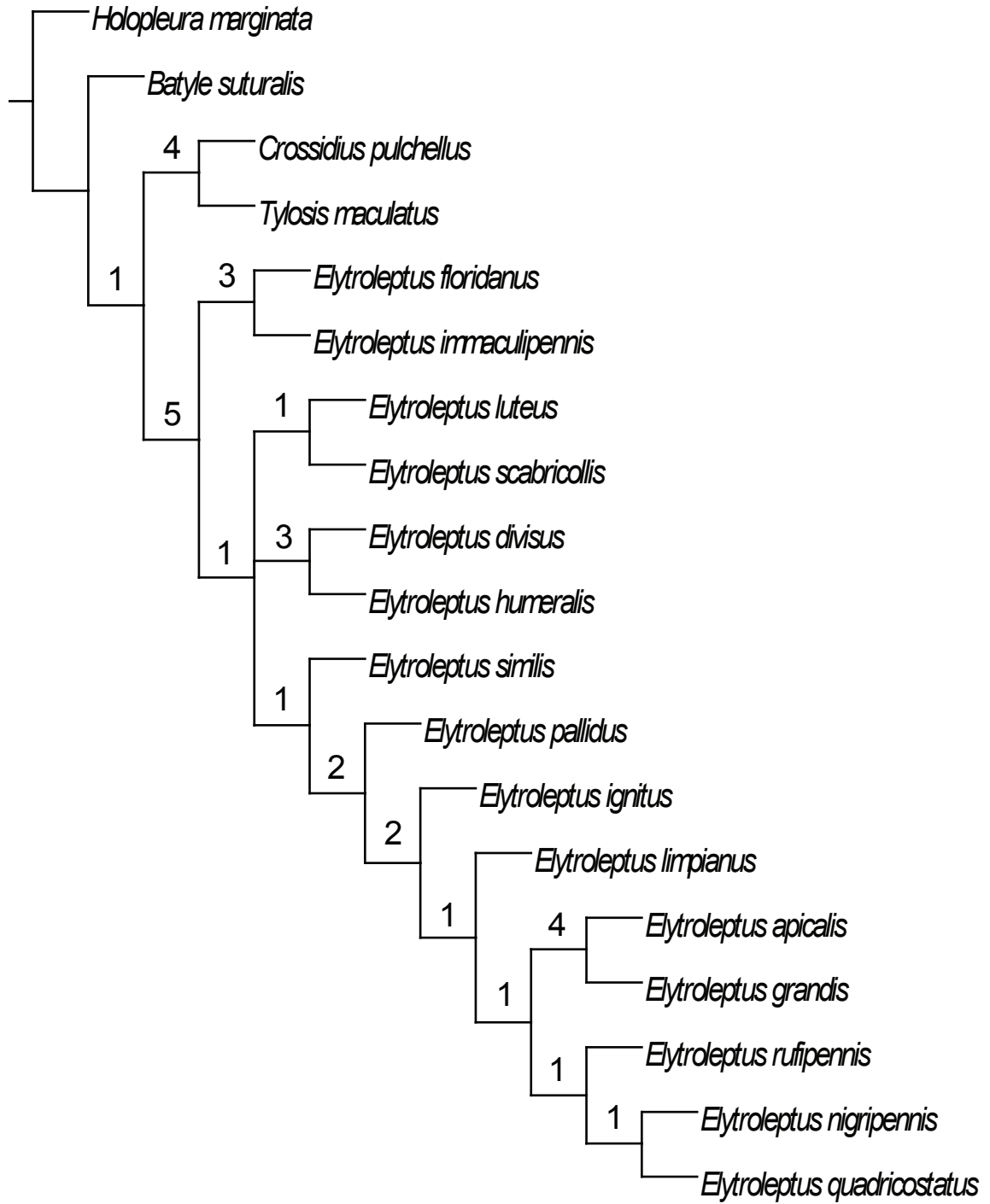


Figure 51. Strict consensus for two most parsimonious trees resulting from cladistic analysis of *Elytroleptus*. Numbers above branches are Bremer support values.



Figure 52. *Elytroleptus* type material (A) *E. luteus davisi*, holotype (FMNH); (B) *E. dichromaticus*, holotype (CASC); (C) *E. eros*, lectotype (BMNH); (D) *E. grandis*, holotype (CASC); (E) *E. humeralis*, holotype (AMNH); (F) *E. humeralis*, allotype (AMNH).





Figure 53. *Elytroleptus* type material (A) *E. immaculipennis* var. *obliquus*, holotype (FMNH); (B) *E. limpianus*, holotype (CASC); (C) *E. limpianus*, allotype (CASC); (D) *E. lineatus*, holotype (FMNH); (E) *E. luteicollis*, holotype (CASC); (F) *E. nigripennis*, holotype (BMNH).





Figure 54. *Elytroleptus* type material (A) *E. pallidus villosus*, holotype (CASC); (B) *E. pallidus villosus*, allotype (CASC); (C) *E. scabricollis*, lectotype (BMNH); (D) *E. similis*, holotype (CASC).

## APPENDIX A

### CHECKLIST

*Elytroleptus* Dugés, 1879: 182-185.

*apicalis* (LeConte, 1884: 24).

*divisus* (LeConte, 1884: 23).

*dichromaticus* Linsley, 1961: 13. **New Synonymy.**

*floridanus* (LeConte, 1862: 42).

*grandis* Linsley, 1935: 97.

*humeralis* Linsley, 1961: 14.

*ignitus* (LeConte, 1884: 24).

*luteicollis* Skiles & Chemsak, 1982: 66. **New Synonymy.**

*immaculipennis* Knull, 1935: 99.

*peninsularis* Hovore, 1988: 16. **New Synonymy.**

*limpianus* Skiles & Chemsak, 1982: 67.

*luteus* Dugés, 1879: 185.

*davisi* Knull, 1940: 558.

*lineatus* Knull, 1950: 91.

*metallicus* (Nonfried, 1894: 140). ***Incertae Sedis.***

*nigripennis* Bates, 1885: 318.

*pallidus* (Thomson, 1860: 255).

*alfredi* Dugés, 1879: 185.

*quadricostatus* Grzymala & Miller, 2009. **New Species.**

*rufipennis* (LeConte, 1884: 23).

*eros* Bates, 1885: 318.

*longipennis* Bates, 1885: 318.

*scabricollis* Bates, 1892: 172.

*similis* Chemsak & Linsley, 1965: 197.

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