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SCIENTIFIC NOTE

FIRST RECORD OF *AEDES ALBOPICTUS* IN MICHOACÁN STATE, MEXICO

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ABSTRACT. During August and September 2024, mosquito collections were conducted in southeastern Mexico, including the state of Michoacán. Species collected in Michoacán included *Aedes aegypti*, *Ae. albopictus*, *Ae. epactius*, *Haemagogus* sp., and *Culex quinquefasciatus*. This is the first record of *Ae. albopictus* in Michoacán state. At present, the expansion of *Ae. albopictus* includes most states and physiographical regions of Mexico, including the entire Pacific Coast region from Sinaloa to Chiapas states. The Mexican states where *Ae. albopictus* has not yet been reported are Aguascalientes, Baja California, Baja California Sur, Chihuahua, Durango, Sonora, Tlaxcala, and Zacatecas. Specimens collected during this study were deposited in the Culicidae Collection of the Antonio Narro Autonomous Agrarian University in Coahuila, Mexico.

KEY WORDS *Aedes albopictus*, Culicidae, first record, Michoacán, Mexico

In Mexico, 4 invasive species of mosquitoes have been reported, all within the genus *Aedes*: *Ae. vexans* (Meigen), *Ae. dorsalis* (Meigen), *Ae. aegypti* (L.), and *Ae. albopictus* (Skuse) (Ortega-Morales et al. 2023). The Asian tiger mosquito, *Ae. albopictus*, was originally collected and discovered by the Australian entomologist Frederick Skuse (1863–1896) from specimens collected in Kolkata, India (Skuse 1894). This species has been implicated as an important vector of various arboviruses in the Americas, such as chikungunya virus, dengue virus, and Zika virus, and some arboviruses present in North America, such as eastern equine encephalitis, La Crosse, Venezuelan equine encephalitis, western equine encephalitis, West Nile virus, and yellow fever virus (García-Rejón et al. 2021, Wilkerson et al. 2021). In 1983–1985, *Ae. albopictus* was first reported in the Western Hemisphere by personnel from Memphis, TN, USA, and the Harris County Mosquito Control District, Houston, TX, USA (Reiter and Darsie 1983, Sprenger and Wuithiranyagool 1986), and since then this species has had a rapid dispersion throughout the Americas. Currently, this invasive species is present on all continents except Antarctica (García-Rejón et al. 2021, Wilkerson et al. 2021). In Mexico, this species occurs in all states except Aguascalientes, Baja California, Baja California Sur, Chihuahua, Durango, Sonora, Tlaxcala, and Zacatecas (Table 1).

While routine mosquito surveillance activities were conducted in various states in southeastern Mexico, including Michoacán state, immature stages were collected from natural and artificial aquatic habitats, and adult mosquitoes were collected using mechanical aspirators and Shannon traps with protected human bait. Collected specimens were transported to the Molecular Biology Laboratory, Parasitology Department, Antonio Narro Autonomous Agrarian University,

Table 1. Mexican states where *Aedes albopictus* has been previously reported with the first reference from 1990 to 2023.

No.	State	First reference
1	Tamaulipas	Francy et al. (1990)
2	Coahuila	Ibáñez-Bernal and Martínez-Campos (1994)
3	Nuevo León	Orta-Pesina et al. (2001)
4	Veracruz	Flisser et al. (2002)
5	Chiapas	Casas-Martínez and Torres-Estrada (2003)
6	Morelos	Villegas-Trejo et al. (2010)
7	Quintana Roo	Salomón-Grajales et al. (2012)
8	Sinaloa	Torres-Avendaño et al. (2015)
9	Hidalgo	Ortega-Morales et al. (2016)
10	San Luis Potosí	Ortega-Morales and Siller-Rodríguez (2016)
11	Tabasco, Yucatán	Ortega-Morales et al. (2018)
12	Mexico City	Dávalos-Becerril et al. (2019)
13	Guerrero	González-Acosta et al. (2019)
14	Campeche	Hernández-Rodríguez et al. (2020)
15	Mexico State	Adeniran et al. (2021)
16	Colima, Guanajuato, Jalisco, Puebla, Oaxaca, Querétaro	Ortega-Morales et al. (2022)
17	Nayarit	Gómez-Salazar et al. (2023)

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Fig. 1. Collection sites of *Aedes albopictus* in Michoacán state, Mexico. Locality 1: Infiernillo; locality 2: Guayabo Viejo.

Coahuila, Mexico, for rearing and identification. Specimens were identified using the Darsie and Ward (2005) keys.

On September 6, 2024, immature stages were collected from 2 discarded plastic cups in the Infiernillo community, municipality of Arteaga, Michoacán (18°17′17″N, −101°54′11″W; 90 m above sea level; Fig. 1), which were filled with rainwater at ground level with colored water and in conditions of total shade. One of them (cup 2) was found with abundant green algae. Some aquatic parameters were obtained using a portable tester (Hanna®, model HI98129, Smithfield, Rhode Island, USA) (cup 1: pH 6.9, salinity 71 ppm; cup 2: pH 7.4, salinity 232 ppm; the temperature was 25°C for both cups). Four adult males of *Ae. albopictus* with associated exuviae and 2 males and 1 female of *Ae. aegypti* with associated exuviae were obtained from cup 1, and 2 males and 1 female of *Ae. albopictus* with associated exuviae and 2 females and 1 male of *Ae. aegypti* with associated exuviae were obtained from cup 2. In the same location, adult mosquitoes were collected using a Shannon trap with protected human bait at night (2000–2200 h) in a peridomestic environment. In this site, 2 females and 1 male of *Ae. albopictus* in association of 3 females of *Ae. trivittatus* (Coquillett), 1 male of *Ae. aegypti*, 1 female of *Haemagogus* sp., and 2 females and 1 male of *Culex interrogator* Dyar and Knab were collected. On September 7, 2024, while immature stages were collected from discarded tires in the Guayabo Viejo community, municipality of Múgica, Michoacán (18°57′31″N, −102°4′25″W; 300 miles above sea level) (Fig. 1), adult females were collected, seeking humans with biting intention. One adult female of *Ae. albopictus* was collected from this site in association with 2 females of *Ae. epactius* Dyar and Knab, while the reared immature stages collected from discarded tires were 5 larvae and 3 females of *Ae. epactius* with associated exuviae, and 1 larva of *Cx. quinquefasciatus* Say.

Mexico is divided into 15 major physiographic regions, of which 11 have been invaded by *Ae. albopictus* (Ortega-Morales et al. 2022). The Mexican physiographic regions where *Ae. albopictus* has not been reported and the possible reasons for its absence are the following. 1) The Sonoran plain, including the northeastern regions of Sonora state bordering Arizona, USA—This region was recently sampled for mosquito collections, and *Ae. albopictus* was not found (Ortega-Morales et al. 2024). This is a very arid region, including the Altar Desert, which is the largest desert in Mexico, with summer daytime temperatures of 30–50°C. 2) Mountain ranges and plains of the north, including the northern states of Chihuahua and Sonora—Like the Sonoran plain, the mountain ranges and plains of the north include mostly desert and arid areas, receive little rain during the summer, and experience extreme climatic conditions in the winter with a temperature range of 0–4°C. 3) The Baja California peninsula, including the states of Baja California and Baja California Sur—This region has been historically neglected in mosquito collections, and the mosquito fauna is unknown. However, this region is mostly desert, with arid conditions similar to those of the Sonoran plain. 4) Sierra Madre Occidental, including the mountain areas of the states of Aguascalientes, Chihuahua, Durango, and Zacatecas—The average elevation in this region is above 2,000 meters. Most of the year it is cold and temperate, in the winter with snowfall and the temperature is below 0°C. Entomological surveillance of medically important mosquito species such as *Ae. albopictus* is recommended in regions where the species has not yet been reported.

Specimens collected during this study were deposited in the Culicidae Collection of the Parasitology Department, Antonio Narro Autonomous Agrarian University, under the accession numbers 02060924-I, 03060924-I, 04060924-I, and 02070924-GV and collection code ZOOMAT-24. We thank Salvador Morales-Avitia for his valuable collaboration during our collection trips. This study was partially funded by the Consejo Nacional de Humanidades, Ciencias y Tecnologías (CONAHCYT) with "Ciencia Básica y de Frontera 2023-2024" number CBF2023-2024-2141. We would also like to thank 2 anonymous reviewers.

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