Fire Blight in ‘Bradford’ Pear

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Abstract. Naturally occurring fireblight disease incited by Erwinia amylovora (Burr.) Winslow et al. was observed on old trees of ‘Bradford’ pear (Pyrus calleryana Deane.). Affected twigs dropped from the trees by midsummer leaving no trace of symptoms or disfigurement of the trees.

‘Bradford’ pear is widely grown as an ornamental tree in many U.S. cities and suburban areas. It was selected from over 40 kg of Pyrus calleryana seed collected in the mountains near Ichang, China, in 1957 by Reimer and the pioneer plant explorer Frank Meyer (5). It was evaluated at the U.S. Plant Introduction Station in Glenn Dale, Md., and named for a long-time employee at that station. ‘Bradford’ has been called ‘the tree for all seasons’ because of its ability to exhibit a succession of displays from March to November. The tree has rapid early growth, is resistant to insects, and thrives under a wide range of soil types and moisture conditions (1, 2, 8).

Pyrus calleryana is recognized as having greater resistance to Erwinia amylovora, the inciter of fire blight disease, than most Pyrus species (4, 5, 6, 7). However, since 1976, several trees of ‘Bradford’ at the Glenn Dale Station and on the campus of North Carolina State University, have shown fire blight symptoms. In this report we describe the reaction of ‘Bradford’ pear to infection by E. amylovora.

Affected trees at both locations were 15 to 30 years old when diseased twigs were first observed. At Glenn Dale, 5 to 30 blighted twigs were observed on 6 of 30 large trees along 1 street located 50 to 100 m from about 500 foreign accessions and cultivars of pears, some of which are annually devastated by fire blight. At North Carolina State University, blight was observed in 1976, a year in which temperatures were unusually high in late February and early March, when the trees were in full bloom. Ten to 50 blighted twigs developed on each of 5 campus trees. Blighted blossoms and twigs have developed in each of the past 6 years.

In some respects the course of the disease was like that seen in many commercial cultivars of P. communis L. The infection apparently occurs through the blossoms and tips of new growth. As it moves down the twig, the leaves turn dark brown, and the typical ‘shepherd’s crook’ symptom is apparent (Fig. 1). Diseased twigs shrivel and become dark brown. In other respects the disease in ‘Bradford’ trees was different from that usually seen in commercial cultivars, attesting to the relative resistance of this cultivar to E. amylovora. By late May the infection had progressed only 9 to 30 cm down the twigs. On July 1, most of the blighted twigs could not be found. Upon closer inspection they were found on the ground, having fallen without apparent damage or disfigurement to the trees. The few remaining affected twigs on the tree had broken at the advancing margin of the diseased area and were dangling from the trees. Their fruit was shrivelled, hard, dark brown, and 3 to 4 mm in diameter; normal fruit of ‘Bradford’ is 7 to 8 mm in diameter. By September each year, no disease symptoms could be seen in any of the Glenn Dale trees.

In an experiment at Raleigh, more than 100 succulent shoots of 1 ‘Bradford’ tree were inoculated with E. amylovora. Very little infection occurred, and death of shoot tips was restricted to 1 cm or less.

Fire blight and another disease called bacterial blossom blight, caused by Pseudomonas syringae van Hall, are difficult to distinguish based on symptoms (3). The disease described here was associated with the fire blight organism by culturing E. amylovora from naturally infected trees at Raleigh. The question remains as to whether only unusually virulent strains of the bacterium infect ‘Bradford’ pear. It is intriguing that fire blight has not been observed in ‘Bradford’ trees less than 10 years old although flowering begins after 4 years of age. It is obvious that ‘Bradford’ has substantial resistance to fire blight, since it remains an attractive tree in an immediate environment of numerous severely diseased and disfigured accessions representing many Pyrus species. Most interesting was that at Glenn Dale infected twigs broke off at the advancing margin of the diseased tissue, so that by midsummer no sign of the disease remained. The net effect is that tree growth, shape, flowering, and coloration are essentially unaffected by fire blight.

When fire blight is severe in what is thought to be a ‘Bradford’ tree, one should check for a graft union. In older trees the union may be apparent only by difference in the bark between scion and rootstock. If the tree was not grafted it is either another cultivar or a ‘Bradford’ seedling, as seedlings of ‘Bradford’ vary considerably in their reaction to fire blight (6).

References


