Caryota urens

L.

Arecaceae

LOCAL NAMES
Bengali (sopari); English (toddy palm,fishtail palm,Indian sago palm,wine palm,jaggery palm,kitul palm); Hindi (mari); Sanskrit (mada,dirgha); Sinhala (kitul); Tamil (kundal panai,koondalpanai,thippali,tippili,konda panna)

BOTANIC DESCRIPTION
Caryota urens is an unarmed, hapaxanthic, solitary or clustered, medium-sized palm up to 20 m tall; bole straight, unbranched, obscured at first by persistent fibrous leaf bases and sheaths, conspicuously ringed with narrow leaf scars, internodes elongated.

Leaves bipinnate (pinnate in juveniles), induplicate with a terminal leaflet; sheath triangular, disintegrating into strong black fibres, densely hairy; petiole channelled above; leaflets numerous, obliquely wedge shaped, upper margin irregularly toothed.

Inflorescence axillary, solitary, pendulous, branched to 1 order or rarely unbranched, bisexual; prophyll tubular; peduncular bracts up to 8, large; distal portion of rachis bearing spirally arranged, protandrous triads of 2 male flowers and 1 female flower. Flowers with 3 sepals and 3 petals. Male flower with free petals; stamens 6, filaments short, sometimes connate at base. Female flower globose; petals connate up to half way; ovary superior, 3-locular with a single ovule per cell, stigma 3-lobed.

The smooth epicarp of the drupaceous and globose fruit turns dark scarlet-red at maturity. Mesocarp is fleshy, filled with abundant, irritant, needlelike crystals. The endocarp is not differentiated. Each fruit has 2 large hemispherical seeds with ruminate endosperm.

BIOLOGY
C. urens is monoecious, flowering and leaf flushing continue throughout the year. Since the plants have a determinate growth habit, no new leaves originate after emergence of the 1st terminal inflorescence, which signals the start of the plant's reproductive phase. Flowering begins at the top of the trunk and often continues downwards for several years (like Arenga pinnata). Individual staminate flowers remain open for 16-20 days, while a single inflorescence has flowers opening for about 6 weeks. The pistillate flowers open for 2-3 weeks after all the staminate flowers have bloomed and remain receptive for 3-13 days. C. urens is an obligate outbreeder. Fruit development takes 32-38 weeks.

C. urens flowers after about 15 years in a very conspicuous display from the crown to the base over a period of several years before it finally dies. In Sri Lanka, at maturity, fruits are eaten by the polecat (Paradoxurus hermaphroditus hermaphroditus), which disperses unharmed seeds far from the mother tree. Palm civets and polecats effectively disperse fruits.

C. urens, the Kitul palm, Sri Lanka. (Robert Zwahlen)

(Trade winds fruit)

ECOLOGY
The species naturally inhabits the understorey tree stratum in moist lowland and submontane forests of tropical Asia. In lowland rainforests in Sri Lanka, its distribution was found to be less than 2 trees/ha, indicating its rarity in the wild.

Ecologically it is found in monsoon climates and peri-humid regions. It prefers moist, shady, cool places. C. urens is a slow-growing, shade-tolerant or shade-demanding species.

BIOPHYSICAL LIMITS
Altitude: Up to 1200 m

DOCUMENTED SPECIES DISTRIBUTION

Native: India, Malaysia, Myanmar, Nepal, Sri Lanka
Exotic: Papua New Guinea, Thailand, Vietnam

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 primary product of C. urens in rural communities is the sugar substitute called kitul honey or jaggary; juice from the flowers is concentrated in large, wide-mouthed vessels on an open fire to prepare a viscous, golden syrup with a delicious flavour. It is often served with a thick, fermented curd, prepared from buffalo milk. Alternatively the sap is further concentrated to give kitul jaggary (candy). The fruits contain raphides and are normally not eaten, although the seeds may be chewed.

The apical region of the stem of young C. urens is used as a food source. The palm heart consisting of the apical meristem together with its immediate derivatives before thickening is eaten as a vegetable by rural people.

Fodder: In Sri Lanka, leaves of C. urens are traditionally used as a 'delicacy fodder' for domesticated elephants; in areas where the trees are not tapped, they are cut down to feed elephants. The leaves are used for fodder; they contain 2% crude protein and 9.3% crude fibre.

Apiculture: This palm is cultivated for its nectar for honey production.

Fibre: The sheathing leaf bases provide a strong fibre for brushes. In Sri Lanka it is used as a source of fibre resembling horsehair, kitul fibre or kitul toddy.

Timber: The mature wood is strong, heavy and durable. Caryota stem yields an inferior timber sometimes used for construction purposes such as planking, rafters, roofing, partitioning and fencing. In Papua New Guinea, it is commonly used for flooring and making spears. The stem, cut lengthways in 2 with its centre scooped out, is used for gutters and drains, or to convey water over long distances. Polished stems are used as monoliths in modern houses.

Alcohol: Sap collected from the inflorescence is fermented with a crude, mixed inoculum of yeast to obtain toddy. The alcoholic beverage prepared from C. urens can be distilled, as is coconut toddy, to prepare a more concentrated spirit.

Medicine: A porridge prepared from C. urens flour is prescribed by local physicians to treat gastric ulcers, migraine headaches, snake-bite poisoning and rheumatic swellings. The root is used for tooth ailments, the bark and seed to treat boils, and the tender flowers for promoting hair growth.

Other products: Both toddy and jaggary are well-established cottage industries in villages that border forests in the wetter part of Sri Lanka. Villagers who process it receive a substantial income from the sale of jaggary.

SERVICES
Ornamental: As the only palm having bipinnate leaves with fishtail-like leaflets, both young and semi-adult plants are increasingly used as indoor as well as outdoor plants in households, large hotels and airport terminal buildings. The leaves are also used to enhance floral decorations. Unlike ornamental palms such as royal palm (Roystonea) and cabbage palm (Oreodoxa oleracea), however, C. urens is not a good candidate for avenue planting because of its relatively short stature and short life span.

TREE MANAGEMENT
The daily yield per tree of sap for wine and sugar from C. urens is 20-27 litres; its trunk yields 100-150 kg of starch. Harvest for sago and other purposes is mainly from wild and semi-wild populations. When flowering begins, the inflorescence is stimulated to produce juice; the inflorescence is then bound into a ‘candle’ form and tapped for its sweet juice by repeatedly slicing off the end of the candle. A tapping period may last for 10-15 years. Usually harvests for timber occurs when the tapping period has ended.

GERMPLASM MANAGEMENT
At room temperature the seeds remain viable for 30-90 days, depending on storage conditions. An experiment in Sri Lanka on the effect of seed storage and exposure to sunlight revealed a germination rate of 99% for seeds sown after 30-day storage in a dark room.

PESTS AND DISEASES
In Sri Lanka, only 2 major fruit predators are known. One is a fruit-boring coleopteran belonging to the family Scolytidae; 50-60% of prematurely falling fruit is infected with this beetle. The 2nd is the polecat, which eats ripe fruits. It feeds on the pericarp and the undigested seeds are released with faecal matter.

Leaf sheath caterpillar, red weevil and stem borers cause minor damages to kitul palm. Young palms has been reported to have died due to red weevil damage followed by a secondary infestation of fungal into pith and root system. Crown rot under high humid forest conditions as a result of Phytopthora fungal infestation has been observed.

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SUGGESTED CITATION

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