



Southern Highbush Blueberry Marketing and Economics

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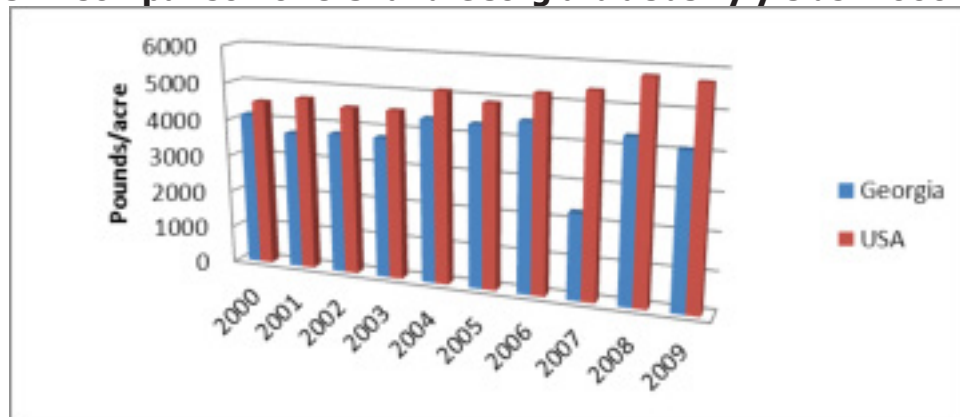


Introduction

In Georgia, three types of blueberries are grown: Rabbiteye (*Vaccinium ashei*), Northern Highbush (*Vaccinium corymbosum L.*) and Southern Highbush (*Vaccinium corymbosum X Vaccinium darrowii*). Rabbiteye is native to south Georgia, north Florida and southeast Alabama. It is the most commonly cultivated blueberry in Georgia. Northern Highbush is a species well adapted to northern Georgia due to its higher winter chilling requirement and lower heat tolerance. Southern Highbush is a hybrid between Northern Highbush and Darrow's Evergreen blueberry. Both Southern Highbush and Rabbiteye have a low to moderate winter chilling requirement that allows for their production in the warm temperate climate of south Georgia. Rabbiteye blueberries are better adapted to mineral soils and easier to grow than Southern Highbush blueberries. Southern Highbush blueberries perform well on spodic soils with at least 3 percent organic matter or soils heavily amended with pine bark.

Blueberry yields in Georgia are currently lower than the United States average. Beginning in 2004, yields in Georgia have been nearly constant or decreasing whereas across the United States the yields are almost continuously increasing. In 2004, the yields were 5,120 pounds per acre in the United States against 4,380 pounds per acre in Georgia. In 2009, the yields were 5,720 pounds per acre in the United States -- an increase of 12 percent -- while in Georgia the yields were 4,100 pounds per acre -- a decrease of 6 percent. To be more competitive, Georgia blueberry producers have to increase their yields to match or better the U.S. values. This increase can occur through an improvement of the agricultural practices and a better mastery of blueberry cultivation (Figure 1).

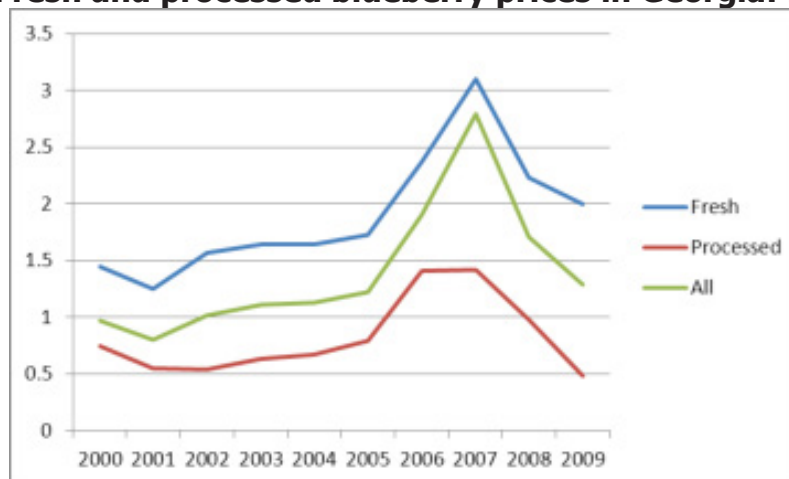
Figure 1: Comparison of U.S. and Georgia blueberry yields: 2000 - 2009



Source: Noncitrus Fruits and Nuts 2001-2010 Summary ASB, NASS, and USDA

Blueberries are sold both fresh and frozen in Georgia. The percentage of each varies from year to year, but equal amounts are often produced. The price difference between fresh and processed is substantial. Southern Highbush blueberries are all fresh-market and the cost of production is higher.

Figure 2: Fresh and processed blueberry prices in Georgia: 2000- 2009



Source: Noncitrus Fruits and Nuts 2001-2010 Summary ASB, NASS, and USDA

The prices of fresh and processed blueberries follow the same trend. Until 2007 there was an increasing trend in the price from \$1.45 in 2000 to \$3.10 in 2007 for fresh blueberries and from \$0.75 to \$1.42 for processed blueberries (this particular price extremity was a result of very poor production that year). There has been a price decrease since the spike in 2007; in 2009, the price for fresh blueberries was \$2.00 and \$0.48 for processed. The price increase in fresh blueberries may be due in part to the increased amount of Southern Highbush plants being planted (Figure 2).

Assumptions used in the economic analysis

Although there are several ways of doing a budget, this economic analysis adopted the risk-rated method. The risk-rated return assumes five different yields and prices per pound at the top of the budget, namely: “Best,” “Optimum,” “Median,” “Pessimistic” and “Worst.” The “Best” and “Worst” yield or price levels were expected to occur very rarely. The “Median” yield and price level was expected 50 percent of the time. The “Optimistic” and “Pessimistic” levels would be anticipated to occur once in six years.

Planting distance used for this study was 4 feet by 10 feet even though growers are slowly adopting 2.5 feet by 10 feet. After planting and cultivation, it was assumed to have taken four years for the crop to attain full production. Variable interest rates of 7 percent of total operating/variable costs were used for each year. Cost per flat was based on custom packaging. Hired utilized labor was contracted at a flat rate of \$9.00 per hour. Harvesting yields were calculated based on a 95 percent fruit recovery rate; thus, 5 percent field and packaging loss. The brokerage fee was 15 percent, with cooling and handling included. The overhead and management fee was 15 percent of the total operating/variable cost. Compounded recaptured costs were based on a 5 percent fixed interest rate, and the expected lifespan of a blueberry farm in the Georgia environment was 20 years. Machinery and equipment operation cost calculations were based on 10 acres and a 5 percent fixed interest rate.

The calculations included all the essential topics such as percentage use for crop, purchase price, salvage value, life span, depreciation, interest, tax and insurance. All equipment was assumed to be new. Solid set irrigation was calculated based on 10 acres with a sprinkler spacing of 40 feet by 45 feet and an 8-inch well capable of pumping about 600 gallons/minute. Risk-rated marketing prices and yields were obtained from growers and MBG Marketing Inc., while input and equipment prices were obtained from vendors and machinery dealers, respectively. The adopted variable interest rates for operating/variable costs were for short-term loans, while the fixed interest rates used for machinery and compounded establishment costs were for long-term loans (these rates were recommended and/or obtained from AgGeorgia Farm Credit). A detailed calculation breakdown of fixed machinery and equipment, irrigation and recaptured establishment costs may be provided upon request

First year estimated establishment and maintenance cost

The first year in establishing Southern Highbush Blueberries is highly crucial in terms of workload and cost. This budget includes all returns and costs associated with producing this crop in Georgia. For this estimated analysis a planting distance of 4 feet by 10 feet was employed, amounting to 1,089 plants per acre at a cost of \$2,450.45. Other notable cost components in land preparation include: stumping, pushing and burning, which costs \$1,000 per acre; chopping, which costs \$120 per acre; and milled pine bark at \$800 for 20 tons. Fertilizers, along with pre- and postemergence weed control costs, equal \$406.04, while pest and disease control costs were \$255.71. The total operating cost for the first year amounted to \$6,563.24. Fixed costs consisting of a tractor and equipment, overhead and management, and irrigation equaled a sum of \$3,107.36. Both of these together determined the total establishment costs for one year: \$9,670.60.

Table 1: First year estimated establishment and maintenance cost per acre of Southern Highbush blueberry in soil in Georgia, 2011

Items	Appl.	Unit	Quantity	Price	\$Amt.	Your Cost
Land preparation						
Pre-plant weed control		Gal.	2.50	36.00	90.00	
Stumping, pushing, burning	2/yr.	Acre	1.00	1,000.00	1,000.00	
Chopping		Acre	3.00	40.00	120.00	
Triple super phosphate		Lbs.	150.00	0.13	19.50	
Copper sulfate		Lbs.	4.00	2.00	8.00	
Harrowing		Acre	3.00	30.00	90.00	
Bedding		Acre	1.00	45.00	45.00	
Breaking aisles		Acre	1.00	30.00	30.00	
Ditching and drainage		Acre	1.00	80.00	80.00	
Milled pine bark		Ton	20.00	40.00	800.00	
Planting						
Plants (4' x 10')			1,089.00	2.25	2,450.25	
Planting labor			1,742.00	0.25	435.50	
Fertilizers	1/yr.					
Fertilizer (liquid)		Gal.	64.00	1.86	119.04	
Weed control					0.00	
Pre-emergence	2/yr.	Acre	2.00	58.00	116.00	
Post-emergence	2/yr.	Acre	2.00	43.50	87.00	
Tractor and sprayer	4/yr.	Hrs.	4.00	12.00	48.00	
Labor	4/yr.	Hrs.	4.00	9.00	36.00	
Insect and disease control					0.00	
Fungicide	4/yr.	Acre	4.00	26.43	105.71	
Insecticide	2/yr.	Acre	2.00	12.00	24.00	
Tractor and sprayer	6/yr.	Acre	6.00	12.00	72.00	
Labor	6/yr.	Acre	6.00	9.00	54.00	
Pruning	1/yr.	Hrs.	3.00	9.00	27.00	
Irrigation		Acre	1.00	276.87	276.87	
Interest on operation costs		\$	6,133.87	0.07	429.37	
Total pre-harvest costs					\$6,563.24	
Fixed costs						
Tractor and equipment		Acre	1.00	795.22	795.22	
Overhead and management		\$	6,563.24	0.15	984.49	
Irrigation		Acre	1.00	1,327.65	1,327.65	
Total fixed costs (TFC)					\$3,107.36	
Total costs (TC)					\$9,670.60	

Second year establishment and maintenance cost

During the second year, the number of times insecticide and fungicide was applied doubled. Correspondingly, the labor involved in spraying also doubled. As a whole, this had a major impact on the total variable cost. Furthermore, the total operating cost for year two was \$1,693.33, which is nearly five times less than year one. It was assumed that 500 pounds would be harvested in year two, equivalent to 145 flats (3.3 pounds containing 12 to 125 g clamshells) with a 95 percent pack out rate.

Harvesting and marketing costs, including harvesting, custom packing, cooling, handling and brokerage fees, amounted to \$2,984.35. Fixed costs similarly included tractor and equipment, overhead and management, and irrigation. These amounted to a cost of \$2,376.87 and altogether give a total establishment cost of \$7,045.55 for year two. Assuming a return from receipts of 1,615 pounds with a 95 percent pack out rate and a selling price of \$3.00 per pound (median), gross receipts would be \$4,845.00. This reduces the total establishment cost in this year to \$2,209.55

Table 2: Second year estimated and maintenance cost per acre for Georgia Southern Highbush blueberry in soil, 2011

Operating Costs Items	Appl.	Unit	Quant.	Price	\$Amt.	Your Cost
Fertilizers						
Fertilizer (liquid)	Yr.	Gal.	85.00	1.86	158.10	
Weed control						
Pre-emergence	2/yr.	Acre	2.00	58.00	116.00	
Post-emergence	2/yr.	Acre	2.00	43.50	87.00	
Labor	4/yr.	Acre	4.00	9.00	36.00	
Insect and disease control						
Fungicide	8/yr.	Acre	8.00	46.13	369.00	
Insecticide	4/yr.	Acre	4.00	12.00	48.00	
Tractor and sprayer	12/yr.	Acre	12.00	12.00	144.00	
Labor	12/yr.	Acre	12.00	9.00	108.00	
Pruning	1/yr.	Acre	1,089.00	0.22	239.58	
Irrigation	Yr.	Acre	1.00	276.87	276.87	
Interest on operation costs		\$	1,582.55	0.07	110.78	
Total pre-harvest costs					\$1,693.33	
Harvesting and marketing costs						
Harvesting		Lbs.	1,700.00	0.72	1,224.00	
Custom packing		Lbs.	1,615.00	0.94	1,518.10	
Cooling, handling and brokerage		Lbs.	1,615.00	0.15	242.25	
Total harvesting and marketing costs (TH&MC)					\$2,984.35	
Fixed costs						
Tractor and equipment		Acre	1.00	795.22	795.22	
Overhead and management		\$	1,693.33	0.15	254.00	
Irrigation		Acre	1.00	1,327.65	1,327.65	
Total fixed costs (TFC)					\$2,376.87	
Total cost per acre (TC)					\$7,054.55	
Less returns from receipts					\$4,845.00	
Total net returns per acre					\$2,209.55	

Third year establishment and maintenance costs

In the third year, fungicide was the largest variable cost component at \$369.00, followed closely by irrigation at \$276.87. Although the cost of labor remained relatively the same, the total cost of pruning decreased significantly from \$239.58 in year two to only \$36.00 in year three. Chemicals and labor for weed control amounted to \$188.00, which was \$51.00 lower than the previous year due to a decrease in the price of post-emergence chemical. Fertilizers for this year amounted to \$158.10 and insecticide cost only \$48.00. Total operation cost for year three was \$1,693.33.

Total harvesting and marketing costs were \$7,022.00. This included harvesting, custom packing, cooling, handling and brokerage fees. Fixed costs, including tractor and equipment, overhead and management, and irrigation altogether cost \$2,332.80. The overall total cost for year three is \$10,754.33. Assuming a return from receipts of 3,800 pounds with a 95 percent pack out rate and a selling price of \$3.00 per pound, gross receipts were \$11,400. Therefore, the total cost per acre resulted in a net gain of \$645.67 in year three.

Table 3: Third year estimated and maintenance cost per acre for Georgia Southern Highbush blueberry in soil, 2011

Operating Costs Items	Appl.	Unit	Quantity	Price	\$Amt.	Your Cost
Fertilizers						
Fertilizer (fertigation)	Yr.	Gal.	85.00	1.86	158.10	
Weed control						
Pre-emergence	2/yr.	Acre	2.00	58.00	116.00	
Post-emergence	2/yr.	Acre	2.00	18.00	36.00	
Labor	4/yr.	Acre	4.00	9.00	36.00	
Insect and disease control						
Fungicide	8/yr.	Acre	8.00	46.13	369.00	
Insecticide	4/yr.	Acre	4.00	7.00	28.00	
Tractor and sprayer	12/yr.	Acre	12.00	12.00	144.00	
Labor	12/yr.	Acre	12.00	9.00	108.00	
Pruning	1/yr.	Hrs.	4.00	9.00	36.00	
Irrigation		Acre	1.00	276.87	276.87	
Interest on operation costs		\$	1,307.97	0.07	91.56	
Total pre-harvest costs					\$1,399.53	
Harvesting and marketing costs						
Harvesting		Lbs.	4,000.00	0.72	2,880.00	
Custom packing		Lbs.	3,800.00	0.94	3,572.00	
Cooling, handling and brokerage		Lbs.	3,800.00	0.15	570.00	
Total harvesting and marketing costs					\$7,022.00	
Total variable costs (TVC)					\$8,421.53	
Fixed costs						
Tractor and equipment		Acre	1.00	795.22	795.22	
Overhead and management		\$	1,399.53	0.15	209.93	
Irrigation		Acre	1.00	1,327.65	1,327.65	
Total fixed costs (TFC)					\$2,332.80	
Total cost (TC) per acre					\$10,754.33	
Total receipt per acre					\$11,400.00	
Total net returns per acre					\$645.67	

Fourth year – full production costs

In year four, the blueberry field is assumed to be in full production. The chemicals and labor required for disease and pest control contributed the most to the total variable cost at \$501.00. Pruning and mechanical topping increased significantly with a sum of \$314.58 in year four versus \$36.00 from the previous year. Irrigation amounted to \$276.87, while weed control costs were \$220.00. The cost of fertilizer remained the same as the year before at \$158.10. Total pre-variable costs amounted to \$1,706.17.

Total harvesting and marketing costs, including harvesting, custom packing, cooling, handling and brokerage fees were \$12,288.50. Fixed costs include tractor and equipment, overhead and management, and irrigation, which altogether cost \$3,418.18. Assuming a return from receipts of 7,000 pounds with a 95 percent pack out rate and a selling price of \$3.00 per pound, gross receipts would be \$21,000. This minus the total cost per acre of \$17,412.82 equal a net gain of \$3,587.18 in year four.

Table 4: Fourth year – full production Georgia Southern Highbush blueberry in soil, 2011

	Best	Opt	Median	Pessimistic	Worst	Yours
*Yield (lbs.)	9000	8000	7000	6000	5000	
*Price per lb.	3.50	3.25	3.00	2.75	2.50	
Variable Costs Items	Appl.	Unit	Quantity	Price	\$Amt./Acre	Your Cost
Fertilizers						
Fertilizer (fertigation)	Yr.	Gal.	85.00	1.86	158.10	
Weed control (4' band)						
Pre-emergence	2/yr.	Acre	2.00	50.00	100.00	
Post-emergence	2/yr.	Acre	2.00	20.00	40.00	
Tractor and sprayer	4/yr.	Hrs.	4.00	12.00	48.00	
Labor	4/yr.	Hrs.	4.00	9.00	36.00	
Insect and disease control						
Insecticides	3/yr.	Acre	3.00	7.00	21.00	
Fungicides	8/yr.	Acre	8.00	46.13	369.00	
Tractor and sprayer	11/yr.	Hrs.	11.00	12.00	132.00	
Labor	11/yr.	Acre	11.00	9.00	99.00	
Pruning						
Pruning (manual)	1/yr.	Plants	1,089.00	0.22	239.58	
Mechanical topping	1/yr.	Acre	1.00	75.00	75.00	
Irrigation		Acre	1.00	276.87	276.87	
Interest on operation costs		\$	1,594.55	0.07	111.62	
Total pre-variable costs		\$			1,706.17	
Harvesting and marketing costs						
Harvesting		Lbs.	7,000.00	0.72	5,040.00	
Custom packing		Lbs.	6,650.00	0.94	6,251.00	
Cooling, handling and brokerage		Lbs.	6,650.00	0.15	997.50	
Total harvesting and marketing costs		\$			12,288.50	
Total variable, harvesting and marketing costs		\$			13,994.67	
Fixed costs						
Tractor and equipment		Acre	1.00	795.22	795.22	
Overhead and management		\$	1,706.17	0.15	255.93	
Irrigation		Acre	1.00	1,327.65	1,327.65	
Recaptured establishment costs		\$	1.00	1,039.38	1,039.38	
Total fixed costs		\$			3,418.18	
Total budgeted cost per acre		\$			17,412.84	

Risk-rated returns over total costs:

Table 5 indicates the probability of obtaining the various calculated risk-rated net returns over total costs. The “Returns (\$)” row denotes seven different net returns possibilities. These returns reflect the variability of prices and yields in respect to the expected net return. The first “Chances (%)” row reflects the estimated percentage of obtaining the above net returns or more, and likewise the second “Chances (%)” row shows the estimated frequency of obtaining the above net returns or less. According to the risk-rated returns over total costs, the base budgeted net revenue was \$3,587 with a 99 percent chance of making a profit under Georgia conditions.

Table 5: Net returns over total costs of producing Southern Highbush blueberry in soil in Georgia, 2011

Net return levels (TOP ROW)								
The chances of obtaining this level or more (MIDDLE ROW)								
The chances of obtaining this level or less (BOTTOM ROW)								
	Best	Optimistic		Expected	Pessimistic		Worst	
*Returns (\$)	9,187	8,113	7,040	2,537	4,892	3,819	2,745	
Chances (%)	7%	16%	31%	94%				
Chances (%)				6%	31%	16%	7%	
Chances for Profit =		99%	Base Budgeted Net Revenue =					\$3,587

Farm input prices

Many factors had direct or indirect impact on input prices, cost of production and profitability. Farmers use motor sizes (HP) that are commensurate with their future targeted acreages. Quantity discounts for items such as packing supplies were factors that also affected prices of some inputs. The cost estimate in this study reflects a combination of the current agricultural practices in Georgia, which have changed drastically from the past decade, and recommendations from UGA specialists. Prices used were actual prices obtained from vendors around the counties involved in blueberry production areas, excluding quantity discounts.

Fixed costs

The fixed machinery cost in this study includes shielded herbicide sprayer, air-blast sprayer, rotary mower, tractor, fertilizer spreader, harrow and hand-sprayer. The following were taken into consideration in the calculations: percentage of use for Southern Highbush, purchase price, salvage value of equipment, lifespan, depreciation, interest, taxes and insurance, respectively. The calculation was based on 10 acres and a 5 percent fixed interest rate. The estimated fixed machinery cost per acre in this study was \$795.22. Overhead and management cost was \$255.93, or 15 percent of pre-harvest variable cost (Table 4).

Irrigation fixed cost per acre was \$1,327.65 and included items such as pipes and fittings, sprinklers, 8-inch-deep well, pump and motor, check valves, filter, meter base, cut off valve, water tank, miscellaneous items and installation, respectively. The following were taken into consideration in the calculations: percentage of use for Southern Highbush, purchase price, salvage value of equipment, lifespan, depreciation, interest, taxes and insurance, respectively. The calculation was also based on 10 acres and a 5 percent fixed interest rate (Table 4).

While the annual compounded recaptured establishment cost was \$1,039.38, the fixed compounded interest rate used was 5 percent. We used 20 years in our calculations because we believe that a well-managed Southern Highbush blueberry farm in Georgia would last that long before it would need to be replanted. A detailed calculation breakdown of fixed machinery and equipment, irrigation and recaptured establishment costs may be provided upon request (Table 4).

Conclusion

Georgia is the fourth- or fifth-highest producer of cultivated blueberries in the U.S., with almost 10 percent of production. Marketing and economic analysis were carried out to determine why the blueberry industry in Georgia has experienced tremendous growth. A risk-rated returns over total costs revealed that the base budgeted net revenue was \$3,587 with a 99 percent chance of making a profit under Georgia conditions. Such a return on investment per acre indicates that the industry is vibrant.

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Cover picture from U.S. Highbush Blueberry Council:

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