

Pest Alert

Florida Department of Agriculture and Consumer Services
Division of Plant Industry

The Taro Planthopper, *Tarophagus colocasiae* (Matsumura), a New Delphacid Planthopper in Florida

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INTRODUCTION: Two specimens of a taro planthopper, *Tarophagus colocasiae* (Matsumura), were collected in suction traps at the DPI facility in Winter Haven, Florida in June 2015. Additional specimens were collected in July at a discount garden center in Winter Haven on elephant ear (*Colocasia esculenta* (L.) Schott) plants for sale. The genus *Tarophagus* includes three described species, all serious pests of taro (*C. esculenta*), a crop commonly known as dasheen in the Caribbean Basin. Possibly a fourth undescribed species of *Tarophagus* occurs in the Pacific islands (Carmichael et al. 2008). This is the first report of any species of *Tarophagus* in the continental United States. *Tarophagus colocasiae*, the species that has been found in Florida, is the most wide-ranging of the three species. It occurs in Southeast Asia, the Indonesian archipelago, and Pacific islands as far east as Hawaii (Asche and Wilson 1989). There are unconfirmed, but credible reports from the Caribbean that it has been in Jamaica since 2011 (Anonymous 2013) and in Cuba since 2014 (Cabrera 2015).

DESCRIPTION: Adult taro planthoppers are small (2.5-4.1 mm) and dark brown with white markings on the thorax (Fig. 1). Both long and short winged forms occur. Nymphs may be white if they are very young, or if they have just molted (Carmichael et al. 2008). Species determination requires examination of the male genitalia. The sculpturing on the pygofer (Fig. 2) will separate the three described species (Asche and Wilson 1989).



Figure 1. Taro planthopper, *Tarophagus colocasiae* (Matsumura).

Photograph credit: Susan E. Halbert



Figure 2. Taro planthopper, *Tarophagus colocasiae* (Matsumura) male pygofer.

Photograph credit: Susan E. Halbert

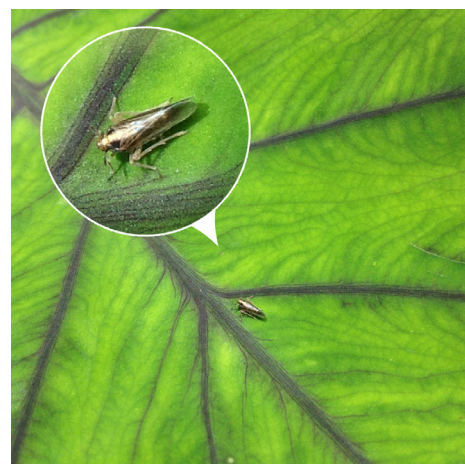


Figure 3. A taro planthopper on an elephant ear leaf.

Photograph credit: Kyle E. Schnepf



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For practical field purposes in Florida, if high populations of small planthoppers are found on *Colocasia* or related aroids, these bugs are suspect taro planthoppers. The planthoppers are reported to infest the back sides of the leaves (Fig. 3). In the retail store, we also found them on and inside the curled petioles near the base of the plant (Fig. 4). Plants had damage on the petioles that matched the damage descriptions in the literature (Carmichael et al. 2008) (Figs. 5, 6).



Figure 3. Taro planthoppers on an elephant ear petiole.

Photograph credit: Kyle E. Schnepf



Figure 5. Taro planthopper damage on plants for sale.

Photograph credit: Susan E. Halbert



Figure 6. Taro planthopper damage on plants for sale.

Photograph credit: Kyle E. Schnepf

BIOLOGY: Taro planthoppers feed on taro and related aroids. Heavy infestations may cause the plants to wilt and even die. Penetration of the leaves for feeding and oviposition causes the sap to exude, forming red, crusty deposits on leaves and stems (Carmichael et al. 2008).

Taro planthoppers develop on the undersides of the leaves or on the petioles. There are five nymphal instars. Under unspecified laboratory temperature conditions in the Philippines, development took about 31 days. Mated females laid an average of 168 eggs (Duatin and de Pedro 1986). Under field conditions, newly hatched first instars may reach adulthood in 13-19 days (Fullaway 1937, Vargo 2000, Matthews 2003), and adults may live 48-73 days (Duatin and de Pedro 1986).

HOSTS: Taro planthoppers are major pests of taro and elephant ear. They also might feed on other plants in the aroid family, including caladiums (*Caladium* spp.) and malanga (*Xanthosoma sagittifolium* (L.) Schott). In a study in the Philippines, Duatin and de Pedro (1986) put 20 first and second instar nymphs on various plants found in and around taro fields. They enclosed the leaves to prevent escapes and determined if the insects were still alive after 24 hours. In this study, the nymphs survived for 24 hours on *Caladium bicolor* (Aiton) Vent., *Xanthosoma* sp., *Ipomoea batatas* (L.) Lam. (sweet potato), *Manihot esculenta* Crantz (cassava), *Euphorbia hirta* L., *Ipomoea aquatica* Forssk., *Monochoria vaginalis* (Burm. f.) C. Presl, and *Commelina benghalensis* L. (Duatin and de Pedro 1986).

The common names of aroid crops are confusing. Malanga, for example, commonly refers to *X. sagittifolium*, but apparently it also is used for *C. esculenta* in Cuba (Cabrera 2015). Partly for this reason, it is not known for sure how damaging taro planthoppers will be on crops that are not in the genus *Colocasia*.

ECONOMIC IMPORTANCE: Taro planthoppers cause direct damage to taro by feeding on the leaves and stems. Excessive feeding causes the plants to wilt and die. Damage also manifests as crusty exudates at the feeding sites due to leaf wounding during feeding and oviposition (Carmichael et al. 2008).

Taro planthoppers are thought to transmit several viruses causing disease in taro crops. *Colocasia* Bobone disease virus (CBDV), known from the island of New Guinea and the Solomon Islands, causes severe stunting and distorted leaves. The symptoms vary greatly among cultivars (Carmichael et al. 2008; Tsatsia and Jackson publication date unknown). Some plants recover, but others die from a condition known as alomae disease. The exact nature of alomae disease is not understood. Initially, alomae disease was thought to be caused by a combination of CBDV and a badnavirus transmitted by the mealybug *Planococcus citri* (Risso) (Rondoni et al. 1994); however, Revill et al. (2005) found a poor correlation between alomae disease and infection by the mealybug-transmitted badnavirus. Thus, alomae disease might be caused by a combination of viruses, but if so, the second virus is not known (Revill et al. 2005). Phytosanitary and regulatory practices such as roguing, virus elimination from planting stock, and quarantine measures have helped to

contain the problem (Anonymous publication date unknown; Carmichael et al. 2008; Tsatsia and Jackson publication date unknown). Another virus, taro feathery mottle virus, is reported from the Philippines (Palomar 1987). It was transmitted by taro planthoppers after feeding for 5 minutes, but not after feeding for only 2 minutes. This virus does not seem to have been characterized further and does not show up in online databases of plant viruses. The nature and extent of vectored pathogens associated with taro planthoppers are not understood very well. If the Florida population of taro planthoppers persists, it should be tested for viruses.

NATURAL ENEMIES: An orthotyline mirid bug, *Cytorhinus fulvus* Knight, is an important egg predator used for biological control of the taro planthopper, but success has been variable. In some cases, the pests have all but disappeared following the introduction of the predator, but in other cases control failed. Asche and Wilson (1989) suggest that there might be variability in the predator as well as the pest to account for the failures, because planthopper species differences among locations did not explain the mixed results obtained with the predators. It is thought that the predator will not control taro planthoppers sufficiently to prevent spread of plant pathogens (Anonymous publication date unknown).

Three dryinid wasps are reported from *Tarophagus* planthoppers: *Echthrodelphax fairchildii* Perkins, *Haplogonatopus apicalis* Perkins and *Haplogonatopus oratorius* (Westwood) (Guglielmino and Olmi 1997, Guglielmino et al. 2013). The Eulophid wasp *Aprostocetus megameli* (Fullaway 1940) is an egg parasite on *Tarophagus* (Fullaway 1940).

Additional natural enemies were reported by Duatin and de Pedro (1986) from the Philippines. These were a predaceous ant that dug into the oviposition sites and ate the eggs, a mite belonging to the family Trombidiidae, and a “minute gastropod,” which, based on their photo, might be a strepsipteran.

DISTRIBUTION: Southeast Asia including the Indonesian archipelago, Pacific islands west to Indonesia and east to Hawaii (Asche and Wilson 1989), Cuba (Cabrera 2015), Jamaica (Anonymous 2013), and Polk County, Florida.

FLORIDA DISTRIBUTION (July 2015):

Polk County

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