Washington Navels

2,4-D water sprays to reduce preharvest drop of oranges

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During the 1946–47 Washington navel orange harvest, trials were made on the use of 2,4-D water sprays to reduce mature fruit drop—preharvest drop.

In one period—October, 1946, to April, 1947—17 field experiments tested 2,4-D and other plant growth regulators for control of preharvest fruit drop.

The reduction in fruit drop ranged from 27% to 96%—according to the grove and other factors, such as season, age of trees and previous cultural conditions—when 2,4-D was applied in a water spray at concentrations of from five to 25 parts per million of the free acid equivalent. On this basis a spray containing eight p.p.m. of 2,4-D may be expected to reduce mature fruit drop 30% to 60%.

In one plot 2,4-D applied at eight p.p.m. in a water spray on March 24, 1947, reduced drop during the next 26 days 86% compared to nonsprayed trees. It might be expected that in groves having only a slight fruit drop the difference between 2,4-D treated and nontreated trees would be less.

Time of Spraying

There appears to be a wide time interval during which 2,4-D sprays may be successfully applied to navel oranges.

Applications in October, 1946, while the fruit was still green, were effective in reducing the mature fruit drop in late January, 1947.

Applications made on March 27, several weeks after fruit drop started, significantly reduced the succeeding drop.

Applications made at any time between these dates also were effective in reducing drop.

Application of 2,4-D sprays during the period from full bloom to July 1 may induce the formation of rudimentary seeds in navel oranges and for this reason their application during this time seems inadvisable.

To reduce preharvest drop and to gain protection from wind loss, it appears that the most favorable time of application would be during the last two weeks of December.

In two different groves 2,4-D water sprays were applied on November 22, six hours before a heavy rain. Additional plots on previously nonsprayed trees in the same groves were established November 25, following the rain storm. Within the same grove no appreciable differences in fruit drop were observed between the plots sprayed before or after the rain. The 2,4-D sprays resulted in equal fruit drop reduction in both plots.

No Injury

Eight p.p.m.—.0008%—2,4-D water sprays apparently do not cause permanent injury. If they are applied at the beginning of a leaf growth flush or before a growth flush has fully expanded, they may cause a curling or buckling of the leaves.

No indication to date has been obtained that this leaf curling decreases production or quality of the fruit. Application of sprays containing more than eight p.p.m. 2,4-D, even between growth flushes, usually results in a curling of the young leaves in the succeeding growth flush. If an extreme concentration of 2,4-D has been applied—225 p.p.m.—this condition may persist through several growth flushes. No effects of the low concentration sprays—eight p.p.m.—have been observed on mature leaves.

Results from a preliminary eight-week commercial storage test of navel oranges from trees sprayed with 25 p.p.m. 2,4-D indicate that there are apparently no undesirable effects on fruit storage quality.

Application Methods

In addition to applying 2,4-D as a drenching water spray, it has been applied in low volume with a spray-duster, as a fine mist or fog, and in dust form.

Concentrations of 2,4-D by this method varied from 600 p.p.m. to 7,200 p.p.m. Concentrations below 2400 p.p.m. applied as a fog did not give consistent results. A concentration of 2,400 p.p.m. or more resulted in fruit drop reduction of between 20% and 71% compared to nontreated trees.

As with the spray-duster application, an adequate number of plots using this method have not been established as yet to allow its recommendation.

One experiment on navel oranges was made testing 2,4-D at 500 and 1,000 p.p.m. —.05% and .01%—as a dust. This was applied using a hand duster. Compared to nontreated trees fruit drop reductions of 12.5% and 44%, respectively, were obtained. Further data are necessary before it will be possible to evaluate the place this method may have in orange fruit drop control.

Caution

Until results are available from at least another season of experimental 2,4-D spraying, it does not seem justifiable to recommend its use as a means of reducing preharvest drop on a commercial basis.

Experience with many new chemical treatments has shown that entirely unforeseen difficulties may arise from their use on a large scale basis.

Growers who may be interested in using 2,4-D sprays are advised, for this season at least, to test them only on a limited basis.

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Above, 5,121 fruit dropped from 40 nonsprayed navel orange trees during the interval March 13, 1947 to April 13, 1947. Below, 115 fruit dropped during the same interval from 40 trees of comparable size but sprayed with 25 p.p.m. 2,4-D in water. This amount of reduction is considered an exceptional case.