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SCIENTIFIC NOTE

FIRST RECORD OF THE TRIBE ORTHOPODOMYIINI IN THE YUCATAN PENINSULA

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ABSTRACT. Updating the mosquito fauna occurring in a specific area is crucial, given that certain species serve as vectors capable of transmitting zoonotic arboviruses. This scientific note presents the first records of mosquitoes of the tribe Orthopodomyiini in the Yucatan Peninsula. Immature mosquitoes were collected on 2 occasions inside a large tree hole in Felipe Carrillo Puerto, Quintana Roo, Mexico. Thirteen adult specimens, reared from the immatures, were obtained and identified as *Orthopodomyia kummi* based on external characteristics of females and males. This species has been recorded in Panama, Costa Rica, El Salvador, Guatemala, Mexico, and marginally in the United States, but its presence in the Yucatan Peninsula had gone unnoticed until now. The knowledge about mosquitoes of the genus *Orthopodomyia* is limited, and their epidemiological importance remains uncertain. Therefore, further studies could provide insights into the ecological and infection dynamics associated with this species.

KEY WORDS Arboviruses, new record, *Orthopodomyia kummi*, vector, zoonosis

Mosquitoes of the tribe Orthopodomyiini are distributed in most tropical and warm temperate areas worldwide (Wilkerson et al. 2021). This tribe includes only the genus *Orthopodomyia*, represented in the Americas by 8 species and an informally described Mexican highlands form. Among the valid species, *Or. alba* Baker and *Or. signifera* (Coquillett) are mainly restricted to the Nearctic region, *Or. waverleyi* (Grabham) is endemic to Jamaica, while *Or. albicosta* (Lutz in Bourroul), *Or. fascipes* (Coquillett), *Or. kummi* Edwards, *Or. phyllozoa* (Dyar and Knab), and *Or. sampaioi* da Costa Lima are distributed in the continental part of the Neotropical region (Zavortink 1968). Overall, the genus *Orthopodomyia* is poorly known, and its epidemiological relevance remains uncertain (Byrd et al. 2012). Therefore, further studies could provide insights into the role played by this species in ecological and infection dynamics.

The Yucatan Peninsula is a biogeographic province of the Neotropical region encompassing the states of Campeche, Quintana Roo, and Yucatán in Mexico, as well as the northern portion of Guatemala and Belize below 300 m above sea level (Morrone 2014). This biogeographic province is predominantly flat and characterized by a tropical wet/dry climate, with minimum and maximum monthly mean temperatures ranging from 23.6°C and 31.6°C and an average annual rainfall of 1,200 mm distributed over 160 days. There is a significant decrease in rainfall during the winter months from November to April. The eastern coast (including Cozumel Island) is significantly wetter, corresponding to a tropical wet climate, while the northern coast is considerably drier, corresponding to a semiarid environment (Torrescano-Valle and Folan 2015).

During field campaigns for the PRONAII (Proyectos Nacionales de Investigación e Incidencia) project, samples of mosquitoes were collected in various aquatic habitats across the Mexican Yucatan Peninsula. Immature mosquitoes were collected with pipettes, placed into plastic bottles labeled with a collection code, and transported alive to the laboratory. Individuals were then reared until adult emergence and mounted on entomological pins. Voucher specimens were stored in the entomological collection of the International Joint Laboratory ELDORADO (Ecosystem, Biological Diversity, Habitat Modifications and Risk of Emerging Pathogens and Diseases in Mexico), UNAM-IRD (Universidad Nacional Autónoma de México–Institut de Recherche pour le Développement), Mérida, Yucatán, Mexico.

In April 2022 and October 2023, samplings were conducted in a remnant forest located near the Instituto Nacional de los Pueblos Indígenas (INPI) in the northern part of the city of Felipe Carrillo Puerto in the state of Quintana Roo (19.587461°N, 88.042°W). The forest in this area has typical trees of the region, such as *Bursera simaruba* (L.) Sarg., *Lysiloma latisiliquum* (L.) Benth, *Manilkara zapota* (L.) P. Royen, *Metopium brownei* (Jacq.) Urb., and *Vitex gaumeri* Greenm. The soil of the forest belongs to the well-known Yucatecan Carso, with flat rocky soil, slight depressions, and a few deep holes.

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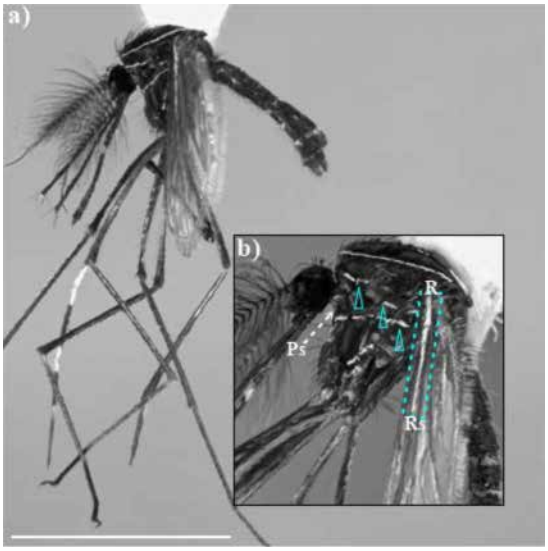

Fig. 1. Male *Orthopodomyia kummi*. (a) Lateral view, (b) blue dotted lines indicating white scales from R to Rs veins; blue arrows point to thin lines of white scales. Scale bar 10 mm.

On these occasions, a large tree hole contained 13 adult specimens (6 females and 7 males with associated immature exuviae) belonging to the tribe Orthopodomyiini. Adult males and females were identified under a stereomicroscope as *Or. kummi* using the specific taxonomic key of *Orthopodomyia* provided by Zavortink (1968). This species is easily separated in the adult stage from other species of *Orthopodomyia* by the following: (1) wing largely or completely dark-scaled except for a conspicuous white-scaled line on vein R from the base to the separation of vein Rs, which is limited to the region of remigium in the Mexican highlands form, vein 1A dark-scaled, a variable but always small number of scattered light scales sometimes present in radial and subcostal fields (Fig. 1a), and (2) thoracic pleuron with 3 very narrow discrete longitudinal lines of white scales, the lowest line continued anteriorly across prosternum to form a complete or nearly complete band anteriorly (Fig. 1b) (McDonald and Belkin 1960, Zavortink 1968).

Orthopodomyia kummi has been recorded in Panama, Costa Rica, El Salvador, Guatemala, Mexico, and marginally from the United States in southeastern Arizona (Zavortink 1968). However, its presence in the Yucatan Peninsula, including northern Guatemala and Belize, had not been reported until now (Clark-Gil and Darsie 1983, Pecor et al. 2002, Talaga et al. 2023). In Mexico, *Or. kummi* was initially recorded in the states of Chiapas, Puebla (de Buen 1953), and Veracruz (Díaz Nájera 1963). Later, specimens were reported in Baja California Sur, Guerrero, Oaxaca, and San Luis Potosí by Zavortink (1968). More recently, *Or. kummi* has been recorded in Durango (Pérez-Santiago et al. 2018) and Nuevo León (Ortega-Morales et al. 2019). It is probable that *Or. kummi* also inhabits the neighboring Mexican states of Campeche and Yucatán.

Immature stages of *Orthopodomyia* typically inhabit tree holes, although they have been occasionally found in artificial containers (Hanson et al. 1995, Woodward et al. 1998, Qualls and Mullen 2006). In this study, larvae were collected from a 30-cm-diam and 40-cm-deep tree hole of *Mangifera indica* L. situated 1 m above the ground. The water exhibited a reddish coloration, with a significant amount of organic matter deposited at the bottom. This situation is consistent with known preferences of *Orthopodomyia* for large permanently filled tree holes, but also indicates that introduced species of trees can serve as immature habitat. During both visits, *Orthopodomyia* were found together with larvae of *Toxorhynchites moctezuma* (Dyar and Knab), which are obligate predators of macroinvertebrates, including mosquito larvae (Donald et al. 2020). This scenario is reminiscent of the field association between *Or. signifera* and *Tx. septentrionalis* (Dyar and Knab) reported in central New Jersey in the United States (Farajollahi et al. 2009). *Orthopodomyia signifera* was classified as predator-resistant by Bradshaw and Holzapfel (1983), mainly because they have longer and stouter bristles compared to other container mosquitoes, which might potentially reduce prey capture success by *Toxorhynchites* larvae. Additionally, behavioral adaptations aimed at predator avoidance in *Orthopodomyia* are also expected to play an important role in their survival in the presence of *Toxorhynchites* (Farajollahi et al. 2009).

There is limited understanding regarding the vectorial capacity of *Orthopodomyia* mosquitoes to transmit pathogens in Mexico. Vargas (1960) reported *Or. signifera* as a vector of eastern equine encephalitis virus among mosquito species in Sonora. Since *Or. kummi* feeds on wild birds, this behavior may amplify its role in maintaining the circulation of arboviruses in sylvan environments (Zavortink 1968). Further studies are necessary to understand the ecological and epidemiological roles of *Orthopodomyia* in the Yucatan Peninsula as human-wildlife contact rates increase.

This note presents the first record of the tribe Orthopodomyiini in the Yucatan Peninsula, further documenting the distribution of *Orthopodomyia* mosquitoes across the Americas.

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