

5 YEARS' CONTINUED USE ABSCISSION INDUCING CHEMICALS -ON 'HAMLIN' ORANGES

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Abstract. Acti-Aid (cycloheximide), Acti-Aid plus Sweep (chlorothalonil), Pik-Off (glyoxal-dioxime); and Release (5-chloro-3-methyl-4-nitro-1H-pyrazole) were sprayed at several rates onto 'Hamlin' (*Citrus sinensis* (L.) Osb.) orange trees during December,

January, and February for five years. Fruit quality (as indicated by total soluble solids and acidity), yield, and tree growth were not affected by the abscission-inducing chemicals. Up to 10 per cent defoliation occasionally resulted from sprays, but leaf size and shoot growth were not affected. When applied in February, the chemicals delayed flowering about one week in 1976 and 1978. Sweep increased the effectiveness of Acti-Aid in four of five years when applied in December, but not at other application times. Acti-Aid and Release loosened fruit more consistently than Pik-Off in December. The three sprays were equally effective in January; and Release was the most effective spray in February.

Acti-Aid (cycloheximide), Pik-Off (glyoxal-dioxime), Release (5-chloro-3-methyl-4-nitro-1H-pyrazole) or certain combinations of these sprays are effective citrus fruit looseners and can be used to facilitate mechanical (2, 3, 4, 6) or hand harvest (1). Sweep (chlorothalonil) may increase the

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effectiveness of the abscission chemicals by increasing the length of time fruit produce ethylene (5, 6, 7). Acti-Aid is the only chemical that is registered for use as an abscission chemical on oranges.

Data presented in most reports are from one season and show the efficiency of the chemicals in lowering the fruit removal force (FRF) or increasing ethylene production and cellulase activity. The only reported information on fruit quality after the applications of abscission chemicals is on 'Valencia' oranges during one season (5), and the effects on yield of 'Valencia' oranges have been reported after mechanical harvest (9). Some defoliation usually occurs after abscission chemical applications (4, 7). Effects of continued low levels of defoliation on fruit quality, yield, and tree growth have not been reported. Other effects of continued use of these abscission-inducing chemicals on fruit quality, yield, tree growth, and consistency of loosening during several seasons are not known. Abscission chemicals cause tissue damage, as shown by defoliation (4) and fruit rind damage (7). An application of these chemicals could be expected to influence flowering, particularly if they are applied close to the bloom period. Other probable effects are a reduction in acidity because of the ethylene produced, a reduction in ratio of soluble solids to acids in juice, and lower juice content because of increased maturation rate.

The objectives of our study were to determine the effects of continued

use of Acti-Aid, Pik-Off, Release, and Acti-Aid plus Sweep on quality, yield, and tree growth of 'Hamlin' oranges, and to determine how consistently these chemicals loosen 'Hamlin' oranges during a five-year period when applied in early, middle, and late periods of the usual harvest season.

Materials and Methods

For these tests, 'Hamlin' (Citrus

sinensis (L.) Osb.) 10-year-old orange trees on Carrizo citrange (*C. sinensis* (L.) Osb. X *Poncirus trifoliata* (L.) Raf.) rootstock growing near Lake Butler, Florida, were used. The grove was well irrigated, fertilized, and received adequate pest control measures. Two two-tree replications were used for each treatment at each application date. Over a five-year period, the chemicals were applied consistently in December, January, or

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