Constriction Canker Management in Peach

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Some growers in the southeastern United States have observed an increase in twig dieback in recent years. In most cases the dieback is due to constriction canker, a disease caused by the fungal plant pathogen, *Phomopsis amygdali*. Although fungicides reliably control other fungal diseases such as peach scab and brown rot, no silver bullet is currently available for management of constriction canker. This makes it a frustrating disease for commercial growers and university scientists. Recent research has explored a number of disease management options, such as fungicide efficacy, application timing, and sanitation. The results of these studies are summarized in this article to serve as a guide for constriction canker management.

The disease. Constriction canker was first observed in New Jersey orchards in 1934, and was subsequently reported in Maryland, Delaware, Virginia, New York, Massachusetts, and Rhode Island during the 1940's and 1950's. In the southeastern United States, the disease was first observed in Alabama in the early 1990's and was later reported in Georgia and South Carolina. The disease causes a twig dieback and can cause severe damage to the tree in highly susceptible varieties. Shoot death results in direct fruit loss because infected shoots are fruit-bearing for the current growing season. In a recent study from New Jersey, constriction canker was shown to cause 20 to 30% crop loss in severely infected orchards.

Disease epidemiology and disease symptoms. The fungal pathogen infects through leaf scars in the fall and through buds, bud scale scars, blossoms, and fruit scars in the spring. Of these infection sites, fall leaf scars are considered most important. The resulting cankers are centered around twig nodes (Figure 8). They are first reddish brown, become sunken and turn tan to silver in appearance as they mature. By early summer, the cankers will have killed the shoots, resulting in the characteristic shoot blight (Figure 9). The pathogen produces fruiting structures on the cankers, called pycnidia, which provide inoculum for subsequent infection of twigs in the fall and spring. Moist conditions favor production of spores (conidia) from these pycnidia (Figures 10 and 11).

Control strategies. Management of constriction canker is limited to the integration of cultural controls. Although only a few control options (see below) are available, each of them contributes to an overall reduction in disease.

1. Choose less susceptible cultivars

One way to reduce disease is to plant resistant varieties, but to our knowledge, there are no Phomopsis-resistant varieties available. There is evidence that some varieties are more susceptible than others. A survey among peach growers from South Carolina revealed that the following varieties are highly susceptible: Contender, Cresthaven, Empress, Springcest, Redhaven, Red Globe and the Baby Gold series. In New Jersey, high levels of infection have been observed in Encore, Biscoe, Jerseyglo, Autumnglo, Cresthaven, and Redhaven. Factors such as drought stress or the use of excess nitrogen may impact the susceptibility of varieties.

2. Prune cankers from tree canopies

Pruning is an effective method of reducing fall infections because dead wood colonized by this fungus is an important source of inoculum. **If done PRIOR TO LEAF FALL, as a part of the summer pruning routine, the incidence of constriction canker can be reduced by 40%.** A study from Georgia reported that this reduction in disease was obtained even with shoot debris remaining under the canopy. Ideally, pruning should be performed during late summer, when the maximum number of shoots show blight symptoms, thus making them easier to find and remove. However, since this timing coincides with harvest, an alternative approach would be to initially prune after thinning, followed by a second follow-up pruning immediately after harvest.

If gummosis problems also exist, debris should be removed from the orchard and either burned or taken to an isolated location away from the orchard. Alternatively, prunings can be raked to the middle and chopped with a flail mower. Flail mowers produce smaller pieces that decompose faster and support less growth and spore production by the fungus than prunings chopped with a conventional bush hog.

3. Orchard replacement

Constriction canker is found most frequently at high levels in older, established orchards. Given the yield loss from canker and the lack of highly cost-effective controls, removal of these less productive blocks may be the best economic alternative. In this case, the block should be replaced with a less susceptible cultivar. Regular scouting and pruning out cankers as they appear should be practiced to keep infection levels low. Observations in younger replacement peach blocks in New Jersey revealed very little re-infection by the pathogen after several years of growth. Removal and burning of the original infected trees may have helped remove the inoculum source. Furthermore, the lack of adjacent infected blocks probably played an important role in preventing subsequent spread into the new orchards.

Research on fungicide control. Fungicide efficacy data for canker control is available from field and lab trials. Here is an efficacy ranking based on those data:

Efficacy	**Fungicide**[x]
most effective:	Chlorothalonil > captan > thiram > ferbam
effective:	DMI fungicides (such as Indar, Orbit, Elite) > benzimidazoles (Topsin-M) > strobilurins (such as Abound, Flint)
not effective:	Sulfur

[x] ">" stands for "more effective than"

Although some of the above fungicides are registered for one or two applications in the late fall or early spring (for leaf curl control), NONE ARE REGISTERED FOR MULTIPLE CONSECUTIVE APPLICATIONS during these time periods. At this time, no data are available which indicate how many fungicide applications during these periods would provide significant levels of control. However, **a recent study showed that the disease cannot be effectively controlled even after the best fungicides (chlorothalonil and captan) were applied throughout the leaf abscission period. Therefore, cultural control is still the best option for constriction canker management.**

Relevant literature. Most of the information gathered for this article was obtained from the following references.

Lalancette, N. and Polk, D. F. 2000. Estimating yield and economic loss from constriction canker of peach. Plant Dis. 84: 941-946.

Lalancette, N. and Robison, D. M. 2002. Effect of fungicides, application timing, and canker removal on incidence and severity of constriction canker of peach. Plant Dis. 86. 721-728.

Uddin, W. and Stevenson, K. L. 1998: Seasonal development of Phomopsis shoot blight of peach and effects of selective pruning and shoot debris management on disease incidence. Plant Dis. 82:565-568.

Figure 8. Constriction cankers on 'Jerseyglo' peach. Young cankers (top and bottom) and older canker (middle) are centered about the leaf node. Note slight constriction of twig diameter on bottom canker.

Figure 9. Shoot blight phase of constriction canker on 'Biscoe' peach. Low growing shoots located near the inside of the tree canopy appear to be infected at a higher frequency than shoots at other canopy positions. In addition to loss of fruit for the current growing season, shoot death exasperates tree pruning and training efforts to generate future fruiting wood.

Figure 10. Tendrils of conidia held together by mucilage (cirri) exuding from pycnidia of *Phomopsis amygdali* on peach.

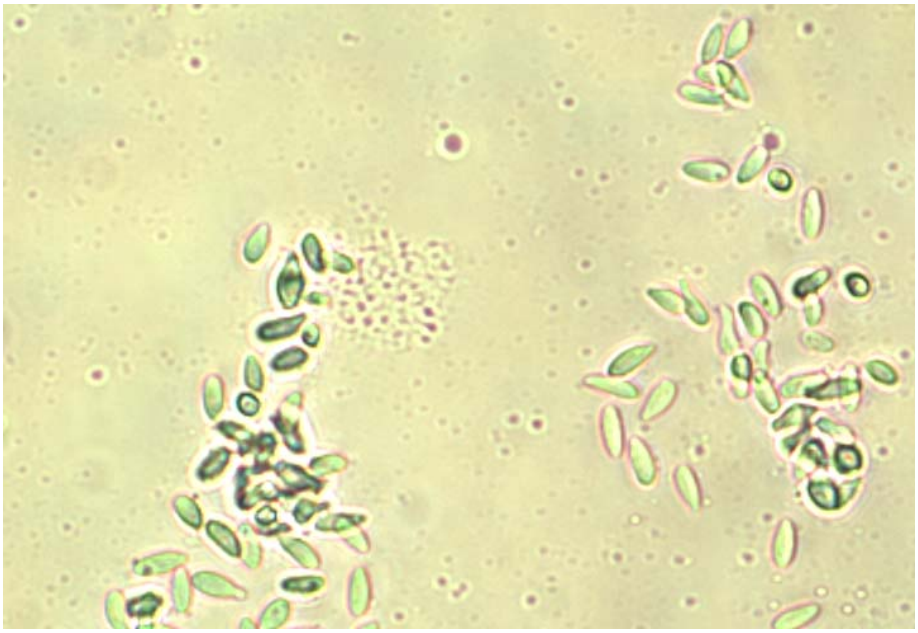

Figure 11. Conidia of Phomopsis (400X). Shapes can range from ovoid to fusiform.

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