

***Mansonia titillans*: New Resident Species or Infrequent Visitor in Chatham County, Georgia, and Beaufort County, South Carolina, USA**

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SCIENTIFIC NOTE

MANSONIA TITILLANS: NEW RESIDENT SPECIES OR INFREQUENT VISITOR IN CHATHAM COUNTY, GEORGIA, AND BEAUFORT COUNTY, SOUTH CAROLINA, USA

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ABSTRACT. In September, October, and November 2014, adult *Mansonia titillans* were collected at 4 separate sites near Savannah in Chatham County, Georgia, and 1 site in Muscogee County, GA, during routine mosquito surveillance. Although previously recorded from Beaufort County, SC, and several inland southern Georgia counties, recent reports of this species from coastal Georgia or South Carolina are lacking. These newly captured *Ma. titillans* specimens represent the first documented records for Muscogee County and Chatham County, GA, and may indicate a recent northern expansion or reintroduction of this species along the Georgia and South Carolina coast.

KEY WORDS *Mansonia titillans*, Georgia, South Carolina, expansion, introduction, new record

There is extensive documentation of the importation/introduction and spread of exotic species, as well as the dispersal of native mosquito species within North America (Sprenger and Wuithiranyagool 1986; Craven et al. 1988; Darsie and Ward 1989, 2000; West et al. 1994; Peyton et al. 1999; Harrison et al. 2002; Ringrose et al. 2013). Since 1985, 5 previously unrecorded species of mosquitoes have been found in Georgia and South Carolina. Those species are *Mansonia dyari* Belkin, Heinemann, and Page (Darsie and Hager 1993); *Aedes albopictus* (Skuse) (Richardson et al. 1995, Womack et al. 1995); *Ma. titillans* (Walker) (Smith and Floore 2001, Goddard and Harrison 2005); *Aedes japonicus japonicus* (Theobald) (Reeves and Korecki 2004, Gray et al. 2005); and *Culex coronator* Dyar and Knab (Kelly et al. 2008, Moulis et al. 2008). This report documents the first collections of *Ma. titillans* in coastal Chatham County, GA, and helps validate the South Carolina record.

The identification of mosquitoes collected in Chatham and Muscogee counties was performed following the dichotomous keys of Darsie and Ward (2005). Confirmation of *Ma. titillans* specimens (all females) were based on the presence of

a row of spiniform setae (R. E. Harbach, personal communication) on the posterior margin of tergum VII of the abdomen. Based upon authors' personal observations, the pale scales on the proboscis were not considered to be a reliable taxonomic character in separating *Ma. titillans* and *Ma. dyari*. The Aedini generic names used herein follow the guidelines of the *Journal of the American Mosquito Control Association*.

Mansonia titillans is a medium-sized dark mosquito that is found in scattered locations in the southeastern United States (Darsie and Ward 2005, Burkett-Cadena 2013), with dense populations occurring in some areas of Florida. The larvae obtain oxygen from plant aerenchyma by using specialized siphons modified for piercing the stems, roots, and floating leaves of aquatic plants, such as water hyacinth, *Eichornia crassipes* (Mart.) Solms, and water lettuce, *Pistia stratiotes* Linnaeus. In Georgia, specimens have previously been reported from 5 southern counties: Ben Hill, Calhoun, Charlton, Tift, and Worth (Smith and Floore 2001). These specimens were captured in Centers for Disease Control and Prevention (CDC) light traps during June and July 1997. An unreported, but confirmed, specimen was also collected in Muscogee County, GA, in a CDC light trap deployed in a clearing within a mixed woods area on August 28, 2007. In addition, a South Carolina specimen was captured from Beaufort County in 1995 (Goddard and Harrison 2005). These combined records indicate a sporadic distribution pattern of *Ma. titillans* in southern Georgia and along the southern tip of South Carolina (Fig. 1).

During the fall of 2014, specimens of *Ma. titillans* began showing up in collections from Chatham County, GA. Two specimens were captured during a routine inspection with

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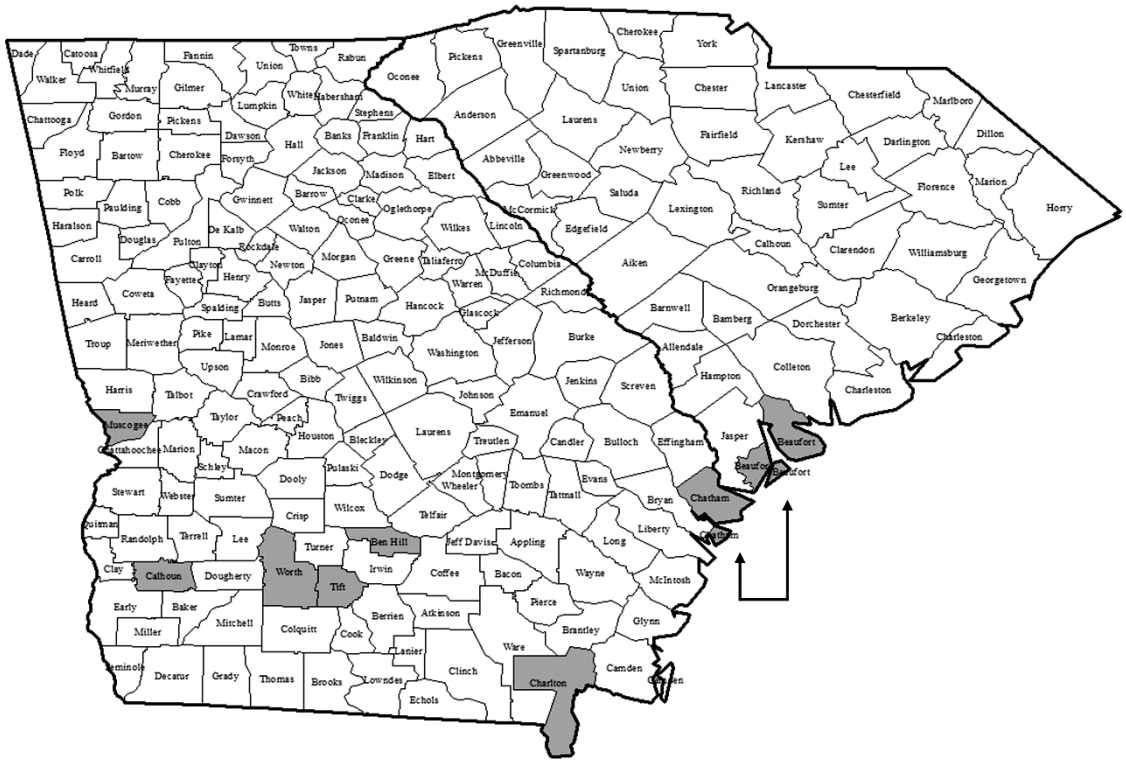


Fig. 1. Confirmed county records where *Ma. titillans* has been collected in Georgia and South Carolina. Arrows indicate location of Chatham County, GA, and Beaufort County, SC.

a hand-held aspirator on September 30 from a nature center situated within a mixed forested, river-swamp-area along the Ogeechee River. Single specimens were collected in the CDC light traps at another site approximately 5 mi (8 km) downstream from the initial site on October 21 and 28. This second site was also located within a mixed woods habitat along a man-made canal that regulated the flooding of historic rice fields and a waterfowl habitat. Five more specimens were caught in a CDC light trap set within a dense mixed forest swamp of the same river system on October 28 and November 25. An additional specimen was obtained from a CDC light trap set on the northern edge of the county on an intercoastal island located between forks of the Savannah River on November 13. In South Carolina, *Ma. titillans* was found once while performing landing rate counts in a mixed woods area containing substantial undergrowth on October 24, 1995. These records show that, although captured at a limited number of sites, *Ma. titillans* is not restricted to an isolated region in the Chatham County area (Fig. 2).

The lone specimen of *Ma. titillans* from Muscogee County also represents a new county record in Georgia. It was captured along with *Ae. albopictus*, *Cx. erraticus* (Dyar and Knab), and *Cx. nigripalpus* Theobald. Fifteen species were

caught in traps with *Ma. titillans* in Chatham County, GA: *Ae. albopictus*, *Ae. atlanticus/tormentor*, *Ae. canadensis* (Theobald), *Ae. dupreei* (Coquillett), *Ae. infirmatus* Dyar and Knab, *Ae. taeniorhynchus* (Wiedemann), *Ae. triseriatus* (Say), *Ae. vexans* (Meigen), *Anopheles crucians* complex (Wilkerson et al. 2004), *Cx. erraticus*, *Cx. nigripalpus*, *Cx. salinarius* Coquillett, *Culiseta melanura* (Colquillett), *Psorophora ferox* (von Humbolt), and *Uranotaenia sapphirina* (Osten Sacken). In Beaufort County, SC, the specimen of *Ma. titillans* mentioned by Goddard and Harrison (2005) was collected along with *Ae. atlanticus/tormentor*.

To date, mosquito control agencies in Chatham County, GA, and Beaufort County, SC, have not collected larvae of *Ma. titillans*. This is probably due to the scarcity of suitable aquatic vegetation normally associated with immature *Mansonia* species. Attempts to collect larvae from the root systems of water hyacinths in the few areas containing this plant species proved fruitless. Why Chatham County Mosquito Control (CCMC) has not recorded this species before 2014 is another perplexing question, as an extensive surveillance program has been in operation since the late 1950s. It is possible that previously captured specimens were misidentified. Collectors that rely on speckled dark and pale

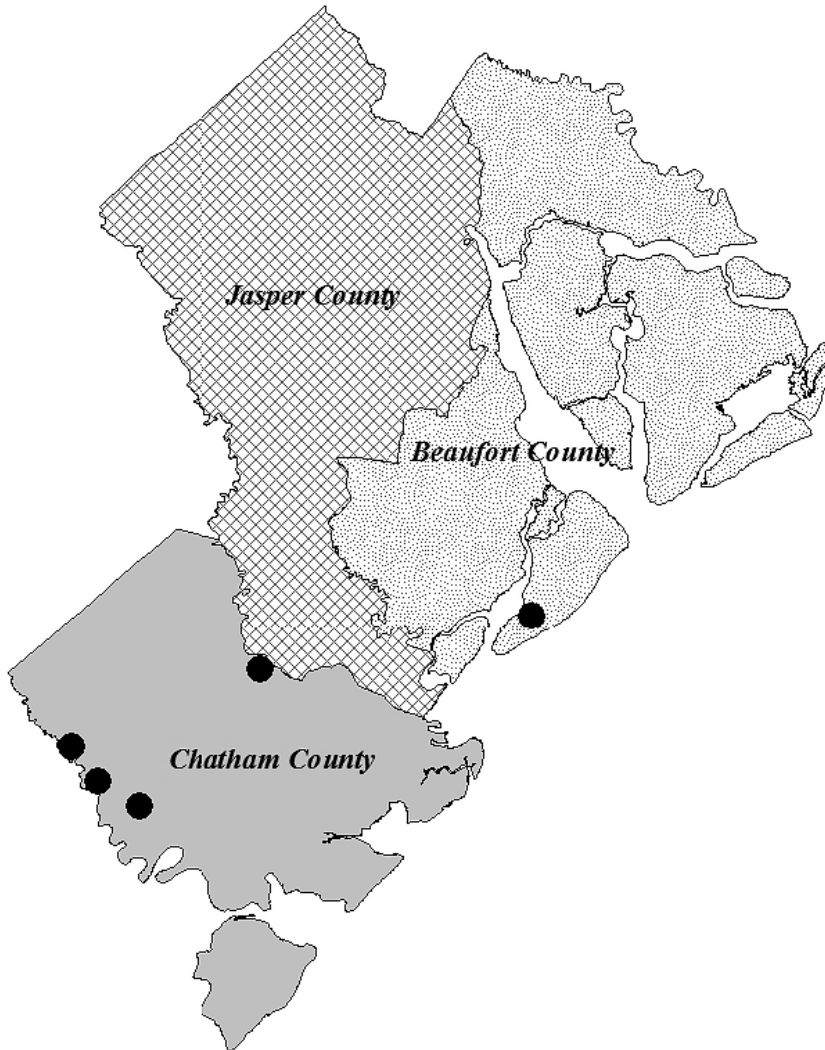


Fig. 2. Collection sites for *Ma. titillans* in Chatham County, GA, and Beaufort County, SC.

scales on the wings and a banded proboscis for identifying *Cq. perturbans* (Walker), *Ae. sollicitans* (Walker), and *Ps. columbiae* (Dyar and Knab) should be alert because *Ma. titillans* shares these characters.

These new *Mansonia* records clearly represent a northern extension of this species. This presents a question of whether *Ma. titillans* is a new resident species in the Chatham, Muscogee, and Beaufort county areas or just an infrequent visitor. Goddard and Harrison (2005) suggested that the northerly extensions of *Mansonia* species may be related to the introduction and establishment of their primary aquatic host plants. In Georgia, some of these “exotic” aquatic plants are commonly sold as ornamentals for outdoor home water gardens and may have contributed to

unintended introductions of *Mansonia*. However, in South Carolina both water hyacinth and water lettuce are considered noxious plants and are illegal to possess, import, or distribute within the state (SCDNR 2010).

Mansonia titillans may have migrated from populations farther south in Georgia, although recent records of *Mansonia* are lacking from the Fort Stewart area (T. D. Waite, personal communication), Lowndes County (M. Blackmore, personal communication), or areas in Liberty County (K. Graham, personal communication; C. Reisinger, personal communication). However, the collections of *Ma. titillans* along a 6-mi (10-km) stretch of the Ogeechee River, in southern Chatham County, suggest that there is a resident population in this area. No *Mansonia*

specimens have been found in Beaufort County, SC, since 1995, and none have been captured from the limited amount of mosquito surveillance conducted by CCMC in Jasper County, SC. This suggests that *Ma. titillans* is currently an infrequent visitor in lower coastal South Carolina. The status of this species in Muscogee County cannot be resolved without further collections. Much farther south in the Jacksonville, FL, area, both *Ma. titillans* and *Ma. dyari* occur, and catch rates have been greater over the last 2 years compared to the previous 13 years (M. Clark, personal communication). Thus, it appears that more surveillance is required to accurately determine the range of *Mansonia* species in southern Georgia and South Carolina.

The role of *Ma. titillans* in local arbovirus transmission is unknown. In Florida bloodfed *Ma. titillans* contained far more mammalian blood (93%) than avian blood (7%), and no reptile/amphibian blood (Edman 1971). More recently, alligator blood has been detected in *Ma. titillans* captured at a central Florida alligator farm (Rodrigues and Maruniak 2006). One pool of *Ma. titillans* collected in October from Louisiana (Unlu et al. 2010) and another sample collected in August from Florida (Florida Health, 2006) tested positive for West Nile virus. In Guatemala, Venezuelan equine encephalitis virus has been isolated from *Ma. titillans* (Sudia et al. 1971). The *Ma. titillans* specimens collected by CCMC were not submitted for virus testing during 2014, and this species is unlikely to be tested in the future because of its scarcity.

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