

Fresh Fruits and Vegetables

deliveries per week and refrigeration available for fresh fruits and vegetables affected by types of retail stores

Jessie V. Coles and Marilyn Dunsing

The following article is the fifth of a series of reports on a survey of characteristics of and services offered by retail grocery stores in five counties in California made cooperatively by the Department of Home Economics, University of California, and the United States Department of Agriculture under the authority of the Research and Marketing Act as part of Western Regional Research Project WM-26.

Consumers are concerned specifically with the kinds, the varieties and the quality of fresh fruits and vegetables offered by retail grocery stores.

The availability of fresh fruits and vegetables—as well as canned, frozen and dried products—in grocery stores is being studied in California and in 10 other western states.

Some measure of the quality of the fresh fruits and vegetables may be made by the frequency of receipt and the care in the grocery stores. Although not always true, fruits and vegetables are likely to be fresher and of better quality in stores receiving them most frequently.

In a survey—of 1,028 representative retail grocery stores in five California counties—the number of times a week fresh fruits and vegetables were received and the availability of daytime refrigeration for those products were studied as indicators of probable quality. All data refer to stores which carried fresh fruits and vegetables.

About half of the stores in Alameda, Los Angeles and San Diego counties carrying fresh fruits and vegetables received deliveries six or more times a week. Deliveries were less frequent in Fresno, where 37% of the stores received their fresh produce six or more times a week, and in Butte, where 20% received it this often.

From one sixth to almost one half of the surveyed stores carrying fresh fruits and vegetables received deliveries three times a week. The proportions varied from 18% in Los Angeles to 48% in Butte. By comparison, only 5% or less received produce four or five times a week.

In both Butte and Fresno counties 20% of the stores received fresh fruits and vegetables only twice a week. In the other three counties 15% of the stores in San Diego, 13% in Los Angeles and 11% in Alameda received fresh produce only twice a week.

Fresh fruits and vegetables were re-

ceived only once a week by 5% to 12% of the stores. The proportion was highest in Fresno and lowest in Alameda and San Diego counties. From 2% to 5% of the stores—with the highest proportion in Butte—received fresh products even less often than once a week.

The frequency with which fresh fruits and vegetables were received by the stores was associated with size of stores, their location, and ownership.

Number of Times a Week Stores Carrying Fresh Fruits and Vegetables Received Them

County	1 or less	2	3	4 or 5	6 or more
	%	%	%	%	%
Butte	10.2	20.4	48.1	0.9	20.4
Fresno	13.8	20.7	24.8	4.1	36.7
San Diego....	8.2	15.1	23.3	4.1	49.3
Alameda	6.9	10.7	23.3	5.0	54.1
Los Angeles ..	10.2	12.7	17.5	5.5	54.1

In each of the counties the proportion of stores receiving their fresh produce six or more times a week was much higher in the urban than in the rural stores, although less than 1% of the stores surveyed in Alameda and Los Angeles were in rural areas. In four counties 48% to 55% of the urban stores received deliveries that often; in Butte the proportion was only 27%. Only 3% to 7% of the rural stores in three counties—Butte, Fresno and San Diego—had deliveries as often as six times a week.

The proportions of urban stores receiving fresh fruits and vegetables three times a week ranged from 17% to 23% in all counties other than Butte, where 56% of the urban stores had produce delivered this frequently. The proportions of rural stores receiving it three times a week varied from 29% to 44%.

Only 11% to 14% of the urban stores received fresh produce twice a week. On the other hand 22% to 44% of the rural stores fell in this category.

In the metropolitan counties—Alameda and Los Angeles—54% to 61% of the stores in downtown and in neighborhood-secondary shopping districts received fresh fruits and vegetables six or more times a week. From 12% to 28% of the stores in those shopping areas in those two counties received produce three times a week. From 6% to 9% of the stores in the downtown areas in Alameda and Los Angeles and 10% to 13%

in the neighborhood-secondary areas received deliveries only twice a week.

In Butte—with the largest proportion of rural stores—about 28% of the stores in downtown areas and in neighborhood-secondary areas received fresh produce six times a week. The largest proportion of the downtown stores, 53%, and of the neighborhood-secondary stores, 46%, had deliveries three times a week. In the neighborhood-secondary areas 21% of the stores and in the downtown districts 12% received produce twice a week.

Isolated stores most frequently received fresh fruits and vegetables three times a week in Butte, 50%, and San Diego, 47%. In Fresno 40%, in Butte 24% and in San Diego 6% of these stores carrying fresh fruits and vegetables had deliveries twice a week. Over 35% in San Diego, 13% in Fresno but only 3% in Butte had fresh produce delivered six or more times a week.

The proportions of chain stores carrying fresh fruits and vegetables with six or more deliveries a week were higher in all counties than the proportions of independently owned stores receiving supplies so frequently. From 80% to 89% of the chain stores in the four most populated counties received their produce six or more times a week. In Butte, only 53% of chains and from 15% to 47% of the independents received fresh produce so often.

Fresh fruits and vegetables were received three times a week by 40% of the chain stores in Butte, by 13% in San Diego, by none in Fresno, and by 3% to 7% in the other two counties. Fresh produce was received twice a week by 1% of the chains in Los Angeles and by 7% in Butte. In the other counties no chains received fresh fruits and vegetables only twice a week.

Independent stores affiliated with other independents—for cooperative buying, advertising and the like—more often received fresh produce six or more times a week than did the nonaffiliated stores. The latter more frequently received supplies two or three times a week. From 14% to 28% of the nonaffiliated independents received produce twice a week, 24% to 42% three times, and 11% to 44% six or more times a week. On the other hand, 3% to 15% of the affiliated

Continued on page 15

major equipment is estimated as \$62,642. Supplemental outlays would be required for site construction, electric wiring installation, conveyor belting for main assembly conveyor, spare motor and repair parts, estimated as totaling \$3,226.

An annual fixed charge of 17% of the major equipment cost of stationary vining included: depreciation, 10%; taxes, 1%; insurance, 1%; interest on investment, 3% or approximately 5.5% of the undepreciated balance; and fixed repairs and maintenance, 2%. The annual fixed charge for site construction, electric wiring, conveyor belting, and spare parts was estimated as 10% of replacement cost. Site rent was added directly.

Applying these charges to the equipment replacement costs developed in the example gave an annual charge of \$10,649 for the major equipment items and \$415 for the supplemental equipment including \$92 for site rental. Combining the separate charges gave a total annual charge of \$11,064 for a Method A installation with a 4,000-pound hourly production rate.

The annual fixed charge for equipment used in the mobile vining operation was estimated as 19% of replacement cost. The higher percentage reflects a greater annual outlay for fixed repairs and maintenance attributable to higher costs of gasoline engine repair and overhaul and a higher rate of wear with the mobile equipment.

Total Annual Costs

Total annual costs related to rate of output per hour and length of season were calculated by multiplying the hourly variable costs by the hours operated per season and adding the annual fixed charge. In the example, variable costs totaled \$57.16 per hour with an annual fixed charge of \$11,064. For a season of 1,500 operating hours total annual cost would amount to \$96,804—\$11,064 plus \$57.16 multiplied by 1,500.

Total annual costs for three selected lengths of season are plotted in the accompanying graph for hourly output rates varying from 400 to 10,000 pounds per hour.

Of the three stationary vining methods studied, Method C was lowest in cost throughout the ranges considered in hourly output rate and length of season. Its advantage relative to the other stationary vining methods is due primarily to the reduced labor in forking the vines and in handling the lugs of shelled beans.

Mobile vining—because of large investment cost per unit—involves relatively high annual fixed charges. However, variable costs are relatively low, principally because the vine hauling operation is eliminated. Mobile vining

becomes more advantageous as length of season—with a given output rate—is increased and the annual fixed charge spread over a larger total volume of output as illustrated by the graph. There were no savings with mobile vining in 500 hours operation, but savings became substantial in a 1,500-hour season.

High equipment costs and a short operating season combine to make vining an expensive operation. Vining cost can be lowered substantially by multiple-shift use of fixed equipment. For example, total daily requirements in a processing plant operating one 8-hour shift could be met by a vining operation of one half the plant capacity but operating two 8-hour shifts. With this arrangement in a plant of 10,000 pounds per hour capacity and a 500-hour operating season, the lowest cost—for a vining capacity rate of 5,000 pounds per hour and 1,000-hour operating season—is shown by the

chart to be with mobile vining and to amount to \$60,000 per season. However, with 1-shift vining the required vining capacity is 10,000 pounds per hour, with 500 hours of operation per season. The lowest season cost—\$71,000—occurs with stationary Method C. Comparison of the estimates of season vining cost in this example indicates an annual saving of \$11,000 with 2-shift vining operations. This assumes that differences between vining shifts in product quality, wage rates, and productivity are negligible.

The savings indicated in the example apply to the methods, production standards, and cost rates specified. Adjustment probably would be necessary in making comparisons for particular situations.

Robert H. Reed is Associate in Agricultural Economics, University of California, Berkeley, and Agricultural Economist, Agricultural Marketing Service, United States Department of Agriculture.

RETAIL

Continued from page 13

independently owned stores received them twice a week. In four counties 19% to 29% had deliveries three times, and 44% to 55% six or more times a week. In the fifth county—Butte—60% of the independents received produce three times a week and only 20% received it six or more times.

In general, the larger the number of full-time employees in a store the more often were fresh fruits and vegetables delivered. However, this situation varied from one county to another.

In Alameda 91% and in Los Angeles 97% of the stores with 15 or more employees received produce six or more times a week. In San Diego 89% and in Fresno all the stores with 15 or more employees received produce with the same frequency.

From 78% to 94% of the stores with 7-14 employees in Alameda, Los Angeles and San Diego counties received their fresh fruits and vegetables six or more times a week. In Butte and Fresno counties about 45% of such stores received produce so often.

Stores with three to six employees

most frequently received fresh produce six or more times a week. With the exception of Butte, 49% to 72% of such stores received deliveries that often, 16% to 29% three times, and 3% to 8% twice a week. In Butte 25% of those stores received fresh produce six or more times a week, 61% three times, and 14% twice a week.

The smaller stores with one or two employees most frequently had fresh fruits and vegetables delivered three times a week—24% to 40% receiving supplies that often. From 16% to 31% received them twice and 12% to 38% six or more times a week.

In Fresno 86% and in Butte 89% of the stores with fresh fruits and vegetables had home kind of daytime refrigeration other than a sprinkling system. On the other hand, only 69% in Los Angeles, 55% in San Diego, and 45% in Alameda County had daytime refrigeration.

Considerable proportions of stores—especially in some counties—were without refrigeration for fresh produce. For the most part the stores without refrigeration were the smaller, independently owned stores in neighborhood-secondary shopping districts.

Concluded on next page

Stores Carrying Fresh Fruits and Vegetables Without Daytime Refrigeration

County	Shopping area					Ownership			Number of employees				
	Location		Down town	Neighborhood Sec.	Isolated store	Independent			1 or 2	3 to 6	7 to 14	15 or more	
	Rural	Urban				Unaffiliated	Affiliated	Chain					
Butte	%	%	%	%	%	%	%	%	%	%	%	%	
Fresno	19.4	7.8	5.9	7.0	20.6	20.8	2.5	..	18.3	3.6	
San Diego	12.2	15.4	5.3	19.8	7.5	18.8	5.9	..	19.8	8.9	
Alameda	50.0	43.8	42.9	46.5	35.3	48.9	35.5	40.9	57.7	22.0	43.8	37.5	
Los Angeles	100.0*	54.4	55.6	53.4	75.0	64.1	57.9	20.7	73.5	28.1	23.5	9.1	
	..	31.2	30.3	31.2	25.0	46.8	24.1	18.5	46.3	20.8	17.5	12.7	

* Only 1 store.

NEW PUBLICATIONS

—now ready for distribution—

1958 PEST CONTROL GUIDE FOR COTTON, Leaf. 83 (rev.).

RETAIL

Continued from preceding page

In the two counties with the largest proportions of rural stores—Butte and Fresno—19% of these stores in Butte and 12% in Fresno had no refrigeration.

Only about 5% of the downtown stores carrying fresh fruits and vegetables in Butte and Fresno were without refrigeration. The proportions of these stores without daytime refrigeration were 30% in Los Angeles, 43% in San Diego and 56% in Alameda.

The proportions of stores in the neighborhood-secondary shopping districts without refrigeration ranged from 7% in Butte to 53% in Alameda. In the three counties with any considerable number of isolated stores, the proportions of these stores without refrigeration ranged from 8% in Fresno to 35% in San Diego.

When ownership was considered, the proportion of stores carrying fresh fruits and vegetables without refrigeration was lower in chain stores than in the independents in four counties. The exception was San Diego where 41% of the chain stores had no refrigeration. The non-affiliated independent stores were somewhat more frequently without refrigeration than were affiliated independents. The proportions of the nonaffiliated independents in the five counties varied from 19% to 64% while the proportions of the affiliated varied from 3% to 58%.

The proportions of stores carrying fresh produce without refrigeration were

higher in all counties in stores with one or two employees than those of stores with more employees. These proportions varied from 18% in Butte and 20% in Fresno to 74% in Alameda. However, in San Diego 44% of the stores with 7-14 employees and 38% of those with 15 or more had no refrigeration. Only 9% of the stores in Alameda and 13% in Los Angeles with 15 or more employees were without refrigeration.

Jessie V. Coles is Professor of Family Economics, University of California, Berkeley.

Marilyn Dunsing is Assistant Professor of Home Economics, University of California, Davis.

DONATIONS FOR AGRICULTURAL RESEARCH

Contributions to the University of California for research by the Division of Agricultural Sciences, accepted in March, 1958

BERKELEY

California Forest Protective Association \$7,500.00
For study of influence of taxation on residual and second growth timber stands in Mendocino County

Velsicol Chemical Corp. Chlordane and Heptachlor chemicals
For research on microbiological processes in soil

DAVIS

Abbott Laboratories \$5,500.00
For research on metabolism and residue of gibberellic acid

American Chemical Paint Co. \$500.00
For spray thinning experiments

Bono Products, Inc. 800' 6" Standard reinforced gated pipe
200' 6" reinforced transmission pipe,
3 end caps
Canal liners, ditch dams
For research on use of rubber pipe

California Crop Improvement Assn. \$2,235.00
For seed research

The Dow Chemical Co. \$3,000.00
For evaluation of palatone and cyclotene

Lo-Sodium Dairy Products Corp. \$250.00
For research on feasibility of producing low sodium cheddar cheese using a salt substitute

National Canners Assoc. \$2,000.00
For research on color retention in green vegetables

Sugar Research Foundation, Inc. \$300.00
For research on sugar in ice cream

Various donors \$1,621.50
For research on summer pneumonia and other sheep diseases

Dorothy W. Atkinson
McNab Ranch
Mr. and Mrs. E. E. Vassar
Thomas F. Baxter III
Sherwood Coffin
Andrew Scheubeck
W. A. Schrock
William Leib
Mrs. J. W. Mailliard
Walter Fickswirth
E. A. Anderson, Sr.
Dennis Pluth
Baber Bros.
Ross Noonan
Horace Thompson

J. A. Raymond
E. B. Elgorriaga
Mrs. B. Groverman and son
T. F. Baxter, Jr.
Ben Williams
Tooby & Prior, Inc.
Tooby Bros.
Mrs. Blanche G. Williams
Ethel W. Mulligan
Naca Nest Co.
Olin Henry Timm
Clarence W. Budd
Howard Twining
Brown & Mann
R. & J. Sheep Co.

P. L. McPherson
Mokolunne Farms
Philip Erro
S. Maynard Smith
Mrs. Carl Holm
Gustave Dittmore
Walter Struckman
Robert Livermore
Joseph Russ, Jr.
D. A. Gonzales
J. K. Sexton & Sons
J. N. Morrow
Lester A. Dickson
Ernest C. Armstrong
Jack Peff
Finch Ranch
Andrew L. Richardson
Harry Petersen
H. R. Lisson
Wesley Wooden
W. F. Rickard
Guy C. Mann
Mrs. Phil Smith
Lester McMaster
Fred Neuenschwander
C. M. French
Floyd M. Marsh
D. C. Barnard
Mary B. Davis
Howard Neuren
Steeven Brothers
Eugene Brown
N. J. Brown
Noriega Sheep Company
Neraal Sheep Company

N. C. Clark
Peter Ruffino
Chas. Pitzell, Jr.
Wm. Campbell
John Geithle
Charles W. Tuttle, Jr.
Weldon L. Craig
Stewart Kern
Henry Goff, Jr.
A. W. Wilcox
Hans Engelbrecht
W. Fred Bruha
G. Wm. Kretsinger
Caesar Calvi
Arthur C. Marschall
John J. Singleton
Henry Evans
L. O. Madsen
Norris O. Fry
Warren A. Thoman
Mrs. Hannah F. Hulsman
Brown-Will Ranch
Brown & Brown
A. J. Brown
A. Pareira
Garry C. Stewart
C. A. Call
Frank C. Clarke
L. W. Gregg
James Koeber
Chas. Poff
C. D. Quimby
Seth F. Rigby
F. & F. Stephens
Robert J. Walker

RIVERSIDE

California Avocado Society \$300.00
For root rot studies on avocados

STATEWIDE

Agriform Co. 690 lbs. Aqua ammonia
For the Imperial Valley Field Station

American Can Co.
Pacific Division \$1,000.00
For study of phytophthora infection—field investigations

Border Fertilizer Co. 240 lbs. ammonium sulfate
For the Imperial Valley Field Station



Penalty for private use to avoid payment of postage, \$300

University of California College of Agriculture, Agricultural Experiment Station, Berkeley 4, California

Paul J. Sharp
Director

Free—Annual Report or Bulletin or Report of Progress
Permit No. 1127