

ECONOMIC FEASIBILITY OF MARKETING MECHANICALLY HARVESTED ASPARAGUS IN THE FRESH MARKET

by
Richard W. Stammer
Rutgers - The State University
New Brunswick, New Jersey

Lists results of sales tests where prepackaged mechanically harvested asparagus out sold traditional bunched asparagus 2.2 to 1.

A discussion of a more efficient method of marketing asparagus seems very appropriate for a conference whose main subject is "What Price Quality". We all know that the price of quality asparagus is high throughout the entire marketing system. The high cost starts at the farm level where, due primarily to high labor costs, the harvest cost alone averages twelve cents a pound and continues through the distribution and retail marketing systems where spoilage, handling damage, and high in-store handling costs add significantly to total cost. Yet, despite this high price retailers realize the drawing appeal of "quality" fresh asparagus. Asparagus is referred to as "The King" or "The Aristocrat of Vegetables". It is a status vegetable with a following of consumers who almost appear to be indifferent to price changes. However, the future of fresh asparagus as a supermarket item is in doubt due to increasing labor costs and labor availability problems at the farm level, the need to cut costs and waste in produce departments, and increasing consumer awareness of prices and value.

Many man hours of engineering research have been devoted to developing a machine to mechanically harvest asparagus but, at present, the only harvester that has proven itself to be economically and operationally feasible is one of the nonselective type. This type of harvester goes down a row and cuts all the asparagus above two inches tall. Hence, the resulting product is a mixture of all green spears ranging from approximately one to eight inches in length. This product

is acceptable to the canning industry for use in a cuts and tip pack. However, the product was not considered acceptable for the fresh market because it was felt that consumers preferred the standard bunch of nine inch asparagus. The cost of separating out these spears was considered to be excessively high and the remaining spears, less than seven inches, would have to be used for cuts and tips anyway. Finally, the prevailing opinion was that the inch or two of white butt at the end of a spear protected the rest of it from drying out and, hence, quality problems would develop with an all green spear.

Despite these problems, agricultural economists and engineers at Rutgers felt that the tremendous harvest cost savings possible with non-selective harvesters (from approximately twelve to five cents a pound) could not be overlooked. It was also felt that some method could be developed to handle the asparagus so they could be sold for their highest use value (the fresh market) rather than one of the lowest (a cuts and tip pack). Following some pilot market research it was decided to try to pre-package the asparagus in an overwrapped pulp tray and test market three different packs; one containing twelve ounces of spears varying in length from five to seven inches, one containing twelve ounces of asparagus and varying in length from three to five inches, and one containing ten ounces of spears under three inches in length. All spears over seven inches were butt cut since research indicated that spears under seven inches would be virtually fiber free. Handling the asparagus in this manner assured the consumer of an all-green, all edible product.

Ag engineers at Rutgers developed a system of equipment to take the jumbled asparagus direct from the harvester and

mechanically sort and package the grass in the three consumer packs. At the same time, food scientists developed a film in which the asparagus created its own environment, would not dry out, and in which spoilage was retarded.

During the asparagus seasons of 1971 and 1972, the prepacked machine harvested asparagus were test marketed in a total of five supermarkets in the central Jersey area. The markets were selected to cover a representative cross section of the area's population. In 1971, the asparagus in the 3-5 and 5-7 inch packs were all oriented and consumers had free choice of either the Rutgers packs or traditionally bunched asparagus at all times. Approximately the same shelf space was allocated to bunched and pre-packed asparagus. The 1972 study was similar to the 1971 study except for two important deviations; the asparagus were only longitudinally oriented in the 3-5 and 5-7 inch packs, and in one store the standard pack was an over-wrapped tray of virtually all green nine inch California asparagus that was packed in the store. In both the 1971 and 1972 studies the standard packs contained a better quality asparagus than the Rutgers packs since the Rutgers asparagus came from beds with an average age of twelve years. The supermarkets were free to set and vary the prices of the standard packs to conform with market conditions or chain wide promotions. The prices of the Rutgers packs were varied in accordance with a latin square experimental design.

Results from the marketing study (see following Summary Table) indicate a very significant consumer preference for the machine harvested prepackaged asparagus over the traditional bunch of hand harvested asparagus. In stores where the competing product was bunched asparagus the Rutgers pack sold 38% more (by weight) even though the weighted average price of the Rutgers pack was 58% higher than that of the bunched asparagus. Taking sales revenue as an indication of consumer votes, consumers preferred the Rutgers pack by 2.2 to 1 over the traditional bunched asparagus. Between the 3-5 inch and 5-7 inch packs consumers showed a slight preference for the 3-5 pack. The low sales of the short spear pack reflects availability more than consumer preference.

In stores where the competing pack was a store wrapped tray of virtually all green asparagus (a very competitive product that except for length would be hard to distinguish from the Rutgers pack) consumers still indicated about a 14% preference for the Rutgers pack. In this store the price of the Rutgers pack averaged about 67% higher than the standard pack. This store was also using the standard pack as a loss leader item during part of the study.

At the end of the 1972 marketing study a questionnaire was used to determine consumer attitudes towards the Rutgers pack. The results from this questionnaire correspond quite closely with conclusions that were drawn from analyzing the price elasticity and cross elasticity calculations. Most consumers said they preferred the Rutgers pack because of the condition of the spears and the fact that the spears were all edible and, hence "you weren't paying for asparagus you couldn't use". Most consumers of the Rutgers pack said they would not return to buying the bunched grass whatever the price spread between the two. This fact is indicated by the insignificant cross elasticity between the price of the standard pack and the sales of the Rutgers pack. Consumers of bunched asparagus, however, were quite price conscious and would switch to the Rutgers pack when its price fell. This is indicated by the cross elasticity of 1.44 between the sales of the standard pack and the price of the Rutgers pack. The consumer preference for the 3-5 pack over the 5-7 pack is also indicated by their respective cross elasticities and by the fact that the price elasticity for the 3-5 pack is less than that for the 5-7 pack even though the 3-5 pack has the higher average price. A final conclusion that was reached when the 1971 and 1972 studies were compared was that orienting the spears with all tips in the same direction did not significantly increase sales over the longitudinally oriented spears.

In addition to the strong consumer preference for the mechanically-harvested prepacked asparagus there are several other favorable attributes of fresh asparagus handled in this manner. As previously mentioned, it is advantageous to the farmer because it greatly reduces the problems of

Summary Table — Asparagus Marketing Study
1971 — 1972

	All Stores				Short Spear
	Standard	All Pre- packaged	5"-7"	3"-5"	
Average weighted price per sales unit	.57	.67	.64	.72	.67
Average weighted price per pound	.57	.92	.85	.95	1.07
Unit Sales	3164	4971	2369	1842	760
Pound Sales	3164	3634	1777	1382	475
Total Revenue	1802	3340	1512	1318	510

Store in Which Competition Was Pre-Packed Virtually All Green
7"-9" Asparagus

	Standard	All Pre- packaged	5"-7"	3"-5"	Short Spear
Average weighted price per sales unit	.52	.64	.62	.67	.63
Average weighted price per pound	.52	.87	.82	.88	1.00
Unit Sales	1032	967	510	308	149
Pound Sales	1032	710	384	232	94
Total Revenue	542	616	317	205	94

Elasticities of Demand

	All Stores	Stores where standard pack was bunches	Store where standard pack was virtually all green pre-packed California asparagus
Price elas. of standard	1.34	insignificant	-1.87
Price elas. of all Rutgers pack	-1.80	-1.65	-2.16
Price elas. of 5-7 pack	-3.20	-3.64	insignificant
Price elas. of 3-5 pack	-2.83	-1.91	-4.92
Cross elas. of standard sales vs. price of Rutgers pack	1.44	1.28	1.00
Cross elas. of Rutgers sales vs. price of standard pack	insignificant	insignificant	insignificant
Cross elas. of 5-7 sales vs. 3-5 price	1.83	2.18	insignificant
Cross elas. of 3-5 sales vs. 5-7 price	insignificant	1.00	insignificant

obtaining sufficient harvest labor and cuts his harvesting cost by approximately 60%. The retailers who handled the product were very pleased with it since it greatly reduced the amount of in-store labor needed to properly market a quality asparagus product, greatly reduced spoilage problems, and virtually eliminated loss due to spear damage from consumer handling. In-store observation and testing by the Rutgers Food Science Department indicated an in-store shelf life of approximately five to six days. When the asparagus were held at ideal conditions the shelf life approached two

weeks. The consumer benefits by purchasing this pack because she is actually paying less for usable asparagus (assuming that approximately 40% of hand harvested asparagus is too fibrous to eat, she is actually paying \$.95 for a pound of edible asparagus). Finally, in this age of environmental concern, we all benefit because the waste asparagus is left at the farm rather than being transported to the city and then transported out again as garbage. This yields both a saving in social cost and actual transportation costs.

STORE DESIGN AND LAYOUT FOR MANAGEMENT DECISION

by
Clyde Cunningham
University of Missouri
Columbia, Missouri

A preliminary report on a study of an "ideal" layout for medium sized supermarkets.

Today the food retailer finds himself in a competitive cost-price squeeze. Food retailing is undergoing important changes. Among these are (1) expanding total sales, (2) declining number of stores, (3) expanding sales per store, (4) increasing sales per employee, (5) increasing hourly wages, (6) expanding sales area in stores, (7) increasing number of food and non-food items, and (8) increased emphasis on discount pricing. In addition, the retailer has become increasingly aware of his responsibility to the consumer. The need for designing, building, and operating efficient retail facilities that effectively serve the consumer is central to this effort.

The supermarket is the focal point where the consumer comes in contact with the food distribution system. It is here

that she develops her image of the retail firm and impressions of the food industry. Store layout planning has an important role in that the layout provides the framework for developing the image and establishing an efficient retail operation. As such the layout must serve four important functions.

1. Effectively serve the consumer--it should make it easy for the customer to move through the store and obtain the desired merchandise with a minimum of confusion, congestion and delay.

2. Improve store efficiency--it should minimize labor and handling needed in moving merchandise through the store while satisfying the merchandising objectives.

3. Maximize sales--it should provide for a merchandising arrangement that assures maximum exposure for all merchandise carried, considering space costs, product movement, profitability and perishability.