KFRI Research Report 188

FIELD IDENTIFICATION KEY FOR RATTANS OF KERALA

C. Renuka

KERALA FOREST RESEARCH INSTITUTE
PEECHI, THRISSUR

October 2000 Pages: 34

Indexes are Linked in this Report

CONTENTS

INTRODUCTION

Rattans are a group of climbing palms that provide raw material for cane furniture and handicrafts industries. There are approximately 600 species of rattans world-wide, belonging to 13 genera with great variation in morphology, ecology, altitudinal preferences, geographical distribution and end uses. Dransfield and Uhl (1986) have placed rattans under a distinct subfamily Calamoideae of the family Arecaceae (Palmae). The 13 recognized genera of rattans are *Calamus, Daemonorops, Korthalsia, Plectocomia, Plectocomiopsis, Ceratolobus, Pogonoitum, Calospatha, Retispatha, Myrialepis, Eremospatha, Laccosperma* and *Oncocalamus*. Majority of these genera and species are concentrated in South-East Asia and Peninsular Malysia. However, the genera *Eremospatha*, *Laccosperma* and *Oncocalamus* are found only in the equatorial forests of Africa. Although local people have found uses for species belonging to several genera, the most important canes from a commercial point of view are produced by some species of the genus *Calamus*.

In India there are about 61 species of rattans under four genera namely *Calamus, Daemonorops, Korthalsia* and *Plectocomia* (Renuka, 1999) distributed in 3 major eco-geographic regions; Peninsular India, North and North Eastern India and Andaman and Nicobar Islands. Kerala is represented with one genus *Calamus* with 14 species.

A sound knowledge of rattan taxonomy is needed for the development of rattans as a plantation crop. With over 600 different rattans world wide, it is also essential to know which of the species are being tried to grow and how they can be distinguished from other species. It is also essential to recognize the commercially important species from closely related ones in the natural forests for seed collection in the wild. Moreover, the rattan trade continues to rely heavily upon the raw material collected from wild and if there is to be any attempt towards proper management of this wild resource then it has to be based on a sound knowledge of their biology; a good taxonomic base is essential for this. The name of a plant is not just of academic interest, but it carries several other supplementary information. An incorrect identification and naming leads to confusion and also misleading information.

Rattan is taxonomically one of the most difficult groups. Identification of rattans in the field is very difficult, sometimes even for a taxonomist. Rattans flower annually and hence mostly these plants are seen in the vegetative condition, which makes the problem more complicated. The identification key based on vegetative characters (Renuka, 1992) helps to solve this problem to a great extent. But the researchers working in other scientific fields as well as the foresters find it difficult to use the conventional flora because they are alien to the botanical terms used to describe the plants. This necessitates the formulation of a field identification key with easily recognisable characters.

This book is an attempt to solve the problems in field identification of rattans. A simple description of the plant is given along with photographs which will help in the easy recognition of the plant. An illustrated glossary is also provided in addition to the glossary of scientific terms used in the text. Easily recognisable vegetative characters and fruit characteristics are used in the preparation of this key. Line drawings are provided along with the descriptive key for easy understanding.

Most of the rattans can be identified with the help of leaf sheaths and fruits. Hence along with each species description, photographs of sheaths and fruits are provided.

RATTANS OF KERALA

The Western Ghats with its rich tropical evergreen forests form one of the few ideal habitats for rattans. Kerala is represented by one genus *Calamus* with 14 species (Table 1). Even though a species *C. rheedei* (Kattuchural) was reported by Beccari (1908) based on Rheede's plate (1693), after its first publication, it has never been described from living or dried specimens. Hence the said species is not included in this book.

Distribution

Rattans are distributed mainly in the evergreen, semi-evergreen and moist deciduous forests. Some species occur in sacred groves also. Rattans grow at elevations ranging from sea level to 2000 m above, most species showing altitudinal preferences. Majority of the species are distributed at altitudes below 1000 msl. Six species are of high altitudes and are seen only at elevations above 700 msl (Table 1).

Of the different species occurring in Kerala, *C. thwaitesii* and *C. hookerianus* have a wider range of distribution and their population size also is comparatively bigger. *C. vattayila* and *C. delessertanus*, though extend throughout the Western Ghat region of Kerala, their population size is very small and the plants are scattered. *C. travancoricus* is at present located in less accessible areas and here also the number of mature plants are getting scarce.

C. dransfieldii is endemic to Dhoni hills of Palakkad District and *C. neelagiricus* and *C. huegelianus* to Silent Valley National Park. *C. nagbettai*, originally reported from the Sulorahmanya forests of Karnataka, has recently been reported from Quilon District also. (Mukundakumar et al. 1998; Sasidharan & Anto, 1997)..

Calamus metzianus is reported from Nilambur forests. *C. brandisii* is seen only on the southern part of Kerala in Agasthyamala (Renuka, 1992) and in Pandimotta of Quilon District (Mukundakumar & Vijayan, 1990).

Though rattans generally prefer evergreen and semi-evergreen forests, *C. dransfieldii*, *C. metzianus* and *C. thwaitesii* occur in moist deciduous forests too. *C. rotang* is seen along the plains and coastal regions.

Rattans grow well where moisture is abundant. Light is also an important factor for enhanced growth. In the seedling stage rattans are shade loving with very slow growth. With the onset of stem formation the plant shoots up and then onwards, it requires more light.

Table 2 shows distribution of different rattan species. Forests of Palakkad District harbour 10 species of rattans of which three are endemic to that region. Seven species are reported from Thiruvananthapuram District.

Table 1. Habit, habitat and altitudinal preference of *Calamus* species

Species	Local Name	Altitude	Forest type
A. Clump forming			
C. brandisii	Kalakkadan, Vanthal	above 1000 m	Southern hill top tropical evergreen forests
C. gamblei	Pacha chural, Tannikodi, Narikodi	700-2000 m	Evergreen, Southern montane wet temperate forests
C. hookerianus	Velichural, Kallan Kakkachural, Vanthal, Chentakara	50-1000 m	Evergreen, semi-evergreen
C. huegelianus	-	1300-2200 m	Evergreen
C. metzianus	Odiyanchural	50 m	Semi evergreen & moist deciduous
C. nagbettai	-	450 m	Evergreen
C. neelagiricus	-	1100 m	Evergreen
C.pseudotenuis	-	700-1000 m	Evergreen
C. rotang	Cheruchural	50 m	Marshy plains and sacred groves
C. thwaitesii	Pannichural, Thadiyanchural, Vandichural, Anachural	50-700 m	Evergreen, semi-evergreen and moist deciduous
C. travancoricus	Arichural	300-500 m	Evergreen
B. Single stemmed			
C. delessertianus	Ottamoodan, Pacha chural	700-1000 m	Evergreen
C. dransfieldii	-	300 m	Moist deciduous
C. vattayila	Vattayila, Ottaman	250-1000 m	Evergreen

Morphology

Most of the rattans in Kerala are **'clump forming'** or **'clustering' (**multi stemmed) except *C.dransfieldii, C. delessertianus* and *C. vattayila* which are **'solitary '** (single stemmed) climbers (Figs. 1-2).

Stem

The stem or actual cane of commerce is covered with spiny leaf sheaths (Fig. 3). When the cane matures, the leaf sheaths fall off exposing the cane within. The stem generally consists of elongated internodes and well defined nodes. In the genus *Calamus* the stem is unbranched. Diameter of the stem varies from 3 mm to 30 mm. Stem surface is smooth and generally straw-yellow in colour..

Table 2. District-wise distribution of rattans in Kerala.

No	Species	T	K	Pa	Ko	A	I	E	Th	Pk	Kz	W	Kn	M
1.	*Calamus brandisii*	x	x	-	-	-	-	-	-	-	-	-	-	-
2.	*C. delessertianus*	x	-	x	-	-	x	-	-	x	-	x	-	-
3.	*C. dransfieldii*	-	-	-	-	-	-	-	-	x	-	-	-	-
4.	*C. gamblei*	x	-	-	-	-	x	-	-	x	-	x	-	-
5.	*C. hookerianus*	x	x	x	x	-	x	x	x	x	-	x	x	x
6.	*C. huegelianus*	-	-	-	-	-	-	-	-	x	-	-	-	-
7.	*C. metzianus*	-	-	-	-	-	-	-	-	-	-	-	-	x
8.	*C. nagbettai*	-	x	-	-	-	-	-	-	-	-	-	-	-
9.	*C. neelagiricus*	-	-	-	-	-	-	-	-	x	-	-	-	-
10.	*C. pseudotenuis*	-	-	-	-	-	x	-	-	x	-	-	-	-
11.	*C. rotang*	-	x	-	-	x	-	-	-	-	-	-	-	-
12.	*C. thwaitesii*	x	x	x	x	-	x	x	x	x	x	x	x	x
13.	*C. travancoricus*	x	-	x	x	-	x	x	x	x	-	x	-	x
14.	*C. vattayila*	x	-	x	-	-	-	-	x	x	-	x	-	x

T – Thiruvananthapuram; **K**- Kollam; **Pa**- Pathanamthitta; **Ko**-Kottayam; **A**- Alapuzha; **I** – Idukki; **E**- Ernakulam; **Th**-Thrissur; **Pk**- Palakkad; **Kz**- Kozhikode; **W**- Wynad; **Kn**- Kannur; **M**- Malappuram

Leaf

The leaves are large, pinnately compound and spirally arranged on the stem. The leaf is generally distinguishable into three parts; the leaf sheath, the petiole and the laminar area. In certain species the leaf rachis extends beyond the leaflets to form a spiny, whip-like structure called '**Cirrus**'. Such leaves are called '**Cirrate**'. In other species a whip like organ known as '**Flagellum'** originates from the top of the leaf sheath obliquely opposite the petiole. Usually flagella and cirri are mutually exclusive; in species with cirrus there is no flagellum and vice-versa. Cirrus and flagellum are the climbing organs of rattans. Both the structures are provided with reflexed grapnel-like spines (Figs. 4-5).

Leaf sheath

The lower portion of the petiole that encircles the stem is the sheath. The sheaths cover the stem along its full length leaving only a small apical portion exposed. Sheaths of adjacent leaves overlap and imbricate so that the stem is completely hidden and the actual stem apex lies a little below the observed tip.

The mouth of the leaf sheath is sometimes provided with an erect, ligule-like structure termed '**Ocrea**' (Fig. 4) The ocrea frequently disintegrates as the leaf develops. In most of the species, leaf sheath bears a large swelling at the base of the petiole termed the `**Knee**' (Fig. 3). The leaf sheath is usually spiny.

Fig. 1. Solitary Habit

Fig. 2. Clump forming

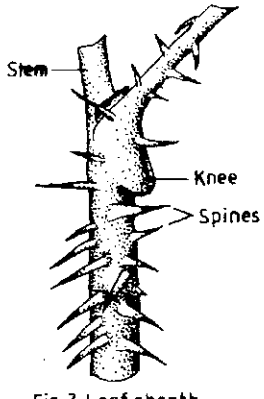


Fig. 3. Leaf sheath

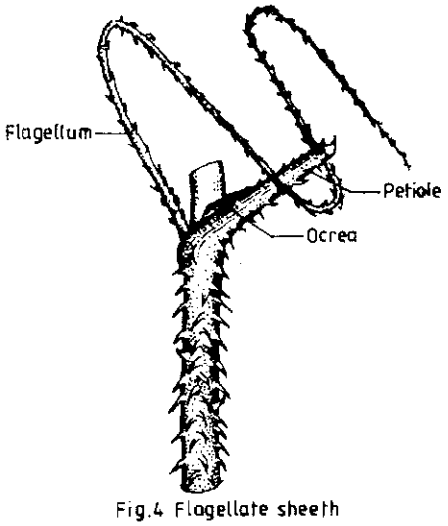


Fig. 4 Flagellate sheath

Petiole

The axial part above the leaf sheath upto the point of origin of leaflets is the petiole(Fig.4).

Rachis

The rachis represents the axis of the leaves and bears a number of leaflets on its either side(Fig.6).

Leaflets

The size, shape and arrangement of leaflets vary with species. In some rattans the leaflets are grouped along the rachis while in others they are regularly arranged (Figs. 6-7).

Inflorescence

Calamus is dioecious, the male and female plants are separate. The inflorescence may branch into 2 or 3 orders. Usually the male inflorescence is more branched than the female. The inflorescence bears a series of tubular bracts or sheaths. The primary sheaths subtends the '**partial inflorescences**' and the secondary sheaths, the '**rachillae**' (Figs. 8-11). Rachillae are the ultimate branchlets which bear flowers. Flowers are typically trimerous having 3 sepals, 3 petals, 6 stamens or staminodes and a trilocular ovary or pistillode (Figs. 9 - 10).

Fruits

Fruits are usually produced in abundance. Each fruit is covered with vertical rows of reflexed overlapping scales. The scales are often hard and shiny and are frequently grooved vertically along the midline (Figs. 12-13).

Phenology

In the genus *Calamus* the male and female plants are separate and the flowering is annual. The time of initiation of flowering varies with the species. In general the mature fruits are available from March to June. Seeds are viable only for a short period . The fully ripened seeds germinate within period of two weeks.

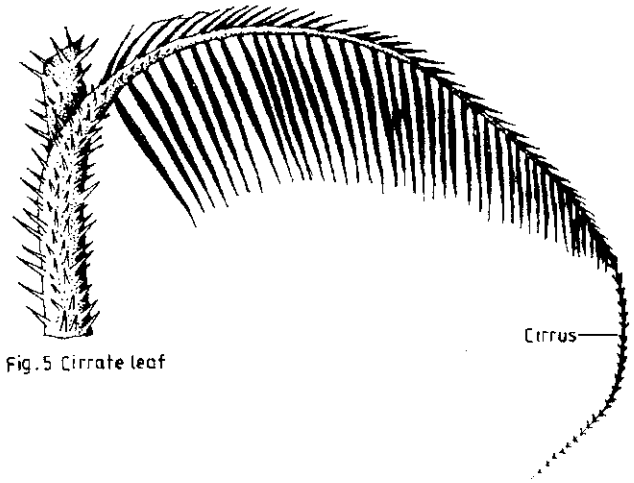


Fig. 5 Cirrate leaf

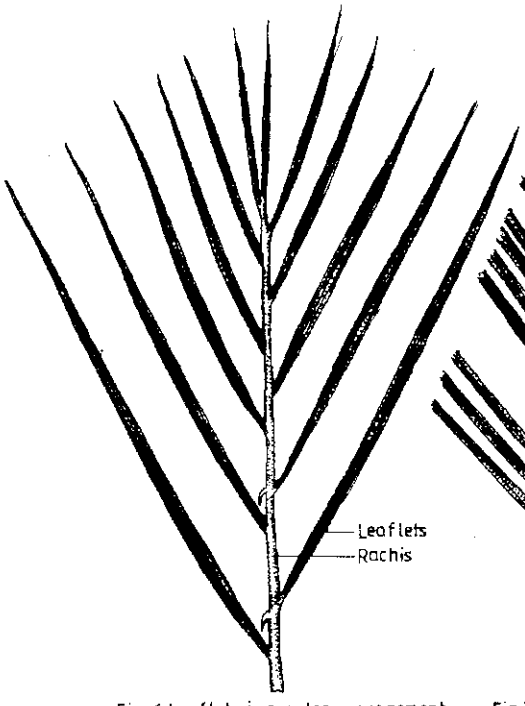


Fig. 6. Leaflets in regular arrangement

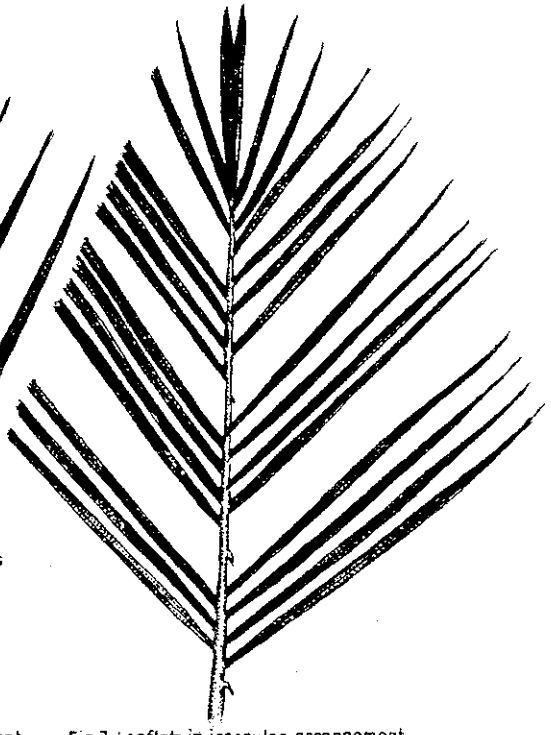


Fig. 7. Leaflets in irregular arrangement

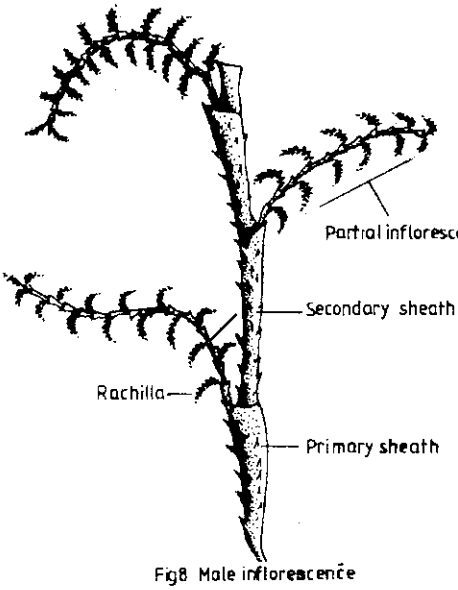


Fig8 Male inflorescence

Fig.9. Male flower

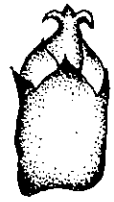


Fig.10. Female flower

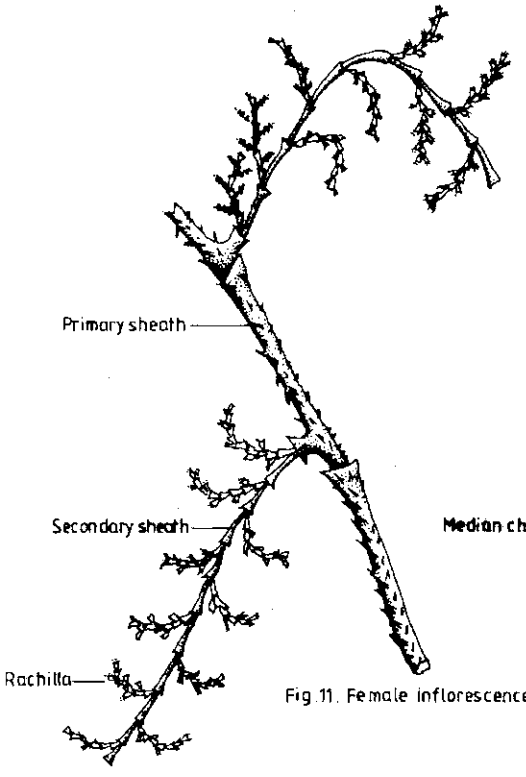


Fig.11. Female inflorescence

Fig.12 Fruit

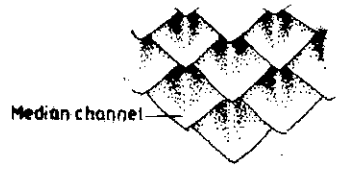


Fig.13. Scales

DIAGNOSTIC MORPHOLOGICAL CHARACTERS

Detailed studies of the specimens reveal that many vegetative characters are species-specific which can be used effectively in the field for identification .

Habit

Rattans are either single stemmed or clump forming . For a given species the character of solitary *versus* clump forming is usually constant and often of value in field identification. *C. dransfieldii, C. vattayila* and *C. delessertianus* are single stemmed.

Diameter of the stem

Based on diameter, rattans can be graded as large, medium and small diameter canes. The diameter of the stem is species-specific.

Leaf

Leaves are either cirrate or ecirrate depending on the species.

Leaflets

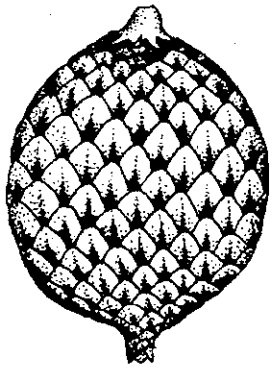
The shape and arrangement of leaflets are diagnostic characters in rattans. The leaflets are either regular or variously grouped depending upon the species. The leaflets may be variously hairy, bristly or unarmed and these characters are also of taxonomic importance. However, juvenile foliage is strikingly different from adult foliage.

Leaf sheath

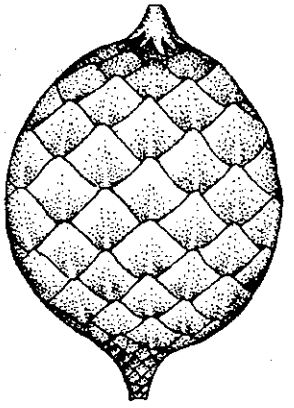
From a field taxonomic point of view, leaf sheath is the most important part of rattans. The nature and arrangement of spines on the sheath are so characteristic that sterile specimens represented by sheath alone can be identified upto species level.

Fruits

The shape, size and the number of vertical rows of scales are important identification features. These features vary with species (Fig. 14).



C.gamblei

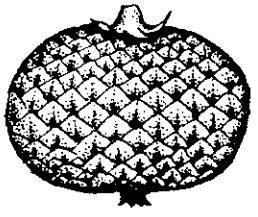


C. thwaitesii

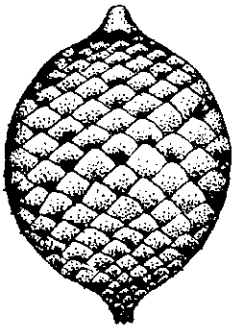
C. vattayila

C. travancoricus

C. pseudotenuis



C. neelagiricus



C. huegelianus

Fig.12 Different shaps of fruits

CONSERVATION

Until very recently rattans were one of the neglected natural resources, even though it was an important source of income and employment for the tribes residing near the forest areas .This self-sustaining co-existence with nature continued till the advent of cash economy and industrial production. Rattan was once a very low value product meant for inexpensive and often traditional furniture, but today it has grown in demand and is now a high value material. Consequently this resources is being over-exploited and has become short in supply.

During the last 20 years, the exploitation of rattans from the Western Ghats was very extensive and this has led to the disappearance of rattans from all the accessible areas. Large scale destruction and fragmentation of forests have further aggravated the situation. The extraction of young plants, before they flower, affects the regeneration. At present rattans are restricted mostly to remote areas in Kerala.

The demand for rattans is exceeding supply. Rattan industries in Kerala now depend on the raw material supplied from North Eastern India. The alarming rate of forest destruction and the over exploitation of rattans are leading to the depletion of genetic resources of this group of plants in Kerala. Species like *C. travancoricus, C. gamblei, C. pseudotenuis, C. dransfieldii, C. huegelianus* and *C. neelagiricus* are now seen in very remote localities. If the depletion continues at the present rate, the natural rattan resources will almost be totally decimated in a few years and thus we are likely to lose the rattan gene pool necessary for genetic improvement.

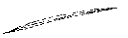
FIELD KEY FOR RATTANS OF KERALA

1a. Plant is single stemmed..... 2

1b. Plant is cluster forming..... 5

2a. Leaflets oblong or elliptic, 6 veined .....*C. vattayila*

2b. Leaflets linear-lanceolate, 3 veined 3



3a. Leaf sheath sparingly spiny, pale green, cilia on veins 2cm long.....*C.dransfieldii*

3b. Leaf sheath spiny, green, cilia on veins 1cm long..... 4

4a. Rachilla not twisted, fruit globose, 1.5cm diameter, scales in 27 rows.....
.....*C.delessertiunus*

4b. Rachilla twisted ,fruit oblate, 1x0.5 cm, scales in 21 rows.....
..... *C.nee1agiricus*

5a. Leaves ending in a cirrus, fruit elliptic..... *C.nagbettai*

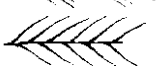
5b. Leaves not ending in a cirrus, fruit not elliptic..... 6

6a. Stem with sheath 3-6 cm in diameter..... 7

6b. Stem with sheath less than 1.5cm in diameter..... 12

7a. Leaflets grouped..... 8

7b. Leaflets not grouped 9



8a. Leaf sheath with black spines arranged in oblique whorls..... *C.thwaitesii.*

8b. Leaf sheath with brown ,green or yellow spines 9

9a. Petiole and rachis with yellow needle-like spines, spines to
3 cm long..... *C .pseudotenuis*

9b. Petiole and rachis with brown or green, flat or bulbous based spines; spines to 1.5 cm long 10

10a. Sheath with brown tomentum, spines brown, flat..... 11

l0b. Sheath without brown tomentum, green, bulbous based spines ..... *C.gamblei*

l1a. Mouth of the sheath with long papery spines of 10-28cm length, spines on the sheath solitary, fruit brown ..... *C.hookerianus*

l1b. Mouth of the sheath with out long papery spines, spines on the sheath solitary or sub seriate, fruits jet black.....*C.hugelianus.*

12a. Leaflets grouped..... 13

12b. Leaflets not grouped 14

13a. Stem 0.5cm to 0.8cm in diameter, mouth of the sheath without tufts of spines .....*C. travancoricus*

13b. Stem 1 cm in diameter, mouth of the sheath with tufts of spines to 4 cm long .....*C.brandisii*

14a. Leaf sheath, rachis and inflorescence axis glabrous..... *C.rotang*

14b. Leaf sheath, rachis and inflorescence axis covered with brownish or yellowish pubescence, especially on young leaf sheaths ..... *C.metzianus*

SPECIES DESCRIPTION

Calamus brandisii Becc.

A cluster forming, slender rattan. Stem with sheaths 1.5 cm in diameter, without sheaths up to 0.8 cm. Leaves about 1 m long; leaf sheath green, with minute bristle like spines; mouth of the sheath with larger spines to 4 cm long; knee present; leaflets grouped. Male and female inflorescence are long and slender. Fruits ovate, 1.8 x 0.8 cm, scales arranged in 17 vertical rows, slightly channelled in the middle, brown with dark brown border.

Habit

Distribution: Usually seen in evergreen forests between 1000 and 1500 m at Bonacaud and Agasthyamala, (Thiruvananthapuram District) and at Pandimotta (Kollam District) in Kerala and at Kalakkadu, Muthukuzhivayal and upper Kothayar in Tamil Nadu.

Flowering: October-December. Fruiting: March-May.

Uses: Excellent small diameter cane, extensively used in furniture industry.

Leaf Sheath

Fruits

Calamus delessertianus Becc.

(പച്ചച്ചൂരൽ, ഒറ്റമുഡൻ)

Solitary, medium diameter rattan. Stem with sheaths 3 cm in diameter at base, 5 - 6 cm at the apex, without sheaths 2 - 2.5 cm. . Leaves about 1.5 to 2 m long; leaf sheath *green* with bulbous based spines; leaflets regularly arranged along the rachis, about 55 x 2.5 cm, veins ciliated on the upper surface; cilia to 1.5 cm long, black tipped, leaf margin spinulose. Female inflorescence rather large, partial inflorescence to 30 cm long, arising erect at first and then spreading. Fruit globose, 1.5 cm in diameter, distinctly stalked, scales straw-yellow, in 28 rows, spirally arranged, deeply channelled in the middle.

Habit

Distribution: Seen in the evergreen forestsbetween 700 and 1200m throughout Western Ghats.

Flowering: August-September. **Fruiting:** May-June.

Uses: A good medium diameter rattan. Used in furniture industry.

Fruits

Leaf **Sheath**

Calamus dransfieldii Renuka

Solitary, moderate sized rattan. Stem with sheaths about 3.5 cm in diameter, without sheaths about 2.5 cm. Leaves to 2m long; leaf sheath pale green, sparingly spiny with bulbous based spines; knee conspicuous; leaflets pale green, regularly arranged, about 45 x 2 cm, veins ciliate on both surfaces; cilia to 2 cm long. Inflorescence long, flagellate, partial inflorescence to 9 cm long.

Leaf Sheath

Distribution: This species is endemic to Dhoni hills of Palakkad district. Only very few plants are present in this locality.

Flowering: November-December.

Uses: A good, large diameter cane, but available only in limited quantities.

A young plant

Calamus gamblei **Becc,**

(പച്ചച്ചൂരൽ)

Habit

A clustering, moderate sized rattan. Stem with sheaths about 2.5 cm in diameter and without sheaths 1.5 cm. Leaves about 1.2 m long; leaf sheath green, armed with bulbous based spines; knee present; leaflets arranged regularly on the rachis, about 40 x 2.5 cm. Inflorescence flagellate, about 3 m long, partial inflorescence to 90 cm long. Fruit 2 cm in diameter, spherical or slightly tapering at the base, short stalked, scales in 23 rows, deeply channelled, pale yellow, shiny.

There are two varieties for this species based on the shape of the fruit. Fruit slightly tapering towards the base - *Calamus gamblei* var. *gamblei*. Fruit sperical - *Calamus gamblei* var. *sphaerocarpa*

Distribution: This species is seen in evergreen forests above 700 m in Thiruvananthapuram, Thenmala, Ranni, Munnar, Thrissur, Palakkad, Nemmara and Wayanad Forest Divisions, in Periyar Wildlife Sanctuary, Eravikulam National Park and Silent Valley National Park. This is also distributed in the Western Ghat regions of Tamil Nadu and Karnataka.

Flowering: July-August. Fruiting: May-June.

Uses: A moderately good quality cane. Used in furniture industry and for basket-

Leaf Sheath

Male Inflorescence

Fruits

Calamus hookerianus Becc.

(വേലിച്ചൂരൽ, കാക്കച്ചൂരൽ, വന്തൾ, കല്ലൻ, ചെൻതകര)

A clustering, moderate sized rattan. Stem with sheaths measure about 4 cm in diameter, without sheaths to 2.5 cm. Leaves to 2 m long; leaf sheath brownish green, densely armed with spines; spines triangular, the longest to 2.5 cm long, 0.5 cm wide at the base, interspersed with numerous smaller spines and abundant brown tomentum, mouth of the sheath provided with long papery spines to 18 cm long; knee sometimes present, not conspicuous; leaflets regularly arranged. Inflorescence to 5 m long, partial inflorescence to 75 cm long. Fruits about 1 x 0.8 cm, subglobose, scales in 18 rows, yellowish brown with a dark brown border.

Habit

Distribution: This species is seen in the evergreen forests 1000 m throughout the Western Ghats in Kerala, Tamil Nadu and Karnataka.

Flowering: July-August. Fruiting: April-May.

Uses: A medium diameter rattan, extensively used in furniture industry and basket- making.

Male Inflorescence

Leaf Sheath

Fruits

Calamus huegelianus Mart.

A clustering, moderate sized rattan. Stem with sheaths to 3 cm in diameter, without sheaths to 2 cm. Leaf to 2 m long; leaf sheath brownish green, densely armed with spines; spines solitary or sub-seriate, the largest 10-15mm long, interspersed with abundant brown tomentum; knee present; leaflets regularly arranged along the rachis. Inflorescence long, flagellate, partial inflorescence to 30-40 cm long. Fruit 15-18 mm across, almost spherical, scales in 21 rows, quite black, shiny.

Distribution: This species is presently seen in Silent Valley National Park in the evergreen forest from Walakkad to Sispara within an elevation of 1300 to 2200 m. The population size is considerably very small.

Flowering: July-August. Fruiting: May-June.

Uses: A good quality cane but not available in sufficient quantities.

Leaf Sheath

Calamus metzianus Schlecht.

(ഒടിയൻച്ചൂരൽ)

A clustering, small diameter rattan. Stem with sheaths to 2 cm in diameter, without sheaths to 1 cm. Leaf to 1m long leaf sheath pale green, densely armed with spines, spines to 2 cm long, triangular, yellowish, with numerous small spines in between; knee conspicuous; leaflets regularly arranged, 37 x 2 cm, gradually getting smaller towards the tip. Inflorescence to 2 m long, partial inflorescence to 25 cm long. Fruit ovoid, scales in 17 rows, channelled in the middle, light yellow coloured with white border and brown apex.

Habit

Distribution: This species is present in the moist deciduous forests at about 50m in Nilambur Forest Division. The species is also reported from Karnataka.

Flowering: October-November. Fruiting: April-May.

Uses: This cane is not used for any purpose because of its easily breakable nature

Leaf Sheath

Fruits

Calamus nagbettai Fernandez & Dey

(നാഗബത്ത)

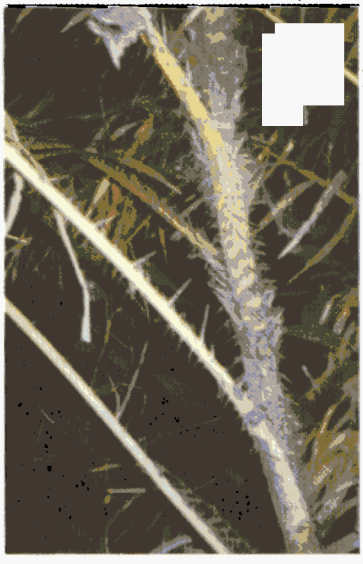
A clustering, large diameter rattan. Stem with sheaths to–4.5 cm in diameter, without sheaths to 3cm. with black patches at the basal portion. Leaves green, juvenile ones brown, mature leaves cirrate; leaf sheath yellowish green to green, lower half densely armed'with spines, spines in groups of 2-3, about 3 x 0.5 cm, narrow, triangular, black, intermingled with bristle-like spines, upper portion of the sheath with few spines, mouth with long spines to 4 cm long, young sheaths with brown tomentum; knee not prominent; leaflets regularly arranged along the rachis, 50 x 2 cm. Inflorescence branching to 2 orders, partial inflorescence to 70 cm long. Fruit about 1.6 x 0.9 cm, ovoid, scales in 15 rows, brown with a thin, dark brown margin, deeply channelled in the middle.

Habit

Distribution: In Kerala this species is seen in Shenduruni Valley of QuilonDistrict. This is originally reported from the Subrahmanya forests at Kamataka State.

Flowering: September-October. Fruiting: May-June.

Uses: This cane is considered to be very sacred and is worshiped in many households in Karnataka. This is a very robust cane, but not available in sufficient quantities.



Leaf Sheath

Fruits

Calamus neelagiricus Renuka

A solitary, moderate sized rattan. Stem with sheaths measures cm in diameter, without sheaths to 3 cm; leaf to 2 cm long; leaf sheath green, armed with sturdy, bulbous based spines of 1 cm; leaflets arranged regularly. Inflorescence to 2.5 m long, partial inflorescence to 30 cm long. Fruit oblate, 1 x 0.5 cm, scales straw yellow when dry, channelled in the middle and arranged in 21 rows.

Distribution: This species is collected from Silent Valley National Park.

Flowering : Not known. Fruiting: April-May.

Uses: A good quality cane but not available in sufficient quantities.

Leaf Sheath

Fruits

Calamus pseudotenuis Becc. ex Becc. & Hook. f.

A clustering, moderate sized rattan. Stem with sheaths measures upto 3.5 cm in diameter, without sheaths about 2.5 cm. Leaf to 1.6m long; leaf sheath yellowish green and armed with spines of about 3.5 cm length; spines needle like, yellow in colour and pointing to different directions. Brown tomentum seen in between the spines; mouth of the sheath provided with 3 or 4 longer spines of 6 cm length; petiole and rachis also armed with 3 cm long spines; leaflets arranged regularly. Inflorescence about 3 m long, partial inflorescence to 70 cm long. Fruit sub ovoid, 1.5 x 0.8 cm, scales arranged in 18 rows, greenish yellow with a dark brown border.

Habit

Distribution: This species is found in evergreen forests generally above 750 m at Peerumedu, Munnar, Nemmara, Palakkad and Thrissur Forest Divisions and in Periyar Wildlife Sanctuary. This is also distributed in the Western Ghat portion of Tamil Nadu and Kamataka. Southwards, the distribution extends to Sri Lanka.

Flowering: July-August. Fruiting: April-May.

Uses: Used in furniture industry and for basket-making.

Leaf Sheath

Fruits

Calamus rotang Linn.

(ചെറുച്ചൂരൽ)

A clustering, slender rattan. Stem, with sheaths 1.3 cm in diameter and without sheaths to 1 cm. Leaf to 80 cm long; leaf sheath green, spiny, spines to 1 cm, needle like and yellow in colour; knee prominent, petiole absent; leaflets arranged regularly. Inflorescence about 3m long; partial inflorescence to 70 cm long. Fruit ovoid, scales arranged in 21 rows, faintly channelled along the middle and straw yellow coloured.

Distribution: This species is restricted to the plains along coastal regions and backwaters. Usually seen in the sacred groves and coastal regions of Alappuzha and Kollam Districts. It is reported from Sri Lanka also.

Flowering: April-September. Fruiting: March-May.

Uses: Used for basket-making.

Habit

Leaf Sheath

Fruits

Calamus thwaitesii Becc. & Hook.f.

(പന്നിച്ചൂരൽ, തടിയൻച്ചൂരൽ, വണ്ടിച്ചൂരൽ)

This is the thickest cane available in the Western Ghats. Very robust, clump forming, large diameter rattan. Stem with sheaths to 6 cm in diameter and without sheaths to 3.5 cm. Leaves about 3m long leaf sheath yellow, densely armed with black spines, arising from a raised rim-like surface, the largest 3 x 0.7 cm, flat, smaller spines scattered in between; knee absent; petiole and rachis yellowish, armed with black spines grouped and arranged into oblique whorls; leaflets usually grouped, sharply spinulose along the margins. Inflorescence about 6m long, partial inflorescence about 70 cm long. Fruit about 2 x 1.3 cm, ovoid, scales arranged in 12 vertical rows with median grooves, yellow with deep brown margins.

Habit

Distribution: This cane grows in evergreen, semi-evergreen and moist deciduous forests between 75 to 900 m throughout the Western Ghats. The distribution extends to Sri Lanka also.

Flowering: June-July. Fruiting: April-May.

Uses: One of the best quality canes used extensively in furniture industry.

Leaf Sheath

Male Inflorescence

Fruits

Calamus travancoricus Bedd. ex Becc. & Hook .f.

(അരിച്ചൂരൽ)

A very slender, clustering rattan. Stem with sheaths upto 0.8 cm in diameter and without sheaths to 0.4 cm. Leaf to 45 cm long; leaf sheaths green, armed with small spines of 0.5 cm length, mouth of the sheath with slightly longer spines of .75 to 1.00cm length; leaflets grouped along the rachis. Inflorescence to 1m long, partial inflorescence 10-12 cm long. Fruit 1 cm across, globose, scales in 24 rows, straw yellow with a dark brown border.

Habit

Distribution: This rattan is seen only in the evergreen forests from 200-500 m in Thiruvananthapuram, Thenmala, Ranni, Konni, Malayattoor, Chalakkudy, Vazhachal and Nilambur Forest Divisions of Kerala.

Flowering: October-November. Fruiting: May-June.

Uses: A best quality small diameter cane used extensively in handicraft and furniture industries, but not available in sufficient quantities.

Leaf Sheath

Fruits

Calamus vattayila Renuka
(വട്ടയിലയൻ, ഒറ്റമൻ)


Habit

A single stemmed moderate sized rattan. Stem with sheaths up to 5 cm in diameter at apex and 2.5 cm at base, without sheaths 1.8 cm. Leaf 1m long; leaf sheath dark green and sparingly spiny; spines generally pointing upwards; leaflets alternate, about 40 x 10 cm; inflorescence to 1m long; partial inflorescence to 40 cm long; getting shorter towards the tip of the inflorescence. Fruits in heavy bunches; a single fruit measuring about 2.5 x 0.8 cm, oblong, scales in 27 rows, longer than broad, chestnut brown coloured.
The shape of the leaflet is similar to that of a reed. The local name "vattayila" comes from the shape of the leaflet.

Distribution: Seen sporadically in evergreen forests between 200 to 750 m. This is reported from Thenmala, Ranni, Nilambur, Wayanad, Nemmara; Thekkady, Chalakkudy and Vazhachal Forest Divisions. The distribution extends to Tamil Nadu and Kamataka.

Flowering: September-October. Fruiting: May-June,

Uses: A good quality cane used in furniture industry, but not available in required quanti-


Leaf Sheath


Fruits

REFERENCES CITED

1. Beccari, O. 1908. Asiatic palms. Lepidocaryeae. Part. I. The species of *Calamus*. *Ann. Roy. Bot. Gard.* Calcutta 11: 1-518. P1. 1-11: 1-237.
2. Dransfield, J. and N.W. Uhl. 1986. An outline of a classification of palms. Principes 30 (1): 3-11.
3. Mukundakumar, S. and K. Vijayan. 1990. A new record of *Calamus brandisii* Becc. (Arecaceae) from Kerala Forest. *J. Econ. Tax. Bot.* 14(1): 192-194.
4. Mukundakumar, S., P.C. Binoy, J.C. Jose, A.S. Hemanthakumar and S. Seeni. 1998. Occurrence of *Calamus nagbettai* Fer. & Dey in Kerala. *J. Econ. Tax. Bot.*, 22(1): 205-206.
5. Renuka,C.1992. Rattans of Western Ghats- A taxonomic manual. Kerala Forest Research Institute, Peechi, Kerala, India.
6. Renuka, C. 1999. Indian rattan distribution – An update. Indian For. 125(6): 591-598.
7. Sasidharan, N. and P.V. Anto. 1997. New records of two rare and threatened plants for Kerala. *J. Econ. Tax. Bot.* 21: 247-248.
7. Van Rheede, H.A. 1693. *Hortus Malabaricus* Vols.12 Amsterdam.

GLOSSARY OF MORPHOLOGICAL TERMS

Bract : Modified leaf associated with inflorescence

Ciliate : Bearing a fringe of hairs

Cirrate : Bearing a cirrus

Cirrus : A climbing organ, structurally a whip like extension of the leaf rachis, armed with reflexed spines.

Flagellum : A whip like climbing organ, derived from an inflorescence, bearing reflexed spines

Knee : A swelling of the leaf sheath at the base of the petiole

Lanceolate : Narrow, tapering at both ends, the base end often broader

Linear : Several times longer than wide, usually narrow.

Oblate : Spherical but flattened at the poles

Oblong : Much longer than broad with nearly parallel sides

Ocrea : An extension of the leaf sheath beyond the petiole insertion.

Orbicular : More or less circular in outline or shape

Ovoid : An object that is oval in outline

Partial inflorescence :The branch that bears the flowers including all its bract branches

Petiole : The stalk of the leaf

Rachilla : The branch that bears flowers

Rachis : The axis of a leaf beyond the petiole.

Rosette : Short, bunchy habit of plant growth

Sheath : The lowest part or the base of the leaf which is always tubular at first but often split during or after maturity.

Sub : As a prefix, meaning nearly or almost eg., sub opposite – nearly opposite

Tomentum : A covering of dense, short, soft and tangled hairs

INDEX TO SCIENTIFIC NAMES

INDEX TO MALAYALAM NAMES