

in Arthur E. Christy's "The Asian Legacy and American Life," published in 1945 by the John Day Co., N. Y.

It is reasonable to believe, in line with that recorded by Li and Chou, that Mr. Brewster in preparing plants for shipment to this country would choose this variety. Strangely he gives no varietal names in his information presented to the United States Department of Agriculture. Moreover the physical and chemical data covering the Chen family purple as worked upon by Li and Chou, compares strikingly with that which we know regarding the "Brewster."

Li and Chou say that at least nine-tenths of the crop in Henghwa is composed of the Chen-tze lychee, which was undoubtedly the variety sent to America by Brewster. It is further significant to the development of the Chen-tze or "Brewster" lychee in Florida that Ts'ai Hsiang in his writings recorded as many as 12 forms of this variety or class known in Henghwa as the Chen family purple.

Quoting Ts'ai Hsiang: "The Chen-tze variety of lychee originated when the first members of the Chen family cleared the land and established their home. The

low-lying sections of this land were filled in and leveled off, after which the lychee trees were planted. Some say that the extraordinary fertility of this land is responsible for the good quality of this variety. At present when other people obtain this seed and plant it in a fertile place, they do not obtain such a good fruit." Thereafter follow 11 other varietal names related to the Chen-tze, being color names, with brief descriptions of the merits or demerits of the respective types.

The lychee is extremely variable in its fruit characters. Here in Florida we can expect new strains out of "Chen-tze" or "Brewster." And the possibilities for lychee varieties by further explorations in China and cooperation with the Chinese almost is endless. To extend the southern range of its culture in the Americas lychee studies should extend into southern Kwangtung, Hainan, Indo-China, Siam, Burma, and India. Fortunately we now have in the Chen-tze lychee, largely through the interest and efforts of the late Reverend Brewster of Henghwa, one of the very best lychee varieties for a northern, subtropical range area, such as Florida.

THE KARANDA AS A COMMERCIAL FRUIT

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It is always interesting to watch the development of a new fruit being brought into commercial use. Many of the tropical fruits, especially the bush fruits, are still being propagated from seed. This is due to a lack of outstanding forms among these seedling plants as

well as to a lack of commercial use for the fruits.

This paper is given to draw attention to one of these miscellaneous tropical fruits that now appears to have commercial value. I refer to the *Carissa carandas*, Linn. commonly known in its native country, India, as the Karanda.

Early mention is made of the Karanda in several European horticultural papers

as an ornamental hothouse plant. Nicholson's "The Illustrated Dictionary of Gardening" published in London in 1884 describes the plant as—"Fl. milky-white, Jasmine-like; corymbs terminal and axillary, few flowered. July Lvs. ovate, mucronate or elliptic, obtuse, glabrous; spines often two-forked. Sub-arborescent. Ht. 15 ft. to 20 ft. India, 1790. (L.B.C. 663 (Loddiges C) Botanical Cabinet, London. 1812-33. 20 vls." In Bailey's "Standard Cyclopaedia of Horticulture" the same general description is given. Mention, however, is made of the fact that the corolla is twisted to the left in the bud. This is a distinguishing feature as the corolla twists to the right in the true *Carissa* sp. Bailey also mentions the fruit as being the size of a cherry, reddish in color and pleasantly flavored.

In "Plant Foods of the Philippines" Wester describes two species: *C. carandus*, the Karanda, "with roundish oblong black fruits of about the size of the ciruela but with dark red acid flesh;" the other smaller-fruited one "*Carissa carandas* var. *dulcis*, the Perunkilla" is described as "egg-shaped or roundish fruits about the size of a small cherry, containing a subacid juicy pulp of pleasant flavor." Illustration is also given of the two forms which are readily recognized among our own plants as seedling variations rather than distinct species.

In our own experience with this fruit in south Florida there has been evident a great deal of variation; one batch of seedlings, of seed from a single plant, will produce a great variety of types in foliage, productivity, size, and quality of fruit. We had found it advisable to bring the plants to fruiting before offering them for sale, due to a large percentage of poor quality fruits of undesirable

flavor among the seedlings. In general, the seedlings fall into two main types, the larger-sized acid fruit with 3-6 fruits in a cluster, and the smaller subacid type with 6-10 fruits in the cluster. The small subacid fruits are pleasant to eat out of hand, although most of them contain a latex that coats the lips.

Until recently we have given no more than casual attention to the Karanda in our nursery work. We have used the fruit in our home for several years for jelly and as a fruit juice for punches, and for flavoring ice cream and sherbets. It has been very difficult to propagate this plant asexually; tip cuttings do not strike roots readily nor were our efforts at ground or air-layering sufficiently successful for nursery work, especially with a casual fruit for home use not greatly in demand.

During the past year two things have happened to give a different aspect to the situation. About a year ago we gave some of the juice to a soda fountain operator who became interested in it and has successfully worked it up into a very good soda fountain syrup. There is now a demand for the Karanda flavor at this soda fountain but the supply is not yet up to the demand. The other thing that has happened to influence the value of this fruit is the use of plastic wrappings for air-layering. The Karanda is slow in forming roots but this method of marcotting now makes it possible to propagate selected high quality forms true to type. With a possible market for the juice and a successful method of propagation we are now in a position where selection of desirable fruiting forms of this plant becomes essential. It is hoped that anyone with a high quality strain of this fruit will report it to the variety committee of

this Krome Memorial Institute, or to the Subtropical Experiment Station, for examination as a possible horticultural variety.

The plant is slow to become established in the small size, but on becoming established, the growth is strong. The growth is spready with a tendency to produce long slender water sprouts from the base of the plant. For better fruiting it should be planted on well-drained soils that are inclined to be dry; on wet soils the vegetative growth becomes very rank to the detriment of fruiting.

The best fruit is borne on the slender mature twigs of the less vigorous branches. Careful pruning will be necessary to restrict the strong water sprouts and to keep the plant in workable control. The plant is a straggly shrub and may be pruned as an individual bush or trained on a trellis or low wire fence as a vine. In either case, a pruning practice will have to be worked out in the event of commercial plantings.

The flavor of this fruit is very agreeable. A larger form of the subacid type, with a minimum of latex, could become

valuable as a table fruit. In the meantime it may be considered only as a fruit for processing. It is difficult to handle the juice expressed direct from the ripe fruit because of the latex present in the fruit. The juice must be extracted by boiling in order to separate the latex.

The plant flowers heavily in spring and matures the main crop during the early summer. It continues fruiting spasmodically throughout the summer until late fall. It sometimes bears off-season fruits during a mild wet winter.

In "The Food Plants of the Philippines" Wester gives the following analysis, or percentages, for the fruits of the two types:

Karanda (large acid fruit)—Water 83.17; Ash 0.78; Crude fiber 1.81; Protein 0.66; Fat 4.63; Carbohydrates 0.51; Sugar 7.35 Acidity as citric 2.09; Calories per kilo of food 753.

Perunkilla (smaller subacid fruit)—Water 83.24 Ash 0.66; Crude fiber 0.62; Protein 0.39; Fat 2.57; Starch trace; Carbohydrates 0.94; Sugar 11.58; Calories per kilo of food 745. (1 kilo equals 2½ lbs.)

PHYTOPHONA SEEDLING BLIGHT, A NEW DISEASE OF FLORIDA AVOCADOS

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A new disease of Florida avocado seedlings was discovered in October 1947, in a large commercial nursery near Princeton. Nearly all of approximately 4,000 seedlings were attacked to some extent. The disease affected mainly the leaves but it also caused stem lesions

which sometimes resulted in breaking of the stems. The plants were rendered unsuitable for grafting, and the scions of plants already grafted were attacked and frequently killed. The seedlings, grown from the seed of several varieties, showed no observable difference in reaction to the disease.

The most conspicuous symptoms were present on matured leaves as large, irregular reddish-brown necrotic areas