

amount of milk the average hourly earnings in manufacturing industries could purchase has more than doubled since 1940.

Milk prices

If milk prices had increased in proportion to wages, the 1968 price of a half-gallon carton of milk would have been 74.9 cents in Los Angeles and 82.0 cents in San Francisco—approximately 57 per cent above prevailing prices in 1950. Nearly 2.3 billion quarts of milk were consumed in California during 1968, meaning the consumer's milk bill would have totaled almost \$330 million more. This saving to consumers excludes the savings on concentrated milk, fluid skim milk, cream products, butter, cheese, and other processed dairy products which are more difficult to calculate.

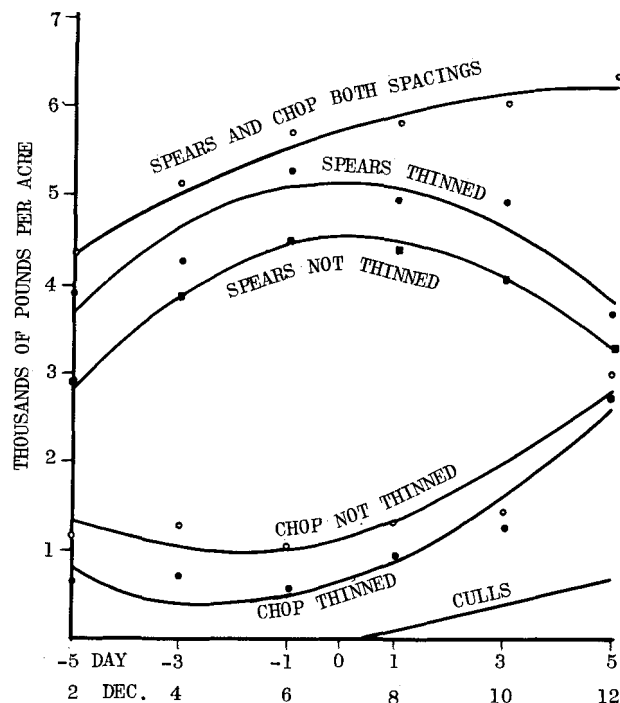
First DHIA

The first DHIA was established in Humboldt County in 1909 under the name of the Ferndale Cow Testing Association with eight members and 581 cows. This association is still in operation and is the oldest in the U. S. in terms of continuous operation. The DHIA movement was given considerable impetus during the 20's by a campaign organized by the Agricultural Extension Service with the Farm Bureau, banks, the press and many other agricultural groups and allied industries participating. Since 1950, however, the growth of DHIA has been due mainly to the recognition of the importance of individual cow records to dairy management.

As shown in table 1, the impact of DHIA on the dairy industry has increased significantly through the years. From a modest 5 per cent of the state's cow population in 1920 the number of cows on test in DHIA increased to 49 per cent in 1968—and these cows produced almost 58 per cent of the state's milk. This expanding influence of DHIA was a major factor contributing to the spectacular increase in milk production per cow since 1950. The increase during this 18-year period was more than three times the increase of the previous 20 years. This also explains, to a large degree, why the total milk supply in California increased approximately 50 per cent since 1950 with only a slight increase in cow numbers.

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GRAPH 1. YIELD TRENDS FOR ONCE-OVER HARVESTS OF HARVESTER BROCCOLI, FIRST TRIAL



Time of machine

HAND HARVESTING costs run over \$85 per acre for a 5,000-lb crop of broccoli for freezing. Mechanical harvesting of this crop, if feasible, could be done at a small fraction of this cost.

To find the best time for mechanical harvesting by determining how yield and quality of broccoli change from day to day, two trials were conducted in Ventura County with the Harvester variety of broccoli late in 1968. The Harvester variety was developed by the Asgrow Seed Company for mechanical harvesting. It matures early and quickly, and its quality is good. Its stems are long, thus minimizing the number of leaves attached to heads cut about 6 inches below the top of the heads.

First trial

The first trial was precision-planted September 10 at 2-inch spacing with a Stanhay planter in rows 14 inches apart on the bed and 26 inches across the furrow. Plots were in Swift and Brucker's broccoli field north of Hueneme Road south of Oxnard.

On October 1, four plots consisting of 120 ft of bed each were hand thinned by pulling plants, and another set of four plots of the same size were left unthinned. Thinned and unthinned plots were arranged in a randomized complete block design. On October 22, plants in all plots

were counted and it was found that the average spacing in the thinned plots was 5.7 inches between plants and in the unthinned plots the spacing was 3.4 inches between plants.

Sample harvested

On December 2, 4, 6, 8, 10, and 12, a sample of 20 ft of bed was harvested from each plot. The locations of these 20-ft samples were randomized within each main plot. When these samples were harvested, all heads were taken regardless of size or maturity, to simulate mechanical harvesting. All heads were cut to a 5-inch length. Each sample was graded into three classes (spears, chop, and culls) by Kenneth Knapp, Quality Control Manager of Oxnard Frozen Foods. Heads in each sample were counted and heads and parts of heads in each quality class were weighed.

Plants spaced at 5.7 inches produced over 600 lbs per acre more spears than those spaced at 3.4 inches (see graph 1). This was true for six picks and for yields at peak yield of spears. Plants spaced at 5.7 inches produce about 450 lbs per acre less chop-grade broccoli than those spaced at 3.4 inches, and up to 560 lbs per acre less at the peak yield of spears.

A number of conclusions were drawn regarding the differences in broccoli head

harvest for harvested BROCCOLI

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size between the thinned and unthinned plots: From December 2 to December 12, head size increased at the rate of .0047 lbs per day for the 5.7-inch plots, and at a rate of .0024 lbs per day for the 3.4-inch plots. At the peak yield of spears, heads from the thinned plots averaged .116 lb, and heads from the unthinned plots averaged .091 lb.

In a second trial, a single row of Harvester broccoli was planted in Silveira's broccoli field south of Hueneme Road September 20. Single seeds were dropped at 2-inch intervals and the stand, as determined by the number of plants finally harvested, was 3.6 plants per ft, or 3.3 inches between plants. No thinning was done. Before harvesting, the upper half of the trial was divided into three sections and each section was divided into six plots. A plot from each section was harvested every three days. Harvesting was done by hand and all heads were taken to simulate once-over machine harvesting. The broccoli from each of the three plots harvested each day was graded into spears, chop, and culls, as in the first trial. Before weighing and grading, all heads were cut to a 5-inch length.

Yields trends for spears and chop each followed quadratic curves and their combined yields followed a cubic curve (see graph 2). At the peak of yields for spears, the yield of spears and chop equaled over

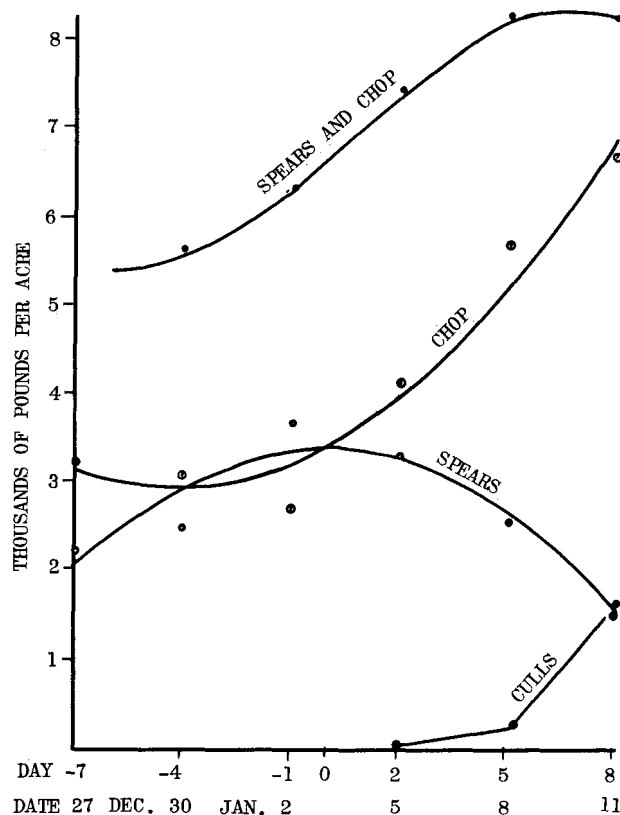
6,000 lbs per acre. The yield of spears and chop combined increased at a rate of approximately 300 lbs per acre per day for four days after the time of the peak yield for spears, and reached a yield of 8,000 lbs per acre before culls exceeded 250 lbs per acre. Until two days after the time of the peak yield for spears, almost no heads were classified as culls because of overmaturity.

The combination of a more dense stand and cooler weather may account for the lower yield of spears in this second trial.

To relate head diameter to head weight, a sample of heads from the fourth pick was weighed and measured. This was done by selecting 20 groups of five heads of uniform size, laying them side by side to get total diameter for five heads, and then weighing each five-head sample. This showed a straight line relationship between head diameter and head weight for heads from 2 to 3 inches in diameter. Two-inch heads weighed .06 lb and three-inch heads weighed .14 lb.

There are several probable reasons for the differences in the results of the two trials. The second trial was planted 10 days later than the first trial, and the date of peak yield of spears for the second trial was 27 days later than for the first. Also, in the unthinned plots of the first trial, the spacing of harvested heads was 4.95 in. In the second trial it was 3.36 in.

GRAPH 2. YIELD TRENDS FOR ONCE-OVER HARVEST OF HARVESTER BROCCOLI, SECOND TRIAL.



The spacing in the unthinned plots of the first trial was 3.36 at thinning time, but only two-thirds of the plants produced heads. No stand count was made in the second trial at thinning time.

Several conclusions can be drawn from these two harvest trials of Harvester broccoli: The yield of spear quality broccoli increased at the rate of approximately 300 lbs per acre per day for a few days before peak yield of spears was reached. The yield of spears and chop combined increased at a rate of over 200 lbs per day to the time of peak yield of spears. At this peak yield time, yield of spears and chop combined exceeded 5,500 lbs per acre. From two days before peak yield until two days after, yield of spears was within 300 lbs per acre of peak yield. In the first trial, where peak yield occurred on December 7, peak yield of spears was over 5,000 lbs per acre from plots thinned to 5.7 inches and over 4,500 lbs per acre from plots left unthinned at a spacing of 3.4 inches.

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