

Published in Western Farm Life
July 1, 1937

JUN 11 1937

Used 7/1/37

"As Insects are Controlled, so
are 7 mils Harvested"

Insect Control from the Standpoint
of the Horticulturist
by
A. M. Binkley

Title changed by
W.F.L.

5

Today, more than ever before, a knowledge of insect control measures is of primary importance to profitable fruit and vegetable production. There is scarcely a horticultural crop grown that is not subject to damage by some pest. This damage to the crop is measured in reduced yields, poorer quality, less attractive appearance, and often loss in storage. Although exact estimates are hard to secure, the losses caused by insect damage run into millions of dollars in this country.

In some seasons, insect damage reduces total yields in the United States and causes a short crop. This may result in higher prices, and often a short crop may return more net profit than do average crops or higher than average yields. There is no question but that insect control raises the cost of production; also, with intensive cropping, insect pests do more damage. In many parts of the country, it is impossible to produce ^{usable} horticultural crops without insect control measures being put to effective use. Growers of horticultural crops must recognize spraying, dusting and other insect control measures as very necessary operations just the same as weed control, and cultivation and fertilization of the crop.

A knowledge of control measures is important, and the grower should be able to recognize the more common insect pests in the field and control them. General methods of control are given here from the viewpoint of the horticulturist to emphasize their importance. No attempt is made to go into technical phases. That part remains for the station or extension entomologist. Every year damage to crops can be reduced by paying more attention to the details of timely and thorough application of insecticides.

the use of better spray equipment, and practical knowledge of how to control insect pests.

Timeliness

Timeliness is of particular importance in all insect control measures. Any control treatment to be of value must be applied when it is most effective. Growers should examine their crops at frequent intervals and start control measures as soon as destructive insects make their appearance.

All insect control measures might well be compared to crop insurance and the costs of the control are the insurance premiums. The earlier and more timely the control measures are applied, the lower the premium rates and the lower the annual cost. Control treatments are generally most effective if the material is applied when the insects first make their appearance. Delayed treatments may give insects time to damage the crop seriously, particularly if a heavy infestation is present. The more insects present the more damage they can do before they can get enough poison to kill them. Start control measures early.

Thoroughness

Thoroughness goes hand in hand with timeliness in insect control work. A sloppy, incomplete job of spraying or dusting is a waste of time, money and material. Spraying costs are often doubled by poor coverage, and little benefit or control can result. The use of proper and adequate spray machinery is the only way thorough spray applications can be put on. A fine mist should be applied generally on the upper and lower sides of foliage. High pressure - 250 pounds or more - is necessary to get the type of mist necessary for good coverage.

The Right Method and the Right Material.

While preventive methods of insect control should be taken as a regular procedure in crop production, many growers are not equipped with good sprayers or dusters or do not know or recognize the insect in time to apply treatment. Small hand sprayers often use more insecticides and are not as efficient as large sprayers. Growers should buy the largest capacity sprayer that is practicable for the acreage to be sprayed. Power sprayers that develop high pressure - 250 pounds or more - should be used if the acreage to be sprayed will justify the cost. However, small hand dusters compare favorably with the large dusters in efficiency.

The right material for the particular insect is important, e.g., dusting cabbage for cabbage-root maggot would do not good. In order to know just what control measure to apply and when, ^{to apply it} one must know the life history of the insect and its appearance in different stages. Growers of horticultural crops should have knowledge of the common insects and they should consult the county agent or the extension entomologist for specific questions on when and what to apply for control.

Insect Resistant Varieties

The development of varieties resistant to insect damage is a comparatively new field for the plant breeder, even though natural resistance in horticultural crops has been known for a long time. For example, it has been known that the Kieffer pear is somewhat immune to San Jose scale, and that red cabbage is practically free from maggot injury. Habit of growth may repel or favor an insect. Examples of this are the delayed loosening of the husks on corn causing partial resistance to the cornear worm, thickness of leaf epidermis to plant lice, and peculiar

neck growth of onions as resistance to thrips. Another type of resistance is due to physiological characters such as a volatile chemical substance in the leaves. Varieties of sweet corn resistant to cornear worm have been developed in the south. When planted in Colorado, however, they were too late maturing to be of value. Varieties of Golden Bantam resistant to cornear worm may be out in a few years, as well as onion varieties resistant to thrip insects. It has been known for some time that the variety of Stringless Refugee bean is more tolerant to bean beetle injury than some of the standard earlier types of snap beans. The *Curcubita pepo* group of pumpkins will tolerate more squash bug injury than the *Cucurbita maxima* group of squash. These are examples of insect resistant or tolerant varieties and this field has scarcely been touched.

Crop Absence

This is an old standard control measure that is sound in principle. It consists of separating the insect pest from the crop sufficiently by long crop rotations to reduce the building up of specific insect populations.

Sanitation

The value of cleaning up weeds and crop residues in the field or orchard has been recognized for many years, but it has not been practiced to the extent that the results justify. Many insect larvae and adults hibernate in the trash or weeds left in the orchard or field. To destroy this waste material is to reduce to a great extent the insect population. Pull out all plants in the field that are badly infested with insects or that are badly diseased. In some cases diseases are carried by insects and roguing or pulling out of diseased plants will prevent spread from diseased to healthy plants. A careful cleanup of

an orchard, scraping off of loose bark from old trees and removing trash from the orchard are helps in keeping down codling moth infestations.

Control of Growing Conditions

In most cases, it is difficult to control temperatures, humidities and other climatic factors. Growers can, in some cases, shape their cultural practices to work with the crop and against the insect. Fall plowing where severe freezing takes place is useful in destroying insects. Mechanical protection, such as is used in screening aster plants from leafhoppers, or cabbage plants from the fly which deposits the eggs that hatch into the cabbage maggot, can be used. Late planting with some crops is of use and planting at two-week intervals is a help on early maturing crops. Bean beetle damage is often less on late planted snap beans.

Plants in a weakened condition grown on a soil low in fertility are more susceptible to severe insect injury than vigorous growing plants. The onion thrip is an example of an insect that severely injures weak growing plants. With other crops it is possible to mature early crops before the greatest injury from insects may occur.

Pruning

Pruning practices which are associated with certain methods of training apple trees are important considerations in determining the quality of fruit produced. The effect on grade is determined principally by whether or not a tree is easy or difficult to spray for insect control. Trees poorly trained reduce the effectiveness of insect control measures and increase the cost. The openness of the tree and the removal of dead or diseased parts also has an important bearing on insect control. The codling moth ~~xxx~~ is the most serious pest on apples and it is necessary

to use arsenical sprays at regular, well-timed intervals to reduce the damage caused by the insect.

Spraying and Dusting

Spraying and dusting constitute very effective controls against many of our common insect pests. Insects which have biting mouth parts and actually chew or eat the plant are largely controlled by stomach poisons. Arsenical insecticides are commonly employed for this type of insect. The second group includes those that suck sap from plants. These cannot be killed by stomach poisons but are checked by using contact insecticides. The common plant lice are an example of this type, and it is necessary to hit the insects to kill them. Nicotine is the insecticide most often used for this type of insect.

The chief insecticides in use today are the arsenicals, rotenone, pyrethrum, various nicotine carriers, and lime sulphur. The arsenicals may be used where there is no danger of residues on the edible part of the plant. However, during recent years vegetable shipments have been seized and dumped because of excess poisonous residues, particularly excess arsenic and lead. Insecticides such as rotenone and pyrethrum that are non-injurious to humans are now in more general use. These should be used when it is necessary to spray or dust shortly before the crop is marketable. A dust containing 0.75 percent rotenone is used particularly on cauliflower and cabbage. Apple washing is now a general practice and the excess arsenical residues can be satisfactorily removed before marketing. On vegetable crops the use of a non-poisonous material has proved satisfactory for control of many insects previous to harvesting.

Nicotine sulphate has proved to be a good insecticide for checking many sucking insects. It may be used either in dust or liquid form. The strength of the ~~mix~~ dust is expressed in percent nicotine and this should

be considered in adapting the materials to recommendations.

Lime-sulphur is now used as an insecticide to control tomato psyllid on potatoes. The dilution of one gallon of liquid lime-sulphur to 40 gallons of water is recommended for that comparatively new pest on the potato crop.

General insects common to fruit crops are codling moth, aphid, borers and cherry slugs. On vegetable crops, the potato beetle, the tomato psyllid on potatoes and tomatoes, cutworms, plant lice, flea beetles, striped cucumber beetle, bean beetle and red spider. These are but a few important ones which may do damage to crops. Bulletins are available which describe in detail the methods of control for most of these common insects. By dropping a card to your state experiment station or to the extension service, you can obtain free copies.