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**Sugar palm
[*Arenga pinnata* (Wurmb.) Merr.]**

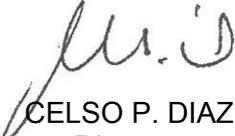
Compiled by

Helen B. Florido
Priscilla B. de Mesa

Foreword

Sugar palm is popularly known as kaong (*Arenga pinnata*). Although considered as a minor forest species, it provides two important food products: the sweet kaong gel and vinegar. These products have great potentials for export. Kaong gel is a very popular ingredient for salad and can be eaten alone as dessert, while kaong vinegar is processed from the sweet sap. It is becoming popular especially in Indang, Cavite where the palms abundantly grow. Kaong vinegar is classified as one of the best because the processing method used by a local manufacturer is similar to that for a brand of worldwide popularity. At present, raw material supplies rely on the available natural stand. To ensure a steady supply, there is a need to establish kaong plantations.

With this issue goes our encouragement for those who wish to invest in kaong plantations. May this manual provide useful information.



CELSO P. DIAZ
Director

Common name: Sugar palm (English): kaong (Pilipino)

Local names: bagatbat (Negros Oriental); cabo negro (Spanish-Filipino); black rope; hebiok (Capiz); hidiok (Camarines, Albay, Capiz, Antique); ibiok (Capiz, Negros Occ., Bohol); igok (Antique); irok (Zambales, Cavite, Tayabas, Mindoro); kaong (Manila, Rizal, Cavite, Laguna); kauing (Bataan); onau-onau (Misamis, Surigao); rapitan (Ilocos province).

Scientific name: *Arenga pinnata* (Wurmb.) Merr.

Family: Arecaceae

Description

Sugar palm (*Arenga pinnata*) reaches a height of 12 to 15 m and a diameter of 40 cm upon reaching the maturity age (more than 15 years). It has long ascending pinnate leaves up to 8.5 m in length with 100 or more pairs of linear leaflets. Once maturity is reached, huge fruit clusters begin to appear. The male flower, in a dense cluster of 4 ft long is purple and has an unpleasant odor. The female flower clusters are longer than the male and ripen very slowly into glossy, brown, plum sized fruit. Each new flower cluster is borne on a leaf axil. When flowering reaches the lowest leaf axil and the fruit ripens, the entire spectacle ends and the plant dies. Since each flower takes about 2 to 5 years to become a ripe fruit, fruits are always available on the trees during this period. *Arenga pinnata* has very numerous, crowded green nuts, which turn yellow when mature. Fruits are about 5 cm in diameter and contain 2 to 3 seeds.

Distribution

The species can be found in Luzon (Rizal, Cavite, Bataan, Laguna, Quezon), Polillo Island, Biliran, Visayas and Mindanao. It grows in natural stands or cultivated in most islands and provinces. It is an introduced species that has become naturalized.

Uses

Leaves

- Leaves are used for rough brooms and woven into coarse baskets.
- Splints prepared from the petioles are used in making baskets, marquetry work on tables, stands, screen, boxes and other light pieces for furniture.

Fiber

- The most important industrial yield of this palm is the black, tough fiber locally known as *yumot* or cabo Negro (commercially known as *gomuti* fibers). This is found at the base of the petioles and is manufactured into ropes, cleaning brushes, filters and thatching materials. It is known for its durability and can stand long exposure to either fresh or salt water and is also fire resistant.

Bark

- Very hard and used for barriers, flooring, furniture and tool handles.

Sap

- The sweet sap is used as a favorite drink called *tuba*. When boiled, it is also used as feed for hogs. When distilled, alcohol is produced.

Sap Production

A few months before the flowering, stalks could be tapped for its sweet sap. The tapper would have to rock the flowering stalks once a day everyday until the flowers bloom and attract fruit flies. It is only then that the flowering stalk would be ready for sap tapping and collection. The stalk is then cut off at the base and the sap that exudes is caught in a hollow joint bamboo. A thin slice is removed from the cut end of the stalk once or twice each day during the period of sap flow.

Yield

Sap yield varies depending on the climatic conditions, age of the tree and length of time the sap has been flowing out. Normally, a tapper could collect 10 to 12 liters (l) of sap per day per tree.

Vinegar production

- The sweet sap of *arenga* is placed in vitrified earthen jars locally known as *tapayan* or *banga* for fermentation. The process would take 3 to 4 weeks to complete. The vinegar is then pasteurized and bottled, preserving its taste and aroma. This method is similar to the "New Orleans" process known to produce one of the finest vinegars in the world. A local manufacturer uses *burnay* jars from Ilocos because these are the most appropriate for such purpose.

Sugar production

- Sugar is made by boiling its sweet unfermented sap. To avoid rapid fermentation, a different sap receiver (bamboo joint) is used each day to collect the sap. Putting crushed ginger or chili pepper in the receiver also prevents rapid fermentation. Generally, sap is thickened into a desirable consistency by boiling in an open kettle. The right size and mixture is reached if the liquid solidifies when dropped on cool surface. The sugar produced is brown, similar to the sugar of buri palm.

Starch

- In Indonesia, starch is used as their staple food in place of rice. It is also used as an ingredient in the preparation of cakes, noodles, and other dishes. Boiled starch can also be used to feed hogs.

Starch production

Kaong trees more than 20 to 25 years old produce starch from the inner part of the tree. Starch is extracted from the trunk by cutting down the plant. Then, the interior fibrous parts of the trunk are cut into small pieces. These chips are then crushed, pulverized, washed with water several times, then finally dried under the sun. Since starch is obtained only by cutting the tree, it is usually the last product obtained from kaong.

Yield

Estimated yield per tree is about 50 to 75 kg of starch (age of tree is more than 15 years)

In Central Java, 100 households in one village developed a home industry producing starch. They process 2,000 kg of starch from 200 trees everyday. In North Sulawesi, it was found out the solitary palms produce more starch than trees planted in a group.

- Fruits*
- Kaong fruits are eaten by wild pigs, bats and palm civet, *Viverra zangalunga* (musang) and *Paradoxorus philippinensis* (alamid). These mammals naturally aid in the propagation of *Arenga pinnata* by eating the fruits and excreting the seeds.
 - Seeds of immature fruit when extracted and boiled with sugar is sold as an ingredient for salad and dessert. Harvesting is done anytime of the year. However, the peak months are November to January.
- Buds*
- The buds, raw or cooked, make a fine salad.

Other uses

Medicinal

1. *Tuba* has curative properties for tuberculosis.
2. In Cambodia, the root is considered to be stomachic and pectoral.
3. Petioles have diuretic and antihemophilic properties.
 - Agroforestry crops
 - Honey production

Habitat

It is found growing in some forested areas but never far from settled areas, in ravines along streams, and areas under semi-cultivation. It is also occasionally found in virgin forest since its fruits are scattered by wild hogs, fruit, bats and civet cat.

Climatic requirement

Altitude: 600 m to 1,000 m asl

Phenology

Arenga pinnata begins to flower after 16 years at higher elevation (1,000 m and 12 to 13 years at lower elevations (600 m). They flower from the top leaf axils and then successively lower. Flowering is throughout the year. In Mt. Makiling, the fruit ripens 3 to 5 years after flowering (Reyes 2004, personal communication). After the last and lowers flowering, the tree dies at about 15 22 years.

Seed technology

Fruit/seed collection. Seed collection can be done anytime of the year. Collect mature and ripe fruits while still attached to the mother tree. Average number of fruits/inflorescence is around 480. Every tree produces 5,000 to 7,000 seeds.

Seed extraction. The outer part of the fruit contains stinging crystals which cause intense irritation and burning sensation when it gets into contact with the skin. Using hand gloves is advisable in handling the seed. *Arenga* seeds can be extracted by hastening the decay of the exocarp portion of the fruit through the following methods:

- Cover seeds with moist soil for 24 hrs.
- Cover seeds with moist leaf litter. Irritating effect decreases after exocarp decays. Percent (%) decay is 73%.
- Seed count: 292 seeds/liter

Pre-germination treatment. Remove the hilar cover using sharp pointed knife. Soak the pre-treated seeds in tap water until the radicle emerges in the hilar area. Change the water daily to prevent bacterial contamination.

Seed storage and viability. Viability is short and seeds can be stored only for a period of two months.

Wildlings

Seedlings for planting can be obtained from the wild from natural regeneration and raised as nursery seedlings.

Pests and diseases

No pest and diseases have been reported.

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