



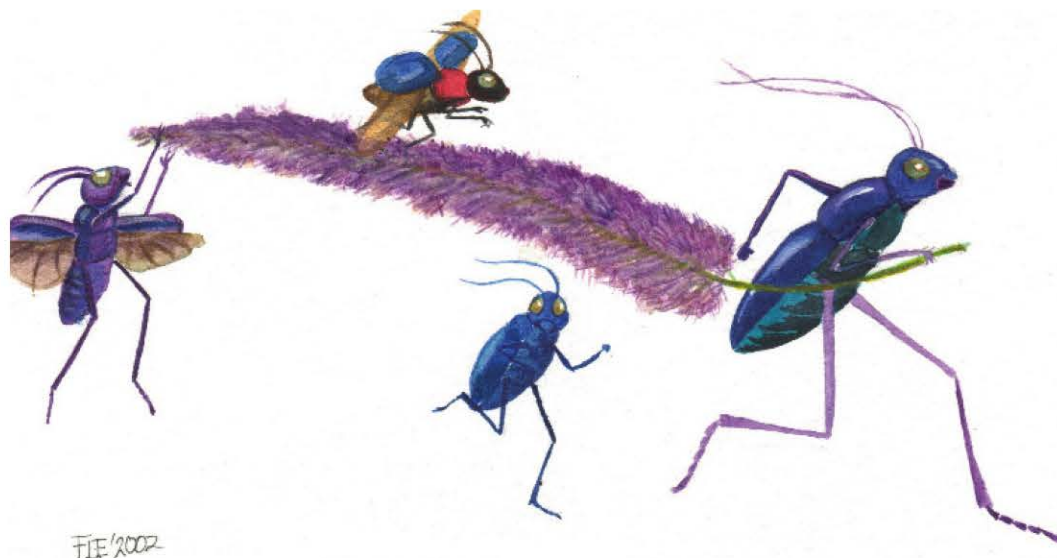
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The Western Hemisphere subgenus *Pinacodera* Schaum: *Cymindis* (*Pinacodera*) *latiuscula* subgroup (Coleoptera: Carabidae: Lebiini: *Cymindis* Latreille)

El subgénero *Pinacodera* Schaum del Hemisferio Oeste: Subgrupo *Cymindis* (*Pinacodera*) *latiuscula* (Coleoptera: Carabidae: Lebiini: *Cymindis* Latreille)

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ABSTRACT

A taxonomic treatment of the *latiuscula* species subgroup of subgenus *Pinacodera* Schaum, genus *Cymindis* Latreille with a key to species. Twelve species and two subspecies are treated, eleven (ten species, one subspecies) are described as new. One species, *C. punctifera* (LeConte), is re-ranked as a subspecies of *C. punctifera* (*sensu lato*).

Listed alphabetically are the species and subspecies: *Cymindis apache*, **new species** (Ramsey Canyon, Cochise County, Huachuca Mountains, Arizona, U.S.A.); *C. crenatoverpa*, **new species** (Volcán Cebohuco, Nayarit, México); *Cymindis cuyuteca* **new species** (Cuautla, Jalisco, México); *C. geminata*, **new species** (Cuernavaca, state of Morelos, México); *C. huichilobos*, **new species** (km 117, Oaxaca-Puerto Angel road, state of Oaxaca, México); *C. latiuscula* (Chaudoir) (Dzibilchaltun Archaeological Zone, ca. 16 km north of Mérida, Yucatán, México); *C. punctifera punctifera* LeConte, **new rank** (Madera Canyon, Santa Rita Mountains, Pima County, Arizona, U.S.A.); *C. punctifera toltec*, **new subspecies** (Mazatlán, Sinaloa, México); *C. rugofrons*, **new species** (19.5 km NW Los Volcánes, Jalisco, México); *C. tonatiuh*, **new species** (15 km SE Nochixtlán, Oaxaca, México); *C. yaqui*, **new species** (Cave Creek Canyon, S. Fork, Chiricahua Mts., Arizona, U.S.A.); *C. zacapa* **new species** (12-14 km S. San Lorenzo, Departamento Zacapa, Guatemala); and *C. zapotec* **new species** (San Gabriel Mixtepec, Oaxaca, México).

Cymindis punctifera (LeConte 1884), a junior synonym of *C. cribrata* (Chaudoir 1875), is the valid species name because the latter is a junior secondary homonym of *Cymindis cribrata* LeConte 1859 (= *C. pilosa* Say 1823).

Ecologically, the species of the *latiuscula* subgroup are geophile or arboreal mesophiles, occupying tropical wet and dry, oak-pine [lowland to montane], and cloud forests, to scrubby desert vegetation, their resting places are under bark or bromeliads.

These beetles are active in year-round, principally March to September. They may be found from sea level to 3060 m, with most found below 1800 m.

Key Words: Coleoptera, Carabidae, Lebiini, *Cymindis*, *Pinacodera*, taxonomy, biogeography.

RESUMEN

Se presenta una publicación taxonómica con claves dicotómicas a nivel de especies para el subgrupo de la especie *latiuscula* del subgénero *Pinacodera*, género *Cymindis* Latreille. La publicación se enfoca en 12 especies y dos subspecies; once (diez especies, una subspecie) son descritas como nuevas. Una especie, *C. punctifera* (LeConte), es reclasificada como subspecie de *C. punctifera* (*sensu lato*).

Las especies y subspecies, organizadas alfabéticamente, son: *Cymindis apache*, **nueva especie** (Cañón de Ramsey, Condado Cochise, Montaña Huachuca, Arizona, EE. UU.); *C. crenatoverpa*, **nueva especie** (Volcán Cebohuco, Nayarit, México); *C. cuyuteca*, **nueva especie** (Cuautla, Jalisco, México); *C. geminata*, **nueva especie** (Cuernavaca, Estado de Morelos, México); *C. huichilobos*, **nueva especie** (km 117, Carretera Oaxaca-Puerto Ángel, Estado de Oaxaca, México); *C. latiuscula* (Chaudoir) (Zona Arqueológica Dzibilchaltun, ca. 16 km al norte de Mérida, Estado de Yucatán, México); *C. punctifera punctifera* LeConte, **nuevo rango** (Cañón de Madera, Montañas de Santa Rita, Condado Pima, Arizona, EE.UU.); *C. punctifera toltec*, **nueva subspecie** (Mazatlán, Sinaloa, México); *C. rugofrons*, **nueva especie** (19.5 km al NO de Los Volcanes, Jalisco, México); *C. tonatiuh*, **nueva especie** (15 km al SE de Nochixtlán, Oaxaca, México); *C. yaqui*, **nueva especie** (Cañón de Cave Creek, S. Fork, Chiricahua Mts., Arizona, EE.UU.); *C. zacapa*, **nueva especie** (12-14 km al S de San Lorenzo, Departamento Zacapa, Guatemala); and *C. zapotec*, **nueva especie** (San Gabriel Mixtepec, Oaxaca, México).

Cymindis punctifera (LeConte 1884), un sinónimo menor de *C. cribrata* (Chaudoir 1875), es el nombre válido de la especie porque *C. cribrata* es homónimo secundario menor de *Cymindis cribrata* LeConte 1859 (= *C. pilosa* Say 1823).

Ecológicamente, las especies del subgrupo *latiuscula* son geófilas o mesófilas arbóreas, que ocupan vegetación de tipo tropical húmeda y seca, en robles y pinos de tierras bajas y montañosas, en bosque nuboso, hasta vegetación de arbustos desérticos; descansan debajo de corteza de árboles y bromelias.

Estos escarabajos son activos todo el año, principalmente desde marzo hasta septiembre. Se los puede encontrar desde nivel del mar hasta los 3060 m de altitud, y la mayoría se encuentra por debajo de los 1800 m de altitud.

Palabras clave: Coleoptera, Carabidae, Lebiini, *Cymindis*, *Pinacodera*, taxonomía, biogeografía.

This study, a taxonomic revision, is part of a more extensive project in which a revision of the entire subgenus *Pinacodera* Schaum is being undertaken. Ball and Hilchie (1983) redefined and reclassified the genera of cymindidine Lebiini, with the taxon *Pinacodera* placed as a subgenus of *Cymindis*. Examination of morphological features of

the subgenus showed that the species could be organized in probably monophyletic assemblages (Hunting 2013: 13-14), one of which is the *latiuscula* subgroup. Its members, collectively, comprise a characteristic element of the drier forests and desert margins of Nuclear Middle America Mexican Transition Zone (Halffter 1987) and southwestern

United States. The adults are of moderate size (standardized body length: 6.9–9.7 mm) with body color ranging from rufous to piceous and surface of pronotum and elytra densely punctate and setose. They are frequently collected at light and in bromeliads, in tropical latitudes.

This study includes a key to the species, and characterization of each taxon in terms of structural features, habitat, and geographical distribution. A geographical history correlates the distribution pattern with what is known of geological, physiographical, and climatic change in Nuclear Middle America during the latter part of the Tertiary Period.

MATERIALS AND METHODS

More than 2400 specimens of the *Cymindis latiuscula* subgroup were examined, representing 12 named species and 2 subspecies. Most specimens were borrowed, but some are represented in the Strickland Museum, University of Alberta (UASM). Listed below, with codens used in the text, are names and addresses of the lending institutions and owners or institutional curators. In the text, specimen numbers for each sex are listed, males first, followed by number of females preceding the institution coden.

- AMNH – American Museum of Natural History, Central Park West at 79 Street, New York, New York, U.S.A. 10024 (L. H. Herman).
- ANSP – Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, Pennsylvania, U.S.A. 19103 (D. Otte).
- CASC – Department of Entomology, California Academy of Sciences, 55 Music Concourse Drive, San Francisco, California, U.S.A. 94118 (D. H. Kavanaugh, retired).
- CDAE – California Department of Agriculture, Plant Pest Diagnostics, 3294 Meadowview Road, Sacramento, California, U.S.A. 95832 (C. Bellamy, deceased).
- CMNH – Carnegie Museum of Natural History, 440 Forbes Avenue, Pittsburg, Pennsylvania, U.S.A. 15213 (John Rawlins, Robert L. Davidson).
- CMNC – Canadian Museum of Nature Collection, P.O. Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4 (R. S. Anderson, F. Génier).
- CNCI – Canadian National Collection, Biosystematics and Research Institute, Agriculture Canada, K.W. Neatby Building, Ottawa, Ontario, Canada K1A 0C6 (Y. Bousquet).
- CNIN – Colección Nacional de Insectos, Instituto de Biología, Universidad Nacional Autónoma de México, Apdo. Postal 70-133, 04510 México, D.F., México (Santiago Zaragoza Caballero).
- CUNY – Insect Collection, Department of Entomology, Cornell University, 1 Hungerford Hill Road, Ithaca, New York, U.S.A. 14853 (J. K. Liebherr, R. Hoebeke retired).
- EMEC – Essig Museum of Entomology, University of California, Berkeley, 201 Wellman Hall, #3112, Berkeley, California, U.S.A. 94720-3112 (K. W. Will; C. B. Barr).
- FSCA – Museum of Entomology, Florida State Collection of Arthropods, 1911 SW 34th Street, Gainesville, Florida, U.S.A. 32608-1268 (M. C. Thomas retired, P. E. Skelley).
- FMNH – Field Museum of Natural History, 1400 S.

- Lakeshore Drive, Chicago, Illinois, U.S.A. (H. Dybas)
- GJHC – G. J. Hilchie collection, 10629-64 Avenue, Edmonton, Alberta, Canada, T6H 1T1.
- JEWC – J. E. Wappes collection, J.E. Wappes, 8734 Paisano Pass, San Antonio, Texas U.S.A. 78255.
- LACM – Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, California, U.S.A. 90007 (B. V. Brown).
- LSUC – Louisiana State University Collection, Louisiana State Arthropod Museum, Baton Rouge, Louisiana, U.S.A. 70803-1710 (C. E. Carlton).
- MAIC – M. A. Ivie insect collection, M. A. Ivie, Entomology Research Laboratory, Montana State University, Bozeman, Montana, U.S.A. 59717-3020.
- MCZC – Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, U.S.A. 02138 (P. Perkins, B. D. Farrell).
- MNHP – Entomologie, Museum National d’Histoire Naturelle, 45 Rue Buffon, Paris 75005, France (T. Deuve).
- MTEC – Montana State University Entomology Collection, Entomology Research Laboratory, Montana State University, Bozeman, Montana, U.S.A. 59717 (M. A. Ivie).
- OSUC – Department of Entomology, Ohio State University, Columbus, Ohio, U.S.A. 43210 (N. F. Johnson).
- PKLC – P. K. Lago collection, P. K. Lago, Department of Biology, University of Mississippi University, Mississippi, U.S.A. 38677.
- RFMC – R. F. Morris II, collection, 2635 Ewell Road, Lakeland, Florida, U.S.A. 33811.
- RHTC – R. H. Turnbow, Jr. collection, Robert H. Turnbow, Jr., 59 Brookview Ct., Enterprise, Alabama, U.S.A. 36330.
- TAMU – Department of Entomology, Texas A & M University, College Station, Texas, U.S.A. 77843 (E. G. Riley).
- UCRC – Entomology Research Museum, Department of Entomology, University of California, Riverside, California, U.S.A. 92521 (D. Yanega).
- UASM – E. H. Strickland Entomology Museum, Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada T6G 2E9 (F.A.H. Sperling, D. Shpeley).
- USNM – Department of Entomology, United States National Museum of Natural History, Smithsonian Institution, Washington, D.C. U.S.A. 20560 (T. L. Erwin).
- WSUP – Department of Entomology, Washington State University, Pullman, Washington, U.S.A., 99163 (R. S. Zack).
- ZMHB – Museum für Naturkunde der Humboldt-Universität zu Berlin, Invalidenstrasse 43, 10115 Berlin, Germany (M. Uhlig retired, F. Heike retired).

Taxonomic concepts, principles, criteria for ranking, and general working methods were the same as those described previously (Ball 1975, 1978; Allen and Ball 1980; Ball and Shpeley 2001).

Measurements: Characterization of the species employed a number of methods. One of these was standardized measurement of various body parts for comparative purposes. The measurements used in this paper are outlined

below:

Length of head (**HL**), measured on left side from base of left mandible to the posterior margin of the compound eye.

Pronotum length (**PL**), measured along the midline from anterior margin to basal margin.

Pronotum width (**PW**), maximum width of the pronotum.

Elytron length (**EL**), length of the longer elytron (if elytra of a single specimen were unequal) measured along the suture from the basal ridge to the apex.

Phallus, maximum length (**MLp**), maximum length from apex to base (Figure 2A).

Phallus, maximum width (**MWp**) maximum width measured near its middle (Figure 2A).

Phallus, maximum displacement, a measurement of curvature (**MDp**), maximum distance measured from a line connecting the apex and base to a point farthest from the line on the phallus, about midway, used as an index of curvature (Figure 2A).

Phallus, distal portion (**DPp**), maximum length of distal (preapical) portion of the phallus

Standardized body length (**SBL**), expressed as the sum of **HL + PL + EL**, is used as an index of overall size (Table 2). The ratio **PL/PW** (Table 3) indicates relative width of the pronotum; higher values indicate narrower, with lower values indicating broader. The phallic measurements, **MLp**, **MWp**, **MDp**, and **DPp** are recorded in Tables 4-7, respectively. The data in Tables 2-7 are sequenced according to mean values, from high to low. This places in juxtaposition the species most similar for the measurement in question.

Preparation of material. Studies of male genitalia involved removal of the organ (Lindroth 1969), examination, then preservation in glycerin and storage in microvials, pinned through the stopper beneath the specimen from which they were removed. Larger structures and those that were gold-coated for study with the Scanning Electron Microscope (SEM), were glued to cards pinned beneath the specimens from which they were removed.

Photographs of some isolated structures were taken with a JEOL JSM 6301 FXV field emission stereo electron microscope (SEM). Specimens were cleaned using a sonicator and were gold plated. Photographs (habitus and body parts) were taken with a Nikon Coolpix camera mounted on a Wild M5 stereo binocular microscope. The resulting images were stitched together using the image-handling program Automontage. Plates were prepared using Adobe Photoshop 7.0.

Measurements were made with a Wild M3C stereo binocular microscope at 16X, 25X and 40X. Line drawings of selected body parts were prepared by using a camera lucida on a Wild W5 stereoscopic microscope.

Recognition. Criteria for recognizing taxa were based primarily on differences in structural features. Habitat data and geographic distribution were used when appropriate.

Descriptions. To reduce repetition, character states of lower ranking taxa recorded in the descriptions of higher-ranking taxa are not repeated in the descriptions. Thus, the complete description of a species must be assembled

from its taxonomic placement. Such a description may be obtained by reading the descriptions and diagnoses of the sequence of higher-ranking taxa in which the lower-ranking taxon is placed.

Habitat, habits and seasonal occurrence. For each species, a section thus entitled summarizes the label data available, with "habitat" indicating primarily forest type and elevation. "Habits" summarize data about way of life. "Seasonal occurrence" indicates months of the year during which the specimens were collected.

Relationships. A general mental analysis for the *latiuscula* subgroup was done (Figure 32). Notes on relationships were made taking in account morphological similarity and geographical distribution.

Specific ranking. Species are clusters of morphologically similar adults, distinguished from other clusters by discontinuity in one or more structural features, with emphasis on form and structure of the phallus and/or gonocoxa. We expect that the discontinuity between morphologically similar clusters will be reflected in features of other life stages. Further, we expect that the clusters we recognize as distinct are reproductively isolated from each other. Expressed in the fashion of Hennig (1966), the tokogenetic relations that previously connected these clusters have been interrupted. Thus, we accept the (now) classical "biological" species definition, as formulated and defended over the years by Mayr (1942). See also Darlington (1980).

Subspecific ranking. Subspecific ranking is a contentious issue. Where does one draw the line between species and subspecies? For one species treated, we recognize two subspecies. Phenotypically, most individuals can be placed in one or the other taxon, but a few populations appear mixed to some extent. Differences in habitat preferences can be extrapolated from elevation data where known. For reasons of convenience, we follow Willis (1967) "If a subspecies reflects to some degree the actual pattern of variation, as well as being convenient 'handles' for reference, their value seems sufficient to justify their recognition."

Supraspecific ranking. We have adopted a broad generic concept to make this categorical level useful to a wide variety of biologists rather than restricting it, so that its value is limited to carabid specialists (Lindroth 1969: XVII). Thus, *Pinacodera* is treated as a subgenus of *Cymindis* (sensu lato) (Ball and Hilchie 1983: 149-154). Clusters of species of *Pinacodera* are evident, based on features that may be synapotypic, and are so postulated. To designate these putative monophyletic clusters, the taxonomically informal category used is species group.

Label data. For holotypes and lectotypes, the information on each label is reproduced as exactly as is possible using ordinary type. Information on each label is enclosed in quotation marks. As well, a double slash mark (//) marks the end of a label. A single slash mark (/) indicates the end of each line of text. Enclosed in square brackets is information about color of label paper (other than white) or

printing (other than black), and form of the label (other than rectangular).

For other material (including paratypes), we report in full the locality data, date of collection and collectors. Label data about habitat, habits and seasonal occurrence are reported in summary fashion for each species.

Terms

Structural features. - Most of the terms used to designate details of structures are found in textbooks of general entomology, or are used by coleopterists, generally. Other words, used to designate particular structures or parts thereof, are not in general use, though they have been used by one of us in previous publications (Ball 1975, 1978; Allen and Ball 1980; Ball and Shpeley 2002). We provide information about these words here, as well as names that have been changed for certain structural features.

Microsculpture. A “sculpticell” is the space on the surface of the cuticle enclosed by adjacent microlines of the integumental system of microsculpture (Allen and Ball 1980:485-486). Microsculpture in subgenus *Pinacodera*, overall, varies from mesh pattern isodiametric with sculpticells convex, to transverse with sculpticells flat. Emphasis is placed on description of microsculpture of the sclerites of the dorsal surface, which is adequate for characterization of the species of the *latiuscula* species subgroup.

Chaetotaxy. This term refers to the fixed setae, which are the long, evidently tactile setae, commonly encountered on carabids: dorsal labral; clypeal; supraorbital; stipital; submental; mental; glossal; palpigeral; pronotal; elytral parascutellar, discal, and umbilicate (or lateral); coxal, trochanteral, femoral, and tarsomeral; abdominal sternal ambulatory (sterna IV, V, VI); and abdominal sternal terminal (sternum VII, near posterior margin).

Body parts. —The term “segment” is restricted to those body parts that reflect embryonic somites; thus, somite-like portions of the abdomen are referred to as segments. Abdominal segments are designated by Roman numerals corresponding to their respective somites. The first complete sternum is III, and the last one normally exposed is VII. For numbering the genital somites, we follow Bills (1976).

Portions of appendages are designated by the suffix “-mere”, the prefix depending on the appendage in question: antenno-, palpo-, tarso-, etc.

Mandibles. Shpeley and Ball (2000:9-21, Figs. 6A-E) characterized the mandibles of the lebiine subtribe Pericalina, and illustrated the major features with SEM figures. We use here the same system.

Labium. The labium of *Pinacodera* in form is standard for Carabidae. For the combined glossae and paraglossae, we use the standard term ligula. The central sclerotized, apically setigerous structure is the glossal sclerite.

Pronotum. The pronotum is typical for *Cymindis*, (Figs. 3, 8A-8G and 9A-9I), covered by setae, moderately to more coarsely punctate, adjacent punctures not coalescing. Shape is somewhat various within and among species, from subquadrate (e.g. Fig. 8C) to more broadly expanded lateral margins (e.g. Fig. 8G).

Elytra. The elytra are typical in form for *Cymindis* with a single setigerous puncture at the base of stria 1, (Fig. 2C), many along or in the marginal striae with a single one near the apex (Figs. 2F, G, H). Form of the apex is various from

being slightly produced (acute, Fig. 2F), more obtuse (Fig. 2H) to more evenly rounded (Fig. 2G). All intervals are setose from base to apex.

Male tarsal vestiture. One type of adhesive vestiture on the ventral surface of the fore and middle tarsomeres is exhibited by *Pinacodera* males: biseriate squamo-setae (for illustrations, see Shpeley and Ball 2000: 30, Figs. 12A-C).

Male genitalia. The surface of the phallus treated by convention as dorsal is really the ventral surface, and vice versa (Deuve 1993:88). We have chosen to remain with the conventional usage. Phalli were classified as: anopic, with the ostium dorso-medial; left pleuropic-anopic, with the ostium laterad, but more toward the dorsal surface; and left pleuropic, with ostium more toward the ventral surface.

Phalli, exhibiting interspecific differences in form (e.g., Figs. 10 and 11), are illustrated in left lateral aspect, with the bases toward the left of the page. These differences are seen readily as overall patterns (‘Gestalt’) but are not so easily described, except with notation of differences in size and shape of the distal area. To provide the basis for verbal description, two principal regions are distinguished, the shaft and basal lobe (Fig. 2B) or phallobase. The latter is the swollen area set at an angle to the ventrally curved shaft, surrounding the basal opening. Three areas of the shaft are recognized: a more distal periostial area subtending the ostial membrane, which surrounds the ostium, marking the place of egress of the endophallus during copulation; a more proximal middle area extended from the base of the ostium to the basal lobe; and a preapex (or preapical, or distal) area extended distally from the apex of the ostial membrane to the apex of the phallus.

Ovipositor. For naming the sclerites of the aedeagus ovipositor, we follow the system used by Liebherr and Will (1998; see Figures 3-55), rather than persisting with the older system used by Shpeley and Ball (200:21). Comparing the systems, laterotergite = valvifer; gonocoxite 1 = stylomere 1; and gonocoxite 2 = stylomere 2. For the gonocoxites, the surfaces that are ventral in the retracted position are lateral when the ovipositor is extended; thus, such surfaces are designated as lateral, and the other surfaces are designated accordingly. Gonocoxite 2 is simplified, evidently by reduction (ensiform setae only two), (Liebherr and Will 1998).

Geographical terms. The term “Middle America” refers to México plus the republics of Central America, collectively. “Mesoamerica”, for some authors, is the equivalent of Middle America. For anthropologists, it has a more restricted meaning, and for this reason, Mesoamerica is not used here.

Biogeographical parts of Middle America are recognized following Marshall and Liebherr (2000): Starting in the northwest; Arizona, Sonoran Desert, Sierra Madre Occidental-Central Plateau, Sierra Madre Oriental, Sierra Transvolcanica, Sierra Madre del Sur, Chiapan Guatemalan Highlands and Talamancan Cordillera in the southeast.

Biogeographical terms. The following terms are used: *Nuclear Middle America*, which includes northern Nicaragua, the Central American republics to the north thereof (Honduras, El Salvador, Guatemala and Belize), and México; and *Lower Central America*, which includes the southern part of Nicaragua, Costa Rica, and Panamá. Lower Central America is a region, which, until the Pliocene Epoch, consisted of a series of isolated volcanic

islands. Nuclear Middle America includes two parts: *Nuclear Central America*, northern Nicaragua north to the Isthmus of Tehuantepec; and México, north of that isthmus, for which we have no other designation.

Phylogenetic terms. In place of sister group or sister taxon, we use “adelphotaxon” (Ax 1987:36), for reasons given by that author. In place of “plesiomorphic” and “apomorphic”, we use “plesiotypic” and “apotypic”, on the basis that the latter pair have a more general connotation than the former pair (Tuomikoski 1967).

Genus *Cymindis* Latreille, 1805

Subgenus *Pinacodera* Schaum, 1857: 294. **GENERITYPE:** *Cymindis limbata* Dejean, 1831: 32 (designated by Lindroth, 1969: 1067). – LeConte 1861: 24. – Chaudoir, 1875: 2. – Horn, 1881: 156. – 1882: 146. – LeConte and Horn, 1883: 45. – Bates, 1883: 187-188. – 1884: 296. – Blatchley, 1910: 142, 152. – Leng, 1920: 67. – Casey, 1920: 279. – Csiki, 1932: 1487. – Blackwelder, 1944, 62, - Jeannel, 1949: 878. – Ball, 1960: 161. – Lindroth, 1969: 1067-1070. – Erwin, Whitehead and Ball, 1977: 4, 58. – Ball, 1982: 517-518 – Ball and Hilchie, 1983: 139. – Bousquet and Laroche, 1993: 268. – Ciegler, 2000: 119. – Ball and Bousquet, 2001: 111. – Lorenz, 2005: 465-466. – Hunting, 2013: 13.

The taxonomic content of this genus was proposed by Ball and Hilchie (1983: 129-157) to include four subgenera: the Afrotropical-Oriental *Afrotarus* Jeannel 1949; the Oriental-southern Palearctic *Taridius* Chaudoir 1876; the Megagean *Cymindis* (*sensu stricto*); and the Western Hemisphere *Pinacodera* Schaum 1857. This arrangement, as reasonable as it seemed to us, was rejected by our European colleagues (Basilevsky 1984: 549; and Lorenz 2005: 465-469), who elected to rank these groups as genera, thereby maintaining an inflated generic concept within the subtribe Cymindidina and losing a taxonomic unity clearly indicated especially by the structural details of the ovipositor. Bousquet (2012) recognized two sub genera, *Tarulus* and *Pinacodera* (Table 1).¹

Recognition. As noted above, the genus *Cymindis* is represented in the Western Hemisphere by two subgenera: *Cymindis* (*sensu stricto*) and *Pinacodera*. Their ¹Bousquet, in his remarkable Catalogue (2012: 1284), “ for practical reason” also declined to accept the Ball-Hilchie proposal to re-rank the 14 supraspecific groups of *Cymindis* (*sensu stricto*) (Lorenz 2005: 465-470) as species groups, but recognized *Pinacodera* as a subgenus of *Cymindis* (*sensu lato*). Following Lindroth (1969: 1072-1073) Bousquet (2012) included the Nearctic species of *Cymindis* (except members of *Pinacodera* in the subgenus *Tarulus* (Bedel, 1906). We treat this assemblage as the *C. zargoides* species group of *Cymindis* (*sensu stricto*). We draw attention here to the classification of the South American genus *Leptosarcus* Peringuey. As noted and evidently accepted as correct by Bousquet (2012: 1284) this genus was placed by Lorenz (2005: 470) in the cymindidina. Previously, Ball and Hilchie (1983: 119) and Basilevsky (1984: 538) had placed it in the thyreopterine *Pericalina*. Superficially adults of this genus, in habitus and color, are cymindine-like (Ball and Hilchie 1983: 110, Fig. 26-28) but details of dorsal microsculpture, elytral setation, form of labrum and structure and setation of ovipositor gonocoxite 2 are characteristic of the *Pericalina*. We are satisfied that the latter placement is correct, with the cymindine features being either plesiotypic, or convergent.

geographical ranges overlap extensively in the Nearctic Region. For geographical distribution, see maps in Hunting (2013, p 4-5, Figs. 1-2). Adults of the two subgenera are not easily distinguished from one another. In general, adults of *Pinacodera* are flatter, with ventral surface of the head and proepisternum glabrous, these surfaces impunctate (most individuals) or very sparsely punctate, elytron with apical margin clearly sinuate (Figs. 2F, 2G, 2H), and tarsal claws with long pectinations. In contrast, adults of *Cymindis* (*sensu stricto*) have the body surface more densely setose (including ventral surface of head and proepisternum). Males of *Pinacodera* have fore and middle tarsomeres 1-4 expanded, tarsomeres 1-3 ventrally with adhesive biseriate squamo-setae, whereas males of *Cymindis* (*sensu stricto*) have only fore tarsomeres 1-3 expanded, with adhesive setae ventrally.

In areas where the ranges of the two subgenera overlap, *Pinacodera* adults have the metepisterna elongate, and most (but not all) are macropterous, whereas adults of *Cymindis* (*s. str.*) are brachypterous and the metepisterna are approximately quadrate.

Adults of *Pinacodera* resemble superficially (in form and rufopiceous color of the body) those of some species of *Plochionus* Dejean, *Calleida* Latreille and Dejean, and *Infernophilus* Larson. These genera are calleidines: the adults have essentially glabrous body integument, and tarsomere 4 glabrous. Further, only the fore tarsomeres of males have adhesive setae ventrally.

Description. Form and size. Body flat, moderately elongate. Size in mid-range for carabids, SBL *ca.* 6.5-10 mm.

Color. Somber (rufous to black), with dorsal surface of most specimens darker than ventral surface and appendages paler than body integument. Head concolorous. Pronotum with lateral areas paler than disc, or uniformly concolorous. Elytral epipleura of most specimens paler than dorsal surface. Antennae rufotestaceous to rufopiceous, with antennomere 1 (scape) of most specimens paler than antennomeres 2-11. Legs rufotestaceous to black, with femora of most specimens paler than other articles.

Microsculpture and luster. Mesh pattern in general isodiametric or transverse but sculpticells comparatively wide. Body surface either dull or shining, but not iridescent. Labrum: mesh pattern isodiametric. Clypeus: mesh pattern isodiametric to transverse, or microlines partially or totally effaced, surface smooth. Head capsule dorsally with mesh pattern isodiametric, microlines distinct or indistinct, or microlines partially to completely effaced. Pronotum: mesh pattern uniformly transverse, or isodiametric posteriolaterally, or microlines partially or completely effaced, surface smooth. Scutellum: shiny, microlines shallow, mesh pattern, isodiametric to transverse or obscured. Elytra: mesh pattern uniformly isodiametric. Thorax, ventral surface: prosternum and pterothorax with mesh pattern transverse, microlines evident, or partially or completely effaced; proepisternum with mesh pattern oblique, microlines partially to completely effaced. Abdominal sterna with mesh pattern transverse, microlines evident or partially to completely effaced.

Macrosculpture. Surfaces generally smooth, but head capsule dorsolaterally (*i.e.* beside and in front of eyes) with two to four or five irregular ridges and grooves more or less

distinctly developed. Frons and vertex smooth or variously punctate in most species; in specimens of some species, surface rugose, very coarsely, or densely punctate.

Chaetotaxy. Mostly standard for lebiine adults: clypeus, one pair; supraorbital setae, two pairs; mentum, one pair; pronotum two pairs lateral setae; elytra, each with two setae, in or near stria 3 (individually varying to one or three); umbilical series more or less continuous, about 20 setae; middle coxae each with lateral row of three to five setae; hind coxae each two setae; abdominal sterna III-VI each with one pair of ambulatory setae; sternum VII posteriorly with row of four to six setae in both sexes.

Punctures and cuticular setae ("hairs"). Head capsule various, with frons and vertex impunctate and glabrous to sparsely punctate and setose, setae long or short (Figs. 4-7). Antennomeres 1-3 either glabrous (except normal long preapical setae) or sparsely setose, setae short, antennomeres 4-11 dense, setose; pubescent. Pronotum glabrous and impunctate to moderately densely punctate, setae long or short. Prosternum punctate, with short setae; propleura and proepipleura glabrous, impunctate. Pterosterna punctate, with short setae; mesopleura impunctate, glabrous; metepisterna either impunctate, glabrous, or very sparsely punctate, with short setae. Legs: femora sparsely setose; tarsomeres dorsally either glabrous (except for single pair each of long, preapical setae), or sparsely setose. Tarsomere 5 with row of several long setae on each ventrolateral margin. Elytra with intervals impunctate and glabrous, or very sparsely punctate and glabrous, or setose, uniseriately punctate, or uniformly bi, or tri punctate, or biseriately punctate in basal half, uniseriately punctate or impunctate toward apex. Abdominal sterna II-VII with sparse vestiture of short setae, surface sparsely punctate.

Head. Form and proportions (Figs. 4, 5, 6) about standard for lebiine adults, eyes of most specimens markedly convex, but flattened in those of a few species; frontal impressions broad, shallow. Paragenae at minimum width much less than width of antennomere 2.

Antennae. Standard in form and length, for lebiine adults; antennomeres 4-11 filiform.

Mouthparts. Labrum standard in form and proportions. Mandibles (Ball and Hilchie, 1983: 140, Figs. 43A-D) trigonal, not explanate ventrolaterally, each with distinct scrobe on lateral surface; ventral surface glabrous, except row of rather short microtrichia in ventral groove; left mandible with long terebral area, occlusal surface with long terebral ridge, retinaculum edentate, retinacular ridge and molar areas short; right mandible dorsally with tumid area lateromedially on dorsal surface, occlusal surface with long terebral ridge, prominent retinacular area, small anterior retinacular tooth, and moderately well developed molar area. Maxillae (Ball and Hilchie 1983: 141, Fig. 45) with stipes and palpifer each with one lateral seta; Lacinia with patch of setae preapically; galea broad, galeomere 2 short, apical margin subtruncate; palpus with palpomere 4 subfusiform, apical margin truncate, though narrow. Labium (Ball and Hilchie 1983: 141, Fig. 46): mentum bisinuate anteriorly, with distinctly developed epilobes and tooth, latter either broad with truncate apex, or narrower with apex bluntly pointed; glossal sclerite with one pair of apical setae, paraglossae membranous, adnate along medial edge to glossal sclerite, apices extended beyond apex of latter; palpus sparsely setose, anterior margin of palpomere

2 with three or more setae.

Thorax. Pronotum (Figs. 3, 8, 9) (Lindroth 1969: 1068, Fig. 536) of most adults transverse to subquadrate, laterally explanate or not; lateral margins rounded, constricted evenly posteriorly, or sinuate; anterior margin slightly concave; posterior margin either subtruncate or slightly lobed medially; disc slightly convex, lateral margins more or less elevated; lateral bead indistinct in individuals of most species, moderately developed in few; posteriolateral angles right or slightly obtuse; median longitudinal and anterior transverse impressions fine, shallow. Proepipleura extended at about right angle from proepisternum if pronotum explanate, otherwise only slightly curved outward. Other propleural and prosternal sclerites standard, intercoxal process not margined apically.

Pterothorax. Metepisternum either longer than wide at base, or short, with lateral and anterior margins sub equal.

Elytra. Standard for adult lebiines, humeri broadly rounded, normally developed, or slightly constricted; apical margin subtruncate, more or less sinuate, apical angle at suture rounded (Fig. 2G), or more or less angulate, projected as small denticle (Figs. 2F and 2H). Surface flat; basal ridge complete, extended from humeral angle nearly to scutellum; striae shallow, finely punctate, either complete or broken into series of linear punctures; parascutellar stria joined or not to stria 1; intervals flat, or slightly but obviously convex. Elytral epipleuron standard for lebiines, not explanate.

Hind wings. Normally developed with narrow, elongate wedge and oblongum cells, or variously reduced.

Legs. Standard for lebiines; middle and hind tibiae canalicate on dorsal (posterior) surface; fore tibia similarly canalicate or not. Male with fore and middle tarsomeres 1-4 ventrally with biseriately squamo-setae. Tarsal claws pectinate.

Abdomen. Sterna II-VII standard for carabids; sternum VII with apical margin evenly rounded, of similar shape in both sexes.

Male genitalia. Phallus more or less tubular, anopic; more or less straight or curved, basal area with or without prominent projection on left side; apical portion either short or variously elongate, broad and flat or cylindrical; dorsally with or without ridge and denticle. Endophallus with or without apical C-shaped sclerite (as in males of *Cymindis* (*s. str.*)), preapical microtrichia patches, or medial spine patches. Parameres typical for lebiomorphs, both asetose; - left larger, conch-like, right smaller, violin-like.

Female genitalia and associated sclerites. (cf. Figs. 76A-C, in Ball and Hilchie 1983: 152). Segment VIII with tergum and sternum divided into two parts: each hemitergite with pronounced apodeme and associated ridge; each hemisternite with short broad apodeme and small fenestra. Tergum X transverse narrow. Ovipositor with transverse, narrow, asetose laterotergite; gonocoxites 1 and 2 present, gonocoxite 2 (Figs. 12 and 13) with base narrow, apex various, broadly rounded to acutely pointed, with two ensiform setae, one on ventral margin, and one on dorsal margin; preapical setose organ with nematiform setae short.

Immature stages. See Mahar (1978) for description of the larvae and pupae of *C. platicollis*. Otherwise, immatures are unknown.

Included taxa. This subgenus contains 32 species.

Habitat and Activity. Habitats include forests of

various types (tropical wet and dry, oak and pine [lowland to montane], and cloud forest) and scrubby desert vegetation. Many species appear to be arboreal, as indicated by adults collected from bromeliads and squirrel nests, and from under bark on standing tree trunks, while others seem to be geophile inhabitants of leaf litter. Some species seem to be both arboreal and geophile. Elevational range extends from sea level to 3060 m. Activity seems to be principally nocturnal, with many adults collected at night using liquid baits painted on tree trunks. Flight is also nocturnal, as indicated by catches of many specimens in light traps.

Geographical distribution. The range of subgenus *Pinacodera* extends through Middle America, from Panamá to northern México, southwestern USA, and in the east to southeastern Canada (Lindroth 1969: 1067-1069, Hunting 2013: 3, Fig. 2).

Table 1. Classification of the *Cymindis* subgenus *Pinacodera*

Family Carabidae; subfamily, Lebiinae; tribe Lebiini;
Genus *Cymindis*;
Subgenus *Pinacodera*

- C. limbata* group (revised by Hunting 2013)
 - C. limbata* subgroup
 - C. complanata* Dejean
 - C. limbata* Dejean
 - C. rufostigma* Hunting
 - C. platicollis platicollis* (Say)
 - C. platicollis atripennis* (Casey)
 - C. punctigera* subgroup
 - C. punctigera punctigera* LeConte
 - C. punctigera sulcipennis* (Horn)
 - C. chevrolati* subgroup
 - C. chevrolati* Dejean
 - C. laevior* (Bates)
 - C. ruficornis* (Bates)
- C. latiuscula* group
 - C. latiuscula* subgroup (this manuscript)
 - C. apache* **new species**
 - C. crenatoverpa* **new species**
 - C. cuyuteca* **new species**
 - C. geminata* **new species**
 - C. huichilobos* **new species**
 - C. latiuscula* (Chaudoir)
 - C. punctifera punctifera* (LeConte)
 - C. punctifera toltec* **new subspecies**
 - C. rugofrons* **new species**
 - C. tonatiuh* **new species**
 - C. yaqui* **new species**
 - C. zacapa* **new species**
 - C. zapotec* **new species**
 - C. chalcea* subgroup
 - C. chalcea*
 - C. basipunctata* subgroup
 - C. basipunctata*
 - several undescribed species
 - C. tacanamera* subgroup
 - C. tacanamera*
 - many undescribed species

Key to Western Hemisphere subgenera of *Cymindis* Latreille and to the species groups and subgroups of subgenus *Pinacodera* Schaum, based on characters of adults (from Hunting 2013:14)

1. Middle and hind tarsomeres dorsally with six or more setae. Hind femur, anterior surface (ventral in pinned specimens) ventrad with row of three or more long setae. Male middle tarsi without biseriate adhesive setae ventrally; fore tarsomeres 1-3 with biseriate adhesive setae ventrally. subgenus *Cymindis* (*s. str.*) 1' (2). Middle and hind tarsomeres dorsally with four or fewer setae. Hind femur, anterior surface ventrad, with two long setae. Male middle tarsomeres 1-3 with biseriate adhesive setae ventrally; fore tarsomeres 1-4 with biseriate adhesive setae ventrally subgenus *Pinacodera* 2
- 2 (1'). Elytra densely, uniformly punctate and setose, concolorous, rufopiceous *Cymindis* (*Pinacodera*) *latiuscula* subgroup
- 2'. Elytra glabrous to densely setose, punctures sparse to dense, or not evenly distributed, color various, with or without metallic sheen 3
- 3 (2'). Elytra with shallow depression posteriad, extended from suture to interval 5. Brachypterous, metepisternum nearly quadrate *Cymindis* (*Pinacodera*) *tacanamera* subgroup
- 3'. Elytra in posterior one third plane, without shallow depression. Macropterous or brachypterous, with metepisternum distinctly longer than wide at base 4
- 4 (3'). Legs with femora and tibiae rufo-piceous to black *Cymindis* (*Pinacodera*) *limbata* group (in part) *C. chevrolati* complex
- 4'. Legs rufous to rufo-testaceous 5
- 5 (4'). Elytra metallic green, intervals rather densely and evenly punctate throughout *Cymindis* (*Pinacodera*) *chalcea* subgroup
- 5'. Elytra rufous to piceous in color, not metallic 6
- 6 (5'). Elytra basally with intervals moderately densely punctate, but apicad less dense, and impunctate on apical declivity ... *Cymindis* (*Pinacodera*) *basipunctata* subgroup
- 6'. Elytra with intervals moderately densely punctate to sparsely punctate, but apical declivity impunctate to punctate *Cymindis* (*Pinacodera*) *limbata* group (in part)

***Cymindis latiuscula* species subgroup**

Recognition. Adults of the *C. latiuscula* subgroup exhibit moderately dense punctation evenly distributed over the pronotum (Fig. 3) and elytral intervals (Fig. 2C). The dorsal surface of the body is unicolorous, ranging from rufous (most species) to piceous, with ventral surface somewhat paler, and the appendages paler still, in most species testaceous, and non-metallic in luster. The head macrosculpture varies from relatively smooth with few setigerous punctures to markedly rugose and quite densely setose, especially along the lateral margins of the frons and vertex. All species are macropterous.

Description. The subgroup is uniform in general body form and size. Sculpture of the head and shape of

the pronotum are useful for recognition of some species. The greatest variation observed was in the structure of the phallus of the males. Variation was present in the form of the female gonocoxa, but not to the degree seen in male genitalia.

Immature stages. Unknown.

Geographical distribution. The range of the *latiuscula* species subgroup extends from Neotropical Costa Rica northward through Middle America to southwestern Nearctic USA. Center of diversity appears to be southern México north of the Isthmus of Tehuantepec, with a secondary center south of the Isthmus, and another in Arizona and northern México.

Key to the species of the *latiuscula* species subgroup, based on characters of adults

1. Abdominal sternum VII with four setae (Fig. 2D). Head with frons impunctate, finely punctured or with few scattered larger punctures (Figs. 4A-E, 5A-C, and 5E-F, 6A-G, 7A-C, and E-H) 2
 - 1'. Abdominal sternum VII with six setae (Fig. 2E). Head with frons coarsely punctate, many punctures anastomosing in form of shallow grooves laterally (Figs. 5D, 7D). Pronotum (Fig. 9D), Phallus (Figs. 11F, 11G). Gonocoxa (Fig. 13B) *Cymindis rugofrons*, **new species**
 - 2 (1). Elytron with apex at suture rounded, obtuse, (equal to or greater than 90°) (Figs. 2G, 2H) 3
 - 2'. Elytron with apex angulate, produced, more acute (Fig. 2F). Phallus (Fig. 11H). Gonocoxa (Fig. 13C). Head (Figs. 5E, 7E). Pronotum (Fig. 9E) *Cymindis tonatiuh*, **new species**
 3. (2) Locality of collection, north of 23° north latitude and/or west of 103° west longitude (northern and western México, and southern U.S.A.), arid to semi arid habitat. Frons punctate or not 4
 - 3'. Locality of collection, south of 23° north latitude (southern and eastern México, and north of Panama), tropical, subtropical, cloud and oak pine forests. Frons impunctate, finely punctured or with few scattered larger punctures 6
 - 4 (3). Elytral apical margin more broadly rounded (Fig. 2G). Phallus shorter, 1.5 - 2.3 mm, preapex spatulate or rounded (Figs. 10A, 10B 11A, 11B) 5
 - 4'. Apex of elytron close to 90° to slightly obtuse (Fig. 2H). Phallus long, 2.3 - 2.5 mm, preapex slightly flattened (Figs. 11I, 11J, 11K). Gonocoxa (Fig. 13D), Arizona, northern México. Head (Figs. 5F, 7F). Pronotum (Fig. 9F) *Cymindis yaqui*, **new species**
- 5 (4). Smaller, SBL of males less than 7.4 mm, females less than 7.9 mm. Phallus short, 1.5 - 1.9 mm, with slightly rounded preapical portion (Figs. 11A, 11B). Gonocoxa (Fig. 12F). Northern and western México, and southwestern U.S.A. Head (Figs. 5A, 7A). Pronotum (Fig. 9A) *Cymindis punctifera punctifera*, (LeConte), **new rank**
- 5'. Size larger, SBL of males more than 7.6 mm; of females more than 8.1 mm. Phallus long, 2.0 - 2.3 mm, apex broadly spatulate (Figs. 10A, 10B). Gonocoxa (Fig. 12A). Northern México and Arizona. Head (Figs. 4A, 6A). Pronotum (Fig. 8A) *Cymindis apache*, **new species**
- 6 (3'). Head with frons impunctate, or with fine aetose punctures, vertex with few shallow punctures (Figs. 4D, 5B, 5C, 7F, 7G) 7
 - 6'. Head with frons with punctures setose, vertex with punctures more numerous and deeper (Figs. 4B-D, 4F), pronotum (Figs. 8B-D) usually less transverse, PL/PW ratio less than 0.67 10
 - 7 (6). Head with frontoclypeal suture more or less straight, frons with few scattered punctures. Phallus with preapex rounded, not hooked ventrad. México 8
 - 7'. Head, frontoclypeal suture arcuate, frons with very fine punctures bordered halfway to the eyes with a shallow transverse sulcus. Head macrosculpture (Fig. 7G) irregular shallow impressions. Phallus preapex sharply hooked ventrad (Figs. 11L, 11M), endophallus with microtrichial patches. Gonocoxa 2, shaft sub-parallel (Fig. 13E). Pronotum broad, PL/PW ratio 0.63-0.66, (Fig. 9G). Costa Rica, Guatemala, Honduras. *Cymindis zacapa*, **new species**
 - 8 (7). Head shiny, more or less devoid of microlines, more elongate in appearance, few setose punctures on vertex (Figs. 7H, 7I), pronotum less transverse, PL/PW ratios 0.70-0.74 (Fig. 9H, 9I). Gonocoxa 2, apex sickle-like (Fig. 13F) *Cymindis zapotec*, **new species**
 - 8'. Head dull, microsculpture mesh pattern isodiametric, wider in appearance (Figs. 7B, 7C), pronotum more transverse PL/PW ratios 0.63 - 0.72 (Figs. 8F, 8G, 9B) 9
 - 9 (8') Phallus more markedly curved (displacement 0.78, 0.75 - 0.80 mm), apex with a distinctive bend (Figs. 10L, 10M). Gonocoxa 2, not sharply curved (Fig. 12E). Head (Figs. 6F, 6G). Pronotum (Figs. 8F, 8G). Tropical lowland (to 1400 m, mean 616 m), Yucatan Peninsula *Cymindis latiuscula* (Chaudoir), in part
 - 9'. Phallus straighter (displacement 0.65, 0.54 - 0.74 mm), preapex with a less pronounced bend (Figs. 11C-E). Gonocoxa 2, stout, not sharply curved (Fig. 13A). Head (Figs. 5B, 7B, 7C). Pronotum (Fig. 9B, 9C). México, widespread, to 2560 m *Cymindis punctifera toltec* **new subspecies**
 - 10 (6'). Males, phallus longer than 1.9 mm, SBL more than 8.5 mm. Females larger, SBL more than 9 mm..... 11
 - 10'. Males, phallus shorter than 1.9 mm. SBL less than 8.1 mm. Female SBL less than 8.25 mm. Gonocoxa 2, apex sickle like (Figs. 12B, 12C) 12
 - 11 (10). Male, phallus preapex straight, short, less than 0.20 mm, overall form strongly arched (Fig. 10G), Head (Fig. 6C). Pronotum (Fig. 8C) (uplands, cloud forest) (female not known) *Cymindis cuyuteca* **new species**
 - 11' Males, phallus with preapical portion hooked down, longer than 0.20 mm (Fig. 10K). Gonocoxa 2, parallel sided, apex spatulate (Fig. 12D). Head (Figs. 6E). Pronotum (Fig. 8E). Pacific Coastal lowland, Oaxaca *Cymindis huichilobos*, **new species**

12 (10'). Phallus with lateral notch preapically (Figs. 10C, 10F). SBL of male greater than 7.5 mm. Gonocoxa (Fig. 12B). Head (Figs. 4B, 6B). Pronotum (Fig. 8B) *Cymindis crenatoverpa*, **new species**
 12'. Phallus without notch, preapical portion slightly flattened (Fig. 10H), SBL of male less than 6.8 mm, of female less than 7.4 mm. Gonocoxa (Fig. 12C). Head (Figs. 4C, 6D). Pronotum (Fig. 8D). Body shorter, SBL less than 7.8 mm *Cymindis geminata*, **new species**

***Cymindis* (*Pinacodera*) *apache*, Hilchie & Ball, new species**

(Figs. 2G, 4A, 6A, 8A, 10A, 10B, 12A, 14, 29, 31
<http://zoobank.org/A78D8A96-AC91-463C-8BF5-3A0DC6094E4>

Type material. HOLOTYPE: Male: U.S.A., Arizona “// Ramsey Canyon / Huachuca / Mts. / Ariz. W H Mann // W M Mann 1954 / collection // (USNM)

PARATYPES, 461: **MÉXICO. Chihuahua:** 19.9 km N, Ejido Zaragoza, 2310 m, oak-pine for. (damp), 79-82, 24.VII.1979, J.S. Ashe, G.E. Ball, D. Shpeley, 1F (UASM); 13.3 km E, El Vergel, oak-pine, arroyo, litter, 2650 m, 83-26, 12.VII.1983, H.E. Frania, R. Jaagumagi, D. Shpeley, 1M (UASM); 48.1 km N, Madera, 2030 m, oak-pine arroyo litter, 83-25, 9.VII.1983, H.E. Frania, R.J. Jaagumagi, D. Shpeley, 1F (UASM); 48.1 km N, Madera, 2480 m, oak-pine forest litter, 83-26, 9.VII.1983, H.E. Frania, R.J. Jaagumagi, D. Shpeley, 2M, 1F (UASM); 28.3 km E, Mesa de Tres Rios, Sonora, 2160 m, oak-pine forest, arroyo, 83-19, 7.VII.1983, H.E. Frania, R. Jaagumagi, D. Shpeley, 1M (UASM); Rio Negro, 48.8 km E, Mesa de Tres Rios, Sonora, 1790 m, UV light, 83-24, 8.VII.1983, H.E. Frania, R. Jaagumagi, D. Shpeley, 1F (UASM); 9.7 km S, Yecora (Sonora), 1750 m, 2-3.VII.1990, S. McCleve, 2F (UASM). **Sonora:** El Aserradero, 24.0 km (by air) WSW Fronteros, Sierra Buenos Aires, Ajos-Bavispe Res., 30.77694°N, 109.8136°W, rocky mountainside, oak woodland with pines, 1702 m, 14.VIII.2016, T.R. Van Devender, J.D. Palting, 1F (UASM); 2 km N, Mesa de Tres Rios, 1950 m, oak-pine forest, UV light, 83-17, 6.VII.1983, H.E. Frania, R. Jaagumagi, D. Shpeley, 1M, 1F (UASM); 4.5 km N, Mesa de Tres Rios, 1950 m, UV light, 5.VII.1983, 83-11, H.E. Frania, R. Jaagumagi, D. Shpeley colls., 2F (UASM); 4.5 km N, Mesa de Tres Rios, 1950 m, oak-pine forest, 6.VII.1983, 83-12, H.E. Frania, R. Jaagumagi, D. Shpeley colls., 2F (UASM); Mina Puertecitos, ca. 9.5 km (by air) WNW Cananea, Sierra Elenita, 30.11278°N, 110.39°W, Rocky ridge top, pine oak forest 1942 m 30.IV.2016, T.R. Van Devender, J.D. Palting, 1M, 1F (UASM); Mt. Huachinera, Rancho Madroño, 2200 m, at light, 25.V.1981, S. McCleve, 3M (UASM); Sierra Huachinera, 22.1 km SE, Huachinera, 2090 m, oak-pine forest, 82-05, 3-4.VIII.1982, G.E. & K.E. Ball, S. McCleve, 2F (UASM); Rancho el Tigre, N of Mina el Tigre, Sierra el Tigre, camp, 30.58944°N, 109.20722°W, 28.3 km (by air) WNW Bavispe, pine-oak forest, 2297 m, 10.VIII.2015, T.R. Van Devender, A.L. Reina-G., J.D. Palting, 1M, 1F (UASM); Rancho el Tigre, just N of Mina el Tigre, Sierra el Tigre, 30.57667°N, 109.2683°W, 29.0 km (by air) WNW Bavispe, pine-oak forest, 2297 m, 25.VI.2015, T.R. Van Devender, A.L. Reina-G., 2M, 5F (UASM); Sierra Buenos Aires, 30.72668°N, 109.82116°W, rocky mountainside oak

woodland with pine, Hg vapor light, 1707 m, 16.VIII.2016, D. Shpeley 01-16, 1M (UASM); Sierra Huachinera, 32-34 km NE, Nacori Chico, 1950 m, oak-pine forest, 82-10, 6-7.VIII.1982, G.E. & K.E. Ball, S. McCleve, 1M, 1F (UASM); Sierra Huachinera, Arroyo NE, Cocono, 86.2 km NE, Nacori Chico, 1660 m, riparian forest, 82-11, 7-8.VIII.1982, G.E. & K.E. Ball, S. McCleve 1M (UASM); Sierra Juriquipo, Rancho La Zulema, 15.9 km (by air) SE Nacozanide Garcia, 30.28389°N, 109.56028°W, rocky mountainside, oak woodland, 1687 m, 15.VIII.2017, T.R. Van Devender, J.D. Palting, 1F (UASM); Sierra El Tigre, 30.58988°N, 109.20811°W, Camp large flat area, pine oak forest, at night head lamping on ground, 2261 m, 12.VIII.2015, 11-15, 2M, 2F (UASM); Yecora, 20-22.V.1961, Gibson, Howden, Martin 1M (CNCI); 6.4 km NE, Yecora, rd. to Maycoba, 1547 m, UV, 30.VI-1.VII.1990, S. McCleve, 1M, 1F (UASM); 11.6 km NW, Yecora, 1646 m, 7-11.VIII.1990, P. & E. Jump, 2M (UASM); 11.6 km NW, Yecora, 1646 m, UV, 28-29.VI.1990, S. McCleve, 1M, 2F (UASM). **U.S.A. Arizona: Cochise County:** Bisbee, 19.VIII.1967, R.F. Sternitzky 1M, (CNCI); Charleston, 1340 m, 16.V.1968, R.F. Sternitzky, 1F (CNCI); *Chiricahua Mountains*, 1830 m, 29.VI.1968, [K.P. Stephan] 1M (TAMU); *Chiricahua Mountains*, Cave Creek Canyon, 1530 m, 4.VIII.1986, W.T. Lanier, 1M (MTEC), Cave Creek Canyon, UV, 5.VIII.1986, D.R. Corr, 1M (MTEC), Cave Creek Canyon, 20.VII.1968, D.E. Bright, 1F (CNCI), Cave Creek Canyon, 4 km W, Portal, 1590 m, UV, 21-22.VIII.1981, J.K. Liebherr, 1F (CUIC), Cave Creek Canyon, near Portal, UV light, 1570 m, 5.VIII.2003, E.G. Riley, 1F (TAMU); *Chiricahua Mountains*, Cave Creek Canyon, South Fork, UV, J. Stibick, (USNM) - (evening, Lot No. 135, 9.VII.1964, 1M; 8-9 PM, Lot No. 136, 10.VII. 1964, 1M, 1F; 1620 m, Lot No. 140, 11.VII.1964, 1M; 8-9:30 pm, Lot No. 163, 18.VII.1964, 1M); *Chiricahua Mountains*, Cave Creek, South Fork, UV, 6.VIII.1986, B.J. Johnson, 2F (MTEC); *Chiricahua Mountains*, [Cave Creek], South Fork Canyon, Lot. No. 824, 13.VII.1964, R.H. Arnett, Jr., E.R. Van Tassel, 2M (FSCA); *Chiricahua Mountains*, Fly's Peak, 2900 m, 9.VII.1927, J.A. Kusche, Van Dyke Collection, 3M (CASC); *Chiricahua Mountains*, Herb Martyr Camp, 10 km. SW Portal, 1700 m, riparian forest, ex f.i.t., S&JP 2000-17, 9.V.2000, S. & J. Peck 2M, 4F (CMNC); same, except S&JP 2000-24, 20.V-5.VI.2000, 2M, 2F (CMNC); *Chiricahua Mountains*, Onion Saddle Road at East Turkey Creek, 1960 m, pine-oak forest, UV, 6.VII.1966, R.C. Beard, 2F (CUIC); Onion Saddle, 2320 m, pine-oak forest, UV, 7.VII.1966, R.C. Beard, 1M, (CUIC); *Chiricahua Mountains*, Portal, 24.VI.1967, J.W. Tilden, 1F (USNM), Portal, 22.VI.1966, D. Larson, W. Sharp, 1F (UASM), Portal, 26.VII.1965, W. Rosenberg, 1F (USNM); nr. Portal, at light, 16.VI.1973, S. McCleve, 1M (UASM); nr. Portal, 28.VII-7.VIII.1968, 1F (TAMU); *Chiricahua Mountains*, Rucker Canyon, 21.VII.1968, D.E. Bright, 1F (CNCI), Rucker Canyon, 1730 m, Loc. 29, 22.VII. 1976, G.E. Ball, J.M. Campbell, P.M. Hammond, 1F (UASM); *Chiricahua Mountains*, Southwestern Research Station, near Portal, R. Rosenberg (USNM), — (9.VII.1964, 1M; 10.VIII.1973, 1M; 23.VIII.1973, 1M; 24.VII.1977, 1F; 27.VIII.1973, 1F; 16.VIII.1977, 1F; 18.VIII.1977, 1F; 22.VII.1977, 1F; 24.VIII.1977, 1M, 1F; 3.IX.1977, 1F; 4.IX.1977, 1F); near Southwestern Research Station, near Portal, 1675 m, 4.VIII.2003, E. Riley, 2F (TAMU);

Southwestern Research Station, Lot No. 289, 14-22.VII.1957, R.H. Arnett, Jr., 1F (FSCA); *Chiricahua Mountains*, Stewart Camp, 1.6 km S, Portal, UV, 18-20.VIII.1971, J.T. Doyen, 1F (EMEC); *Chiricahua Mountains*, Southwestern Research Station, 8 km SW Portal, at lights, 1645 m, 16-22.VIII.2000, M.J. Yoder, 1M (TAMU); *Chiricahua Mountains*, East Turkey Creek, 1960 m, pine-oak forest, UV, 10.VII.1966, R.G. Beard, 2M, 1F (CUIC); East Turkey Creek, 29.VIII.1967, R.G. Beard, 1F (CUIC); *Dragoon Mountains*, Cochise Stronghold, 22.VII.1985, P.K. Lago, 1M, 2F (PKLC); Cochise Stronghold, 1410 m, 6.X.1965, L. & C.W. O'Brien, blacklight trap, 1M, 1F (USNM); Cochise Stronghold, 12.VII.1978, G.J. Hilchie, 2M, 1F (GJHC); *Huachuca Mountains*, Ash Canyon, 20.VIII.1968, R.F. Sternitzky, 1M (CNCI), Ash Canyon, 24.VII.1968, D.E. Bright, 1M (CNCI); *Huachuca Mountains*: Cave Canyon, 11.VI.1968, Flint, Menke, 1M (USNM); *Huachuca Mountains*: E, slope, pine-oak forest, 1760 m, Loc. 26, 20.VII.1976, J. M. Campbell, G. E. Ball, P.M. Hammond, 3M, 3F (UASM); "Huachuca Mts.", Acc. No. 5409, Coll. Chas. Palm, 1F (AMNH); Miller Canyon: 1530 m, 1.VII.1969, R.F. Sternitzky, 1M (CNCI); 1770 m, 11.VII.1974, E.E. Hoebeke, 6F (CUIC); 1.VII.1907, H.A. Kaeber, 1M (USNM); 4.VII.1974, T.L. McCabe, 1F (CUIC); 8.VII.1974, T.L. McCabe, 2F (CUIC); 22.VII.1974, T.L. McCabe, 1F (CUIC); 1680 m, 21.VII.1985, A.E. Zuccaro, Jr., 1F (PKLC); Ramsey Canyon, 24 km S, Sierra Vista, 1830 m, R.F. Sternitzky (CNCI) — (15.III.1964, 1M; 15.IV.1964, 1F; 19.VI.1964, 1M; 14.VII.1964, 1F; 20.VIII.1964, 1M; 23.X.1966, 1F; 13.V.1967, 2M, 2F; 17.VI.1967, 1M, 1F; 29.VI.1967, 1M, 11.VII.1967, 1F; 16.VII.1967, 2M, 3F; 18.VII.1967, 1M, 2F; 20.VII.1967, 1M; 22.VII.1967, 2M, 1F; 7.IV.1968, 2M [endophallus w/ spermatophore], 6F; 18.IV.1968, 1F; 29.IV.1968, 2M; IV-V.1968, 3M, 1F; 22.V.1968, 1F; 29.V.1968, 1F; VI.1968, 1M, 4F; VII.1968, 10 M, 3F; VIII.1968, 4M, 15F; 11.VIII.1968, 3M, 2F; IX.1968, 3M, 10F; 3.IX.1968, 1M, 2F; 21.X.1968, 1M; 9.VII.1969, 2M); Sierra Vista, R. F. Sternitzky (CNCI) — (7.III.1964, 2M, 2F; V.1965, 1F; 1-20.X.1965, 2M; "1966", 1M; 14.VI.1967, 1M; 16.VI.1967, 6M, 5F; 20.VI.1967, 3M, 1F; 24.VI.1967, 5F; 25.VI.1967, 2F; 8.VII.1967, 1M, 1F; 20-31.VII.1967, 2M, 1F; 25.VII.1967, 2M, 13F; IX.1967, 6M, 4F; X.1967, 12M, 4F); Fort Huachuca, Blacktail Canyon Road, UV light, 2172 m, 12-14.IX.1995, Cate, Quinn, 1F (TAMU). *Graham County: Pinaleño Mountains*, Wet Canyon, 15.2 km W, Hwy 666 on Hwy 366, 23.VII.1985, A.E. Zuccaro, Jr., 3M, 3F (PKLC); [*Pinaleño Mountains*], Mt. Graham, Wet Canyon, 15 km SW Safford, 1800 m, ex f.i.t., S&JP 2000-11, 6.V-6.VI.2000, S. & J. Peck, 1F (CMNC). *Pima County: Green Valley*, VI.1973, Lenczy, 1M, 1F (OSUC); *Santa Catalina Mountains*, Bear Canyon, K.P. Stephan (TAMU) — (6.VII.1968, 1F; 25.VII.1969, 1M, 1F; 22.VI.1970, 1M; 30.VII.1970, 1M, 1F); Madera Canyon, 13.VI.1965, R.W. Poole, 2F (CUIC). *Santa Cruz County: Pajarito Mountains*, Peña Blanca Lake, 20.VII.1985, P.K. Lago, 2F (PKLC); *Santa Rita Mountains*, Madera Canyon, 7-30.VIII.1947, 1M (EMEC); Madera Canyon, 1900 m, 1-2.VIII.1952, H.B. Leech, J.W. Green, 1M (CASC); Madera Canyon, 16.VII.1956, A.E. Lewis, 1M (UCRC); Madera Canyon, J.G. Franclemont, (CUIC) — (30.VI.1959, 3F; 1.VII.1959, 1F; 2.VII.1959, 1F; 4.VII.1959, 2F; 20.VII.1959, 1F); Madera Canyon, [UV light], 3.VIII.1960, 1530-1770 m,

G.E. Ball family, and R.B. Madge, 2F (UASM); Madera Canyon, J.D. Marshall, (CUIC) — (1490 m, 5.VI.1963, 1F; 1490 m, 10.VI.1963, 3F; 1710 m, 10.VI.1963, 2M, 3F; 11.VI.1963, 2M [1 w/ spermatophore in endophallus] 5F; 1490 m, 12.VI.1963, 1M, 1F; 1490 m, 1710 m, 14.VI.1963, 3M, 3F; 1710 m, 15.VI.1963, 1M, 1F; 1490 m, 16.VI.1963, 1F; 1490 m, 17.VI.1963, 1M; 1710 m, 17.VI.1963, 3M, 11F; 1490 m, 18.VI.1963, 2M, 1F; 1710 m, 18.VI.1963, 6M, 5F; 1490 m, 19.VI.1963, 1M; 1710 m, 20.VI.1963, 3M, 2F; 1490 m, 21.VI.1963, 1F; 1710 m, 21.VI.1963, 3F; 1490 m, 23.VI.1963, 1F; 1490 m, 25.VI.1963, 1M; 1710 m, 25.VI.1963, 3M, 1F; 1490 m, 26.VI.1963, 1M, 1F; 1830 m, 26.VI.1963, 4M; 1490 m, 27.VI.1963, 1F; 1710 m, 27.VI.1963, 3M; 1710 m, 28.VI.1963, 2M, 6F; 1490 m, 29.VI.1963, 1M; 1710 m, 29.VI.1963, 4M [1 w/ spermatophore in endophallus], 4F; 1710 m, 1.VII.1963, 1M, 2F); Madera Canyon, 12.VII.1066, W.H. Tyson, 1M (USNM); Madera Canyon, 1400-1670 m, 13-22.VI.2011, J. Wappes, B. King, 3F (UASM); Madera Canyon, Bog Spring Camp Ground, UV, 1560 m, 10-26.VII.1964, D. Davis, 1F (USNM); upper end Madera Cn. road, at picnic ground, 1680 m, 7.VIII.1967, R.G. Beard, 1M, 2F (USNM); 29.VII.68, D.E. Bright, 1F (CNCI); 8.VII.1970, K. Stephan, 2F (UAIC); 26.VII.1970, K. Stephan, 1M (UAIC); 2.VII.1977, W. Rosenberg, 2F (USNM); 3.VII.1977, W. Rosenberg, 1F (USNM); 13.VIII.1977, W. Rosenberg, 2F (USNM); 24.VII.1985, P.K. Lago 1F (PKLC); 4.VIII.1988, 1650 m, at light, M.A. Ivie, 1M (MTEC); 19 km S, Sonoita, Hidden Springs Canyon, 2.VI.1967, R.F. Sternitzky, 1M, 1F (CNCI).

Specific epithet. An aboriginal word, "Apache" is used as a Latinized nominative singular noun in apposition. It is based on the name of the aboriginal Apache nation on whose ancestral lands this beetle species lives.

Type locality. Ramsey Canyon, Huachuca Mountains, Cochise County, Arizona, U.S.A.

Recognition. Adults of *C. apache* are likely to be confused with those of *C. punctifera punctifera* and *C. yaqui*, the three taxa whose geographical ranges overlap extensively in southwestern U.S.A. and adjacent northwestern México. All three are similar in body form, integumental macrosculpture, and color (dorsal surface of body rufotestaceous to rufous). *Cymindis apache* is larger than *C. p. punctifera* (Table 2, no overlap in SBL between samples of the two species), and on average *C. apache* is larger than *C. yaqui*. Both *C. apache* and *C. p. punctifera* differ from *C. yaqui* in form of the elytral posterior (apical) sutural angle (round in *C. apache* (Fig. 2G) and *C. p. punctifera*, angulate in *C. yaqui* (Fig. 2H). In phallic details, males of these three taxa differ markedly: in form of apex (broadly spatulate in *C. apache*, (Fig. 10B) narrower and knobbed in *C. p. punctifera* (Fig. 11B), and narrow and more or less pointed in *C. yaqui* (Figs. 11K, 11L); and in curvature of the shaft (displacement, Table 6).

Description. Size, form, microsculpture and color average as per *C. p. punctifera*. Data on variation in SBL, phallic measurements, and in the ratio PL/PW are presented in Tables 2 to 7.

Punctuation and vestiture. Head (Figs. 4A, 6A) vertex, irregular punctures; frons with few punctures, anterolateral sculpture not expanded.

Thorax. Pronotum in form average for *latiuscula* subgroup (Fig. 8A).

Elytra. Sutural apical angle rounded (Fig. 2G).

Male genitalia (Figs. 10A, 10B). Phallus (10A) relatively long (Table 4), broad (Table 5), markedly curved (Table 6), preapex (Fig. 10B) relatively long (Table 7), flattened, dorsoventrally, spatulate. Endophallus without dense patches of microtrichia.

Female genitalia (Fig. 12A). Ovipositor with gonocoxite 1 average for the subgroup, gonocoxite 2, parallel sided from base to insertion of ensiform setae, apical portion stout, bluntly pointed.

Habitat, habits and seasonal occurrence. This species is a resident of oak-pine montane forest. Elevational range (Fig. 31) extends from 1340 to 2900 m. Adults have been collected in every month of the year (Fig. 29) with the largest number of captures made during the months of summer. Many specimens were collected at UV light traps.

Geographical distribution. (Fig. 14). The range of this species extends in the Sierra Madre Occidental from western Sonora and Chihuahua northward to the slopes of the isolated mountain ranges (Chiricahua, Huachuca, Pajarito, Pinaleño, Santa Catalina, Santa Rita, etc.) in southeastern Arizona.

Geographical affinities. The range of *C. apache* is contained within the ranges of *C. p. punctifera* and *C. yaqui* (Fig. 14; cf. Figs. 20 and 26).

Morphological affinities. At present, the best candidate for an adelphotaxon is *C. yaqui* based on the elongate phallic preapex and its dorsoventral flattening (Fig. 10B; cf. Fig. 11K).

Material examined. We have examined 481 specimens of *C. apache*. For details, see type material, above.

***Cymindis* (*Pinacodera*) *crenatoverpa*, Hilchie & Ball,
new species.**

(Figs. 4B, 6B, 8B, 10C-F, 12B, 15, 29, 31)

<http://zoobank.org/D54D9763-567B-4917-BEA4-B0CA1A9D8F1E>

Type material. HOLOTYPE: Male: “// MEXICO Nay. Volcán / Ceboruco, 13 km w / Jala, oak for. few / pine; 1930-1970 m. / 24.VII.1983 83-55 // MEXICO EXPED. 1983 / H.E. Frania / R.J. Jaagumagi & / D. Shpeley colls. //” (USNM).

PARATYPES, 12: **MÉXICO. Guerrero:** 138.1 km NE, Atoyac de Álvarez, oak-alder, UV light, 1737 m, 18.VIII.1986, G.E. Ball, H.E. Frania, D.S Mulyk, 1M (UASM). **Jalisco:** 10.6 km NW Cuautla, arroyo, pine oak, 1710 m, 2.VIII.1985, H.E. Frania, D. Shpeley, 1M (UASM); nr El Rincón, 54 km NW, Los Volcanes, 1650 m, 11-12.VIII.1967, G.E. Ball, T.L. Erwin, R.E. Leech, 1M (UASM). **México (State):** Real de Arriba, Temascaltepec, H.E. Hinton 1F (MCZC); Rincon, Temascaltepec, Hinton, 1M (MCZC); Tejupilco, Temascaltepec, H.E. Hinton, 1M (MCZC). **Michoacán:** 87.1 km W Apatzingán on road to Dos Aguas, scrub, UV light, 1220 m, 9.VIII.1985, H.E. Frania, D. Shpeley, 1M (UASM). **Nayarit:** km 33, El Cuarenteño, El Cora, 17.X.1989, A. Cadena, 2M (CNIN); Volcan Ceboruco, 8-12 km W, Jala, 4.X.1990, R. Turnbow, 1F (RHTC); Volcan Ceboruco, 13 km W, Jala, 1930-1970 m, oak forest, few pine, 24.VII.1983, H.E. Frania, R.J. Jaagumagi, D. Shpeley, 2M (UASM).

Specific Epithet. A compound noun in apposition, based on the Latin adjective *crenatus* for notched, and noun

verpa for penis (or phallus), which refers to the notch near the apex of the phallus.

Type locality. Volcan Ceboruco, 13 km west of Jala, Nayarit, México.

Recognition. Slight expansion of the anterolateral macrosculpture, coarse punctation on the frons and relatively long frontal and pronotal setae are diagnostic for this species. The anterolateral margin of the frons is not markedly expanded as in specimens of *C. rugofrons*. Shape of the apical portion of the phallus (Figs. 10C, 10F) serves to distinguish males of *C. crenatoverpa* from all other males in the *latiuscula* species subgroup. Two females have been associated with the males.

Description. Size and form about average for *latiuscula* species subgroup. Data on variation of SBL, phallus and in the ratios PL/PW are presented in Tables 2 to 7.

Punctation and vestiture. Head (Fig. 4B, 6B), vertex with three to four rows of coarse punctures, coarse puncture fields laterally, anterolateral sculpture slightly expanded, merged with puncture fields; central frons with many coarse setose punctures, setae longer than average for *latiuscula* species subgroup.

Thorax. Pronotum average to slightly narrower, coarsely punctate, setae longer than average for *latiuscula* species subgroup.

Elytra. Average in form for *latiuscula* subgroup.

Male genitalia (Figs. 10C-10F). Phallus (Figs. 10C, 10F) relatively short (Table 4), relatively broad (Table 5), curvature slight, ventral surface relatively flat (Table 6), with prepaex relatively short and broad (Table 7); preapex with a distinct notch in the lateral margin; right and left parameres respectively, as in Figs. 10D and 10E). Endophallus unarmed, without dense patches of microtrichia.

Female genitalia (Fig. 12B). Ovipositor with gonocoxite 1 average for the species subgroup, gonocoxite 2 tapered from base to apex, base much wider than width at insertion points of the ensiform setae, apex acutely pointed, scythe-like in form.

Habitat, habits and seasonal occurrence. Specimens were collected at elevations between 1220 and 1970 m during July, August, and October. One collection was in an oak forest, another at the edge of a cornfield, but in an area in which pine forest seemed to be the dominant form of vegetation. The natural plant association for the area is wet pine forest.

Geographical variation. Two population groups are apparent, one western and the other more central (Fig. 15). Differences in size are noted with western specimens being slightly smaller. The phallus shows a similar pattern in dimension (cf. Fig 10C, western male, and Fig. 10F, a central population male). These differences could reflect a species/ subspecies difference or simply be a collecting artifact from small samples. We choose to treat them as a single species in spite the disjunction in range (Fig 15). Similar habitat that this species probably occupies extends around the margin of the Sierra Transvolcanica.

Geographical distribution. (Fig. 15). The known range of *C. crenatoverpa* extends in the Transvolcanic Sierra from the area around Temascaltepec, México state, westward to Volcán Ceboruco, Nayarit, and southward to the lower slopes of the Sierra Madre del Sur, in the state of Guerrero.

Morphological affinities. The similarity of the structure

of the female gonocoxite 2 of *C. crenatoverpa* in overall appearance with *C. geminata* (Fig. 12C) and *C. zacpotec* (Fig. 13F) implies these species may be related. All three of these species occur in south central México in the Sierra Madre del Sur.

Geographical affinities. The geographical range of *C. crenatoverpa* (Fig. 15) is overlapped by the ranges of *C. latiuscula* (Fig. 19) and *C. p. toltec* (Fig. 20), and possibly by the ranges of *C. cuyuteca* (Fig. 16), *C. geminata* (Fig. 17), *C. rugofrons* (Fig. 24), and *C. tonatiuh* (Fig. 25).

Material examined. We have seen 13 specimens of this species. For details, see type material, above.

***Cymindis (Pinacodera) cuyuteca*, Hilchie & Ball, new species**

(Figs. 6C, 8C, 10G, 16, 29, 31)

<http://zoobank.org/069BF488-22A3-4BB2-B37F-77A65C62F1E3>

Type material. HOLOTYPE: Male: “// MEX. Jal. 42.4 km / NW Cautla, litter / pine-oak; 1760 m / 3.VIII.1985 28-85 // MEXICO EXP. 1985 / H.E. Frania & / D. Shpeley / collectors //” (USNM).

Specific epithet. An Aztec word, treated as a Latin singular noun in apposition, this species is named in honor of the Cuyuteca, an indigenous people of the Nahua (Uto-Aztecan) tribe, on whose ancestral lands this beetle species was discovered (southwestern Jalisco). The culture of the Cuyuteca is extinct, but the descendants are extant.

Type locality. 42.4 km northwest of Cautla, Jalisco, México.

Recognition. Externally similar to *C. crenatoverpa*, but differs significantly in being larger (Table 2) and the phallus longer (Table 4) and different in form (Fig. 10G).

Description. Size larger than average, and form about average for *latiuscula* species subgroup. Data on SBL, male phallus and in the ratios PL/PW are presented in Tables 2 to 7.

Punctuation and vestiture. Head (Fig. 6C), vertex with three to four rows of coarse punctures, coarse puncture fields laterally, anteriolateral sculpture slightly expanded, merged with puncture fields; central frons nearly devoid of punctures, setae longer than average for *latiuscula* species subgroup.

Thorax. Average to slightly narrower for *latiuscula* species subgroup, coarsely punctate, setae longer than average for *latiuscula* species subgroup (Fig. 8C).

Elytra. Average for *latiuscula* species subgroup.

Male genitalia. Phallus (Fig. 10G) slightly longer (Table 4) and moderately broader (Table 5) than average for *latiuscula* species subgroup, curvature marked (Table 6), and preapex very short (Table 7). Endophallus unarmed, without dense patches of microtrichia.

Female genitalia. Unknown.

Habitat, habits and seasonal occurrence. The specimen of *C. cuyuteca* was collected in the litter of a pine-oak forest association at mid elevation (1760 m) on 3 August.

Geographical distribution. (Fig. 16). Known from one locality, near Cautla, Jalisco.

Geographical affinities. The single locality for this species (Fig. 16) is very close to that of one locality of *C. crenatoverpa* (Fig. 15). Possibly these species are

microsympatric. Ranges of additional species with ranges overlapping that of *C. cuyuteca* are *C. geminata* (Fig. 17), *C. latiuscula* (Fig. 19), *C. rugofrons* (Fig. 24) and *C. tonatiuh* (Fig. 25).

Morphological affinities. Not postulated.

Material examined. We have seen a single specimen of *C. cuyuteca*. For details, see type material, above.

***Cymindis (Pinacodera) geminata*, Hilchie & Ball, new species**

(Figs. 4C, 6D, 8D, 10H-J, 12C, 17, 29, 31)

<http://zoobank.org/32A59B52-342C-490B-925D-709AE774802D>

Type material. HOLOTYPE: Male: “// MEXICO. Morelos. / 4600'. 5.4 mi. e. / Cuernavaca, / VI.29-30.1966 / pedregal / black light // George E. Ball / D.R. Whitehead / collectors //” (USNM).

PARATYPES, 66: MÉXICO. Chiapas: 7 km S, Chicoasen, 10.VI.1989, H.F. Howden, at light, 1M (UASM); Manos de Imploran Mirador, near Chicoasen, 27.VI.1987, W.F. Chamberlain, 1F (TAMU); Chorreadera [sic!] State Park, MV & UV light, 26.V.1987, D.B. Thomas, D.A. Rider, E.G. & T.J. Riley, 3M, 4F (LSUC); Chorreadero, 8 km E, Chiapa de Corzo, 6.VI.1989, H. Howden, 1M, 1F (UASM); Chorreadero, 8 km E, Chiapa de Corzo, 17.VI.1989, H. Howden, 1F (UASM); Chorreadero Canyon, Tuxtla Gutiérrez, at light, 20.VI.1987, W.F. Chamberlain 2M (TAMU); El Chorreadero, 17.VI.1989, P.K. Lago, E. Zuccaro, 3M, 1F (PKLC); El Chorreadero, 10 km W, Tuxtla Gutiérrez, 23.VI.1989, P.K. Lago, E. Zuccaro, 6F (PKLC); El Chorreadero, 10 km W, Tuxtla Gutiérrez, UV light, 23.VI.1989, S. Testa, E. Lago, 1F, (PKLC); Cinco Cerros, 860 m, 31.V.1990, H.&A. Howden, 1M, 1F (UASM); 7.8 km N, Frontera Comalapa, 730 m, UV, 17.VI.1966, G.E. Ball, D.R. Whitehead, 1M, 4F (UASM); 4.8 km N, Tapilula, 10.V.1969, Bright, Campbell, 1M (CNCI). **Guerrero:** 8 km N, Chilpancingo, 24.VIII.1958, H.F. Howden, 1M, (CNCI); Cerro Tuxpan, Iguala, 2.VI.1989, H. Pérez, 2F (CNIN); Cerro Tuxpan, Iguala, 520 m, 25.VI.1987, H. Pérez, 1F (CNIN); 21.2 km NW, jct. Rte. 195, rd. to Filo de Caballo, 1580 m, oak-acacia-palmetto, arroyo, litter, 7-8.VIII.1983, 83-67, H.E. Frania, R.J. Jaagumagi, 1M (UASM); Microondas Tuxpan, 7.III.1987, Harry Brailovsky, 1M (CNIN); Teloloapan, Cerro de la Loma Larga, Villa de Ayala, 1520 m, 18°23'36"N, 100°02'16"W, 14.X.2004, P. Feria *et al.*, collectors, Selva baja caducifolia, vegetacion secundaria arbustiva, col. noche, 1M, 9F (USNM); Teloloapan, El Arenal, 1260 m, 18°17'27"N, 100°03'55"W, 19.X.2004, P. Feria *et al.*, collectors, Selva baja caducifolia, vegetacion secundaria arbustiva, a mano, 1M (USNM); 10 km WSW, Xochipala, 1650 m. 30.VI.1982, J.E. Rawlins, 1F (CMNH). **Morelos:** Cañon de Lobos, 19 km E, Cuernavaca, 1120-1375 m, 3.VII.1992, C.L. Bellamy, 2F (CMNH); Cuernavaca, 1680 m, 6.VI.59, H.E. & M.A. Evans, 1F (CUIC); Cuernavaca, 1680 m, 19-29.VI.1959, H.E. Evans, 1F (CUIC); 5.8 km E, Cuernavaca, 1400 m, pedregal, 24.XI.1965, G.E. Ball, D.R. Whitehead, 1F (UASM); 7.1 km E, Cuernavaca, at light, 6-7.VII.1974, Clark, Murray, Ashe, Schaffner, 1M (TAMU); 8.6 km E, Cuernavaca, 1400 m, pedregal, 25.XI.1965, G.E. Ball, D.R. Whitehead, 1F (UASM); 8.6 km E, Cuernavaca, 1400 m, pedregal, UV, 29-30.VI.1966,

G.E. Ball, D.R. Whitehead, 2M, 3F (UASM). **Oaxaca:** 21 km N, San Pedro Juchatengo, 1440 m, in bromeliads, 23.III.1966, G.E. Ball, D.R. Whitehead, 1M (UASM); 59.2 km NW, Oaxaca, 2260 m, at night, 1.VI.1974, O'Briens, Marshall, 1M (UASM); Tepetlapa, 1M (ZMHB); Rte. 175, 40.6 km S, Uchixtelpec [sic!], 8-9.VII.1972, P.A. Myer, G.E. Ball, 1F (UASM). **Puebla:** 72 km N, Acatlán de Osorio, 30.VII.1963, J. Doyen, 1M, 1F (EMEC).

Specific epithet. The adjectival feminine form of the Latin noun *geminus* or twin, referring to the general similarity in structural features of *C. geminata* to *C. punctifera*.

Type locality. 8.6 km east of Cuernavaca, Morelos, México.

Recognition. Members of this species are recognized by a combination of small size (Table 2), a cluster of enlarged punctures along the posteriolateral area of the vertex of the head capsule, and the irregular anteriolateral striations, which are not expanded onto the frons. For males, the phallus (Figs. 10H, 10J) is slender, relatively flat (displacement relatively slight), and with apical portion relatively narrow and of moderate length.

Specimens of *C. geminata* are markedly similar in external features to those of *C. p. punctifera*, but these two taxa are relatively widely separated geographically (Fig. 17; cf. Fig. 20). *Cymindis geminata* is sympatric with *C. p. toltec*. The sculpture pattern resembles that of *C. apache* and *C. yaqui*. Males of *C. geminata* and *C. p. punctifera* are also similar in phallic form (Figs. 10H, 10J; cf. 11A, 11B) but the apical portion of the phallus of *C. geminata* is shorter and flatter. Females are easily confused with those of *C. latiuscula*. On average, specimens of *C. geminata* are about 0.9-1.2 mm shorter (SBL) than those of *C. latiuscula* (Table 2).

Description. Specimens of this species are markedly similar to those *C. punctifera* in external features. Size small, form about average for *latiuscula* species subgroup. Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDp, and DPp), are presented in Tables 2 to 7.

Punctuation and vestiture. Head capsule: vertex (Fig. 4C, 6D) with four irregular rows of punctures, expanded anterolateral puncture fields, frons with few punctures. similar to *C. apache* and *C. yaqui*.

Thorax. Pronotum (Table 3, Fig. 8D) distinctly narrower than average for *latiuscula* species subgroup.

Elytra. Average for *latiuscula* species subgroup, sutural angle rounded (cf. Fig. 2G).

Male genitalia. Phallus (Figs. 10H-10J). Similar to *C. punctifera* except apex compressed dorso-ventrally. Measurements: phallus very short (Table 4), very narrow (Table 5), curvature very slight (Table 6), and preapex very short (Table 7). Left paramere, lateral aspect, as in Fig. 10I. Endophallus unarmed, without dense patches of microtrichia.

Female genitalia (Fig. 12C). Ovipositor with gonocoxite 1 average for the subgroup, gonocoxite 2 similar in form to *C. crenatoverpa* (Fig. 12B) and *C. zapotec* (Fig. 13F), tapered with base much wider than width of the shaft at the insertion point of ensiform setae, apex acutely pointed, scythe-like in shape.

Habitat, habits, and seasonal occurrence. This species occupies dry deciduous woodland, at elevations ranging

from about 500 m to about 2300 m, adults occurring on the ground in litter, or in trees, resting in bromeliads. Adult activity extends from May to August, with most captures in June (Fig. 29). Flight occurs at night, as indicated by captures at UV light traps.

Geographical distribution. (Fig. 17). The geographical range of *C. geminata* extends in southwestern México from the Chiapan-Guatemalan border northward to the southern slopes of the Sierra Transvolcanica.

Geographical affinities. This species is sympatric with *C. latiuscula* (Fig. 19), *C. p. toltec* (Fig. 20), *C. tonatiuh* (Fig. 25), and *C. zapotec* (Fig. 28), and possibly with *C. crenatoverpa* (Fig. 15) and *C. huichilobos* (Fig. 18).

Morphological affinities. Based on the structure of the female gonoxoxa (Fig. 12C), *C. geminata* is closely related to *C. crenatoverpa* (Fig. 12B) and *C. zapotec* (Fig. 13F), a trend not seen in the form of the male phallus (c.f. Figs. 10H vs. 10C, 10F) for *C. geminata* and *C. crenatoverpa* (males unknown for *C. zapotec*).

Material examined. We have seen 67 specimens of *C. geminata*. For details, see type material, above.

Cymindis (*Pinacodera*) *huichilobos*, Hilchie & Ball, new species

(Figs. 6E, 8E, 10K, 12D, 18, 29, 31)

<http://zoobank.org/15428F11-5FC3-4035-BE76-417600C03CD9>

Type material. HOLOTYPE: Male: “// MEXICO: Oaxaca km. 117 / Oaxaca-Puerto Angel / 30.I.88 E. Ramirez / A. Cadena / C. Barrera //” collectors (CNIN).

PARATYPES, 16: MÉXICO. **Oaxaca:** km 117, Oaxaca-Puerto Angel [rd.], 30.I.1988, E. Ramirez, A. Cadena, C. Barrera, 1M, 1F (UASM), 10M, 2F (CNIN), 1M, 1F (USNM).

Specific epithet. This is an Aztec word, used as a Latin nominative singular noun in apposition, in recognition of Huichilobos (or Huitzlopochtli), the god of war to whom human sacrifices were made during Montezuma's reign.

Type locality. Km. 117, Oaxaca-Puerto Angel road, Oaxaca, México.

Recognition. Adults of *C. huichilobos* are difficult to separate from many other members of the *C. latiuscula* subgroup. The most notable characters distinguishing males of this species are the decurved angle of the apical portion of the phallus (Fig. 10K) and its large overall size (Tables 4 and 5). Females were identified by general similarity with co-occurring males and the form of the apex of gonocoxite 2, rounded and scoop shaped (Fig. 12D).

Description. Similar in form to *C. punctifera*. Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDp, and DPp), are presented in Tables 2 to 7.

Punctuation and vestiture. Head capsule (Fig. 6E): (cf. Figs. 5E, 7E), vertex with 2 to 3 irregular rows of punctures traversing apex, frons smooth with scattered setose punctures, anterior lateral macrosculpture not expanded.

Pronotum. (Fig. 8E) Average in form for *latiuscula* species subgroup.

Elytra. Average for *latiuscula* species subgroup, apices similar to specimens of *C. yaqui*.

Male genitalia. Phallus (Fig. 10K) with apex hooked; relatively long (Table 4) and broad (Table 5),

curvature moderate (Table 6), preapex long (Fig. 7) and slender. Endophallus unarmed, without dense patches of microtrichia.

Female genitalia (Fig 12D). Ovipositor with gonocoxite 1 average for the subgroup, gonocoxite 2 parallel sided from base to insertion point with ensiform setae; apex broadly rounded, scoop shaped, similar in form to that seen in females of *C. rugofrons* (Fig. 13B) and *C. tonatiuh* (Fig. 13C).

Habitat, habits and seasonal occurrence. Recorded from the Pacific coastal region of Oaxaca, this species probably occupies dry to moist deciduous forest, which abounds in that area. See Fig. 29 for data about seasonal activity, and Fig. 31 for elevation.

Geographical affinities. Known from a single locality, the geographical range of *C. huichilobos* (Fig. 18) is not overlapped by the range of any known species of the *latiuscula* subgroup. However, the range of *C. latiuscula* (Fig. 19) extends almost to that locality. Additional possibilities of sympatry include *C. p. toltec* (Fig. 21), *C. tonatiuh* (Fig. 25), and *C. zapotec*. (Fig. 28).

Geographical distribution. (Fig. 18). Known only from the type locality, near the Pacific coast of Oaxaca, west of the Sierra Miahuatlán.

Morphological affinities. The marked similarity in the form of gonocoxite 2 in females of *C. huichilobos* (Fig. 12D) and those found in females of *C. rugofrons* (Fig. 13B) and *C. tonatiuh* (Fig. 13C) suggests a close relationship. The overall form of the male phallus is somewhat similar for these species (cf. Fig. 10K vs. Figs. 10F & 10G, 10H) and at best weakly supports the relationship indicated by the form of gonocoxite 2. Head sculpture is similar in *C. huichilobos* (Fig. 6E) and *C. tonatiuh* (Figs. 5E, 7E), and is quite different in *C. rugofrons* (Figs. 5D, 7D).

Material examined. We have seen 17 specimens of *C. huichilobos*. For details see Type material above.

***Cymindis (Pinacodera) latiuscula* (Chaudoir, 1875)**

(Figs. 1, 4D, 4E, 5C, 6F, 6G, 8F, 8G, 10L-N, 12E, 19, 21-23, 29, 31)

Pinacodera latiuscula Chaudoir, Bull. Soc. Nat. Mosc. XLIX 1875, II, p. 6.

Type material. Oberthür-Chaudoir Collection, a single female, HOLOTYPE, labeled “Ex Musaeo Chaudoir” [red ink], in front of the following box label: “latiuscula / Chaud. / Yucatan / Pilate” (MNHP). —Bates, 1883: 188.

Type locality. The type area of this species is the state of Yucatan, México. The type locality is here designated as Dzibilchaltún Archaeological Zone, ca. 16 km north of Merida, Yucatán, México.

Recognition. Adults are recognized by the absence of a well, defined contiguous band of punctures across the vertex and a wider pronotum (PL/PW 0.61-0.73). Other members of the *latiuscula* species subgroup have at least one complete well, defined row of punctures on the vertex. For males, the hooked apex of the phallus, and patches of endophallic microtrichia further delineate the species.

Description. Size and form about average for the *latiuscula* species subgroup, Data on variation of SBL, phallus, and in the ratio PL/PW are presented in Tables 2-7.

Punctuation and vestiture. Head (Figs. 4D, 4E, 6F, 6G) with vertex punctures shallow, two lateral fields; frons with

fine punctures, lateral sculpture not expanded.

Thorax. Pronotum (Figs. 8F, 8G) surface is coarsely punctate, posterolateral impressions rugulose, broader than average.

Male genitalia. Phallus (Figs. 10L–10N), with preapex slightly flattened, hooked; relatively short (Table 4) and moderately broad (Table 5), curvature about average for *latiuscula* species subgroup (Table 6), and preapex short (Table 7), endophallus (Fig. 10N) with dense patches of microtrichia.

Female genitalia (Fig. 12E). Ovipositor with gonocoxite 1 average for the subgroup, gonocoxite 2 slightly tapered from base to insertion point of ensiform setae; apex bluntly pointed, gently curved.

Variation. Variation is seen in pronotal form (Figs. 8F, 8G) overlapping to some degree with that seen in *C. punctifera toltec* (Figs. 9B, 9C) and *C. zacapa* (Fig. 9G). Specimens from low elevation/tropical lowland tend to have a broader more transverse pronotum (Fig. 22). A lesser degree of variation is seen in the form of the phallus (Figs. 10L–10N).

Habitat, habits and seasonal occurrence. This species occupies a wide range of forest types: principally dry deciduous forest (thorn forest; acacia scrub; oak–acacia forest; oak–pine forest; and secondary forest) at lower elevations, but also pine forest and even cloud forest at higher elevations (Fig. 21). The range in elevation (Fig. 31) of *C. latiuscula* extends from near sea level (15 m) to 1400 m (state of Chiapas).

At higher elevations colder winter temperatures are more prevalent (Fig. 23). In Jalapa, Veracruz, winter temperatures are known to dip to 0° C (elevation about 1500 m). It is likely that adults are sensitive to these lower temperatures (frost intolerant), which limits their presence at the higher elevations. Preference for resting in arboreal bromeliads would expose them to the cold.

Specimens of *C. latiuscula* have been collected in nearly every month of the year (except September and December, Fig. 29). Many were collected from bromeliads, mostly during the period February–March. Teneral specimens (6), collected in July, suggest that individuals overwinter as adults, a surmise borne out by the winter bromeliad collections. Nocturnal flight activity is indicated by collections from UV light traps.

Geographical distribution. (Fig. 19). The geographical range of this widespread species extends from Belize, Yucatan Peninsula and Chiapas northward in the Eastern Versant north of the Tropic of Cancer in the state of Tamaulipas, and in the Western Versant to western Jalisco.

Geographic affinities. The range of *C. latiuscula* overlaps markedly the ranges of *C. geminata* (Fig. 17), *C. punctifera toltec* (Fig. 20), *C. tonatiuh* (Fig. 25), and *C. zacapa* (Fig. 27), and marginally the ranges of *C. p. punctifera* (Fig. 20), and *C. rugofrons* (Fig. 24), and probably the range of *C. huichilobos* (Fig. 18).

Morphological affinities. Based on the shared endophallic armature and generally allopatric distribution pattern, *C. zacapa* may be closely related of *C. latiuscula*. Similar form of gonocoxite 2 in the females also suggests close relationship.

Material examined. In addition to the holotype we have examined 357 specimens from the following localities.

BELIZE: Kayo District: Mountain Pine Ridge, Hidden

Valley, 17°00'N, 89°00'W, 650-700 m, pine-oak savanna, 24.V.1990, M.S. Adams, L.C. Dow, 1M, 1F (CMNH). **MÉXICO:** "México": *cribrata*, From Muche (Staudinger, Bang-Haas), 1M, 1F (MCZC); 1F (ZMHB); intercepted with plants from México at Miami, Florida, USA, 6. XI.1968, on bromeliads, Byrd K. Dozier, 2M, 1F (FSCA). **Campeche:** 6 km N, Escarcega, 9.X.1976, Cate, Clark, 1F (TAMU); 9.6 km N, Escarcega, 9.X.1976, Cate, Clark, 1M (TAMU). **Chiapas:** 47.2 km N, Arriaga, Rte. 195, 550 m, in bromeliads, 24.II.1966, George E. Ball, D.R. Whitehead, 17M, 21F (UASM); Berriozabal, nr. Rte. 190, 18.VI.1972, P.A. Meyer, G.E. Ball, 2M (UASM); 2 km S, Chicoasén, road to Mirador, 18.VI.1989, H.F. Howden, 1F (UASM); Chorreadera [*sic!*] State Park, 26.V.1987, D.B. Thomas, D.A. Rider, E.G. & T.J. Riley, 1F (LSUC); 48 km E, Comitán, Rte. 190, 24.VII.1963, J. Doyen, 2M 1F (EMEC); Comitán, 52 km E, Rte. 190, 670 m, UV, 1.IX.1965, George E. Ball, D.R. Whitehead, 1F (UASM); Comitán, 52 km E, Rte. 190, 670 m, 14.VI.1966, George E. Ball, D.R. Whitehead, 1F (UASM); 7.8 km N, Frontera Comalapa, 730 m, 17.VI.1966, black light, G.E. Ball, D.R. Whitehead, 1M, 2F (UASM); 12.3 km N, Frontera Comalapa, 790 m, UV, 15-16.VI.1966, George E. Ball, D.R. Whitehead, 2M, 1F (UASM); 47.5 km N, Huixtla, 1310 m, George E. Ball, D.R. Whitehead, 1F (UASM); 3.2 km S, Ixhuatán, 580 m, 16.VI.1965, Burke, Meyer, Schaffner, 1F (TAMU); Hwy 195, 4.5 km N, Ixtapa, 920 m, MV & UV, 24.V.1987, D.A. Rider, E.G. & T.J. Riley, 1M, 1F (LSUC); 26 km SW, Las Cruces, 860 m, UV, 28.VIII.1967, T.L. Erwin, R.E. Leech, G.E. Ball, 2M (UASM); Hwy 190, Oaxaca border, 1000 m, 6.VIII.1989, H.F. Howden, 1M (UASM); Rte. 199, 11.4 km NW Ocosingo, 2.5 km E on side road, oak-pine forest, beating bromeliads, 1400 m, 83-92, 16.IX.1992, G.E. Ball, R.S. Anderson, 1M, 1F (UASM); Ocosingo, 9.8km N, 20. VI.1990, M.C. Thomas, 1M (FSCA); 14.7-20.0 km N, Ocozocuahtla, 975 m, in bromeliads, 3-4.III.1966, George E. Ball, D.R. Whitehead, 3M, 4F (UASM); 7.4 km N, Ocozocuahtla, 885 m, in bromeliads, 4-5.III.1966, G.E. Ball, D.R. Whitehead, 21M, 18F (UASM); 18.6 km N, Ocozocuahtla, 975 m, UV, 10-13.VI.1966, G.E. Ball, D.R. Whitehead 2M, 1F (UASM); 22 km N, Ocozocuahtla, 2.VII.1969, Bright, Campbell, 1F (CNCI); 14.9 km N, Palenque, 30 m, 9.VII.1966, G.E. Ball, D.R. Whitehead, 1M (UASM); Parque Nacional El Aguacero, MV & UV, 23.V.1987, D.B. Thomas, D.A. Rider, E.G. & T.J. Riley, 1F (LSUC); Parque Nat. Laguna Belgica, 0.5 km N, 23. VI.1990, M.C. Thomas, 1F (FSCA); Rte. 195, 37.8 km S, Pueblo Nuevo, 1280 m, 28.IV.1966, G.E. Ball, D.R. Whitehead, 2M, 1F (UASM); 4.8 km N, Tapilula, 10.V.1969, Bright, Campbell, 1M (CNCI); 12.8 km SE, Teopisca, 9. VII.1969, Campbell, Bright, 1M (CNCI); 40 km SE, Teopisca, Hwy. 24, 19.V.1969, D.E. Bright, 1F (CNCI); Rte. 190, 21.4 km W, Tuxtla Gutiérrez, 860 m, in bromeliads, 4.II.1966, G.E. Ball, D.R. Whitehead, 18M, 8F (UASM); Rte. 195 ca. 8 km S, Junction Rte. 190, and 195, 710 m, thorn scrub, in bromeliads, 79-13, 14.I.1979, G.E. & K.E. Ball, 1M, 1F (UASM). **Guerrero:** Ciudad Altamirano, 6. VII.1984, H. Brailovsky, 1M (CNIN); bei [= near] Chilapa 1F (ZMHB); 7-10 km W, El Ocotito, 15, 16, 22.IX.1989, J.E. Wappes, 1F (JEW); Copalillo Tecaballo, Papaluta, 790 m, 18°01'56"N, 98°54'47"W, selva baja caducifolia, vegetacion secundaria arborea, 12.VIII.2004, P. Feria *et al.*, 1F (USNM); Coyuca de Catalán, Cerro El Divisadero,

Santa Teresa, 390 m, 18°20'38"N, 100°48'07"W, selva baja caducifolia, vegetacion secundaria arbustiva, col. noche, 15.IX.2004, P. Feria *et al.*, 1F (USNM); Coyuca de Catalán, Cerro de Eastaban, Santo Domingo, 270 m, 18°24'41"N, 100°53'59"W, selva baja caducifolia, vegetación secundaria arbustiva, col. noche, 16.IX.2004, P. Feria *et al.*, 1F (USNM); Picaya, El Oyonco, 800 m, 18°38'24"N, 99°31'12"W, selva baja caducifolia, vegetación secundaria arbustiva, 12.VI.2004, P. Feria *et al.*, 3F (USNM); Picaya, Parque Nacional Grutas de Cacauamilpa, 800 m, 18°40'12"N, 99°30'00"W, área agrícola de temporal, UV, 8-9.VI.2004, P. Feria *et al.*, 1F (USNM); 5.3 km E, Papanoa, Rte.200, 110 m, U-V, 79-73, 16.VII.1979, J. S. Ashe, G. E. Ball, D. Shpeley, 1M, 5F (UASM); Tejuvilco, El Naranjo Grande, 930 m, 18°47'26"N, 100°21'00"W, selva baja caducifolia, vegetación secundaria arborea, col. noche, 16-17.VII.2004, P. Feria *et al.*, 1M (USNM). **Jalisco:** Municipio La Huerta, Chamela Biol. Sta. roadside sweep, 27.VII.1996, W. Godwin, 1F (TAMU); Estación Biológica Chamela, at light, 20-27.VII.1984, J.A. Chemsak, J.T. Doyen, 3F (EMEC); Estación Biológica Chamela, 25. VIII.1990, C. Mayorga, A. Cadena, J. Martinez, 1F (CNIN); vic. Estación Biológica Chamela, CNIN, UV light, 9-14. VII.1993, Morris, Huether, Wappes, 1M, 1F (RFMC). **Oaxaca:** 4.3 km NW, El Cameron [*sic!*], taken at light, 24.VII.1973, Mastro, Schaffner, 1F (TAMU); 4.3 km NW, El Cameron [*sic!*], taken at light, 21.VII.1974, Clark, Murray, Ashe, Schaffner, 2F (TAMU); 4.3 km NW, El Cameron [*sic!*], UV, 21.VII.1974, Clarke, Murray, Ashe, Schaffner, 3F (TAMU); Microondas San Cristóbal, km 1.4, 10.2 km SE, El Camarón, 1120 m, riparian, oak-pine forest, 21-22.VI.1979, 79-46, J.S. Ashe, G.E. Ball, D. Shpeley, 2F (UASM); 9.6 km W, Tehuantepec, UV, 2.VII.1964, A.G. Raske, 1M, 2F (EMEC); 16.8 km W, Tehuantepec, 22. VII.1974, Clark, Murray, Ashe, Schaffner, 1M, 4F (TAMU); 23 km W, Tehuantepec, 245 m, 30.VII.1977, E. Fisher, P. Sullivan, 1F (CASC); 59.5 km NW Tehuantepec, 457 m, 12.VIII.1974, O'Briens & Marshall, 1M (UASM); 89.6 km NW, Tehuantepec, 27.II.1963, J. Doyen, 2M, 1F (EMEC); 3.4 km NW, Totolapan, 11-17.VII.1981, Bogar, Schaffner, Friedlander, 1M (TAMU). **Puebla:** 23.2 km SE, Acatlán, 21.VII.1981, Bogar, Schaffner, Friedlander, 1F (TAMU); Izúcar de Matamoros, San Isidro, 1310 m, 18°33'05"N, 98°25'19"W, área agrícola temporal, col. noche, 26. VI.2004, P. Feria *et al.*, 1M, (USNM); nr. Tepexco, Rte. 115, 1220 m, 10.VIII.1965, G.E. Ball, D.R. Whitehead, 1F, (UASM). **San Luis Potosí:** El Banito, 60 m, 27.VI.1982, J.E. Rawlins, 1F (CMNH); 2.9 km N, El Naranjo, 300 m, 4 & 13.X.1965, G.E. Ball, D.R. Whitehead, 4F (UASM); Rte. 80, 5.8 km W, El Naranjo, 370 m, 13-14.X.1965, G.E. Ball, D.R. Whitehead, 4F (UASM); El Salto, nr. El Naranjo, 29.VI.1965, P.J. Spangler, 3F (USNM); El Salto, 520 m, 25.VIII.1954, J.G. Chilcott, 1F (CNCI); El Salto de Agua, 23-24.VIII.1960, H.F. Howden, 1F (CNCI); Microondas Ciudad Valles, 2.IX.1978, 1F (CNIN); 11.6 km W, Rio Verde, 2.VI.1987, R.S. Anderson, 1M (UASM). **Tamaulipas:** El Monte, 1709, Orchids, 1.I.1948, 1M (USNM); El Salto Falls, 41.6 km W, Antigua Morelos, 11-14.VII.1963, Duckworth Davis, 2M (USNM); 8 km E, Nuevo Morelos, 520 m, 16.VIII.1971, C. & L. O'Briens, B. Marshall, 1M (UASM); Rio Sabinas, W, El Encino, 180 m, Lot B, bromeliads, 11.X.1965, G.E. Ball, D.R. Whitehead, 1F (UASM); 33 km E, Villa de Casas, 460 m,

5.VII.1965, G.E. Ball, D.R. Whitehead, 1F (UASM). **Veracruz:** Atoyac, A.B. Lau, 22.X.1965, 1F (USNM); Rte. 180, 26.1 km S, Catemaco, 210 m, in bromeliads, 6. III.1966, G.E. Ball, D.R. Whitehead, 9M, 6F (UASM); Córdoba, 4.VII.1965, A.B. Lau, 1M (USNM); Córdoba, 5. VII.1965, A.B. Lau, 1M (USNM); Córdoba, 6-9.VII.1965, A.B. Lau, 1F (USNM); Córdoba, 17.VI.1997, Koebele Coll., 1M (CASC); Fortín de las Flores, 26-30.VI.1963, D.R. Whitehead, 1M, 1F (UASM); Fortín de las Flores, 890 m, 22.I.1966, G.E. Ball family, 1M (UASM); Rte. 143, 54.9 km E, Huatusco, 150 m, thorn forest, in bromeliads, 18. XII.1978, G.E. & K.E. Ball, 10M, 8F (UASM); 8 km NE, Independencia, Troncones Highway, 29.IX.1976, W.E. Clark, 1M (TAMU); Jalapa, Hoege — (1F (labeled “Donated by F. du Cane Godman 1907”, (AMNH); 1F (ANSP); 3M, 4F (MCZC); 5M, 6F (USNM); 3M, 1F (ZMHB)); Rte. 140, 7.5 km E, Jalapa, in bromeliads, 1100 m, 9.IV.1966, G.E. Ball, D.R. Whitehead, 4M, 2F (UASM); Rte. 140, 9.3 km E, Xalapa [sic!], in bromeliads, 24. VII.1967, G.E. Ball, T.L. Erwin, R.E. Leech, 1M (UASM); Rte. 140, 19 km E, Xalapa, in bromeliads, 790 m, 9.IV.1966, G.E. Ball, D.R. Whitehead, 1M (UASM); Rte. 140, 35.2 km E, Xalapa, in bromeliads, 310 m, 9.III.1966, G.E. Ball, D.R. Whitehead, 1F (UASM); 11.2 km SW, Minatitlán, 230 m, 2.VIII.1974, CW. & L. O’Brien, Marshall, 2M (UASM); 6.4 km SW, Puente Nacional, 180 m, in bromeliads, 8. III.1966, G.E. Ball, D.R. Whitehead, 16M, 11F (UASM); Rancho Clacotengo, ca. 2-5 km N, Fortín de Las Flores, 1120 m, in bromeliads, 78B-33, 21.XII.1978, G.E. & K.E. Ball, 1M, 4F (UASM); Rte. 140, Tamarindo, 90 m, in bromeliads, 9.I.1966, G.E. Ball family, 2M (UASM); Tampico, 22.IX, E.A. Schwarz, 1M (USNM); 32 km S Misantla, beating flowers *Hampea nutridea* (male), 22. XI.1976, W.E. Clark, 1M (TAMU). **Yucatán:** Chichen Itza, 2 km E, black light trap, 16.VI.1990, M.C. Thomas, 1M, 2F (FASC); Dzibilchaltún, ca. 16 km N, Mérida, 15 m, in bromeliads, 19.IV.1966, G.E. Ball, D.R. Whitehead, 1F (UASM); Ruinas de Kabah, Rte 180, 30 m, 13.I.1966, G.E. & K.E. Ball, 2M, 3F (UASM); 7 km W, Tzucacab, 20.X.1991, R. Turnbow, 1M (RHTC); 15 km S, Vallodolid, 25.X.1991, R. Turnbow, 1M (RHTC); 2 km S, Xcalacoop, 23.X.1991, R. Turnbow, 1M (RHTC).

Cymindis (Pinacodera) punctifera (LeConte, 1884)

(Figs. 2C, 2D, 3, 5A, 5B, 7A–7C, 9A–9C, 11A–11E, 12F, 13A, 20–23, 30, 31).

Pinacodera cribrata Chaudoir 1875: 5 (not *Cymindis (sensu stricto) cribrata* LeConte, 1859: 2).

Type material. Three specimens, male and two females, in front of the following box label: “cribrata/ Chaud/ Mexique/ Sallé”. LECTOTYPE here selected: male, labeled “Ex Musaeo/ Chaudoir” [red print]. PARALECTOTYPES. Two females, each labeled same as lectotype. – Bates, 1883: 188 (MNHP).

Lebia punctifera J. LeConte 1884:2. Type material single female, HOLOTYPE, labeled: “Type 5800” [red paper, number handwritten]//; L. puncti/ fera/ Lec.” [handwritten]; “*Pinacodera punctifera*/ LeConte/ recognized by G.E. Ball & G.J. Hilchie (1979) as HOLOTYPE” [handwritten] (MCZC). – Csiki, 1932:1330.–Madge, 1967: 218.

Cymindis (Pinacodera) punctifera; Bousquet and

Larochelle, 1993:269. Bousquet, 2012:395.

Notes about names. The types of *Pinacodera cribrata* and *Lebia punctifera* are believed to be conspecific, based on a population variation pattern that bridges their morphological differences. Although *C. (Pinacodera) cribrata* (Chaudoir (type area México) is senior synonym, it is also a junior secondary homonym of *Cymindis (Tarulus) cribrata* LeConte, 1859 (type area, Kansas), and is thus unavailable. The next available name is *C. punctifera* (LeConte), which is, accordingly, the valid name of the species.

Recognized here as polytypic, *C. punctifera* includes two subspecies (Fig. 20). The range of the more northern subspecies includes northern México and southwestern U.S.A., within which is the type area (Arizona) of the *C. punctifera* (LeConte). The range of the one southern subspecies includes southern and central México, within which is the type area of the *C. cribrata* (Chaudoir). Therefore, the name of the more northern subspecies is *C. punctifera punctifera* (LeConte). Because of the homonymy of *C. cribrata*, the southern subspecies is without an available name. As a replacement name, we propose here *C. punctifera toletc*, new name.

Recognition. Due to extensive variation in phallic features as well as external features, distinguishing specimens of *C. punctifera* from those of other members of the *latiuscula* species subgroup is difficult, and at the species level, one is compelled to work in generalities. Size (SBL) is relatively small, on average for the *latiuscula* species subgroup (Table 2). The phallic preapex is more or less cylindrical (Figs. 11A–11E) and relatively long (Table 7). Head and pronotal punctation vary sufficiently to extend over the range of the *latiuscula* species subgroup for these features. Nonetheless, they are useful at the subspecies level. Geographical range is extensive, from the Isthmus of Tehuantepec in southern México to southern Arizona, U.S.A.

The stout form of gonocoxite 2 is most similar to females of *C. apache*.

Two relatively widespread forms of phallic preapex are included in this species, correlated with geographical distribution. However, some samples include intermediates between these forms. The correlation and variation provide both the basis for inclusion of the two genitalic groups in one species and the basis for recognition of two subspecies. For details, see below.

Cymindis (Pinacodera) punctifera punctifera (LeConte, 1884)

(Figs. 2C, 2D, 3, 5A, 7A, 9A, 11A, 11B, 12F, 20–23, 30, 31)

Recognition. Adults of *C. punctifera punctifera* are likely to be confused with those of *C. apache* and *C. yaqui*, the three taxa whose geographical ranges overlap extensively in southwestern U.S.A. and adjacent northwestern México. All three are similar in body form, integumental macrosculpture, and color (dorsal surface of body rufotestaceous to rufous). Although size overlap among these taxa is more or less extensive (Table 2), *C. p. punctifera* is smaller than *C. apache* (no overlap in SBL between samples of the two taxa), and on average smaller than *C. yaqui*. Both *C. apache* and *C. p. punctifera*

differ from *C. yaqui* in form of the elytral apical sutural angle (round in *C. apache* (Fig. 2G) and *C. p. punctifera*), angulate in *C. yaqui* (Fig. 2H)). In phallic details, males of these three taxa differ markedly: in form of apical portion (narrower and apex knobbed in *C. p. punctifera* (Fig. 11B), broadly spatulate in *C. apache* (Fig. 10B), narrow and more or less pointed in *C. yaqui* (Figs. 11K, 11L); and in curvature of the shaft (displacement, Table 6).

Morphological distinction between this subspecies and *C. p. toltec* is discussed below, under the latter subspecies. Geographically, *C. p. punctifera* ranges south in western México to about 27° N. Lat., or the Rio El Fuerte Basin, being replaced further south by *C. p. toltec*.

Description. Size relatively small, body form about average for *latiuscula* species subgroup. Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDp, and DPP), are presented in Tables 2 to 7.

Punctuation and vestiture. Head (Figs. 5A, 7A), vertex with two to three irregular transverse rows of coarse punctures; frons smooth, anteriolateral sculpture not expanded. Microsculpture various, obsolete on most specimens, partial to well developed on some specimens from Pima County, Arizona.

Thorax. Pronotum average in form for *latiuscula* species subgroup (Fig. 9A).

Elytra. Average for *latiuscula* species subgroup (Fig. 2C).

Male genitalia. Phallus (Figs. 11A, 11B) with preapex cylindrical, apex distinctly knobbed, bulbous; short (Table 4), narrow (Table 5), curvature slight (Table 6), and preapex moderately long (Table 7). Endophallus without microtrichial patches.

Female genitalia (Fig. 12F). Ovipositor with gonocoxite 1 average for the subgroup, gonocoxite 2 with a slight taper from base to insertion point with ensiform setae; apex bluntly rounded, very similar in form and proportions with females of *C. punctifera toltec* (Fig. 11F) and *C. apache* (Fig. 12A).

Habitat, habits and seasonal occurrence. This subspecies is known from areas that experience significant periods of below freezing temperatures. It is a resident of oak-pine montane forest, occurring on the ground in leaf litter, or in vegetation (specimens beaten from oak and juniper). Elevational range extends from near sea level to 3060 m with a mean collection elevation of 1600 m (Fig. 31). Adults readily fly to lights (many were collected from UV light traps), which implies that most of the habitat notes are probably about beetles which landed on or were resting on/in vegetation after dispersing. Adults have been collected in every month of the year from February through November with the largest number of captures made during the months of summer (Fig. 30).

Geographical distribution. (Fig. 20). The range of *C. p. punctifera* includes northeastern México from 25° N. lat northward to southwestern Texas, and westward to southeastern Arizona. To the west in México, the range includes the Sierra Madre Occidental from the Rio El Fuerte Basin in western Sonora and Chihuahua northward to the slopes of the isolated mountain ranges (Chiricahua, Huachuca, Pajarito, Pinaleno, Santa Catalina, Santa Rita, etc.) in southeastern Arizona.

Geographical affinities. In Arizona and New Mexico, the range of *C. p. punctifera* (Fig. 20) completely overlaps the ranges of *C. apache* (Fig. 14) and *C. yaqui* (Fig. 26). To the east in the Mexican state of Tamaulipas, the range of *C. p. punctifera* overlaps narrowly the range of *C. latiuscula*.

Material examined. We have examined 1144 specimens collected in the following localities in México and southwestern U.S.A. **MÉXICO. Chihuahua.** Basuchil, 1830-2140 m, VIII.1929, Y. Meria, 1F (CASC); Cerro San Luis, 1767 m, 13.VIII.1981, S. McCleve, P. Jump, 1F (UAIC); 67.2 km N, Chihuahua, 4.8 km W, Parrita, 1560 m, 2.VI.1981, J.K. Liebherr, 1M, 1F (CUIC); Cerro Venado, 37 km N Temosachic, ca. UV light, 2161 m, 19.VII.1984, S. McCleve & P. Jump, 1M (UASM); 6.4 km N, Los Chinacas, nr Sonora border, 1271 m, UV, 9-10.VII.1989, S. McCleve, 1F, (UASM); 48.1 km N, Madera, 2480 m, oak-pine forest litter, 83-26, 9.VII.1983, H.E. Frania, R. Jaagumagi, D. Shpeley, 1M (UASM); 8 km W, Parrita, Santa Clara Canyon, 21.VI.1956, J.W. MacSwain, D.D. Linsdale, 1F (EMEC); 37 km SW Ciudad Jiménez, ca. UV light, 1539 m, 17.VII.1984, S. McCleve & P. Jump, 1F (UASM); 4 km E, Perdernales, UV light, ca. 2234 m, 18.VII.1984, P. Jump & S. McCleve, 8M, 6F (UASM); 9.7 km S, Yecora (Sonora), 1752 m, UV, 2-3.VII.1990, S. McCleve 1M, 1F (UASM), 10 km SW Yecora, Sonora, in the Sierra Madre Occidental, 1830 m, oak-pine forest, beating vegetation, 93-17, 6-7.VII.1993, S. McCleve, K.E. & G.E. Ball, 1M (UASM). **Coahuila:** 6.4 km W, Saltillo, 1710 m, 20.VIII.1971, O'Briens, Marshall, 1M (UASM); Rte. 57, 16 km SE, Saltillo, 2230 m, 27.V.1981, J.T. Doyen, J.K. Liebherr, 1F (EMEC); 52.8 km SE, Saltillo, near Jame, 2290 m, 25.VII.1963, at light, H.F. Howden, 1M (CNCI). **Nuevo Leon:** 4.8 km E, Galeana, 1530 m, 7-8.VIII.1963, Duckworth, Davis, 1M (USNM); 11.2 km ESE, Galeana, 1680 m, 22.VI.1982, J.E. Rawlins, 1F (CMNH); 32 km W, Linares, 8.XI.1946, E.S. Ross, 1M (CASC); Paso Mamulique, 650 m, 16.VII.1982 1F (MAIC), 10 km S Monterrey, Chipinque Mesa, UV light, 1371.6 m, 2.VI.1983, M. Kaulbars, R.S. Anderson, 1F (UASM). **Sonora:** 11.2 km W, Alamos, light coll, 8.VIII.1964, J.A. Chemsak, J. Powell, 1F (EMEC); same, UV, 18.VII.1967, M.S. Wasbauer, 1F (CDAE); Bacanora, 14.2 km (by air) SW of, Rancho las Tierras de Jiménez, Sierra de Murieta rocky slope, oak woodland 1387 m 28.90111 -109.51417, 2.VIII.2014, T.R. Van Devender, 1M (UASM); 7 km N, El Coyote, 26.VI.1981, 1200 m, at light, S. McCleve, 2M, 1F (UAIC); Rte 15, 51.2 km S, Hermosillo, 230 m, desert, 27.VII.1967, G.E. Ball, T.L. Erwin, R.E. Leech, 1F (UASM); Esqueda, 7.9 km (by air) ESE of, 30.6975°N, 109.5075°W, Chihuahuan desert scrub, 1275 m, 16.VIII.2017, T.R. Van Devender, A.L. Reina-G. 1M (UASM); 22.1 km SE Huachinera, Sierra Huachinera, oak-pine forest, 2090 m, 82-05, 3-4.VIII.1982, G.E. & K.E. Ball, S. McCleve, 2M, 1F (UASM); 5.1 km NW, Huicoche, near Chihuahua border, UV, 1577 m, 11-13.VII.1989, S. McCleve, 3F (UAIC); Mazatán, 10.7 km (by air) NW of, Sierra Huerfana, 1.6 km (by air) WSW of Rancho El Bachan gentle granitic slopes, oak woodland 1381 m 29.09083° N -110.20472° W, 28.VII.2014, T.R. Van Devender, 6M 3F (UASM); 17 km SW, Moctezuma, at light, 940 m, 27.VI.1981, S. McCleve, P. Jump, 1F (UAIC); 17 km SW Moctezuma, at light, 944 m, 1-12.VII.1983, S. McCleve & P. Jump, 3M, 3F (UASM); 19.1 km. S Moctezuma, on Rte. 14, Sinaloan legume forest, UV light,

2000 m, 93-14, 4.VII.1993, S. McCleve, G.E. & K.E. Ball, 1F (UASM); 19 km NW, Nacori Chico, 930 m, desert, beating, 82-09, 5.VIII.1982, G.E. & K.E. Ball, S. McCleve, 1M, 1F (UASM); Observatorio de Astrofísica Guillermo Haro, vicinity of, Sierra la Mariquita, 31.05444°N, 110.38250°W, 9.4 km (by air) NNW of Cananea, rocky slope, pine-oak forest, 2422 m, 2.VIII.2013, T.R. Van Devender, J.D. Palting, 1F (UASM); Rancho Aguajia, 16 km NW Yecora, oak-pine forest, UV light, 1311 m, 93-28 & 29.VII.1987, S. McCleve, 7M, 5F (UASM); Rancho El Metate, 7.4 km (by air) SSW Naco, E base of Sierra San José, 31.25861°N, 109.95917°W, desert grassland, oak woodland, 1654 m, 16.IX.2017, T.R. Van Devender, J.D. Palting, 1M, 1F (UASM); Rancho Las Alisos, 9.4 km (by air) WSW of Aconchi, Sierra Anchonchi, 27.79833°N, 110.31972°W, rocky canyon Sycamore riparian deciduous forest, oak woodland on slopes, 1301 m, 2.VII.2013, T.R. Van Devender, A.L. Reina-G. 3M, 8F (UASM); Rancho Las Avispas, 15.5 km (by air) SW of Nogales, Sierra Las Avispas, 31.19278°N, 111.10139°W, rocky canyon riparian forest, oak woodland, 1200 m, 21.VII.2012, T.R. Van Devender, A.L. Reina-G. 1M, 2F (UASM); Rancho Madroño, Sierra Huachinera, 2200 m, 25.VI.1981, S. McCleve, P. Jump, 1M (UAIC); Rincón de Guadalupe, 16.5 km (by air) ENE of Bacadehuaci, Arroyo Campo Los Padres (Rio Riito drainage), Sierra de Bacadehuaci, 29°50'40"N, 108°58'37"W, rocky canyon and mountainside, Sycamore, *Cupressus arizonica* riparian forest, pine-oak forest on slopes, 30.III.2012, T.R. Van Devender, 1F (UASM); Río Mayo, San Bernardo, 15.VII.1935, H.S. Gentry, 1M (CASC); Río Nácori, 20 km E, Nácori Chico, 1050 m, oak forest, UV, 83-03, H.E. Frania, R.J. Jaagumagi, D. Shpeley, 3F (UASM); Río Tres Rios, 18 km N, Mesa de Tres Rios, oak forest, litter, 1450 m, 5.VII.1983, H.E. Frania, R.J. Jaagumagi, D. Shpeley, 1F (UASM); Rte. 16, 32.3 km E Río Yaqui, thorn scrub-oak woodland, UV light, 917 m, 26-27.VII.1987, S. McCleve, 3F (UASM); San Carlos Bay, 10.VIII.1960, P.H. Arnaud, Jr., E.S. Ross, D.C. Rentz, 4M (CASC); Sierra Álamos, 2.7 km S, 1.9 km W Álamos, thorn forest, UV light, 518 m, 30-31.VII.1987, S. McCleve, 6M, 6F (UASM); Sierra Buenos Aires, 30.72668°N, 109.82116°W, rocky mountainside with pines, Hg vapor light 1701m, 14.VIII.2916, D. Shpeley, 01-16, 1M (UASM); Sierra Juriquipa, Rancho la Zulema, 15.9 km (by air) SE Nacozan de Garcia, 30.28389° N, 109.56028°W, rocky mountainside, oak woodland, 1687 m, 15.VII.2017, T.R. Van Devender, J.D. Palting, 2M, 2F (UASM); Sierra Madre Occidental, 6.1 km S, Santa Rosa, Sinaloa, thorn scrub, UV light, 1900 m, 93-22, 9.VII.1993, S. McCleve, G.E. & K.E. Ball, 7M, 4F (UASM); Sierra Madre Occidental, 11.6 km NW Yecora, oak-pine, roadside, 1900 m, 93-19, 8.VII.1993, S. McCleve, G.E. & K.E. Ball, 1M (UASM); Sierra Madre Occidental, 23.2 km NW Yecora, oak forest, UV light, 1680 m, 93-20, 8.VII.1993, S. McCleve, G.E. & K.E. Ball, 1F (UASM). **Tamaulipas:** Sierra Pichachos, 21.XI.1978, J.W. Johnson, 1M (TAMU). **U.S.A. Arizona:** "Arizona", 1M (ANSP). *Cochise County:* (non-montane localities), Gleeson, ex cowpie, 9.VIII.1979, F.G. Andrews, 1F (CDAE); Leslie Canyon, 25.6 km N, Douglas, 1432 m, UV, Loc. 21, 18.VII.1976, G.E. Ball, J.M. Campbell, P.M. Hammond, 2M, 1F (UASM); Palmerlee, H.A. Kaeber (USNM) (1M; VII, 1M; VII.1917, 1M; VII.1920, 1M; VI.1927, 1F); *Chiricahua Mountains*, "Chiricahua Mts": 9.VII.1908, 1M (CASC); 30.VII.1927, J.A. Kusche, 1M, 2F (CASC); "Chiricahua Mts", D.J. & J.N. Knull (OSUC)—2.VII.1929, 1F; 5.VII.1949, 1F; 26.VII.1952, 1F; 13.VII.1953, 1F; 15.VII.1953, 2F; 17.VII.1957, 2F; 22.VII.1957, 3F; 27.VII.1957, 1F; 2.VII.1959, 4F; 16.VII.1959, 2F; Chiricahua National Monument, nr. entrance, at night, 13.V.1972, C. O'Brien, Marshall, 1F (USNM); Ash Canyon, 24.VII.1968, D.E. Bright, 1M, 1F (CNCI); Ash Canyon, 11.2 km W Palominas, UV light, 1550 m, (TAMU)--6.VIII.1995, 1F; 21.VIII.1995, 1F; 14.X.1995, 1F; *Chiricahua Mountains, Cave Creek Canyon:* Cave Creek, 1530-1830 m, 26.VIII.1927, J.A. Kusche, 1M (CASC); Cave Creek Canyon, D.L. Gustavson, 3.VIII.1986, 2M (MTEC); Cave Creek Canyon, UV, 1560 m, 31.VII.1988, D.L. Gustavson, 1F (MTEC); Cave Creek Canyon, 1.VII.1988, D.L. Gustavson, 1F (MTEC); Cave Creek Canyon, 6.4 km SSW, Portal, 1620-1650 m, 23.VIII.1981, R. Davidson, 1F (CMNH); Cave Creek Canyon, 24-28.VII.2011, J. Wappes, B. King, 1M, 1F (UASM); Cave Creek Canyon, 9.6 km W, Portal, 14.VII.1959, G.E. Ball family, 1M (UASM); Cave Creek Ranch, 1530 m, at light, 6-8.VIII.1960, G.E. Ball family, R.B. Madge, 1F (UASM); Cave Creek Canyon, near Portal, 31° 52' 59"N 109° 10' 49"W, UV, 1570 m, 5.VIII.2003, E. Riley, 3M, 6F (TAMU), 1M, 1F (EGRC); Cave Creek Canyon, near Southwest Research Station, 31° 53' 38"N 109° 12' 53"W, UV, 1720 m, 6.VIII.2003, E. Riley, 2M, 6F (TAMU), 1M, 2F (EGRC); Cave Creek Ranch 1520 m, G.E. Ball family, R.B. Madge, - (9.VIII.1960, 1M, 2F; 10.VIII.1960, 1M, 1F; 25-31.VIII.1960, 2F); Cave Creek Ranch, Portal, 29-30.VIII.1971, E.G. Linsley, 1M (EMEC); Cave Creek Ranch, Portal, 20-24.VIII.1972, E.G. Linsley, 2M (EMEC); Cave Creek, South Fork, UV, Lot No. 135, 9.VII.1964, J. Stibick, 1M, 2F (USNM); Cave Creek, South Fork, UV, Lot No. 136, 10.VII.1964, J. Stibick, 1M, 1F (USNM); Cave Creek, South Fork, UV, 1620 m, Lot No. 140, 11.VII.1964, J. Stibick, 2M, 1F (USNM); South Fork, Lot No. 814, 10.VII.1966, R.H. Arnett, Jr., E.R. Van Tassell, 4F (FSCA); Lot No. 817, 11.VII.1966, R.H. Arnett, Jr., E.R. Van Tassell, 1F (FSCA); Lot No. 824, 13.VII.1966, R.H. Arnett, Jr., E.R. Van Tassell, 1M, 2F (FSCA); Lot No. 827, 15.VII.1966, R.H. Arnett, Jr., E.R. Van Tassell, 1F (FSCA); *Chiricahua Mountains:* Chiricahua RRR Station, 10.VIII.1972, S. McCleve, 3F (UAIC); Herb Martyr Forest Camp, 1780 m, UV, 1.VIII.1966, R.G. Beard, 3F (CUIC); Herb Martyr Camp, 10 km. SW Portal, 1700 m, riparian forest, ex f.i.t., S&JP 2000-17, 9.V.2000, S. & J. Peck, 3M (CMNC); Onion Saddle, 2320 m, pine-oak, UV, R.G. Beard, 7.VII.1966, 1F (CUIC); Paradise, 1530-1830 m, 22.VIII.1927, J.A. Kusche, 1F (CASC); 3.2 km N, Paradise, 1620 m, 6-8.VII.1964, D.R. Davis, 2F (USNM); 6.4 km. SW Paradise, 5.VIII.1967, F.G. Andrews, 1M, 3F (CDAE); Parker Canyon Lake, 25.VII.1968, D.E. Bright, 1M, 1F (CNCI); Parker Dam Lake, 1770 m, at light, 6.VIII.1979, J.K. Liebherr, 1F (CUIC); Pinery Canyon, 3M, 3F (TAMU); Portal, 21.VII.1965, W. Rosenberg, 1M, 1F (USNM); Portal, 29.VII.1965, W. Rosenberg, 5M, 4F (USNM); Portal, Mont. Cazier, 3.VIII.1964, 1M (CMNH); Portal, VII.1976, Dr. Lenczy, 1F (CMNH); Portal, 5.VIII.1965, B.K. Dozier, 1F (FSCA); Portal, 10.VI.1967, D.J. & J.N. Knull, 2M (OSUC); Portal, 24.VI.1967, B.A. Tilden, 1F (USNM); Portal, at light, 14.VII.1963, A. Raske, 1F (EMEC); 1.6 km S, Portal, Mont Cazier, (CMNH)-19.

- VI.1965, 1F; 3.VII.1965, 1M, 2F; 3.2 km S, Portal, 19. VI.1965, Mont Cazier, 2F (CMNH); 8 km. W, Portal, 2. IX.1976, F.G. Andrews, 1M, 3F (CDAE); 30.4 km W, Portal, 13.VI.1968, T.L. & L.V. Erwin, 1F (USNM); near Portal, 28.VII-7.VIII.1966, 1M (TAMU); near Rucker Lake, 10.VII.1974, S. McCleve, 4F (UAIC); *Southwestern Research Station*: on horse dung, 9.VI.1956, 1650 m, O.L. Cartwright, 1F (USNM); 1650 m, 4.VII.1956, O.L. Cartwright, 3F (USNM); 8-10.VII.1956, O.L. Cartwright, 1F (USNM); 23.VII.1956, C. & M. Cazier, 1F (AMNH); at light, H.F. & A. Howden, 10.VI.1956, 2F (CNCI); H.F. & A. Howden, 12.VI.1956, 1F (CNCI); at light, H.F. & A. Howden, 17.VI.1956, 1F (CNCI); H.F. & A. Howden, 24. VI.1956, 1F (CNCI); H.F. & A. Howden, 30.VI.1956, 1F (CNCI); H.F. & A. Howden, 7.VII.1956, 2F (CNCI); H.F. & A. Howden, 8.VII.1956, 3F (CNCI); H.F. & A. Howden, 9.VII.1956, 2F (CNCI); H.F. & A. Howden, 7.VII.1956, 2F (CNCI); 10.VI.1956, H.F. & A. Howden, 1F (FSCA); Lot 289, 14-22.VII.1957, R.H. Arnett, Jr., 2F (FSCA); Lot 309 13.VIII.1957, R.H. Arnett, Jr., 1F (FSCA); 1650 m, 13. VI.1958, C.D. MacNeill, 1F (CASC); 17.VI.1958, C.D. MacNeill, 1F (CASC); 23.VII.1961, J.M. Linsley, 1M (EMEC); 1650 m 31.VII-2.VIII.1964, D.R. Davis, 1F (USNM); 23.VI.1967, B.A. Tilden, 1F (USNM); UV, 1. VIII.1967, R.E. Frisbie, 1M (UCRC); 13.VII.1969, L.L. Pechuman, 1F (CUIC); 11-28.VIII.1980, L.L. Lampert, 2F (MTEC); W. Rosenberg, (USNM) — (16.VIII.1977, 1F; 17.VIII.1977, 2F; 18.VIII.1977, 2F; 20.VIII.1977, 2F; 21. VIII.1977, 1M, 4F; 22.VIII.1977, 1M, 4F; 23.VIII.1977, 2F; 24.VIII.1977, 3F; 25.VIII.1977, 2M, 2F; 26.VIII.1977, 1F; 27.VIII.1977, 1M, 1F; 28.VIII.1977, 3F; 29.VIII.1977, 2F; 30.VIII.1977, 2F; 31.VIII.1977, 1M, 1F; 1.IX.1977, 2F; 2.IX.1977, 2F; 3.IX.1977, 1F; 4.IX.1977, 3F); Southwest Research Station, 8 km SW Portal, 31° 54' 02"N 109° 13' 39"W, at light, 1645 m, 16-22.VIII.2000, M.J. Yoder, 1F (TAMU); near Southwest Research Station, near Portal, 31° 52' 55"N 109° 13' 04"W, UV, 1675 m, 4. VIII.2003, E. Riley, 1M, 4F (TAMU); Stewart Camp, 1.6 km W, Portal, UV, 18-20.VII.1971, J.T. Doyen, 2M, 5F (EMEC); Stewart Camp, 4.8 km W, Portal, UV, 25. VII.1971, J.T. Doyen, 3M 4F (EMEC); Texas Canyon, 1520 m, 23.IX.1927, J.A. Kusche, 1M (CASC); Texas Canyon, 1530-1830 m, 30.IX.1927, J.A. Kusche, 1M, 1F (CASC); West Turkey Creek, at light, 20.VI.1972, S. McCleve, 1F (UAIC). *Dragoon Mountains*, Cochise Stronghold: light trap, 13.VIII.1958, C.W. O'Brien, 5F (USNM); 15.VIII.1957, M.C. Cushner collection, 1F (CASC); 29.III.1968, R.F. Sternitzky, 1M (CNCI); Cochise Stronghold, 12.VII.1978, G.J. Hilchie, 5M, 11F (GJHC); 5.6 km W Dragoon, 22.VII.1985, P.K. Lago, 2M (PKLC); Cochise Stronghold, sweeping, feeding on mesquite, at night, 8.VIII.1979, F.G. Andrews, 8M, 5F (CDAE). *Cochise County: Huachuca Mountains*, "Huachuca Mountains": Charles Palm Coll., 1F (AMNH); 1M (CUIC); 1M (CUNY); Brooklyn Mus. Coll., 1F (USNM); VII.1905, 1M, 1F (USNM); E. Shoemaker Coll., VII, 1905, 1M, 1F (CASC); 4F (USNM); J.W. Green Coll., 1M, 2F (CASC); 11. IX.1928, E.R. Leach, 1F (CMNH); Bear Creek, Montezuma Pass, 30.VI.1956, H.F. & A. Howden, 2F (CNCI); Bear Creek, Montezuma Pass, 1.VII.1956, H.F. & A. Howden, 1M, 2F (CNCI); Montezuma Pass, 6.VII, H.F. & A. Howden, 1M, 1F (CNCI); *Carr Canyon*: 24 km S, Sierra Vista, 9.V.1964, 1710-1830 m, R.F. Sternitzky, 1F (CNCI); 23.VII.1968, D.E. Bright, 1M, 2F (CNCI); 3060 m, at night, 23.VIII.1970, R.E. Woodruff, 10F (FSCA); canyon floor, 1650 m, 8-9.VIII.1952, H.B. Leech, J.W. Green, 1M, 1F (CASC); canyon mouth, grassland, 1430 m, Locs. 25 & 31, 20 & 24.VII.1976, J.M. Campbell, P.M. Hammond, G.E. Ball, 1F (UASM); E Slope, 1760 m, UV, pine-oak forest, 20.VII.1976, J.M. Campbell, P.M. Hammond, G.E. Ball, 18M 32F (UASM); Copper Canyon, 13.VII.1978, G.J. Hilchie, 1F (GJHC); *Miller Canyon*: 21.VII.1907, H.A. Kaeber, 1M, 2F (USNM); 1530 m, E.R. Hoebeke, (CUIC) — (25.VI.1974, 1F; 1.VII.1974, 1M; 2.VII.1974, 3F; 3.VII.1974, 1M, 2F; 5.VII.1974, 5M, 5F; 7.VII.1974, 3F; 10.VII.1974, 1M, 2F; 17.VII.1974, 1F); 1530 m, T.L. McCabe, (CUIC) — (25.VI.1974, 1M; 2.VII.1974, 2F; 3. VII.1974, 1M; 4.VII.1974, 1F; 8.VII.1974, 1F; 14.VII.1974, 1F; 15.VII.1974, 1F; 17.VII.1974, 1F; 22.VII.1974, 1M); 1680 m, A.E. Zuccaro, Jr. 21.VII.1985, 2M, 3F (PKLC); 30.VI.2000, R. Turnbow, 1F (RHTC); *Ramsey Canyon*: R.F. Sternitzky (CNCI) — (1830 m, 2.VIII.1964, 1F; 1830 m, 29.VI.1967, 1F; 11.VII.1967, 2F; 16.VII.1967, 1M; 22.VII.1967, 2M; 24.VII.1967, 1F; 1590 m, IV-V.1968, 2F; 1830 m, 27.V.1968, 2F; 1590 m, VI.1968; 1590 m, VII.1968, 2M, 1F; VIII.1968, 2M, 1F; 1590 m, VIII.1968, 2M, 3F; IX.1968, 1M); Sierra Vista, Huachuca Mountains, R.F. Sternitzky (CNCI) — (20.III.1964, 1F; V.1965, 1F; VI, 1965, 1F; 15-30.VI.1965, 1M; VI.1966, 1F; 16.VI.1967, 2M, 8F; 20.VI.1967, 1M, 2F; 8.VII.1967, 2F; 20-31. VII.1967, 5M, 3F; 25.VII.1967, 7M, 7F; IX.1967, 2M, 3F; X.1967, 3M, 7F); Sunnyside, 19.VIII.1940, Van Dyke, 1F (CASC); *Peloncillo Mountains*, 52.8 km E. Douglas, at light, 17.VII.1973, S. McCleve, 3M (UAIC). *Coconino County*: Walnut Canyon, 10.1 km EESE Flagstaff, 12. VII.1965, J.G. Franclemont, 1M (CUIC). *Gila County*: Globe, 18.VII.1933, Parker, 1M (CASC); 17.6 km SE, Globe, Pinal Mtn. Recreation Area, 27.VII.1990, P.K. & E.B. Lago, 1F (PKLC); 24.1 km E, Payson, 1640 m, Loc. 37, 26.VII.1976, G.E. Ball, J.M. Campbell, P.M. Hammond 1M, 1F (UASM); Pinal Mts., 1707 m, UV, 13-15.VII.1977, R.P. Allen, G.C. Duffy, 20M, 16F (CDAE). *Graham County*: Aravaipa Canyon, east end, at light, 24-25. VII.1974, S. McCleve 1F (UAIC); Aravaipa Canyon, 17.7 km N, Klondyke Junction, Turkey Creek, 900 m, Loc. 33, UV, 24.VII.1976, G.E. Ball, J.M. Campbell, P.M. Hammond, 3M 1F (UASM); Fort Grant, 12.VII, Coll. Hubbard, Schwarz, 1F (USNM); *Galiuro Mountains*, "Galiuro Mountains", 1650-1770 m, 30.VII.1963, G.E. & K.E. Ball, 1F (UASM); Ash Creek Canyon, North Fork, 1530-1640 m, riparian forest, 82-18, 16-17.VIII.1982, G.E. Ball, S. McCleve, D.R. Maddison, 1M, 7F (UASM); Powers Garden, 28.VII.1963, G.E. & K.E. Ball, 1F (UASM); *Pinaleño Mountains*, 9 km SW, of Artesia, Wet Canyon, Arcadia Camp, 2030 m, 5-7.VIII.1991, M. Damon, R. Davidson, M. Klingler, W. Zanol, J. Rawlins, 2M (CNMH); [*Pinaleño Mountains*], Mt. Graham, Wet Canyon, 15 km SW Safford, 1800 m, ex f.i.t., S&JP 2000-11, 6.V-6. VI.2000, S. & J. Peck, 2F (CMNC). *Greenlee County*: 33.6 km N, Clifton, 12.VII.1968, D.E. Bright, 1M (CNCI). *Pima County*: (non-montane localities), Green Valley, VI.1973, Lenzy, 4M, (OSUC); Madera Canyon, 5.VIII.1961, F.G. Andrews, 1M (CDAE); Madera Canyon, at light, 8. VIII.1986, M.A. Ivie, 1M (MTEC); Madera Canyon, Proctor Road, MV + UV, 25.VII.1989, R.H. Turnbow, 2F (RHTC); Mount Lemmon, lower edge of oak zone, 14.

VIII.1983, E.G. Riley, 1F (TAMU); Santa Rita Experimental Range, 4.VIII.1988, S. Lajeunesse, 1M (MTEC); Tucson, J.W. Green, 1M (CASC); *Baboquivari Mountain*, Baboquivari Canyon, 25-27.VII.1952, H.B. Leech, J.W. Green, 6M, 1F (CASC); El Mirador Ranch, 6.4 km NW, of Sasabe, 1190 m, 3.IX.1950, T. Cohn, P. Boone, M. Cazier, 1M (AMNH); Kitt Peak, 2.VIII.1968, D.E. Bright, 8M, 10F (CNCI); Sabino Canyon, 1143 m, at light, 31.VII.1979, S. McCleve, 1M (UACI); 20.8 km E, Topawa, 1220 m, 25.VII.1952, Leech, Green, 1F (CNCI); *Santa Catalina Mountains*, Bear Canyon, 2140 m, Acc. No. 48-123, 4-5.VIII.1948, G.E. Ball, 1F (UASM); Bear Canyon area, Lot No. 387, 2.VII.1959, R.H. Arnett, Jr., 2F (FSCA); Bear Canyon, Lot No. 395, 6.VII.1959, R.H. Arnett, Jr., 1F (FSCA); Madera Canyon, UV, 26.VIII.1970, R.E. Woodruff, 2F (FSCA); Madera Canyon, 15.VIII.1983, E.G. Riley, 1F (TAMU); Madera Canyon, Whitehouse Picnic Area, MV & UV, 24.VII.1989, R. Turnbow, 1M, 1F (RHTC); Molino Basin, 2.VIII.1970, J. Powell, P. Rude, 1F (EMEC); Molino Basin, 1410 m, 3.IX.1965, L. & C.W. O'Brien, 3M, 4F (USNM); Molino Basin, 1410 m, 4.IX.1965, L. & C.W. O'Brien, 1F (USNM); Molino Canyon, 9.IX.1969, 1M (UASM); *Santa Rita Mountains*, 11.VII.1986, J.A. Comstock, 1M (CNCI); Box Canyon, 1340 m, 3.VIII.1988, S. Lajeunesse, 2M (MTEC). *Pinal County*: Casa Grande, 12.VIII.1955, 1F (UCRC). *Santa Cruz County*: (non-montane localities), Canelo, 14.V.1967, R.F. Sternitzky, 1M (CNCI); Patagonia, Sonoita Creek, 14.IV.1968, R.F. Sternitzky, 1F (CNCI); *Atasco Mountains*, Sycamore Canyon, UV, 13.VIII.1977, S. Kaba, 2M, 6F (CDAE); *Pajarito Mountains*, Peña Blanca, 31.VIII.1966, F.G. Andrews, 1F (CDAE); Peña Blanca, 1210 m, 26.VIII.1959, J.G. Franclemont, 2F (CUIC); Peña Blanca, 1190 m, at light, 5.VIII.1979, J.K. Liebherr, 1F (CUIC); Peña Blanca, Lot 600, R.H. Arnett, Jr., E. van Tassell, (FSCA) — (6.VII.1962, 1M; 7.VII.1962, 1M; 9.VII.1962, 1M, 1F; 14.VII.1962, 1M; 16.VII.1962, 1M); Peña Blanca, 1220 m, at light, 11.VIII.1960, G.E. Ball family, R.B. Madge, 1F (UASM); 29.VII.1965, G.E. Ball, D.R. Whitehead, 2M, 1F (UASM); Peña Blanca, Lot No. 172, 8-10 PM, UV, J. Stibick, 22.VII.1964, 1F (USNM); Peña Blanca, Lot No. 185, UV, J. Stibick, 8.VIII.1964, 1F (USNM); Peña Blanca Canyon, 28.VII.1970, K.P. Stephan, 1F (TAMU); Peña Blanca Lake, 20.VII.1985, P.K. Lago, 2M, 7F (PKLC); 3.2 km S Peña Blanca Lake, UV light, 1250 m, 28.VII.1989, R.S. Anderson, S. McCleve, 5F (TAMU); near Peña Blanca Lake, 31° 22' 58"N 111° 05' 30"W, 7.VIII.2003, E.G. Riley, 1M, 3F (TAMU); *Patagonia Mountains*, Mt. Washington, 1830 m, nr. Nogales, 16.VII.1919, J.A. Kusche, 1F (CASC); Mt. Washington, 1830 m, nr. Nogales, 20.VII.1919, J.A. Kusche, 3F (CASC); *Santa Rita Mountains*, Santa Rita Mountains, 15.VI, Hubbard, Schwarz, 1F (USNM); Box Canyon, 7.IV.1968, K.P. Stephan, 1M (TAMU); Box Canyon, 13.IV.1969, K.P. Stephan, 1F (TAMU); Madera Canyon, 25-29.VII.1982, J.E. Wappes, 2F (TAMU); Madera Canyon, 8.VIII.1970, A.J. Gilbert, 1F (CDAE); Madera Canyon, 1890 m, 1-2.VIII.1952, H.B. Leech, J.W. Green, 1M (CASC); Madera Canyon, J.G. Franclemont, (CUIC) — (1490 m, 30.VI.1959, 7M, 8F; 1490 m, 1.VII.1959, 1490 m, 8M, 7F; 1490 m, 2.VII.1959, 1M, 1F; 1490 m, 4.VII.1959, 3M, 10F; 1490 m, 8.VII.1959, 1M; 1490 m, 20.VII.1959, 4M, 4F; 1490 m, 23.VII.1959, 3M, 2F; 1490 m, 25.VII.1959, 3M, 1F); Madera Canyon, J.D. Marshall (CUIC) — (1490 m, 10.VI.1963, 1M; 1490 m, 11.VI.1963, 1M; 1710 m, 15.VI.1963, 1M; 1710 m, 17.VI.1963, 3M, 2F; 1710 m, 18.VI.1963, 2M, 1F; 1710 m, 20.VI.1963, 1M; 1490 m, 23.VI.1963, 1F; 1710 m, 25.VI.1963, 1M; 1710 m, 28.VI.1963, 1F; 1710 m, 1.VII.1963, 1M; 1490 m, 4.VII.1963, 1F); Madera Canyon, 1340 m, 13.VI.1965, R.W. Poole, 1M (CUIC); Madera Canyon, 13.VIII.1968, light trap, E.C. Becker, 1M, 4F (CNCI); Lot No. 436, 5.VIII.1959, R.H. Arnett, Jr., 11M, 4F (FSCA); Madera Canyon, at light, 17.VII.1959, G.E. Ball family, 4M, 5F (UASM); Madera Canyon, 1530-1770 m, 3.VIII.1960, G.E. Ball family, R.B. Madge, 1M, 3F (UASM); Madera Canyon, 1530-1770 m, 10.VIII.1960, G.E. Ball family, R.B. Madge, 8M, 6F (UASM); Madera Canyon, 1520 m, under oak leaves, 10.VIII.1960, G.E. Ball family, R.B. Madge, 2F (UASM); Madera Canyon, 1530 m, at light, 11-24.VIII.1963, G.E. & K.E. Ball, 1M, 6F (UASM); Madera Canyon, 1895 m, 1-2.VIII.1952, H.B. Leech, J.W. Green, 1F (CASC); Madera Canyon, UV, 15.VIII.1964, R. Dickson, 1M (UCRC); Madera Canyon, 15.VII.1947, L. Martin, 1F (LACM); Madera Canyon, 1710 m, 17.VI.1963, J.D. Marshall, 1M (CUIC); Madera Canyon, 1710 m, 21.VI.1963, J.D. Marshall, 1M (CUIC); Madera Canyon, 10.VIII.1957, Stange, Harding, 1M (LACM); Madera Canyon, 21.VII.1969, K.P. Stephan, 1F (TAMU); Madera Canyon, 8.VII.1970, K.P. Stephan, 1F (TAMU); Madera Canyon, W. Rosenberg, (USNM) — (1.VII.1977, 2F; 2.VII.1977, 1F; 3.VII.1977, 4F; 4.VII.1977, 1M, 1F; 5.VII.1977, 3F; 6.VII.1977, 1F; 7.VII.1977, 1M; 9.VII.1977, 1M; 12.VII.1977, 2M, 1F; 13.VII.1977, 1M, 2F; 14.VII.1977, 1F); Madera Canyon, 1650 m, UV, 7-8.VIII.1986, M.A. Ivie, 2M, 2F (MTEC); Madera Canyon, 1650 m, UV, 4.VIII.1988, M.A. Ivie, 1F (MTEC); Madera Canyon, 1400-1670 m, 13-22.VI.2011, J. Wappes, B. King, 1M, 2F (UASM); Madera Canyon, Bog Spring Camp Ground, 10-26.VIII.1964, D. Davis, 2M, 7F (USNM); Madera Canyon, Roundup Picnic Area, MV + UV, 27.VII.1989, R.H. Turnbow, 1M, 1F (RHTC); *Tumacacori Mountains*, Calabasas Canyon, E slope, 1220 m, chaparral, 28.VII.1948, G.E. Ball, H.E. Evans, 1F (UASM). *Yavapai County*: Granite Basin Lake, 11.2 km NW, Prescott, 17.VII.1985, P.K. Lago, 3M 4F (PKLC); Prescott, 6.4 km N, Granite Dells, 12.VII.1970, L.M. Martin, 1F (LACM); Prescott, UV, 1.VIII.1968, J.C. Schaffner, 1F (TAMU). **New Mexico**: *Catron County*: Cooney Canyon, 16 km E, Alma, 11.VII.1959, G.E. Ball family, 1F (UASM). *Grant County*: Burro Mountains, Sawmill Canyon, 1840 m, UV, 19.VII.1983, S. McCleve, W. Riley, 2M (UASM). *Hidalgo County*: Peloncillo Mountains, Clanton Draw, at light, 1675 m, 7.VII.1991, S. McCleve, 1F (TAMU). *Otero County*: Sacramento Mountains, Westside Road, 32° 54' 49"N 105° 50' 05"W, UV, 2285 m, 11.VII.2003, E.G. Riley, 3M, 3F (TAMU). *Socorro County*: Water Canyon 11 km SE, Magdalena, 2070 m, 5.VIII.1984, R.E. Acciavatti, R.L. Davidson, 2F (CMNH). **Texas**: *Brewster County*: *Big Bend National Park*, Cattail Falls Road and Window Outlet, R.S. Anderson, 1M (UASM). Big Bend National Park, 14.VII.1950, R.F. Smith 1M, 2F (AMNH); Big Bend National Park, 9.IV.1967, A. & M.E. Blanchard, 1M (USNM); Chisos Basin, 17.VI.1956, H. & A. Howden, 2F (CNCI); Chisos Basin, H.F. Howden, E.C. Becker (CNCI) — (beating *Quercus grisea* or *Juniperus* or taken at light, 3.V.1959, 3M, 2F;

beating *Quercus grisea*, 8.V.1959, 1M 2F; 27.V.1959, 2M, 1F); Chisos Basin, door light, 1610 m, 19.V.1982, R.O. Kendall, C.A. Kendall, 1F (TAMU); Green Gulch, 2.VII.1978, J.E. Wappes, 2M (JEWG), 1F (TAMU); Green Gulch, 5.IV.1967, A. Blanchard, 2M (USNM); Juniper Canyon, 14.VII.1928, F.M. Gage, 1F (AMNH); North Rosillos Mountains, Buttrill Spring, Malaise trap, 10-17.VII.1991, R. Vogtsberger, 1M, 3F (TAMU); Panther Junction, 1220 m, 29-30.IV.1959, H.F. Howden, E.C. Becker, 1F (CNCI); Panther Pass, 1780 m, UV, 21.VII.1967, R.G. Beard, 1F (CUIC). *Jeff Davis County*: Limpia Canyon, Fort Davis, 4-6.VII.1968, J.E. Wappes, 1F (JEWG); Lympia [*sic!*] Canyon, Fort Davis, 4-6.VII.1978, J.E. Wappes, 1F (TAMU); 3.2 km N, Fort Davis, 26.VII.1985, A.E. Zuccaro, Jr., 1F (PKLC); 1.6 km W, Fort Davis, UV, 20.VII.1968, J.E. Hafernik, 1M, 1F (TAMU); Indian Lodge State Park, Route 118, UV, late evening, Lot No. 132, 8.VII.1964, J. Stibick, 2F (USNM); Route 118, 32-35.2 km SE, Kent, mesquite, 15.VIII.1981, R.L. Davidson, 1F (CMNH); Mount Locke, Davis Mountains, 4.VII.1969, A. & M.E. Blanchard, 18M, 13F (USNM); Davis Mountains Resort, 1830 m, 15.VII.1999, J.E. Wappes, 1M (TAMU); Davis Mountains Resort, MV & BL, R. Turnbow, (RHTC) (25.VI.2000, 2M, 1F; 26.VI.2000, 2M; 1.VII.2000, 2M, 1F); Davis Mountains Resort, 1700 m, 2-3.VII.2000, J.E. Wappes, 2F (TAMU); Davis Mountains Resort, D. Marqua residence, UV light, 1765 m, 26.VI.1994, E.G. Riley, 3M, 1F (TAMU); Davis Mountains Resort, D. Marqua residence, UV light, 1.VII.1999, E.G. Riley, 4M, 2F (TAMU); Davis Mountains Resort, upper Limpia Creek Canyon, 30° 37' 48"N 104° 07' 59"W, UV, 1880 m, 17.VII.2002, C.M. & E.G. Riley, 1M, 5F (TAMU); rest stop 15.2 km S Junction Hwy 118 on 166, UV light, 24.VII.1989, E.G. Riley, 1M (TAMU); rest stop 15.2 km S Junction Hwy 118 on 166, UV light, 9.VIII.1992, W. Godwin, E.G. Riley, 2F (TAMU); Davis Mountains State Park, UV, 29-30.VI.1999, E.G. Riley, 1M (TAMU); Madera Canyon Rest Stop, Hwy. 118, 23.VII.1989, E.G. Riley, C. Wolfe, 1F (TAMU); Madera Canyon Rest Stop, Hwy. 118, UV light, 28.VII.1999, E.G. Riley, 2F (TAMU). *Webb County*: Laredo, 8.I.1936, on green string beans, from México, 3791 R.C. Bondy, 1F (USNM); Laredo, 27.I.1938, on string beans, from México, 38-1597, R.C. Bondy, 1F (USNM).

***Cymindis* (*Pinacodera*) *punctifera toltec*, Hilchie & Ball, new subspecies**

(Figs. 5B, 7B, 7C, 9B, 9C, 11C-E, 13A, 20 22, 23, 30, 31)
<http://zoobank.org/A9EEBEEF-3E36-4701-B9DD-84A030338623>

Pinacodera cribrata (in part); Bates 1883: 188.

Note about synonymy. Bates (1883: 188) recorded two groups of localities for this taxon: a northern group, including sites in Veracruz and Oaxaca, México, and a southern group, including sites in Guatemala. Specimens from the Mexican sites probably belong to *C. punctifera toltec*, whereas those from the southern sites probably belong to *C. zacapa*, new species.

Type material. HOLOTYPE: Male: “// MEX. Sinaloa, Rte. / 15, Microond. El / Indio, Sin. thorn / for. 370 m, u.v light / 93-30, 18.VII.93 // MEX. EXPEDITION / 1993 S. McCleve, / G.E. & K.E. Ball / collectors //” (USNM). PARATYPES, 252 specimens: **MÉXICO. Colima:** 9.7 km

S, Colima, 335 m, Acacia thorn scrub, 88-24, 4.VII.1988, R.S. Anderson, 1M, 1F (UASM); 15.8 km S Colima, Rte 110, 500 m, pasture, oak-acacia litter, 31-85, 5.VIII.1985, H.E. Frania, D. Shpeley, 1F (UASM). **Durango:** Canelas, 1M (ZMHB); 16 km W, Durango, 12.VII.1954, J. W. MacSwain, 1F (EMEC); 25.6 km S, Durango, 14.VII.1964, H.F. Howden, 2F (CNCI); 40 km W, Durango, 10.VI.1964, H.F. Howden, 3M, 1F (CNCI); 44 km SE, Durango, 2.X.1990, R.H. Turnbow, 1M (RHTC); El Salto, San Antonio, 1530 m, 10.VI.1937, M.A. Embury, 1F (CASC); 51.9 km S Durango City, road to La Flor, Rte. 115, UV light, 93-44, 2560 m, 27.VII.1993, S. McCleve, G.E. & K.E. Ball, 1F (UASM); 11.8 km N, El Pino, oak-pine grassland, 2270 m, 93-39, 25-26.VII.1993, S. McCleve, G.E. & K.E. Ball, 1F (UASM); 11.8 km N, El Pino, oak-pine grassland, 2270 m, UV light, 93-40, 25-26.VII.1993, S. McCleve, G.E. & K.E. Ball, 2F (UASM); El Salto, vicinity, V.1976, pitfall, E. van den Burghe, and J. Probst, 2F (CMNH); Reserva de la Biosfera, La Michilia, El Temazcal, pine-oak forest, 2400 m, 80-22, 11-14.VIII.1980, 1980, G.E. Ball, W. Fraga, D. Shpeley, 1F (UASM); 8 km N, Rodeo, 6.4 km W, ca. UV light, 1417 m, 15.VII.1984, S. McCleve, P. Jump, 3M, 6F (UASM). **Guerrero:** 78.5 km N, jct. Rte. 200 on Rte. 134 to Ciudad Altamirano, oak-pine forest, leaf litter & under logs, 1770 m, 31-92, 31.VII.1992, J.S. Ashe, H.E. Frania, D. Shpeley, 1M (UASM); 22 km E, Cacahuamilpa, 1100 m, [no date], 3M, 1F (USNM); 22 km E, Chichihualco, 1590 m, 22.IX.1989, R. Turnbow, 1M (RHTC); 8 km N, Chilpancingo, 24.VIII.1958, H. F. Howden, 1M, 1F (CNCI); 8-10 km E, Huitzaco, 19. IX.1989, R. Turnbow, 2M, 1F (RHTC); 15.4 km SW, jct. Rte. 196 and rd. to Filo de Caballos, 1350 m, tropical deciduous forest, UV, 83-73, 9.VIII.1983, H.E. Frania, R.J. Jaagumagi, 1F (UASM); microondas, 10.7 km N, Iguala, 1160-1310 m, 21.IX.1989, R. Turnbow, 1M (RHTC); 12.8 km N, Iguala, 21.VIII. 1958, H.F. Howden, 1M, 1F (CNCI); 32 km W, Iguala, 1350 m, at light, 15.IX.1982, J.A. Powell, J.A. Chemsak, 3M, 2F (EMEC); Mexcala, 29.VI.1951, P.D. Hurd, 1F (CASC); 13 km S, Mezcala, (Hwy 95), 17. VII.1992, C.L. Bellamy 1M (CMNH); 9.7 km NE Taxco, 1707 m, 14.VIII.1974, C.W. & L. O'Brien, B. Marshall, 1F (UASM); 16 km NE, Taxco, 1710 m, 8.VII.59, 1F (OSUC); 10 km WSW, Xochipala, 1650 m, 30.VI.1982, J. E. Rawlins, 1M (CMNH); ca. 10 km SW, Xochipala, ca. 1728 m, 6. VII.1987, P. Kovarik, & J. Schaffner, 1F (CUIC); 11.1 km W, Xochipala, 17.IX.1989, R. Turnbow, 1F (TAMU). **Hidalgo:** 20.9 km NW, Ixmiquilpan, on Rte. 85, 1.3 km SE, 1524 m, UV light, 14.VII.1986, S. McCleve & P. Jump, 2F (UASM). **Jalisco:** 11.7 km S, Cocula, 1814 m, UV light, 12.VII.1984, S. McCleve, P. Jump, 1F (UASM); 8.8 km NW, Cuautla [*sic!*] 2020 m, 6-7.VIII.1967, G.E. Ball, T.L. Erwin, R.E. Leech, 2M, 1F (UASM); 14.6 km NW, Cuautla, 1675 m, 7.VIII.1967, G.E. Ball, T.L. Erwin, R.E. Leech, 2F (USAM); 42.4 km NW Cuautla, 1760 m, pine-oak litter, 28-85, 3.VIII.1985, H.E. Frania & D. Shpeley, 2M (UASM); 47 km NW Cuautla, 1520 m, arroyo, oak-acacia, 27-85, 2. VIII.1985, H.E. Frania, D. Shpeley, 1F (UASM); 7 km N, Malacque [*sic!*], 16, 19.VII.1990, J.E. Wappes, 1F (JEWG); 5.3 km S Tequila, on road to microondas, 1560 m, oak forest litter, 25.VII.1985, H.E. Frania & D. Shpeley, 1F (UASM). **México** (state): Cerros Guadalupe, 7.VII.1962, U. Stein, Col. J. Hendrichs S., 1F (CNIN). **Michoacán:** 35.4 km N, Arteaga, oak-Acacia woodland, 914 m, 8-17,

31.VII.1988, R.S. Anderson, 1F (UASM); San Lucas, Cerro del Salguaro, 300 m, 18°24'40"N, 100°38'00"W, selva baja caducifolia, vegetación secundaria arbustiva, col. noche, 18.IX.2004, P. Feria *et al.*, 2F (USNM); km 23, Carretera Morelia-Patzcuaro, 2000 m., 26.V.1988, A. Cadena, L. Cervantes, 1F (CNIN); 14.3 km S, Uruapan, oak-Acacia woodland, 1370-1465 m, 88-10, 29.VII.1988, R.S. Anderson, 1F (UASM). **Morelos:** Cuernavaca, 1680 m, 17.V.1959, H.E. Evans, 1M (CUIC); Cuernavaca, 1680 m, 28.V.1959, 1M; Cuernavaca, 1680 m, 4.VI.1959, H.E. & M.A. Evans, 1M (CUIC); Cuernavaca, 1680 m, 6.VI.1959, H.E. & M.A. Evans, 1M; Cuernavaca, Dr. A. Fenyes, A. Fenyes Collection, 1M, 1F (CASC); Cuernavaca, June, A. Fenyes Collection, 1M (CASC); Cuernavaca, 29.IX.1964, E.G. Linsley, A.E. Michelbacher, 1M (EMEC); Cuernavaca, 13.IX.1902, F. A. Eddy collection, 1M (MCZC); 8 km N, Cuernavaca, 28.VIII.1958, H.F. Howden, 1F (CNCI); 14.6 km E, Cuernavaca, Cañon de Lobos, 1310 m, UV, 24.VII.1966, G.E. Ball, D.R. Whitehead, 1F (UASM); 16 km E, Cuernavaca, 31.VII.1963, J. Doyen, 1F (EMEC); 24.1 km S, Cuernavaca, 15.XI.1946, E.C. Van Dyke, 1F (CASC); Huitzilac, 24.XI.1963, Col. J. Hendrichs S., 1F (CNIN); Tepalcingo, Los Sauces, 1004 m, 18°35'10"N, 98°57'18"W, selva baja caducifolia, vegetación secundaria arbustiva, trampa, 20-21.VI.2004, P. Feria *et al.*, 7F (UASM). Tlaquiltenango, Lorenzo Vsquez, 900 m, 18°33'36"N, 99°04'01"W, selva baja caducifolia, vegetación secundaria arbustiva, col. noche, 19.VI.2004, P. Feria *et al.*, 1M, 3F (USNM); Tlaltizapán, 1F (ZMHB); Xochitepec, *Atta* sp. 14.IV.1965, Col. J. Hendrichs S., 1M (CNIN). **Nayarit:** Arroyo Santiago, nr. Jesús María, 5.VII.1955, B. Malkin, 1M (EMEC); Rte. 66, 12.1 km E Jalcocotan, subtropical fruitfall in ravine, 963 m, 86-97, 25.VIII.1986, G.E. Ball, H.E. Frania, & D.J. Mulyk, 1F (UASM); 57.9 km SW Las Piedras, ca. 70 m, UV light, 7-8.VII.1984, S. McCleve, P. Jump, 9M, 8F (UASM); Nayarit-Durango border, 110.3 km W Huejuquillo el Alto (Jal.), road to Jesús María (Nay.), pine-oak forest litter, 2300 m, 21-85, 30.VII.1985, H.E. Frania & D. Shpeley, 1M, 2F (UASM); 2 km E, Punta de Mita, 30.VII-2.VIII.1991, C.L. Bellamy, 1F (CMNH); San Francisco, 17.X.1989, A. Cadena, 1F (CNIN); San Leonel, 9.6 km S, 17.III.1985, L. Strange, R. Miller, 1M (FSCA); 37 km SE Tepic, ca. 1295 m, UV light, 5.VII.1985, S. McCleve, P. Jump, 1M, 2F (UASM); 33 km SE Tepic, Rte. 15, UV light, oak-pine forest, 1270 m, 93-32, 20-21.VII.1993, S. McCleve, G.E. & K.E. Ball, 3M, 5F (UASM); Volcan Ceboruco, Isla, UV light, 15-16.VII.1993, Morris, Huether, Wappes, 2F (RFMC). **Oaxaca:** 4.3 km E, Azumbilla, 2170 m, thorn scrub, 10.VII.1975, G.E. Ball, H.E. Frania, 1F (UASM); Chacalapa, 14.X.1985, Y. Mariño, 1M (CNIN); 8 km W, El Camaron, 20.V.1969, H.F. Howden, 1M, 3F (UASM); 9.7 km N, Huajuapán de Leon microondas, 2 km W, Rte. 90, oak-acacia, 2000 m, 79-25, 9.VI.1979, J.S. Ashe, G.E. Ball, D. Shpeley, 1 M (UASM); 14.3 km E, Ixtlán de Juárez, dry pine forest, 2030 m 21.VII.1975, G.E. Ball, H.E. Frania, 1F (UASM); 8.8 km SW, Laguna Guadalupe, Rte. 125, under bark, leaf litter, 2050 m, 92-60, 18.VIII.1992, J.S. Ashe, H.E. Frania, D. Shpeley, 1M (UASM); 12.8 km N, La Ventosa, 20.VII.1968, J. Doyen, 2M, 2F (EMEC); 13-14 km E Mitla, 2100 m, 11.VIII.1986, H. & A. Howden, 2F (UASM); 14 km E, Mitla, (road to Zacotepec), 2150 m, 17.VIII.1988, J.K. Lieberr, D.A. Yager, 1M, 1F (CUIC); Monte Alban, 27.III.1990, E.

Barrera, A. Cadena, 1M (CNIN); Oaxaca [Ciudad], 1530 m, 20.VII.1937, M.A. Embury, Van Dyke Collection, 5M, 6F (CASC); 4.8 km SE, Nochixtlan, at night, O'Brien & Marshall, 2103 m, 1F (UASM); 17.6 km. SE Nochixtlán, at night, 2220 m, 1.VI.1974, C.W. & L. O'Brien, & B. Marshall, 1M (UASM); 35.8 km N, Puerto Escondido, 640 m, UV, 20-21.VII.1966, G.E. Ball, D.R. Whitehead, 1F (UASM); 43 km W, Salina Cruz, 91 m, Acacia thorn scrub, 87-19, 14.VII.1987, R.S. Anderson, 2F (UASM); 43.2 km SW Salina Cruz, 14.VII.1987, Kovarik, Schaffner, 1F (TAMU); Sola de Vega, km 41, Puerto Escondido Road, 4.VII.1990, E. Barrera, A. Cadena, 1M (CNIN); Tehuantepec, 26.V.1951, L. Vásquez, 1F (CNIN). **Puebla:** 7.1 km E Azumbilla. pine-juniper-yucca woodland, 2220 m, 92-71, 22.VIII.1992, G.E. Ball, H.E. Frania, 1F (UASM); 7 km SW Chipilo, 1990 m, cult. oak, arroyo, 54-85, 16.VIII.1985, H.E. Frania & D. Shpeley, 1M (UASM); Tehuacán, Hoege, donated by F. du C. Godman 1907, Am. Mus. Nat. Hist. Dept. Invert. Zool., No. 65, 2F (AMNH); Tehuacán, Hoege, 1M (ZMHB); Teotlalco, Cerro La Peña del Cuervo, Tlaucingo, 1004 m, 18°23'31"N, 98°49'20"W, selva baja caducifolia, col. noche, 16.VIII.2004, P. Feria *et al.*, 1M (USNM); Teotlalco, Cerro La Peña del Cuervo, Tlaucingo, 1004 m, 18°23'31"N, 98°49'20"W, selva baja caducifolia, col. noche, 17.VIII.2004, P. Feria *et al.*, 1M, 1F (USNM). **Sinaloa:** 8 km NW Choix, 11.VII.1968, T.A. Sears, 7M, 10F (CASC); 24.1 km NW Culiacan, 6.4 km N on rd. to Presa L. Mateos, ca. 195 m, UV light, 3.VII.1984, S. McCleve & P. Jump, 4M, 2F (UASM); 35.2 km S, Culiacán, 5.VIII.1981, P. Jump, 1M (UAIC); 14 km NE, La Cap de Taxte, 30.IX.1990, J.E. Wappes, 1F (JEWG); Mazatlán, 16.I.1930, Blackwelder Collection, 1M (USNM); Mazatlán, 17-23.VII.1963, P.J. Spangler, 1F (USNM); 8 km N, Mazatlán — (5-7.VIII.1964, H.F. Howden, 5M, 6F (CNCI); 24.VII.1964, H.F. Howden, 1F (CNCI); 24-29.VII.1964, H.F. Howden, 1F (CNCI); 28.VII.1964, H.F. Howden, 1F (CNCI); 30.VII.1964, W.C. McGuffin, 1M, 1F (CNCI); 1.VII.1965, J.A. & M.A. Chemsak, E.G. & J.M. Linsley, 1M, 1F (EMEC); at light, 28.VII.1973, J.A. Chemsak, 1M, 3F (EMEC); at light, 25.VII.1973, J.A. Chemsak, E.G. Linsley, A.E. Michelbacher, 2M, 1F (EMEC); 48 km N, Mazatlán, microondas [sic!] El Indio, 412 m, trop. deciduous forest, UV light, 6.VIII.1986, G.E. Ball, H.E. Frania, & D.J. Mulyk, 2M, 2F (UASM); 87 km E Mazatlán, Rte. 40, 1090 m, arroyo, litter in oak forest, H.E. Frania, R.G. Jaagumagi, D. Shpeley, 1M (UASM); 33.6 km E, Villa Union, 25.VII.1964, H.F. Howden, 1M (CNCI); Rte. 15, Microondas El Indio, Sinaloa thorn forest, UV light, 370 m, 93-30, 18.VII.1993, S. McCleve, G.E. & K.E. Ball, 2M, 3F (UASM). **Veracruz:** (labeled Ex. Musaeo Chaudoir) Bates, 1M, 2F (MNHP). **Zacatecas:** Hacienda Laguna Balderrama, 40 km W, of Fresnillo, 2410 m, 21-25.VI.1954, R.H. Brewer, 1M (FMNH).

Subspecific epithet. An aboriginal word, used as a Latin nominative singular noun in apposition. The Toltec were one of the indigenous peoples of México; this taxon is named in their honor. Toltec were purported to have existed from about 890-1100 CE. The peoples appear to have been absorbed into the Aztec culture and were often referred to as wise men or women and took on mythical proportions by the Aztec.

Type locality. Rte. 15, Microondas El Indio, Sinaloa, México.

Recognition. Generally similar to *C. p. punctifera*, most males of *C. p. toltec* lack the knob-like phallic apex (Figs. 11C-E) exhibited by males of the nominotypical subspecies (Figs. 11A-B). Further, *Cymindis p. toltec* specimens average larger in size (males 7.70 mm, females 7.99 mm) than those of *C. p. punctifera* (males 7.30 mm, females 7.49 mm) (Table 2). Pronotal proportions (PL/PW, Table 3) match those of *C. p. punctifera*.

Form of the phallic preapex ranges from near *C. p. punctifera* to near *C. latiuscula*. Adults appear to be intermediate in size between those two taxa (SBL, Table 2), and vary in extent of punctation on the vertex, from near *C. p. punctifera* to near typical *C. latiuscula*.

Description. Size, form, microsculpture and color average as per *C. p. punctifera*. Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDp, and DPP), are presented in Tables 2 to 7.

Punctation and vestiture. Head similar to *C. p. punctifera*, vertex (Figs. 5B, 7B, 7C) with slightly shorter setae, punctures irregular and shallower; frons with few punctures, anteriolateral sculpture not expanded.

Thorax. Pronotum. Normal for *latiuscula* species subgroup (Figs. 9B, 9C).

Elytra. Normal for *latiuscula* species subgroup, apex rounded.

Male genitalia. Phallus (Figs. 11C–11E) short (Table 4), narrow (Table 5), curvature slight (Table 6), and preapex moderately long (Table 7), with or without a terminal bulb. Endophallus (Fig. 11E) without dense microtrichial patches.

Female genitalia (Fig. 13A). Ovipositor gonocoxites are virtually indistinguishable from *C. p. punctifera* (Fig. 12F). See discussion under *C. p. punctifera*.

Variation and comparisons. Throughout most of its range, adults of this subspecies show little variation. In Jalisco, Guerrero, and Oaxaca the ranges of *C. latiuscula* and *C. p. toltec* overlap. Punctation on the vertex varies from near typical *C. p. punctifera* (Figs. 5A, 7A) through individuals with fewer punctures on the vertex (Figs. 5B, 7B, 7C), as typical for *C. latiuscula*. Males have phallic form ranging from near typical *C. p. punctifera* to the tip thickened and atypical (Figs. 11C, 11D, 11E). Externally, these southern males are similar in appearance to those of *C. latiuscula*, except for their much narrower pronotum (Table 3), Figure 23 shows the variation of pronotal shape (expressed through the ratio PL/PW) over their geographic range for *C. punctifera* and *C. latiuscula*. Figure 22 shows a comparison of pronotal length to width ratio versus elevation for *C. latiuscula* and *C. punctifera*. Ecological separation is apparent, with specimens of *C. latiuscula* favoring lower elevations (including southern latitudes) and those of *C. punctifera* capable of living at higher cooler elevations (including northern latitudes).

Habitat, habits and seasonal occurrence. The elevation range for this subspecies extends from near sea level (Mazatlán, Sinaloa) to 2560 m (El Salto, Durango) with a mean elevation of 1467 m (Fig. 23). Collection dates range from February to November with most specimens collected in July and August (Fig. 30). Specimens are found in regions which experience seasonal climatic conditions of extended periods below freezing (may be snow covered) in the winter, and semiarid to arid conditions in the summer. Semi-desert to oak–pine vegetation associations are

common sites of collecting for this subspecies (Fig. 21). Data for some specimens indicate tropical deciduous forest, oak–acacia, oak–pine grasslands, pine–juniper–yucca woodland and thorn–oak forest associations. Specimens have been found on the ground in the litter. They fly readily at night, and light capture data represent most of the collections. This subspecies seems not to be associated with bromeliads.

Geographical distribution. (Figs. 20 & 21). The range of this subspecies extends in México from the Isthmus of Tehuantepec northward to northwestern Durango. South of the 20° Meridian, the range extends from the Pacific coast to the western edge of the Atlantic Versant; northward, the range is primarily western—across the Sierra Madre Occidental to the Pacific coast.

Chorological affinities. The geographical range of *C. punctifera toltec* (Fig. 20) overlaps the ranges of eight other species of the *latiuscula* species subgroup, but not the range of more northern *C. p. punctifera* (Fig. 20), *C. apache* (Fig. 14) and *C. yaqui* (Fig. 26), and the more southern *C. zacapa* (Fig. 27).

Morphological affinities. The postulated adelphotaxon of *C. punctifera toltec* is the more northern *C. p. punctifera*.

***Cymindis* (*Pinacodera*) *rugofrons*, Hilchie & Ball, new species.**

(Figs. 2E, 5D, 7D, 9D, 11F, 11G, 13B, 24, 30, 31).
<http://zoobank.org/6FEE8D3F-9A15-4E28-B41B-7C2AD006B446>

Type material. HOLOTYPE: Male: “// MEX. Jalisco / 12.2 mi. n.w. / Los Volcánes / 5900’ / oak-pine forest / August 7, 1967 // Ball, T.L. Erwin / R.E. Leech / collectors //” (USNM). PARATYPES, 9: **MÉXICO. Colima:** Mt. Colima SE, slope, 2.XII.1948, E.S. Ross, 1M (CASC). **Jalisco:** 8.8 km NW, Cautla [*sic!*], 2020 m, 6-7.VIII.1967, G.E. Ball, T.L. Erwin, R.E. Leech, 1M, 1F (UASM); 8.8 km NW Cuautla, oak-pine litter, 1750 m, 24-85, 2.VIII.1985, H.E. Frania, D. Shpeley, 1M, 1F (UASM); 10.6 km NW Cuautla, arroyo, oak-pine litter, 1710 m, 25-85, 2.VIII.1985, H.E. Frania, D. Shpeley, 1M, (UASM); 19.5 km NW, Los Volcanes, 1800 m, oak-pine forest, 7.VII.1967. G.E. Ball, T.L. Erwin, R.E. Leech, 1M (UASM). **Michoacán:** 22.6 km W, Uruapan, 2150 m, wet pine-oak forest, 15.VIII.1967, G.E. Ball, T.L. Erwin, R.E. Leech, 1M (UASM). **Nayarit:** 33 km SE Tepic Rte. 15, oak-pine forest, UV light, 1270 m, 20-21.VII.1993, S. McCleve, G.E. & K.E. Ball, 1F (UASM).

Specific epithet. A Latin-based two-part noun in apposition, singular, nominative case, from the adjective *rugosus* meaning wrinkled and the noun *frons*, meaning that part of the head capsule. The word refers to the markedly irregular dorsal surface of the head capsule (Figs. 5D, 7D).

Type locality. 19.5 km northwest of Los Volcánes, Jalisco, México.

Recognition. The markedly expanded anteriolateral margins and rugosity of the frons, and six setose abdominal sternum VII distinguish members of this species from those of all other members of the *C. latiuscula* species subgroup.

Description. Size and form about average for *latiuscula* species subgroup. Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDp, and

DPP), are presented in Tables 2 to 7.

Punctuation and vestiture. Head capsule (Figs. 5D, 7D) with surface rugose; vertex with coarse setose punctures, no glabrous discal area, macrosculpture of anteriolateral margin expanded.

Thorax. Pronotum (Fig. 9D), form average for *latiuscula* species subgroup, surface coarsely punctate.

Elytra. Average for *latiuscula* species subgroup.

Male genitalia. Phallus (Figs. 11F, 11G) long (Table 4), moderately wide (Table 5), curvature moderate (Table 6), preapex relatively short (Table 7), and apex narrowly rounded. Endophallus without dense microtrichial patches.

Female genitalia (Fig. 13B). Ovipositor with gonocoxite 1 average for the subgroup, gonocoxite 2 parallel sided from the base to the point of insertion of the ensiform setae; apex broadly rounded, and scoop shaped. Similar in form to females of *C. huchilobos* (Fig. 12D) and *C. tonatiuh* (Fig. 13C).

Habitat, habits and seasonal occurrence. Specimens of *C. rugofrons* were collected at moderate elevations, 1270 to 2150 m (Fig. 31), in oak pine or wet pine forests. Several specimens were collected in leaf litter and one captured at light. The specimen from Volcan Colima was collected on December 2 from the southeast slope. The remaining specimens were collected in July (n=2) and August (n=5) of which one was teneral.

Geographical distribution. (Fig. 24). The range of this species seems confined to the western part of the Mexican Sierra Transvolcanica.

Geographic affinities. The geographical ranges of *C. crenatoverpa* (Fig. 15), *C. latiuscula* (Fig. 19) and *C. p. toltec* (Fig. 20) are close enough to the range of *C. rugofrons* (Fig. 24) to indicate the possibility of sympatry.

Morphological affinities. Based on the structure of gonocoxite 2 (Fig. 13B), *C. rugofrons* is most closely related to *C. huchilobos* (Fig. 12D) and *C. tonatiuh* (Fig. 13C).

Material examined. We have seen 10 specimens of this species. For details, see type material, above.

***Cymindis (Pinacodera) tonatiuh*, Hilchie & Ball, new species**

(Figs. 2F, 5E, 7E, 9E, 11H, 13C, 25, 30, 31)
<http://zoobank.org/B4449CE3-5554-4DA7-A2F4-584899C452E6>

Type material. HOLOTYPE: Male, labeled: “// MEXICO. Oaxaca / Rte. 190, 9.4 mi / se. Nochixtlan. / 7200'. / III.24.66 /in bromeliads // George E. Ball / D. R. Whitehead / collectors //” (USNM). PARATYPES: 64, from the following localities: **MÉXICO. Oaxaca:** km 14, Carretera Mitla-Albarradas, 26.III.1990, A. Barrera, E. Cadena, 1F (CNIN); km 108, Huajuapán de Leon, 6.V.1981, E. Barrera, 2M (CNIN); 34.9 km N, Juchatengo, in bromeliads, 2170 m, 18-19.VII.1966, G.E. Ball, D.R. Whitehead, 1M, 3F (UASM); Rte. 190, 15 km SE Nochixtlan, 2200 m, in bromeliads, 24.III.1966, G.E. Ball, D.R. Whitehead, 17M, 14F (UASM); Hwy 131, 184 km S, Oaxaca, 1830 m, 27-30.V.1971, D.E. Bright, 1M (CNCI); Rte 179, 14.2 km S, San Pedro y Pablo Ayutla, 1720 m, oak-pine forest (dry), in litter, 79-41, 18.VI.1979, J.S. Ashe, G.E. Ball, D. Shpeley, 1M (UASM); 14.6 km N, Sola de Vega, in bromeliads, 1860 m, 23.III.1966, G.E.

Ball, D.R. Whitehead, 6M, 5F (UASM); Rte. 131, 38.4 km N Telixtlahuaca, [sic!] oak-palmetto woodland, leaf litter, 1880 m, 23-92, 19.VII.1992, H.E. Frania, D. Shpeley, 2F (UASM); Rte. 125, 10.8 km N Tlaxiaco, dry oak-pine forest, 2260 m, 17.VIII.1992, 1M, 1F (UASM); 24.2 km SW Yolomécatl, Rte. 125, oak-pine-madrone litter, 2120 m, 20.VIII.1992, G.E. Ball, H.E. Frania, 6M, 3F (UASM).

Specific epithet. An Aztec word used as a Latin nominative singular noun in apposition, the name *Tonatiuh* is that of the Sun God, the image of whose head is shown in the center of the Aztec calendar.

Type locality. Rte. 191, 15 km southeast of Asuncion Nochixtlan, Oaxaca, México.

Recognition. The slightly projected posterior sutural angle of the elytron (Fig. 2F) serves to separate this species from other members of the *C. latiuscula* species subgroup. Punctuation of the head capsule of adults of this species resembles that of *C. latiuscula*, except punctures are more numerous and slightly deeper.

Description. Size and form about average for *latiuscula* species subgroup. Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDP, and DPP), are presented in Tables 2 to 7.

Punctuation and vestiture. Head capsule (Figs. 5E, 7E), vertex, 2 to 3 irregular rows of punctures transversing the apex, frons mostly smooth but with scattered setose punctures, anterior lateral sculpture not expanded.

Thorax. Pronotum average for *latiuscula* species subgroup, to slightly narrower (Fig. 9E).

Elytra. Average for *latiuscula* species subgroup, apex angulate (Fig. 2F).

Male Genitalia. Phallus (Fig. 11H) moderately long, slightly less than average for *latiuscula* species subgroup (Table 4), slightly wider than average (Table 5), curvature marked (Table 6), preapex short (Table 7), and apex narrowly rounded.

Female Genitalia (Fig. 13C). Female with gonocoxite 1 average for the subgroup, gonocoxite 2 with sides parallel from base to the insertion point of the ensiform setae; apex broadly rounded and scoop shaped, similar in form to females of *C. huchilobos* (Fig. 12D) and *C. rugofrons* (Fig. 13B).

Habitat, habits and seasonal occurrence. This species occupies primarily dry oak-pine forest, although a few specimens were collected in cloud forest. See Fig. 30 for data about seasonal activity and Fig. 31 for elevation.

Geographical distribution. (Fig. 25) Known from a limited area in the Oaxaca highlands on the Pacific side (Western Versant) of the state.

Geographical affinities. The geographical ranges of *C. crenatoverpa* (Fig. 15), *C. geminata* (Fig. 17), *C. huichilobos* (Fig. 18), *C. latiuscula* (Fig. 19), *C. p. toltec* (Fig. 20), and *C. rugofrons* (Fig. 24) are close enough to the range of *C. tonatiuh* (Fig. 25) to indicate the possibility of sympatry. Adults of *C. latiuscula* were captured at a site 13.9 km south of the type locality. The uppermost elevation recorded for *C. latiuscula* is 1400 m and the lowest for adults of *C. tonatiuh* is 1720 m. It appears that *C. latiuscula* and *C. tonatiuh* are spatially isolated by elevation (Fig. 31) even though both species occupy similar habitat, where they are known to occur in bromeliads.

Morphological affinities. Based on the structure of gonocoxite 2 (Fig. 13C), *C. tonatiuh* is most closely related

to *C. huichilobos* (Fig. 12D) and *C. rugofrons* (Fig. 13B).

Material examined. We have seen 65 specimens of this species. For details, see type material, above.

***Cymindis* (*Pinacodera*) *yaqui*, Hilchie & Ball, new species**

(Figs. 2H, 5F, 7F, 9F, 11I–11K, 13D, 26, 30, 31)
<http://zoobank.org/08336787-C959-4E72-940B-004DD5473F9E>

Type material. HOLOTYPE: Male: “// U.S.A., Ariz. / Cochise Co. / CaveCreek Cn. / South Fork / Black lights // Lot No. 135 / VII-9-1964 / Evening / J. Stibick //” (USNM). PARATYPES, 30: **MÉXICO. Sonora:** 5.1 km NW, Huicoche, near Chihuahua border, 1577 m, UV, 11-13.VII.1989, S. McCleve, 1M (UASM); Rancho Aguajia, 16 km NW Yecora, oak-pine forest, UV light, 1311 m, 28-29.VII.1987, S. McCleve, 1M (UASM); 11.6 km NW, Yecora, 1650 m, 7-11.VIII.1990, P. & E. Jump, 1M (UASM). **U.S.A. Arizona:** *Cochise County:* *Chiricahua Mountains*, Cave Creek Canyon, S, Fork, black light, Lot. No. 140, 1620 m, 11. VII.1964, J. Stibick, 1M (USNM); 1.6 km S, Portal, 3.VII.1965, Mont Cazier, 1F (CMNH); 1.6 km S, Portal, 19.VI.1965, Mont Cazier, 1M (CMNH); Stewart Camp, 1.6 km S, Portal, UV, 18-20.VII.1971, J.T. Doyen, 3M, 3F (EMEC); Stewart Camp, 1.6 km S, Portal, UV, 25.VII.1971, J.T. Doyen, 1M (EMEC); *Huachuca Mountains*, Miller Canyon, 14.VII.1907, H.A. Kaeber, 1M (USNM); Sierra Vista, 16.VI.1967, R.F. Sternitzky, 2M (CNCI); Sierra Vista, 20.VI.1967, R.F. Sternitzky, 1M (CNCI); Sierra Vista, 25.VII.1967, R.F. Sternitzky, 2M (CNCI); Sierra Vista, IX.1967, R.F. Sternitzky, 2M (CNCI); “Huachuca Mountains”, Cornell U. Lot 543, Sub. 724, 1M (CUIC); “Huachuca Mountains”, 1F (CUIC); Ramsey Canyon, 24 km S, Sierra Vista, R.F. Sternitzky (CNCI)- (21.V.1967, 1M; 17.VI.1967, 1M; 11.VII.1967, 1M). *Pima County:* T19S R15E, Sec. 18, 11.VI.1962, D.H. Horn, 1M (OSUC). *Santa Cruz County:* Sonoita, 19.2 km S, Hidden Spring Canyon, 2.VI.1967, R.F. Sternitzky, 1M (CNCI). *Santa Rita Mountains*, Madera Canyon, 3.VII.1968, 1M (TAMU); 5.VII.1977, Rosenberg Collection, 1M (USNM).

Specific epithet. An aboriginal name (Yaqui language), treated as a Latin singular noun in apposition, named in honour of the Yaqui nation that inhabited the northwestern region of México and adjacent Arizona, the Sonoran region, roughly the area inhabited by the members of this species. These people were not part of the Aztec or Toltec empires.

Type locality. South Fork of Cave Creek Canyon, Chiricahua Mountains, Cochise County, Arizona, U.S.A.

Recognition. Adults of *C. yaqui* are likely to be confused with those of *C. punctifera punctifera* and *C. apache*, the three taxa whose geographical ranges overlap extensively in southwestern U.S.A. and adjacent northwestern México. All three are similar in body form, integumental macrosculpture, and color (dorsal surface of body rufotestaceous to rufous). Both *C. apache* and *C. p. punctifera* differ from *C. yaqui* in form of the elytral posterior (apical) sutural angle (round in *C. apache* (Fig. 2G) and *C. p. punctifera*, subangulate in *C. yaqui* (Fig. 2H)). Although size overlap is more or less extensive (Table 2), *C. yaqui* is larger on average than *C. p. punctifera*, and on average smaller than *C. apache*. In phallic details, males of these three taxa differ markedly: in form of preapex and

apex (broadly spatulate in *C. apache* (Fig. 10B) narrower and knobbed in *C. p. punctifera* (Fig. 11B), and narrow and more or less pointed in *C. yaqui* (Figs. 11J, 11K); and in curvature of the shaft (displacement, Table 6). Females may be identified by association with males and the general form and curve of the elytral apex.

Description. Size and form average for *latiuscula* species subgroup, Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDp, and DPp), are presented in Tables 2 to 7.

Punctuation and vestiture. Similar to adults of *C. apache*, vertex with irregular punctures, frons with few punctures, anteriolateral sculpture not expanded. T h o r a x . Pronotum. Average for *latiuscula* species subgroup (Fig. 9F).

Elytra. Average for *latiuscula* species subgroup (Fig. 2H).

Male genitalia. Phallus (Figs. 11I–11K) markedly long (Table 4), slightly wider than average for *latiuscula* species subgroup (Table 5), curvature about average (Table 6), preapex markedly elongate (Table 7), apex somewhat asymmetric, flattened, chisel-like (Fig. 11K). Endophallus without dense patches of microtrichia.

Female genitalia (Fig. 13D). Ovipositor with gonocoxite 1 average for the subgroup, gonocoxite 2 tapered slightly from the base to the insertion point with the ensiform setae; apex bluntly pointed. The form is more similar to females of *C. latiuscula* (Fig. 12E) and *C. zacapa* (Fig. 13E), than to the two species it is sympatric with (*C. apache* Fig. 12A and *C. p. punctifera* Fig. 12F).

Habitat, habits and seasonal occurrence. Recorded elevations for *C. yaqui* extend from 1310 to 1650 m (Fig. 31). Most specimens were captured in June and July with one specimen captured in each of May, September and October (Fig. 30). When more data become available, we expect that the range of collection dates will be similar to those of *C. apache*.

Geographical distribution. (Fig. 26). Known only from the mountain ranges in southeastern Arizona, and from the northern Sierra Madre Occidental, in the state of Sonora, México.

Geographical affinities. See discussion under *C. apache*. The range of *C. yaqui* (Fig. 26) is overlapped completely by the ranges of *C. apache* (Fig. 14) and *C. p. punctifera* (Fig. 20).

Morphological affinities. *Cymindis apache* and *C. yaqui* appear to be closely related based on external morphological similarity and form of gonocoxite 2 (cf. Figs 13D and 12A) and their proximate geographical ranges (Figs. 14 and 26).

Material examined. We have seen 31 specimens of this species. For details, see type material, above.

***Cymindis* (*Pinacodera*) *zacapa* Hilchie & Ball, new species**

(Figs. 7G, 9G, 11L, 11M, 13E, 22, 27, 30, 31)
<http://zoobank.org/E37CAF8A-6A63-48EB-99DB-C4ECCB06EA85>

Pinacodera cribrata (in part); Bates 1883: 188.

Note about synonymy. Bates (1883: 188) included in his list of localities for *P. cribrata* several sites in Guatemala. Because the only taxon of the *latiuscula* species subgroup

known from Guatemala is *C. zacapa*, it seems likely that these Bates specimens (BMNH) belong to this species. But this synonymy is conjectural, and awaits confirmation by examination of the specimens in question.

Type material. HOLOTYPE: Male: “// GUAT. Zacapa: La / Palmilla, 6 km sw / Teculután, gallery / for. ca. 300 m. u-v / light 91-30 5.VI.1991 // G.E. & K.E. Ball / and D. Shpeley collectors // H.F. Howden / GUATEMALA / EXPED. 1991 //” (USNM). PARATYPES, 27: **COSTA RICA:** *Guanacaste Prov.*; Santa Rosa National Park, 12.XII.1978-10.I.1979, D.H. Janzen, 1M (USNM); Santa Rosa National Park, 13-15.VII.1980, D.H. Janzen, W. Hallwachs, 1F, (USNM). **GUATEMALA:** ALTA VERAPAZ: Cacao, Trece Aguas, 20.IV, Schwarz & Barber Coll., ADP 08663, 1F (USNM). IZABAL: Cayuga, IV.1915, ADP 08664, 1M (USNM). PROGRESO: Parque regional “Lo de China” c.a. 6 km E of El Jicaro N14°54.412' W89°50.413', 340 m, 4-5 June 2011, light traps R.S. Zack, 1M, 1F (WSUP). ZACAPA: road to San Lorenzo, 1000 m, MV & BL, 15.XI.2006, R. Turnbow, 1M (RHTC); 12-14 km S, San Lorenzo, 300-610 m, 3-6.VI.1989, J. E. Wappes, 1F (JEW); La Palmilla, 6 km SW Teculután, gallery for. UV light, ca. 300 m, 91-30, 5.VI.1991, H.F. Howden, G.E. & K.E. Ball, D. Shpeley, 1M (UASM). “Santa Cruz” Marble Quarry Rd, NE of Teculután, 573 m, 17 May 2006, N15°02.604' W89°40.126', R.S. Zack, mv/bl light traps, 1M, 2F (WSUP). **HONDURAS:** Intercepted with plants at Miami, Florida, 8.III.1966, 1F (FSCA). Departement SANTA ROSA DE COPAN: 16 km NW, Santa Rosa de Copan, 8.X.1993, R. Turnbow, 1F (RHTC). Departement de COMAYAGUA: Rancho Chiquito, km. 62, UV light, 29.V.1964, F.S. Blanton, A.B. Broce, R.E. Woodruff, 3M, 2F (USNM); Rancho Chiquito, km. 62, UV light, 850 m, 7.VI.1964, F.S. Blanton, A.B. Broce, R.E. Woodruff, 1F (UASM); 22.4 km NW Siguatepeque, 610 m, 21.VII.1974, O'Brien & Marshall, 1F (USNM). Departement de EL PARAISO: Vic Yuscaran, 16.X.1993, R. Turnbow, 1M (RHTC); Yuscaran, 14.VII.2001, R. Turnbow, 1F (RHTC). Departement de MORAZAN: Escuela, 5 km E, Agricola Panamericana, 2.VI.1993, M.C. Thomas, 1M (FSCA); Esc. Agr. Pan. Zamorana, 820 m (encinal), 22.VII.1948, T.H. Hubbell U of Michigan, 1M 1F, (USNM). **NICARAGUA.** GRANADA: Laguna de Apoyo, 20-22.V.2005, van den Berghe, 1F (CMNH); Domitila, 20.VI.2004, van den Berghe, 1F (CMNH).

Specific epithet. An aboriginal (Nahuatl) name used as a singular Latin noun in apposition, based on the name of the Department of Zacapa in Guatemala in which the type locality of this species is located.

Type locality. 6 km southwest of La Palmilla, Department of Zacapa, Guatemala.

Recognition. Similar to *C. latiuscula* in overall appearance and size. Readily distinguished by the head width and unique sculpture pattern. Males are distinguished by phallic form (Figs. 11L, 11M).

Description. Data on variation in SBL, the ratio PL/PW, and in phallic measurements (MLp, MWp, MDp, and DPp), are presented in Tables 2 to 7.

Head capsule (Fig. 7G) with frontal punctures covering a broad area of the vertex, frons with transverse macrosculpture.

Thorax. Pronotum wider than average (Table 3, Fig. 9G).

Elytra. Average for *latiuscula* species subgroup.

Male genitalia. Phallus (Figs. 11L, 11M), moderately short (Table 4), rather narrow (Table 5), curvature about average for *latiuscula* species subgroup (Table 6), preapex short (Table 7), apex (Fig. 11L) obliquely truncate, hooked ventrad. Endophallus with dense microtrichial patches.

Female genitalia (Fig. 13E). Ovipositor with gonocoxite 1 about average for the subgroup, gonocoxite 2, sides parallel from base to the insertion point with the ensiform setae; apex broadly pointed.

Habitat, habits and seasonal occurrence. Adults of *C. zacapa* have been collected from 300 to 1000 m (Fig. 31), most specimens at UV or MV lights. Collection dates range from February to July, and October to December (Fig. 30). This range is likely a collecting artifact due to small sample size. The greatest number of collecting events was in June and July. Beetles of this species are expected to be active year-round in the tropical and subtropical forests. One locality label indicated gallery forest.

Geographical distribution. (Fig. 27). The geographical range of *C. zacapa* extends on the Pacific side of Middle America from Costa Rica northward to Guatemala.

Geographical affinities. The range of *C. zacapa* (Fig. 27) abuts with the common widespread species *C. latiuscula* (Fig. 19).

Morphological affinities. Based on similarity of endophallic armature, gonocoxite 2 and largely allopatric distribution, this species and *C. latiuscula* are postulated to be adelphotaxa. On the other hand, overall appearance of the phallus suggests a close relationship of *C. zacapa* to *C. huichilobos* (Fig. 11L; cf. Fig. 10K). SBL (nonoverlapping size range, Table 2) and differences in curvature of the phallus coupled with the different shape of the pronotum indicate separate species (Fig. 22).

Material examined. We have seen 32 specimens of this species. For details, see type material, above.

Cymindis (Pinacodera) zapotec Hilchie & Ball, new species

(Figs. 7H, 7I, 9H, 9I, 13F, 28, 31)

<http://zoobank.org/B9421E58-6A49-48F6-B999-5428EDFAD150>

Type material. 2: HOLOTYPE: Female, labeled: // MEX: Oax. 24.3 km N. / San Gabriel Mixtepec / 1174 m 11.vii.87 87-14 / R. Anderson cloud for. // (USNM). PARATYPE (1): **MÉXICO:** *Guerrero*; El Paraiso, 15 km NW, at edge of stream, 1190 m, 9.Aug. 1986, J. Rawlins, R. Davidson, 1F (FMNH).

Specific epithet. The name is used as a singular Latin noun in apposition based on the name Zapotec. The name comes from (Nahuatl) which means “inhabitants of the place of sapote”. Zapotec were an indigenous pre-Columbian civilization that occupied the valleys of Oaxaca in Mesoamerica.

Recognition. Head capsule (Figs. 7H, 7I) is similar to that of *C. latiuscula* (Fig. 6F), and the form of the pronotum (9H, 9I) is similar to that of *C. geminata* (Fig. 8D); differing from these two species by the posteriolateral impressions of the pronotum being deeper, showing greater relief. Female gonocoxite 2 is scythe-like (Fig. 13F), and most similar in shape to that seen in females of *C. crenatoverpa* (Fig. 12B) and *C. geminata* (Fig. 12C). The basal ensiform setae

of *C. zapotec* (Fig. 13F) are thicker than those seen in *C. crenatoverpa* (Fig. 12 B) and *C. geminata* (Fig. 12C).

Description. In form, similar to *C. latiuscula* (Fig. 1). Head (Fig. 7H, 7I), almost devoid of setae, inner ridge prominent, continuous to near posterior supraorbital setae; vertex finely, sparsely punctate, with a few punctures on the lower frons; fronto-clypeal groove without obvious sculpture, well developed.

Thorax. Pronotum (Fig. 9I) with lateral margins markedly curved, punctures with transverse grooves; posteriolateral depressions deeper than average.

Elytra. Average for *latiuscula* species subgroup.

Male Genitalia. Unknown.

Female Genitalia. Ovipositor with gonocoxa 2 (Fig. 13F), apical portion thin and scythe-like. Basal most ensiform setae thicker (Fig. 13F) than those seen in *C. crenatoverpa* (Fig. 12 B) and *C. geminata* (Fig. 12C).

Habitat. Collected at edge of stream, at 1190 m, and in cloud forest at 1174 m. Dates of collection are July 11 and August 9.

Geographical distribution. Known from the western Mexican states of Guerrero and Oaxaca, in the Sierra Madre del Sur (Fig. 28).

Geographical affinities. The range (Fig. 28) of *Cymindis zapotec* is within the known geographical ranges of *C. geminata*, (Fig. 17), *C. latiuscula* (Fig. 19), and *C. punctifera toltec* (Fig. 20).

Morphological affinities. The form of gonocoxite 2 aligns *C. zapotec* (Fig 13F) with females of *C. crenatoverpa* (Fig. 12B) and *C. geminata* (Fig 12C).

Material examined. We have seen two specimens from the localities noted above.

Evolutionary Aspects

Overall, the members of the *latiuscula* subgroup are relatively uniform in appearance, (size, vestiture, and sculpture). The species can be arranged in three general geographic divisions (Table 8): a southern one (Nuclear Middle America to the Isthmus of Tehuantepec), including *C. latiuscula* and *C. zacapa*; a central one, from the Isthmus of Tehuantepec northward to about the Tropic of Cancer, including *C. crenatoverpa*, *C. cuyuteca*, *C. geminata*, *C. huichilobos*, *C. punctifera toltec*, *C. rugofrons*, *C. tonatiuh* and *C. zapotec*; and a northern one (northwestern México, southwestern USA), including *C. apache*, *C. punctifera punctifera* and *C. yaqui*.

Species of the northern assemblage are virtually indistinguishable from each other, excepting in minor differences in size and sculpture (cf. Figs. 6A, 7A, 7F, 8A, 9A, 9F). The key diagnostic character suite is in the phallus. Interpretation of relationship based on form of the preapex (distinctly flattened) suggests that *C. apache* (Figs. 10A, 10B) and *C. yaqui* (Figs. 11I, 11J, 11K) are more closely related to each other than to *C. punctifera punctifera* (Figs. 11A, 11B). The known ecological and behavioral parameters are not much help in postulating relationships: all three have similar geographic ranges, similar altitudinal preferences, similar vegetation associations of dry pine/ oak temperate forests, and occasional records of being found in leaf litter or under objects. All fly and are attracted to UV lights.

Teasing apart relationships for the central group is similarly difficult. *Cymindis rugofrons* stands apart from all

other *latiuscula* subgroup members on the basis of 6 setae on abdominal sternum VII (Fig. 2E), and greater rugosity of sculpture on the frons (Fig. 5D). The mid altitudinal habitat preference, in an oak pine association seen in *C. rugofrons*, is the norm for most of the central group as is the case for *C. rugofrons*.

Form of the pronotum shows a trend (Table 3) from a relatively narrow form typical of *C. geminata* and *C. huichilobos* (Figs. 8D, 8E) to a broader shape as seen in *C. latiuscula* and *C. zacapa* (Figs. 8F, 8G, 9G). Members of the latter species pair typically occur at lower elevations (Fig. 30), and for *C. latiuscula* the beetles are commonly collected in bromeliads.

Most species in the *latiuscula* subgroup have a narrower pronotum, and are found at mid altitudes in oak-acacia, oak-pine forest, and thorn-scrub associations. *Cymindis tonatiuh* breaks the trend by being associated with bromeliads, yet maintains a midaltitude habitat preference in cloud forest. One wide ranging subspecies, *C. punctifera toltec*, exhibits considerable variation in pronotal width/length ratios (Figs. 9B, 9C), and has variable form of the preapex of the male phallus. In a few populations, the form of the preapex approaches that seen in *C. p. punctifera* (Figs. 11A, 11B) to that typically seen in *C. p. toltec* (Figs. 11C, 11D, 11E) suggesting a mixing or a resorting of genes. The large range exhibited by this species covers many types of habitat, which exerts variable selective pressures on different populations, perhaps driving a speciation event. This might explain the variability in form.

Specimens of *C. geminata* resemble those of *C. p. toltec* in general shape and size, but differ significantly in the length of the preapex of the phallus (Table 7), and exhibit larger and deeper punctures on the pronotum (Fig. 8D). The head appears slightly longer (not quantified) and narrower (Fig 6D) than what is seen in *C. p. toltec* (Figs. 7B, 7C). It is likely *C. geminata* is closely related to *C. p. toltec*. Habitat and altitudinal preferences are similar between the two taxa.

On the basis of the downward hooking of the preapex, the phallus of male *C. huichilobos* (cf. Figs. 10K & 11L) is similar to that seen in males of *C. zacapa*. Males of *C. huichilobos* differ by having a narrower pronotal profile than what is seen in males of *C. zacapa* (Figs. 8E vs. 9G, Table 3). Both species occupy low elevation habitats in the tropical to subtropical zone.

The next in the series of species, do not have any clear synapotypic characters, which would demarcate the order. Specimens of *C. crenatoverpa* do not pair with any other species in the *latiuscula* subgroup. This is based on the markedly distinctive form of the preapex with the distinct notch in the side (Figs. 10C & 10F). Habitat choice and mid altitude preference is typical. Geographic range is in the Trans Volcanic Sierra of western México.

A second species that does not exhibit obvious pairing is *C. cuyuteca*. Again, the form of the phallus is distinctive (Fig. 10G). The form of pronotum is average for the *latiuscula* species subgroup and habitat preferences are similar to the norm: leaf litter in a pine-oak forest association at mid altitude. Geographically the species is known from one locality in western México.

Another species, that stands by itself is *C. tonatiuh*: the form of the phallus is simple (plesiotypic?) (Fig. 11H). An apotypic feature, which sets this species aside from all other

C. latiuscula subgroup members is the unusual angle of the elytral apices (Fig. 2F).

Presence of six setae on abdominal sternum VII (Fig. 2E) on specimens of *C. rugofrons* is a marked deviation from the four associated with other *Cymindis* (Fig. 2B). Coarseness of sculpture on the head can be envisioned as an end of a transformation series with the condition represented by *C. latiuscula* at the other extreme. The simple form of the phallus (Fig. 11F) helps place *C. rugofrons* in a basal position within the *C. latiuscula* subgroup.

As drawn, all branches indicate monophyly in a reconstructed phylogeny (Fig. 32) and is dominated by a basal polytomy. Ecological and geographical characters help to group and order the species. More characters are needed; perhaps these will be found in the larvae, and pupae, and in finer resolution of the species' ecological niches. Characteristics of additional species in the *latiuscula* species subgroup yet to be discovered may contribute a better understanding of relationships.

The driver of speciation in the *latiuscula* species subgroup is likely reflected by similar changes in the vegetational composition and geographical shifts. Floral community shifts are well documented in the deserts (Axelrod 1979, Van Devender 1990) of Mesoamerica during the Quaternary Period. In general, when the climate cooled, the floral communities shifted to lower elevations. Oak and pine forests spread down the mountainsides and out across many valleys, depending on elevation and moisture regimes. It is at this time that major dispersal of *C. punctifera* would have likely occurred, spreading down slope and southward in latitude, tracking the semi-arid oak-pine forest vegetation association. These forests would have ebbed and flowed many times during the last 40,000 years, perhaps peaking in extent around 12,000 to 20,000 BP.

Similar vegetation realignments were taking place with the tropical and subtropical forests further south, only these would more or less be extirpated and be replaced by the oak, pine and thorn scrub vegetation associations on the lowlands as suggested by a temperature drop of about 5°C (Toledo 1982). The insect fauna that could track or adapt to these changes would tend to flourish. Most members of the *latiuscula* subgroup are presently found at mid elevations with only a few species found at low elevation (Fig. 31).

Upon returning to modern climatic conditions, the flora and fauna would move back up in elevation and latitude, in essence overrunning fragments of previous associations. This is clearly shown by isolated temperate tree species in the subtropical forests of Veracruz (Toledo 1982).

CLOSING REMARKS

Members of the *C. latiuscula* subgroup occupy primarily temperate oak pine environment at mid elevations. Some taxa are known from cloud forest and a few others are in tropical to subtropical regions. Very little is known about life history apart from some species appearing to be arboreal while others appear in part terrestrial, and all, readily disperse by flight. The reconstructed phylogeny is inconclusive; further analysis of other *Pinacodera* groups and examining life stages may assist in resolving this problem.

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Figure 1. Habitus photograph of *Cymindis (Pinacodera) latiuscula* (Chaudoir 1875). Male, Ruinas de Kabah, Yucatan, México, Scale bar = 1 mm.

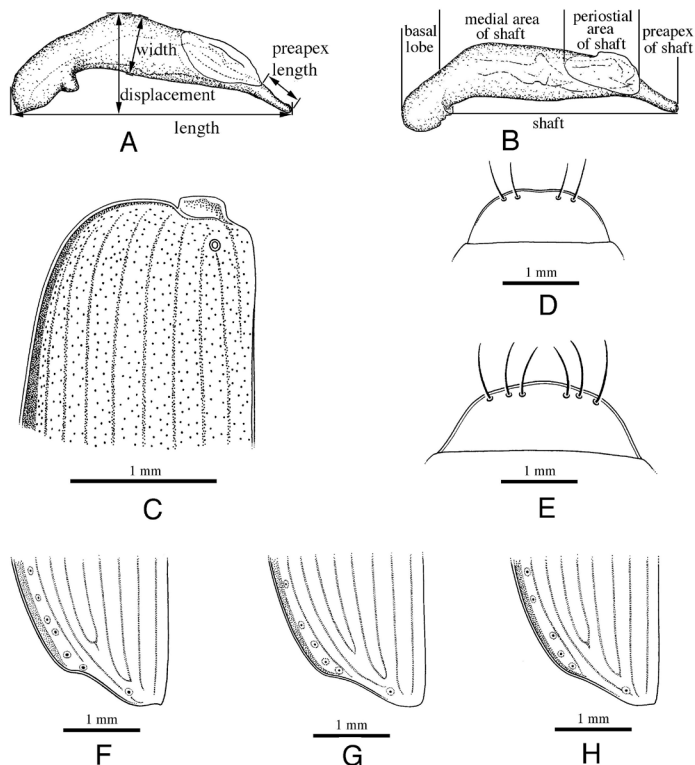


Fig. 2.(up) Line drawings illustrating various structures of *C. (Pinacodera)*. **A.** Phallus, left lateral aspect, showing axes of measurements. **B.** Phallus, left lateral aspect, showing areas used in descriptions. **C.** Basal third of left elytron, dorsal aspect, showing strial and puncture patterns of *C. punctifera* (LeConte). **D.** Sternum VII, ventral aspect, showing posterior marginal setae, of *C. punctifera* (LeConte). **E.** Same, of *C. rugofrons*, **new species**. **F, G, H,** Apical one third of left elytron, showing apical margin, respectively, of **F,** *C. tonatiuh*, **new species**, **G,** *C. apache*, **new species**, and **H,** *C. yaqui*, **new species**. Scale bars = 1 mm.

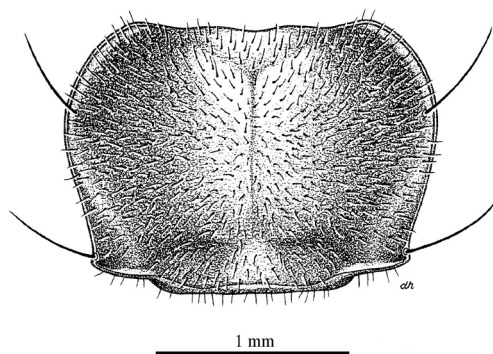


Fig. 3.(left) Line drawing, dorsal aspect, of pronotum, showing punctation and setal patterns of *C. punctifera punctifera* (LeConte). Scale bar = 1 mm.

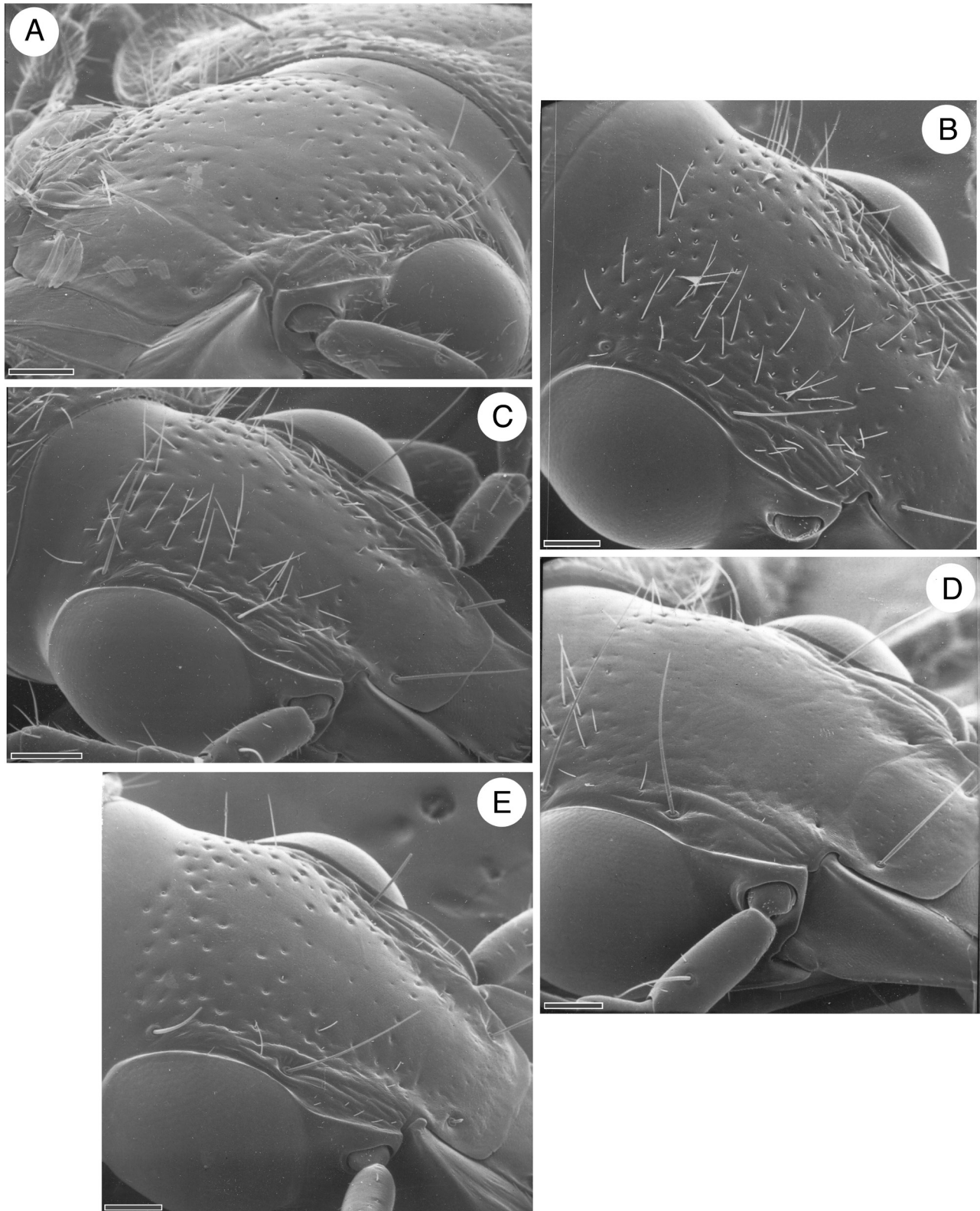


Figure 4. SEM photographs of head capsules, dorsal oblique aspect, showing puncture and setal patterns of species of *C.* (*Pinacodera*) *latiuscula* species subgroup: **A**, *C. apache* **new species**, Sierra Vista, Cochise Co., Arizona, U.S.A.; **B**, *crenatoverpa*, **new species**, Temascaltepec, state of México, México; **C**, *C. geminata*, **new species**, Cuernavaca, Morelos, México; **D**, *C. latiuscula* (Chaudoir), Catemaco, Veracruz, México; **E**, *C. latiuscula* (Chaudoir), Cuernavaca, Morelos, México. Scale bar = 0.2 mm.

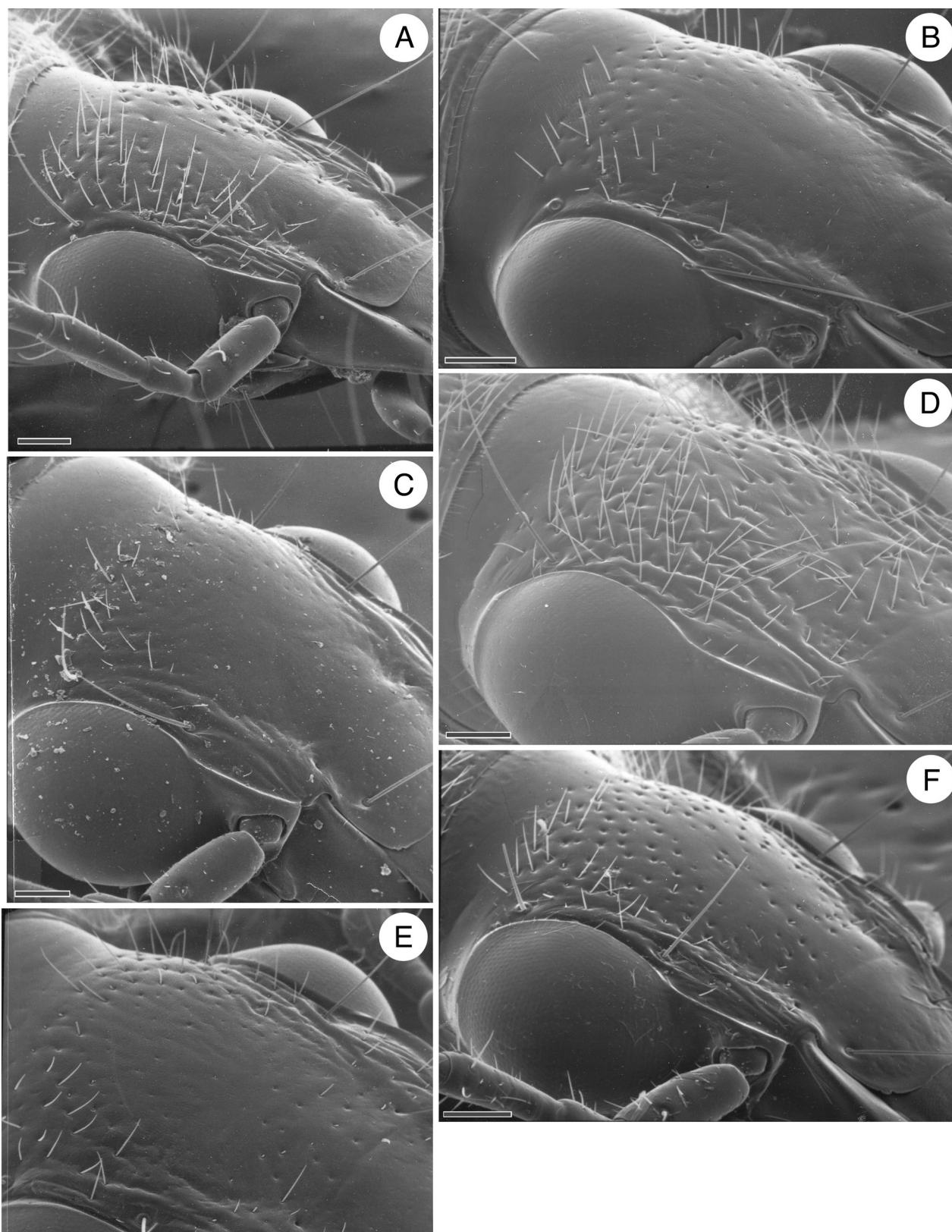


Figure 5. SEM photographs of head capsules, dorsal oblique aspect, showing puncture and setal patterns of species of *C. (Pinacodera) latiuscula* species subgroup: **A**, *C. punctifera punctifera* (LeConte), Huachuca Mountains, Cochise Co., Arizona, U.S.A.; **B**, *C. punctifera toltec*, **new subspecies**, Mazatlan, Sinaloa, México; **C**, *C. latiuscula* (Chaudoir), Jalapa, Veracruz, México; **D**, *C. rugofrons*, **new species**, Los Volcanes, Jalisco, México; **E**, *C. tonatiuh*, **new species**, Juchatengo, Oaxaca, México; **F**, *C. yaqui*, **new species**, Sierra Vista, Cochise Co., Arizona, U.S.A. Scale bar = 0.2 mm.

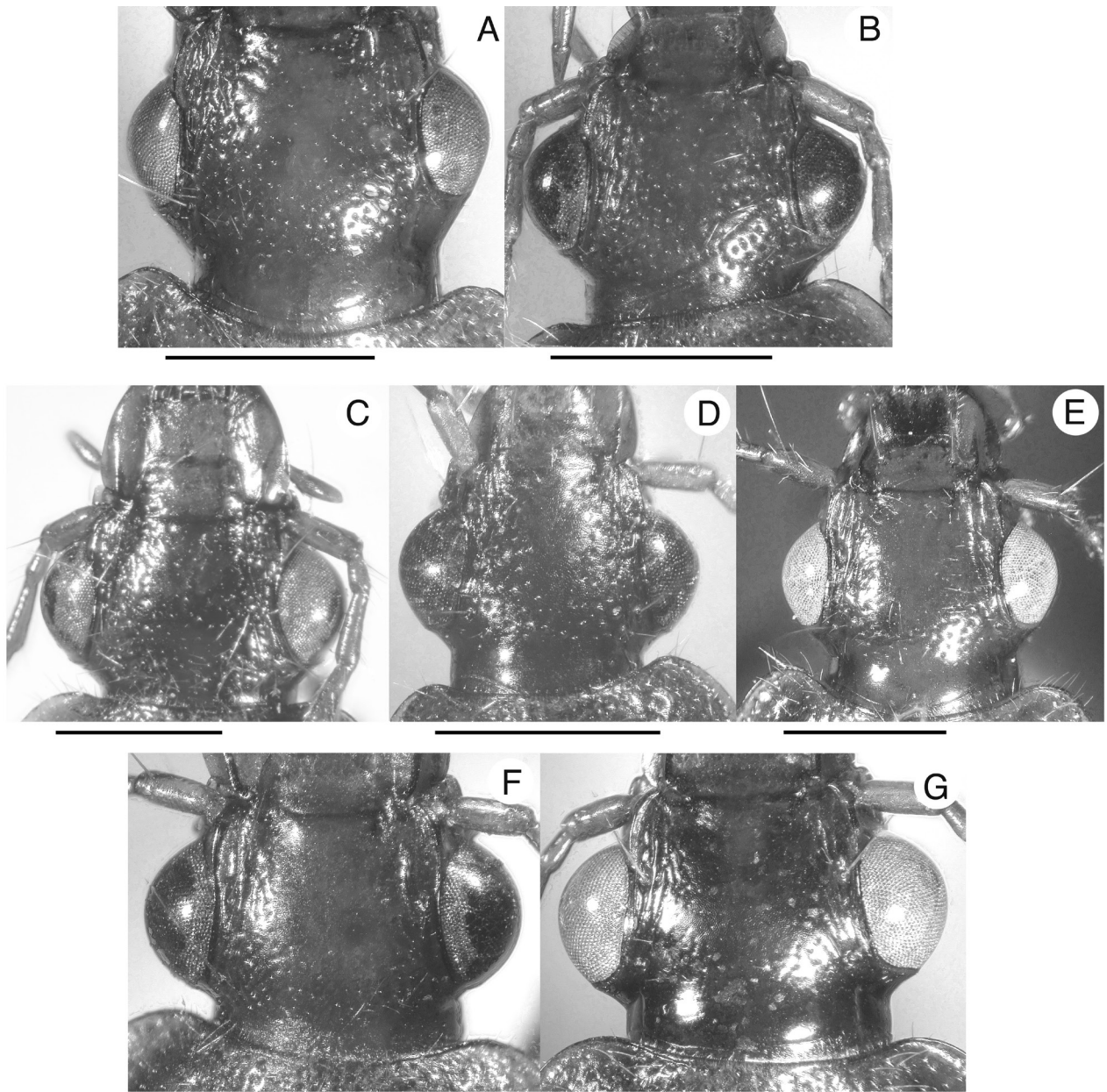


Figure 6. Automontage photographs of head capsules, dorsal aspect, showing puncture and setal patterns of species of *C.* (*Pinacodera*) *latiuscula* species subgroup: **A**, *C. apache* **new species**, Madera Canyon, Santa Rita Mountains, Santa Cruz Co., Arizona, U.S.A.; **B**, *C. crenatoverpa*, **new species**, Rincón, Temascaltepec, state of México, México; **C**, *C. cuyuteca*, **new species**, Cuautla, Jalisco, México; **D**, *C. geminata*, **new species**, Cuernavaca, Morelos, México; **E**, *C. huichilobos*, **new species**, Puerto Angel, Oaxaca, México; **F**, *C. latiuscula* (Chaudoir), Puente Nacional, Veracruz, México; **G**, *C. latiuscula* (Chaudoir), Xcalacoop, Yucatán, México. Scale bar = 1 mm.

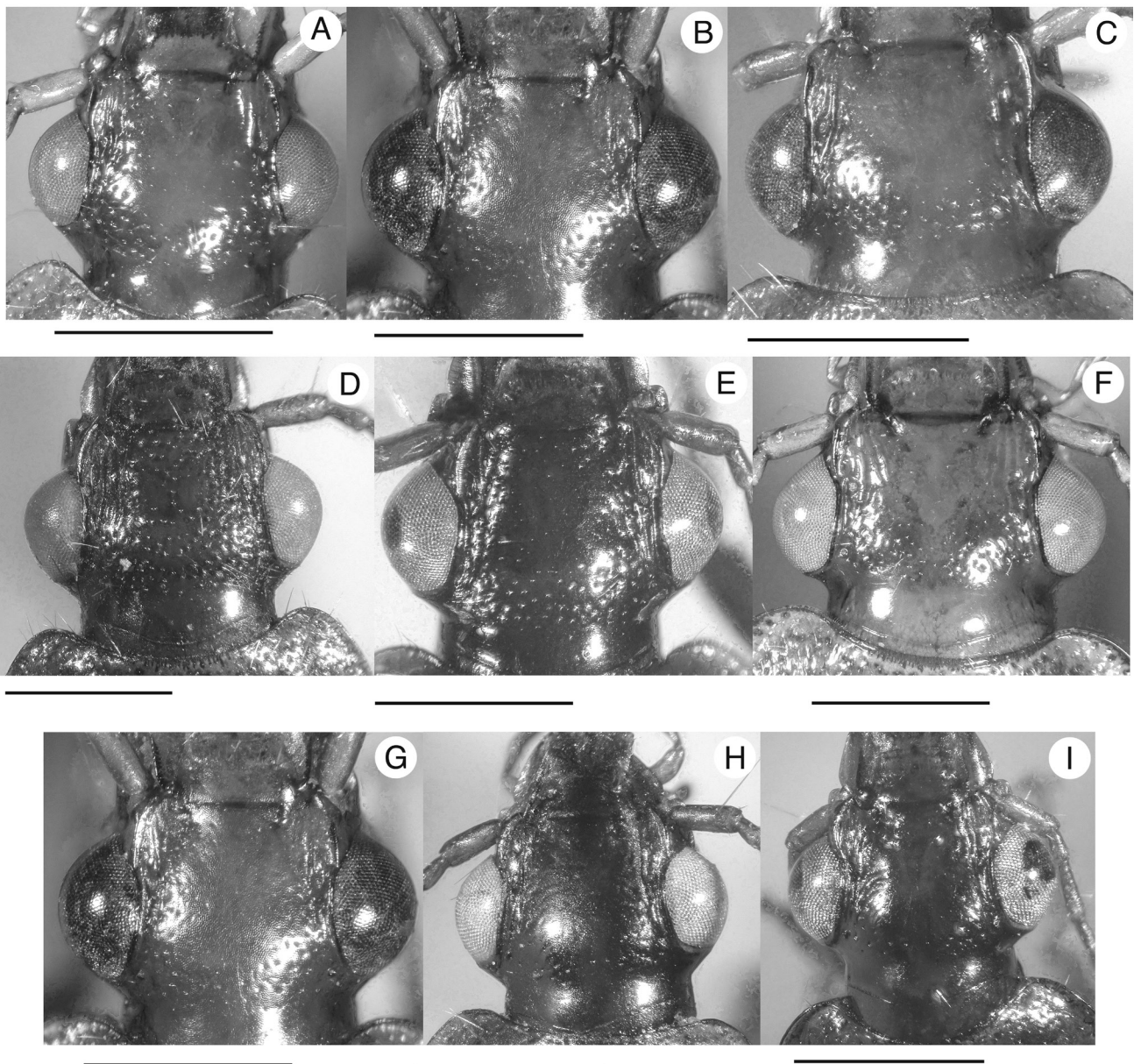


Figure 7. Automontage photographs of head capsules, dorsal aspect, showing puncture and setal patterns of species of *C. (Pinacodera) latiuscula* species subgroup: **A**, *C. punctifera punctifera* (LeConte), Madera Canyon, Santa Rita Mountains, Santa Cruz Co., Arizona, U.S.A.; **B**, *C. punctifera toltec*, **new subspecies**, El Camarón, Oaxaca, México; **C**, *C. punctifera toltec*, **new subspecies**, Cuernavaca, Morelos, México; **D**, *C. rugofrons*, **new species**, Volcán Colima, Colima, México; **E**, *C. tonatiuh*, **new species**, San Pedro y Pablo Ayutla, Oaxaca, México; **F**, *C. yaqui*, **new species**, Ramsey Canyon, Huachuca Mountains, Cochise Co., Arizona, U.S.A.; **G**, *C. zacapa*, **new species**, San Lorenzo, Zacapa, Guatemala; **H**, *C. zapotec*, **new species**, El Paraiso, Guerrero, México; **I**, *C. zapotec*, **new species**, San Gabriel Mixtepec, Oaxaca, México. Scale bar = 1 mm.

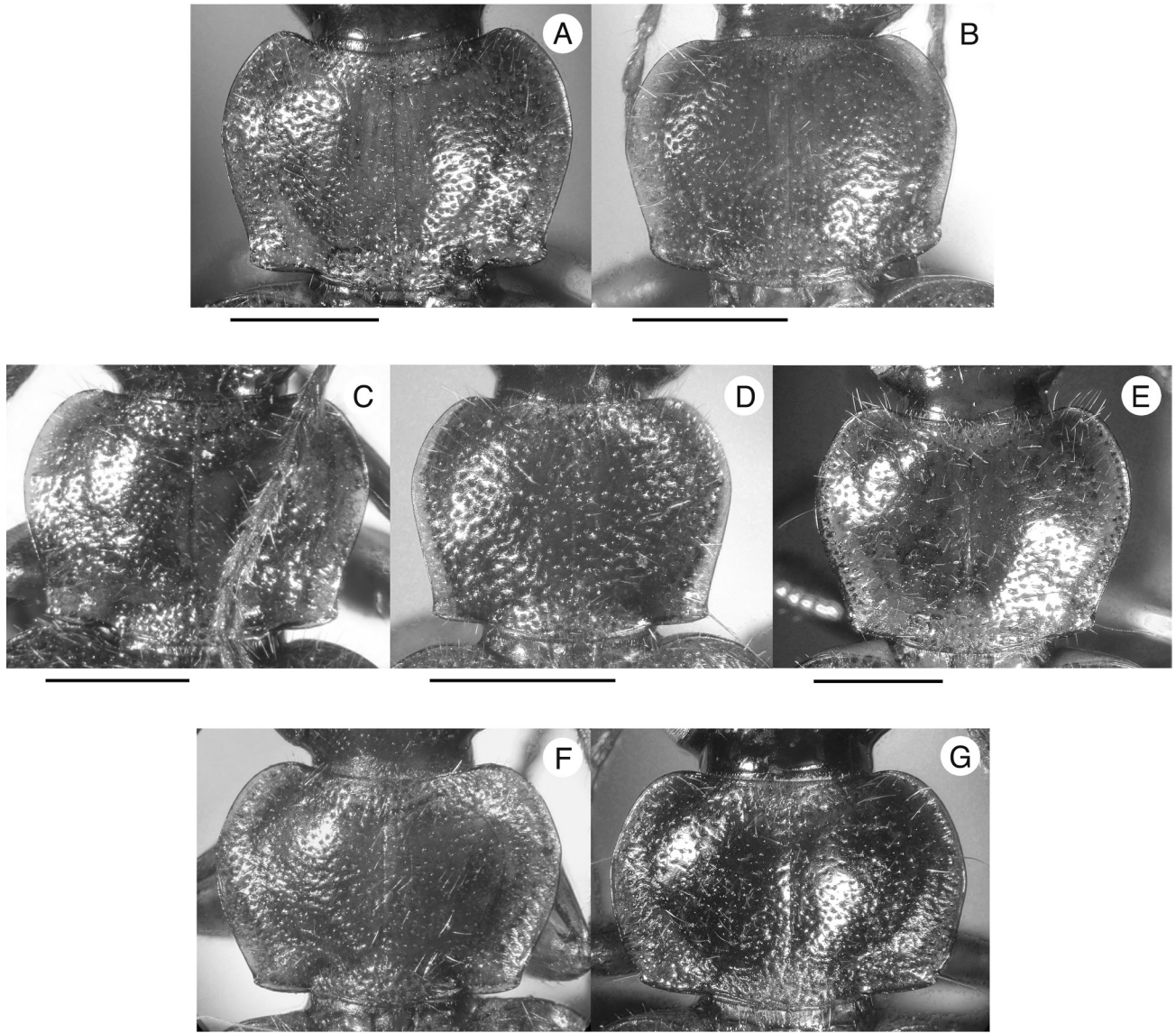


Figure 8. Automontage photographs of prothoraces, dorsal aspect, showing puncture and setal patterns of species of *C. (Pinacodera) latiuscula* species subgenus: **A**, *C. apache*, **new species**, Madera Canyon, Santa Rita Mountains, Santa Cruz Co., Arizona, U.S.A.; **B**, *C. crenatoverpa*, **new species**, Rincón, Temascaltepec, state of México, México; **C**, *C. cuyuteca*, **new species**, Cuautla, Jalisco, México; **D**, *C. geminata*, **new species**, Cuernavaca, Morelos, México; **E**, *C. huichilobos*, **new species**, Puerto Angel, Oaxaca, México; **F**, *C. latiuscula* (Chaudoir), Puente Nacional, Veracruz, México; **G**, *C. latiuscula* (Chaudoir), Xcalacoop, Yucatán, México. Scale bar = 1 mm.

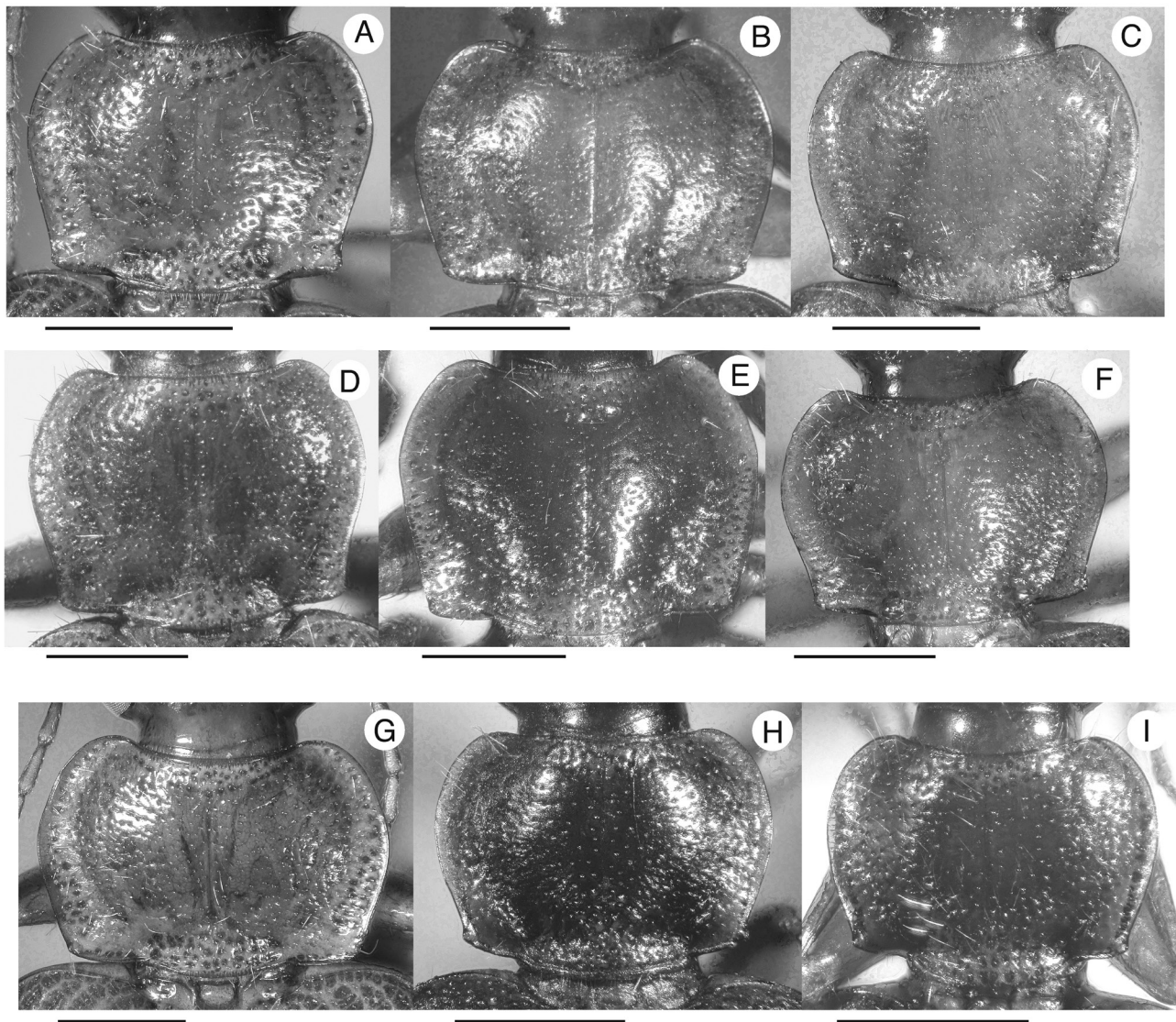


Figure 9. Automontage photographs of prothoraces, dorsal aspect, showing puncture and setal patterns of species of *C. (Pinacodera) latiuscula* species subgroup: **A**, *C. punctifera punctifera* (LeConte), Madera Canyon, Santa Rita Mountains, Santa Cruz Co., Arizona, U.S.A.; **B**, *C. punctifera toltec*, **new subspecies**, El Camarón, Oaxaca, México; **C**, *C. punctifera toltec*, **new subspecies**, Cuernavaca, Morelos, México; **D**, *C. rugofrons*, **new species**, Volcán Colima, Colima, México; **E**, *C. tonatiuh*, **new species**, San Pedro y San Pablo Ayutla, Oaxaca, México; **F**, *C. yaqui*, **new species**, Ramsey Canyon, Huachuca Mountains, Cochise Co., Arizona, U.S.A.; **G**, *C. zacapa*, **new species**, San Lorenzo, Zacapa, Guatemala; **H**, *C. zapotec*, **new species**, El Paraiso, Guerrero, México; **I**, *C. zapotec*, **new species**, San Gabriel Mixtepec, Oaxaca, México. Scale bar = 1 mm.

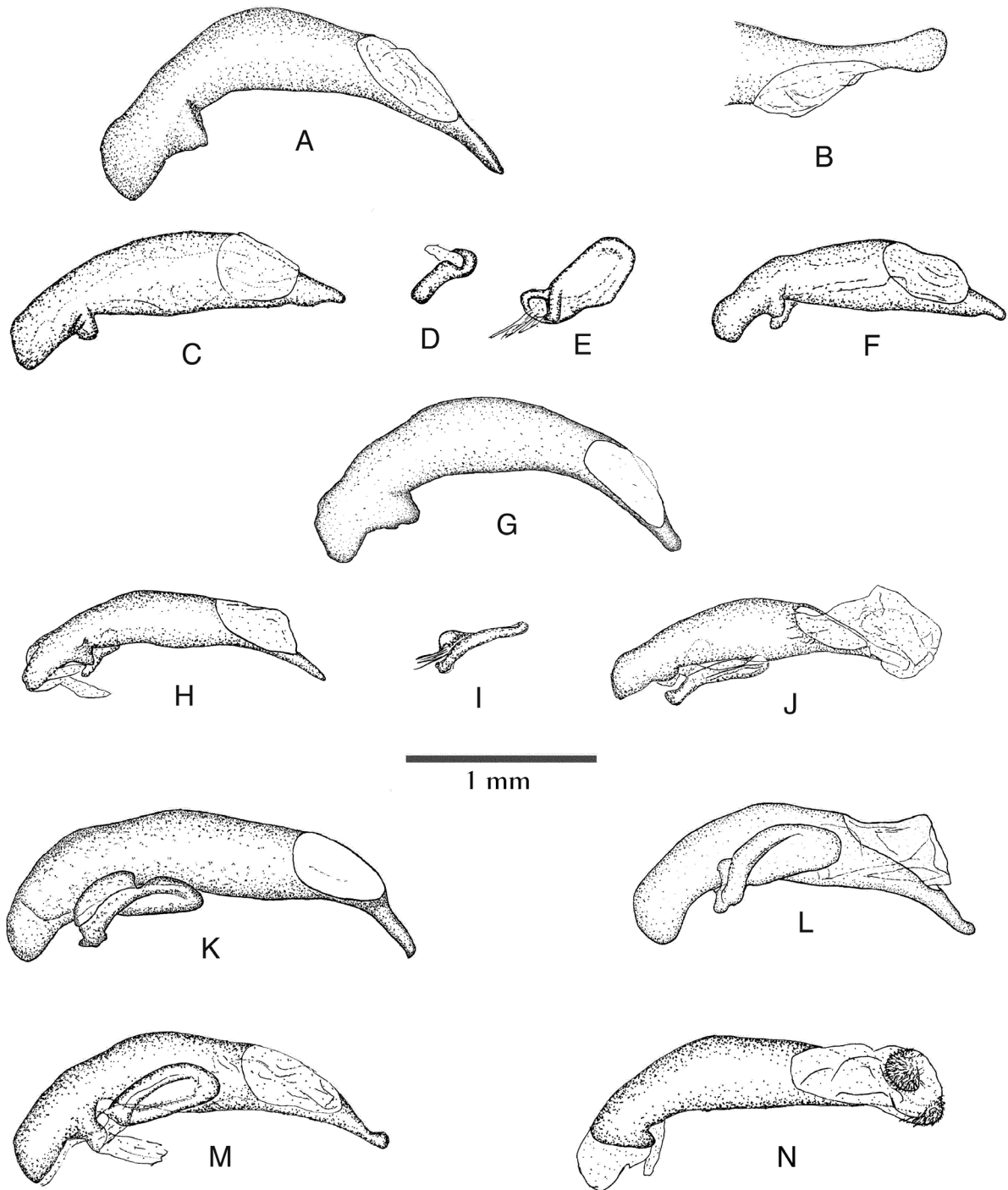


Figure 10. Line drawings of male genitalia of species of *C. (Pinacodera) latiuscula* species subgroup. **A–B**, phallus of *C. apache*, **new species**, Madera Canyon, Santa Rita Mountains, Santa Cruz Co., Arizona, U.S.A.: **A**, left lateral aspect; **B**, periostial area and preapex, dorsal aspect. **C–F**, phallus and parameres of *C. crenatoverpa*, **new species**, HOLOTYPE, Temascaltepec, state of México, México: **C**, **F**, phallus, left lateral aspect; **D**, **E**, right and left parameres respectively, ventral aspect; **F**, phallus, left lateral aspect, of *C. crenatoverpa* **new species**, El Rincón, Jalisco, México. **G**, phallus, left lateral aspect, of *C. cuyuteca*, **new species**, HOLOTYPE, Cuautla, Jalisco, México. **H–I**, phallus, **H**, left lateral aspect and **I**, left paramere, lateral aspect of *C. geminata*, **new species**, HOLOTYPE, Cuernavaca, Morelos, México. **J**, Phallus, left lateral aspect, with endophallus partially everted, of *C. geminata*, **new species**, Cuernavaca, Morelos, México. **K**, phallus, left lateral aspect, of *C. huichilobos*, **new species**, Puerto Angel, Oaxaca, México. **L–N**, phallus, left lateral aspect of *C. latiuscula* (Chaudoir): **L**, Tzucacab, Yucatán, México; **M**, Cuernavaca, Morelos, México; **N**, endophallus partially everted, showing microtrichial patches, Cuernavaca, Morelos, México. Scale bar = 1 mm.

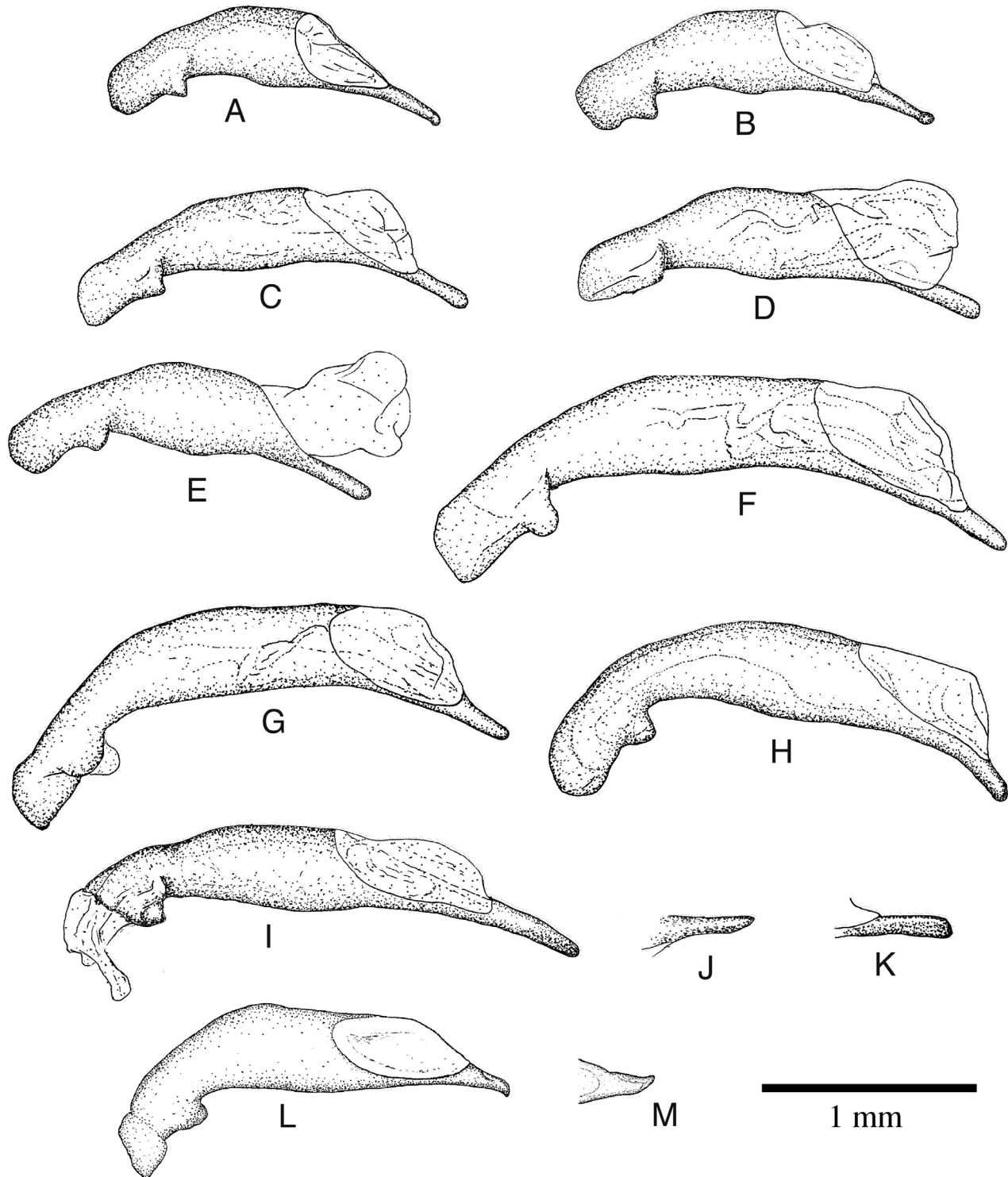


Figure 11. Line drawings of male genitalia of species of *C. (Pinacodera) latiuscula* species subgroup. **A, B**, phallus, left lateral aspect, of *C. punctifera punctifera* (LeConte) Madera Canyon, Santa Rita Mountains, Santa Cruz Co., Arizona, U.S.A. **C–E**, phallus, left lateral aspect, endophallus partially everted, of *C. punctifera toltec*, **new subspecies**: **C, D**, Cuernavaca, Morelos, México; **E**, Veracruz, México. **F, G**, phallus, left lateral aspect of *C. rugofrons*, **new species**. **F**, Los Volcanes, Jalisco, México; **G**, Cuautla, Jalisco, México. **H**, phallus, left lateral aspect, of *C. tonatiuh*, **new species**, Nochixtlán, Oaxaca, México. **I, J**, phallus of *C. yaqui*, **new species**, Sierra Vista, Cochise Co., Arizona, U.S.A.: **I**, left lateral aspect; **J**, preapex, dorso-ventral aspect. **K**, phallic preapex, dorsoventral aspect of *C. yaqui*, **new species**, Cave Creek, Cochise Co., Arizona, U.S.A. **L, M**, phallus of *C. zacapa*, **new species**, vic. Yucasran, El Paraiso, Honduras: **L**, left lateral aspect; **M**, dorsal aspect. Scale bar = 1 mm.

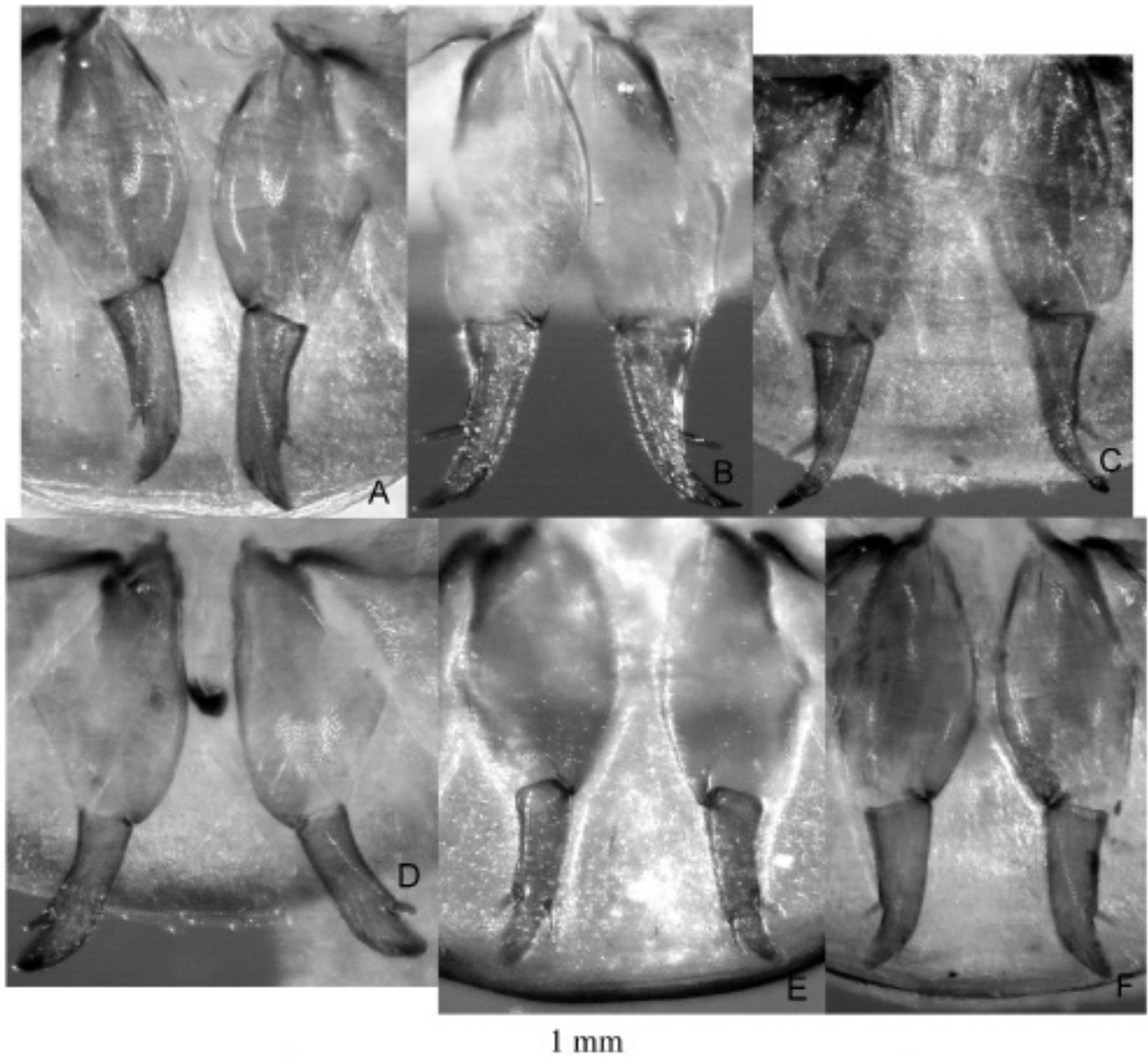


Figure 12. Automontage photographs of female genitalia (gonocoxa) of species of *C. (Pinacodera) latiuscula* species subgroup. **A**, *C. apache*, **new species**, Huachuca Mountains, Cochise Co., Arizona, U.S.A. **B**, *C. crenatoverpa*, **new species**, Volcán Ceboruca, Nayarit, México. **C**, *C. geminata*, **new species**, Tuxtla Gutiérrez, Chiapas, México. **D**, *C. huchilobos*, **new species**, Puerto Angel, Oaxaca, México. **E**, *C. latiuscula*, (Chaudoir), Runias de Kabah, Yucatán, México. **F**, *C. punctifera punctifera* (LeConte), Chiricahua Mountains, Cochise Co., Arizona, U.S.A. Scale bar = 1 mm.

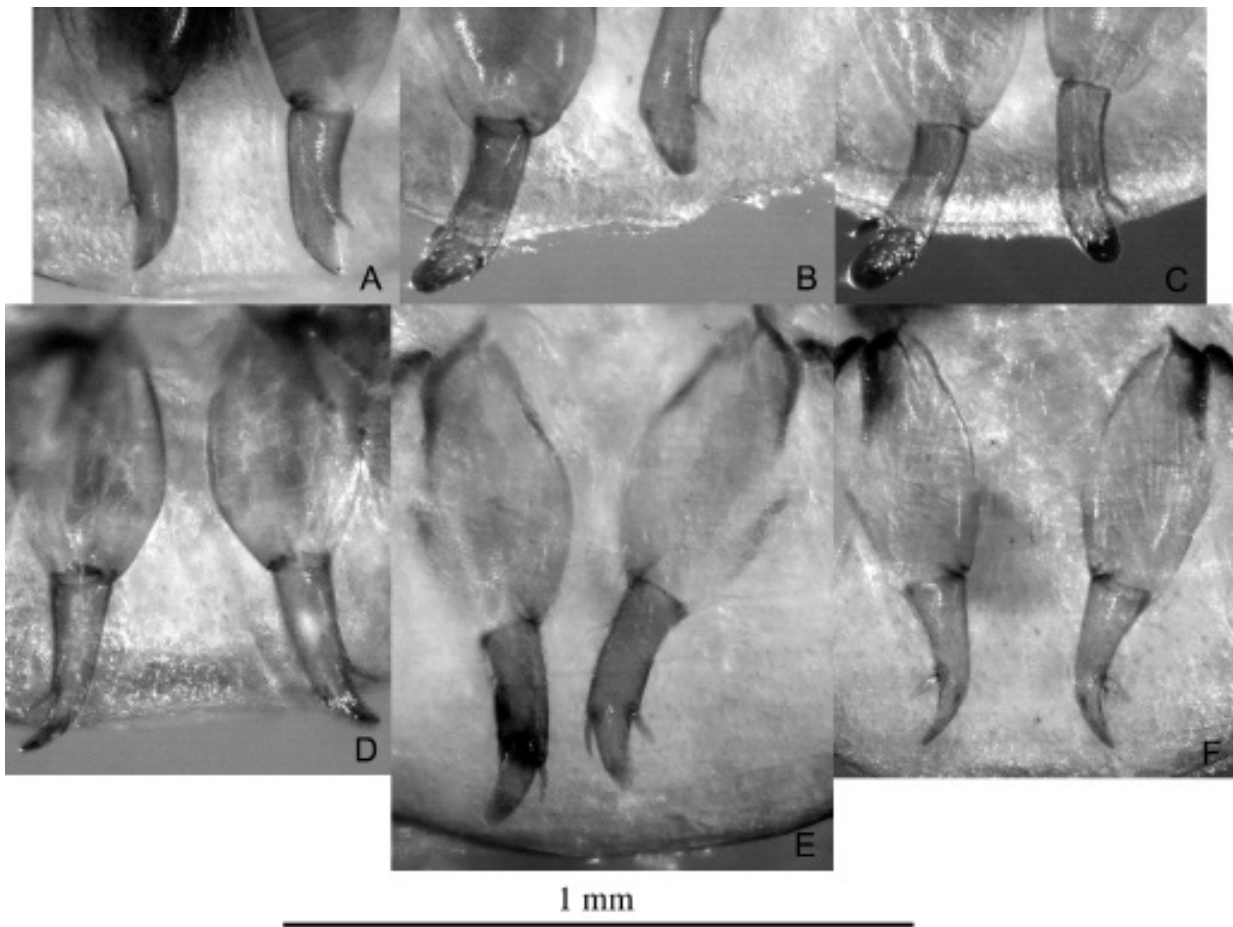


Figure 13. Automontage photographs of female genitalia (gonocoxa) of species of *C. (Pinacodera) latiuscula* species subgroup. **A**, *C. punctifera toltec*, **new subspecies**, Ixmiquilpan, Hidalgo, México. **B**, *C. rugofrons*, **new species**, Tepic, Nayarit, México. **C**, *C. tonatiuh*, **new species**, Telixlahuaca, Oaxaca, México. **D**, *C. yaqui*, **new species**, Portal, Cochise Co., Arizona, U.S.A. **E**, *C. zacapa*, **new species**, Granda Laguna, Nicaragua. **F**, *C. zapotec*, **new species**, San Gabriel Mixtepec, Oaxaca, México. Scale bar = 1 mm.

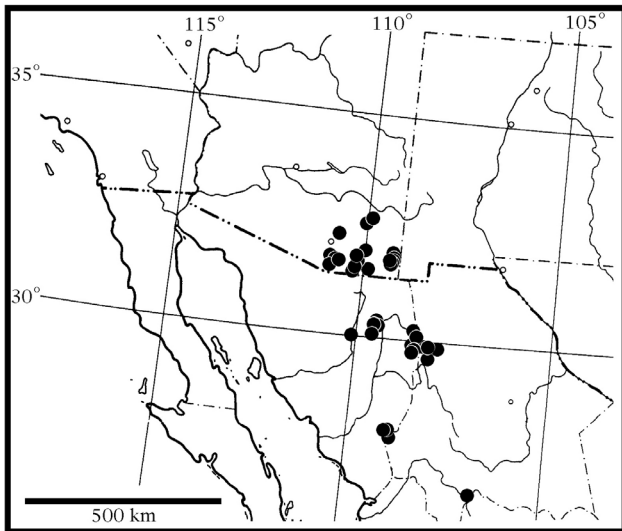


Figure 14. Outline map of southwestern United States of America and adjacent northwestern México showing positions of known localities for *Cymindis apache*, **new species**.

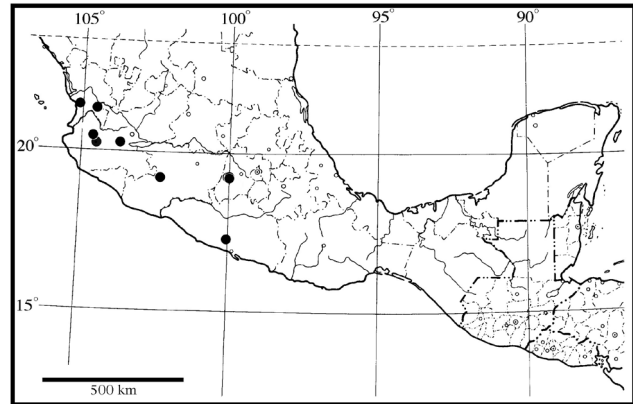


Figure 15. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis crenatoverpa*, **new species**.

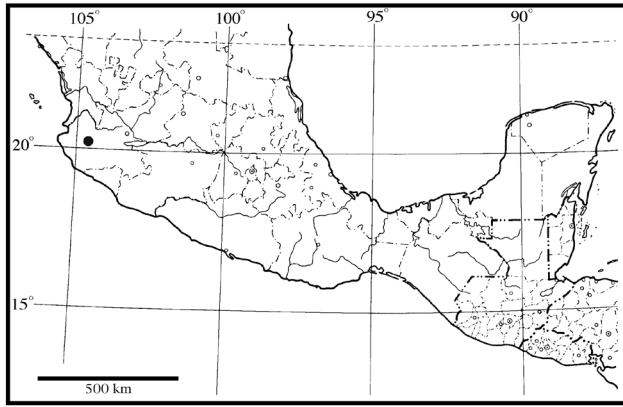


Figure 16. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis cuyuteca*, new species.

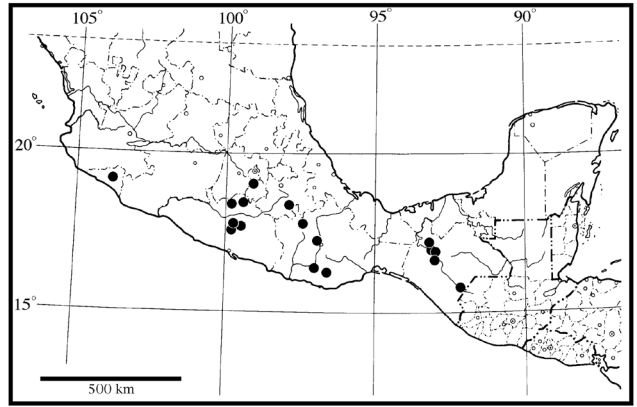


Figure 17. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis geminata*, new species.

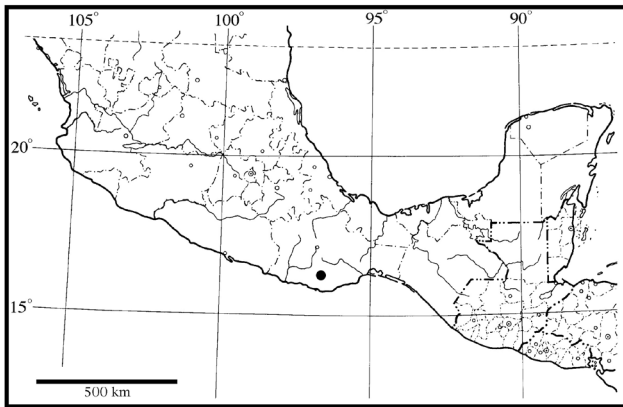


Figure 18. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis huichilobos*, new species.

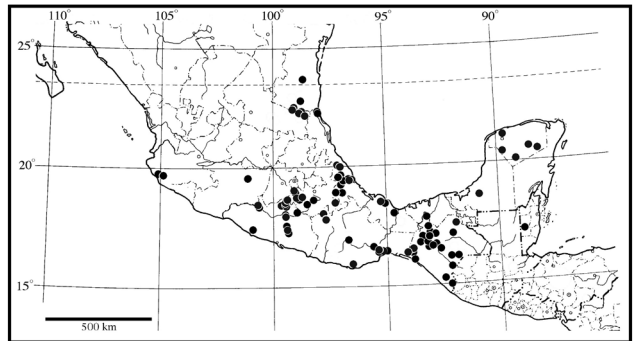


Figure 19. Outline map of México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis latiuscula* (Chaudoir).

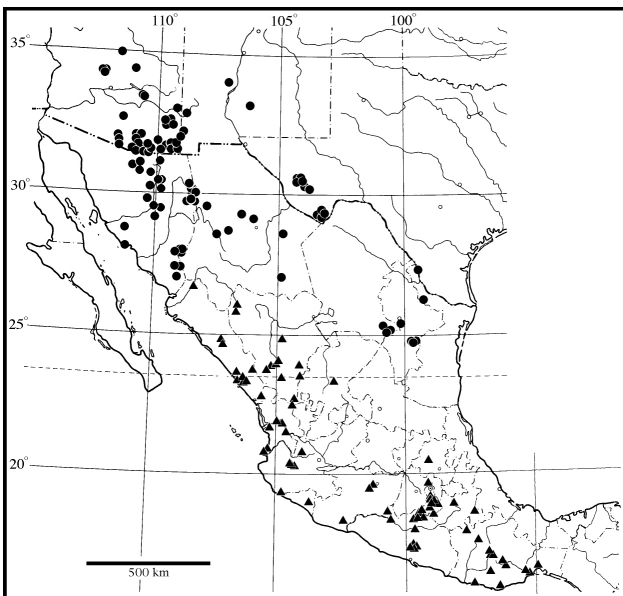


Figure 20. Outline map of southwestern United States of America and México showing positions of known localities for subspecies of *Cymindis punctifera* (LeConte): *C. p. punctifera* (LeConte) (●) and *C. p. toltec*, (▲) new subspecies.

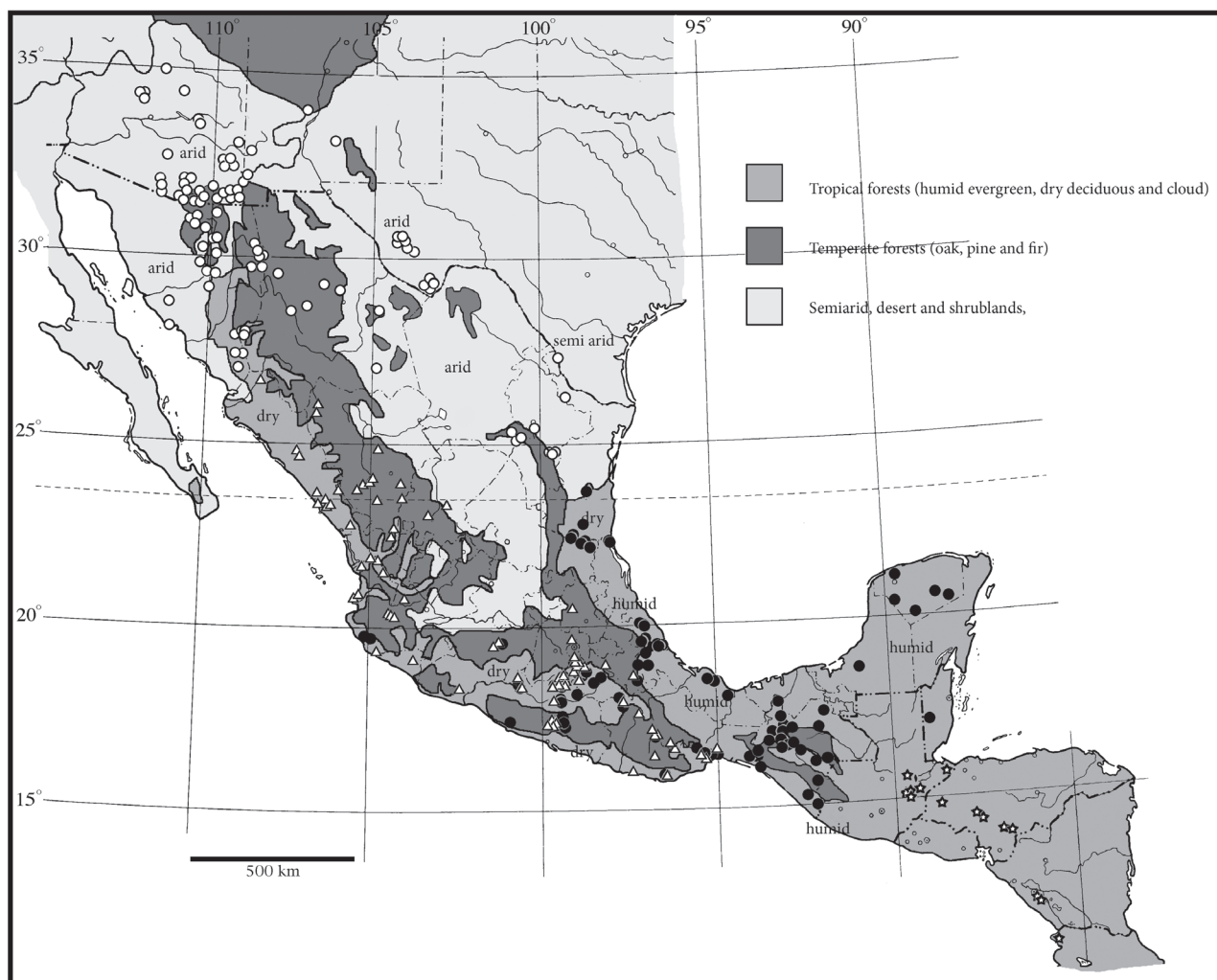


Figure 21. Outline map of southwestern United States of America, México and adjacent Nuclear Middle American republics, with an overlay of general forest types and showing positions of known localities for *Cymindis p. punctifera* (O), *C. p. toltec*, **new subspecies** (△), *C. latuscula* (Chaudoir) (●), and *C. zacapa*, **new species** (☆).

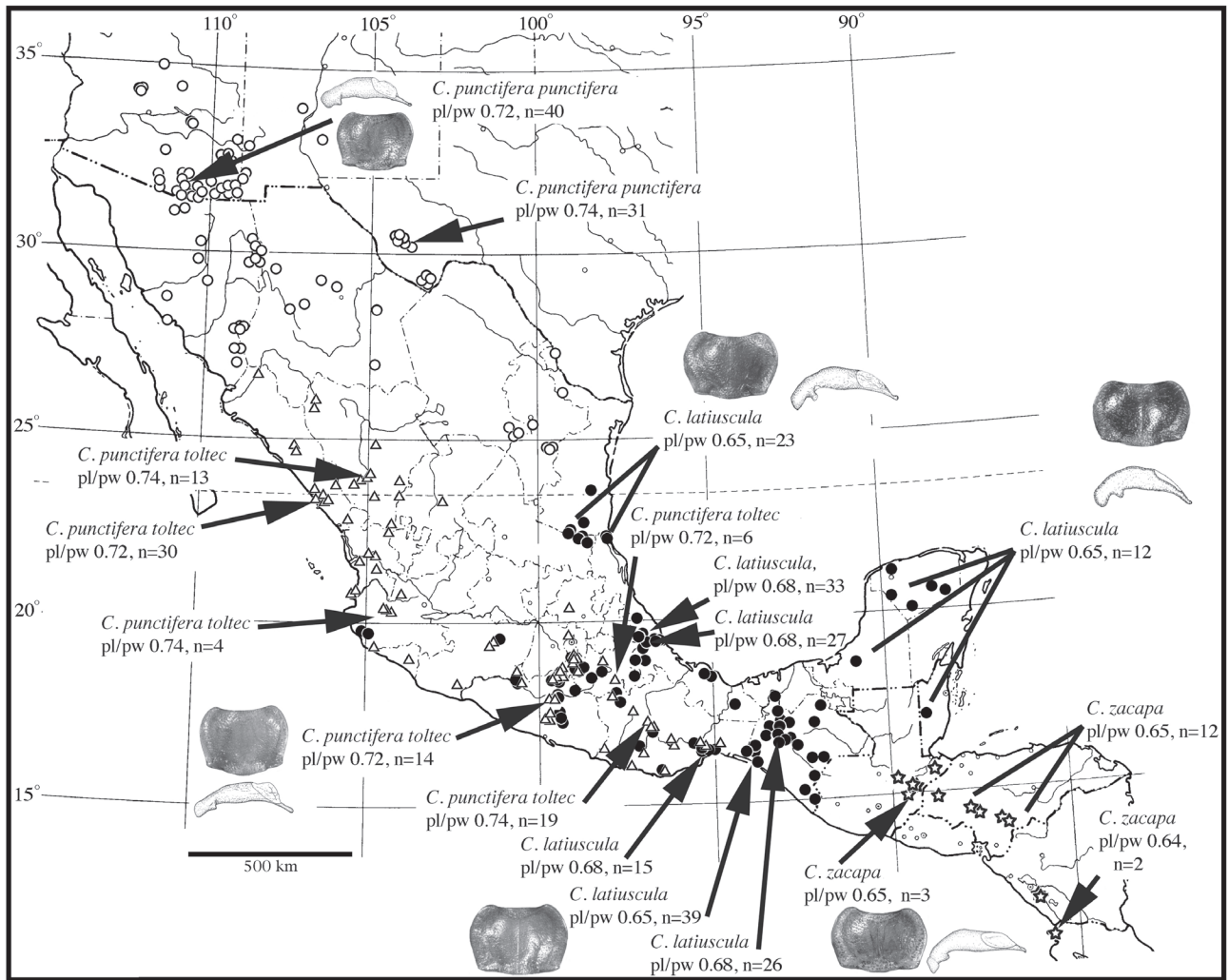


Figure 22. Outline map of southwestern United States of America, México and adjacent Nuclear Middle American republics, including representative values for the ratio PL/PW, examples of pronotal shape, and form of the phallus for specimens from representative localities of *Cymindis p. punctifera* (○), *C. p. toltec*, **new subspecies** (△), *C. latiuscula* (Chaudoir) (●), and *C. zacapa*, **new species** (☆).

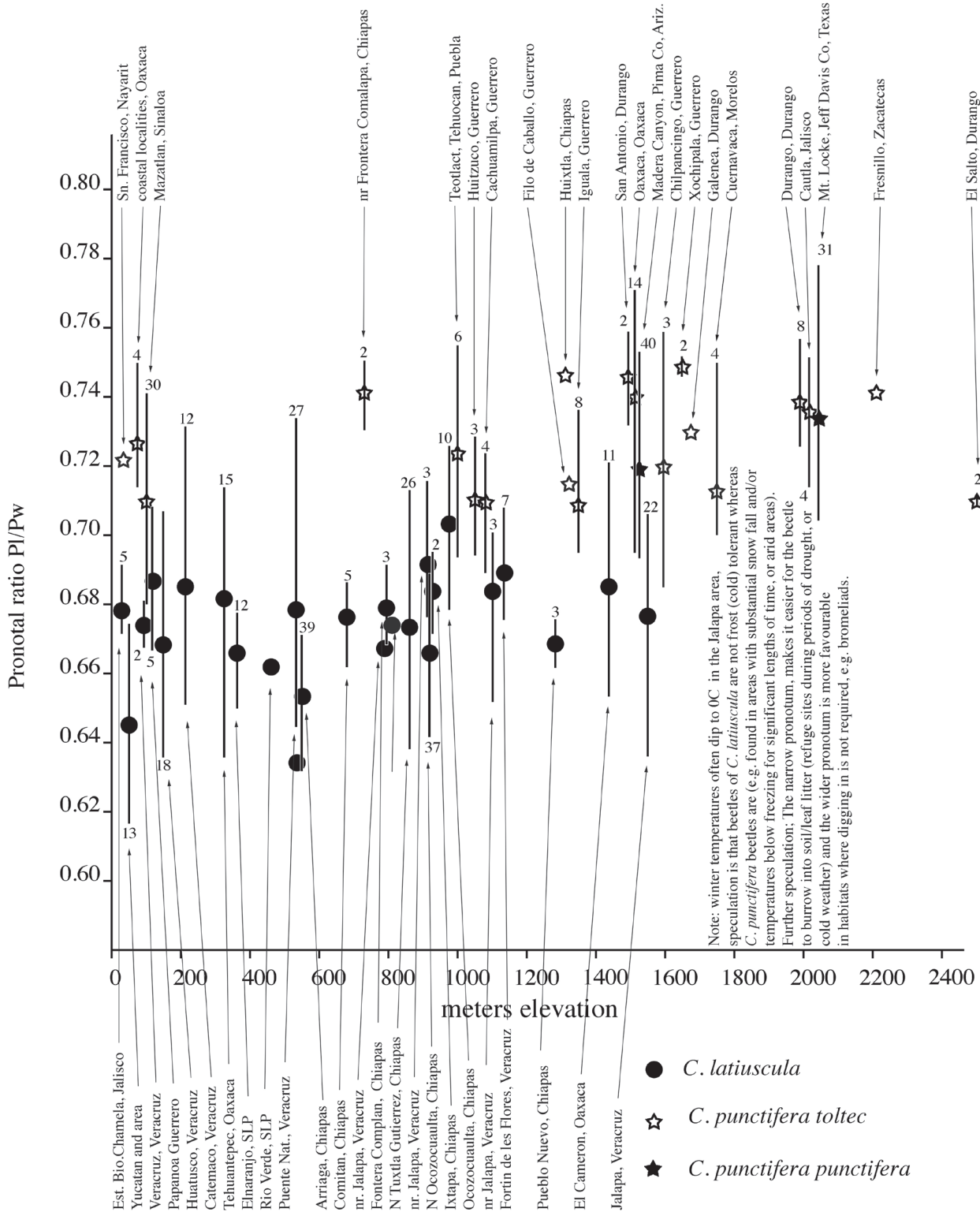


Figure 23. Graph of values for ratio PL/PW vs. elevation (m) for selected population samples of *Cymindis latiuscula* (Chaudoir) (●), *C. p. punctifera* (LeConte) (★), and *C. punctifera toltec*, new subspecies (☆).

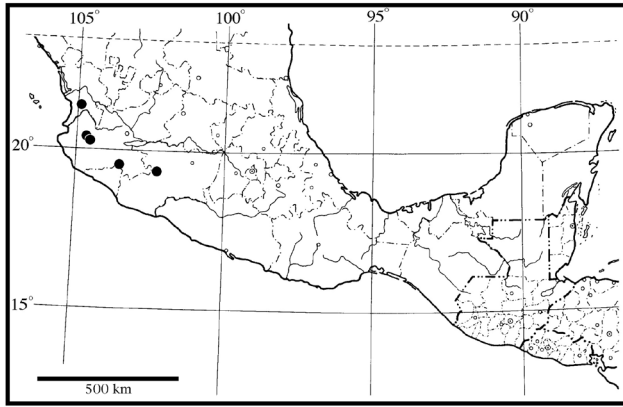


Figure 24. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis rugofrons*, **new species**.

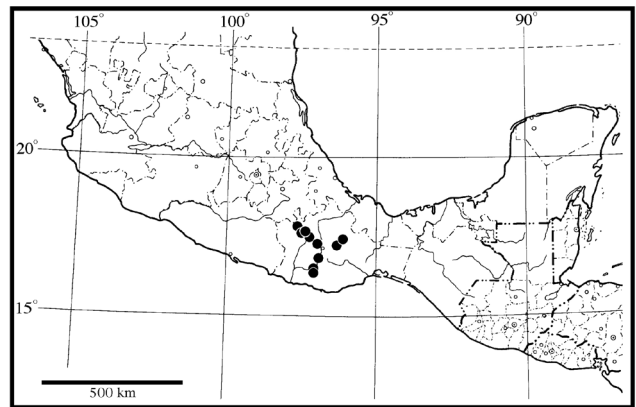


Figure 25. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis tonatiuh*, **new species**.

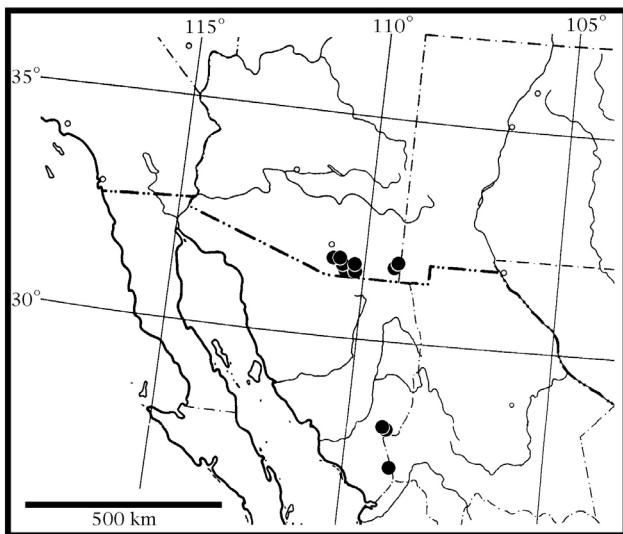


Figure 26. Outline map of southwestern United States of America and adjacent northwestern México showing positions of known localities for *Cymindis yaqui*, **new species**.

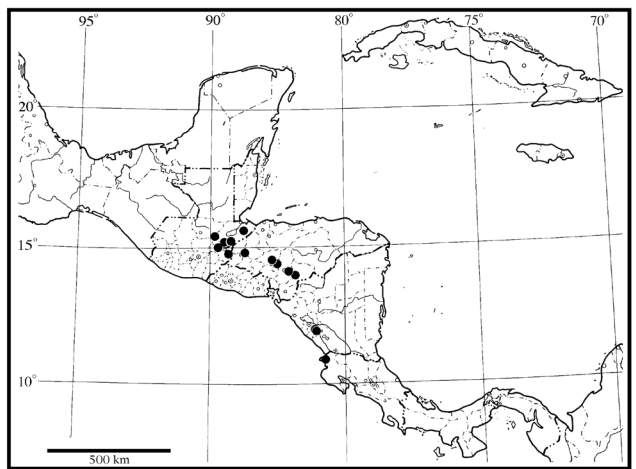


Figure 27. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis zacapa*, **new species**.

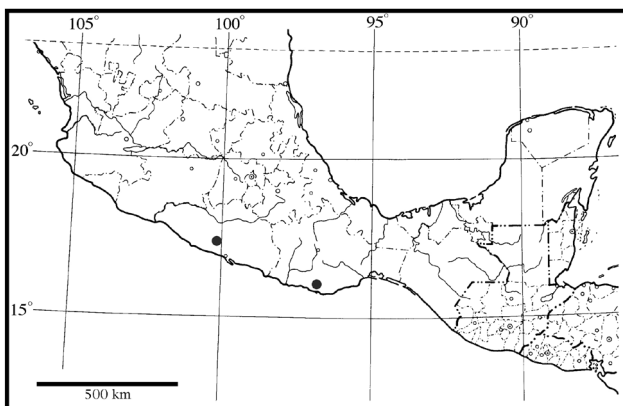


Figure 28. Outline map of southern México and adjacent Nuclear Middle American republics showing positions of known localities for *Cymindis zapotec* **new species**.

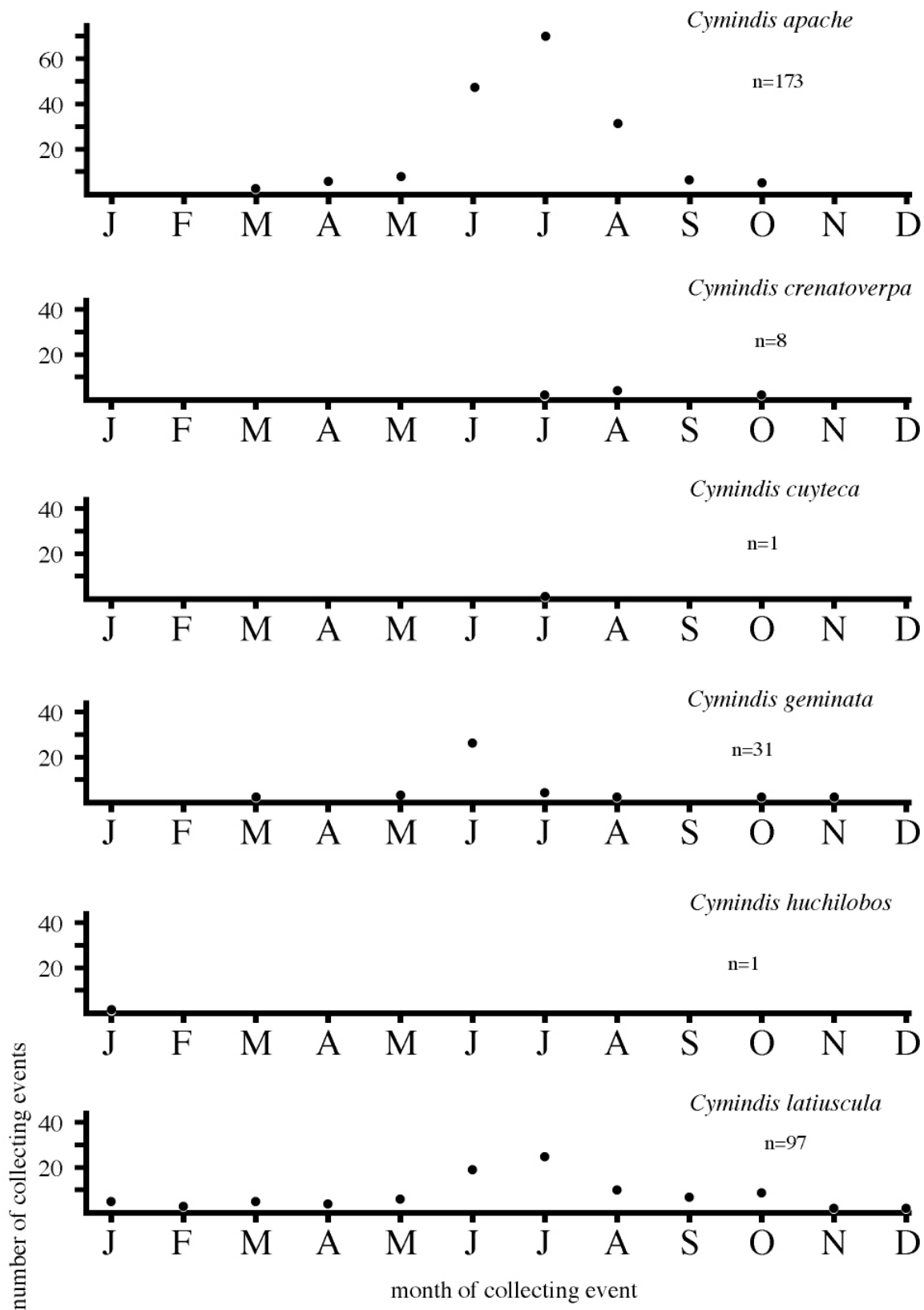


Figure 29. Graphs showing number of collecting events per month, for six species of *Cymindis* (*Pinacodera*), *latiuscula* species subgroup.

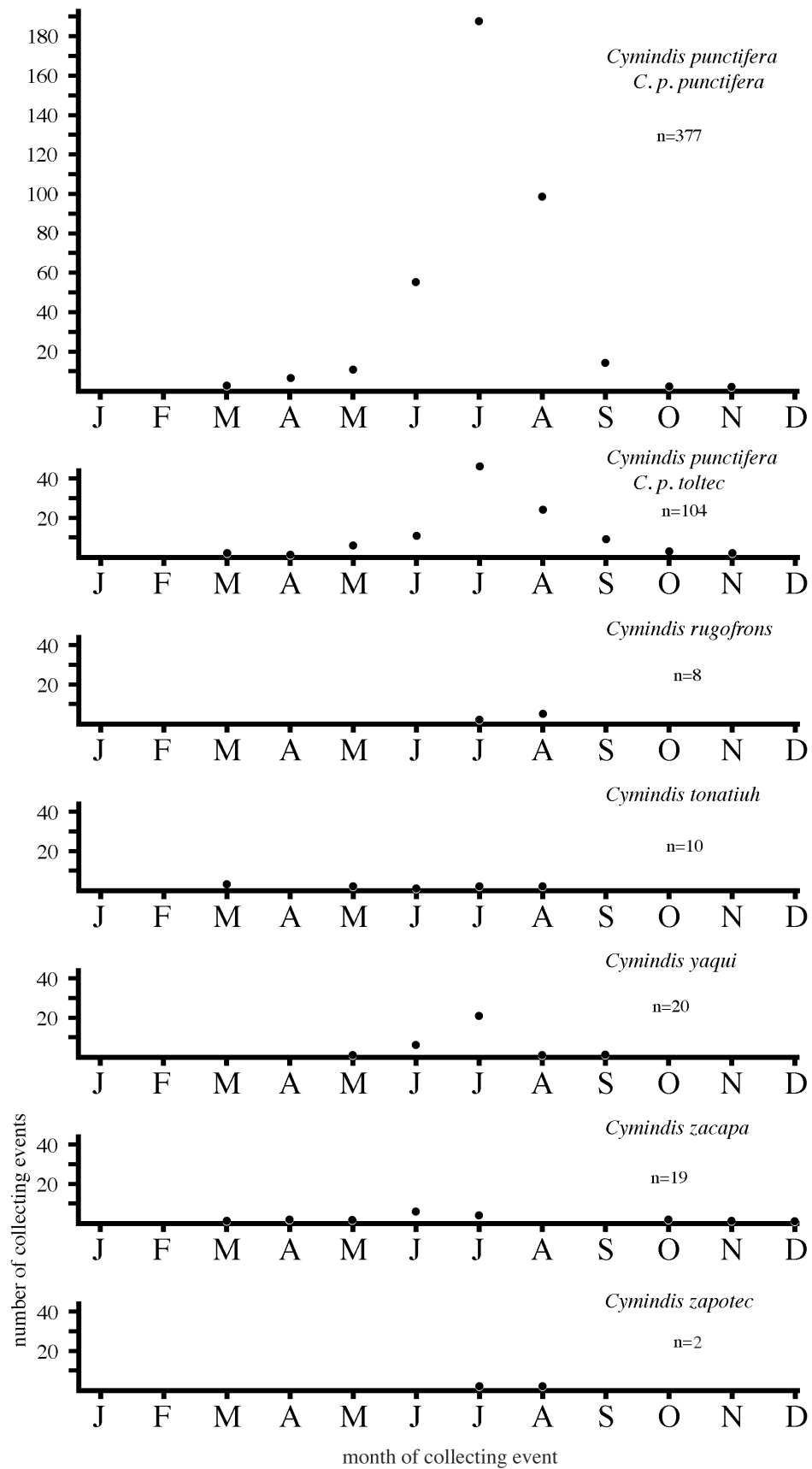


Figure 30. Graphs showing number of collecting events per month, for five species and two subspecies of *Cymindis* (*Pinacodera*), *latiuscula* species subgroup.

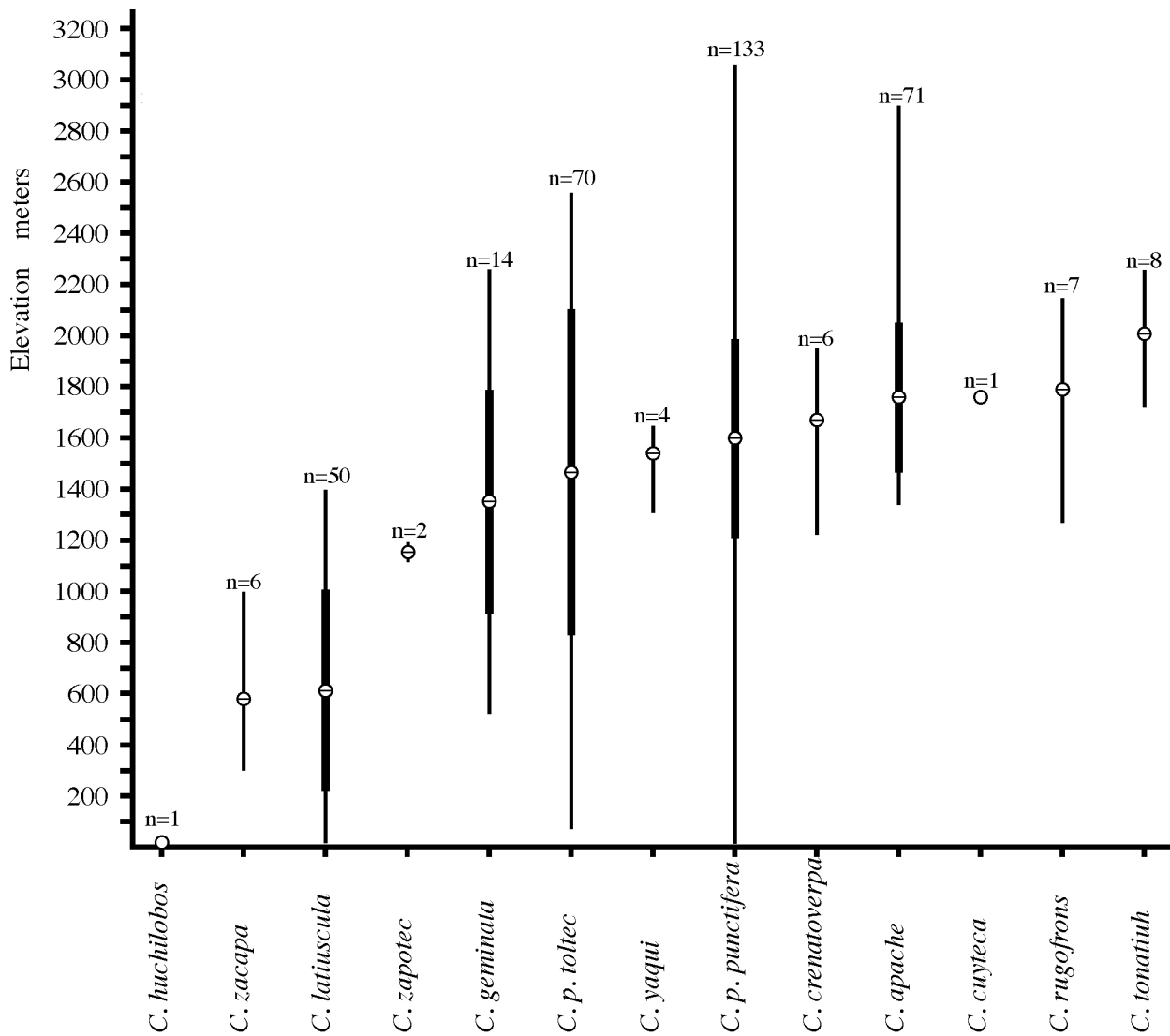


Figure 31. Distribution of species of *Cymindis* (*Pinacodera*), *latiuscula* species subgroup by elevation (m). Each point used (n) is a collecting event with elevation data recorded on the label. This does not represent the number of specimens collected on a given date or at that locality. For each taxon, the thin vertical line represents elevation range, the accompanying thick line, one standard deviation each side of mean; mean is a circle with a short horizontal bar; and a circle without horizontal bar is a single collecting event.

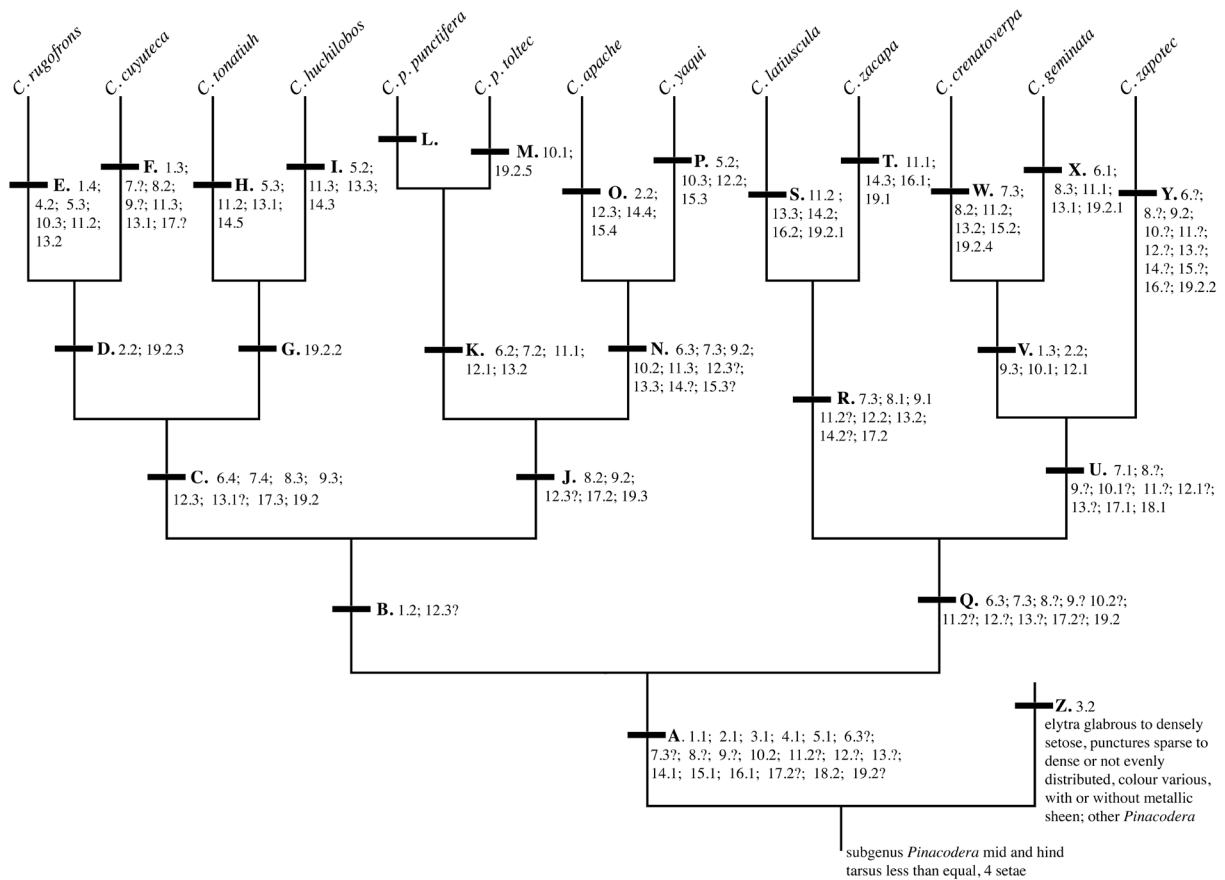


Figure 32. Reconstructed phylogeny of the taxa of the *Cymindis* (*Pinacodera*) *latiuscula* species subgroup, branches are identified by letter and character states by number (see Table 9).

Table 2. Data about variation in standardized body length (SBL, mm) for the *Cymindis latiuscula* sub- group (SE= standard error, SD=standard deviation).

Species	N	Range	Mean \pm 2SE	1.5 SD
MALES				
<i>C. rugofrons</i>	6	8.59 - 9.61	9.23 \pm 0.28	0.52
<i>C. tonatiuh</i>	29	8.57 - 9.29	8.83 \pm 0.06	0.24
<i>C. cuyuteca</i>	1		8.72	
<i>C. huichilobos</i>	12	8.51 - 9.08	8.69 \pm 0.11	0.28
<i>C. apache</i>	18	8.06 - 8.89	8.51 \pm 0.10	0.31
<i>C. zacapa</i>	10	8.05 - 8.89	8.46 \pm 0.16	0.38
<i>C. yaqui</i>	20	7.87 - 8.70	8.28 \pm 0.10	0.33
<i>C. latiuscula</i>	42	7.18 - 8.94	8.18 \pm 0.11	0.53
<i>C. crenatoverpa</i>	8	7.77 - 8.13	7.84 \pm 0.17	0.34
<i>C. p. toltec</i>	12	7.10 - 8.41	7.70 \pm 0.22	0.59
<i>C. p. punctifera</i>	20	6.55 - 7.95	7.30 \pm 0.15	0.51
<i>C. geminata</i>	11	6.40 - 7.37	6.90 \pm 0.18	0.45
FEMALES				
<i>C. rugofrons</i>	4	9.61 - 9.99	9.76	
<i>C. tonatiuh</i>	26	9.04 - 10.32	9.50 \pm 0.14	0.52
<i>C. huichilobos</i>	5	8.70 - 9.79	9.39 \pm 0.38	0.63
<i>C. apache</i>	30	8.12 - 9.16	8.79 \pm 0.11	0.44
<i>C. zacapa</i>	7	7.98 - 9.09	8.75 \pm 0.28	0.56
<i>C. yaqui</i>	5	7.79 - 9.08	8.50 \pm 0.41	0.69
<i>C. crenatoverpa</i>	2	7.86 - 8.25	8.05	
<i>C. latiuscula</i>	59	7.13 - 9.29	8.15 \pm 0.11	0.65
<i>C. p. toltec</i>	21	7.02 - 8.77	7.99 \pm 0.22	0.74
<i>C. p. punctifera</i>	43	6.32 - 8.08	7.49 \pm 0.13	0.64
<i>C. geminata</i>	25	6.51 - 7.76	7.19 \pm 0.15	0.57
<i>C. zapotec</i>	2	6.80 - 7.19	6.99	

Table 3. Data about variation in the ratio PL/PW for the *Cymindis latiuscula* sub-group.

Species	N	Range	Mean
MALES			
<i>C. geminata</i>	11	0.73 – 0.79	0.76
<i>C. rugofrons</i>	6	0.71 – 0.85	0.76
<i>C. huichilobos</i>	12	0.73 – 0.78	0.75
<i>C. tonatiuh</i>	29	0.70 – 0.79	0.74
<i>C. crenatoverpa</i>	8	0.71 – 0.77	0.73
<i>C. p. punctifera</i>	42	0.69 – 0.78	0.73
<i>C. cuyuteca</i>	1		0.73
<i>C. apache</i>	18	0.67 – 0.75	0.72
<i>C. p. toltec</i>	46	0.68 – 0.77	0.72
<i>C. yaqui</i>	20	0.63 – 0.73	0.71
<i>C. latiuscula</i>	148	0.61 – 0.73	0.67
<i>C. zacapa</i>	10	0.63 – 0.68	0.65
FEMALES			
<i>C. geminata</i>	25	0.72 – 0.81	0.76
<i>C. rugofrons</i>	4	0.74 – 0.78	0.76
<i>C. huichilobos</i>	5	0.74 – 0.78	0.76
<i>C. crenatoverpa</i>	2	0.71 – 0.80	0.75
<i>C. tonatiuh</i>	26	0.69 – 0.77	0.74
<i>C. p. punctifera</i>	42	0.69 – 0.77	0.73
<i>C. zapotec</i>	2	0.70 – 0.74	0.72
<i>C. p. toltec</i>	46	0.68 – 0.77	0.72
<i>C. yaqui</i>	5	0.68 – 0.73	0.71
<i>C. apache</i>	30	0.66 – 0.74	0.70
<i>C. latiuscula</i>	67	0.62 – 0.72	0.67
<i>C. zacapa</i>	7	0.63 – 0.66	0.65

Table 4. Data about variation in total length (MLp, mm) of the phallus for males of the *Cymindis latiuscula* sub-group (SE= standard error, SD=standard deviation).

Species	N	Range	Mean \pm 2SE	1.5 SD
<i>C. rugofrons</i>	6	2.27 – 2.59	2.46 \pm 0.10	0.17
<i>C. yaqui</i>	20	2.16 – 2.47	2.33 \pm 0.03	0.10
<i>C. apache</i>	18	2.07 – 2.28	2.16 \pm 0.02	0.07
<i>C. huichilobos</i>	12	2.05 – 2.16	2.10 \pm 0.02	0.05
<i>C. tonatiuh</i>	29	1.93 – 2.12	2.03 \pm 0.02	0.07
<i>C. cuyuteca</i>	1		2.00	
<i>C. zacapa</i>	9	1.80 – 1.93	1.86 \pm 0.03	0.07
<i>C. latiuscula</i>	42	1.67 – 2.06	1.85 \pm 0.03	0.14
<i>C. p. toltec</i>	12	1.62 – 1.91	1.77 \pm 0.05	0.13
<i>C. crenatoverpa</i>	8	1.56 – 1.79	1.71 \pm 0.05	0.11
<i>C. p. punctifera</i>	14	1.46 – 1.74	1.61 \pm 0.04	0.10
<i>C. geminata</i>	10	1.44 – 1.53	1.50 \pm 0.02	0.05

Table 5. Data about variation in maximum width (MWp, mm) of the phallus for males of the *Cymindis latiuscula* sub-group (SE= standard error, SD=standard deviation).

Species	N	Range	Mean \pm 2SE	1.5 SD
<i>C. apache</i>	18	0.38 – 0.67	0.49 \pm 0.05	0.04
<i>C. huichilobos</i>	12	0.45 – 0.52	0.47 \pm 0.01	0.04
<i>C. yaqui</i>	20	0.41 – 0.52	0.47 \pm 0.01	0.05
<i>C. cuyuteca</i>	1		0.47	
<i>C. crenatoverpa</i>	8	0.39 – 0.54	0.43 \pm 0.04	0.08
<i>C. rugofrons</i>	6	0.40 – 0.49	0.43 \pm 0.03	0.06
<i>C. latiuscula</i>	42	0.35 – 0.52	0.43 \pm 0.02	0.07
<i>C. tonatiuh</i>	29	0.38 – 0.47	0.42 \pm 0.01	0.04
<i>C. zacapa</i>	9	0.35 – 0.45	0.39 \pm 0.02	0.01
<i>C. p. punctifera</i>	14	0.31 – 0.40	0.36 \pm 0.01	0.04
<i>C. p. toltec</i>	12	0.33 – 0.42	0.36 \pm 0.02	0.05
<i>C. geminata</i>	10	0.28 – 0.35	0.32 \pm 0.01	0.03



Table 6. Data about variation in displacement (MDp, mm) of the phallus for males of the *Cymindis latiuscula* species group (SE= standard error, SD=standard deviation).

Species	N	Range	Mean \pm 2SE	1.5 SD
<i>C. apache</i>	18	0.85 – 1.04	0.95 \pm 0.03	0.09
<i>C. cuyuteca</i>	1		0.89	
<i>C. huichilobos</i>	12	0.80 – 0.92	0.86 \pm 0.02	0.05
<i>C. rugofrons</i>	6	0.80 – 0.89	0.82 \pm 0.03	0.06
<i>C. tonatiuh</i>	29	0.73 – 0.85	0.79 \pm 0.01	0.05
<i>C. zacapa</i>	9	0.67 – 0.78	0.71 \pm 0.02	0.05
<i>C. latiuscula</i>	42	0.49 – 0.85	0.68 \pm 0.02	0.11
<i>C. yaqui</i>	20	0.61 – 0.71	0.66 \pm 0.01	0.04
<i>C. p. toltec</i>	12	0.47 – 0.71	0.57 \pm 0.03	0.09
<i>C. crenatoverpa</i>	8	0.49 – 0.64	0.57 \pm 0.03	0.07
<i>C. p. punctifera</i>	14	0.47 – 0.59	0.54 \pm 0.02	0.05
<i>C. geminata</i>	10	0.45 – 0.52	0.49 \pm 0.02	0.04

Table 7. Data about variation in preapex length (DPp, mm) of the phallus for males of the *Cymindis latiuscula* subgroup (SE= standard error, SD= standard deviation).

Species	N	Range	Mean \pm 2SE	1.5 SD
<i>C. yaqui</i>	20	0.34 – 0.42	0.39 \pm 0.01	0.04
<i>C. apache</i>	18	0.31 – 0.42	0.37 \pm 0.01	0.05
<i>C. huichilobos</i>	12	0.28 – 0.35	0.31 \pm 0.01	0.04
<i>C. p. punctifera</i>	14	0.21 – 0.28	0.25 \pm 0.01	0.03
<i>C. p. toltec</i>	12	0.20 – 0.31	0.25 \pm 0.02	0.04
<i>C. rugofrons</i>	6	0.21 – 0.28	0.24 \pm 0.02	0.04
<i>C. crenatoverpa</i>	8	0.21 – 0.28	0.23 \pm 0.02	0.03
<i>C. latiuscula</i>	42	0.15 – 0.28	0.23 \pm 0.01	0.04
<i>C. zacapa</i>	9	0.19 – 0.26	0.22 \pm 0.02	0.04
<i>C. tonatiuh</i>	29	0.14 – 0.20	0.17 \pm 0.01	0.02
<i>C. cuyuteca</i>	1		0.17	
<i>C. geminata</i>	10	0.14 – 0.19	0.16 \pm 0.01	0.02

Table 8. Areas of precinction: **AZ**, Arizona; **CGH**, Chiapan-Guatemalan Highlands; **OCC**, Sierra Madre Occidental, including southern part, and excluding Central Plateau; **ORI**, Sierra Madre Oriental; **SD**, Sonoran Desert; **SUR**, Sierra Madre del Sur; **TAL**, Talamancan Cordillera; **TRAN**, Sierra Transvolcanica.

 many collection records within area
 limited occurrence within area




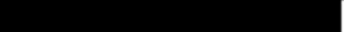







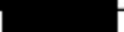


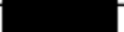
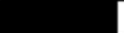






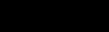







TAXA	AREAS OF PRECINCTION								TOTAL AREAS/TAXON
	SOUTH & EASTERN GROUP		SOUTH CENTRAL GROUP		NORTH & WESTERN GROUP				
	TAL	CGH	SUR	TRAN	ORI	OCC	SD	AZ	
<i>C. zacapa</i>									2
<i>C. latiuscula</i>									4
<i>C. geminata</i>									3
<i>C. huichilobos</i>									1
<i>C. tonatiuh</i>									1
<i>C. zapotec</i>									1
<i>C. crenatoverpa</i>									3
<i>C. cuyuteca</i>									1
<i>C. rugofrons</i>									1
<i>C. p. toltec</i>									4
<i>C. p. punctifera</i>									4
<i>C. yaqui</i>									3
<i>C. apache</i>									3
TOTAL TAXA/AREA	1	3	7	6	2	5	4	3	
PRECINCTIVE TAXA/AREA	0	0	3	2	0	0	0	0	

Table 9. Phylogeny, character states.

location and character	code	character state	notes, example figures
head, sculpture	01.1	frons smooth; vertex with few punctures	Fig. 4D
	01.2	frons with few punctures; vertex with 2-3 rows of punctures	Figs. 5B, 5C
	01.3	frons with scattered punctures; vertex “strongly punctured”	Fig. 4A, 5E
	01.4	frons rugose, vertex deeply punctured	Figs. 4B, 5F
pronotum, punctation	02.1	fine	Fig. 9B
	02.2	coarse	Fig. 8D
elytra, punctation	03.1	densely evenly punctate, and setose	<i>latiuscula</i> group only other <i>Pinacodera</i>
	03.2	punctation and setae uneven	
abdomen, sternum VII, number of fixed setae	04.1	four	Fig. 2D
	04.2	six	Fig. 2E
elytron, apical angle	05.1	rounded	Fig. 2G
	05.2	angulate	Fig. 2H
	05.3	sinuate-angulate	Fig. 2F
standardized body length (SBL), mean values, males	06.1	6.4-7.7 mm	
	06.2	7.75-7.9 mm	
	06.3	8.0-8.7 mm	
	06.4	8.8-9.6 mm	
standardized body length (SBL), mean values, females	07.1	6.8-7.35 mm	
	07.2	7.4-8.25 mm	
	07.3	8.3-9.0 mm	
	07.4	9.05-10.3 mm	
pronotal length/width (PL/PW), mean values, males	08.1	0.65-0.69	Figs. 8G, 9G
	08.2	0.70-0.73	Figs. 8A, B, 9A, B, F Figs. 8D, E, 9D, E, H
	08.3	0.74-0.76	
PL/PW, mean values, females	09.1	0.65-0.69	Figs. 8G, 9G
	09.2	0.70-0.73	Figs. 8A, B, 9A, B, F Figs. 8D, E, 9D, E, H
	09.3	0.74-0.76	
phallus, maximum length, mean values	10.1	1.40-1.80 mm	
	10.2	1.81-2.20 mm	
	10.3	2.21-2.60 mm	
phallus, maximum width, mean values	11.1	0.28-0.40 mm	
	11.2	0.41-0.45 mm	
	11.3	0.46-0.67 mm	
phallus, maximum displacement, mean values	12.1	0.45-0.60 mm	
	12.2	0.61-0.74 mm	
	12.3	0.75-1.00 mm	
phallus, length of preapex, mean values	13.1	0.14-0.20 mm	

	13.2	0.21-0.28 mm	
	13.3	0.29-0.42 mm	
phallus, form of tip	14.1	evenly rounded	Figs. 10G, 11D
	14.2	bent	Fig. 10M
	14.3	hooked	Figs. 10H, 11L
	14.4	broad	Figs. 10A, 11K
	14.5	clubbed	Figs. 11A, B
phallus, preapex	15.1	unmodified, i.e., round \pm	Figs. 11A - D
	15.2	notched	Figs. 10C, F
	15.3	flattened	Fig. 11K
	15.4	spatulate	Fig. 10B
endophallus, armature	16.1	without microspine patch	Figs. 10J, L, 11D, E
	16.2	with microspine patches	Fig. 10N
gonocoxite 2, form of apex	17.1	blunted	Figs. 12D, 13B, C
	17.2	sharp	Figs. 12A, E, F, 13A, E
	17.3	scythe like	Figs. 12B, C, 13F
gonocoxite 2, form of shaft	18.1	sub-parallel, stout	Figs. 12A, D-F, 13A-E
	18.2	tapered	Figs. 12B, C, 13F
geographical areas (distribution)	19.1	South and eastern: Talamancan Cordillera, Chiapan-Guatemalan	Fig. 27
	19.2	South-central	
	19.2.1	South central, eastern: Chiapan- Guatemalan, Sierra Madre del Sur, Sierra Transvolcanica	Figs. 17, 19
	19.2.2	South central: Sierra Madre del Sur	Figs. 18, 25, 28
	19.2.4	South central: Sierra Madre del Sur, Sierra Transvolcanica, Sierra Madre Occidental	
	19.2.5	South central: Sierra madre del Sur, Sierra Transvolcanica, Sierra Madre Occidental, Sonoran	Fig. 20 (part)
	19.3	North and western: S. M. Occidental + Sonoran desert + Arizona mountains	Figs. 14, 20 (part), 26