culturing. Unthrifty trees should be removed from the orchard. Pruning from tree to tree should be done after tool sterilization. Limbs girdled by the twig glidler, *Onsideres cingulatus* Shay, should be removed and burned to help control this insect (6). Freeze damage may encourage decline. Some cultivars appear to be more prone to this decline than others. The recommended cultivars appear to have less decline.

Conclusions

The demand for persimmon fruit is currently greater than production. Non-astringent types could be easily introduced into the marketplace creating a greater demand. The cultivars 'Izu', 'Matsumoto Wase Fuyu', 'Ichikikei Jiro', 'Fuyu' and 'Suruga' could be used to supply a market from late September to mid-November. Freeze damage may limit the life of orchard production to 10 years. Three to 4 cover sprays with a fungicide/insecticide timed at full bloom, 1 month later, in late August and frequently in late September will improve performance and tree life.

Acknowledgements

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'HOMESTEAD', A SUPERIOR GUAVA FOR FRESH MARKET AND FOR PROCESSING

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Abstract. **In 1945 G. D. Ruehle made crosses between the 'Ruby' and 'Supreme' cultivars of guava. The progeny were grown in the field at the Tropical Research and Education Center, Homestead. Two trees bearing red-fleshed fruit were selected for their superior characteristics of production and fruit quality. The selections were similar in all respects except that one had more ascorbic acid than the other. Both were propagated by air layering and tested at many locations in Florida and in other states and countries.**

One of the selections, originally designated as Ruby × Supreme 6-29, is described in this paper as the cultivar, 'Homestead'. The tree produces large crops of superior fruit. The fruit is large, with a thick pulp and relatively few seeds. The pulp is red and sweet, with excellent flavor and texture. Acidity is low, making this a good fruit for the fresh market. It is also desirable for processing into guava shells and other products.

The guava, *Psidium guajava* L., is an important fruit throughout the tropics and warm subtropics. It is harvested from wild trees and is cultivated on farms of all sorts, from the most primitive subsistence farms to those of the largest multinational agricultural companies. The fruit, rich in vitamins and minerals, is consumed fresh and processed into many products (5, 8, 10).

The guava is native to Tropical America. It was introduced to Florida in 1847 (5) and became naturalized in the southern part of the state. The usefulness and nutritive value of the fruit were quickly recognized by the local population, who harvested fruit from both wild and cultivated trees. For a long time most of the available fruit was small, acid and seedy, the product of unimproved seedling trees (8).

When the University of Florida Subtropical Experiment Station (now Tropical Research and Education Center, TREC) was established at Homestead in 1930, one of its main objectives was the improvement of fruits important to the people of Florida, including the guava (2, 3, 4, 8, 9). During the late 1930's and the 1940's seeds and plants of good selections of guava were introduced from many countries of the tropics and planted at TREC. The best of these were used in a breeding program which produced numerous guava cultivars. They included acid types, intended primarily for processing (1, 3, 4, 9), and sweet types, intended for fresh consumption as well as processing (2, 3, 4, 9). This paper describes the 'Homestead' guava, one of the products of the TREC fruit improvement program.

Origin

In 1945 G. D. Ruehle used hand pollination to make crosses between the 'Ruby' and the 'Supreme' guavas, two cultivars he had selected previously (3, 6). The 'Ruby' had a sweet, red-fleshed fruit and the 'Supreme' had a sweet, white-fleshed fruit. A severe hurricane that year damaged the guava plantings at TREC severely and destroyed all of the fruit but one from the hand pollinations. The seeds from that fruit were planted and produced 150 seedlings, 130 of which were planted in the field at TREC in 1946.

About 60 percent of the trees produced red-fleshed fruit; the remainder produced fruit with flesh which was white or pale shades of yellow or pink (3,6).

Yield records were taken and fruit quality was evaluated periodically. The majority of the trees produced large crops of high-quality fruit. Several were determined to be superior to both parent cultivars. In the early 1960's the two best trees producing sweet, red-fleshed fruit were selected. They were designated as 6-29 and 10-30, according to their location in the original planting. They were similar in all respects except that 6-29 had more ascorbic acid in the fruit than 10-30 (12). The selections were propagated by air layering and planted in a trial at TREC, with 3-tree plots replicated 5 times. Planting material was also distributed to persons at many other locations in Florida and in other states and countries, where the trees proved to be highly productive and were considered to have fruit of excellent quality. One of the selections, tested as 'Ruby' × Supreme 6-29', is described in this paper as the cultivar, 'Homestead.'

Description

Tree. The canopy of a mature, unpruned 'Homestead' guava tree growing in full sun will reach a height of 7-8 m and a spread of 8-9 m. Florida growers prefer to use periodic manual or mechanical pruning to limit the trees to a height of 4-5 m and a spread of 5-6 m, to facilitate cultural care and harvesting. The leaves are opposite, light green, and elliptic to oval in outline. They are 10-15 cm in length and finely pubescent on the lower side.

Flowers. The flowers are ca 2 cm in diameter, with white petals, many long, prominent stamens, and a single pistil. The flowers are borne singly or in clusters of 2 or 3 in the axils of leaves on the green, 4-angled branchlets of recent growth.

Fruit. The external color of the fruit is bright yellow. The skin is thin and the fruit surface varies from smooth to slightly undulating. The pulp is red, the intensity varying according to weather conditions prevalent during fruit maturation. In relatively dry weather the red color is darker than in rainy weather. Weather conditions also affect fruit flavor, with fruit maturing in rainy weather apparently less sweet than fruit maturing in drier weather. Analysis of fruit of this cultivar in 1982 by high-performance liquid chromatography (h.p.l.c.) indicated 3.18% total sugars (12). Field determinations of fruit samples in August 1989 by hand refractometer indicated 6.8-7.7° Brix. Organic acid analysis by h.p.l.c. in 1982 indicated 0.29% total acidity (12). Ascorbic acid content was 0.12%, making this cultivar a good source of vitamin C. It is also a good source of calcium, phosphorus, and carotene (11). Pulp texture is smooth and uniform. The fruit wall varies in thickness from 1.0 to 1.8 cm, with an average of ca 1.2 cm. Fruit of medium size (150g) have ca 300 small uniform seeds, the total weight of which is ca 4g. The seeds are virtually the only part of the fruit which is discarded in processing, so there is little waste involved.

The fruit is nearly always radially symmetrical, but fruit shape varies considerably in longitudinal section, even among fruit from the same tree. The shape varies from spherical to ellipsoid to broadly pyriform, with the ellipsoid shape normally predominant. Fig. 1 illustrates some actual fruit shapes, diameters and weights. Table 1 presents weight, diameter and length data on a sample of fruit taken in 1989.

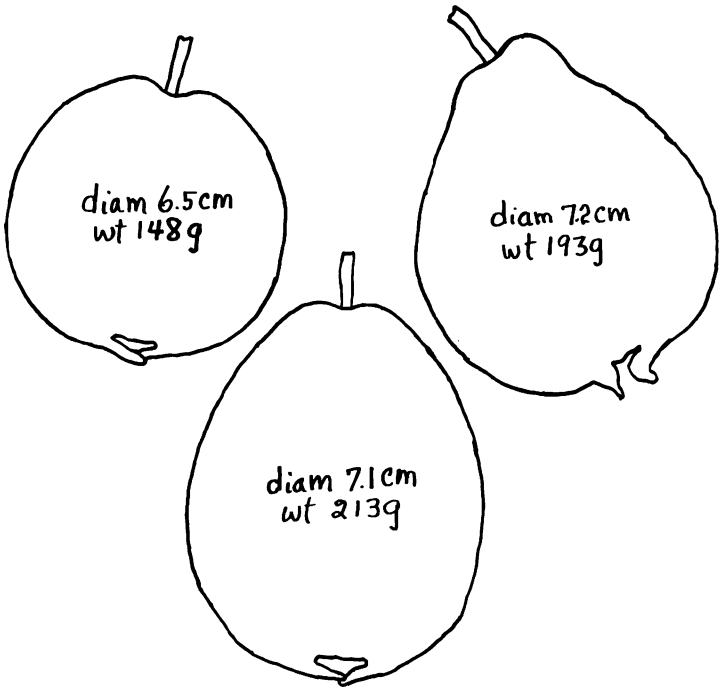

Fig. 1. Shapes, diameters and weights of typical 'Homestead' guava fruit, August, 1989.

Fruit Production

In Florida, the 'Homestead' guava produces a small crop of fruit in May and the main crop of the year in August and September. The fruit takes about 90-100 days to develop from bloom to maturity. Some fruit matures at other times, especially during the period January to March, but production at those times is small and is not dependable.

It has been demonstrated in various countries that off-season flowering can be induced in guava trees by such practices as light pruning or chemical defoliation, procedures which force the formation of vigorous, succulent new shoots (10). Grower trials with the 'Homestead' guava in Florida have given some success in flowering control. Light mechanical pruning in the fall, removing only small branchlets, induces a flush of new growth, which produces bloom in a few weeks and a crop of fruit in the early spring. Summer pruning has not been successful in producing a larger winter fruit crop in Florida. Chemical defoliation with spray applications of urea has not been successful in inducing off-season flowering in Florida.

Good selections of guava produce large crops of fruit in Florida. The 130 trees of the Ruby × Supreme seedling

Table 1. Dimensions of a 50-fruit sample of 'Homestead' guava fruit, TREC, Homestead August 1989.

	Diameter (cm)	Length (cm)	Weight (g)
Low	4.7	5.3	63
Mean	6.3	7.2	154
High	8.0	9.0	292

Table 2. Fruit production of original tree of 'Homestead' guava, TREC Homestead.

Year	Tree age	Number of fruit	Fruit wt (kg)
1951	5	914	117.1
1953	7	796	90.4
1954	8	2992	374.3
1955	9	1652	234.7
1957	11	1227	213.4
1958	12	1013	162.5
1959	13	2723	402.7

population from which the 'Homestead' was selected produced an average of 100 kg of fruit per tree in the 5th year after planting, and some trees ultimately produced more than 450 kg per year in favorable years. Table 2 presents data on fruit production of the original 'Homestead' tree from the 5th through 13th years after planting. These trees were planted at a wide spacing (7.6 × 7.6 m or 170 trees/ha) to prevent competition between trees and facilitate taking individual yield records. Most commercial plantings have a tree spacing of 7.6 × 4.6 m or ca 286 trees/ha. It is reasonable to expect mature trees at that spacing to produce average yields of 180-200 kg of fruit per tree annually, or 21-23 T/ha. A substantial amount of fruit would be culled out prior to packing for sale on the fresh market, so yields for that purpose would be lower than yields of fruit intended for processing.

Harvesting and Utilization

The 'Homestead' is an excellent guava for fresh consumption. Fruit for the fresh market should be picked by hand from the tree, handled carefully, kept cool and taken to the packinghouse as quickly as possible. If the fruit is to be shipped to distant markets it should be mature, full-sized and of firm texture, but without an obvious color break on the surface. Fruit for local use can be harvested in a more advanced stage of maturity.

Fruit for processing can be picked by hand or shaken from the tree. Fallen fruit can be picked up from the ground, but it would be better to use some sort of catching frame, to prevent the fruit from being contaminated with soil, debris and microorganisms.

The 'Homestead' fruit has a thick pulp and good color and is excellent for the processing of guava shells, which are canned in heavy syrup. This cultivar can be used for puree and for juice as well, but processors usually prefer more acid selections for these products.

Propagation

The 'Homestead' guava does not come true from seed, so vegetative propagation is necessary to reproduce the cultivar. The favored method for propagation of trees for field planting in Florida is air layering (4, 7). Various forms of graftage can be used also. Veneer grafting of green, quadrangular scions with well-developed buds has given the best success in Florida. Trees can be propagated from greenwood cuttings, but the method is not used much in Florida (4, 7).

The 'Homestead' guava is sold at times in plant nurseries in southern Florida, usually under the name 'Ruby × Supreme.' Nurserymen or growers who wish to start stock plants can obtain a small amount of propagating material from the University of Florida, Tropical Research and Education Center, 18905 S.W. 280 Street, Homestead, Florida 33031.

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SURVEY OF SOUTHERN HIGHBUSH AND RABBITEYE BLUEBERRIES IN FLORIDA

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Additional index words. Vaccinium ashei, Vaccinium corymbosum, Southern Highbush.

Abstract. **The acreage of blueberries (*Vaccinium spp.*) has continued to increase in Florida. This increase was determined by a survey in the Spring of 1989 of the commercial blueberries grown in each county of Florida. The results showed that the acreage increased from 1057.7 in 1985 to 2106.5 in 1989. Total acreage was 1434 for rabbiteye blueberry and 672.5 for Southern Highbush. The area west of the Apalachicola River had 461 acres or a 62% increase from 1985, the north-central area had 1363 acres or 99% increase from 1985 and the area south of Marion County had 282.5 acres or 225% increase from 1985.**

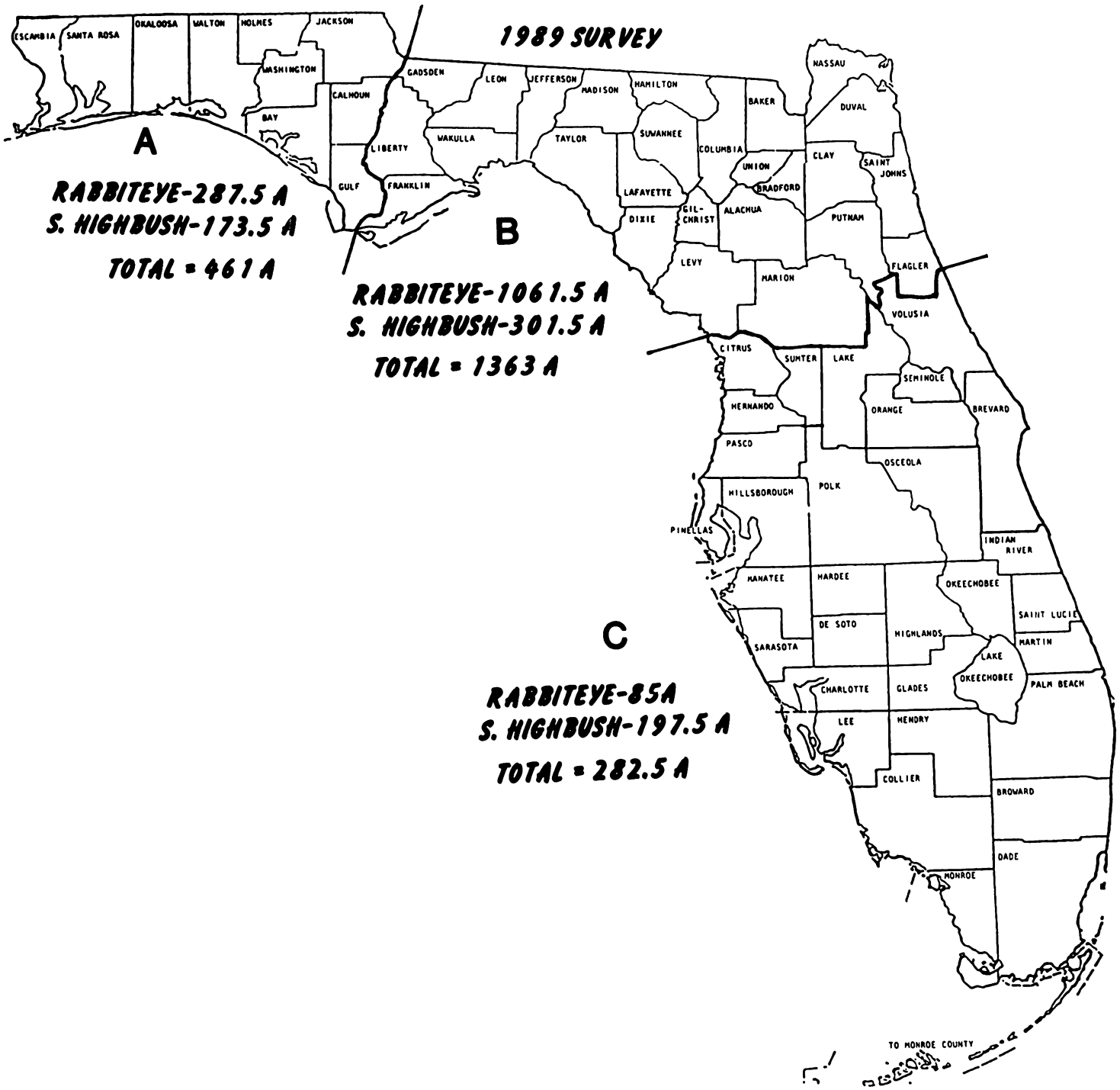

Fig. 1. Acres of southern highbush, rabbiteye and total blueberries by region in Florida.

The last survey of bluebrry acreage in Florida, which was done in 1985, gave the acreage for blueberries, both rabbiteye and Southern Highbush (SHB) as 1,057.7 (1). Since 1985 there has been an increased interest in blueberry production in the state, primarily because of the shipment of early blueberries as fresh fruit to world markets (2,4). Florida is the only supplier of fresh blueberries in commerical quantities from mid April to mid May.

The authors had observed increased plantings of blueberries, especially the Southern Highbush (SHB). Many of these plantings were in the southern range for blueberries (below Marion County) because the berries ripen earlier in that region and higher prices were being received for the fruit (2, 4).

Materials and Methods

Early in 1989, a survey form which asked for the number of acres of blueberries grown in the county was sent to the county extension agent or horticultural agent in each country where blueberries are cultivated in Florida. The response rate was very good, and a reminder mailed to those counties that had not responded further increased the response rate. Counties that did not return the survey

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.**

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

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