form were contacted by telephone. Therefore, every county had a response. The agents were asked for a breakdown by type of blueberry (rabbiteye or SHB) and by variety. The response was excellent for type of blueberry but there was not sufficient information by varieties to report.

Results and Discussion

Figure 1 shows the number of commercial blueberry acres by type in the State and by 3 regions: (A) the area west of the Apalachicola River, (B) the north-central Florida area and (C) the area south of an east-west line drawn at the south end of Marion County. As was true in the 1985 survey (1), the 1989 survey showed the largest concentration of blueberries in north-central Florida, which had 1,363.0 acres. The area west of the Apalachicola River had 461 total acres, while the area south of Marion County had 282.5 total acres.

The total planted blueberry acreage for the state as of August, 1989 was 2,106.5 of which 1,434 acres were rabbiteye and 672.5 were SHB. The percentage of SHB varied greatly by region (Table 1). Region A had 38% SHB, Region B had 22% and Region C had 70%. This shows that, as was expected (2, 4), there was great interest in planting early-maturing blueberries in the southern area for the fresh fruit market. Increased interest in highbush blueberries in the southern region was further shown by Highlands County, which reported 2 acres in 1985 and 125 acres of SHB in 1989.

The percent increase in blueberry acreage is quite striking (Table 1). The total increase for the state from 1985 to 1989 was 99%, but the largest increase was in Region C with a 225% increase. In this region, 70% of the acreage was SHB. Region B still had the largest blueberry acreage in Florida with 1,363 acres, which was a 99% increase over 1985.

Alachua County still had the largest number of acres (727) of which 529 were rabbiteye and 198 were SHB. Gulf County was in second place, 310 acres, of which 150 were rabbiteye and 160 were SHB.

Table 1. Comparison of blueberry acreage by type and by region from 1985-1989.

Region	1989	AC	% SHB	1985 AC	% increase 1985-1989
A	SHB*	173.5	38	285	62
	R	287.5			
	Total	461.0			
B	SHB	301.5	22	685.7	99
	R	1061.5			
	Total	1363.0			
C	SHB	197.5	70	87	225
	R	85.0			
	Total	282.5			
A+B+C	SHB	672.5	32	1057.7	99
	R	1434.0			
	Total	2106.5			

*SHB = Southern Highbush, R = Rabbiteye

All counties in Region A had commercial blueberry production, and in Region B, only 2 counties, Dixie and Lafayette, did not report commercial blueberries. In region C, 17 counties did not report commercial production.

Blueberry acreage has continued to expand from less than 100 commerical acreas in 1973 (3) to 1,058 in 1985 (1) to over 2,000 in Florida in 1989. The acreage in the state should continue to increase because of the early shipping season and the excellent market window that Florida has for fresh market blueberries.

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COMPARISON OF PINE BARK MULCH AND POLYPROPYLENE FABRIC GROUND COVER IN BLUEBERRIES

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Abstract. **Sixteen advanced selection blueberry clones [8 highbush (*Vaccinium corymbosum*) and 8 rabbiteye (*V. ashei*) were planted in 14-plant plots at the Horticultural Unit in Gainesville, FL during January, 1987. Plants were spaced 1.5 m × 3.5 m. Half of each 14-plant plot was mulched with pine bark in a band 1 m wide × 5 cm deep, and the other half was planted into a .91 m wide band of polyfabric synthetic ground cover. Soil type of the site is Kanapaha fine sand, and 10 l of Florida peat was added to each hole at planting. The plants were fertilized 4 times per year with 12-4-8 plus 2% Mg blueberry mix and overhead irrigation was provided. After 2½ years, vegetative growth of most clones was better with the pine bark mulch, but some showed only slight differences between the treatments. Plant mortality was nearly equal in each treatment. Both the bark and the ground cover fabric held up well throughout the experiment and provided excellent in-row weed protection.**

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Polyfabric ground cover can help provide weed control during the difficult early years of a blueberry planting. Recent reports from both Australia and Texas favorably compare polyfabric to other forms of mulch, or lack of it, currently being used in those areas (1,2). This experiment was planted in January, 1987, at the Horticultural Unit near Gainesville to investigate the possible benefits of polyfabric mulch under Florida's conditions and cultivars.

Materials and Methods

The soil at the planting site is a well-drained Kanapaha fine sand with pH averaging 4.7 and about 2% organic matter. The native vegetation of this area is a north Florida upland hammock. Although such land can be suitable for blueberry production, high levels of calcium, phosphorous and aluminum, partially due to previous farming practices, make this site less than ideal for blueberries.

Eight clones each of advanced highbush and rabbiteye blueberry selections were planted in fourteen-plant plots. Although none of these test selections is a currently released cultivar, they represent a range of genetic backgrounds from which most Florida cultivars have been, or will be, selected. The plants were two-year-old rooted softwood cuttings dug bareroot from field nurseries on the day of planting. Variation in the size and general appearance of the different clones was considerable within both species, but care was taken to select uniform ramets of each clone at planting.

Prior to planting, the site was divided into 4 rows 12 ft apart, each containing 4 plots. Each plot was planted with 14 plants of one clone, and was split between treatments of pine bark and polyfabric mulch. The roll of polyfabric, donated by Chicopee Ground Cover, Cornelia, Ga., was .91 m wide and was easily laid down with a plastic film mulch applicator of the type commonly used in tomato and strawberry culture. Width of the machine was adjusted to bury the outside 10 cm of mat, leaving a 71 cm wide strip exposed. A nichrome hot-wire connected to a 12 v battery was devised and used to burn a 30 cm cross in the fabric for each planting hole to eliminate unraveling that can occur when the material is cut with a knife (1). About 10 l of Florida peat was placed in each plant hole.

After planting, the flaps of polyfabric around the plants were folded back tightly against the crown and a single shovelful of pine bark was placed over the cut to hold the flaps down. The remaining half of each plot was then mulched solid with a strip of fresh, course pine bark about 1 m wide and 5 cm deep.

Irrigation was provided by a preexisting overhead system that was used as needed during the growing season and occasionally for frost protection during the early spring. Water at the Horticultural Unit is from a deep well and contains: 60.1 ppm Ca, 13.7 ppm Mg, 6.8 ppm Na, and 4.04 meq/l bicarbonates, and has a pH of 8.0. The plots were fertilized 4 times a year with 12-4-8 plus 2% Mg granular blueberry mix scattered by hand on top of both mulch types around the drip line of the bushes.

Measurements of bush height, width and breadth were taken in the summer of 1989 after 2½ years of growth. The product of these measurements was calculated for bush volume. Ten of the original 224 plants had died. The dead plants were fairly evenly distributed among the clones and treatments, and their measurements were excluded from the mean calculations. Soil samples from each half-plot were collected, screened through a No. 25 U.S. standard sieve, and analyzed for pH, mineral concentrations, and organic matter content. Soil temperatures at both 5 and 15 cm depths were measured beneath polyfabric and pine bark mulches during August, 1989.

Table 1. Overall means for plant height and volume.

	Bark	Fabric	p
Height (cm)	129	120	.0367*
Volume (m^3)	1.97	1.41	.0005**

*,** Bark mean differs from fabric mean at 5% and 1% levels, respectively, according to F-test.

Results and Discussion

Overall means for both height and volume were significantly greater in the pine bark treatments (Table 1). Although the treatment means for height only differed by 9 cm, plant width and breadth contributed to a much greater difference between treatment means for volume. Greater width and density of the pine bark-mulched plants was apparent upon casual observation in many of the plots.

Clones differed considerably in their response to the pine bark and polyfabric mulches (Table 2). Many of the clones, especially among the highbush selections, did not differ significantly for plant height between treatments, although the pine bark mulch produced wider and broader plants in all but two of the plots. The notable exception was highbush selection 85-15, which grew considerably larger on the polyfabric mulch. Highbush selection 85-13 was the only clone that showed no significant difference in either plant height or volume between the two mulch types.

Statistical values in Table 2 were generated by completely randomized block analysis to compare the individual clonal responses to mulch type. Mulch types, however, although randomly assigned to either half of each plot, were not randomized to individual plants within the plots. Thus the effects of any soil differences between the two halves of each plot cannot be separated from mulch treatment effects in comparing plant performance within individual clones.

Soil analysis revealed significantly higher calcium concentrations under the polyfabric as compared to the pinebark mulch (Table 3). Organic matter, pH, phosphorous, potassium, and aluminum levels were not significantly

Table 2. Average heights and volumes by clone.

Clone	Height (cm)		Volume (m^3)	
Rabbiteye	Bark	Fabric	Bark	Fabric
84-96	117	113 ns[z]	1.92	1.73 *
84-106	155	129 **	2.68	1.65 **
80-25	135	124 ns	2.59	1.24 **
80-17	142	119 *	2.64	1.37 **
84-104	113	110 ns	1.50	1.03 **
85-17	126	96 **	2.48	1.00 **
85-16	118	101 **	1.87	1.42 **
84-86	129	131 ns	2.52	1.80 **
Highbush				
77-3	145	136 ns	1.64	1.48 *
85-12	138	132 ns	2.08	1.63 **
85-13	124	138 ns	1.85	1.86 ns
84-41	108	113 ns	1.37	1.21 *
85-15	117	136 *	1.08	1.26 *
83-132	117	103 ns	1.70	1.21 **
73-2	145	136 ns	1.64	1.48 *
84-40	134	108 **	1.47	.85 **

[z]Not significantly different at 5% level according to t-test.
*,**Significantly different at 5% and 1% levels, respectively.

Table 3. Soil analysis means for 16 plots for each mulch type.

	Polyfabric	Bark	
pH	4.8	4.6	ns[z]
% organic matter	2.13	2.08	ns
Ca ppm	391	166	**
K ppm	18.1	17.2	ns
P ppm	119	118	ns
Al ppm	558	569	ns

[z]ns Not significantly different at 5% level.
*,** Significantly different at 5% and 1% levels, respectively.

Table 4. Average afternoon soil temperatures under pine bark and polyfabric mulches.[z]

Depth	Polyfabric	Bark
5 cm	35.8°C	32.5°C
15 cm	31.1°C	28.7°C

[z]Temperatures recorded daily at 3:00 PM and averaged over a 20-day period in August, 1989.

affected by mulch type. Evaporation of the high-calcium (ca 60 ppm) irrigation water is the probable source of increases *in soil calcium* during the 2½ year experiment (3). Since irrigation rates with the overhead system were virtually identical for both treatments, it is possible that higher evaporation rates were responsible for more rapid calcium buildup beneath the polyfabric mulch. Soil temperature readings averaged for twenty days in August, 1989 (Table 4), were substantially higher under the polyfabric mulch treatments than under the bark mulch. The relatively uninhibited circulation of air beneath and throughout the woven polyfabric fibers may also have facilitated rapid evaporation of irrigation water.

Although high calcium levels are generally undesirable for blueberries, soil pH was relatively unaffected by the calcium concentration differences between the pine bark and polyfabric mulched plots. Thus, lower calcium levels are probably only partially, if at all, responsible for the superior growth achieved in the pine bark mulched plots.

Perhaps the most important field observation in contrasting these mulch types was the proliferation of shallow, matted feeder roots throughout the zone of interface between the pine bark mulch and the soil. The particles of decomposing pine bark in this zone were almost completely screened out of the soil samples in preparation for analysis, but they are apparently fine enough to provide a moist, well aerated medium for blueberry root development.

Both mulches provided satisfactory, durable, in-row weed control and prevented soil compaction around the root zone. Maintenance of a weed-free strip along the borders of the mulched rows was easily accomplished with contact herbicides which prevented encroachment of rhizomatous weeds. Planting was somewhat slower in the polyfabric mulch since the cutting of holes and removal of soil from the fabric surface required extra time. This effort is probably balanced, however, by the labor required if pine bark mulch is spread by hand.

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THE FLORIDA CLIMATE AS IT RELATES TO BLUEBERRY PRODUCTION

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Abstract. **Mild temperatures from January through April in south-central Florida offer the possibility of producing blueberries (*Vaccinium* species) well before the start of the blueberry season in established blueberry-growing areas farther north. However, late-winter cold waves that produce temperatures below 28°F between 15 January and 1 April are potentially devastating to blueberry flowers and fruit, and frost-protection systems are needed on most sites. Low rainfall and high percentage of possible sunshine from January through May favor production of early-ripening blueberries in the Florida peninsula, but heavy rains in June and July cause problems during harvest of late-ripening rabbiteye cultivars. Mild winters in most of the Florida peninsula make it necessary to plant low-chill cultivars bred especially for the state. Because blueberries grow best on peat or sandy-peat soils where heavy rains can cause flooding, good drainage and raised planting beds are needed for growing blueberries in most areas in Florida. Neither strong winds nor hail are likely to be regular problems with Florida blueberry production.**

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The cultivated blueberry industry (Table 1) has arisen almost entirely during the past 60 years (4). Acreage, production, and consumption have all increased rapidly throughout this period. During recent years, blueberry cultivation has been spreading to new areas of the country, including Florida.

Florida's first blueberry plantings were made between 1887 and 1930 when enough wild rabbiteye (*V. ashei*) plants were transplanted from the woods to plant 2225 acres in cultivated fields (8). This enterprise was unsuccessful due to poor markets. Improved rabbiteye blueberry cultivars were planted in Florida after 1960, at first for pick-your-own marketing and later for the fresh-fruit shipping market. The first low-chill highbush cultivars (largely *V. corymbosum* × *V. darrowi* segregants) were released by the University of Florida in 1976 and 1977 (13) and after