



# Citrus Diseases Exotic to Florida: Sweet Orange Scab (SOS)<sup>1</sup>

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Citrus is susceptible to a large number of diseases caused by a wide range of plant pathogens. Economic losses due to plant diseases can be severe, but fortunately, not all pathogens that attack citrus worldwide are present in Florida. Citrus diseases of economic importance currently in Florida include: *Alternaria* brown spot, blight, citrus canker, greening, greasy spot, melanose, *Phytophthora*-induced diseases (foot and root rot, brown rot), postbloom fruit drop (PFD), scab, and tristeza. An effort to eradicate citrus canker and greening is ongoing in Florida. Any exotic diseases, if introduced, will significantly increase production costs and decrease profitability for Florida growers and could affect the viability of the industry or the varieties that could be profitably grown. Background information for all important exotic citrus diseases will be presented in a series of fact sheets to provide a basis for evaluating pathogens that pose potential risks to Florida citrus and to create a decision-making framework to prevent their introduction and spread (See <http://edis.ifas.ufl.edu/>

TOPIC\_SERIES\_Citrus\_Diseases\_Exotic\_to\_Florida ). This paper will discuss Sweet Orange Scab (SOS).

## Why Are We Concerned About Sweet Orange Scab?

SOS is a disease that differs in host ranges from the common citrus scab present in Florida. Citrus scab is serious on many tangerines and tangerine hybrids such as Temple, as well as grapefruit and lemons, but rarely causes lesions on sweet orange. In contrast, SOS can cause significant damage on all sweet oranges as well as tangerines and their hybrids. It can be a significant problem on fruit produced for fresh market. Establishment of SOS in Florida could also have quarantine implications for marketing of fresh fruit, especially in Europe. SOS is common in humid citrus growing areas of South America (Argentina, Bolivia, Brazil, Ecuador, Paraguay, and Uruguay), but its presence has not been confirmed elsewhere.

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## The Causal Agent of Sweet Orange Scab

The causal agent of SOS is the fungus *Elsinoe australis*, which is quite similar to *Elsinoe fawcetti*, the cause of common citrus scab, but clearly a distinct species. SOS pathogen never infects leaves and only produces symptoms on fruit, whereas citrus scab pathogen infects both leaves and fruit of susceptible varieties. The asexual spores (conidia) produced in culture and on fruit are similar to those of *E. fawcetti*. *E. australis* does not produce the spindle-shaped conidia in scab lesions that are often associated with *E. fawcetti*. The scab isolates can be readily differentiated based on their abilities to infect different citrus cultivars. *E. fawcetti* incites lesions on leaves of rough lemon, but *E. australis* does not.

### What Cultivars Are Affected?

SOS mainly attacks all sweet oranges and some tangerine cultivars. The damage produced is superficial and does not affect internal fruit quality.

### What Are the Typical Symptoms Caused by Sweet Orange Scab?

In contrast to citrus scab, SOS does not form lesions on leaves or twigs. The symptoms are corky, wart-like pustules on the fruit that are tan to gray in color (Figures 1 and 2). These lesions are flatter than those produced by citrus scab. However, because of variation in symptoms due to the age of tissue infected and the cultivar, it would be difficult to differentiate the different scab diseases only by fruit symptoms.



**Figure 1.** Sweet orange scab caused by *Elsinoe australis* on young fruit.



**Figure 2.** Sweet orange scab caused by *Elsinoe australis* on ripe fruit.

### How Does Sweet Orange Scab Spread and Survive?

SOS pathogen (*E. australis*) requires moisture for production of spores and for infection to occur. The fungus attacks only young fruit. Fruit are susceptible for 6 to 8 weeks after petal fall. Fungal spores are primarily distributed by rain splash between trees, and can also be spread short distances by air. Citrus scab pathogen (*E. fawcetti*) survives in unfavorable conditions in old leaves and stem lesions. However, it is unclear how *E. australis* survives when fruit are absent. Long distance spread is due to the movement of infected fruit by humans. The role of ascospores (sexual spores) in the infection process remains uncertain.

### How Can Sweet Orange Scab Be Detected in the Field?

Scab lesions are readily observed on young fruit and an introduction of SOS would presumably be followed by the appearance of extensive scab outbreaks on sweet orange cultivars. Some pathotypes of citrus scab may also infect sweet orange under favorable conditions, but never cause extensive outbreak on sweet orange. All occurrences of citrus scab on sweet orange in Florida have been in situations where sweet orange is in close proximity to heavily infested varieties like Temple. Recent

molecular characterization studies of various scab agents may provide a basis for developing rapid techniques for detection and differentiation of the species.

## How Can Sweet Orange Scab Be Controlled?

As with citrus scab, SOS can be controlled by properly timed fungicide applications. Products such as Topsin® (thiophanate methyl), Abound® (azoxystrobin), Gem® (trifloxystrobin), Headline® (pyraclostrobin), ferbam, and copper fungicides are registered in Florida for citrus scab and presumably would be effective for SOS (<http://edis.ifas.ufl.edu/CG020>). In countries where SOS is endemic, two fungicide sprays are applied; one at 2/3<sup>rd</sup> petal fall and followed 2 to 3 weeks later with a second spray.

## What Can Growers Do?

SOS must be controlled even though it primarily affects fruit for the fresh market. Given that the climatic conditions in Florida are suitable for establishment of the pathogen, SOS would increase production costs of fresh market citrus if it were introduced into the state. Preventing SOS from entering Florida is much easier than trying to eradicate or control it. It is important to avoid bringing propagation materials from SOS-infected areas to Florida. Any citrus propagating materials must be introduced through the Florida Department of Agriculture and Consumer Services, Division of Plant Industry.

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