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COLD STORAGE POTENTIAL OF CLING PEACH VARIETIES

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A look at 1984 research on cling peach storage and comparison of the potential of 13 varieties.

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Cold storage of clingstone peaches prior to canning can be used to regulate the flow of fresh fruits into the processing plant and to lengthen the processing season for peach products and fruit cocktail. Such benefits also help overcome problems related to changes in harvesting schedules due to unpredictable weather conditions as well as problems resulting from restrictions on water use and waste disposal in processing plants.

During the 1984 season, a study was carried out to evaluate the precanning storage potential of 13 cling peach varieties. This research was supported, in part, by the California Cling Peach Advisory Board and the Del Monte Corporation. The author appreciates the technical assistance provided by Lisa Kitinoja, Ellen Chan, Alexander Chordas, and Robert Fenton in various aspects of this research project.

Fruits of 13 varieties of hand-picked cling peaches were obtained during July and August, 1984 from two orchards located in the central valley of California (Table 1). The orchards differed in soil type (sandy vs. loamy soil) and the age of trees (young trees in the sandy soil and older trees in the loamy soil). The peaches were transported to the Postharvest Pomology Laboratory at UC Davis within a few hours of harvest and were sorted to eliminate any fruits showing bruises, decay, or other serious defects.

Various fruit lots were used to determine respiration and ethylene production rates, water loss potential, susceptibility to bruising, and susceptibility to internal breakdown at 5°C (41°F). For the storage test, fruits were kept at 0°C (32°F) and 90-95% relative humidity in air for up to 6 weeks. In addition, samples of five varieties (Carolyn, Dr. Davis, H6-55, Starn, and Corona) were placed in a controlled atmosphere of 1% oxygen + 5% carbon dioxide + 94% nitrogen. All stored peaches were dipped into a fungicidal suspension of botran (800 ppm) and benlate (300 ppm) to minimize decay problems.

At weekly intervals, peaches were removed from storage and evaluated for various quality attributes, then canned using standard procedures. Canned peaches were stored at 20°C (68°F) until evaluated for overall appearance, com-

TABLE 1

Source and harvest time of clingstone peach varieties used in the 1984 study.

	HARVEST TIME			
Soil type	**Extra early**	**Early**	**Late**	**Extra Late**
Loamy	Loadel	Andross	Halford	H6-55
	Carson	Klamt	Wiser	Starn
			Carolyn	Corona
Sandy	D6-15W	Klamt	Ross	
			Carolyn	
			Dr. Davis	

TABLE 2

A comparison between a variety with poor storage potential (Halford) and a variety with excellent storage potential (Dr. Davis) as to their postharvest behavior and fruit characteristics (based on data from the 1982 to 1984 seasons).

Parameter	Halford	Dr. Davis
Respiration rate (ml co_2/kg.hr) at 32°F	2.6	2.2
Ethylene production rate (ul CO_2/kg.hr) at 32°F	0.07	0.05
Susceptibility to water loss	Low	Low
Susceptibility to bruising	Moderate	Moderate
Susceptibility to browning	High	Low
Total phenolics (mg %)	38.6	20.7
Polyphenol oxidase activity (units)	0.10	0.05
Total ascorbic acid	11.8	10.4
Severity of internal breakdown after 3 weeks at 41°F	Severe	Moderate

positional, and textural quality. The potential storage durations shown in Figure 1 are based on samples reaching a score of 3 on a 1 = poor to 7 = excellent overall appearance quality.

Large differences were found among the 13 varieties used in this study as to their cold storage potential in air (Figure 1). The possible storage period ranged from 1 to 2 weeks for Andross, Klamt, and Halford to 6 weeks for Dr. Davis. Fruits of Klamt and Carolyn from sandy soil stored less well than fruits of the same two varieties from loamy soil. These differences may have been due to differences in tree age and cultural practices (fruit load per tree, irrigation, fertilization) between the two orchards. Further studies are planned for the 1985 season to identify the possible reasons for differences in storage potential between peaches from sandy soil and those from heavier soil.

In an attempt to understand the reasons for the large difference between fruits of Halford and Dr. Davis in their storage potential, we looked at data obtained on these two varieties during the 1984 as well as previous seasons. As shown in Table 2, differences in respiration and ethylene production rate were relatively small. Also, fruits of Halford and Dr. Davis had similar susceptibilities to water loss and bruising. Halford fruits exhibited more severe internal breakdown symptoms than Dr. Davis fruits after 3 weeks at 5°C (41°F), but the severity was comparable after 4 weeks. The only significant difference between these two varieties was that Halford fruits contained more total phenolics and polyphenol oxidase activity, and were more susceptible to browning (Table 2). However, the magnitude of these differences varies from season to season.

Storage in a controlled atmosphere (CA) of 1% oxygen + 5% carbon dioxide + 94% nitrogen extended the storage potential at 0°C (32°F) of Dr. Davis from 6 weeks (in air) to 8 weeks, H6-55 from 3 weeks (in air) to 6 weeks, and both Starn and Corona from 3 weeks (in air) to 4 weeks (Figure 1). Carolyn fruits stored in CA were significantly firmer and had better appearance than those kept in air for 3 to 4 weeks.

During the 1985 season, several follow-up studies will be conducted to investigate the following:

1. Extent of seasonal variation in the relative storage potential of selected varieties.
2. Cold storage potential of 8 promising UC advanced breeding lines.
3. Factors which may contribute to differences in storage potential of a given variety grown on various soil types.
4. Possible factors which are responsible for the large difference between fruits of Halford and Dr. Davis in their storage potential.

In conclusion, this study points out the need for evaluating new breeding lines as to their pre-canning storage potential and for taking such information into consideration when selecting varieties for future plantings. Successful cold storage for the indicated durations for each variety will depend on use of proper harvesting, handling, and storage procedures. These include minimizing physical injuries to the fruits during harvesting and handling, sorting to eliminate defective fruits before storage, prompt cooling of the peaches to near 0°C (32°F), and maintenance of a temperature range of 1 ± 1°C (34 ± 2°F) and 90 to 95% relative humidity throughout the storage period.

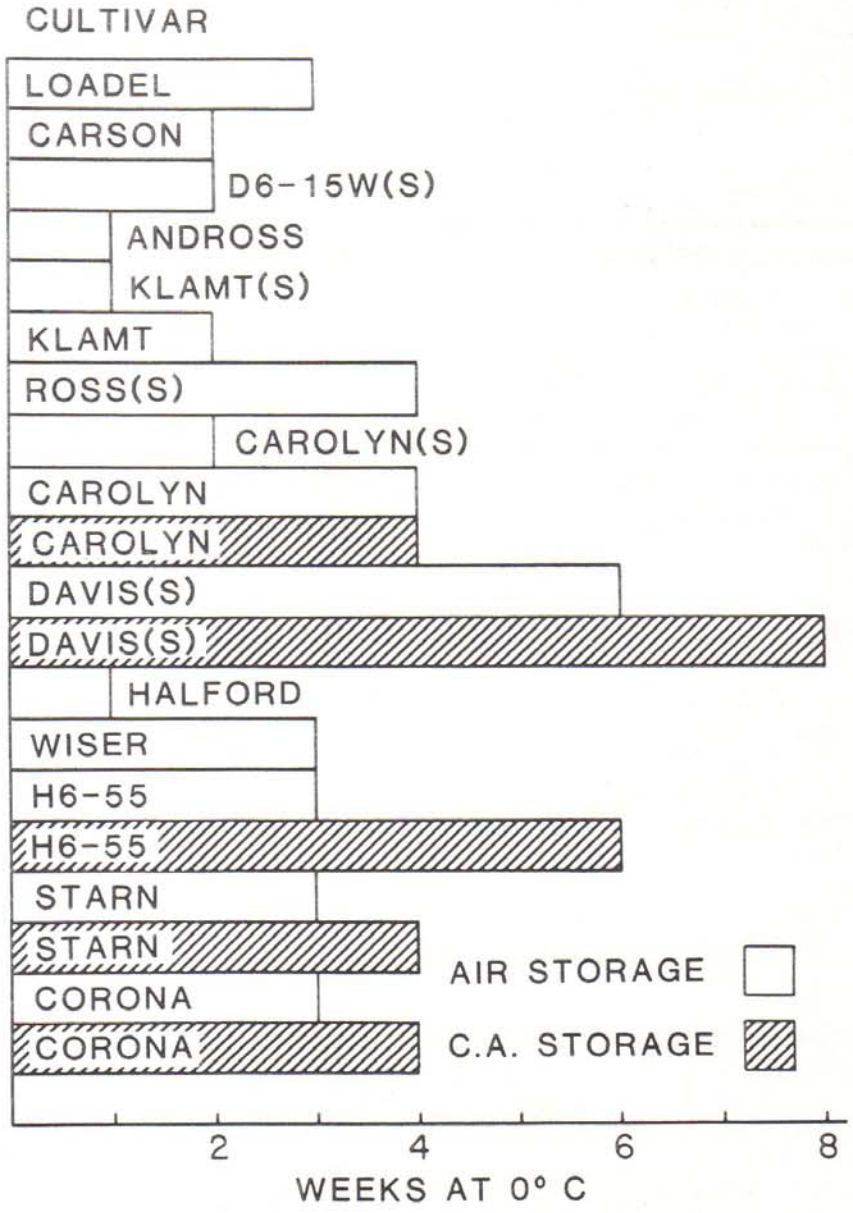

FIGURE 1

Cold storage potential of clingstone peach varieties kept at 0°C (32°F) in air or in a controlled atmosphere (CA) of 1% oxygen and 5% carbon dioxide. (S) indicates varieties obtained from sandy soil; all others were obtained from loamy soil.