CULTURAL CONTROL of the GRAPE BERRY MOTH

Agriculture Information Bulletin No. 256

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE
CULTURAL CONTROL OF THE GRAPE BERRY MOTH

By George W. Still, entomologist, Entomology Research Division, Agricultural Research Service

The grape berry moth, a small brownish moth (fig. 1, A), is a major pest of grapes over most of the Eastern United States. One larva may injure several berries (fig. 1, B). After completing their feeding on the berries, the larvae, or caterpillars, spin their cocoons about harvesttime in rolled fragments of vegetation, such as a grape or weed leaf. Most of these rolled leaf fragments containing the cocoons soon become detached from the leaves and fall to the ground beneath the grapevines (fig. 1, C). Although winds may blow some of them to other locations, over 60 percent of them fall in a strip about 3 feet wide under the grape trellis. The insect overwinters as a pupa within the cocoon (fig. 1, D).

CULTURAL CONTROL PRACTICES

Damage by the grape berry moth to grapes can be greatly reduced by following certain cultural control practices. In general, they include using tillage implements to bury overwintering cocoons under a layer of soil. The moths, therefore, are unable to make their way out in the spring. They die without reaching the grapevines to lay their eggs.

Although cultural control practices cannot be expected to eliminate the grape berry moth, they will reduce the amount of injury it causes. They affect only the first brood, but any reduction in the first brood will reduce the numbers in the second brood. Thoroughness and timeliness in carrying out these practices are essential.

A tractor-attached grape hoe, operated either manually or mechanically, is one of the most useful implements for cultural control practices (fig. 2). It requires only one operator and can be used under a wide range of soil conditions. Wheels on the walking type of grape hoe may be eliminated by using a swivel connection attached to the tractor drawbar.

In all cultural control operations the implements should never go deeper than 2⅛ inches. Deep tillage injures grape roots and reduces vine growth and production. For this reason it is necessary to keep the entire vineyard as level as possible. The ridges of soil under the grape trellis should be low and from 24 to 30 inches wide, so that there is enough soil to cover the grape berry moth cocoons and effective cultivation is possible.

Shallow plowing or disking is not always thorough in turning under heavy stands of weeds or cover crops, but it is better than deep
plowing. A disk and a cultipacker can be used to cover organic matter. A tiller may be used in hard soils if operated at a shallow depth.

THREE EFFECTIVE METHODS

Three effective methods of cultural control for grape growers in the area where the grape berry moth occurs are given in the order of their popularity.

Method 1.—Late in the summer and 30 to 45 days before harvest, throw the soil from the row centers into a low ridge under the grape trellis with a grape hoe, disk, or plow. Make the ridge flat and wide, and let it remain during the winter. Cocoons of the grape berry moth will accumulate on the surface. Make the row centers almost level, and you may seed them to a winter cover crop (fig. 3, A). If the ridge
FIGURE 2.—Tractor-attached grape hoes: 
A, Pulls soil with cocoons from grape trellis area into row center; B, pushes soil from row center toward vines to cover cocoons and with blade extension levels soil ridge under trellis.

is too high and narrow (fig. 3, B), the grape roots may be injured by deep hoeing in the spring, when the ridge is thrown back into the row center. When the soil is not thrown far enough under the grape trellis and it is insufficient (fig. 3, C), clean hoeing will be difficult in the spring. In addition, surface water tends to stand under the trellis if a depression remains there over winter.

Early in the spring before the moths begin to emerge, pull the soil ridge, with the cocoons on its surface, from under the trellis into the row centers with a mechanical grape hoe (fig. 2, A). The blade should be at least 24 inches long for this operation. With a hand hoe pull out any islands of soil left around the grapevines and posts as far into the row centers as the soil pulled out by the mechanical hoe. Two men with hand hoes can usually keep up with a horse-drawn or tractor-attached hoe. After the ridge has been hoed out, the strip under the trellis should be clean of grape berry moth cocoons and weeds (fig. 4). Then disk or plow
the row centers to bury the cocoons. Use a straight disk followed by a cultipacker to make a compact soil covering over the buried cocoons. Rains help to seal in the cocoons. The soil in the vineyard should be almost flat or level (fig. 5).

Complete these cultural operations at least 15 days before the average date of grape bloom. Do not cultivate until at least 15 days after grape bloom.

Method 2.—Keep the vineyard soil level during the winter. In the spring throw a low ridge of soil under the grape trellis to cover the weeds and cocoons. The soil must be in the proper condition to form a smooth, compact covering over the cocoons (fig. 6, A). Spring rains help to seal the soil. When the soil and sod growth do not form a compact covering over the cocoons (fig. 6, B), many grape berry moths will emerge through openings between the layers of sod.
Figure 6.—Soil ridges thrown under grape trellis in the spring: A, Low, smooth, compact ridge is desirable; B, ridge with openings between sod layers is undesirable.
Figure 7.—Soil ridges thrown under grape trellis after fall harvest: A, Low, flat, compact ridge with row centers almost level is desirable; B, high, steep ridge is undesirable.
Complete this cultural operation at least 15 days before grape bloom. The row centers may be cultivated during the spring and summer if desired, but do not remove the ridge of soil under the trellis until 15 days after grape bloom or later. A winter cover crop in the row centers can be turned under when desirable.

Method 3.—After fall harvest make a low, flat, compact ridge of soil under the grape trellis so that the buried cocoons are tightly covered. Use a plow, disk, or grape hoe. Make the row centers almost level, with only a slight depression in the middle (fig. 7, A). In a vineyard that is plowed too deeply and that has a high, steep ridge under the trellis (fig. 7, B), there will be injury to grape roots, poor vine growth, reduced yields, improper soil-surface drainage, and a soil ridge that is difficult to hoe. No further vineyard culture is necessary in the fall.

In the spring throw back this soil ridge into the row centers, but not until 15 days after grape bloom. Disk or plow the row centers so that the vineyard is flat or level. With this method fall cultivation is usually completed too late for seeding and establishing a winter cover crop, but a spring cover crop can be grown (fig. 8). This is perhaps the least used method, but it may serve as a temporary substitute for method 1 when it is desirable to have a ridge of soil under the trellis during the winter and when it is impractical to use that method.