Algal Stem Blotch in Southern Highbush Blueberry in Florida

Algal stem blotch is a significant disease on southern highbush blueberries (SHB) in Florida and has now been observed on blueberries in Georgia. Caused by the parasitic green alga *Cephaleuros virescens* Kunze, it can cause stunted growth and blotchy leaf yellowing (Figure 1), as well as increased susceptibility to Botryosphaeria, which can lead to plant death.

Figure 1. Plant with chlorotic leaves and stunting due to algal stem blotch infection.
Credits: D. Phillips

The pathogen is thought to enter the plant through natural wounds and openings, pruning cuts, or by direct penetration of the plant cuticle. Once inside the plant it forms colonies beneath the stem cuticle, creating raised red blotchy lesions that expand to form irregular cankers that can encircle canes (Figure 2). Leaves on symptomatic canes bleach white to pale yellow, and growth of the entire plant can be severely stunted as the disease advances. These symptoms are thought to be the result of the toxins produced by the algae, although additional research is needed to confirm this hypothesis. Leaf yellowing tends to occur on a few canes of each plant and differs from symptoms of nutritional deficiency in being less uniform and more blotchy (Figure 1). Defoliation can also occur with severe infections.

During hot, humid, and wet conditions, reproductive structures emerge and produce spores that are wind and water-splash dispersed. Peak spore production typically occurs between May and September and can result in widespread and numerous summer infections, although symptom development is slow, taking up to one year to produce symptoms. Older mature

canes may not show obvious symptoms until sporulation occurs through the bark when conditions are hot and humid. Bright orange felt-like mats or tufts of algal growth appear from the blotchy lesions on young stems and older cane surfaces (Figure 3).

Stunting is the result of reduction in plant vigor and can appear as a lack of regrowth after summer pruning. Eventually infected canes and stems crack, and this damaged tissue can lead to *Botryosphaeria* stem blight susceptibility and plant death. Plants that are stressed by abiotic or biotic factors are more susceptible to infection and subsequent disease development.

Figure 2. Algal stem blotch lesions.
Credits: P. Harmon

Figure 3. *C. virescens* reproductive structures.
Credits: D. Phillips

Limited information exists about management practices for algal stem blotch. Most modern fungicides are specific to fungi and have no effect on algae or algal stem blotch. No systemic pesticide products have been found to date that will kill the algae living underneath the plant epidermis. Spray applications of copper-containing fungicides can help to reduce algal sporulation. These products kill the algal reproductive structures present on the plant and protect healthy canes from infection for a few days after application. However, these applications do not impact existing symptoms or eradicate the disease.

Copper product sprays should begin after harvest and continue through September. Applications must be done on a regular schedule prior to infection in order to be effective, and spray equipment must achieve good cane coverage. The specific spray schedule and rate will vary by label instruction of product chosen with reapplication intervals ranging from 7 to 28 days. More frequent applications are recommended when weather forecasts are favorable for disease development and when the disease is known to occur on the farm. Follow all label instructions and be cautious when considering tank-mixing products that contain copper with anything else. Specific issues with tank mixes of acidic products or acidifying adjuvants and copper are well-documented and can result in plant burn. Tank mixes of copper products and products with penetrants or spreader sticker type formulations also can be problematic in some conditions (Bravo Weatherstik is an example). For specific product rates, timings, and details, see the product label and UF/IFAS 2024 Blueberry Integrated Pest Management Guide (http://edis.ifas.ufl.edu/pdffiles/HS/HS38000.pdf).

Certain cultural practices also can help reduce the spread of this disease. Disease-free stock should be used for new plantings. Good management practices (irrigation, fertilization, sanitation, and disease and pest control) will reduce plant stress and help the plants be less susceptible to disease. Overhead irrigation should be avoided if possible when disease is present because it favors the spread of algal reproductive structures. In addition, removing and destroying infected canes and eliminating weeds improves air circulation in the canopy and can help to slow disease development. Disinfection of pruning equipment where symptoms are present may also help minimize the spread of disease.

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