

Canker lesions formed on a young branch after Hurricane lan. Note the lesion at each leaf node.

# Post-hurricane expectations for foliar diseases and phytophthora

By Megan Dewdney or foliar diseases, 2022 started off easily with limited outbreaks in Florida because the spring was dryer than average. The same La Niña weather pattern responsible for the dry conditions of the last two springs is predicted to occur again this winter into early spring. The weather pattern is then predicted to become a neutral pattern with prevailing warm and wet conditions.

#### **CITRUS CANKER**

Despite the weather being unfavorable for diseases, it will be important this spring to consider measures to suppress citrus canker in young plantings. Young trees affected by the blowing wind and rain of Hurricane Ian, and to a lesser extent Hurricane Nicole, were likely exposed to the citrus canker-causing bacterium that is now widespread in the environment.

The main concern is not leaf lesions, but the much harder to see stem lesions. Infected leaves will drop quickly, limiting the amount of inoculum produced. However, stems were also likely infected, leading to stem lesions on potential scaffold limbs. Additionally, stem lesions can ooze bacteria for up to four years, leading to more fruit infection and yield loss than otherwise expected. This is more problematic in young trees because these branches are a large proportion of the canopy.

To slow inoculum production from stem lesions and protect the new flush as the canopy grows into a mature tree, it is recommended to use a systemic acquired resistance activator like Blockade. Soil applications should start before infection occurs in late-February and be continued for four or five applications for maximum effect. See application and rate details in the Florida Citrus Production Guide.

In mature trees, keep an eye on fruit size and rain events in case of a damaging early-season infection event. Most yield loss in oranges comes from early-season infection events. Fruit is most vulnerable at 0.25- to 1.25-inch diameter for oranges and 0.5- to 1.5inch diameter for grapefruit. Since multiple blooms occur, making fruit size variable, it is important to evaluate how big fruit are on average to best time any necessary copper applications. Choose a good quality copper product and a maximum three-week interval for the best results in canker suppression on fruit.

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#### **PHYTOPHTHORA DISEASES**

Any blocks flooded by Hurricanes Ian or Nicole should have been evaluated for phytophthora inoculum shortly after the waters receded so trees could receive any necessary treatments to minimize damage to the fibrous root systems. If treatment was necessary after the storms, continue the planned treatment regimen, timing applications with the root flush. Root flush follows the leaf flush in citrus groves.

It is important to rotate among products targeting phytophthora so that resistance develops as slowly as possible. If the more aggressive *P. palmivora* is frequently found in your grove, consider using some of the newer products like Presidio, Orondis or Orondis Ultra in your rotation. When evaluating phosphite-containing products, it is not legal to use a product without a pesticide label for disease management. It is also important to check the active ingredient concentration to make sure products are equivalent.

If phytophthora levels were below the treatment thresholds of 10 to 20



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propagules/cm<sup>3</sup> of soil after hurricane flooding, but trees look thin and yellow or there are oozing cankers on trunks, another sampling of soil inoculum is in order. Use the threshold to determine if treatment is needed.

If you are planning to replant in a site with a phytophthora history, choose a rootstock with known phytophthora tolerance and suitability for the soil conditions such as Swingle or the US rootstock series. For more details, consult the Florida Citrus Rootstock Selection Guide, 4th Edition (crec.ifas.ufl.edu/extension/citrus\_ rootstock/tables.html).

Few fungicides compare to the economical fungicide copper, which works for multiple diseases such as greasy spot, melanose and canker.

When planting, ensure drainage is adequate and the bud union is at least 6 inches above the soil line to protect the susceptible scion. Do not overwater young trees or they will be more prone to foot rot. It is prudent to remove tree wraps as quickly as possible and provide adequate ant control.

#### **GREASY SPOT**

Greasy spot can defoliate all citrus types and reduce tree productivity, particularly on stressed trees. The fungus Zasmidium citri-griseum (formerly Mycosphaerella citri) reproduces in the leaf litter from leaves infected during the previous season, which is in greater quantities after the hurricanes. Spores are ejected from the leaf litter and germinate on fruit and leaves.

The fungus grows on plant surfaces, providing treatment opportunities from May to July. In blocks with high greasy spot severity, slow the tractor speed to thoroughly wet the whole canopy, increase application volume to >250 gallons per acre and consider a third application in August.

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Oozing trunk cankers from phytophthora

economical fungicide copper, which works for multiple diseases such as greasy spot, melanose and canker. Copper can cause fruit blemishes in high temperatures (>94 degrees) and dry conditions and become toxic in the soil. Use caution when combining it with petroleum oils or other products because burns can be devastating. Copper should be applied on moderately warm days without any additives, particularly oils, at 2 pounds per acre or less.

If you are worried about phytotoxicity, strobilurin-containing fungicides [Fungicide Resistance Action Committee (FRAC) 11] or the demethylation inhibitor fungicide Enable (FRAC 3) are effective control options with or without oil. See edis.ifas.ufl.edu/ publication/PP275 for a summary of the recommended fungicides for all diseases. These fungicides are good melanose products as well in late May to early June. To keep processing orange leaves minimally infected, petroleum oils are a good option. Fungicide resistance is problematic with *Z. citri-griseum*. Do not use two consecutive applications of a non-copper fungicide for greasy spot.

#### **MELANOSE**

Small dead twigs produce copious melanose spores. Small-diameter twigs

(< 0.25 inch) are rapidly colonized by the fungus *Diaporthe citri* and form spores in spring. Live twigs are also infected, but spores are not formed until twig death. Removing dead wood via hedging will reduce the number of infectious twigs.



Orange with melanose

Melanose is more severe in periods of extended leaf wetness, needing only 10 to 12 hours of leaf wetness at temperatures between 70 and 80 degrees to infect. In cooler temperatures, the fungus needs longer, up to 24 hours of leaf wetness. These are not unusual wetting periods in Florida. Leaf and fruit lesions are sterile and a dead end for the fungus.

While its long residual activity makes copper highly economical for melanose control, fruit expansion and rainfall erode the layer. On average, copper applications are needed every 21 days to maintain the protective coating from early May until fruit becomes resistant in early July. This is particularly true for grapefruit, the most susceptible cultivar. Off-season fruit complicates timing. Maintaining rind quality on these fruit for the fresh market will be difficult.

Copper applications in early June also serve as the first greasy spot application. Strobilurin-containing fungicides can be used if phytotoxicity is a concern but follow the same restrictions as greasy spot. The residual activity of strobilurins is shorter than copper, so more frequent applications are needed.

Megan Dewdney (mmdewdney@ufl. edu) is an associate professor at the University of Florida Institute of Food and Agricultural Sciences Citrus Research and Education Center in Lake Alfred.



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