

Pest Alert

Florida Department of Agriculture and Consumer Services
Division of Plant Industry

***Fiorinia proboscidaria* Green (Hemiptera: Diaspididae), a new armored scale pest of citrus in Florida**

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INTRODUCTION: On December 17, 2013, Joann Hoffmann of UF-IFAS, Hillsborough County, submitted a residential citrus leaf sample that was covered with the armored scale, *Fiorinia proboscidaria*, a U.S. CONTINENTAL RECORD. A sample from Santa Rosa County was collected in January 2014, and additional samples from several residential locations in Tampa in November 2014. This species is recorded from hosts in several plant families, but citrus is a significant host for this pest, so it should be regarded as a potentially serious introduction. *Fiorinia* is one of the largest genera of armored scales, many species of which now occur worldwide and are or can be major pests.

DESCRIPTION: In the infestations observed, all stages of the scale were commingled on the abaxial (lower) surface of the leaves, suggesting that multiple generations were present (Figs. 1 and 2). Several leaves from the 2014 Tampa sample were co-infested with other common citrus pests, including wooly whitefly (*Aleurothrixus floccosus* Maskell; Fig. 1), fern scale (*Pinnaspis aspidistrae*; Fig. 5a) and glover scale (*Lepidosaphes gloverii*). In the sample from Santa Rosa County, some of the female scales were embedded within a nearly continuous layer of Florida red scale (*Chrysomphalus aonidum*).

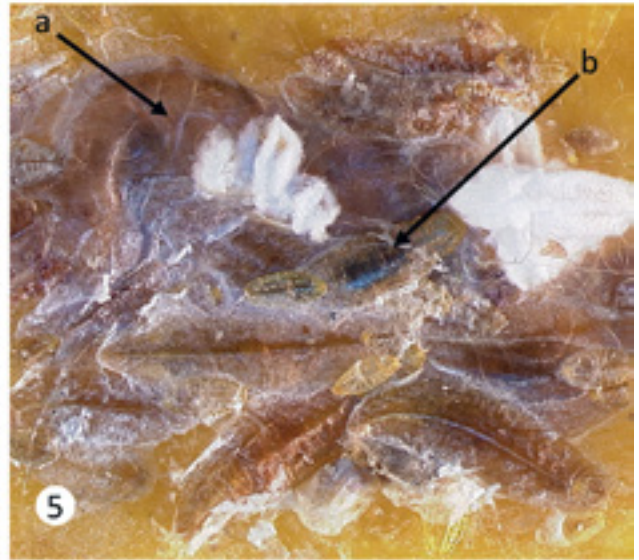
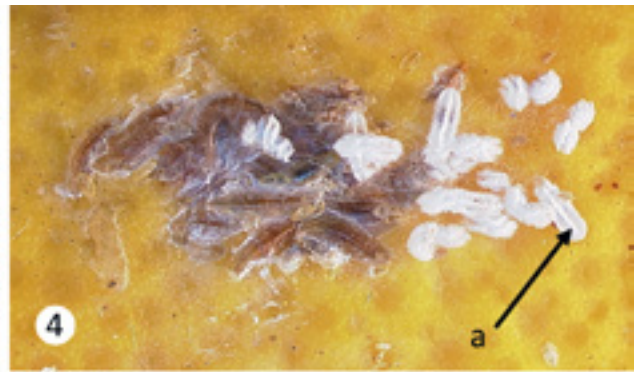
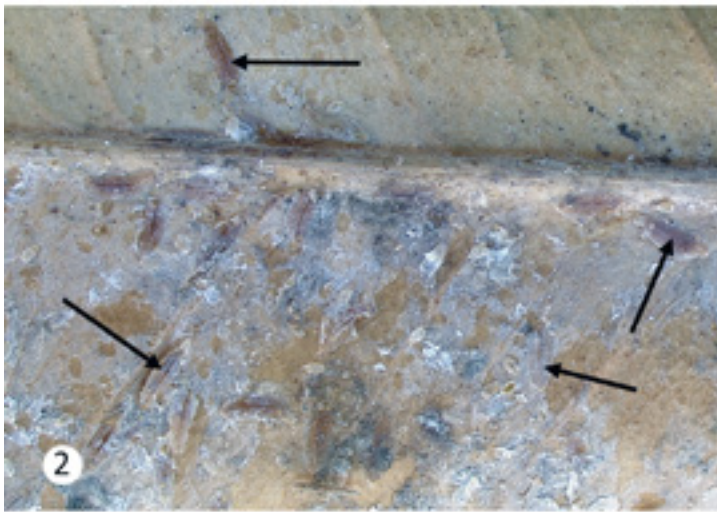
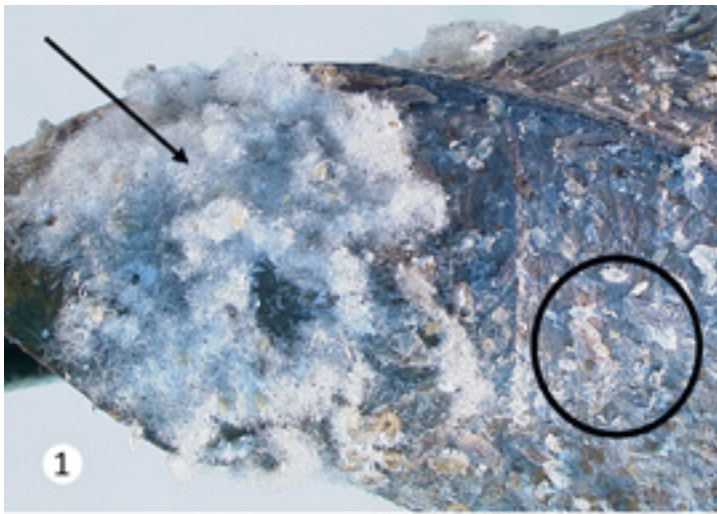
The shape of the scale cover of this species resembles that of tea scale (*Fiorinia theae*, Fig. 6) and camellia scale (*Fiorinia florinae*), both of which are common in Florida on hosts such as camellia and holly. The cover is elongate-oval in shape, and has a noticeable carina (ridge) running longitudinally along the mid-line (Fig. 3). The contour of the scale margin can vary considerably, apparently under the influence of environmental conditions such as crowding by neighbors, and can therefore assume an irregular shape. Attached to the posterior end of the adult scale is the cast skin, or exuvia, of the crawler stage (Fig. 3).

The color of the cover of this and related species of *Fiorinia* is generally a shade of brown, but in this species it is a lighter shade of brown than that of tea or camellia scale, and in the samples observed thus far, has a glossier appearance. Specimens cannot be identified unless slide-mounted, but *F. proboscidaria* should be suspected if citrus leaves or fruit with scales fitting the above description are present.

Immature and pupal males were often in abundance in or near a cluster of developing female scales on both citrus leaves and fruit (Figs. 4 and 5). Males develop a white, parallel-sided cover with a noticeable dorsal longitudinal ridge (Fig. 4a). The general presentation of the infestations are in accord with that documented by Beardsley (2001) on infested citrus in Hawaii.

A slide-mounted specimen from Tampa in 2013 contained a parasitic wasp identified by Dr. G. Evans (USDA-APHIS) as *Encarsia citrina* (Hymenoptera: Aphelinidae), and a single specimen from the 2014 Tampa sample contained an unidentified developing parasitoid (Fig. 5b). Numerous species of parasitoid wasps are recorded from *Fiorinia* species, but none are documented parasitoid associates of *Fiorinia proboscidaria* (Noyes 2014).





1. Woolly whitefly (*Aleurothrixus floccosus*) puparia (arrow); crawler-stage whiteflies and armored scales, adult female armored scales commingled on leaf (circle). Photography credit: Ian Stocks, FDACS-DPI.
2. Adult females of *Fiorinia proboscidea*, several of which are obscured by a white coating of fungal hyphae and/or wax. Photography credit: Ian Stocks, FDACS-DPI.
3. Adult female *Fiorinia proboscidea*, longitudinal carina and attached crawler exuviae. Additional crawlers (a) and an up-turned adult female (b). Photography credit: Ian Stocks, FDACS-DPI.
4. *Fiorinia proboscidea* adult females, crawlers and male pupae (a) on skin of citrus fruit. Photography credit: Ian Stocks, FDACS-DPI.
5. Close-up of *Fiorinia proboscidea* adult females, crawlers and male pupae on skin of citrus fruit, showing an adult female *Pinnaaspis aspidistrae* (a) and parasitized adult female *Fiorinia proboscidea* (b). Photography credit: Ian Stocks, FDACS-DPI.
6. Tea scale, *Fiorinia theae*, adult females and crawler. Photography credit: Ian Stocks, FDACS-DPI.

BIOLOGY: Little is known about the biology of this scale insect, but both tea scale and camellia scale have multiple generations per year, and it is likely that this species will be present year-round in Florida. Scale covers of *Fiorinia* species are durable and can remain on the leaf long after the scale itself has died. Determining whether a scale is alive, or if a population of scales is actively growing and reproducing, is especially difficult for species in this genus because the adult female is protected and hidden by not only the scale cover, but by the cuticle of the previous stage.

HOSTS: Host data are from Takagi (1970), Ben-Dov *et al.* (2014) and Williams and Watson (1988).

Anacardiaceae—mango, *Mangifera indica* L.

Apiaceae—carrot, *Daucus carota* L.

Araceae—centipede tongavine, *Epipremnum pinnatum* (L.) Engl.

Arecaceae—areca nut palm, *Areca catechu* L.

Euphorbiaceae—*Suregada lanceolata* (Willd.) Kuntze

Rutaceae—Citrus spp.; kumquat, *Fortunella* spp.

Myrtaceae—rose-apple, *Syzygium jambos* (L.) Alston

DISTRIBUTION: Distribution data are from Takagi (1970), Williams and Watson (1988), Moghaddam (2013), Ben-Dov *et al.* (2014) and USDA interdiction reports from Dr. G. Evans (USDA-APHIS).

Australasian: Fiji, Hawaii, French Polynesia, Tonga.

Oriental: Ryukyu Island, Sri Lanka, Taiwan, Japan, India.

Paleartic: Iran.

USDA Interception Records: Bangladesh, China, France, Indonesia, Vietnam.

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