

PHOMOPSIS TWIG BLIGHT AND FRUIT ROT

Patrick Fenn

Department of Plant Pathology
University of Arkansas
Fayetteville, AR 72701

Phomopsis twig blight of peach is most often observed in early spring following bud break. Symptoms include wilt and death of leaves on new shoots. Wilt and death of blossoms and young fruit on fruiting wood also occur (Figure 1). A diffuse canker, often with a concentric appearance and exuding gum, can be found on the fruiting wood at the base of the blighted shoots. The canker is usually centered on a dead bud, which is believed to be the infection court for the pathogen. Most bud infection is believed to occur during the previous fall or winter, but new infections can also occur in the spring, leading to shoot blight during early summer. Superficially, Phomopsis twig blight can be confused with other causes of twig death (e.g., *Cytospora* canker), but can be distinguished by close examination of the canker and by laboratory culture. *Cytospora* spp. and *Botryosphaeria* spp. often invade cankers and shoots killed by Phomopsis infection.



Figure 1. Typical symptoms of Phomopsis twig blight of peach include wilt and death of emerging shoots and leaves in the spring.

CAUSAL AGENT

There is considerable confusion in the literature concerning the etiology of Phomopsis twig blight and its relationship to several other canker and blight diseases of peach, including constriction canker and fusicoccum canker. However, consensus suggests the three diseases are identical. Likewise, there is no general agreement on the species epithet of the *Phomopsis* sp. that causes twig blight or fruit rot, although *P. amygdali* has been implicated. More research is needed to clarify these relationships. The pathogen has a perfect stage (*Diaporthe* sp.), which has been rarely reported from field material, although many peach

Phomopsis isolates from Arkansas produce the perfect stage in culture.

Phomopsis fruit rot, which has been rarely reported as an orchard problem, can be recognized only on ripening fruit. Phomopsis will invade and rot green fruit if introduced through wounds.



Figure 2. Phomopsis lesions on ripening fruit of Babygold 5 peach. Lesions are round to oval, develop rapidly, and have a very moist texture.



Figure 3. Fruit with Phomopsis lesions readily fall from the tree. The rot lesions are easily dislodged, exposing the pit.

Rot lesions are very moist, generally round to oval, and develop rapidly on the cheek or pistil end of the fruit (Figure 2). The rotted tissue is easily and cleanly dislodged to the depth of the pit by pushing on the lesion edge or vigorously shaking the fruit. This characteristic and the wet nature of the rotted tissue help distinguish Phomopsis fruit rot from brown rot (*Monilinia*) or anthracnose (*Colletotrichum*) with which it may be confused. An additional difference is that fruit with large developing Phomopsis lesions readily fall from the tree (Figure 3). Phomopsis lesions will sporulate on either the ripening fruit on the tree or on abscised fruit on the ground.

Morphological and cultural characteristics, inoculation experiments, and molecular characterization indicate that twig blight and fruit rot isolates of *Phomopsis* are the same pathogen.

DISTRIBUTION AND IMPORTANCE

Currently, *Phomopsis* twig blight is found in peach-growing areas from New Jersey south to Georgia and west to Arkansas and Oklahoma. In most areas, in most years, *Phomopsis* twig blight is not severe nor does it limit production. However, extensive damage has been reported in Georgia, Alabama, and South Carolina where losses of fruiting wood may be sporadically severe, and overall tree health and productivity have been jeopardized. The wide variation in incidence of *Phomopsis* twig blight may be related to environmental conditions, orchard management (pruning and sanitation), and to differences in varietal susceptibility to *Phomopsis* infection.

Phomopsis fruit rot has been sporadic and may have been suppressed or controlled by the broad-spectrum fungicides used historically to control scab and brown rot. *Phomopsis* fruit rot is rare in the southeastern states, where twig blight is more often important. Fruit rot has been important in some Arkansas production areas where fruit losses of up to 50% have occurred, but *Phomopsis* twig blight has been a minor problem in orchards prone to fruit rot. In Arkansas orchards, the incidence of twig blight appears to be unrelated to the incidence of fruit rot. Regional differences in these diseases may arise because of varying environments, orchard management, virulence of *Phomopsis* isolates, and susceptibility of peach varieties to twig blight or fruit rot. Some clingstone cultivars such as the Babygold series and some nectarines appear to be particularly susceptible to *Phomopsis* fruit rot. In processing peaches, *Phomopsis* lesions, if not removed during processing, can affect several quality parameters of peach puree and limit its acceptability for some food uses.

CONTROL

Phomopsis twig blight is generally not the direct target of disease control measures, but in orchards where blight is severe, pruning of diseased wood and chemical sprays may be required. Fungicide sprays have limited efficacy in controlling twig blight, and some of the older, more effective chemicals are no longer available. Resistant varieties would offer the best means of managing twig blight.

Management of *Phomopsis* fruit rot is problematic because the pathogen forms latent (symptomless) infections in developing peach fruit. A grower cannot anticipate the incidence of *Phomopsis* fruit rot until rot lesions develop on ripening fruit. Fruit can be infected any time from shuck split until fully ripe. Post-harvest rot can develop rapidly if fruit are not stored cold or processed promptly. Several fungicides with systemic activity can delay infection and slow the rot in ripening fruit. In an orchard trial, benomyl sprays significantly lowered the incidence of latent *Phomopsis* infection in green fruit, whereas propiconazole was not effective in controlling latent *Phomopsis* infection in the field.

REFERENCES

- Daines, R. H. and J. L. Peterson. 1976.** The occurrence and control of *Phomopsis* fruit rot of peach. *Plant Disease Reporter* 60: 141-143.
- Farr, D. F., L. A. Castlebury and R. A. Pardo-Schultheiss. 1999.** *Phomopsis amygdali* causes peach shoot blight of cultivated peach trees in the southeastern United States. *Mycologia* 91: 1008-1015.
- Fenn, P. and H. Barczynska. 1993a.** Differences in susceptibility of peach varieties to *Phomopsis* fruit rot. Pages 98-101 in: Proc. 114th Ann. Mtg. Arkansas State Horticultural Society.
- Fenn, P. and H. Barczynska. 1993b.** Preliminary studies on fungicidal control of *Phomopsis* fruit rot of peaches. Pages 87-89 in: Proc. 114th Ann. Mtg. Arkansas State Horticultural Society.
- Fenn, P. and H. Barczynska. 1999.** Evaluation of fungicides for control of *Phomopsis* fruit rot on ripening peaches. Pages 25-27 in: Horticultural Studies 1998. Arkansas Agric. Expt. Sta. Research Series 466.
- Fenn, P., H. Barczynska, and P. Miller. 1999.** Field evaluation of Benlate and Orbit for control of latent *Phomopsis* infection in developing peach fruit. Pages 28-30 in: Horticultural Studies 1998. Arkansas Agric. Expt. Sta. Research Series 466.
- Lalancette, N. and D. F. Polk. 2000.** Estimating yield and economic loss from constriction canker of peach. *Plant Disease* 84: 941-946.
- Lalancette, N. and D.M. Robinson. 2001.** Seasonal availability of inoculum for constriction canker of peach in New Jersey. *Phytopathology* 91: 1109-1115.
- Latham, A. J. 1994.** *Phomopsis* dieback of peach shoots. Pages 116-120 in: Proc. 6th Stone Fruit Tree Decline Workshop. USDA Agricultural Research Service, ARS-122.

- Li, X. Y., A. R. Gonzalez and P. Fenn. 1996.** Effects of *Phomopsis* peach rot on pulp losses and puree quality. *Journal of Food Quality* 19: 147-160.
- Ogawa, J. M., E. I. Zehr, G. W. Bird, D. F. Ritchie, K. Uriu and J. K. Uyemoto. 1995.** Compendium of stone fruit diseases. APS Press, St. Paul, MN.
- Roberts, J. W. 1940.** The constriction disease of peach. *Phytopathology* 30: 963-968.
- Smith, M. A. and G. B. Ramsey. 1957.** Fruit decay and twig cankers on peach. *Phytopathology* 47: 445-446.
- Uddin, W. and K. L. Stevenson. 1997.** Pathogenicity of a species of *Phomopsis* causing a shoot blight on peach in Georgia and evaluation of possible infection courts. *Plant Disease* 81: 983-989.
- Uddin, W. and K. L. Stevenson. 1998.** Seasonal development of *Phomopsis* shoot blight of peach and effects of selective pruning and shoot debris management on disease incidence. *Plant Disease* 82: 565-568.