



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Impact of Improved Marketing on Maine Potato Sales, Revenue, and Market Share*

Maine Agricultural Experiment Station Publications # 1068

by

Russell C. Parker, Associate Scientist
Dept. of Agricultural and Resource Economics
University of Maine

Alan S. Kezis, Associate Professor
Dept. of Agricultural and Resource Economics
University of Maine

Duane A. Smith, Extension Economist
Dept. of Agricultural and Resource Economics
University of Maine

Edward F. Johnston, Associate Professor
Dept. of Agricultural and Resource Economics
University of Maine

Introduction

Commercial production and marketing of potatoes is a major agricultural enterprise in Maine. Since 1970 potato acreage in Maine has declined from 150,000 to less than 100,000 acres.[1] During this period Maine has experienced a significant decrease in its share of the U.S. tablestock potato market.

The loss in market share has resulted in declining total revenues for Maine producers, shippers, dealers and the associated agribusiness sector. Other potato marketing studies [2,3,4,5] have determined that packag-

ing considerations figure as highly as quality considerations in successfully marketing tablestock potatoes.

In 1983 a major research effort was undertaken to determine what role improved marketing might play in increasing the sale of Maine potatoes. As part of this research Maine potatoes were graded, closer sized, washed and packed in modern polyethylene bags and test marketed in twelve New England supermarkets. Each of the twelve stores also marketed traditional Maine potatoes which are often sold unwashed, in paper bags, and varying in size from two to four inches. Data

*The research reported was funded by 1) Maine Agricultural Experiment Station, 2) Maine Potato Commission, 3) Maine Department of Agriculture, Food, and Rural Resources, 4) and Maine Cooperative Extension Service. Special gratitude goes to the Maine Commissioner of Agriculture Stewart N. Smith.

was collected from each store over a twenty-five week period. This paper reviews the data obtained and reports our initial findings. Additional papers will provide a thorough statistical analysis of the data and examination of consumer characteristics and perceptions.

Objective

To determine if U.S. No. 1 Maine potatoes can be sold at a premium when they are closer sized, washed and packed in modern polyethylene bags. Moreover, to determine if the premium obtained is high enough to cover and anticipated increase in packaging costs and still provide additional revenue to producers, shippers and retailers of Maine potatoes.

Procedure

The in-store market test began November 26, 1984 and ran for ten consecutive weeks until February 4, 1985. Data were also collected for the ten weeks prior to the test (September 17 to November 26) and for the five weeks following the test (February 4 to March 11).

The data were collected from twelve stores located in Massachusetts and New Hampshire. For each store, on a weekly basis, the following were obtained:

1. the number of customers;
2. a description of each type of potato sold (origin, variety, how packaged and product identification number);
3. the amount of each type of potato sold; and
4. the price at which each type of potato sold.

All potatoes utilized in the market test were U.S. No. 1 Maine potatoes, washed and packed in polyethylene bags. Test potatoes were packaged in three ways. Maine Fancy potatoes were sized from 2-1/4 to 4 inches and packed in both five and ten pound units. Gourmet potatoes were sized from 2 to 2-1/4 inches and packed in five pound units.

The term, Gourmet, was used for descriptive purposed in this paper but is not standard terminology in the Maine potato industry. Gourmet potatoes were included in the test to explore marketing opportunities for closely sized small potatoes. Potatoes of this size are currently included in the traditional Maine U.S. No. 1 pack.

The test potatoes were neither advertised nor promoted during the market test. Point of purchase material, included with the initial potato shipment, was intended primarily for identification purposes. Each polyethylene bag indicated origin, weight and size range of potatoes it contained. The reliance upon improved packaging and quality, during the market test, was intended to separate the effect of these factors from the effects of promotion.

Each store was selected for one of three groups based upon Maine potato sales per thousand customers and their respective demographics, two Treatment Groups and a Control Group. Gourmet potatoes at Treatment 1 Stores were marketed at a price equivalent to the price received for Maine potatoes, U.S. No. 1, unwashed in paper bags. Maine Fancy potatoes at Treatment 1 Stores were marketed at the dry-paper price plus 10 percent for the first six weeks (Time Period 1) and were marketed at the dry-paper price plus 20 percent for the last four weeks (Time Period 2).

Gourmet potatoes at Treatment 2 Stores were also marketed at a price equivalent to the price received for Maine, 8.S. No. 1, dry-paper. Maine Fancy potatoes at Treatment 2 Stores were marketed at the dry-paper price plus 20 percent for the first six weeks (Time Period 1) and were marketed at the dry-paper price plus 30 percent for the last four weeks (Time Period 2). Price premiums used in the study were developed in conjunction with the Supermarket merchandiser and were based upon a subjective evaluation of market conditions. Test potatoes were not shipped to the four Control Stores.

The price of test potatoes was adjusted to determine how great a premium consumers were willing to pay for quality Maine pota-

atoes. Once set, the price of test potatoes was maintained for the designated time period. The price of traditional Maine potatoes and other non-Maine potatoes varied according to market conditions and were often placed "on sale." During these sale periods, the premium paid for test potatoes often exceeded the desired 10 to 30 percent premium.

Results

Approximately 130,000 lbs. of test potatoes were sold during the study period with a retail value of \$22,000. Of this volume of sales, 38,700 lbs. were Maine Fancy potatoes sold in five pound units. Maine Fancy potatoes, sold in ten pound units, accounted for 66,400 lbs. of sales.

Approximately 19 percent (24,900 lbs.) of the test potatoes sold during the ten-week market test were Gourmet Maine potatoes. This amount exceeds the percentage of potatoes of this size which are obtained from a typical field run of round white potatoes in Maine.

Market Share

Maine's market share was improved by the introduction of the test potatoes. In order to more easily analyze sales data, the time span over which data were collected was divided into four periods: the ten-week Pretest Period (beginning September 17); Time Period 1 (six weeks beginning November 26); Time Period 2 (four weeks beginning January 7); and the five-week Post-test Period (beginning February 4). The amounts of potatoes sold in pounds per thousand customer are listed in Table 1.

During the ten-week Pretest Period, Maine potato sales accounted for approximately 59 percent of all potato sales in Treatment Stores as compared to an average of 63 percent in the Control Stores. In Time Period 1, with the introduction of the test potatoes, Maine's market share increased to 64 percent in both sets of Treatment Stores while Maine's market share in Control Stores dropped to 61 percent.

During Time Period 2, Idahos, Prince Edward Islands (PEI), traditional Maine five pounders, and traditional Maine ten pounders

were on sale. As a result of Idaho and PEI sale prices, Maine's market share fell 9 percent (to 55%) in Treatment 1 Stores, fell 5 percent (to 59%) in Treatment 2 Stores, and dropped 7 percent (to 54%) in Control Stores. The presence of test potatoes in Treatment Stores reduced the drop in Maine's market share that otherwise would have occurred. In both Treatment Stores Maine's total market share remained above that obtained in Control Stores.

Withdrawal of test potatoes (from Treatment Stores) reduced Maine's market share in the Post-test Period in Treatment Stores. However, Maine's market share increased in Control Stores. Maine's market share fell to 50 percent in Treatment 1 Stores and to 57 percent in Treatment 2 Stores, while Maine's market share increased from 54 to 57 percent in Control Stores.

The most dramatic result of withdrawing Maine test potatoes from the market was the reduction in total potato sales. Both Treatment and Control Stores experienced a reduction in total potato sales per thousand customers in the Post-test Period. The reduction in sales volume was more pronounced in the Treatment Stores. This change in sales patterns suggests that test potatoes were largely responsible for increased business during the market test.

Our analysis suggests that the bulk of test potato sales were accounted for by a higher volume of sales and not substitution of test potatoes for other brands. Of the 82 pounds of test potatoes purchased per thousand customers at treatment stores during the market test: 9.33 pounds (11.4%) were purchased as a substitute for traditional Maine potatoes; 10.67 pounds (13%) were purchased as a substitute for non-Maine potatoes; and 62 pounds (75.6%) would not have been purchased if test potatoes had not been available. These estimates are based on the data contained in Table 1 and the assumption that sales in Treatment Stores would have followed the same pattern as that of Control Stores had the test potatoes not been present in the Treatment Stores.

Table 1
Weight of Potatoes Sold in Pounds Per Thousand Customers
By Store Group and Time Period

	Pretest	%	Time Period One	%	Time Period Two	%	Post- test	%
<u>TREATMENT ONE</u>								
Other Weight	45	9	38	7	38	6	59	11
PEI Weight	29	5	41	7	55	9	76	14
Idaho Weight	141	28	126	22	172	30	135	25
Test Weight	0	0	93	17	74	13	0	0
Maine Weight	294	58	262	47	243	42	272	50
Total Weight	509	100	560	100	582	100	542	100
<u>TREATMENT TWO</u>								
Other Weight	46	9	31	6	44	7	45	8
PEI Weight	28	6	38	7	64	10	75	14
Idaho Weight	125	25	121	23	149	24	119	21
Test Weight	0	0	87	16	66	11	0	0
Maine Weight	297	60	256	48	299	48	320	57
Total Weight	496	100	533	100	622	100	559	100
<u>CONTROL</u>								
Other Weight	36	7	24	5	33	6	39	7
PEI Weight	29	6	46	9	72	14	82	16
Idaho Weight	127	24	128	25	141	26	101	20
Test Weight	0	0	0	0	0	0	0	0
Maine Weight	330	63	316	61	290	54	296	57
Total Weight	522	100	514	100	536	100	518	100

Sales Revenue

The effect of marketing test potatoes on revenue is illustrated in Table 2. It shows in tabular form the average retail value of potatoes sold per thousand customers during the marketing study. During the ten-week Pretest Period, Maine potato sales accounted for 48 percent, 44 percent, and 44 percent of total revenues from potatoes in the Control, Treatment 1, and Treatment 2 Stores, respectively. During Time Period 1, the total revenue from Maine potato sales dropped \$1.95 per thousand customers in the Control Stores while total revenue from the sale of Maine

potatoes (traditional and test potatoes) increased \$6.30 in Treatment 1 Stores and \$5.19 in Treatment 2 Stores per thousand customers.

In terms of percentage of total potato revenue, revenue from the sale of Maine potatoes increased 5 percent during Time Period 1 in both groups of Treatment Stores. In the Control Store group, the percentage of total potato revenue dropped 1 percent from the Pretest Period.

Table 2
Retail Value of Potatoes Sold in Dollars Per Thousand Customers
By Store Group and Time Period

	Pretest	%	Time Period One	%	Time Period Two	%	Post- test	%
<u>TREATMENT ONE</u>								
Other Revenue	17.93	16	12.82	12	13.77	12	22.47	19
PEI Revenue	9.13	8	9.49	9	13.63	12	16.56	14
Idaho Revenue	36.20	32	33.70	30	45.16	39	41.51	34
Test Revenue	0.00	0	14.86	13	13.51	12	0.00	0
Maine Revenue	48.68	44	40.12	36	29.71	25	39.87	33
Total Revenue	<u>111.94</u>	<u>100</u>	<u>110.99</u>	<u>100</u>	<u>115.78</u>	<u>100</u>	<u>120.41</u>	<u>100</u>
<u>TREATMENT TWO</u>								
Other Revenue	16.42	16	10.74	11	15.18	13	15.83	15
PEI Revenue	8.26	8	8.61	8	15.05	13	15.38	14
Idaho Revenue	31.97	32	32.83	32	37.42	33	34.28	31
Test Revenue	0.00	0	14.68	14	11.99	11	0.00	0
Maine Revenue	44.72	44	35.23	35	33.96	30	43.60	40
Total Revenue	<u>101.37</u>	<u>100</u>	<u>102.09</u>	<u>100</u>	<u>113.60</u>	<u>100</u>	<u>109.09</u>	<u>100</u>
<u>CONTROL</u>								
Other Revenue	12.88	12	8.32	8	10.88	11	13.26	15
PEI Revenue	8.82	9	9.53	10	16.28	16	16.47	16
Idaho Revenue	31.28	31	34.26	35	36.21	37	29.12	28
Test Revenue	0.00	0	0.00	0	0.00	0	0.00	0
Maine Revenue	48.08	48	47.03	47	35.65	36	43.84	43
Total Revenue	<u>101.06</u>	<u>100</u>	<u>99.14</u>	<u>100</u>	<u>99.02</u>	<u>100</u>	<u>102.69</u>	<u>100</u>

In Time Period 2, the price of test potatoes was increased, while the price of traditional Maine potatoes and other competing potatoes were dramatically reduced. As a result of these price changes, Maine's revenue per thousand customers in all stores declined during the second time period. Maine's percentage of total revenue dropped to 37 percent in Treatment 1 Stores and to 41 percent in Treatment 2 Stores. However, both groups remained above Control Stores which dropped to 36 percent. Maine potato revenues per thousand customers were dramatically higher in the stores with test potatoes than in the Control Stores during the ten weeks of test

marketing. Using a weighted average, revenues averaged 18 percent higher in Treatment 1 Stores and 14 percent higher in the Treatment 2 Stores than the Control Stores. Since Time Period 1 was six weeks long, its values were weighted by 6/10 when calculating averages. Values from the shorter second time period were weighted by 4/10.

Total revenue per thousand customers generated from potato sales, was higher in stores which marketed the test potatoes. In Time Period 1, the decline in revenue in Control Stores was greater than in Treatment Stores. In Time Period 2, the Control Stores'

revenue per thousand customers declined slightly while total revenues increased substantially in Treatment Stores.

Again, using a weighted average for the ten-week test market period, total potato revenue per thousand customers dramatically increased in the stores with test potatoes as compared to the Control Stores. Total potato revenue was 14 percent higher in Treatment 1 Stores and 8 percent higher in Treatment 2 Stores, than the Control Stores during the test.

During the Post-test Period, the withdrawal of test potatoes, caused a significant drop in sales volume and sales revenue. This drop was partially offset by increased purchasing of Maine traditional potatoes (see Table 1). However, the losses associated with removal of test potatoes predominated. Maine revenue per thousand customers fell from \$43.22 to \$39.87 in Treatment 1 Stores and from \$45.95 to \$43.60 in Treatment 2 Stores. Maine revenue in Control Stores increased due to increased sale of traditional Maine potatoes.

The effect of withdrawing test potatoes on total potato revenue was most evident in Treatment 2 Stores. Sales volume fell from 622 pounds to 559 pounds on a per thousand customer basis. Total potato revenue fell from \$113.60 per thousand customers to \$109.09 per thousand customers. In Treatment 1 Stores the revenue loss associated with withdrawing test potatoes was offset by increased sales of bulk potatoes. Bulk potatoes were usually of high quality and commanded the highest premium in the stores. In Control Stores increased sale of traditional Maine potatoes and increased sale of bulk potatoes caused an increase in total potato revenue per thousand customers.

Summary and Conclusions

The results of the market test and the verification provided by the consumer interviews [6] indicate that the Maine Potato Industry can, through improved packaging and aggressive marketing, enhance its position in the U.S. market for tablestock potatoes.

The points listed below summarize our findings.

1. A significant percentage of consumers will purchase Maine potatoes, sized 2 to 2-1/4 inches (when they are washed and packed in attractive poly bags), at a price equivalent to the price they will pay for the traditional unwashed 2 to 4 inch package.
2. During the test marketing, consumers paid 8.5 percent to 63.5 percent more for Maine Fancy potatoes (sized 2-1/4 to 4 inches washed and packed in 5 and 10 pound packages) than the amount charged for traditional Maine U.S. #1, 2 to 4 inch, unwashed, equivalent size packages.
3. The test potatoes accounted for 16 percent of all potato sales in participating stores during the ten-week market test. The Gourmet package sized 2 to 2-1/4 inches accounted for 19 percent of the volume of test potatoes marketed, Fancy fives 30 percent, Fancy tens 51 percent.
4. The share of the market which Maine potatoes commanded in stores with test potatoes averaged 3 percent higher than Control Stores. The pounds of Maine potatoes sold per thousand customers was 13 percent higher in stores with test potatoes than in Control Stores during the ten-week test period. This amounts to over 40 pounds of additional sales of Maine potatoes per thousand customers.
5. The revenue from Maine potatoes averaged 18 percent higher in Treatment 1 Stores and 14 percent higher in Treatment 2 Stores than the Control Stores during the ten-week test. The retail stores selling test potatoes experienced higher total revenues from potatoes than the Control Stores. Total revenues from potato sales per thousand customers were 14 percent higher in Treatment 1 Stores and 8 percent higher in Treatment 2 Stores during the market test.
6. During the ten-week market period 1300 cwt. of test potatoes were sold in the eight treatment stores. The retail value of these potatoes was \$22,000 or nearly

17 ¢ per pound. Using the retail price differential between the traditional and the test product, the increase in retailer revenue accountable to the test potatoes was \$4,200 or approximately \$3.25 per hundred pounds of test potatoes sold. This is substantially above the 15 ¢ to 20 ¢ per hundred weight anticipated increase in the packaging cost over traditionally sized washed potatoes.

Endnotes

- [1] Potato Statistical Yearbook, National Potato Council, Denver, Colorado, 1984-85.
- [2] Perry, Alvah L. Plastic Bags for Potato Packages. University of Maine Agricultural Experiment Station Bulletin No. 514, 1953.
- [3] Merchant, Charles H. Consumers' Acceptance of Sized Potatoes. University of Maine Agricultural Experiment Station Bulletin No. 465, 1948.
- [4] Libeau, Clayton P. Marketing Potatoes for Consumer Approval. University of Idaho Agricultural Experiment Station Bulletin No. 285, 1951.
- [5] King, Francis R. "An Economic Analysis of the Market Potential for Closely-Sized Potatoes." Unpublished Masters' Thesis. University of Massachusetts, 1963.
- [6] Smith, Duane A. "Focus Group Interviews, Albany, New York." Griffin Associates, Inc., Portland, Maine, 1983.