

Eastern Filbert Blight

March, 2016

Eastern filbert blight (EFB) on hazelnut is caused by the fungus *Anisogramma anomala*. Vigour and productivity decline significantly when trees are infected with this fungus, resulting in an economically unproductive orchard. EFB has become a common and serious disease in hazelnut orchards throughout the Pacific North-Western United States and southern part of British Columbia.

Spread

In spring, spores are released from mature cankers of infected hazelnut trees. Spores are spread by rain and splashing water droplets driven by wind. Young and developing shoots, during bud-break to shoot elongation, are highly susceptible to new infection. Newly infected trees do not show any symptoms for 12-15 months (latent period). The second summer following infection, the fungus begins to produce dark-brown to black spore-producing structures called “stroma” within cankers on infected stems (an important diagnostic feature in field and laboratory). The mature stroma begin releasing spores the following spring. The fungus continues to produce new stroma and releases spores as the canker expands each year.

Symptoms

Infected trees may show sudden dieback of twigs and branches in summer months. When closely observed, elongated, sunken cankers, expanding lengthwise on branches can be seen. Cankers are infected areas of sunken, dying tissues formed along a branch. Stroma are produced within cankers in relatively straight rows lengthwise along the branch (Fig. 1). Cankers expand from year to year and girdle the branch, resulting in branch dieback. The disease also resembles another fungal disease caused by *Eutypella cerviculata*. *Eutypella* produces similar spore producing structures; however, they are smaller in size and produced on dead wood.

Disease Control

Monitoring: As EFB continues to spread within and around commercial orchards, all orchards must be scouted intensively. Control of EFB will be much more effective if the disease is detected early. Scouting should be done twice a year. In late summer, look for dying branches (dieback). In the dormant season (late fall and winter), look for the cankers and stroma; mostly found near the top of the canopy.



Figure 1. Dark-brown to black stroma, bearing spores, are produced on infected cankers by the fungus *Anisogramma anomala*. Photo credit: Oregon State University and Jeff Stone

Suspicious samples should be submitted to the Ministry of Agriculture Plant Health Laboratory for disease confirmation.

Management

Prune out any diseased branches with cankers about 2-3 feet below the site of infection and burn diseased wood. Alternatively, infected wood can be chipped, covered with plastic film and allowed to compost. This must be done before bud-break in spring. Because initial infection is often found in the top of trees, it is best to use a “cherry picker” to gain better viewing during scouting for disease and access for pruning out infections.

If EFB has been detected in your orchard or in the vicinity, fungicide sprays are essential to help prevent new infections and slow down the progress of the disease. Since new growth in spring and early summer is highly susceptible to infection, spraying must begin soon after bud-break. In Oregon, 4 applications at 10-14 day intervals, from bud-break to new shoot growth, are considered necessary to provide adequate protection. In coastal B.C., the spray period will generally be from late March until early May. The fungicides registered for EFB can only protect young shoots from initial infection, i.e. they need to be applied before the fungal spores land on vulnerable young tissues so that germinating spores are killed before they infect and enter young plant tissues. It is essential to set up the sprayer to obtain coverage of all new growth. Given the density and height of many Fraser Valley orchards, this can be a challenge even with the best air-blast sprayers. Because of EFB’s latent period, the effect of fungicides on disease control will only be evident several years after application.

The following fungicides are registered for EFB in Canada:

- Bravo 500 (chlorothalonil 500 g/L) at 6.72 L/ha (2.7 L/acre) in 500-3000 L of water/ha (200-1200 L/acre). Apply preventatively during bud-break and shoot elongation in spring and early summer. Do not enter treated areas within 3 days for orchard maintenance activities and 11 days for transplanting. Do not allow workers to engage in scouting within 20 days of treatment. Do not apply within 120 days of harvest. Do not exceed a maximum of 3 applications per season.
- Copper Oxychloride 50 at 3.0 to 9.0 kg/ha (1.2 to 3.6 kg/acre) in at least 1,000 L/ha (400 L/acre) of water or Cueva (copper octanoate) at 0.5% to 2% solution at 470-940 L/ha. Apply at 7-10 day intervals. Use the low rate on small trees and the high rate on mature trees. Do not apply within 1 day of harvest.
Note: Copper is generally acceptable for organic production. Check with your certifying agency.
- Flint 50 WG (50% trifloxystrobin) at 140 to 280 g/ha (56 to 112 g/acre) in at least 1,000 L/ha (400 L/acre) of water. Use the higher rate when disease pressure is severe. Do not apply more than 4 times per season. Do not apply more than two consecutive applications of Flint. Do not apply within 60 days of harvest.
- Quadris Flowable (250 g/L azoxystrobin) at 900 mL/ha (360 mL/acre). For mature trees, use at least 1,000 L/ha (400 L/acre) of water. Do not apply more than 4 times per season. Do not apply more than two consecutive applications of Quadris. Do not apply within 45 days of harvest.

Management Notes:

- Use Bravo or Copper Oxychloride preventatively in orchards that have not been exposed to or detected with EFB (low risk orchards).
- Use Bravo and Copper Oxychloride in rotation with Flint and Quadris for orchards infected with EFB or in close proximity to an infected orchard (moderate to high risk orchards).
- Caution: Quadris will cause severe damage to many varieties of apple. Do not allow drift onto nearby apple plantings.
- Caution: Flint and Quadris are in the same fungicide class (strobilurin) and both have a same mode of action. If used consecutively, the pathogen may soon develop resistance against these fungicides. Therefore, these two fungicides should be rotated with Bravo or Copper Oxychloride to prevent development of resistance.

More information

[Canadian Food Inspection Agency \(CFIA\) Phytosanitary Requirements](#)

[Disease cycle and symptoms can be seen on the Oregon Eastern Filbert Blight Help Page](#)

****Note:** *Some of the chemicals registered for EFB in the USA are not registered in Canada.***