lous. It was found that when the bark is removed from the limb, the wood is quite brittle and the weight of the large leaves causes the branches to snap quite easily during the slightest wind. Attaching small bamboo splints outside the wrapped marcot eliminates this problem. The use of a "Fog-Box" or mist-type propagator has not proven very successful, especially with new wood consisting of growing tips from terminal and lateral branches. Wood, two to three years old, is showing more promise of success. It is proposed to try a method of propagation used in Jamaica and Trinidad, whereby mature wood is buried in moist sand and the young sprouts arising from adventitious buds are removed with a large heel and then potted.

Coconut (Cocos nucifera)

Since coconuts are not grown extensively in the Bahamas as a plantation crop and are used especially in Nassau for ornamental purposes, it is felt that if dwarf coconuts were used more extensively, they would be less susceptible to hurricane damage. Experimental blocks of two dwarf forms which produce yellow and green nuts have been established. These plants bear nuts three to four years after the seedling is set out and may eventually reach a height of ten to fifteen feet. It has been noted that these dwarf forms show vigorous growth response to applications of fertilizer. The golden coconut is also being propagated for ornamental purposes.

Citrus (Citrus sp.)

Citrus are propagated at the Experiment Station for distribution throughout the Colony. Marked improvement has been noted in the past two years in run-down trees which have been given two to three applications per annum of a nutritional spray consisting of copper, zinc and manganese. The sprays were coupled with applications of fertilizer in spring, early summer and fall.

Papaya (Carica papaya)

The Hortus Gold papaya has proven very prolific in the Bahamas, and the fruit is of good quality. Its medium height makes it very desirable since it is less subject to wind damage. A red-fleshed variety from Colombia has also been tested. This variety takes two to four months longer to fruit than the Hortus Gold, and the quality of the fruit varied greatly with day length.

Miscellaneous Tropical Fruits

Local selections have been made of White Sapote (*Casimiroa edulis*), Sugar Apple (*Annona squamosa* L.) Custard Apple (*Annona reticulata*), Genip (*Melicocca bijuga* L.) and Barbados Cherry (*Malphigia glabra*).

During the past two years, some of the better Florida selections of sub-tropical fruit such as Black Sapote, Loquat, Macadamia Nut, Mysore Raspberry, Red Ceylon Peach, Mabolo, Woolly Leaf White Sapote, Canistel, Lychee, Sweet Carambola, Antidesma, Jaboticaba and hybrid Guavas have been introduced. These selections will be used as standards by which to judge local selections of tropical fruit.

The writer would like to take this opportunity of publicly thanking the Sub-Tropical Experiment Station, Homestead, the Morton Collectanea and Botany Department of the University of Miami, the Florida Agricultural Experiment Station, Gainesville, and Mr. A. R. Caves and Mr. Robert G. Newcomb of Homestead, all of whom have been most helpful in supplying plant material or technical advice to the Experiment Station at Nassau.

HORTICULTURAL DEVELOPMENT OF FLORIDA BLUEBERRIES

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This paper discusses the possibilities, limitations, and present stage of development of some of the blueberry species of Florida. For those interested in culture and general information on blueberries, excellent information is available elsewhere (5). Contrasted with Coville's breeding work (3) with northern species which began in 1909, the first breeding work with a Florida species was apparently the crossing of two rabbiteye blueberry selections by the U. S. Department of Agriculture in 1940 (6). With a wealth of native material in Florida, and improvement

Florida Agricultural Experiment Station Journal Series, No. 193.

possibilities demonstrated in northern species and elsewhere, this crop appears of outstanding interest for breeding work.

The blueberry species of North America and their interrelationships have been described in a recent monograph by Camp (2). He describes 5 diploid species, 5 tetraploid species and 2 hexaploid species to be found in Florida. Nine of these species are confined mostly to North Florida, while three are to be found about as far south as suitable acid-soil types exist in the state. Natural hybrids occur commonly between species of the same chromosome number and possibly to some extent between species of different chromosome number where they grow close together. Darrow and Camp (4) found no well marked sterility barriers between homoploid species, and reported several successful heteroploid species crosses.

Of the several Florida species, three seem of particular interest as of horticultural value. They are discussed separately, using the species names given by Camp (2).

1. *Vaccinium ashei* Reade. Common name: Rabbiteye blueberry. Hexaploid. Most common in northwest Florida. This species was dug from the wild and extensively planted during the period 1920 to 1930. Some of the history of this promotion and observations on cultural requirements were made by Mowry and Camp (7). It has been estimated that 3500 acres were planted with this species, mostly in northwest Florida (4). Most of the plantings still survive and produce considerable fruit; but commercially the venture has been a failure. One of the principal difficulties has been the small fruit size and the variable quality and production of a high percentage of these wild seedlings. The result has been excessive harvesting costs and a mediocre, non-uniform product, judged by the standards set by northern highbush varieties.

Since 1940, the U.S.D.A. and the Georgia Coastal Plains Experiment Station have cooperated on a large scale breeding and selection program with this species. Their first step was to obtain the better individuals from seedling plantations, mostly in the West Florida area. Their initial crosses between two such selections, Myers and Black Giant, resulted in release in 1950 (6) of the first two named varieties of this species to come from controlled breeding. These new varieties are Coastal and Calloway and at least one additional selection, 9-112, is being considered for possible future release (1). All of these represent considerable improvement over either parent or over any material of this species previously known. Vegetative propagation is slow, but they can be increased by cuttings, and several small plantings of these improved varieties have been made. More recently, a large number of seedlings have been fruited at Tifton, Georgia, from crosses of Calloway and others by Satilla, a very blue-fruited selection from southeastern Georgia. This group of seedlings shows further improvement in fruit size, color and quality characteristics. Several of the seedlings produce fruits over 5/8-inch in diameter, of excellent blue color and of high quality. Extensive testing is needed to determine the best selections, their range of adaptation, and full usefulness; but in due course of time, superior named varieties should result.

Such improved varieties should be very valuable to home and local market producers in the northern part of Florida. From tests and observation we know that for good climatic adaptation, rabbiteye blueberries require 250 or more hours below 45 degrees F. during the dormant season. Some varieties need still more chilling than this for good growth and fruiting. Based on tests thus far, no varieties can be recommended for planting much south of the Gainesville area; and at least one variety, Calloway, has been rather unsatisfactory in all areas of Florida. Possibly, an inherent drawback for full commercial use of rabbiteye varieties is the late season of ripening. Requiring about 30 more days from bloom to ripe fruit than early varieties of the northern highbush, they begin to ripen at about the same time as the commercial crop in North Carolina. They are more tolerant of drought than northern varieties, are very heavy producers and can be grown on clay and other soil types not considered suitable for the northern varieties. Their future role in the commercial blueberry industry of the U.S., however, must await study and further development of production.

2. *Vaccinium myrsinites* Lam. Common name: Florida evergreen blueberry, also often called Huckleberry. Tetraploid. Widespread in Florida, this species grows as far south as Miami and Naples. It has been crossed with northern highbush varieties, which are also tetraploid. Since northern highbush varieties

require about 800 or more hours below 45 degrees F. during the dormant season and are much more critical in their soil and moisture requirements, first generation hybrids might be expected to be poorly adapted to southern conditions.

Unfortunately, tests of second generation material of such a cross have apparently not been made in the Deep South. The first generation seedlings under observation at Tifton (1) have died after a few years. Superior selections of *V. myrsinites* may still be of value because they are tetraploid and offer a method of introducing the high fruit quality of northern varieties. Its fruit is usually black or near black and selections so far observed have not been especially early ripening. For these reasons, other ways of improving the range and quality of Florida blueberries appear of more promise as noted below.

3. *Vaccinium darrowi* Camp. Common name: Darrow's evergreen blueberry. Diploid. Mostly blue fruited, some markedly so, this species is found extensively in central Florida. Usually small fruited, some plants produce fruit up to 9 mm. in diameter of good quality. Since 1950, the author has been interested in selection of outstanding wild plants of this species for use in crosses with the best varieties of *V. ashei*. It was possible to make the first crosses in 1952, using three selections. In 1953, ten selections were used as the female parent in crosses with Coastal, Calloway and other selections of *V. ashei*.

Initial objectives of these crosses are tetraploid seedlings which might serve as foundation material for further breeding work. Eventual objectives are good blue-fruited evergreen plants with much wider adaptation than the presently available horticultural varieties of *V. ashei*. Both species can stand considerable drought, are accustomed to warm humid summers and mild winters and the seedlings should show good climatic adaptation. Though most selections were found to take nearly as long as *V. ashei* to mature fruit, one ripened its fruit in 64 to 72 days from pollination. This offers promise that earlier ripening selections might also result from use of this material.

Some rather striking specimens of possible ornamental value have been noted in this species. In several selections, younger leaves are very glaucous, and one selection develops a pronounced reddish coloration during cool weather. The plants are usually under three feet in height at maturity. Leaves are small, evergreen and densely arranged when grown in full sun. Combinations of these characters with improved fruit size would produce a valuable plant for both ornamental and fruiting use.

SUMMARY

Striking progress has already been made in the development of horticulturally promising blueberries of the rabbiteye type, *V. ashei* of north Florida. The use of other species, especially *V. darrowi*, in extending the range and usefulness of blueberries in Florida appears a promising field for further breeding work.

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TWO NEW FRUITS FOR SOUTH FLORIDA

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Florida is still far from exhausting the possibilities for introduction and testing of new fruits. New ones are gradually being added to the already long list of species that have been found to be adapted or promising enough to be included for trial in Florida gardens. Two such promising new species are *Antidesma dallachyanum* Baill. and *Dovyalis abyssinica* (A. Rich.) Warb. They are included in the 1953 revision of the bulletin "Miscellaneous Tropical and Sub-Tropical Florida Fruits" (Fla. Agr. Ext. Ser. Bull. 156).

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