and Northern Florida. Probability of 1-inch or more rainfall each week during February-May varies from 19 to 45 percent.

Most of the soils used for peach production have a low to medium water holding capacity, hence supplemental irrigation is necessary to attain commercially acceptable fruit size. In addition, yield increases up to 20% may be expected from regularly scheduled irrigation.

Types of irrigation systems considered best suited for peach production are permanent overhead sprinkler, permanent pop-up under-tree sprinkler, self-propelled (traveling) gun and drip or trickle irrigation.

Cost of irrigation (fixed and variable) may vary from a high of $7.00 per acre-inch to as low as $4.00 per acre-inch. For an average of six 1.5-inch applications annually, total irrigation costs should range between $40 and $63 per acre .

When considering an on tree price of $12 per bushel, and an average yield of 150 bushels per acre, a 20 percent increase in yield due to irrigation would gross an additional $360 per acre. The additional gross income due to irrigation is $180 per acre even if the increase is only 10 percent.

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ANTITRANSPIRANT SPRAYS AS AFFECTING FRUIT SIZE OF 'EARLY AMBER' PEACHES

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Abstract. **Application of an antitranspirant, Vapor Gard, at 0.5% to 'Early Amber' peaches 4 and 5 weeks prior to commercial maturity increased fruit size. Vapor Gard increased the proportion of fruit 1⅞ inches or larger in diam. by 18%. Visual observations indicated that fruit size was not affected until the end of the final fruit swell period. Data are also given on the effects of Vapor Gard on color and shelf-life.**

Spraying antitranspirants, such as plastic films, on plants has been shown to reduce moisture loss from both fruit and foliage significantly (2, 3, 4, 5, 7). Albrigo and Brown (1) reported that these films form a continuous layer over the plant organ creating a superficial barrier to both gas exchange and moisture loss.

Recent reports indicate that concomitant with reduced moisture loss, there is an increase in fruit growth for those fruits, such as the peach, having a distinct period of final growth characterized by cell expansion (3, 5). Davenport et al. (6) reported an increase in fruit size of 5 to 15% for cherries and peaches by spraying an antitranspirant shortly before harvest.

This paper reports some effects of an antitranspirant, Vapor Gard, applied as a preharvest spray on fruit size and storage of 'Early Amber' peaches.

Materials and Methods

'Early Amber' peach trees located at the University of Florida's horticultural unit at Gainesville were sprayed with 2 applications of a 0.5% Vapor Gard[1] (poly-1-p Menthen-8-9 diyl) solution at a rate of 4 to 5 gal. per tree on April 17 and April 25, 1972. Treated and nontreated trees were

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[1]Vapor Gard supplied by Miller Chemical and Fertilizer Company, Hanover, Pennsylvania.

hand thinned to approx. 300 fruit per tree prior to spraying. Fruit size was checked at early maturity, May 24, visually and at full maturity, May 29, by harvesting all fruit from a randomly selected portion of each tree and measuring individual fruit diam.

For the storage test, treated and nontreated fruit harvested at early maturity were stored at 40°F (4.4°C) for 18 days followed by 70°F (21°C) for 5 days. Fruit firmness, respiration (as CO_2 evolved), and % soluble solids (Brix) were determined periodically during the storage period on 10 fruit samples. Decay was evaluated at the end of 18 days at 40°F followed by 5 days at 70°F. Fruit firmness measurements were subjected to analysis of variance and Duncan's Multiple Range comparison. The respiration and soluble solids measurements were made from pooled samples and were not analyzed statistically.

Results and Discussion

The application of an antitranspirant, Vapor Gard, 4 and 5 weeks prior to completion of fruit growth markedly increased the fruit size of 'Early Amber' peaches (Fig. 1). The number of fruit larger than 1⅞″ diam. was greater by 18%. Twenty-five % of these fruit were 2″ or larger but only 10% of the nontreated fruit exceeded or met this minimum size. Fruit size is apparently

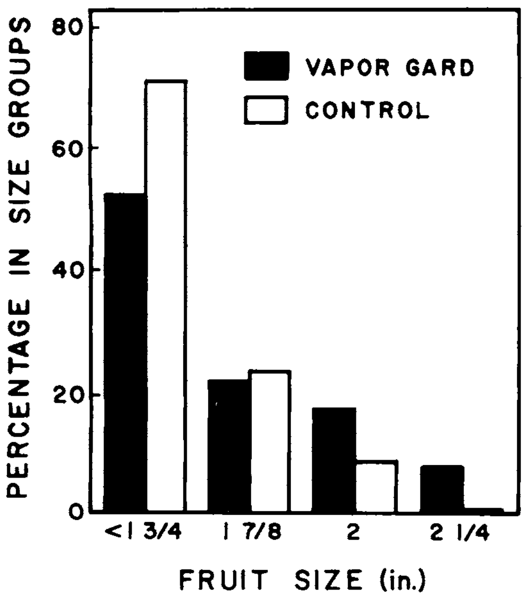


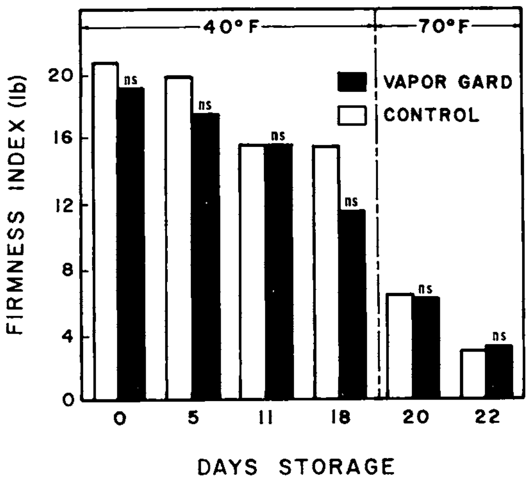
Fig. 1. Percentage by size groups of Vapor Gard treated and nontreated 'Early Amber' peaches harvested at completion of growth. (May 29, 1972).

increased with antitranspirants only during the final phase of fruit growth which is primarily by cell enlargement of the mesocarp. Field observations during the first harvest at early maturity indicated that fruit size was comparable for both treated and nontreated fruit. Growth curves for antitranspirant-treated fruits reported by Davenport et al. (3, 5, 6) also indicate that the increase in size at this stage would not be apparent unless assigned fruits had been measured periodically throughout the growth period. However, an increase in fruit size of the treated fruit was readily apparent in the field during the second harvest when growth was essentially complete. These observations are in agreement with the work of Davenport et al. with cherries (6), peaches (3), and olives (5). They observed that spraying 'Halford' peaches approx. 18 days prior to completion of fruit growth with the antitranspirant Mobileaf resulted in a 6% increase in the final fruit volume. The effect of antitranspirants in increasing fruit size during the final period of growth has been attributed primarily to its effect on increasing the water potential. Growth during this period is by cell enlargement, a process highly dependent on the water status of the plant.

The effect of Vapor Gard on storage life was made only on fruit harvested at early maturity. These preliminary results indicate that Vapor Gard applied as a preharvest spray 4 and 5 weeks prior to completion of growth has little effect on fruit maturity, shelf life, or fruit quality of peaches. Fruit firmness of Vapor Gard-treated fruit harvested at early maturity was approx. 3 lb. less firm than nontreated fruit (Fig. 2). However, fruit firmness did not vary substantially from the nontreated fruit during storage at either 40° or 70°F.

Respiration data on fruit harvested at early maturity also indicated that the maturation and ripening processes were not accelerated by Vapor Gard applications (Table 1). The initial CO_2 production was higher for nontreated fruit, but all were comparable thereafter. Fruit color appeared to be slightly enhanced by the Vapor Gard treatment. However, the enhanced color was not as great as that observed on fruit treated with ethephon. Similar observations have been noted on several varieties of mango (C. R. Barmore and R. T. McMillan, unpublished data).

Vapor Gard did not seem to influence the % soluble solids (Brix) of these particular fruit either at time of harvest or during storage at either 40° or 70°F (Table 2). The effect of Vapor



ns = do not differ statistically at the 5% level.

Fig. 2. Firmness index during storage at 40°F, with subsequent ripening at 70°F, of Vapor Gard-treated and nontreated 'Early Amber' peaches harvested at early maturity (May 24, 1972).

Gard on the solids probably would not be seen until the period of final fruit swell is complete. The increase in moisture content at this time would probably result in a lower solids conc. Flavor quality was not affected, as judged by a taste panel.

The effects of Vapor Gard on fruit decay during storage was also checked. Brown rot, caused by *Monilinia fructicola* (Wint.) Honey, was not a severe problem in the orchard this year. However, brown rot in storage was greater on fruit treated

Table 1. CO_2 production during 40°F storage of 'Early Amber' peaches treated with a preharvest application of Vapor Gard. Fruit were harvested at early maturity (May 24, 1972).

Storage (days)	CO2 (ml/kg/hr) Control	Vapor Gard
1	0.58	0.49
5	0.50	0.49
7	0.51	0.52
11	0.47	0.50
15	0.30	0.32
18	0.19	0.12

Table 2. Percent soluble solids during storage at 40° and 70°F of 'Early Amber' peaches treated with a preharvest application of Vapor Gard. Fruit were harvested at early maturity (May 24, 1972).

Storage (days)	% Soluble solids Control	Vapor Gard
	40°F	
0	8.02	8.03
5	8.97	8.30
7	9.55	9.65
11	9.19	9.01
15	9.52	9.12
18	10.35	11.33
	70°F	
20	9.63	10.24
22	9.32	9.74

with Vapor Gard than on nontreated fruit. These fruit did not receive a fungicide at the time of Vapor Gard application or a postharvest application prior to storage. The Vapor Gard coating may have created a micro-environment between the surface of the fruit and plastic coating conducive to the development of this organism. Brown and Albrigo (unpublished data) have also noticed an enhanced development of *Penicillium* on citrus under similar conditions. The addition of a fungicide, e.g. Benlate (benomyl), to Vapor Gard at time of application might alleviate this problem.

Further investigations are needed before firm recommendations can be made for Florida peaches on the use of Vapor Gard, or any other antitranspirant, as an aid for increasing fruit size. Although effectiveness in increasing fruit size is now well established, a delayed harvest to maximize size increase would increase handling problems because the fruit would be very mature by this stage. Fruit treated with Vapor Gard without a fungicide were observed to have an increase in brown rot decay during 70°F storage.

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EFFECTS OF ETHEPHON ON FRUIT MATURITY AND STORAGE OF FLORIDA PEACHES cv. 'EARLY AMBER'

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Abstract. **Ethephon applied during cytokinesis at 50 ppm to 'Early Amber' peaches advanced fruit maturity by approx. 4 to 5 days, with more uniform maturity of all treated fruit. Ethephon-treated fruit harvested at early maturity (17.2 lb. firmness), time of harvest based on fruit size of nontreated fruit, were stored successfully for 18 days at both 32 and 40°F (0 to 4.5°C) without apparent adverse effects on fruit quality after storage and subsequent ripening at 70°F. Storage life of ethephon-treated fruit harvested at late maturity 13.7 lb. firmness) was reduced by approx. 1/3 as compared to fruit harvested at early maturity.**

Ethephon (Ethrel) applied to peaches during cytokinesis as a thinning agent is reported to accelerate the maturation and ripening processes of the fruit (2, 5, 6, 7, 8). These changes can be beneficial to the Florida peach industry since early marketing is of crucial importance. However, without hydrocooling and adequate refrigeration in transit, increased losses can result from overripening.

Peaches are very perishable and, generally, have a storage life of 2 to 3 weeks under proper storage conditions (1). The storage life of peach fruit treated with ethephon will be reduced since these fruit are physiologically more mature at harvest than nontreated fruit, since a minimum size must be attained for marketing. Ethephon acts through the release of ethylene (9), a gas known to be essential for the initiation of numerous changes characteristic of fruit maturation and ripening (4). The effects of ethephon stimulation can be seen in the resultant change in skin and flesh color, firmness, fruit growth, and soluble solids (Brix) (3, 6, 7). The present study reports the effects of ethephon applied during cytokinesis on fruit maturity and its subsequent effect on fruit storage at various temperatures of 'Early Amber' peaches.

Materials and Methods

'Early Amber' peach trees located at the University of Florida's horticultural unit at Gainesville were sprayed with 50 ppm ethephon during cytokinensis, May 1, 1972. Treatment was replicated 5 times. Fruit samples for storage were harvested at early and late maturity on May 25 and 30, respectively. The first harvest date ("early maturity") was selected when fruit of the nontreated trees reached a minimum size of 1⅞ in. dia. The second harvest ("late maturity") was 5 days later. All fruit were hydrocooled immediately after harvest and shipped to the Agricultural Research and Education Center at Lake Alfred. Fruit were washed, defuzzed, and randomized into individual units of 10 fruits each. Both treated and nontreated fruit were stored at 32 and 40°F up to 18 days. After storage, fruit were ripened at 70°F and fruit quality was evaluated by a taste panel.

Fruit firmness, Brix, and acidity were determined periodically during the storage period. Determinations were made on 10 fruit samples. Fruit firmness was measured with a Magness Taylor pressure gauge with a ⅛″ tip. Percentage Brix

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