2 had 5-10 acres, and 8 had more than 10 acres. The largest reported acreage owned by one grower in Alachua County was 85 acres. Blueberry acreage is expected to increase tremendously in the Alachua County area this year with a large quantity of plants already propagated for planting. In the State as a whole, planting size varied from a quarter of an acre up to 207 acres.

These data established a benchmark of where blueberries are grown in Florida as of 1985. We expect further growth in the north central Florida area and in the area west of the Apalachicola River. Further work needs to be done to determine the cultivar composition of Florida’s plantings, and to see how many are rabbiteyes and how many are highbush. We expect that most increases in production in the southern part of the State (that area south of Marion County), beyond the 87 acres already reported, will be due to the highbush types.

From less than 100 acres of commercial blueberries in 1973 (4), Florida acreage has now expanded to over 1000 acres. Because Florida has an excellent market window at the beginning of the shipping season and can market fresh blueberries before the season begins in other blueberry-producing states, we expect that acreage in the State will continue to increase.

**Literature Cited**


**PROGRESS IN LOW-CHILL PLUM BREEDING**

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**Abstract.** At this time there are no high fruit quality, disease resistant, low-chilling Japanese type plums (Prunus salicina Lindl.) available for north and central Florida. The breeding program at Gainesville is combining low chill germplasm from Taiwan, high fruit quality from USA temperate zone cultivars, and resistance to bacterial leaf spot and plum leaf scald from the USDA Byron, Georgia breeding program. Two selections, Fla. 8-2 and Fla. 3-4, have been given the local names ‘Gulfruby’ and ‘Gulfgold’, respectively. Nine additional selections are in evaluation stages.

Japanese plums, Prunus salicina, and their hybrids with North American species have been tested in central and northern Florida for many years with disappointing results (2,3,4). Lack of low chilling adaptation, poor fruit quality, and susceptibility to bacterial spot, incited by Xanthomonas campestris pv. pruni (Sm) Young et al., and plum leaf scald, associated with a rickettsia-like organism, have been major factors limiting plum growing in Florida. ‘Bruce’, ‘Mariposa’, and ‘Excelsior’ are among the lowest chilling plums but fruit poorly in central Florida except following the coldest winters, and they lack either high fruit qualities or disease resistance, the latter resulting in a short tree life of 4 to 7 years. ‘Methley’ and ‘Ozark Premier’ have low chilling adaptation to north Florida and are grown for dooryard fruit, but have failed as commercial cultivars because they lack fruit quality or are short-lived due to diseases. Florida needs early ripening plums in order to avoid fruit rot diseases during the rainy season which begins in mid-June. Resistance to rust, incited by Tranzschelia pruni-spinosae (Pers.) Diet. which results in early fall defoliation, is readily found in plums (1).

An added problem with plums is self-unfruitfulness, making it essential to have 2 pollen compatible cultivars with similar chilling requirements and overlapping bloom periods to insure cross-pollination. Self-unfruitfulness arises from either pollen incompatibility as in ‘Ozark Premier’ and ‘Burbank’ or pollen sterility as in ‘Bruce’ and ‘Mariposa’.

A plum improvement program was begun in the Fruit Crops Department at Gainesville in 1966 to search for available germplasm with breeding potential among available Japanese-type plums (5). The most promising low chill germplasm came from a seedling selection resulting from a P. salicina seed importation from Taiwan. This yellow-skinne selection had approximately 100 chilling units (1 chilling unit = 1 hour of chilling at an optimum temperature usually thought to be near 7°C), had 25g fruit, and

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lacked the bitterness or astringency found in the skin of native plum species. Pollen from this selection was used to develop hybrids mostly with ‘Ozark Premier’, but also with ‘Burbank’, ‘Methley’, ‘Beauty’, and ‘Bruce’. About 500 F1 (first generation hybrid) seedlings were obtained and planted for fruiting. Chilling requirement among the F1 ‘Ozark Premier’ seedlings was about 300 chill units with little variation, indicating that both parents were homozygous at chilling loci. Six of these F1 seedlings were selected based on fruit size, fruit quality, crop load, and low chilling requirement. Selections were budded on root-knot nematode resistant peach seedlings planted together in isolation, allowed to interpollinate, and seed were harvested from each clonal selection. The resulting interpollinated generation of about 1000 F2 seedlings (second generation) was planted and upon fruiting only 8 F2 plants were saved because they had good fruit quality. The remaining seedlings with poor fruit quality were pulled. The following year seed were harvested from the 8 trees that interpollinated, resulting in about 1000 F3 seedlings (3rd generation). Again, selected F3 trees were saved because they had good fruit quality and the remaining seedlings were removed. The selected F3 trees were allowed to interpollinate, and about 1000 new F4 seedlings were obtained (4th generation). These fruited in 1985, resulting in 3 trees exhibiting early ripening and high fruit quality that were propagated, plus 9 other trees selected for use in additional breeding.

Following initial hand pollination the plum cultivar improvement program has largely relied upon cross-pollination enforced by self-unfruitfulness. This hybridization was followed by selection among progeny for outstanding individual seedlings and clonal propagation of these selections. This breeding scheme has provided maximum response with minimum effort and expense in plum variety improvement.

Some attempts have been made to incorporate additional germplasm into the breeding program. Selections from the 2nd, 3rd, and 4th generations of the program were budded on standard peach stocks as were P. texana Dietr. and some advanced disease resistant selections from the USDA-Byron, Georgia plum program. These were planted in isolation for evaluation and hybridization. Five hybrid and about 50 second generation seedlings involving P. texana were produced. The F2 had a high degree of fruitfulness but showed only slight variation for plant and fruit characteristics, being more similar to the F1 than to either parent. Both P. texana and its hybrids had small, soft fruit which cracked at ripening. Trees with P. texana parentage were highly susceptible to twig cankers caused by bacterial leaf spot. Thus all progeny from this parent were discarded. The USDA-Byron selections resistant to leaf scorch and twig canker should fruit in spring 1986 and hybrids by open pollination with the low chill selections should be obtained.

Self-fertility is desirable in Japanese type plums and the development of a screening method to test selections for this character would substitute for the self-fertility test made in screenhouses by hand pollination. Albino seedlings were found in germinating open-pollinated seed of selection Fla. 79-3 at near a 1:3 ratio in 2 different seed lots; 13 of 51 in 1979 and 74 of 272 in 1981. No albino progeny were obtained from any other selections. It may be that Fla. 79-3 is self-fertile and is heterozygous for an albino receive allele. Self-fertility is known among Japanese-type plums (‘Beauty’, ‘Methley’, and ‘Santa Rosa’), but we have not confirmed self-fertility in Fla. 79-3 nor the genetics of the albino character.

Current clonal selections from the plum breeding program vary from 200 to 400 chill units, ripen from early May through 10 June, and fruit size ranges from 35 to 60g. Red fruit skin color and bright yellow to orange and red flesh color are predominant, sweet flesh with no bitterness or astringency has been emphasized, and more recently, preference has been given to a higher degree of fruit firmness in the breeding program. There are 9 new selections being evaluated for resistance to leaf scald and twig cankers.

Two older selections, Fla. 8-2 and Fla. 3-4 have been propagated in recent years and sold in central Florida as ‘Gulfruby’ and ‘Gulfgold’, respectively (Table 1). ‘Gulfruby’ requires about 250 and ‘Gulfgold’ about 350 chilling units but representative trees overlap enough in bloom in most years to give adequate fruit set. Trees are likely to be productive for only 4 to 7 years due to leaf scald and twig canker. Peach with root-knot nematode resistance (Nemaguard or Nemared) is the recommended rootstock for plum in Florida. Neither ‘Gulfruby’ nor ‘Gulfgold’ will be released for commercial trial. They may have a place in the home gardens of central Florida because no better cultivars with low chilling adaptation are available.

It is expected that several of the best clonal selections on hand will merit cultivar status or that another generation of hybridizing with more disease resistant germplasm from Auburn University in Alabama and USDA-Byron, Georgia will produce hybrids with appropriate disease resistance.

Literature Cited

Table 1. Average performance of Fla. 8-2 (‘Gulfruby’) and Fla. 3-4 (‘Gulfgold’) plums at Gainesville, Florida 1978 to 1985.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Selection no.</th>
<th>Chill* units</th>
<th>Fruit wt.(g)</th>
<th>Skin color</th>
<th>Flesh color</th>
<th>Flesh acidity</th>
<th>Bacterial spot rest.</th>
<th>Leaf scorch rest.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulfruby</td>
<td>Fla. 8-2</td>
<td>250</td>
<td>45</td>
<td>red</td>
<td>yellow</td>
<td>high</td>
<td>susceptible</td>
<td>moderate</td>
</tr>
<tr>
<td>Gulfgold</td>
<td>Fla. 3-4</td>
<td>350</td>
<td>65</td>
<td>yellow</td>
<td>yellow</td>
<td>low</td>
<td>moderate</td>
<td>susceptible</td>
</tr>
</tbody>
</table>

*Estimated, based on bloom dates.