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SCIENTIFIC NOTE

AEDES AEGYPTI IN GEORGIA, USA

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ABSTRACT. *Aedes aegypti*, commonly known as the yellow fever mosquito, is closely linked to the human environment and directly influenced by the availability of water-holding containers for oviposition and larval development. The discovery of an active population of *Ae. aegypti* in Columbus, GA, was deemed an important public health matter, and extensive surveillance was initiated to monitor, delineate, and suppress this population.

KEY WORDS *Aedes aegypti*, mosquito surveillance

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Aedes aegypti (L.), commonly known as the yellow fever mosquito, is closely linked to the human environment and directly influenced by the availability of water-holding containers for oviposition and larval development. Competition with other container-inhabiting mosquito species, particularly *Ae. albopictus* (Skuse), also may impact the presence and local abundance of *Ae. aegypti*. *Aedes aegypti* was first described from the continental USA (Savannah, GA) in 1828 (Christophers 1960). However, as indicated by yellow fever and dengue outbreaks, for which *Ae. aegypti* most likely served as the vector, the mosquito probably has been present, permanently or intermittently, in the continental USA at least since the 1640s (Eisen and Moore 2013).

Systematic multistate surveys for *Ae. aegypti*, coordinated by the Public Health Service, were conducted in the continental USA from 1942 to 1964 (Hayes and Tinker 1958, Tinker and Hayes 1959, Morlan and Tinker 1965). During this time, *Ae. aegypti* was commonly encountered in the southernmost states (Florida, South Carolina, Georgia, Alabama, Mississippi, Louisiana, and Texas) and occasionally recorded from bordering states to the north (North Carolina, Virginia, Arkansas, and Tennessee). Population persistence in the continental USA is reportedly limited to southward of the average 50°F winter isotherm, which in the east bisects Alabama, Mississippi, Georgia, and South Carolina (Eisen and Moore 2013). However, an overwintering population of *Ae. aegypti* has been documented in Washington, DC, since 2011 (Lima et al. 2016).

Aedes albopictus, commonly known as the Asian tiger mosquito, was introduced into the USA in 1985 (Texas) and 1986 (Florida) (Hawley et al. 1987). By 1991, *Ae. albopictus* had been found in all 159 Georgia counties (Womack et al. 1995). The geographical distribution of *Ae. aegypti* shifted after the introduction of *Ae. albopictus* (Moore et al. 1988). The rapid extirpation of *Ae. aegypti* was likely due to asymmetric satyrization of *Ae. aegypti* females by *Ae. albopictus* males (Tripet et al. 2011), resulting in interspecific mate competition that favored populations of the newly invasive *Ae. albopictus* (Burford Reiskind et al. 2018). *Aedes albopictus* also typically outcompetes *Ae. aegypti* as larvae in shared containers, though the outcome of competition is context dependent (Juliano 2009).

In 2005, 2 female *Ae. aegypti* were found at one location in the city of Columbus, GA, during routine West Nile virus (WNV) surveillance. *Aedes aegypti* had not been reported in Georgia, except for rare collections of 1 or 2 adults in Chatham County (Chatham County Mosquito Control, personal communication), since 1964. These intermittent observations are thought to be related to freighters coming into the Port of Savannah. The discovery of an active population of *Ae. aegypti* in Columbus was deemed an important public health matter, and extensive surveillance was initiated to monitor, delineate, and suppress this population.

As part of this effort and the ongoing WNV surveillance program, gravid traps and Centers for Disease Control and Prevention (CDC) light traps, baited respectively with hay infusion and dry ice, were placed at approximately 6 sites throughout Columbus. Traps were set monthly between July and October starting in 2002, as resources allowed. Sites were determined in coordination with the local health department and based on complaints, risk of disease transmission, and positive bird reports and human cases. In 2016, funding from the Zika virus portion of the Epidemiology Lab Capacity grant allowed the hiring of 5 Vector Surveillance Coordinators (VSCs) and a 2nd entomologist, resulting in an increase in surveillance efforts. In 2018, one of the VSCs was tasked with starting surveillance in the area where *Ae. aegypti* had been found as soon as weather conditions allowed to determine when this mosquito species became active in south Georgia, and with

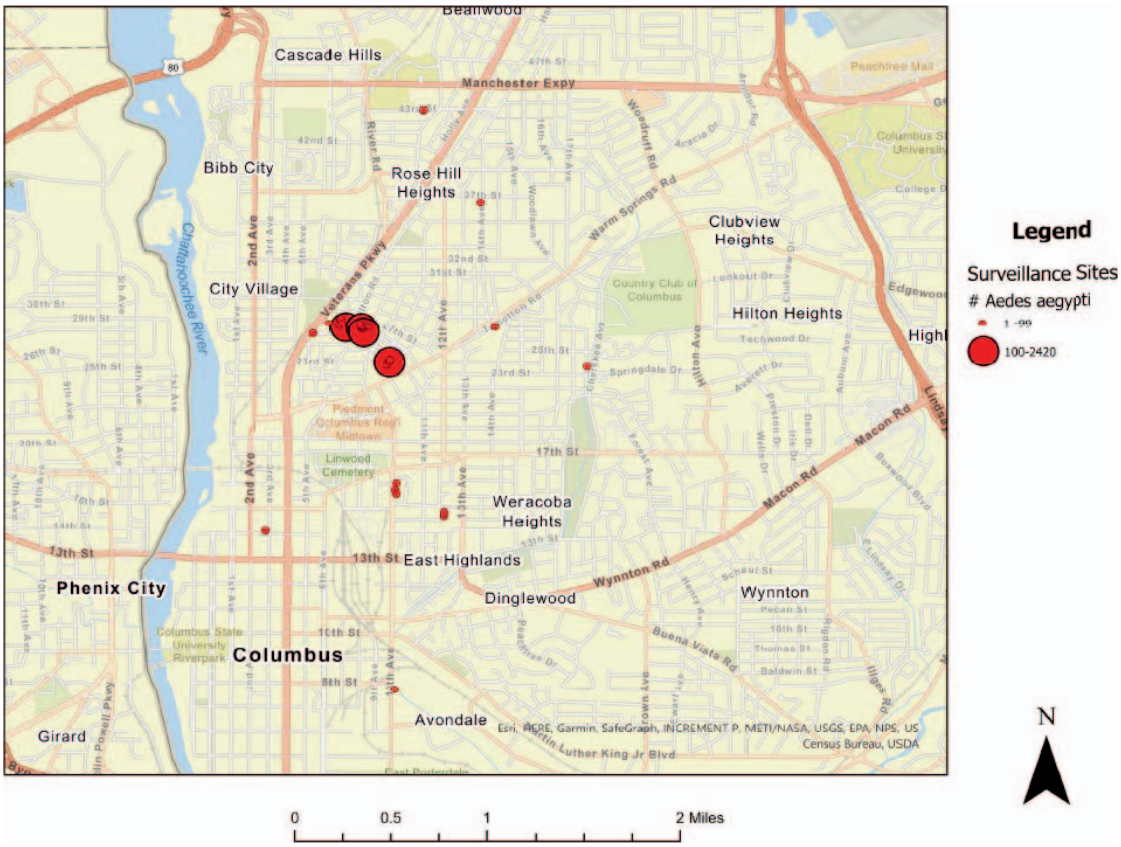

Fig. 1. Area where *Aedes aegypti* are known to be ovipositing.

setting surveillance traps in the area weekly as possible. This increased surveillance was continued in 2019, and a BG-Sentinel trap (Biogents, Regensburg, Germany), baited with a BG lure, was added at each site. Due to the Covid-19 pandemic, no additional funding was available to continue this program in 2020, and increased surveillance in Columbus was discontinued.

A few *Ae. aegypti* were collected at 2 sites in Columbus prior to 2011. In 2011, 79 *Ae. aegypti* were found at a site that had been chosen due to a WNV case in the area. The *Ae. aegypti* were collected primarily in the CDC light trap, while *Ae. albopictus*, also trapped at the same site, were primarily collected in the gravid trap. *Aedes aegypti* larvae and pupae were also discovered in water-filled containers found near the trap site. This particular site is in an old area of Columbus. It consists of a mix of older homes and small businesses. There are newer neighborhoods in the area, and one of these neighborhoods was built at the end of the road where the *Ae. aegypti* were found. This short road was heavily vegetated and poorly maintained. Two old houses with overgrown yards and a multitude of containers were along one side, while an old building holding a business selling tires was along the other. There was a large stormwater catch basin at the end of the road.

Between 2012 and 2021, *Ae. aegypti* were found in a total of 17 sites in Columbus (Fig. 1). Over 100 specimens were collected at 5 of those sites. Sites with >100 *Ae. aegypti* are clustered in an area approximately 1 mi in diameter. *Aedes aegypti* were found at these sites as early as early May and as late as early November. The largest number of adult *Ae. aegypti* were collected in October (Fig. 2).

Oviposition sites were found at each of the areas where large numbers of *Ae aegypti* were trapped. These included various types of containers and tires. It is also likely that the *Ae. aegypti* were laying eggs and/or harboring in the stormwater system, based on the fact that mosquito numbers dropped when the storm drain became covered with soil after the road was cleaned. However, it was never possible to check this by opening up the storm drain. Because of the importance of this species as a vector, surveillance will continue in this area as funding allows.

We would like to thank the Columbus County Health Department and their Vector Control program for all the assistance they provided.

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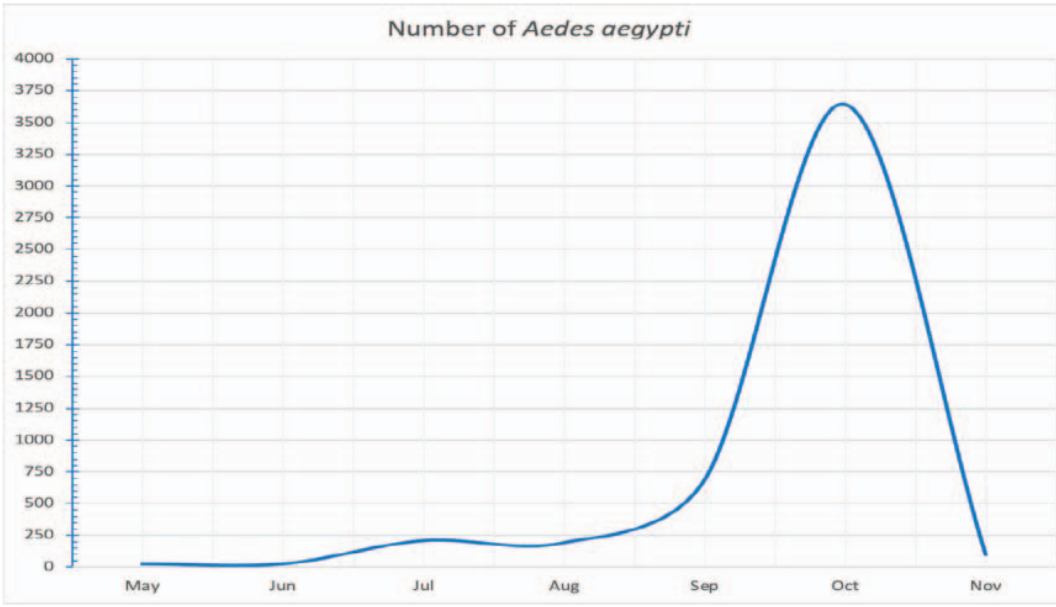

Fig. 2. Total number of *Aedes aegypti* collected per month.

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