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SCIENTIFIC NOTE

FIRST RECORD OF *AEDES JAPONICUS* IN ST. TAMMANY PARISH, LOUISIANA

SHANNON M. O. CAWTHON, MOLLIE M. DIMISE[1] AND RICHARD FRAZIER

St. Tammany Parish Mosquito Abatement District, 62436 Airport Road, Slidell, LA 70460

ABSTRACT. Information of species presence and abundance is useful for taking a targeted approach to controlling populations of medically important and nuisance mosquito species. In April 2023, staff at St. Tammany Parish Mosquito Abatement District (STPMAD), in Slidell, Louisiana, identified *Aedes japonicus* (Theobald, 1901) mosquitoes from a larval sample brought in from the field for identification. Although invasive *Aedes* species like *Aedes albopictus* are commonly found in Louisiana, this is the first record of *Ae. japonicus* in St. Tammany Parish.

KEY WORDS *Aedes*, distribution, first record, habitat, Louisiana

On April 13, 2023, mosquito pupae were collected from an upturned paddle boat, in Folsom, LA, and were brought into St. Tammany Parish Mosquito Abatement (STPMAD) for identification. The boat had a plastic 228-cm by 137-cm hull with a 71-cm by 35-cm cavity for the pedal. The paddle boat's pedal cavity contained mosquito infested water that was 20 cm in depth. Initially, it was thought that the pupae were *Culex erraticus* (Dyar and Knab); however, after emergence, adult specimens were identified to be *Aedes japonicus* (Theobald) by laboratory staff using the identification keys by Darsie and Ward (Darsie and Ward 2005). On April 20, 2023, the specimens identified by STPMAD staff were confirmed by staff at the New Orleans Mosquito, Termite and Rodent Control Board to be *Ae. japonicus*. Subsequently, a field biologist at STPMAD continued to collect larval samples from the aforementioned boat debris in an effort to obtain more specimens. *Aedes japonicus* larvae were identified and raised to adulthood in a colony in STPMAD's insectary. The *Ae. japonicus* larvae were fed a 1:1 ratio of bovine liver powder and brewer's yeast and adults were fed a 10% sucrose solution. Two adult females were pinned for record.

Upon continued surveillance for the species, we found *Ae. japonicus* at 8 distinct sites in Folsom, Madisonville, and in the Lee Road community in St. Tammany Parish, LA (Fig. 1). Breeding containers varied from boat debris to black plastic gravid pans (50 cm × 38 cm and 17 cm depth) used to provide oviposition sites in mosquito surveillance (Irish et al. 2014). *Aedes japonicus* were often found in containers where *Aedes albopictus* (Skuse), *Culex territans* (Walker), and *Aedes triseriatus* (Say) larvae were also present. In one instance, *Ae. japonicus* were found in a container with a chironomid, *Psorophora ferox* (von Humboldt), and various *Culex* species larvae. To date, STPMAD has found 56 *Ae. japonicus* in St. Tammany Parish. Although STPMAD performs weekly surveillance of adult mosquitoes via CO_2-baited (dry ice) Centers for Disease Control and Prevention (CDC) traps, no adult *Ae. japonicus* have been found in routine arbovirus surveillance.

Aedes japonicus was first described in Tokyo, Japan, by Theobald in 1901. There are four known subspecies, which include *Ae. japonicus japonicus*, *Ae. j. shintienensis* (Tsai and Lien 1950), *Ae. j. amamenisis* (Tanaka et al. 1979), and *Ae. j. yaeyamensis* (Tanaka et al. 1979). Although *Ae. japonicus* are commonly known as the Asian rock pool mosquito, like other *Aedes* species, *Ae. japonicus* are container breeders, laying their desiccation-resistant eggs just above the water line on the walls of containers (Swan et al. 2018). Rock holes are the primary habitat for *Ae. japonicus* larvae (Sames et al. 2022); however, this habitat is lacking in Louisiana. Common container habitats for *Ae. japonicus* include tires, planters, and trash cans, which are also utilized by *Ae. albopictus* (Cunze et al. 2016). While *Ae. albopictus* are prevalent in Louisiana, to our knowledge, there is only one other account of *Ae. japonicus* detected in Louisiana from larvae and pupae samples collected in New Orleans (Sallam et al. 2020). Still, little is known about the abundance and distribution of *Ae. japonicus* locally that might be utilizing some of the same habitats and resources as other *Aedes* species. Container color, material, and structure also plays a role in the selection of oviposition sites by both *Ae. japonicus* and *Ae. albopictus* (Bartlett-Healy et al. 2012, Cunze et al. 2016).

Since its invasion into the United States in the 1990s, *Ae. japonicus* has been found in seven states in the middle to western United states (including Hawaii) as well as all states east of the Mississippi river (Kaufman and Fonseca 2014). With a relatively new record of *Ae. japonicus* in New Orleans, LA (Sallam et al. 2020), Texas (Sames et al. 2022), and in previous records in Florida, Arkansas, and Mississippi (Gaspar et al. 2012, Thorn et al. 2012, Riles et al. 2017), it is likely that *Ae. japonicus* has spread to Louisiana from bordering states as well as more local invasion through the transportation of discarded tires (Schaffner et al. 2003). Little is known about

[1] To whom correspondence should be addressed.

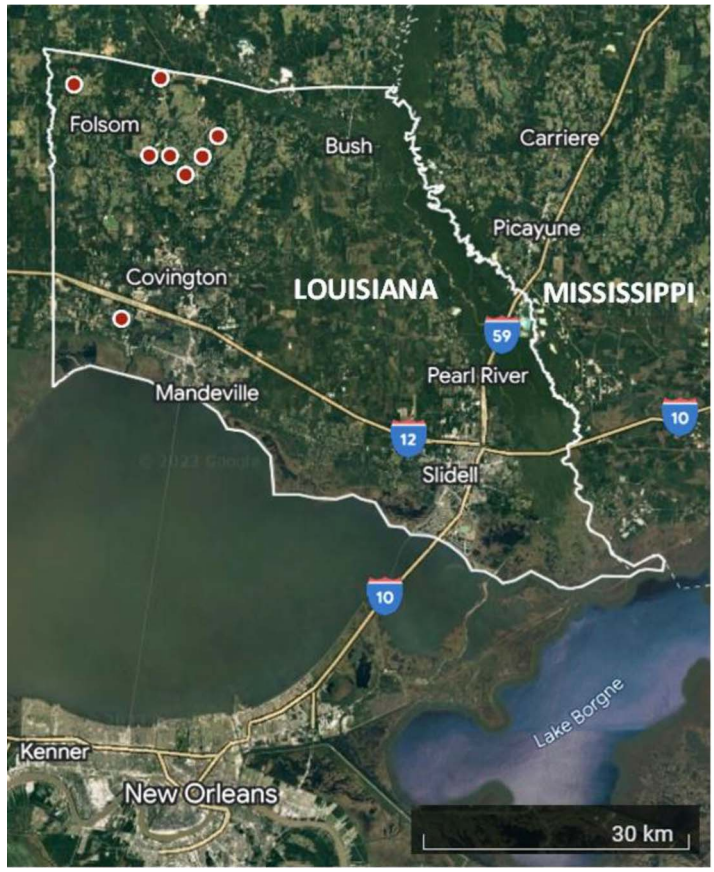

Fig. 1. Locations of sampling points where *Ae. japonicus* larvae were found in St. Tammany Parish, Louisiana.

the medical importance of *Ae. japonicus* (Peyton et al. 1999) and it has not been defined as an important arbovirus vector (Schaffner et al. 2003, Kampen and Werner 2014, Kaufman and Fonseca 2014). This species is fairly under studied because of its recent invasion in the southern region of the United States; however, it may still be a threat to public health (McKenzie et al. 2019). Due to its propensity to blood feed on and live in close proximity to humans, surveillance and eventual management are important, especially when it involves introduction of the species into a new area (Jansen et al. 2018). *Aedes japonicus* has the potential to transmit Dengue viruses (Schaffner et al. 2011), Chikungunya, and three types of encephalitis viruses, including West Nile virus (DeCarlo et al. 2020). It is also a laboratory vector of Japanese encephalitis virus (Tanaka et al. 1979), though it is not currently a vector of concern in Louisiana.

There are many possible explanations for why *Ae. japonicus* has been found in Louisiana. Extension of the geographic range for *Ae. japonicus* is evident in numerous studies that examine the first record of the species in a given area. Many of the sites where *Ae. japonicus* were discovered are in areas bordering another state or country where the species has been previously found (Gaspar et al. 2012, Thorn et al. 2012, Seidel et al. 2016, Goddard et al. 2017, Krupa et al. 2021, Sames et al. 2022). Invasive species distribution is likely to change as climates fluctuate, with populations responding to climate-related changes such as humidity, temperature, and other biotic interactions (Skendžić et al. 2021). Projected future climate conditions suggest that the suitable habitat for *Ae. japonicus* will be expanding northward and westward in the United States (Peach et al. 2019). Additionally, the trade and dispersion of used tires is a major contributor to the invasion of medically important *Aedes* species (Farajollahi and Price 2013). There are a multitude of tire piles in Louisiana which have the potential to harbor invasive *Aedes* species (Comiskey et al. 1999). Invasive *Aedes* species have also been introduced to areas via the standard bred horse trade and their transportation trailers (Fonseca et al. 2001, Gaspar et al. 2012). Maritime ports throughout the Gulf of Mexico, including New Orleans, receive international shipments that also have the possibility to be carrying invasive *Aedes* species (McKenzie 2020). The actual origin of *Ae. japonicus* in Louisiana and how they arrived remains unknown. Extensive sampling and surveillance

are needed to determine if this discovery represents a new local population for St. Tammany Parish, or if accidental transport and climactic conditions allowed for a one-off, isolated case.

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