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Artículo

Andricus partali n. sp. from Costa Rica (Hymenoptera: Cynipidae: Cynipini)

Andricus partali n. sp. de Costa Rica (Hymenoptera: Cynipidae: Cynipini)

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RESUMEN

Una nueva especie de avispa agalladora, *Andricus partali* **n. sp.** (Hym., Cynipidae, Cynipini), es descrita de Costa Rica induciendo agallas en hojas de *Quercus costaricensis* Liebm. (Sección Lobatae). Se proporciona la descripción, diagnosis e información sobre la distribución y biología de la nueva especie.

Palabras clave: avispas agalladoras, taxonomía, morfología, distribución, biología.

ABSTRACT

A new species of oak gallwasp, *Andricus partali* **n. sp.** (Hym., Cynipidae: Cynipini), is described from Costa Rica inducing galls on the leaves of *Q. costaricensis* Liebm. (Section Lobatae). We provide a description, diagnosis, and information about the distribution and biology of the new species.

Key words: Oak gallwasp, taxonomy, morphology, distribution, biology.

The oak gall wasps (Hymenoptera: Cynipidae: Cynipini) predominantly occur in the Holarctic region, but also in the Oriental and Neotropical. Historically, the Nearctic and Western Palaearctic regions have accumulated the greatest number of described species of oak gall wasps (Stone *et al*. 2002), but recently new hotspots of cynipid diversity are being discovered in the Eastern Palaearctic and Oriental regions (Pénzes *et al*. 2018). The Neotropics has been the most overlooked region with respect to the study of cynipids (Medianero and Nieves-Aldrey 2011a), but this is starting to change. During the last few years, this region has undergone a significant increase in sampling effort, mostly in Panama and, to a lesser extent, Colombia and Costa Rica. As a result, several species of in Neotropical oak gall wasp have been newly described belonging to the genera: *Amphibolips* Reinhard, *Andricus* Hartig, *Bassettia* Ashmead, *Disholcaspis* Dalla Torre Kieffer, *Loxaulus* Mayr, *Melikaiella* Pujade-Villar, *Neuroterus* Hartig, *Odontocynips* Kieffer and *Striatoandricus* Pujade-Villar, (e.g. Cuesta-Porta *et al.* 2020; Fernández-Garzón *et al*. 2017; Medianero and Nieves-Aldrey 2010, 2011a, 2011b, 2014; Medianero *et al*. 2011a, 2011b; Melika *et al.* 2009, 2011; Nieves-Aldrey and Medianero 2010; Nieves-Aldrey *et al*. 2021; Pujade-Villar 2008; Pujade-Villar and Rodríguez 2015; Pujade-Villar *et al*. 2015, 2017). New endemic genera have also been described: *Barucynips* Medianero and Nieves-Aldrey, *Coffeikokkos* Pujade-Villar and Melika, and *Zapatella* Pujade-Villar and Melika (Medianero and Nieves-Aldrey 2013; Pujade-Villar *et al.* 2012a, 2012b, respectively).

The first cynipid species that was described for Costa Rica, was *Odontocynips hansoni* Pujade-Villar (Pujade-Villar 2008). Later descriptions include *Andricus costaricensis*, Pujade-Villar and Melika, 2009; *Disholcaspis costaricensis* Melika and Pujade-Villar, 2011; *Coffeikokkos copeyensis* Pujade-Villar and Melika, 2012; *Neuroterus glandiphilus* Nieves-Aldrey and Medianero, 2017 and *N. titou* Pujade-Villar and Hanson, 2021 (Melika *et al*. 2009; Melika *et al*. 2011; Pujade-Villar *et al*. 2012a; Medianero and Nieves-Aldrey 2017; Pujade-Villar and Hanson 2021, respectively). Currently, six species have been described from Costa Rica, though Pujade-Villar and Hanson (2006) estimated that the diversity of oak gall wasps (Cynipini) might be of more than 30 species. In this study, we describe a new species of *Andricus*, which represents the second record of this genus for Costa Rica.

MATERIALS AND METHODS

The examined material was collected in Costa Rica and sent to the University of Barcelona by the last author from galls collected on leaves of *Quercus costaricensis* Liebm.

Morphological terminology follows Liljeblad and Ronquist (1998), and Melika (2006), except for

abbreviations of forewing venation, which follow Ronquist and Nordlander (1989). Cuticular surface terminology follows Harris (1979). Measurements and abbreviations used here include: F1–F12, 1st and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocellar-ocular distance) is the distance from the outer edge of a posterior ocellus to the inner margin of the compound eye; LOL, the distance between lateral and frontal ocelli. The width of the forewing radial cell is measured from the margin of the wing to the Rs vein.

The SEM images were obtained using a field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) for high-resolution imaging without gold-coating the specimens. Gall images were taken with a Canon A1 camera with a 50 mm macro lens followed by Adobe Photoshop CS3 software processing. Adult images were taken with an Olympus SC30 camera, coupled to an Olympus U–CMAD3, adapted to an Olympus SZX10 stereomicroscope. Image stacking and processing was performed with the Helicon Focus 6.2.2 software. Forewing pictures were taken with a Canon camera (Power Shot SX 210 IS) directly from the microscope.

The type specimens of the newly described species are deposited in UB, Universitat de Barcelona, Catalonia (Juli Pujade-Villar col.).

RESULTS AND DISCUSSION

Andricus partali n. sp.

(Figs, 1-5, 6a)

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Etymology. Named after the journalist Vicent Partal i Montesinos, for his magnificent speech gloss about the repressed Catalan people on September 9, 2021 (see acknowledgments).

Type material. HOLOTYPE female deposited in UB (col. JP-V) with the following labels: 'Costa Rica, Cartago-San José, Cerro de la Muerte, 3000 m., Villa Mills., 8.iv.1989, col. Hanson' (white label); '*Quercus costaricen.*, leaf gall with free-rolling cell' (white label); 'Holotype of *Andricus partali* n. sp. ♀, desig. JP-V 2021' (red label). PARATYPES (1♂ and 3♀ deposited in UB): 1♀ with same data of holotype; 1♀ idem 26.iii.1995, P. Hanson; 1♂ and 1♀ idem vi.1997, P. Hanson ('Villa Mills.' is not mentioned).

Diagnosis. This species belongs to a sexual form (see comments below). The new species is characterized and differs from other *Andricus* species by having the following combination of characters: head not broadened behind eye, lower face shining with alutaceous sculpture, malar space without radiating striae, antenna with 12-flagellomeres, F1 long (around 1.4x as long as F2), mesoscutum weakly sculptured, notauli complete, mesopleuron sculptured (weakly on the speculum), tarsal claws simple, lateral propodeal carinae strong and curved outwards in posterior 1/3, and ventral spine of hypopygium 3.0x as long as broad. The only other *Andricus* species known from Costa Rica, *A. costaricensis*, also has a malar space without radiating striae, notauli complete, simple tarsal claws and similar propodeal carinae, but differs from the new species by: head broadened behind eye, lower face with coriaceous sculpture, antenna with 13-flagellomeres, F1 slightly longer than F2, mesoscutum coriaceous, speculum smooth and ventral spine of hypopygium 5.0x as long as broad. The position of *A. partali* **n. sp.** discussed also in Comments.

Description: Sexual female.

Body length 2.1–2.4 mm (n=4).

Color. Light brown to chestnut; head in frontal view and legs amber to yellowish, antenna brown, with first segments (scapus to F2) lighter; lateral scutellum lighter; forewings hyaline with brown veins.

Head. Alutaceous with few white setae on lower face, 2.1 times as broad as long from above, 1.4 times as broad as high and as broad as mesosoma in front view. Gena delicately coriaceous, not broadened behind eye; malar space delicately coriaceous, without striae or malar sulcus, 0.5 times as long as height of eye. POL nearly 1.2 times or slightly longer than OOL; OOL 3.0 times as long as length of lateral ocellus and 1.3 times as long as LOL. Transfacial distance 1.4 times as broad as height of eye; diameter of antennal torulus 1.5 times as large as distance between them, distance between torulus and inner margin of eye equal to the diameter of torulus; lower face shiny, with very delicate alutaceous sculpture, with sparse white setae. Clypeus rectangular, delicately coriaceous, with very small elevated central area, ventrally smooth, widely emarginated, with a short median incision; anterior tentorial pits distinct; epistomal sulcus and clypeo-pleurostomal line distinct but superficial. Frons alutaceous, without setae. Vertex, interocellar area and occiput delicately coriaceous.

Antenna. 14-segmented; slightly longer than mesosoma; scapus compressed and short, 1.6 times as long as pedicel; pedicel globular, 1.5 times as long as broad; F1 1.4 times as long as F2, 2.6 times as long as pedicel; F2 longer than F3; F3=F4; F5–F7 becoming shorter, F8–F11 shorter than F5–F7, all equal in length; F12 1.4x as long as F11; placodeal sensilla present on F2–F13, absent on F1, obscured by setae.

Mesosoma. Slightly longer than high in lateral view; with very sparse white setae. Pronotum alutaceous, with numerous strigae laterally, emarginated along the ventro-lateral edge, with short white setae; anterior rim of pronotum narrow; propleuron alutaceous, shining, with smooth area basally. Mesoscutum delicately alutaceous, almost smooth in the center, more strongly impressed outside the notauli; only slightly longer than broad in dorsal view (largest width measured across mesoscutum at the level of the base of tegulae). Notauli complete, deep and narrow, distinctly impressed, slightly converging and not broadened at the posterior end; anterior parallel lines, parapsidal lines and median mesoscutal line absent. Mesoscutellum 0.5 times as

long as mesoscutum, uniformly coriaceous-rugose laterally, weakly sculptured in central part of disk, with parallel sides and short white setae, elongated in dorsal view, slightly longer than broad, overhanging metanotum; mesoscutellar foveae present, shining, subquadrangular with distinctly elevated coriaceous median carina not delimited basally. Mesopleuron alutaceous, more delicately in the speculum which is sometimes almost smooth, sometimes with very weak transverse carinae, basally smooth, glabrous or with very few white setae; dorsal axillar area alutaceous; lateral axillar area coriaceous and glabrous; axillula short, triangular, alutaceous, with few white setae; subaxillular bar smooth, shining, slightly shorter than height of metanotal trough; postalar process short, inconspicuous; metapleural sulcus reaching mesopleuron in the upper half of its height. Metascutellum, uniformly coriaceous, metanotal trough smooth to weakly alutaceous, with few short white setae; ventral impressed area at least twice as narrow as height of metascutellum, smooth, with distinct longitudinal striae; central propodeal area smooth, shiny, lateral propodeal carinae strong, high, curved outwards in posterior 1/3, glabrous; lateral propodeal area with few long white setae next to propodeal carinae. Nucha with irregular wrinkles and rugae.

Legs. Tarsal claws simple, without basal lobe.

Wings. Forewing longer than body, hyaline, with short dense cilia on margin, radial cell 4.2 times as long as broad; R1 reaching wing margin, Rs nearly straight, nearly reaching wing margin and broadened distally; areolet large, triangular, closed and distinct. M reaching basalis at half its height.

Metasoma. Shorter than head+mesosoma, as high as long in lateral view; only 2nd and 7th metasomal tergites with a few short white setae, only laterally, all other tergites without setae, smooth, shining; 2nd metasomal tergite occupying half the metasomal length in dorsal view. Ventral spine of hypopygium slender, prominent part 3.0 times as long as broad, with sparse, long white setae, not extending beyond the apex of spine.

Male. Similar to female except: head as long as broad in frontal view; malar space shorter, around 0.3 times as long as height of eye; POL 2.0x OOL; OOL slightly shorter than length of lateral ocellus and subequal in length to LOL. Transfacial distance slightly shorter than height of eye; antenna 15-segmented; longer than body length; scapus shorter, 1.3 times as long as pedicel; F1 1.3 times as long as F2, very slightly curved but broadened distally; F2=F3 and slightly longer than F4; F5=F7 and slightly longer than F8; F8=F12; F13 slightly shorter than F12; placodeal sensilla present on all segments; sculpture of mesoscutum more impressed and mesopleura smooth. Length: 2.0 mm (n=1).

Gall (Fig. 6a). Globular swelling of the leaf blade projecting on both the upper and lower surface of the leaf, located adjacent to the main vein or a secondary vein. Usually there are only one or two galls on a single leaf, rarely more. The gall is up to 10 mm in diameter, green in color, sometimes with a slightly reddish tinge on the surface. The external wall is coriaceous, quite hard, and with a shiny surface. Mature galls are hollow inside and within the internal air space is a single 2-3 mm diameter, brown sphere containing the larval chamber, which can become detached and capable of rolling around inside the hollow interior of the gall.

Biology. This new species was found inducing galls on *Quercus costaricensis* Liebm. (Section Lobatae of *Quercus*, red oaks), which occurs from 2300 m to 3600 m elevation in Costa Rica and western Panama (Morales 2010). The gall appears to belong to the sexual generation. Mature galls were collected in March-April, and adults emerged soon after the galls were collected. Other hymenopterans that emerged from these galls include parasitoids, *Quercastichus* sp. (Eulophidae) and *Torymus* sp. (Torymidae).

Distribution. Only known from high elevations in Costa Rica (Cordillera de Talamanca).

Comments. *Andricus* is a problematic genus that has been repeatedly recovered as non-monophyletic in previous phylogenetic studies (Liljeblad *et al.* 2008; Stone *et al.* 2009; Nicholls *et al.* 2017), and thus needs a thorough taxonomic revision. Some of the characters of the new species described here are not concordant with the morphology of most *Andricus* species: tarsal claws simple, malar space without radiating striae from clypeus and lower face almost smooth.

The presence or absence of a basal lobe on the tarsal claws is not considered a diagnostic generic character (Melika and Abrahamson 2002). Two large oak gall wasp genera, *Callirhytis* and *Andricus*, include species without and with a basal lobe on the tarsal claws, respectively (Weld 1952; Melika 2006). Many species placed by Weld (1952) in *Callirhytis* (as a genus without a basal lobe on the tarsal claws), in fact, belong to *Andricus* and vice versa (Melika *et al*. 2009). Also, some *Andricus* species in the Western Palaearctic and Neotropical regions do not have radiating striae from clypeus (Melika 2006; Melika *et al*. 2009), and a few species of *Andricus* have a smooth lower face (Tang *et al*. 2012; for example). Thus, the new species fits into the current definition of the genus *Andricus*, despite the peculiarity of some morphological characters. Further studies and revisions of this genus are needed to clarify the diagnostic characters and true limits of *Andricus*.

Cameron (1883: 71) described *Cynips guatemalensis* based exclusively on gall samples, however the drawings of the galls in the same study (Cameron 1883: Table 4, Figs 7 & 7a) were morphologically discordant from his description in the text. Furthermore, *Synergus dorsalis* Cameron was described in the same study (Cameron, 1883: 72); the type material of which (adult) was examined by Richie & Shorthouse (1987: 240) who concluded that it corresponds to an *Andricus*. Cameron mentions that *S. dorsalis* was obtained from the gall of *Cynips guatemalensis*, therefore *S. dorsalis*, currently *Andricus dorsalis* (Cameron), would be the inducer of the gall of *C. guatemalensis* (currently

Andricus guatemalensis). The gall of *Andricus partali* **n. sp.** may be similar to the description of *Andricus guatemalensis* (Cameron). Ritchie & Shorthouse (1987: 240) also studied the type material of *A. guatemalensis* (gall), labelled by Cameron, and the authors compared it with "*Andricus*? *mexicana* Bassett", a velvety leaf gall; then, they confirmed that *A. guatemalensis* (gall) corresponds to Cameron's drawing (Fig. 6b), a velvety leaf gall. Thus, the description of *A. guatemalensis* (gall) is erroneous. According to the ZNC, a drawing cannot be a type (nor a description); a 'Type' should be a sample, or a synthetic series of samples (Brothers *pers. com*.). Thus, the type series of *A. guatemalensis* (gall) and of *Andricus dorsalis* (adult) deposited in the British Museum are the true syntypes of both species, and not the description by Cameron. Pujade-Villar *et al.* (2011) considered *Andricus mexicanus* Bassett and *Cynips guatemalensis* Cameron as *incertae sedis*, since they were described based only on the velvety leaf galls, which are impossible to differentiate from other velvety leaf galls on leaves that are known. Based on the conclusions of Ritchie & Shorhouse (1987) we know the inducer of the gall *Andricus dorsalis* (Cameron) and after having the opportunity to examine the type of this species we conclude that it belongs to the *tecturnarum* group (JP-V *unpublished data*). Therefore, *A. guatemnalensis* is a species morphologically distinct (both the gall and the adult) from the new species described here, and *Andricus partali* **n. sp.** is a valid species distinct from *A. guatemalensis* (= *S. dorsalis*). As was mentioned, neither a description nor a drawing are "valid" for anything beyond providing information about which the author considered relevant, and either (or both) could be erroneous in several aspects. In summary, even though the description of the gall by Cameron is similar to that described here and given that the verbal descriptions do not correspond to the drawings, the only way to determine the correct application of names is to examine the type specimens. By this means it can be decided whether the descriptions or the drawings are more precise. For these reasons, *Cynips guatemalensis*, considered in this study as *dubida species*, corresponds to a multilocular velvety gall on the leaves (Fig. 6b-c) very distinct from the leaf gall described here (*A. parlati*, Fig. 6a). The lectotype of *Cynips guatemalensis* is designed here (Fig. 6c). Cameron (1883: 70) described also another velvety gall, *Cynips imitator*, from Guatemala in the same place, nevertheless this species occurs in twigs (Cameron, 1883: Fig. 8).

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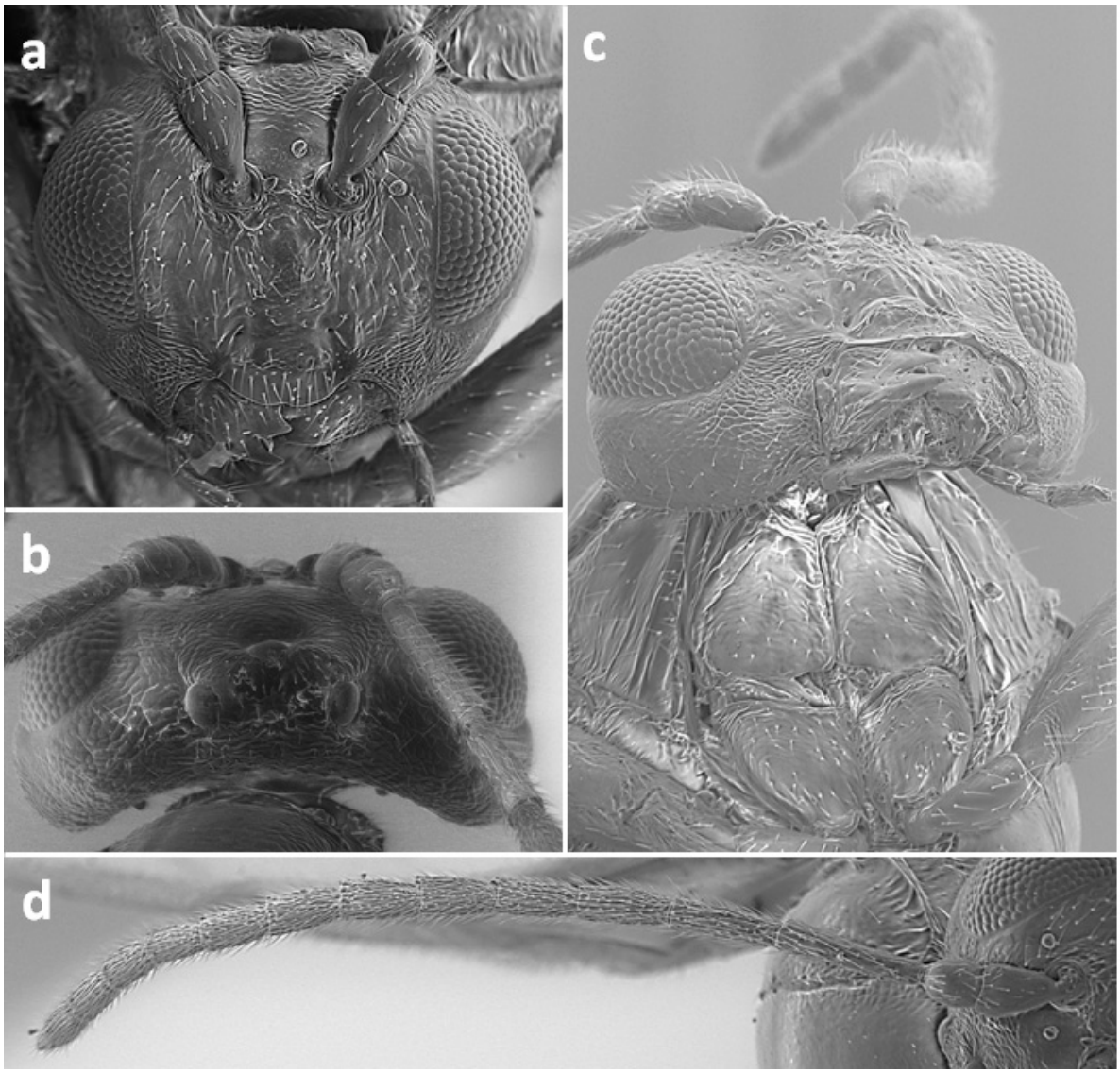

Figure 1. *Andricus partali* **n. sp.** ♀: (a) head in frontal view, (b) head in dorsal view, (c) head in ventral view and propleura, (d) antenna.

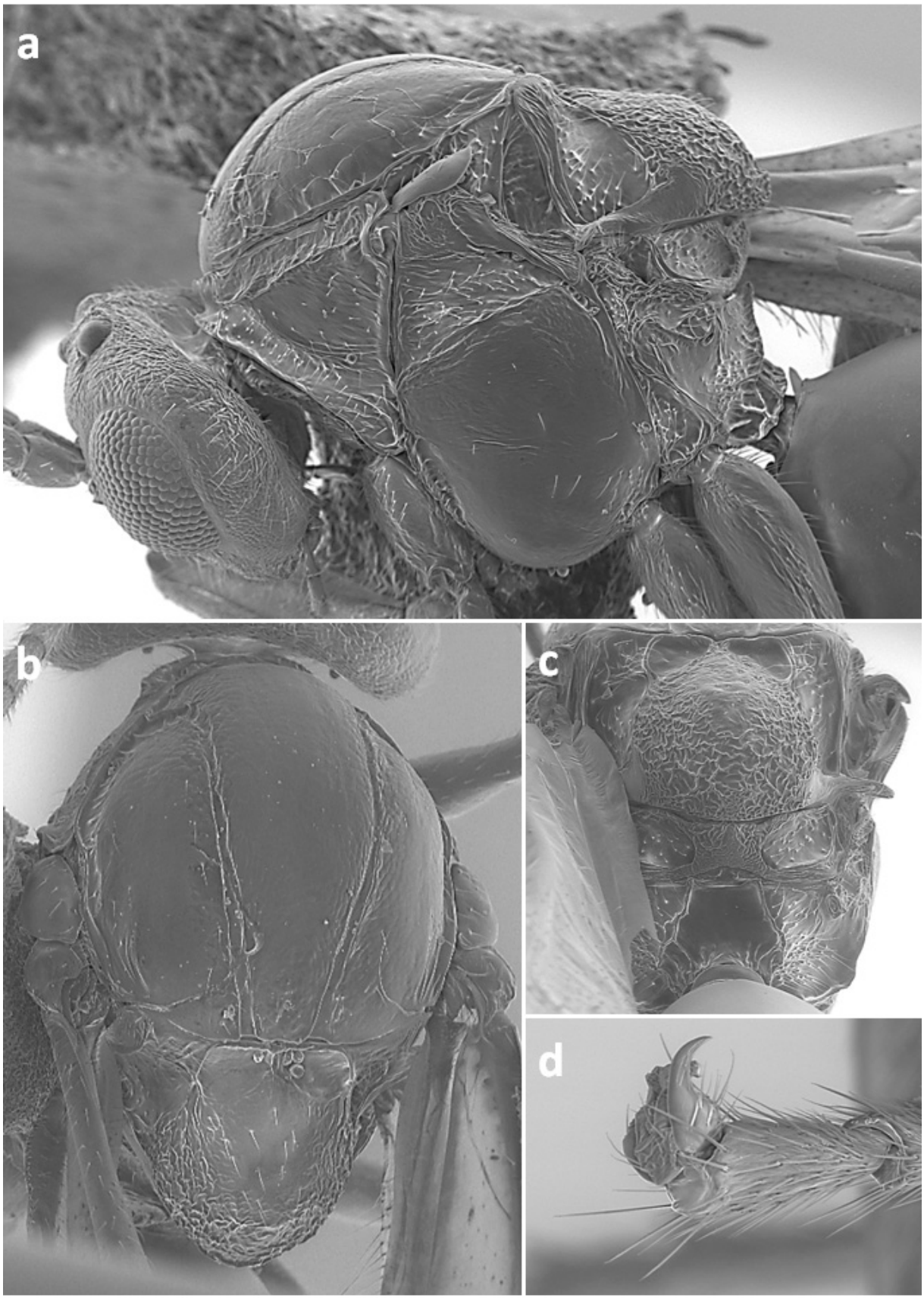

Figure 2. *Andricus partali* **n. sp.** ♀: (a) mesosoma in lateral view, (b) mesonotum in dorsal view, (c) mesosoma in posterior view, (d) tarsal claws.

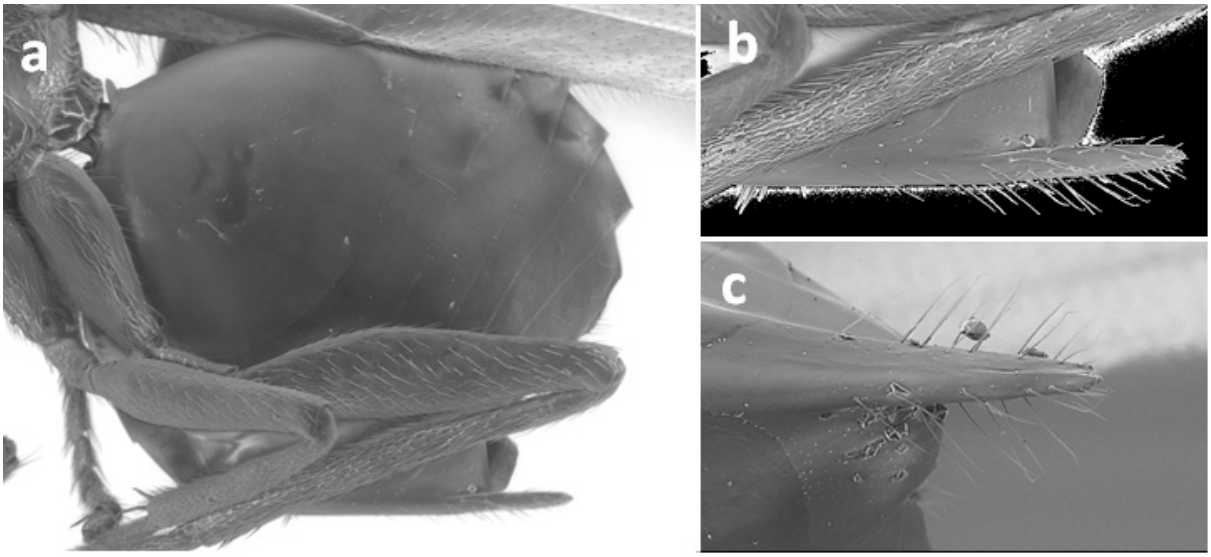

Figure 3. *Andricus partali* **n. sp.** ♀: (a) metasoma in lateral view, (b) ventral spine of hypopygium in lateral view, (c) ventral spine in ventral view.

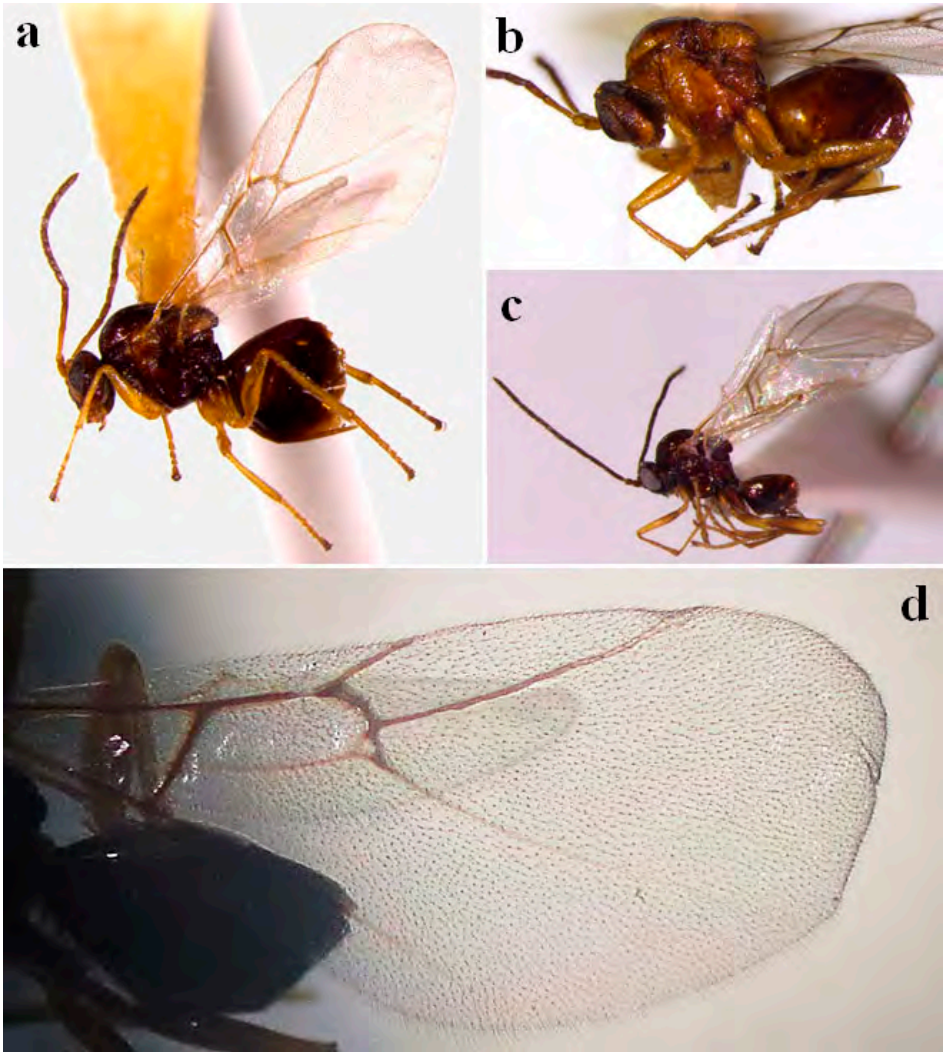

Figure 4. *Andricus partali* **n. sp.**: (a-b) habitus female, (c) habitus male, (d) forewing.

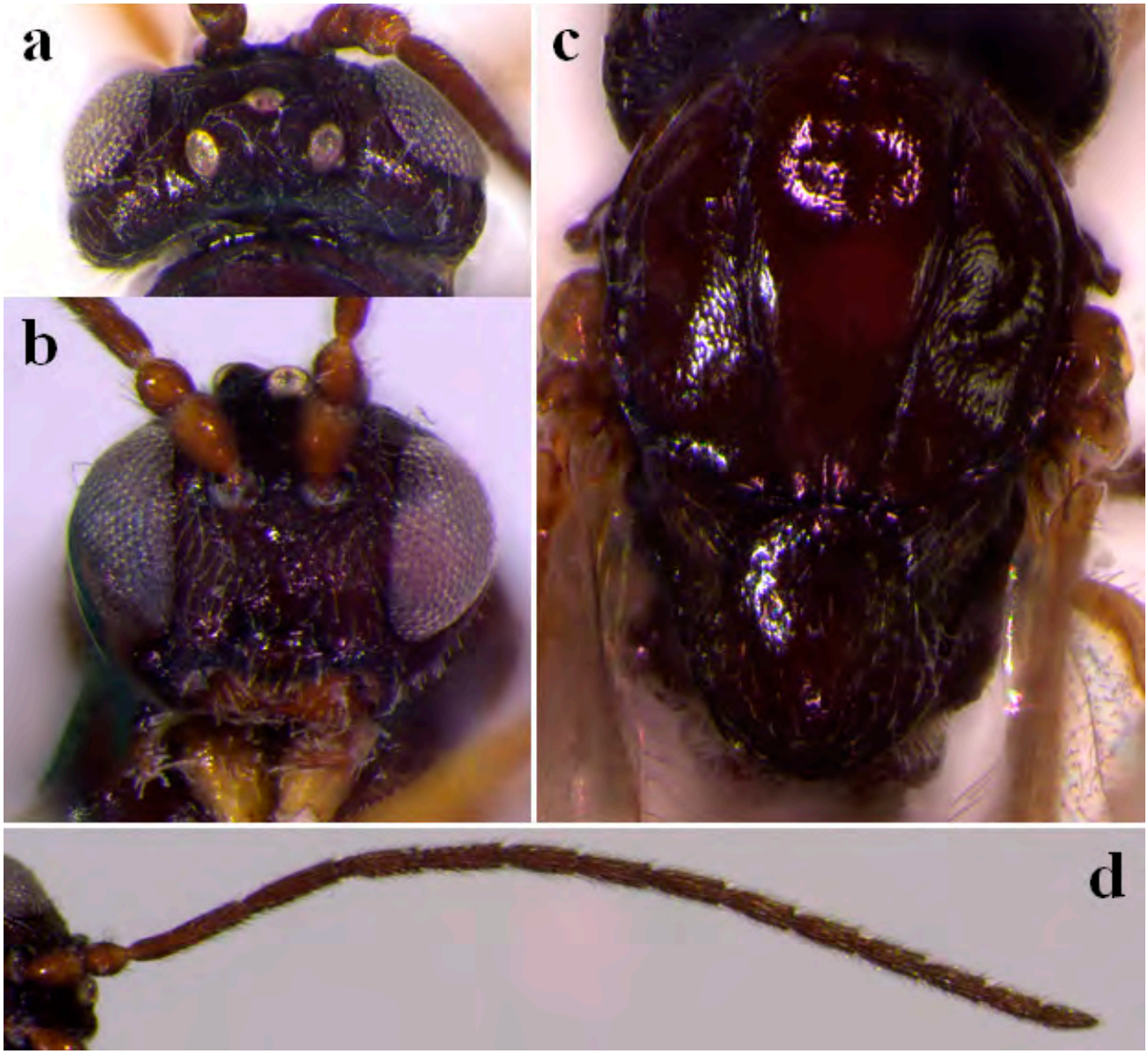

Figure 5. *Andricus partali* **n. sp.** ♂: (a) head in dorsal view, (b) head in frontal view, (c) mesosoma in dorsal view, (d) antenna.

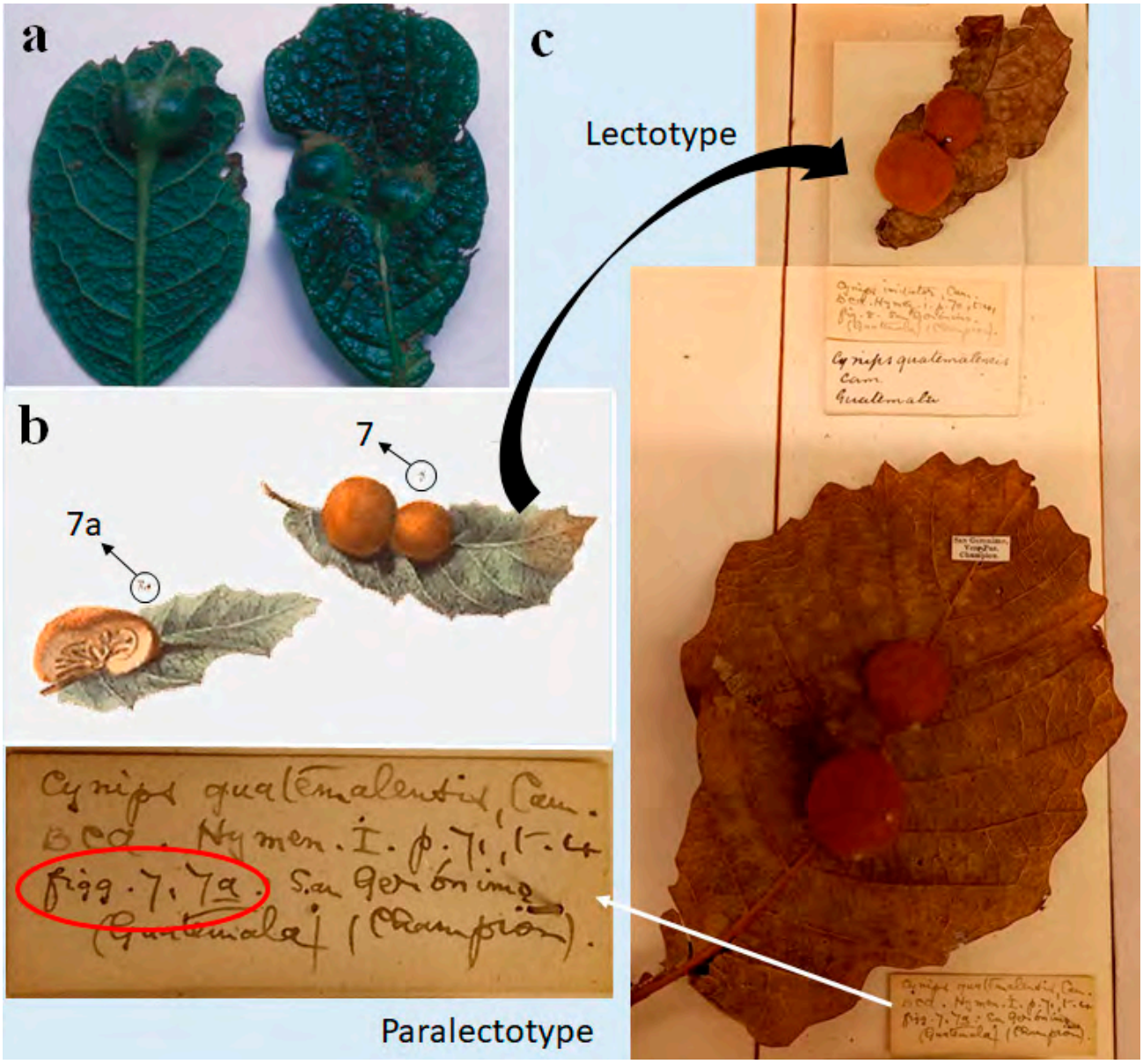

Figure 6. (a) Gall of *Andricus partali* **n. sp.** on *Q. costaricensis*. (b) Drawing in Cameron (1883) illustrating *Cynips guatemalensis* gall. (c) Syntypes of *C. guatemalensis* including the designation of lectotype.

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Artículo

Cundinablissus callejai, a new genus and new apterous species of Blissidae (Hemiptera: Heteroptera: Lygaeoidea) from Colombia

Cundinablissus callejai, género nuevo y especie áptera nueva de Blissidae (Hemiptera: Heteroptera: Lygaeoidea) de Colombia

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ABSTRACT

The new genus *Cundinablissus* gen. nov., with the single species *C. callejai* sp. nov., is described from Colombia. A key to the known genera of Blissidae with apterous or micropterous condition from the Western Hemisphere is included.

Key words: Insecta, Heteroptera, Blissidae, new genus, new species, apterous, key, Neotropical Region

RESUMEN

Un nuevo género *Cundinablissus* gen. nov., con una sola especie *C. callejai*, sp. nov., de Colombia son descritas. Se incluye una clave para separar los géneros ápteros y micropteros de Blissidae del Continente Américano.

Palabras clave: Insecta, Heteroptera, Blissidae, género nuevo, especie nueva, áptero, clave, región Neotropical.

The Blissidae, previously treated as a subfamily of the Lygaeidae (Henry 1997), is a worldwide group of phytophagus Heteroptera found in all zoogeographic regions (Henry and Sweet 2015). A total of 52 genera of Blissidae are known in the world; of these 21 occur in the Western Hemisphere (Dellapé and Henry 2020). Slater (1979) monographed the family, providing diagnoses for 46 genera, a phylogenetic analysis, and keys to the genera and many of the species (Henry and Sweet 2015). Later, Slater (1986) described *Aulacoblissus* from Venezuela (one species), Ŝtys (1991) added *Howdenoblissus* from Colombia (one species), Brailovsky and Barrera (2012) described *Napoblissus* from Ecuador (one species), and Brailovsky (2015) described *Barrerablissus* from Ecuador (one species) and provided an update key to the six apterous or micropterous New World genera of the family. More recently, Henry and Sweet (2015) added *Wheelerodemus* from the United States of North America (one species), and Minghetti et al. (2020) described *Tympanoblissus* from Ecuador (one species).

Slater (1995) added a new species of *Praetorblissus* from Costa Rica, Dallapé and Montemayor (2009) a new species of *Ischnodemus* from Peru, and Cervantes Peredo and Brailovsky (2013) a new species of *Praetorblissus* from México. Wheeler (2016) provides additional information about the genus *Wheelerodemus*.

In this work, the new blissid genus *Cundinablissus* and its species *C. callejai* are described, based on apterous specimens collected in Colombia. Also, a key to the apterous and micropterous genera of Blissidae from the Western Hemisphere is presented.

MATERIALS AND METHODS

The following abbreviations are used for the institutions cited here: Instituto de Biología, Universidad Nacional Autónoma de México, México (UNAM); Universidad Nacional de Colombia, Bogotá, Colombia (UNDC). The measurements were obtained using eyepiece micrometer. All measurements are in mm. External and genital structures were studied with a stereoscopic microscope (model Zeiss Stereo Discovery 8). Pictures were taken with a Nikon D200 camera. To remove soft tissues, genitalia were macerated in hot 10% solution of KOH for 5 minutes, rinsed in distilled water, and dissected under stereoscopic microscope Leica MX8.

RESULTS

TAXONOMY

Cundinablissus gen. nov.

Figures 1–5

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Type species. *Cundinablissus callejai* sp. nov., here designated.

Diagnosis. This new genus (Figs. 1-5) is recognized by the combination of open fore coxal cavities, body entirely shiny, without pruinose areas, presence of a ocellus, apterous condition, abdomen lacking a stridulitrum, fore

femur mutic, and the small size and broad, sublinear body form.

Description. Length of males 3.58; females 4.20. Apterous specimens. Body relatively broad, sublinear, shining, without pruinose area; ground color uniformly reddish brown; pubescence simple, scattered, with decumbent and upstanding silvery setae; shallow to deep scattered punctures on head, anterior lobe of pronotal disc, scutellar disc, mesonotum, metanotum and dorsum of abdominal segments; shallow sparse punctures on abdominal sterna; connexival segments and pleural abdominal margins impunctate.

Head. Non-declivent, nearly prognant, wider than long; tylus almost reaching apex of antennal segment I, apically globose, in lateral view higher and longer than jugum; vertex moderately flat; antenniferous tubercle short, truncate; antennal segment I broad, barrel-shaped; segments II and III cylindrical, IV fusiform; antennal segment I the shortest, IV the longest, and II longer than III; ocelli closer to compound eyes than to each other; eyes hemispheric, protruding, not touching anterior margin of pronotum; maxillary plates and genae without modifications; buccula short, apically rounded, not extending base of antennal segment I; rostrum surpassing fore coxae, reaching middle third of mesosternum; rostral segment I reaching anterior margin of prosternum; rostral segment II the longest, I and III subequal, and IV slightly longer than I and III.

Thorax. Pronotum. Wider than long; subrectangular, with barely indicated short collar, broadly rounded; pronotal disc below calli with shallow concavities indicating the limits of the anterior lobe; posterior lobe of pronotal disc conspicuously wrinkled; anterolateral margins evenly convex to nearly parallel-sided, emarginated, broadest at level of calli; anterior margin concave; calli almost flat, foveate; frontal and humeral angles rounded; posterior margin straight. Mesosternum without median furrow; mesonotum straight, strikingly transverse, lateral borders parallel and external margins swelling, slightly folded downward; metanotum simple, not subdivided, straight, strongly depressed at midline, with lateral margins exposed, conspicuously swelling, folded downward, and clearly visible in dorsal position; metathoracic scent gland auricle elongate, slightly rounded distally, ear-like, and moderately curving posteriorly (Fig. 2); evaporative surface transversally furrowed, extending to posterior margin of metapleuron, and extending onto mesopleuron, occupying the posterior margin.

Legs. Fore coxal cavities open, separated by a wide rounded prosternal projection; all trochanters terminating into ventrodistal subspinose axial projection adpressed to the femora; all femora short, moderately incrassate, mutic; tibiae mutic; fore tibiae slightly enlarged distally.

Scutellum. Wider than long; lacking a median elevation.

Hemelytra. Apterous.

Abdomen. Broad, parallel-sided, slightly convex, wider than thorax; abdominal terga almost flat; connexivum raised above tergum, with prominent spiracles, placed far from upper border; abdominal spiracles II to VI dorsal, VII and VIII ventral; abdominal spiracle II closer to anterior border, III to VIII almost at midline; abdominal sterna lacking a stridulitrum.

Integument. Almost glabrous; dorsal surface and abdominal sterna with sparse, elongate and upstanding silvery setae; head ventrally and thorax glabrous; antennal segments and legs with moderately dense, upstanding silvery setae.

Male genitalia. Genital capsule simple, globose; posteroventral edge entire, rounded (Fig. 4). Paramere. Like in figure 5.

Female genitalia. Abdominal sterna III-V uniformly developed, straight; abdominal sterna VI constricted at midline; sternite VII with fissura along midline. Gonocoxite VIII enlarged, subrectangular; in lateral view with upper and external borders slightly convex, in caudal view with inner borders straight and widely opened; laterotergite VIII quadrate, spiracle visible; laterotergite IX rectangular, slender, longer than laterotergite VIII, with inner and outer borders straight (Fig. 3).

Differential diagnosis. This new genus shares the extreme microptery to apterous condition and fore coxal cavities open with other eight genera: (*Aulacoblissus* Slater, *Barrerablissus* Brailovsky, *Heteroblissus* Barber, *Howdenoblissus* Ŝtys, *Napoblissus* Brailovsky and Barrera, *Praetorblissus* Slater, *Tympanoblissus* Dellapé and Minghetti, and *Wheelerodemus* Henry and Sweet). Although *Ischnodemus* Fieber has a similar wing condition as the above-mentioned genera the fore coxal cavities are closed.

With this group of nine genera *Cundinablissus* gen. nov., shares the presence of ocelli with *Barrerablissus*, *Heteroblissus*, *Praetorblissus*, *Tympanoblissus*, and *Wheelerodemus*. Of these. *Heteroblissus* and *Tympanoblissus* can be distinguished by the presence of a stridulitrum in the abdomen. Furthermore *Barrerablissus*, *Praetorblissus* and *Wheelerodemus* exhibit micropterous condition. *Cundinablissus* is the only known genus, within group, with apterous condition.

Aulacoblissus, *Howdenoblissus*, and *Napoblissus* share the absence of ocellus. In *Aulacoblissus* and *Napoblissus* the fore femur are ventrally armed and the hemelytra are micropterous. In the other two species the fore femur are mutic and apterous. *Cundinablissus*, has ocellus absent in *Howdenoblissus*.

Etymology. Named for its occurrence in the Cundinamarca Department, Colombia.

Key to the known apterous or micropterous genera of Blissidae from the Western Hemisphere (modificated from Brailovsky and Barrera 2015)

1. Fore coxal cavities closed behind . *Ischnodemus* Fieber
- Fore coxal cavities open …… 2

2. Ocelli present ……..……. 3
- Ocelli absent ……..…… 8
3. Abdomen with stridulitrum ……..……. 4
- Abdomen lacking a stridulitrum ……...…… 5
4. Abdominal venter with a prominent stridulitrum on sternites III–IV; macropterous or micropterous; body completely subshining, lacking pruinose areas ……..... .....…… *Heteroblissus* Barber
- Abdominal tergites I–II with tymbal organs; apterous; body not entirely shining or subshining with pruinose areas ……..… *Tympanoblissus* Dellapé and Minghetti
5. Apterous……. ….....… *Cundinablissus* gen. nov.
- Micropterous ……..…… 6
6. Fore femur mutic; body elongate, slender, small size, male 3.40– 3.84, female 4.28–4.80; prosternum with a median keel ……..…. *Wheelerodemus* Henry and Sweet
- Fore femur armed; body relatively robust, elongate, longer, male 4.68–12.96, female 8.08; prosternum without median keel……..…….7
7. All femora multispinose; metathoracic scent gland auricle strongly curving anteriorly … *Praetorblissus* Slater
- Fore femur with two ventral spines; middle and hind femora mutic; metathoracic scent gland auricle moderately curving posteriorly ….....… *Barrerablissus* Brailovsky
8. Apterous; fore femur mutic …. *Howdenoblissus* Ŝtys
- Micropterous; fore femur ventrally armed …..... 9
9. Fore femur armed below and distally with two spines; median mesosternal furrow deep; scutellar disc with median elevation .. *Napoblissus* Brailovsky and Barrera
- Fore femur armed below and distally with a single minute spine median mesosternal furrow absent; scutellar disc flat, lacking a median elevation … *Aulacoblissus* Slater

***Cundinablissus callejai* sp. nov.**

Figures 1–5

http://zoobank.org/FF9497C0-6398-439D-9D3D-5ED7DAEE67F1

Type locality. Colombia, Cundinamarca Department, Cabrera.

Type material. HOLOTYPE: male, **COLOMBIA**: Cundinamarca, Cabrera, Vereda de Hoyerias, 3390 m, 3°918'N-74°394'W, 19–22-X-2014, C. Dumar (t.winkler) (UNDC). **PARATYPES:** same data as holotype: 1 male, 2 females, (1 female UNAM, 1 male, 1 female UNDC). 1 male, 1 female, **COLOMBIA**: Cundinamarca, Chipaque, Vereda Las Fruticas, collecting in grass, 3570 msnm, 4°344'N-79°095'W, 9–12-X-2014, C. Dumar (1 male UNAM, 1 female UNDC).

Description. Male (holotype). Body above and below shining, without pruinose areas. ***Dorsal coloration.*** Nearly uniformly reddish brown, becoming castaneous orange on tylus, anterolateral margins of meso-, and metanotum, and apex of scutellum; antennal segments I-III castaneous orange, IV dark reddish brown with basal joint castaneous orange; abdominal segments II-VII shiny reddish orange.

Ventral coloration. Nearly uniformly reddish-brown, to castaneous- orange on rostral segments I-IV (apex of IV black), acetabulae, coxae, and trochanters; femora and tibiae shiny castaneous orange; tarsi pale yellow orange; evaporative surface dull gray; abdominal sterna and genital capsule shiny reddish orange.

Genitalia. Genital capsule simple, globose; posteroventral edge entire, rounded (Fig. 4). Paramere. Like in figure 5.

Measurements. Male holotype. Body length 3.58 mm. Head length 0.42 mm; width across eyes 0.80 mm; interocular space 0.50 mm; preocular distance 0.32 mm; interocellar distance 0.23 mm; length of antennal segments: I, 0.20 mm; II, 0.37 mm; III, 0.31 mm; IV, 0.52 mm; length of rostral segments: I, 0.28 mm; II, 0.30 mm; III, 0.28 mm; IV, 0.29 mm. Pronotal length 0.58 mm; width across humeral angles 1.22 mm. Scutellar length 0.21 mm; width 0.62 mm.

Female. Coloration similar to that of male holotype. Body dorsally and ventrally uniformly dark reddish-brown, to dark castaneous-orange on tylus, middle third of scutellum, lateral margins of meso-, and metanotum, connexivum, pleural margins of abdominal sterna II-VII, and acetabulae; antennal segments I-III dark castaneous orange, IV dark reddish-brown; rostral segments I-IV dark castaneous orange; coxae, trochanters, and basal third of femora pale castaneous orange; femora, (except basal third), tibiae and tarsi dark castaneous orange; evaporative surface dull gray, strongly contrasting with adjacent shining reddish brown color.

Genitalia. Abdominal sterna III-V uniformly developed, straight; abdominal sterna VI constricted at midline; sternite VII with fissura along midline. Gonocoxite VIII enlarged, subrectangular; in lateral view with upper and external borders slightly convex, in caudal view with inner borders straight and widely opened; laterotergite VIII quadrate, spiracle visible; laterotergite IX rectangular, slender, longer than laterotergite VIII, with inner and outer borders straight (Fig. 3).

Measurements. Female paratype. Body length 4.20 mm. Head length 0.45 mm; width across eyes 0.83 mm; interocular space 0.52 mm; preocular distance 0.34 mm; interocellar distance 0.27 mm; length of antennal segments: I, 0.22 mm; II, 0.42 mm; III, 0.32 mm; IV, 0.55 mm; length of rostral segments: I, 0.29 mm; II, 0.32 mm; III, 0.28 mm; IV, 0.30 mm. Pronotal length 0.60 mm; width across humeral angles 1.35 mm. Scutellar length 0.27 mm; width 0.71 mm.

Distribution. Known only from the type locality.

Etymology. It is a pleasure to dedicate this new species to Dr. Ignacio Calleja distinguished Odontologist and friend for many years. Gender masculine.

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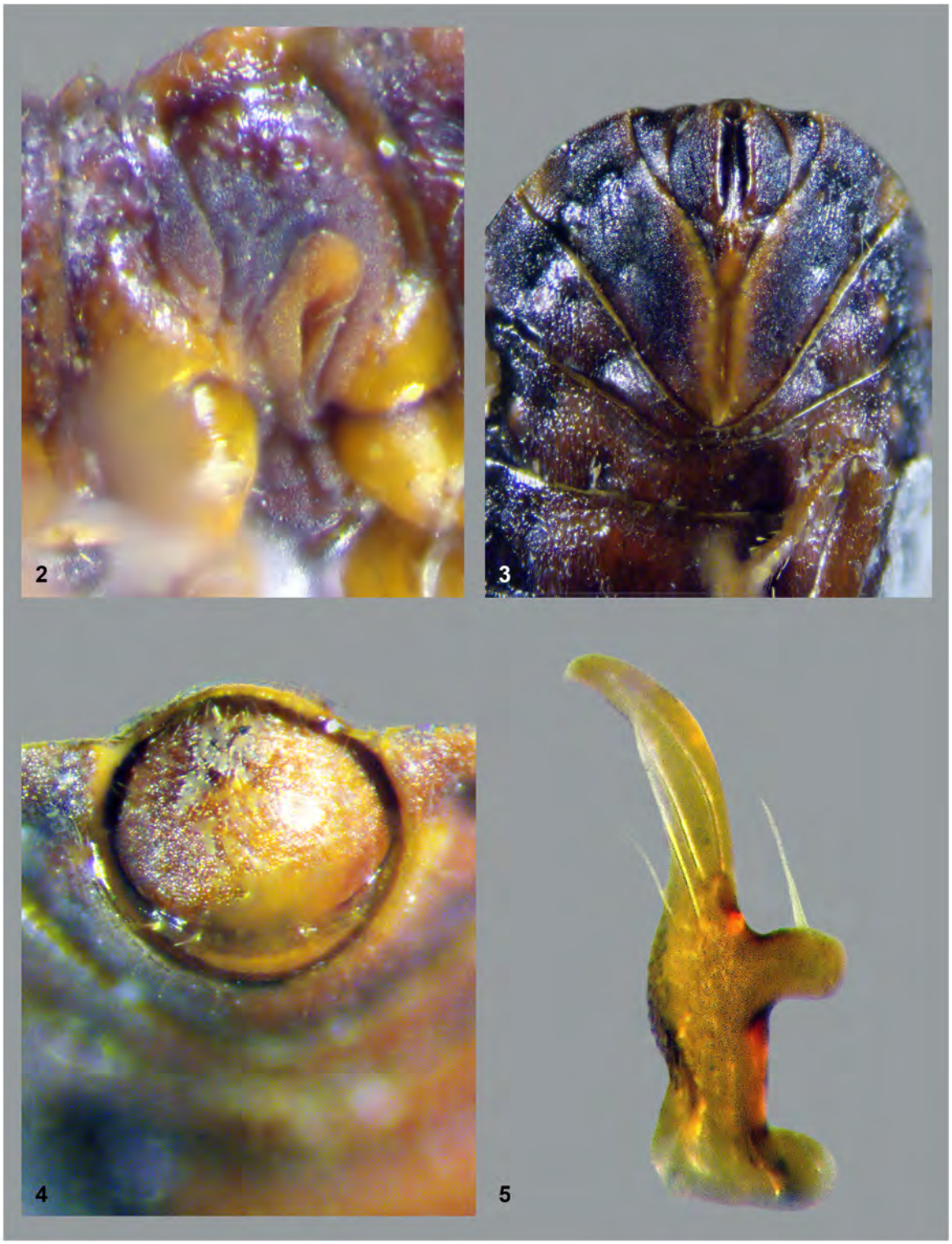
Figure 1. Dorsal view of *Cundinablissus callejai* gen. nov., sp. nov.



Figures 2–5. *Cundinablissus callejai* gen. nov., sp. nov. **2.** Metathoracic scent gland auricle. **3.** Female genital plates. **4.** Male genital capsule in caudal view. **5.** Paramere.

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Artículo

Ensamble de coleópteros (Coleoptera) atraídos a la carroña en un bosque artificial resultado de la urbanización en el Área Natural Protegida Sierra de Guadalupe en el centro de México

Ensembles of beetles (Coleoptera) attracted to carrion in an artificial forest result of the urbanization in the Protected Natural Area Sierra de Guadalupe in central Mexico

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RESUMEN

Se estudio el ensamble de coleópteros, así como, la distribución estacional de la diversidad atraída a la carroña en un bosque artificial resultado de la urbanización del Área Natural Protegida Sierra de Guadalupe en el centro de México. Se realizaron muestreos mensuales de junio de 2017 a mayo de 2018 con el empleo de cuatro trampas tipo NTP-80 cebadas con carroña. Se capturaron un total de 3,434 individuos agrupados en 17 familias y 58 especies, de las cuales 13 se determinaron a nivel de especie y 45 a morfoespecie. Los estimadores de especies sugieren que se registró entre el 77.3% (Chao 1) y 80.5% (ACE) de las especies. Las familias Staphylinidae, Silphidae, Carabidae, Leiodidae, Histeridae y Nitidulidae agruparon el 95.8% de la abundancia total y el 67.2% de las especies. La familia Staphylinidae presentó la mayor riqueza con 21 especies, las restantes tuvieron menos de cinco, de las cuales destacó la familia Silphidae con cuatro especies, la cual como gremio necrófago ocupo el segundo lugar en abundancia (21%) después de los depredadores (62%). La diversidad fue mayor en las lluvias que en la sequía, la similitud faunística entre épocas fue baja (J=0.37), con 32 especies exclusivas de las lluvias y cuatro de la sequía. En el área cohabitan especies de amplia distribución adaptadas a condiciones de perturbación, una especie endémica y convergen elementos de montaña con especies de ambientes semiáridos, por lo tanto, es importante mantener la conexión del bosque artificial con la zona de bosque de las partes altas de la Sierra de Guadalupe y conservar los fragmentos de matorral xerófilo que son muy escasos en la cuenca del Valle de México, para mitigar el impacto de la urbanización en la diversidad de coleópteros asociados a la carroña.

Palabras clave: NTP-80, Estado de México, Coacalco, Sierra de Guadalupe, necrófilos.

ABSTRACT

The ensembles of beetles and the seasonal distribution of diversity attracted to carrion in an artificial forest result of the urbanization of the Protected Natural Area Sierra de Guadalupe in central Mexico was studied. Monthly samples were collected from June 2017 to May 2018 using four carrion traps type NTP-80. A total of 3,434 individuals belonging to 17 families and 58 species were collected, of which 13 were identified to the species level and 45 to morphospecies. The species estimators suggest that was registered between 77.3% (Chao 1) and 80.5% (ACE) of the species. The families Staphylinidae, Silphidae, Carabidae, Leiodidae, Histeridae and Nitidulidae grouped 95.8% of the total abundance and 67.2% of the species. The family Staphylinidae was the higher richness with 21 species, the remaining had less than five species, of which the family Silphidae was the most important with four species, and represented the necrophagous guilt which was the second most abundant making up 21% of all beetles collected after the predators (62%). The diversity was higher in rainy than in drought season, the faunistic similarity between seasons was low (J=0.37), with 32 species exclusive of rainy and four of drought season. In the area inhabit wide-ranging species adapted to perturbation conditions, an endemic species, and converge montane elements with species of semiarid environments, therefore, is important to maintain the connection of the artificial forest with the forest area in upper parts of the Sierra de Guadalupe, and conserve the fragments of xeric shrubland that are scarce in the basin of Mexican Valley, so as to mitigate the impact of the urbanization in the diversity of beetles associated to carrion.

Key words: carrion trap, Estado de México, Coacalco, Sierra de Guadalupe, necrophilous.

La urbanización ha provocado la desaparición de muchos de los hábitats de las especies especialistas las cuales han sido reemplazadas por especies generalistas adaptadas a ambientes artificiales creados por el hombre (parques urbanos y jardines), los cuales ofrecen refugio a especies nativas y nuevos colonizadores (Sánchez-Bayo y Wyckhuys, 2019). En estos sitios la biodiversidad puede verse incrementada por la adición de especies exóticas introducidas por el hombre de forma accidental o intencional, que pueden desplazar rápidamente a las especies nativas, además estos hábitats artificiales frecuentemente tienen una productividad primaria mucho mayor que los ecosistemas naturales adyacentes, debido al aporte constante de agua, fertilizantes y generación de residuos orgánicos. El incremento de la riqueza de especies es muy evidente en plantas, en contraste con las especies de invertebrados, donde parece no haber un incremento paralelo (McKinney 2008), debido a que, aun cuando las comunidades de plantas urbanas pueden ser muy diversas, en muchos casos, más diversas que los ecosistemas naturales, no han evolucionado con las especies de artrópodos nativas (Dale y Frank 2018).

En la Sierra de Guadalupe, Estado de México, el matorral xerófilo corresponde a la vegetación nativa de las zonas más bajas (2,240 msnm) de la Sierra, sin embargo, ha desaparecido debido a la urbanización siendo sustituido por la introducción de especies arbóreas exóticas en programas de reforestación desde hace más de 50 años, creando bosques artificiales con escasos elementos del matorral; en la parte más alta de la Sierra y las cañadas de difícil acceso, aún se conserva el bosque de encino nativo (GCDMX 2016). Estas alteraciones indudablemente afectan la fauna de coleópteros asociados a la carroña, los cuales como muchos insectos juegan un papel importante en la descomposición y reciclaje de la materia orgánica necesaria para proveer de nutrientes para el crecimiento de las plantas (Schowalter *et al*. 2018), sin embargo, se desconoce la diversidad que alberga esta área.

Por lo anterior, el objetivo es conocer la composición de coleópteros atraídos a la carroña en un bosque artificial producto de la reforestación, así como, la distribución temporal de la diversidad. Al tratarse de un área afectada por la urbanización, se espera que el número de familias y especies de coleópteros sea menor que el encontrado en áreas naturales no perturbadas. Por otro lado, el área se caracteriza por tener un periodo de lluvias y uno sequía bien definidos, lo cual determinará una distribución estacional marcada para las poblaciones de coleópteros.

MATERIAL Y MÉTODOS

Área de estudio. La Sierra de Guadalupe es una Área Natural Protegida localizada al norte de la Ciudad de México y los límites del Estado de México. El muestreo se realizó en la periferia de la Sierra, dentro del "Centro Ecoturístico y de Educación Ambiental Sierra de Guadalupe" ubicado en el municipio de Coacalco de Berriozábal, Estado de México en los 19°36'37''N y 99°5'20''O (Figura 1A). Pertenece a la región hidrológica del Río Pánuco de la cuenca del Río Moctezuma y a la provincia fisiográfica Faja Volcánica Transmexicana, tiene un rango altitudinal que va de 2,240 a 2,800-3,000 msnm, y es un pequeño conjunto de elevaciones volcánicas independientes y sobrepuestas (Lugo-Hubp y Salinas-Montes 1996). Predomina un clima templado subhúmedo con lluvias en verano Cb(w0)(w)(i') g; presenta temperatura media anual de 16.7°C, enero es el mes más frío con una media de 13.1°C y junio el más cálido con 18.8°C (Cedillo *et al*. 2007). Con precipitación media anual de 733.9 mm, enero es el más seco con 30 mm y junio el más húmedo con 152 mm (GCDMX 2016). El periodo de sequía va de noviembre a abril y el de lluvias de mayo a octubre (Peña 2018).

Los muestreos se hicieron en una zona fuertemente afectada por la urbanización, donde se realizan actividades recreativas como: campismo, senderismo, deporte y pastoreo por parte de los habitantes de la zona urbana de los alrededores. En este lugar se presenta un bosque artificial con asociaciones vegetales derivadas de las perturbaciones y la introducción de especies exóticas, producto de la reforestación con fines de restauración y conservación (Cedillo *et al*. 2007; GCDMX 2016) (Figura 1B). El estrato forestal estuvo compuesto por plantaciones de *Eucalyptus camaldulensis* Dehnh. (eucalipto), *Casuarina equisetifolia* L. (casuarina), *Cupressus lindleyi* Klotzsch ex Endl. (cedro blanco), *Cupressus sempervirens* L. (ciprés panteonero) y diversas especies de pinos, entre las que se encuentran *Pinus cembroides* Zucc., P. *montezumae* Lamb., *P. patula* Schltdl. & Cham. y *P. radiata* D.Don. El estrato de sotobosque está dominado por plantas herbáceas anuales de Poaceae, Asteraceae, Fabaceae y Convolvulaceae, con escasos elementos del matorral xerófilo nativo como Cactaceae: *Opuntia* sp. (nopales), *Mammillaria* sp. (biznaga), Asparagaceae: *Agave* sp. (maguey) y Fabaceae: *Vachellia farnesiana* (L.) Wight & Arn. (huizache). Las zonas de mayor altitud y las cañadas de difícil acceso son las mejor conservadas y donde se puede encontrar bosque natural de encino (GCDMX 2016).

Diseño del muestreo. Para la captura se colocaron cuatro trampas tipo NTP-80 (Morón y Terrón 1984) modificadas, cebadas con calamar el cual fue sustituido mensualmente y como líquido conservador monoetilenglicol (Figura 1C). Las trampas se ubicaron a nivel de suelo y se distribuyeron en cuatro puntos en un transecto de aproximadamente un kilómetro a lo largo de la ladera norte del cerro (sitio 1: 2,455 msnm, 19° 36' 27'' N, 99° 05' 35'' O; sitio 2: 2,472 msnm, 19° 36' 24.6'' N, 99° 05' 33.5'' O; sitio 3: 2,502 msnm, 19° 36' 25.9'' N, 99° 05' 30.2'' O; sitio 4: 2,531 msnm, 19° 36' 20.2'' N, 99° 05' 28.7'' O) con una diferencia de 25 msnm y 150 m de distancia en promedio entre cada trampa (Figura 1A). Las trampas estuvieron instaladas permanentemente de junio de 2017 a mayo de 2018, las muestras se recuperaron cada mes y se colocaron en frascos con etanol al 70% para su traslado al laboratorio.

Procesamiento del material entomológico. El material obtenido fue separado y determinado hasta el nivel taxonómico posible, mediante claves especializadas (Arnett y Thomas 2001; Arnett, Jr. *et al.* 2002; Navarrete-Heredia *et al.* 2002; Triplehorn y Johnson 2005; Delgado 2008; Navarrete-Heredia 2009; Márquez y Asiain 2010; Moctezuma y Halffter 2020) y por comparación con especímenes depositados en la Colección de Artrópodos de la FES Iztacala (CAFESI), UNAM, donde se depositó todo el material. El 77.6 % de las especies que correspondió a 45 morfoespecies, fueron determinados a nivel de género, subfamilia o familia, y solamente 13 a nivel de especie, a lo largo del escrito se hace referencia a todas ellas en conjunto con el termino de especies. Para organizar las familias se empleó la clasificación de Bouchard *et al.* (2011).

Análisis de datos. Se contó el número de individuos (abundancia) y número de especies (riqueza) por mes y por sitio. La eficiencia del muestreo se evaluó con los estimadores de especies no paramétricos ACE y Chao 1, para lo cual se utilizó el programa Estimates versión 9 (Colwell y Coddington 1994). Se elaboró la curva de rango-abundancia para evaluar la estructura cuantitativa de la comunidad. Además, se calculó el índice de diversidad de Shannon (H) y la uniformidad (E) por época del año, se aplicó la prueba de t de Hutchenson para saber si había diferencias significativas de la diversidad entre épocas. La similitud entre épocas se evaluó con el índice de similitud de Jaccard (J), todos estos cálculos se realizaron con el programa Past versión 4.0.1. (Hammer *et al.* 2001). Los gremios tróficos para cada familia están basados en Thayer (2005), Stork y Grimbacher (2006), Davis *et al.* (2011) y Moctezuma y Halffter (2020). Las morfoespecies determinadas hasta nivel de subfamilia o género permitieron una asignación un poco más precisa a cada uno de los gremios tróficos, tal fue el caso de las familias Staphylinidae, Scarabaeidae y Curculionidae, las cuales son muy diversas e incluyen taxones con hábitos alimentarios particulares; en el caso de las morfoespecies determinadas a nivel de familia el gremio fue asignado con base en el gremio predominante en las especies de la familia, por lo que puede existir un margen de error en su asignación.

RESULTADOS

Se obtuvo un total de 3,434 individuos agrupados en 17 familias y 58 especies (Cuadro 1). Los estimadores de especies sugieren que se registró entre el 77.3% (Chao 1= 75) y 80.5% (ACE= 72) de las especies necrófilas del área (Figura 2).

Las familias Staphylinidae, Silphidae, Carabidae, Leiodidae, Histeridae y Nitidulidae (ordenadas de mayor a menor abundancia) agruparon el 95.8% (3,292 individuos) de todos los coleópteros capturados y el 67.2% (39 especies) de las especies. La familia Staphylinidae fue la de mayor riqueza con 21 especies, seguida de Carabidae e Histeridae con cinco cada una; Silphidae y Tenebrionidae tuvieron cuatro especies cada una, las restantes familias tuvieron menos de tres (Cuadro 1).

Aleocharinae sp. 1 (970 individuos), *Nicrophorus mexicanus* Matthews, 1888 (651 individuos) y Carabidae sp. 2 (606 individuos) fueron las especies dominantes y en conjunto representaron el 64.8% de la abundancia total; Leiodidae sp. 1, *Xerosaprinus* sp. y Nitidulidae sp. 1 tuvieron entre 130 y 310 individuos cada una y agruparon el 19.6% de la abundancia; 15 especies registraron entre diez y noventa individuos, las restantes 37 tuvieron menos de diez (Figura 3).

El mayor promedio mensual de riqueza y abundancia se registró en junio y julio, y los valores más bajos fueron en diciembre y enero (Figura 4A-B). En la temporada de lluvias se obtuvo mayor riqueza (54 especies) y abundancia (2,903 individuos) que durante la sequía (26 especies y 531 individuos). De las 16 familias registradas en las lluvias, 12 también estuvieron presentes en la sequía. La familia Anthicidae fue la única exclusiva de la sequía; mientras que Chrysomelidae, Hydrophilidae, Ptiliidae y Scarabaeidae fueron exclusivas de la época de lluvias (Cuadro 1). La similitud entre la época de lluvias y la de sequía fue baja con 37% (J= 0.37), con veintidós especies presentes en ambas épocas, 32 fueron exclusivas de las lluvias y cuatro de la sequía (Cuadro 1). La diversidad fue significativamente mayor en las lluvias (H=2.1) que en la sequía (H=2) (p= 0.001) (Figura 5A). Por el contrario, la uniformidad fue mayor en la sequía (E= 0.28) que en las lluvias (E= 0.16) (Figura 5B).

A mitad del periodo de sequía (febrero- marzo) se observó un pico de abundancia (Figura 4A), el cual se debió principalmente a las especies de Histeridae: *Xerosaprinus* sp. y *Saprinus* sp. que mostraron preferencia por los meses secos (Cuadro 1).

De la familia Scarabaeidae, la especie *Ontophagus chevrolati* Harold, 1869 fue exclusiva de las lluvias. En el caso de la familia Silphidae, *N. mexicanus* se recolectó todo el año, mientras que *Oxelytrum discicolle* (Brullé, 1836) y *Thanatophilus truncatus* (Say, 1823) (Silphidae), fueron casi exclusivos del periodo húmedo, solo capturados esporádicamente en los meses secos. La especie *Thanatophilus graniger* (Chevrolat, 1833) no mostró un patrón definido debido a su baja abundancia en ambos periodos. Finalmente, de las 21 especie de Staphylinidae, solamente Aleocharinae sp. 1 se registró todo el año, las especie restantes fueron exclusivas de las lluvias (Cuadro 1).

En cuanto a los gremios tróficos, los depredadores representaron el 62% de la abundancia total, seguidos por los necrófagos (21%) y los fungívoros (14%) (Figura 6A). En cuanto a la riqueza, los gremios mejor representados también fueron los depredadores que agruparon a la mitad de las especies (50%), le siguieron los fungívoros (19%) y los saprófagos generalistas (12%); los necrófagos, aunque ocuparon el segundo lugar de abundancia, solo agruparon al 8% de las especies (Figura 6B). Tanto la abundancia como el número de especies de los diferentes gremios

tróficos disminuyó durante la sequía, con excepción de la abundancia de los herbívoros y la riqueza de los necrófagos que fueron similares en ambas épocas; mientras que la abundancia de los saprófagos generalistas fue ligeramente mayor en la sequía (Fig. 6C y D).

DISCUSIÓN

Son pocos los estudios llevados a cabo en México que proporcionan datos sobre la totalidad de familias de coleópteros recolectadas con trampas cebadas con carroña, entre éstos se encuentra el de Morón y Terrón (1984) quienes al igual que en el presente estudio donde se registraron 17 familias, también obtuvieron un número bajo de familias con 20, en un área cubierta por bosques mesófilo y tropical perturbados en la Sierra Norte de Hidalgo.

Lo anterior contrasta con lo observado en otras localidades de México en lugares con problemáticas similares a la Sierra de Guadalupe, relacionadas con la substitución de la vegetación original por especies exóticas, como el bosque urbano de Los Colomos, Jalisco, ubicado a 1,551 m, con clima templado semicálido donde obtuvieron 28 familias (Navarrete-Heredia *et al.* 2012); o la zona de Teotihuacan cercana a la Sierra de Guadalupe, con altitud similar (2,300 m) pero con un clima semiseco templado, con áreas cubiertas por extensos cultivos, zonas urbanas y suburbanas, con escasos fragmentos de matorral xerófilo nativo, donde se registraron 33 familias (Moreno-Olvera *et al.* 2014). Por otro lado, en una zona conservada Naranjo-López y Navarrete-Heredia (2011) registraron 34 familias en dos localidades, una en un bosque tropical caducifolio y otra en un bosque de pino en Gómez Farías, Jalisco, a una altitud de 1,678 m con clima semiseco y semicálido respectivamente. En todos los casos mencionados, se trata de muestreos anuales realizados con un número variable de trampas tipo NTP-80, que va desde cuatro como en el presente estudio hasta 14, abarcando dos o más áreas con características de vegetación, clima y altitud diferente. Labrador (2005) encontró que el número máximo de familias registradas en la carroña en México es de 38.

De acuerdo con los estimadores, es posible que un mayor esfuerzo de recolecta permita la captura de entre 19% y 22% de especies adicionales en la Sierra de Guadalupe, lo cual podría incrementar también el número de familias. Aun así, la composición de familias observada en la Sierra de Guadalupe, es consistente con aquellas que tienen mayor afinidad por la carroña como es el caso de: Staphylinidae, Silphidae, Carabidae, Leiodidae, Histeridae, Nitidulidae, Scarabaeidae, Trogidae y Tenebrionidae (Shubeck *et al.* 1977; Morón y Terrón 1984; Naranjo-López y Navarrete-Heredia 2011; Navarrete-Heredia *et al.* 2012; Moreno-Olvera *et al.* 2014), las cuales también se han recolectado en estudios de interés forense (Almeida y Mise 2009).

Las familias Anthicidae, Chrysomelidae, Cryptophagidae, Curculionidae, Hydrophilidae, Latridiidae, Mycetophagidae y Ptiliidae correspondieron al 47% del total de familias, todas ellas con excepción de Anthicidae (28 individuos) y Curculionidae (18 individuos) tuvieron menos de diez individuos, lo cual coincide con lo observado en la mayoría de los estudios (Shubeck *et al.* 1977; Shubeck *et al.* 1981; Morón y Terrón 1984; Labrador, 2005; Naranjo-López y Navarrete-Heredia 2011; Navarrete-Heredia *et al.* 2012; Moreno-Olvera 2015), donde entre el 33% y 57% de las familias están representadas por menos de diez individuos; las familias mencionadas han sido registradas comúnmente en trampas cebadas con carroña por lo que podrían ser consideradas como secundarias por su baja abundancia.

De los curculiónidos registrados, solo se capturó un individuo perteneciente a la subfamilia Scolytinae (*Manarthrum* sp.) cuyas especies se caracterizan por ser de hábito xilófago/fungívoro, de manera general los escolitinos podrían considerarse accidentales en la carroña, si bien Scolytinae han sido registrada en gran abundancia en la mayoría de los estudios llevados a cabo en el país (Morón y Terrón 1984; Naranjo-López y Navarrete-Heredia 2011; Navarrete-Heredia *et al.* 2012), esto se debe a un artefacto causado por los componentes de la mezcla utilizada como líquido conservador, el cual está formado principalmente por alcohol etílico como lo sugiere el diseño original de la trampa NTP-80 (Morón y Terrón, 1984), esto simula la fermentación de la madera y puede atraer grandes cantidades de escolitinos (Burgos-Solorio 1998; Navarrete-Heredia *et al.* 2012; Quezada-García *et al.* 2014), mientras que en el presente estudio la captura de un solo escolitino se debe a que el líquido conservador utilizado fue monoetilenglicol el cual es casi inodoro.

La mayor riqueza y abundancia de coleópteros registrada durante las lluvias es un patrón común de la fauna asociada a la carroña en el país (Rodríguez *et al.* 2018), lo cual coincide con la mayor disponibilidad de recursos; de manera general se observó que las especies más abundantes estuvieron presentes prácticamente todo el año como fue el caso de *N. mexicanus*, aunque su mayor abundancia se observó en el periodo de lluvias, salvo algunas excepciones como ocurrió con *Xerosaprinus* sp. y *Saprinus* sp. que prefirieron la sequía; en este sentido, se ha visto que la familia Histeridae destaca por su preferencia por la sequía independientemente del tipo de vegetación donde sea recolectada, ya sea bosque tropical caducifolio, bosque de pino, matorral xerófilo o bosques urbanos (Naranjo-López y Navarrete-Heredia 2011; Navarrete-Heredia *et al.* 2012; Moreno-Olvera *et al.* 2014), en algunos estudios se ha detectado que aunque los histéridos pueden estar representados por hasta cinco especies como ocurrió en el presente estudio, solamente las de los géneros *Xerosaprinus* y *Saprinus* muestran clara preferencia por la sequía (Naranjo-López y Navarrete-Heredia 2011).

La familia Scarabaeidae fue exclusiva de las lluvias y solo se registraron dos especies, un individuo de *Orizabus clunalis* (LeConte, 1856) (Dynastinae), la cual tiene amplia distribución y habita en bosques mesófilo, pino, encino, matorral y comunidades secundarias establecidas entre

los 500 y 3,000 m de altitud (Ratcliffe y Morón, 1997), fue considerada accidental debido a su hábito fitófago; también se recolectaron 29 individuos de *Onthophagus chevrolati* (Scarabaeinae) que es una especie copro-necrofaga que habita en bosques de encino-pino y encino, aunque se ha visto que es más abundante en matorral, pastizal y vegetación secundaria en bosques desmontados en la cercanía de zonas boscosas, además, esta especie es un elemento de montaña característico de la Zona de Transición Mexicana distribuida entre los 1,500 y 4,000 m de altitud (Zunino y Halffter 1988; Halffter *et al.* 2019; Moctezuma y Halffter 2020). En ambos casos su presencia en la Sierra de Guadalupe coincide con las características de altitud y vegetación conocidas para estas especies.

A pesar de que el área de muestreo no fue muy extensa y la perturbación observada en la Sierra de Guadalupe, se registraron cuatro especies de tres géneros distintos de Silphidae, que corresponde al máximo número de especies registradas en otros estudios del país (Navarrete-Heredia y Quiroz-Rocha 2000; Quiroz-Rocha *et al.* 2008; Trevilla-Rebollar *et al.* 2010; Naranjo-López y Navarrete-Heredia 2011; García-Fernández y Jiménez-Sánchez 2014; Jiménez Sánchez *et al.* 2019; Reyes-Hernandez y Navarrete-Heredia 2019, Rodríguez *et al*. 2019).

Al comparar la composición de especies obtenidas en la Sierra de Guadalupe con el estudio llevado a cabo en la zona de Teotihuacán (Jiménez Sánchez *et al.* 2019), ubicada también en la cuenca del Valle de México, se encontró que compartió las mismas especies de Silphidae y Trogidae; para la primera familia destaca *Thanatophilus graniger* (Chevrolat, 1833) que es endémica de México la cual ha sido registrada en las provincias de la Sierra Madre oriental y el Cinturón Volcánico Transmexicano (Márquez *et al.* 2015) y en el caso de Trogidae solo se registró a *Trox plicatus* Robinson, 1840 que es una especie ampliamente distribuida desde el sur de Estados Unidos hasta el centro-sur de México (Deloya 2000), se tienen registros puntuales de la especie en bosques de mesófilo de montaña, encino, encino-pino y matorral xerófilo entre los 2,000 y 2,400 msnm (Morón y Deloya 1991; Pérez-Villamares *et al.* 2016; Reyes-Hernandez y Navarrete-Heredia 2019), por lo que su presencia coincide con el rango altitudinal y los tipos de vegetación presentes en la región.

Sin considerar a las especies de la subfamilia Aleocharinae, la Sierra de Guadalupe (15 especies) tuvo casi el mismo número de especies de Staphylinidae que las capturadas con la trampa NTP-80 en la región de Teotihuacán (16 especies) (Jiménez Sánchez *et al.* 2019) y compartió especies que habitan principalmente ambientes semiáridos como fue el caso de: *Belonuchus ephippiatus* (Say, 1830) (Smetana 1995; Ferro *et al.* 2013; Jiménez-Sánchez *et al.* 2013) y *Belonuchus erichsoni* Bernhauer, 1917, sin embargo, en la Sierra de Guadalupe también se encontraron especies representativas de las zonas templadas que podrían ser consideradas como elementos de montaña, tal es el caso de *Philonthus testaceipennis* Erichson, 1840 y *Tachinus mexicanus* Campbell, 1973 (Campbell 1973; Márquez y Asiain 2010; Rodríguez *et al*. 2019), cuyas poblaciones posiblemente sean más abundantes en el bosque de encino que se encuentra en las zonas más altas de la sierra.

Por lo tanto, el bosque artificial de la Sierra de Guadalupe aloja especies tanto de la zona semiárida que abarca la mayor parte de la cuenca del valle de México, así como, especies de montaña del área de bosque de encino presente en las partes altas de la Sierra cuyo pico máximo puede alcanzar los 3,000 m (Lugo-Hubp y Salinas-Montes 1996), además en esta área se tiene una alta riqueza de especies de Silphidae que son muy importantes en la degradación y reciclamiento de los cadáveres, así mismo, este grupo de necrófagos fue el segundo gremio más abundante, mientras que los depredadores ocuparon el primer lugar en cuanto a número de especies y abundancia. Trumbo y Bloch (2000) encontraron que los sílfidos del género *Nicrophorus* fueron menos exitosos en encontrar y enterrar los cadáveres en fragmentos de bosque pequeños que en áreas más grandes de bosque; por lo que, en el área de estudio la conexión del bosque artificial que aún existe con el área boscosa mayor que cubre las partes altas de la Sierra, probablemente determinan la alta riqueza de especies de Silphidae registrada y las poblaciones grandes de *N. mexicanus*.

Por último, aunque la diversidad de familias en la Sierra de Guadalupe es baja comparada con otros estudios, la presencia de especies tanto de ambientes semiáridos como de zonas templadas denotan la importancia que tiene el conservar la vegetación nativa aledaña como son los bosques de encino de la parte alta de la sierra y los fragmentos de matorral xerófilo que cada vez son más escasos en la cuenca del Valle de México, las cuales mantienen las poblaciones de coleópteros presentes en las áreas con impacto de la urbanización. Además, es urgente ordenar el uso del suelo, debido a que los datos indican que en la Sierra de Guadalupe el suelo urbano ha tenido un incremento lineal y se ha cuadruplicado en los últimos treinta años (Peña 2018).

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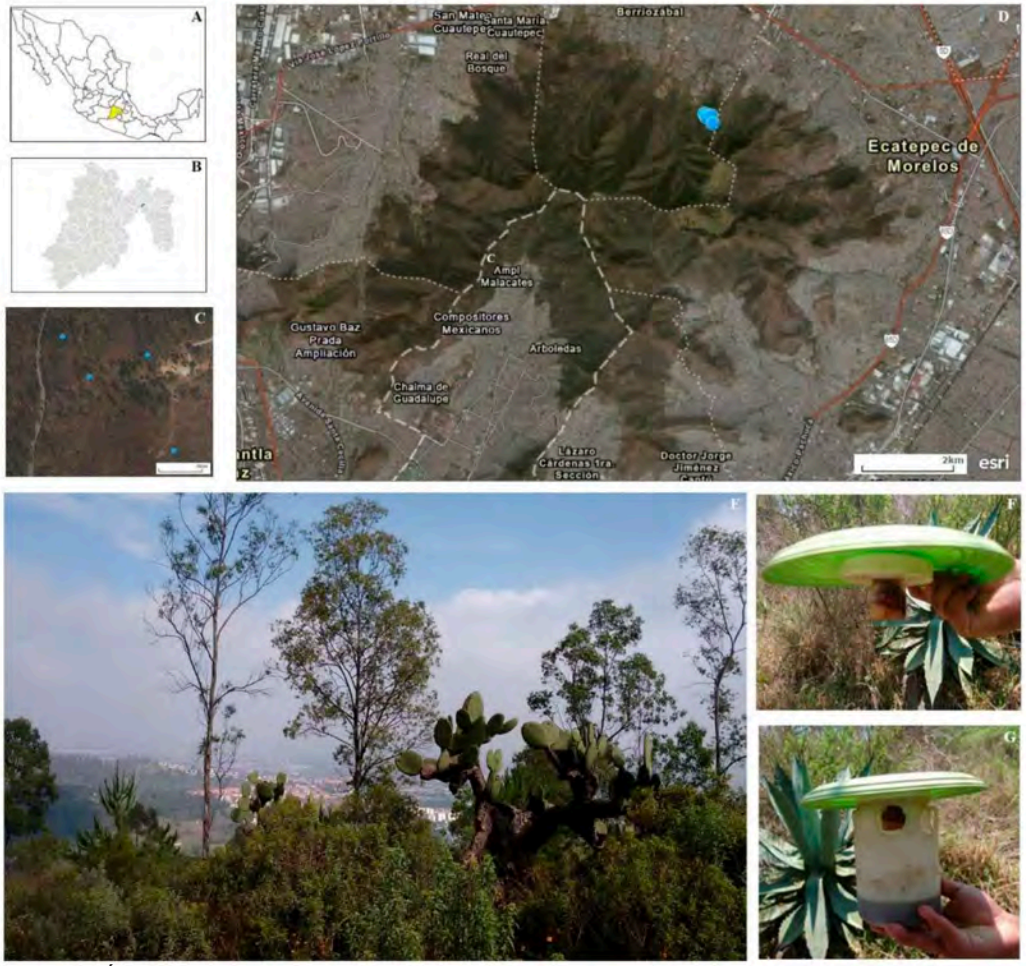

Figura 1. Área de estudio y diseño de la trampa. Ubicación del área de estudio: A. Nivel nacional, B. Nivel estatal, C. Sitios de muestreo, D. Perspectiva de la Sierra de Guadalupe con puntos de muestreo (puntos azules), E. Panorámica de la vegetación de la zona de muestreo. Trampa NTP-80 modificada: F. Tapa y frasco con el cebo (calamar) y G. Trampa ensamblada. Fotos por E. Jiménez e I. Rodríguez.

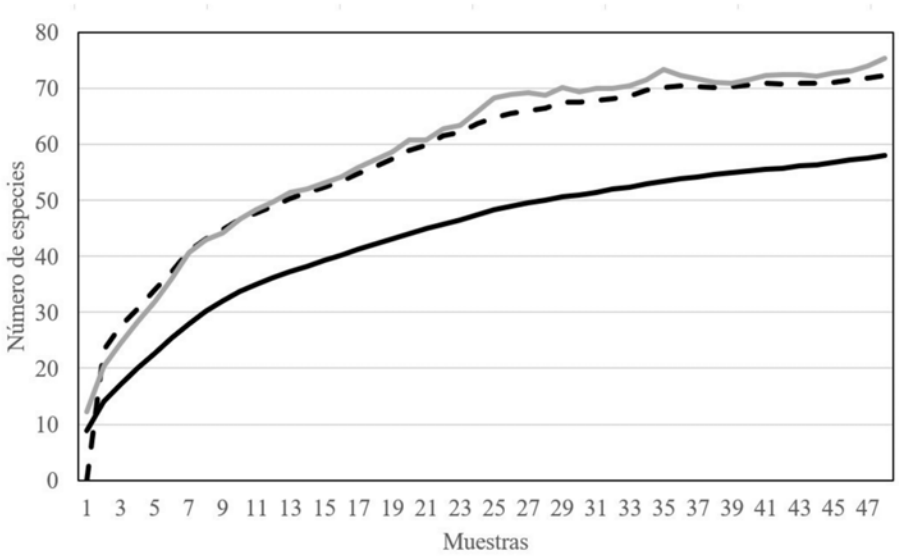

Figura 2. Curvas de acumulación de especies de coleópteros observadas (línea negra), y estimadas Chao1 (línea gris) y ACE (línea discontinua).

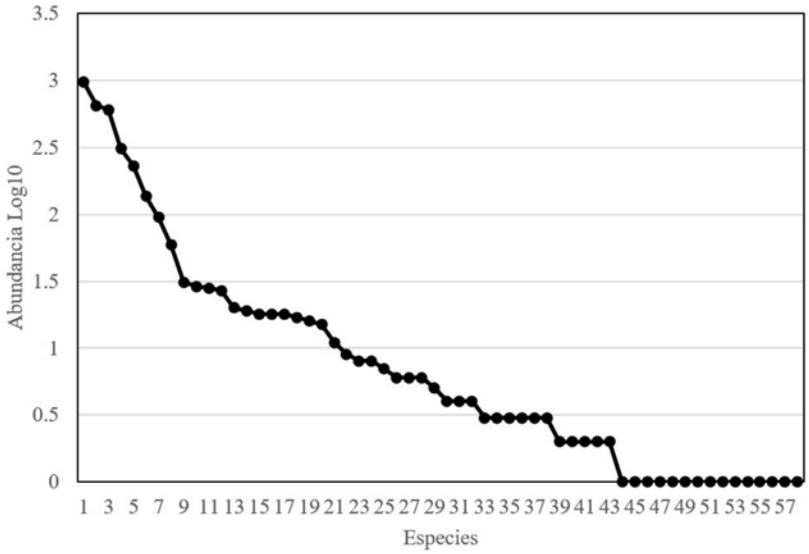

Figura 3. Curva de rango abundancia del ensamble de coleópteros asociados a la carroña.

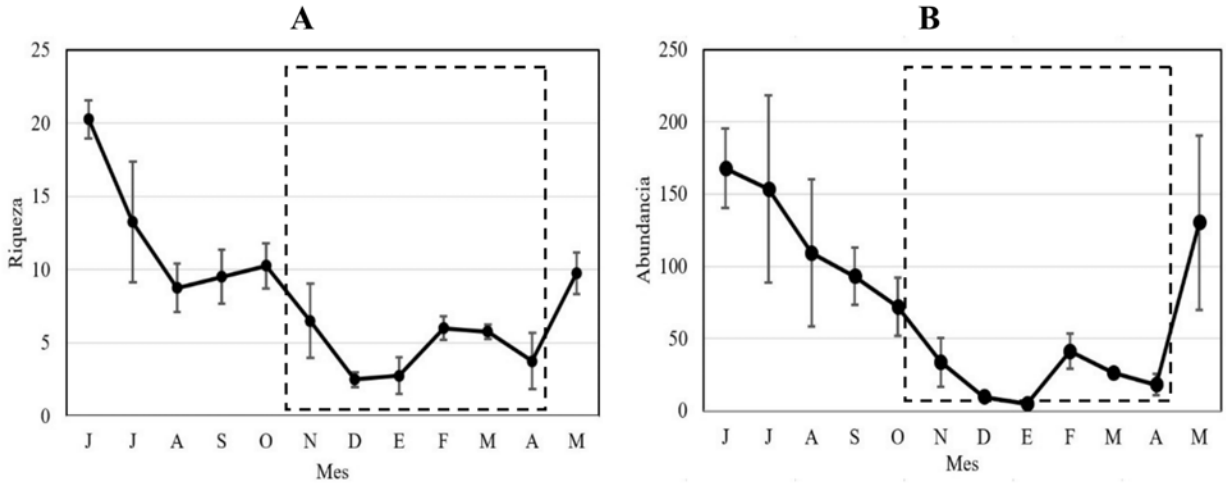

Figura 4. Promedio mensual ± error estándar del número de especies (A) e individuos (B) de coleópteros asociados a la carroña. Los meses dentro del rectángulo punteado corresponden a la época de sequía.

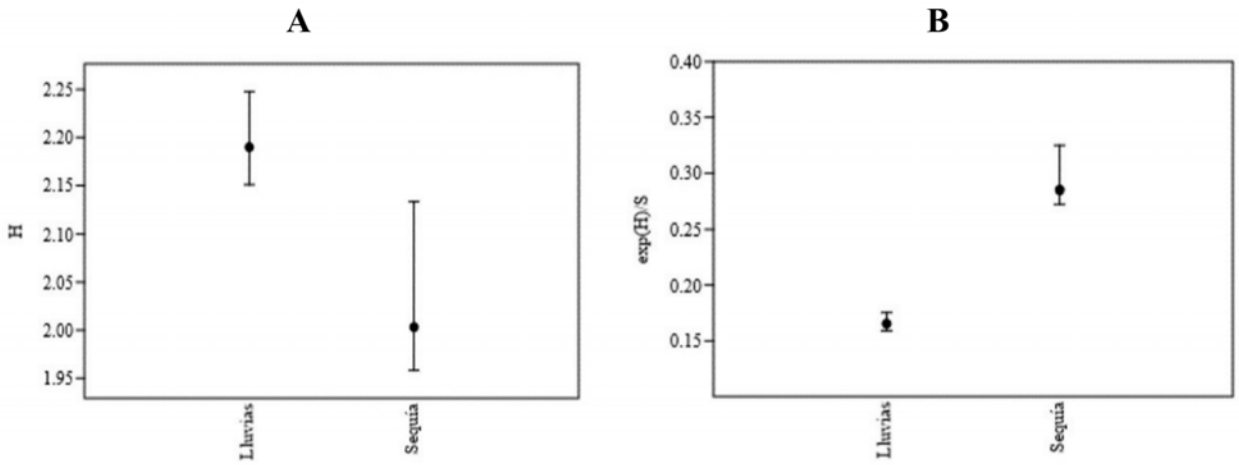

Figura 5. Diversidad (A) y uniformidad (B) de coleópteros asociados a la carroña en la época de lluvias y sequía. Las barras de error corresponden al intervalo de confianza de 95%.

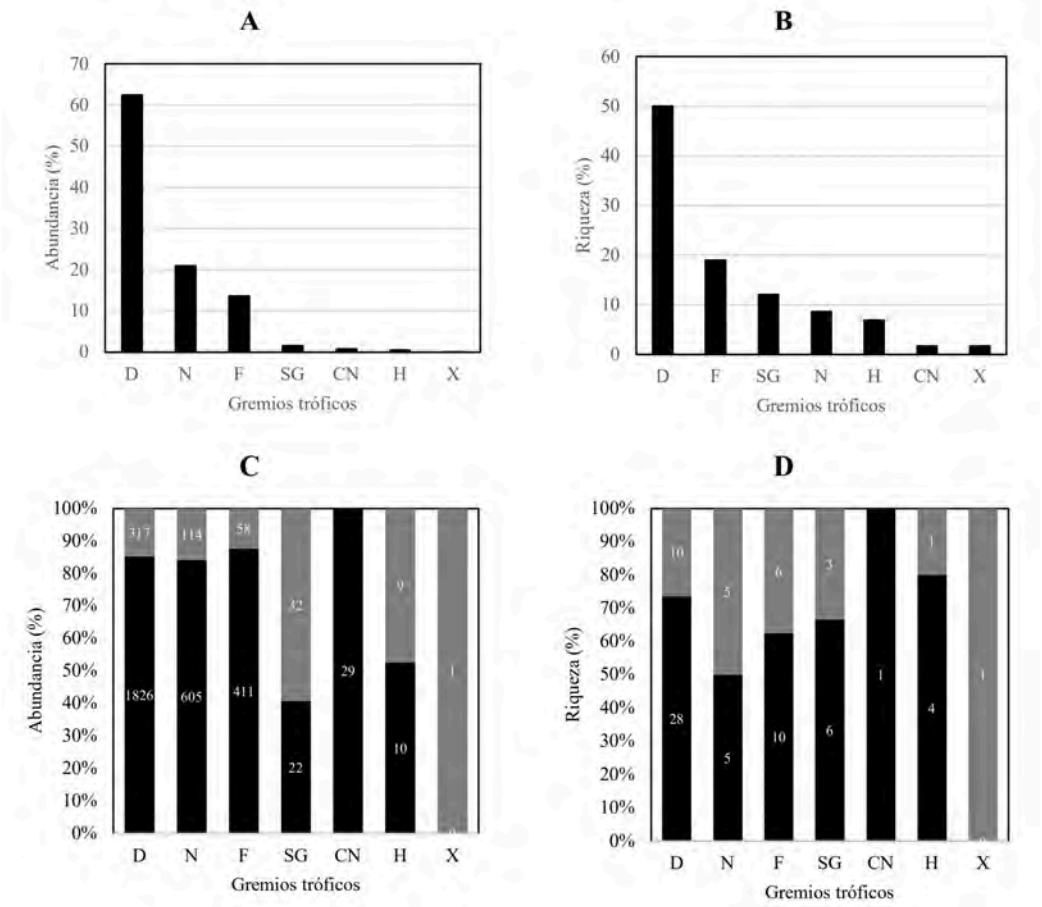

Figura 6. Porcentaje de abundancia (A, C) y riqueza (B, D) de los gremios tróficos de coleópteros asociados a la carroña durante el ciclo anual (A, B), en la estación de lluvias (barra negra) y en la sequía (barra gris) (C, D). D = depredador; F = fungívoro; SG = saprófago-generalista; N = necrófago; H = herbívoro; CN = copro-necrófago; X = xilófago.

Cuadro 1. Abundancia y riqueza mensual de los coleópteros asociados a carroña en la Sierra de Guadalupe. Las columnas sombreadas corresponden a la época de sequía. LL = lluvias; S = sequía; GT = gremio trófico. Meses J-M = julio-mayo. En la columna de gremios tróficos: D = depredador; F = fungívoro; SG = saprófago generalista; N = necrófago; H = herbívoro; C-N = copro-necrófago; X = xilófago. * Familia exclusiva de la sequía; **Familia exclusiva de las lluvias.

Taxones	J	J	A	S	O	N	D	E	F	M	A	M	LL	S	Total	GT
Anthicidae						**9**	**8**	**5**	**6**					**28***	**28**	
Anthicidae sp. 1						9	8	5	6					**28**	28	H,SG
Carabidae	**181**	**184**	**92**	**19**	**11**	**3**		**1**		**1**	**17**	**169**	**656**	**22**	**678**	
Carabidae sp. 1	1												1		1	D
Carabidae sp. 2	163	145	86	14	11	2		1		1	16	167	586	20	606	D
Carabidae sp. 3	11	35	6	5							1	1	58	1	59	D
Elaphrini sp.	6	4										1	11		11	D
Promecognatinni_sp.						1								1	1	D
Chrysomelidae	**1**												**1****		**1**	
Alticini sp. 1	1												**1**		1	H
Cryptophagidae	**2**					**1**	**1**			**3**		**1**	3	5	**8**	
Cryptophagidae sp. 1	1									3			1	3	4	F
Cryptophagidae sp. 2	1											1	2		2	F
Cryptophagidae sp. 3						1	1							**2**	2	F
Curculionidae	**2**	**1**			**2**	**3**		**2**	**4**	**1**		**3**	8	10	**18**	
Monarthrum sp.									1					1	1	X/F
Curculionidae sp. 1	1	1			2	3		2	3	1		3	7	9	16	H
Curculionidae sp. 2	1												**1**		1	H
Histeridae	**29**	**6**	**4**	**3**	**44**	**63**	**12**	**6**	**32**	**47**	**18**	**39**	125	178	**303**	
*Eremosaprinus*_sp.	10	2	1								1	1	14	1	15	D
Euspilotus sp.	5	2	2										9		9	D
Geomysaprinus sp.	2	2	1	2	9	1						1	17	1	18	D
Saprinus sp.	6				3	2		1	7	3		9	18	13	31	D
Xerosaprinus sp.	6			1	32	60	12	5	25	44	17	28	**67**	**163**	230	D
Hydrophilidae		**1**											1**		**1**	
Hydrophilidae sp.		1											**1**		1	SG
Latridiidae	**1**									**3**		**2**	3	3	**6**	
Latridiidae sp. 1	1									3		2	**3**	**3**	6	F
Leiodidae	**135**	**57**	**67**	**34**	**15**				**1**			**2**	310	1	**311**	
Leiodidae sp. 1	135	57	67	34	14				1			2	309	1	310	F
Leiodidae sp. 2					1								**1**		1	F
Mycetophagidae						**2**						**3**	3	2	**5**	
Mycetophagidae sp. 1						2						3	**3**	**2**	5	F
Nitidulidae	**27**	**13**	**2**	**1**	**14**	**5**	**3**	**1**	**27**	**8**	**3**	**33**	90	47	**137**	
Nitidulidae_sp. 1	26	13	2	1	14	5	3	1	27	8	3	33	89	47	136	F
Nitidulidae sp. 2	1												**1**		1	F
Ptiliidae	**1**												1		**1**	
Ptiliidae sp. 1	1												**1****		1	F
Scarabaeidae	**24**	**5**		**1**									30**		**30**	
Onthophagus chevrolati	24	4		1									29		29	C-N
Orizabus clunalis		1											**1**		1	H
Silphidae	**148**	**21**	**100**	**194**	**93**	**45**	**10**	**1**	**15**	**17**	**25**	**30**	586	113	**699**	
Nicrophorus mexicanus	136	20	94	192	79	40	9	1	15	16	24	25	546	105	651	N
Oxelytrum discicolle	3	1	5	1	12	2					1	2	24	3	27	N
Tanatophilus graniger							1			1		1	1	2	3	N
Tanatophilus truncatus	9		1	1	2	3						2	**15**	**3**	18	N
Staphylinidae	**113**	**319**	**167**	**110**	**105**		**4**	**2**	**78**	**24**	**9**	**233**	1047	117	**1164**	
Aleochara sp. 1					1								1		1	D
Aleochara sp. 2									2			1	1	2	3	D
Aleocharinae sp. 1	58	278	124	77	89		4	2	76	24	8	230	856	114	970	D,M,S
Aleocharinae_sp. 2		2		1									3		3	D,M,S
Aleocharinae sp. 3	2	1	2	1									6		6	D,M,S

Aleocharinae_sp. 4		3			5								8		8	D,M,S
Anotylus sp.					1								1		1	S
Belonuchus ephippiatus	3	1	1								1	1	6	1	7	D
Belonuchus erichsoni	12	6											18		18	D
Echiaster sp.	9	17	36	28	5								95		95	D
Lordithon sp.		1											1		1	D
Philonthus sp. 1	2	1	3										6		6	D
Philonthus sp. 2	13	3		1	1							1	19		19	D
Philonthus sp. 3	2	1											3		3	D
Philonthus testaceipennis		1			3								4		4	D
Platydracus marcidus	2	1											3		3	D
Platydracus mendicus	7	1											8		8	D
Platydracus sp. 1		1	1										2		2	D
Sepedophillus sp.		1											1		1	D,M,S
Tachinus mexicanus	2			2									4		4	D,M,S
*Toxidium*_sp.	1												**1**		1	F
Tenebrionidae	**2**	**2**	**2**	**8**	**4**	**3**			**1**			**2**	20	4	**24**	
Tenebrionidae sp. 1	2	2	2	4	2	2			1			2	14	3	17	SG
Tenebrionidae sp. 2				1	1								2		2	SG
Tenebrionidae sp. 3				1		1							1	1	2	SG
Tenebrionidae sp. 4				2	1								**3**		3	SG
Trogidae	**5**	**5**	**3**	**2**						**1**		**4**	19	1	**20**	
Trox plicatus	5	5	3	2						1		4	**19**	**1**	20	N
Abundancia	**671**	**614**	**437**	**372**	**288**	**134**	**38**	**18**	**164**	**105**	**72**	**521**	**2903**	**531**	**3434**	
Riqueza	**37**	**32**	**18**	**21**	**21**	**15**	**7**	**8**	**11**	**11**	**9**	**23**	**54**	**26**	**58**	

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Artículo

New locality records for ants in the coffee zone of Cundinamarca, Colombia

Nuevos registros locales de hormigas en la zona cafetalera de Cundinamarca, Colombia

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ABSTRACT

Shade coffee plantations harbor a great diversity of ants that in some cases have not been recorded. Therefore, it is important the information of their distribution both locally and regionally, five new records for the coffee region of Cundinamarca are related here, four species for the subfamily Myrmicinae with: *Protalaridris armata*, *Nesomyrmex pittieri*, *Cyphomyrmex peltatus*, *Strumigenys pariensis* and for the subfamily Proceratinae the species *Proceratium colombicum*.

Keywords: Biodiversity, Formicidae, neotropical region, Quipile, shade coffee

RESUMEN

Los cafetales de sombrio albergan una gran diversidad de hormigas que en algunos casos no han sido registradas. Por lo tanto es importante la información de su distribución tanto local como regional, cinco nuevos registros para la región cafetera de Cundinamarca se relacionan aquí, cuatro especies para la subfamilia Myrmicinae con: P*rotalaridris armata* , *Nesomyrmex pittieri* , *Cyphomyrmex peltatus* , *Strumigenys pariensis* y para la subfamilia Proceratinae la especie *Proceratium colombicum*.

Palabras clave: Biodiversidad, Formicidae, neotropical, Quipile, Café de sombra.

The coffee agroecosystem in Colombia is characterized by a high diversity of fauna and flora, located in the equatorial strip of the Neotropical region in the north of South America (Constantino 2020). This is part of the tropical Andes considered a globally critical point (hotspot) (Myers *et al.* 2000). The presence of shade in coffee plantations can promote ecological functions because they attract associated fauna of great importance such as insects (Manson *et al.* 2008). Due to the close relationship between plants and insects, the high percentage of plant endemism in the tropical Andes (about half of the species) suggests a high level of insect diversity and endemism (Larsen *et al.* 2011).
Among these insect groups, ants present a high diversity in Colombia with an estimated 1100 species compared to the 3300 species reported in the Neotropical region (Guerrero *et al.* 2018). Highlighting, that in these agroecosystems even though there is strong pressure to increase their productivity or transform to other land uses (Rojas *et al.* 2012). They continue to maintain a great richness of ants (Cepeda *et al.* 2014, Martínez 2018). Where they fulfill important functions as biological predators of the coffee berry borer (Escobar *et al.* 2020). They can act as bioindicators (Alonso y Agosti 2000). They improve soil composition (Philpott *et al.* 2010). And regulate the population of arthropods (Gallego-Ropero y Armbrecht 2005). However, the diversity patterns of ants in coffee landscapes remain poorly understood (Escobar *et al*. 2020). Therefore, there is the possibility of finding new local and regional records, motivating us to continue with this type of work in coffee plantations in Colombia.

MATERIAL AND METHODS

The specimens were collected in December 2016 and 2017 in a pitfall trap and manual collect in a coffee farm in Quipile, Cundinamarca (04.46.13.3N, 074.32.06.8W), which is located 83 km west of Bogotá city, Colombia (Fig. 1). It has an altitude between 1599 and 1702 m.n.s.m, also presents a temperature from 16°C to 18°C and rainfall between 1,000 and 2,000 mm. This place is part of the Premontane damp forest (Rodríguez *et al.* 2006).

The digital images were generated with a Nikon AZ100M multipurpose zoom microscope software with Nikon elements a high-resolution digital camera (Type

DS-U3) and a Leica MC170 HD camera with a Leica 10450528 adapters on a Leica M205 A microscope using a 1x objective. Other digital images were taken from AntWeb (2021). The keys and the diagnosis developed in this work based on the following documents: Lattke *et al*. (2018) for *Protalaridris*, Kempf (1959) for *Nesomyrmex,* Kempf (1966) for *Cyphomyrmex,* Lattke and Goitía (1997) for *Strumigenys* and Baroni Urbani and de Andrade (2003) for *Proceratium.*

RESULTS

Subfamily Myrmicinae:

Protalaridris armata Brown, 1980

Material examined: COLOMBIA, Cundinamarca. Quipile, Vereda Guadalupe Alto, Finca San Miguel. Shade coffee plantation. 04.46.21.7N, 074.32.06.3W.1722m. Pitfall trap.20-December-2016. Martinez.R.1 Worker. ICN100266.Figs, 2A, 2B.

Comments: Only two species are known in Colombia, one recently described *Protalaridris arhuaca* Guerrero, Lattke & Alpert, 2018 in the Sierra Nevada de Santa Marta and *P. armata*, which is known in Panama, Ecuador, and Venezuela. In Colombia, it known in Chocó and Nariño (Fernández *et al.* 2019).

Nesomyrmex pittieri (Forel, 1899)

Material examined: COLOMBIA, Cundinamarca. Quipile, Vereda Guadalupe Alto, Finca San Miguel, 04.46.20.6N, 074.32.05.7W.1710m. Shade coffee plantation. Manual capture found in tree trunk *Citrus aurantium* L, 1753. 19-April-2017. Martinez. R .2 workers. ICN100267. Figs, 3A, 3B.

Comments: Known from México, Costa Rica, Nicaragua Panamá (Kempf 1959). In Colombia has been recorded in Cauca (Chacón de Ulloa *et al.* 2014), and Caldas (Fernández *et al.* 1996).

Cyphomyrmex peltatus Kempf, 1966

Material examined*:* COLOMBIA, Cundinamarca. Quipile, Vereda Guadalupe Alto, Finca Los Naranjitos, 04.46.10.7N ,07432.06.3W.1599. Shade coffee plantation. Pitfall trap. 22-December-2016. Martinez. R .1 worker. ICN100268. Figs, 4A, 4B.

Comments: This species is very similar to *Cyphomyrmex rimosus* (Spinola, 1851), but these are its differences: no middle pronotal tubercles, a pentagonal impression in the mesonotum, delimited by the four lower welts, postpetiolar mediodorsal always deeper, thin hairs, recovered, not scaly (Kempf 1966).

Known from Costa Rica to Brazil (Rio Grande do Sul). In Colombia: Moni-fue, Leticia, Amazonas (Perez *et al.* 2009). Huila, Putumayo, Quindío, and Vichada (Fernandez *et al.* 2019).

Strumigenys pariensis Lattke and Goitía, 1997

Material examined: COLOMBIA, Cundinamarca. Quipile, Vereda Guadalupe Alto, Finca los Naranjitos, 04.46.12.7N, 074.32.05. 0W.1585m. Shade coffee plantation. Manual capture around the lower part of the trunk of *C. aurantium*. Pitfall trap. 14-November-2016. Martinez. R .2 workers. ICN100269. Figs, 5A, 5B.

Comments*:* Although confused with *S. elongata*, the basal ribbing of the first tergus of the gaster also differs, and it does not extend after the first pair of medium erect hairs (Lattke and Goitía 1997).

This species is known from México, Costa Rica, Honduras, Nicaragua to Venezuela. In Colombia is known without a specific locality (Fernandez *et al*. 2019).

Subfamily Proceratinae:

Proceratium colombicum De Andrade, 2003

Material examined: COLOMBIA, Cundinamarca. Quipile, Vereda Guadalupe Alto, Finca los Naranjitos, 04.46.13.3N, 074.32.06.8W .1593m. Shade coffe plantation. Pitfall trap. 22-December-2016 Martinez. R .1 queen. NC5SL. Figs, 6A, 6B.

Comments: This is the smallest species of the micrommata clade, is endemic to Colombia; it is known only for the department of Nariño. (Baroni Urbani and de Andrade 2003).

CONCLUSIONS

The coffee plantations of the coffee-growing area of Cundinamarca have the potential as a habitat for ant diversity, therefore it is important to conserve and maintain this type of agroecosystems motivating studies to report new records and possibly new species.

ACKNOWLEDGMENT:

To the institute ENTOMA and ICN-UNAL for the photographs of *Proceratium and Protalaridris,* to Rodolfo Probst and Maria Camila Tocora for the corroboration and determination of the ant's species.

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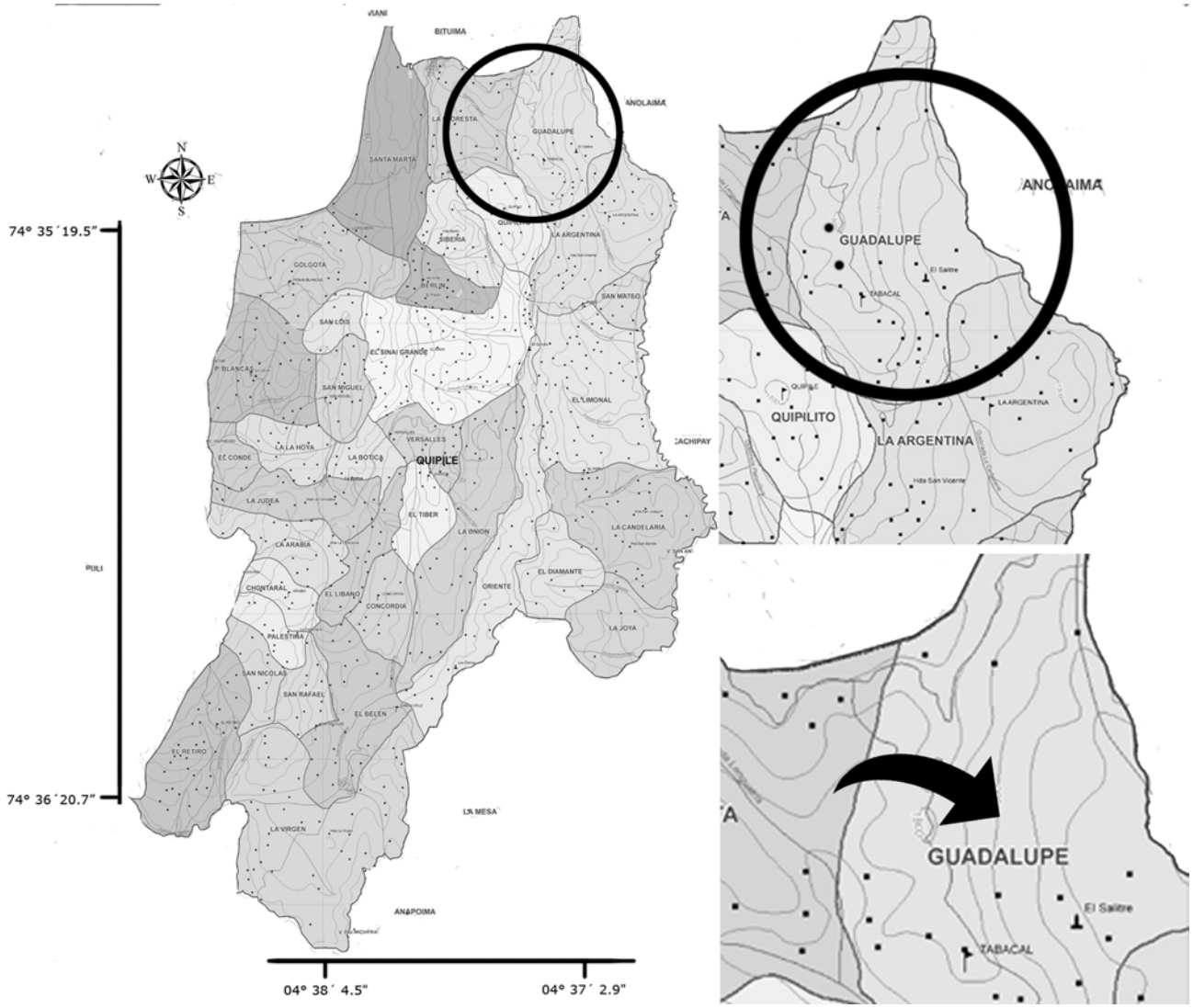

Figure 1. Location of the farms studied on the upper village Guadalupe in the municipality of Quipile (Cundinamarca, Colombia).

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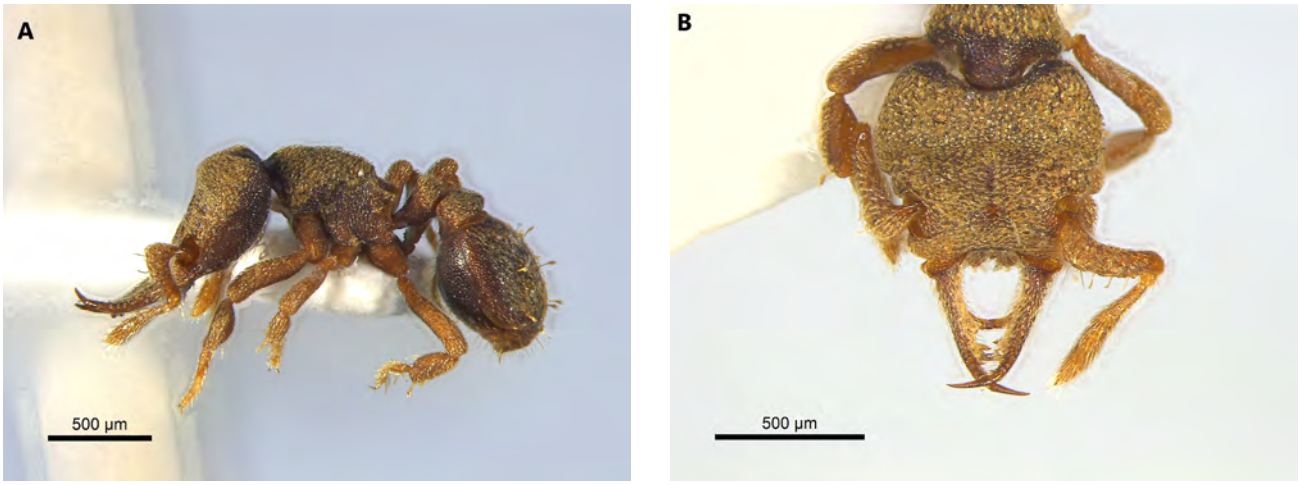

Figure 2. Body profile (A) and head in full-face view (B) of the *Protalaridris armata* worker. Imagen was taken by Camila Tocora ICN.

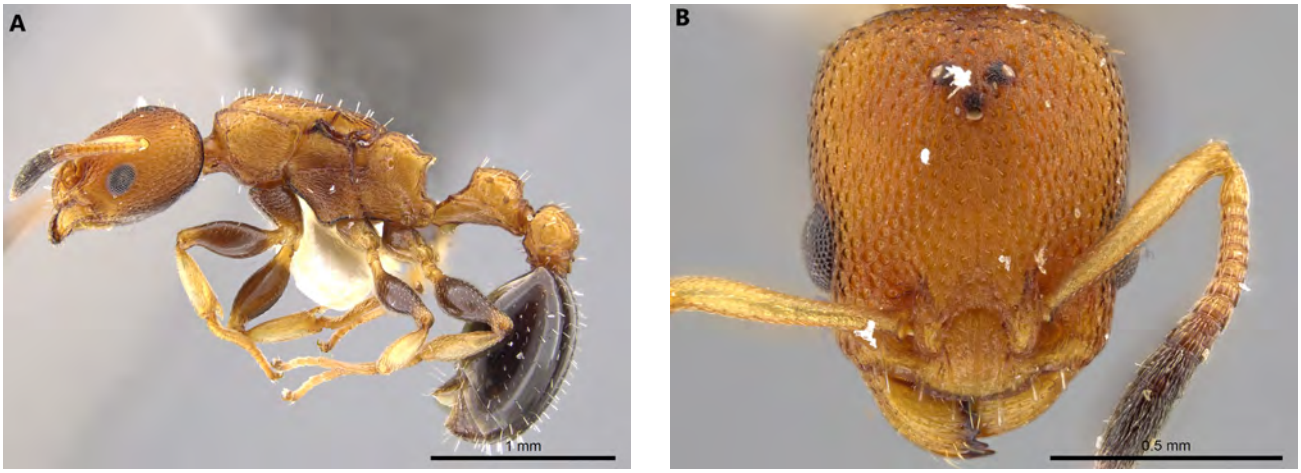

Figure 3. Body profile (A) and head in full-face view (B) of the *Nesomyrmex pittieri* worker. (INBIO CRI01275159). Image by M.pierce, from www.antweb.org).

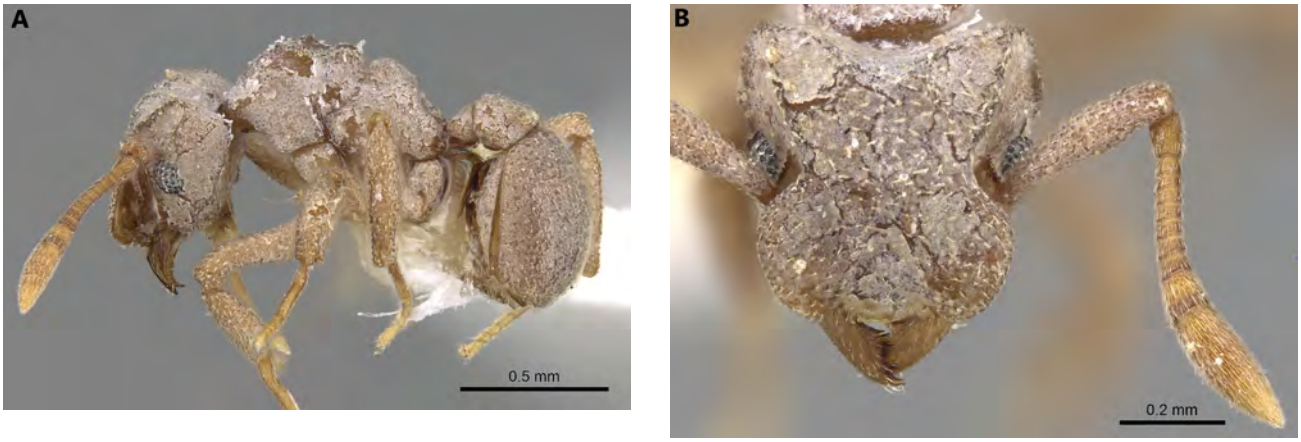

Figure 4. Body profile (A) and head in full-face view (B) of the *Cyphomyrmex peltatus* worker. (CASENT 0281766). Image by Shannon Harman, from www.antweb.org.

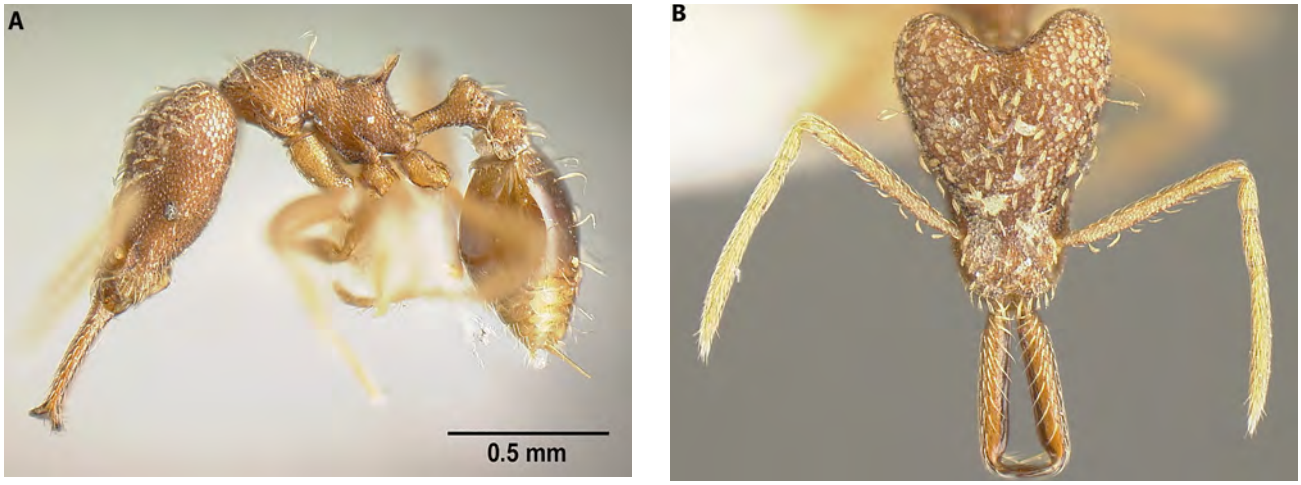

Figure 5. Body profile (A) and head in full-face view (B) of the *Strumigenys pariensis* worker. (INBIOCRI001283773). Image by D.J Cox, from www.antweb.org).

Figure 6. Body profile (A) and head in full-face view (B) of the *Proceratium colombicum queen.* Imagen was taken by Instituto ENTOMA.

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Artículo

Primer registro de la "mosca de la madera" *Pantophthalmus zoos* (Enderlein, 1931) (Diptera: Pantophthalmidae), para el estado de Morelos, México

First record of "Timber fly" *Pantophthalmus zoos* (Enderlein, 1931) (Diptera: Pantophthalmidae), from State of Morelos, México

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RESUMEN

Se registra por primera vez a *Pantophthalmus zoos* (Enderlein, 1931) con base en un ejemplar macho atraído a la luz mercurial localizado en las inmediaciones del campus universitario cerca de un bosque de pino-encino de la parte norte del estado de Morelos

Palabras clave: Mosca barrenadora, distribución, Bosque de pino-encino, México

ABSTRACT

Pantophthalmus zoos (Enderlein, 1931), is recorded for the first time in northern Morelos. The specimen was collected attracted to light in the vicinity of the university campus near the vicinity of a pine-oak forest in the northern part of the state of Morelos.

Key words: Oak-pine Forest, Oak tree, neotropical region, distribution, Mexico.

La familia Pantophthalmidae pequeña familia de "orthorrhaphous" Brachycera cuyo significado proviene del griego "*panto*" que significa "todo completo" más *"Ophthalmus"* que significa "ojo" más *"idae"* sufijo latino que tipifica a la familia y que el nombre hace referencia a al tamaño de los ojos que cubren la mayor parte de la superficie de la cabeza (Val, 1976Ibáñez y Reyes, 2017). En este taxa, representado por 20 especies integrada en los géneros *Opetiops* Enderlei, 1921 representado por una sola especie y *Pantophthalmus* Thuberg, 1919, representado por 19 especies de estas solo cinco se distribuyen para el país, *Pantophthalmus bellardi* (Bigot En: Bellardi, 1862) distribuida en Chiapas y Veracruz; *P. planiventris* (Wiedeamm, 1821) para Puebla y Oaxaca; *P. roseni* (Enderlein, 1931), Veracruz y Tamaulipas; *P. tabaninus* Thunberg, 1819, México (sin localidad precisa y *P. zoos* (Enderlein, 1931) para Oaxaca (Papavero, 2009a y b; Pujol-Luz y Souto, 2018). Comúnmente son llamadas como "Moscas de la madera"; para el caso de *P. zoo* las larvas se le llama comúnmente como "Barrenillo del encino" "Mosca barrenadora de la madera" "Barreno del encino u "Oak driller". Integra a este género 19 especies, distribuidas en la región neotropical, sin embargo las recolectas de esta especie muy posiblemente nos indicarán que la distribución del grupo de las mosca barrenadoras podrían estar distribución más al norte del país, convergiendo con la distribución de las comunidades de encino (Val, 1992); lo anterior se sustenta en que en país alberga la mayor diversidad de especies de encinos, con más de 161 especie (Anónimo, 2020), por lo que se ofrece un potencial sobre la distribución de *P. zoos* y las otras registradas para el país es muy alta (Valencia, 2010).

MATERIALES Y METODOS

El ejemplar se colectó atraído a la luz mercurial, en las inmediaciones del Centro de Investigaciones Biológicas de la Universidad Autónoma del Estado de Morelos (18°58'57.87"N y 99°14'13.76"O) a una altitud de 1910 m, sitio cercano a un bosque de pino-encino ubicado en la ladera sur del Eje Neovolcánico Transversal en la parte norte del estado de Morelos. Para la determinación específica, fueron utilizadas las claves de Val (1992) y corroborada por el Dr. S. Ibáñez

Las imágenes de la mosca sierra, fueron tomadas con un microscopio estereoscópico Nikon SMZ-1500 y una cámara digital Nikon DXM 1200C, cuyas imágenes se renderizaron con el programa Helicon Focus Exe, 7.7.5. La toma de medidas fue procesada con el programa Image Tools 3.0. La terminología utilizada es acorde al criterio de Val (1992). El material entomológico se encuentra depositado en la colección entomológica CEUM del Laboratorio de Parasitología Vegetal, del Centro de Investigaciones Biológicas de la Universidad Autónoma del Estado de Morelos, para su consulta.

RESULTADOS

Pantophthalmus Thunberg, 1919.

Pantophthalmus zoos (Enderlein, 1931)

Localidad tipo: México, Oaxaca. Refs. –Carrera & d'Andretta, 1957: 311 (*Rhaphiorhynchus*); Papavero, 1967: 4 (cat.; *Rhaphiorhynchus*); Val, 1976: 91. Tipo, DEI.
Rhaphiorhynchus zoos; Carrera & D´Andretta, 1957: 311; Papavero, 1967: 4

Diagnosis: Esta especie se distingue del resto de las especies por el macho presenta una talla de 35.4 largo y 9.73 mm ancho; Ojos holópticos, negros y prominentes, ligeramente hendido en su base; Antena filiforme, formado por ocho flagelómeros, el 1er casi tan ancho como largos, 2° ancho y corto, 3er más lago que ancho, en la parte media dibuja una línea media que aparenta dividirlo, 4° de igual tamaño, 5° y 6° más largo que ancho, 7° delgado y largo, 8° ligeramente abultado en su base pero con el estilus agudo, superficie pilosa con apariencia aterciopelada gris claro; Palpos tri-segmentados con sedas negra, erectas, agudas, excepto en el tercer segmento, con la superficie pilosa, aterciopelada y lisa; Tubérculo facial prominente, agudo, doblado en su ápice, superficie lisa, brillosa, excepto en su base, pilosa; Pronoto más largo que ancho, con tres bandas sobre su dorso, dos laterales y una central, ornamentado con finas sedas negras decumbentes; Escútelo recto en su borde anterior y redondeado en borde posterior, ligeramente abultado; Mesonoto con la superficie ornamentado con dos líneas laterales y una en la parte central delgada,. Abdomen ancho, aplanado con un par de pequeñas crenulaciones sobre los segmentos 3° a 5°, cuarto segmento con dos manchas amarillas localizada en los bordes laterales, superficie ligeramente ornamentada con sedas negras finas y delgadas; Alas largas con machas amarillas o cafés, dos veces y media más largas que anchas, con manchas café-oscura, que se originan desde el lóbulo axilar y recorre todo el borde posterior hasta la 4a celda radial, el resto de las alas de café-amarillentas; Patas cafés-oscuras a negras, ornamentadas con sedas negras; metapatas con la presencia de una espina ventral larga y fuerte sobre la fémora. Alas más de dos veces más largas que anchas oscura sobre el margen; Aedeago cuadrado sobre el ápice (Figuras 2-9).

Hembra. desconocida

Hospederos: *Celastrus vulcanicolus* (Calastraceae), *Cornus, excelsa* (Cornaceae), *Quercus* spp (Fagaceae) (encino blanco, encinos entre otras) Ibáñez y Reyes (2017).

Distribución: Oaxaca, Oaxaca y Veracruz, Jalapa, Papavero (2009a); Ibáñez y Reyes (2017).

Vegetación. En la región norte del estado de Morelos prosperan una comunidad de bosque de pino-encino de ésta prosperan nueve especies de encinos como *Quercus candicans*, *Q. castanea*, *Q. crassipes*, *Q. frutex*, *Q. glabrescens*, *Q. glaucoides*, *Q. laurina*, *Q. obtusata*, Q. *rugosa* (Cerros, *com pers*), lo anterior es para efectos de proporcionar información infiriendo posibles hospederos de esta especie de mosca barrenadora, asimismo se observó exudaciones resinosas características larvas barrenadoras en la región norte en Santa María Ahuacatilán, Cuernavaca (Cerros *et. al.,* 2020)

Material examinado: México: Morelos, Cuernavaca, Campus Chamilpa, UAEM, 04-07-2019, 1910 m, Col. A. Burgos, AB-2747 (1♂).

Observaciones: El ejemplar examinado es recolectado sobre el suelo y atraído a la luz mercurial, localizado en el campus universitario

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Se agradece al Dr. Sergio Ibáñez Bernal del Instituto de Ecología, Xalapa, Veracruz por la identificación del organismo, asimismo al M. en C. Santiago Jaume Shinkel estudiante de doctorado del museo Alexander Koennig, Universidad de Bonn, Alemania al proporcionar información sobre el taxa. Esta contribución forma parte del proyecto EXB-48 aprobado por la SEP-PROMED número de convenio 103.5/03/2531, así como el proyecto "establecimiento de una colección de referencia y Colección Entomológica de Referencia (CEUM), y del proyecto PII-69 del Centro de Investigaciones Biológicas, UAEM, asimismo este documento forma parte de las actividades del Cuerpo Académico de Entomología y Fitopatología UAEM-CA 073, de la DES de Ciencias Naturales de la Universidad Autónoma del Estado de Morelos. Finalmente, los autores agradecen a los revisores por sus comentarios y sugerencias al escrito.

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Figura 1. Distribución geográfica de los bosques de pino-encino y *Pantophthalmus zoos* en México (puntos negros) (Anónimo, 2020).

Figura 2. Hábitus de *Pantophthalmus zoos*, a) Macho adulto, b) Vista frontal de los ojos; c) Lóbulo frontal, d) Palpos labiales, e) detalle de la antena, f) Mesonoto, g) Segmento abdominales, h) fémora con espina, i) Ala izquierda; La línea representa 1 cm.

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Artículo

An annotated checklist of ground beetles (Insecta: Coleoptera: Carabidae) occurring in the state of Sonora, Mexico with descriptions of new species and notes about some collection localities

Lista anotada de carabidos (Insecta: Coleoptera: Carabidae) que ocurren en el estado de Sonora, México, con descripción de nuevas especies y notas sobre algunas localidades de colecta

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ABSTRACT

An annotated checklist of ground beetles in the family Carabidae from the state of Sonora in Mexico is presented with notes including number of specimens examined, municipios, habitat, vegetation, elevation, and collection dates. The checklist includes 388 taxa, of which 270 are described taxa (included are 19 subspecies and 1 hybrid) and 118 are unnamed morphospecies, in 92 genera representing 35 tribes. Dot maps display where specimens were collected. Three new species are described, with corrected keys and images: *Calathus mcclevei*, **new species** (type locality: Mexico, Sonora, Municipality of Yécora, 10 km south of Yécora, ca. 28.278° N 108.926° W); *Calathus tigrinus*, **new species** (type locality: Mexico, Sonora, Municipality of Nacozari de García, Rancho El Tigre, 28.3 km (by air) WNW Bavispe, Sierra El Tigre, 30.58988° N 109.20811° W); and *Amblygnathus balli*, **new species** (type locality: Mexico, Sonora, Municipality of Fronteras, Rancho Capulín, 23.5 km (by air) WSW Fronteras, Sierra Buenos Aires, 30.76167° N 109.82361° W).

Key Words: Biogeography, checklist, Carabidae, habitats, new species, Sonora, vegetation.

RESUMEN

Se presenta una lista comentada de los escarabajos de la familia Carabidae del estado de Sonora, México, incluye número de ejemplares examinados, municipios, hábitat, vegetación, elevación, y fechas de colecta. El listado contiene 388 taxones, de los cuales 270 son taxones descritos (se incluyen 19 subespecies y un híbrido) y 118 son morfoespecies sin nombre, en 92 géneros de 35 tribus. Con mapas de puntos se muestran los lugares de colecta. Se describen tres especies nuevas, con claves corregidas e imágenes: *Calathus mcclevei*, especie nueva (localidad tipo: México, Sonora, Municipio de Yécora, 10 km al sur de Yécora, ca. 28.278° N 108.926° W); *Calathus tigrinus*, especie nueva, (localidad tipo: México, Sonora, Municipio de Nacozari de García, Rancho El Tigre, 28.3 km (por aire) WNW Bavispe, Sierra El Tigre, 30.58988° N 109.20811° W); y *Amblygnathus balli*, especie nueva (localidad tipo: México, Sonora, Municipio de Fronteras, Rancho Capulín, 23.5 km (por aire) WSW Fronteras, Sierra Buenos Aires, 30.76167° N 109.82361° W).

Palabras Clave: Biogeografia, listado, Carabidae, hábitats, especies nuevas, Sonora, vegetación.

This is the first regional checklist of carabid beetles collected in the state of Sonora in Mexico. The authors would like to note that this list of species is not complete, and no attempt was made to assemble all of the carabid specimens collected in Sonora, nor did they personally sample many parts of Sonora, and as such, this checklist is a starting point for someone wishing to do further studies on Sonoran carabids. Approximately one third of the species in our checklist are not named, which reflects the paucity of current literature dealing with the taxonomy of the family Carabidae in Mexico.

BIOGEOGRAPHY AND VEGETATION

Sonora is a large state in northwestern Mexico. It is bound on the west by the Gulf of California and to the east by the Sierra Madre Occidental (SMO). To the north is the border with Arizona and a broad transition into the American Southwest. Although the Tropic of Cancer is at 23.4°N, just north of Mazatlán, Sinaloa, is often considered the northern limits of the New World tropics, the transition into the northern temperate zone is at about 29°N in east-central Sonora, 680 km to the north-northwest. The northernmost tropical deciduous forest (TDF) is in the Sierra San Javier (28.6˚ N; 300 km south of the Arizona border; Martin *et al.* 1998). Thornscrub is the transitional vegetation between TDF and adjacent biotic communities. Coastal thornscrub (CTS) is on the coastal plain of the Gulf of California as far north as Guaymas (28.0˚ N, 110.8˚ W), where it transitions into Sonoran desertscrub. Foothills thornscrub (FTS) is inland on rocky slopes as far north in river valleys to ca. 104 km south of the Arizona border (30.4˚ N; Van Devender *et al.* 2013a). FTS is transitional with Sonoran desertscrub to the west; oak woodland in the foothills of the Sierra Madre Occidental (SMO) to the east and on Sky Island mountain ranges in northeastern Sonora; and desert grassland in the north (Van Devender et al. 2013a).

At higher elevations and latitudes with colder winter temperatures, more temperate vegetation is present. On

the Chihuahua-Sonora border to the east, the SMO reaches its northern limit in Sonora in the Sierra Huachinera (ca. 30.3° N). The vegetation zonation in the Yécora area in the SMO in easternmost Sonora is FTS, TDF, oak woodland, and pine-oak forest (Van Devender and Reina-G. 2016). The wettest, most diverse floristic area in the SMO is from Yécora to Mesa Tres Ríos in the Madrean Tropical Floristic Subdivision in eastern Sonora (González-E. *et al.* 2012).

In the Madrean Archipelago (= the Sky Islands Region) between the SMO and the Mogollon Rim in central Arizona, there are 55 isolated Sky Island mountain ranges or complexes of ranges connected by oak woodland corridors; 32 of them are in Sonora (Deyo *et al.* 2013, Van Devender *et al.* 2013b). Sky Islands crowned with oak woodland or pine-oak forest emerge from lowland "seas" of Sonoran and Chihuahuan desertscrub, desert grassland, FTS or TDF. The Madrean Archipelago is a convergence zone for species from the cold temperate Rocky Mountains and Colorado Plateaus; Mediterranean/Californian chaparral below the Mogollon Rim in Central Arizona; the Great Plains and Chihuahuan Desert from the east; the Sonoran Desert to the west; and the New World tropics to the south.

The Sonoran Desert covers the western half of Sonora (Turner 1994). The Plains of Sonora Subdivision dominated by mixed legumes and organ pipe cactus (*Stenocereus thurberi* (Engelm.) F. Buxb.) is present in much of central Sonora. The Arizona Upland Subdivision in north-central Sonora is dominated by saguaro (*Carnegiea gigantea* (Engelm. (Britton & Rose)) and foothills paloverde (*Parkinsonia microphylla* Torr.). The Central Gulf Coast Subdivision along the Gulf of California in both Sonora and Baja California is dominated by diverse cacti and succulent shrubs. Near the coast there are saltscrub on saline flats and dunescrub on sand dunes. The Lower Colorado River Valley Subdivision in northwestern Sonora is hyperarid with stark desert mountain ranges, a massive inland sand sea, and sandy flats with sparse desertscrub (Turner 1994).

Riparian vegetation is not part of the normal vegetation gradient but dissects the landscape in a linear fashion. Riparian habitats are not restricted to wet rivers or streams but are ecological features of drainages at all elevations. They are more mesic than adjacent vegetation types, harvesting water, nutrients, and seeds from large areas. In southern Sonora, tropical riparian communities line arroyos and rivers with *guásima* (*Guazuma ulmifolia* Lam.) and Mexican bald cypress/*sabino* (*Taxodium distichum* (L.) Rich. var. *mexicanum* (Carrière) Gordon). In northeastern Sonora, the Fremont cottonwood (*Populus fremontii* S. Watson)-willow (*Salix* spp.) riparian deciduous forest typical of Arizona is present. Xeroriparian vegetation mostly dominated by velvet mesquite/*mezquite* (*Prosopis velutina* Wooton) is along arroyos throughout drier parts of Sonora (Van Devender et al. 2010).

HABITATS

Carabids were collected in most of the major habitats in Sonora, including TDF (Figure 1B), and CTS and FTS (Figure 2). Temperate habitats sampled include desert grassland (Figure 3), oak woodland (Figure 4), and pine-oak forest (Figure 5). Carabids were also collected in arid desertscrub in the Central Gulf Coast (Figure 6A), Plains of Sonora (Figure 6B), Arizona Upland (Figure 7A), and the Lower Colorado River Valley (Figure 7B) subdivisions of the Sonoran Desert. Riparian habitats are linear vegetation along rivers, streams, dry arroyos, etc. (Figure 8) that dissect other vegetation types at all elevations along the vegetational gradient. These habitats often support carabids as they harvest moisture and nutrients from drier upland habitats. Highways provide access to the various vegetation types they pass through. The best sampled habitats are places like Álamos surrounded by natural vegetation that are often visited cultural sites (Figure 1A). Oak woodland in the Sonoran Sky Island mountain ranges has been relatively well sampled because of the Madrean Archipelago Biodiversity (MABA) program at Sky Island Alliance and the Madrean Discovery Expeditions (MDE) program at Greater Good Charities. But other areas with limited access such as the Gran Desierto in the Lower Colorado River Valley, coastal thornscrub, halophytic communities, and mangrove stands along the coast of the Gulf of California, desert grassland, and Chihuahuan desertscrub near the Arizona border in northeastern Sonora have only been casually sampled and surely would yield interesting records.

MATERIALS AND METHODS

The following records in the checklist are based on 13,646 carabid specimens, the majority of which are housed in the E. H. Strickland Entomological Museum (7,213 specimens), University of Alberta, Edmonton, Alberta, Canada and the California Academy of Sciences (4,220 specimens), San Francisco, California, United States. The remaining 2,213 carabid specimens seen are housed in the following 12 collections: Canadian National Collection of Insects, Ottawa, Ontario, Canada; American Museum of Natural History, New York, New York, United States; Hasbrouck Insect Collection, Arizona State University, Tempe, Arizona, United States; Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, United States; Essig Museum, University of California Berkeley, Berkeley, California, United States; Milwaukee Public Museum, Milwaukee, Wisconsin, United States; Texas A & M University, College Station, Texas, United States; University of Arkansas Department of Entomology, Fayetteville, Arkansas, United States; University of Arizona Insect Collection, Tucson, Arizona, United States; University of California Riverside Collection, Riverside, California, United States; Universidad Nacional Autónoma de México, Mexico City, Mexico; and Department of Entomology, United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States. Only a few records were

Figure 1. **A**. Álamos, Sonora. Photo by Van Devender. **B**. Tropical deciduous forest. Sierra de Álamos. Photo by James C. Rorabaugh.

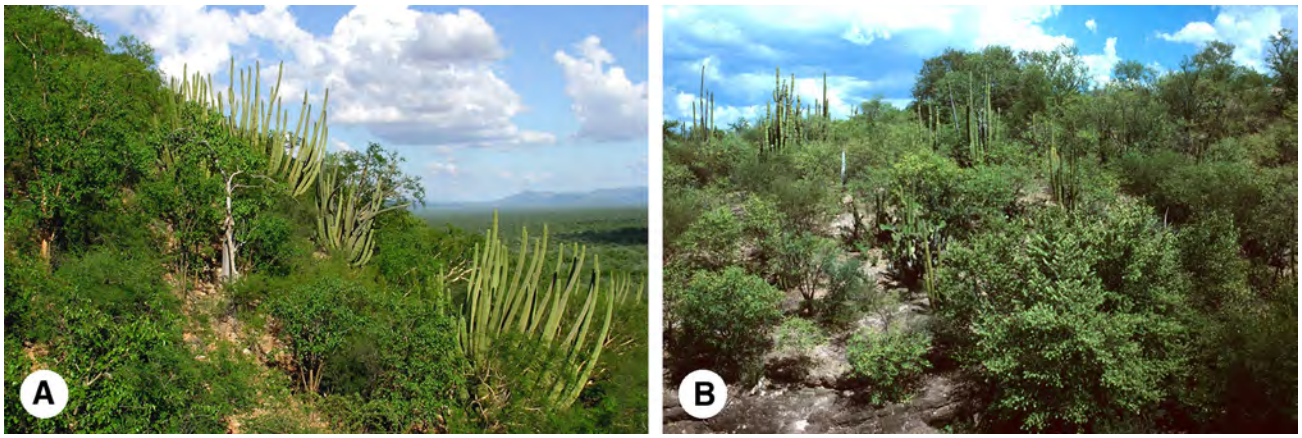

Figure 2. Foothills thornscrub. Visible plants are organpipe cactus/*pitahaya* (*Stenocereus thurberi* (Engelm.) F. Buxb.), tree morning glory/palo santo (*Ipomoea arborescens* (Humb. & Bonp.) G. Don), *papelillo* (*Jatropha cordata* (Ortega) Müll. Arg.), and Durango pricklypear/*nopal* (*Opuntia* cf. *durangensis* Britton &Rose). **A**. Photo by Philip C. Rosen. **B**. Curea. Photo by Van Devender.

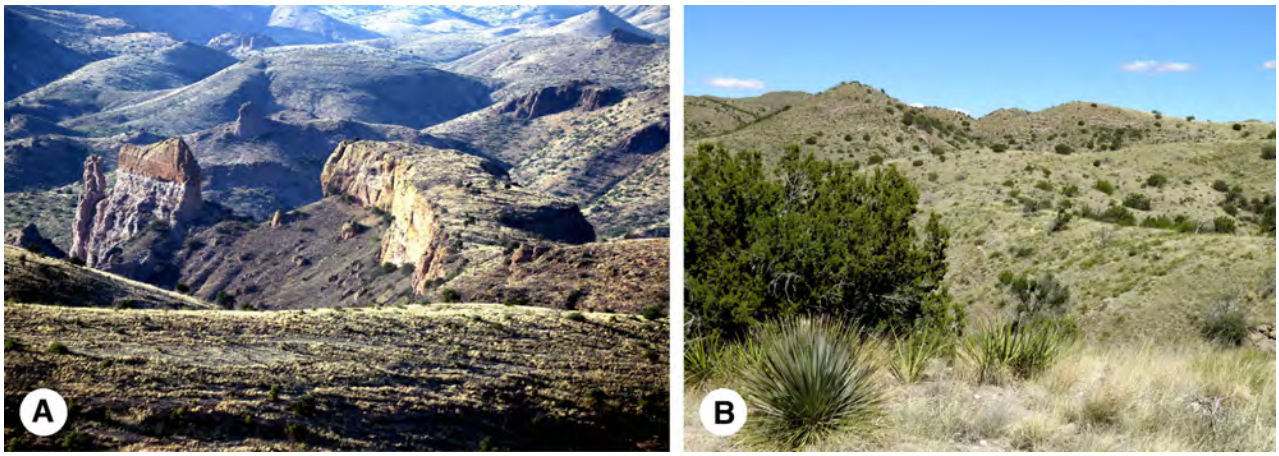

Figure 3. Desert grassland, Sierra San Luis. **A**. Photo by J. Saucedo. **B**. Arizonia juniper (*Juniperus arizonica* (R.P. Adams) R.P. Adams), desert spoon/*sotol* (*Dasylirion wheeleri* S. Watson ex Rothr.), and banana yucca/*dátil* (*Yucca baccata* Torr.) are visible. Photo by Van Devender.

Figure 4. Oak woodland. **A**. Sierra Chivato. Dominants are Arizona oak/*encino blanco* (*Quercus arizonica* Sarg.), Emory oak/*bellota* (*Q. emoryi* Torr.), and alligator bark juniper/*huata* (*Juniperus deppeana* Steud.). Photo by Luis Gutiérrez, NortePhoto.com. **B**. Sierra Los Locos. Mexican blue oak/*encino azul* (*Q. oblongifolia* Torr.) and coralbean/*chilicote* (*Erythrina flabelliformis* Kearney) are visible. Photo by James C. Rorabaugh.

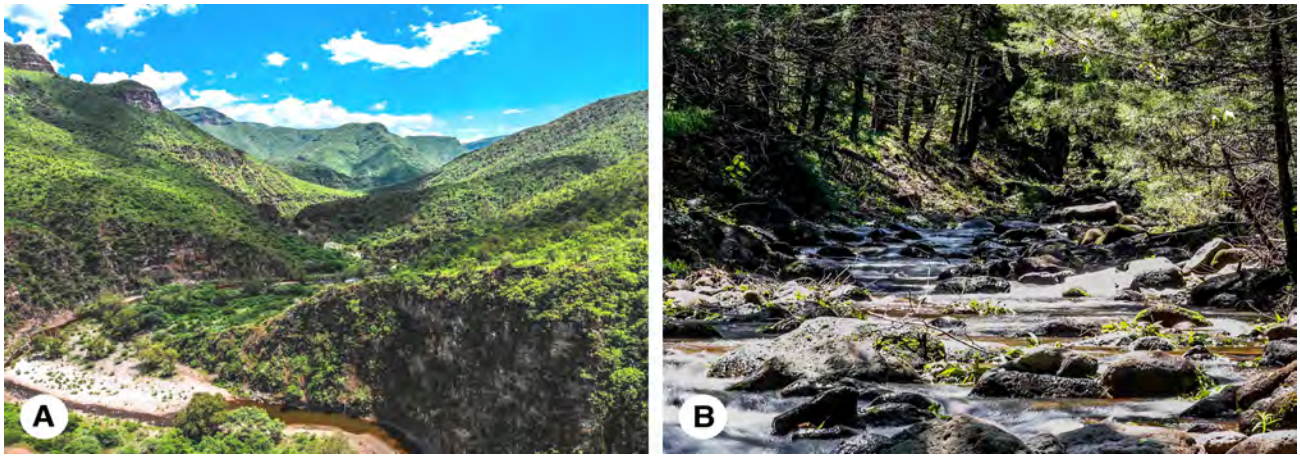

Figure 5. **A**. Pine-oak forest, aerial view. Mesa Tres Ríos, Sierra Madre Occidental. **B**. Arroyo La Cueva. Arizona cypress/*sabino* (*Hesperocyparis arizonica* (Greene) Bartel) is the dominant tree. Photos by Luis Gutiérrez, NortePhoto.com.

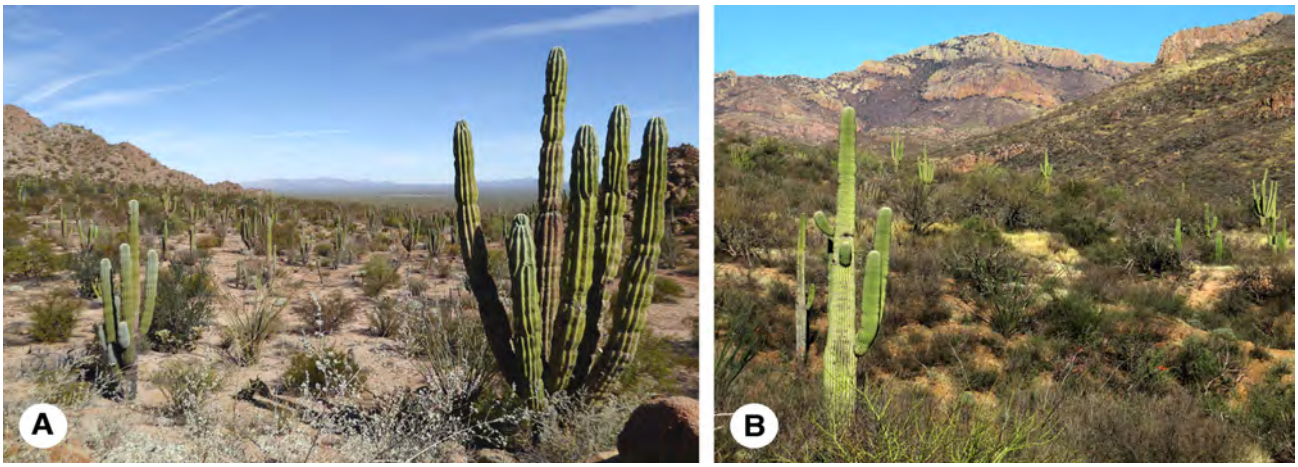

Figure 6. **A**. Central Gulf Coast desertscrub. Near Puerto Libertad. Dominant columnar cactus is *cardón* (*Pachycereus pringlei* (S. Watson) Britton & Rose). Photo by Ana Lilia Reina-G. **B**. Plains of Sonora desertscrub, foothills of Sierra Cucurpe. Dominant plants are saguaro (*Carnegiea gigantea*) and foothill paloverde (*Parkinsonia microphylla* Torr.). Photo by Doug Danforth.

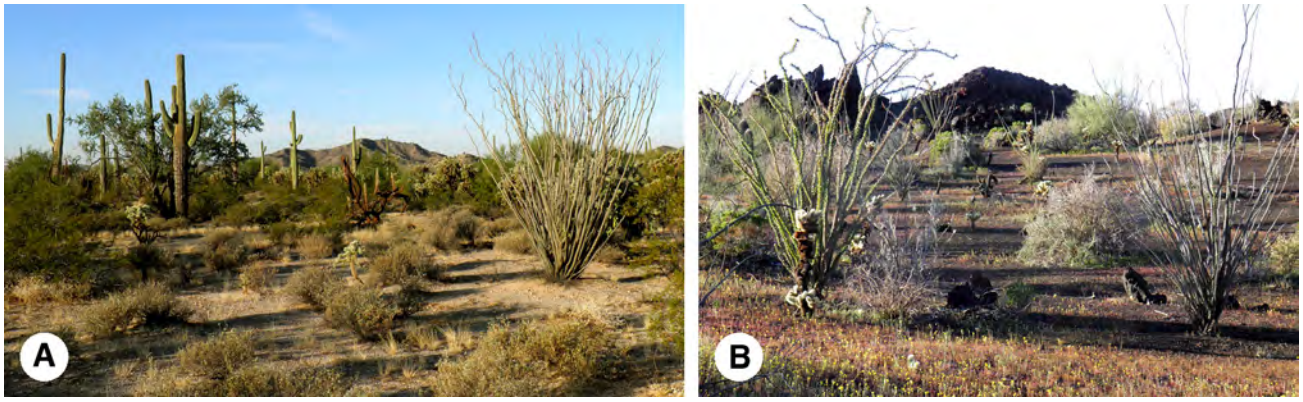

Figure 7. **A**. Arizona Upland desertscrub. Near Sonoyta. Dominant plants are saguaro (*Carnegiea gigantea*), desert ironwood/*palo fierro* (*Olneya tesota* A. Gray), ocotillo (*Fouquieria splendens* Engelm.), chainfruit cholla/*choya* (*Cylindopuntia fulgida* (Engelm.) F.M. Knuth), and triangleleaf bursage/*chicurilla* (*Ambrosia deltoidea* (Torr.) W.W. Payne). **B**. Lower Colorado River desertscrub. Sierra Pinacate. Dominant plants are ocotillo, white bursage/*hierba del burro* (*A. dumosa* (A. Gray) W.W. Payne), and teddybear cholla/*choya* (*C. bigelovii* (Engelm.) F.M. Knuth). Photos by Van Devender

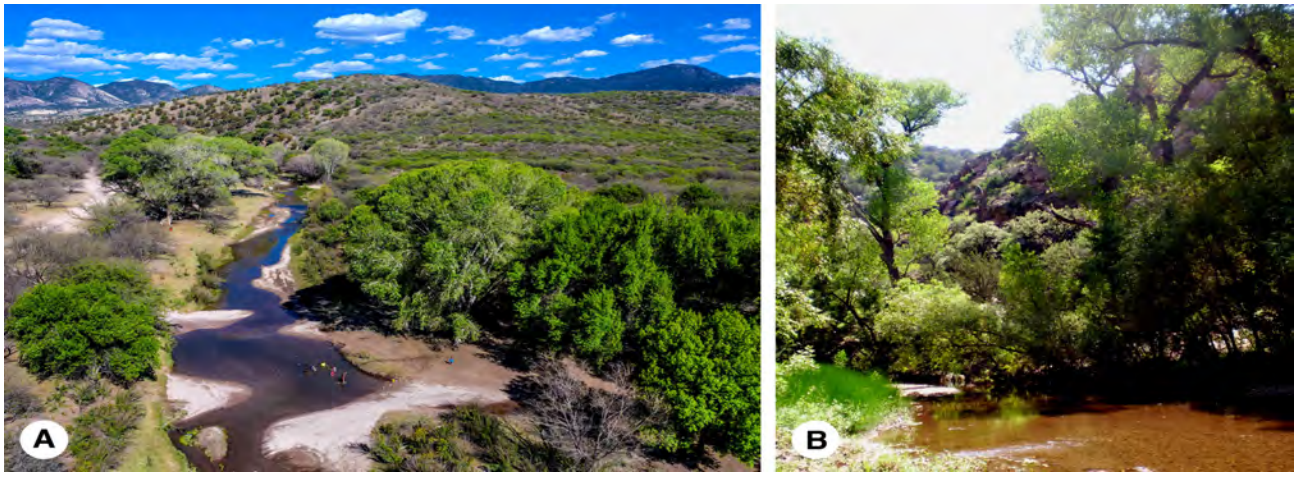

Figure 8. Cottonwood-willow deciduous forests in riparian habitats. Dominants are Fremont cottonwood/álamo (*Populus fremontii* S. Watson) and Goodding's willow (*Salix gooddingii* C.R. Ball). **A**. Santa Cruz River aerial. Photo by Luis Gutiérrez, NortePhoto.com. **B**. Cajón Bonito Rancho Los Ojos Calientes. Photo by Van Devender.

taken from published literature (Cazier 1954; Gidaspow 1959) and are noted in the checklist. Records for most of the Sonoran carabids cited in this study are publicly available in the MDE database (madreandiscovery.org).

The holotype (male) and one paratype (female) of each of *Calathus mcclevei*, **new species**, and *Calathus tigrinus*, **new species**, will be deposited in UNAM. Two paratypes (one male, one female) of each of *Calathus mcclevei*, **new species**, and *Calathus tigrinus*, **new species**, will be deposited in CASC, UAIC, and USNM.

The holotype (male) of *Amblygnathus balli*, **new species**, will be deposited in UNAM; the paratype (male) of *A. balli*, **new species**, will be deposited in PWMC. All of the remaining type material will be housed in the UASM.

CASC Departament of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118, U.S.A.

PWMC Peter W. Messer Collection, Wisconsin, U.S.A.

UAIC University of Arizona Insect Collection, Departament of Entomology, University of Arizona, Tucson, Arizona 85721-0036, U.S.A.

UASM Strickland Museum, Departament of Biological Sciences, University of Alberta, Edmonton, Alberta T6G 2E9 Canada

UNAM Universidad Nacional Autónoma de México, Apartado Postal 70133, 04510, México City, Department Federal, Mexico

USNM United States National Museum of Natural History, Department of Entomology, Smithsonian Institution, Washington, D.C. 20560. U.S.A.

This paragraph applies only to the three new species that are described in this paper – *Calathus mcclevei*, **new species**, *Calathus tigrinus*, **new species**, and *Amblygnathus balli*, **new species**. Total length (**TL**) in the descriptions

is the sum of the following three measurements: length of head (**HL**), measured on the left side from base of mandible to posterior margin of compound eye; length of pronotum (**PL**) along the midline; and length of longer elytron (**EL**) from transverse basal line to apex. For the following measurements taken of male genitalia, see Figure 10: length of apical portion (**LAP**) and width of apical disc (**WD**). All of the above measurements are named the same as those used by Ball and Nègre (1972). The only other measurement used in the descriptions is length of male median lobe (**LML**), see Figure 10.

CARABID BEETLE COLLECTING IN SONORA, MEXICO

Some of the carabids collected in Sonora would have been picked up by entomologists and other researchers who stopped for fuel at service stations while driving through the state. Many carabid species have membranous flight wings and are attracted to the bright lights at the service stations at night. Some appear to be living in cracks around the pumps and buildings. However, most carabids are collected in the field, where different habitats are sampled using different techniques – rolling stones and logs, sifting leaf litter, pitfall traps, rotten meat traps, other types of bait traps, beating vegetation, splashing water on pond or stream margins, black lights, mercury vapor lights, and head-lamping at night to name a few. Unfortunately, many of the specimen locality labels do not include how the specimen was collected.

In 1935, Howard S. Gentry collected many carabids in the Rio Mayo region near San Bernardo while collecting plants and fossils. His book *Rio Mayo Plants* (Gentry, 1942) was published in 1942. In 1953, Borys Malkin collected carabids while in the areas of Hermosillo and Desemboque west-central Sonora and to a lesser extent near Navojoa in southern Sonora. In 1960 and 1963, Paul H. Arnaud, Jr., Edward S. Ross, and David C. Rentz (California Academy of Sciences) collected carabids in the areas of Álamos and Navojoa in southern Sonora, and in the areas of San Carlos Bay and north of Hermosillo in the Sonoran Desert. In 1963 and 1964, Gary R. Noonan collected carabids in the areas of Álamos and Navojoa. Mont A. Cazier, Ronald L. Huber, David L. Pearson, and Norman L. Rumpp collected many tiger beetles in coastal and montane Sonora. Scott McCleve made numerous trips into Sonora from 1980 to 1993 to collect scarabs in the genus *Diplotaxis*, and generously picked

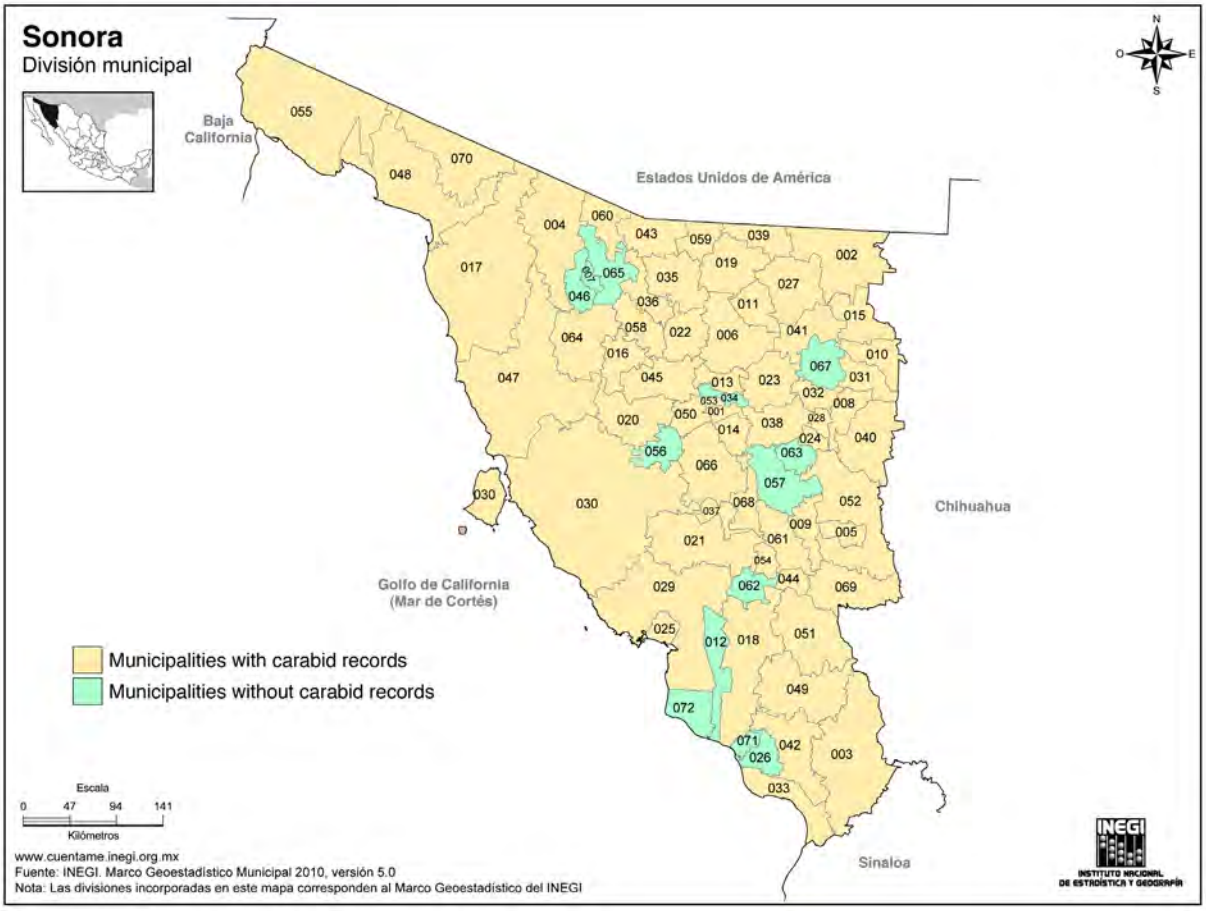

Figure 9. Outline map of the state of Sonora, illustrating the political boundaries of municipalities and those within which carabids have been recorded.
Source of map: http://www.cuentame.inegi.org.mx/mapas/pdf/entidades/div_municipal/sonorampios.pdf

up carabids and other families of beetles at the same time. Some of Scott's field companions were Annie McCleve (Scott's wife), Peter Jump, Steven J. Prchal, George E. Ball, Kathleen E. Ball, and David R. Maddison.

Six collecting trips, originating from the University of Alberta in Edmonton, Alberta, Canada, passed though Sonora. In 1965, George E. Ball and Donald R. Whitehead collected specimens along MEX 15, near Nogales, Cíbuta, La Atascosa, El Oasis, and Vícam before continuing south into the state of Sinaloa. In 1967, George Ball, Terry L. Erwin, and Robin E. Leech collected specimens along MEX 15, near La Atascosa, Santa Ana, and Hermosillo before continuing to Sinaloa. In 1982, Ball, Kathleen E. Ball, Maddison, and McCleve collected in the Sierra San Luis (Varela Ranch [= Rancho el Valle]) and Huachinera (Rancho el Madroño). They also made collections near San Nicolás (SW of Colonia el Tajo), Nácori Chico, and in the vicinity of Moctezuma, as well as along MEX 15 near Ímuris and Santa Ana. In 1983, Henry E. Frania, Rein J. Jaagumagi, and Danny Shpeley travelled south and east through Sonora making collections near Nacozari de García, Huásabas, Río El Riíto, Rancho los Pinos, Mesa Trés Ríos, and Rio Bavispe before continuing eastward to Chuhuichupa in the state of Chihuahua. Then in 1986, George E. Ball, Frania, and Dean Mulyk travelled south along MEX 15, and collected near Peón (SE of Empalme), then continued to Sinaloa. Later that same year, they drove north from Sinaloa through Sonora, and made collections along MEX 15 near Hermosiin Nogales, on the Rio Magdalena, and near Hermosillo. Lastly, in 1993, George Ball, Kathleen Ball, and McCleve collected near Moctezuma, Santa Rosa and Yécora before driving east to Chihuahua. On the same trip, they also collected at El Llano (south of Santa Ana) and near Hermosillo on MEX 15 and near Álamos before driving south into Sinaloa.

In the last decade, there has been a concerted effort to document the biodiversity of the Sky Island mountain ranges in northeastern Sonora. From 2009 to 2019, there were major biotic inventories in 17 Sky Islands as part of the MABA and MDE programs. Smaller groups went to six additional Sky Islands plus numerous other areas throughout the state.

Interestingly, carabid specimens are recorded from 59 of the 72 municipalities in Sonora (Figure 9). The lack of carabid specimen records from the remaining 13 municipalities (Átil, Bácum, Benito Juárez, Etchojoa, Huepac, Oquitoa, San Ignacio Río Muerto, San Miguel de Horcasitas, San Pedro de la Cueva, Suaqui Grande, Tepache, Tubutama, and Villa Hidalgo) is an artifact of collecting rather than an absence of carabids in those municipalities. No attempts were made to visit each municipality in the state of Sonora to collect carabids.

DISCUSSION

There have been several publications of generic revisions or descriptions of new species of carabids known to occur in Mexico, and those papers usually include Sonora records (a few examples: Ball & Shpeley 2002; Cazier 1954; Erwin 1970: Noonan 1973; Shpeley 1986; Shpeley & Ball 1993; Whitehead 1972). A very recent paper by Messer & Raber (2021) treated the genus *Selenophorus* north of Mexico, but also included many specimen records from Sonora and other states in Mexico. This is the first checklist of the carabids of Sonora, primarily based on specimens which were examined by the authors. Ball and Shpeley (2000) stated that the known carabid fauna of Mexico included 172 genera and 1,957 described species. The number of described species of carabids in Mexico today is probably more than 2,000. In this checklist, we recognized 92 genera and 388 taxa, of which 269 are described taxa and 119 are undescribed morphospecies. Bousquet (2012, Table 5) records 502 carabid species (in 107 genera) in Arizona and 646 carabid species (in 104 genera) in California. Based on the best information available, we estimate that the number of described carabid species in Sonora is approximately 500, similar to that of Arizona, even though the number of Arizona genera is significantly higher. The total number of described carabid species is not available for Baja California or Sinaloa, but based on the best information available, we estimate that the number in Baja California would be less than that of Sonora, and the number in Sinaloa would be similar to that of Sonora.

Some of the taxa are represented by large numbers of specimens. Of the 388 taxa included in this study, two taxa are represented by over 500 specimens, and 38 taxa are represented by over 100 specimens. Most of the taxa are represented by fewer specimens. There are 179 taxa represented by 6 to 100 specimens, and 169 taxa are represented by 5 or fewer specimens. Which begs the question – are some of these species very common and some rare? Within the genus *Brachinus*, *B. elongatulus* is represented by 949 specimens, whereas the next most collected taxon in *Brachinus* is *B. costipennis* represented by 63 specimens. Many of the specimens collected are the results of single day events. Some of the single specimens for a taxon are the result of multiple day events in the same general area. Different methods of collecting can result in very different taxa collected. For example, many carabids are attracted to mercury vapor lights, but some carabids appear to only be attracted to blacklights.

As mentioned in the introduction, we do not claim this list to be the definitive number of species of carabids that may inhabit Sonora. This paper should be considered to be a starting point for a researcher interested in documenting and studying the carabid species in Sonora. Unfortunately, the lack of available revisions of many of the genera is the major stumbling block in applying published scientific names to many of the taxa collected.

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The authors thank the Sky Island Alliance (Madrean Archipelago Biodiversity Assessment, MABA) and Great-

er Good Charities (Madrean Discovery Expeditions, MDE) for providing the infrastructure to collect natural history specimens in the state of Sonora. We also thank the staff of the Bavispe Area for the Protection of Flora and Fauna, especially J. Mario Cirett-Galán, that accompanied the researchers on the collecting trips, not only setting up the camps but also as guides and preparing meals. We thank Drs. Nico Franz and Sangmi Lee for participating on several expeditions and curating MDE specimens in the Arizona State University Hasbrouck Insect Collection. We also thank Drs. Harry Brailovsky-Alperovitz and Alejandro Zaldívar-Riverón, Colección Nacional de Insectos, Universidad Nacional Autónoma de México for support under their SEMARNAT collecting permits

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The second author thanks the many biologists from Mexico and the United States who went on the MDE and MABA Expeditions. Ed Gilbert created the MDE (madreadiscovery.org) and MABA databases in the SEINet network where the Sonoran carabid records are publicly available. Ana Lilia Reina-Guerrero was a stalwart companion on all expeditions and other Sonoran travels. John D. Palting, moth specialist extraordinaire, facilitated most collecting efforts, especially with his ultraviolet lights at each camp. The unflagging support of Elizabeth Baker, Noah Horton, Brooke Nowak, and Steve Minter at Greater Good Charities for the MDE biodiversity programs in the Sky Island mountains of Sonora is greatly appreciated.

ANNOTATED CHECKLIST OF SONORA CARABIDS

This checklist follows the names and arrangement of tribes as published by Bousquet (2012). The one exception is the tribe name Manticorini, used by Wiesner (2020), whereas Bousquet (2012) used the tribe name Amblycheilini. In this checklist, the tiger beetles are included as members of the family Carabidae (Bousquet, 2012). The scientific names of tiger beetles have been updated to the list published by Wiesner (2020). Genera, species and subspecies are arranged alphabetically for ease of location in the manuscript.

All of the headings in the following checklist are self-explanatory, and are based on specimens seen and their associated label data. Tribes, in bold font, are numbered from 01 to 35. Taxa are numbered from 001 to 388, in normal font (not bold). Some of the taxa scientific names include the collection acronym in which they are housed (i.e., CASC, UASM and USNM). Non-label vegetation data has also been added to the **Vegetation** heading when this information was known by the authors. Elevation for a few well-known localities has been added when not present on the specimen locality labels. Note that "at light", "at uv light", and "at Hg vapor light" are included under the **Habitat** heading as [at light].

Class Insecta
Order Coleoptera
Family Carabidae
01. Notiophilini

001. ***Notiophilus chihuahuae*** Casey, 1913
Number examined: 6.
Municipalities: Huachinera, Nacozari de García.
Habitat: north-south rocky ridge top
Vegetation: meadow, pine-oak forest.
Elevation range: 2090 – 2337 m.
Collection dates: **1982**.VIII.04; **2015**.VIII.10.

002. ***Notiophilus semiopacus*** Eschscholtz, 1833
Number examined: 2.
Municipality: Huachinera.
Habitat: ?
Vegetation: meadow, pine-oak forest.
Elevation: 2090 m.
Collection date: **1982**.VIII.04.

02. Cychrini

003. ***Scaphinotus mexicanus*** Bates, 1882
Number examined: 5.
Municipalities: Huachinera, Nácori Chico.
Habitat: ?
Vegetation: meadow, pine-oak forest.
Elevation range: 1950 – 2330 m.
Collection dates: **1982**: VIII.04, VIII.06-VIII.08.

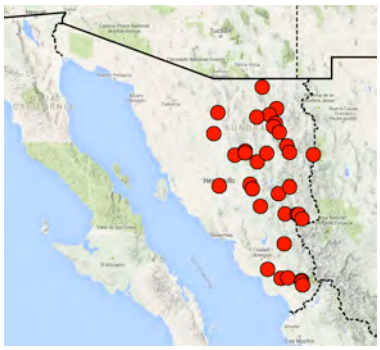
03. Carabini

004. ***Carabus forreri*** Bates, 1882
Number examined: 6.
Municipalities: Nácori Chico, Nacozari de García.
Habitat: rocky stream canyon
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest on slope
Elevation range: 1715 – 2278 m.
Collection dates: **1982**: VIII.06-VIII.07; **2015**.VIII.11; **2018**.VI.27.

005. ***Calosoma angulatum*** Chevrolat, 1834
Number examined: 186.
Municipalities: Aconchi, Álamos, Bacanora, Bacoachi, Benjamín Hill, Cajeme, Fronteras, Granados, Hermosillo, Huásabas, La Colorada, Magdalena de Kino, Mazatán, Moctezuma, Naco, Nácori Chico, Nacozari de García, Rosario, Rayón, Sahuaripa, San Felipe de Jesús, Yécora.
Habitat: gentle granitic slope; rocky mountainside; rocky stream canyon; stream margin; motel; urban sidewalks; at light.
Vegetation: Chihuahuan desertscrub; desert grassland; cypress-maple-alder-sycamore riparian forest; foothills thornscrub; oak woodland; pine-oak forest; riparian tropical scrub; Sonoran desertscrub; tropical decidous forest.
Elevation range: 396 – 1687 m.
Collection dates: 1940.VII.29; 1953: VII.09-VII.16; 1957: VII.28-VII.29; 1958.VIII.01; 1963.II.20; 1965.VII; 1969: VII.16-VII.17; 1971.VIII.16; 1979.VIII.23; 1980: IX.17-IX.18; 1982: VIII.01, VIII.11; 1984.VIII.24; 1987: VII.26-VII.31; 1993: VII.09, VII.14;

2012: VII.12, VIII.01, VIII.03, VIII.04, VIII.06; IX.02, IX.05; 2013.VII.16; 2014: 07.28, VIII.02, VIII.29; 2015: VII.12, VIII.08; 2017: VII.22-VII.23, VIII.13-VIII.16, IX.02; 2018: VIII.05-VIII.07, VIII.09, VIII.11; 2019: VII.22, VII.24, VIII.05-VIII.06, IX.26.

Note: Seven specimens were dug out of rocky soil about 25 cm below the surface on a steep rocky mountainside in oak woodland.



006. ***Calosoma parvicolle*** Fall, 1910

Number examined: 26.

Municipalities: Hermosillo, General Plutarco Elías Calles, Guaymas, Pitiquito, Puerto Peñasco, San Luis Río Colorado.

Habitat*:* disturbed area; sandy flats and sand dunes.

Vegetation: coastal Sonoran desertscrub; coastal Sonoran dunescrub.

Elevation range: 2 – 42 m.

Collection dates: 1958.IV.02; 1966.IV.24; 1973.V; 2017: II.27, III.17-III.18; 2019.III.05.

Note: Gidaspow (1959) recorded this species from La Choya (municipality of Puerto Peñasco, mapped) and Puerto Libertad (municipality of Pitiquito, mapped) on the west coast.

007. ***Calosoma peregrinator*** Guérin-Méneville, 1844

Number examined: 86.

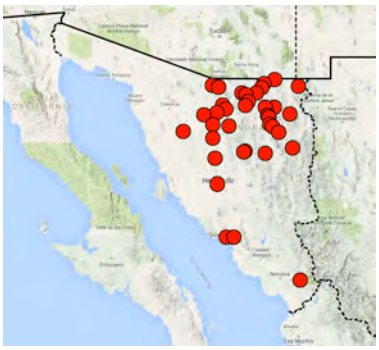
Municipalities: Álamos, Aconchi, Agua Prieta, Bacadéhuachi, Benjamín Hill, Cananea, Carbó, Cucurpe, Empalme, Fronteras, Hermosillo, Ímuris, Magdalena de Kino, Moctezuma, Naco, Nacozari de García, Nogales, Opodepe, San Felipe de Jesús, Santa Ana, Trincheras.

Habitat: rocky slopes, ridge, canyon, arroyo; PEMEX station; urban. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; desert grassland; foothills thornscrub; pine-oak forest; riparian tropical scrub; sycamore riparian deciduous forest oak woodland; tropical deciduous forest.

Elevation range: 7 – 2467 m.

Collection dates: 1950.VIII.06; 1953: VII.09-VII.16; 1960. VIII.08; 1963: II.20, VII.06, VIII.06; 1980: VII.21-22, IX.18-IX.19; 1982: VIII.01, VIII.09, VIII.23; 1986. VIII.05; 1990.IX.03; 1993.VII.14; 2012: VII.30, VII.21, VIII.01, IX.02, IX.04, IX.05, IX.11, IX.12; 2013: VII.17, VIII.02, VIII.04, VIII.23, IX.08 – IX.11; 2014: VIII.25, VIII.28, IX.14, IX.16; 2015: VII.12, VIII.08, VIII.10, VIII.13, IX.06; 2016: VIII.13-VIII.15, VIII.24; 2017: VII.16, VII.23-VII.24, VIII.14-VIII.16, IX.02-IX.03; 2019.VIII.05.



008. ***Calosoma prominens*** LeConte, 1853

Number examined: 142.

Municipalities: Álamos, Agua Prieta, Benjamín Hill, Cananea, Carbó, Empalme, Fronteras, Granados, Guaymas, Hermosillo, Magdalena de Kino, Mazatán, Nogales, Opodepe, Santa Ana.

Habitat: gentle granitic slopes; PEMEX station at night; urban. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; coastal thornscrub; desert grassland; foothills thornscrub; oak woodland; tropical deciduous forest.

Elevation range: 7 – 1587 m.

Collection dates: 1953: VII.07-VII.16, VIII.15-VIII.20, VIII.27, IX.28; 1954.VIII.24; 1955.VIII.21; 1957. VIII.16; 1959.VIII.12; 1960.VIII.08; 1961.VIII.7; 1963: II.20, VII.06; 1965.VII.31; 1967.VII.27; 1982. VIII.23; 1970.VIII.20; 1971.VIII.20; 1986.VIII.05; 2012: VIII.08, IX.05, IX.10, IX.11; 2013: III.18, VIII.09, VIII.10, VIII.23; 2014.VII.28; 2016.VIII.24; 2017: VII.21-VII.23, IX.17; 2018.VIII.11.

009. ***Calosoma protractum*** LeConte, 1862
Number examined: 2.
Municipality: Huachinera.
Habitat: ?
Vegetation: desert grassland.
Elevation: 1150 m.
Collection date: **1982**.VIII.05.

010. ***Calosoma sayi*** Dejean, 1826
Number examined: 5.
Municipalities: Álamos, Empalme.
Habitat: Urban.
Vegetation: coastal thornscrub; tropical deciduous forest;
Elevation range: 7 – 400 m.
Collection dates: **1986**.VIII.05; **2012**: IX.11, IX.12.

011. ***Calosoma scrutator*** (Fabricius, 1775)
Number examined: 49.
Municipalities: Aconchi, Álamos, Cananea, Fronteras, Magdalena de Kino, Mazatán, Moctezuma, Nácori Chico, Nacozari de García, Nogales, San Felipe de Jesús, Santa Cruz, Sáric, Yécora.
Habitat: gentle granitic slopes; rocky arroyo, canyon, hillside and mountainside; urban. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; riparian tropical scrub; Sonoran desert-crub; tropical deciduous forest.
Elevation range: 780 – 2422 m.
Collection dates: 1929.VIII.22; 1940.VIII.30; 1982: VIII.01, VIII.11; 1990: VI.30-VII.03; 2012: IX.02, IX.03; 2013: III.20, VIII.02, VIII.09, IX.08, IX.09; 2014: VIII.25, IX.14, IX.16; 2016.VII.14; 2017: VIII.14-VIII.15, IX.17; 2018: VIII.07-VIII.08; 2019: IV.24-IV.25, VIII.05.

012. ***Calosoma sponsum*** Casey, 1897
Number examined: 1.
Municipality: Hermosillo.
Habitat: Urban.
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1958**.IV.04.

04. Amblycheilini

013. ***Amblycheila baroni*** Rivers, 1890
Number examined: 8.
Municipalities: Agua Prieta, Arizpe, Bacoachi, Cananea, Nacozari de García.
Habitat: rocky ridge; rocky slope; rocky stream canyon.
Vegetation: Chihuahuan desertscrub; desert grassland; oak woodland; riparian forest.
Elevation range: 750 – 2467 m.

Collection dates: **1998**.VIII.05; **2009**.IX.07; **2013**: VII.17, VIII.02, IX.09.

05. Megacephalini

014. ***Tetracha carolina*** Linnaeus, 1767

Number examined: 109.

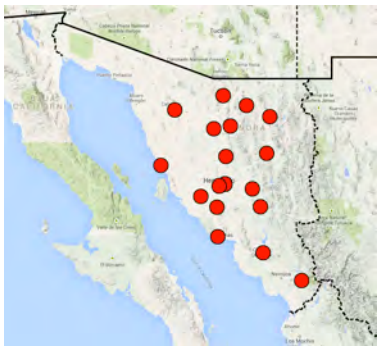
Municipalities: Álamos, Cajeme, Guaymas, Hermosillo, Ímuris, Mazatán, Moctezuma, Nacozari de García, Navojoa, Pitiquito, Santa Ana.

Habitat: urban. [at light]

Vegetation: coastal and foothills thornscrub; riparian tropical scrub; Sonoran desertscrub; tropical deciduous forest.

Elevation range: 255 – 707 m.

Collection dates: **1940**.VII.29; **1950**.VII.15; 1953: VII.09-VII.16, VIII.01-VIII.15, VIII.20-VIII.31, IX.01-IX.10; **1960**: VII.27, VIII.10; **1963**.VII.14; **1965**.VII.31; **1967**: VI.12, VII.27; **1985**.VII.31; **2013**.IX.09; **2017**: VII.21, VII.23, IX.08.



06. Cicindelini

015. ***Brasiella wickhami*** (W. Horn, 1903)

Number examined: 303.

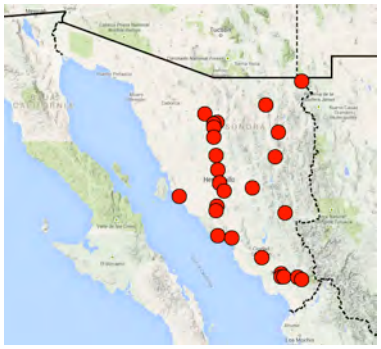
Municipalities: Agua Prieta, Álamos, Cajeme, Carbó, Empalme, Fronteras, Guaymas, Hermosillo, Mazatán, Moctezuma, Nacozari de García, Navojoa, Ónavas, Opodepe, Santa Ana.

Habitat: cow pasture; rocky arroyo. Urban [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; coastal and foothills thornscrub; oak woodland; tropical deciduous forest.

Elevation range: 3 – 1429 m.

Collection dates: **1950**.VIII.10; **1952**.VIII.02; **1953**: VII.09-VII.16, VIII.15-VIII.20; **1954**.VIII.24; **1959**.VIII.29; **1960**: VI.27, VII.15, VII.27, VIII.08-VIII.10, VIII.12; **1963**.VIII.06; **1965**.VII.31; **1967**.VI.27; **1979**: VII.07-VII.08; 1980.IX.16; **1982**: VIII.19-VIII.20, VIII.23; **1986**.VIII.29; **1987**: VII.26-VII.27, VII.30-VII.31; **2016**.VII.02; **2017**: VII.22-VII.23, VIII.14; **2018**.VIII.09; **2019**: VII.24, VII.26.



016. ***Brasiella viridisticta*** *arizonensis* (Bates, 1884)

Number examined: 26.

Municipalities: Álamos, Cananea, Fronteras, Moctezuma, Nácori Chico, Ímuris, Santa Ana, Yécora.

Habitat: cow pasture; marsh; river. [at light]

Vegetation: desert grassland; foothills thornscrub; oak woodland; pine-oak forest; Sonoran desertscrub; tropical deciduous forest

Elevation range: 518 – 1950 m

Collection dates: **1967**.VII.27; **1984**.VIII.26; **1985**: VIII.01, VIII.02; **2016**.VII.02; **2017**.VII.16.

017. *Cicindelidia aeneicollis* (Bates, 1881)

Number examined: 2.

Municipalities: Álamos, Yécora.

Habitat: ?

Vegetation: Pine-oak forest; tropical deciduous forest.

Elevation range: 400 – 1547 m.

Collection dates: **1958**: VII.15-VII.20; **1990**: VI.30-VII.1.

018. ***Cicindelidia beneshi*** (Varas-Arangua, 1930)
Number examined: 353.
Municipality: Puerto Peñasco.
Habitat: mud flats; salt marsh flats; sandy beach.
Vegetation: coastal saltscrub.
Elevation: ?
Collection dates: **1952**.VI.12; **1954**.V.30; **1966**: VII.17, VII.29-VII.30; **1971**.VII.27; 1972.V.16; **1987**: V.15, V.31, VI.01; **1991**: VII.15, VII.16; **1995**: V.28, VI.05.

019. ***Cicindelidia carthagena carthagena*** (Dejean, 1831)
Number examined: 24.
Municipalities: Empalme, Guaymas.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation: ?
Collection dates: **1952**.VII.25; **1954**.VII.10; **1966**: VI.01-VI.02, VII.21.

020. ***Cicindelidia carthagena colossea*** (W. Horn, 1926)
Number examined: 17.
Municipality: Pitiquito.
Habitat: ?
Vegetation: Sonoran desertscrub
Elevation: ?
Collection dates: **1953**.VIII.11; **1975**.VII.10.

021. ***Cicindelidia carthagena carthagena X carthagena colossea***
Number examined: 8.
Municipality: Hermosillo
Habitat: tidal flat.
Vegetation: coastal saltscrub.
Elevation: ?
Collection dates: **1958**.X.24; **1966**.VII.19.

022. ***Cicindelidia fera*** (Chevrolat, 1834)
Number examined: 23.
Municipalities: Álamos, Altar, Hermosillo, Pitiquito.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1897**.IV.19; **1934**.XII.01; **1952**.VII.04; **1953**: V.27, VII.09-VII.16

023. ***Cicindelidia haemorrhagica haemorrhagica*** (LeConte, 1851)
Number examined: 4.
Municipality: San Luis Río Colorado.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1949**: VI.04-VI.05.

024. ***Cicindelidia juvenilis*** (W. Horn, 1897)
Number examined: 2.
Municipality: Huatabampo.
Habitat: ?
Vegetation: coastal thornscrub.
Elevation: 46 m.
Collection date: **1967**.VII.28.

025. ***Cicindelidia latesignata parkeri*** (Cazier, 1848)
Number examined: 49.
Municipalities: Caborca, Puerto Peñasco.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1941**.IV.20; **1949**.III.27; **1952**.VI.12; **1960**.IV.07; **1966**: V.29-V.30; **1990**.IV.07.

026. ***Cicindelidia melissa*** Duran & Roman, 2014
Number examined: 10.
Municipality: Nácori Chico.
Habitat: steep mountainside, along roadside; stream margin.
Vegetation: pine-oak forest.
Elevation range: 1893 – 2080 m.
Collection dates: **1983**.VII.04; **2018**.VIII.07

027. ***Cicindelidia obsoleta santaclarae*** (Bates, 1890)
Number examined: 3.
Municipality: Fronteras.
Habitat: cow pasture.
Vegetation: oak woodland.
Elevation: 1429 m.
Collection date: **2016**.VII.02.

028. ***Cicindelidia ocellata*** (Klug, 1834)

Number examined: 99.

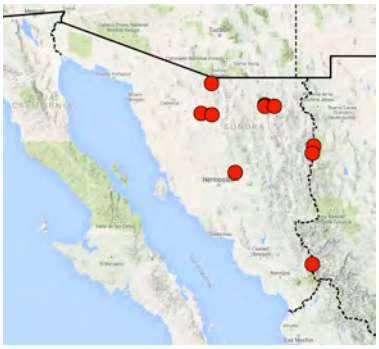
Municipalities: Álamos, Fronteras, Nácori Chico, Nogales, Santa Ana, Ures.

Habitat: cow pasture; rocky mountainside; rocky stream canyon. [at light]

Vegetation: cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest.

Elevation range: 1429 – 1715 m.

Collection dates: **1966**.VII.18; **1983**.VII.04; **1985**.VIII.01; **2016**: VII.02, VIII.15; **2018**.VI.27.



029. ***Cicindelidia sedecimpunctata*** (Klug, 1834)

Number examined: 171.

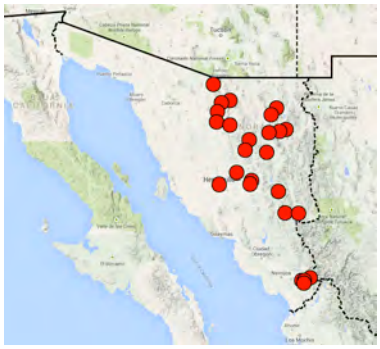
Municipalities: Aconchi, Álamos, Bacanora, Banámichi, Cucurpe, Cumpas, Fronteras, Ímuris, Magdalena de Kino, Moctezuma, Nacozari de García, Nogales, Ónavas, Santa Ana, Ures, Yécora.

Habitat: rocky mountainside. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; foothills thornscrub; oak woodland; pine-oak forest; riparian tropical scrub; tropical deciduous forest.

Elevation range: 244 – 1687 m.

Collection dates: **1940**: VII.28, VII.30, VIII.01; **1952**: VII.02, VII.19; **1953**: VII.09-VII.16, IX.14; **1958**. VII.08; **1960**.VIII.12; **1963**: VII.13, VII.15; **1966**: VII.18, VII.22; **1982**.VIII.01; **1987**: VII.26-VII.31; **2017**: VII.23, VIII.14, VIII.16; **2019**: VI.03, VII.24.



030. ***Cicindelidia sommeri*** (Mannerheim, 1837)

Number examined: 208.

Municipalities: Álamos, Altar, Hermosillo, Ímuris, Moctezuma, Nacozari de García, Pitiquito, Ures.

Habitat: sandy river bottom.

Vegetation: Sonoran desertscrub; foothills thornscrub; oak woodland; tropical deciduous forest.

Elevation range: 244 - 1000 m.

Collection dates: **1897**.IV.19; **1934**.XII.01; **1952**.VII.04; **1953**: IX.14-IX.15; **1955**.XI.12; **1963**: VII.13, VII.15; **1966**: VII.18, VII.22; **1993**.VII.04.

031. ***Cicindelidia tenuisignata*** (LeConte, 1851)

Number examined: 5.

Municipality: Cajeme.

Habitat: ?

Vegetation: coastal thornscrub.

Elevation: ?

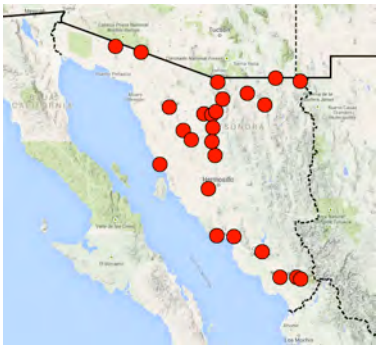
Collection dates: **1952**.VII.29; **1953**.IX.15.

032. ***Cicindelidia thalestris*** (Bates, 1890)
Number examined: 1.
Municipality: Aconchi.
Habitat: ?
Vegetation: pine-oak forest.
Elevation: 1860 m.
Collection date: **2012**.VII.07.

033. ***Cicindelidia trifasciata ascendens*** (LeConte, 1851)
Number examined: 35.
Municipalities: Empalme, Guaymas, Hermosillo.
Habitat: tidal flat.
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation: ?
Collection dates: **1966**: VI.02, VII.19, VII.21; **1973**.V.

034. ***Cicindelidia sp. near thalestris*** (Bates, 1890)
Number examined: 2.
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation: 1577 m.
Collection dates: **1989**: VII.11-VII.13.

035. ***Cylindera lemniscata lemniscata*** (LeConte, 1854)
Number examined: 233.
Municipalities: Agua Prieta, Álamos, Caborca, Cajeme, Cananea, Carbó, Empalme, Fronteras, General Plutarco Elías Calles, Guaymas, Hermosillo, Ímuris, Magdalena de Kino, Navojoa, Nogales, Opodepe, Pitiquito, Puerto Peñasco, Santa Ana, Trincheras.
Habitat: cow pasture; river bottom; urban. [at light]
Vegetation: desert grassland; oak woodland; Sonoran desertscrub.
Elevation range: 3 – 1521 m.
Collection dates: **1940**.VII.22; **1950**: VII.14-VII.15, VIII.06, VIII.10; **1953**: VII.09-VII.31, VIII.27, IX.01-IX.10, IX.26; **1954**.VIII.24; **1958**: VII.11, VII.16; **1960**: VII.21, VII.27-VII.28, VIII.07-VIII.08, VIII.10, VIII.12; **1965**: VII.30, VII.31; **1966**.VII.17; **1979**: VII.07-VII.08, VIII.20; **1982**: VIII.19-VIII.20, VIII.23; **1985**: VIII.02, VIII.05; **2015**: VII.12, VIII.08, IX.06; **2016**.VII.02; **2017**: VII.21, VII.23; **2018**.VIII.13.



036. ***Ellisoptera nevadica nevadica*** (LeConte, 1875)
Number examined: 7.
Municipality: Puerto Peñasco.
Habitat: open sand flats. [at light]
Vegetation: creosotebush.
Elevation:
Collection date: **2019**.V.04.
Note: Cazier (1954) recorded only 2 specimens of this species from La Choya (municipality of Puerto Peñasco, mapped) on the west coast.

037. ***Ellisoptera sperata vauriei*** (Cazier, 1954)
Number examined: 5.
Municipalities: Hermosillo, Pitiquito.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1952**.VII.04; **1958**.VII.22.

038. ***Eunota californica brevihamata*** (W. Horn, 1908)
Number examined: 139.
Municipalities: Guaymas, Hermosillo, Huatabampo, Opodepe.
Habitat: tidal flat.
Vegetation: coastal saltscrub; Sonoran desertscrub.
Elevation: 3 m.
Collection dates: **1950**.VII.14; **1952**.VII.31; **1953**: VII.04-VII.06; **1958**.VII.13; **1960**.VIII.10; **1961**.VI.07; **1966**: VII.19, VII22; **1970**.VIII.23; **1971**: VII.21-VII.22; **1979**: VII.07-VII.08.

039. ***Eunota californica mojavi*** (Cazier, 1937)
Number examined: 250.
Municipalities: Pitiquito, Puerto Peñasco.
Habitat: coastal dunes; mud flats; salt marsh flats; tidal salt flats. [at light]
Vegetation: coastal saltscrub.
Elevation: 5 – 10 m.
Collection dates: **1952**: VI.12, VIII.16; **1953**.VIII.11; **1966**: V.29-V.30, VII.17; **1980**.VIII.22; **1987**: V.31, VI.01; **1991**: VII.15-VII.16, VIII.28, VII.31, IX.01; **1994**: VIII.01-VIII.02; **1995**.VI.05; **2018**.VIII.16.

040. ***Eunota gabbii*** (G. Horn, 1866)
Number examined: 167.
Municipalities: Caborca, Empalme, Hermosillo, Puerto Peñasco.
Habitat: coastal dunes; sandy beach; tidal flat; tidal salt flat. [at light]
Vegetation: coastal saltscrub.
Elevation: ?
Collection dates: **1952**.VII.18; **1966**: VI.01, VII.17, VII.19; **1967**: V.31, VI.01, VII.16; **1991**: VIII.31, IX.01; **1994**: VIII.01-VIII.02; **2018**.VIII.16. One label reads only “Oct.”.

041. ***Eunota rockefelleri*** (Cazier, 1954)
Number examined: 8.
Municipality: Puerto Peñasco.
Habitat: ?
Vegetation: coastal saltscrub.
Elevation:
Collection dates: **1952**.VI.12; **1966**.V.30.

042. ***Microthylax digueti*** (W. Horn, 1897)
Number examined: 10.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1950**-VII-25; **1952**.VII.13.

043. ***Microthylax sinaloae schrammeli*** (Cazier, 1954)
Number examined: 140.
Municipalities: Hermosillo, Pitiquito, Puerto Peñasco.
Habitat: coastal dunes; mud flats; sandy beach; salt marsh flats; tidal salt flats. [at light]
Vegetation: coastal saltscrub.
Elevation: 10 m.
Collection dates: **1950**.VII.25; **1952**: VI.12, VII.16; **1953**: VII.17-VII.31, VIII.01-VIII.15, IX.01-IX.10; **1966**: V.30, VII.17; **1967**.V.31; **1968**.VII; **1970**.VIII.22; **1975**. VII.10; **1987**.V.15; **1991**: VII.15-VII.16, VIII.31, IX.01; **1994**: VIII.01-VIII.02; **2018**.VIII.16.

044. ***Microthylax sinaloae sinaloae*** (Bates, 1890)
Number examined: 94.
Municipalities: Empalme, Guaymas, Hermosillo.
Habitat: tidal flat
Vegetation: coastal saltscrub.
Elevation: 3 m.
Collection dates: **1921**.VII.08; **1952**: VII.14, VII.18; **1960**. VIII.10; **1966**: VI.01-VI.02, VII.19, VII.21-VII.22; **1979**: VII.07-VII.08.

045. ***Opilidia macrocnema kino*** (Cazier, 1954)
Number examined: 147.
Municipality: Hermosillo.
Habitat: beach.
Vegetation: coastal dunescrub.
Elevation range: 5 m.
Collection dates: **1952**: VII.14, VII.18; **1958**.X.24; **1966**: VII.18-VII.19, VII.23; **1967**.VI; **1970**.VIII.24.

046. ***Opilidia macrocnema macrocnema*** (Chaudoir, 1852)
Number examined: 130.
Municipality: Empalme.
Habitat: ?
Vegetation: coastal thornscrub.
Elevation: ?
Collection dates: **1952**.VIII.11; **1966**: VI.01-VI.02, VII.21.

07. Omophronini

047. ***Omophron gilae*** LeConte, 1852

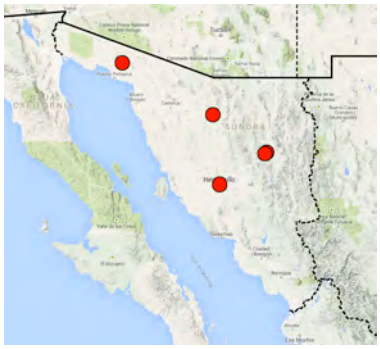
Number examined: 1.
Municipality: Pitiquito.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1952**.VII.04.

048. ***Omophron gratum*** Chaudoir, 1868

Number examined: 4.
Municipality: Cajeme.
Habitat: ?
Vegetation: coastal thornscrub.
Elevation: ?
Collection dates: **1950**.VII.15; 1961.VI.11.

049. ***Omophron obliteratum*** G. Horn, 1870

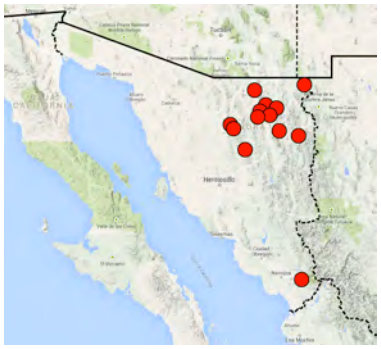
Number examined: 13.
Municipalities: Hermosillo, Moctezuma, Puerto Peñasco, Santa Ana.
Habitat: [at light]
Vegetation: foothills thornscrub; Sonoran desertscrub.
Elevation range: 944 – 2000 m.
Collection dates: **1897**.IV.19; **1976**.IV.09; **1977**.IV.09; **1983**: VII.11-VII.12; **1985**.VIII.01; **1993**.VII.04.



08. Pasimachini

050. ***Pasimachus californicus*** Chaudoir, 1850

Number examined: 22.
Municipalities: Agua Prieta, Álamos, Aconchi, Bacoachi, Cananea, Cucurpe, Fronteras, Huachinera, Nacozari de García, San Felipe de Jesús.
Habitat: cow pasture; rocky canyon, slope and mountainside.
Vegetation: Chihuahuan desertscrub; cottonwood-willow and sycamore riparian deciduous forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; tropical deciduous forest.
Elevation range: 305 – 1860 m.
Collection dates: **1964**.VIII.21; **1982**: VIII.05, VIII.19; **2012**.VII.07; **2013**: VII.02, VII.18; **2014**: VIII.23, VIII.29; **2016**.VII.02; **2017**: I.09, VIII.13, VIII.16; **2019**: VII.06, VII.22, VIII.04-VIII.06, VIII.16.



051. ***Pasimachus obsoletus*** LeConte, 1846

Number examined: 1.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: Chihuahuan desertscrub.
Elevation: ?
Collection date: 1965.VII.09.

052. ***Pasimachus velutinus*** Van Dyke, 1943

Number examined: 8.

Municipio: Álamos, Mazatán, Moctezuma, Onavas.

Habitat: [at light] (walked, did not fly)

Vegetation: foothills thornscrub; riparian tropical scrub; tropical deciduous forest.

Elevation range: 433 - 944 m.

Collection dates: **1935**: VII.07, VII.15; **1982**.VIII.02; **1987**: VII.26-VII.27, VII.30-VII.31; **2012**.VI.26; **2019**: VII.24, VIII.09.

053. ***Pasimachus viridans*** LeConte, 1858

Number examined: 96.

Municipalities: Aconchi, Álamos, Bacanora, Cananea, Fronteras, Mazatán, Moctezuma, Nácori Chico, Nacozari de García, Ónavas, San Felipe de Jesús, Yécora.

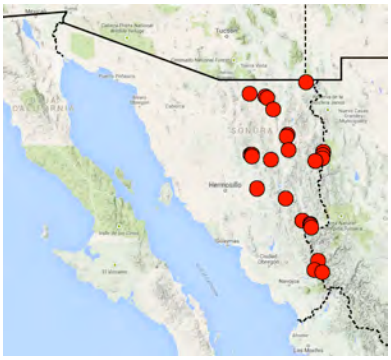
Habitat: rocky arroyo, canyon, slope, and mountainside.

Vegetation: cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; sycamore riparian forest, oak woodland on slopes; tropical deciduous forest.

Elevation range: 1301 – 2160 m.

Collection dates: **1935**: VII.19-VII.20; **1980**.IX.23 **1982**: VIII.06-VIII.07; **1983**: VII.06-VII.07; **1987**: VII.26-VII.29; **1989**: VII.11-VII.14; **1990**: VI.28-VII.03; VIII.07-VIII.11; **1993**.VII.08; **2012**.VII.07; **2013**: VII.02, VII.03; **2014**: VII.28, VIII.02, VIII.25, IX.20; **2016**: VIII.15-VIII.16, VIII.26; **2017**: VIII.12-VIII.15; **2018**: VI.27, VI.29, VIII.05-VIII.09; **2019**: VIII.05-VIII.06.

Variation: Only 6 of the 96 specimens have reddish pronotal and elytral margins rather than the typical green margins (see frontispiece).



09. Scaritini

054. ***Scarites subterraneus*** Fabricius, 1775

Number examined: 7.

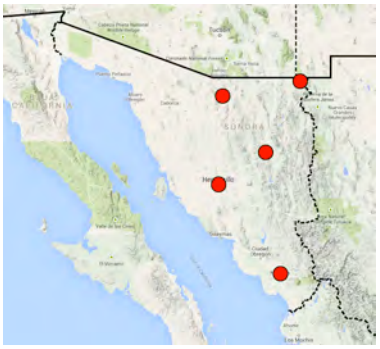
Municipalities: Agua Prieta, Hermosillo, Ímuris, Moctezuma, Navojoa.

Habitat: ?

Vegetation: Chihuahuan and Sonoran desertscrub; riparian tropical scrub; coastal and foothills thornscrub.

Elevation range: 15 – 1350 m.

Collection dates: **1908**.IX.01; **1982**: VIII.01, VIII.20, VIII.24; **1987**.XI.02.



10. Clivinini

055. ***Ardistomis sp.***

Number examined: 1.

Municipality: Ímuris

Habitat: ?

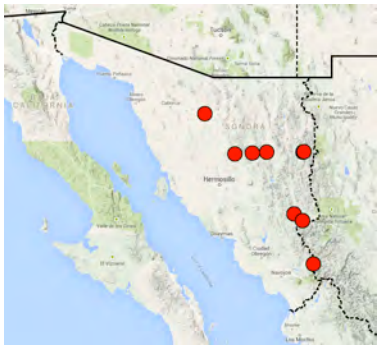
Vegetation: cottonwood-willow riparian forest.

Elevation: 1040 m.

Collection date: 1982.VIII.24.

056. ***Aspidoglossa subangulata*** (Chaudoir, 1843)
Number examined: 3.
Municipalities: Carbó, Hermosillo, Navojoa.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16, IX.26; **1960**. VIII.08.

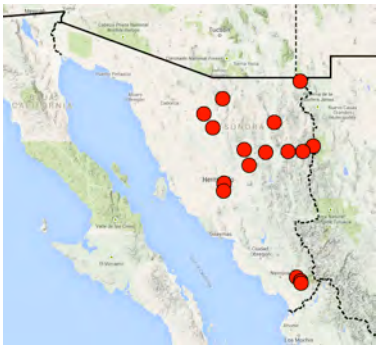
057. ***Aspidoglossa sp.***
Number examined: 21.
Municipalities: Aconchi, Álamos, Moctezuma, Nácori Chico, Rayón, Santa Ana, Yécora.
Habitat: urban. [at light]
Vegetation: foothills thornscrub; oak woodland; Sonoran desertscrub; tropical deciduous forest.
Elevation range: 542 – 1752 m.
Collection dates: **1982**: VIII.09, VIII.23; **1983**: VII.03, VII.11-VII.12; **1989**: VI.11-VI.13; **1990**: VII.02-VII.03; **1993**.VII.09; **2014**:VIII.29; **2019**.VIII.15.



058. ***Clivina lucida*** Putzeys, 1866
Number examined: 1.
Municipality: Navojoa.
Habitat: ?
Vegetation: coastal thornscrub.
Elevation: ?
Collection date: **1956**.VI.24.

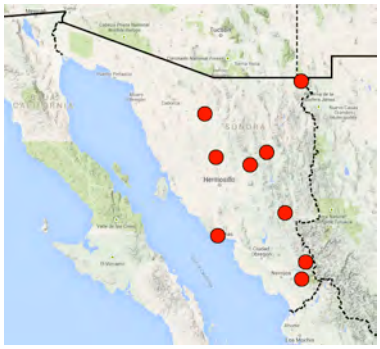
059. ***Clivina sp***. 1
Number examined: 6.
Municipality: Carbó.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: 1965.VII.31.

060. ***Clivina spp***. (may be more than one species)
Number examined: 87.
Municipalities: Agua Prieta, Álamos, Granados, Hermosillo, Ímuris, Moctezuma, Nácori Chico, Nacozari de García, Navojoa, Santa Ana, Ures.
Habitat: rocky canyon; urban. [at light]
Vegetation: desert grassland; foothills thornscrub; oak woodland; riparian tropical forest; Sonoran desertscrub; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 235 – 1450 m.
Collection dates: **1954**.VIII.22; **1969**.VIII.12; **1982**: VIII.01, VIII.11, VIII.19-VIII.20, VIII.23, VIII.24; **1983**: VII.03-VII.04, VII.11-VII.12; **1987**: VII.30-VII.31; 1993.VII.05; **2012**.IX.02; **2017**: VII.21-VII.23.



061. ***Schizogenius auripennis*** Bates, 1881
Number examined: 70.
Municipios: Agua Prieta, Álamos, Hermosillo, Moctezuma.
Habitat: [at light]
Vegetation: Chihuahuan and Sonoran deseretscrub; tropical deciduous forest.
Elevation: 1350 m.
Collection dates: **1953**: VII.09-VII.16; **1960**.VIII.12; **1969**.VIII.12; **1982**: VIII.19-VIII.20.

062. ***Schizogenius falli*** Whitehead, 1972
Number examined: 122.
Municipalities: Agua Prieta, Álamos, Carbó, Guaymas, Hermosillo, Moctezuma, Ónavas, Santa Ana.
Habitat: [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; foothills thornscrub; oak woodland; tropical deciduous forest.
Elevation range: 710 -1350 m.
Collection dates: **1935**.VI.27; **1953**: VII.09-VII.16; **1960**: VIII.08, VIII.10, VIII.12; **1969**.VIII.12; **1982**: VIII.19-VIII.20, VIII.23; **1983**: VII.11-VII.12; **2019**.VII.22.



063. ***Schizogenius longipennis*** Putzeys, 1866
Number examined: 143.
Municipalities: Álamos, Moctezuma, Nácori Chico, Ónavas.
Habitat: rocky stream margin. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; foothills thornscrub; oak woodland; pine-oak forest; riparian tropical scrub; tropical deciduous forest.
Elevation range: 917 – 1648 m.
Collection dates: **1960**.VIII.12. **1982**: VIII.01, VIII.06-VIII.07, VIII.09; **1983**: VII.03, VII.11-VII.12; **1987**: VII.26-VII.27; **1989**.VII.08; **1993**.VII.04; **2018**: VIII.05-VIII.06.

064. ***Schizogenius neovalidus*** Whitehead, 1972
Number examined: 5
Municipality: Agua Prieta.
Habitat: [at light]
Vegetation: Chihuahuan desertscrub.
Elevation: 1350 m.
Collection dates: **1982**: VIII.19-VIII.20.

065. ***Schizogenius pluripunctatus*** LeConte, 1852
Number examined: 7.
Municipalities: Agua Prieta, Álamos, Nácori Chico.
Habitat: rocky stream margin. [at light]
Vegetation: Chihuahuan desertscrub; pine-oak forest.
Elevation range: 945 - 1350 m.
Collection dates: **1982**: VIII.19 VIII.20; **1983**. VII.03; **2018**.VIII.05; **2019**.VII.23.

066. ***Schizogenius pygmaeus*** Van Dyke, 1925
Number examined: 102.
Municipios: Agua Prieta, Álamos, Hermosillo, Guaymas, Ímuris, Moctezuma, Nácori Chico, Ónavas, Santa Ana.
Habitat: [at light]
Vegetation: Chihuhuan and Sonoran desertscrub; cottonwood gallery forest; cypress-maple-alder-sycamore riparian forest; foothills thornscrub; oak woodland; pine-oak forest; oak forest; pine-oak forest; riparian tropical scrub; tropical deciduous forest.
Elevation range: 710 – 1690 m.
Collection dates: **1953**: VII.09-VII.16; **1960**: VIII.10, VIII.12; **1969**.VIII.12; **1982**: VIII.01, VIII.19-VIII.20, VIII.23; **1983**: VII.03, VII.11-VII.12; **1986**.VIII.30; **1987**: VII.26-VII.27; **1989**: VII.11-VII.13; **1990**. VIII.06; **2018**.VIII.06; **2019**.VII.22.

067. ***Semiardistomis propinquus*** (Putzeys, 1866)
Number examined: 35
Municipality: Yécora
Habitat: [at light]
Vegetation: pine-oak forest.
Elevation range: 1547 -1752 m.
Collection dates: **1990**: VI.30-VII.03.

11. Dyschiriini

068. ***Dyschirius analis*** LeConte, 1852
Number examined: 19.
Municipalities: Álamos, Guaymas, Hermosillo.
Habitat: [at light]
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16; **1960**: VIII.10, VIII.12; **1965**.VIII.01.

069. ***Dyschirius aratus LeConte***, 1852
Number examined: 1.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1953**: VII.09-VII.16.

070. ***Dyschirius politus*** (Dejean, 1825)
Number examined: 5.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16.

071. ***Dyschirius terminatus*** LeConte, 1848
Number examined: 7.
Municipalities: Álamos, Hermosillo
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16; **1960**.VIII.12.

072. ***Dyschirius*** sp.
Number examined: 9.
Municipalities: Agua Prieta, Ímuris, Moctezuma.
Habitat: [at light] [treading]
Vegetation: Chihuahuan and desertscrub; foothills thornscrub.
Elevation range: 944 – 1350 m.
Collection dates: **1982**: VIII.19-VIII.20; **1983**: VII.11-VII.12; **1986**.VIII.30; **1993**.VII.04.

12. Trechini

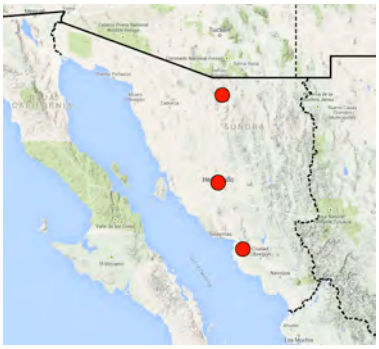
073. ***Cnides sp***. 2
Number examined: 3.
Municipality: Álamos.
Habitat: riparian.
Vegetation: tropical deciduous forest.
Elevation: ?
Collection dates: **1975**.VIII.11; **1999**.VII.20.

13. Bembidiini

074. ***Bembidion (Cyclolopha) poculare*** Bates, 1884
Number examined: 1.
Municipality: Huachinera.
Habitat: ?
Vegetation: desert grassland.
Elevation: 1150 m.
Collection date: **1982**.VIII.05.

075. ***Bembidion (Eupetedromus) aratum*** (LeConte, 1852)
Number examined: 1.
Municipality: Ímuris.
Habitat: cottonwood-willow riparian forest.
Vegetation: ?
Elevation: 1040 m.
Collection date: **1983**.VIII.24.

076. ***Bembidion (Furcacampa) egens*** Casey, 1918
Number examined: 29.
Municipalities: Guaymas, Hermosillo, Ímuris.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1956**.VI.24; **1965**: VII.31, VIII.11.



077. ***Bembidion (Furcacampa) sp. cf. cognatum*** Dejean, 1831
Number examined: 8.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16.

078. ***Bembidion (Furcacampa) sp. cf. nogalesium*** Casey, 1924
Number examined: 2.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1923**.IX.23.

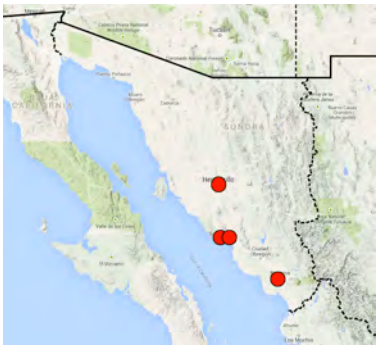
079. ***Bembidion (Furcacampa) sp***. 1
Number examined: 1.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1961**.VI.13.

080. ***Bembidion (Furcacampa) sp***. 2
Number examined: 3.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16.

081. ***Bembidion (Notaphus) rapidum*** species group sp. #1
Number examined: 1.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: oak woodland; riparian vegetation.
Elevation: 1291 m.
Collection date: **2017**.IV.23.

082. ***Bembidion (Notaphus) rapidum*** species group sp. #2
Number examined: 1.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: oak woodland; riparian vegetation.
Elevation: 1291 m.
Collection date: **2017**.IV.23.

083. ***Bembidion (Notaphus) rapidum*** species group sp. #3
Number examined: 15.
Municipalities: Empalme, Guaymas, Hermosillo, Navojoa.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub
Elevation: ?
Collection dates: **1923**.IX.23; **1953**: VII.9-VII.16; **1954**: VIII.22, VIII.24.



084. ***Bembidion (Notaphus) semifasciatum*** species group sp. #1
Number examined: 32.
Municipality: Ímuris.
Habitat: bog; marsh.
Vegetation: cottonwood-willow riparian forest.
Elevation: 914 - 1040 m.
Collection dates: **1965**.VII.31; **1967**.VII.27; **1982**.VIII.24; **1986**.VIII.30.

085. ***Bembidion (Notaphus) sp***. son-1
Number examined: 1.
Municipality: Agua Prieta.
Habitat: [at light]
Vegetation: Chihuahuan desertscrub.
Elevation: ?
Collection date: **2017**.IV.23.

086. ***Bembidion (Ochthedromus) cheyennense*** Casey, 1918
Number examined: 1.
Municipality: Ímuris.
Habitat: ?
Vegetation: cottonwood-willow riparian forest.
Elevation: ?
Collection date: **1965**.VII.31.

087. ***Bembidion (Peryphus) lugubre*** LeConte, 1857
Number examined: 2.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: Riparian vegetation, oak woodland.
Elevation: 1291 m.
Collection date: **2017**.IV.23.

088. ***Bembidion (Peryphus) mexicanum*** Dejean, 1831
Number examined: 30.
Municipalities: Nácori Chico, Santa Cruz.
Habitat: rocky stream margin.
Vegetation: cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest.
Elevation range: 1549 - 1648 m.
Collection dates: **2018**: VIII.05-VIII.08; **2019**.IV.25.

089. ***Bembidion (Peryphus) perspicuum*** (LeConte, 1848)
Number examined: 11.
Municipality: Agua Prieta.
Habitat: [at light]
Vegetation: oak woodland; riparian vegetation.
Elevation: 1291 m.
Collection date: **2017**.IV.23.

090. ***Bembidion (Peryphus) mexicanum*** species group sp. son-1

Number examined: 11.
Municipalities: Cananea, Nacozari de García, Nogales.
Habitat: rocky arroyo, stream margin and canyon.
Vegetation: oak woodland; pine-oak forest; riparian deciduous forest;
Elevation range: 1161 - 1928m.
Collection dates: **2014**.VIII.24; **2015**: VII.12, VIII.12.

091. ***Bembidion (Peryphus) mexicanum*** species group sp. son-2

Number examined: 7.
Municipalities: Fronteras, Nacozari de García.
Habitat: cow pasture; rocky arroyo, stream margin.
Vegetation: oak woodland; pine-oak forest.
Elevation: 1429 - 1928 m.
Collection dates: **2015**.VIII.12; **2016**.VII.02.

092. ***Bembidion (Peryphus) mexicanum*** species group sp. B2

Number examined: 5.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: oak woodland; sycamore riparian forest.
Elevation: 1350 - 1690 m.
Collection dates: **1982**: VIII.19-VIII.20.

093. ***Bembidion (Peryphus) mexicanum*** species group sp. B3

Number examined: 2.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: oak woodland; sycamore riparian forest.
Elevation: 1429 - 1928 m.
Collection date: **1982**.VIII.19.

094. ***Bembidion (Peryphus) mexicanum*** species group sp. B4

Number examined: 21.
Municipalities: Agua Prieta, Ímuris, Moctezuma, Nácori Chico, Yécora.
Habitat: arroyo, stream margin. [at light]
Vegetation: foothills thornscrub; oak woodland; pine-oak forest; sycamore riparian forest.
Elevation: 914 - 1950 m.
Collection dates: **1967**.VII.27; **1982**: VIII.06-VII.07, VIII.19-VIII.20; **1983**: VII.03, VII.11-VII.12; **1990**. VI.30.

095. ***Bembidion (Peryphus) mexicanum*** species group sp. B5

Number examined: 1.
Municipality: Huachinera.
Habitat: ?
Vegetation: Pine-oak forest.
Elevation: 2090 m.
Collection date: **1982**: VIII.03-VIII.04.

096. ***Elaphropus conjugens*** (Notman, 1918)

Number examined: 1.
Municipality: Yécora.
Habitat: ?
Vegetation: pine-oak forest.
Elevation: ?
Collection date: **1990**: VIII.08-VIII.11.

097. ***Elaphropus dolosus*** (LeConte, 1848)

Number examined: 37.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16.

098. ***Elaphropus mellitus*** (Casey, 1918)

Number examined: 122.
Municipalities: Álamos, Guaymas, Hermosillo, San Javier.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1897**.IV.19; **1929**.IV.03; **1953**: VII.09-VII.16; **1960**: VIII.10, VIII.12; **1963**.II.27.

099. ***Elaphropus obesulus*** (LeConte, 1852)

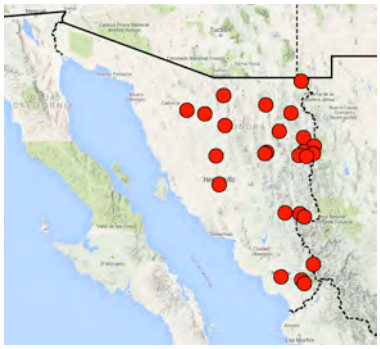
Number examined: 17.
Municipalities: Hermosillo, Saric.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1929**.VI.02; **1953**: VII.09-VII.16.

100. ***Elaphropus sp.*** CASC 37-B-MEX
Number examined: 3.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1960**.VIII.12.

101. ***Elaphropus sp.*** CASC 3-B-US
Number examined: 13.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1960**.VIII.12.

102. ***Elaphropus sp***. 1
Number examined: 8.
Municipality: Ónavas.
Habitat: [at light]
Vegetation: foothills thornscrub; oak woodland.
Elevation: 917 m.
Collection dates: **1987**: VII.26-VII.27.

103. ***Elaphropus spp***. (may be more than one species)
Number examined: 289.
Municipalities: Agua Prieta, Álamos, Altar, Carbo, Fronteras, Huachinera, Ímuris, Moctezuma, Nácori Chico, Nacozari de García, Nogales, Ónavas, Santa Ana, Yécora.
Habitat: cow pasture; rocky arroyo, stream margin, and mountainside; rocky; flood litter. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; cottonwood-willow riparian forest; foothills thornscrub; oak woodland; pine-oak forest; riparian tropical scrub; Sonoran desertscrub; tropical deciduous forest.
Elevation range: 710 – 2278 m.
Collection dates: **1941**.V.24; **1942**.II.11; **1952**: IX.19-IX.20; **1953**: VII.09-VII.16; **1959**.VIII.14; **1960**.VIII.12; **1961**: VI.12-VI.13; **1962**: IV.16, V.22; **1967**.VIII.20; **1970**.VI.18; **1972**.X.25; **1980**: IX.17-IX.18, IX.23, IX.26-IX.27; **1982**: VIII.01, VIII.03-VIII.04, VIII.19-VIII.20, VIII.23-VIII.24; **1983**: VII.03-VII.05, VII.11-VII.12; **1986**.VIII.30; **1989**: VII.11-VII.13; **1990**: VI.30-VII.01, VIII.06, VIII.07-VIII.11; **1993**: VII.04, VII.05; **2015**.VIII.11; **2016**.VII.02; **2017**.VIII.15; **2018**: III.19, VIII.05-VIII-06, VIII.08.



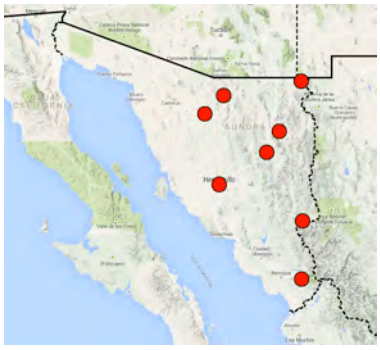
104. ***Micratopus sp***.
Number examined: 3.
Municipalities: Empalme, Guaymas, Hermosillo.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation: ?
Collection dates: **1954**.VIII.24; **1962**.XI.15; **1973**.V.

105. ***Paratachys sp***. USNM #29
Number examined: 2.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1960**.VIII.12.

106. ***Paratachys sp***. USNM #60
Number examined: 4.
Municipalities: Álamos, Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1953**: VII.09-0VII.16; **1960**.VIII.12.

107. ***Paratachys sp***. USNM #105
Number examined: 2.
Municipalities: Álamos, San Javier.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection dates: **1929**.IV.03; **1954**.VII.21.

108. ***Paratachys spp***. (may be more than one species)
Number examined: 51.
Municipalities: Agua Prieta, Álamos, Hermosillo, Ímuris, Moctezuma, Nacozari de García, Santa Ana, Yécora.
Habitat: marsh; rocky mountainside. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; foothills thornscrub; oak woodland; pine-oak forest; riparian forest; tropical deciduous forest.
Elevation range: 710 – 1830 m.
Collection dates: **1953**: VII.09-VII.16; **1960**.VIII.12; **1967**.VII.27; **1982**: VIII.19-VIII.20, VIII.23-VIII.24; **1983**: VII.11-VII.12; **1993**: VII.06-VII.07; **2017**.VIII.15.



109. ***Pericompsus laetulus*** LeConte, 1852
Number examined: 2.
Municipality: Saric.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1929**.VI.02.

110. ***Pericompsus sellatus*** LeConte, 1852
Number examined: 1.
Municipality: Santa Ana.
Habitat: [at light]
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1982**.VIII.23.

111. ***Pericompsus tlaloc*** Erwin, 1974
Number examined: 10.
Municipalities: Álamos, Guaymas, La Colorada.
Habitat: [at light]
Vegetation: Sonoran desertscrub; tropical deciduouis forest.
Elevation: ?
Collection dates: **1929**.III.06; **1960**: VIII.10, VIII.12; **1962**.IV.16.

112. ***Pericompsus sp***.
Number examined: 2.
Municipalities: Ímuris, Santa Ana.
Habitat: [at light]
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1982**.VIII.23; **1986**.VIII.30.

113. ***Polyderis sp.***
Number examined: 7.
Municipalities: Álamos, Moctezuma, Santa Ana.
Habitat: [at light]
Vegetation: foothills thornscrub; Sonoran desertscrub; tropical deciduous forest.
Elevation range: 710 – 944 m.
Collection dates: **1960**.VIII.12; **1969**.VIII.12; **1982**.VIII.23; **1983**: VII.11-VII.12.

114. ***Tachys misellus*** (LaFerté-Sénectère, 1841)
Number examined: 3.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1973**.V.

115. ***Tachys virgo*** LeConte, 1852
Number examined: 1.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1960**.VIII.10.

116. ***Tachys vittiger*** LeConte, 1852
Number examined: 5.
Municipalities: Guaymas, Puerto Peñasco.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1968**.VI.14; **1973**.V.

117. ***Tachys corax*** complex sp.
Number examined: 85.
Municipalities: Guaymas, Huatabampito, Pitiquito.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation: ?
Collection dates: **1960**.VIII.10; **1974**: III.20, IV.22.

118. ***Tachys pallidus*** complex sp.
Number examined: 60.
Municipalities: Guaymas, Huatabampito.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation: ?
Collection dates: **1960**.VIII.10; **1974**.IV.22.

119. ***Tachys vittiger*** complex CASC sp.
Number examined: 55.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1960**.VIII.10,

120. ***Tachys*** CASC n. sp. 1
Number examined: 4.
Municipality: Guaymas.
Habitat: sand dunes.
Vegetation: coastal dunescrub; Sonoran desertscrub.
Elevation: ?
Collection date: **1974**.IV.19.

121. ***Tachys*** CASC sp. 6
Number examined: 74.
Municipalities: Guaymas, Pitiquito.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.17-VII.31; **1960**.08.10.

122. ***Tachys*** USNM sp. #11
Number examined: 5.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1960**.VIII.10.

123. ***Tachys*** USNM sp. #12
Number examined: 6.
Municipalities: Guaymas, Pitiquito.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VIII.20-VIII.31, IX.01-IX.10; **1960**.08.10.

124. ***Tachys*** USNM sp. #13
Number examined: 2.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1960**.08.10.

125. ***Tachys*** spp. (may be more than one species)
Number examined: 24.
Municipalities: Cajeme, Empalme, Guaymas, Pitiquito.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation: ?
Collection dates: **1952**.VII.29; **1954**.VIII.24; **1960**.08.10; **1965**.VIII.01; **1973**.V; **1974**.VIII.28.

126. ***Tachyta nana inornata*** (Say, 1823)
Number examined: 3.
Municipality: Nácori Chico.
Habitat: ?
Vegetation: pine-oak forest.
Elevation range: 1950 – 2000 m.
Collection dates: **1983**.VII.06; **2018**.VIII.06.

127. **Subtribe Tachyina**, New Genus, new species
Number examined: 1.
Municipality: Yécora.
Habitat: [at light]
Vegetation: pine-oak forest.
Elevation: 1547 m.
Collection date: **1990**: VI.30-VII.01.

14. Paussini

128. ***Pachyteles gyllenhali*** (Dejean, 1825)
Number examined: 12.
Municipalities: Agua Prieta, Hermosillo.
Habitat: [at light]
Vegetation: Sonoran desertscrub.
Elevation: 1350 m.
Collection dates: **1980**.X.25; **1982**: VIII.19-VIII.21.

129. ***Pachyteles kuntzeni*** (Bänninger, 1927)
Number examined: 2.
Municipality: Ures.
Habitat: urban [at light]
Vegetation: foothills thornscrub.
Elevation: 1377 m.
Collection dates: **2014**: VII.27-VII.29.

130. ***Pachyteles parca*** LeConte, 1884
Number examined: 7.
Municipalities: Álamos, Moctezuma, Ónavas, San Felipe de Jesús.
Habitat: ?
Vegetation: foothills thornscrub; tropical deciduous forest.
Elevation range: 435 – 1300 m.
Collection dates: **1982**.VI.10; **1987**: VII.26-VII.27, VII.30-VII.31; **2019**: VII.25, VIII.04.

15. Brachinini

131. ***Brachinus adustipennis*** Erwin, 1969
Number examined: 1.
Municipality: Mazatán.
Habitat: ?
Vegetation: foothills thornscrub.
Elevation: 550 m.
Collection date: **2012**.VIII.13.

132. ***Brachinus azureipennis*** Chaudoir, 1876
Number examined: 1.
Municipality: Cananea.
Habitat: ?
Vegetation: desert grassland.
Elevation: 1531 m.
Collection date: **2015**.IX.06.

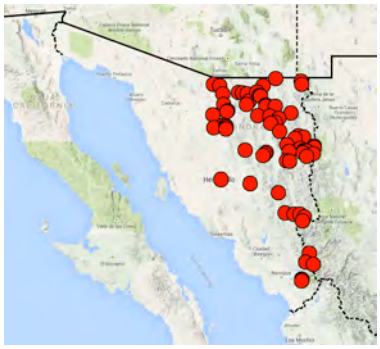
133. ***Brachinus cibolensis*** Erwin, 1970
Number examined: 2.
Municipality: Agua Prieta.
Habitat: [at light]
Vegetation: Chihuahuan desertscrub.
Elevation: 1350 m.
Collection dates: **1982**: VIII.19-VIII.20.

134. ***Brachinus consanguineus*** Chaudoir, 1876
Number examined: 3.
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation: 1577 m.
Collection dates: **1935**.VII.1; **1989**: VII.11-VII.13.

135. ***Brachinus costipennis*** Motchulsky, 1859
Number examined: 63.
Municipalities: Agua Prieta, Hermosillo, Nácori Chico, Santa Ana.
Habitat: river margin. [at light]

Vegetation: Chihuahuan and Sonora desertscrub; oak woodland.
Elevation range: 1350 – 1450 m.
Collection dates: **1897**.IV.19; **1982**: VIII.19-VIII.20; **1983**. VII.04; **1985**: VIII.01-VIII.02.

136. ***Brachinus elongatulus*** Chaudoir, 1876
Number examined: 949.
Municipalities: Aconchi, Agua Prieta, Álamos, Bacadéhuachi, Bacanora, Bacoachi, Cananea, Divisaderos, Fronteras, Granados, Hermosillo, Huachinera, Huásabas, Ímuris, Magdalena de Kino, Moctezuma, Naco, Nácori Chico, Nacozari de García, Nogales, Ónavas, Santa Ana, Santa Cruz, Yécora.
Habitat: cow pasture; rocky arroyo, canyon, slope, and mountainside; ridge top; roadside; river bed; urban. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian forest; cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; riparian tropical scrub; tropical deciduous forest.
Elevation range: 293 – 2441 m.
Collection dates: **1935**: I.07, I.27; **1960**.VIII.12; **1966**. VIII.29; **1980**.IX.23; **1982**: VIII.01, VIII.03-VIII.07, VIII.09, VIII.11, VIII.19-VIII.20; **1983**: VII-03-VII.06, VII.11-VII.12; **1985**.VIII.01; **1986**: VIII.29-VIII.30; **1987**: VII.26-VII.27, VII.30-VII.31; **1989**: VII.11-VII.13; **1990**: VI.28-VII.03, VIII.07-VIII.11; **1993**: VII.05-VII.09; **2012**: III.30, VII.07, VII.13, VII.21, VIII.01, VIII.09, IX.02, IX.12; **2013**: VII.16, VIII.04, VIII.09, IX.10, IX.28; **2014**: VII.28, VIII.02, VIII.24, VIII.27, IX.08, IX.14, VI.16, IX.20; **2015**: VII.12, VIII.10, VIII.12-VIII.13, IX.06, IX.13-IX.14; **2016**: V.01, VII.02, VIII.13-VIII.16, VIII.24, VIII.26, X.17; XI.20-XI.21; **2017**.IV.23, V.23, VII-15-VII-16, VII.23, VIII.12-VIII.16, IX.16-IX.17; **2018**: III.18-III.20; VI.27, VI.29, VIII.05-VIII.09, VIII.11, VIII.13; **2019**: IV.26, IX.25.



137. ***Brachinus explosus*** Erwin, 1970
Number examined: 1.
Municipality: Mazatán.
Habitat: gentle granitic slopes.
Vegetation: oak woodland.
Elevation: 1381 m.
Collection date: **2014**.VII.28.

138. ***Brachinus favicollis*** Erwin, 1965
Number examined: 9.
Municipality: Moctezuma.
Habitat: foothills thornscrub.
Vegetation:
Elevation: 944 m.
Collection date: **1982**.VIII.01.

139. ***Brachinus fumans*** (Fabricius, 1781)
Number examined: 3.
Municipalities: Álamos, Agua Prieta, Yécora.
Habitat: gentle rocky slope. [at light]
Vegetation: Chihuahuan desertscrub; pine-oak forest; tropical deciduous forest.
Elevation range: 1206 - 1582 m.
Collection dates: **1935**.X.15; **2014**.IX.20; **2015**.VIII.08.

140. ***Brachinus galactoderus*** Erwin, 1970
Number examined: 7.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: 400 m
Collection date: **1935**.I.27.

141. ***Brachinus gebhardis*** Erwin, 1965
Number examined: 1.
Municipality: Nacozari de García.
Habitat: [at light]
Vegetation: desert grassland.
Elevation: 1381 m.
Collection date: **2015**.VIII.08.

142. ***Brachinus hirsutus*** Bates, 1884
Number examined: 25.
Municipalities: General Plutarco Elia Calles, Moctezuma, Nácori Chico, Santa Ana.
Habitat: stram margin.
Vegetation: foothills thornscrub; oak woodland; riparian tropical scrub; Sonoran desertscrub.
Elevation range: 457 – 1450 m.
Collection dates: **1949**.IV.04; **1982**.VIII.01; **1983**.VII.05; **1985**: VIII.01-VIII.02.

143. ***Brachinus imperialensis*** Erwin, 1965
Number examined: 1.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1953**: VIII.15-VIII.20.

144. ***Brachinus lateralis*** Dejean,1831

Number examined: 10.

Municipalities: Empalme, Ímuris, Moctezuma, Nacozari de García, Santa Ana, Ures, Villa Pesqueira.

Habitat: rocky granitic slope.

Vegetation: Sonoran desertscrub; desert grassland; oak woodland; riparian forest; coastal and foothills thornscrub.

Elevation range: 30 - 1422 m.

Collection dates: **1929**.II.24; **1957**.IV.03; **1958**.IV.03; **1962**.V.01; **1965**.VII.31; **1982**: VIII.11, VIII.24; **1985**. VIII.01; **1993**.VII.04; **2014**.IV.27.

145. ***Brachinus mexicanus*** Dejean, 1831

Number examined: 50.

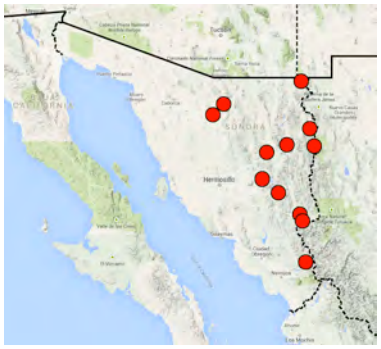
Municipalities: Agua Prieta, Álamos, Bacanora, Bacerac, Huásabas, Ímuris, Moctezuma, Nácori Chico, Santa Ana, Villa Pesqueira, Yécora.

Habitat: river margin; rocky slope; stream margin; urban. [at light]

Vegetation: Chihuahuan and Sonora desertscrub; foothills thornscrub; oak woodland; pine-oak forest; riparian forest; riparian tropical scrub; tropical deciduous forest.

Elevation range: 561 – 1830 m.

Collection dates: **1929**.II.24; **1935**.I.27; **1982**: VIII.01, VIII.07-VIII.08, VIII.20; **1983**.VII.05; **1985**: VIII.01-VIII.02; **1993**: VII.06-VII.07, VIII.07-VIII.11; **2012**:VIII.02; **2014**.VIII.02; **2015**.VII.12.



146. ***Brachinus sonorous*** Erwin, 1970

Number examined: 2.

Municipality: Empalme.

Habitat: ?

Vegetation: coastal thornscrub.

Elevation: 30 m.

Collection date: **1962**.V.01.

16. Morionini

147. ***Morion aridus*** Allen, 1968

Number examined: 5.

Municipalities: Álamos, Bacanora, Guaymas, Pitiquito.

Habitat: rocky slope. [at light]

Vegetation: foothills thornscrub; Sonoran desertscrub; tropical deciduous forest.

Elevation range: 518 -1387 m.

Collection dates: **1953**: IX.01-IX.10; **1960**.VIII.10; **1987**: VII.30, VII.31; **2014**.VIII.02.

148. ***Morion cordatus*** (Chaudoir, 1837)

Number examined: 6.

Municipalities: Álamos, Moctezuma, Ónavas.

Habitat: *Atta* nest.

Vegetation: foothills thornscrub; oak woodland; tropical deciduous forest.

Elevation range: 518 – 944 m.

Collection dates: **1983**: VII.11, VII.12; **1987**: VII.26-VII.27, VII.30-VII.31.

149. ***Morion lafertei*** Guérin-Meneville, 1844
Number examined: 1.
Municipality: Altar.
Habitat: in *Atta* colony.
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1964**.XI.29.

17. Abacetini

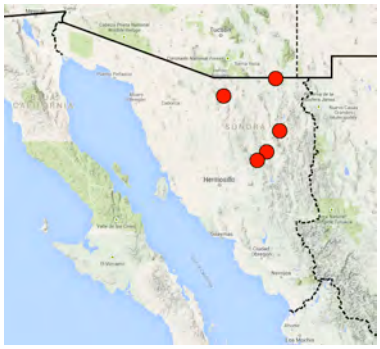
150. ***Oxycrepis infimus*** (Bates, 1882)
Number examined: 2.
Municipalities: Carbó, Santa Ana.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1958**.IV.03; **1965**.VII.31.

151. ***Oxycrepis pactinullus*** (Allen, 1972)
Number examined: 2.
Municipalities: Álamos, Carbó.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1964**.VIII.24; **1965**.VII.31.

152. ***Oxycrepis sculptilis*** (Bates, 1884)
Number examined: 3.
Municipalities: Álamos, Navojoa.
Habitat: [at light]
Vegetation: coastal thornscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1964**: VIII.24-VIII.25.

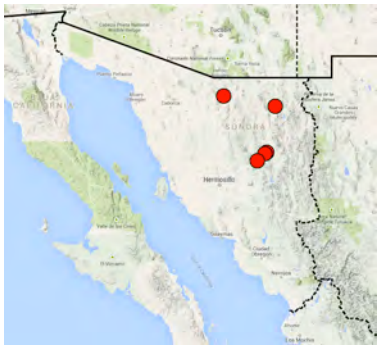
18. Pterostichini

153. ***Abaris splendidula*** (LeConte, 1863)
Number examined: 60.
Municipalities: Agua Prieta, Ímuris, Moctezuma, Nacozari de García.
Habitat: rocky arroyo.
Vegetation: Chihuahuan desertscrub; foothills thornscrub; oak woodland; riparian tropical scrub.
Elevation range: 500 – 1460 m.
Collection dates: **1982**: VIII.01, VIII.02, VIII.24; **2013**. VIII.23; **2017**.VIII.14.



154. ***Cyclotrachelus substriatus*** (LeConte, 1848)
Number examined: 13.
Municipality: Nácori Chico
Habitat: [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest.
Elevation range: 1648 – 2330 m.
Collection dates: **1982**: VIII.06-VII.08; **1983**.VII.06; **2018**.VIII.09.

155. ***Hybothecus flohri*** (Bates, 1882)
Number examined: 15.
Municipalities: Álamos, Fronteras, Ímuris, Moctezuma.
Habitat: [at light]
Vegetation: Chihuahuan desertscrub; foothills thornscrub; riparian tropical scrub; tropical deciduous forest.
Elevation range: 400 – 1202 m.
Collection dates: **1982**: VIII.01, VIII.02, VIII.24; **1987**: VII.30, VII.31; **1993**.VII.04; **2012**: VIII.01, IX.12.



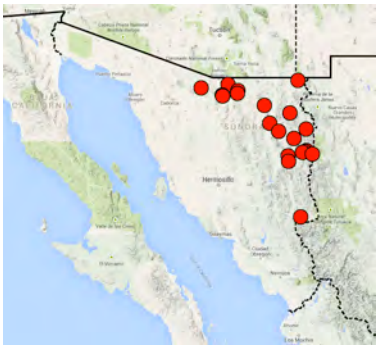
156. ***Poecilus diplophryus*** Chaudoir, 1876
Number examined: 3
Municipality: Guaymas.
Habitat: [at light]
Vegetation: Sonoran desertscrub.
Elevation: 46 m.
Collection date: **1984**.VII.02.

157. ***Poecilus scitulus*** LeConte, 1848
Number examined: 10.
Municipalities: Benjamín Hill; Carbó, Fronteras, Hermosillo, Nácori Chico, Santa Ana.
Habitat: [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; foothills thornscrub; stock tank.
Elevation range: 175 – 1450 m.
Collection dates: **1965**.VII.31; **1983**.VII.04; **2012**.VIII.01; **2017**.VII.23; **2020**.IX.10.

19. Zabrini

158. ***Amara californica*** Dejean, 1828
Number examined: 69.
Municipalities: Agua Prieta, Bacadéhuachi, Divisaderos, Fronteras, Granados, Huachinera, Ímuris, Nácori Chico, Nacozari de García, Nogales, Santa Cruz, Saric, Yécora.
Habitat: large flat area near ridge top; rocky arroyo; rocky mountainside; shallow rocky arroyo.
Vegetation: Chihuahuan and Sonoran desertscrub; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; sycamore riparian forest.
Elevation range: 502 – 2441.
Collection dates: **1929**: VI.02, VII.03; **1965**.VII.31; **1982**: VIII.03, VIII.04, VIII.06, VIII.07, VIII.09, VIII.24;

1983: VII.04, VII.07; **1986**.VIII.30; **1990**.VIII.11. **1993**: VII.06-VII.07; **2015**: VIII.11-VIII.12; **2016**: IV.16, VIII.15, XI.21; **2017**: IV.23, VIII, VIII.13, VIII.15; **2019**: IV.24-IV.26.



159. ***Amara deparca*** (Say, 1830)
Number examined: 3.
Municipalities: Agua Prieta, Nogales.
Habitat: ?
Vegetation: Chihuahuan desertscrub; desert grassland.
Elevation: 1350 m.
Collection dates: **1965**.VII.30; **1982**.VIII.20.

160. ***Amara nupera*** G. Horn, 1892
Number examined: 3.
Municipalities: Agua Prieta, Cananea, Nácori Chico.
Habitat: rocky slope.
Vegetation: Chihuahuan desertscrub; desert grassland; riparian deciduous forest; pine-oak forest.
Elevation range: 1291 – 2422 m.
Collection dates: **1983**.VII.06; **2013**.VIII.02; **2017**.III.29.

161. ***Amara sera*** Say, 1830
Number examined: 1.
Municipality: Nácori Chico.
Habitat: camp clearing.
Vegetation: cypress-maple-alder-sycamore riparian forest.
Elevation: 1648 m.
Collection date: **2018**.VIII.09.

162. ***Amara sp.***
Number examined: 1.
Municipality: Yécora.
Habitat: litter
Vegetation: oak woodland.
Elevation: 1680 m.
Collection date: **1993**: VII.09.

20. Oodini

163. ***Oodinus alutaceus*** (Bates, 1882)
Number examined: 2.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: 10 m.
Collection dates: **1965**.VIII.01; 1972.IX.03.

164. ***Stenocrepis elegans*** (LeConte, 1851)
Number examined: 16.
Municipalities: Álamos, Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16; **1960**.VIII.12.

21. Panagaeini

165. ***Panagaeus sallei*** Chaudoir, 1862
Number examined: 9.
Municipalities: Cananea, Carbó, Cucurpe, Fronteras, Granados, Mazatán, Yécora.
Habitat: rocky mountainside; urban. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; riparian deciduous forest.
Elevation range: 540 - 1521 m.
Collection dates: **1959**.IX.08; **1987**.VII.28-VII.29; **1998**.VIII.04; **2012**.VII.12; **2014**.VIII.29; **2015**.IX.06; **2016**.VIII.16; **2017**.VII.16; **2018**.VIII.11.

22. Chlaeniini

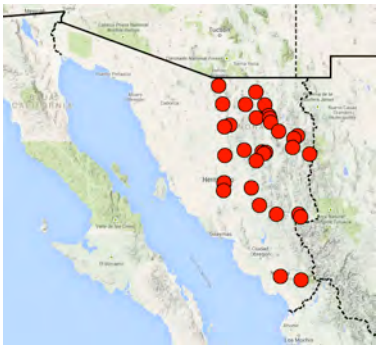
166. ***Chlaenius caeruleicollis*** Chaudoir, 1876
Number examined: 1.
Municipality: Yécora
Habitat: ?
Vegetation: pine-oak forest.
Elevation: 1646 m.
Collection date: **1990**.VIII.07.

167. ***Chlaenius chaudoiri*** G. Horn, 1876
Number examined: 6.
Municipalities: Álamos, Nacozari de García, Santa Ana.
Habitat: ?
Vegetation: Snoran desertscrub; oak woodland.
Elevation: ?
Collection dates: **1958**.IV.03; **1978**.VIII.10; **2019**.VII.22.

168. ***Chlaenius cumatilis*** LeConte, 1851
Number examined: 20.
Municipalities: Agua Prieta, Cananea, Divisaderos, Moctezuma, Nácori Chico, San Felipe de Jesús, Santa Ana.
Habitat: flood litter; rocky slope and stream margin. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian forest; cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest.
Elevation range: 930 – 1648 m.
Collection dates: **1982**: VIII.01, VIII.20; **1983**.VII.05; **2014**.VIII.27; **2016**.XI.20; **2018**: III.19-III.20, VIII.05, VIII.08-VIII.09; **2019**.VII.04.

169. ***Chlaenius cursor*** Chevrolat, 1835
Number examined: 4.
Municipalities: Santa Ana, Yécora.
Habitat: ?
Vegetation: pine-oak forest; Sonoran deserscub.
Elevation: ?
Collection dates: **1985**.VIII.01; **1993**.VII.06.

170. ***Chlaenius forreri*** Bates, 1884
Number examined: 64.
Municipalities: Aconchi, Álamos, Arizpe, Bacadéhuachi, Cananea, Carbó, Cucurpe, Fronteras, Hermosillo, Huachinera, Ímuris, La Colorada, Magdalena de Kino, Mazatán, Moctezuma, Nácori Chico, Nacozari de García, Nogales, Navojoa, Ónavas, Yécora.
Habitat: cow pasture; disturbed area; rocky canyon, hillside, and mountainside; urban. [at light]
Vegetation: desert grassland; foothills thornscrub; oak woodland; pine-oak forest; Sonoran desertscrub; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 50 – 1969 m.
Collection dates: **1982**: VIII.01-VIII.03, VIII.05, VIII.09, VIII.11; **1983**: VII.02, VII.04; **1987**.IX.02; **1989**.VII.08; **1990**: VI.28-VI.29, VIII.11; **1993**.VII.05; 2012: VI.26, VII.12, VIII.06, VIII.13; **2013**: VII.02, IX.09; **2014**: VIII.27, VIII.29, IX.14; **2015**.VII.12; **2016**.VII.02; **2017**: VII.15, VII.21-VII.22; **2018**.VI.27; **2019**: VII.06, VII.25.



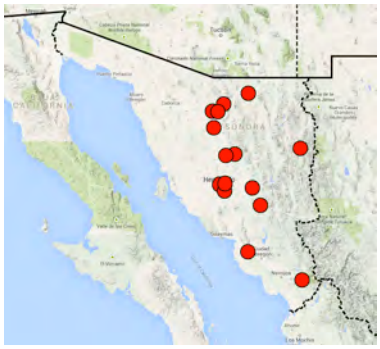
171. ***Chlaenius herbaceus*** Chevrolat, 1835
Number examined: 2.
Municipality: Navojoa.
Habitat: ?
Vegetation: coastal thornscrub.
Elevation: 50 m.
Collection date: **1987**.XI.02.

172. ***Chlaenius leucoscelis*** Chevrolat, 1834
Number examined: 18.
Municipalities: Agua Prieta, Baviácora, Cananea, Fronteras, Ímuris, Nácori Chico, Nacozari de García, Yécora.
Habitat: camp clearing; flood litter; rocky stream canyon, hillside, and mountainside. [at light]
Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian deciduous forest; cypress-maple-alder-sycamore riparian forest; desert grassland; oak woodland; pine-oak forest.
Elevation Range: 945 – 1707 m.
Collection dates: **1980**.IX.21; **1982**:VIII.20-VIII.21; **1983**.VII.05; **1986**.VIII.30; **1990**.VIII.11; **2014**.IX.14; **2016**.VIII.15; **2017**.VIII.15; **2018**: VIII.05-VIII.06, VIII.08.

173. ***Chlaenius nebraskensis*** LeConte, 1856
Number examined: 1.
Municipality: Ímuris.
Habitat: ?
Vegetation: cottonwood-willow riparian deciduous forest.
Elevation: ?
Collection date: **1956**.XII.26.

174. ***Chlaenius obsoletus*** LeConte, 1851
Number examined: 3.
Municpalities: Agua Prieta, Hermosillo, Moctezuma.
Habitat: [at light]
Vegetation: foothills thornscrub; Chihuahuan and Sonoran desertscrub.
Elevation Range: 1000 – 1350 m.
Collection dates: **1953**: VII-09-VII.16; **1982**: VIII.19-VIII.20; **1993**.VII.04.

175. ***Chlaenius orbus*** G. Horn, 1871
Number examined: 68.
Municipalities: Álamos, Bacadéhuachi, Cananea, Carbó, Guaymas, Hermosillo, Ímuris, La Colorada, Magdalena de Kino, Mazatán, Rayón, Santa Ana.
Habitat: rocky canyon, slope, and mountainside; urban.
Vegetation: desert grassland; foothills thornscrub; pine-oak forest; Sonoran desertscrub; sycamore-cypress riparian forest.
Elevation Range: 235 – 1680 m.
Collection dates: **1953**: VII.09-VII.16, VIII.15-VIII.20, IX.28; **1957**: VII.28-VII.28; **1958**.IV.03; **1984**.VII.02; **1989**.VII.08; **2012**: VII.12, VIII.06, IX.05; **2014**. VIII.29; **2015**: VII.12, IX.06; **2017**: VII.21-VII.23.



176. ***Chlaenius purpureus*** Chaudoir, 1876
Number examined: 12.
Municipalities: Aconchi, Álamos, Mazatán, Nacozari de García.
Habitat: rocky canyon, slopes, and mountainside. [at light]
Vegetation: foothills hornscrub; oak forest; oak woodland; pine- sycamore riparian deciduous forest; tropical deciduous forest.
Elevation Range: 1301 – 1830 m.
Collection dates: **1989**: VII.11-VII.13; **1993**: VII.06-VII.07; **2013**.VII.02; **2014**.VII.28; **2015**.VIII.08; **2017**. VIII.15.

177. ***Chlaenius ruficauda*** Chaudoir, 1856
Number examined: 24.
Municipalities: Agua Prieta, Ímuris, Nácori Chico, San Felipe de Jesús, Santa Ana.
Habitat: stream margin.
Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian forest; oak woodland.
Elevation Range: 963 – 1450 m.

Collection dates: **1982**.VIII.21; **1983**.VII.05; **1985**.VIII.01; **1986**.VIII.30; **2019**.VIII.05.

178. ***Chlaenius sparsus*** LeConte, 1863

Number examined: 18.

Municipalities: Álamos, Ímuris, Moctezuma, Nácori Chico, Navojoa, Yécora.

Habitat: camp clearing; roadside; rocky stream canyon.

Vegetation: cypress-maple-alder-sycamore riparian forest; foothills thornscrub; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation Range: 50 – 1900 m.

Collection dates: **1956**.XII.26; **1987**.XI.02; **1989**.VII.11; **1993**: VII.05, VII.08; **2018**: VI.27, VI.29, VIII.06, VIII.08-VIII.09.

179. ***Chlaenius tomentosus*** (Say, 1823)

Number examined: 8.

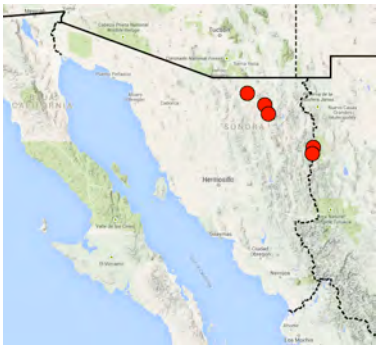
Municipalities: Cananea, Fronteras, Nácori Chico, Nacozari de García.

Habitat: cow pasture; rocky canyon. [at light]

Vegetation: cypress-maple-alder-sycamore riparian forest; desert grassland; oak woodland; pine-oak forest.

Elevation Range: 1429 – 1950 m.

Collection dates: **1983**.VII.06; **2013**.VII.16; **2015**.IX.06; **2016**.VII.02; **2018**.VIII.09.



180. ***Chlaenius tricolor*** Dejean, 1826

Number examined: 8.

Municipalities: Agua Prieta, Cananea, Ímuris, Santa Ana.

Habitat: urban.

Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian forest; desert grassland.

Elevation Range: 1040 – 1573 m.

Collection dates: **1982**: VIII.20, VIII.24; **1985**.VIII.01; **2013**.VIII.04.

23. Licinini

181. ***Dicaelus suffusus*** (Casey, 1913)

Number examined: 9.

Municipalities: Nacozari de García, Nácori Chico.

Habitat: steep north facing rocky slope.

Vegetation: pine-oak forest.

Elevation Range: 1950 – 2440 m.

Collection dates: **1982**: VIII.06-VIII.08; **1983**.VII.07; **2015**.VIII.10.

24. Harpalini

182. ***Amblygnathus balli*, new species**

Fig. 10

http://zoobank.org/4EDCB118-22CA-4E22-BDDE-D88B816E3548

Etymology: Latinized surname of George E. Ball, colleague, field companion and friend, who passed away on January 12, 2019.

Type material: 2 specimens. Holotype male, labelled: "MEXICO: Sonora/ Municipio de Fronteras,/ Rancho Capulin,/ 23.5 km (by air) WSW/ Fronteras, SierraBuenos/ Aires, Ajos-Bavispe Res.,"; "30.76167°N 109.82361°W/ cow pasture in oak/ woodland, 1429 m,/ 2.VII.2016, T.R. Van/ Devender, J.D. Palting"; "UASM#372724" (UNAM). Paratype male, labelled: "USA AZ Cochise Co/ Huachuca Mts, Miller Cyn/ CW Melton 2015.7.6" (PWMC).

Type locality: Mexico, Sonora, Municipio de Fronteras, Rancho Capulín, 23.5 km (by air) WSW Fronteras, Sierra Buenos Aires, 30.76167°N 109.82361°W.

Diagnosis: This species is readily separated from the only other species of *Amblygnathus* found in Sonora (*Amblygnathus interior*) by the rufo-testaceus pronotum.

Description: Member of the *Amblygnathus iripennis* group (Ball & Maddison 1987:210), based on characteristics of the male genitalia. Total Length males: 5.64-5.68 mm. Mouthparts, antennae and legs testaceus to dark testaceus. Dorsal surface of head black, pronotum rufo-testaceus and elytra piceous with rufo-testaceus border, dark marking of elytra brightly iridescent (Figure 12A). Ventral surface rufo-testaceus to dark rufo-testaceus, abdomen dark brunneus, last sternite broadly rufo-testaceus apically. Head shiny, isodiametric scupticels very finely impressed; pronotum shiny, no visible micro-lines on the disc, isodiametric scupticels very finely impressed in postero-lateral area; elytra with very fine transverse microsculpture, microlines barely visible, markedly iridescent. Male genitalia (Figure 12A-12B) with apical portion moderately long, with dorsal flange. Lamina long, straight, sharply pointed, spine-like, with long apodeme-like basal extension; nearly straight in dorsal aspect, slightly sinuate in lateral aspect. Internal sac (endophallus) with one large spine, about equal in length to lamina, medial in position, best viewed in right lateral aspect.

Municipality: Fronteras.

Habitat: canyon (Arizona); cow pasture (Sonora).

Vegetation: Madrean oak-juniper woodland (Arizona); oak woodland (Sonora).

Elevation range: 1429 (Sonora) – 1622 (Arizona) m.

Collection dates: **2015**.VII.06 (Arizona); **2016.**VII.02 (Sonora).

Distribution: This species is only know from two specimens, one from the type locality in Sonora, Mexico, and the second from Miller Canyon, Cochise County in Arizona, United States.

The following change is made to the key to New World species of *Amblygnathus* in Ball and Maddison (1987:202) to accommodate this new species:

3 (02) Dorsal surface predominately flavous; pronotum uniformly so, or with middle 0.5 black or infuscated; each elytron with basal 0.8 of intervals 1-3 black ....*Amblygnathus suturalis* Putzeys

3' Dorsal surface either uniformly dark, metallic, or head and pronotum rufous, elytra black 04

3" Dorsal surface mainly black, entire pronotum and basal, lateral, apical and sutural margin of elytra rufo-testaceus; disc of elytra iridescent .... *Amblygnathus balli*, **new species**

183. ***Amblygnathus interior*** Ball & Maddison, 1987

Number examined: 6.

Municipalities: Álamos, Nácori Chico, Nacozari de Garciá, Yécora.

Habitat: rocky stream canyon and mountainside. [at light]

Vegetation: cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation range: 1681 - 1830 m.

Collection dates: **1964**.VIII.25; **1993**: VII.06-VII.07; **2017**.VIII.15; **2018**.VI.27.

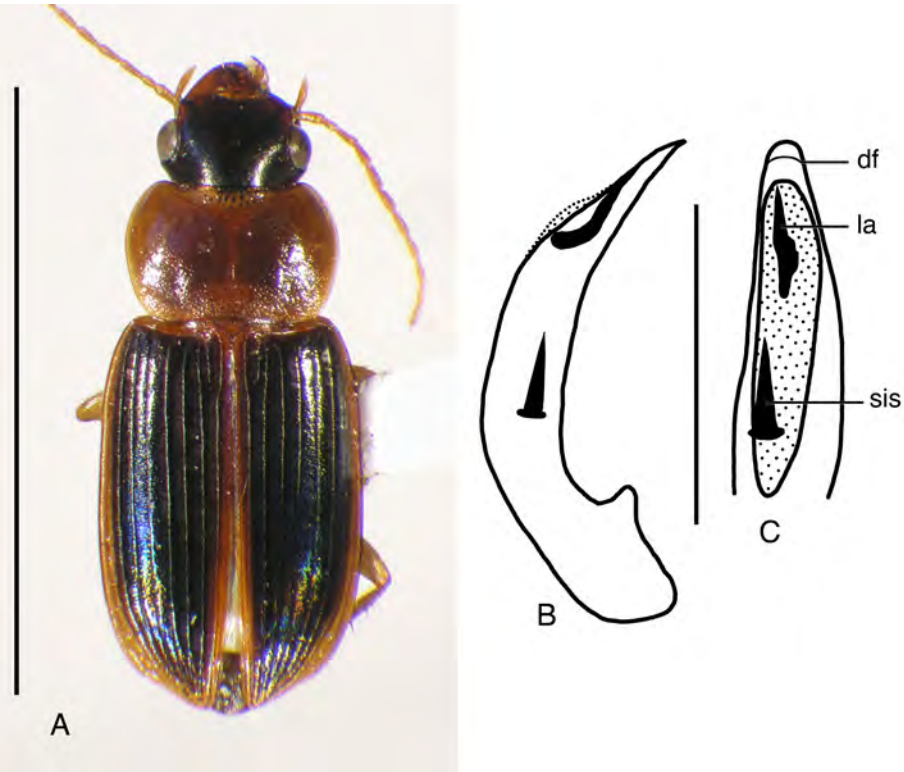


Figure 10. Habitus digital image and line drawings of male genitalia of *Amblygnathus balli*, **new species**, holotype. **A**. Habitus, dorsal aspect. Male genitalia: **B**. left lateral aspect; **C** dorsal aspect. Legend: **df** dorsal flange; **la** lamina; **sis** spine of internal sac. Scale bars: **A** 6 mm; **B**, **C** 1 mm.

184. ***Amphasia interstitialis*** (Say, 1823)
Number examined: 1.
Municipality: Ímuris.
Habitat: ?
Vegetation: cottonwood-willow riparian deciduous forest.
Elevation: ?
Collection date: **1958**.VII.11.

185. ***Anisodactylus anthracinus*** (Dejean, 1829)
Number examined: 73.
Municipalities: Bacadéhuachi, Cananea, Fronteras, Huachinera, Ímuris, Mazatán, Moctezuma, Nácori Chico, Nacozari de García, Nogales, Yécora.
Habitat: cow pasture; rocky canyon, slope, and mountainside; urban. [at light]
Vegetation: cottonwood-willow riparian deciduous forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; riparian forest, oak woodland.
Elevation Range: 847 – 2297 m.
Collection dates: **1982**: VIII.01, VIII.03, VIII.05, VIII.11; **1983**: VII.02, VII.04; **1986**.VIII.30; **1990**: VI.28-VI.29; **1993**: VII.09, VIII.05; **2012**.VII.21; **2013**.VII.16; **2014**.IV.27; **2015**: VI.25, VII.12, IX.06; **2016**: VII.02, VIII.14; **2017**: VII.16, VII.24, VIII.15.

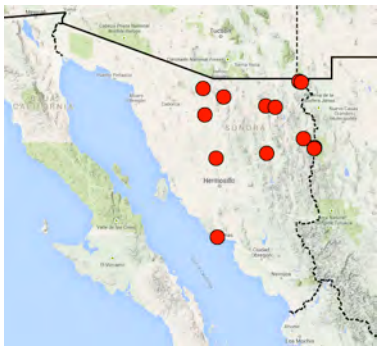
186. ***Athrostictus sericatus*** Bates, 1878
Number examined: 12.
Municipalities: Álamos, Carbó, Hermosillo, Santa Ana.
Habitat: [at light]
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation range: 650 - 707 m.
Collection dates: **1952**.VII.19; **1964**: VII.28-VII.31, VIII.24, IX.10; **1993**.VII.17; **2017**.VII

187. ***Bradycellus nitidus*** (Dejean, 1829)
Number examined: 5.
Municipality: Nácori Chico.
Habitat: camp clearing; rocky stream canyon.
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest.
Elevation: 1648 m.
Collection dates: **2018**: VI.27, VIII.06, VIII.09.

188. ***Bradycellus rupestris*** species group sp.
Number examined: 2.
Municipalities: Ímuris, Nogales.
Habitat: [at light]
Vegetation: cottonwood-willow riparian deciduous forest; desert grassland;
Elevation: ?
Collection dates: **1965**: VII.30-VII.31.

189. ***Bradycellus sp***. UASM-6
Number examined: 1.
Municipality: Ímuris.
Habitat: marsh.
Vegetation: cottonwood-willow riparian deciduous forest.
Elevation: 914 m.
Collection date: **1967**.VII.27.

190. ***Bradycellus sp***p. (may be more than one species)
Number examined: 190.
Municipalities: Agua Prieta, Fronteras, Guaymas, Huachinera, Ímuris, Moctezuma, Nácori Chico, Sáric, Santa Ana.
Habitat: cow pasture; flood litter, stream margin.
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood gallery forest; foothills thornscrub; oak woodland; pine-oak forest.
Elevation: 710 – 2090 m.
Collection dates: **1929**.VI.27; **1953**: VII.09-VII.16, VIII.15-VIII.20; **1960**: VIII.08, VIII.10; **1982**: VIII.04, VIII.19-VIII.20, VIII.23-VIII.24; **1983**: VII.04-VII.06, VII.11-VII.12; **1986**.VIII.30; **2012**.VIII.01 **2016**. VII.02; **2017**.IV.23.

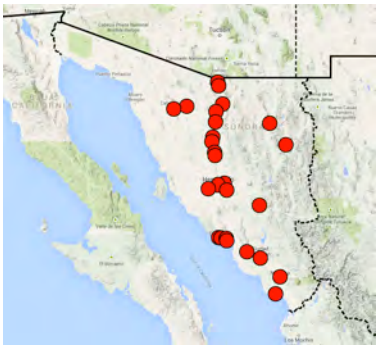


191. ***Discoderus crassiusculus*** (Putzeys, 1878)
Number examined: 6.
Municipality: Yécora.
Habitat: ?
Vegetation: pine-oak forest.
Elevation range: 2134 - 2438 m.
Collection dates: **1961**: V.20-V.22.

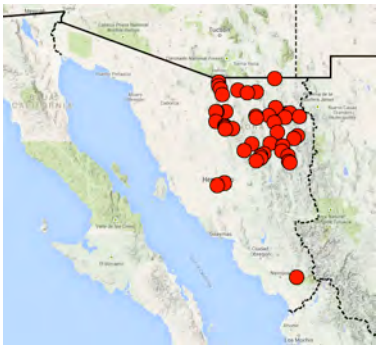
192. ***Discoderus sp***. UASM son-1
Number examined: 1.
Municipality: Huachinera.
Habitat: ?
Vegetation: desert grassland.
Elevation: 1150 m.
Collection date: **1982**.VIII.05.

193. ***Discoderus sp***. UASM son-2
Number examined: 8.
Municipalities: Huachinera, Nácori Chico, Nacozari de Garciá.
Habitat: ?
Vegetation: desert grassland; oak woodland.
Elevation range: 1380 – 1420 m.
Collection dates: **1982**: VIII.03, VIII.11; 1983.VII.04.

194. ***Discoderus sp.*** UASM son-3
Number examined: 314.
Municipalities: Cajeme, Carbó, Empalme, Guaymas, Hermosillo, Huásabas, Huatabampo, Ímuris, La Colorada, Magdalena de Kino, Nacozari de García, Navojoa, Nogales, Opodepe, Pitiquito, Santa Ana.
Habitat: PEMEX station; urban. [at light]
Vegetation: coastal and foothills thornscrub; cottonwood-willow riparian deciduous forest; desert grassland; Sonoran desertscrub.
Elevation range: 46 - 1201 m.
Collection dates: **1950**: VII.13, VII.21; **1952**: VII.19, VII.25-VII.26, VII.29, VII.31; **1953**: VII.09-VII.16; **1956**.VI.24; **1957**.VI.21; **1958**.X.08; **1959**.VII.22; **1960**.VIII.08; **1963**.VII.14; **1965**: VII.30-VII.31; **1984**.VII.02; **1985**.VII.31; **1993**.VII.17; **2012**.VIII.06; **2015**: VII.12, VIII.13; **2016**.V.05, 2017: II.27, VII.21-VII.23.



195. ***Discoderus sp***. UASM-8
Number examined: 230.
Municipalities: Agua Prieta, Álamos, Arizpe, Bacadehuachi, Bacoachi, Banamichi, Bavispe, Cananea, Cucurpe, Cumpas, Divisaderos, Fronteras, Granados, Hermosillo, Huachinera, Ímuris, Magdalena de Kino, Mazatán, Moctezuma, Nacozari de Garciá, Nogales, San Felipe de Jesús, Santa Ana, Santa Cruz.
Habitat: flood litter; pond margin; rocky arroyo, mountainside, ridge top, slopes, and strean canyon; urban. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; tropical deciduous forest.
Elevation range: 212 – 2441 m.
Collection dates: **1965**: VII.31, IX.11, IX.16; **1968**.VI.18; **1982**: VIII.02-VIII.03, VIII.05, VIII.11; **1986**: VI.28, VIII.30; **1993**.VII.05; **2012**: VIII.09, VIII.13, IX.05; **2013**: VIII.12, VIII.23, IX.09; **2014**.VIII.25; **2015**: VIII.10, VIII.15, IX.06, IX.14; **2016**: III.04, III.29, IV.01, IV.07, IV.16, VIII.24, XI.21-XI.22; **2017**: IV.21, VII.16, VII.21, VII23, VIII.13-VIII.16; **2018**: III.19-III.20; **2019**: IV.25, VII.06, VIII.04-VIII.05, VIII.09, VIII.16, IX.14, IX.23, IX.25-IX.26.

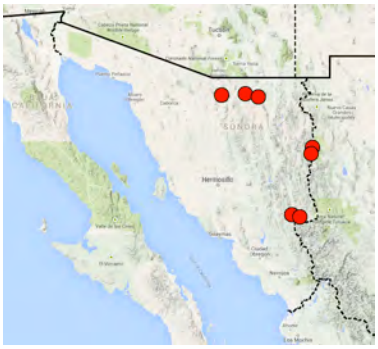


196. ***Discoderus sp***. UASM-11
Number examined: 56.
Municipalities: Bacanora, Huachinera, Moctezuma.
Habitat: rocky slope.
Vegetation: desert grassland; foothills thornscrub; oak woodland; riparian tropical scrub.
Elevation range: 944 - 1387 m.
Collection dates: **1982**: VIII.01, VIII.05; **1993**.VII.05; **2014**.VIII.02; **2019**.VIII.09.

197. ***Discoderus sp.*** UASM-13
Number examined: 66.
Municipalities: Agua Prieta, Cananea, Granados, Ímuris, Naco, Nogales.
Habitat: urban. [at light]
Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian deciduous forest; desert grassland; foothills thornscrub.
Elevation range: 858 - 1573 m.
Collection dates: **1949**.VIII.15; **1965**.VII.30; **2013**: VIII.04, VIII.23; **2015**: VII.12, VIII.08, IX.06; **2016**: III.29, VIII.24; **2017**.IX.02; **2018**.VIII.13.

198. ***Discoderus sp.*** UASM-16
Number examined: 83.
Municipalities: Agua Prieta, Cananea, Fronteras, Ímuris, Magdalena de Kino, Naco, Nacozari de García, Nogales, Santa Ana.
Habitat: urban. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian deciduous forest; desert grassland; oak woodland.
Elevation range: 742 – 1573 m
Collection dates: **1964**.IX.06; **1965**: VII.30, IX.04, IX.11; **2012**.VIII.01; **2013**: VIII.04, VIII.23; **2016**.VIII.24; **2017**.IX.02.

199. ***Harpalus caliginosus*** (Fabricius, 1775)
Number examined: 10.
Municipalities: Bacoachi, Cananea, Ímuris, Nácori Chico, Yécora.
Habitat: arroyo; meadow; stream canyon.
Vegetation: cottonwood-willow riparian deciduous forest; desert grassland; oak woodland; pine-oak forest.
Elevation range: 1204 - 1950 m.
Collection dates: **1965**.VII.31; **1983**.VII.06; **1984**.VIII.25; **1990**.VIII.11; **2016**.VIII.25; **2018**.VIII.07.



200. ***Harpalus desertus*** LeConte, 1859

Number examined: 15.

Municipalities: Cananea, Nácori Chico, Nacozari de García.

Habitat: shallow rocky arroyo, stream margin.

Vegetation: desert grassland; oak woodland; pine-oak forest.

Elevation rane: 1521 - 2278 m.

Collection dates: **1982**: VIII.06-VIII.07; **2015**.VIII.11; **2016**.VIII.24.

201. ***Harpalus fraternus*** LeConte, 1852

Number examined: 1

Municipality: Nogales.

Habitat: ?

Vegetation: desert grassland.

Elevation: 1081 m.

Collection date: **2013**.VIII.09.

202. *Harpalus pensylvanicus* (DeGeer, 1774)

Number examined: 104.

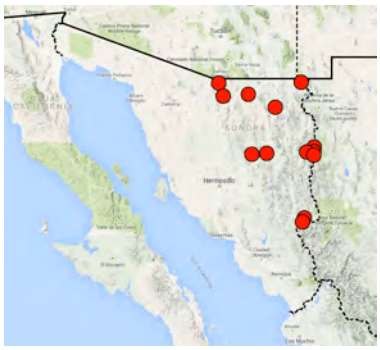
Municipalities: Aconchi, Agua Prieta, Cananea, Fronteras, Ímuris, Moctezuma, Nácori Chico, Nogales, Yécora.

Habitat: camp clearing; pasture; rocky stream canyon; stream margin. [at light]

Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian forest; cypress-maple-alder-sycamore desert grassland; foothills thornscrub; pine-oak forest; riparian forest.

Elevation range: 606 - 1950 m.

Collection dates: **1965**: VII.30-VII.31; **1982**: VIII.01, VIII.06-VIII.07; **1983**.VII.05; **1990**: VI.30-VII.03, VIII.11; **2012**.VIII.01; **2015**.IX.06; **2018**: VI.27, VIII.05-VIII.09; **2019**.VIII.15.



203. ***Notiobia brevicollis*** (Chaudoir, 1837)

Number examined: 52.

Municipalities: Agua Prieta, Álamos, Bacadéhuachi, Cananea, Huachinera, Ímuris, Naco, Nácori Chico, Nacozari de García, Nogales, Yécora.

Habitat: camp clearing; pasture; rocky stream canyon and ridge top; urban. [at light]

Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian forest; cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation Range: 1204 – 2261 m.

Collection dates: **1965**: VII.30-VII.31; **1982**: VIII.03, VIII.06-VIII.07, VIII.19-VIII.20; **1989**: VII.11-VII.13; **1990**: VII.02-VII.03, VIII.11; **1993**.VII.08; **2013**: VII.16, VIII.04; **2015**: VIII.12, IX.06; **2017**.IX.02; **2018**: VI.27, VIII.06, VIII.09.

204. ***Notiobia cyanippa*** (Bates, 1882)

Number examined: 12.

Municipalities: Álamos, Fronteras, Nácori Chico, Nacozari de García.

Habitat: cow pasture; gravel; rocky arroyo; rocky canyon; rocky mountainside.

Vegetation: Chihuahuan desertscrub; foothills thornscrub; oak woodland; sycamore riparian forest; tropical deciduous forest.

Elevation range: 950 - 1595 m.

Collection dates: **1935**.VII.07; **1982**.VIII.09; **1983**.VII.04; **2013**.VII.16; **2016**: VII.02, VIII.15; **2017**: VII.15, VIII.14-VIII.15.

205 ***Notiobia mexicana*** Dejean, 1829

Number examined: 127.

Municipalities: Aconchi, Álamos, Bacadéhuachi, Bacoachi, Cananea; Fronteras, Huachinera, Magdalena de Kino, Moctezuma, Nácori Chico, Nacozari de García, Yécora.

Habitat: cow pasture; rocky arroyo, stream canyon, slope, mountainside, and ridge top.

Vegetation: Chihuahuan and Sonoran desertscrub; cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation Range: 1000 – 2467 m.

Collection dates: **1982**: VIII.03-VIII.07, VIII.11; **1983**: VII.04-VII.07; **1989**: VII.11-VII.13; **1990**: VI.28-VII.03, VIII.11; **1993**: VII.05-VII.07; **2012**.VIII.09; **2013**: VII.03, VII.16, IX.03; **2014**.IX.20; **2015**: VI.25, VIII.10, VIII.12, IX.06, IX.13-IX.14; **2016**: VII.02, VIII.14-VIII.15; **2017**.VIII.15; **2018**: VI.27, VI.29; **2019**: IX.24-IX.25.

206. ***Notiobia purpurascens*** (Bates, 1882)

Number examined: 22.

Municipalities: Agua Prieta, Ímuris, Navojoa.

Habitat: [at light]

Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian forest; coastal thornscrub.

Elevation Range: 1040 – 1350 m.

Collection dates: **1972**.VII.18; **1982**: VIII.20, VIII.24.

207. ***Notiobia schlingeri*** Noonan, 1973

Number examined: 17.

Municipality: Nácori Chico.

Habitat: camp clearing. [at light]

Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest.

Elevation: 1648 m.

Collection dates: **2018**: VIII.06-VIII.09.

208. ***Notiobia terminata*** (Say, 1823)

Number examined: 3.

Municipalities: Álamos, Nacozari de García.

Habitat: large flat area near ridge top. [at light]
Vegetation: pine-oak forest; tropical deciduous forest.
Elevation: 2261 m.
Collection dates: **1964**.VIII.24; **2015**.VIII.13.

209. ***Pelmatellus stenolophoides*** Bates, 1882
Number examined: 1.
Municipality: Nácori Chico.
Habitat: camp clearing
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest.
Elevation: 1648 m.
Collection date: **2018**.VIII.06.

210. ***Pogonodaptus mexicanus*** (Bates, 1878)
Number examined: 2.
Municipalities: Guaymas, Navojoa.
Habitat: [at light]
Vegetation: coastal thornscrub.
Elevation: ?
Collection dates: **1964**.VIII.25; **1965**.VIII.01.

211. ***Polpochila erro*** (LeConte, 1854)
Number examined: 61.
Municipios: Agua Prieta, Álamos, Carbó, Benjamín Hill, Hermosillo, Huatabampo, Magdalena de Kino, Nácori Chico, Opodepe, Pitiquito, Santa Ana.
Habitat: rocky stream canyon; PEMEX station. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; oak woodland; pine-oak forest; tropical deciduous forest.
Elevation range: 741 - 1605 m.
Collection dates: **1950**.VIII.10; **1953**: VII.09-VII.16, VIII.20, IX.26; **1957**: VII.28-VII.29; **1963**.VII.15; **1965**.VII.31; **1967**.VII.27; **1980**.IX.16; **1982**: VIII.19-VIII.20, VIII.23; **1985**.VII.31; **1987**: VII-30-VII.31; **2012**.IX.10; **2013**.VIII.23; **2017**.VII.23; **2018**: VI.29, VIII.13.

212. ***Selenophorus aeneopiceus*** Casey, 1884
Number examined: 51.
Municipalities: Agua Prieta, Banámichi, Cananea, Carbó, Fronteras, Ímuris, Magdalena de Kino, Naco, Nacozari de García, Nogales.
Habitat: cow pasture; PEMEX station; rocky mountainside; small limestone hill; urban. [at lights on building at night]
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian deciduous forest; desert grassland; foothills thornscrub; oak woodland.
Elevation range: 742 – 2297 m.
Collection dates: **1968**.VI.19; **2012**: VII.13, VIII.09; **2013**: VII.05, VIII.23; **2015**: VI.25, VII.12, VIII.13; **2016**: II.09, VII.02; **2017**: VII.16, VIII.15.

213. ***Selenophorus aequinoctialis*** Dejean, 1829

Number examined: 613.

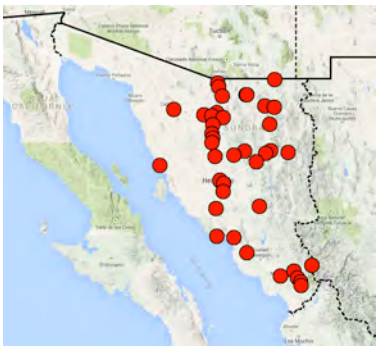
Municipalities: Agua Prieta, Álamos, Banámichi, Benjamín Hill, Cananea, Carbó, Empalme, Fronteras, Granados, Guaymas, Hermosillo, Ímuris, La Colorada, Magdalena de Kino, Mazatán, Moctezuma, Nacozari de García, Navojoa, Nogales, Opodepe, Pitiquito, Rayón, San Felipe de Jesús, Santa Ana.

Habitat: cow pasture; lights at building at night; PEMEX station; rocky slope; urban. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian deciduous forest; desert grassland; foothills thornscrub; oak woodland; tropical deciduous forest.

Elevation range: 33 – 1573 m.

Collection dates: **1950**.VII.13; **1953**: VIII.09-VIII.16, VIII.21-VIII.30; **1957**.VIII.16; **1960**: VIII.09, VIII.10, VIII.12; **1963**: VIII.03, VIII.06-VIII.07; **1964**: VIII.08, VIII.23-VIII-25, IX.03, IX.06; **1965**: VII.15, VII.30-VII.31; **1967**.VII.27; **1969**.VIII.19; **1971**.VIII.16; **1980**.IX.16; **1982**: VIII.02, VIII.04, VIII.23; **1983**: VII.11-VII.12; **1984**.VII.04; **1985**.VII.31; **1986**: VIII.05, VIII.29; **1987**: VII.30-VII.31; **1989**: VII.08, VII.11-VII.13; **1993**: VII.04, VII.14. **2012**: VII.12-VII.13, VIII.01, VIII.06, VIII.08-VIII.09, IX.05; **2013**: VII.05, VIII.04, VIII.09, VIII.23; **2014**: VIII.02, VIII.29; **2015**: VI.27, VII.12, VIII.08, VIII.13; **2016**.VII.02; **2017**: V.23, VII.16, VII.21-VII.23; **2018**: VIII.11, VIII.13; **2019**: VIII.05, VII.25.



214. ***Selenophorus balli*** Messer & Raber, 2021

Number examined: 234.

Municipalities: Álamos, Hermosillo, La Colorada, Navojoa.

Habitat: [at light]

Vegetation: coastal thornscrub; Sonoran desertscrub; tropical deciduous forest.

Elevation range: 229 – 518 m.

Collection dates: **1960**.VIII.12; **1964**: VII.24-VII.25, IX.10; **1967**.VII.27; **1987**: VII.30-VII.31; **2012**.VIII.06.

215. ***Selenophorus concinnus*** Schaeffer, 1910

Number examined: 314.

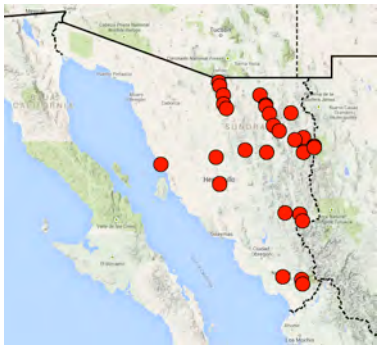
Municipalities: Álamos, Aconchi, Cananea, Carbó, Fronteras, Hermosillo, Huchineras, Ímuris, Mazatán, Moctezuma, Nácori Chico, Nacozari de García, Nogales, Navojoa, Ónavas, Pitiquito, Yécora.

Habitat: cow pasture; rocky stream canyon, slopes, and mountainside; urban. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian deciduous forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; riparian forest; riparian tropical scrub; sycamore riparian deciduous forest; tropical deciduous forest.

Elevation: 858 – 2297 m.

Collection dates: **1953**: VII.08-VII.16; **1960**: VIII.08, VIII.12; **1964**: VIII.08, VIII.24-VIII.25; **1967**.VII.22; **1981**.VI.26; **1982**: VIII.01, VIII.04, VIII.09; **1983**: VII.03-VII.04, VII.06, VII.11-VII.12; **1987**: VII.26-VII.27; **1989**.VII.08; **1990**: VI.28-VI.29, VII.02-VII.03; **1993**.VII.04; **2013**.VII.02, VII.16; **2014**: VII.28, VIII.24; **2015**: VI.25, VI.27, VII.12, VIII.08; **2016**: VII.02, VIII.14; **2017**: VII.24, VIII.14-VIII.15.



216. ***Selenophorus dispar*** Bates, 1891

Number examined: 2.

Municipalities: Carbó, Hermosillo.

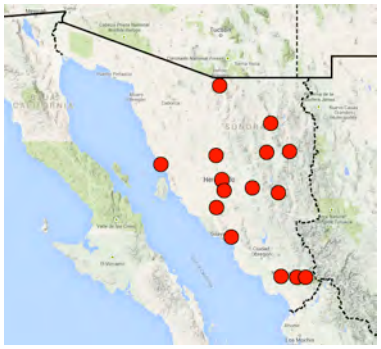
Habitat: ?

Vegetation: Sonoran desertscrub.

Elevation: ?

Collection dates: **1965**.VII.31; **1967**.VII.27.

217. ***Selenophorus fatuus*** (LeConte, 1863)
Number examined: 212.
Municipalities: Álamos, Bacanora, Carbó, Empalme, Granados, Hermosillo, Mazatán, Moctezuma, Nacozari de García, Nogales, Navojoa, Pitiquito.
Habitat: rocky slope; PEMEX station; urban. [at light]
Vegetation: coastal and foothills thornscrub; desert grassland; oak woodland; Sonoran desertscrub; tropical deciduous forest.
Elevation range: 229 - 1387 m.
Collection dates: **1953**: VIII.20-VIII.31; **1954**.VIII.24; **1960**: VIII.08, VIII.12; **1964**: VIII.24-VIII.25, IX.10; **1965**.VII.31; **1967**.VII.27; **1983**: VII.11-VII.12; **2014**.08.02; **2015**: VII.12, VIII.13; **2017**: VII.21-VII.22; **2018**.VIII.11.



218. ***Selenophorus pedicularis*** Dejean, 1829
Number examined: 15.
Municipalities: Álamos, Hermosillo, Saric.
Habitat: ?
Vegetation: Sonoran desertscrub tropical deciduous forest.
Elevation: ?
Collection dates: **1929**.VI.27; **1953**: VII.09-VII.16; **1973**.X.11.

219. ***Selenophorus pumilus*** Messer & Raber, 2021
Number examined: 17.
Municipalities: Álamos, Hermosillo, Navojoa.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16; **1956**.VI.24; **1960**. VIII.12.

220. ***Selenophorus pyritosus*** Dejean, 1829
Number examined: 67.
Municipalities: Álamos, Navojoa.
Habitat: [at light]
Vegetation: coastal thornscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1962**.VI.24; **1964**.VIII.25; **1989**.VII.08.

221. ***Selenophorus rileyi*** Messer & Raber, 2021

Number examined: 8.
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation range: ?
Collection dates: **1960**.VIII.12; **1964**: VIII.24, IX.03.

222. ***Selenophorus semirufus*** Bates, 1882
Number examined: 5.
Municipalities: Cajeme, Hermosillo, Naco.
Habitat: ?
Vegetation: coastal thornscrub; desert grassland; Sonoran desertscrub.
Elevation: 1416 m.
Collection dates: **1953**: VII.09-VII.16; **1960**.VIII.11; **2017**.IX.02.

223. ***Selenophorus seriatoporus*** Putzeys, 1878
Number examined: 23
Municipalities: Aconchi, Álamos, Nácori Chico, Ónavas.
Habitat: rocky canyon and mountainside. [at light]
Vegetation: foothills thornscrub; oak woodland; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 917 - 1681 m.
Collection dates: **1964**: VII.24, VIII.08, VIII.24; **1983**. VII.04; **1987**: VII.26-VII.27; **1989**: VII.11-VII.13; **2013**.VII.02; **2017**.VIII.15.

224. ***Selenophorus sinuaticollis*** Notman, 1922
Number examined: 31.
Municipalities: Carbó, Navojoa, Pitiquito, Santa Ana.
Habitat: ?
Vegetation: coastal thornscrub; Sonoran desertscrub.
Elevation range: 650 - 850 m.
Collection date: **1956**.VI.24; **1982**.VIII.23; **1985**. VII.31; **1993**: VII.14, VII.17; **2017**.VII.23.

225. ***Selenophorus striatopunctatus*** Putzeys, 1878
Number examined: 2.
Municipalities: Navojoa, Soyopa.
Habitat: ?
Vegetation: coastal and foothills thornscrub.
Elevation: 278 m.
Collection dates: **1964**.VIII.25; **1965**.VII.11.

226. ***Selenophorus hylacis*** group sp. UASM-12
Number examined: 18.
Municipalities: Álamos, Navojoa.
Habitat: [at light]
Vegetation: coastal thornscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1964**: VIII.24-VIII.25.

227. ***Selenophorus hylacis*** group sp. UASM-14
Number examined: 2.
Municipalities: La Colorada, Rosario de Tesopaco.
Habitat: ?
Vegetation: foothills thornscrub; Sonoran desertscrub.
Elevation: 413 m.
Collection dates: **1971**.IX.05; **2012**.VIII.06.

228. ***Selenophorus suavis*** group sp. UASM-6
Number examined: 1.
Municipality: Nogales.
Habitat: ?
Vegetation: desert grassland.
Elevation: 1159 m.
Collection date: **2015**.VI.27.

229. ***Selenophorus (Hemisopalus)*** sp. 1
Number examined: 43.
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation: 518 m.
Collection dates: **1964**: VII.24, VIII.24; **1987**: VII.30-VII.31; **1989**.VII.08.

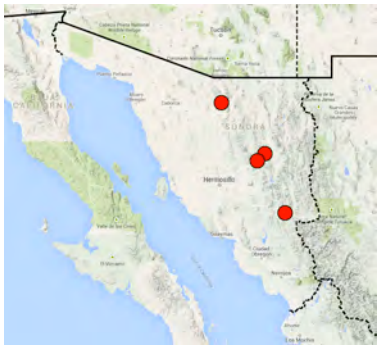
230. ***Selenophorus (Hemisopalus)*** sp. 2
Number examined: 1.
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation: 518 m.
Collection date: **1987**: VII.30-VII.31.

231. ***Selenophorus (Hemisopalus)*** sp. 3
Number examined: 38.
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1964**: VIII.24.

232. ***Selenophorus (s. str.)*** sp. 4
Number examined: 1.
Municipality: Navojoa.
Habitat: [at light]
Vegetation: coastal thornscrub.
Elevation range: ?
Collection date: **1964**: VIII.25.

233. ***Selenophorus (s. str.)*** sp. 25
Number examined: 1.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: desert grassland.
Elevation: 1600 m.
Collection date: **1982**.VIII.22.

234. ***Selenophorus (s. str.)*** sp. 26
Number examined: 4.
Municipalities: Ímuris, Moctezuma, Nácori Chico.
Habitat: ?
Vegetation: cottonwood-willow riparian deciduous forest; foothills thornscrub; oak woodland.
Elevation range: 500 – 1380 m.
Collection dates: **1982**: VIII.02, VIII.23; **1983**.VII.04; **1993**.VII.05.



235. ***Stenolophus comma*** (Fabricius, 1775)
Number examined: 9.
Municipalities: Agua Prieta, Nácori Chico, Santa Ana.
Habitat: [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; pine-oak forest.
Elevation range: 1350 – 1950 m.
Collection dates: **1982**: VIII.06-VIII.07, VIII.23; **1983**. VII.04.

236. ***Stenolophus lineola*** (Fabricius, 1775)
Number examined: 2.
Municipalities: Nácori Chico.
Habitat: rocky stream canyon. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest.
Elevation Range: 1450 - 1648 m.
Collection dates: **1983**.VII.04l **2018**.VIII.05.

237. ***Stenolophus ochropezus*** (Say, 1823)
Number examined: 39.
Municipalities: Agua Prieta, Cananea, Ímuris.
Habitat: rocky hillside. [at light]
Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian forest; desert grassland; oak woodland.
Elevation range: 1040 – 1350 m.
Collection dates: **1982**: VIII.19-VIII.20, VIII.24; **1986**. VIII.30; **2014**.VIII.14; **2017**.IV.23.

238. ***Stenolophus conjunctus*** species group sp.
Number examined: 2.
Municipalities: Agua Prieta, Moctezuma.
Habitat: ?
Vegetation: desert grassland; foothills thornscrub.
Elevation range: 1000 – 1600 m.
Collection dates: **1982**.VIII.22; **1993**.VII.05.

239. ***Stenomorphus californicus rufipes*** LeConte, 1858
Number examined: 1.
Municipality: Navojoa.
Habitat: [at light]
Vegetation: coastal thornscrub.
Elevation: ?
Collection date: **1962**.VII.12.

240. ***Stenomorphus convexior*** Notman, 1922
Number examined: 72.
Municipalities: Agua Prieta, Álamos, Altar, Cananea, Fronteras, Magdaleno de Kino, Mazatán, Naco, Nogales.
Habitat: lights at building at night; rocky stream canyon and hillside. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; desert grassland; foothills thornscrub; oak woodland; tropical deciduous forest.
Elevation range: 376 – 1521 m.
Collection dates: **1965**.VII.31; **1967**.VIII.20; **1971**. VIII.16; **2012**: VIII.01, VIII.09, VIII.13, IX.05, IX.12; **2013**: VIII.23, IX.11; **2014**: IX.14, IX.16; **2015**: VIII.08, VIII.13, IX.06; **2016**.VIII.24; **2017**.IX.02; **2018**.VIII.13.

241. ***Stenomorphus sinaloae*** Darlington, 1936
Number examined: 19.
Municipalities: Mazatán, Quiriego, Rayón.
Habitat: urban.
Vegetation: coastal and foothills thornscrub.
Elevation range: 542 – 550 m.
Collection dates: **1991**.VIII.31; **2012**.VIII.13; **2014**.VIII.29.

242. ***Trichopselaphus erwinorum*** Ball, 1978
Number examined: 1.
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation: 1577 m.
Collection date: **1989**: VII.11-VII.13.

25. Sphodrini

243. ***Calathus mcclevei*, new species**
http://zoobank.org:/B205C63B-EBBA-4F2D-BBBC-200FD6AAA430
Fig. 11A, 12A, 12B

Etymology: Latinized surname name of Scott McCleve, one of the collectors of the type series.

Type material: 37 specimens. Holotype male, labelled: "MEXICO: Sonora, S.M./ Occidental, 10 km s/ Yecora, 1830 m/oak-pine litter/ 93-17, 06-07.VII.93"; "MEX. EXPEDITION/ 1993, S. McCleve,/ G.E. & K.E. Ball/ collectors"; "UASM#/ 259363" (UNAM). Paratypes, 36: 9 males, labelled same as holotype, except: "UASM#/ 259385" (CASC); "UASM#/ 259381" (UAIC); "UASM#/ 259361", "UASM#/ 259368", "UASM#/ 259372", "UASM#/ 259374", "UASM#/ 259380", "UASM#/ 259382" (UASM); "UASM#/ 259384" (USNM). 25 females, labelled same as holotype, except: "UASM#/ 259360" (CASC); "UASM#/ 259362" (UAIC); "UASM#/ 259364" (UNAM); "UASM#/ 259366", "UASM#/ 259367", "UASM#/ 259369", "UASM#/ 259370", "UASM#/ 259371", "UASM#/ 259376" – "UASM#/ 259379", "UASM#/ 259383", "UASM#/ 259386" – "UASM#/ 259394" (UASM); "UASM#/ 259365" (USNM). 1 male: "MEXICO SONORA/ 4.5 km n Mesa de/ Tres Rios, oak-/ pine for.; 1950 m./July 6, 1983, 83-12"; "MEXICO EXPED. 1983/ H.E. Frania,/ R.J. Jaaguagi,/ D. Shpeley colls."; "UASM#253979" (UASM). 1 female: "MEXICO SONORA/ 4.5 km n Mesa de/ Tres Rios, oak-/ pine for.; 1950 m./ July 6, 1983, 83-12"; "MEXICO EXPED. 1983/ H.E. Frania,/ R.J. Jaagumagi,/ D. Shpeley colls."; "UASM#/ 253980" (UASM).

Type locality: Mexico, Sonora, Municipio de Yécora, 10 km south of Yécora, ca. 28.278°N 108.926°W.

Diagnosis: Males of this species are readily separated from males of *C. tigrinus*, new species, by morphology of the male genitalia: apical portion short, LAP/WD 1.78-2.43; median lobe shorter (LML) relative to body length (TL) of male (ratio LML/TL 0.22-0.26).

Description: Member of the *melanocephalus* group (Ball & Negre 1972:428-429). Total Length: males (n=10), 7.76-9.20 mm (mean 8.51 mm); females (n=10), 8.28-9.64 mm (mean 9.06 mm). Mouthparts, antennae and legs rufo-testaceus to nearly brunneus. Dorsal (Figure 10A) and ventral surface rufo-brunneus to dark brunneus, lateral margins of pronotum and elytra diffusely paler. Dorsal microsculpture with isodiametric sculpticels; males with head and pronotum shiny, elytra dull; females with head and pronotum less shiny than in males, elytra dull. Pronotum basally with coarser sculpticels in both sexes. Prosternum with apex beaded. Elytra with 3 to 5 setae in striae 3 (preapical seta also observed in stria 2 and interval 3). Hind wings reduced to narrow stubs, adults incapable of flight. Middle femur with 2 setae in antero-ventral row. Hind metatarsus with groove on

both outer and inner surfaces. Tarsal claws finely pectinate. Male genitalia (Figure 12A, 12B) with short apical portion and well developed apical disc; endophallus without spines; left paramere somewhat ovoid, with membranous lobe apically; right paramere narrow, elongate, with short spine at apex. Female ovipositor was not studied.

Municipalities: Nácori Chico, Yécora.
Habitat: ?
Vegetation: oak-pine forest; oak-pine litter.
Elevation range: 1830 – 1950 m.
Collection dates: **1983**.VII.06; **1993**: VII.06-VII.07.
Distribution: This species is currently only known from Sonora and near Madera in Chihuahua.

244. ***Calathus opaculus*** LeConte, 1854
Number examined: 30.
Municipalities: Agua Prieta, Ímuris.
Habitat: flood litter
Vegetation: Chihuahuan desertscrub; cottonwood-willow riparian.
Elevation range: 963 – 1350 m.
Collection dates: **1982**: VIII.20, VIII.24; **1986**.VIII.30.

245. ***Calathus ruficollis*** Dejean, 1828
Number examined: 1.
Municipality: Cananea.
Habitat: rocky stream canyon.
Vegetation: oak woodland; pine-oak forest; riparian deciduous forest;
Elevation: 1905 m.
Collection date: **2014**.VIII.24.

246. ***Calathus tigrinus***, **new species**
http://zoobank.org/0C39C5D9-FE17-4429-A7D6-A21E2E0E5E76
Fig. 11B, 12C, 12D

Etymology: Latinized name of the mountain range in which this species was collected, the Sierra El Tigre in Sonora.

Type material: 21 specimens. Holotype male, labelled: "MEXICO: Sonora,/ Sierra El Tigre,/ 30.58988°N 109.20811°W,/ camp, large flat area," ; "pine-oak forest, at night/ headlamping, on ground/ 2261m,12.VIII.2015,/ D. Shpeley11-15'; "UASM#370301" (UNAM). Paratypes, 20: 3 males, labelled same as holotype, except: "UASM#/ 370303 –UASM#/ 370305" (UASM). 2 females, labelled same as holotype, except: "UASM#/ 370300" (UASM); "UASM#/ 370302" (UNAM). 2 males: "MEX. Sonora Sierra/ Huachinera 56 km./ n.e. Nacori Chico/ oak-pine forest/ 2330 m. 82-12/ August 8, 1982"; "MEX. EXPED. 1982/ G.E. & K.E. Ball/ & S. McCleve/ collectors": "UASM#/ 253816" (CASC); "UASM#/ 253815" (UASM). 3 females: "MEX. Sonora Sierra/ Huachinera 56km./ n.e. Nacori Chico/ oak-pine forest/ 2330 m. 82-12/ August 8, 1982"; "MEX. EXPED. 1982/ G.E. & K.E. Ball/ & S. McCleve/ collectors": "UASM#/ 253814" (CASC); "UASM#/ 253812, UASM#/ 253813" (UASM). 1 female: "MEX. Sonora Sierra/ Huachinera 32-34/ km. n.e. Nacori/ Chico 1950 m.; oak-/ pine for. 82-10/ August 6&7, 1982"; "MEX. EXPED. 1982/ G.E. & K.E. Ball/ & S. McCleve/ collectors"; "UASM#/ 253780" (UASM). 3 males: "MEXICO Sonora/ 18.5 km e Mesa de/ Tres Rios, pine-oak/ forest; 2440 m./ July 7, 1983 83-18"; "MEXICO EXPED. 1983/ H.E. Frania,/ R.J. Jaagumagi,/ D. Shpeley colls.": "UASM#/ 253984" (UAIC); "UASM#/ 253988" (UASM); "UASM#/ 253987" (USNM). 5 females: "MEXICO Sonora/ 18.5 km e Mesa de/ Tres Rios, pine-oak/ forest; 2440 m./ July 7, 1983 83-18"; "MEXICO EXPED. 1983/ H.E. Frania,/ R.J. Jaagumagi,/ D. Shpeley colls.": "UASM#/ 253986" (UAIC); "UASM#/ 253981" – "UASM#/ 253983" (UASM); "UASM#/ 253985" (USNM). 1 male: MEX. Sonora Sierra/ San Luis; Varela/ Rch., Cn. Chimeneaz/ 1460-1690m. oak-/ juniper-sycamore/ VIII.19.1982 82-20"; "MEX. EXPED 1982/ GE Ball, S. McCleve/ & DR Maddison/ collectors"; "UASM#253779" (UASM).

Type locality: Mexico, Sonora, Municipio de Nacozri de García, Rancho El Tigre, 28.3 km (by air) WNW Bavispe, Sierra El Tigre, 30.58988°N 109.20811°W.

Diagnosis: Males of this species are readily separated from males of *C. mcclevei*, new species, by morphology of the male genitalia: apical portion long, LAP/WD 2.56-3.63; median lobe longer (LML) relative to body length (TL) of male (ratio LML/TL 0.29-0.32).

Description: Member of the *melanocephalus* group (Ball & Negre 1972:428-429). Total Length: males (n=10), 7.92-9.96 mm (mean 8.95 mm); females (n=11), 7.48-9.76 mm (mean 8.56 mm). Mouthparts, antennae and legs rufo-testaceus to nearly brunneus. Dorsal (Figure 10B) and ventral surface rufo-brunneus to dark brunneus, lateral margins of pronotum and elytra diffusely paler. Dorsal microsculpture with isodiametric sculpticels; males with head, pronotum and elytra shiny; females with head and pronotum shiny, elytra dull. Pronotum basally with coarser sculpticels in both sexes. Prosternum with apex beaded. Elytra with 3 to 5 setae in stria 3 (preapical seta also observed in stria 2 and interval 3). Hind wings reduced to narrow stubs, adults incapable of flight. Middle femur with 2 setae in antero-ventral row. Hind metatarsus with groove on both outer and inner surfaces. Tarsal claws finely pectinate. Male genitalia (Figure 12C, 12D) with long apical portion and well developed apical disc; endophallus without spines; left paramere somewhat ovoid, with membranous lobe apically; right paramere narrow, elongate, with short spine at apex. Female ovipositor was not studied.

Municipalities: Agua Prieta, Nácori Chico, Nacozari de García.

Habitat: large flat area near ridge top; shallow rocky arroyo.

Vegetation: oak-pine forest; oak-juniper-pine forest; oak-juniper-sycamore forest; pine-oak forest.

Elevation range: 1460-2440 m.

Note regarding elevation: Ball and Negre (1972:522) stated that the Mexican species of *Calathus* are not found below about 6,500 feet (based on the specimens they used for their study). The single male specimen collected at the Varela Ranch (4,888-5,544 feet) is the only specimen of this new species that was collected below that elevation.

Collection dates: **1982**: VIII.06-VIII.08, VIII.19; **1983**. VII.07; **2015**: VIII.11-VIII.12.

Distribution: This species is currently only known from Sonora and near Madera in Chihuahua.

Ball & Negre (1972:421-423) used morphology of the median lobe (male genitalia) and distribution records to separate some of the species in their key, as differences in external morphological characters were lacking. The following changes have to be made to the key to the Nearctic species of *Calathus* in Ball and Nègre (1972:422) to accommodate the above two new species:

14 (13) Specimen from Sierra Madre Occidental (Chihuahua, Durango or Sonora) 15
14' Specimen from Trans-Volcanic Sierra or Sierra Madre Oriental 16
15 (14) Pronotum with disc more convex, lateral depression not widened basally, posteriolateral impression convex (Chihuahua) ..... *C. ambigens* (in part) Bates
15' Pronotum with disc less convex, lateral depression widened basally, posteriolateral impression concave to slightly convex, not as above (Chihuahua, Durango or Sonora) 15a
15a (15) Specimen from Durango .... *C. durango* Ball & Nègre
15a' Specimen from Sonora or Chihuahua 15b
15b (15a') Median lobe with apical portion short as in Figure 11A, 11B (ratio LAP/WD 1.78-2.43), median lobe shorter (LML) relative to body length (TL) of male (ratio LML/TL 0.22-0.26) ..... *C. mcclevei*, new species
15b' Median lobe with apical portion long as in Figure 11C, 11D (ratio LAP/WD 2.56-3.63), median lobe longer (LML) relative to body length (TL) of male (ratio LML/TL 0.29-0.32) ..... *C. tigrinus*, new species

247. *Calathus* sp. UASM son-3

Number examined: 1

Municipality: Cananea.

Habitat: ?

Vegetation: pine-oak forest.

Elevation: 2350 m.

Collection dates: **1982**.VIII.25

Note: The specimen is a female that cannot be assigned at this time to any of the known or undescribed taxa.

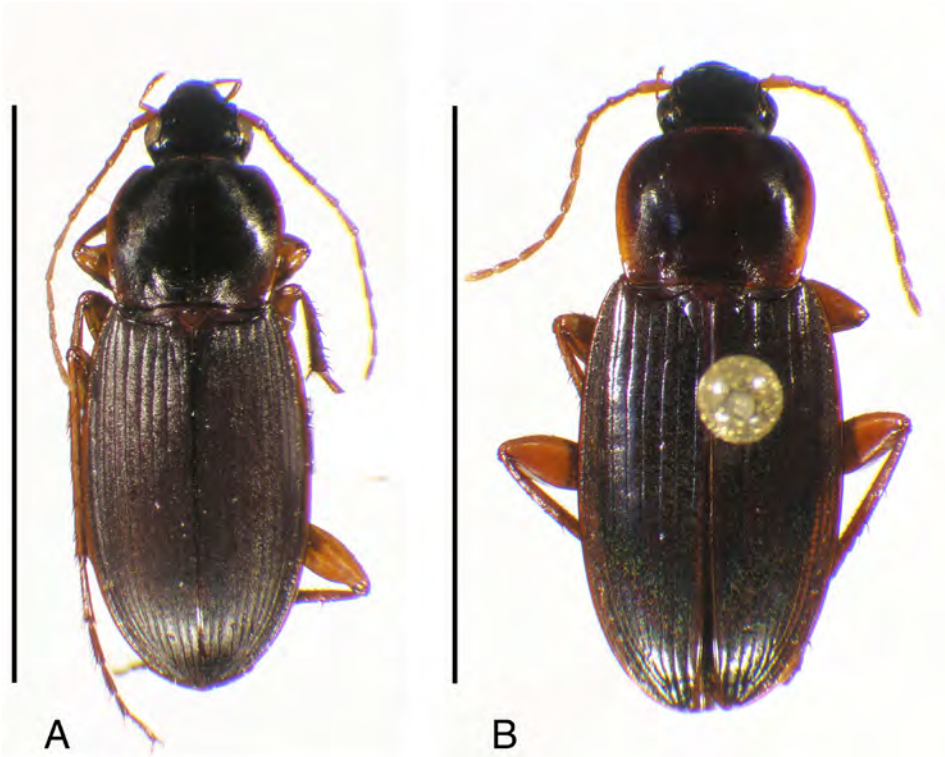


Figure 11. Habitus digital image of *Calathus* species, dorsal aspect. **A**, Holotype of *C. mcclevei,* **new species**; **B**, Holotype of *C. trigrinus*, **new species**. Scale bar 9 mm.

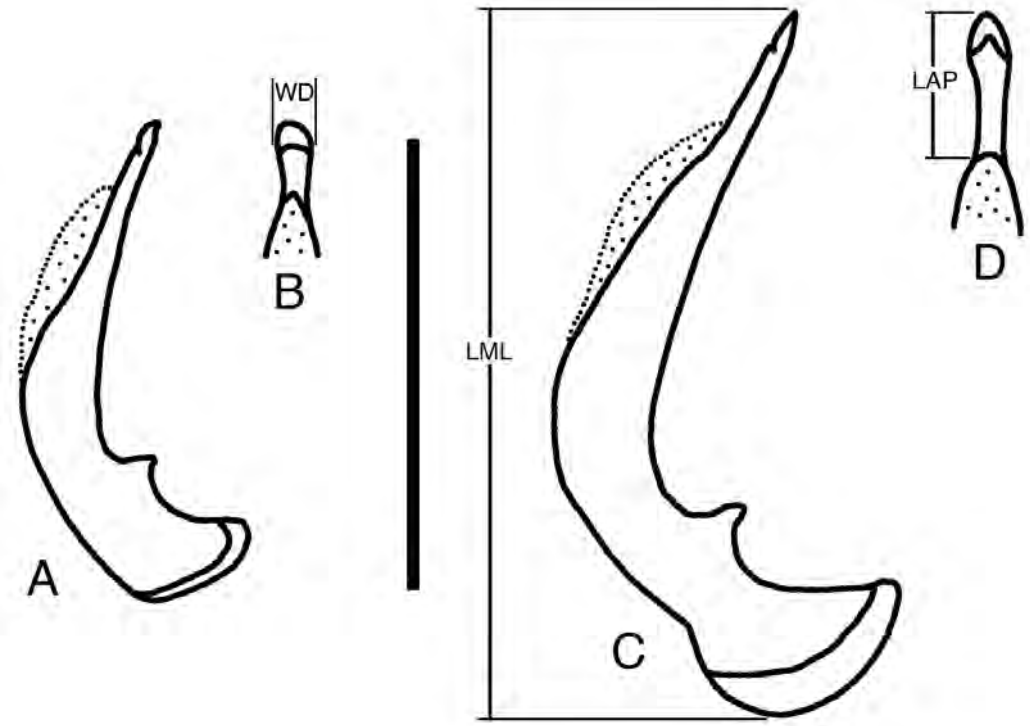
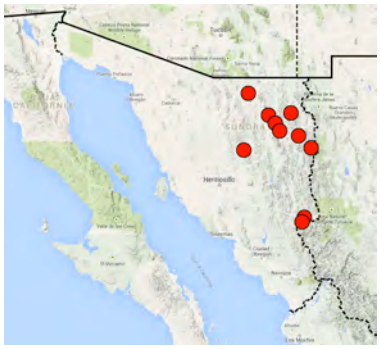


Figure 12. Line drawings of male genitalia of *Calathus* species. **A**, **C** left lateral aspect, and **B**, **D** dorsal aspect. **A**, **B** *C. mcclevei*, **new species**. **C**, **D** *C. tigrinus*, **new species.** Legend: **LAP** length of apical portion; **LD** length of disc; **LML** length of median lobe; **WD** width of disc. Scale bar 2 mm.

248. *Synuchus semirufus* (Casey, 1913)
Number examined: 16.
Municipalities: Cananea, Huachinera, Nácori Chico, Nacozari de García.
Habitat: meadow; rocky arroyo, slope, and ridge top.
Vegetation: pine-oak forest.
Elevation range: 2090 – 2440 m.
Collection dates: **1982**: VIII.04, VIII.08; **1983**.VII.07; **2013**: IX.09-IX.10; **2015**: VIII.10-VIII.11.

26.Platynini

249. ***Agonum anthracinum*** Dejean, 1831
Number examined: 16.
Municipalities: Aconchi, Cananea, Huachinera, Nácori Chico, Nacozari de García, Yécora.
Habitat: rocky arroyo, mountainside ridge.
Vegetation: desert grassland; foothills thornscrub; oak woodland; pine-oak forest.
Elevation range: 1150 – 2467 m.
Collection dates: **1982**: VIII.05, VIII.11; **1983**.VII.06; **1990**: VI.30-VII.03; **2012**.IX.03; **2013**.VII.17; **2015**: VIII.12, IX.06; **2017**: VII.15; VIII.12-VIII.13.



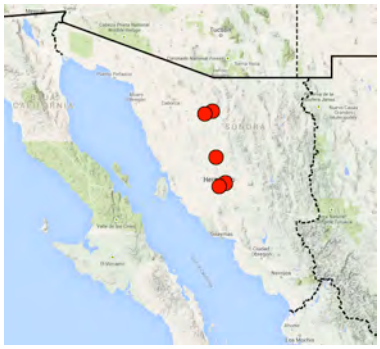
250. ***Agonum cyanope*** (Bates, 1882)
Number examined: 13.
Municipalities: Ímuris, Nácori Chico, Nacozari de García, Yécora.
Habitat: camp clearing; clearing; gentle rocky slope.
Vegetation: Cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest.
Elevation range: 1400 – 1648 m.
Collection dates: **1956**.XII.26; **1982**.VIII.11; **2014**.IX.20; **2018**: VIII.06, VIII.09.

251. ***Agonum cyclifer*** (Bates, 1884)
Number examined: 1.
Municipality: Benjamín Hill.
Habitat: plains.
Vegetation: Sonoran desertscrub.
Elevation: 741 m.
Collection date: **2017**.VII.23.

252. ***Agonum decorum*** (Say, 1823)
Number examined: 13.
Municipalities: Agua Prieta, Ímuris.
Habitat: [at light]
Vegetation: cottonwood-willow riparian forest; oak woodland.
Elevation: 1291 m.
Collection dates: **1956**.XII.26; **2017**.IV.23.

253. ***Agonum extensicolle*** (Say, 1823)
Number examined: 18.
Municipalities: Cananea, Ímuris, Nácori Chico, Santa Ana.
Habitat: gentle rocky slopes; stream margin.
Vegetation: desert grassland; foothills thornscrub; Sonoran desertscrub.
Elevation range: 1450 – 1525 m.
Collection dates: **1956**.XII.26; **1983**.VII.05; **1985**.VIII.01; **2014**.VIII.27.

254. ***Agonum parextimum*** Liebherr, 1986
Number examined: 8.
Municipalities: Carbó, Hermosillo, Santa Ana.
Habitat: urban; plains. [at light]
Vegetation: Sonoran desertscrub.
Elevation range: 255 - 710 m.
Collection dates: **1953**: VII.09-VII.16; **1958**.IV.03; **1960**.VIII.08; **1982**.VIII.23; **2017**.VII.21.



255. ***Agonum placidum*** (Say, 1823)
Number examined: 4.
Municipality: Huachinera.
Habitat: meadow.
Vegetation: pine-oak forest.
Elevation: 2090 m.
Collection date: **1982**.VIII.04.

256. ***Agonum punctiforme*** (Say, 1823)
Number examined: 19.
Municipality: Ímuris.
Habitat: ?
Vegetation: cottonwood-willow riparian forest.
Elevation: 1040 m.
Collection date: **1982**.VIII.24.

257. ***Agonum texanum*** LeConte, 1878
Number examined: 4.
Municipalities: Agua Prieta, Moctezuma, Santa Ana.
Habitat: [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; foothills

thornscrub.
Elevation: 944 - 1350 m.
Collection dates: **1958**.IV.03; **1980**: VII.21-VII.22; **1982**: VIII.19-VIII.20.

258. ***Onypterygia cyanea*** Chaudoir, 1878
Number examined: 3.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1935**.VII.20.

259. ***Onypterygia famini*** Solier, 1835
Number examined: 7.
Municipalities: Álamos, Yécora.
Habitat: [at light]
Vegetation: oak woodland; pine-oak forest; tropical deciduous forest.
Elevation range: 1547 – 1752 m.
Collection dates: **1989**: VII.11-VII.13; **1990**: VI.30-VII.03; **1993**: VII.08-VII.09.

260. ***Onypterygia fulgens*** Dejean, 1831
Number examined: 2.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1935**.VII.20.

261. ***Onypterygia tricolor*** Dejean, 1831
Number examined: 2
Municipality: Álamos.
Habitat: [at light]
Vegetation: tropical deciduous forest.
Elevation range: 435 – 1577 m.
Collection dates: **1989**: VII.11-VII.13; **2019**.VII.25.

262. ***Hemiplatynus chihuahuae*** (Bates, 1884)
Number examined: 5.
Municipalities: Huachinera, Nácori Chico, Yécora.
Habitat: arroyo. [at light]
Vegetation: pine-oak forest.

Elevation range: 1646 – 2090 m.
Collection dates: **1982**: VIII.03-VIII.04; **1983**.VII.06; **1990**: VI.28-VI.29.

263. ***Platynus acuminatus*** (Chevrolat, 1835)
Number examined: 13.
Municipalities: Álamos, Fronteras, Nácori Chico, Yécora.
Habitat: cow pasture; rocky arroyo and stream canyon. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest; tropical deciduous forest.
Elevation range: 1429 – 1752 m.
Collection dates: **1989**: VII.11-VII.13; **1990**: VII.02-VII.03; **2016**: VII.02, VIII.25; **2018**: VIII.05, VIII.09.

264. ***Platynus brunneomarginatus*** (Mannerheim, 1843)
Number examined: 1.
Municipality: Ímuris
Habitat: ?
Vegetation: cottonwood-willow riparian forest.
Elevation: 1040 m.
Collection date: **1982**.VIII.24.

265. ***Platynus falli*** (Darlington, 1936)
Number examined: 6.
Municipalities: Arizpe, Moctezuma, Nacozari de García, Yécora.
Habitat: rocky slope. [at light]
Vegetation: desert grassland; foothills thornscrub.oak woodland;
Elevation range: 500 – 1413 m.
Collection dates: **1982**.VIII.02; **1984**.VIII.24; **2015**.VIII.08; **2019**.VII.06.

266. ***Platynus lyratus*** (Chaudoir, 1878)
Number examined: 117.
Municipalities: Agua Prieta, Álamos, Fronteras, Ímuris, Moctezuma, Nácori Chico, Nacozari de García, Yécora.
Habitat: bog; rocky arroyo, mountainside and stream canyon; stream margin. [at light]
Vegetation: Chihuahuan desertscrub; cottonwood deciduous riparian forest; cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest; tropical deciduous forest.
Elevation range: 944 – 1950 m.
Collection dates: **1982**: VIII.06-VIII.07, VIII.20, VIII.24; **1983**:VII.04, VII.11-VII.12; **1986**.VIII.30; **1989**: VII.11-VII.13; **1990**: VI.30-VII.03; **1993**: VII.06-VII.07; **2013**.IX.08; **2015**.VIII.12; **2016**: VIII.14, VIII.16; **2017**.VIII.15; **2018**: VIII.05-VIII.06, VIII.08-VIII.09.

267. ***Platynus megalops*** (Bates, 1882)

Number examined: 107.

Municipalities: Aconchi, Álamos, Arizpe, Bacanora, Cananea, Fronteras, Huachinera, Huásabas, Moctezuma, Naco, Nácori Chico, Nacozari de García, Nogales, Ónavas, Yécora.

Habitat: cow pasture; rocky canyon, slope, and mountainside. [at light]

Vegetation: desert grassland; cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest; foothills thornscrub; tropical deciduous forest.

Elevation range: 561 – 2297 m.

Collection dates: **1982**: VIII.03-VIII.04; **1983**: VII.11-VII.12; **1989**: VII.11-VII.13; **1990**: VI.30-VII.01, VIII.06-VIII.11; **1993**: VII.08-VII.09; **2012**: VII.21, IX.02; **2013**.IX.08; **2014**: VIII.02, VIII.24; **2015**: VI.25, VIII.08; **2016**.VII.02; **2017**: VII.15, VIII.14-VIII.15, IX.16; **2018**: VI.28, VIII.05-VIII.09; **2019**.VII.06.

268. ***Platynus ovatulus*** (Bates, 1884)

Number examined: 83.

Municipalities: Agua Prieta, Álamos, Fronteras, Huachinera, Moctezuma, Nácori Chico, Nacozari de García, Ónavas, Yécora.

Habitat: rocky arroyo, slope, and mountainside; stream margin. [at light]

Vegetation: Chihuahuan desertscrub; desert grassland; foothills thornscrub; pine-oak forest; sycamore riparian deciduous forest; tropical deciduous forest.

Elevation range: 500 – 2266 m.

Collection dates: **1960**.VIII.12; **1964**.VIII.24; **1982**: VIII.02-VIII.04, VIII.09, VIII.11, VIII.19; **1983**: VII.04-VII.06; **1987**: VII.26-VII.27, VII.30-VII.31; **1989**: VII.11-VII.13; **1990**: VII.02-VII.03, VIII.06-VIII.11; **1993**: VII.06-VII.07, VII.09; **2015**.VIII.10; **2016**: VIII.14, VIII.16; **2018**.VIII.06.

269. ***Platynus rufiventris*** (Van Dyke, 1926)

Number examined: 47.

Municipalities: Álamos, Nacozari de García, Yécora

Habitat: rocky ridge. [at light]

Vegetation: oak woodland; pine-oak forest; tropical deciduous forest.

Elevation range: 1547 - 2467 m.

Collection dates: **1989**: VII.11-VII.13; **1990**: VI.28-VII.03; **2013**.VII.17.

270. ***Platynus valens*** (Bates, 1891)

Number examined: 1.

Municipality: Huachinera.

Habitat: ?

Vegetation: pine-oak forest.

Elevation: 2090 m.

Collection date: **1982**: VIII.03-VIII.04.

271. ***Platynus sp.*** UASM 19a

Number examined: 11.

Municipalities: Aconchi, Arizpe, Bacanora, Naco, Moctezuma, Yécora.

Habitat: rocky canyon and slope. [at light]

Vegetation: desert grassland; foothils thornscrub; oak woodland; sycamore riparian deciduous forest.

Elevation range: 944 – 1680 m.

Collection dates: **1983**: VII.11-VII.12; **1990**: VI.30-VII.01; **1993**: VII.08-VII.09; **2013**.VII.02; **2014**.VIII.02; **2017**. VIII.16; **2019**.VII.06.

272. ***Platynus sp.*** UASM 27a

Number examined: 3.

Municipality: Yécora.

Habitat: [at light]

Vegetation: oak woodland; pine-oak forest.

Elevation range: 1547 – 1752 m.

Collection dates: **1990**: VI.30-VII.03.

273. ***Platynus sp.*** UASM 65b

Number examined: 2.

Municipality: Yécora.

Habitat: [at light]

Vegetation: oak woodland; pine-oak forest.

Elevation: 1311 m.

Collection dates: **1987**: VII.28-VII.29.

274. ***Platynus sp.*** UASM 90

Number examined: 57.

Municipalities: Agua Prieta, Fronteras, Huachinera, Nácori Chico, Nacozari de García, Yécora.

Habitat: rocky arroyo, stream canyon, mountainside, and ridge top; [at light]

Vegetation: Chihuahuan desertscrub; cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest; sycamore riparian deciduous forest.

Elevation range: 1460 – 2440 m.

Collection dates: **1982**: VIII.03-VIII.04, VIII.06-VIII.08, VIII.19; **1983**: VII.06-VII.07; **1990**: VII.02-VII.03; **2014**.VIII.24; **2015**: VIII.10, VIII.12; **2018**: VIII.07, VIII.09.

275. ***Platynus sp***. UASM 132

Number examined: 20.

Municipalities: Nácori Chico, Yécora.

Habitat: arroyo. [at light]

Vegetation: oak woodland; pine-oak forest.

Elevation range: 1547 - 1950 m.

Collection dates: **1982**: VIII.06-VIII.07; **1983**.VII.06; **1990**: VI.30-VII.03; **1993**: VII.06-VII.07, VII.09.

276. ***Platynus sp.*** UASM 209a
Number examined: 71.
Municipalities: Álamos, Nácori Chico, Yécora.
Habitat: rocky stream canyon. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; oak forest; oak woodland; pine-oak forest on slope; tropical deciduous forest.
Elevation range: 1311 - 1950 m.
Collection dates: **1982**: VIII.06-VIII.07; **1987**: VII.28-VII.29; **1989**: VII.11-VII.13; **1990**: VI.28-VII.03; **1993**: VII.06-VII.08; **2018**: VI.27, VIII.05, VIII.07.

277 ***Platynus sp.*** CASC 73
Number examined: 1.
Municipality: Yécora.
Habitat: ?
Vegetation: pine-oak forest.
Elevation: ?
Collection date: **1984**.VIII.27.

278. ***Platynus sp***. CASC 75
Number examined: 1
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1935**.VII.07.

279. ***Rhadine sp***.
Number examined: 2.
Municipality: Huachinera.
Habitat: meadow
Vegetation: pine-oak-forest.
Elevation: 2090 m.
Collection date: **1982**.VIII.04.

27. Lachnophorini

280. ***Anchonoderus horni*** Csiki, 1931
Number examined: 6.
Municipalities: Álamos, Saric.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1929**.VII.03; **1960**.VIII.12; **1964**.VIII.05.

281. ***Anchonoderus*** sp.
Number examined: 3.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection dates: **1935**.VII.15; **1957**: VII.28-VII.29; **1965**. VII.18.

282. ***Ega laetula*** LeConte, 1851
Number examined: 3.
Municipalities: Álamos, Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1897**.IV.04; **1935**.VII.01; **1955**.V.25.

283. ***Euphorticus*** sp.
Number examined: 71.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection dates: **1934**.X.03; **1935**.VII.15; **1960**.VIII.12; **1964**.VIII.24.

284. ***Lachnophorus elegantulus*** Mannerheim, 1843
Number examined: 12.
Municipalities: Álamos, Santa Ana.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1934**.X.03; **1940**.VII.28; **1985**.VIII.02.

285. ***Lachnophorus*** sp.
Number examined: 1.
Municipality: Agua Prieta.
Habitat: riparian.
Vegetation: ?
Elevation: 1350 m.
Collection date: **1982**.VIII.20.

28.Pentagonicini

286. ***Pentagonica felix*** Bell, 1987

Number examined: 12.

Municipalities: Álamos, Nácori Chico, Nacozari de García, Yécora.

Habitat: large flat area near ridge top. [at light]

Vegetation: cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation range: 1547 – 2261 m.

Collection dates: **1989**: VII.11-VII.13; **1990**: VI.30-VII.03; **2015**.VIII.12; **2018**: VIII.05, VIII.07, VIII.09.

287. ***Pentagonica*** sp. UASM-11

Number examined: 65.

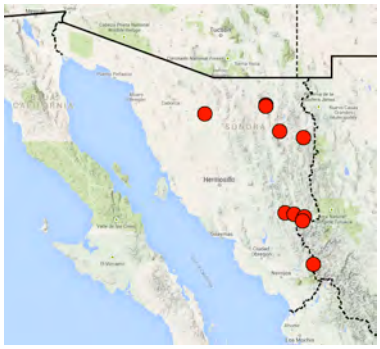
Municipalities: Álamos, Fronteras, Huachinera, Nacozari de García, Ónavas, Santa Ana, Yécora.

Habitat: cow pasture; rocky mountainside. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; foothills thornscrub; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation range: 710 – 2090 m.

Collection dates: **1982**: VIII.03-VIII.04, VIII.23; **1987**: VII.26-VII.27; **1989**: VII.11-VII.13; **1990**: VI.30-VII.03; **1993**.VII.09; **2016**: VII.02, VIII.14-VIII.16; **2017**: VII.14-VII.15, VIII.12, VIII.14-VIII.15.



288. ***Pentagonica*** sp. CASC 2

Number examined: 1.

Municipality: Álamos.

Habitat: ?

Vegetation: tropical deciduous forest.

Elevation: ?

Collection date: **1935**.VII.07.

29.Odacanthini

289. ***Colliuris lengi*** (Schaeffer, 1910)

Number examined: 1.

Municipality: Nogales.

Habitat: [at light]

Vegetation: desert grassland.

Elevation: ?

Collection date: **1965**.VII.30.

290. ***Colliuris lioptera*** (Bates, 1891)

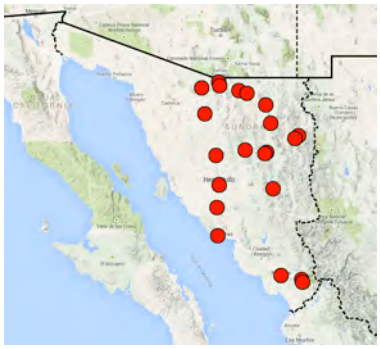
Number examined: 24.

Municipalities: Aconchi, Álamos, Arizpe, Fronteras, Moctezuma. Nacozari de García, Nogales.

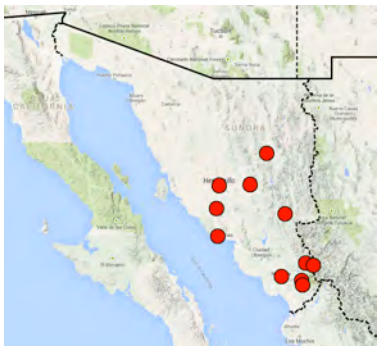
Habitat: cow pasture; rocky canyon; stream margin. [at light]
Vegetation: Chihuahuan desertscrub; desert grassland; foothills thornscrub; oak woodland; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 500 - 1577 m.
Collection dates: **1960.**VIII.12; **1965**.VII.30; **1982**.VIII.02; **1989**: VII.11-VII.13; **1993**.VII.04; **2013**: VII.02, IX.08; **2016**.VII.02; **2019**.VII.06.

291. ***Colliuris marginestriata*** Putzeys, 1845
Number examined: 1.
Municipality: Yécora.
Habitat: ?
Vegetation: pine-oak forest.
Elevation: 1752 m.
Collection date: **1990**: VII.02-VII.03.

292. ***Colliuris pensylvanica*** (Linnaeus, 1758)
Number examined: 123.
Municipalities: Aconchi, Álamos, Bacadéhuachi, Cananea, Carbó, Fronteras, Guaymas, Hermosillo, Huachinera, Moctezuma, Nacozari de García, Navojoa, Nogales, Santa Ana, Santa Cruz, Saric, Soyopa.
Habitat: cow pasture; lights at building at night; PEMEX station; rocky canyon. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; coastal and foothills thornscrub; desert grassland; oak woodland; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 229 – 1549 m.
Collection dates: **1953**: VII.09-VII.16; **1956**.VI.25; **1960**: VIII.08, VIII.10, VIII.12; **1962**.VII.12; **1963**.I.17; **1965**: VII.09, VII.11, VII.30-VII.31; **1967**.VII.27; **1982**: VIII.01, VIII.03, VIII.05, VIII.23; **1983**: VII.11-VII.12; **1989**.VII.08; **1993**.VII.04; **2012**.VIII.09; **2013**.VII.02; **2015**.VIII.13; **2016**.VII.02; **2019**: IV.25, VII.23.



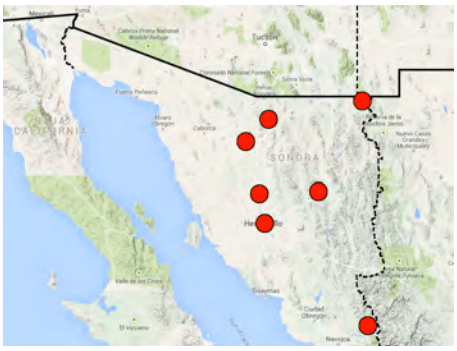
293. ***Colliuris pilatei*** (Chaudoir, 1848)
Number examined: 25.
Municipalities: Álamos, Guaymas, Hermosillo, Mazatán, Moctezuma, Navojoa, Ónavas.
Habitat: gentle granitic slopes. [at light]
Vegetation: coastal and foothills thornscrub; oak woodland; Sonoran desertscrub; tropical deciduous forest.
Elevation range: 229 - 1577 m.
Collection dates: **1935**: VI.25, VI.27, VII.09, VII.15; **1953**: VII.09-VII.16; **1954**.VIII.22; **1958**.VIII.06; **1960**: VIII.10, VIII.12; **1963**.VIII.07; **1964**.VIII.05; **1965**.VIII.13; **1967**.VII.27; **1983**: VII.11-VII.12; **1989**: VII.11-VII.13; **1990**.VIII.06; **2014**.VII.28.



30. Cyclosomini

294. ***Anaulacus mcclevei*** Ball & Shpeley, 2002
Number examined: 4.
Municipalities: Álamos, Moctezuma, Navojoa.
Habitat: ex *Atta* nest; *Atta* trash pile.
Vegetation: coastal and foothills thornscrub; tropical deciduous forest.
Elevation range: 433 – 1577 m.
Collection dates: **1962**.VII.12; 1980.VII.22; **1989**: VII.11-VII.13; **2019**.VII.24.

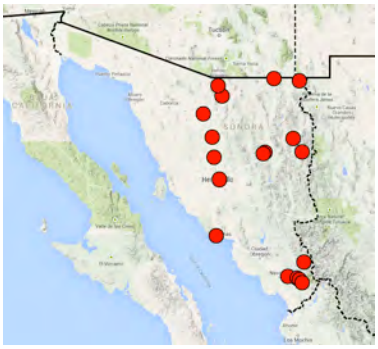
295. ***Tetragonoderus fasciatus*** (Haldeman, 1843)
Number examined: 41.
Municipalities: Agua Prieta, Álamos, Carbó, Hermosillo, Ímuris, Moctezuma, Santa Ana.
Habitat: [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian deciduous forest; tropical deciduous forest.
Elevation range: 293 – 1350 m.
Collection dates: **1897**.IV.19; **1935**.VI.25; **1953**: VII.09-VII.16; **1965**.VII.31; **1982**: VIII.19-VIII.20, VIII.23-VIII.24; **1986**.VIII.29; **1993**.VII.04.



296. ***Tetragonoderus mexicanus*** (Chaudoir, 1876)
Number examined: 31.
Municipalities: Agua Prieta, Moctezuma, Nácori Chico, Nogales, Santa Ana.
Habitat: [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; desert grassland; foothills thornscrub; oak woodland.
Elevation range: 1000 – 1350 m.
Collection dates: **1982**: VIII.19-VIII.20; **1983**.VII.03; **1985**.VIII.01; **1993**.VII.04; **2015**: VI.27, VII.12.

297. ***Tetragonoderus pallidus*** G. Horn, 1868
Number examined: 4.
Municipalities: General Plutarco Elias Calles, Pitiquito, Puerto Peñasco.
Habitat: [at light]
Vegetation: Sonoran desertscrub.
Elevation: 152 m.
Collection dates: **1949**: III.25, III.31; **1953**: VIII.01-VIII.15, IX.01-IX.10.

298. ***Tetragonoderus poecilus*** Bates, 1883
Number examined: 198.
Municipalities: Agua Prieta, Álamos, Bacadéhuachi, Carbó, Fronteras, Guaymas, Hermosillo, Ímuris, Moctezuma, Nácori Chico, Navojoa, Nogales, Opodepe, Santa Ana.
Habitat: cow pasture; rocky mountainside. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; cottonwood-willow riparian deciduous forest; desert grassland; foothills thornscrub; oak woodland; tropical deciduous forest.
Elevation range: 293 – 1420 m.
Collection dates: **1935**.VI.25; **1959**: VIII.12-VIII.14; **1960**: VIII.08, VIII.10, VIII.12; **1963**: I.17, II.20, VII.06, VIII.05; **1964**.VIII.24; **1966**.VIII.29; **1971**.VIII.16; **1973**.V; **1980**.IX.17; **1982**: VIII.03, VIII.19-VIII.20, VIII.23-VIII.24, **1983**: VII.03, VII-11-VII.12; **1986**.VIII.29; **1993**: VII.04-VII.05; **2013**.VIII.09; **2016**.VII.02; **2017**.VIII.14; **2019**.VII.23.



31.Lebiini

299. ***Agra truquii*** Chaudoir, 1866

Number examined: 2.

Municipality: Álamos

Habitat: [at light]

Vegetation: tropical deciduous forest.

Elevation: 450 m.

Collection dates: **1964**.VII.08; **1977**.IX.19.

300. ***Apenes lucidulus*** (Dejean, 1831)

Number examined: 24.

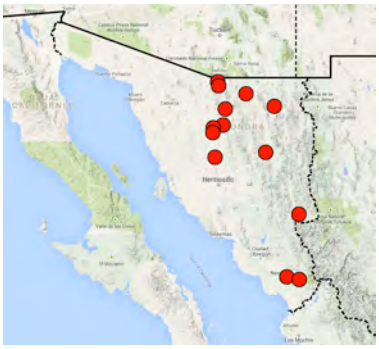
Municipalities: Álamos, Benjamín Hill, Cananea, Carbó, Fronteras, Hermosillo, Ímuris, Mazatan, Moctezuma, Navojoa, Nogales, Santa Ana, Yécora.

Habitat: urban. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; coastal and foothills thornscrub; cottonwood-willow riparian deciduous forest; desert grassland; oak woodland; tropical deciduous forest.

Elevation range: 550 – 1646 m.

Collection dates: **1959**: VIII.14-VIII.15; **1960**.VIII.08; **1965**.VII.30; **1982**.VIII.01; **1990**: VIII.07-VIII.11; **2012**: VII.13, VIII.01, VIII.09, VIII.13; **2013**: VIII.04, VIII.09; **2018**.III.18.



301. ***Apenes marginalis*** (Dejean, 1831)

Number examined: 16.

Municipalities: Aconchi, Fronteras, Moctezuma, Nogales, Ónavas, San Felipe de Jesús.

Habitat: cow pasture; rocky canyon [at light].

Vegetation: Chihuahuan desertscrub; desert grassland; foothills thornscrub; oak woodland; sycamore riparian deciduous forest.

Elevation range: 917 – 1429 m.

Collection dates: **1983**: VII.11-VII.12; **1987**: VII.26-VII.27; **1993**.VII.04; **2012**.VIII.09; **2013**.VII.02; **2016**.VII.02; **2019**.VIII.04.

302. ***Apenes nebulosus*** LeConte, 1866

Number examined: 14.

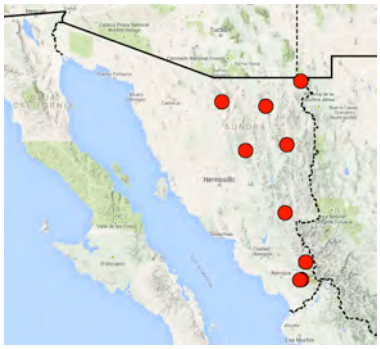
Municipalities: Agua Prieta, Álamos, Fronteras, Huásabas, Ímuris, Ónavas, San Felipe de Jesús.

Habitat: rocky arroyo; urban. [at light]

Vegetation: Chihuahuan desertscrub; foothills thornscrub; oak woodland; sycamore riparian deciduous forest; tropical deciduous forest.

Elevation range: 549 – 1708 m.

Collection dates: **1935**.VII.15; **1957**: VII.28-VII.29; **1960**.VIII.12; **1964**. VIII.08; **1972**.X; **1982**: VIII.19-VIII.20, VIII.24; **1987**: VII.26-VII.27; **2016**: V.05, VIII.14, VIII.16; **2019**.VIII.04.



303. ***Apenes marmorata*** complex sp.
Number examined: 1.
Municipality: Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1960**.VIII.10.

304. ***Apristus pugetanus*** Casey, 1920
Number examined: 4.
Municipalities: Álamos, Guaymas, Hermosillo, San Javier.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forst.
Elevation: ?
Collection dates: **1897**.IV.19; 1929.IV.03; **1963**.II.26; **1973**.V.

305. ***Apristus*** sp.
Number examined: 1.
Municiplaity: Huachinera.
Habitat: ?
Vegetation: desert grassland.
Elevation: 1150 m.
Collection date: **1982**.VIII.05

306. ***Apristus*** sp. CASC 1
Number examined: 2
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16.

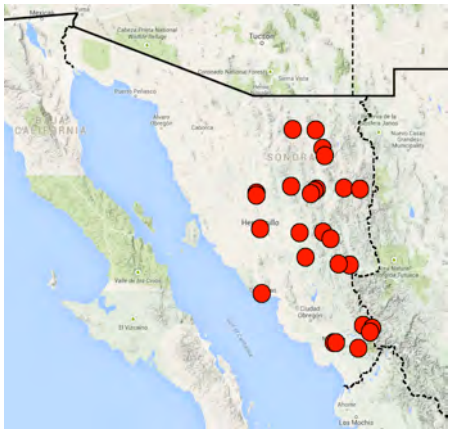
307. ***Axinopalpus biplagiatus*** (Dejean, 1825)
Number examined: 4.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16.

308. ***Axinopalpus fusciceps*** LeConte, 1851
Number examined: 4.
Municipalities: Guaymas, Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection dates: **1953**: VII.09-VII.16; **1973**.V.

309. ***Axinopalpus*** sp.
Number examined: 1.
Municipality: Guaymas.
Habitat: Sonoran desertscrub.
Vegetation: ?
Elevation: ?
Collection date: 1973.V.

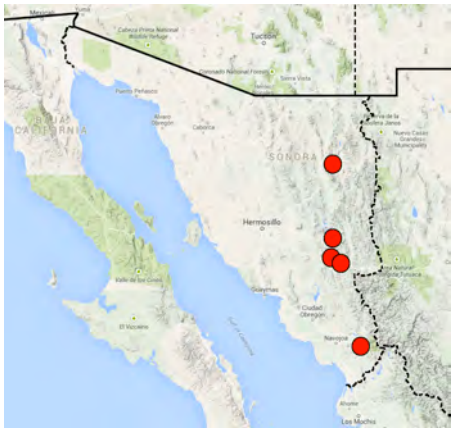
310. ***Calleida brunnea*** Dejean, 1831
Number examined: 2.
Municipalities: Aconchi, Nacozari de García.
Habitat: rocky arroyo and canyon.
Vegetation: oak woodland; sycamore riparian deciduous forest.
Elevation range: 1301 - 1388 m.
Collection dates: **2013**.VII.02; **2017**.VIII.14.

311. ***Calleida cordicollis*** Putzeys, 1845
Number examined: 194.
Municipalities: Aconchi, Álamos, Bacanora, Cananea, Carbó, Fronteras, Granados; Guaymas, Hermosillo, Moctezuma, Nácori Chico, Nacozari de García, Navojoa, Ónavas, San Felipe de Jesús, Soyopa, Yécora.
Habitat: cow pasture; rocky canyon, slope, and hillside; stock pond. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; coastal and foothills thornscrub; desert grassland; sycamore riparian deciduous forest; oak woodland; tropical deciduous forest.
Elevation range: 277 – 1577 m.
Collection dates: **1935**: VII.07, VII.09, VII.15; **1940**. VII.28; **1953**: VII.09-VII.16; **1957**: VII.28-VII.29, IX.07; **1960**: VIII.08, VIII.11-VIII.12; **1963**.VIII.07; **1964**.VIII.05; **1965**: VI.11, VII.07, VII.11, VII.15, VII.30; **1967**.VII.27; **1973**.X.11; **1982**: VIII.01, VIII.09; **1987**: VII.26-VII.27, VII.30-VII.31; **1989**: VII.08, VII.11-VII.13; **1990**.VIII.08; **1993**: VII.04, VII.09; **2012**.VII.07; **2014**: VIII.02, IX.14; **2015**.VIII.08; **2016**.VII.02; **2017**.VII.22; **2018**.VIII.11; **2019**: VII.22, VIII.04-VIII.05, VIII.09.



312. ***Calleida cyanippe*** Bates, 1883
Number examined: 7.
Municipalities: Álamos, Bacanora, Nacozari de García, Ónavas, Soyopa.

Habitat: rocky slope and mountainside; [at light].
Vegetation: foothills thornscrub; oak woodland; tropical deciduous forest.
Elevation: 180 – 1687 m.
Collection dates: **1957**: VII.28-VII.29; **1990**.VIII.08; **2012**.VIII.06; **2014**.VIII.02; 2017.VIII.14.



313. ***Calleida platynoides*** G. Horn, 1882
Number examined: 2.
Municipality: Opodepe.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1963**.VII.06.

314. ***Calleida punctulata*** Chaudoir, 1848
Number examined: 64.
Municipalities: Álamos, Bacanora, Cucurpe, Ónavas, Yécora.
Habitat: rocky canyon and slope. [at light]
Vegetation: foothills thornscrub; oak woodland; tropical deciduous forest.
Elevation range: 876 – 1387 m.
Collection dates: **1934**.X.25; **1935**: I.03, VII.07; **1957**: VII.28-VII.29; **1958**.VIII.06; **1960**: VII.21, VIII.12; **1964**: VII.24, VIII.08; **1987**: VII.26-27, VII.30-VII.31; **1993**.VII.09; **2014**: VIII.02, VIII.29; **2019**: VII.22, VII.25.

315. ***Calleida*** sp. CASC 2
Number examined: 16.
Municipalities: Álamos, Guaymas.
Habitat: ?
Vegetation: Sonoran desertscrub; tropical deciduous forest.
Elevation: ?
Collection dates: **1935**: VII.07, VII.09; **1960**.VIII.10.

316. ***Calleida*** sp. CASC 9
Number examined: 1.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: 400 m
Collection date: **1935**.VIII.21.

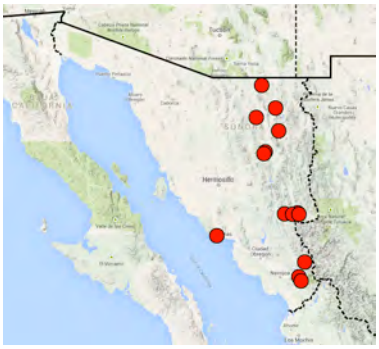
317. ***Calleida*** sp. CASC 19
Number examined: 1.
Muicipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: 400 m
Collection date: **1960**.VII.21.

318. ***Coptodera brunnea*** Shpeley & Ball, 1993
Number examined: 11.
Municipalities: Agua Prieta, Arizpe, Fronteras, Nacozari de García.
Habitat: arroyo; rocky mountainside. [at light]
Vegetation: desert grassland; oak woodland; sycamore riparian deciduous forest.
Elevation range: 1275 - 1698 m.
Collection dates: **2016**:VIII.16; **2017**: IV.23, VII.15; **2019**. VII.06.

319. ***Coptodera nitidula*** (Buquet, 1834)
Number examined: 9.
Municipalities: Agua Prieta, Nacozari de García, Yécora.
Habitat: rocky mountainside. [at light]
Vegetation: cottonwood-willow riparian deciduous forest; oak woodland.
Elevation range: 1291 – 1687 m.
Collection dates: **1987**: VII.28-VII.29; **1990**: VI.30-VII.01; **2017**: IV.23, VII.15.

320. ***Cymindis arizonensis*** Schaeffer, 1910
Number examined: 4.
Municipalities: Cananea, Nacozari de Garcia, Nogales, Santa Cruz.
Habitat: rocky slope.
Vegetation: desert grassland; oak woodland; pine-oak forest.
Elevation range: 1217 - 2422 m.
Collection dates: **1982**.VIII.11; **2013**.VIII.13; **2019**: IV.24-IV.25.

321. ***Cymindis punctifera punctifera*** (LeConte, 1884)
Number examined: 70.
Municipalities: Álamos, Arizpe, Fronteras, Guaymas, Moctezuma, Naco, Nacozari de García, Ónavas, Yécora.
Habitat: rocky mountainside. [at light]
Vegetation: Chihuahuan desertscrub; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; tropial deciduous forest.
Elevation range: 435 – 1900 m.
Collection dates: **1935**.VII.15; **1960**.VIII.10; **1983**: VII.11-VII.12; **1987**: VII.26-VII.31; **1993**: VII.04, VII.08-VII.09; **2015**: VIII.10, VIII.12; **2016**: VIII.14, VIII.16; **2017**: VII.15, VIII.12, VIII.15-VIII.16; **2019**: VII.06, VII.22, VII.25.



322. ***Cymindis punctigera punctigera*** (LeConte, 1851)
Number examined: 43.
Municipalities: Agua Prieta, Álamos, Cajeme, Cananea, Hermosillo, Ímuris, Moctezuma, Nácori Chico, Opodepe, Yécora.
Habitat: gentle rocky slope; river bottom; urban. [at light]
Vegetation: Chihuahuan and Sonoran desertscrub; coastal and foothills thornscrub; cottonwood-willow riparian forest; oak woodland; pine-oak forest; tropical deciduous forest.
Elevation range: 744 – 2134 m.
Collection dates: **1921**.VII.03; **1961**: V.16-V.23; **1964**.VIII.25; **1970**.IX.17; **1982**: VI.09-VI.11, VIII.01, VIII.19-VIII.21; **1992**.VII.09; **1994**.IX.11; 2012.II.06; **2013**.VIII.04; **2014**.IX.20; **2017**.IV.21.

323. ***Cymindis uniseriata*** Bates, 1884
Number examined: 24.
Municipalities: Huachinera, Nácori Chico, Nacozari de García.
Habitat: rocky arroyo, slope, and ridge top; [at light]
Vegetation: pine-oak forest.
Elevation range: 2090 – 2440 m.
Collection dates: **1982**: VIII.03-VIII.04; **1983**.VII.07; **2015**.VIII.10-VIII.12; **2017**.IV.21.

324. ***Cymindis*** sp. son-1
Number examined: 1.
Municipality: Nacozari de García.
Habitat: ?
Vegetation: desert grassland; oak woodland.
Elevation: 1400 m.
Collection date: **1982**.VIII.11.

325. ***Cymindis*** sp. son-2
Number examined: 24.
Municipalities: Álamos, Huachinera, Nácori Chico, Yécora.
Habitat: [at light]
Vegetation: oak woodland; pine-oak forest; tropical deciduous forest.
Elevation range: 1311 - 2200 m.
Collection dates: **1961**: V.20-V.22; **1981**.VI.25; **1982**: VIII.03-VIII.04, VIII.06-VIII.07; **1983**: VII.05-VII.06; **1987**: VII.28-VII.29; **1989**: VII.11-VII.12; **1990**: VI.38-VII.03, VIII.07-VIII.11.

326. ***Cymindis*** sp. son-3

Number examined: 21.
Municipalities: Huachinera, Nácori Chico, Yécora.
Habitat: [at light]
Vegetation: oak woodland; pine-oak forest.
Elevation range: 1547 - 2200 m.
Collection dates: **1961**: V.20-V.22; **1981**.VI.25; **1982**: VIII.03-VIII.04, VIII.06-VIII.07; **1983**: VII.05-VII.06; **1990**: VI.28-VII.03.

327. ***Dromius piceus*** Dejean, 1831

Number examined: 22.
Municipalities: Fronteras, Nácori Chico, Nacozari de García.
Habitat: rocky arroyo, canyon, mountainside, ridge top. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest; sycamore riparian deciduous forest.
Elevation range: 1681 – 2297 m.
Collection dates: **2015**: VI.25, VIII.10, VIII.12; **2016**: VIII.14-VIII.15; **2017**: VII.15, VIII.12, VIII.14-VIII.15; **2018**: VIII.08-VIII.09.

328. ***Euproctinus abjectus*** (Bates, 1883)

Number examined: 13.
Municipalities: Álamos, Yécora.
Habitat: [at light]
Vegetation: pine-oak forest; tropical deciduous forest.
Elevation range: 518 – 1646 m.
Collection dates: **1987**: VII.30-VII.31; **1989**: VII.11-VII.13; **1990**: VI.28-VI.29; **2019**.VII.23.

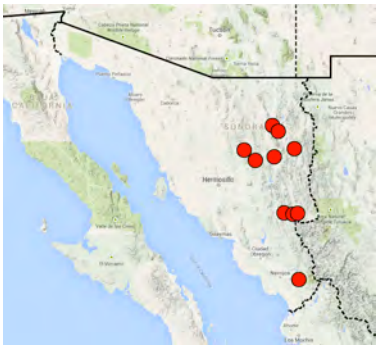
329. ***Euproctinus balli*** Shpeley, 1986

Number examined: 25.
Municipalities: Nácori Chico, Nacozari de García, Yécora.
Habitat: rocky mountainside; [at light]
Vegetation: oak woodland; pine-oak forest.
Elevation range: 1547 - 1950 m.
Collection dates: **1983**.VII.06; **1990**: VI.28-VII.01; **2017**. VII.15.

330. ***Euproctinus sigillatus*** (Bates, 1883)

Number examined: 11.
Municipalities: Alamos, Yécora.
Habitat: [at light]
Vegetation: oak woodland; pine-oak forest.
Elevation range: 1547 – 1752 m.
Collection dates: **1989**: VII.11-VII.13; **1990**: VI.28-VII.03, VIII.07-VIII.11.

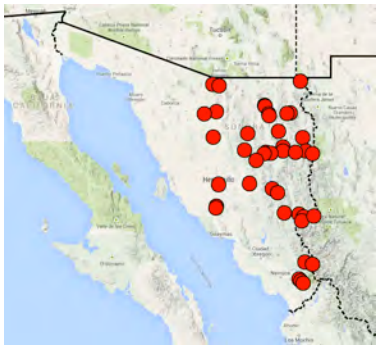
331. ***Lebia (Chelonodema) balli*** (Reichardt, 1972)
Number examined: 32.
Municipalities: Aconchi, Álamos, Baviácora, Moctezuma, Nácori Chico, Nacozari de García, Ónavas, Yécora.
Habitat: rocky canyon and mountainside. [at light]
Vegetation: foothills thornscrub; oak woodland; pine-oak forest; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 917 – 1687 m.
Collection dates: **1959**.VIII.14; **1980**.IX.24; **1982**.VIII.05; **1987**: VII.26-VII.29; **1993**.VII.09; **2012**.IX.02; **2015**.VIII.08; **2017**: VII.15, VIII.14; **2018**.VIII.09.



332. ***Lebia (Chelonodema) quadrinotata*** (Chevrolat, 1835)
Number examined: 44.
Municipalities: Álamos, Moctezuma, Nácori Chico, Ónavas, Yécora.
Habitat: rocky river canyon. [at light]
Vegetation: foothills thornscrub; oak woodland; pine-oak forest; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 518 – 1680 m.
Collection dates: **1934**.X.25; **1935**.VIII.25; **1984**: VIII.02-VIII.04; **1987**: VII.30-VII.31; **1989**: VII.11-VII.13; **1990**: VI.28-VI.29; **1993**: VII.08-VII.09; **2018**.VIII.05.

333. ***Lebia (Lebia) abdita*** Madge, 1967
Number examined: 11.
Municpalities: Agua Prieta, Santa Ana.
Habitat: [at light]
Vegetation: cottonwood-willow riparian deciduous forest; oak woodland; Sonoran desertscrub.
Elevation range: 710 - 1350 m.
Collection dates: **1982**: VIII.19-VIII.20, VIII.23; **2017**.IV.23.

334. ***Lebia (Lebia) analis*** Dejean, 1825
Number examined: 183.
Municipalities: Aconchi, Agua Prieta, Álamos, Arizpe, Bacanora, Baviácora, Fronteras, Hermosillo, Huachinera, Ímuris, Magdalena de Kino, Moctezuma, Nácori Chico, Nacozari de García, Nogales, Ónavas, Opodepe, San Felipe de Jesús, Santa Ana, Soyopa, Ures, Yécora.
Habitat: cow pasture; rocky arroyo, stream canyon, slopes, mountainside, and ridge top; [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; foothills thornscrub; oak woodland; pine-oak forest; Sonoran desertscrub; sycamore riparian deciduous forest; tropical deciduous forest.
Elevation range: 229 – 2261 m.
Collection dates: **1935**.VII.15; **1953**: VIII.15-VIII.20; **1958**: VII.07-VII.11; **1960**.VIII.12; **1963**.VII.06, VIII.05; **1965**: VI.11, VII; **1967**.VII.27; **1980**.IX.24; **1982**: VIII.01, VIII.03-VIII.04, VIII.06-VIII.07, VIII.23; **1983**: VII.03, VII.11-VII.12; **1987**: VII.26-VII.27, VII.30-VII.31; **1989**: VII.11-VII.13; **1990**: VI.28-VII.03; **1993**: VII.04, VII.09; **2012**: VII.21, IX.02; **2013**: VII.02, VII.16, VIII.12, IX.07; **2014**.VIII.02; **2015**: VI.24, VIII.12; **2016**: VII.02-VII.03, VIII.15-VIII.16; **2017**: I.11, IV.21; **2018**.VI.27; **2019**: VII.22, VII.25, VIII.04-VIII.05.



335. ***Lebia (Lebia) chalybe*** Bates, 1883

Number examined: 7.
Municipality: Álamos.
Habitat: in bromeliads [at light]
Vegetation: tropical deciduous forest.
Elevation range: 518 – 1577 m.
Collection dates: **1935**.VII.07; **1957**: VII.28-VII.29; **1987**:VII.30-VII.31; **1989**: VII.11-VII.13.

336. ***Lebia (Lebia) cymindoides*** Bates, 1883
Number examined: 150.
Municipalities: Agua Prieta, Arizpe, Cananea, Fronteras, Huachinera, Magdalena de Kino, Naco, Nácori Chico, Nacozari de García, Nogales.
Habitat: arroyo; cow pasture; rocky stream canyon, slope, mountainside, and ridge top. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; desert grassland; oak woodland; pine-oak forest; Sonoran desertsrub;.
Elevation range: 1161 – 2467 m.
Collection dates: **1982**: VIII.03-VIII.04, VIII.06-VIII.07, VIII.12-VIII.20; **1983**: VII.04, VII.06; **2012**.VII.13; **2013**: VII-16-VII.17, VIII.02; **2014**.VIII.24; **2015**: VIII.12, IX.13; **2016**: VII.02-VII.03, VIII.13-VIII.16; **2018**: VI.27, VIII.06, VIII.09; **2019**.VII.06.

337. ***Lebia (Lebia) duillia*** Bates, 1883
Number examined: 1.
Municipality: Nacozari de García.
Habitat: rocky mountainside. [at light]
Vegetation: oak woodland.
Elevation: 1681 m.
Collection date: **2017**.VIII.12.

338. ***Lebia (Lebia) guttula*** LeConte, 1851
Number examined: 8.
Municipalities: Guaymas, Puerto Peñasco.
Habitat:
Vegetation: Sonoran desertscrub.
Elevation:
Collection dates: **1960**.VIII.10; **1962**.IV.15.

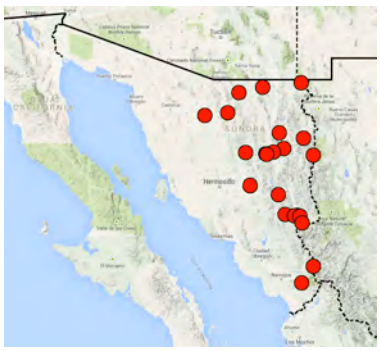
339. ***Lebia (Lebia) histrionica*** Bates, 1883
Number examined: 9.
Municipalities: Aconchi, Bacadéhuachi, Cajeme, Cananea, Nacozari de García, Navojoa, Yécora.
Habitat: flat area in canyon bottom; rocky canyon; rocky hillside. [at light]
Vegetation: coastal thornscrub; desert grassland; oak woodland; pine-oak forest; sycamore riparian deciduous forest.
Elevation range: 1216 – 1752 m.
Collection dates: **1954**.VIII.22; **1982**.VIII.03; **1990**: VII.02-VII.03; **2012**.IX.02; **2013**: VII.16, IX.07; **2014**. IX.14; **2015**.VI.24.

340. ***Lebia (Lebia) miranda*** G. Horn, 1872
Number examined: 41.
Municipalities: Arizpe, Bacadéhuachi, Guaymas, Mazatán, Moctezuma, Nácori Chico, Nogales, Opodepe, San Felipe de Jesús, Santa Ana.
Habitat: meadow; rocky canyon. [at light]
Vegetation: desert grassland; foothills thornscrub; oak woodland; Sonoran desertscrub.
Elevation range: 550 – 1420 m,
Collection dates: **1960**.VIII.10; **1963**.VIII.06; **1982**: VIII.01, VIII.03, VIII.23; **1983**.VII.03 **2012**.VIII.13; **2017**.I.11; **2018**.III.18; **2019**: VIII.04 – VIII.05.

341. ***Lebia (Lebia) scalpta*** Bates, 1883
Number examined: 1.
Municipality: Bacanora.
Habitat: rocky slope.
Vegetation: oak woodland.
Elevation: 1387 m.
Collection date: **2014**-08-02

342. ***Lebia (Lebia) subrugosa*** Chaudoir, 1871
Number examined: 1.
Municipality: Agua Prieta.
Habitat: ?
Vegetation: cottonwood-willow riparian deciduous forest; oak woodland.
Elevation: 1291 m.
Collection date: **2017**.IV.23.

343. ***Lebia (Lebia) tuckeri*** (Casey, 1920)
Number examined: 211.
Municipalities: Agua Prieta, Álamos, Bacanora, Huachinera, Magdalena de Kino, Moctezuma, Naco, Nácori Chico, Nacozari de García, Ónavas, San Felipe de Jesús; Santa Ana, Santa Cruz, Ures, Yécora.
Habitat: rocky arroyo, stream canyon, slope, mountainside; [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; Sonoran desertscrub; tropical deciduous forest.
Elevation range: 930 – 2090 m.
Collection dates: **1982**: VIII.01, VIII.03-VIII.05, VIII.19-VIII.20, VIII.23; **1987**: VII.26-VII.27, VII.30-VII.31; **1989**: VII.11-VII.13; **1990**: VI.28-VI.29, VII.02-VII.02; **1993**: VII.04, VII.06-VII.09; **2014**: VII.28, VIII.02; **2015**.IX.13; **2017**: IV.21, VII.15, VIII.12, VIII.14-VIII.15, IX.16; **2018**.VI.27; **2019**: IV.25, VIII.05.



344. ***Lebia (Lebia) viridis*** Say, 1823
Number examined: 23.
Municipalities: Agua Prieta, Cananea, Moctezuma, Nácori Chico, Nacozari de García.
Habitat: arroyo; litter; river valley; rocky slope. [at light]
Vegetation: desert grassland; foothills thornscrub; oak woodland; pine-oak forest.
Elevation range: 1000 – 2300 m.
Collection dates: **1982**: IX.19-08.20; **1983**: VII.04, VII.06; **1993**.VII.04; **2014**.IX.14; **2015**.VIII.11; **2017**: IV.22, IV.24.

345. ***Lebia (Lebia) sp. nr. chalybe*** Bates, 1883 (= sp. CASC 113)
Number examined: 3.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: 400 m
Collection date: **1935**.VII.07.

346. ***Lebia (Lebia) sp. nr. charilla*** Bates, 1883 (= sp. CASC 124)
Number examined: 1.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: 400 m
Collection date: **1960**.VIII.12.

347. ***Lebia (Lebia)*** sp. son-5
Number examined: 2.
Municipality: Agua Prieta.
Habitat: [at light]
Vegetation: cottonwood-willow riparian deciduous forest; desert grassland; oak woodland.
Elevation: 1350 m.
Collection dates: **1982**: VIII.19-VIII.20.

348. ***Lebia (Lebia)*** sp. UASM-4
Number examined: 1.
Municipality: Nácori Chico.
Habitat: rocky stream canyon. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest.
Elevation: 1648 m.
Collection date: **2018**.VIII.09.

349. ***Lebia (Lebia)*** sp. UASM-37
Number examined: 5.
Municipalities: Fronteras, Moctezuma, Naco, Nacozari de García.
Habitat: rocky mountainside. [at light]
Vegetation: desert grassland; foothills thornscrub; oak woodland.
Elevation range: 1000 - 1707 m.
Collection dates: **1993**.VII.04; **2016**: VIII.15-VIII.16; **2017**: VII.15, IX.16.

350. ***Lebia (Lebia)*** sp. UASM-37A
Number examined: 1.
Municipality: Naco.
Habitat: ?
Vegetation: desert grassland; oak woodland.
Elevation: 1654 m.
Collection date: **2017**.IX.16.

351. ***Lebia (Lebia)*** sp. UASM-41
Number examined: 3.
Municipalities: Agua Prieta, Moctezuma.
Habitat: [at light]
Vegetation: foothills thornscrub.
Elevation range: 1000 – 1350 m.
Collection dates: **1982**: VIII.19-VIII.20; **1993**.VII.04.

352. ***Lebia (Lebia)*** sp. UASM-74
Number examined: 1.
Municipality: Yécora.
Habitat: [at light]
Vegetation: oak woodland.
Elevation: 1680 m.
Collection date: **1993**.VII.08.

353. ***Lebia (Lebia)*** sp. UASM-75
Number examined: 23.
Municipalities: Huachinera, Nácori Chico.
Habitat: meadow; rocky stream canyon. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; oak woodland; pine-oak forest.
Elevation range: 1648 – 2090 m.
Collection dates: **1982**: VIII.03-VIII.04, VIII.06-VIII.07; **2018**: VIII.05-VIII.09.

354. ***Lebia (Lebia)*** sp. UASM-78
Number examined: 1.
Municipality: Nogales.
Habitat: rocky canyon.
Vegetation: riparian forest, oak woodland.
Elevation: 1200 m.
Collection date: **2012**.VII.21.

355. ***Lebia (Lebia)*** sp. UASM-97
Number examined: 1.
Municipality: Álamos.
Habitat: [at light]
Vegetation: ?
Elevation: 1577 m.
Collection date: **1989**: VII.11-VII.13.

356. ***Lebia (Lebia)*** sp. UASM-123
Number examined: 1.
Municipality: Yécora.
Habitat: [at light]
Vegetation: oak woodland; pine-oak forest.
Elevation: 1680 m.
Collection date: **1993**.VII.08.

357. ***Lebia (Lebia)*** sp. UASM-140
Number examined: 5.
Municipality: Nácori Chico, Nacozari de García.
Habitat: rocky mountainside. [at light]
Vegetation: oak woodland; Sonoran desertscrub.
Elevation range: 930 - 1687 m.
Collection dates: **1982**.VIII.05; **2017**.VII.14.

358. ***Lebia (Lebia)*** sp. UASM-167
Number examined: 16.
Municipality: Nácori Chico.
Habitat: rocky stream canyon. [at light]
Vegetation: cypress-maple-alder-sycamore riparian forest; pine-oak forest.
Elevation Range: 1648 – 1715 m.
Collection dates: **2018**: VI.27, VIII.05-VIII.06, VIII.09.

359. ***Lebia (Loxopeza) atriceps*** LeConte, 1863
Number examined: 40.
Municipalities: Aconchi, Agua Prieta, Álamos, Bacadehuachi, Bacanora, Cananea, Fronteras, Huachinera, Mag-

dalena de Kino, Moctezuma, Naco, Nacozari de García, Nogales, Yécora.

Habitat: arroyo; canyon, slope, mountainside; rocky stream; [at light]

Vegetation: cypress-maple-alder-sycamore riparian forest; desert grassland; foothills thornscrub; oak woodland; pine-oak forest; Sonoran desertscrub; tropical deciduous forest.

Elevation range: 944 – 2422 m.

Collection dates: **1935**. VII.07; **1982**: VIII.01, VIII.03, VIII.05, VIII.19-VIII.20; **1990**: VII.02-VII.03; **1993**: VII.08-VII.09; **2012**: VII.13, VII.21, IX.02; **2013**: VII.16, VIII.02, VIII.09; **2014**: VIII.02, VIII.24; **2015**. IX.13; **2016**.VIII.15; **2017**: VII.15, IX.16; **2018**.VI.27.

360. ***Lebia (Loxopeza) deceptrix*** Madge, 1967

Number examined: 16.

Municipalities: Fronteras, Naco, Nacozari de García, Yécora.

Habitat: arroyo; rocky mountainside. [at light]

Vegetation: oak woodland; sycamore riparian forest.

Elevation range: 1646 – 1752 m.

Collection dates: **1990**: VI.28-VI.29, VII.02-VII.03; **2016**.08.15; **2017**: VII.15, VII.15, IX.16.

361. ***Lebia (Loxopeza) pimalis*** (Casey, 1920)

Number examined: 171.

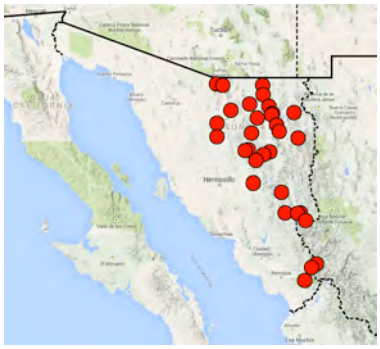
Municipalities: Aconchi, Álamos, Arizpe, Bacadehuachi, Bacanora, Baviácora, Cananea, Fronteras, Magdalena de Kino, Moctezuma, Naco, Nacozari de García, Nogales, Onavas, Opodepe, San Felipe de Jesús, Santa Ana, Ures, Yécora.

Habitat: arroyo; mountainside, and ridge top; rocky slope, stream canyon, slope, hillside; [at light]

Vegetation: desert grassland; foothills thornscrub; oak woodland; pine-oak forest; Sonoran desertscrub; sycamore riparian deciduous forest; tropical deciduous forest.

Elevation range: 518 - 2467 m.

Collection dates: **1935**.VII.07; **1968**.X.01; **1980**: IX.24, IX.27; **1982**: VIII.01, VIIII.03, VIII.05; **1987**: VII.30-VII.31; **1989**: VII.11-VII.13; **1990**: VII.02-VII.03, VIII.06; **1993**: VII.08-VII.09, VII.14; **2012**: VII.07, VII.13, VII.21, VIII.09, IX.02; **2013**: VII.16-VII.17; **2014**: VII.08, VIII.02, VIII.24, IX.14; **2015**: VIII.08, VIII.12, IX.13; **2016**: VIII.14-VIII.15; **2017**: I.11, VII.15, VIII.12, VIII.14-VIII.15, IX.16; **2019**: VII.06, VIII.05.



362. ***Lebia (Loxopeza) subdola*** Madge, 1967

Number examined: 6.

Municipalities: Cananea, Fronteras, Nacozari de García.

Habitat: arroyo; rocky stream canyon, slope, and ridge. [at light]

Vegetation: oak woodland; pine-oak forest on slopes; sycamore riparian deciduous forest.

Elevation range: 1698-2467 m.

Collection dates: **2013**: VII.17, VIII.02; **2014**.VIII.24; **2016**.VIII.16.

363. ***Lebia (Loxopeza) subgrandis*** Madge, 1967

Number examined: 104.

Municipalities: Aconchi, Agua Prieta, Álamos, Arizpe, Baviácora, Cananea, Carbo, Fronteras, Hermosillo, la Colorada, Mazatán, Moctezuma, Naco, Nácori Chico, Nacozari de García, Nogales, Navojoa, Onavas,

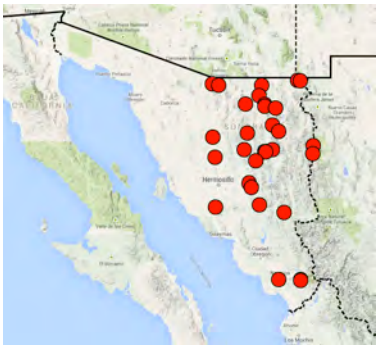
Opodepe, Santa Ana, Ures.

Habitat: cow pasture; rocky stream canyon, slope, hillside, and mountainside. [at light]

Vegetation: Chihuahuan and Sonoran desertscrub; coastal and foothills thornscrub; cypress-maple-alder-sycamore riparian forest; desert grassland; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation range: 229-2238 m.

Collection dates: **1954**.VIII.22; **1957**: VII.28-VII.29; **1960**. VIII.08; **1963**.VII.06; **1967**.VII.27; **1980**: IX.18, IX.24; **1982**: VIII.01, VIII.05, VIII.19-VIII.20, VIII.23; **1983**: VII.04, VII.11-VII-12; **1990**.VIII.06; **1993**.VII.04; **2012**: VII.07, VII.21, VIII.06, VIII.09, VIII.13; **2014**: VII.28, VIII.26, IX.14; **2015**: VII.12, VIII.08; **2016**: VII.02, VIII.14-VIII.16; **2017**: I.11, IV.23, VII.15, VIII.16, IX.16; **2018**.VIII.06.



364. ***Lebia (Loxopeza)*** sp. son-7

Number examined: 37.

Municipalities: Álamos, Onavas, Yécora.

Habitat: [at light]

Vegetation: foothills thornscrub; oak woodland; tropical deciduous forest.

Elevation range: 518 – 1577 m.

Collection dates: **1960**.VIII.12; **1964**.VIII.05; **1965**.VII; **1987**: VII.26-VII.27, VII.30-VII.31; **1989**: VII-11-VII.13; **1993**.VII.09.

365. ***Lebia (Loxopeza***) sp. son- 8

Number examined: 19.

Municipalities: Álamos, Bacanora, Nacozari de García, Onavas, Ures, Yécora.

Habitat: rocky slope and mountainside; [at light]

Vegetation: foothills thornscrub; oak woodland; pine-oak forest; tropical deciduous forest.

Elevation range: 518 – 1752 m.

Collection dates: **1960**.VIII.12; **1987**: VII.26-VII.27, VII.30-VII.31; **1990**: VI.30-VII.03, VIII.06; **1993**. VII.09; **2014**: VII.28, VIII.02; **2017**.VII.15.

366. ***Lebia (Loxopeza)*** sp. UASM-136

Number examined: 7.

Municipalities: Álamos, Yécora.

Habitat: [at light]

Vegetation: oak woodland; pine-oak forest; tropical deciduous forest.

Elevation range: 1577 – 1680 m.

Collection dates: **1989**: VII.11-VII.13; **1993**.VII.08.

367. ***Lebia (Polycheloma)*** sp. UASM-31 (= sp. CASC 104)

Number examined: 25

Municipalities: Álamos, Hermosillo, Ímuris, Onavas.

Habitat: in bromeliads. [at light]

Vegetation: ciénega in cottonwood-willow riparian deciduous forest; foothills thornscrub; Sonoran desertscrub; tropical deciduous forest

Elevation range: 229 – 917 m.

Collection dates: **1935**.VIII.18; **1960**.VIII.12; **1964**. VIII.08. **1967**.VII.27; **1987**: VII.30-VII.31; **1990**. VIII.06.

368. ***Lebia (Polycheloma)*** sp. UASM-164
Number examined: 15.
Municipality: Agua Prieta.
Habitat: [at light]
Vegetation: cottonwood-willow riparian deciduous forest.
Elevation: 1350 m.
Collection dates: **1982**: VIII.19-VIII.20.

369. ***Nemotarsus*** sp.
Number examined: 1.
Municipality: Ónavas.
Habitat: [at light]
Vegetation: foothills thornscrub.
Elevation: 917 m.
Collection date: **1987**: VII.26-VII.27.

370. ***Philophuga caerulea*** Casey, 1913
Number examined: 9.
Municipalities: Cananea, Naco, Nacozari de García.
Habitat: rocky canyon, slope, and ridge.
Vegetation: desert grassland; oak woodland; pine-oak forest.
Elevation range: 1654 – 2467 m.
Collection dates: **2013**: VIII.02, IX.08-IX.09, IX.11; **2014**. IX.08; **2017**.IX.16.

371. ***Philophuga viridis viridis*** (Dejean, 1831)
Number examined: 1.
Municipality: Nogales.
Habitat: ?
Vegetation: desert grassland.
Elevation: ?
Collection date: **1965**.IX.28.

372. ***Plochionus timidus*** Haldeman, 1843
Number examined: 5.
Municipalities: Álamos, Bacadéhuachi, Pitiquito.
Habitat: rocky canyon and mountainside.
Vegetation: sycamore-*Cupressus arizonica* riparian forest, pine-oak forest on slopes; tropical deciduous forest.
Elevation range: 200 - 1680 m.
Collection dates: **1935**: VII.07, VII.15; **1953**: VIII.08-VIII.10; **1976**.IX.28; **2012**.III.30.

32. Zuphiini

373. ***Thalpius simplex*** (Liebke, 1934)

Number examined: 10.
Municipalities: Álamos, Guaymas, Ónavas, Santa Ana.
Habitat: [at light]
Vegetation: foothills thornscrub; tropical deciduous forest.
Elevation: 917 m.
Collection dates: **1964**.VIII.24; **1973**.V; **1987**: VII.26-VII.27; **1989**.VII.08; **2018**.III.19.

374. ***Thalpius*** sp. CASC 9

Number examined: 1.
Municipality: Hermosillo.
Habitat: ?
Vegetation: Sonoran desertscrub.
Elevation: ?
Collection date: **1953**: VII.09-VII.16.

33.Galeritini

375. ***Galerita atripes*** LeConte, 1858

Number examined: 16.
Municipalities: Álamos, Fronteras, Nácori Chico, Nacozari de García, Yécora.
Habitat: rocky arroyo and mountainside. [at light]
Vegetation: Chihuahuan desertscrub; oak woodland; oak-juniper-sycamore riparian forest; pine-oak forest; tropical deciduous forest.
Elevation range: 1577 - 1950 m.
Collection dates: **1983**.VII.06; **1989**: VII.11-VII.113; **1990**: VI.28-VI.29, VIII.07-VIII.11; **2016**: VIII.14, VIII.16; **2017**.VII.15.

376. ***Galerita forreri*** Bates, 1883

Number examined: 19.
Municipalities: Aconchi, Álamos, Bacanora, Cananea, Fronteras, Moctezuma, Nacozari de García, Nogales, Ónavas, San Felipe de Jesús.
Habitat: rocky arroyo, canyon, hillside, and mountainside.
Vegetation: Chihuahuan desertscrub; desert grassland; foothills thornscrub; oak woodland; oak-juniper-sycamore riparian forest.
Elevation range: 433 – 1708 m
Collection dates: **1983**.VII.06; **1987**: VII.26-VII.27; **1993**.VII.05; **2012**: VII.21, IX.02; **2013**.VII.02; **2014**: VIII.02, IX.14; **2016**.VIII.15; **2017**.VIII.14; **2019**: VII.24, VIII.06.

377. ***Galerita lecontei*** Dejean, 1831

Number examined: 24.
Municipalities: Agua Prieta, Ímuris, Nácori Chico, Santa Ana.
Habitat: stream margin.
Vegetation: riparian forest.
Elevation range: 1040 – 1450 m.

Collection dates: **1982**: VIII.20-VIII.21, VIII.24; **1983**. VII.05; **1985**.VIII.02.

378. ***Galerita mexicana*** Chaudoir, 1872

Number examined: 62.

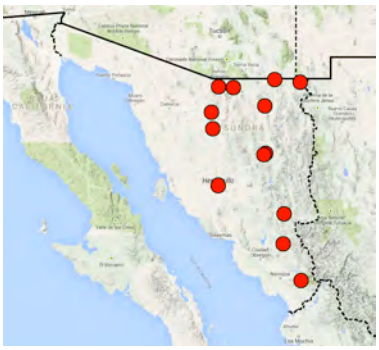
Municipalities: Agua Prieta, Álamos, Fronteras, Hermosillo, Moctezuma, Nogales, Ónavas, Rosario, Santa Ana, Santa Cruz.

Habitat: cow pasture; lights at building at night. [at light]

Vegetation: Chihuahuan and Sonora desertscrub; desert grassland; foothills thornscrub; oak woodland; tropical deciduous forest.

Elevation range: 376 – 1429 m.

Collection dates: **1953**: VII.09-VII.16; **1958**.IV.03; **1980**: VII.21-VII.22; **1982**: VIII.01, VIII.19-VIII.20; **1983**: VII.11-VII.12; **1984**.VII.21; 2004.X.18; **1987**: VII.26-VII.27; **1993**.VII.04; **2012**.IX.12; **2013**: VIII.09, IX.11; **2015**.VII.12; **2016**.VII.02; **2017**.VII.23; **2018**.VIII.13.



379. ***Galerita ruficollis*** Dejean, 1825

Number examined: 17.

Municipalities: Álamos, Carbó, Guaymas, Navojoa, Rosario.

Habitat: [at light]

Vegetation: coastal and foothills thornscrub; Sonoran desertscrub; tropical deciduous forest.

Elevation range: 46 – 518 m.

Collection dates: **1960**: VIII.08, VIII.12; **1962**.VII.12; **1984**: 07.02, VII.21; **1987**: 07.30-07.31; **1989**.07.08; **1992**: X.03-X.16; **2012**.09.12.

34.Helluonini

380. ***Helluomorphoides ferrugineus LeConte, 1853***

Number examined: 7.

Municipalities: Álamos, Cananea, Hermosillo, Moctezuma, Naco, Nacozari de García.

Habitat: rocky hillside.

Vegetation: desert grassland; oak woodland; Sonoran desertscrub; tropical deciduous forest.

Elevation range: 268 – 1654 m.

Collection dates: **1962**.VII.13; **1982**.VIII.11; **1983**: VII.11-VII.12; **2012**.IX.13; **2015**: IX.06; **2017**.IX.16.

381. ***Helluomorphoides latitarsis*** (Casey, 1913)

Number examined: 23.

Municipalities: Aconchi, Álamos, Arizpe, Fronteras, Mazatán, Moctezuma, Nacozari de Garcia, Nogales, San Felipe de Jesús.

Habitat: cow pasture; rocky canyon, slopes, and mountainside; slopes.

Vegetation: desert grassland; foothills thornscrub; oak woodland; sycamore riparian deciduous forest; tropical deciduous forest.

Elevation range: 944 – 1707 m.

Collection dates: **1935**.VI.26; **1957**: VII.28-VII.29; **1982**: VIII.01, VIII.11; **1983**: VII.11-VII.12; **1993**.VII.04; **2012**: VII.21, VIII.01; **2013**.VII.02; **2014**.VII.28; **2015**: VIII.08; **2016**: VII.02, VIII.14; **2019**: VII.06, VIII.04.

382. ***Helluomorphoides*** sp. CASC 2
Number examined: 1.
Municipality: Álamos.
Habitat: ?
Vegetation: tropical deciduous forest.
Elevation: ?
Collection date: **1935**.VII.20.

35.Pseudomorphini

383. ***Pseudomorpha huachinera*** Erwin & Amundson, 2013
Number examined: 1.
Municipality: Yécora.
Habitat: ?
Vegetation: pine-oak forest.
Elevation: ?
Collection date: **1987**: VIII.28-VIII.29.

384. ***Pseudomorpha angustata*** group sp. #1
Number examined: 1
Municipality: Santa Ana.
Habitat: Sonoran desertcrub.
Vegetation: ?
Elevation: ?
Collection date: **1982**.VIII.23.

385. ***Pseudomorpha angustata*** group sp. #2
Number examined: 2.
Municipality: Nacozari de García.
Habitat: rocky canyon.
Vegetation: oak woodland.
Elevation: 1595 m.
Collection date: **2013**.VII.16.

386. ***Pseudomorpha angustata*** group sp. #3
Number examined: 1
Municipality: Nacozari de García.
Habitat: rocky mountainside.
Vegetation: oak woodland
Elevation: 1687 m.
Collection date: **2017**.VIII.15.

387. ***Pseudomorpha santarita*** group sp.

Number examined: 1
Municipality: Fronteras.
Habitat: arroyo. [at light]
Vegetation: oak-sycamore-juniper forest.
Elevation: 1730 m.
Collection date: **2016**.VIII.16.

388. ***Pseudomorpha tenebriodes*** group sp.
Number examined: 1
Municipio: Santa Ana.
Habitat: Sonoran desert.
Vegetation: ?
Elevation: ?
Collection date: **1982**.VIII.23.

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Digital image of *Pasimachus viridans* LeConte. Locality label data: Mexico, Sonora, Municipality of Nácori Chico, 2 km N Mesa Tres Rios, pine-oak forest, 1950 m, July 6, 1983, H.E. Frania, R. Jaagumagi & D. Shpeleycollectors (overall body length = 27 mm).

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Homenaje

Una entrevista con Juan José Morrone y su influencia en el cambio de paradigmas para la biología evolutiva en México

An interview with Juan José Morrone and his influence in the paradigm changes of the evolutive biology in Mexico

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RESUMEN

Se presenta un reconocimiento a Juan José Morrone, quien por su larga trayectoria, amplia dedicación en diversas ramas de la biología evolutiva y aportes a distintos grupos zoológicos ha dejado una huella indeleble en la historia de la ciencia en México y el resto de Latinoamérica. Actualmente, el Dr. Morrone cuenta con más de 300 publicaciones de sus trabajos científicos, entre las que destacan artículos y libros, que sin duda son un referente y parteaguas para cualquier curso que aborde temas de sistemática, biogeografía o biología comparada. Su gran labor como investigador no opaca su tarea como docente, pues ha impartido 130 cursos a diferentes niveles de educación y 120 conferencias tanto en México como en América Latina. En este trabajo destaco de manera breve algunos puntos cruciales de su amplia trayectoria y el impacto que sus ideas han tenido a nivel mundial. Además, presento extractos de una entrevista en la que tratamos temas como sus influencias literarias, su forma de trabajar y su manera de abordar distintas problemáticas durante el trabajo científico.

Palabras clave: Coleoptera, biogeografía, homenaje.

ABSTRACT

Herein, a recognition to Juan José Morrone is presented, whose great career, dedication to various branches of evolutionary biology and contributions to different zoological groups have left an indelible mark on the history of science in Mexico. To date, Dr. Morrone has had a great history of publications, including more than 300 scientific works, 35 books that are undoubtedly a reference and a threshold for any course dealing with systematics, biogeography or comparative biology. His great work as researcher does not diminish his work as a teacher, as he has taught 130 courses at different levels of education and gave 120 conferences in Mexico as well as in Latin America. In this work I try to summarize his great career and the impact that his ideas have had worldwide. In addition, I present excerpts from an interview in which we discussed some issues such as his literary influences, his way of working and his way of tackling different problems during scientific work.

Keywords: Coleoptera, biogeography, homage.

La sistemática, la biogeografía y la biología comparada son ramas de la biología evolutiva que tratan de recuperar hipótesis de evolución, distribución y cambios a lo largo del tiempo. Aunque existen muchas personas que dentro de sus líneas de investigación trabajan en estas temáticas, uno de los referentes en estos temas es, sin lugar a duda, el Dr. Juan José Morrone.

El objetivo del presente artículo es reconocer su admirable trayectoria y el impacto que sus trabajos han tenido en generaciones de investigadores latinoamericanos. Juan José Morrone trabaja en el Museo de Zoología de la Facultad de Ciencias de la Universidad Nacional Autónoma de México (UNAM), desde hace 23 años, aunque para el momento de su llegada a nuestro país ya tenía una trayectoria como profesor e investigador en la Argentina. Si bien una gran parte de sus trabajos han tenido como objeto de estudio a los escarabajos, principalmente Curculionidae (gorgojos), las ideas que el Dr. Morrone trata en sus trabajos alcanzan a muchos organismos. Esta característica lo ha convertido en un referente en México y el mundo, con más de 300 publicaciones. En reconocimiento a sus contribuciones, Juan José funge como patrónimo de 2 géneros y 10 especies nombrados en su honor.

Juan José Morrone nace a principios de la década de 1960 en la ciudad de Quilmes, ubicada al este de la Argentina, al sur del Río de la Plata y contigua a la ciudad de Buenos Aires. Quilmes, además de su fama por ser una de las marcas más reconocidas de cerveza sudamericana, es cuna de grandes figuras de las artes plásticas (Aldo Severi y Víctor Roverano), la literatura (Rodolfo Fogwill

y Adriana Ballesteros), el deporte (Sergio "El Kun" Agüero, Mariné Russo y Maravilla Martínez) y sin duda uno de los más grandes exponentes de las ciencias biológicas en Latinoamérica, como es el homenajeado en este trabajo. Sus comienzos en las ciencias biológicas fueron en el Museo de La Plata, de la Universidad Nacional de La Plata, y como las probabilidades de estudiar coleópteros por su gran diversidad siempre serán altas, comienza con un grupo de escarabajos, los gorgojos (Coleoptera: Curculionidae) y es tal la diversidad de esta familia que hasta en el fin del mundo existen; siendo así que comenzó sus primeros trabajos sobre algunas especies de curculiónidos en la Argentina. Desde ese momento fue muy notorio el reconocimiento de patrones biogeográficos para diferenciar entre distintas biotas. Este tema después sería una de las temáticas más importantes para el Dr. Morrone.

Después en un posdoctorado en el American Museum of Natural History estas ideas madurarían, sin duda, por el acercamiento a grandes autores y los principales referentes de la biogeografía cladística o la escuela de Nueva York para la sistemática filogenética. Después de esta provechosa estancia, regresa a Argentina a cubrir una plaza de profesor, porque las ideas que no se comparten están destinadas al fracaso, es por eso que la docencia es parte muy importante en su carrera. El destino nunca está decidido y fue cerca del cambio de milenio que todos los que estudiamos en la Universidad Nacional Autónoma de México, tenemos la fortuna de que el Dr. Morrone acepte una posición para trabajar en la Facultad de Ciencias, impartiendo cursos de sistemática, biogeografía y biología comparada. De esta manera la mayor parte de su carrera científica se ha desarrollado en esta institución.

En más de 30 años de carrera, Juan José Morrone ha escrito más de 35 libros de texto, de los cuales, "Sistemática: fundamentos, métodos, aplicaciones" e "Introducción a la biogeografía", el segundo en coautoría con una de sus exalumnas, son elogiados por todos los estudiantes que se dan la oportunidad de leerlo, por su lenguaje claro y accesible. Sin duda muchos de sus libros forman parte fundamental de cursos tanto de pregrado y posgrado en todas las universidades de habla hispana. Además tiene 74 capítulos de libros y 315 publicaciones, es decir, sus contribuciones suman más de 420, lo cual nos da un número promedio mayor de 10 publicaciones por año desde que inició su carrera. El impacto de sus contribuciones se puede ver en las más de 16,000 citas en sus trabajos (Figura 1). Por su gran trayectoria, ha sido revisor de muchas publicaciones científicas y es editor de Cladistics, Zootaxa, Phytotaxa y la Revista Mexicana de Biodiversidad, entre otras. Los temas de cada una de estas contribuciones son variados, pues no solo se restringe su conocimiento a los coleópteros, sino que sus ideas pueden ser aplicadas a un sinfín de organismos con diferentes hábitos, formas o cualidades.

Su trabajo como investigador, como se mencionó anteriormente, no disminuye su trabajo como docente, pues ha impartido 133 cursos (50 en licenciatura y 83 en posgrado), ha dirigido 43 tesis (8 de licenciatura, 14 de maestría y 21 de doctorado), fue parte del comité tutoral de 132 tesis y formó parte del jurado en 290 defensas de tesis (46 licenciatura y 244 posgrado). Quienes hemos tenido la fortuna de tener a Juan José en este proceso, podemos atestiguar la calidez de sus comentarios y el gran ingenio para poder corregir nuestros muchos errores, siempre intentando mejorar los trabajos que tenemos la osadía de presentarle.

En la actualidad, me atrevería a decir que no hay un trabajo sistemático que no cite al menos una idea o un trabajo de Juan José Morrone. Asimismo, los mapas más interesantes que se pueden encontrar en la literatura científica normalmente utilizan las provincias biogeográficas de sus trabajos, los cuales representan de mejor manera la distribución de las biotas que la división política que sabemos no tiene una correlación ideal con la naturaleza.

A continuación, se presentan extractos de una entrevista que tuvimos en donde se discutieron diferentes cuestiones.

¿Cómo se llega a la afinidad con las ciencias biológicas?

De chico, siempre me gustaron los animales y me parecieron muy interesantes; en consecuencia, tuve muchísimos animales (pájaros, tortugas, lagartos, peces, perros, gatos y otros); agradezco a mis padres por su enorme paciencia. En la escuela secundaria y la preparatoria tuve dos ideas: ser zoólogo o veterinario. Después de leer más (y afortunadamente para todos sus lectores), encontré varias cuestiones que no me gustaron de la veterinaria y por consecuencia me decidí por la zoología.

Pasado el tiempo, cuando entré a la universidad, quería ser etólogo de mamíferos. Al hacer mi doctorado, mi decisión fue dedicarme a la sistemática filogenética y biogeografía de Coleoptera.

Su forma de trabajo ha probado ser bastante útil, ¿nos puede contar un poco sobre los pasos que toma para realizar sus diferentes publicaciones? ¿Se pondera el trabajo continuo o el trabajo en un periodo corto de tiempo?

Sin duda, mi trabajo es continuo. Por ejemplo, para un libro en el que estoy trabajando ahora, tengo que escribir al menos 2 páginas al día. Cuando escribo un libro, usualmente distingo 3 etapas principales:

1. La etapa de "agregado": En esta etapa, todos los días agrego algo, no necesita estar muy estructurado; aquí se va construyendo una especie de esqueleto, incluyendo las ideas generales, pero que termina conteniendo los capítulos y las partes principales en que se dividirá la obra.
2. Etapa de "engorda": En esta etapa, añado todas las ideas después de leer la mayoría de los trabajos disponibles y relacionados con la obra. El texto que resulta de esta etapa es extenso, pesado e incluso llega al exceso. Todas las ideas pueden caber aquí, lo principal es re-

unir la mayor cantidad de información.

3. Etapa de "corte": En esta última etapa, simplifico el texto. Aquí elimino todos los excesos y pulo el texto, tratando de pensar en el lector y en los objetivos planteados.

Aunque en la mayoría de los casos confío bsatante en mi memoria, el proceso de escritura es continuo. Después de leer los trabajos relacionados, entenderlos y hasta cierto punto hacerlos propios, plasmo las ideas en el texto, justo enseguida de haber leído el trabajo, pero sin copiar, sino tratando de traducir la visión propia del autor.

¿Cómo se afronta el cambio en las diferentes hipótesis filogenéticas que se plantean?

Las filogenias son herramientas, conjeturas, nunca verdades absolutas. Pueden cambiar con la inclusión de nueva información; por lo tanto, los escenarios cambian con estas nuevas hipótesis. Uno no debería casarse a priori con ideas preconcebidas, ya que con nueva información pueden surgir nuevas explicaciones, o si se tiene una idea previa deberíamos ser lo suficientemente flexible como para abandonarla y adoptar una idea alternativa.

Por lo tanto, para abordar el estudio del árbol de la vida y encontrar una solución más extensa, lo ideal es atacar tanto las ramas iniciales, como las ramas terminales, siempre tomando en cuenta que estas son hipótesis y pueden modificar la manera en la que vemos y entendemos el mundo. En el proceso natural de avance de la ciencia, las ideas seguirán cambiando y se deberán ir ajustando de acuerdo con las nuevas evidencias.

A lo largo de su carrera, ¿han rechazado alguno de sus trabajos? ¿Cuál es su manera de superar estos contratiempos?

¡Claro! Todos tenemos contratiempos, la peor situación es el rechazo. Si bien queremos que nos acepten nuestros manuscritos, la realidad es a todos nos rechazan trabajos. Lo importante es tratar de buscar soluciones y no quedarse en ese sentimiento por mucho tiempo. El tema con las publicaciones tiene muchas circunstancias, por ejemplo, los revisores y los editores pueden ser antagónicos a nosotros o alguna de nuestras ideas. El proceso es perfectible y depende de muchas circunstancias. Como revisor, puedo no estar de acuerdo con las ideas de un autor, pero exijo que su trabajo tenga coherencia interna. Trato de llegar a un justo medio, para que el trabajo quede lo mejor posible y pueda ser entendido por todos los lectores.

Después de una gran carrera en las ciencias biológicas y la propuesta de las diferentes regiones biogeográficas de toda Latinoamérica. ¿Existe alguna afinidad con alguna de estas en particular?

Sin lugar a duda los bosques subantárticos del sur de Chile y la Argentina me producen un gran interés, tal vez por la afinidad que tengo con ellos, pues en esta zona hice el trabajo de campo de mi doctorado y llegué a admirar su belleza. La idea de reconocer las biotas presentes en esta zona que tienen una afinidad mayor con taxones en otros continentes australes, como Australia y Nueva Zelanda, y no con las regiones geográficamente más cercanas y continuas a la zona en que habitan, la idea de esta afinidad y su complejidad me parece muy interesante. La complejidad, resultado de la vicarianza y de dispersión de los diferentes componentes que forman una biota hace el descubrir cada una de estas historias sea fascinante. También tengo gran afinidad por los bosques templados de la Zona de Transición Mexicana, que me resultan particularmente interesantes. Por el contrario, si bien no existe un rechazo explicito, no poseo demasiada afinidad por las zonas tropicales. También tengo gran interés por algunos lugares que no conozco, como el archipiélago Juan Fernández (Pacífico de Chile), las Islas Malvinas (Atlántico argentino) y las islas Revillagigedo (Pacífico mexicano).

En sistemática, ¿qué se disfruta más, el trabajo de gabinete o el trabajo práctico?

La sistemática es un tema muy interesante para mí y engloba tanto el descubrimiento y descripción de especies, como la reconstrucción filogenética y otras cuestiones. La biogeografía en realidad es una parte de la sistemática en su sentido más amplio, por lo tanto, son dos aspectos de un mismo tema, ambos igualmente disfrutables.

La biogeografía de Curculionidae me pareció un tema interesante al comenzar mi carrera. Sin embargo, el conocimiento sistemático del grupo no es extenso, por lo que he debido explorar grupos mejor conocidos, como plantas, vertebrados y otros grupos de artrópodos.

¿Cómo dar a conocer conceptos complicados, por ejemplo, a sus estudiantes?

Siempre es importante introducir los conceptos (el concepto de especie o la filogenia) con la historia que tuvieron hasta llegar a la actualidad y las diferentes definiciones que se les dio en el pasado. Siempre hay que tener una visión crítica de la historia, pero tratando de valorar la contribución de quienes nos precedieron.

Sus trabajos son bastante accesibles para diferentes niveles académicos ¿Es necesario utilizar lenguaje técnico para escribir ciencia?

Cuando se escribe un artículo científico es inevitable usar lenguaje técnico, pero sin excederse; citando a un editor amigo: "escribir fácil es difícil, lo realmente difícil es escribir fácil". Tomando esto en cuenta es importante escribir lo más sencillo posible, sin excesos. Ahora, se debe distinguir a quién va dirigido el texto y prepararlo de acuerdo con esto, si se trata de un público especializado o un público general uno escribe diferente.

¿Qué diferencias encuentra entre escribir ciencia y literatura?

Ambas son muy distintas. La diferencia principal radica

en que en los escritos sobre ciencia tratamos de expresar algo que todos deberían entender de la misma manera (con el correcto manejo del lenguaje técnico). En la literatura, como arte que es, lo que yo escribo puede tener diferentes significados para distintos lectores. No creo que un escritor desee que todos entiendan lo mismo. En cambio, en ciencia, si describo una especie y planteo que está relacionada filogenéticamente con otra, o me refiero a su distribución geográfica, espero que todos entiendan esta idea.

En este contexto, ¿alguna vez se ha interesado en escribir una obra literaria fuera de la ciencia?

No. Una de las principales dificultades para esto es tener suficiente paciencia. Por ejemplo, escribir una novela bastante larga cuesta mucho trabajo; los cuentos, en cambio, parecen obras más cercanas y accesibles. Tomando como ejemplo a uno de los mejores escritores, Jorge Luis Borges, él nunca escribió una novela. Por ello, de pretender incursionar en la literatura, yo elegiría cuentos o poesía.

¿Qué se disfruta más sobre los escritos literarios?

Me parece muy apasionante el lenguaje. Por ejemplo, Juan Rulfo tiene una precisión impresionante, ya que no hay desperdicio en ninguna página. Su lenguaje es tan simple y a la vez preciso, que luego de leerlo uno encuentra excesos en cualquier autor. Además, dentro de su simplicidad puede describir perfectamente un lugar o un personaje.

Por último, después de tantas publicaciones, ¿cómo se decide el siguiente paso?

Eso es más bien contingente. Las personas siempre querrán hacer algo nuevo, pero durante el trabajo que se realiza día a día, puede aparecer algo y, en consecuencia, surgen nuevas ideas. Normalmente uno no da un giro drástico a la línea de investigación sobre la cual se ha trabajado durante un largo periodo de tiempo. También es importante reconocer que a veces llega un estudiante con ideas nuevas y un tanto diferentes a la línea planteada, incluso fuera de mi zona de confort, y decido acompañarlo en su maestría o doctorado, tratando de fomentar el trabajo en el que está interesado y ayudándolo a que desarrolle su propia línea de investigación.

Este breve escrito se realizó emotivamente como homenaje al Dr. Juan José Morrone, a quien admiro y agradezco por brindarme la oportunidad de realizar la entrevista y sobre todo por su paciencia y gran calidez humana.

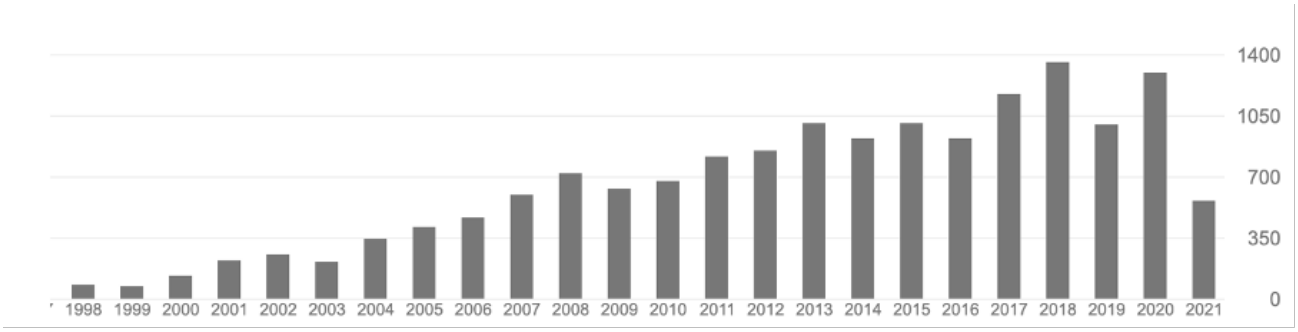

Figura 1. Número de citas por año para los trabajos del Dr. Morrone. Fuente: Google Scholar.

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Dr. Jorge Llorente-Bousquets: lepidópterologo mexicano reconocido con la Karl Jordan Medal

Dr. Jorge Llorente-Bousquets: Mexican lepidopterologist recognized with The Karl Jordan Medal

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La Sociedad de Lepidopterólogos (The Lepidopterists' Society) otorga un reconocimiento a un investigador destacado por su investigación sobresaliente en el ámbito de la lepidopterología. Dicha distinción es conocida como *The Karl Jordan Medal.*. Para ser acreedor de tal reconocimiento tiene que haber unanimidad por parte del comité de selección, por esta razón la medalla no se entrega cada año, asegurando que el premio se otorgue a una persona que realice investigación de alta calidad.

Este año, dicho premio fue otorgado al Dr. Jorge Llorente-Bousquets, quien dio una ponencia para expresar su gratitud con la Sociedad. En esta conferencia, el Dr. Llorente se dijo estar muy sorprendido y halagado por ser considerado como uno de los lepidopterólogos más importantes del último medio siglo.

Esto sin duda es motivo de celebración para la comunidad entomológica de México, pues es un reconocimiento en el que el comité de la Sociedad de Lepidopterólogos busca a la persona idónea, quien además de hacer investigación de alta calidad, fomente los valores que Karl Jordan difundió durante toda su vida como entomólogo, los cuales son la cooperación, el mantener una buena relación con los compañeros de trabajo y la excelencia.

Cuando hablamos del Dr. Llorente es fácil pensar en todas sus aportaciones a la sistemática, biogeografía, taxonomía y entomología de México, sin embargo, personalmente, hablar de él es pensar en sus más de 40 años de investigación sobre lepidópteros.

Su pasión por las mariposas inició a muy temprana edad, justo en su infancia e incluso su abuela lo llegó a llamar "El maestro de las mariposas". Durante la etapa de universidad conoció a quien sería el profesor más importante que tuvo, Alfredo Barrera, quien, al igual que Karl Jordan, era sifonapterólogo, sin embargo, también estaba interesado en las mariposas, la taxonomía, biogeografía y la etnociencia, esto sin duda propició que el interés del Dr. Llorente por los lepidópteros aumentara.

Al echar un vistazo a su trayectoria profesional podemos darnos cuenta de sus 48 años trabajando en la Universidad Nacional Autónoma de México. Pero no es solamente en la UNAM donde ha realizado investigación, pues también ha visitado otras instituciones como el Museo Nacional de Historia Natural Smithsoniano, el Museo de Entomología de Allyn, el Centro McGuire de la Universidad de Florida, el Instituto de Ciencias Naturales UNAL Bogotá, el Museo Americano de Historia Natural y el Museo Británico de Historia Natural.

Durante estas visitas él tuvo la fortuna de conocer y entablar amistad con varios de sus colegas esto también le dio la oportunidad de realizar trabajo de campo en varios países: México, Estados Unidos, Colombia, Ecuador, Guatemala, Inglaterra y Austria, por mencionar algunos.

El Dr. Llorente ha sido acreedor a varios cargos por su trabajo en la biología, dentro de los más importantes están ser el primer director del Museo de Zoología de la Facultad de Ciencias, UNAM, director de Análisis y Prioridades de CONABIO y coordinador de la Red iberoamericana de Biogeografía y Entomología por CYTED-RIBES. Entre los reconocimientos que se le han dado se encuentra el ser nombrado profesor emérito por la UNAM e Investigador Nacional Emérito por CONACYT, y en el 2019 fue homenajeado por la Universidad de Guadalajara y se le dedicó un volumen de la revista Dugesiana.

A lo largo de su carrera ha publicado 450 productos, entre los que se encuentran 182 artículos, 67 libros, 152 capítulos de libros y 10 publicaciones electrónicas, siendo el 48% de estas centradas en lepidópteros.

Dentro de sus grupos de estudio, la familia Pieridae es su favorita y la ha usado como modelo biológico para sus estudios y a la subfamilia Dismorphiinae como modelos para estudiar el mimetismo batesiano en el Neotrópico.

Una de sus más grandes contribuciones al estudio de Lepidoptera es la colección de libros titulados Mexican Butterflies, de la cual el primer libro trató sobre las familias Papilionidae y Pieridae, mientras que los tres libros subsecuentes han sido sobre las subfamilias de Nymphalidae y otros tres volúmenes se tienen en preparación.

Actualmente se cuenta con una base de datos de Lepidoptera del Museo de Zoología, Facultad de Ciencias, UNAM, que rebasa los 530,000 registros, todos estos con datos georreferenciados, convirtiéndola en la base más grande de México y de América Latina de mariposas. El Dr. Llorente menciona que esto no habría sido posible de no ser por el esfuerzo de sus dos colegas y amigos Armando Luis e Isabel Vargas, a los cuales les cedió la batuta de la base que él inició entre 1984 y 1985.

Entre sus trabajos más recientes e importantes se encuentran los que han sido centrados en algunos géneros de Dismorphiinae y en el estudio de la morfología y las microestructuras, en particular de las antenas de Pieridae y el corion de Pieridae, Nymphalidae y Riodinidae.

Por esta razón se hace una extensa felicitación al Dr. Jorge Llorente-Bousquets por tan merecido premio.

Recibido: 17 de diciembre 2021
Aceptado: 17 de diciembre 2021

Los manuscritos recibidos para su evaluación y posible publicación en Dugesiana son evaluados al menos por dos árbitros anónimos especialistas en la temática del artículo, generalmente ajenos al comité editorial. Es indispensable que el autor envíe el nombre de tres especialistas, con sus respectivos correos electrónicos, para ser considerados en el proceso de evaluación.

Para someter a revisión un trabajo que desee ser publicado en Dugesiana, el manuscrito se debe ajustar a las siguientes normas editoriales:

- El manuscrito debe estar escrito en Word, a doble espacio, márgenes de 2.5 cm y sangría de 0.5 cm.
- Sin formato especial: elimine el espaciado automático entre párrafos, no dar espacios con la barra o tecla espaciadora; nunca utilizar los encabezados del sistema de word.
- Escrito con letra (fuente) Times New Roman a 12 puntos.
- Numerar las páginas consecutivamente, colocar el número en la parte inferior central.
- Se aceptan manuscritos en español, inglés y portugués.

El texto deberá incluir los siguientes puntos y secciones: Título en el idioma original, Título en español, Resumen, Palabras claves, Abstract (inglés), Key words, Introducción, Material y métodos, Resultados, Discusión, Agradecimientos y Literatura citada. Los encabezados deben escribirse con mayúsculas, negritas y estar centrados en el texto. Si el manuscrito está en español o portugués, se debe incluir un título en inglés. Si el manuscrito está en inglés se debe incluir un título en español.

- Utilizar un título corto como cabecera, máximo 16 palabras. En caso de utilizar nombres científicos, colocar el apellido del descriptor y el año de descripción separados por una coma. Es importante adicionar entre paréntesis el nombre del orden y familia. Todos los trabajos deben llevar el título en dos idiomas, dando preferencia al inglés y español.
- Nombre completo de autores con mayúsculas y minúsculas, seguidos por las direcciones postales adecuadamente relacionadas con números en superíndice y el autor de correspondencia con asterisco.
- Las direcciones o afiliaciones de los autores deberán estar señaladas inicialmente con el número en superíndice que le corresponde. Mencionar las dependencias en orden jerárquico de menor a mayor grado. Ejemplo: Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México. No abreviar los nombres de las instituciones. Además de señalar la ciudad, estado y país (en este orden).
- Incorporar el número ORCID para cada autor.
- Resumen: párrafo que no debe exceder de 300 palabras, ni incluir referencias.
- Palabras clave: hasta ocho palabras, distintas de las que se incluyen en el título del manuscrito.
- Abstract: versión en inglés del resumen (debe ser una traducción, nunca algo diferente al resumen). No debe exceder las 300 palabras.
- Key words: hasta ocho y ser equivalentes a las palabras clave.
- Los encabezados para subtítulos en las secciones Introducción, Material y métodos, Resultados, se escribirán con mayúscula inicial y en negritas.
- Los nombres científicos siempre deberán escribirse en cursivas o itálicas; nunca subrayados. La primera vez que se mencionen deben ir seguidos por el autor (es) que describió (eron) la especie y el año de descripción, separados por una coma; por ejemplo: Oxyporus lawrencei Campbell, 1974. Este formato debe incluirse también en el Resumen y Abstract. En caso de citar nombres regulados por un código de nomenclatura diferente al de Zoología, deberá colocarse entre paréntesis al menos el nombre de la familia a la que pertenece el taxón. El apellido del descriptor debe estar escrito completo.
- Al final del artículo y en página aparte, se incluirá la sección para los pies de figura y los cuadros, con sus respectivos encabezados. Para facilitar la edición de los mismos, nunca utilice imágenes de los cuadros, siempre elaborarlos con texto con las herramientas del procesador Word.
- Las figuras, mapas o fotografías serán presentadas por separado del texto, en formato TIFF con una resolución de 300 dpi o mayor. Todas deben numerarse de manera continua como figuras, de acuerdo con su señalamiento en el cuerpo del manuscrito. En caso de existir varias, es indispensable organizarlas en láminas. Se pueden enviar imágenes a color, siempre y cuando sean de alta resolución (600 dpi), con muy buena definición y que su publicación a color se considere indispensable. Las imágenes que no reúnan estos requisitos no se publicarán a color. Todas deben incorporarse a la plataforma de la revista. Para su evaluación, es necesario enviar un archivo pdf con todas las imágenes.
- En las imágenes y cuadros, en caso de haber sido tomados o modificados de otra fuente, mencionar el autor de los mismos o aclarar que son de autoría propia cuando fueron realizados por el o los autores.

- Agradecimientos: Además de los nombres de personas e instituciones que apoyaron aspectos del trabajo, pueden incluirse créditos a proyectos, programas, becas u otros datos pertinentes al trabajo o al (los) autor (es). Para ello, mencione el nombre de la institución u organización que dio el apoyo, agregue nombre y/o número del proyecto o contrato.
- Literatura citada: la cita en texto se incluye sin comas entre autor y año ejemplo: (López 1980), (López y Hernández 1980). Es oportuno recordar que de esta forma, se diferenciará entre las citas bibliográficas y la referencia al descriptor y año de descripción de un taxón. No utilizar el operador "&" (ampersand); no incluir sangrías, justificación o numeración. En la lista, todas las referencias se deben organizar en orden alfabético. Cuando se mencionen varios artículos del mismo autor, éstos se presentarán en orden alfabético, cronológico y por número de autores. Si hay dos artículos con el (los) mismo (s) autor (es) y año, deberán diferenciarse por las letras 'a', 'b', … En cursivas deberán escribirse los títulos de libro, nombre de revista y título de tesis (en lo posible evitar citas de tesis y resúmenes de eventos académicos); no se permiten citas de páginas de internet, pero pueden incluirse referencias a publicaciones electrónicas o digitales, bases de datos o software. Las conjunciones de los autores deben escribirse en el idioma original de la obra citada. Ejemplo: y, and, et, und.

Ejemplos:

Libros [sin páginas totales]:

Morón, M.A., B.C. Rattclife y C. Deloya (Eds). 1997. *Atlas de escarabajos de México: Coleoptera: Lamellicornia, Vol. I Familia Melolonthidae*. CONABIO-SME, México, D.F.

Coloque la ciudad correspondiente en función de la fecha de la obra. Algunas ciudades de edición pueden cambiar con el tiempo. Es el caso de la Ciudad de México.

Capítulos de libro [los nombres de los editores ordenados de manera similar que los nombres de los autores del capítulo]:

Edmunds, G.F. and D. Waltz. 1995. Ephemeroptera. (pp. 126-163). In: Merritt, R.W. and K.W. Cummins (Eds.). *An Introduction to the Aquatic Insects of North America*. Kendall-Hunt, Dubuque.

Artículos [El nombre de la revista debe escribirse completo. Es indispensable incluir el número de la revista cuando éste existe. Para el caso particular de Folia Entomológica Mexicana, Acta Zoológica Mexicana, Zootaxa y, en general, para aquellas publicaciones que durante un tiempo utilizaron o siguen utilizando sólo el número (excluyendo el volumen), coloque el número de la revista entre paréntesis]:

Fitzgerald, T.D., A. Pescador-Rubio, M.T. Turna and J.T. Costa. 2004. Trail marking and processionary behavior of the larvae of the weevil Phelypera distigma (Coleoptera: Curculionidae). *Journal of Insect Behavior*, 17(5): 627-646.

Huerta, C. y G. Halffter. 2000. Factores involucrados en el comportamiento subsocial de Copris (Coleoptera: Scarabaeidae: Scarabaeinae). *Folia Entomológica Mexicana*, (108): 95-120.

Kohlmann, B. and A. Solís. 2006. New species of dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae) from Mexico and Costa Rica. *Zootaxa*, (1302): 61-68.

Tesis [Evitar en lo posible este tipo de referencias]:

Contreras-Ramos, A. 1990. *The inmature stages of* Platyneuromus *(Corydalidae) with a key to the genera of larval Megaloptera of Mexico.* M. Sc. Thesis, University of Alabama, Tuscaloosa.

Memorias de congresos, simposios y otras reuniones [Evitar en lo posible este tipo de referencias. En caso de ser necesario contactar al editor].

Publicaciones y sitios web, bases de datos y Software (debe incluirse la dirección electrónica y la fecha de consulta):

Oksanen, J., F. Guillaume Blanchet, R. Kindt, P. Legendre, R. B. O'Hara, G. L. Simpson, P. Solymos, M. H. H. Stevens and H. Wagner 2011. vegan: Community Ecology Package. R package version 1.17-8. http://www.rproject.org/. Fecha de consulta: 12 de diciembre de 2016.

Linbos. 2014. Los insectos del bosque seco. http://1.linbos.net/. Fecha de consulta: 12 de diciembre de 2016.

Sistema Meteorológico Nacional. 2016. Información climatológica. http://smn.cna.gob. mx/es/climatologia/informacion-climatologica. Fecha de consulta: 12 de diciembre de 2016.

Steinkraus, D. 2004. Strange facts about soldier beetles infected with the poorly known fungal pathogen, Erynopsis lampyridarum. Papers of the 2004 Entomological Society of America Annual Meeting and Exhibition. Disponible en: https://esa. confex.com/esa/2004/techprogram/paper_17245. htm. Fecha de consulta: 12 de diciembre de 2016.

En las contribuciones para las secciones Taxonomía y Técnicas de estudio, los encabezados quedan a juicio del autor (es), pero es recomendable que estén acompañadas de ilustraciones. En estas secciones se incluyen aquellos trabajos de tipo catálogo, inventarios, descripción o redescripción de especies, claves, etc. Los manuscritos sobre grupos particulares (ejemplo: Odonata, Coleoptera, entre otros) deben mencionar aspectos sobre la biología del grupo, técnicas de estudio (en campo y gabinete), así como claves dicotómicas, mínimo para nivel de familia. Se recomienda la inclusión de figuras en las claves las cuales deben organizarse en láminas. Los trabajos deben ser originales y enfocarse principalmente a México o la región Neotropical.

Para los trabajos de Taxonomía deben tomarse en cuenta las consideraciones del Código Internacional de Nomenclatura Zoológica cuarta edición (1999).

Los trabajos que abarquen comentarios sobre una sola especie deben contener información biológica de una especie que es nativa o que su distribución incluya alguno de los estados de la República Mexicana. El título del trabajo debe ser el nombre científico de la especie en cuestión; se debe incluir el autor y año de descripción. En el siguiente renglón mencionar los nombres comunes (si existen). Abajo y centrado, escribir con mayúsculas y minúsculas el nombre de al menos dos categorías taxonómicas que permitan ubicarlo fácilmente. Separar cada categoría con dos puntos. Dos renglones abajo incluir la información de la especie. Es indispensable incluir una ilustración o fotografía de buena calidad, que deberá enviarse en formato TIFF. El objetivo de este trabajo es dar a conocer información original sobre la especie en cuestión. Ejemplo:

Megasoma elephas Fabricius, 1775

"Escarabajo elefante", "ronrón"

Coleoptera: Melolonthidae

No existen sobretiros impresos, solo digitales, los cuales pueden descargarse desde la página de la revista: http://148.202.248.171/dugesiana/index.php/DUG/issue/archive

Descripción de taxones

Se debe adaptar a las características de un artículo. La descripción del taxón debe contener los siguientes elementos: nombre, diagnosis, descripción, material tipo, etimología, biología, distribución y comentarios taxonómicos.

Taxonomía y técnicas de estudio

Los encabezados del manuscrito deberán incluir: Resumen, Abstract (inglés), Introducción, Tratamiento taxonómico, Discusión, Agradecimientos y Literatura citada. En caso de considerar necesaria la inclusión de otras secciones, éstas se pueden incluir respetando: encabezados escribir con mayúsculas y centrados en el texto; subtítulos con mayúsculas y minúsculas y con sangría. Este tipo de contribuciones debe ser un aporte detallado al estudio de un taxón particular.

Ensayo

Los encabezados del texto de un ensayo deberán incluir:

Resumen, Abstract (inglés), Introducción, Discusión, Conclusiones y/o sugerencias, Agradecimientos y Literatura citada. En caso de considerar necesaria la inclusión de otras secciones, éstas se pueden incluir respetando: encabezados escribir con mayúsculas y centrados en el texto; subtítulos con mayúsculas y minúsculas y con sangría. Los ensayos deben ser trabajos analíticos y con propuestas o posiciones claras de parte del autor (es).

Nota Científica

No se aceptan notas científicas.

Reseña bibliográfica

No se aceptan reseñas bibliográficas.

Para mayores detalles, contactar a:

Editor

Dr. José Luis Navarrete-Heredia, Centro de Estudios en Zoología, CUCBA, Universidad de Guadalajara, Apdo. Postal 134, 45100, Zapopan, Jalisco, México,

glenusmx@gmail.com

o

Asistente editorial

M. en C. Ana Laura González-Hernández, Centro de Estudios en Zoología, CUCBA, Universidad de Guadalajara, Apdo. Postal 134, 45100, Zapopan, Jalisco, México, alaura.gonzalez@academicos.udg.mx

The received manuscripts for their assessment and possible publishing in Dugesiana are revised at least by two anonymous specialists who are familiar with the area of study and usually not part of the editorial committee. It is essential that the reference of three specialists is sent by the author as well as their e-mail addresses since they are considered when assessing.

In order to have reviewed the work to be published in Dugesiana, the manuscript has to follow the next publishing rules:

- The manuscript is to be written in Word, double space, with a margin of 2.5 cm and indentation of 0.5 cm.
- No special format: delete automatic spacing between paragraphs, no spacing out with spacing key and no using Microsoft Word headlines.
- Written with Times New Roman format, size 12.
- Numbered pages. Add page number below and centered.
- Manuscripts in Spanish, English and Portuguese are accepted.

Text should contain the following aspects: original language title, title in Spanish, abstract, key words, abstract in English, introduction, material, as well as methods. Results, a discussion, acknowledgments and references to quoted literature (as literature cited). Headline should be written in capitals, bold and centered. Manuscripts in Spanish, English and Portuguese are preferred. Should the manuscript be in Spanish or Portuguese, then it should contain a title in English.

- Short title as headline, no more than 16 words. Regarding scientific names, last name and year of description should be separated by a comma. It is important to add name of order and family in parenthesis. Every title should be written in two languages, where mainly English and Spanish will be used.
- Complete name of authors in capital and small letters, followed by the corresponding addresses related with superscript numbers as well as the corresponding author marked with an asterisk.
- Addresses or affiliations of authors should be indicated initially with the superscript number that corresponds to them. Mention the dependencies in hierarchical order from lower to higher degree. For example: Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México. Do not abbreviate the names of institutions, and add the city, state and country (in this order).
- Add ORCID number for each author.
- Abstract: paragraph that should not exceed 300 words, not include references.
- Keywords: up to eight words, many of which are included in the title of the paper.
- Resumen: Spanish version of abstract (must be a translation, never something different). Not exceed 300 words.
- Palabras clave: Spanish version of keywords, with the same indications.
- Subtitle headings in “Introduction, Material and Methods, Results, Discussion and Acknowledgments” sections will be written in initial capital letters and bold.
- Scientific names should be always be written in italics, but never underlined. The first time mentioned, they should be followed by the author/ authors who described the specie and year of description, separated by a comma. e.g. “Oxyporus lawrencei Campbell, 1974.” This format should also be included in the abstract. In case of quoting names regulated by a nomenclature code being different to the one used in zoology, the family name belonging to taxon should be written in pa- rent- hesis. The descriptor full name should be writ- ten as well.
- At the end of the article and in a separated page, the footnotes and tables, with their respective headings, will be included. For editing purposes, the tables should never be drawn as images, do it using the Word tools.
- Figures, maps, or photographs will be presented separately from the text in TIFF format with a resolution of 300 ppp or larger. All of them should be numbered continuously as figures, according to the manuscript body. In case of having sever- al, it is essential to have them organized as plates. Colored pictures are accepted, provided that their resolution is high (600 ppp), as well as their defi- nition; as long as their colored publishing is re- ally essential. Pictures not accomplishing these requirements will not be published in color. All of them should be uploaded in the platform of the magazine. As for their assessment, it is necessary to send a pdf file including all the pictures.
- Regarding pictures and charts taken from another source, either the author should be mentioned or their authorship should be mentioned.

- Acknowledgments: besides the names of people and institutions that supported the work, credit can be given to projects, programs, scholarships as well as other data concerning the work as well as authors. In that case, you should include not only the name of the institution, that is, organiza- tion, but also the name and/or number of project, that is, contract.
- Literature cited: literature is to be written without commas between the author and year, e.g.: (López 1980), (López y Hernández 1980). It is worth remembering that in this way, quote and reference to the descriptor as well as a taxon's description can be differentiated. Do not use the operator "&" (ampersand); as well as indentation, justification or numeration. All references should be organized alphabetically. If several articles from the same author are to be mentioned; these will be present- ed in alphabetical, chronological order as well as by number of authors. In case there are two arti- cles with the same author and year, they are to be differentiated by using the letters 'a', 'b'… Titles of book, magazine as well as the title of a thesis should be written in italics (quotes from thesis and congress or symposium reports should be avoided as much as possible). Website references are not allowed; nevertheless, references from electronic publishing, data base as well as software may be included. Conjunctions from the authors should be written in the original language, e.g.: y, and, et, und.

Examples:

Books [no total page number]:

Morón, M.A., B.C. Rattclife y C. Deloya (Eds). 1997. *Atlas de escarabajos de México: Coleoptera: Lamellicornia, Vol. I Familia Melolonthidae*. CONABIO-SME, México, D.F.

Write the corresponding city according to the date. Some cities might change through time, such as Mexico City.

Book chapters [the name of the editors organized in a similar way as the name of the chapter's authors]:

Edmunds, G.F. and D. Waltz. 1995. Ephemeroptera. (pp. 126-163). In: Merritt, R.W. and K.W. Cummins (Eds.). *An Introduction to the Aquatic Insects of North America*. Kendall-Hunt, Dubuque.

Articles [the journal's name should be written completely; not to forget that the number of journal should be written when it exists. As for Folia Entomologica Mexicana, Acta Zoologica Mexicana, Zootaxa as well are publishing only using the number (leaving out the volume), parenthesis should be for the number of the magazine.

Fitzgerald, T.D., A. Pescador-Rubio, M.T. Turna and J.T. Costa. 2004. Trail marking and processionary behavior of the larvae of the weevil Phelypera distigma (Coleoptera: Curculionidae). *Journal of Insect Behavior*, 17(5): 627- 646.

Huerta, C. y G. Halffter. 2000. Factores involucrados en el comportamiento subsocial de Copris (Coleoptera: Scarabaeidae: Scarabaeinae). *Folia Entomológica Mexicana*, (108): 95-120.

Kohlmann, B. and A. Solís. 2006. New species of dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae) from Mexico and Costa Rica. Zootaxa, (1302): 61-68.

Thesis [is recommended to avoid this type of references]:

Contreras-Ramos, A. 1990. *The inmature stages of* Platyneuromus *(Corydalidae) with a key to the genera of larval Megaloptera of Mexico.* M. Sc. Thesis, University of Alabama, Tuscaloosa.

Congresses, symposia and other meetings reports [Avoid in this type of references. If is necessary to include this type of references please contact the editor].

Online publications and websites, database and software (e-mail address and search date should be included)

Oksanen, J., F. Guillaume Blanchet, R. Kindt, P. Legendre, R. B. O'Hara, G. L. Simpson, P. Solymos, M. H. H. Stevens and H. Wagner 2011. vegan: Community Ecology Package. R package version 1.17-8. http://www.rproject.org/. Search date: 12 de diciembre de 2016.

Linbos. 2014. Los insectos del bosque seco. http://1.linbos.net/. Search date: December 12th, 2016.

Sistema Meteorológico Nacional. 2016. Información climatológica. http:// smn.cna.gob.mx/es/climatologia/informacion-climatologica. Search date: December 12th, 2016.

Steinkraus, D. 2004. Strange facts about soldier beetles infected with the poorly known fungal pathogen, Erynopsis lampyridarum. Papers of the 2004 Entomological Society of America Annual Meeting and Exhibition. Available on: https://esa.confex.com/ esa/2004/techprogram/paper_17245. htm. Search date: December 12th, 2016.

Regarding contributions for taxonomy and study methodology areas, headlines are up to the author's criteria; however, it is highly recommended to have pictures. Catalogs, inventories, description of species, among others should be included in this section. Manuscripts about some particular groups, such as Odonata, Coleoptera, among others, should mention aspects about the taxa biology, study methodologies (in field and others), as well as dichotomous keys, at least at a family level. It is highly recommended to

include figures that should be organized as prints. The work should be original and focused mainly either on Mexico or the Neotropical region.

As for taxonomy works, recommendations from "The International Code of Zoological Nomenclature", fourth edition (1999) should be kept in mind.

All remarks concerning single specie should include biological information of a native species or in the worst case, it can be found in one of the states from the Mexican Republic. The title should be the scientific name of the specie being studied, as well as the author and year of description. In the following line, the common names should be mentioned (in case there are some). Two taxonomic categories, at least, should be written below, centered, in upper case and lower case letters. Each category should be separated by two dots, as well as the information of the specie should be included in the following line. It is worth remembering to include a draw or good-quality picture that should be sent in TIFF format with a resolution of 300 dpi or larger. The objective of this piece of work is to make public original information about the specie being studied. e.g.:

Megasoma elephas Fabricius, 1775

"Escarabajo elefante", "ronrón"

Coleoptera: Melolonthidae

No reprints, only digital which can be downloaded from the magazine website: http://148.202.248.171/dugesiana/index.php/DUG/issue/archive

Taxa description

Adapted to the features of the article. It should include the following elements: name, diagnosis, description, type of material, etymology, biology, distribution, as well as taxonomic remarks.

Taxonomy and study methodology

Headlines should include: resumen, abstract (in English), introduction, taxonomical work, discussion, thank-you note, as well as references. In case of considering other sections, those can be included provided that the headlines are written in capital letters and centered; subtitles in capital and small letters as well as an indentation. This type of contributions will be a detailed study of a particular taxon.

Essay

Headings should include: Resumen, Abstract, Introduction, Discussion, Conclusions and / or suggestions, Acknowledgments and Literature quoted. In case it is considered necessary to include other sections, these can be included respecting: headings written in capital letters and centered in the text; uppercase and lowercase captions and indented. The essays must be analytical works and with clear propositions or positions on the part of the author(s).

Scientific note

Not accepted.

Book reviews

Not accepted.

It is considered that the author(s) agree with publishing the results of the research in the journal "Dugesiana" and to testify that there is no conflict of interests, as well as to claim that it is an original version and it has not been sent to another magazine to be assessed.

For any other situation not related to the ones mentioned, please get in touch with the editor.

Editor

Dr. José Luis Navarrete-Heredia, Centro de Estudios en Zoología, CUCBA, Universidad de Guadalajara, Apdo. Postal 134, 45100, Zapopan, Jalisco, México,

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