

Florida Department of Agriculture and Consumer Services Division of Plant Industry

First continental record of *Melanaspis leivasi* Costa Lima, (Hemiptera: Diaspididae), a *Leivasi* armored scale (Suggested Common Name)

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INTRODUCTION: *Melanaspis leivasi* Costa Lima (Hemiptera: Diaspididae) is known from Brazil, Colombia, Guatemala, Mexico and Panama (Lepage and Giannotti 1943; Deitz and Davidson 1986), and is not known to occur in the United States. There are two species of *Melanaspis*, obscure scale, *M. obscura* (Comstock), and gloomy scale, *M. tenebricosa* (Comstock), which are considered to be serious pests of landscape trees in Florida. We therefore consider *M. leivasi* to have the potential to be a pest of concern in Florida.

The first sample was received on August 2, 2017, collected by Mark Aubry (USDA) from *Ficus aurea* Nutt., commonly known as the Florida strangler fig (or simply strangler fig), from Palm Beach, Florida and it was initially identified as *Melanaspis* sp. pending examination of additional material. Aubry sent more samples from the same host on September 27, 2017, and they were all confirmed as *M. leivasi*. The samples were also sent for further confirmation to Dr. Greg Evans (USDA-APHIS), Dr. Scott Schneider (USDA-SEL), and Dr. Ian Stocks (USDA-APHIS).

There are eight species of *Melanaspis* identified from Florida in the FDACS-DPI database (*M. bromiliae* (Leonardi), *M. coccolobae* Ferris, *M. deklei* Deitz and Davidson, *M. mimosa* (Comstock), *M. obscura* (Comstock), *M. odontoglossi* (Cockerell), *M. smilacis* (Comstock), and *M. tenebricosa* (Comstock)). In addition, there are several historic slides identified as *Melanaspis* species but none of those upon further review are a match for *M. leivasi*.

Overall, armored scales are the most diverse group of scale insects in Florida, with over 130 species (FDACS-DPI Database). They feed on the contents of cells beneath the surfaces of leaves and bark, and use wax and their waste to form protective covers (Rosen 1990). This cover can be removed to reveal the soft-bodied insect feeding beneath it (Fig. 1–2). Once female armored scales begin to feed on a host plant, they remain immobile for the rest of their lives. Even after death, the armored scale cover may remain on the plant for several years.

DESCRIPTION: The adult female is large (up to 2.5 mm) (Figs. 1–2). The dorsal scale cover is strongly convex, brown externally, black internally; the ventral cover has a white layer on top of a black layer that is directly attached to the host (Fig. 2). The shed skins near the anterior end of the scale, are brown, and black when rubbed (Fig. 2). The body of the adult female is cream yellow when newly matured, but in older females, the thorax and head are light purple (Fig. 2). The females do not lay eggs, but are ovoviviparous (Fig. 1–2). The crawlers are round to oval, cream yellow with large light purple or pink areas (Fig. 2). After oviposition, the females turn brown. The body shape of the female is not totally round, but is constricted anterior to abdominal segment three (Fig. 2).

Melanaspis leivasi is the only species in the genus that has the combination of several large projections anterior to lobe four and a basal sclerosis attached to the median lobes. It is similar to *M. tenebricosa*, but differs by having (characters of *M. tenebricosa* are given in parentheses): four or five paraphyses in the third space (two or three paraphyses); constriction in body margin anterior to abdominal segment three (without a constriction); body of adult female 1.6 to 2.5 mm long (Fig. 2) (0.5 to 1.5 mm long); and, anal opening in posterior third of pygidium (posterior fifth of pygidium).



HOST PLANTS: *Melanaspis leivasi* has previously been found on host plants from four genera in four families: *Anacardium excelsum*, wild cashew (Anacardiaceae); *Bursera* sp. (Burseraceae); *Ficus* (Moraceae); and, *Vitis* sp. (Vitaceae) (Lepage and Giannotti 1943; Deitz and Davidson 1986).

It was found in Florida on strangler fig, *Ficus aurea*. Although *F. aurea* is not common in Florida landscapes, it provides significant food, dense shade, and shelter for Florida wildlife (Gilman and Watson 2014). There are several economically important plant species in the plant families that are hosts of *M. leivasi* such as cashews, figs, grapes and gumbo limbo. Therefore, this scale insect has the potential for being a pest in Florida.

DAMAGE: At low levels of infestation, armored scales rarely damage their host plants. Armored scale feeding can reduce plant photosynthesis and growth, and often leads to yellowing of leaves, premature leaf drop, branch dieback and gradual plant death.

Female armored scales are only mobile as crawlers (Figs. 1–2). After selecting a feeding site and beginning to feed, they molt to the second and third instars which lack legs and are immobile. The adult female produces offspring either internally or by depositing eggs under the scale cover, typically in the tens to hundreds (Beardsley and Gonzalez 1975). Eggs hatch, emerge from the cover, find a suitable feeding site, and begin the cycle again.

PEST SCOUTING: Most armored scales have multiple generations per year that can vary due to climate and region. Two common species of *Melanaspis*; obscure scale and gloomy scale are known to have only one generation per year in the North (Hoover 2003; Frank and Dale 2015). Monitoring for *Melanaspis* scale insects should begin as early as February and continue until late September. However, they can have overlapping generations in the tropical climate and crawlers can be found all year (Buss and Dale 2016). A 5–30 X hand lens or a dissecting microscope are very helpful for spotting and identifying armored scales on plant material. When scale insects have been located, look closely for evidence of predation (large openings in scale covers) or parasitism (small circular holes in scale covers). Also check to see if scales are alive by mashing them with your finger nail or pocket knife. If scales are alive, a liquid will be produced; if they are dead, there will be no liquid.

MANAGEMENT: Control of armored scales is difficult. One of the best approaches for managing armored scales is the inspection of incoming and already existing plants in the landscape on a regular basis. High pressure water sprays help remove armored scales from bark and reduce populations without the need for chemical control (Bedford 1990).

There are numerous hymenopteran parasitoids that attack armored scale pests and often keep them below economic damage levels (Ehler 1995). Other natural enemies include lady beetles, lacewings, and predacious midges, many of which are useful in the control of armored scales (Rosen 1990).

Foliar insecticide applications can help if applied at the stage of crawler emergence. This can be very challenging for many armored scale species, because crawlers gradually emerge over several weeks to a few months, or have overlapping generations. Natural products such as horticultural oils and dormant oils can kill crawlers by smothering them and breaking down cell membranes (Riehl 1990). Horticultural oils can be effective because they penetrate adult scale covers (Riehl 1990). Additional information on scale insect management can be found in Buss and Dale (2016), and Buss and Brown (2014). Trunk sprays or soil drenches of systemic insecticides may provide effective, season-long control of many scale insects. These systematic products reduce non-target risks and concern over plant coverage. The list of currently labeled insecticides for scale insect control on landscape plants is available in Buss and Dale (2016).

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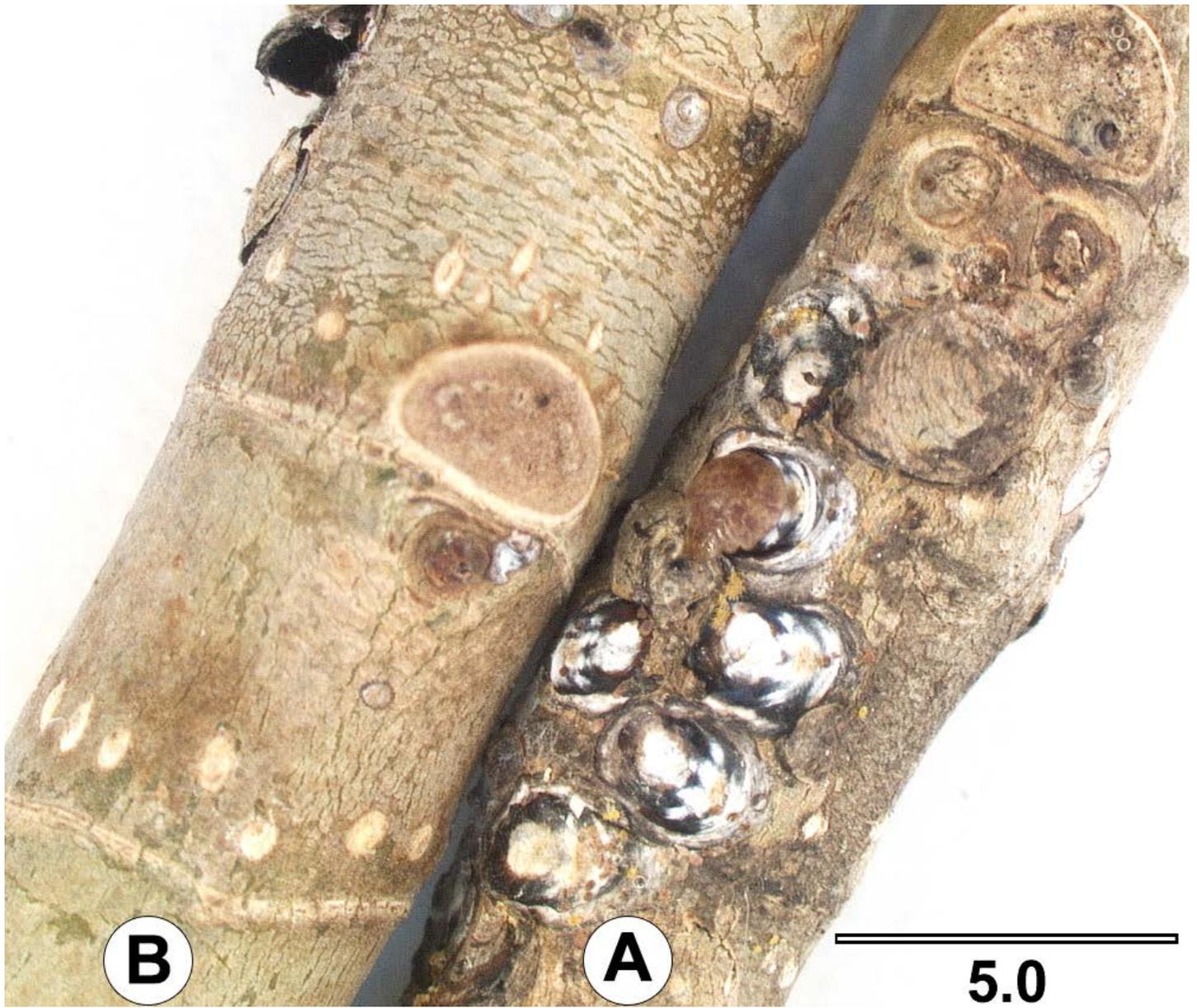


Fig. 1. *Melanaspis leivasi* infested (a), and uninfested branches of *Ficus aurea* (b). Photography credit: M.Z. Ahmed, FDACS-DPI.

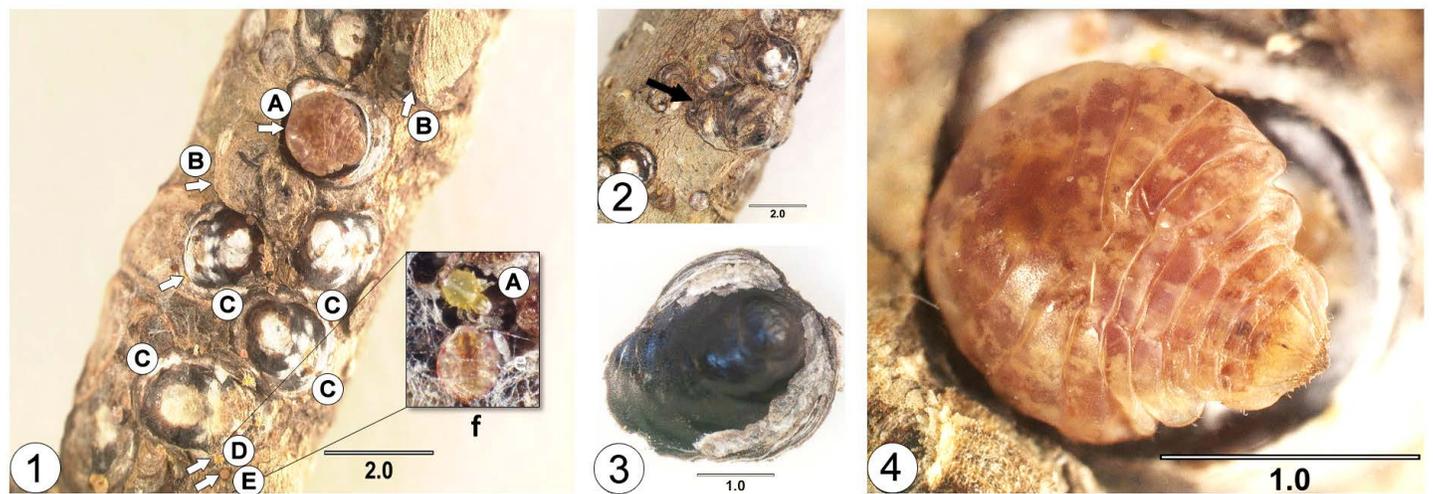


Fig. 2. Infestation of *Melanaspis leivasi* on *Ficus aurea*. 1) Infested branch of *F. aurea* with an adult female of *M. leivasi*: several adults under the host epidermis; several ventral covers without dorsal covers and adult females, (a) adult female with dorsal cover removed, (b) adult female cover under epidermis of host, (c) black and white ventral cover, (d) predatory mite *Cheletogenes* cf. *scaber* Qayyum & Chaudhri, (e) first instar of *M. leivasi*, and (f) close-up of predatory mite and first instar. 2) Dorsal view of cover under host epidermis. 3) Underside of dorsal cover. 4) Body of adult female scale without dorsal cover. Photography credit: M.Z. Ahmed, FDACS-DPI.

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