

# Chemical Loosening of Sweet Cherries as a Harvest Aid

W. C. Micke • W. R. Schreder • J. T. Yeager • E. J. Roncoroni

**MECHANICAL HARVESTING** of sweet cherries for brining is feasible in California but it has not been used extensively because of the difficulty of removing fruit from the tree. A loosening agent to reduce the force necessary to remove fruit would aid mechanical harvest.

The growth regulator, ethephon (Ethrel), has been shown in other states to be an effective loosening agent for sweet cherries. Ethephon causes loosening between the stem and fruit rather than at the junction of the stem and spur. This characteristic, in addition to aiding mechanical harvest, might also reduce the stem removal problem during the brining process. Such a material might also aid hand harvest of fresh cherries if the trade would accept stemless fruit.

Unfortunately, the tests described here show that the phytotoxic effects of ethephon on sweet cherry trees under California conditions outweigh its loosening benefit. Therefore, this material is not recommended for sweet cherries in California.

Preliminary trials with ethephon were conducted in California during 1970 and 1971 on the Royal Ann (Napoleon) variety. These tests showed that ethephon would loosen fruit when applied approximately two weeks before harvest. It was also determined that a 500 ppm application could cause gumming on limbs of treated trees.

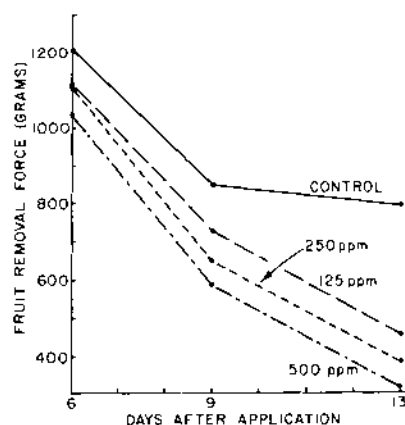
In 1972, an expanded trial was conducted with ethephon on the Royal Ann variety. The material was applied two weeks before anticipated harvest. The fruit removal force was measured with a force gauge fitted with a special adaptor for this purpose. Concentrations of 250 and 500 ppm gave excellent loosening 13 days after application, while 125 ppm gave satisfactory loosening in this test (graph 1).

The soluble solids content of treated fruit, as measured with a hand refractometer, decreased as the concentration of ethephon was increased (graph 2). This reduction in soluble solids should be no problem for brining cherries but it

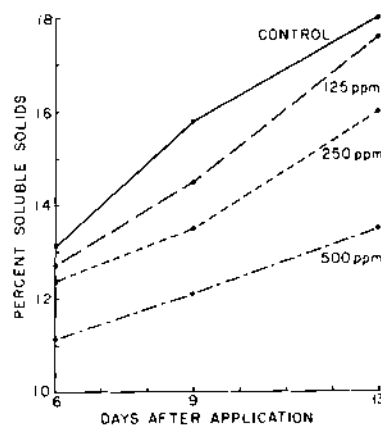
could be detrimental for fruit intended for the fresh market.

Ethephon at 250 and 500 ppm caused serious phytotoxicity while at 125 ppm the damage was slight and probably commercially acceptable (graph 3). The most serious

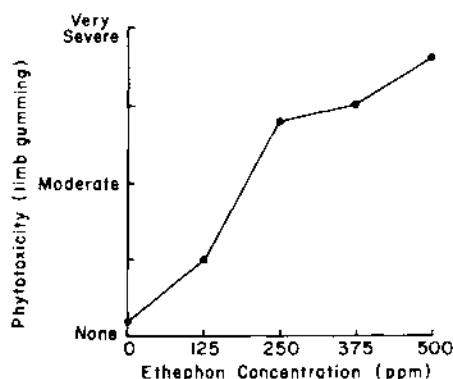
phytotoxic symptom was gumming from scaffold limbs and from current season's shoot growth. Large amounts of gum were exuded and gumming was still noted 1½ years after application on those trees treated with concentrations of 250



GRAPH 1. THE EFFECT OF VARIOUS CONCENTRATIONS OF ETHEPHON ON THE FRUIT REMOVAL FORCE OF ROYAL ANN SWEET CHERRIES. SAN JOAQUIN COUNTY, 1972.



GRAPH 2. THE EFFECT OF VARIOUS CONCENTRATIONS OF ETHEPHON ON THE SOLUBLE SOLIDS CONTENT OF ROYAL ANN SWEET CHERRY FRUIT. SAN JOAQUIN COUNTY, 1972.



GRAPH 3. PHYTOXICITY (GUMMING OF LIMBS) CAUSED BY VARIOUS CONCENTRATIONS OF ETHEPHON ON ROYAL ANN SWEET CHERRIES. SAN JOAQUIN COUNTY, 1972.

# Control of the Corn Earworm on Sweet Corn in Southern California

G. G. Kennedy • H. N. Nakakihara • E. R. Oatman

to 500 ppm. These higher concentrations also caused some killing of small shoots, particularly in the tops of trees. However, little leaf drop was observed in these tests. Some fruit on treated trees began to darken and shrivel within about ten days after ethephon application.

Additional studies conducted in 1973 and 1974 indicated that 250 ppm was the maximum concentration that could be used on Royal Ann cherries in California because of gumming from treated trees. Even at this concentration, however, serious gumming can occur in some seasons. A concentration of 125 ppm has not produced serious gumming but loosening at 125 ppm has been inconsistent. Hence, there appears to be seasonal variability in the response of sweet cherry trees and fruit to this material.

Limited trials with ethephon were conducted on the fresh shipping varieties, Bing and Van, during the 1972, 1973, and 1974 seasons. Ethephon at 250 ppm gave adequate loosening with no adverse effects on fruit color, soluble solids or weight. In the tests with Bing and Van, no serious phytotoxic effects were noted.

While ethephon can greatly aid in fruit removal, the potential phytotoxic effects of this material on sweet cherry trees in California appear to outweigh its fruit loosening advantage. The use of ethephon on cherries is not recommended by the University of California and because of its phytotoxic effects, this material is not labeled for use on sweet cherries in California.

---

*W. C. Micke is Extension Pomologist, U. C. Davis; W. R. Schreader is University of California Farm Advisor, San Joaquin County; and J. T. Yeager and E. J. Roncoroni are Extension Staff Research Associates, U. C. Davis. The authors gratefully acknowledge Amchem Products, Inc., for supplying the ethephon used in this study and for the technical assistance of its representatives Ken Dunster and Sheron Christensen. The following growers also assisted in these studies: Mario Podesta, Caminata and Podesta, Lagomarsino Bros., and Robert Russell.*



Larva of corn earworm feeding on kernels of sweet corn.

THE CORN EARWORM, *Heliothis zea* (Boddie), also known as the tomato fruitworm and cotton bollworm, is a serious pest on sweet corn, tomato, cotton, and several other row crops grown commercially in California. Sweet corn, however, is the preferred host and, although the larvae also feed on the tassel in the whorl, the most significant damage results from feeding on kernels in the developing ear.

In the past, corn earworm infestations in southern California were so severe that virtually all ears not treated with insecticide were damaged by this pest. For example, in the absence of insecticides, an average of 99.1 per cent of harvested ears from successive plantings in Orange County during 1963, 1964, and 1965 were injured by the corn earworm. In the Coachella Valley of Riverside County, between 1966 and 1968, an average of 99.0 percent of all untreated ears harvested during June were injured by the corn earworm. More recently, however, earworm damage has been considerably less severe in the Coachella Valley. Between 1969 and 1972, for example, only 9 percent of the untreated ears harvested during June were infested by the corn earworm. This

reduced level of infestation has apparently continued through 1974. Similarly, a reduction in the level of tomato fruitworm (= corn earworm) infestations in processing tomatoes occurred in Orange County in recent years. There, the level of fruitworm-infested tomatoes in untreated plots averaged 5.3 percent between 1969 and 1972 whereas, between 1973 and 1974, it averaged only 0.7 percent. Under conditions of low earworm infestations, satisfactory control may be obtained by insecticides that do not provide acceptable control under the pressures of a severe infestation.

During 1974, four commercially available insecticides and three experimental compounds were evaluated for control of the corn earworm on sweet corn in Riverside, where late-season corn earworm infestations continue to reach high levels. The commercial materials were also evaluated for effectiveness in controlling the aphid *Rhopalosiphum padi* (L.). This aphid is usually not a serious problem on sweet corn, but it occasionally develops high populations which are capable of devitalizing their host plant. Additionally, it produces copious quantities of sticky honeydew which foster the growth of a black sooty mold which interferes with normal photosynthesis and discolors the husk of the ears.

All insecticides tested were applied to 'Golden Cross Bantam' (t strain) sweet corn planted June 17, 1974, at the University of California's Citrus Research Center and Agricultural Experiment Station. Applications were made with a high-clearance ground sprayer, equipped with four D-4 hollow-cone nozzles per row. Fifty gallons of spray mix per acre were applied at 90 to 100 psi. All treatments were replicated four times in a randomized complete-block design.

The commercially available compounds, Iorsban (not presently approved for control of corn earworm on sweet corn), Lannate, Sevimol and Gardona were applied to plots