

The persistent problem of algal spot

By Megan Dewdney

Mid-summer to fall has become algal spot season in my office. The disease is re-emerging in Florida for unknown reasons. While much of the year algal spot is low key and hard to spot, between June and September it is very obvious.

So, what is algal spot, should you be concerned, and what can you do about it? Algal spot is caused by a green alga, *Cephaleuros virescens*. It has not been considered a parasite, as it grows superficially, but it does damage trees if left unmanaged. Historically, the disease has been minor on most citrus types and was resolved with better routine grove maintenance. More recently, the disease has become more severe and is mostly found on sweet oranges.

SPOTTING THE SYMPTOMS

The canopy symptoms are most important. The disease is on the branches (Figure 1) and most visible when the alga is producing fruiting bodies from approximately June to September. The colonies vary from orange red to dark red with a velvety texture when fruiting. They can appear as donuts with a gray center surrounded by red. During the rest of the year, the lesions fade to a much more subtle gray-green color.

An initial symptom is bark thickening around the lesions. Eventually, the lesions crack and the bark falls off in small pieces or in shreds. Individual lesions usually

are approximately $\frac{1}{2}$ inch in diameter, but they can coalesce in severe cases to cover the entire branch with a sheath-like appearance. If conditions are favorable, the disease can kill scaffold branches of 2 inches in diameter or stunt branch growth, causing chlorotic leaves and leaf drop.

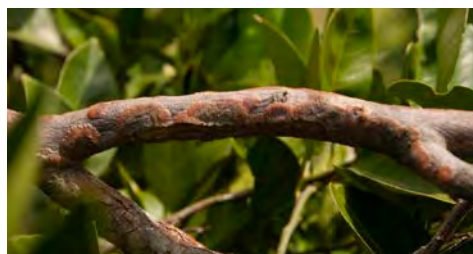
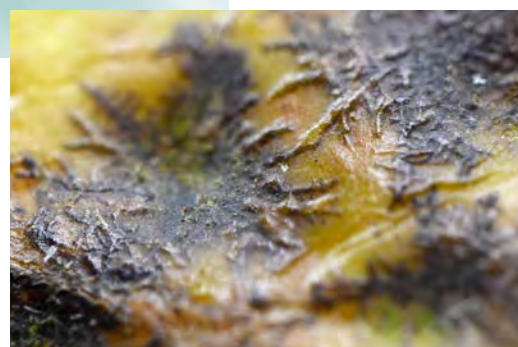


Figure 1. Top: Raised fruiting lesions of algal spot exhibit a brick-red color and donut morphology. Bottom: Bark cracking of a limb affected by algal spot.

Photos by M.M. Dewdney and T.N. Hobbs



Photos by T. Weeks

Figure 2. Fruit symptoms on an overmature Valencia orange (top) and a closeup view of fruit lesions (bottom). When looking at the lesions with a hand lens, they have a feathery appearance.

The fruit and leaf symptoms are less concerning. Normally, fruit symptoms (Figure 2) are in overripe, unmarketable fruit in the grove. Lesions are dark black and circular to irregularly shaped. When inspected with a hand lens, lesions are highly branched. Lesion diameter ranges from $\frac{1}{16}$ to $\frac{1}{4}$ of an inch. Brushing easily removes the lesions. Little damage is caused by leaf lesions. The raised lesions can occur on either side of the leaf; occasionally there is chlorosis around the lesions (Figure 3, page 16). The lesions eventually dry and flake off the leaf surface, leaving a small depression.

COPPER AND HLB

Previously, the routine use of copper for other foliar diseases such as greasy spot, melanose or canker was sufficient to control algal spot. Why this is no longer the case is unknown. Emerging



Photo by J.W. Miller

Figure 3. Leaf symptoms of algal disease on Tahiti lime include mild chlorosis around some lesions.

algal spot problems are also occurring in brambles and blueberries, and the ineffectiveness of copper applications is consistent with findings in those agricultural systems.

Algal spot may be an unexpected side effect of the changed growth pattern in trees with HLB but also could be favored by warming temperatures. In HLB-affected canopies, there is more blind wood (no side branches or leaves over part of the branch) and a thinner canopy. Often, algal spot occurs on branches under these circumstances. Potentially, the effect of copper was indirect and by better managing other defoliating diseases, algal spot was shaded out. This may no longer occur with the new growth patterns of citrus trees.

TRIAL RESULTS

Since copper was clearly ineffective, the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) conducted a trial in 2019. The major finding was that 0.5 gal/acre of the phosphite ProPhyt applied in late February, post-bloom in May and in late June significantly reduced the branch coverage by algal spot compared to copper, other non-phosphite treatments or the untreated control.

To refine what was learned in 2019, UF/IFAS conducted a trial starting in January 2021 to confirm the results and

Table 1. Treatment details for a 2021 algal spot trial

Treatment	Rate (per acre)	Application Dates
Revus	8 fl oz	Feb 10, May 7, June 22
Orondis	2.6 fl oz	Feb 10, May 7, June 22
Orondis Ultra	8 fl oz	Feb 10, May 7, June 22
ProPhyt	0.25 gal	Feb 10, May 7, June 22
ProPhyt	1 gal	Feb 10, May 7, June 22
Kocide 3000	2.23 lbs (0.67 lbs metallic Cu)	Feb 10, May 7, June 22
ProPhyt	0.50 gal	Feb 10, May 7, June 22
ProPhyt	0.50 gal	May 7, June 22
ProPhyt	0.50 gal	June 22
Untreated control	—	—

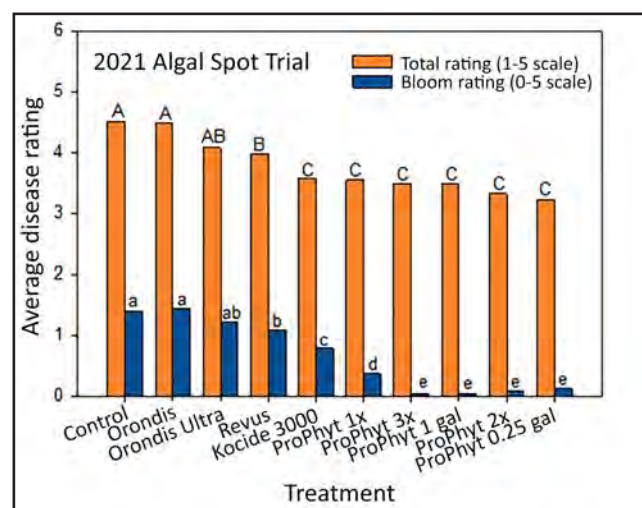


Figure 4. Results from an algal spot field trial on Valencia in 2021. The treatments labeled with the same uppercase or lowercase letters are not significantly different.

look at timing more closely. All products were applied as a dormant spray Feb. 10, a postbloom spray May 7 and while fruiting bodies were present June 22. Two additional ProPhyt (0.5 gal/acre) treatments were made on May 7 and June 22 or just June 22. For the full treatment list and rates, see Table 1.

Researchers rated the percent of area covered with algal spot of a 12-inch section of branch and percent of area of the algal spot that was in bloom. ProPhyt at all concentrations and timings was able to significantly reduce the total area covered with algal spot and the area in bloom compared to the untreated control (Figure 4). Unlike in 2019, Kocide 3000 reduced the total area as much as the ProPhyt treatments but did not reduce the bloom as much, although it was better than the untreated control. One application of ProPhyt in June did significantly reduce the bloom compared to the untreated control, but it was not as effective as two or three treatments.

In 2019, the 1 gal/acre ProPhyt

treatment had lower efficacy than 0.5 or 0.25 gal/acre but was equivalent in 2021. These data will help inform an official recommendation for algal spot management, although UF/IFAS research will continue to look at additional products to find something that is even more effective.

When treating for algal spot, there needs to be a great enough water volume (minimum 125 gal/acre) and application pressure (175 psi) to penetrate the inner canopy and wet the wood. When planning applications for algal spot, evidence from UF/IFAS trials and those in other crops shows that copper products do not appear to be effective. To date, phosphite products with a fungicide label are the most effective products. By reducing the algal spot bloom, there will be less spread of the disease in tree canopies. 🍊

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