

AGRICULTURAL EXPERIMENT STATION
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FIRE BLIGHT (PEAR BLIGHT) OF PEARS, APPLES, ETC.

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INTRODUCTION

There are few parts of Oregon that have not been invaded by this disease. It is especially troublesome in the Rogue River Valley and in some parts of eastern Oregon. Although occasionally met with, the disease has rarely caused serious losses in the Umpqua, Willamette, and Hood River Valleys. Evidently the environment is seldom favorable for rapid fire-blight development in these localities. Fire blight has not usually been found along the coast.

Fire Blight Spreads Rapidly. -- If not detected in its first attacks in an orchard and promptly eradicated, the disease increases rapidly when conditions are favorable, and it becomes a matter of great expense and difficulty to overcome it. In those sections of Oregon where the disease seems successfully held in check, the fight has been made a distinctly community fight, and funds have been provided for the careful and thorough inspection of the orchards throughout the district, and for the enforcement of the eradication measures necessary for the control of fire blight. Where this has not been done, the disease has sometimes resulted in tremendous losses to both pear and apple growers.

If any grower discovers a diseased condition that he suspects may be fire blight, he should send a fresh specimen at once to the Oregon State College, at Corvallis, or to his local fruit inspector or county agent for identification. If it proves to be fire blight, steps should at once be taken to locate the source from which it entered the orchard and by the adoption of proper methods, to eradicate the disease from the grower's own place and from the entire neighborhood. No one should try to eradicate the disease himself until he finds out from a reliable source just how to proceed. Because of the extremely contagious nature of the disease, ignorant efforts may easily result in spreading it instead of checking it.

THE NATURE OF THE DISEASE

Fire blight is caused by bacteria of a particular kind (Bacillus amylovorus). It may be recognized in general by the wilting and dying of blossoms, spurs, twigs, or branches, and sometimes by a shrivelling rot of the fruit. The dead foliage clings to the twigs, turning black in the case of the pear, browning

in the apple. The bark invaded by the bacteria also turns dark colored. When the disease is very active, bacteria ooze out of the affected parts in pearly drops that contain millions of individuals. This ooze is attractive to insects, which become contaminated with the germs and easily spread the disease. The exudation also may be washed by rain or spattered onto foliage and green shoots and start new infections in this way.

Disease Winters in Affected Trees. -- The disease is carried over the winter in the margins of blight-killed bark areas known as hold-over cankers, or in diseased spurs and twigs. In the early spring the bacteria become active in these places. From these sources, fire blight is carried by rain drip or by insects to the blossoms or tender leaves and shoots, thus producing new infections that develop rapidly. The disease is often spread by unsterilized pruning tools. Pruners should always sterilize their pruning tools so as to carry no blight from one tree to another. Any part of the tree may be attacked. The trouble usually begins in the spring as a blossom blight. Later twig blight and limb cankers make their appearance. Water sprouts are very susceptible, and the blight makes its way rapidly down such shoots to the trunks or roots, where body blight, collar rot, and root blight may develop with the most serious consequences.

The season of most rapid development of fire blight corresponds with the season of most active growth of the tree, and warm, moist conditions which are conducive to tree growth also favor the increase of the disease. In general, the healthiest and most vigorous trees suffer the most severe attacks. In addition to the apple and pear, quinces are very susceptible. Native pomaceous trees, such as Wild Crab, Hawthorne, and Service Berry are also attacked.

GENERAL CONTROL MEASURES

The Southern Oregon Branch Experiment Station for many years has been working toward the development of blight-resistant root and trunk stocks. Although the ultimate solution of the fire-blight problem may be through blight-resistant varieties, we must for the time rely on methods outlined below.

Surgical Methods

The only successful method of fighting fire blight, whether in a single orchard or in an entire community, is by removing the diseased parts or tissues from affected trees as rapidly as infections are discovered, and by cutting out all hold-over cankers. In the fall the trees should be gone over and inspected branch by branch and limb by limb. All dead parts must be cut out and the wounds sterilized. This eradication of hold-overs is of tremendous importance, and where thoroughly done, is of immense benefit. Then, as the disease makes its appearance during the growing season, active efforts should be made to detect and eradicate every new case. In cutting during the most active period, the bark should be removed or the branch cut back at least from one to two feet below the point of lowest evident discoloration. If the outbreak is serious, such cultural methods should be adopted in the orchard as will check the growth of the trees and thus tend to check the advance of the disease. Irrigation should be reduced or omitted entirely whenever the disease appears to be getting out of control.

Cutting Out Root Blight Absolutely Necessary

Not only should the source of infection above ground be carefully eliminated, but it is just as important to inspect the crown of the tree below ground every fall, or whenever the appearance of the top suggests trouble down below, for signs of root and trunk blight, which may be a very important source of loss, and a most effective means of carrying over the disease from one season to the next. The earth should be thrown away from the base of the tree and main roots, and search made for the slightest trace of blight discoloration. One practical way is to take a small gouge and chisel out tiny bits of bark at three-inch intervals entirely around the trunk just above the main roots. Where any sign of disease is discovered, the entire affected area is cut away carefully, and the cut surface is disinfected.

DISINFECTION

All wounds made in blight cuttings or in searching for blight in the roots, or in pruning an orchard where blight has been present, should be carefully disinfected with Reimer's solution, made by combining corrosive sublimate and mercuric cyanide, according to the following formula:

Reimer's Blight Disinfectant

1 part by weight of corrosive sublimate
 1 part by weight of mercuric cyanide
 500 parts by weight of water

This solution can be prepared at any drug store. It should be kept in glass, porcelain, or wooden containers only, as it will attack metals. The material is a deadly poison and should be so labelled and kept out of reach of children. Keep a sponge or cloth soaked in the solution and wash the surface of every wound. The cutting and pruning instruments ought to be disinfected after each cut. Do not use the solution after it has become dirty, and keep the sponge freshly wet while it is being used. Brush and bark removed from trees should be burned promptly and not left on the ground to attract insects.

Zinc Chloride

While zinc chloride solutions have been used with a degree of success for several years in California to stop the spread of blight cankers in pears, according to methods worked out by the California Experiment Station, Oregon growers have hesitated to adopt this method because of the difficulty of complete elimination of hold-overs on the one hand, and the danger of injuring healthy bark tissues on the other. Furthermore, it is a question in the minds of some whether the method worked out for California conditions would be reasonably effective or safe under Oregon conditions, and on different varieties of pears.

Special Suggestions

Probably there is no fire blight district in America where more consistent and effective control of the disease has been maintained for many years than in the Rogue River Valley, Oregon. The following suggestions have been

contributed out of the experience of the man who has directed the work there in recent years, County Agent L. P. Wilcox, of Medford:

"The only sure method of blight eradication as determined by experience in the Rogue River Valley is cutting out of all infected and diseased tissue. The destruction of this diseased tissue is necessary in order to reduce the possible number of sources of infection.

- "1. The Number of Men Cutting Blight should be large enough so that the entire orchard is thoroughly gone over once every three or four days. This is especially true during the height of the season.
- "2. Method of Cutting. Blight cutters should be quick of eye and thorough in their observations of diseased parts in the tree. A systematic search should be made of each branch for any signs of diseased tissue. Particular attention should be paid to the center of the tree, for infected fruit spurs in the region mean an infected scaffold branch or leader, which, if allowed to grow, may mean the loss of $1/3$ to $1/4$ of the tree. Look for any dried leaves, dried up fruit, or dark, water-soaked appearing bark. Cut out all diseased branches and do not spare the wood. Go two feet or more below the extent of the disease, as indicated on the surface. The greatest trouble in the cutting of blight is with 'short cuts' or cases where cutters do not get below the disease. Disinfect each cut, and the tool doing the cutting after removing each piece of blight.

Where individual trees show a tendency to blight badly, such trees should be marked and visited each day for the purpose of removing new blight showing up at that time. Emphasis should be given to the cutting plenty of distance below the disease and not to spare in the use of disinfectants.

- "3. Tools and Equipment. Most cutters carry the following tools: A two-foot pruner, pruning saw, hooked-blade knife. Other equipment necessary: ladder, glass bottle as a container for disinfectant, and a sponge for applying solution to tools and cuts. Never attempt to cut blight with a pole pruner.
- "4. Removal of Hold-Over Cankers. A thorough trunk and root test should be carried on each fall and winter so that all trees with blighted roots or crown can be detected and removed before the bloom period."