

## *Vacciniums* – Growing Blueberries in the South

The data is in! We're eating more blueberries today than just a few years ago. In fact, there's a 50% increase in consumption per cap in the last ten years. This is a global trend. Demand is high and prices for fresh, processed, and juice markets are just plain exciting. Besides a growing fresh market, blueberries are finding their way into juices, jellies, and other processed products. Here are the facts!

Blueberries are now the second most popular berry in USA!

Blueberries in the USA are now at 17 ozs. per year per cap consumption!

Blueberries and eyesight – prevents macular degeneration!

Blueberries and memory – may slow onset of Alzheimers!

Blueberries are good for cardiovascular!

Blueberries fight aging - # 1 source of antioxidants!

Blueberries fight Cancer!

Blueberries are high fiber, high vitamin C, no fat, no cholesterol!

**HISTORY** - Blueberries were first established in East Texas as a test plot on the small farm of Mr. Herbert K. Durand at Buna, Texas in 1967. Dr. Hollis Bowen, a Texas A & M University pomologist with a fresh PhD out of Rutgers, speculated that east Texas should be a fine place to test rabbiteye blueberries (*Vaccinium ashei* Reade), a species indigenous to Florida and parts of Alabama and Georgia. In their natural range, rabbiteyes prefer alluvial floodplain sites, a low soil pH and good humic content. East Texas is blessed with acid sandy loam soils, nearby sources of irrigation water and



ready access to a number of organic soil amendments (pine bark, straw, chips, hay, etc.). The requirements to grow rabbiteyes and East Texas attributes looked like a logical union. The early planting was successful and a second was established at Magnolia Springs, Texas on Texas Forest Service land; the plants languished for several years under sporadic sprinkler irrigation during the summer. After a heavy wood chip application and a good dose of nitrogen via ammonium sulfate, the plants took on years of heavy growth and good production. In 1973, a larger trial under the direction of Dr. John Lipe was put into place at the Overton Research and Extension Center. The first plantings were primarily variety trials that included Tifblue, Briteblue, Delite, Woodard, Garden Blue, Southland, Menditoo, and Bluegem. In 2008, only Tifblue remains a major part of the commercial picture as newer varieties have taken over the scene. During the late 1970's and 1980's, care and culture studies were initiated to determine the best strategy for encouraging growth and production. Blueberry research in east Texas can be attributed to two efforts: 1) TAMU Research and Extension Center, Overton, Texas, and 2) the Stephen F. Austin State University blueberry research program. At SFASU, water quality experiments, germplasm trials, fertigation studies and field mulching/in-ground amendment work has made a significant contribution to the health of the industry. At TAMU, past research focused on nutrient requirements, germplasm trials, mulching, and salinity studies.

During the mid 1970's, the Texas Agricultural Extension Service began to report the results of trials at grower field days, conferences and events. Interest surfaced. Economic projections appeared rosy. With yields of 12,000 lbs per acre possible and market prices hovering around a dollar per pound, there was plenty of reason for optimism. The first large planting was that of Fincastle Blueberry Nursery and Farms, LaRue, Texas. John Schoelkopf, Dallas businessman and horticulture enthusiast, dreamed of establishing a kind of horticultural "Disneyland." The goal was a large planting of diversified fruits and vegetables "pick-your-own" experience, and embracing of the "farm-to-consumer" philosophy. A great capital investment was made, consultants were hired, irrigation systems were installed and Fincastle began commercial production. John promoted the industry by hosting and partially subsidizing some of the first blueberry conferences in east Texas. The "Texas Blueberry Growers Association" came into being in 1980. As a result of field trial production data, good promotion and news releases, East Texas blueberry acreage grew. In 2008, Texas acreage is estimated to be around 1000 acres. Since the mid-1980's, late spring frosts have emerged as the single most important constraint to high yields.

SFA has enjoyed a cooperative relationship with Mill Creek Blueberry Farm since 1987. The 70 acre field is six miles west of Nacogdoches, Texas and is characterized as a very deep sand. Drip irrigation is based on delivery at 12 gallons per plant per day. This field has been a treasure trove of production and climactic data - and has served as a great research platform for SFA's blueberry research effort. Varieties in the main field included Climax, Premier, Brightwell, Tifblue, and Powderblue. There are many new varieties coming on the scene and the early results are exciting. It's becoming obvious that East Texans will soon have a varietal mix that will allow fresh fruit from May to August.

**PLANTING** – Blueberries are generally spaced 4 to 6' apart in rows 12 to 15' apart. I generally recommend the wider spacing for Rabbiteyes, the closer spacing for Southern Highbush varieties. If possible, it's always best to remove all woody weeds from the site prior to planting. A crop of pearl millet or forage sudan be grown the year before planting – a high tonnage crop that shades the ground and kills many weeds and provides high organic matter content for the initial year of

establishment. In general, most growers plant one gallon plants, but bareroot plants are suitable if they are of suitable size. Care must be taken never to set plants too deep, a common grower mistake. Blueberries should be set at the level they grew in the container or nursery field. If possible, plants should be established in December or January.

**VARIETIES** - There are two types of blueberries adapted to East Texas: Rabbiteye blueberries (RE) and Southern Highbush (SHB). A good website via the University of Georgia that describes most varieties in commercial use today is:

[http://www.smallfruits.org/Blueberries/production/06bbcvproc\\_Nov0206.pdf](http://www.smallfruits.org/Blueberries/production/06bbcvproc_Nov0206.pdf).

Commercial fields in East Texas are based primarily on five varieties: Climax, Premier, Brightwell, Tifblue and Powderblue. Average production (lbs./acre) at Mill Creek Blueberry Farm in Nacogdoches, Texas (approximately 70 acres) over the last five years (2003-2007) is as follows: Climax (6530), Premier (6641), Tifblue (8132), Brightwell (12,063), and Powderblue (16,063). Alapaha and Austin in evaluation plots have performed well and are recommended for trials in commercial numbers. SHB (Southern Highbush) varieties are generally restricted to the southeastern portion of Texas. SHBs bloom and ripen a bit earlier than REs. SHBs smaller statured and prefer an extremely well-drained soil with good organic matter in the soil. Plants need a perpetual mulch. If spring frost damage is avoided they generally ripen in May, a time when prices are exceptionally high.

**SOIL** – In general, a sandy to sandy loam soil is preferred. More important, perhaps, is the surface and internal drainage characteristics of the soil. Blueberries like well drained soils. Heavier soils can be used but rows should be elevated into mild “berms” to improve drainage. The following data indicates the soil nutrient characteristics of superior fields and plants. If a soil has characteristics outside of these parameters, further study is warranted!

Table 1. Soil parameters associated with superior plants, 1986-88.

YEAR	pH	Cond	P	K	Soil PPM Ca	Mg
1986	4.6 5.1±	85	29	53 ± 22	232 ± 102	42 ± 15
1987	.3 5.2±	55±25	22±11	13±49	280±84	46±21
1988	.6	153±29	29±19	102±46	539±211	68±25
x	4.9±.5	92±70	27±16	52±37	325±123	50±20

YEAR	Na	Cu	Soil PPM Fe	Mn	Zn
1986	36±12	0.6±.4	86±80	29±30	1.0±1.4
1987	57±29	.5±.4	73±63	38±75	2.4±1.2
1988	37±11	.7±.8	129±121	30±41	3.0±2.1
x	43±18	.6±.5	92±84	32±48	2±1.5

**IRRIGATION** – In general, growers use drip irrigation to provide water during the growing season in East Texas. Growers generally design their fields to provide 8 to 12 gallons of water per plant per day. Care must be taken to place emitters at the plant – this is critical during the first year or two of establishment when root systems are small.

Table 2. Irrigation water parameters associated with superior plants, 1986-88

YEAR	pH	cond.(umhos/cm)	Ca	Mg	IRRIGATION WATER PPM	
					Na	Bicarb (meg/l)
1986	6.7±.9	178±190	15.2±26.9	4.3±6.8	10.5±12.5	.7±1
1987	7.3±1.1	182±209	15.9±31.7	5.1±6.2	13.2±16.3	.9±1.1
1988	7.2±.5	213±207	10.9±17.8	4.6±6.8	30.1±4.4	1.2±1.1
x	7.0±.9	188±201	14.4±26.3	4.7±6.6	16.3±19.3	.9±1.1

**FROST** – Spring frost is the number one problem facing growers. Blueberries tend to bloom at or near the time of the last few spring frosts. Temperatures below 28°F freezing can be devastating to open blooms. A high elevated north-facing slope is generally preferred (warm air rises, cold air sinks). A rolled and packed smooth surface is considered better than a grassed alley. Sprinkling for frost protection can protect blooms from freeze damage but conditions must be right (no to very little wind – good coverage - and low temperatures not lower than the capacity of the sprinkler system). A 60 gpm/acre rate will generally protect blueberries into the mid – twenties.

**PESTS** – When blueberries were first introduced, there were few problems with pests. As acreage increased, that no longer was true. Midges at bloom are a problem and spray applications may be necessary in the early season. then. At other times, sporadic pest problems may emerge. Mummy berry requires a spray program as well. Some fields more affected than others and some years are worse than others. Preventative sprays are important.

**FERTILIZING** – Blueberries do not need a high fertility rate. Many growers have switched to feeding plants via a drip irrigation system: fertigation. A rate of 3 to 5 lbs of N per acre per week during the growing season is a common recommendation and feeding at every watering is a prudent strategy. This provides a light steady rate of nutrients in the soil solution during the active growing season. Soluble sources include blueberry specials, ammonium sulfate (can be used to drive soil pH down), and urea generally keeps pH somewhat stable or at background levels. “Blueberry Special” fertilizers, while they cost more, are acid forming and also provide additional micronutrients. Growers should monitor pH and conductivities to keep levels within acceptable parameters. If granular fertilizers are used, it is important to keep fertilizer away from the crown. An ounce of fertilizer around the periphery of the drip line and distributed as uniformly as possible is a good practice. Leaf tissue analysis provides some indication of the health of plants. The following leaf tissue analysis describes the nutrient levels of healthy blueberry plants.

Table 3. Leaf tissue parameters associated with superior plants, 1986-88

LEAF TISSUE						
Year	Percent					
	N	P	K	Ca	Mg	S
1986	1.35±.16	.08±.01	.44±.11	.31±.05	.14±.03	.15±.02
1987	1.14±.09	.08±.03	.52±.06	.27±.09	.13±.05	.14±.02
1988	1.28±.13	.07±.01	.27±.07	.25±.05	.14±.05	.12±.03
x	1.26±.13	.08±.02	.43±.08	.28±.06	.14±.04	.14±.02

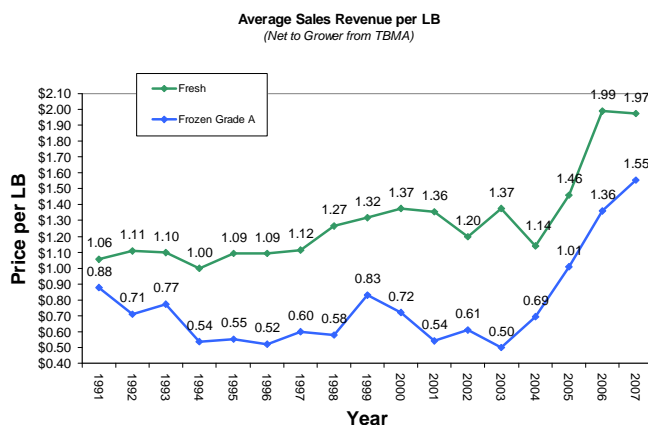
Year	PPM				
	Fe	Mn	Na	Zn	Cu
1986	87±111	81±38	84±52	84±52	NA
1987	133±243	75±101	75±101	161±286	.5±.3
1988	256±364	46±12	46±12	265±406	.5±.3
x	145±220	70±53	70±53	156±221	.5±.3

**HARVESTING AND PROCESSING** –

It is not within the scope of this article to fully analyze harvest and postharvest practices. In East Texas, one laborer can pick about 100 to 150 lbs in a day. An over-the row harvester can pick up to 20,000 lbs in a night (growers often harvest at night to have cooler blueberries going into the processing shed). Conventional processing sheds involve conveyor lines that allow workers to remove the off quality berries and trash. Technology is available to sort via color or softness.



**ECONOMICS** – Every field will have a different investment cost and a business plan should help point the way to profitability. The graph below describes the pricing pattern for blueberries since 1991 for one TBMA producer. Prices have been high in the last three years.



## **CONCLUSIONS**

Blueberries are an exciting alternative crop for East Texans. The economic picture has improved greatly in the last few years due to increased demand for both fresh and processed product, which has resulted in a strong price picture for growers.

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