

Small Fruit News

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Clemson University
NC State University
University of Georgia
University of Tennessee

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Special Reports

Orange Felt (Orange Cane Blotch) of Blackberry

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With the recent expansion of the blackberry industry in Georgia, we have seen diseases which are only briefly mentioned as curiosities in other locations. One of these is the orange felt (also known as orange cane blotch) disease of blackberry, caused by the parasitic alga *Cephaleuros virescens*. Orange felt is especially prevalent on blackberries grown in very hot, wet, and humid environments, such as those encountered in much of the coastal plain areas of the Southeast. Where colony formation is limited, it has been stated that this alga does not limit production. However, though confirming research trials have yet to be conducted, we are currently recommending that control methods be utilized in Georgia. Where ideal environmental conditions occur, this alga may possibly girdle canes or augment other cane diseases, causing subsequent decline and death.

Causal Organism

Only a few algal species attack plants, and of these, *C. virescens* is the only common species in the United States (Figure 1). The *Cephaleuros parasiticus* alga, though a significant pathogen of tea, has been reported on Louisiana magnolias, but has otherwise not been observed as a pathogen in the United States. The alga *C. virescens* is prevalent in the South, and it has been reported as a pathogen of nearly 300 species and cultivars of plants; of these, roughly 80 include stem spots or lesions as symptoms. Though *C. virescens* is generally reported to only colonize between the cuticle (upper waxy layer) and the epidermis (outer cell layer), colonization has been observed within the epidermal cells of the plant, and damaged tissue has been observed within the plant cortex region – opening the door for the possibility that the plant may be “girdled” by the infections or subsequent damage. Since stem cracking also accompanies infection, this may also account for death of blackberry canes, due to secondary attack by opportunistic fungi such as *Botryosphaeria* species.

Symptoms

Initial symptoms are observed as colonies develop on canes. Orange felt is first characterized by the appearance of yellow, disk-shaped spots on the canes (Figure 2). Initial spotting is usually more prevalent towards the cane base (Fig-

ure 3). Orange felt is later characterized by orange spots which are often blotchy or velvety in appearance. The orange color results from the production of haematochrome pigments by the spore-producing structures as they mature. Spots often coalesce (merge) under wet, humid conditions – virtually covering the entire cane. Spots can appear in the late spring, but are more prevalent throughout the summer and fall as the colonies develop. This disease is often confused with rust diseases of blackberry, since the spots are very orange in appearance as they mature. However, the two can be easily distinguished microscopically. In addition, rust spores readily rub off, forming a rust stain on whatever surface they touch, whereas lightly rubbing orange felt colonies does not result in a stain.

Disease Development and Spread

Through field observation and limited reports, it is assumed at this time that the disease cycle for *C. virescens* is roughly the same on blackberry as other plant species, but this has not been studied in detail. Generally, colonies form where zoospores (mobile swimming spores) settled the prior summer. In the case of blackberries, spread has to occur from floricanes to primocanes in each year of continued colony production. As the colonies develop in early to mid-summer, they form hair-like stalks (sporangiophores), which subsequently produce multiple sporangia. Under wet conditions, the sporangia in turn release multiple zoospores (swimming spores), each of which is capable of forming a new colony. Spores can actually swim to a new spot on a cane, but spread from floricanes to primocanes is likely through splashing water from summer rains. Producing prolific numbers of viable spores, this alga can be aggressive. The disease cycle takes 8-9 months to complete.

Control

Removal of floricanes immediately after harvest may help to prevent further spread of the algal spores to primocanes. Copper sprays should also help to prevent spread. Many copper products are registered for control of a multitude of blackberry diseases, using relatively high rates for late dormant and fall applications and lower rates for

times in which succulent tissue is present (read all labels for specific directions). The currently labeled use times for most copper materials may not be sufficient to cover all infection periods. Also, copper injury can occur under prolonged use or under certain environmental conditions, such as very hot or prolonged moist periods (poor drying conditions). Since sporulation of this alga has been observed in June, this may indicate that additional, season-long or targeted applications of copper materials (reduced rates) may be necessary for optimal control; however, mid-summer copper applications are not generally allowed under most current labels, and once again, plant tissue damage may possibly occur under hot conditions. Reduced-rate, summer copper applications, as well as development of new algicidal materials and control methods, should be subjects for future research. Without regard, good sanitation and use of copper sprays (as currently labeled) are the best (only) good control methods available at this time.

Selected References

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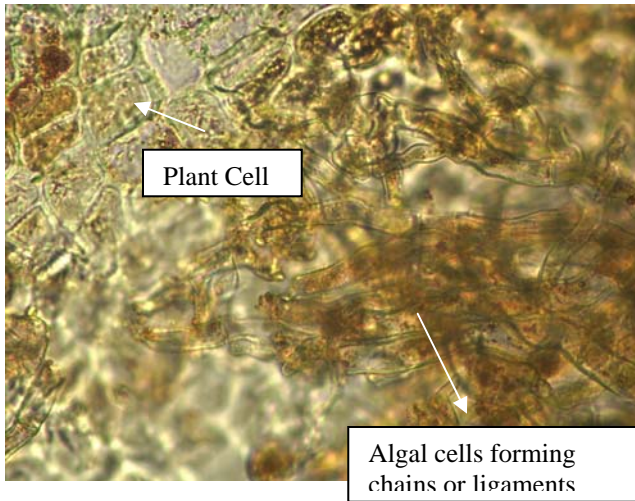


Fig. 1. Microscopic shot of filaments (algal cells) of *Cephaleuros virescens* working their way across a blackberry cane (mainly observed between the cuticle and epidermal plant cells).



Fig. 2. Yellow to orange velvet-like colonies formed by *Cephaleuros virescens* on a thornless blackberry cane.



Fig. 3. Orange felt forms yellow to orange spots, starting on the base of the canes in the late spring or early summer. Spots become more pronounced each fall. [Photo submitted through DDDI by Jerome Ethridge (Seminole County, GA)].

Bramble Chores

Summer/Fall Schedule 2004

Gina Fernandez
NC State University

Here is a brief summary of chores for the next few months for the harvest season. If you have any questions give me a call or send me an email (Phone: 919.513.7416, Email: Gina_Fernandez@ncsu.edu).

HARVEST

- Blackberry harvest should be complete by the end of the month in NC.
- Some higher elevations are harvesting summer (primocane fruiting) raspberries. Keep botrytis under control for the summer and "fall" crops, it has been very rainy in some areas.

IRRIGATION

- Water demand by the plants will decrease after fruiting, however keep water on plants if you are experiencing drought conditions in your area.

TRELLISES

- Inventory and make list for fall winter repair season

FERTILIZER and TISSUE SAMPLING

- Just after harvest is the time to take leaf tissue analysis to determine your fertilizer program for next season. Sample healthy leaves on primocanes in late summer. Collect the youngest fully expanded leaves on each of 50 randomly selected primocanes. For information on how to sample and where to send samples in NC go to: <http://www.ncagr.com/agronomi/pwshome.htm>

- Do not apply nitrogen fertilizers until spring
- Apply non nitrogenous fertilizers in fall so that fall and winter rains can move them into the rooting zone
- Apply lime if needed

INSECT AND DISEASE ISSUES

- Areas that experience what seemed to be the daily rain shower should be looking at optimizing next years crop. Make sure you get adequate sprays on now for protection against diseases next year.
- Crown borer and phytophthora root rot control should be implemented in the fall if they are known to be a problem in your area. Check with your states agricultural chemical manual and local extension agent for labeled chemicals to control these pests. Heavily infested sites should be removed as both of these pests will steadily weaken the planting.

PLANTING

- Prepare ground for fall planting now. Plants can be set in late Oct- December in south and eastern parts of North Carolina. You won't see much above ground growth this fall, but fall planting enables the plant to establish a good root system and allows for more growth next summer. Make sure you get plants from a reputable nursery and that they have been virus indexed. There is a nursery database on the Smallfruits.org website, click on Nursery database, and it will download to your computer. You must have Excel to read the file.
<http://www.smallfruits.org/Bramble/index.htm#Marketing>

WEEDS

- Weed growth can be very vigorous at the same time as the bramble crop peaks. Weed control is best done earlier in the season before harvest commences. Please note that glyphosphate application at this time can cause serious injury to the crop. Each year I see some of this injury. It can be mistaken for double blossom. See article at <http://www.smallfruits.org/Recent/AvoidGlyphosate.htm> for details.

OTHER

- Attend the NCSU Specialty Crops Field Day, July 13, 2004 to see the bramble research trials in eastern NC.

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