New York Agricultural Experiment Station.

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EXPERIMENTS IN RINGING GRAPE VINES.

WENDELL PADDOCK.

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*Connected with Fertilizer Control.
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EXPERIMENTS IN RINGING GRAPE VINES.

SUMMARY.

Experiments in ringing grape vines were begun in 1896 and continued through two seasons. The first season the effect on the fruit of some varieties was very marked. Fruit on ringed vines of Empire State was not only larger in both bunch and berry, but began ripening 21 days before fruit on unringed vines. Other varieties did not show any gain in size or earlier maturing of the fruit when ringed.

The fruit of some varieties, as the Delaware, showed a lack of quality when ringed, while thin-skinned varieties, as the Worden, showed a greater tendency to crack when grown on ringed vines.

The second season the effect of ringing was not nearly so marked thus showing that the season has something to do with results obtained.

That the effect of ringing is devitalizing to the plant there can be little doubt, but when judiciously managed the cumulative effect on strong growing varieties need not result disastrously.
INTRODUCTION.

Briefly stated, the operation of girdling, or more properly speaking, ringing, grape vines consists in removing a ring of bark from the bearing arm about an inch wide or wide enough so that the bark will not heal over the wood that has been laid bare.

The effect sought in ringing is to produce earlier ripening of the fruit and larger bunches and berries. The explanation of this effect on the fruit is readily found when the movement of the food within the plant is understood. The food materials taken in by the roots pass up through the outer layers of wood to the green parts of the plant. Here new material for growth is formed and the portion that is not needed by the leaves and other green parts passes downward, for the most part through the inner bark, to be distributed wherever it is needed. The wood is not disturbed in the process of ringing, therefore the upward movement of the solutions is not interfered with; but since the downward passage takes place through the inner bark the flow is arrested when it arrives at the point where the bark has been removed. Consequently the parts of the plant that are above the point where the ring of bark has been removed receive more than a normal supply of food, which tends to produce increase in size and earlier ripening of the fruit.

It will be seen that the food that passes into the ringed arms is mostly lost so far as building up the plant itself is concerned, hence the operation must result in a drain on the plant's vitality. However, in localities where ringing is extensively practiced, vineyards are frequently pointed out that have been ringed ten or fifteen years in succession and are still yielding paying crops. Growers have learned to do the work intelligently; for instance, where the vines are grown on the two-arm Kniffin system the ring of bark is commonly taken from both arms just beyond the fifth bud. It has been found that the ten buds that are left to the vine produce enough leaf surface to supply the food necessary to keep the vine in a vigorous condition, providing the vineyard has
received proper care. Where the four-arm Kniffin system is used some growers ring the two top arms only, leaving three or four buds on each for renewal. The two lower arms, it is claimed, will bear as good fruit as adjacent vines that have not been ringed. With the renewal system the two main arms are usually ringed just beyond the renewal bud. With this system of training several shoots are left in the center of the plant which supply a sufficient amount of plant food to support the vine. Some growers find it more satisfactory to ring their vines every other year since with this method the vines are given an opportunity to recover from any loss of vigor they may have suffered.

With any system of training, in order to get the best results, the vines must not be allowed to carry too large a crop of fruit. Since each ringed arm acts independently so far as maturing its fruit is concerned it will be seen that there is a certain relation between the leaf surface and the amount of fruit on the ringed vine. A large amount of fruit with insufficient leaf surface on the ringed arms results in inferior or even worthless grapes; hence the importance of an abundance of foliage free from plant disease and insect attack. It is equally important that there be an abundance of healthy foliage back of the rings in order to supply the plant with sufficient nourishment to keep it in a vigorous condition. All fruit back of the rings should be removed, for if allowed to remain it does not properly mature and only adds a useless drain on the plant's vitality.

The increase in size and early maturing of the fruit is commonly thought to take place at the expense of quality and firmness. Our experience goes to show that this is true of some varieties; whether or not it is a general principle is not so clear.

Fruit from ringed Delaware vines in our experiments was found to lack much of the fine quality that is characteristic of this variety. On the other hand the loss of quality was not noticeable in some of the less delicately flavored sorts. The fruit of those varieties that crack easily, as the Worden, was found to be more marked in this characteristic when grown on ringed vines.

Growers have found that the best results with ringing are obtained by doing the work when the grapes are about one-third
grown; the exact time depending on the season and variety. The operation may be performed with a knife, but where ringing is extensively engaged in a tool designed for the purpose is used.

Figs. 1. and 3. Tools used in Ringing Grape Vines; 2. Vine Showing Ring of Bark Just Removed; 4. Same at Close of Season.

In order to obtain some definite data on the subject of ringing grape vines experiments were begun in 1896 in two sections of the State. The results of the experiments as given in the following pages are not at all conclusive, but are offered as a confirmation of some of the knowledge that the growers have gained.

EXPERIMENTS AT POUGHKEEPSIE.

Experiments in ringing grape vines were begun in the vineyard of Mr. Walter F. Taber, Poughkeepsie, N. Y., in 1896 and continued through two seasons. Different varieties were selected for the experiment and since Mr. Taber trains his vines on the two-arm Kniffin system both arms of all vines save four were ringed just beyond the fifth bud. With the remaining four vines both arms were ringed just beyond the renewal bud.
All vines were ringed June 20. Notes were taken on the condition of the fruit August 20 as follows:

Concord.—A remarkable difference in the condition of the fruit on the ringed and unringed vines. The fruit on the former vines is much farther advanced, though not yet ripe.

Delaware.—Not much difference in size or earliness but the quality of the fruit on the ringed vines is decidedly inferior to that on unringed vines.

Empire State.—Fruit on ringed vines is now about ripe. Nearly two weeks earlier in ripening than the unringed vines.

Moore's Early.—No noticeable difference between the fruit on ringed and unringed vines, though the berries of the former are a little larger and not as good in quality.

Niagara.—Fruit on ringed vines is somewhat larger and somewhat earlier, not yet ripe.

Worden.—Fruit on ringed vines a little earlier but no larger, more inclined to crack than fruit from unringed vines.

The following table is taken from a letter from Mr. Taber, which gives the season of ripening of the fruit on the ringed and unringed vines of the different varieties for 1896:

**Influence of Ringing on Ripening of Grapes.**

<table>
<thead>
<tr>
<th></th>
<th>Began picking.</th>
<th>Maturity advanced by ringing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concord, ringed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concord, unringed</td>
<td>Sept. 4</td>
<td></td>
</tr>
<tr>
<td>Delaware, ringed</td>
<td>Aug. 24</td>
<td>9</td>
</tr>
<tr>
<td>Delaware, unringed</td>
<td>Sept. 2</td>
<td></td>
</tr>
<tr>
<td>Empire State, ringed</td>
<td>Aug. 25</td>
<td>21</td>
</tr>
<tr>
<td>Empire State, unringed</td>
<td>Sept. 15</td>
<td></td>
</tr>
<tr>
<td>Moore's Early, ringed</td>
<td>About same time</td>
<td></td>
</tr>
<tr>
<td>Moore's Early, unringed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Niagara, ringed</td>
<td>Aug. 27</td>
<td>14</td>
</tr>
<tr>
<td>Niagara, unringed</td>
<td>Sept. 10</td>
<td></td>
</tr>
<tr>
<td>Worden, ringed</td>
<td>About same time</td>
<td></td>
</tr>
<tr>
<td>Worden, unringed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Days*
Plate I.—Fig. 1. Fruit of Empire State from Ringed Vine; 2. From Unringed Vine; 3. From Ringed Vine Back of Ring. Photographed Aug. 21, 1886.
PLATE II.—FIG. 1. FRUIT OF NIAGARA FROM RINGED VINE; 2. FROM UNRINGED VINE. Photographe Sept. 1, 1887.
No difference was noticed during the season between the vines that were ringed beyond the fifth bud and those that were ringed beyond the renewal bud.

In 1897 it was the intention to ring the same vines and in the same manner. The result is best given by an extract from a letter from Mr. Taber under the date of Nov. 3, 1897.

The same vines were girdled as last year excepting the two vines of Niagaras, one of which was dead and the other died soon after leaving out; these vines you will remember were girdled back to the renewal bud. This is evidently more than the vine can stand.

The effects this year were not as pronounced as last year. The fruit on girdled vines commenced coloring earlier than the others but when it was fit to cut there were bunches on ungirdled vines that were just as near ripe. One kind only, the Empire State, was improved in size and hastened somewhat in ripening, but changed more in size than in time of ripening.

EXPERIMENTS AT LODI.

The experiments at Poughkeepsie were duplicated in the vineyard of E. Smith and Sons, Lodi, N. Y. Mr. Smith trains his vines on the renewal system and as there are several shoots allowed to grow up in the center where none grow on vines trained on the Kniffin system the ring may be made closer to the renewal bud with less danger of injuring the vine. This is due to the larger amount of leaf surface left to build up the vine when trained on the renewal system.

In these experiments the ring was made just beyond the renewal bud. All vines were ringed June 29, 1896. The following notes were taken August 29:

Concord.—Bunches are noticeably larger and more compact, with larger berries on the ringed vines; now ripe. Two vines had but one arm ringed; the bunches on these arms are larger and compact while on the unringed arms on the same vine the clusters are small, loose and unripe:

Catawba.—Fruit on ringed vines will evidently be quite a little earlier.

Delaware.—Fruit quite a little larger in bunch and berry but no earlier in ripening and not as good in quality as on unringed vines.
Geneva.—Was able to pick out the ringed vines by the appearance of the fruit. The bunches on these vines were uniformly large and compact. Berries a little larger but much poorer in quality, quite sour as compared with fruit on unringed vines.

Niagara.—Bunch and berry on ringed vines are larger and finer in appearance; a little earlier in ripening. Not as good in quality, more acid than fruit on unringed vines.

In 1897 the ends of the ringed canes on part of the vines were cut back in order to see if this would make any difference in the quality of the fruit, the theory being that if the food required by the new growth could be made available to the fruit it would tend to produce better quality.

All vines were ringed June 29. The following notes were taken September 1:

Champion.—Bunch and berry at least one-third larger than on unringed vines.

Catawba.—Fruit on ringed vines is at this date a half larger and well colored. On unringed vines the grapes are still green.

Geneva.—Bunches on ringed vines are at least one-fourth larger and ten days ahead in ripening. Bunches much better filled out and nicer in appearance.

Notes were again taken on September 11, and at this date there was not so much difference to be seen between the fruit of the ringed and unringed vines. The weather had been very dry and hot which may in a measure account for such results.

Champion.—The fruit of this variety shows about the same difference on ringed and unringed vines as was noted on September 1.

Catawba.—This variety alone shows a striking difference. Grapes on ringed vines are now nearly ripe while on the unringed vines the berries are just beginning to turn.

Geneva.—The bunches on ringed vines are at least a third larger, more compact and better filled out. But little difference in the period of ripening.

Niagara.—Bunches and berries on ringed vines somewhat larger than on unringed vines but not a marked difference.

The fruit on the ringed vines that were cut back seems to be somewhat better in flavor and quality than that on untrimmed
vines. Fruit of Concord and Geneva, especially, on the trimmed vines does not have so much of the acid taste which is so noticeable in fruit from untrimmed vines.

RÉSUMÉ.

1. Ringing grape vines, generally speaking, produces an earlier ripening of the fruit and larger bunches and berries.

2. These results, however, depend on several factors, among which may be mentioned: Variety, season, an abundance or lack of healthy foliage, good culture or lack of it and the amount of fruit the vine is allowed to mature.

3. That some varieties suffer a loss of quality when ringed there is little doubt; other varieties do not appear to be affected in this manner by the operation. Cutting back the new growth on ringed arms appeared to result in giving better quality to the fruit.

4. The process is more or less devitalizing in its effect on the vine, depending in part at least, on the factors mentioned in the second paragraph. It has been found in practice however that some varieties when judiciously managed may be ringed for a number of years in succession with little injury to the vine.

5. Vines grown on the renewal system would seem to be better adapted to ringing than those grown on the Kniffin plan, since with the former more wood can be left to support the vine than is possible with the latter system.