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Bulletin No. 46

February, 1905

UNIVERSITY OF IDAHO  
AGRICULTURAL EXPERIMENT STATION

Department of Entomology

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THE GRAPE PHYLLOXERA

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By J. M. ALDRICH

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1905:  
NORTH IDAHO STAR SHOP  
MOSCOW

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## BULLETINS.

The regular bulletins of the Station are sent free to all citizens of Idaho who request them. Late Bulletins are :

38. Grasses and Forage Plants in Idaho.
39. Some Experiments in Fungus Diseases in 1903.
40. Winter Spraying for the Apple Aphis.
41. Grasshopper and Cricket Outbreaks.
42. Experiments in Pig Feeding.
43. Planting the Apple Orchard.
44. Alkali and the Treatment of Alkali Lands
45. Trap Rock of the Palouse Regions. Road Material

## THE GRAPE PHYLLOXERA.

J. M. ALDRICH.

The object of this bulletin is to call the attention of grape growers to the occurrence in Idaho of the above named enemy of the grape, to describe its mode of attack and the symptoms of its presence, to discuss methods of eradication, and especially to call attention to the great importance of starting new vineyards in such a way as to make them immune to its injuries thereafter.

The Grape Phylloxera (*Phylloxera vastatrix*) was first discovered in Idaho in 1901, when it was found in several vineyards at Juliaetta. Careful inspection at that time resulted in the entire digging up of one vineyard of some three hundred vines, and the removal of parts of three others. This action seemed to be sufficient, and for a year or two no more infested vines were found. Afterward it appeared again in the largest and best vineyard of the locality, showing that the first treatment was not thorough enough, some of the infested vines not having been found. Since then, in spite of careful attention on the part of the local horticultural inspectors the insect has spread to a considerable extent.

While both American and European grapes are affected, the Phylloxera works in its worst form almost entirely on the latter. The American grapes are affected mainly on the leaf, producing small galls or swellings of the tissue. These are very easily noticed. At the same time it occurs to some extent on the roots of the same vines, but does not in most varieties actually kill the roots; most American varieties withstand the root attack so well that no serious effect is produced.



In the European varieties the leaf is not attacked, but the insect produces a much worse effect on the roots, multiplying excessively and causing the larger roots to rot. Smaller roots often show galls or swellings, on the surface of which the insects are found. It is much more difficult for the grower to recognize the cause of the trouble in this class of grapes, as there is no appearance of the insect above ground. The main symptom is a weakened vitality, small growth, stunted leaves and fruit, and in two or three years the complete death of the vine.

Growers of the European varieties should observe their vineyards carefully, and on the appearance of these indications should seek the assistance of the local horticultural inspector, or send samples of roots from suspected vines to the Experiment Station for examination. To postpone action is the worst possible course to pursue.

Phylloxera is a native American insect. Prior to the settlement of the eastern United States, it occurred on the wild vines of that section. In the course of time the introduction of European varieties gave it more favorable conditions, and ultimately it was introduced on grape roots into France and other regions where the European varieties were extensively raised. It is unnecessary to describe the havoc it produced, especially in France and California, Thousands of acres of otherwise magnificent vineyards were destroyed. It is said that in considerable parts of France the principal fuel was stumps of grapevines that had been dug up.

The insect is a very small yellow louse, wingless except as hereinafter mentioned. It winters in a halfgrown condition, and produces eggs in the warmer part of the year. These eggs hatch into forms resembling the adult, and soon grow to maturity. The increase in one season is very great.

In vineyards of the European varieties, only the root form occurs, and the spread from vine to vine is comparatively slow,

being made underground. It is estimated at about three rows of vines a year.

Under favorable conditions, there is produced in some years a winged form, which comes out of the ground and flies away, thus spreading the infestation much more rapidly. The conditions determining the occurrence of a winged brood are not understood. In the eastern states it seems to be an annual occurrence, but in California it is not thought to occur so often; in fact, Professor Woodworth, entomologist of the California Experiment Station, thinks it does not appear oftener than once in ten years on the average, though there is no regular interval. In Idaho no winged brood has as yet been found at all, although the spread which occurred in Juliaetta prior to the discovery of the insect can hardly be accounted for on any other theory than the existence of the winged form.

Owing to the subterranean habits of the species, no satisfactory remedy for its injury has ever been found. The French government offered an immense cash prize for many years to the discoverer of a successful remedy, but without avail. In some cases valuable vines have been kept alive for years by annual treatment with carbon disulphide, which is poured into holes in the ground about the roots; but this would not be practicable under the conditions existing in Idaho. As a general rule, the prompt removal of all vines found to be infested, together with all other vines for three rows in all directions, has been found most effective. The difficulty of ascertaining just what vines are attacked is a great barrier to complete success in this, and in most cases too few are removed.

After removal of infested vines, it is necessary that the ground be kept entirely free from all vegetation for one year, in order to insure the death of all grape roots and consequently all Phylloxera. If a crop is raised in the land, some root may send up a shoot unnoticed, and so preserve itself and its colony of insects.



As it was discovered many years ago that the roots of most of the American varieties are comparatively resistant to *Phylloxera*, the idea of grafting the European top on an American root was early thought of. Dr. C. V. Riley, while entomologist of Missouri, gave much attention to this subject. Largely through his efforts, it soon became a practical method, and is now widely adopted. Unfortunately, it involves some additional labor and expense in starting the vineyard, and it has been the almost universal custom in new regions where there was no *Phylloxera* to start new vines on their own roots, simply planting cuttings. This has been the case in Idaho, and there is not a European grape in the state at the present time on a resistant root. Now that we can see a prospect of future trouble from *Phylloxera* in this state, it is time that new methods of propagation should be commenced. No more cuttings of European varieties should be rooted, but growers should start on a sound basis by taking the additional trouble to plant properly grafted vines.

There is considerable difference in the resistance of different American roots, and also a difference in the ease with which they take grafts of European varieties. On this account, there is not even yet a completely settled system of grafting among commercial propagators and growers. After some correspondence with California growers, I think the resistant varieties most favored as stocks are those called *Rupestris* St. George and *Riparia Gloire de Montpellier*, although several others are prominently mentioned. The Idaho Experiment Station is planning to experiment with some of the most valuable roots in Idaho, beginning this season.

The operation of grafting the grape is somewhat difficult, one experienced propagator of California reporting only fifty per cent of his work successful. The large vineyardists of California generally make contracts for this kind of work, paying about \$60 per thousand for grafted vines.

The European grape industry in Idaho is still in its infancy

but it is already evident that at Lewiston and along the canyons of the lower Clearwater and Snake Rivers, and perhaps in other warm, sheltered localities, there will in a few years be hundreds if not thousands of acres devoted to this fascinating and profitable branch of horticulture. Hence it is the part of wisdom to learn from the experience of other grape growing regions, and make our beginnings in such away that the work will not have to be done over again at some future, perhaps not remote, period.

Acknowledgments are due to E. H. Twight, viticulturist, and C. W. Woodworth, entomologist, of the California Experiment Station; also to Frank T. Swett, Martinez, Cal., and Geo. C. Roeding, Fresno, Cal., for information on California methods.

The habits of the Phylloxera as described are those of the root form, as observed in Idaho on European grapes.