

# Oriental Scale, *Aonidiella orientalis* (Newstead, 1894) (Insecta: Hemiptera: Diaspididae)<sup>1</sup>

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*The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids, and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences. This publication profiles the destructive pest insect, *Aonidiella orientalis*, commonly called the “Oriental scale.” It includes the insect’s physical description, information about its range, its host plants, the damage it causes, and its economic importance. Integrated pest management strategies for control of this pest insect are included as well.*

## Introduction

The Oriental scale, *Aonidiella orientalis* (Newstead, 1894), belongs to the order Hemiptera, infraorder Coccoomorpha and family Diaspididae (Miller and Davidson 2005). It is a highly polyphagous insect with a broad range of host plants and is widely distributed across 72 countries (García Morales et al. 2016). This insect may be found on the leaves, branches, trunks, shoots, and fruits of its hosts. *Aonidiella orientalis* is regarded as a serious pest in various regions of the world, causing significant economic losses to numerous important crops, including citrus, figs, mangoes, papayas, bananas, palms, tea, and some key ornamental plants, including *Roystonea regia* (royal palm), *Dyopsis* spp. (e.g., areca palm, triangle palm), *Phoenix* spp. (date palms), *Sabal* spp. (e.g., cabbage palm), *Hibiscus* spp., *Plumeria* spp. (frangipani), and *Ficus* spp. (fig trees), among others, which are widely used in tropical and subtropical landscaping, including Florida (Dekle 1976; García Morales et al. 2016; European Food Safety Authority Panel on Plant Health 2022).

## Description

*Aonidiella orientalis* is commonly found on leaves, fruits, stems, and the bases of palm fronds. This is a small insect, with females approximately 1.5–2.0 mm (~1/16 in) in diameter and males 1.0–1.3 mm (~1/32 in) long. The scale cover of the adult female is flat, circular to oval,

and ranges in color from yellow to yellowish-brown. It often features a small, transparent or brown spot near the center called a subcentral exuvia (Figure 1).

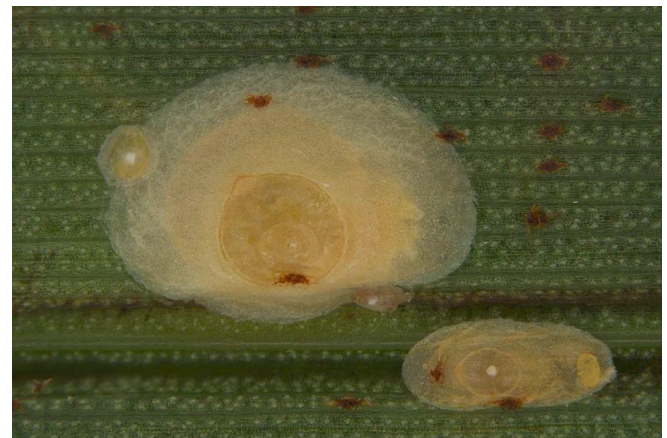


Figure 1. Settled first instar (far top left), adult female (top left), and second-instar male (bottom right) cover of the Oriental scale (*Aonidiella orientalis*).

Credit: Lyle Buss, UF/IFAS.

The cover of the second-instar female has the same texture and color as the adult female but is smaller with only one exuvia incorporated into the cover. Similarly, the cover of the immature male has the same color and texture but is smaller, with the first-instar exuvia located submarginally. The body of the adult female, as well as the eggs and first-instar nymphs (immatures called crawlers), are yellow (Miller and Davidson 2005; Watson and Kondo 2022). The body shape of the adult female (Figures 2 and 3) is somewhat inflated and marginally sclerotized with maturity but never reniform (kidney-shaped) (Watson 2002; Miller and Davidson 2005). This is a primary field diagnostic character differentiating *A. orientalis* from mature adult females of the other three species of the same genus known to occur in Florida: *Aonidiella aurantii* (Maskell, 1879), *Aonidiella citrina* (Coquillett, 1891), and *Aonidiella taxus* Leonardi, 1906.

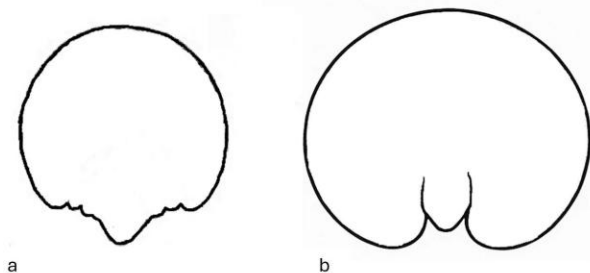


Figure 2. General body shape of adult females of four *Aonidiella* species: a) *A. orientalis* (somewhat inflated, not kidney-shaped); b) *A. aurantii*, *A. citrina*, and *A. taxus* (kidney-shaped).  
Credit: Minor V. Solano Gutiérrez, UF/IFAS.

In slide-mounted specimens, the adult female can be distinguished from the other three species by her clusters of large ducts (macroducts) located near the sides of the back (dorsal submarginal area) on the first three abdominal segments before the pygidium (prepygidial abdominal segments I–III), and by the presence of small pores around the genital opening (perivulvar pores) (Miller and Davidson 2005; Watson and Kondo 2022).



Figure 3. a) Body of adult female with cover removed and b) Slide-mounted adult female of the Oriental scale (*Aonidiella orientalis*).  
Credit: a) Erin Powell, FDACS-DPI; b) Minor V. Solano Gutiérrez, UF/IFAS.

## Distribution

*Aonidiella orientalis* is likely of East Asian origin. It was first described from *Panicum* sp. in India by Newstead in 1894 as *Aspidiotus orientalis*. It is a tropical and subtropical species, currently found in 72 countries (García Morales et al. 2016) (Figure 4). Its wide distribution is attributed to accidental spread through the human transport of infested plants and plant materials. It is also found in greenhouses in temperate regions (Watson 2002). In the United States, *A. orientalis* is known to be established only in Florida.

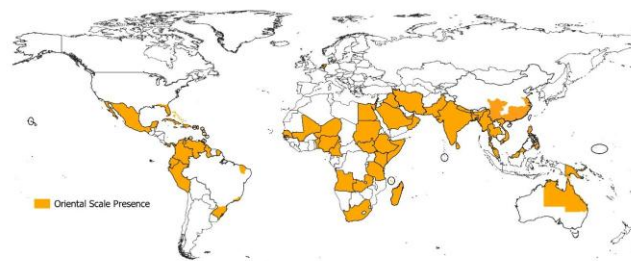


Figure 4. Global distribution of the Oriental scale (*Aonidiella orientalis*) in 2024.

Credit: Minor V. Solano Gutiérrez, UF/IFAS, based on ScaleNet database.

## Life Cycle and Biology

*Aonidiella orientalis* reproduces rapidly, with population densities peaking when developing between 15°C (59°F) and 30°C (86°F) (Badawi and Al-Ahmed 1990). As with other insects, its rate of development is temperature dependent. Females require an average of 44.2 days to develop from the crawler stage to the production of the first crawler at 25°C (77°F) (Elder and Smith 1995). Eggs hatch within 2–3 days at around 20°C (68°F) and within 7–9 hours at 30°C (86°F) (Watson and Kondo 2022). A single female can produce approximately 200 eggs during her lifetime (Waterhouse and Sands 2001). *A. orientalis* reproduces continuously throughout the year, with overlapping generations and all life stages coexisting in tropical conditions (Badawi and Al-Ahmed 1990).

## Host Plants

Although *Aonidiella orientalis* is highly polyphagous, palms are the most common hosts in Florida. Worldwide, this scale occurs on host plants belonging to at least 189 genera in 77 families (García Morales et al. 2016). In Florida, from 2006 to 2025, 50% of *Aonidiella orientalis* reports were on coconut palm (*Cocos nucifera*) (FDACS-DPI Database 2025). Other common hosts in Florida include *Roystonea regia* (royal palm), *Dypsis* spp. (e.g., areca palm, triangle palm), *Phoenix* spp. (date palms), *Sabal* spp. (e.g., cabbage palm), and other ornamental plants like *Hibiscus* spp., *Plumeria* spp. (frangipani), and *Ficus* spp. (fig trees) (Dekle 1976; García Morales et al. 2016).



Figure 5. Heavy infestation of Oriental scale (*Aonidiella orientalis*) showing chlorotic (yellowing) leaf tissue damage on a coconut palm. Credit: Adam Dale, UF/IFAS.

## Damage and Economic Importance

Like other armored scales, *Aonidiella orientalis* uses its piercing-sucking mouthparts to feed on individual mesophyll parenchyma cells within leaves, fruits, or stems. Since mesophyll contains many chloroplasts, which are the primary sites of photosynthesis in plants, heavy infestations can lead to chlorosis (yellowing) and cellular death. Ultimately, this results in reduced plant vigor, premature leaf drop, reduced aesthetic quality, and declining plant health (CABI 2021; Watson and Kondo 2022). Water-stressed hosts are particularly vulnerable to attack by the Oriental scale (Watson and Kondo 2022), and warmer temperatures further increase population density, posing a threat to palms and ornamentals in Florida urban environments. In addition to damaging the appearance and health of plants in residential and public landscapes, infestations can also affect the role of native or historically important plants in supporting local wildlife and preserving regional plant diversity.

## Management

As with other armored scale insects, *Aonidiella orientalis* is most effectively managed with a combination of strategies, including biological, cultural, and chemical controls that will vary depending on the host plant, planting site, and severity of infestation (Watson and Kondo 2022).



Figure 6. Infestation of Oriental scale (*Aonidiella orientalis*) on a bird of paradise (*Strelitzia* sp.) leaf. Credit: Adam Dale, UF/IFAS.

## Biological Control

Numerous natural enemies (e.g., predators and parasites) can help suppress *Aonidiella orientalis* populations. Predators include lady beetles (Coleoptera: Coccinellidae) in the genus *Chilocorus*, such as *C. circumdatus* (Gyllenhall, 1808), *C. baileyi* Blackburn, 1890, and *C. nigritus* (Fabricius, 1798) (Ponsonby 2009; Watson and Kondo 2022). Other predators include the predatory mite, *Hemisarcoptes coccophagus* Meyer, 1962 (Acari: Hemisarcoptidae) and the green lacewing *Chrysoperla carnea* (Stephens, 1836) (Neuroptera: Chrysopidae), which are commercially available in Florida and many parts of the world (García Morales et al. 2016; Watson and Kondo 2022). Parasitoid wasps that attack *Aonidella orientalis* belong to 23 genera across four families within the superfamily Chalcidoidea (Hymenoptera): Aphelinidae, Encyrtidae, Eulophidae, and Azotidae (Watson and Kondo 2022).

Parasitoid wasps are known to be highly effective in keeping *Aonidella orientalis* populations in check. In Australia, parasitism rates of up to 80% have been reported by *Encarsia citrina* (Craw, 1891) and *Aphytis melinus* DeBach, 1959 (Hymenoptera: Aphelinidae) (Elder et al. 1998), both of which are present in Florida, with *Aphytis melinus* being commercially available. Habitat manipulation to create suitable environments for

supporting natural enemy populations is crucial (Gontijo 2019). This includes minimizing impervious surface area around the base of plants, installing trees to promote suitable microclimates and lower high temperatures, and providing habitat that attracts and supports predatory and parasitic insects, which includes plants that provide flower pollen and nectar, structural complexity, and diverse plant species (Raupp et al. 2010; Gontijo 2019; Dale et al. 2020).

## Cultural Control

Cultural practices play a vital role in preventing and managing *Aonidiella orientalis* infestations. Key cultural control measures include maintaining plant health through proper irrigation, fertilization, and pruning. Healthy plants are better able to tolerate and recover from infestations. Removal and destruction of heavily infested plant material, such as pruning infested fronds, can significantly reduce scale populations and prevent spread to nearby plants. Additionally, selecting non-host or less susceptible plant species when designing landscapes can reduce long-term pest pressure. Avoiding excessive use of nitrogen fertilizers is also important, as lush new growth may favor scale population growth.

## Chemical Control

When necessary, spot treatments of infested plant tissue with mineral oil, such as mineral oil emulsion sprays, can help reduce infestation levels. These oils are considered low impact because they work through physical action rather than chemical toxicity and generally pose less risk to beneficial insects when applied carefully. Insecticide use should be considered only after cultural practices (like pruning heavily infested fronds) and the use of biological control tactics (such as parasitic wasps and predatory beetles) have been considered. Broad-spectrum insecticides, which kill a wide range of insects (including helpful ones) should be avoided whenever possible to prevent unintended toxic effects on natural enemies and other beneficial fauna (Watson and Kondo, 2022). In addition to low-impact products like mineral oils, selective products such as insect growth regulators and products that work through translaminar or systemic activity will likely provide the best control and plant protection. However, systemic insecticides should be avoided on any plants that are attractive to pollinators or that are a food source for other plant-feeding insects. Systemic insecticides can contaminate nectar, pollen, or plant tissue and harm non-target species. Pest

management strategies should be implemented with consideration of the ecosystem using an integrated pest management (IPM) approach.

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