

ADAPTATION TRIALS OF TROPICAL AND SUBTROPICAL FRUITS ON SANDY SOILS IN BROWARD COUNTY, FLORIDA

C.W. Campbell,¹ J. Popenoe,² and H. Y. Ozaki³

¹*Assistant Horticulturist, Sub-Tropical Experiment Station, Homestead.*

²*Associate Horticulturist, Sub-Tropical Experiment Station, Homestead.*

³*Assistant Horticulturist, Plantation Field Laboratory, Fort Lauderdale.*

Since the establishment of the Sub-Tropical experiment Station in 1930, there has been a continuous program of testing of tropical and subtropical fruits for adaptation to culture in south Florida. Most of the testing has been done in the limestone soils of the Rockdale series in Dade County. In 1953, R. B. Ledin and J.L. Malcolm, of the Sub-Tropical Experiment Station, established a planting of tropical and subtropical fruits at the Plantation Field Laboratory, Port Lauderdale, for the purpose of testing various fruit introductions for adaptation to the soils of that area. This planting has been supervised and maintained until the present time by personnel of the Sub-Tropical Experiment Station and the plantation Field Laboratory.

The soil in this area is designated as Pompano and Delray fine sand. The trees were planted in two-row beds with drainage ditches between the beds. During much of the year, the water table is maintained less than 24 inches below the surface of the soil.

In the establishment and maintenance of the planting, an effort was made to eliminate as many variables as possible, so that all species would receive the same treatment. Uniform fertilizer applications were made yearly. No minor element applications were made. The plot was mowed several times a year, and grass and weeds were hoed away from the plants once or twice a year. Frosts occurred several times, frequently causing the loss of young plants. The effects of frost were assumed to be nearly uniform over the plot.

The most variable factor has been the water content of the soil. The water table was often high enough that a difference of a few inches in planting height made the difference between survival or death of small plants. This factor was much less important in the case of well-established plants with extensive root systems. All plants were set in the soil as early in the rainy season as possible, so that they might be well established before the dry season began. Plants were irrigated at the time of planting, but not thereafter. Many young plants which made little growth during the first season after planting died from the effects of drought during the following winter.

These trials included 3-tree plots of 61 species of tropical and subtropical fruit. All were planted between 1953 and 1955, with the exception of 7 species which were planted in 1956, and 4 species which were planted in 1957. Regular observations have been made on growth, flowering, and fruiting.

Thirty-five species have survived to the present time, have grown well and fruited

consistently, and are obviously well adapted to culture at the Plantation Field Laboratory. These include :

Achras sapota
Antidesma dallachyanun
Artocarpus hypargyraea (planted 1956)
Artocarpus integra (planted 1956)
Butia capitata
Carissa carandas
Diospyros discolor
Dovyalis hebecarpa
Dovyalis "hybrid" (*abyssinica* x *hebecarpa*)
Eleagnus philippensis (planted 1956)
Eriobotrya japonica
Eugenia aggregata
Eugenia dombeyi
Eugenia jambos
Eugenia luschnathiana
Eugenia uniflora
Euphoria longana
Feijoa sellowiana
Flacourtia indica
Litchi chinensis
Macadamia ternifolia
Malpighia glabra
Mangifera indica
Muntingia calabura
Myrciaria cauliflora
Myrica rubra
Phyllanthus emblica (planted 1956)
Pouteria campechiana
Psidium cattleianum
Psidium guajava
Rhodomyrtus tomentosa

Spondias cytherea (planted 1956)

Syzigium cumini

Tamarindus indica

Zizyphus mauritiana

Fifteen species have survived to the present time, but have not flourished. These are listed in Table 1, with possible reasons for their failure to thrive. It should be emphasized that some of the species did not grow well because of mechanical injury. Without further evidence, it obviously cannot be concluded that these species are not well adapted to culture in sandy soils.

Table 1. Species which have survived up to 1962 at Plantation Field Laboratory, but have failed to thrive.

Species	Year planted	Possible reasons for failure to thrive
<i>Annona muricata</i>	1954	Repeated cold injury
<i>Annona reticulata</i>	1955	Repeated cold injury
<i>Annona squamosa</i>	1953	Repeated cold injury
<i>Antidesma bunius</i>	1955	Nutrient deficiency (perhaps zinc)
<i>Blighia sapida</i>	1953	Mechanical injury
<i>Carissa grandiflora</i>	1955	Mechanical injury
<i>Casimiroa edulis</i>	1955	Not apparent
<i>Chrysophyllum cainito</i>	1953	Repeated cold injury
<i>Clausena lansium</i>	1953	Nutrient deficiency
<i>Dovyalis caffra</i>	1957	Not apparent
<i>Flacourtia cataphracta</i>	1957	Repeated cold injury
<i>Garcinia livingstonei</i>	1957	Not apparent
<i>Melicocca bijuga</i>	1954	Repeated cold injury
<i>Persea americana</i>	1953	Water injury
<i>Triphasia trifolia</i>	1954	Mechanical injury, water injury

Eleven species have not survived to the present time. They are listed in Table 2, with possible reasons for their death. Death was often caused by a combination of factors.

It may be concluded that the adaptation planting¹ has accomplished its purpose by demonstrating that many uncommon tropical and subtropical fruits will grow well in the sandy soils in the area of the Plantation Field Laboratory with a minimum of care and protection from low temperatures. Many of the species which have died or failed to thrive can undoubtedly be made to grow well in this area if careful attention is paid to cold protection, fertilization, and soil moisture. These observations are offered as an addition to the data that have been collected over the years by private individuals, nurserymen, and other research organizations on the performance of these species in South Florida.

Table 2. Species which have failed to survive at the Plantation Field Laboratory.

Species	Year planted	Year died	Possible reason for death
<i>Anacardium occidentale</i>	1956	1957	Nutrient deficiency, cold injury
<i>Averrhoa bilimbi</i>	1953	1954	Cold injury, drought injury
<i>Averrhoa bilimbi</i> replant	1954	1955	Cold injury, drought injury
<i>Averrhoa carambola</i>	1954	1956	Cold injury, nutrient deficiency
<i>Canarium ovatum</i>	1955	1956	Cold injury
<i>Coffea arabica</i>	1956	1958	Cold injury
<i>Diospyros ebenaster</i>	1954	1957	Water injury, cold injury
<i>Dovyalis abyssinica</i>	1954	1956	Nutrient deficiency
<i>Flacourtia inermis</i>	1957	1958	Cold injury
<i>Pouteria caimito</i>	1955	1956	Cold injury
<i>Prunus persica</i>	1953	1954	Rootknot nematode injury
<i>Prunus persica</i> replant	1955	1956	Rootknot nematode injury
<i>Rubus albescens</i>	1953	1954	Water injury
<i>Rubus albescens</i> replant	1954	1955	Water injury

SUMMARY

In 1953, a planting of tropical and subtropical fruits was established at Plantation Field Laboratory, Fort Lauderdale, for the purpose of testing their adaptation to the sandy soils of that area. Sixty-one species were included in the planting. Thirty-five species have survived to the present time (1962) and are obviously well adapted to culture in the area. Fifteen species have survived, but have not grown well, and 11 species have not survived. Possible reasons for this are presented.

Florida Agricultural Experiment Stations Journal Series No.1552.