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DESCRIPTION OF A NEW SPECIES OF *GYMNETIS* MACLEAY (COLEOPTERA: SCARABAEIDAE: CETONIINAE: GYMNETINI) FROM COLIMA, MEXICO

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ABSTRACT

Gymnetis pedroreyesi Ratcliffe and Nogueira, **new species**, is described from the state of Colima, Mexico. The description is accompanied by illustrations, a diagnosis to distinguish it from similar species, observations on natural history, and a key to the 12 Mexican species of *Gymnetis* MacLeay, 1819.

RESUMEN

Gymnetis pedroreyesi Ratcliffe y Nogueira, **nueva especie**, es descrita del Estado de Colima, México. La descripción es acompañada por ilustraciones, diagnóstico para distinguirla de especies similares, observaciones y características de su hábitat y una clave para las 12 especies mejicanas de *Gymnetis* MacLeay, 1819.

Key Words: taxonomy, flower chafer, Neotropical, scarab beetle, identification key

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INTRODUCTION

The genus *Gymnetis* MacLeay (Coleoptera: Scarabaeidae: Cetoniinae: Gymnetini) includes 56 species and four subspecies and was recently revised by Ratcliffe (2018). Nogueira ascertained that specimens he collected in Colima, Mexico, were new and contacted Ratcliffe to jointly describe this new species. With the addition of this species, there are now 12 species of *Gymnetis* in Mexico, and these are included in an identification key to the Mexican species presented herein.

MATERIAL AND METHODS

Label data are quoted verbatim in the text; a single slash (/) indicates a break between lines on the same label, and a double slash (//) indicates a different label on the same specimen. The key characters and species descriptions were based on the following characteristics: length from apex of pronotum to apex of elytra (the head may or may not

be deflexed and, if measured, could give a misleading length); width across humeri; color and markings; interocular width (number of transverse eye diameters across the frons); form and sculpturing of the head, pronotum, elytra, and pygidium; form of the protibial and mesometasternal process; sculpturing and color of the abdominal sternites; and form of the male parameres. Punctures are considered simple unless otherwise noted. Minute punctures are generally not seen with 12.5× magnification but are easily seen with 50× magnification. Small punctures are easily seen with 12.5× magnification and can be seen with the naked eye. Large punctures are easily seen without the aid of instruments. Sparse punctures are characterized by numerous puncture diameters between them. Punctures moderate in density have 3–5 puncture diameters between them. Dense punctures have only 1–2 puncture diameters between them or less.

We use the phylogenetic species concept as outlined by Wheeler and Platnick (2000). This

concept defines species as the smallest aggregation of (sexual) populations diagnosable by a unique combination of character states.

With *Gymnetis* species in particular, color and markings are extremely important characters, even though we typically consider them of lesser value because of their high intraspecific variability. These characteristics are listed first in the description, and then the physical traits of sculpturing for each of the body regions are given. Expressing in words the subtle shades of color or variably expressed, complex markings that often blend into one another on the pronotum and elytra is challenging and compounded by cultural differences in different countries for interpreting those color and pattern descriptors. Accordingly, the new species is illustrated in color. Velutinous refers to the soft, velvety surface on the pronotum and elytra, even though this surface seems to not be comprised of short, silky setae as implied by “velutinous”. Opaque refers to a dull or non-shiny surface rather than a shiny surface. Diffuse refers to the fuzzy or soft edges of the dorsal markings present as opposed to hard-edged or distinct markings. Smithe (1975) provided a simplified overview (with color swatches) of the more detailed volume of Ridgway (1912), and these works may be consulted for additional color information.

The collection codens used in this work are:

BCRC	Brett C. Ratcliffe Collection, Lincoln, NE, USA
BMNH	The Natural History Museum, London, UK
CMNC	Canadian Museum of Nature, Ottawa, ON, Canada
GNGC	Guillermo Nogueira Collection, Guadalajara, Jalisco, Mexico
IEXA	Instituto de Ecología, Xalapa, Veracruz, Mexico
IMECBIOL	Colección Entomológica del Instituto Manantlán de Ecología y Conservación de la Biodiversidad Centro Universitario de la Costa Sur, Universidad de Guadalajara, Guadalajara, Jalisco, Mexico
INBUNAM	Colección Nacional de Insectos, Universidad Nacional Autónoma de México, Ciudad de México, DF, Mexico
MAMC	Miguel A. Morón Collection, Xalapa, Veracruz, Mexico
MNHN	Museum National d'Histoire Naturelle, Paris, France
NMPC	National Museum of Natural History, Prague, Czech Republic
RACC	Richard Cunningham Collection, Chino, CA, USA

USNM	US National Museum of Natural History, Washington, DC, USA
WBWC	William B. Warner Collection, Chandler, AZ, USA
ZMHU	Museum für Naturkunde, Berlin, Germany

***Gymnetis pedroreyesi* Ratcliffe and Nogueira, new species**

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(Figs. 1–8)

Type Material. Holotype male labeled: “MEXICO: COLIMA / COMALA, 700 m elev. / 7-8-July-2000, / G. Nogueira [sic] collector” and with our red holotype label. Allotype female with same data and our red allotype label. Paratypes with same data (10 males, 5 females), and same data except date of VI-30-20-2000 (2 males, 1 female), and VIII-31-2000 (2 males, 2 females). One additional male paratype labeled: “MEXICO: COLIMA, 651 m el / Comala, nr. Rancho Estrella / 7/8-VII-19, traps banana [sic] / 19°18.631'N 103°44.720'W / R. Cunningham + G. Nogueira.” Holotype and allotype deposited at INBUNAM. Paratypes are deposited at BCRC (2), BMNH (2), CMNC (1), GNGC (5), IEXA (1), IMECBIOL (1), MNHN (2), NMPC (1), RACC (2), USNM (2), WBWC (1), and ZMHU (2). Additional specimens with similar data are in MAMC and are currently unavailable and so not designated as paratypes.

Description. Holotype. Male (Figs. 1, 3). Length 16.8 mm; width across humeri 9.8 mm. **Head:** Frons velutinous smoky black with 2 short, broad, diffuse, gray spots on occiput. Surface with ocellate punctures moderate in size and density, mostly in front of gray spots. Clypeus velutinous smoky black; apex broadly truncate, narrowly reflexed. Interocular width equals 4.5 transverse eye diameters. **Pronotum:** Color mostly velutinous smoky black with diffuse pattern of dark gray and dirty yellow on anterior half and sides. Surface with small, sparse punctures along sides. Lateral margin with short marginal line broken at center, line not reaching anterior and posterior angles. Mesepimeron velutinous smoky black and narrowly shiny black on apex. **Elytra:** Color velutinous smoky black with irregularly dissected, yellow vittae on lateral margins. Surface with small, sparse punctures mesad of humerus, otherwise sculpturing obscured. Apices at suture subquadrate. Lateral marginal bead black. **Pygidium:** Color dark reddish brown. Surface completely, concentrically rugose, setigerous; setae minute, dense, black. **Legs:** Protibia tridentate, basal tooth removed. **Venter:** Metaventricle black,

Figs. 1–3. *Gymnetis pedroreyesi*, new species. 1) Holotype, dorsal view; 2) Paratype; 3) Holotype, lateral view.

weakly shiny, and with sparse, black, crescent-shaped, setigerous punctures on posterior half, anterior half rugose. Mesometasternal process, in lateral view, projecting forward and downwards from ventral axis of body at about 45°, apex

subquadrate (Fig. 3). Metacoxa on posterolateral corner acutely recurved. Abdominal sternites shiny black on center, sides on lateral fourth with indistinct, gray bloom. Sternites 1–5 with small, dense, crescent-shaped punctures on anterolateral

Figs. 4–5. *Gymnetis pedroreyesi*, new species, parameres. 4) Caudal view; 5) Lateral view.

corners. Setae on procoxae and mentum black. **Parameres:** In caudal view, form elongate, subrectangular, weakly flared on lateral margin, each apex flared laterally into small, sharp tooth (Fig. 4). In lateral

Fig. 6. *Gymnetis pedroreyesi*, new species, distribution in Mexico.

view (Fig. 5), phallobase slightly longer than parameres.

Allotype. Female. Length 16.0 mm; width across humeri 9.7 mm. Differs from the holotype in the following respects: **Head:** Frons and clypeus velutinous black. Surface with ocellate punctures moderate in size and density. Interocular width equals 4.0 transverse eye diameters. **Pronotum:** Color velutinous black. Lateral margin with long, marginal line broken at center, line almost reaching anterior and posterior angles. Mesepimeron opaque black with small, shiny black spot on apex. **Elytra:** Color velutinous black with irregularly dissected, yellow vittae on lateral margins. Surface lacking punctures mesad of humerus. **Pygidium:** Color black. **Venter:** Metacoxa on posterolateral corner subquadrate. Abdominal sternites on sides lacking gray bloom. Sternites 1–5 with large, sparse punctures on lateral margins.

Variation. Males (Fig. 2) (14 paratypes). Length 16.5–19.7 mm; width across humeri 10.0–13.0 mm. **Head:** Color varies from smoky black to dark gray to brown to yellowish brown. **Pronotum:** Minor variations in the presence or absence of diffuse pattern of dark gray and dirty yellow. Lateral margin with long marginal line broken or not. **Venter:** Metaventricle with or without gray bloom. Abdominal sternites black to dark reddish brown.

Females (8 paratypes). Length 16.0–18.0 mm; width across humeri 9.0–11.0 mm. **Head:** Color varies from smoky black to dark reddish brown. **Elytra:** Color varies from black to dark reddish brown. **Pygidium:** Color varies from black to dark reddish brown. **Venter:** Color varies from shiny black to shiny dark reddish brown. Metacoxa on posterolateral corner varies from subquadrate to acutely recurved.

Etymology. The specific epithet is named in honor of our recently deceased colleague and specialist of Passalidae, Pedro Reyes Castillo of the Instituto de Ecología in Xalapa, Mexico.

Distribution. *Gymnetis pedroreyesi* is known from Comala, Colima, Mexico.

Temporal Distribution. June (3), July (17), August (4).

Diagnosis. *Gymnetis pedroreyesi* is morphologically similar in its dorsal markings to some specimens of *Gymnetis merops* Ratcliffe and *Gymnetis sallei* Schaum, and nearly identical with *Gymnetis poecila* Schaum. Both *G. merops* and *G. sallei* have a yellow bead on the lateral margin of each elytron (black in *G. pedroreyesi* and *G. poecila*) and with at least some yellow or ochre on the male abdominal sternites (no yellow on the sternites of *G. pedroreyesi* and *G. poecila*). There is broad geographic separation between *G. pedroreyesi*, *G. merops*, and *G. sallei*; *G. pedroreyesi* is found in extreme southwestern Mexico, while *G. merops* is distributed in Peru, and *G. sallei* occurs in extreme southeastern and southern Mexico and Belize.

Figs. 7–8. Type locality habitat near Comala, Colima, Mexico of *Gymnetis pedroreyesi*, new species.

Gymnetis pedroreyesi is most similar to *G. poecila* and occurs partly sympatrically (in the broad sense; we have no Colima records for *G. poecila*) with *G. poecila* in western Mexico. *Gymnetis pedroreyesi* can be distinguished from *G. poecila* by: 1) the presence in males of diffuse, contrasting light gray or dirty yellow markings on the black pronotum (Figs. 1–2) (pronotum monochromatic black in *G. poecila*); 2) lateral margin of each paramere weakly flared (Fig. 4) versus strongly flared in *G. poecila* (fig. 311 in Ratcliffe 2018); and

3) smaller size in *G. pedroreyesi* (16.0–19.7 mm, $\bar{x}$ = 17.5 mm, n = 24) versus larger in *G. poecila* (18.8–21.3 mm, $\bar{x}$ = 19.7 mm, n = 38).

Natural History. Adults of *Gymnetis* species are primarily diurnal visitors to flowers, ripe fruits, and sap flows, either natural or as a result of beetle-induced abrasion (gumming). Other cetoniines collected at the same locality where *G. pedroreyesi* was collected are *Cotinis pauperula* Burmeister, *Cotinis mutabilis* (Gory and Percheron), and *Amithao marginicollis* (Burmeister).

The specimens of *G. pedroreyesi* were collected with very ripe banana fruit placed on tree trunks and on banana bait in a bottle trap. The type locality of *G. pedroreyesi* is tropical semi-deciduous forest (Figs. 7–8) where the dominant vegetation is nogal, *Juglans major* (Torr.) A. Heller (Juglandaceae); cobano, *Swietenia humilis* Zuccarini (Meliaceae); parota, *Enterolobium cyclocarpum* (Jacq.) Griseb. (Fabaceae); huizache, *Goldmania foetida* (Jacq.) Standley (Fabaceae); mezquite, *Prosopis juliflora* (Sw.) DC (Fabaceae); tepemezquite, *Lysiloma divaricatum* (Jacq.) J. F. Macbr (Fabaceae); guamuchil, *Pithecellobium dulce* Benth (Fabaceae); higuera, *Ficus petiolaris* Kunth (Moraceae); rosa morada, *Tabebuia pentaphylla* (L.) Hemsl. (Bignoniaceae); primavera, *Tabebuia donnell-smithii* Rose (Bignoniaceae); guasima, *Guazuma ulmifolia* Lam. (Malvaceae); ciprés, *Cupressus* sp. (Cupressaceae); fresno, *Fraxinus* sp. (Oleaceae); nance, *Byrsonima crassifolia* (L.) Kunth (Malphiaceae); and chico zapote, *Achras zapota* L. (Sapotaceae) (Martínez 1979; Morales *et al.* 1990; Rzedowski and Huerta 1994; Sociedad Botánica de México 1987; Tropicos.org 2019). Climate in the vicinity of the type locality is warm subtropical with annual average precipitation of 1,163 mm and temperature of 23–27 °C.

KEY TO THE MEXICAN SPECIES OF ADULT *GYMNETHIS* MACLEAY

1. Pronotum monochromatic black 2
- 1'. Pronotum with contrasting colors, spots, flecks, or bands 4
2. Lateral marginal bead of elytra yellow
..... *G. ramulosa* Bates
- 2'. Lateral marginal bead of elytra black 3
3. Body length equals 16.0–19.7 mm
... *G. pedroreyesi* Ratcliffe and Nogueira,
new species (in part, female)
- 3'. Size larger, body length equals 18.8–21.0 mm ...
..... *G. poecila* Schaum
4. Abdominal sternites, at least in part, with metallic bronze, metallic green, metallic reddish purple, or metallic reddish brown reflection 5
- 4'. Abdominal sternites lacking metallic reflection, shiny areas, if present, black, brown, or reddish brown, especially in females 6
5. Elytra with bold pattern of alternating black and yellow bands radiating laterally from diffuse orange area at middle
..... *G. stellata* (Latreille)
- 5'. Elytra orange and/or yellow intermixed with mottled, irregularly diffuse, brown or black flecks and with 2 irregular fields of bright yellow, 1 on disc at middle and other near apex
..... *G. cupriventris kerremansi*
Neervoort van de Poll
6. Pronotum and/or disc of elytra predominantly light to dark orange or reddish orange mixed with black bands, spots, or flecks; elytral margin next to marginal bead without contrasting, isolated, reddish orange spots 7
- 6'. Pronotum and/or disc of elytra predominantly light or dark brown, light or dark gray, black, yellow, various shades of olive, ochre, or chalky white mixed with black bands, spots, or flecks; elytral margin next to marginal bead with or without small, orange or reddish orange spots 9
7. Lateral marginal bead of elytra orange
..... *G. bajula wollastonii* Schaum
- 7'. Lateral marginal bead of elytra dark gray, dark brown, or black 8
8. Elytral black markings soft-edged with cloudings of light gray surrounding and/or among most soft-edged black marks
..... *G. vandepolli* Bates
- 8'. Elytral black markings hard-edged, lacking cloudings of light gray among markings. Orange phase of
..... *G. radicolis* Burmeister (in part)
9. Pronotum and/or elytra predominantly light or dark brown or gray with black markings on disc and/or adjacent to lateral margin 10
- 9'. Pronotum and/or elytra black with yellow, ochre, or light to dark orange markings on disc and/or adjacent to lateral margin 11
10. Mesometasternal process, in lateral view, projecting strongly or almost vertically downwards from ventral axis of body. Elytral apices rounded, not produced into short, spine-like projection
..... *G. coturnix* Burmeister
- 10'. Mesometasternal process, in lateral view, projecting obliquely forward and downwards from ventral axis of body at 33–45°. Elytral apices strongly produced into short, spine-like projection
..... *G. difficilis* Burmeister
11. Mesometasternal process, in lateral view, projecting strongly to almost vertically downwards from ventral axis of body 12
- 11'. Mesometasternal process, in lateral view, projecting obliquely forward and downwards from ventral axis of body at 33–45° 13
12. Lateral marginal bead of elytra yellow
..... *G. sallei* Schaum
- 12'. Lateral marginal bead of elytra black. Yellow phase of
..... *G. radicolis* Burmeister (in part)

13. Mesepimeron completely yellow or with trace of black on posterior margin
 G. thula Ratcliffe
 13'. Mesepimeron completely black
 ... *G. pedroreyesi* Ratcliffe and Nogueira,
 new species (in part, male)

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