Insects of the Grape

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In common with other horticultural plants grapes have their share of insect pests in Florida as elsewhere, twenty-five species of them more or less serious, and it is lucky that they have. Otherwise the wild grape vine would strangle every tree in our hammock. As it is, insects defoliate the grape every year or two, or sometimes twice a year, thereby giving the supporting trees a chance for their lives.

We can divide the insect and other animal pests of the grape into four great groups: Those that eat leaves; those that suck the leaves and tender stems; those that attack the berries; and those that attack the roots. The following outline will give the main pests under each head.

**FOLIAGE AND STEMS**

*Eaters*—Lead Arsenate
Harrisina—Soldier Worms.
Flea Beetle—*Haltica chalybea*.
Horn Worm—*Ampelophagus myron*, *Pandorus Brown Sphinx* (*Pholus Pandorus*), *Achemon* (*Pholus Achemon*), *Purslane Sphinx* (*Deilephila lineata*), *Dark Veined Sphinx* (*Deilephila galli*).

*Weevils*
June Bugs, three species.
Cane Gall Maker.

Eight-Spotted Forester—*Alypio 8-maculatus*.
Leaf Roller—*Desuria funeralis*.
Yellow Wooly Bear—*Diacrisia virginica*.
Tiger Moth—*Apantesis arge*.

*Suckers*
Grape Leaf-hopper—*Typhlocyba com-

Sharp Shooters, three species.
Aphids—The Common Garden Aphis
*Nyzus persicae*, The Melon Aphis
(*Aphis gossypii*)
Mealy Bugs (*P. maritima*).

Berry Moth—(*Polychrosis (botrama)
viteana*)
Curculio—(*Craponius inequalis*).
Northern Green Stink Bug—*Nesara hilaris*.
Southern Green Stink Bug or Pumpkin Bug—(*Nesara viridula*).
The Leaf-footed Plant Bug—*Lepto-
glossus phyllopus*.

*Roots*
Phylloxera *vestatrix*.
Nematodes, causing root-knot.

In spite of this rather formidable list
I am happy to be able to say that the Florida grape grower is no more likely to be troubled with insect pests than are the growers in other states. In fact, there are two rather severe pests of grapes in the northern states that are entirely absent in Florida and a third that is so rare as to be of no commercial importance. These are the seventeen-year Locust or Cicada and the Big Spotted June Bug (*Pelidnota punctata*) which are not found in Florida at all, and the Rose Chafer which is a rare insect with us.

Taking up the more serious pests in order, perhaps the first in importance is the caterpillar, *Harrisina americana*. These have a curious habit of lining up on the leaves in rows with their heads toward the tip. These ranks of worms have suggested the name Soldier Worms (sometimes called Army Worms, but they must not be confused with the common Grass Worm which is usually spoken of as the Army Worm.) The caterpillars are black and yellow in color. When young they eat the delicate tissues between the veins thus skeletonizing the leaf. Later on they consume all but the larger veins. The caterpillar hatches from an egg laid by a small, blue-black moth with a red collar around its neck. They are double brooded in Florida, one brood occurring in the spring and the other in late summer.

The remedy is of course lead arsenate and the time of application may be whenever the worms are observed to be feeding on the leaves of the grape.

Very similar in the work that they do as eaters of leaves are species of hornworms, of which there are five more or less common. These differ from *Harrisina* in that they do not feed in columns but are usually found singly on the leaves. They grow to be much larger than *Harrisina* and, therefore, a single worm will do more damage, though they are not as common. The remedy is the same as for *Harrisina*.

There are a number of other moths, including the eight-spotted Forester, the Yellow Wooly Bear, and the caterpillar of the Tiger Moth. There are also various leaf-folders feeding on the leaves, but none of these often become abundant.

Next to the *Harrisina*, the most serious injury to the leaves is inflicted by the Flea Beetle, a bluish beetle, *Haltica chalybea*. These skeletonize the leaves very much as do the young soldier worms, but the damage is done by the adult beetles. They get the name Flea Beetle from their tendency to spring into the air and get away very quickly if disturbed. The best remedy is lead arsenate in Bordeaux sprayed on the leaves. Indeed Bordeaux alone will drive away these beetles though it will not kill them. However, it is best to put in the lead arsenate.

**Sucking Insects**

Among the sucking insects which attack the grape one of the most common is the aphis, or plant louse. These collect in large numbers on the leaves of the grape. Fortunately they are preyed upon by a large number of enemies which frequently hold them in check. However, it is best to give these enemies a little help if the infestation becomes severe. Among the most important of these enemies is a little wasp-like...
insect. If you look over a collection of aphids you will nearly always find that some of them are swollen until they are nearly or quite spherical in shape and have a brownish hard appearance. These plant lice are those that have been parasitized. The wasp-like insect lays an egg in the aphid from which a little grub hatches which lives inside the aphid, causing it to swell up and finally to die. When mature the parasite cuts a round hole in the body of the aphid from which the adult emerges. These holes can be seen in almost any collection of colonies of aphids. Another common enemy of the aphids are lady-beetles, especially the Convergent and Twice-Stabbed Lady-Beetles. The Downy Darkling Beetle, a grayish, oval-shaped beetle, is also a common enemy of aphids.

If you will examine a colony of aphids you will find crawling around amongst them a soft bodied maggot varying in size from one barely visible to the naked eye to one a quarter of an inch long. If watched, these maggots can be seen to seize an aphid, and holding him up in the air, drain his body contents. These are the larvae of the Syrphus Flies. The adult fly is a two winged insect which visits flowers for food. It will hover about a flower while it sucks the nectar very much like a humming bird does. For this reason they are called Hover Flies. They are hairy and often have bright golden iridescence on their wings.

The remedy for aphids is tobacco, usually nicotine sulphate, which is applied either as a spray in Bordeaux or as a dust, which will be described later.

Next to the aphids, a most common and serious pest are the leaf-hoppers. There are several species of these. The larger ones are called "Sharp Shooters." They have a peculiar habit of dodging around behind the stem, and always keeping on the opposite side from the observer, like a squirrel. The smaller ones include the Grape Leaf-hopper *Typhlocyba comes* and often becomes very abundant on the trees.

Two species of scale insects, *Pulvinaria vitis* and *Aspidiotus uvae* are more or less commonly met with on grapes. If they should become sufficiently abundant to warrant control measures they can be controlled by a good strong dormant spray of oil emulsion, or a strong solution of soap and water. Mealy bugs are sometimes found on grapes. One, the Baker's Mealy Bug, is a dangerous pest which has obtained a foot-hold in two localities in Florida.

**BERRY INSECTS**

Among the insects attacking the berry is the berry moth, *Polychrotis viteana*. The eggs are laid among the grapes in the cluster and the moth hatches out and feeds on the developing grapes. It not only eats the grapes, but its web makes an unsightly mess in the bunch which detracts from its appearance. Several species of plant bugs, including the Pumpkin Bug (*Nesara viridula*), and its close relative the Northern Green Stink Bug (*Nesara hilaris*), are sometimes found on grapes, as is also the Leaf-footed Plant Bug, *Leptoglossus phynopus*. These insects feed mostly on legumes such as cowpeas and beggar-
weed, and are liable to become a serious pest of grapes only in vineyards in which legumes are grown as a cover crop. Fortunately the bunch grapes ripen before these insects get very abundant.

ROOT INSECTS

Two extremely dangerous pests attack the roots of grapes, the *Phylloxera*, and the common root-knot nematode. Either or both of these pests combined will quickly destroy a vine of the Old World varieties. Fortunately our native varieties are more or less immune to both of these pests, and these native grapes, or hybrids with a large amount of native grape in their heredity should be used. The *Phylloxera* also attacks the leaves at one stage of its development.

SPRAY SCHEDULE

Entomologists long ago learned to cooperate with the Plant Pathologists in advice as to a spray schedule. By so doing they not only often enable the grower to kill two birds with one stone, but they also often make the insecticide itself a more effective killing agent. For instance, the killing power as well as the spreading power of tobacco extract is increased when it is combined with Bordeaux. The following spray schedule has been taken from Bulletin 35, of this Station.

A SPRAY SCHEDULE FOR GRAPES

<table>
<thead>
<tr>
<th>No.</th>
<th>Disease or Insect</th>
<th>Spray Material</th>
<th>Time of Application</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Anthracnose, Black Rot</td>
<td>Commercial lime-sulphur, 1 part to 9 parts of water.</td>
<td>When vines are dormant. Cover vines, posts and canes with the solution.</td>
</tr>
<tr>
<td>2.</td>
<td>Anthracnose, Black Rot, Downy Mildew, Grape Berry-moth, Various Insects</td>
<td>Bordeaux Mixture, 4-4-50 formula, to which 1 1/2 lbs. dry lead arsenate has been added.</td>
<td>A week before flower buds open.</td>
</tr>
<tr>
<td>3.</td>
<td>Same as Nos. 1 and 2, for curculio and leaf-hopper</td>
<td>Bordeaux mixture, 4-4-50 formula, to which 1 1/2 lbs. of dry lead arsenate, and 3/4 pint of 40% nicotine sulphate have been added.</td>
<td>As soon as blossoms fall.</td>
</tr>
<tr>
<td>4.</td>
<td>Same as No. 3.</td>
<td>Same as No. 3.</td>
<td>When fruit is half grown. Two weeks after No. 4.</td>
</tr>
<tr>
<td>5.</td>
<td>Same as No. 3.</td>
<td>Same as No. 3.</td>
<td>Just before fruit colors.</td>
</tr>
</tbody>
</table>

In addition to the six sprays given above, only four of which have to do with insects, it may be necessary to spray again later in the summer for the second brood of Harrisina. For this spray lead arsenate alone is sufficient, though it is better to combine it with a little soap, three or four pounds to 50 gallons of water, to make it spread better.

DUSTING

In view of the success which has attended the dusting of citrus groves for
rust-mite, the grape grower is naturally interested in the question as to what extent dusting may be applied in his vineyard.

Lead arsenate can, of course, be applied just as thoroughly and considerably cheaper, if one has a suitable machine, as can a liquid spray. As for contact insecticide dusts, we have two which have been extensively used and with highly satisfactory results for suitable insects. Sulphur dust, or sulphur and lime dust, has been highly successful for rust-mites, but, in general, for red spiders only when the temperature was fairly high—90 to 95 degrees. On strawberries and other low-lying plants next to the ground (we know how hot the sand becomes in Florida in the middle of a sunny day, even on a relatively cool day) it has usually been a success. On blackberries, cotton, and other plants which grow upright and reach into the cooler atmosphere a foot or more above the soil, dusting is less certain, and should be tried only on a hot day.

The other successful dusts are the nicotine sulphate-lime dusts. We are now about ready to state where they may be used successfully. Against the melon aphid, and the common garden aphid, *Myzus persicae*, which are the ones most commonly met with on grapes, they have been used with success. This is true also in the case of Chinch Bugs in St. Augustine grass, and the cabbage aphid. Against the larger and more hardy pea aphid, we at the Station have found them to be effective only in the middle of a sunny day. Mr. Beyer has not found the tobacco dusts effective against the bean jassid, neither have we found them effective in killing even the smallest and most delicate caterpillars, such as the celery leaf-tyer. It seems as if the killing power of nicotine sulphate is usually in direct proportion to the size of the insect rather than the hardness of the integument. Thrips, for instance, are easily killed in spite of their very firm exoskeleton, while the much larger but soft-skinned caterpillars are almost uninjured. We would anticipate this from the manner in which insects breathe.

For the present, then, we must consider use of dusts on the grape as limited to lead arsenate for the Soldier Caterpillar (*Harrisina*) and the Berry Moth, and nicotine sulphate for aphids. But, as we have seen, these insects are generally most economically combatted by putting the lead arsenate into the Bordeaux. The same is true of leafhoppers and aphids, the nicotine sulphate is placed in the Bordeaux. But there will be occasions when you will need to combat insects only. The second brood of *Harrisina*, for instance, which will appear after most varieties of grapes have been picked. This brood can be most effectively and cheaply killed by dusting with lead arsenate. Aphids, too, may give trouble later in the season after the Bordeaux sprays have been stopped, and can readily be checked by the nicotine lime dusts. Then there is the possibility that the copper-lime dusts may prove to be efficient substitutes for liquid Bordeaux.