




Original paper

## A new species of the genus *Cyclocephala* Dejean, 1821 (Coleoptera: Melolonthidae) from Oaxaca, Mexico

## Una nueva especie del género *Cyclocephala* Dejean, 1821 (Coleoptera: Melolonthidae) procedente de Oaxaca, México

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**ABSTRACT.** Based on material collected of both sexes, a new species of Melolonthidae, Dynastinae, Cyclocephalini: *Cyclocephala mixteca* **sp. nov.** is described. Types were collected using black light traps in the community of Santo Domingo Yanhuitlán, Oaxaca, Mexico. This new species is similar to *Cyclocephala lunulata* and represents the first endemic species reported for the Oaxaca state.

**Key words:** Dynastinae; Cyclocephalini; *lunulata*-type pattern

**RESUMEN.** Con base en material recolectado de ambos sexos, se describe una especie nueva de Melolonthidae, Dynastinae, Cyclocephalini: *Cyclocephala mixteca* **sp. nov.** La serie tipo fue capturada mediante trampas de luz negra en la comunidad de Santo Domingo Yanhuitlán, Oaxaca, México. Esta especie nueva es similar a *Cyclocephala lunulata* y representa la primera especie endémica para el estado de Oaxaca.

**Palabras clave:** Dynastinae; Cyclocephalini; patrón tipo *lunulata*



## INTRODUCTION

With 359 described species, the genus *Cyclocephala* Dejean, 1821 is the largest genus of the tribe Cyclocephalini (Melolonthidae: Dynastinae), widely distributed in the Americas, from southeastern Canada to Argentina (Moore *et al.*, 2018b). The genus has its greatest richness in the Neotropics, especially in Northern South America (Ratcliffe, 1992; 2009; Ratcliffe *et al.*, 2015; Neita-Moreno, 2021; Paz *et al.*, 2022). This genus can be recognized among other members of Cyclocephalini by the shape of the clypeus, which it may be rounded, parabolic, subtruncate or emarginate, antenna with eight to 10 antennomeres and male protarsus noticeably enlarged, with the median claw larger than the outer (Paz *et al.*, 2022). However, the recognition of this genus among relatives of the tribe is difficult due the number of the species, diversity of forms, colors and its possibly non-monophyly (Moore *et al.*, 2018a).

Many species have been reported as important pollinators, specifically associated with floral host (Moore & Jameson, 2013), but, on the other hand, larvae of some species have been reported as relevant soil pests in some agricultural crops (Morón & Aragón, 2003; Stechauner-Rohringer & Pardo-Locarno, 2010; Cherman *et al.*, 2014; Souza *et al.*, 2015; Lugo-García *et al.*, 2017).

In Mexico, the genus is represented by 66 species, being *Cyclocephala mesophylla* Mora-Aguilar & Delgado (2012), *Cyclocephala huamilule* Romero & Morón, 2017 and *Cyclocephala marquezii* Delgado & Mora-Aguilar, 2020 the latest species described for the country (Guzmán-Vázquez *et al.*, 2017; Romero-López & Morón, 2017; Delgado & Mora-Aguilar, 2020).

Of these species, 32 named species have been reported from the Oaxaca state, however, none of them is considered endemic for this area in the country (Guzmán-Vázquez *et al.*, 2021).

In the present work, we described the new species *Cyclocephala mixteca* **sp. nov.**, based on several adult specimens of both sexes, collected by trapping using a black light trap near to maize crop, in a particular area with high rates of soil erosion, deforestation and water scarcity in the country.

## MATERIALS AND METHODS

Adults were captured using a black light trap on a maize field before planting seeds. The traps were installed on the Sitio Experimental Mixteca Oaxaqueña, facilities belonging to the Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP), located in Santo Domingo Yanhuitlán, Oaxaca state, southeastern Mexico. The objective of utilizing mass trapping was to diagnose the faunistic composition of melolonthid beetles associated with different native maize races, which are used as field experiments to mitigate the main problems of the region such as resistance to diseases and pests, lack of water, etc.

Later, the specimens were sorted, pinned and dissected at the Campo Experimental Valles Centrales INIFAP, located at Santo Domingo Barrio Bajo, Villa de Etla, Oaxaca. After designating types, specimens were photographed using a Color CMOS C-Mount Microscope Camera attached

to a Jewelry Gem Zoom Stereo Microscope, with the software AmScope v. 3.1. Photographs at different depths were staged using the software Helicon Focus v. 6.7.1.

Additional material examined for comparison: *Cyclocephala lunulata* Burmeister, 1847 three males, four females (INIFAP) labeled: MEXICO, Villa de Tututepec, Río Grande, Sitio Experimental Costa Oaxaqueña (17° 59' 52.8" N, 95° 25' 33.6" W), 20/Jun/2022, L. Gálvez-Marroquín *et al.* colls. Three males and three females (INIFAP), same data as before but with date 24/Jun/2022. Four males and one female (INIFAP), same data as before but with date 27/Jun/2022.

## RESULTS AND DISCUSSION

*Cyclocephala mixteca* Cruz-López, Osorio-Alcalá,  
Gálvez-Marroquín & Ramírez-Ponce, 2022 **sp. nov.**

<http://zoobank.org/urn:lsid:zoobank.org:act:177619F9-98D3-46FA-BD9E-93ABD4B24CF9>

### Figures 1–2

**Type locality.** Sitio Experimental Mixteca Oaxaqueña, INIFAP (17° 30' 11.5" N, 97° 21' 09" W), Santo Domingo Yanhuitlán municipality, Oaxaca state, Mexico.

**Deposit of types.** Entomological Collection (IEXA), Instituto de Ecología, A. C. Xalapa, Veracruz, México, and Colección Nacional de Insectos (CNIN), Instituto de Biología, Universidad Nacional Autónoma de México (UNAM).

**Type material.** Holotype (male IEXA, red label) labeled: MEXICO, Oaxaca, Santo Domingo Yanhuitlán, Sitio Experimental Mixteca Oaxaqueña, INIFAP (17° 30' 11.5" N, 97° 21' 09" W), 05/May/2021, L. Osorio-Alcalá *et al.* colls. Paratypes: seven males, one female (IEXA), and five males and six females (CNIN) with yellow labels and with the same data as the holotype.

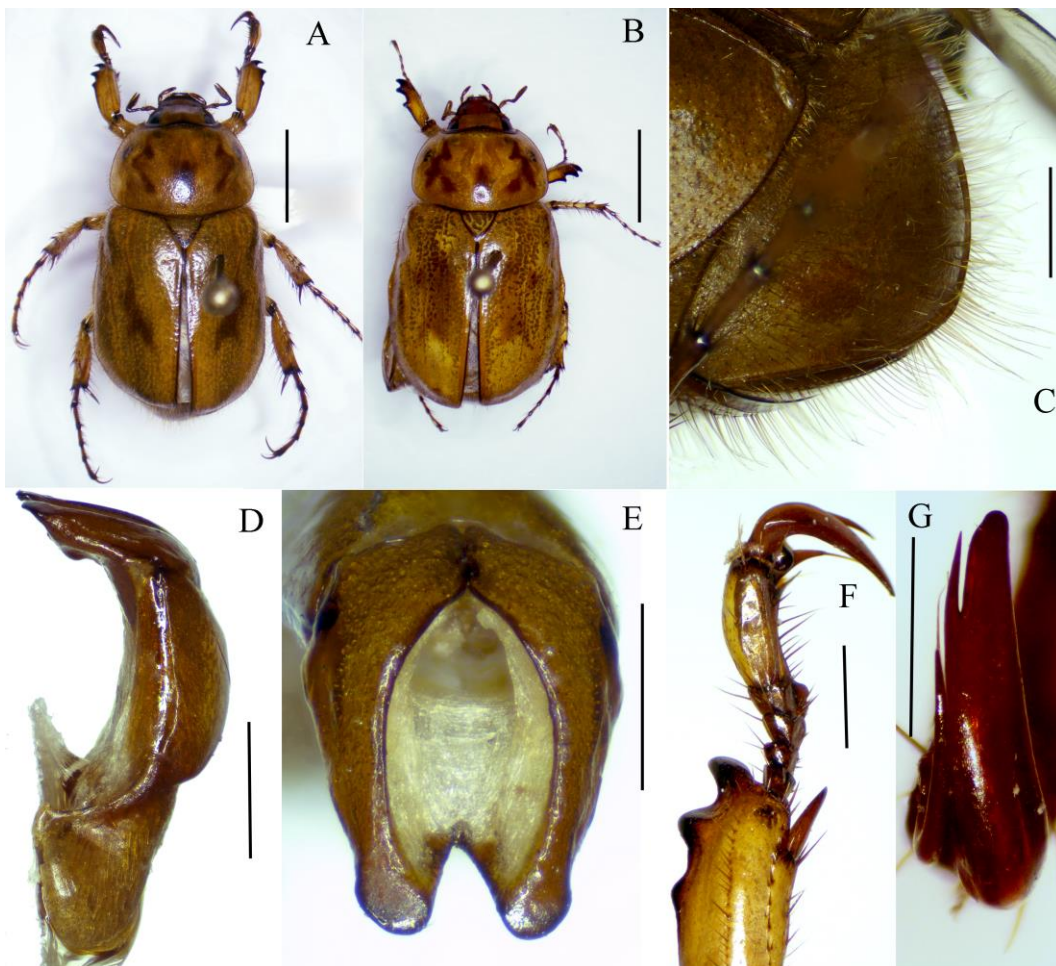
**Etymology.** Toponymic in reference to the region where this species was collected: Mixteca. Also, Mixteca means "place of clouds" or "people from clouds" in the original Nahuatl language.

**Diagnosis.** This new species is easily recognized from the others, specially from the most similar species *Cyclocephala lunulata* Burmeister, 1847 by the following combination of characters: "*C. lunulata*-type" coloration pattern on the pronotum, surface setose; frons from yellow to testaceous, but never dark; pygidium setose covered with long and scarce setae; parameres rounded apically.

**Description.** Holotype (IEXA). Male pinned and dissected. Total length: 16 mm. Color light testaceous. Pronotum with three fuscous macules and with two black spots between them and lateral margins. Elytra with one central irregular macule each one; humeral callus darker (Fig. 1A). Head. Frons with moderate small punctures, setose; supraocular area and ocular canthus setose. Clypeus rugose, rounded; apex reflexed. Interocular width 3.5 transverse eye diameter. Antenna 10-segmented, club slightly longer than antennomeres 2–7 (Fig. 1A). *Pronotum.* Surface smooth on disc; small punctures increasing in size and number toward lateral margins. Setal coverage complete and scattered; setae long, decumbent. Posterior margin without bead (Fig. 1A). *Elytra.*

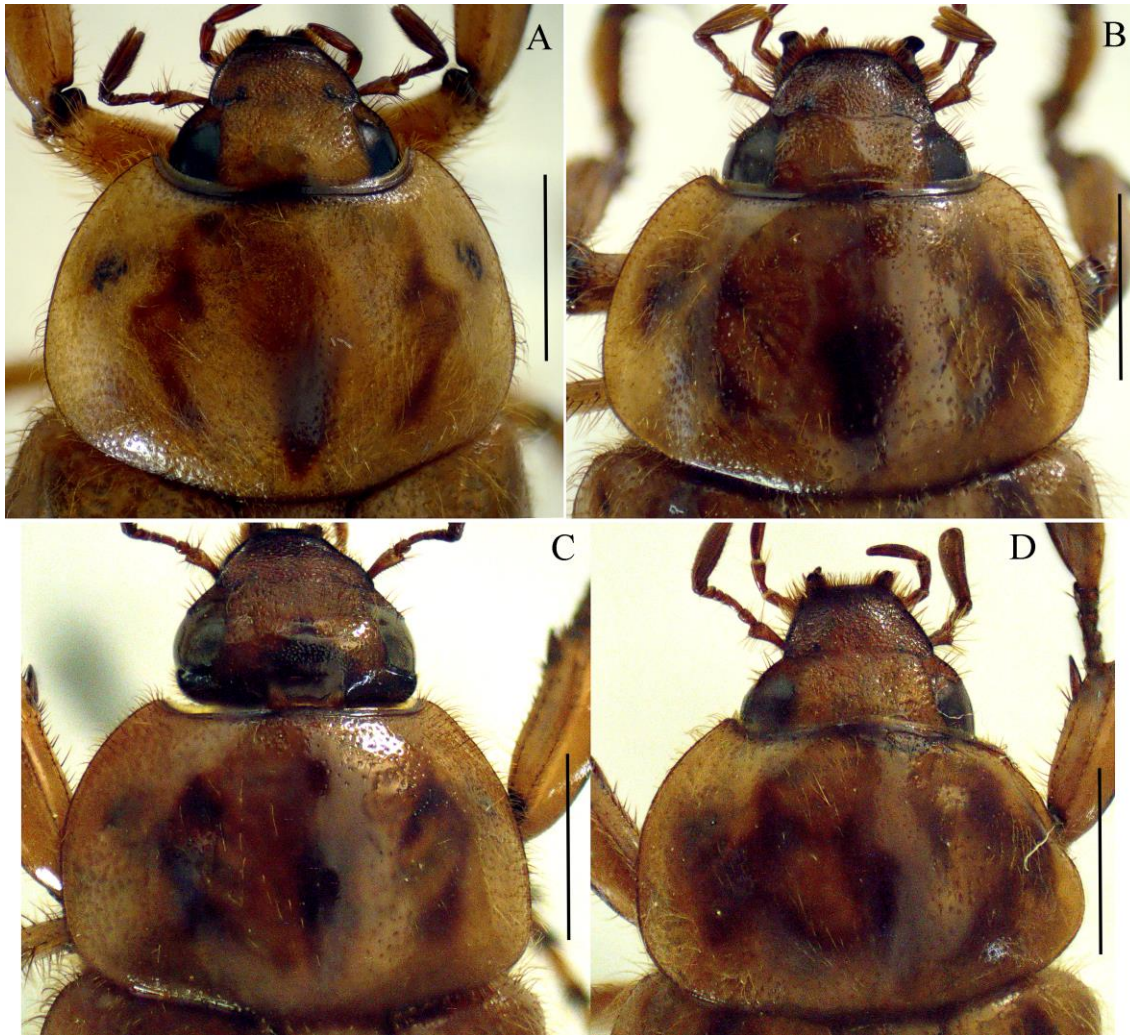
Surface moderate densely punctate; punctures small and shallow. Setigerous surface; setae scattered on base, denser and slightly longer toward apex (Fig. 1A). *Pygidium*. Surface smooth and setigerous; setae long and dense, especially on apical portion. In lateral view regularly or strongly convex (Fig. 1C). *Legs*. Protibia tridentate, basal tooth equally separated from the others. Protarsus enlarged, tarsomere 5 large, slightly curved and concave ventrally. Median claw large, sub-equal to tarsomere 5, curved, apex cleft (Fig. 1F, G). *Venter*. Prosternal process short, rounded and densely covered with long setae. *Parameres*. Sub-heptagonal shaped in caudal view, with the lateral apices slightly defined. Inner margins suboval-shaped, smooth. Apical apices of parameres rounded, forming an inverse "V" (Fig. 1E). In lateral view, parameres shorter than tectum and basal piece (Fig. 1D).

Female paratype. Length 15 mm. Similar as the holotype, except for that the epipleuron expanded at level of sternites 1-2. Elytra in dorsal view expanded above sternite 2. Pygidium wider than larger, semitriangular-shaped. Protarsomere simple, not enlarged (Fig. 1B). *Variation*. In size, from 15 to 17 mm, variation on head and pronotum coloration as in figure 2.



**Figure 1.** *Cyclocephala mixteca* sp. nov. A) holotype male, B) paratype female, C) male pygidium, D) aedeagus, E) parameres, F) protarsus of the holotype, G) protarsal claw of the holotype. Scale bars: A and B) 5 mm, C) 2 mm, D and F) 1 mm, E and G) 0.5 mm.





**Figure 2.** Variation on head and pronotal markings of *Cyclocephala mixteca* sp. nov., showing the differences between pronotal macules and the intensity of testaceous color of frons. A) holotype, B-D) male paratypes. Scale bars: 3 mm.

**Distribution.** This species is only known from the type locality.

**Taxonomic comments.** Comparisons with *C. lunulata*. According with Ratcliffe *et al.* (2013), *C. lunulata* has a very wide geographical distribution along North and Central America, but is easily recognized from other *lunulata*-type species presents on Mesoamerica, by always shows a black frons, with a variable coloration from piceous or fuscous marks. On the other hand, *Cyclocephala mixteca* sp. nov. do not have black frons, but its color varies from yellow to testaceous, and pronotum of *C. lunulata* is glabrous, instead of setose on *C. mixteca* sp. nov. Also, Maes & Ratcliffe (2018) mentioned that protarsomere 5 of *C. lunulata* is shorter than tarsomeres 1–4, while this tarsomere is noticeably longer in *C. mixteca* sp. nov., and the swelling in the middle of elytron of females of *C. lunulata* has pillow-like shape, instead flattened in *C. mixteca* sp. nov. Parameres between these two species are also similar, but according to Ratcliffe *et al.* (2013) and López-García *et al.* (2015), caudal view of the parameres of *C. lunulata* have an oval shape, with the inner

margins pointed dorsally. Apices of parameres of *C. lunulata* are pointing to the inner part, instead rounded on *C. mixteca* sp. nov. Finally, the basal piece is noticeably longer in the new species described here.

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