

CONTROL OF BITTER PIT IN EARLY-PICKED GRANNY SMITH APPLES

In an experiment carried out in 1961, Stevenson (1962) failed to obtain a significant reduction of bitter pit in early-picked Granny Smith apples from young trees when calcium chloride and calcium nitrate preharvest sprays were applied to the trees. It was considered, at that time, that with young trees it might be necessary to apply these salts over a number of seasons before responses were obtained. Accordingly, experiments were carried out in 1962 and 1963 to determine whether responses to the treatments would occur from the second or third year of spraying.

The trees used in the experiment were those used by Stevenson (1962) and were in a block of young trees in an orchard, in the Stanthorpe district, with a known history of high bitter pit incidence. They had been planted in 1948 to 1950 with a 21 ft by 10 ft 6 in. spacing. Stocks used were approximately half Northern Spy and half Seedling. Only light crops had been obtained from the experimental trees and crops in the 1962 and 1963 season averaged $1\frac{1}{2}$ –2 bus per tree, with the 1963 crop being somewhat lighter than that in 1962. The block of trees was divided into five sections and the experimental trees were randomized within each section, so five replicates, each of one tree of each treatment, were used in the experiment.

Experimental Procedure

1962 investigations.—Five treatments were used as follows:

5 sprays calcium chloride—3 of 5 lb/100 gal followed by 2 of 10 lb/100 gal at the rate of 200 gal/ac applied on December 19, 1961, January 3, 1962, January 17, 1962, February 1, 1962, February 8, 1962.

5 sprays calcium nitrate—3 of 5 lb/100 gal followed by 2 of 10 lb/100 gal at the rate of 200 gal/ac applied on December 19, 1961, January 3, 1962, January 17, 1962, February 1, 1962, February 8, 1962.

2 sprays calcium chloride—each of 10 lb/100 gal at the rate of 200 gal/ac applied on February 1, 1962, February 8, 1962.

2 sprays calcium nitrate—each of 10 lb/100 gal at the rate of 200 gal/ac applied on February 1, 1962, February 8, 1962.

Untreated control.

On all days that spraying was carried out no rain fell.

Three pickings were made, namely on February 9, February 19, and March 2, 1962. The fruit was stored at 36°F for eight weeks, removed from store, held for seven days at 70°F and then inspected for pit incidence.

1963 investigations.—Five treatments were used as follows:

2 sprays calcium chloride—each of 10 lb/100 gal at the rate of 200 gal/ac applied on January 29, 1963, February 5, 1963.

2 sprays calcium nitrate—each of 10 lb/100 gal at the rate of 200 gal/ac applied on January 29, 1963, February 5, 1963.

1 spray calcium chloride—of 10 lb/100 gal at the rate of 200 gal/ac applied on January 29, 1963.

1 spray calcium nitrate—of 10 lb/100 gal at the rate of 200 gal/ac applied on January 29, 1963.

Untreated control.

On all days that spraying was carried out no rain fell.

Three pickings were made, namely on February 8, February 18, and March 1, 1963. The fruit was stored at 36°F for eight weeks, removed from store, held for seven days at 70°F and then inspected for pit incidence.

Results and Discussion

The results are summarized in Table 1. In the 1962 experiment all spray treatments significantly reduced the incidence of the disorder, but time of picking had no effect. Of the four spray treatments used in 1963, two sprays of calcium chloride resulted in significantly less bitter pit than either one spray of calcium nitrate or the untreated control; this difference in incidence was not significant. In this experiment, fruit picked on February 18 was less affected by pit than that from either of the other two picks. A similar result was encountered in 1961 (Stevenson 1962), when there was less bitter pit in fruit picked on February 17 than on February 6 or 28. In neither year, however, was pit incidence high nor was complete control of the disorder obtained. In addition, the calcium chloride spray treatments caused slight to severe marginal leaf scorching. For these reasons the use of these sprays for bitter pit control of cool-stored Granny Smith apples in Queensland seems to be of doubtful value, for early-picked fruit. The effect of calcium sprays on bitter pit incidence in fruit from later picking dates has yet to be investigated.

TABLE 1
EQUIVALENT PERCENTAGES BITTER PIT

Year	Treatment	First Pick	Second Pick	Third Pick	Means
1962	5 sprays calcium chloride	3.5	0.9	1.6	1.9
	5 sprays calcium nitrate	0.4	0.8	0.5	0.6
	2 sprays calcium chloride	4.7	1.1	1.4	2.2
	2 sprays calcium nitrate	3.0	1.6	0.5	1.5
	Controls	6.8	6.0	7.3	6.7
	Means	3.3	1.8	1.7	2.2
1963	2 sprays calcium chloride	2.1	0.1	2.8	1.3
	2 sprays calcium nitrate	7.0	1.4	3.3	3.5
	1 spray calcium chloride	4.2	0.9	5.8	3.3
	1 spray calcium nitrate	7.0	3.0	8.1	5.8
	Controls	7.4	4.1	7.3	6.2
	Means	5.3	1.5	5.3	3.8

1962: 5 sprays calcium nitrate significantly less than Control (1% level).

5 sprays calcium chloride; 2 sprays calcium chloride; 2 sprays calcium nitrate significantly less than Control (5% level).

1963: 2 sprays calcium chloride significantly less than 1 spray calcium nitrate; Control (1% level).

Second pick significantly less than First pick; Third pick (1% level).

REFERENCE

STEVENSON, C. D. (1962).—Effects of preharvest calcium sprays on the occurrence of bitter pit in cool-stored apples. *Qd J. Agric. Sci.* 19:133-6.

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(Received for publication September 30, 1963)