

SCIENTIFIC NOTE

A NEW RECORD OF *Aedes thibaulti* IN MASSACHUSETTS

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ABSTRACT. For the 1st time, collections of adult female *Aedes thibaulti* are reported from Massachusetts. Initial collections occurred in 2016 and again in 2017 and 2018. This mosquito was found at 35 locations within 28 municipalities, including the city of Boston. Most of the *Ae. thibaulti* were collected with the Centers for Disease Control and Prevention miniature light traps baited with CO₂. Collections were made from epidemiological (EPI) wk 22 to 35 with a peak at EPI wk 24. Although larvae have not yet been collected, the most common wetland types adjacent to collection sites were forested wetlands, which is consistent with the known larval habitat of this mosquito species. *Aedes thibaulti* is likely established in the state of Massachusetts.

KEY WORDS *Aedes thibaulti*, Massachusetts, new record

The distribution of *Aedes thibaulti* (Dyar and Knab) includes a large portion of the southeastern USA but also extends north into southern Ontario, Canada (Darsie and Ward 2005). The known range in the northeastern USA is Connecticut, New York, Pennsylvania, and Rhode Island (Cookman et al. 1985, Hutchinson et al. 2008). This report expands the range of *Ae. thibaulti* to include Massachusetts.

Collections of *Ae. thibaulti* were made through routine mosquito surveillance. Eleven mosquito control districts and the Massachusetts Department of Public Health collect mosquitoes to monitor their populations and diseases. Only female mosquitoes are identified to species. The program utilizes several different kinds of mosquito traps, but the majority are collected with the Centers for Disease Control and Prevention (CDC) light traps using a variety of CO₂ sources and flow rates. Sampling effort is uneven, with most surveillance focusing on the eastern half of the state.

Adult female *Ae. thibaulti* was first detected in 2016 by Kaitlyn O'Donnell of Norfolk County Mosquito Control District. Additional collections were made in 2017 and 2018. In 2016, 25 specimens were collected from 4 locations in 3 towns. The 1st collections occurred on June 15, 2016, from Dedham and Randolph. In Dedham, 4 *Ae. thibaulti* were collected from a CDC miniature light trap baited with compressed CO₂ at a flow rate of 250 cc/min and no light. At the same site, 1 mosquito was collected

from a Cummings gravid trap. Eleven *Ae. thibaulti* were collected from Randolph using a CDC light trap baited with compressed CO₂ at a flow rate of 250 cc/min and no light. Two later collections were made in 2016. Seven mosquitoes were collected on June 16 and 2 were collected on June 23 from separate locations within the town of Walpole. In 2017, collections were more widespread. At this time, confirmatory identification was done by the staff at Connecticut Agricultural Experiment Station. A total of 112 specimens were collected from 19 locations in 16 cities and towns, including Boston. *Aedes thibaulti* was found in 34 CDC light trap collections from June 13 to August 23, 2017. In 2018, a total of 234 specimens were collected from 20 locations in 16 cities and towns. The 1st collection was on May 30, 2018, which is the earliest collection of *Ae. thibaulti* from Massachusetts to date. The last collection was made on August 29, 2018, which was a week later than in 2017. In 3 years, 371 female *Ae. thibaulti* have been collected from 35 locations in 28 municipalities (Figs. 1 and 2). In 2016 and 2018, collections of *Ae. thibaulti* peaked in epidemiological (EPI) wk 24 (mid-June). In 2017, collections peaked in EPI wk 27 (1st week of July). The most common mosquito species in traps containing *Ae. thibaulti* were *Ae. canadensis* (Theobald), *Coquillettia perturbans* (Walker), and *Culex salinarius* (Coquillett).

Aedes thibaulti larvae have not been collected. However, Copeland's (1986) mark-and-recapture study showed that *Ae. thibaulti* have a limited ability to disperse from their larval habitat. Carpenter and LaCasse (1955) also report that adults do not fly far but remain near their larval habitats, resting among vegetation or in hollow bases of trees and stumps. Therefore, an examination of the wetland types in the immediate vicinity of trap sites was conducted. The wetland types adjacent to *Ae. thibaulti* collection sites were examined using ArcGIS Desktop 10.6.1

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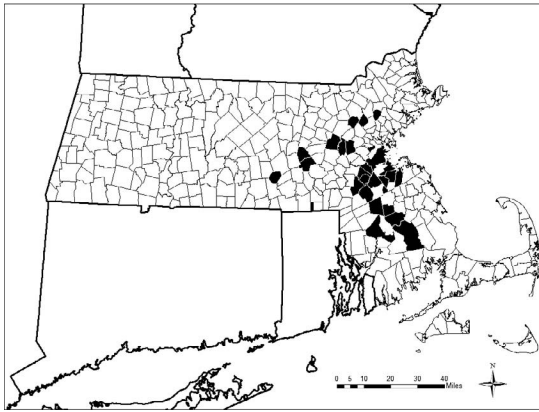


Fig. 1. Map of Massachusetts depicting the towns where *Aedes thibaulti* was collected from 2016 to 2018. The towns where collections were made are shown in black.

(Environmental System Research Institute, Redlands, CA). The trap locations were mapped, and a circle with a radius of 250 m was drawn around each trap location. Each circle had an area of 19.6 ha. A publicly available wetland layer (wetlandsdep_poly) created by the Massachusetts Department of Environmental Protection and distributed for public use by MassGIS (Bureau of Geographic Information) (2017) was used for the analysis. The area of wetland and type of wetland within each circle was recorded. On average, each circle contained 6.8 ± 4.5 ha of wetland. There were 10 different kinds of wetlands found near the traps. The most common wetland type near collection locations were deciduous wooded swamps (2.7 ± 3.1 ha). Deciduous wooded swamps are the most common wetland type in Massachusetts. Wetlands that contain a mix of deciduous and coniferous trees were the 2nd most common wetland type, with an average of 1.1 ± 2.7 ha found near the traps. The 3rd most common wetland type was shrub swamp (0.9 ± 2.0). The remaining wetland types were coniferous wooded swamp (0.8 ± 3.2), deep

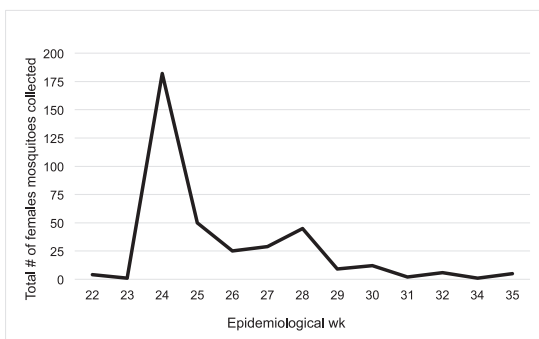


Fig. 2. Total number of female *Aedes thibaulti* collected by epidemiological week (EPI wk) from 2016 to 2018.

marsh (0.2 ± 0.5), open water (0.2 ± 0.6 ha), salt marsh (0.03 ± 0.2 ha), bog (0.01 ± 0.1) and tidal flat (0.006 ± 0.3).

This report expands the known range of *Ae. thibaulti* to include Massachusetts. *Aedes thibaulti* was collected 3 years in a row from 35 locations in 28 municipalities in southeastern Massachusetts as depicted in the map (Fig. 1). There is a sampling bias towards the eastern half of Massachusetts due to the presence of more organized mosquito control in this area. Therefore, the range of *Ae. thibaulti* is likely larger than currently mapped. The species has a limited ability to disperse (Copeland 1986). However, *Ae. thibaulti* was collected from a large area of the state, suggesting that *Ae. thibaulti* was established in Massachusetts prior to 2016. *Aedes thibaulti* is a univoltine mosquito and in Connecticut it is collected from May to August, with collections peaking in mid- to late June (Andreadis et al. 2005, Anderson et al. 2018). Our collections show a similar seasonal abundance, with the earliest collection on May 30, 2018 (EPI wk 22), and the latest on August 29, 2018 (EPI wk 35). The largest collection of 105 females was from Bedford on June 13, 2018.

Larval habitat of *Ae. thibaulti* is described in the literature as the dark recesses of upturned trees such as red maple (*Acer rubrum* L.) and white oak (*Quercus alba* L.) (McNelly 1984). Forested wetlands compose 68.7% of the wetlands adjacent to the collection sites and while we have not yet collected larvae, our analysis suggests that *Ae. thibaulti* larvae are likely using habitat similar to that described in the literature.

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