

Mealybugs on Pears

biological control by utilizing natural enemies

Richard L. Doutt

MEALYBUGS USUALLY ARE SUSCEPTIBLE to biological control.

The adoption of this method in a pest control program on pears has several advantages. Primary among them is economy, for the cost of production has been lowered in every agricultural industry that has successfully practiced biological control.

Mealybugs are preyed upon by a number of natural enemies, and only when these enemies are hindered in their activity, or are absent, do mealybugs become pests.

Since these natural forces alone are capable of suppressing mealybugs, their importance should be given full consideration in any practical control program.

During 1947, the Division of Biological Control undertook an investigation of the

Baker mealybug problem on pears in the Santa Clara Valley.

The test was conducted on a block of 16 unsprayed Winter Nelis trees. The remainder of the orchard received the recommended DDT spray program.

Biological control of the mealybugs in the test block was impressive in its effectiveness, for they were held completely in check on each tree throughout the season.

By comparison, all the trees surrounding the plot were heavily infested and the uniformity in each case is significant.

Most of the control work is attributed to the predaceous green lacewing—*Chrysopa californica*.

Percentage of Fruit Infestation

The percentage of fruit with mealybug

infestation in the calyx was followed until harvest.

At that time only 3% of the fruit from the biological control plot showed such infestation, as contrasted with 71% infestation on fruit outside the plot.

A striking difference also developed in the appearance of the trees, for the foliage in the test plot remained a glossy green while that of the surrounding area became blackened by the sooty mold growing on the honeydew excrement of the mealybugs. This blackened foliage became deciduous somewhat sooner than that in the test plot.

As the trees entered dormancy it was difficult to find a mealybug within the entire test block of 16 trees, while trees in the surrounding area bore heavy overwintering populations.

Having determined that biological control of mealybugs on pears can be highly successful, the research work has now resolved itself into the problem of making this control method compatible with the DDT sprays for codling moth.

The experimental work scheduled for 1948 will be designed to test such a supplementary program.

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TABLE GRAPES

At a given degree Balling, say 18, the acidity of grapes varies inversely with the temperature during the ripening period. If the period is hot, the acid is relatively low and the fruit tastes agreeably sweet; if cool, the acid is high and the fruit is sour.

Approximately one third of the fruit in the ripening range—17° to 19° Balling—was of good eating quality when the summation of heat for the ripening period was well above normal.

With a drop in the heat summation to normal, the percentage of fruit that was of good eating quality dropped sharply. With a summation considerably below normal for the ripening period, only very little of the fruit was palatable.

Malaga

In the case of this variety, the heat summation required to bring the fruit from blooming to 18° Balling for the Coachella Valley and Kern and Fresno counties was 2150—±2 days—degree-days.

The fruit in the ripening range of 17° to 19° Balling was good to eat or sour according to the summation of heat during the ripening period, as with Thompson Seedless.

Some growers and shippers may question the 2150 degree-days from blooming

to 18° Balling, since the Malaga is usually not harvested so soon after the Thompson Seedless. The delay in harvesting is not due to lack of maturity of the Malaga fruit, but to the fact that in the early sections, where earliness counts, most of the growers also grow the more popular Thompson Seedless, and they are busy getting it harvested.

Red Malaga and Ribier

When ungirdled, these two varieties require the same summation of heat as the Malaga to bring them to the minimum degree Balling requirement.

When they are girdled near the beginning of ripening, to hasten maturing, they come in with the Thompson Seedless at 2000 degree-days. That is, 2000 degree-days will bring these varieties from blooming to the required 16° Balling when they are properly girdled, while if not girdled 2150 degree-days are needed.

The influence of heat summation during ripening is the same as indicated for the other varieties.

Emperor

The Emperor is the latest maturing variety that is grown extensively in California.

Figures for 10 years on the heat requirement of this variety indicate that

3300 degree-days will bring it from blooming to 16° Balling.

Although fairly accurate, this figure is of less significance with a late-maturing grape, since there is no incentive to begin harvesting at the earliest possible moment. Similarly, the heat summation during the ripening period loses effectiveness because this sum is increased over the normal by the usual delay in the beginning of the harvest.

Tokay

The Tokay is brought from blooming to a satisfactory minimum degree Balling by a summation of 2250 degree-days.

The fruit was palatable or not according to the summation of heat for the ripening period—four weeks harvest.

With a summation from blooming of 2250 degree-days and a summation of 700 or more degree-days for the ripening period, the fruit was very good; with 670 degree-days during ripening, the fruit was good; and with 640 or less degree-days for the ripening period, it was sour.

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The use of phosphate in synthesis of sugars and starch by plants is under extensive biochemical study by the Division of Plant Nutrition.