Research Report
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MARKET DEVELOPMENT POTENTIAL FOR EAST TEXAS BLUEBERRIES

PRELIMINARY ANALYSIS

TEXAS AGRICULTURAL MARKET
RESEARCH & DEVELOPMENT CENTER
in cooperation with the
Department of Agricultural Economics and the
Texas A&M Research and Extension Center
at Overton, Texas

TEXAS A&M UNIVERSITY • TEXAS AGRICULTURAL EXPERIMENT STATION • TEXAS AGRICULTURAL EXTENSION SERVICE • College Station, Texas

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Preliminary Analysis

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The Texas Agricultural Market
Research and Development Center
and
Department of Agricultural Economics
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Texas A&M University

THE TEXAS AGRICULTURAL MARKET RESEARCH AND DEVELOPMENT CENTER

An Education and Research Service
of
The Texas Agricultural Experiment Station
and
The Texas Agricultural Extension Service

The purpose of the Center is to be of service to agricultural producers, groups and organizations, and governmental agencies, as well as processing and marketing firms in the solution of present and emerging marketing problems. Primary emphasis is given to research and educational activities designed to improve and expand the markets for food and fiber products of present or prospective interest to Texas agriculture. Analyses are also directed toward an analysis of consumer food and fiber needs.

The Center is staffed by a basic group of professional agricultural and marketing economists from both the Experiment Station and Extension Service. In addition, support is provided by food technologists, statisticians and specialized consultants as determined by the requirements of individual projects.

Robert E. Branson
Coordinator

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

HIGHLIGHTS

* An experimental planting of rabbiteye blueberries has been cultivated for ten years at the Overton, Texas Experiment Station. Cultural practices are established. In 1981 and 1982, research was done (including market tests) on the marketing of Texas blueberries.

* Caution: The projections and estimates in this report are based upon producers making extensive and expensive investments in quality control and market development. Without total commitment to market development and orderly marketing plantings of the magnitude discussed in this report could result in extensive over-production, disastrous prices and large losses for producers.

* At present, Texas blueberries have an extremely limited market, which can justify total plantings of less than 40 acres. There is no reason to think this market will grow without substantial investments in market development.

* The purpose of the market test and this analysis is to focus on the fresh market distribution system through supermarkets and examine this market. It is estimated 500 acres of Texas blueberries represents the level of production that can be profitably marketed assuming regional and national distribution for fresh products. Other markets are identified--processing and export--that could result in eventual recommendations to increase the plantings.

* Blueberry varietal tests, harvesting, handling and storage experiments are continuing at Overton. These form a firm basis for estimating the ability to supply major markets.

* Texas blueberries are from 2 to 3 weeks earlier than major markets and command an early season premium that continues even after other areas introduce their production into competing areas.

* Texas blueberries have a lower marketing cost in many large and rapidly growing market centers than those from competing production areas. This is especially true during the peak harvest.

* Fresh fruits and vegetables are the most rapidly growing segment of supermarket sales. Texas blueberries have a price and quantity sales pattern similar to other specialty fruits and vegetables that have received premium prices in this growing, profitable market.

* Texas blueberries have the problem of field heat. It is essential that field heat be removed from the harvest crop by cooling the berries immediately after harvest to extend product life.

* Hand harvesting is not a viable method for large scale production of blueberries. Private partnerships or cooperatives may be necessary to share the capital expense of cooling and mechanical harvestors to serve minimum combined commercial planting of 40 or more acres, with each grower having initially 3 to 5 acres.

* In addition to cooperative efforts in harvesting and cooling, a corporate or a cooperative approach can improve marketing of the production.

* It is strongly felt an area marketing effort and consistent, high quality are essential for long run, profitable production. Without these, failure is certain.

* Cultural practices may allow a low or no pesticide product to be marketed at a significant premium.

* U-Pick is normally felt <u>not</u> to be an important marketing method where consumer driving distances are great. This has not been Overton's experience lending additional weight to the estimates of a strong, growing market.

* It is recommended that U-pick be confined to clean up operations at the end of the season.

* It is anticipated that Texas Agricultural Market Research and Development Center will conduct continuing research in marketing Texas blueberries in fresh, frozen, and processed forms in both domestic and export markets to facilitate the development of this industry to its full potential which could approach sales of $30,000,000 annually.

* The orderly marketing required for the development of the Texas blueberry industry can be best accomplished by a centralized decision making center. The form of organization should be decided well in advance of large marketings.

Market Development Potential for East Texas Blueberries

Jack McEowen
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John Lipe

INTRODUCTION

Among the agricultural enterprises offering potential benefits to producers in East Texas, blueberries offer a high potential income per acre on a limited number of acres. Traditional methods of marketing in East Texas assume any one of the four following forms:

1. Pick your own
2. At-the-farm marketing
3. Roadside sale
4. Farmers markets

These traditional markets will not be sufficient for a sizeable Texas planting.

This study initially examined the acceptance of Texas blueberries in the produce section of selected supermarkets. These fresh market blueberries were found to exhibit strong pricing patterns during a four week market test conducted jointly by the Overton Experiment Station, the Texas Agricultural Market Research and Development Center, and the Safeway Corporation. Since sales per store declined each week during the test, results indicated that the Texas fresh market, without further market development, will take only a limited amount (less than 40 acres) of fresh blueberry production at premium pricing levels. This study reports that market test in detail.

It was felt that the product has market potential beyond the Texas fresh market and that this crop could only make an impact on East Texas agriculture if an expanded market were supplied. The following market segments are explored in this report in addition to the Texas fresh market:

1. National fresh market
2. Frozen and processed markets

3. Export markets
4. Premium markets

These market segments are described. Projected returns for producers are calculated for each segment at volumes of production possible from East Texas. Finally, techniques (linear programming) are used to determine how the supply of Texas blueberries can be delivered to various market segments to maximize the potential income from this crop.

Strategies are developed to allow East Texas to supply these large, growing markets. Simply stated, however, these markets, including the majority of the Texas fresh market are supplied by other regions. An aggressive, expensive marketing program must be used to:

1. Replace other producers in existing markets.
2. Convert the growth in these markets to sales for Texas blueberries.
3. Develop markets presently in their infancy.

TEXAS SUPERMARKET STUDY

During the month of July, 1981, a retail market test of East Texas blueberries was conducted by:

Texas Agricultural Market Research Center
Texas A&M Research and Extension Center - Overton
TAMU Department of Agricultural Economics
TAMU Department of Horticulture

with the cooperation of: Safeway Food Stores - Dallas Division.

The objectives of the study were:

1. Determine market acceptance of East Texas blueberries in middle and high income retail food chain stores.
2. Develop estimated costs and returns potentials for blueberry production in East Texas.
3. Provide a preliminary estimate of the market potential for East Texas blueberries in fresh market sales within the North Texas and East Texas markets.

Safeway Food Stores selected several supermarkets in high and middle

income areas to participate in a market test of blueberries produced at the Overton Experiment Station. The blueberries were packed in one pint containers, 12 pints to a master container. They were then sold in the produce departments of these stores under standard retail conditions.

Standard retail sales audit procedures were used to measure sales on a weekly basis at each participating supermarket. Sales were calculated from deliveries, inventory changes and correction for damaged fruit. Audits were also run on strawberries, peaches and oranges for the purpose of obtaining comparative data. While some competing produce had point-of-sale advertising, no advertising was possible for blueberries because only a few of the stores had the berries.

From the data gathered and confidential store customer counts supplied, an estimate of the Texas state market was prepared and an estimate of the crop's potential in terms of acres planted and revenue was prepared.

Table 1 indicates the results of the test. Initially, it was felt that the retail price of $1.49 per pint (approximately one pound) would be reduced during the test period. However, the product moved well at $1.49 and the food chain advised against any lowering of price; therefore, Texas blueberries sold at retail in the test supermarkets for $1.49 per pint during the entire harvest season, Table 1.

Table 2 shows the results by customer income level when the stores were arbitrarily divided into a high income group and a middle income group.

Table 3 shows the wholesale price per pint of blueberries on the Dallas wholesale market. During most of the period, the blueberries also were available from Georgia, Texas and Arkansas. During the last week of the test, prices declined when the production from the largest producing area in the U.S. (Michigan) reached the market. The results of the market test suggest that Texas blueberries with proper grading and handling can command a strong, stable price and maintain their early season premium.

Table 1
BLUEBERRY RETAIL STORE MARKET TEST
SELECTED STORES
TOTAL SALES RECORD
Dallas, July 1981

Product	Unit	Week 1	Week 2	Week 3	Week 4	Grand Total
Blueberries						
Texas	pts.	563	615	531	305	2014
Florida	pts.	276	86	18	95	475
N.J.	pts.	-0-	-0-	-0-	48	48
Michigan	pts	-0-	-0-	-0-	16	16
TOTAL		939	701	549	474	2553
Strawberries						
California	pts.	1058	940	1001	1241	4240
Peaches						
California	lugs	205	113	34	75	428
Texas	lugs	10	179	191	103	484
Illinois	lugs	-0-	-0-	-0-	78	78
Oranges						
California						
bulk	1/2 bu. carton	64	64	68	59	256
4lb. bags	bags	243	278	304	385	1210
7lb. bags	bags	16	40	5	69	130

Source: TAMDRC store audits.

Table 2
BLUEBERRY RETAIL STORE MARKET TEST

AVERAGE SALES PER STORE

Dallas, July 1981

Product	High Income Stores Average Sales of Each Product	Middle Income Stores Average Sales of Each Product	All Test Stores Average Sales of Each Product
Blueberries (pints)			
Texas	350	308	336
Florida	88	62	79
New Jersey	12		8
Michigan	4		3
	454	370	426
Strawberries (pints)			
California	778	564	707
Peaches (pounds)			
California	1018	2247	1427
Texas	1370	2100	1613
Illinois	280	320	260
	2618	4667	3300
Oranges			
California			
Bulk (pounds)	1289	2222	1600
4 lb. bag	880	624	795
7 lb. bag	228		152
	2397	2846	2547
Average pounds of Fruit Sold Per Store (pt.=1b.)	6247	8447	6980

Source: TAMDRC store audits.

Table 3
Wholesale Blueberry Prices Per Pint (pound)
Dallas, June and July, 1981

Date	Price/Pint	Percent of 6/10 Price
6/10/81	$1.12	100%
6/16/81	.98	88%
6/23/81	.90	80%
6/30/81	.91	81%
7/03/81	.86	77%
7/07/81	.76	68%
7/20/81	.76	68%
7/31/81	.70	63%

Source: Fruit and Vegetable Wholesale Market News - Dallas

Table 4 compares the sales volume per store and shows generally declining volume over the entire test, while high income stores had sales per store 14 percent greater than middle income stores.

Confidential data on customers per store during the test market (customer counts) indicates sales of blueberries per customer entering the medium income stores. On the surface, this indicates a specialty product which, properly marketed, would exhibit stable, premium prices. Data was not made available regarding the total purchases per customer. The possibility remains that medium income consumers simply go to the store more often than high income consumers, Table 4.

Table 4
BLUEBERRY RETAIL STORE MARKET TEST
Weekly Sales Per Store
Dallas, July, 1981

Income Area	Average Store Sales Per Week				Total per Stores
	1	2	3	4	
High	169	119	74	90	452
Middle	109	112	127	47	395

Source: TAMRDC store audits

The volume data was fit to an equation using ordinary least squares with volume per store as the dependent variable and week of the market test as the independent variable. The equation:

Weekly sales per store = 143.3 pints minus 46.72 log week of test

$R^2 = .92$ (6.89)

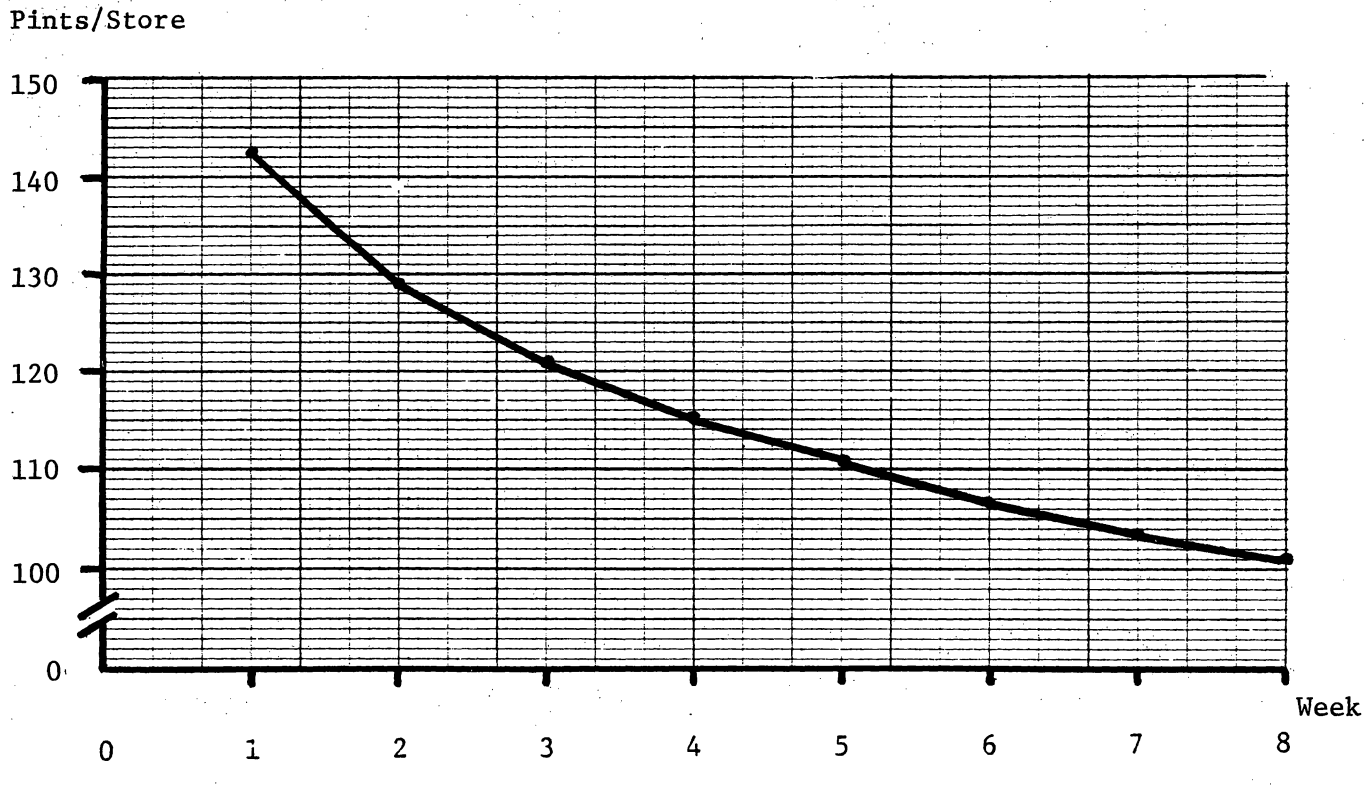
$t = 6.78$

Basically this shows a typical seasonal pattern for sales volume. This is shown graphically in Figure 1. It is interesting to note that many items once believed to be seasonal are now purchased by the consumer year round. Many formerly seasonal items are available 52 weeks a year in the supermarket. The average shopper presently knows no season. Blueberries give indications of being part of this trend, Figure 1.

Figure 1

Blueberry Sales/Store

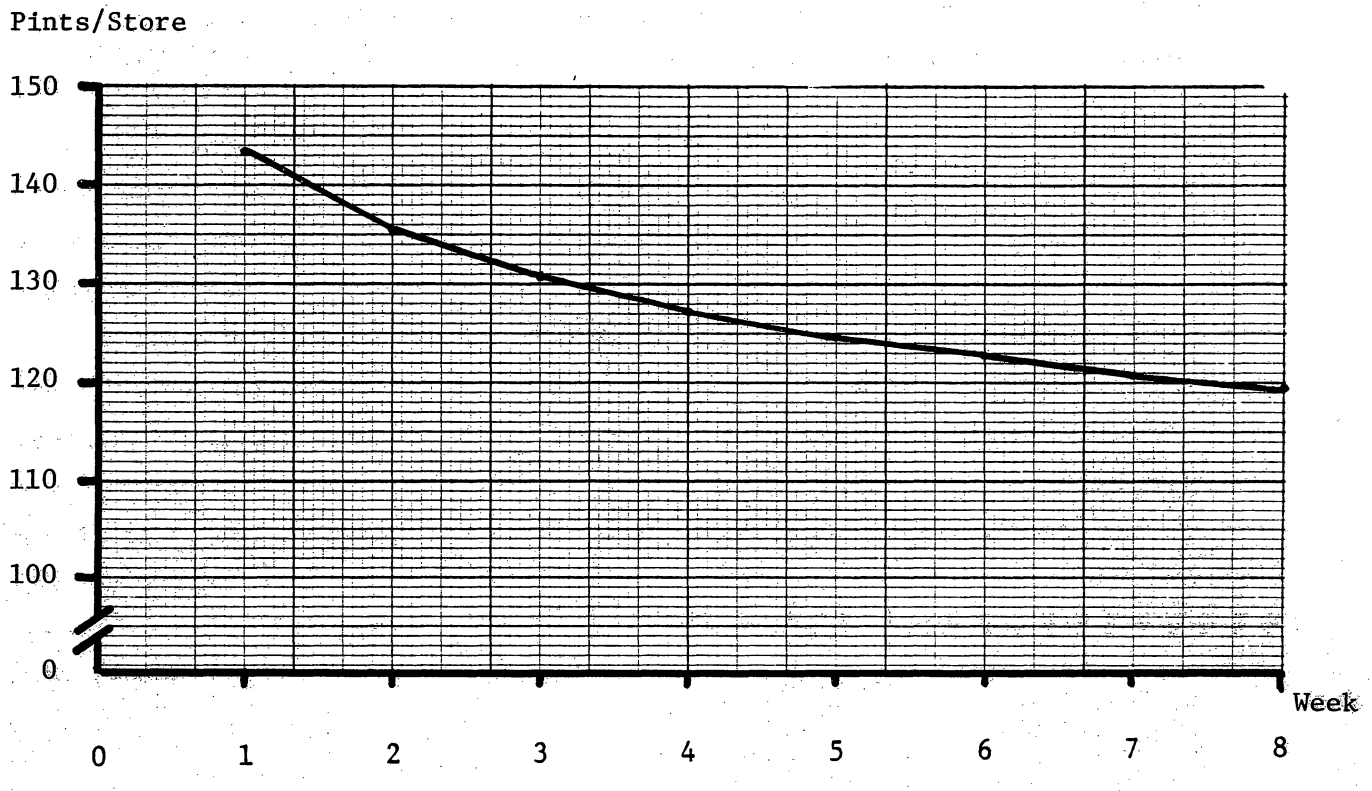
Estimated Present
Blueberry Weekly Sales
Behavior Patterns in Texas Markets



If Texas blueberries are made available with consistent high quality from year to year, it is estimated the seasonal nature of the demand will be moderate, resulting in greater volume and more stable sales. Figure 2 shows the demand that might be expected after 5 years of planned, orderly marketing. Please notice the volume is projected to grow during the peak of harvest, weeks two through five, Figure 2.

Figure 2

Blueberry Sales/Store
Expected Future Blueberry
Sales Pattern in Texas Markets



Using confidential data and Overton yield data, it is the conclusion of this test that the fresh market within Texas for blueberries consumed within the production period for Texas blueberries would support only 40 acres of commercial production based on July, 1981 sales.

Research on storage life at Overton and market studies in geographic areas where Texas has a locational advantage indicate a much larger market

than Texas can be served for a longer period than the four weeks of the test. This results in an estimate of a fresh market for 400 acres of production at 12,000 pound/acre.

In the future, fresh fruits and vegetables will benefit from changing consumer preferences towards fresh produce and the growing importance of the fresh produce departments for supermarkets.

Retailers are responding by placing their primary emphasis on the produce department. Produce departments have become the "image makers" for the store. Within this category, the specialty fruits, like blueberries, are the single fastest growing segment, rising from almost zero only a few years ago to as much as five percent of total produce sales in some supermarkets. Demand for specialty fruits, fueled in part by the recent interest in gourmet cuisine and nutrition, is expected to increase.

RECENT TRENDS IN PRODUCE: STATUS OF THE PRODUCE DEPARTMENT

A 1982 survey by Advertising Age magazine of six major U.S. metropolitan areas has shown that the produce department is now the leading "shopper draw"-- the primary "point of difference" for many retailers.

A few years ago, supermarket produce departments carried as few as 60 items. Today, they carry an average of 125 items with super stores handling as many as 200 produce items.

The entire specialty area is growing very rapidly. Moreover, a short time ago, strawberries, peaches and berries were specialty items, now they are standards.

Many, formerly, "seasonal" items are available 52 weeks a year.

Three years ago, supermarket produce sales as a percent of total store sales was in the 5-6% range. Today, the produce department commonly accounts for 7-8% of sales with some stores at 11-12% and even higher.

A Kroger executive presented the following 1975 to 1981 sales growth figures at the recent Food Marketing Institute convention in Chicago:

*Green topped carrots and radishes up 1100%

*White corn up 1173%

*Mushrooms up 329%

*Oriental vegetables up 433%

*Broccoli/cauliflower/asparagus up 152%

*Peaches and nectarines up 114%

Bottom Line: There are some excellent opportunities for market growth and development in produce, but market knowledge and understanding are keys to success.

For these reasons, blueberry sales in supermarkets can be expected to increase. In addition, major blueberry producing areas in New Jersey, Maine, Michigan, Oregon and Washington can not compete with early season fresh market sales from Texas for the simple reason their crop matures at least 3 weeks later than Texas in a normal season. Blueberries from Arkansas, the Carolinas, Georgia and Florida have greater distance to markets in the western United States and particularly the rapidly growing areas of Texas, Arizona and California. Basically, it is felt that Texas blueberries would have a competitive advantage in the fresh market in all markets west of a line from Houston, Texas, through Minneapolis St. Paul, Minnesota during the first 4 weeks of its producing season. When Washington and Oregon production is being marketed, essentially Texas loses its advantage in the West Coast markets for the final two weeks of Texas production, but still has a competitive advantage in all densely populated states west of the Houston/Minneapolis line except Washington, Oregon and California.

PROCESSED/FROZEN MARKET

Processed blueberries account for more than 80 percent of the market for cultivated blueberries in northern states. Michigan sources, for example, estimate that the production from over 10,000 of the 12,000 acres of cultivated blueberries in that state goes into processing. Generally, these are mechanically harvested, sorted either on the harvester or over a belt and packed in 30 pound corrugated containers with a plastic liner.

These containers are then taken to a commercial freezer who freezes the cartons and stores them for the producer. The producer retains title to the blueberries until they are sold throughout the year. During 1981-82, berries packed in this manner sold for 55 cents per pound. Sorting, packing, containers, freezing and storage costs accounted for 13 cents per pound.

These berries were used for several end uses. Some were repackaged as frozen blueberries. Blueberries have an unusual characteristic in that when frozen in a 30 pound box, if the box is given a sharp jolt while frozen (i.e. dropped) the fruit separates and can be repacked as individual quick frozen (IQF) fruit.

A very small percent of the harvest goes directly without freezing to markets such as pie fillers, jelly and jam producers, syrup manufacturers, etc.

During 1981-82, approximately 30% of the processed blueberries were exported. This is 25 percent of the total crop. Europe was a major market for these exports, because the European blueberry industry had a short crop in 1981. The European market is mainly demands for wild rather than cultivated blueberries, but U.S. production was acceptable to European tastes when blended with their domestic, wild production. The size of this market is not known. Many industry sources believe the 1981-82 strong European market was an exception. In years of normal harvest, it will be less strong.

The Japanese market for processed blueberries is presently small but is expected to grow. This market offers the possibility of long run contracts so the production is sold far in advance--adding stability to blueberry pricing.

Other major producing areas have formed cooperatives that handle the domestic and export marketing of frozen blueberries. The cooperatives establish grades, packages, etc. and need a large volume of sales to function efficiently. In Michigan, for example, the statewide blueberry cooperative has joined with cherry producers to jointly market processed products.

The earlier portion of this study shows that Texas production has a distinct advantage over other areas in fresh market production. Later sections will show the peak harvest is too large to be profitably sold in the fresh market. A marketing plan is developed showing that approximately 25% of the annual production of Texas blueberries will be best utilized as frozen blueberries. These will be available for processing during the third and fourth week of a six week harvest.

Because of the early nature of the Texas crop and work done by the Overton Experiment Station on extending storage life of fresh berries, it appears that under current conditions 25 percent of the crop going into processing optimizes producer income. This is much less than the 80-85% experienced by areas with later production.

It must be stressed that the processed/frozen market is neither a junk nor dumping market. It has rigid quality standards. To compete in this market, Texas blueberries will have to maintain standards as high as other producing areas. To initially penetrate this market, a strategy of quality above the industry standards would be preferable to a price below the prevailing price. Other producing areas could simply meet a reduced price, but they could not duplicate a superior pack once their harvest was in storage.

There is a possibility for imaginative marketing in the frozen/processed export market. Long term contracts are possible and a pack using metric weights might give a competitive advantage with minimal costs.

PICK-YOUR-OWN MARKETING

In decribing this market segment in Farmer to Consumer Direct Marketing of Fruits and Vegetables in East Texas, (1981, p. 1) the Texas Agricultural Market Research and Development Center states:

> Pick-your-own marketing of fruits and vegetables has made entry in Texas but has not flourished because producing farms for the most part are located away from the principal cities. Driving distances mitigate against urbanites making trips to the farms.

The 1982 harvest season at Overton found pick-your-own customers traveling in excess of sixty miles to harvest their own blueberries. They were charged 50 cents per pint (pound) and it was necessary to closely supervise this for more than collection and damage limitation purposes. Customers were found arguing over which bush they could harvest. Some peace keeping was needed.

Overton also supplied ungraded, mechanically harvested berries

at 75 cents per pint (pound) and found customers equally pleased with pick-your-own at 50 cents a pint.

Obviously this market segment is small and would not be a major factor in large acreage. It is interesting in that it indicates a stronger demand for fresh blueberries than would be expected from experience with other fruits and vegetables.

SPECIALTY MARKETS

Texas blueberries have been produced at Overton without any chemical spraying program. Other producing areas have production programs that require as many as seven insecticide applications each season. Cultural practices are not a portion of this study, but since high quality, fresh market berries can be produced without pesticides until spraying is required, this offers a market competitors cannot supply.

Growing consumer interest in fresh fruits and vegetables has been shown. Growing consumer concern over pesticide levels has arisen. It would be possible to market fresh Texas blueberries clearly identified as having no pesticide residual and no pesticides used in their production as a superior product. With no other producing area supplying (or able to supply) this product, the entire North American market would be open.

Such a product could be clearly identified on the clear plastic covering on each pint container, with no extra production costs other than those experienced in fresh berry sales. In addition to a larger market, these berries could command a premium of up to 30 percent over regular fresh blueberries and a more stable market.

Since both Texas fresh blueberries and those sold as health food would be the identical physical product, except for the over wrap and the price, rigid control of this marketing would be essential to capture and maintain the premium from no pesticide blueberries, which could be safely eaten directly from the box.

A similar premium market may be available for consumer packages of frozen blueberries, which Texas could supply.

OPTIMUM MARKETING

Several potential market segments have been discussed for East Texas blueberry production. These market segments have differing pricing structures and different returns to producers. To determine what portion of the production could be sold in market segments that result in maximum returns to producers, a linear program was developed. This program (which is detailed in the Appendix) indicated that during the six week production period:

1. The entire first week's harvest should be sold in the fresh market.
2. The entire second week's harvest should be sold in the fresh market, but it will be necessary to store in refrigerated storage one-third of the second week's harvest for sale in the third through fifth weeks of the harvest.
3. One half the third week's harvest should be sold in the fresh market during the week it is harvested. The balance should be frozen and held for sale in that market.
4. One half the fourth week's harvest should be sold in the fresh market during the week it is harvested. One fifth of the week's harvest should be stored in refrigerated storage for sale in the fresh market during the sixth week of the harvest. The balance should be frozen and held for sale in that market.
5. As harvest winds down in the fifth and sixth weeks, three fifths of the harvest during the fifth and sixth weeks should be sold in the fresh market as harvested. The balance should be cleaned up through pick yourself operations.

During the second through fifth weeks, it is estimated that as much as 10 percent of the entire crop will be in cold storage awaiting sale in the fresh market. Storage must be available.

During the harvest, over half the total crop will move directly into the fresh market with minimal storage. It will be necessary to remove field heat quickly from this production. Extensive and expensive cooling is essential. Overton's experience indicates a five day product life for blueberries without the field heat promptly removed by cooling. The product life is extended for more than a month if field heat is removed.

During the third and fourth weeks of the harvest, when production is at its peak, approximately 25 percent of the total crop should be frozen. Freezing operations will last only two weeks. In all probability, commercial freezing and cold storage will be utilized.

Pick yourself operations may be used to complete the harvest in the final two weeks.

Orderly marketing is dependent upon cooling capacity to remove field heat, cold storage for fresh berries, and freezing and frozen storage capacity. Naturally, this will vary among producers, but for the entire production of East Texas blueberries the above will hold.

It is estimated that a crop marketed under the above marketing program would net to growers 55.7 cents per pound after packing, container, freezing, cooling, transportation and storage costs were deducted. Income (net) from a twenty-five acre planting is estimated to be in excess of $100,000 per year before taxes after the planting reaches full production in the sixth year based on a yield of 12,000 pounds per acre, mechanical harvesting and a following of the linear programming developed marketing plan.

Without mechanical harvesting, it is estimated income for a 25 acre plantation under the marketing plan would fall to $55,000 if the entire crop could be harvested. It is doubtful, based on the experience in the Overton planting, that the crop could be harvested by hand in a manner dependable enough to meet the demands of a reasonable market plan and could quite possibly result in continuing losses to the grower.

RECOMMENDATIONS

It is recommended that an expansion of East Texas blueberry production be undertaken only after provisions for adequate investment in orderly marketing are made.

It is recommended that Texas producers take advantage of their early production and concentrate on the fresh market. It is further recommended that producers recognize that highest quality is necessary for long run profitability and collectively (at the very least) establish

quality standards for blueberries shipped out of the production area as high or higher than those of competing areas of production.

It is recommended that the production be distributed in the national market in those areas Texas production enjoys a regional advantage and that the mechanism such as a cooperative marketing office or a network of brokers be established in advance of major production.

As penetration of the national fresh market is achieved, it is recommended that the frozen/processed/export markets be developed with a strategy of higher quality than competing areas and packaging specifically designed for export.

Present recommendations are for an expansion of acreage to 500 total acres, but as frozen/processed/export markets are developed, the planting recommendations could increase to 2500 acres as the acceptance of Texas production develops.

High capital costs for cooling, storage and mechanical harvesting would be spread among blueberry producers by cooperative efforts such as joint ownership of equipment or custom operations. If these are put in place, the minimum sized economic planting could be reduced.

APPENDIX

Destinations:
Fresh Market During Week:

Linear Program

Sources:
Percent of
Total Production

Week	Percent	1	2	3	4	5	6	7	8	9	Frozen	U-Pick	
1	6.5%	6.5 / .95	0 / .70	0 / .59	0 / .48								= 6.5
2	18.75%		12.1 / .75	4.0 / .60	0 / .49	2.4 / .48							= 18.5
3	25.0%			7.5 / .65	0 / .50	0 / .49	0 / .48				17.5 / .41		= 25.0
4	25.0%				11.2 / .55	0 / .50	4.1 / .49	0 / .38			9.7 / .41		= 25.0
5	18.75%					8.5 / .55	0 / .50	0 / .39	0 / .38		0 / .41	10.0 / .44	= 18.5
6	6.5%						6.5 / .55	0 / .40	0 / .34	0 / .33	0 / .41	0 / .44	= 6.5
Demand		≤13	≤12.1	≤11.5	≤11.2	≤10.9	≤10.6	≤10.4	≤10.2	≤10.1	≥ 0	≤10	

Sources:
Percent of
Total Production

Week	Percent	1	2	3	4	5	6	7	8	9	Frozen	U-Pick	
1	6.5%	6.5 / .95	0 / .70	0 / .59	0 / .48								= 6.5
2	18.75%		12.1 / .75	0 / .60	0 / .49	6.4 / .48							= 18.5
3	25.0%			11.5 / .65	0 / .50	0 / .49	0 / .48				13.5 / .41		= 25.0
4	25.0%				11.2 / .55	0 / .50	4.1 / .49	0 / .38			9.7 / .41		= 25.0
5	18.75%					4.5 / .55	0 / .50	0 / .39	0 / .38		0 / .41	14.0 / .44	= 18.5
6	6.5%						6.5 / .55	0 / .40	0 / .34	0 / .33	0 / .41	0 / .44	= 6.5
Demand		≤13	≤12.1	≤11.5	≤11.2	≤10.9	≤10.6	≤10.4	≤10.2	≤10.1	≥ 0	≤15	

Linear Program

Fresh Market During Week:

Sources: Percent of Total Production	1	2	3	4	5	6	7	8	9	Frozen	U-Pick	
Week 1 — 6.5%	6.5 / .95	0 / .70	0 / .59	0 / .48								= 6.5
Week 2 — 18.75%		12.1 / .75	4.0 / .60	0 / .49	2.4 / .48							= 18.5
Week 3 — 25.0%			7.5 / .65	0 / .50	0 / .49	0 / .48				17.5 / .41		= 25.0
Week 4 — 25.0%				11.2 / .55	0 / .50	4.1 / .49	0 / .38			9.7 / .41		= 25.0
Week 5 — 18.75%					8.5 / .55	0 / .50	0 / .39	0 / .38		0 / .41	10.0 / .44	= 18.5
Week 6 — 6.5%						6.5 / .55	0 / .40	0 / .34	0 / .33	0 / .41	0 / .44	= 6.5
Demand	≤13	≤12.1	≤11.5	≤11.2	≤10.9	≤10.6	≤10.4	≤10.2	≤10.1	≥ 0	≤10	

Sources: Percent of Total Production	1	2	3	4	5	6	7	8	9	Frozen	U-Pick	
Week 1 — 6.5%	6.5 / .95	0 / .70	0 / .59	0 / .48								= 6.5
Week 2 — 18.75%		12.1 / .75	0 / .60	0 / .49	6.4 / .48							= 18.5
Week 3 — 25.0%			11.5 / .65	0 / .50	0 / .49	0 / .48				13.5 / .41		= 25.0
Week 4 — 25.0%				11.2 / .55	0 / .50	4.1 / .49	0 / .38			9.7 / .41		= 25.0
Week 5 — 18.75%					4.5 / .55	0 / .50	0 / .39	0 / .38		0 / .41	14.0 / .44	= 18.5
Week 6 — 6.5%						6.5 / .55	0 / .40	0 / .34	0 / .33	0 / .41	0 / .44	= 6.5
Demand	≤13	≤12.1	≤11.5	≤11.2	≤10.9	≤10.6	≤10.4	≤10.2	≤10.1	≥ 0	≤15	

Sources: Percent of Total Production	1	2	3	4	5	6	7	8	9	Frozen	U-Pick	
Week / Percent												
1 — 6.5%	6.5 / .95	0 / .70	0 / .59	0 / .48								= 6.5
2 — 18.75%		12.1 / .75	0 / .60	0 / .49	6.4 / .48							= 18.5
3 — 25.0%			11.5 / .65	0 / .50	0 / .49	0 / .48				13.5 / .41		= 25.0
4 — 25.0%				11.2 / .55	0 / .50	4.1 / .49	0 / .38			9.7 / .41		= 25.0
5 — 18.75%					4.5 / .55	0 / .50	0 / .39	0 / .38		0 / .41	14.0 / .44	= 18.5
6 — 6.5%						6.5 / .55	0 / .40	0 / .34	0 / .33	0 / .41	0 / .44	= 6.5
Demand	≤13	≤12.1	≤11.5	≤11.2	≤10.9	≤10.6	≤10.4	≤10.2	≤10.1	≥ 0	≤ 20	