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Melittological notes from Guatemala
(Hymenoptera: Anthophila), 1. New country records for
Centris Fabricius (Apidae) and *Zikanapis* Moure (Colletidae)

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Melittological notes from Guatemala
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Abstract. Three species of bees (Hymenoptera: Apidae, Colletidae) are newly recorded for Guatemala: *Centris obscurior* Michener, *Centris vidua* Mocsáry, and *Zikanapis inbio* (Michener, Engel and Ayala). We discuss aspects of their biology and circumstances of the collecting events and provide information on their presently known distribution.

Key words. New records, Guatemala, crepuscular bees, light traps.

Resumen. Se registran por primera vez tres especies de abejas (Hymenoptera: Apidae, Colletidae) para Guatemala: *Centris obscurior* Michener, *Centris vidua* Mocsáry y *Zikanapis inbio* (Michener, Engel y Ayala). Discutimos aspectos de su biología, circunstancias bajo las cuáles fueron colectadas y se provee información en la distribución conocida actualmente.

Palabras clave. Nuevos registros, Guatemala, abejas crepusculares, trampas de luz.

ZooBank registration. urn:lsid:zoobank.org:pub:A19C3260-B215-4F61-AF9C-72D88DD06456

Introduction

The bee fauna (Hymenoptera: Anthophila) of Central America, including Mexico, is among the most species rich in the world (Orr et al. 2021), but availability of data differs significantly between Central American countries.

Bees in countries such as Panama or Costa Rica have been surveyed more extensively than others, likely due to the presence of long-running initiatives and established research institutes. For example, a recent study concluded a 40-year long monitoring of orchid bees (Apidae: Euglossini) in Panama on Barro Colorado Island and Soberania National Park, including regular monthly species inventories, leading to 132,000 expert-level identifications (Roubik et al. 2021). In contrast, the largest insect collection in Guatemala, the Colección de Artrópodos at the Universidad del Valle de Guatemala (UVGC), houses just some 3,500 specimens of bees in total. While 357 species of bees have been reported from Guatemala (Enríquez et al. 2012), this number must be understood as a significant underestimate of the true species diversity: just the neighboring province Chiapas in Mexico is home to more than 1,000 species of bees (SCAN 2022; estimated by separately searching all participating collections for the bee families Apidae, Megachilidae, Andrenidae, Colletidae, and Halictidae, and by counting all error-free, unique species names, excluding unidentified species). This renders the Guatemalan species count unrealistically low. Similarly, the comparatively well-known bee fauna of Costa Rica comprises about 550 species (Ascher and Pickering 2022), despite having fewer distinct ecoregions than Guatemala (Olson et al. 2001), and about half the land area. This knowledge gap puts limits on our ability to characterize the Guatemalan bee fauna and underlines the need for extensive survey work in the country.

Over the past two decades, a long-running collaboration between UVGC and the Washington State University Insect Collection (WSUC) carried out extensive insect surveys across Guatemala, leading to both numerous new species records for the country, as well as to the discovery of new species (e.g., Landolt et al. 2010; Ratcliffe and Cave 2010; Mervin et al. 2014; Zack et al. 2022). A newfound focus of this collaboration lies on bees of Guatemala, with forthcoming work on orchid bees (García et al. 2023) and beyond. This paper represents the first of several publications on bee biology and biodiversity of Guatemala, contributing to a better understanding of the native Central American bee fauna.

Materials and Methods

Specimens examined in this study are deposited in the Colección de Artrópodos at the Universidad del Valle de Guatemala (UVGC) or in the M. T. James Entomological Collection at Washington State University (WSUC). Specimen plates were generated using stacked photographs obtained with a Canon EOS 6D camera and a MacroPro imaging system, including a Stackshot 3× Cognisys device. Z-Stacking was carried out with Zerene Stacker software (Zerene Systems, LLC.) and the Pmax method. Mapping of the new records was conducted with SimpleMappr (Shorthouse 2010) and maps were subsequently modified using standard graphic editors.

Results

Genus *Centris* Fabricius

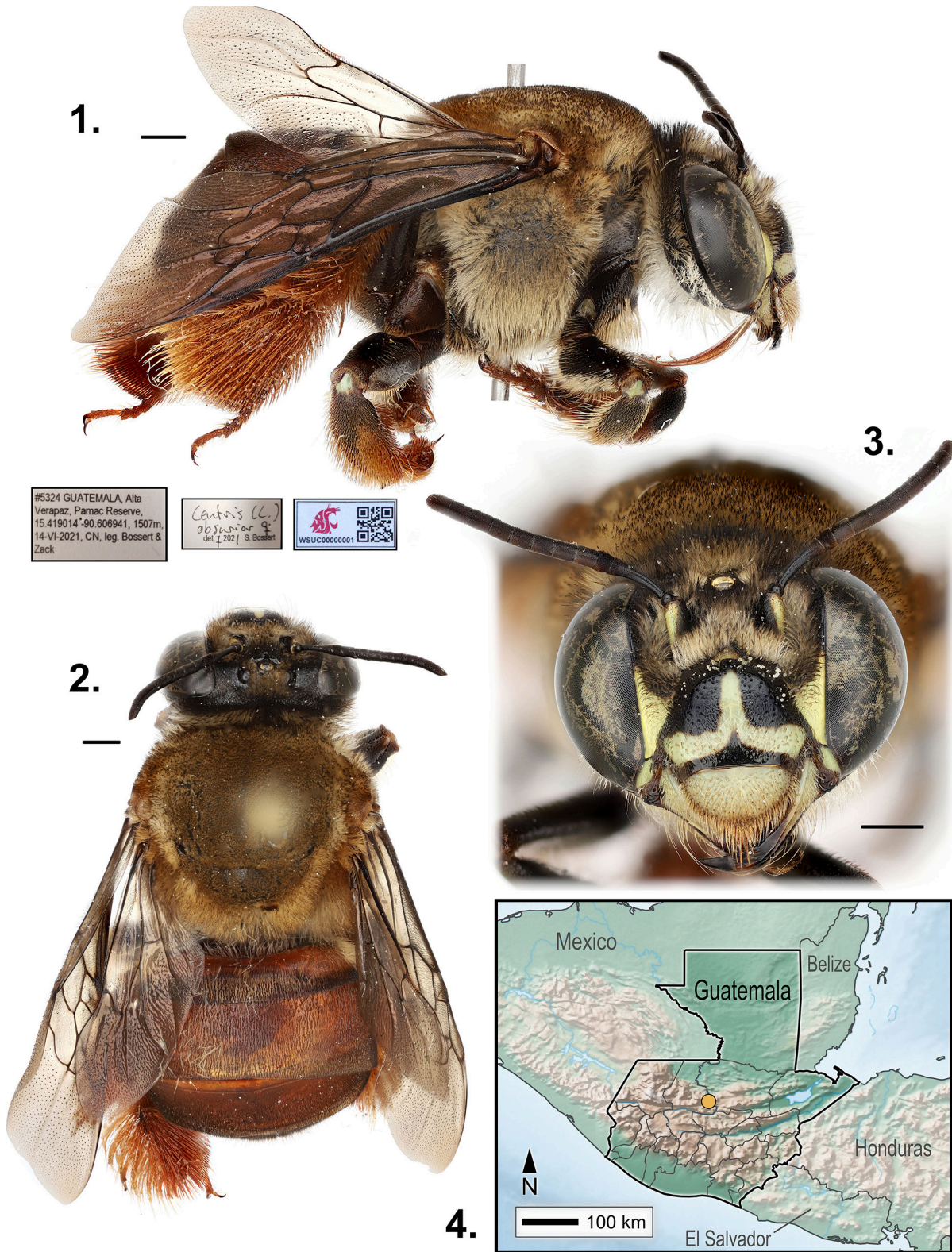
Subgenus *Centris* Fabricius

Centris (Centris) obscurior Michener, 1954

(Fig. 1–4)

Material examined. GUATEMALA, Alta Verapaz, Pamac Reserve, 1507 m alt., 15.419014 –90.606941, 15.VI.2021, leg. S. Bossert & R. S. Zack, deposited WSUC [voucher code WSUC00000001], 1♀.

Distribution. *Centris obscurior* was originally described from a single location in Panama (Michener 1954). A GBIF query (GBIF 2022a) for the species returned 60 georeferenced entries, 18 from Panama (3 localities), 18 from Mexico (8 localities, all of which are in Chiapas), and 24 from Costa Rica (13 localities). The DiscoverLife database (Ascher and Pickering 2022) lists three additional country or regional centroids without specifying the records or specimen repositories: Honduras, Colombia, and the state of Minas Gerais in Southeastern Brazil. The latter represents a significant distributional outlier and deserves further study. Because of the reported records



Figures 1–4. *Centris obscurior*. 1) Female habitus in lateral view. 2) Female habitus in dorsal view. 3) Female habitus in frontal view. 4) Known distribution of *Centris obscurior* in Guatemala. Scale bars next to photographs indicate 1 mm length.

north (Chiapas, Mexico) and south (Costa Rica) of Guatemala, the species likely has a continuous distribution in Central America, and the presented record fills the gap for Guatemala.

Comment. The single female specimen was collected at a water puddle formed by a mid-morning rain shower, where it was observed collecting water.

Subgenus *Trachina* Klug

Centris (Trachina) vidua Mocsáry, 1899

(Fig. 5–8)

Material examined. GUATEMALA, Alta Verapaz, San Pedro Carchá, San Vicente Chicatal, Parque ecológico Hun Nal Ye, 335 m alt., 15.673994 –90.319398, 27.X.2010, leg. J. Monzón-Sierra, deposited UVGC [voucher code JMS-11280], 1♂. GUATEMALA, Petén Dept., Balneario “El Bosque” along Río Machaquilá, ca. 9 km E of Machaquilá, 390 m alt., 6.XII.2021, N16.39023° W89.51188°, leg. R. S. Zack & J. Monzón-Sierra, at UV trap, deposited WSUC [voucher code WSUC00011188], 1♂. GUATEMALA, Petén Dept., Sayaxché, Fca. La Dicha, 1–3.III.2002, leg. Ma. Isa de León, deposited UVGC [voucher code JMS-11355], 1♀.

Distribution. The type locality of *Centris vidua* is in Honduras (San Pedro Sula, Cortés Dept.) (Friese 1900; Rasmussen and Vivallo 2014). A GBIF query (GBIF 2022b) for the species returned 19 georeferenced entries, 8 from Belize (4 localities), 8 from Mexico (2 localities, 1 in Campeche, 1 in Sonora), 2 from Panama (1 locality), and 1 from Costa Rica. Friese (1900) lists additional records from Orizaba, Mexico (Veracruz) and Peru. Hence, the species was reported in every neighboring country of Guatemala except El Salvador. Our newly provided records close this distributional gap.

Comment. Described as an ‘uncommon bee’ (Snelling 1984), little is known about the biology of the species. Interestingly, the recently collected male specimen [WSUC00011188] was captured at a light trap, which includes UV light, between 4 and 5 am in the morning, together with two species of *Ptiloglossa* (Colletidae), a genus long known for crepuscular or matinal activity patterns (e.g., Schrottky 1907; Linsley 1962; Roberts 1971; Rozen 1984). The color pattern of *Centris vidua* resembles that of male *Crawfordapis* (Colletidae) that possess a similar light colored pronotal band on an otherwise dark scutum. Flight activity of *Crawfordapis* has been reported to be primarily diurnal (Otis et al. 1982; Roubik and Michener 1984), however, their flight activity may start in the very early morning, overlapping with truly crepuscular bees (Wuellner and Jang 1996). While we have not collected *Crawfordapis* together with *Centris vidua*, we have frequently collected *Crawfordapis* at UV light traps in Guatemala at times when it was still very dark, between 4 am and 5 am. To the best of our knowledge, no *Centris* is known to be crepuscular, but we suspect that *Centris vidua* may forage in a similar activity pattern as *Crawfordapis*, being diurnal while also being active in the very early morning.

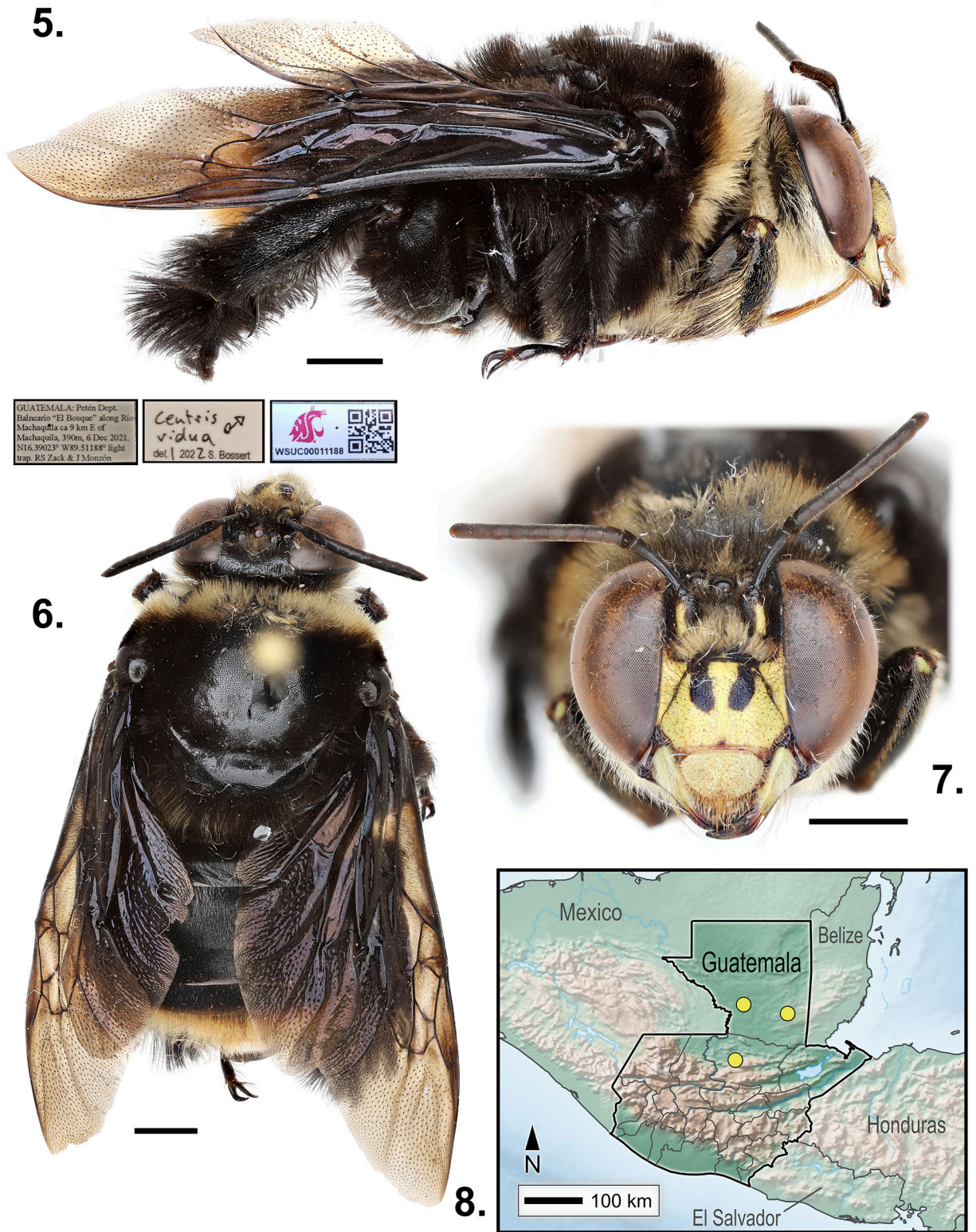
Genus *Zikanapis* Moure

Zikanapis inbio (Michener, Engel and Ayala, 2003)

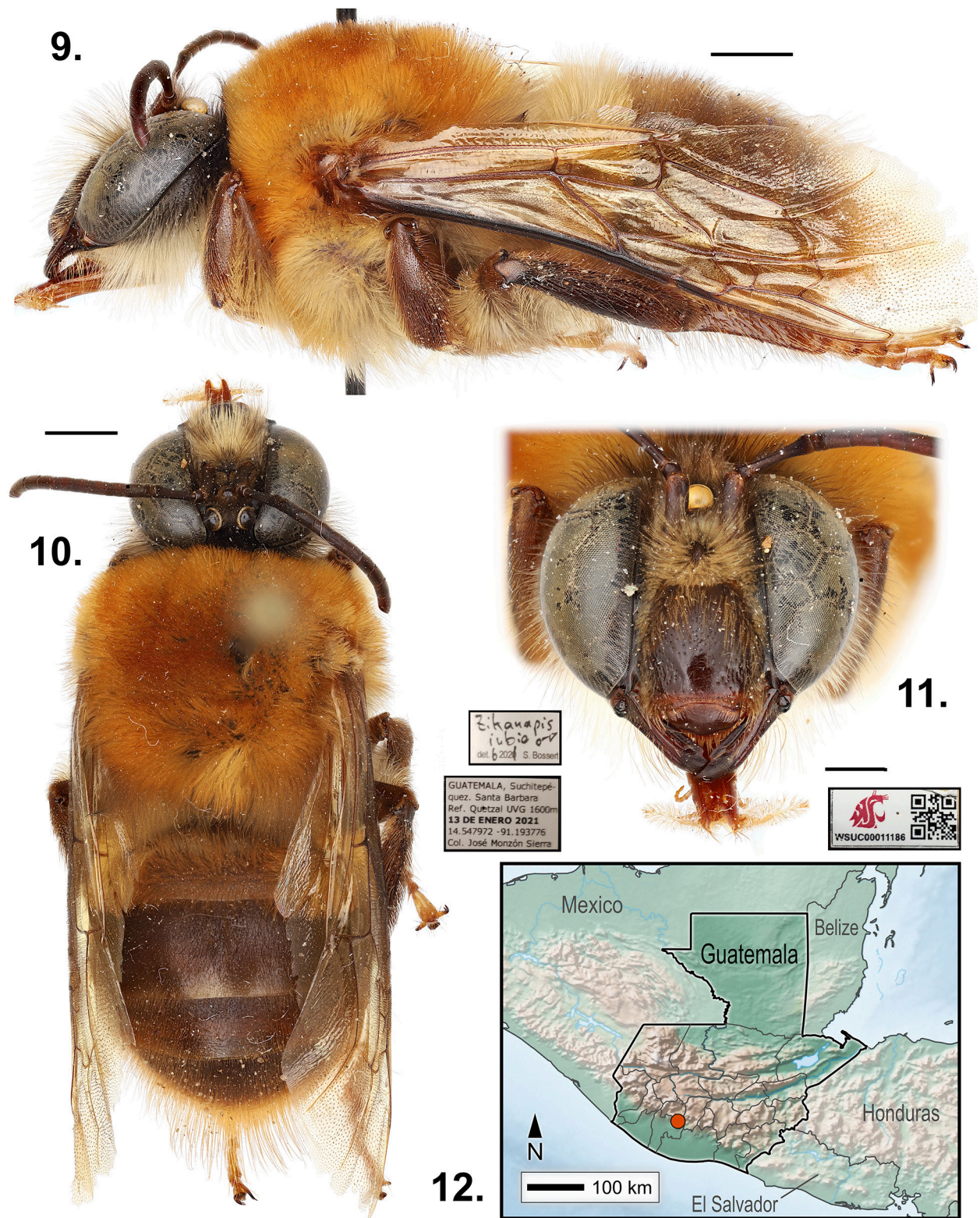
(Fig. 9–12)

Material examined. GUATEMALA, Suchitepéquez, Santa Barbara, Ref. Quetzal UVG, 1600 m alt., 14.547972 –91.193776, 5.XII.2019, leg. J. Monzón-Sierra, deposited UVGC [voucher code WSUC00011186], 1♂. GUATEMALA, Suchitepéquez, Santa Barbara, Ref. Quetzal UVG, 1600 m alt., 14.547972 91.193776, 13.I.2021, leg. J. Monzón-Sierra, deposited WSUC [voucher codes WSUC00017050–WSUC00017055], 4♂, 2♀.

Distribution. *Zikanapis inbio* was known to occur in Costa Rica and Panama. A GBIF query (GBIF 2022c) for the species returned 174 georeferenced entries: 172 entries are from Costa Rica (50 localities) and 2 from Panama (1 locality), most of which were reported in the original publication (Michener et al. 2003). Based on these records, the species is widespread in Costa Rica, but seemingly not beyond. We collected *Z. inbio* at one location in Guatemala on two occasions, significantly expanding the known distributional limit of the species in a northern direction.



Figures 5–8. *Centris vidua*. 5) Male habitus in lateral view. 6) Male habitus in dorsal view. 7) Male habitus in frontal view. 8) Known distribution of *Centris vidua* in Guatemala. Scale bars next to photographs indicate 2 mm length.



Figures 9–12. *Zikanapis inbio*. 9) Male habitus in lateral view. 10) Male habitus in dorsal view. 11) Male habitus in frontal view. 12) Known distribution of *Zikanapis inbio* in Guatemala. Scale bars next to photographs indicate 2 mm length.

Comment. Comparing the prepared genital capsule of the collected males with those illustrated in the original description (Michener et al. 2003), no apparent differences could be found. In line with the seemingly identical external morphology, we deem the Guatemalan records conspecific with the Costa Rican and Panamanian records. Specimens collected at Refugio del Quetzal UVG, were attracted to a light trap (metal halide and UV) when it was still very dark around 4:30 am to just before sunrise.

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