

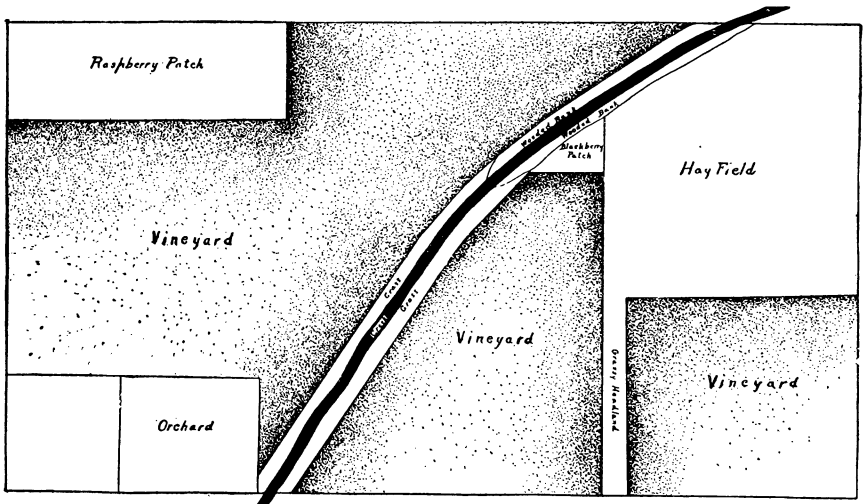
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DEPTH OF SHADING INDICATES EXTENT OF "HOPPER" FEEDING.

CONTROLLING GRAPE LEAF-HOPPERS IN 1912.

SUMMARIZED BY
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FROM BULLETIN BY
F. Z. HARTZELL.

PUBLISHED BY THE DEPARTMENT OF AGRICULTURE.

CONTROLLING GRAPE LEAF-HOPPERS IN 1912.

F. H. HALL.

**Weather aids
in contest.**

Many growers in the Chautauqua grape belt feared very extensive damage from leaf-hoppers in 1912, for millions of those insects went into winter quarters in the fall of 1911.

In spite of seemingly unfavorable hibernating conditions — heavy rains, sleet storms and wet snows to beat down the winter refuges of the insects and severe cold to freeze them and keep them frozen in their icy beds for months, no notable diminution of the numbers was observed when they emerged in the spring. But the remarkably cold summer and the long-continued, wet weather in late summer and early fall proved fatal to the nymphs, so that far less damage was done to vineyards as a whole than was feared, though many suffered severely and enough of the tiny pests matured and went into hibernating quarters in the fall of 1912 to threaten serious injury in many vineyards in 1913 unless active measures are taken to combat them.

**Destroy
hibernating
quarters.**

No really new method was worked out in 1912, but those recommended in Bulletin 344 proved very effective when thoroughly applied. The experience of this season emphasizes the necessity of destroying the winter refuges of the insects, for whenever there were left undisturbed, to shelter the hoppers, patches of weeds along the fences, a grassy headland in the vineyard, a raspberry or blackberry patch adjoining it, underbrush with collected leaves in adjacent woodlands or similar rubbish in ravines or swales near at hand, the tiny pests would be found swarming in the edges of the vineyards, but gradually decreasing in number until at the center or opposite side there might be few or none of them. Thorough cleaning up of such places, especially by fire after the adult hoppers have gone into winter quarters, is one of the most effective measures to be taken; for this not only destroys millions of the insects but it also reduces materially the supply of spring food plants and thereby discourages the survivors when they emerge in the spring. No collection of rubbish should be overlooked if it can with any ease or safety be burned, for thousands of the pests may collect in a small accumulation of leaves that have piled up about a broken-

*This is a brief review of Bulletin No. 359 of this Station on The Grape Leaf-Hopper, by F. Z. Hartzell.



PLATE I.— SOME HIBERNATING PLACES OF GRAPE LEAF-HOPPERS



PLATE II.— GRAPE FOLIAGE WHEN FEEDING BY GRAPE LEAF-HOPPERS BEGINS; REFUGES OF
"HOPPERS."

over tuft of tall grass. The ordinary cover crops in the vineyard, which remain green until late in the fall, do not appear attractive to the hoppers as hibernating quarters. The figures given in the two plates show types of grass and weed borders that were found to shelter great numbers of the hoppers. The foot rule in some of the figures shows how small these patches are, yet they were marked centers of infestation.

Early feeding.

Especial attention should be given wild blackberry and raspberry patches; for these are favorite food plants of the insects, and carry them over from their first appearance until the grape foliage has made some little growth. Other food plants that should be destroyed when practicable are wild strawberry, burdock, catnip and Virginia creeper. The hoppers feed on these wild plants until the middle of May or later, not passing to the vineyards until the grape leaves are of considerable size. (See Plate II, fig. 1.) By June 1st, practically all of the insects have made their way to the grape vines.

Fortunately for the vineyardist the hoppers seem to prefer as food, after they have attacked the grapes, the leaves low down on the vines, particularly those on the suckers that are later removed. Here, of course, their feeding does comparatively little harm. These suckers should be removed, however, before spraying begins.

**Control
by spraying.**

Against the later attacks by the nymphs spraying with nicotine is found very effective if thoroughly done; and the automatic "hopper" sprayer described in Bulletin 344 makes it possible to do effective work economically. This attachment, on sprayers of many makes, has proven thoroughly practicable; though some care in driving is necessary to prevent bending or even breaking the booms. In seven vineyards in which experimental spraying was done, the hoppers were so well controlled that the uniform green of the sprayed vines contrasted strongly with the yellowish, sickly tinge of the vines not sprayed, either those left as checks in the experimental vineyards or those in adjoining untreated plantings. One spraying with Black Leaf 40, one part to 1,600 parts of water, was sufficient to give good control of the insects, even in two cases when the nymphs had reached the fifth instar, or last stage before becoming adults.

**Chance for
wrong
diagnosis.**

In some of the vineyards the vines appeared yellowish, though the "hoppers" were well controlled, a condition which unfortunately prevailed in the Station experimental vineyard at Fredonia. This unhealthy condi-

tion was due not to the insects but to a disease or physiological trouble, with quite similar symptoms. The differences between the yellowing due to hoppers and that due to this "leaf blight (?)" should be learned; since it is merely a waste of materials to spray with nicotine for the latter trouble. Absence, or presence of only small numbers of the hoppers, coupled with yellowing of the leaves is of course a good indication that the insects are not responsible; and if the leaves show yellow and die at the margins first, with dark areas along the midrib and veins, it is the "leaf blight (?)" rather than "hoppers" that are to blame, for their punctures lead to a quite uniform yellowing of the leaf, at first in the form of minute yellowish dots. The veins also will have a yellowish, punctuated appearance.

**Effect of
hopper injury.**

The grape leaf-hopper, as it destroys or makes useless much of the foliage, reduces the crop of fruit for the year of the attack and weakens the vines; but the most striking result of its work is to lower the quality of the fruit. Concord grapes when well ripened are of a rich blue-black color; but when "hoppers" infest the vines, the color changes to a purplish or reddish hue. The sugar also is lessened and the acid increased, so that grapes from badly injured vineyards become unfit for making grape juice and unattractive for market.

In each of the vineyards under experiment samples were taken of grapes from sprayed and from unsprayed vines and the juice pressed out and analyzed. In every set of samples the grapes from the sprayed vines showed more sugar, the increases varying from 8 to 68 per ct. in the different pairs of samples; while the unsprayed grapes had more acid than those from sprayed vines in every case but one, the differences ranging from 0 to 20.6 per ct.

In selecting such comparison samples it is essential that the grapes be taken from corresponding portions of the sprayed and unsprayed vines, since grapes grown on the lower, shaded portions of a vine are lacking in sugar and have an excess of acid as compared with those grown on the upper parts of the vine.

Summary. The work of 1912 on the grape leaf-hopper, then, enforces the practices previously recommended — the destruction of winter refuges

of the insects, such as weeds, clumps of dead grass, brush, and particularly clusters of fallen forest leaves; getting rid of spring food plants like raspberry, blackberry, wild strawberry, burdock, etc.; allowing suckers to remain on vines until spraying time; and thorough spraying with a nicotine preparation.