

Navel Orangeworm

field control of walnut pest in northern California aided by restrictive measures

A. E. Michelbacher and Norman Ross

The navel orangeworm has been increasing as a pest of walnuts and almonds.

The insect is primarily a scavenger but—under favorable conditions—it severely infests sound walnuts. The navel orangeworm breeds in mummified fruits and nuts left on the ground or hanging on the trees. Because it is a scavenger, cull piles and any other harvest waste are ideal places in which it can breed. The insect passes through a number of generations each year and is able to survive winter conditions out of doors as larvae in various stages of development. Where infestations occur, an examination of old nuts hanging in the tree will usually reveal the presence of the larvae.

In spring and summer, breeding continues in these sources and in nuts that have been infested by the codling moth. When the husks crack and the nuts ripen, the navel orangeworm turns to them. If winter conditions in the orchard are favorable for the carrying over of a large population, a serious infestation of sound nuts in the harvested crop can be expected. In addition, there is always the possibility of moths migrating to the orchard from nearby infested premises.

Control Measures

There is no known spray program that will directly control the navel orange-

Treatments and Infestation by the Codling Moth and Navel Orangeworm in the Harvested Crop in an Experimental Orchard Near Modesto, California.

Treatment	Infested Nuts	
	Codling moth	Navel orangeworm
Check (No treatment) . . .	5.5	1.2
DDT spray June 30	2.9	0.9
DDT spray May 3	1.8	0.5
DDT spray May 3 and June 30	0.4	0.3

worm. Control of the pest in the field is largely dependent upon preventive measures. Three practices that will aid in restricting damage are: 1, effective control of the codling moth where it is a pest; 2, early harvest; and 3, good sanitation practices.

Probably because it is a scavenger, infestation by the navel orangeworm is encouraged by codling moth infestations. Information in support of this contention was obtained in one of the experimental orchards at Modesto where both the codling moth and the navel orangeworm were present. At harvest, a separate record was made of the nuts in the several treatments—that were infested by each of these pests. The infor-

mation is shown in the table and indicates that the degree of infestation by these two insects paralleled one another. The navel orangeworm infestation along with that of the codling moth was highest in the check and lowest in the treatment that was most effective in controlling the codling moth.

Early harvest is desirable because the longer the nuts are left on the trees or on the ground, the greater is the opportunity for them to become infested. The navel orangeworm continues to breed throughout the summer and fall, and as the population expands, the chance for infestation of sound nuts increases.

Good sanitary practices aid in checking infestation by the navel orangeworm. Field sanitation will help. Nuts should be removed as completely as possible from the trees. The number of stick-tights should be kept to the minimum and the residue crop on the ground destroyed by plowing or other means before late spring. If orchards are cleaned of nuts, the food chain that carries the pest over to the new crop in the field is broken. Also, culls and other waste that accumulate about dehydrators, hullers, barns, and other buildings should be destroyed well in advance of the growing season either by burning or by plowing under deeply.

If possible, sanitary measures should be conducted on a community basis because orchards are subjected to migrating moths from adjacent properties.

When a crop is infested with the navel orangeworm, it should be immediately delivered to the packing plant and fumigated.

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PRICES

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be higher to provide an area of gross earnings from which to meet the increased costs of doing business.

Still other retail price-setting procedures involve the use of a cents-per-pound margin or a percentage margin which changes with the store's purchase price. Such methods are less simple for the store in its retail price setting. Many smaller stores do not tend to use the procedures of having their margin—absolute or percentage—vary with the wholesale price. To the extent that such methods are used, they are found in the larger stores where the more complicated price-setting methods prevail.

A few cases were uncovered where the

store set its retail prices, not so much by what the wholesale cost was, but by what the competition was doing. By watching its competitors and meeting their prices—at times cutting a bit or even adding a bit—such stores practice the follow-the-leader method of pricing.

Wholesale Price Factor

All stores studied gave considerable thought to the problem of retail pricing and margin setting. In most cases, the retail price was tied in some definite manner to the wholesale price paid by the stores. The particular way in which the retail price was tied to the wholesale price affected the store's margins, sales, and earnings.

From the available evidence, it is clear

that citrus retailers generally react to changes in the prices they have to pay at the time they buy. But the retailers do not change their selling prices unless or until they buy the fruit. Thus, changes in f.o.b. prices or terminal market delivered prices must seep through to the wholesale market and purchases by the stores before an impact is made on consumers by the retail prices they pay.

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The second article in this series will be concerned with how retailers—in specific terms—react to price changes in the wholesale market.