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First Report of the American Palm Cixiid (Hemiptera: Cixiidae) from Mississippi, USA

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ABSTRACT

The American palm cixiid, *Haplaxius crudus* (Van Duzee), feeds on the leaves of palms and has been implicated as a vector of 16SrIV phytoplasmas, including lethal yellowing disease. In North America, the American palm cixiid was previously known to occur in Florida and Texas. Here, the first report of this species from Mississippi is presented.

Key words: Palm, lethal yellowing of palm, invasive

INTRODUCTION

Mississippi has a humid subtropical climate, which is characterized by the absence of severe cold in the winter and the presence of extreme heat in the summer. This climate allows for the growth of a wide variety of non-native palms, especially in the counties along the Gulf Coast. Several highly traveled roadways linking Texas and Florida pass through the coastal counties, increasing the chance of palm pest introduction and establishment, which would set the stage for spread of insect-vectored palm pathogens. The introduction of one or more palm pathogens along with their vectors would have a devastating impact on the nursery and landscape industries, directly impacting Mississippi's economy.

The Mississippi Entomological Museum's Invasive Insect Team conducts surveys for select invasive insect pests throughout Mississippi. Given the importance of palms to the coastal economy, we began conducting a Cooperative Agricultural Pest Survey (CAPS) Palm Commodity Survey for detection of palm tree pests in southern Mississippi, during the growing seasons of 2017 and 2018 (Fig. 1). Nine insect pests were targeted as part of this survey, and a variety of traps and lures were used to detect target taxa.

The American palm cixiid, *Haplaxius crudus* (Van Duzee, 1907), is one of the target taxa we have surveyed for over the last two years (Fig. 2). This species is thought to be native to the Caribbean and south Florida, as well as from south Texas through Central America and northern South America (Bartlett *et al*. 2014). The adults of *H. crudus* feed on a wide variety of palms and a few other monocotyledonous plants, and are the only cixiid commonly found on palm foliage in Florida and the Caribbean region (Whittaker 2018). Nymphs feed on a wide array of grasses, with St. Augustine grass, *Stenotaphrum secundatum* (Walter) Kuntze, Guinea grass, *Panicum*

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maximum (Jacq.) R. Webster, bahiagrass, *Paspalum notatum* Flueggé and Bermudagrass, *Cynodon dactylon* (L.) Pers. being favorable hosts (Reinert 1977, Howard 2006).

The adults of *H. crudus* are between 4.3-5.1 mm long and can vary in color from straw-yellow to light brown, with the abdomen being greenish in lighter-colored individuals. The wings are hyaline and the eyes can vary from maroon at night or on overcast days, to straw-colored during sunny days (Kramer 1979, Whittaker 2018). The antennae consist of a very short scape, a barrel-like pedicle and a long setae-like flagellum. Diagnostic features of the male genitalia are given in Kramer (1979).

Haplaxius crudus is of economic concern because of its potential to vector phytoplasmas of group 16SrIV in palms. *Haplaxius crudus* is thought to be the principle vector of lethal yellowing, a disease caused by *Candidatus Phytoplasma palmae* (16SrIV subgroup A). Lethal yellowing is known to kill 37 species of palm including the economically important date palm (*Phoenix dactylifera* L.) and coconut palm (*Cocos nucifera* L.) (Howard 2006), as well as many species that are planted for ornamental use. Recently, *H. crudus* has also been implicated in the transmission of the Texas Phoenix palm decline caused by *Candidatus Phytoplasma palmae* (16SrIV subgroup D) and the coconut foliar decay virus, evidently caused by a single-stranded DNA virus (Wilson 2005, Bahder et al. 2017, 2018; Gronenborn et al. 2018, Whittaker 2018).

METHODS

Following approved USDA survey methods for *H. crudus*, blue sticky traps were hung from palm fronds at seven locales in four coastal counties in Mississippi from August 2017 – October 2017, and May 2018 – September 2018 (Fig. 1). Sticky traps were collected on an approximate two-week schedule during this time, and the resulting samples were submitted to the Eastern Regional Screening Center at the Mississippi Entomological Museum. There, specimens collected from sticky traps set on a *Washingtonia* sp. frond in Ocean Springs, Jackson County Mississippi were tentatively identified as the American palm cixiid, *H. crudus* and were sent to both Dr. Charles Bartlett and the United States Department of Agriculture National Identification Service for confirmation. In 2018, additional specimens were collected with a standard insect net.

RESULTS

Specimens examined — MISS., Jackson Co., Ocean Springs, 30.39551ºN -88.75931ºW, 29 Aug – 5 Oct. 2017, J.G. Hill and J.L. Sanders, Sticky trap hanging from palm in weedy landscaping near palm nursery (2M, 5F); 6 July 2018, J.G. Hill, sweeping palm frond in landscaping near parking lot (3M, 3F)

During the 2017-2018 sampling periods, the *H. crudus* was present on every sample taken from the Ocean Springs trapping site. It was not found at any of the other sites, suggesting that it is not yet widely established in Mississippi. The palm in which *H. crudus* was collected from did not show any signs of lethal yellowing during the survey. Expanded surveys for this species as well as other palm pests will begin in May 2019.

DISCUSSION

The confirmed presence of *Haplaxius crudus* in Mississippi is of concern as this species is a known (or suspected) vector of phytoplasmas in the 16SrIV group, including the causative agent of lethal yellowing of palm and Texas Phoenix palm decline (Bahder et al. 2017, 2018). *Haplaxius crudus* is also a suggested vector of coconut foliar decay virus (Wilson 2005). It is not entirely clear whether records of *Haplaxius crudus* in Mississippi represent an introduction, a range expansion, or a species that was always present but had gone undetected. The northernmost record of *Haplaxius crudus* of which we are aware is a specimen collected at 29.73732, -82.2184 near Gainesville, Florida in July 1966. The specimens collected in Mississippi are north of this latitude. Further surveys for *Haplaxius crudus* in the Gulf Coast states would help reveal the degree to which palms in this region may be at risk to insect-vectored diseases. Review of existing *Haplaxius* in institutional entomological collections may reveal whether the Mississippi records represents a range expansion or a previously undetected species, and would be valuable in planning strategies of risk management for palm diseases.

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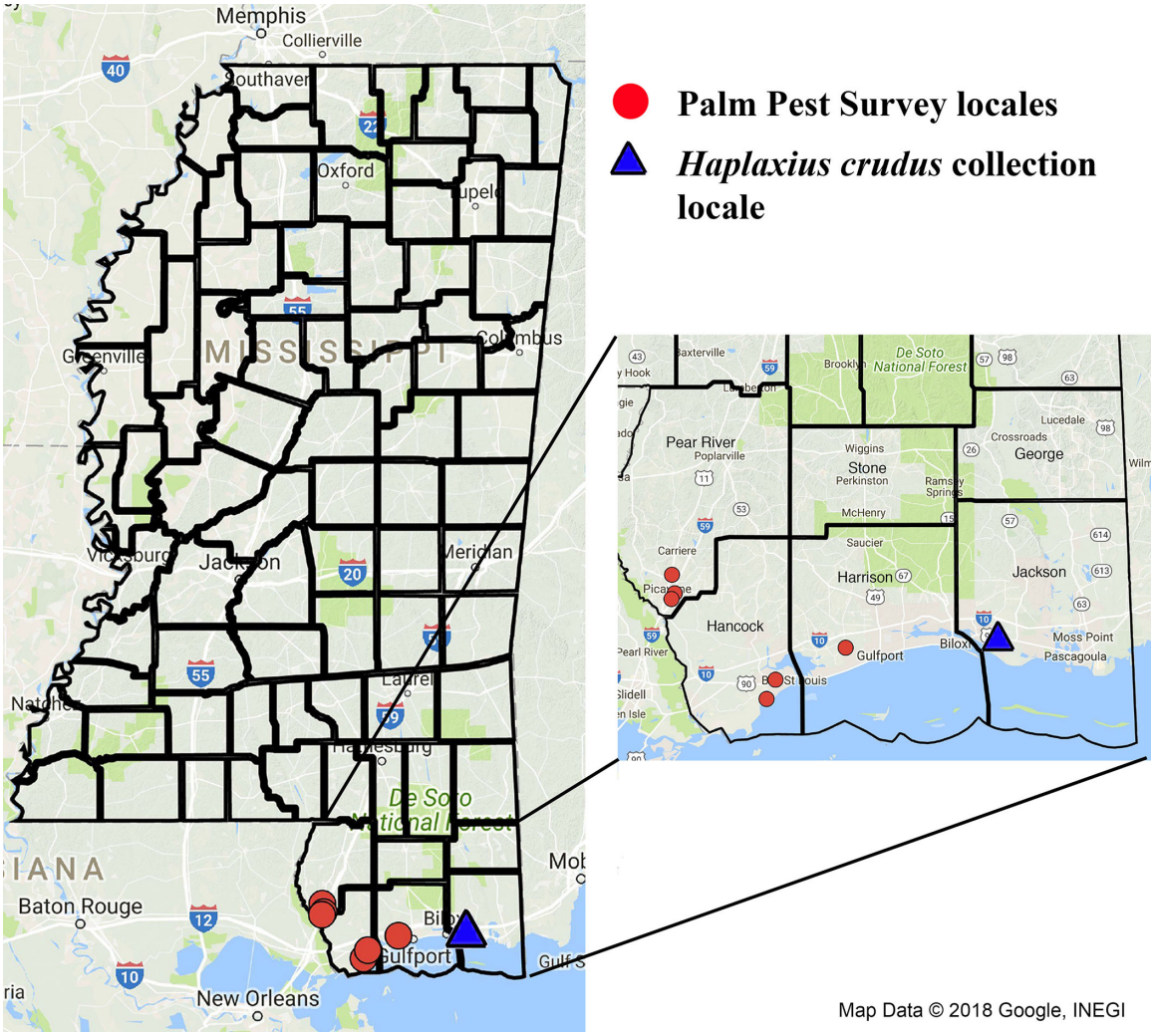

Figure 1. Map showing the locales for the 2017-2018 CAPS Palm Commodity Survey and the location where *Haplaxius crudus* was first detected in the state.

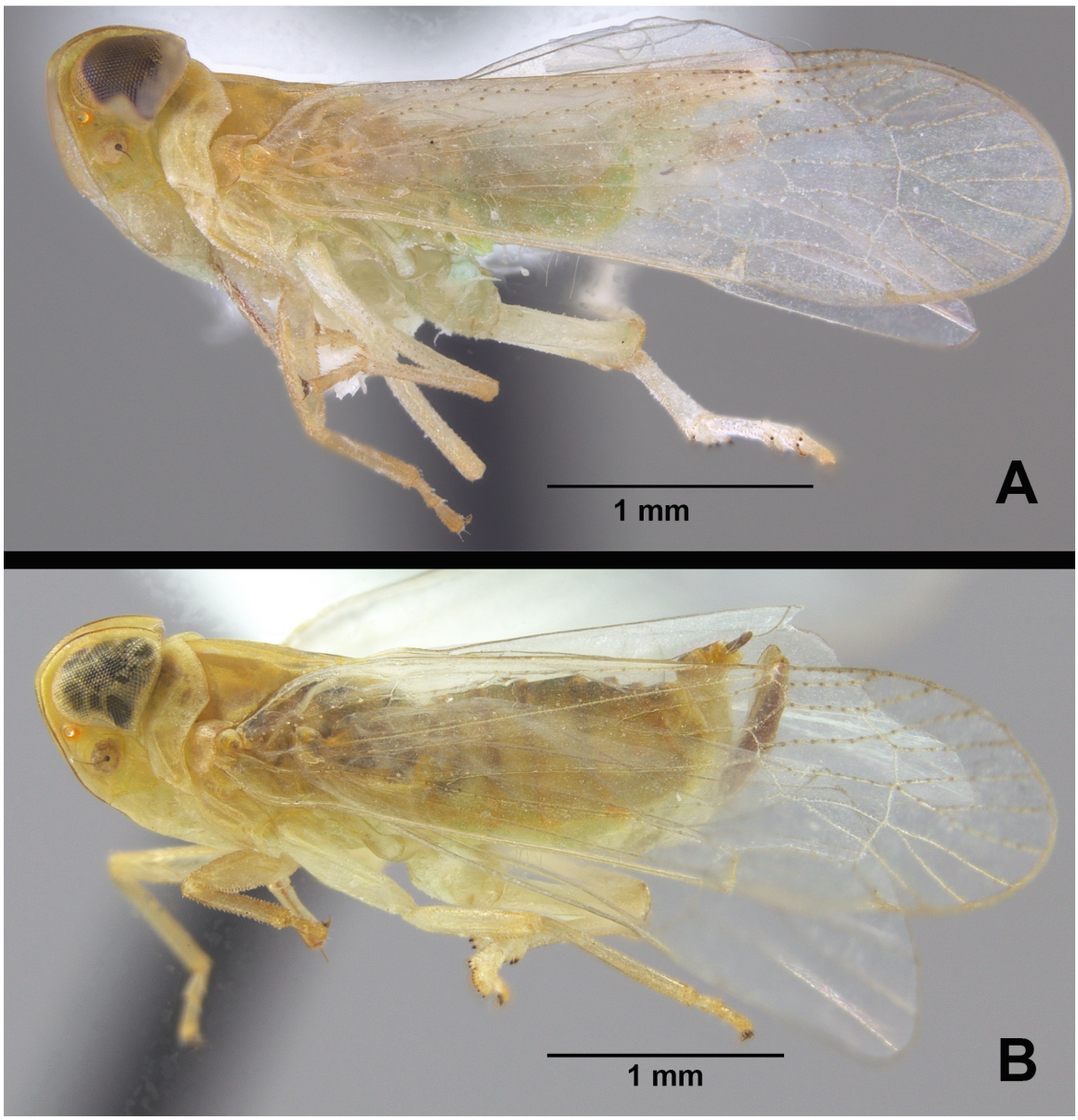

Figure 2. Lateral view of *Haplaxius crudus.* A. Male, B. Female.