

PEST ALERT

FDACS-P-01929

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Florida Department of Agriculture and Consumer Services Division of Plant Industry

Fiorinia proboscitaria Green (Hemiptera: Diaspididae), snout scale, a potential pest of *Citrus* in Florida

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INTRODUCTION

The first continental record of *Fiorinia proboscitaria* Green, snout scale, was collected on December 17, 2013, by JoAnn Hoffman (UF) from Hillsborough County and identified by Dr. Ian Stocks (Stocks 2015). There are at least 24 records after its first detection in Florida from five counties including Hillsborough, Flagler, Pinellas, Putnam and Santa Rosa. The most recent record was from Flagler County (E2020-2353), identified by Dr. Zee Ahmed as a new county record. The genus *Fiorinia* contains several major pest species. Snout scale is considered to be an important pest of *Citrus* (Stocks 2015). A recent sample and three follow-up samples from the last year on *Citrus* were heavily infested. All snout scale samples were collected from residential areas. This updated Pest Alert is aimed at preventing its introduction to and establishment in commercial *Citrus* growing areas in Florida.

DIAGNOSTICS

In old infestations, multiple stages of snout scale were found commingled on the lower surface of the leaves (Fig. 1a), causing chlorotic yellow patches (Fig. 1d). The presence of multiple stages suggests multiple generations each year. In early infestations, yellow-colored first instars (crawlers) (Fig. 1b, c) and second-instar males with white wax (Fig. 1b, e, f) were commonly observed on the lower surface of leaves. Second-instar male covers are white with three slightly elevated longitudinal ridges (Fig. 1b, e, f).

The shape of the snout scale cover resembles other *Fiorinia* species in Florida. Only one of them, tea scale, *Fiorinia theae* Green, has been found on *Citrus* (Fig 2i). The cover of *Fiorinia* species is elongate-oval and has a longitudinal ridge along the midline (Fig. 1g, h) with the pale yellow exuviae of the first instar attached to the anterior end. The adult female molts inside the enlarged exuviae of the second-instar female (Fig. 1g, h). The color of the cover of snout scale and related species of *Fiorinia* is generally a shade of brown, but in snout scale it is a lighter shade of brown compared to *F. theae* (Stocks 2015) (Fig. 1h, 2i). Field specimens of *Fiorinia* species look very similar to one another, and to ensure correct species identification, specimens must be slide mounted to view the diagnostic characters used to distinguish the species (Ahmed 2018).

BIOLOGY

There is no information about the biology of snout scale. Other *Fiorinia* species have multiple generations per year, and it is likely snout scale will be present year-round in Florida. Scale covers of *Fiorinia* species can remain on the leaf long after the scale itself has died. It is essential to determine if the scale is alive or dead since the adult female of *Fiorinia* species is protected and hidden by the cuticle of the second instar.

HOST PLANTS

Snout scale has been reported from 11 host plant families (Anacardiaceae, Apiaceae, Araceae, Arecaceae, Euphorbiaceae, Myrtaceae, Piperaceae, Podocarpaceae, Rosaceae, Rutaceae, and Taxaceae) including 11 host genera and 18 species (García Morales et al. 2016). *Citrus* is one of the most common hosts. It has been reported from several *Citrus* species including *Citrus aurantium* L., *Citrus japonica* Thunb., *Citrus limon* (L.) Osbeck, *Citrus maxima* Merr., *Citrus reticulata* Blanco, *Citrus sinensis* (L.) Osbeck and *Citrus x paradise* Macfad.

Almost all Florida records of snout scale are on *Citrus* species except three. Those were on *Cinnamomum camphora* (L.) J.Presl., *X Citrofortunella microcarpa* (Bunge) Wijnands and *Ilex cornuta* Lindl.



GEOGRAPHICAL DISTRIBUTION

Snout scale has been reported from 20 countries in Africa (Kenya), Asia (Bangladesh, China, Christmas Island, India, Indonesia, Iran, Japan, Sri Lanka, Taiwan), Europe (France), North America (Guadeloupe, Hawaiian Islands, Jamaica, Saint Lucia, US), Oceania (Fiji, French Polynesia, Tonga) and South America (French Guiana) (García Morale et al. 2016). It is only reported in Florida in the continental US.

ECONOMIC IMPORTANCE

Snout scale is an invasive species and has the potential to cause damage to *Citrus* in Florida. It could develop high populations causing economic damage without natural enemies present in the environment.

OTHER SCALE INSECT PESTS OF CITRUS

There are 32 more scale insect species (including 15 armored scales, 10 soft scales, six mealybugs and one other scale) reported on *Citrus* in Florida. Figures 2-5 provide naked eye and 30x views of some of these species.

Armored scales

California red scale, *Aonidiella aurantii* (Maskell); yellow scale, *Aonidiella citrina* (Coquillett); Oriental yellow scale, *Aonidiella orientalis* (Newstead); Florida red scale, *Chrysomphalus aonidum* (Linnaeus); tea scale, *Fiorinia theae* Green; Glover scale, *Lepidosaphes gloverii* (Packard); purple scale, *Lepidosaphes beckii* (Newman); Pergande scale, *Parlatoria pergandii* Comstock; proteus scale, *Parlatoria proteus* (Curtis); black parlatoria scale, *Parlatoria ziziphi* (Lucas); fern scale, *Pinnaspis aspidistrae* (Signoret); lesser snow scale, *Pinnaspis strachani* (Cooley); false oleander scale, *Pseudaulacaspis cockerelli* (Cooley); trilobe scale, *Pseudaonidia trilobitiformis* (Green); citrus snow scale, *Unaspis citri* (Comstock).

Soft scales

Florida wax scale, *Ceroplastes floridensis* Comstock; red wax scale, *Ceroplastes rubens* Maskell; brown soft scale, *Coccus hesperidum* Linnaeus; long brown scale, *Coccus longulus* (Douglas); green scale, *Coccus viridis* (Green); green shield scale, *Pulvinaria psidii* Maskell; urbicola soft scale, *Pulvinaria urbicola* Cockerell; hemispherical scale, *Saissetia coffeae* (Walker); Caribbean black scale, *Saissetia neglecta* De Lotto; black scale, *Saissetia oleae* (Olivier).

Mealybugs

Striped mealybug, *Ferrisia virgata* (Cockerell), pink hibiscus mealybug, *Maconellicoccus hirsutus* (Green); Lebbeck mealybug, *Nipaecoccus viridis* (Newstead); citrus mealybug, *Planococcus citri* (Risso); Jack Beardsley mealybug, *Pseudococcus jackbeardsleyi* Gimpel & Miller; longtailed mealybug, *Pseudococcus longispinus* (Targioni Tozzetti); Odermatt mealybug, *Pseudococcus odermatti* Miller & Williams.

Giant scales

Cottony cushion scale, *Icerya purchasi* Maskell.

ACKNOWLEDGMENTS

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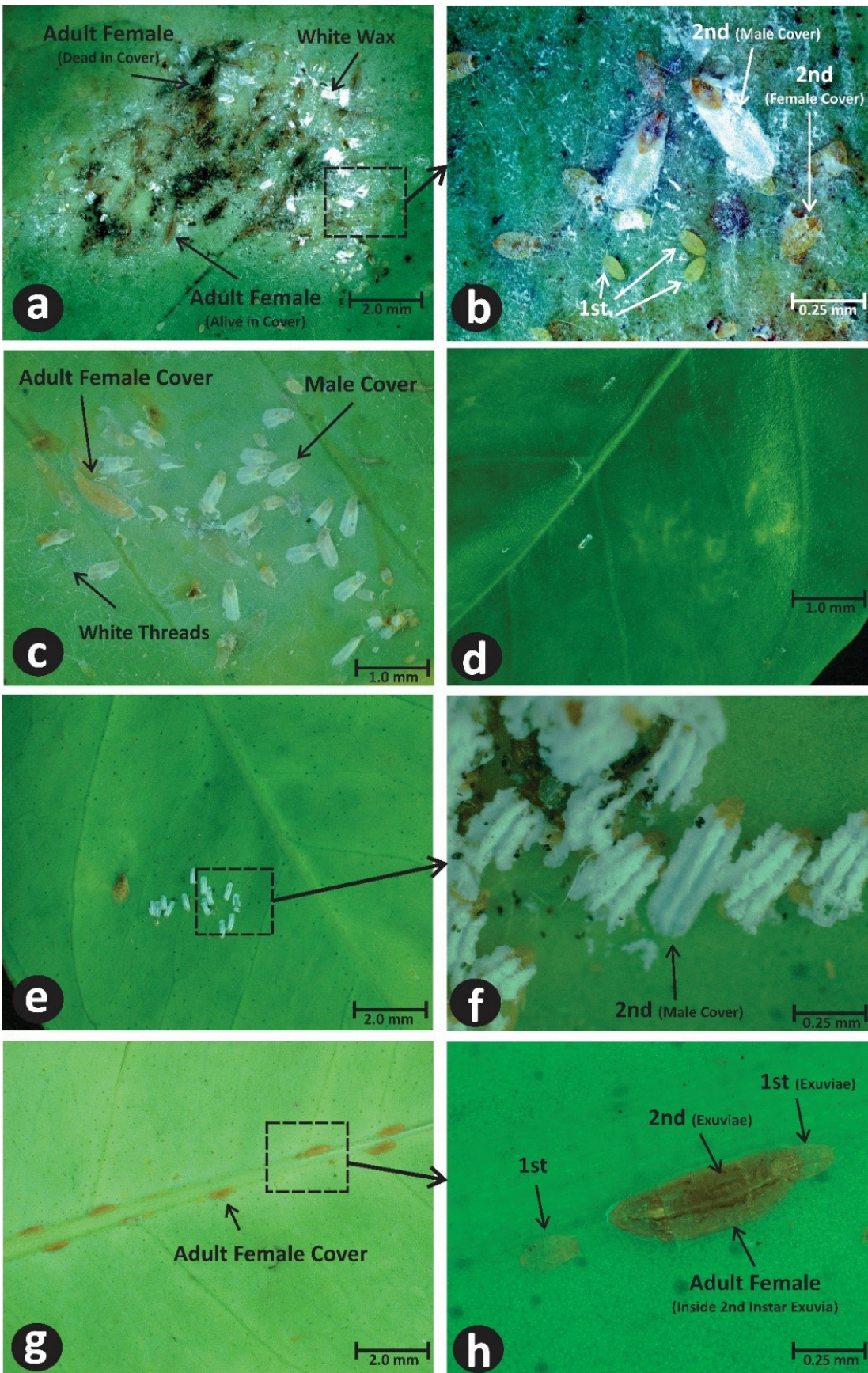


Figure 1. Infestation of *Fiorinia proboscidea* Green on Citrus. (a) naked eye view of old infestation containing multiple generations on lower surface of leaf; (b) 30× view of immature (first-instar and second-instar male and female); (c) naked eye view of initial infestation on lower surface of leaf; (d) naked eye view of yellow patches on upper surface in same position; (e) naked eye view of male cover; (f) 30× view of male cover; (g) naked eye view of adult female (inside cover); (h) 30× view of elongate, brown, adult female body (inside cover). Photos by Lily Deeter and Muhammad Z. 'Zee' Ahmed, FDACS-DPI.

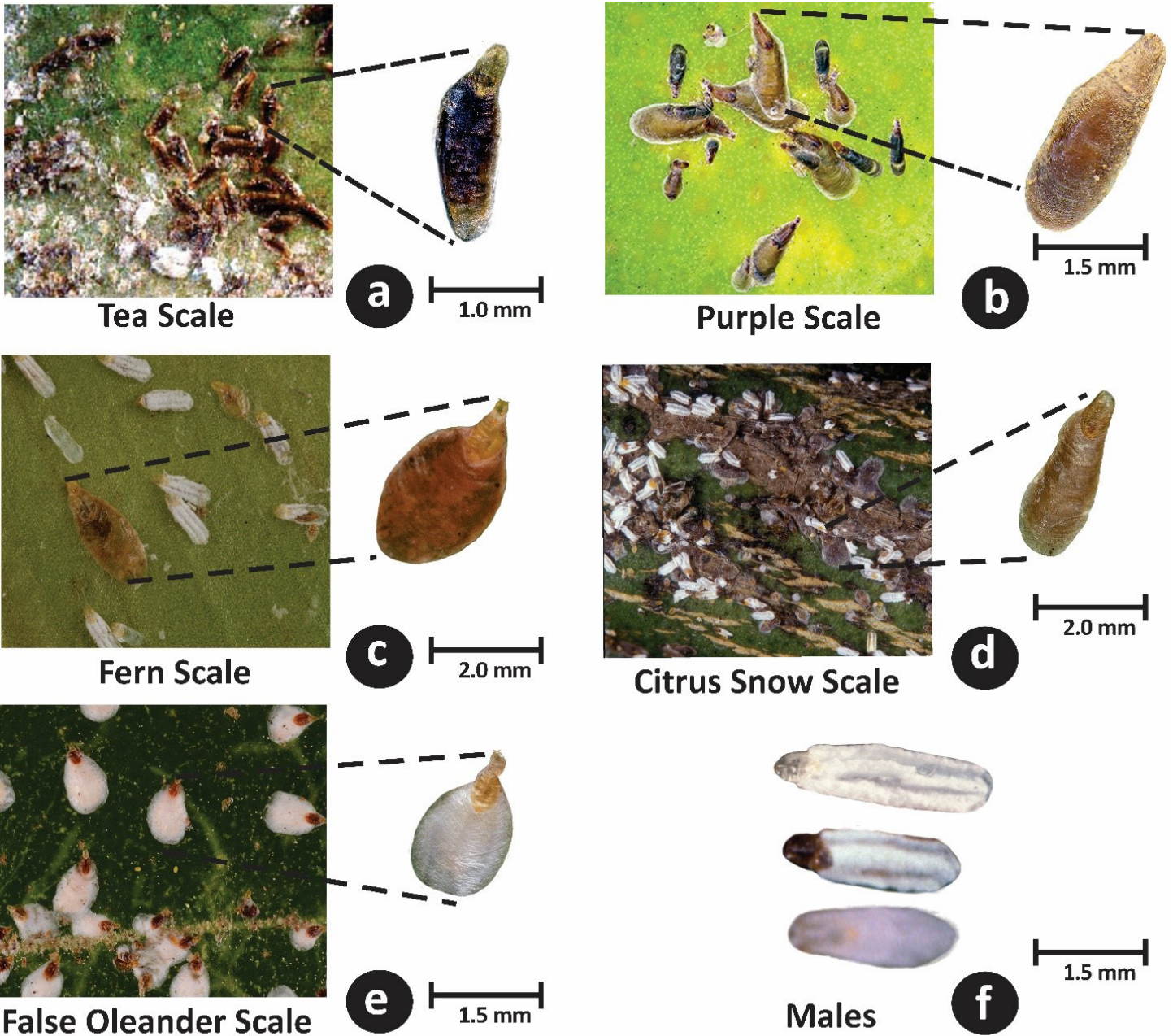


Figure 2. Naked eye and 30× views of armored scale species. (a) The shape of tea scale is elongate like snout scale, *Fiorinia proboscidea*, but it is usually darker in color. (b) Purple scale, *Lepidosaphes beckii* is long and looks like a mussel with purple appearance; (c) fern scale, *Pinnaspis aspidistrae* and (e) false oleander scale, *Pseudaulacaspis cockerelli* are broadly oyster-shell shaped, but fern scale is brown and false oleander scale is white; (d) citrus snow scale, *Unaspis citri* is elongate oyster-shell shaped. (f) Males of tea scale, purple scale, fern scale, citrus snow scale and false oleander scale look identical to males of snout scale in Fig. 1f, narrow and long with white wax often forming either 1 or 3 ridges that run the length of cover, but in some cases, no ridge is clearly visible. Photos by Lyle Buss, University of Florida and Muhammad Z. 'Zee' Ahmed, FDACS-DPI.

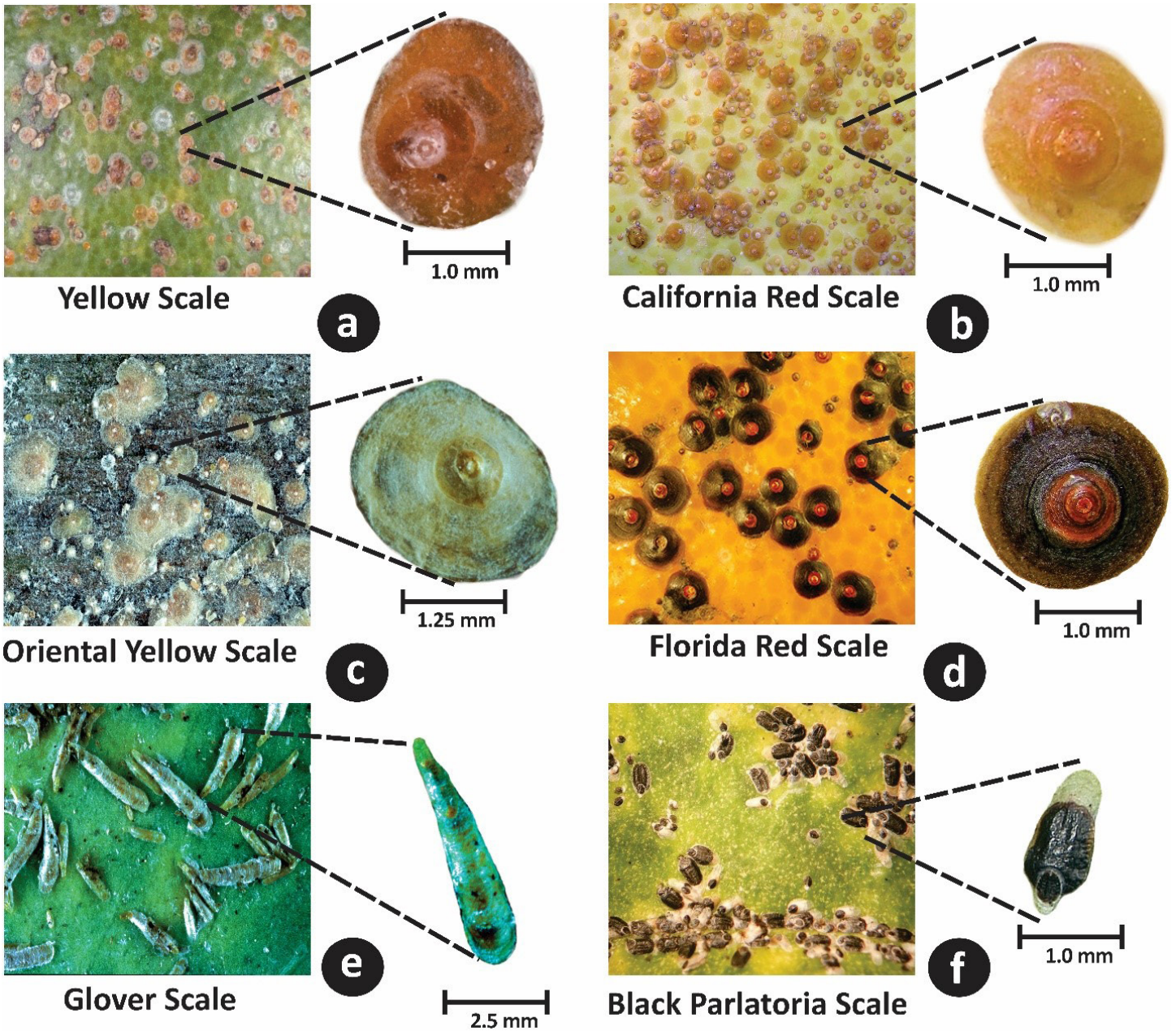


Figure 3. Naked eye and 30× views of armored scale species. (a) Yellow scale, *Aonidiella citrina*; (b) California red scale, *Aonidiella aurantii*; (c) Oriental yellow scale, *Aonidiella orientalis*; (d) Florida red scale, *Chrysomphalus aonidum* are round in shape; (e) Glover scale, *Lepidosaphes gloverii* is long and looks like a mussel, (f) black parlatoria scale, *Parlatoria ziziphi* is broadly elongate oval and black in color. Photos by Lyle Buss, University of Florida and Muhammad Z. 'Zee' Ahmed, FDACS-DPI.

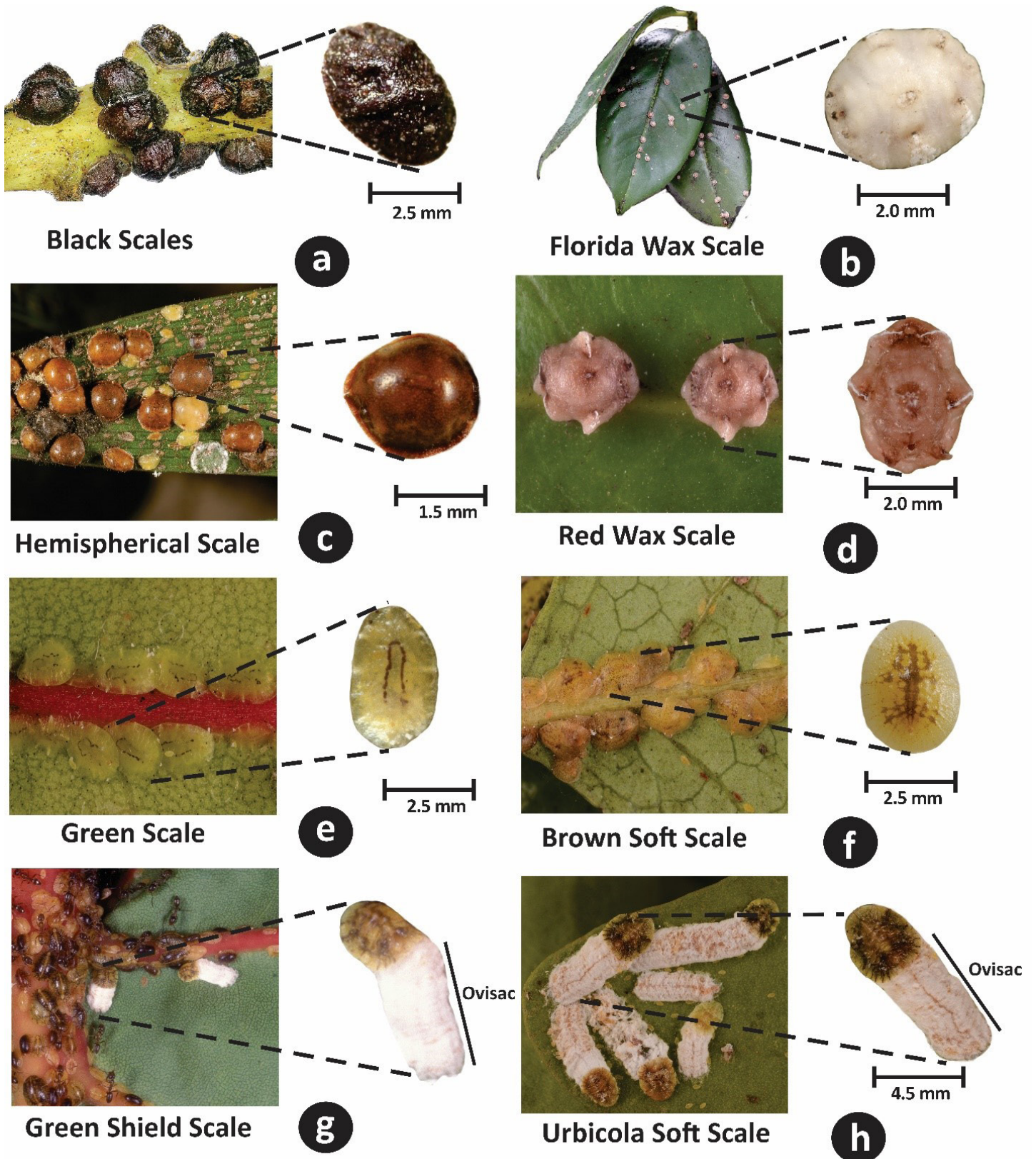


Figure 4. Naked eye and 30× views of soft scale species (a-h). Long, white ovisac behind bodies in g and h. Photos by Lyle Buss, University of Florida and Muhammad Z. 'Zee' Ahmed, FDACS-DPI.

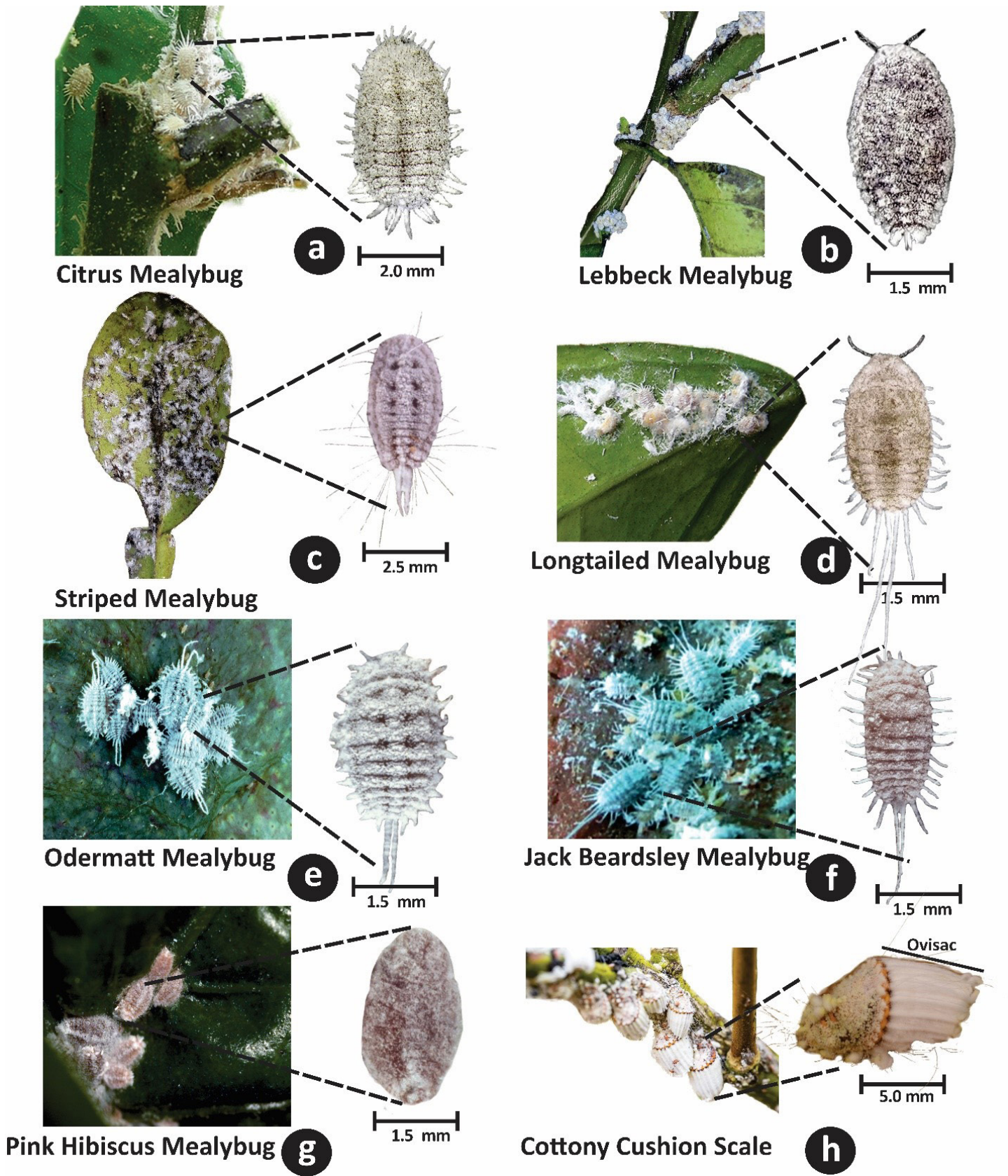


Figure 5. Naked eye view and 30x views of mealybug species (a-g) and giant scales species, cottony cushion scale (h). Photos by Lance Osborne and Lyle Buss, University of Florida; Muhammad Z. ‘Zee’ Ahmed, FDACS-DPI and Protasov AN, Shutterstock.