Synsepalum dulcificum

Daniell

Sapotaceae

LOCAL NAMES
English (sweet berry,miracle berry,miracle fruit); French (fruit miraculeux)

BOTANIC DESCRIPTION
S. dulcificum is a slow growing evergreen shrub or tree to 5.5 m. in its native habitat, rarely reaching 4 m elsewhere

Leaves simple, alternate 3-5 leaves clustered at branch tips, deep green, leathery, elongated (10.16-5.24 cm long) growing in a spire-like habit. Both regular and large-leaf and a hairy-leaf form exist with eight pairs of lateral or side veins.

Flowers small (2.5 cm long), white, produced in flushes and borne in clusters in the leaf axils through many months of the year.

Fruit a small, fleshy, single-seeded, ellipsoidal, bright red berry 2-3 cm long, sweet with a mild pleasant after-taste. It has the unique ability to change the taste buds so that, for an hour or more after eating it, everything sour or bitter tastes sweet. Seed large with a hard, shiny testa.

BIOLOGY
Miracle berry fruits produce the first crop in about 4 years. Flower to fruit takes 3-4 weeks. Dormant phase generally lasts 4-6 weeks. In the native habitat, two large crops are available yearly, each after a rainy season. The mature bushes, usually have a few fruits hanging all year round.

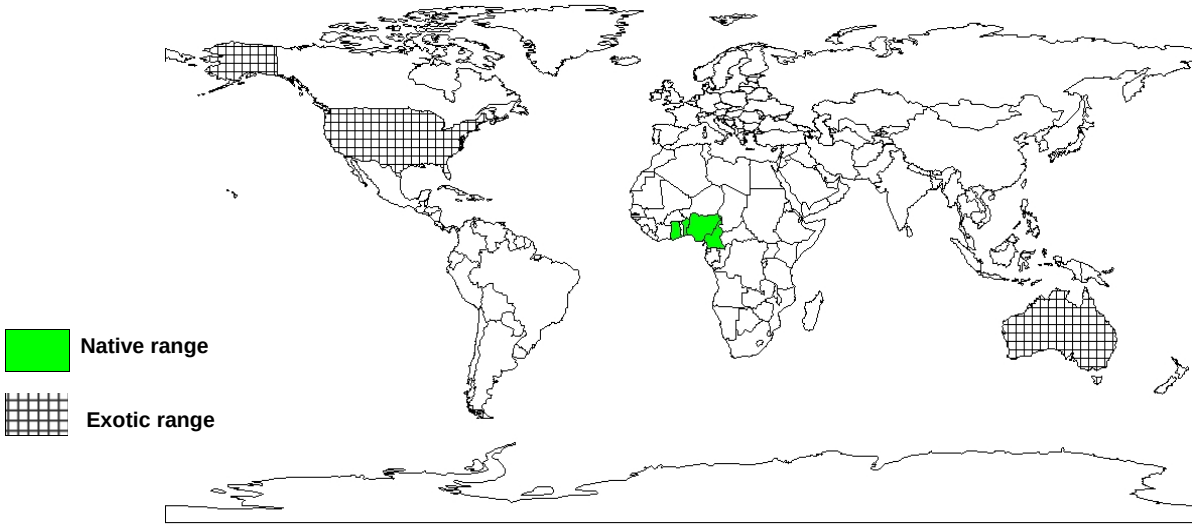
Habit at Maui, Hawaii (Forest & Kim Starr)

ECOLOGY
Hot, wet tropical lowlands. Prefers damp localities, e.g. along rivers. It thrives under warm temperatures and high humidity.

BIOPHYSICAL LIMITS
Altitude:
Temperature: Tolerates minimal frost when full grown (up to 1.7° C) but does best in partial shade.
Rainfall: 1200 mm.
Soil type: Prefers moist, acidic soils of pH 4.5-5.8. In alkaline soils the plant slowly dies back until virtually only the stems remain.

DOCUMENTED SPECIES DISTRIBUTION

Native: Benin, Cameroon, Democratic Republic of Congo, Ghana, Nigeria
Exotic: Australia, Jamaica, Panama, Puerto Rico, US



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

PRODUCTS
Food: A relatively tasteless berry with an amazing side-effect. After eating one miracle fruit, sour things will instantly taste sweet. The berries contain a unique glycoprotein, miraculin. It only removes the sourness 'acidity' from what one eats, the natural aroma and taste remains. The effect lasts an hour or two and should be eaten immediately on picking since the effectiveness in changing the taste buds is lost if refrigerated for a day or so. It has been used to sweeten bitter medicines and palm-wine. It is potential of interest as a natural food sweetener.

Fuel: The wood is used as firewood.

Other products: The twigs are used as chew sticks.

SERVICES
Ornamental: Miracle berry makes an excellent container plant. It may be kept pruned to the height that one desires and makes a unique bonsai. The attractive oval leaves are green with some wine stain. It is often grown around dwellings.

TREE MANAGEMENT
Since the plant's native tropical climate is humid, the miracle berry need to be planted in a well drained soil, and as an indoor plant, the roots should be allowed to fill the container before transplanting into a larger one. Misting the leaves with water helps maintain high humidity. Water soluble fertilizers should be applied sparingly depending on the growing season with more frequency during summer months. Generally, there is no need to prune the miracle fruit plant.

GERMPLASM MANAGEMENT
Seed viability is short and the storage behaviour is recalcitrant. To transport cleaned seed, it should be packaged in plastic bag enclosing a slightly moistened toweling. Seeds that are allowed to dry can be transported or kept for at least two weeks but rapidly loose their viability.

With appropriate treatment seeds can store for up to 1 month at 20ºC. To break dormancy, the seeds should be scarified or soaked for 24 hours and stored at temperatures above 21ºC and not allowed to dry out before planting immediately. This produces a germination rate of at least 50%. Germination period is between 7-21 days with a hardiness temperature for germination being -1ºC.

PESTS AND DISEASES
Miracle berry is prone to mealy bugs, spider mites and other indoor potted plant pests. Specific pests include Anastrepha suspensa (Caribbean fruit fly), Bactrocera neohumeralis, Bactrocera tryoni (Queensland fruit fly), Ceratitis capitata (Mediterranean fruit fly). Waterlogged plants succumb to root rot.

FURTHER READNG

Cagan RH. 1973. "Chemostimulatory Protein: A New Type of Taste Stimulus," Science, Vol. 181.

Facciola S. 1990. Cornucopia - A Source Book of Edible Plants. Kampong Publications. Vista, CA.

Hong TD, Linington S, Ellis RH. 1996. Seed storage behaviour: a compendium. Handbooks for Genebanks: No. 4. IPGRI.

Keay RW. 1989. Trees of Nigeria. Claredon Press Oxford.

Martin FW, Campbell CW & Ruberte RM. 1987. Perennial edible fruits of tropics: an inventory. US Department of Agriculture, Agriculture Handbook No. 642. 252 pp.

Rehm S. 1994. Multilingual dictionary of agronomic plants. Kluwer Academic Publishers.

Tripp N. 1985. 'The Miracle Berry"; Horticulture 63: 58-72. - A story about an attempt to develop the miracle berry as an artificial sweetener including industrial intrigue and the very high stakes in the artificial sweetener industry.

Wiersema JH & León B. 1999. World economic plants: a standard reference. CRC Press, Florida, USA.

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestree Database:a tree reference and selection guide version 4.0 (http://www.worldagroforestry.org/af/treedb/)