

A NEW ROOT PEST OF THE VINE IN CALIFORNIA

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In 1883 Matthew Cooke in his book, "Injurious Insects of the Orchard and Vineyard," gave an account of an insect attacking the grape vine in California which he called the Imported Grape Flea-beetle (*Adoxus vitis*). He confused this insect with the true flea beetle, and this mistake has continued in the accounts of the insect that have appeared in the literature of the state ever since.

It is now known that this insect is closely related to the grape root worm (*Fidia viticida* Walsh) of the eastern states and is improperly called a flea beetle. The life history, as it has been worked out during the past season, is briefly as follows: The beetles appear in May and June, when they feed on the growing parts of the vine above ground, including the leaves, tender shoots, petioles, pedicels, and even the berry itself.

The eggs are laid in clusters of four or five to fifteen or twenty on the stump of the vine beneath two or three layers of the old bark. From eight to twelve days are required for hatching and the young larvæ make their way to the roots, where they feed until the vine becomes dormant. By September some are about full grown, while others are but half grown. These latter resume feeding in the following spring. Pupation occurs within from four to eight inches of the surface of the ground during the latter half of April. The pupal stage lasts two weeks and the beetles begin emerging about May first.

Two forms of the beetle occur in about equal numbers in the state, one being wholly black, while the other has the elytra, tibiae and basal half of the antennæ brown. These are known as *Adoxus vitis* and *Adoxus obscurus*, but they are undoubtedly simply two forms of the same species, since they are always found together and breed indiscriminately.

Adoxus vitis is a well-known pest of the grape in France and specimens received from there are identical with the brown form occurring here. Numerous specimens were sent me by Professor Valéry Mayet of Montpellier, France, but only two specimens of *Adoxus obscurus*, which he states is very rare, and found only on a plant of the marshy prairies, and never upon the grape vine. The *obscurus*, as it is known in France, is apparently a distinct species, while what has been called *obscurus* in this state appears to be simply a form of *vitis*. Specimens from France and California have been submitted to Mr. A. E.

Schwarz of the Bureau of Entomology for determination, but his report has not been received at the present writing.

This insect has been known to occur in California for a good many years and its economic status has been based entirely on its leaf-feeding habits. This above ground injury to the vine, while it has been very great in some cases, is really unimportant as compared with the more serious and permanent injury to the roots. In some vineyards the crop has been reduced a third or a half and in one instance that came under our observation this year, two or three acres of vines were dug up on account of the injury to the roots by the larvæ of this insect.

APHIS GOSSYPHII GLOV., AND ITS ALLIES—MEDICAGINIS KOCH, RUMICIS LINN., FORBESI WEED, OENOTHERIAE OEST., AND CARBO-COLOR GILL.

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In my study of the *Aphididæ* of Colorado I have become convinced that there is still considerable confusion in the literature treating of the species having a close resemblance to *Aphis gossypii* Glover. I do not pretend to be able to straighten out all the crooked places, but hope to be able to offer observations and conclusions that will help to that end.

For several years past *Aphis gossypii* has done more harm than all other insect pests together to the canteloupe and melon vines grown in the Arkansas Valley in this state. In accord with the observations made by several other writers, the first appearance of the lice upon the vines takes place when the latter are just nicely beginning to run, but they seldom attract much attention until the vines are two feet or more in length. Once upon the vines, the lice increase with great rapidity. In our breeding cages Mr. Bragg has repeatedly reared new-born lice to the reproductive stage in eight days, and a common number of births per day has been from six to twelve. As a result the enemies,—parasites, ladybeetles and syrphus flies, finding an unstinted supply of food, also multiply rapidly and by about the second week of July often cause the lice to rapidly decrease in numbers and so save a large proportion of the melon crop. The lice continue upon the vines however to the time when killing frosts render the plants

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