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Rediscovering the Diversity of Guatemalan Bumble Bees (Hymenoptera: Apoidea: *Bombus* Latreille, 1802)

Dardon MJ ^{(1)*} Yurrita CL ⁽²⁾ Landaverde Gonzalez P ⁽³⁾ Vasquez M ⁽⁴⁾ Ayala R ⁽⁵⁾

⁽¹⁾ Faculty of Chemical Sciences and Pharmacy, University of San Carlos de, Guatemala.

⁽²⁾ Biodiversity Unit, Center for Conservation Studies (CECON), University of San Carlos de, Guatemala.

⁽³⁾ Biodiversity Unit, Center for Conservation Studies (CECON), University of San Carlos de, Guatemala.

⁽⁴⁾ Biodiversity Unit, Center for Conservation Studies (CECON), University of San Carlos de, Guatemala.

⁽⁵⁾ Chamela Biology Station (Colima Campus), Institute of Biology, National Autonomous University of Mexico, Mexico.

* Corresponding author

Abstract

Bumble bees (*Bombus* Latreille) play an essential role as pollinators of both wild and cultivated plants. Traditionally, these bees have been identified based on their color patterns, which in some cases vary among individuals of the same species, or different species, can share similar patterns and colorations allowing for inaccurate identifications. Despite these problems, Guatemalan reports on *Bombus* species have relied basically on color patterns. Here, we combine mitochondrial DNA barcode sequences and morphometric measurements, in an attempt to provide further information on the species limits of nine *Bombus* species occurring in Guatemala and also two species occurring in Mexico. When molecular analyses failed to distinguish between "morphological species" we applied traditional morphometrics using body measurements. Analyses of mitochondrial DNA sequences allowed for the discrimination of seven of the eleven "morphological species" evaluated. The remaining four species clustered into two pairs of species that have problematic taxonomy (*B. sonorus*–*B. pensylvanicus*, and *B. ephippiatus*–*B. wilmattae*). Morphometric analysis performed on the *B. ephippiatus*–*B. wilmattae* pair indicated non-discrimination between these forms, supporting the hypothesis that these are a single species. Therefore, based on our results we confirm the presence of the following species in Guatemala: *B. ephippiatus* (including *B. wilmattae* as synonym), *Bombus* (*Cullumanobombus*) *macgregori* Labougle & Ayala, 1985, *Bombus* (*Thoracobombus*) *medius* Cresson, 1863, *Bombus* (*Thoracobombus*) *mexicanus* Cresson, 1878, *Bombus* (*Thoracobombus*) *pullatus* Franklin, 1913, *Bombus* (*Psithyrus*) *variabilis* (Cresson, 1872), *Bombus* (*Thoracobombus*) *weisi* Friese, 1903, and *Bombus* (*Thoracobombus*) *xelajuensis* Asperen de Boer, 1992.

Author Keywords

DNA barcoding, Bombini, Central America, Morphometry, Taxonomy

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