

## *Philephedra tuberculosa* a soft scale

### **BACKGROUND**

A new soft scale pest was identified from papaya on Oahu. An infestation of *Philephedra tuberculosa* Nakahara & Gill was discovered on two papaya trees at the University of Hawaii, College of Tropical Agriculture and Human Resources (UH-CTAHR) Poamoho Experiment Station in Waialua, Oahu. Specimens were first submitted to UH-CTAHR in January 2018 and subsequently forwarded to Hawaii Department of Agriculture (HDOA), where a final identification was provided by the United States Department of Agriculture, Agricultural Research Service, Systematic Entomology Laboratory (USDA-SEL) in February 2018. This is a new state record for Hawaii. According to Poamoho farm staff, a similar scale infestation was detected on the papaya around June 2017, but appeared under control with chemical application.

### **DESCRIPTION**

*P. tuberculosa* is an oval-shaped soft scale insect which ranges in color from yellow to bright green (Fig. 3) when alive and turns dark brown when dead. Females can be found associated with long, white egg sacs (Fig. 2a), where they will be covered by thick cottony wax (Fig. 4). Immature males are yellowish brown and can be found surrounded by wax filaments resembling white fungus (Figs. 6b, 7).

### **DAMAGE**

These scales can cover fruit, petioles, leaves, trunk, and stems of hosts. Soft scale insects produce honeydew, promoting the growth of sooty mold. In high infestations, feeding along with thick sooty mold, can lead to the weakening of the plant, apical point distortion (seedling stage), flower and leaf drop, and possibly dieback.

### **HOSTS**

*P. tuberculosa* has a wide host range of neotropical fruit crops and ornamental plants. Some recorded hosts which are common in Hawaii include *Annona*, avocado, *Citrus*, croton (*Codiaeum variegatum*), *Ficus*, guava, hibiscus, *Ipomoea*, mango, papaya, and red ginger.

### **DISTRIBUTION**

*P. tuberculosa* has only been detected on Oahu at the Poamoho Experiment Station, where the two infested plants have been placed under control by HDOA. It is recorded from Florida, Texas, several Caribbean Islands, Central and South America.



Figure 1. Papaya fruits covered with *Philephedra tuberculosa*.

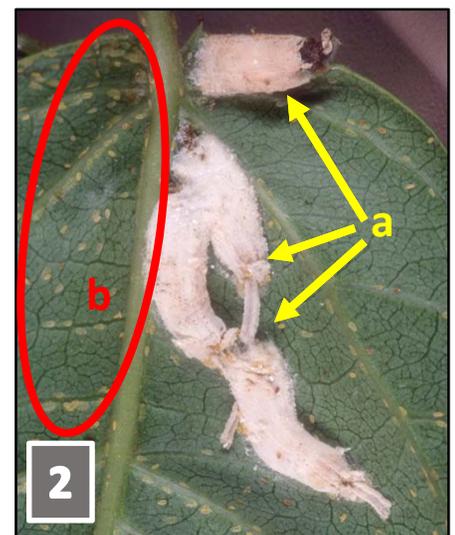


Figure 2. *P. tuberculosa* females with finished egg sacs (a) & crawlers (b).  
Photo: Lyle Buss, University of Florida.

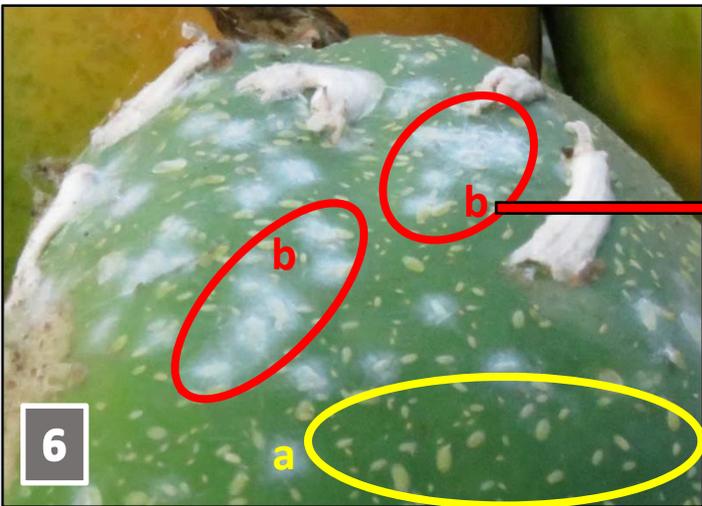


Figure 3. *P. tuberculosa* female before producing an egg sac. Photo: Lyle Buss, University of Florida.

Figure 4. Egg sac opened to show *P. tuberculosa* female with eggs. Photo: Lyle Buss, University of Florida.

Figure 5. Infested papaya fruit with all life stages of scales.

Figure 6. Immature green *P. tuberculosa* female scales covering papaya fruit (a) & immature males surrounded by white wax filaments resembling fungus growth (b).

Figure 7. Immature *P. tuberculosa* male surrounded by white wax filaments. Photo: Lyle Buss, University of Florida.

# *Pseudoparlatoria ostreata*

## grey scale

### **BACKGROUND**

In July 2014 a resident in Nuuanu, Oahu reported to UH-CTAHR that their papaya fruit and tree was covered by armored scale insects (Fig. 9). UH-CTAHR did a preliminary identification, however, insufficient information was relayed to HDOA to conduct follow up investigations or obtain an official species confirmation. In addition, HDOA was informed that the reporter took down and destroyed the infested tree. Surveys conducted by HDOA did not result in positive detections until December 2017 when collections were made at a different Nuuanu residence. HDOA was able to secure a final species confirmation of *Pseudoparlatoria ostreata* (Cockerell) from USDA-SEL in February 2018. This is a new state record for Hawaii.

### **DESCRIPTION**

The grey scale is an armored scale insect with female covers which are widely round, flat, thin, and tan to greyish-brownish in color (Fig. 11a). Male covers are similar, but smaller and more elongate-oval (Fig. 11b). The severe grey scale infestations witnessed on papaya plants resemble those of white peach scale (WPS), which will also cover papaya trunks and fruit (Fig. 12). While female WPS are have smaller, rounder, whiter, and more convex coverings (Fig. 13b) than grey scales, the easiest way to distinguish between infestations of grey scales and WPS on papaya plants is by high numbers of WPS males present. Male WPS coverings are small, white, narrow and elongate with parallel sides (Fig. 13a). When densities are high, thick layers of male WPS resemble white fluffy “snow” (Figs. 12, 13).

### **DAMAGE**

Grey scales can infest the trunk, leaves, and fruit of host plants (Fig. 9). In high infestations, scales can form dense layers which appear like a crust (Figs. 8, 9). Direct feeding damage can lead to chlorosis and weakening of plants while dense scale populations can possibly prevent fruit from normal maturation or render fruit unmarketable.

### **HOSTS**

The grey scale has a diverse host range of plants. Collections on Oahu have been made on papaya and cat’s claw vine (*Macfadyena unguis-cati*). Some other hosts the grey scale has been recorded from in literature include avocado, *Bauhinia*, coconut palm, copper leaf (*Acalypha* spp.), jasmine, kalanchoe, pigeon pea, pine, *Piper* spp., and *Tillandsia*.

### **DISTRIBUTION**

In Hawaii, the grey scale has only been detected in areas of Nuuanu, Oahu. The grey scale has also been recorded from Florida, Texas, several Caribbean Islands, South America, Europe, and Africa.

### **IF YOU SUSPECT INFESTATIONS**

Hawaii Island: 974-4146; Kauai: 241-7132; Oahu: 973-9525; Email: [HDOA.PPC@Hawaii.gov](mailto:HDOA.PPC@Hawaii.gov).

### **ACKNOWLEDGMENTS**

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Figure 8. Papaya fruit covered with grey scales. Photo: Scot Nelson, UH-CTAHR.

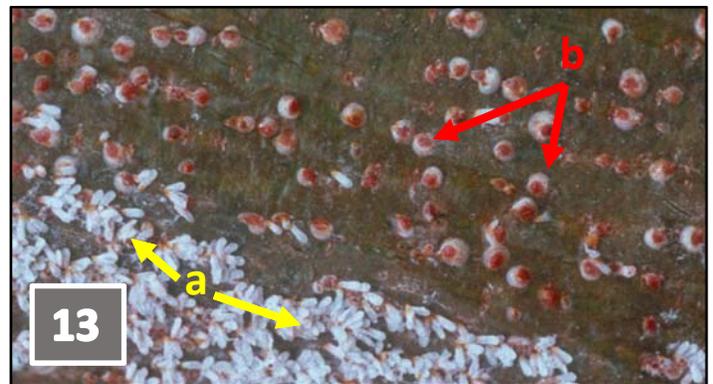
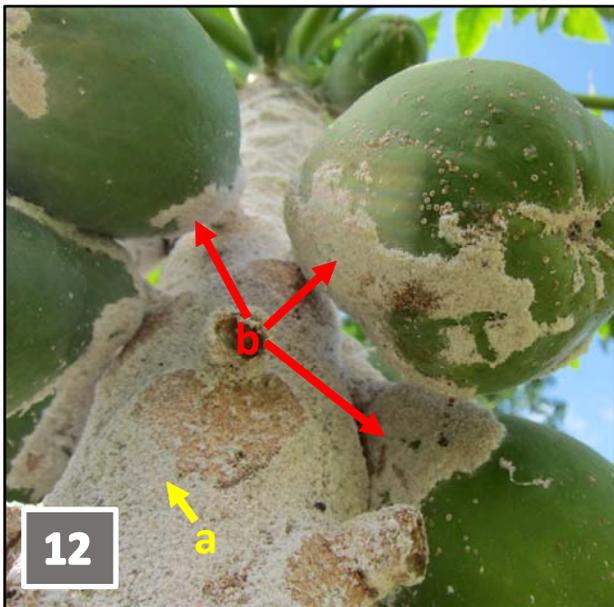
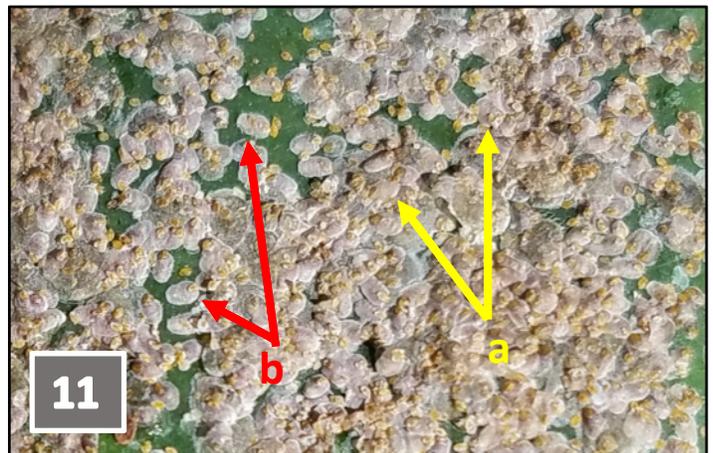
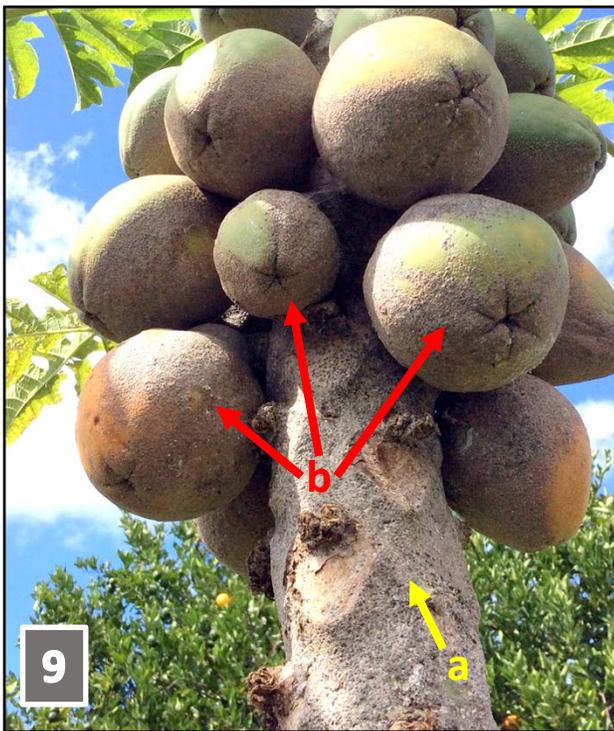


Figure 9. Grey scales covering papaya tree trunk (a) and fruit (b). Photo: Scot Nelson, UH-CTAHR

Figure 10. Young papaya fruit covered in grey scales.

Figure 11. Magnified grey scales.

Figure 12. WPS peach scale infestation (a) and fruit (b).

Figure 13. WPS males (a) and females (b).

## REFERENCES

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