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Tapping Patterns of the Kitul Palm (Caryota urens) in the Sinharaja Area, Sri Lanka

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Palms are perhaps the most beneficial of plants to people in the Tropics. A typical example is the familiar kitul palm (*Caryota urens* L.) native to humid Tropical Asia. In Sri Lanka it is best known for the production of jaggery (a crude brown sugar) and treacle. Both are traditional sweeteners, and their usage and popularity are island-wide. At the village level it is of economic importance, especially for communities living along forest fringes, providing a significant source of income to the people.

The sugar sap from the inflorescence which yields jaggery, is converted to toddy, a weak alcoholic beverage, and then to vinegar on fermentation. The palm also has several other well known uses. The wood is strong and beautiful. The inner tissue of the stem yields a starchy substance which can be used as sago. The leaves yield "salopa" or "kitul" fiber as it is popularly known in Orissa and is obviously the origin of the currently used Sinhala term. Also the word "jaggery" may have originated from "chakkaray" as it is called in Travancore (Sawyer 1895). The uses of the palm are most comprehensively documented by Watt (1889) in the Dictionary of Economic Products of India, while the palm is discussed in a more Sri Lankan context by Molagoda (1945).

The Kitul Palm

The handsome kitul palm attains 40 to 60 feet (15 to 20 m) in height under favorable conditions. Its large bipinnate leaves reach as much as 6–7 m in length. The ultimate leaflets are very characteristic, shaped somewhat like the tail of a fish, thereby earning the popular English name, the "Fish-Tail palm" (Trimen, 1898).

The kitul palm grows wild in the low country wet-zone of Sri Lanka and is a component of the rain forest understorey. It is found more often in cool shady valleys. Because of its utility value, it is commonly found growing in home gardens, but rarely is it cultivated.

Kitul Tapping in Sinharaja

In the Sinharaja area, where the only sizeable extent of lowland rain forest still remains in Sri Lanka, the villagers who live in and around the forest depend greatly on the production and sale of jaggery for their livelihood. As in most palms, in kitul too, the sugar sap is extracted from the young inflorescence. The method and process of extraction vary in detail from place to place. The tapping patterns, evolved through many centuries of practice, are often associated with a great deal of custom and ritual. In relatively undisturbed forest areas such as Sinharaja, one could expect the practice of tapping the kitul palm to have changed little with time, the original methods being still preserved to a great extent.

Rapid destruction of natural forests usually brings about the disintegration of traditional communities. It is therefore impor-

tant that where these traditions still continue, an attempt be made to document the numerous uses made of forest products by the villagers. These uses are steeped in tradition and culture; often based on sound ecological principles realized through knowledge and experience accrued through time.

The Process of Tapping

Flowering. It is believed that a kitul palm growing in a relatively open area will bloom within a period of 10 to 15 years. However, when growing within the forest, it takes much longer, perhaps up to 15 to 20 years, to bloom, depending on the opportunity the palm has of reaching out to the sun. An experienced tapper is able to recognize a palm which is about to bloom from the gradually changing crown form. On reaching maturity, the palm has a characteristic crown of 10–20 loosely arranged leaves, the mature fronds being horizontal. The younger ones are directed obliquely upwards until the last leaves stand erect.

Once in bloom, it produces several inflorescences for a period of three to five years. The flowering is in reverse order, the first inflorescence appearing at the terminal region of the palm and subsequent ones appearing in successively lower leaf axils. Inflorescences also develop on the bare stem beneath the crown from buds in the axils of leaves shed previously. After the lowest inflorescence has matured into fruits, the tree dies. The mature inflorescence is 3 to 4 m long, much branched with a stout peduncle and numerous pendulous branches. The peduncle curves downwards, and the inflorescence hangs clear of the leaf bases. Usually the first inflorescence is the largest and those developing later progressively smaller in size.

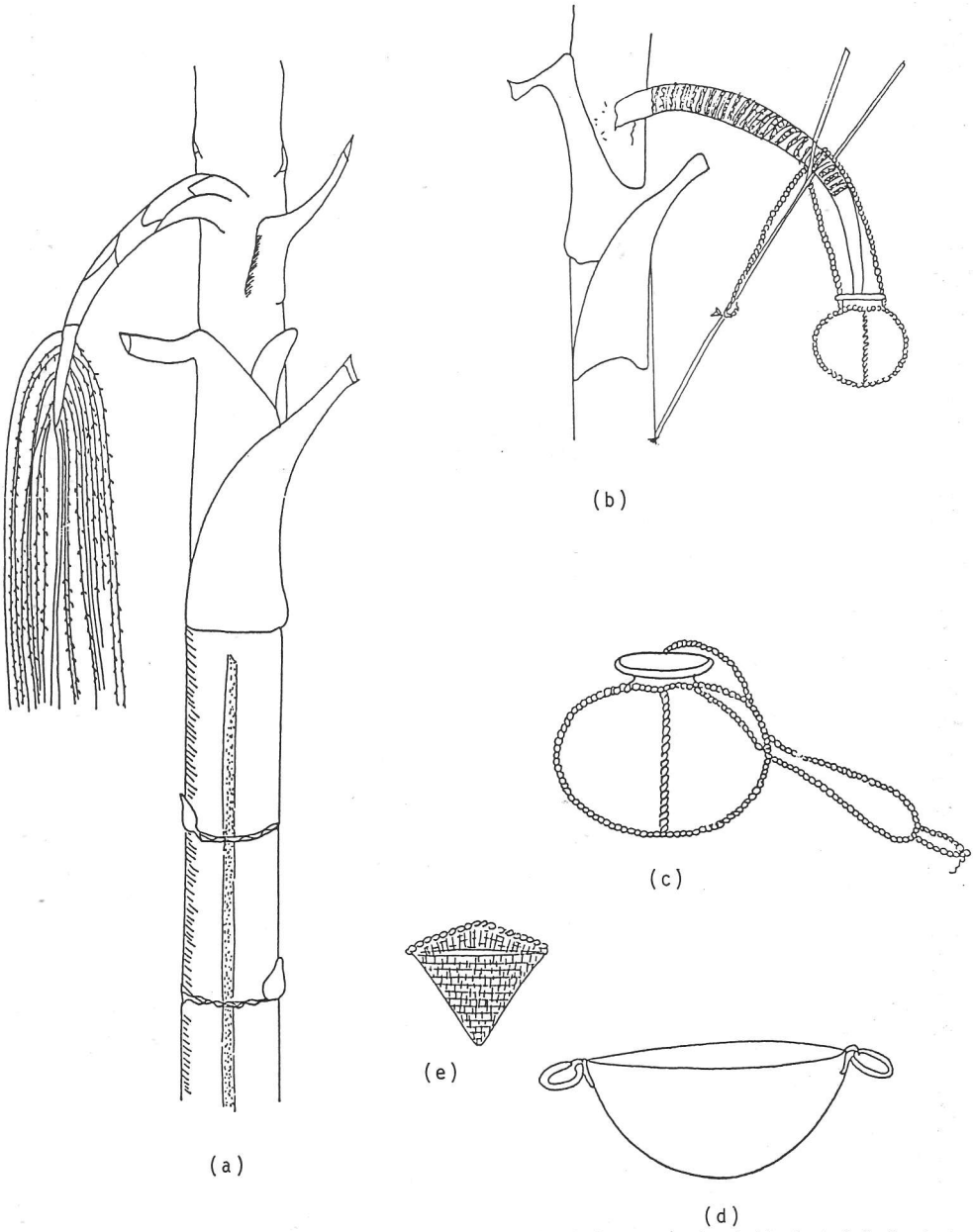
Preparation of the Palm. Once it has been decided to tap the emerging inflorescence, a ladder is improvised to enable climbing up the trunk of the palm. This process is known in Sinhalese as "hera gesima" (Fig. 1a). The ladder consists of a tall staff placed against the palm and bound with woody climbers at regular intervals of about 1.5 ft (0.5 m) to serve as footholds (Fig. 2). In some cases a crude platform is constructed just below the inflorescence.

The wood used for the staff is one that is resistant to decay, that can be rapid in a constantly, humid environment with high microbial activity. The species favored are *Chaetocarpus castanocarpus*, *C. coriaceus* ("Hedawaka"), *Timonius jambosella* ("Angana"), *Nargedia macrocarpa* ("Wal kopi"). The most commonly used species of woody climber for the footholds is *Nepenthes distillatoria* ("Bandura"), however, others such as *Artabotrys zeylanicus* ("Pattikka"), *Cissus acuminatus* ("Mala labu") and the forest bamboo *Ochlandra stridula* ("Bata") are also used as substitutes.

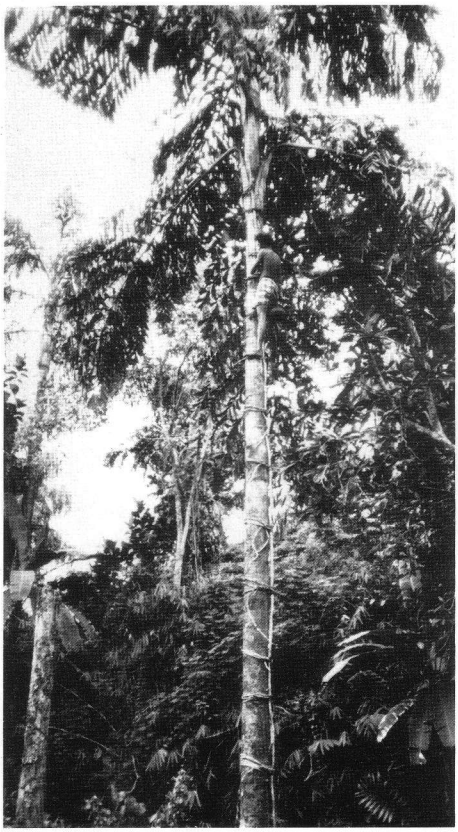
Preparation of Inflorescence. When the inflorescence has emerged sufficiently (about 3 ft) just prior to unfolding, it is supported by means of a 4 to 5 ft long pole forked at the top (Fig. 1b) and maneuvered into a horizontal position for convenience of tapping. The shape of the inflorescence indicates its maturity; cone shaped when immature but acquiring an inverted crescent shape at maturity. The inflorescence by this time has reached its maximum length and is on the verge of unfolding.

The inflorescence is next subject to a process of stimulation—more precisely, a process by which growth is arrested, but not totally prevented. Firstly the enclosing bracts are removed. The peduncle is bruised gently by tapping with a small stone or the handle of the tapper's knife. Applied to the bruised area is a paste of a ground mixture of *Pogostemon heyneanus* ("kollan kola") leaves, slaked lime, lamp black and other additives such as salt, garlic, mustard, lime and young leaves of *Toddalia asiatica* ("Kudumirissa") and *Nepenthes distillatoria* ("Bandura").

The treated inflorescence is bound along



1. a, Palm prepared for climbing, bound at regular intervals which serve as foot holds. b, A forked pole is used to support the inflorescence prior to unfolding and to attach the pot for collecting sap. c, Pot used for collecting sap. d, Pan used for boiling down the sap. e, Rattan strainer for cleaning the sugar syrup of debris.



2. *Caryota urens* with ladder and tapper.

its length with cord made from woody climbers (Fig. 1b) and left exposed for a couple of days. If the weather is dry the inflorescence is shaded using a bract from the Areca nut palm (*Areca catechu*), leaves of *Agrostistachys hookeri* ("Maha beru") or *Coscinium fenestratum* ("Weni wel"). Of late polythene is increasingly used.

The main inflorescence axis yields the greatest amount of sap. All lateral branches and spikes are therefore trimmed before binding it along its length. The terminal end of the main axis is gradually sliced off with a very sharp knife. The exuding sap is collected in a vessel, this process being carried out twice a day for a period of about two months.

Preparation of the Vessel. The vessel used for collecting the exudate is often a clay pot previously used for cooking and therefore well seasoned. The inner surface of the pot is made waterproof by coating with melted resin. The resin is extracted from *Canarium zeylanicum* ("Kekuna") and *Shorea stipularis* ("Nawada").

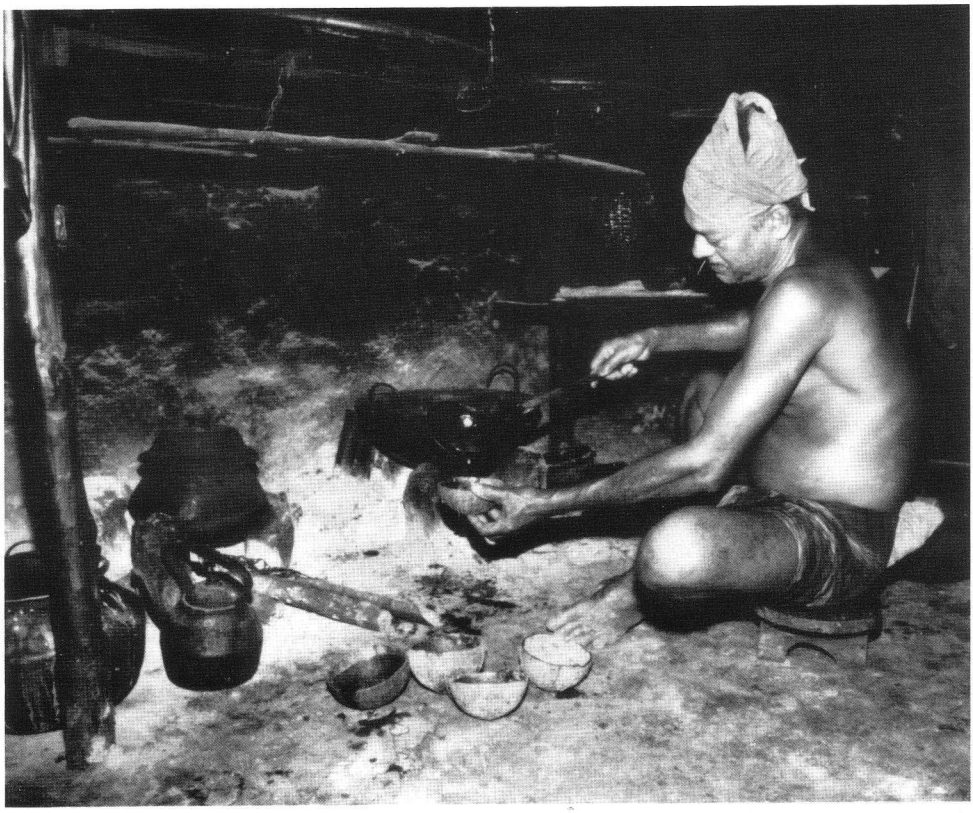
The pot is supported by a handle made with cord woven from woody climbers (Fig. 1c), such as *Nepenthes distillatoria* or *Calamus digitatus* ("Kukulu wel"). The positioning of the pot is shown in Fig. 1b. It is generally hung on the fork of the pole that supports the inflorescence.

To prevent fermentation of the sap, a strip of bark about 1″ in length and ½″ in width of *Shorea stipularis* is put in to the pot. Other bark substitutes used are *Vateria coppalifera* ("Hal"), *Vatica chinensis* ("Mendora").

Tapping Operation. The pot full of sap is removed twice a day, usually at 6 am and 4 pm. A thin slice is cut off the end of the inflorescence axis each time a collection is made and replaced with a fresh pot. A razor-sharp knife is used for slicing off the inflorescence and it is carried in a sheath attached to a waist band worn by the tapper. When climbing up or down the trunk of the palm the pot is hung on the knife handle at the waist of the tapper.

The Production of Jaggery. The sap is first strained into a large vessel (Fig. 1d) through a strainer made of woven rattan or bamboo strips (Fig. 1e). The sap is then immediately placed on the fire. After five to six hours of boiling when the liquid forms froth it can be removed from the fire and the sap can be kept for several hours without fermenting. On further boiling the sap thickens to a syrup and needs to be stirred constantly; at a suitable consistency it is taken off the fire.

The thick syrup is poured into precleaned coconut shells rinsed in cold water, and left to solidify (Fig. 3). A pinch of slaked lime is added to induce crystallization. The solid sugar or jaggery is gently prized out of the coconut shells and wrapped



3. Syrup is poured into cleaned coconut shells.

in dried banana leaf ready to be marketed. The residue left at the bottom of the pan is scraped out and made into balls for use as a domestic sweetener.

Future Prospects

It is evident from recent scientific studies on palms that they require precise environmental conditions for germination and establishment; often regeneration is limited or virtually absent (Moore 1979). Overutilization by man has severely affected the process of natural regeneration. Recent investigations on the floristics of the Sinharaja forest have revealed that mature individuals are very rare in their natural habitat (Gunatilleke and Gunatilleke 1987). It is also known that fruit bats, pole cats, and palm civets (Viverridae) aid in the dispersal and germination of the kitul seed. Whether any specialized relationships exist between the palm and its dispersal agents is not known.

The increasing demand for kitul products may perhaps one day result in the elimination of this species in the wild. The tradition of allowing the first inflorescence to mature and seed is now gradually disappearing, with severe consequences on regeneration. In the interests of preserving the species efforts must be made to study its biology and propagation. As an immediate conservation measure, adequate natural habitats should be protected to conserve wild populations of the palm. The

scientific basis of prevalent customs, rituals, and methods should be investigated for exploiting the resource more efficiently. The popularization of the kitul palm for home garden systems and mixed plantations should be vigorously pursued.

Acknowledgments

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