Shipping methods used for

Fresh Cut Flowers

evaluated in transcontinental trials

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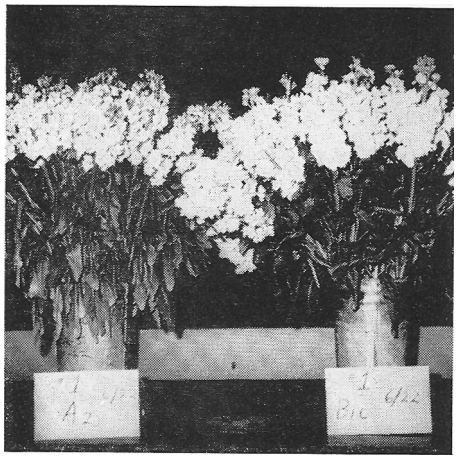
Six trial shipments of cut flowers grown in San Diego County were sent by air freight to Ithaca, New York, to evaluate the condition of the flowers on and following arrival at the eastern market.

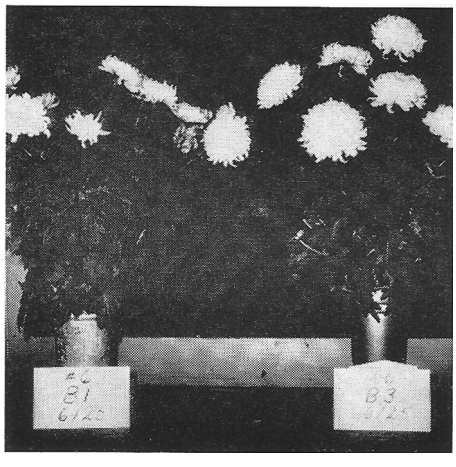
The shipping trials were designed to compare containers, methods of packing, preconditioning of flowers by the grower or shipper, flowers cut at different stages of maturity, and various treatments to affect keeping life of the flowers after arrival at Ithaca.

Another purpose of the trials was to evaluate combinations of old and new methods for the most satisfactory transfer of cut flowers from the grower to the ultimate consumer. All flowers shipped in the trials arrived in good condition so it may be assumed that cut flowers, free from problems when shipped, will arrive in good condition despite shipping methods employed.



Column stock six days after harvest in California. Stems of flowers on the right were recut and crushed after shipment.

Chrysanthemums after six days in New York. Stems of flowers on the right were recut and put into water with preservative added.



Column Stocks

Column stocks are one of the most difficult types of cut flowers to condition after shipment because of their inability to take water.

Crushing the cut ends of the stems of column stocks for 2″–3″ after shipment allowed flowers and foliage to regain turgidity. Stems not crushed remained flaccid after arrival at Ithaca, whether refrigerated or left at room temperature. Cooling column stocks for 24 hours after shipment did not decrease the rate of decline of keeping life but delayed decline by 24 hours. There was no difference in flower condition on arrival or comparative keeping life of stocks shipped in corrugated or styrene-type hampers.

Carnations

All commercial carnation varieties used in the trials—Red Sims, White Sims, Pink Sims, Anniversary, S. Arthur Sims, Galaxy, and Tangerine—were about equal in keeping ability when the flowers were healthy and free of insect damage or disease.

Cooling the carnations prior to shipment increased keeping life at Ithaca about one day. Recutting the stems after arrival increased keeping life about two days without other treatment and for about 10 days when held in plain water at 42°F. Keeping life of recut carnations held at room temperature, after removal from the cooler, was reduced about 50%.

The trial shipments indicated that the best quality and keeping life of carnations, at an eastern destination, are obtained when the grower or the shipper cools the cut flowers overnight at 38°F to 42°F in water with flower preservative and then ships the flowers in uniced boxes. After arrival, the carnation stem should be recut, the flowers placed in water with preservative. When the flowers are fully conditioned, they should be held in refrigeration until selling time.

Whenever the carrier's shipping schedule makes it possible, it seems to be feasible to cut and grade carnations, pack

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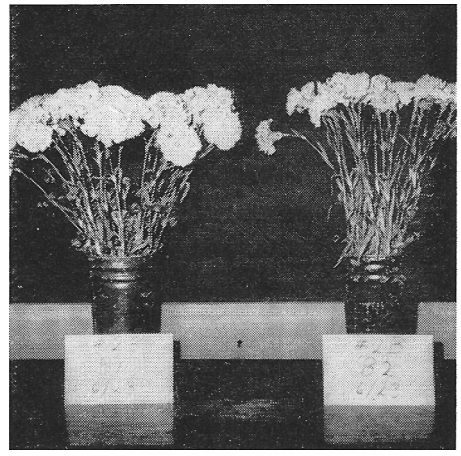
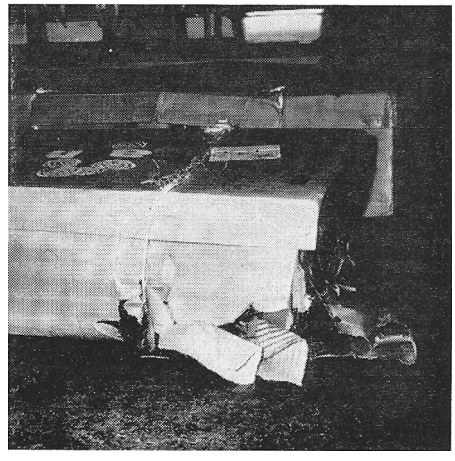


Carnations six days after harvest in California. Stems of flowers on the left were recut and kept four days in plain water.

Flowers shipped in this container were damaged when box became water-soaked by melting ice and collapsed.



Surface irrigation

Water Deliveries and Costs

in the San Joaquin Valley cotton area

CHARLES V. MOORE and TRIMBLE R. HEDGES

Most San Joaquin Valley operators of irrigated farms depend on surface water sources to supplement ground water supplies. In years of low rainfall, when ground water levels drop, wells deliver less than normal quantities—some wells go dry—and sources of surface water are of increased importance.

In a study of surface irrigation water supplies and costs in the San Joaquin Valley, 11 irrigation districts in the cotton producing area were chosen because of their geographical distribution in the floor of the valley.

The different combinations of water sources, the variations of supply within the sources, and the many distributing agencies with varying policies within the selected study districts prevented an area analysis. Consequently, the 11 districts were treated individually.

Among the most important surface water distributors are irrigation districts, water storage districts, county water districts, California water districts, mutual water companies, and private water companies. Irrigation districts supply the most extensive San Joaquin Valley surface water service areas.

Stream flow diversions, reservoir storage, and purchase contracts with the United States Bureau of Reclamation provide most of the water that irrigation districts retail to farmers. The reliability and adequacy of stream diversions depend on the nature of the water rights held by the organization or its members, and flow in the stream to which the rights pertain. An irrigation district may hold only a junior appropriative right on a stream, for example, and, therefore, receive water only during wet years, or only during high stream flow seasons of a given year. In contrast, a district may have a senior right on a stream and with it, a dependable supply throughout the irrigation season, except in unusually dry years.

Costs to the district, and hence to farmers, vary widely. Investments in distribution facilities depend upon the type of system used. Completely closed concrete pipe systems with small service areas of 40–80 acres per turnout are expensive; investments may range up to $300 per acre of cropland in the district. The closed type system is efficient and minimizes losses from seepage and evaporation. Unlined open ditches require lower investments per acre, but seepage and evaporation losses are high.

The age of the system—when installed—also affects its cost and the price that growers must pay for water. Concrete pipeline construction costs in 1960 were 48% higher than they were in 1947. Some of the older districts have repaid the capital cost of their distribution systems, have no funded debt to be repaid, and no need to include fees or charges to cover such obligations. Newer districts usually have heavy capital obligations.

In addition to capital costs, farmer payments for surface water must cover the cost of all services which may include storage within the season, and also year-to-year carryover to insure more uniform water supplies. Some districts carry on extensive ground water recharge programs requiring large percolation facilities. Also, some districts have developed extensive drainage systems for parts or all of their service area.

For the current study all district costs were charged to the surface water delivered—the only quantifiable service—a procedure that masks the amounts properly chargeable against the other services provided. The boards of directors determine pricing policies for their individual districts, and most of the organizations break down the total price into two components, the assessment portion and the toll portion.

Irrigation districts, as public entities, have the power of taxation. They can levy the assessment portion of the total price as a fixed cost which the district member, the farmer, must pay, usually annually, regardless of the amount of water—if any—the farmer received from the district. Special assessments for improvement or drainage districts within an irrigation district, if levied, cause the fixed

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them in boxes without ice and ship immediately. Water from melting ice in a shipping box can cause collapse of the box in handling, loosening of the braces, and damage to merchandise.

Although, in all trials, all flowers were salable on arrival at Ithaca, the carnations showed minor signs of thrips injury, chemical injury, and botrytis. Of the three, thrips injury seemed to be the most serious. Petals showing thrips injury on arrival soon exhibited premature browning and dehydration. If carnations are free of disease, insect injury, and physiologically able to function as cut flowers, shipping success depends little on methods used. However, shipping methods can increase cut flower life.

Standard Chrysanthemums

Standard chrysanthemums in the bud stage shipped well in a box with no ice. Buds opened to salable flower size in 4–5 days when stems were recut and commercial flower preservative added to the water. When stems were recut and plain water used, buds did not open and leaves and flowers did not remain turgid. Recutting of stems and the use of a flower preservative are necessary. Maximum benefits derived from shipping standard chrysanthemums in the bud stage could be savings in transportation, less damage to flowers, and the possibility of stockpiling mums by the wholesaler.

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