

Control of
Grape Insects
in Ontario

by THOMAS ARMSTRONG



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SUMMARY

Grape leafhoppers are the most serious insect pests of grape in Ontario and require annual sprays of DDT in most graperies for their control. Seven other insects and a mite are occasionally troublesome. Of these the grape berry moth, the rose chafer, the grape blossom midge, and the grape flea beetle are controlled by DDT; the European fruit lecanium by a dormant oil spray or a spray of parathion in July; the grapevine aphid by parathion, malathion, TEPP, or nicotine sulphate; and the grape erineum mite by a dormant spray of lime-sulphur. There is no chemical control for the grape phylloxera but varieties grown on native root stocks are resistant to its attack.

Fungicides should be added to some of the annual spray applications according to the directions given in the current year's spray calendar. Safety precautions must be followed in use of very poisonous insecticides such as parathion and TEPP.

CONTROL OF GRAPE INSECTS IN ONTARIO¹

by

Thomas Armstrong
Entomology Laboratory, Vineland Station, Ontario

GRAPE LEAFHOPPERS

Grape leafhoppers² are the most troublesome insect pests of the grape throughout Ontario. Leafhoppers in all stages feed almost exclusively on the undersides of the grape leaves, producing very small white spots. As feeding progresses the spots become more numerous until the whole leaf is brown and dry. Severely injured foliage falls prematurely. The damage reduces the vigor of the vines, dwarfs the grapes, and lowers the quality of the fruit by decreasing the sugar and increasing the acid content.

The adult leafhoppers are about 1/8 inch long and pale yellowish with deeper yellow, red, or black markings that vary considerably. The nymphs, or immature stages, resemble the adults but are small and wingless (Figures 1 and 2).

Life History - The adult leafhoppers pass the winter under fallen leaves, among clumps of grass and weeds, in decaying tree stumps, and in other such places. Woods, headlands, ditches, and fencerows all afford favorable quarters for wintering. In early spring they emerge from hibernation and feed at first on a large variety of plants. About the time the third leaf on the shoots of grape is showing they move to vineyards. There they feed on the undersides of the leaves, especially on the lower ones, and deposit their eggs beneath the lower skin of the leaf.



Figure 1. Grape leafhopper adults,
greatly enlarged

¹ Revision of Processed Publication Series, Entomology, No. 26

² *Erythroneura* spp.



**Figure 2. Grape leafhoppers, adults and nymphs,
on underside of grape leaf.**

The eggs hatch over a period of about five weeks after the grapes begin to bloom. The nymphs reach maturity in about 24 days. A partial second generation occurs later in the season.

Control – Immediately after the fruit is set, spray with 50 per cent DDT wettable powder at 1 lb. in 100 gal. of spray.

ROSE CHAFER

In sandy areas the rose chafer³ is a troublesome and destructive pest. The adult, a somewhat slender, long legged, fawn colored beetle about $\frac{3}{4}$ inch long, eats the blossoms and newly set fruit, and, when abundant, may destroy the crop (Figure 3).

Life History – The rose chafer passes the winter in the grub stage in the soil, 6 to 18 inches below the surface. In the spring the grubs come closer to the surface and feed on the roots of grasses and other plants and later transform to pupae and adults. Usually the beetles begin to emerge from the soil early in June, just before Concord grapes bloom, and continue to emerge for about one month; the majority appear during the first two weeks. Eggs are laid only in sandy soil, most commonly in grassland and grain fields and to a lesser extent in graperies and other cultivated areas. The larvae feed on the roots of grasses and weeds throughout the summer.

Control – The control of the rose chafer is essentially a matter of clean farming. The insect breeds only in light sandy soil, and its most important breeding

³*Macrodactylus subspinosus* (F.).

grounds are waste land, such as idle farms and vacant fields or lots. Consequently the most important step in fighting this pest is to reduce these favorite breeding areas to a minimum. Cultivate waste lands, reforest them or seed them to alfalfa or sweet clover. In addition to reclaiming the waste land, break up old fence rows and keep vineyards, orchards, and small fruit patches well cultivated. Grow crops such as corn, potatoes, and strawberries to the greatest possible extent on land surrounding the vineyards. Practice short rotations of crops with clover wholly replacing grasses.

For effective control, plow, disk, or cultivate the breeding grounds at three different times: (1) in late May and early June, about the time the land should be prepared for the planting of corn (2) in mid-July, when old strawberry patches should be plowed under and (3) in late fall, when plowing is commonly done.

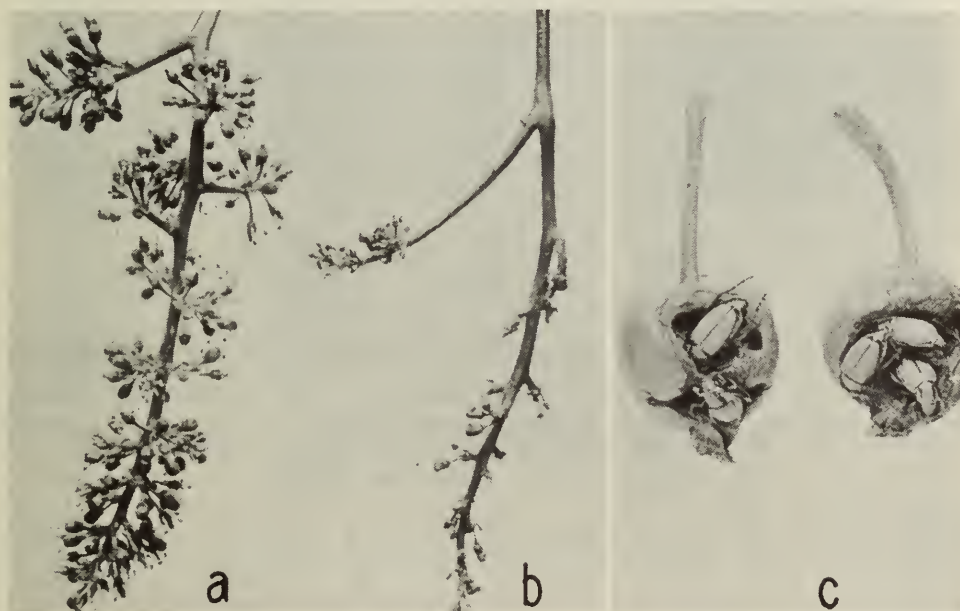


Figure 3. (a) Normal grape blossom cluster.
(b) Blossom cluster destroyed by the rose chafer.
(c) Rose chafers feeding on apples.

Protect grapes from the ravages of the chafer by spraying as soon as the beetles appear, usually before the blossoms open, with 50 per cent DDT wettable powder at 2 lb. per 100 gal. of spray. If heavy rains wash off the first spray, make a second application in about two weeks

GRAPE FLEA BEETLE

The grape flea beetle⁴ sometimes causes severe injury in the Niagara fruit belt, particularly in vineyards near woods, hedgerows, or rough land. These steel-blue or green-blue beetles, about 1/5 inch long, attack the swelling buds in the spring, eating holes in them and destroying a portion of the prospective crop (Figure 4).

Life History — The beetles spend the winter under the protection of leaves, grasses, and rubbish. In spring they emerge from hibernation, feed on the buds, and lay their eggs chiefly under the rough bark or beneath bud scales of the grape

⁴ *Altica chalybea* (Ill.).



Figure 4. Grape flea beetles attacking grape buds.

vines. The brownish grubs that hatch from the eggs feed almost entirely on the upper surfaces of the leaves in late June and July. The amount of injury the grubs cause is never serious. When full-grown they drop to the ground, pupate, and transform to beetles. After feeding for a time the beetles go into winter quarters.

Control — Spray the vines when the buds are swelling with 50 per cent DDT wettable powder at 2 lb. per 100 gal. of spray. If it rains shortly after spraying, repeat the application.

In small vineyards, or where only part of the rows are infested, collect the flea beetles by hand, or jar them into a pan containing kerosene.

In years when the grubs are present on the foliage in large numbers, spray the vines with DDT at the strength given above.

GRAPE BERRY MOTH

The grape berry moth⁵ is usually of minor importance in vineyards in the Niagara district, but from time to time outbreaks occur and cause serious losses. Look for the injury while the crop is being picked, so that you may take steps to bring the pest under control the following year.

The caterpillars are dark greenish or purplish and about 3/8 inch long when full-grown. The first-brood larvae web together and feed on the blossoms and newly set fruit; later broods attack the green and ripening grapes. The caterpillars tie the fruits together with silken threads and bore into the berries, passing from one to another and feeding in the pulp. Infested berries become discolored, shrivel, and may drop (Figure 5).

Control — In severely infested graperies apply three sprays of 50 per cent

⁵*Paralobesia viteana* (Clem.).



Figure 5. (a) Newly set cluster of grapes webbed together by the grape berry moth. (b) Bunch of grapes infested by the grape berry moth.

DDT wettable powder at 2 lb. per 100 gal. of spray. Apply the first spray shortly before the blossoms open, the second immediately after blossoming, and the third 10 days after the second. If the infestation is light omit the third spray.

In spraying for this pest, direct the spray upwards, spray both sides of each row, use liberal quantities of material (at least 200 gal. per acre for the second and third sprays), and make every effort to cover all the fruit clusters.

A hooded boom gives good results if the pump capacity of the spray outfit is sufficiently high. As a general rule, 15 gallons per minute at 400 to 500 pounds' pressure is needed for a single hood with five nozzles at each side.

GRAPE BLOSSOM MIDGE

The grape blossom midge⁶ can be found in small numbers in practically all vineyards in the Niagara Peninsula, but serious infestations have occurred very infrequently. Since 1945, however, some graperies in the St. David's and Virgil districts have suffered considerable losses.

The presence of this insect is indicated by abnormally enlarged yellow-green or sometimes reddish blossom buds that contain numbers of very small, white maggots (Figure 6).

The adult midges emerge from the ground in early June and lay eggs within the blossom buds. The maggots feed within the buds in numbers varying from 2 to 25 per bud. Infested buds wither and are generally shed just as the grapes bloom.

⁶*Contarinia johnsoni* (Sling.).

The damage is done during a period of about three weeks from the time the flies appear until the blossoms open.

Control — Apply 50 per cent DDT wettable powder at 2 lb., or 15 per cent parathion wettable powder at 1 lb., per 100 gal. of spray.

The timing of the spray is extremely important. Begin spraying when the fourth leaf is expanding on the new shoots of the variety Concord. This usually occurs during the first week of June. Spray thoroughly, making a special effort to cover the blossom clusters.



Figure 6. Blossom cluster with enlarged buds infested with the grape blossom midge. One infested bud opened to show maggots, greatly enlarged.

GRAPE ERINEUM MITE

A few French hybrid grape varieties recently introduced into Ontario are susceptible to attacks of the erineum mite⁷. Some of the common grape varieties, such as Delaware, may be occasionally attacked but never seriously. The injury (Figure 7), called erinose, is conspicuous early in the summer on the young leaves and takes the form of raised reddish blotches on the upper surfaces, and concave areas densely covered with masses of grayish hairs on the under surfaces. In a severe infestation the infested foliage falls prematurely.

The mite responsible for this injury is extremely small, and invisible to the naked eye. It establishes colonies on the young leaves and produces the characteristic blisters. In the fall it moves to the buds, where it rests under the outer scales throughout the winter.

Control — Apply a dormant spray of lime-sulphur, 10 gal. in 100 gal. of water. One spray is usually so effective that no further spraying is needed for three or more years.

GRAPE PHYLLOXERA

The grape phylloxera⁸ is an aphid-like insect with a very complicated life history. It produces injury of two types (Figure 8): (1) galls on the leaves, con-

⁷ *Eriophyes vitis* (Pgst.).

⁸ *Phylloxera vitifoliae* (Fitch).



Figure 7. Leaf galls formed by the grape erineum mite. Felty masses of hairs on the lower surfaces (upper leaves), and irregular, convex swellings on the upper surface (lower leaf).

fined to certain cultivated varieties and to wild grapes, and (2) thickened, knotty galls on the roots. The root injury may be very destructive to European grapes but American varieties are more or less resistant. A few cases of root infestation have been reported in the Niagara Peninsula.

Control – It has never been necessary to take measures to control the leaf-gall form in Ontario. Eradicate wild grapes growing along fencerows, etc., near the grapyery. To control the root form, graft all grapes on resistant native stocks.

GRAPEVINE APHID

This deep reddish-brown aphid⁹ is mentioned only because in 1957 a widespread infestation occurred on both cultivated and wild grapes throughout the Niagara grape growing area. The only previous record of its occurrence in abundance was in 1925 in the same area. Infestations were concentrated on the succulent terminal shoots.

Control – If the aphid becomes very troublesome, use one of the aphicides such as parathion, malathion, TEPP, or nicotine sulphate.

EUROPEAN FRUIT LECANIUM

This large, brown, hemispherical scale¹⁰ occasionally attacks grapes in Ontario, but only rarely causes concern. It feeds by piercing the tissue and

⁹ *Aphis illinoisensis* Shimer.

¹⁰ *Lecanium corni* Bouché.



Figure 8. Root galls (above) and leaf galls (below) formed by the grape phylloxera.

sucking the sap on all parts of the vine, including the old wood, and is often found hidden beneath the loose bark. If abundant for two or three years it may kill the branches.

Control — Because parasites are usually effective, control by spraying is seldom necessary. When necessary apply a dormant spray of 3 or 4 per cent oil emulsion, before growth starts in the spring, or a summer spray of 15 per cent parathion wettable powder at 1 lb. per 100 gal. of spray when hatching of eggs is just completed (about July 7 to 10).

NOTE

Any of the fungicides such as bordeaux mixture, fixed copper, wettable



sulphur, or ferbam used to control grape mildews, dead arm disease, and black rot may, and in many instances should, be added to the sprays recommended in this pamphlet. Consult the current year's spray calendar for the complete spray program for grapes.

The adding of a spreader-sticker to the sprays for the control of grape insects has given improved coverage and better control. Commercial preparations are available.

WARNING

For the safe handling of the insecticides recommended in this pamphlet, especially TEPP and parathion, carefully follow all warnings and directions found in every carton and on every package. The insecticides are deadly poisons.

Regulations of the Canada Department of National Health and Welfare have established the amounts of insecticides that are permitted to remain on food crops sold to the public. To avoid exceeding these amounts, follow control recommendations carefully.

For further information write to the Entomology Laboratory, Vineland Station, Ontario.

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