CARIBBEAN FOOD CROPS SOCIETY

37

Thirty Seventh Annual Meeting 2001

Trinidad and Tobago

Vol. XXXVII

Proceedings of the Caribbean Food Crops Society. 37:351-352. 2001

THREE NEW EXOTIC TROPICAL FRUITS FOR CALCAREOUS SOILS

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ABSTRACT: Three newly-introduced tropical fruit species have shown excellent potential in a minor fruit field evaluation project conducted on a calcareous soil (pH 8-9) at the University of the Virgin Islands Agricultural Experiment Station. Black Sapote (BS), *Diospyros dignya*, also called Black Persimmon and Chocolate Pudding Fruit is native to Mexico and represents the only member of the Persimmon family to grow in the tropics. Twenty–year old trees have been fruiting for the last 10 years without pest/disease or nutrient deficiency problems on a calcareous soil. Normally growing to over 30 m tall these trees have been naturally dwarfed by the marl subsoil and yet show no deficiency symptoms. Yields of 100 fruits /tree with an average of 685 g/fruit, 54 % pulp and Brix of 24% have been obtained with each fruit having 2 seeds. Demonstrations at local agricultural fairs and field days have generated great interest in the several ways in which the BS can be utilized. The Egg Fruit (EF), *Pouteria campechiana*, also from Mexico is known alternatively as Canistel, Yellow Sapote and Penny piece. In its native habitat, the EF can grow well over 15.2 m but on a calcareous soil rarely gets over 3-5 m with some trees bearing in 3 years at 1.5-2.0 m. Yields average 70 fruits/tree with a fruit wt of 630 g, width 10.3 cm, length 10.9 cm, 92 % pulp, and a Brix of 24.6 %. The vigorous, pest- and nutrient deficiency-free growth of EF coupled with its multitude of food uses has made it quite popular in the VI. Finally, the Wax Jambu (WJ) or Wax Apple, *Syzygium samarangense* from Malaysia and East Indies has also adapted well with its short compact growth habit, pest- and nutrient deficiency-free nature and yields of 1000 fruits/tree. Fruits of the WJ average 62 g and are 55 cm wide and 52 cm long with almost 100% pulp and 11.9 % Brix. The WJ makes an ideal substitute for its close relative the Malay Apple, which does not tolerate high pH and dry local conditions.

MATERIALS AND METHODS

Forty species of tropical fruits including Black Sapote, Egg Fruit and Wax Jambu were imported from certified nurseries in Puerto Rico (Jardines Eneida, Inc., Cabo Rojo, PR) and Florida (Hopkins Nursery, Ft. Lauderdale, FL) in 3 gal pots. Starting in 1997, plants were transplanted to a 2 ac site- soil type Fredensborg clay loam with a calcareous subsoil having a pH of 8-9. Because of the calcareous nature, the site was prepared under minimum tillage taking care not to expose any subsoil. Plants were set out in rows of 5 plants at a spacing of 20 ft x 20 ft and planting holes made by a tractor-operated post hole digger. A preplant herbicide (Roundup) was applied in a circular band 2-3ft around each hole and inter row grass controlled by mowing at regular intervals. After planting, a drip irrigation system of micro sprinklers (8-10 gal/hr) was installed and water applied at ½ hr/day by battery operated timers. Pest control was done as needed and plants were given a monthly application of 12-12-12 with minor elements starting at 1oz/plant. Growth was recorded as trunk diameter and plant height and fruit characteristics recorded as plants fruited. An average of 10 fruits were sampled for size measurements, pulp and seed %; sugar content (Brix%) was monitored using a portable digital refractometer. Leaf analysis was also carried out after 1 year's growth and average chlorophyll measurements made with a Minolta Spad-501 chlorophyll meter.

RESULTS AND DISCUSSION

Black Sapote, Egg fruit and Wax Jambu were among those that showed good growth as reflected by stem diameter and plant height measurements. Considerable variation in fruit size was noted from small small-fruited species such as West Indian Cherry to those with large fruits such as Eggfruit,

Carambola, Sapodilla, and Black Sapote. Pulp % varied from 100% in Wax Jambu and Fig to lower values in the highly seeded fruits such as the Guavas and W.I Cherry. These are important characteristics when fruit species are being considered for preservation or processing. Sugar content as reflected by Brix% was highest for Black Sapote (24.9) and Egg fruit (24.6) as compared with the more acidic fruits such as W.I Cherry (8.7) and the medium sweet fruits such as Fig (14.3) and Wax Jambu (11.9).

Table 1 ranks the species according to their tolerance to calcareous soil condition, in terms of growth vigor, incidence of pest and diseases and their lack of minor element deficiency symptoms. Although several species showed good tolerance to high soil pH, Black Sapote, Egg fruit and Wax Jambu were exceptional remaining green throughout the year with no deficiency symptoms and almost pest- and disease-free. In addition these calcitrophic species were prolific bearers ranging from 70, 100 and 1000 fruits/tree for Egg fruit, Black Sapote and Wax Jambu respectively. Although new to the Virgin Islands these fruits have had good consumer acceptance so far with their attractive appearance and variety of uses appealing most to consumers. In the case of Wax Jambu, this fruit has special appeal to Virgin Islanders who have migrated from surrounding Caribbean islands where they are more familiar with the closely related Malay Apple or Pomerac. Unfortunately, the latter species tolerates moderately high pH soils and only grows and produces with the continuos application of minor elements particularly Fe and Mn. The pomerac also cannot tolerate drought conditions which predominate in the VI. On the contrary the Wax Jambu produces well under dry conditions and on calcareous soils. It has therefore become a real substitute for the Malay Apple in the VI.

Table 1. Relative Tolerance of Minor Fruits to Calcareous Soil.

Tolerant	Médium Tolerance	Intolerant
Atemoya	Grumichama*	Lanzón
Black Sapote	Star Apple	Lychee
Custard Apple	Surinam Cherry*	Governor Plum
Coconut	Guava (Indonisian Sedles, Indian Red)	Inga (Ice Cream Bean)
Egg Fruti	Carambola*	Jaboticaba
Fig (Magnolia, Brown Turkey, Ashia)	Cattley Guava	Cashew
Jamaica Plum	Cherry of Rio Grande*	Rose Apple
Strawberry Tree	Soursop	Jackfruit
Sapodilla	Malay Apple*	
Sugar Apple		
Wax Jambu (red and pink)		
West Indian Cherry		

* Respond to applications of trace elements.