FRUIT DISEASES FOUND ALONG THE HUDSON.

F. H. HALL, F. C. STEWART AND F. H. BLODGETT.

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During the past season a study has been made of the fruit diseases prevalent in the Hudson Valley. This work was taken up by the Station Botanist as Chairman of the Committee on Plant Diseases of the Eastern New York Horticultural Society. Personal visits to the section were made by both the Botanist and his assistant; and additional information came in answer to a circular letter sent to members of the Society.

Owing to the long-continued drought plants were very free from disease. Dry weather is as unfavorable to the little organisms producing most fruit diseases as it is to the larger plants upon which the minute fungi grow. The survey was of great value, nevertheless, in many ways. Several centers of infection and seats of what may be called chronic cases were located, a few interesting new troubles presented themselves for study and some peculiar examples of mistaken identity came to light.

**Diseases of Pome Fruits.**

It has probably been many years since apples in the Hudson Valley have been so free from disease blemishes as in 1899. Twig blight, leaf spot, sooty blotch, fly speck and rust were very rare. Even scab, the most common fungus pest of the orchard,
was entirely lacking in three of the ten counties bordering the Hudson and rare in the other seven. At Washingtonville scab spots were common on twigs of the Lady apple, a variety very susceptible to this form of attack. Apple canker, the newly-studied disease described in Bulletin 163, was found firmly established in some localities. Many Spitzenberg trees have been killed by it in Albany County, and in Rockland County it is troublesome on Sour Bough.

From Schodack Landing came a report that leaf-spot was very prevalent, some orchards losing a quarter of their foliage; but examination showed the damage to be due to insect injury, not to disease. The work of the "Resplendent shield-bearer" spotted the leaves, not the growth of a fungus.

Russeted apples were common near Hudson; but this trouble and the sun-crack or "Southwest blight" occurring near Washingtonville are of physiological origin. Probably the russetting was caused by freezing of dew on the young fruit or by spraying with Bordeaux mixture in cloudy, damp weather; and the sun-crack by excessive heating by the sun when the trees were frozen. The rapid advance of decay in winter apples, prevalent along the Hudson as in other parts of the State, was probably due to the hot weather which ripened the fruit prematurely.

Of the fungous troubles of the pear, none were so common or so destructive as in 1898. Scab diseases appears to have been quite noticeable in Columbia County, but rare elsewhere; the dreaded fire-blight occurred in only a few localities; and leaf-blight and leaf-spot did no serious harm.

As with the apple, the cankered, or rough, condition of the bark seems increasingly common. This "body blight" is marked by the rough, cracked, unhealthy appearance of the trunks and branches due to the numerous patches of depressed, dead, dried bark and their cracking away from the healthy wood. Recent investigations made at the Station seem to prove that this condition is produced by the same fungus as that causing apple canker. The disease was found in all counties visited except Rockland, Putnam and Westchester. One orchard in Greene County has been so severely attacked that several trees have died.
Quince diseases. The fruit spot and leaf-blight of the quince are symptoms of the presence of the same fungus parasite, which seems to have thriven well in Columbia, Westchester and Orange counties. One Quince grower at Ghent became so alarmed by the prevalence of the disease that he dug out all his bushes. This was a needless panic; for the injury might have been very cheaply and easily prevented by spraying with Bordeaux mixture.

STONE-FRUIT DISEASES.

Fruit rot. As usual, fruit rot was the worst disease of those stone fruits which bore any crop to rot, but it was much less destructive than during the preceding season. So few peaches and apricots were produced that the disease could do little damage upon these fruits; but, according to the reports, the injury upon cherries and plums ranged from "a little upon some varieties" to 50 per cent. of the crop. Sweet cherries suffered worst, the disease prevailing more or less in Westchester and Rockland counties and at Kinderhook, Columbia Co., Delmar, Albany Co., and Highland, Ulster Co. Upon plums it was reported quite abundant in Westchester, Greene and Rensselaer counties; and is said to have destroyed two-thirds of the crop at Millbrook, Dutchess Co., one-half at Old Chatham, Columbia Co., and one-fourth at Annandale, Ulster Co., Newburg, Orange Co., and Blauvelt, Rockland Co.

Cherry diseases. Black knot, witches' brooms, and leaf spot were all practically absent or made no spread during 1899; and but one tree affected with powdery mildew was reported.

Some damage was noticed from winter injury, especially in one case where the trees stood in a depression and went into the winter with "wet feet." This well illustrates the damage which may result from imperfect drainage.

Peach diseases. Peaches suffered worst from the hard freeze in February, which ruined nearly all the fruit buds, did considerable harm to twigs and even killed some trees. There was no alarming outbreak of yellows, but the disease is ever present with the Hudson Valley peach grower and is one of his most dreaded enemies. Leaf
curl was reported in but few places and it is possible that in these cases the work of plant lice was mistaken for disease.

Wherever European varieties of plums are grown in the Hudson Valley, black knot is usually very destructive; but it probably spread little during 1899. Japanese varieties are practically exempt from injury by this disease. Leaf blight or "shot hole" effect may result from the attack of a fungus; but several instances were reported or observed in which the effect was due to the action of Bordeaux mixture. Even properly made, dilute mixture frequently produces this effect upon tender foliage.

**Grape Diseases.**

The most interesting, though not the most prevalent or most destructive disease of the grape, was root rot or walnut tree? a root rot, found at Middle Hope. The vines affected were in one section of the vineyard and were thought by the owner to have been killed by a walnut tree which stood not far away. Upon examination, however, the roots of the dead vines were found covered with a network of white threads. These threads are part of the structure of a fungus, and it is most probable that their presence, rather than the roots or shade of the walnut, caused the death of the grape vines. Peculiarly enough, gooseberry bushes in a plantation at Marlboro were also thought by their owner to be dying from the influence of a walnut tree; but their roots were found covered with threads of a fungus similar but not identical with that on the grape roots. The fungus, in each instance would appear to be the true cause of the death of the plants: but doubt rests upon this conclusion in case of the gooseberries, for apparently healthy bushes at the Station were found to have their roots covered with the white network of mycelium of the same fungus.

Black rot was the most destructive grape disease, the damage wrought by it varying from 75 per cent. at West Nyack, Rockland County, and 50 per cent. in some vineyards in Westchester County to nothing in many Bordeaux-sprayed vineyards. This last condition should prevail in all vineyards; for Bordeaux mixture, properly applied is an almost certain preventive of the disease.
This disease, which is obscure in its origin, is **Black knot.** rare in the Hudson Valley, though common in Western and Central New York. It resembles the black knot of plum and cherry, but is said not to be a fungous growth but to be due to the action of frost.

**SMALL-FRUIT DISEASES.**

The true leaf-spot of currants may be caused by any one of three distinct fungi, all easily prevented from germination and growth on the plants by spraying with Bordeaux mixture. But often complaints come that cases of currant leaf-spot refuse to yield to spraying. The survey has revealed the cause, in some cases at least; for investigation of an instance of reported failure to control the disease by spraying showed that no disease, but an insect, the four-lined leaf bug, was attacking the bushes. **Currant leaf-spot.** Currant growers should learn to distinguish the two injuries and if the spots upon the leaves are small, reddish brown or black and angular at first, brown, dry and *transparent* later it will be of no avail to use Bordeaux. The transparent spot reveals the work of the bug, which has thrust his beak beneath the skin of the leaf and sucked out its juices. Several cases of such insect injury were found; but the true fungous leaf-spot was rare.

**Currant cane-blight.** was the most destructive disease of currants found in the survey. The leaves on one or more canes in a hill suddenly wilt and the canes soon die and become dry. A similar blight of currants occurring in Western New York is said by Dr. E. J. Durand in a Cornell Experiment Station bulletin to be due to the fungus, *Nectria cinnabarina*; but this disease found in the Hudson Valley is due to another fungus which does not fruit upon the currant; hence its identity has not been determined. The blighting canes should be cut out and burned, cutting well below the lowest wilted portion with a knife, frequently disinfected, to prevent spread of the fungus to other canes.

The most interesting disease of the gooseberry has been noted under grape root rot. Powdery mildew is always the worst enemy of the gooseberry grower and was destructive along the Hud-
son in 1899 in Ulster and Columbia counties. Downing gooseberries, sprayed with Bordeaux, escaped with little injury, while half the fruit of Industry, with the same treatment, was mildewed.

The Lucretia dewberry at Highland was affected by a peculiar trouble for which no cause was found. Usually from one to four of the canes in a hill were dead and others healthy. For a few inches above the soil the affected canes were green and healthy, above which point would be a blackened portion which seemed to be the seat of the trouble. No trace of fungi could be found.

Blackberries were troubled to some extent with orange rust, a disease very difficult to control and almost impossible to eradicate. Digging out and burning the affected plants as soon as the disease appears is the only effective treatment. An interesting feature of this disease was observed upon blackberries, raspberries and wild dewberries. The prickles upon rusted canes were fewer and less prominent. In some cases the difference between healthy and diseased canes is so marked in this respect that rusted canes could be picked out even in the winter.

The common raspberry diseases have all been found; but in few localities and not in virulent form. Anthracnose, rust, root galls and leaf-spot presented no striking features. A cane-blight was found at Coxsackie, Poughkeepsie and Voorheesville on black raspberries. Old plantations and old canes are usually attacked, and the disease is worst on high ground. It occurs in wet seasons as well as dry ones. The canes commence to die about the time the fruit begins to ripen, a brownish-black discoloration appearing upon the bark, sometimes only upon one side of the cane. The disease is believed to be due to a fungus, though it may be aggravated by drought.

Leaf-blight or leaf-spot was quite destructive on some varieties, as on Gandy at Poughkeepsie, where Clyde was almost exempt, and on Hunn, which was practically ruined by the disease at Ghent in 1898, while Parker Earle was but slightly affected.

Another trouble, found only on the Hunn, was a sun-scald (?) appearing as dead, brown V-shaped spots involving the tips and upper parts of the leaflets.