Wax Sprays for Sweet Cherries

fail to increase size of fruit in experimental tests in Davis in 1946 and in San Joaquin County in 1949

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Wax sprays applied to trees of the sweet cherry varieties Black Tartarian, Lambert, and Bing did not increase the size of the individual fruits, in experimental work at Davis in 1946 and in San Joaquin County in 1949.

The sprayed fruits had a poor appearance, apparently due to the residue remaining on the fruit after evaporation of the water from the wax emulsion.

In 1945 the Michigan State College reported increased size of sour cherry fruits from trees sprayed with a 1% wax emulsion when the fruit first began to develop red color. Similar results with sweet cherry were reported later.

To determine whether a similar response would occur under California conditions, some small-scale tests were made at Davis in 1946.

On May 15, 1946 Dowax 222 and Dowax 82 were sprayed on branches of a Bing type and of a Lambert tree growing at the Experiment Station. At this time the fruits had started the final growth period but had no red color. A part of each tree, consisting of several of the framework branches, was drenched with a 1% wax emulsion; the remaining branches were used as controls.

Fruits of the Bing type were harvested June 14th and the Lamberts a week later. Upon harvesting, the fruit from each experimentally sprayed branch and control branch was weighed. The results are shown in the accompanying table where it may be noted that all fruits were the same size on the Bing type and with Lambert the weights were nearly identical.

The 1946 trials indicated that the spraying of wax emulsions on cherry fruits at the time they were turning red did not increase their size at harvest time.

In 1949 further tests were made in a commercial sweet cherry orchard in San Joaquin County. The trees used for experimental purposes were approximately 25 years old, vigorous, and producing large crops under cultivated soil conditions. Readily available water was maintained by irrigating at 10-day intervals.

Four trees each of Black Tartarian and Bing were used: a control tree, one tree sprayed May 9th and another one sprayed May 16th, and a fourth tree sprayed on both dates. The sprayed trees were drenched with 1% water emulsion of Dowax 222 by a small power sprayer.

On May 9th the Black Tartarian fruits were mostly light pink in color and the Bings mostly green with white or light pink tips. On May 16th the Bings were mostly light pink, whereas Black Tartarians were approaching the light red color at which they are harvested.

The diameter of 100 tagged fruits on each of the four trees of each variety was measured preceding the application of each spray and at harvest time. Three hundred and seventy-two pounds of fruit from both sprayed and unsprayed trees, harvested by commercial pickers, were counted and weighed. Commercial picking of Black Tartarian and Bing trees under experimental observation was done May 18th and June 8th, respectively.

Influence on Size of Fruit of Wax Emulsion Sprayed on Cherries

1946 Results

Average weight in grams per fruit at harvest time

	Control	Dowax 222	Dowax 82
Bing type	6.3	6.3	6.3
Lambert	4.4	4.1	4.5

1949 Results

	Unsprayed control	Tree sprayed May 9	Tree sprayed May 16	Tree sprayed May 9 and 16
Average weight in grams per mature fruit				
Black Tartarian	4.1	3.0		3.8
Bing	5.6	5.5	6.5	6.0
Average diameter in mm per 100 fruits				
Black Tartarian				
May 9	17.1	16.2		16.3
May 16	19.9	18.2		19.0
Bing				
May 9	15.0	15.2		15.3
May 16	17.6	18.8	18.4	19.5
May 23	20.6	20.7	21.5	22.3

Black Tartarian fruit from the check tree averaged larger in size than fruit from any of the sprayed trees. It is believed that the differences were due to size of crop in relation to leaf area rather than to the spray treatment.

The results were more variable with the Bing variety. The tree sprayed May 9th had about the same size fruit as did the check, and the other two sprayed trees had somewhat larger fruit. Observations indicated that these differences could be due to the size of the crop on the trees.

The application of wax sprays a week before commercial harvest to trees of two varieties of sweet cherries resulted in no increase in fruit size. Also, at the time of harvest for commercial shipment, the sprayed cherries had a less glossy finish and an objectionable residue where the last drop of emulsion dried.

Dust collected more readily on the waxed fruit, adding to its poor appearance.

Verbal reports from several growers in San Joaquin County who conducted independent tests substantiate these results. Two growers who applied the spray to Chapman, Black Tartarian, and Bing, remarked that the fruit appeared a little softer than unsprayed fruit and doubted that the cherries would ship as well.

There seems to be a possible explanation for the difference in behavior of fruit on trees growing in Michigan and in California.

The volume of soil occupied by tree root systems in midwest fruit growing regions is often restricted compared to that in the deep well-drained soils of California. Rainfall is relied upon to supply water requirements to the soil. It is not unusual for May and June to be comparatively dry in the midwest, with insufficient rainfall to supply the requirements of the trees. With a restricted root system, a tree may deplete the soil moisture very rapidly when it is not replaced. This may be especially serious to the cherry if the period of low rainfall corresponds to the last few weeks before harvest when fruit growth is most rapid.

Wax sprays may reduce water loss from the foliage, thus conserving moisture and thereby enabling the fruit to make maximum growth. This conclusion is indicated by reports from Michigan that wax sprayed fruits of sour cherry varieties are low in soluble solids and high in moisture content in comparison to unsprayed fruits.

Under California conditions the situation is much different. Soils usually are deep and root systems extensive, and irrigation is used to maintain a supply of available water—eliminating prolonged periods of stress. If wax sprays are effective because they reduce water loss, benefit could not be expected if the available water were maintained before harvest.

It would be desirable to repeat these experiments with detailed care taken in the selection of trees, so that the leaf area-

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SPACING

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and September 16th were highest for the close spacings. The total yields after additional harvests on October 1st and 19th showed little differences between the $1\frac{1}{2}$- and two-foot treatments but these were significantly higher than the three- and four-foot spacings. The fruit size ranged from an average of .277 pounds per fruit on the plots with a $1\frac{1}{2}$-foot spacing to .297 pounds per fruit on the four-foot spacing.

Observations

In every test early yields were higher on the close than on the wider spacings. On the closely spaced treatments a high percentage of the total crop usually was harvested in the first one or two pickings. These higher early yields are probably due to the greater number of plants per acre since the rate of ripening of the individual fruit is not influenced by plant spacing.

Some advantages of high early yields are: *1,* a larger portion of the crop might be harvested before fall rains or early frosts; *2,* quality of the crop is usually higher in the early pickings; and *3,* a higher percentage of the crop is harvested when labor is more plentiful and harvesting costs are cheaper.

In most of the tests the total yield was increased by closer plant spacing. The total yield may be materially influenced by the length of the harvest season. When the harvest season is terminated unusually early by adverse weather conditions, the closer spacings may show a considerable advantage in yield.

Plant spacings did not greatly affect fruit size although there was some trend toward larger size on the four- and six-foot spacings.

Neither did spacing appreciably influence the quality of the fruit. In the 1947 test there was less sunburn on the $1\frac{1}{2}$-foot spacing than on the three- or six-foot treatments. Test four in 1948 showed slightly greater loss of fruit from mold on the one-foot spacing than on the two-foot or wider spacings.

Plant spacings of $1\frac{1}{2}$ to two feet in the row appear to be the most desirable for the Pearson variety grown for canning. In areas where plants normally grow rather large, the two-foot spacing may be preferable. Spacings closer than $1\frac{1}{2}$ feet showed no advantage in yields and in years when fruit set is late and vine growth larger than usual, these extra close spacings may be more difficult to harvest. Close spacings are easily obtained on field seeded tomatoes. On the transplanted crop the change from a three-foot to a $1\frac{1}{2}$- to two-foot spacing will mean increased costs for plants and planting. Therefore, growers are advised to determine for their own conditions if the close spacing will increase net returns.

On changing to closer spacings a tomato grower should watch his field carefully to determine if a change in irrigation practice is necessary. With more plants per acre the crop may require more water, particularly late in the season.

Since these tests were conducted on irrigated crops, the results should not be applied to tomatoes grown without irrigation.

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CANTALOUPE

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tip of a leaf, and flew away. Each aphid was moving across the fields in a succession of short flights, feeding for short periods on a large number of plants.

This type of feeding is so very efficient in spreading the virus that an extremely low initial incidence of virus infection was increased very rapidly. Sources of infection may be native gourds, zucchini, or other summer squash plants which are grown through the winter in the Imperial Valley, volunteer melons, or seed-borne infection of melon and squash plants.

Virus infection is extremely rare early in the season. Only one case of seed-borne mosaic was found in the desert areas in 1949, even though a considerable number of plants was scouted. This may be a result of the virus-free seed program. The overwhelming numbers of potential aphid vectors that move over the fields in certain years, pick up this rare and scattered virus inoculum and increase it in an almost geometrical ratio.

It should be noted that the presence of volunteer melon plants in fields in which melons had been grown the previous year may nullify the use of virus-free seed.

Insecticides and Repellents

Attempts were made to control the spread of cantaloupe mosaic by the use of insecticides and repellents. Aphids seemed to be able to fly through insecticide clouds without ill effects. No measurable degree of mosaic control was obtained by any of the treatments tried.

The hope that a repellent could be found was based on the observation that, on approaching a plant, in normal flight, an aphid hesitates for a fraction of a second at a distance of one to 1.5 inches from the plant surface. At this point the aphid appears to be sensing, perhaps smelling, the plant to decide whether or not to land. If the plant could be made unattractive to the aphid, it would fly on without landing, and its potential as a vector would be nullified.

A number of plant oils, known repellents for other insects, and various evil-smelling substances were made into dusts and applied on young melon plants at weekly intervals. The only one of these to show a measurable degree of control was tetramethyl thiuramdisulfide, particularly when used at 10%. But the use of this compound resulted in a delay of only a few days in the appearance of mosaic.

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The above progress report is based on Research Project No. 1085.

WAX

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fruit ratio would be comparable, in which increments of growth made after the wax was applied were known and under conditions in which it was suspected that water might be lacking to the fruit during this time. These conditions would evaluate more critically than has been done the effect of the wax upon cherry size.

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The above progress report is based on Research Project No. 920-F.

INSECT

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in tomato fields by the latter part of August. If environmental conditions favor the establishment of the pest in the early season, there is danger that the increased population by mid-summer may result in defoliation to a point where serious sunburning of the fruit may occur.

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