Fire Blight

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ANR-PATH-12-2018

Fire blight is a disease that not only infects various cultivars of apple, crabapple, and pear trees, but other plants in the Rosaceae family (1, 2). The disease is caused by the bacterium *Erwinia amylovora* (3). This bacterium overwinters in infected plants, and in the spring can spread throughout the plants with help of rain, insects, wind, and/or animals. The bacterium is active in the warmer months when plants are the most vulnerable with the development of new shoot growth, but fire blight can spread anytime throughout the season (1, 2, 3).

Symptoms

Notably, fire blight is named after the scorched appearance of infected plants. Indeed, the disease darkens flowers, branches, and leaves of plants especially when flowering occurs making plants highly susceptible to the bacteria (Figure 1). Infected flowers may look water logged at first but will quickly start to darken. Blackened flowers can remain attached, and the darkened leaves can remain well after the other leaves have fallen. Temperature, humidity, rainfall, and plant maintenance such as pruning and overhead irrigation drives fire blight to spread more quickly resulting in the faster appearance of the general symptoms (1, 2).

Disease Cycle

The pathogen enters the plant through natural openings such as newly developing shoots. The pathogen overwinters by creating cankers and awaits the warmer temperatures of spring to begin spreading the disease. As temperatures rise, the cankers start releasing bacterial cells creating a visible ooze. As a result, insects are attracted to ooze given off by

the pathogen. Insects spread bacteria to other parts of the plant and may also infect separate plants. In addition to insects, rain can cause the disease to spread from infected parts of the plant to healthy plant tissue (1, 2, 3).

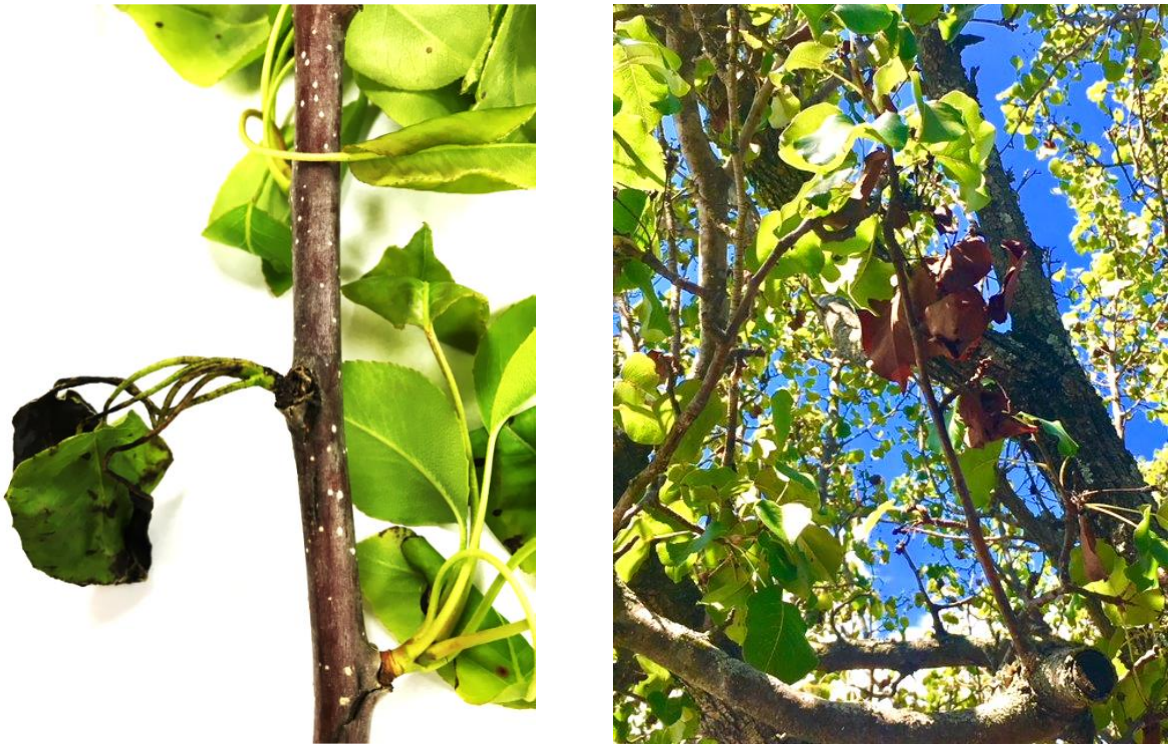

Figure 1. Symptoms of fire blight on branches and leaves

Disease Management

Fire blight can be managed with a variety of options. Selecting resistant/moderately resistant cultivars will help in preventing the disease (Table 1). Another option is to use bactericide applications based on protective schedules with antibiotics, copper, or biocontrol products (Table 2) (4, 5). Disease forecasting models (such as Maryblyt (University of Maryland) and Cougar Blight (Washington State University) can be used to predict blossom blight infections as well as bactericide application timing. If fire blight is discovered, prune the infected sections 1 inch below the sight. Also, take the infected sections and burn the sections to kill the bacteria. Disinfect the cutting tools with a 10% bleach solution or a 70% isopropanol alcohol (rubbing alcohol) between each cut to avoid spreading the disease to healthy plants (1, 3).

Table 1. A selected list of flowering crabapples, flowering pears and flowering quinces with known resistance to fire blight

Flowering crabapple	**Flowering pear**	**Flowering quince**
Malus 'Adams' *Malus* 'Adirondack' *M. sargentii* 'Candymint Sargent' *Malus* 'Centurion®' *Malus* 'Coralburst™' *Malus* 'Doubloons' *M. sargentii* 'Firebird®' *Malus* 'Indian Summer' Malus x 'Lanzam' 'Lancelot™' *Malus* 'Lollipop®' *Malus* 'Prairifire' *Malus* 'Radiant' *Malus* 'Ruby Tears™' *M. sargentii* 'Sargent Crabapple' *Malus* 'White Cascade'	*Pyrus calleryana* 'Chanticleer' *P. calleryana* 'Bradford' *P. calleryana* 'Fauriei'	*Chaenomeles speciosa* 'Contorta' *C. speciosa* 'Nivalis' *C*. x *superba* 'Crimson and Gold'

Table 2. Bactericides with effectiveness against blossom blight and shoot blight

Bactericide	**Active ingredient**	**FRAC Code**	**Blossom blight control**	**Shoot blight control**
Serenade Optimum	*Bacillus subtilis*	44	+	+
DoubleNickel LC	*B. amyloliquefaciens*	44	+	+
Triathlon BA	B. amyloliquefaciens strain D747	44	+	+
LifeGard WG	*B. mycoides* isolate J	44	+	+
Actigard 50WG	acibenzolar-S-methyl	P01	+	+
Regalia	*Reynoutria sachalinensis*	P05	+	+
ZeroTol 2.0 + OxiPhos + TerraGrow (spray and drench program)	hydrogen dioxide and peroxyacetic acid + mono- and di-potassium salts of phosphorus acid + *Bacillus* spp. and *Trichoderma harzianum*	N/A + P07 (33) + 44 and BM02	+	+
Kocide 3000	copper hydroxide	M1	+	+
Badge SC	copper hydroxide + copper oxychloride	M1	+	+
Cueva	copper octanoate	M1	+	+
MasterCop	copper sulfate pentahydrate	M1	+	+
Areca	aluminum tris (O-ethyl phosphonate)	P07 (33)	+	+
Kasumin 2L	kasugamycin	24	+	-
FireLine 17WP	oxytetracycline	41	+	-
FireWall 17WP	streptomycin sulfate	25	+	-

References

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Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication. Use of trade, brand, or active ingredient names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar and suitable composition, nor does it guarantee or warrant the standard of the product. The author(s) and Tennessee State University assume no liability resulting from the use of these recommendations.

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