TABLE 1. Tobacco Budworm Control with Various Insecticides, 1973

Treatment	Rate (ai/acre)*	Larvae† 9/24	Larvae† 9/30	Larvae† 10/8	Damaged squares† 9/24	Damaged squares† 9/30	Damaged squares† 10/8
	(lb)						
Test A							
Dipel	0.125	4.86^{a}	8.57^{ab}	9.12^{ab}	10.86^{a}	31.46^{a}	23.36^{ab}
+ chlordimeform	.125						
Dipel	.25	4.40^{a}	3.26^{b}	3.73^{b}	13.59^{a}	14.22^{a}	9.49^{c}
+ chlordimeform	.25						
chlordimeform	.25	4.65^{a}	5.26^{ab}	5.90^{b}	9.14^{a}	19.93^{a}	17.66^{abc}
Dipel	.5	5.03^{a}	6.34^{ab}	4.97^{b}	20.74^{a}	21.20^{a}	14.22^{bc}
untreated		4.25^{a}	11.19^{a}	13.91^{a}	14.96^{a}	26.92^{a}	27.32^{a}
Test B							
Thuricide	0.5	5.65^{a}	6.93^{a}	1.75^{b}	13.11^{a}	20.44^{b}	11.44^{c}
Thuricide	.25	3.26^{a}	6.21^{ab}	8.14^{a}	9.91^{a}	22.30^{b}	21.56^{ab}
+ Sevin	2.0						
Lannate SP	0.5	2.98^{a}	2.31^{b}	6.27^{a}	16.91^{a}	8.14^{c}	27.58^{a}
Sevin	2.0	3.82^{a}	8.77^{a}	12.99^{a}	10.69^{a}	25.99^{ab}	26.66^{a}
untreated		4.71^{a}	8.68^{a}	10.69^{a}	8.88^{a}	34.37^{a}	15.31^{bc}

*Materials applied by fixed-wing aircraft in 5 gallons of water per acre (ai/acre = active ingredient per acre). Three weekly applications made, beginning September 20 and ending October 2. Each plot, 50 rows wide by ¼ mile long, was replicated three times in a randomized complete block design.
†Larvae counted on 100 cotton plant terminals in each plot after each treatment, and damage to fruiting bodies recorded for each plant checked. Analysis done on square root of count; treatments with no letters in common are significantly different.

TABLE 2. Tobacco Budworm Control, 1976

Treatment	Rate (ai/acre)*	Control 6 days after†: 1st treatment	2nd treatment	3rd treatment
	(lb)		(percent)	
Lannate	0.25			
+ Thuricide	0.25	38.1	36.0	66.4
PP557 (Ambush)	0.1	63.1	60.0	82.4
SD43775 (Pydrin)	0.1	59.5	69.3	91.2
Orthene	1.0	50.0	50.7	40.0
Dursban	1.0	20.2	26.7	32.8
untreated	—	84‡	75‡	125‡

*Materials applied by fixed-wing aircraft in 7½ gallons of water per acre (ai/acre = active ingredient per acre). Three weekly applications were made on plots 50 rows wide and ¼ mile long. Each treatment was replicated three times in a randomized complete block design.
†Larvae and damaged squares counted on 100 terminals in each plot.
‡Larvae per 300 terminals.

in the 1976 cotton growing season. Fertilization and irrigation practices that prolonged the fruiting period of late-season cotton resulted in the most severe damage by budworms. Repeated applications of available insecticides provided little or no control, although carefully chosen and timed insecticide treatments gave fairly good control in some areas.

Synthetic pyrethroids, while possibly effective, are only part of the answer. Changes in production practices will also help manage budworm populations. Early planted cotton should be terminated earlier than it is now; for late-season planting, rapidly fruiting cotton varieties with early cutout and harvest can be used. Such agronomic practices would be economically and environmentally sound and would have the added benefit of reducing overwintering pink bollworm populations.

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Ethephon

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Reported effects of the growth regulator ethephon on fruit maturity in many crops include earlier skin color changes, earlier flesh softening, and occasional increases in soluble solids. In 1975, preharvest ethephon applications on Japanese plum (*Prunus salicina*) were evaluated for their influence on fruit maturation and postharvest ripening.

El Dorado and Queen Rosa plum varieties were treated with foliar applications of ethephon at 50 and 100 ppm. Two application dates, 6 weeks and 4 weeks before harvest, were compared on El Dorado. The Queen Rosa variety had one treatment, 4½ weeks before harvest.

Fruit maturity tests were made before, at, and after harvest. Before-harvest measurements included flesh firmness and visual observation of color break. These same measurements were made at harvest, along with soluble solids and acid content. Following 1 week of storage at 32°F, the fruit was ripened at 68°F. During ripening, flesh firmness, acid, ethylene evolution, and respiratory activity (CO_2 evolution) were measured.

hastens ripening of Japanese plums

Results and discussion

Before harvest, flesh of ethephon-treated El Dorado fruit was softer than that of untreated fruit, but the 50 and 100 ppm treatments gave the same results (table 1). In the early treatment, skin color break from green to light pink at the stylar end began 1 week after application at 100 ppm and in 3 weeks at 50 ppm. Color break of untreated fruit lagged the 50 ppm treatment by about a week. Except for earlier color break, no differences due to application date were apparent.

At harvest, the ethephon-treated El Dorado fruit was still softer than untreated fruit, and there was no difference between 50 and 100 ppm treatments (table 1). Ethephon-treated Queen Rosa fruits were also softer than control fruits, but those in the 100 ppm treatment were softer than those in the 50 ppm (table 2).

All treated fruit were more intensely colored than control fruit. However, increased coloration on the stem end of Queen Rosa, which often lacks a blush, did not occur. The treatments made no difference in soluble solids content, but acid levels were progressively lower as ethephon rates increased. A slight stylar end splitting of the skin and flesh observed in 1974 tests on El Dorado plums was not apparent on El Dorado or Queen Rosa in 1975.

During the postharvest period, flesh firmness of Queen Rosa decreased, but there was no statistically significant difference among treatments in the rates of decrease shown in figure 1. Acid levels remained constant throughout the period. Measurement of ethylene evolution during postharvest ripening indicated the higher the ethephon treatment rate the greater the amount of ethylene evolved on any specific date (fig. 2). Ethephon-treated fruit showed higher respiratory activity than nontreated fruit; the greatest increase was in the 100 ppm treated fruit.

TABLE 1. Effect of Ethephon on Flesh Firmness of El Dorado Plum

Rate	Preharvest flesh firmness *†			
	June 27	June 30	July 3	July 7
(ppm)				
0	11.3 a	9.4 a	9.0 a	7.5 a
50	7.8 b	7.8 b	6.4 b	5.4 b
100	6.8 b	5.4 b	5.3 b	4.3 b

*Harvest July 10.
†Readings (pounds pressure) by means of Hunter spring force gauge with 5/16-inch tip; the higher the reading, the firmer the fruit. Mean separation by Duncan's multiple range test, 1 percent level.

TABLE 2. Effect of Ethephon on Harvest Maturity of Queen Rosa Plums, Fresno County, 1975

Rate	Flesh firmness*†	Soluble solids†	Acid†
(ppm)		(percent)	(percent)
0	6.4 a	12.1 a	0.936 a
50	4.9 b	11.9 a	.720 b
100	4.1 c	12.2 a	.610 c

*Readings (pounds pressure) by means of Hunter spring force gauge with 5/16-inch tip; the higher the reading, the firmer the fruit.
†Mean separation by Duncan's multiple range test, 1 percent level.

Flesh firmness in untreated El Dorado fruit lagged that of treated fruit by 10 days or more (table 1). During postharvest ripening of Queen Rosa, flesh softening for 50 and 100 ppm treated fruits preceded that of control fruit by 5½ and 9 days, respectively.

Ethylene production by fruit in the 100 ppm treatments preceded similar production levels in untreated controls by about 3 to 5 days; in the 50 ppm treatment, ethylene production was accelerated by 1½ to 3 days. Queen Rosa 100 ppm treated fruit from the first harvest was not different from second-harvest control fruit in flesh firmness, acid, or respiratory activity. Thus, shelf life of treated and untreated fruit appeared to be similar.

In conclusion, preharvest applications of ethephon on plums hastens skin color changes and flesh softening but does not hasten soluble solids accumulation. Treated fruits have more intense skin blush, but the surface blush area is not increased. Postharvest evaluations indicate similar ripening rates for treated and untreated fruit.

Ethephon is not registered for use on plums, and it is not recommended by the University of California.

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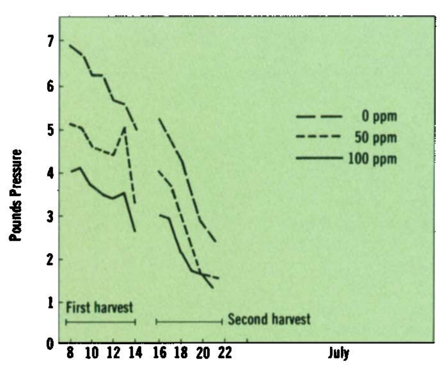

Fig. 1. Flesh firmness of ethephon-treated Queen Rosa plums, July 8-21, 1975, U.C., Davis. Readings (pounds pressure) by means of Hunter spring force gauge; the higher the reading, the firmer the fruit.

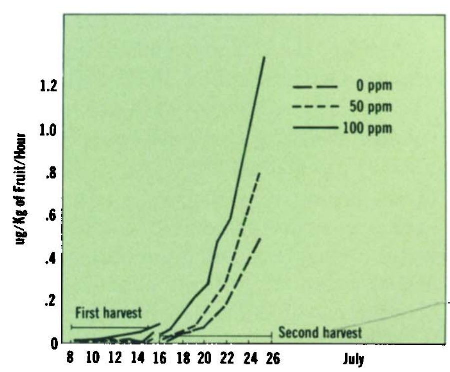

Fig. 2. Ethylene evolution of ethephon-treated Queen Rosa plum, July 8-25, 1975, U.C., Davis.