

Ethnobotanical Studies on Some Rare and Endemic Floristic Elements of Eastern Ghats-Hill Ranges of South East Asia, India

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Issued 24 May 2007

ABSTRACT

The Eastern Ghats, one of the nine Floristic Zones in India. Eastern Ghats are spread over three States of India, namely Orissa, Andhra Pradesh and Tamil Nadu. The hilly areas of Eastern Ghats in Andhra Pradesh are mainly inhabited by 33 aboriginal/tribal communities, who still practice the age old traditional medicines and their application. There are 62 different tribes, inhabited in Orissa. The inhabitants of the aboriginal tribal communities, who still practice the age old traditional medicines and their applications. The author undertook ethno medicobotanical studies in Eastern Ghats along with systematic survey. Many tribal people depending on naturally growing or wild plants for their food and medicine in this region. The study during 1997-2005 brought to light, many unknown uses of plants which are interesting has been collected by the author. The present paper deals with some rare and endemic plant ethnobotanical uses of Eastern Ghats.

Key words: Eastern Ghats, Ethnobotany, Rareplants, Endemic plants.

INTRODUCTION

The Eastern Ghats are located between 11° 31' and 22° N latitude and 76° 50' and 86° 30' E longitude in a North-East to South-West strike. The Ghats cover an area of about 75,000 Sq. Km with an average width of 200 Km in the North and 100 Km in the South. They are extended over a length of 1750 Km between the rivers Mahanadi and Vaigainal along East Coast. The geographers consider the Simlipal massif lying to the North west of the Khondmal hills in the Phulbani district of Orissa as the Northern starting point of Eastern Ghats. Towards the south, the Eastern Ghats run in a west ward direction meeting the Western Ghats in the Nilgiris of Tamilnadu.

Eastern Ghats are spread over three States of India, namely Orissa, Andhra Pradesh and Tamil Nadu. Eastern Ghats can be broadly divided into (1) Northern-Eastern Ghats and (2) The Southern Eastern Ghats. Kondapalli (Krishna district) is meeting point between Northern and Southern Eastern

Ghats.

The Hilly area from the River Krishna to near about Madras, covering the Andhra Pradesh districts of Krishna (Kondapalli range), Kurnool (Nallamala ranges), Cuddapah (Yerramala, Palakonda ranges), Nellore (Veligonda range), and Chittoor and Cuddapah (Seshachalam-Lankamala-Nagari-Kambakkam ranges), represents the middle Eastern Ghats. The low hilly area runs in a West - South-West direction meeting the high mountain ranges of the Western Ghats in the Nilgiri belt, covering the Tamilnadu districts of North Arcot (Javadi Hills), South Arcot (Gingee hills), Salem (hills of Shevaroy, Kalrayan), Namakkal (Kollimalai, Bodamalai, Nainamalai, Chitramalai), Dharmapuri (Melagiri hills), Tiruchirapalli (Pachamalai hills) represents the Southern–Eastern Ghats.. The average elevation of the Eastern Ghats is about 750 metres, though individual peaks rise to heights of 1672 metres. (Pullaiah, T.D. Muralidhara Rao 2002)

The highest peak in Eastern Ghats, Shevaroy hills 1700 m is Deomali Parbat 1673 m (Koraput district). Other notable peaks are Mahendragiri 1501 m, Singaraju Parbat 1516 m, Devagiri 1382 m, Turiakonda 1598 m, Hatimali 1391 m, Chandragiri 1269 m. Dharakonda 1365 m, Sambari Konda near Gudem village Ca 1670 m (Rao 1977), Nallamalias 800 m, Seshachalam hills 850 m, Javadi hills 1275 m and Pachamalais hills 1000 m.

VEGETATION

Vegetation varies considerably with altitudes and shows a distinct zonation of Forest types in all these Eastern Ghats. Practically all these forests are classified under four types as below:

1. Scrub Jungles – to 400m (foot hills)
2. Deciduous forest – 300 to 900m (slopes)
3. Evergreen forest - 800 to 1300m (Plateau)
4. Sholas - 1200 to 1600m

The vegetation of Eastern Ghats is remarkable for the concentration of character species like *Pterocarpus santalinus*, *Shorea robusta*, *Shorea tumbergia*, *Syzygium alternifolium*, *Santalum album*, *Terminalia pallida* etc. in certain well defined areas and for the presence of complex associations of tropical, sub-tropical and temperate species and of evergreens at the elevation of about 1100 m above mean sea level. As a whole, the vegetation is typically deciduous type and scrub jungle in most places.

In Eastern Ghats besides natural vegetation, there are numerous exotic species widely spread throughout the Eastern Ghats whose floristic composition differs from the natural vegetation.

On the basis of dryness, Ahmedullah and Nayar (1986) divided Eastern Ghats into two types - (1) Northern Zone of moist deciduous type with *Shorea robusta* and (2) Southern dry deciduous forest region with *Shorea tumbergia*, *Hardwickia binata* type. Mani (1974) recognized 3 major phytogeographical divisions of the Eastern Ghats i.e. (1) The Northern Sal division, (2) The Deccan division and (3) The Southern division.

According to Legris and Meher-Homji (1982, 1984), seven main vegetation types have been recognised in Easterns Ghats i.e., (1) *Albizia amara* Series (A Thorn Forest Community); (2)

Cochlospermum, *Gyrocarpus*, *Givotia* altitudinal ecotone;

(3) *Hardwickia binata* series; (4) Dry deciduous type, *Terminalia*, *Anogeissus latifolia*, *Tectona grandis* series, (5) The Sal forest types, (6) *Toona-Garuga* series and (7) Miscellaneous deciduous forest types *Terminalia*, *Anogeissus latifolia*, *Cleistanthus* series.

According to the classification of Champion and Seth (1968), vegetation in Eastern Ghats can be broadly classified into (1) Evergreen forests, (2) Tropical semi-evergreen forests, (3) Tropical moist deciduous forests, (4) Southern tropical dry deciduous forests, (5) Northern mixed dry deciduous forests, (6) Dry Savannah forests, (7) Scrub forests, (8) Tropical dry evergreen forests and (9) Tropical dry evergreen scrub.

ETHNOGRAPHIC PROFILE AND TRIBAL WEALTH IN EASTERN GHATS

In India, there are 5 million tribal people of different ethnic groups distributed in different states. Among the states of Indian union, Orissa has got second highest percentage of tribal population (23%). There are 62 different tribes, of which the most numerous ones are, Khonds (Kandho), Gond, Santal, Soara, Kolha, Shabar, Munda, Paroja (Paraja), Bhotada, Bhunya (Bhuiyan), Kissan, Oraon, Bhumija, Bhathudi, Kharia, Binjhal, Koya, Bhumia, Kol, Saunti, Gadabas, Mirdhas and Juang. These tribals have their own culture, customs, religious rites, taboos, legends, food-habitats and a rich knowledge in traditional herbal medicine.

Gonds are a tribal community living in Orissa. Gonds largely depend on their traditional sources (82%), which is not only due to the non-availability, non-affordability and lack of usable knowledge of modern medicine.

The tribal population of Andhra Pradesh is 3,176,001 and the tribes mainly inhabit the plains and the hilly areas along the Eastern Ghats. The hilly areas of Eastern Ghats in Andhra Pradesh are mainly inhabited by 33 aboriginal/tribal communities, who still practise the age old traditional medicines and their application. Many important rivers like Godavari, Krishna, Nagavali, Penna and Vamsadhara pass through these Ghats and innumerable streams and rivulets, provide plenty of scope and shows profound influence on the economy and socio-cultural activities of tribes having their own language, heritage, customs, religious practices, customs etc. which are quite unique. They mainly depend on minor forest produce and agriculture for their livelihood.

According to 1981 census, the tribal population of Andhra Pradesh is 3,176,001 of 33 tribal communities. This constitutes 5.93 per cent of the total population of the state. Of these 27 tribal communities are confined to the isolated hills and adjacent plains of Eastern Ghats. The major groups among them are Bagatas, Chenchus, Jatapus, Khonds (Samantas), Kondadoras, Konda Kammaras, Konda reddis, Koyas, Lambadis (Sugali), Nuka doras (Muka doras), Porjas (Gadabas), Savaras and Valmiki, with a total population of 1,412,450. They are mainly distributed in 9 districts, namely East Godavari, Warangal Khammam, Kurnool, Prakasam, Srikakulam, Visakhapatnam, Vizayanagarum and West Godavari. All the above tribals are aboriginal except Lambadis (Sugalis), who have migrated from Northwest to Southern India and settled in Khammam, Kurnool and Prakasam districts. In the upper Godavari region the tribes commonly found are Bagatas, Jatapus, Khonds, Konda doras, Konda Kammaras, Nuka doras, Porjas and Savaras. The Godavari valley is inhabited mainly by

Konda reddy and Koyas. In Nallamalai region Chenchus are the primitive inhabitants. The Valmiki are found in Godavari valley as well as in the neighbouring district of Eastern Ghats.

Savaras of Srikakulam district are believed to be descendents of the Sabaras referred to in the Aitareya Brahmana and Ramayana. Srikakulam presents a picturesque but varied landscape. The sun drenched sea-coast is followed by a vast expanse of land interspersed with densely populated river-valleys. The lush plains abruptly end with the commencement of the confused hill ranges of the Eastern Ghats running from Mandasa in the North-east through Pathapatnam, Palakonda and Parvathipuram to Saluer in the South-West. The chief rivers that rise in the Eastern Ghats are Vamsadhara, Nagavalli, Mahendratana, Champavathi, Vegavathi, Gomukhi and Gosthani. It is this hilly and wooded tract transversed by these perennial and seasonal streams that constitutes the habitat of about 2 lakh aboriginals who sought refuge in this hitherto inaccessible tract from time immemorial. Major tribes inhabiting this belt are Savara, Jatapu, Konda Dora, Gadaba, Khand, Manne Dora and Mukha Dora of which Savara are the most preponderant. Most of the Savaras of Andhra Pradesh belongs to Kapu Savara (Agriculturists) and Bhima Savaras.

Tribes in Tamil Nadu Hills

Adiyan, Aranadan, Eravallan, Frular Kadar, Kommara, Kanikaran, Kanikkar, Kaniyan, Kanyan, Kattunayakan, Kochu, Velan, Konda Kapus, Konda reddy, Koraga, Kota, Kudiva, Melakudi, Kurichchan, Kurimbas, Kurumans, Maha Malassar, Malai Arayan, Malaivedan, Malakkuravan, Malassar, Malayali (in Dharmapuri, North Arcot, Pudukotti, Salem, South Arcot and Thiruchirapalli districts), Malaye Kandi, Mannan, Mudugar, Mauduvan, Muthvan Palleyan, Palliyan, Palliyar, Paniyan and Sholaga Tada (Shasi, 1994).

Economic activity of tribals in forests of Eastern Ghats

Various tribal groups of Eastern Ghats are at different stages of economic activity such as (i) food collection, hunting, gathering and fishing; (ii) shifting cultivation (Podu); (iii) pastoralism and (iv) settled cultivation. Due to Podu cultivation, particularly in Northern Eastern Ghats of Srikakulam, Vizayanagaram and Visakhapatnam districts resulting in destruction of forest resources as well as soil erosion.

The native tribal people of Shevaroy are called Malayalis. As per 1981 census, the tribal population was 32,746. They are living in nearly 100 conically shaped huts scattered in various parts of the plateau. They are cultivating different kinds of grains, or fruit trees and breeding cattle. The ethnic group of Pacchamalais is also called Malayalis and their mother tongue is Tamil. As per 1991 census calculation nearly 10,006 tribals are living in this area. Of these, in Thenparanadu revenue village 3024 tribals are living in 998 families, in Vayanadu revenue village 4041 tribals are living in 946 families; in Kombi revenue village 1820 tribals are living in 427 families; in Thalngai 336 tribals are living in 67 families, in Sobanapuram revenue village 292 tribals are living in 56 families; in Sookalampatti revenue village 493 tribals are living in 90 families. Most of them are labourers.

The tribal people of Sirumalai group of hills are either Malayalis or Pariars. In Sirumalai alone there are ten tribal villages mainly working as labourers or collecting minor forest produce like

gallnut, Indian Gosseberry, Phoenix leaves, mango fruits and bothai grass.

METHODOLOGY

Ethno-Medico-Botanical Studies

The focus of the study was to register the ethnopharmacological knowledge possessed by tribal people, especially the elders who crossed 60 years. During the initial survey one person tribal people, especially the elders who crossed 60 years. During the initial survey one person had been introduced by the villagers became the key person, who led the way to introduction to other knowledgeable informants. The person from each area of the study accompanied to the field showed the plants, and they have provided the local names and information as to which health conditions the plants and they have provided the local names and information as to which health conditions the plants were used, and the method of preparation and administration of remedies. The ethnobotanical information of the drug yielding plants recorded following the standard methods of Schultes (1962), Jain (1981), Croom, (1983) and Martin(1995). The extensive and intensive exploration of medicinal plants in the study area, conducted during 1997 to 2001, yielded 122 species of medicinal importance, related to skin diseases.

The voucher specimens for each species was collected in quadruplicates, which were carefully tagged with field numbers after making a critical observation on the habit, habitat, colour and odour of flowers, phyto-association, occurrence and other relevant ecological features, which cannot be discerned from dried herbarium specimens.

The tribal people accurately recorded flowering and fruiting periods in the field notebooks along with vernacular names and relevant information on their utility. The specimens were identified with the help of Gamble's "Flora of Presidency of Madras"(1915-35) and other local/regional floras, recent monographs using salient features, recorded in field notebooks. The identification was further confirmed by the comparison with that of authenticated specimens, housed at Central National Herbarium CNH (CAL), Southern Circle (MH), Coimbatore, Sri Krishnadevaraya University Herbarium (SKU) Sri Venkateswara University Herbarium (SVU, Tirupathi), The specimens were deposited in SKU 'SVU', Sri Venkateswara University Herbarium, Tirupathi. The nomenclature of identified specimens was updated by consulting the recent floras on South India (Saldanha and Nicolson, 1976; Nair and Henry, 1983; Bennet, 1987; Henry et al., 1987, 1989; Pullaiah and Chennaiah, 1997). The enumeration of plants is followed as per Bentham and Hooker system of classification following the arrangement in the flora of Presidency of Madras (Gamble & Fisher, 1957). All the specimens deposited in CNH (CAL), MH , Botanical survey of India no. CNH/DD/Tech/2000, BSI/SC/5/21/2001-2018.

RARE ETHNO MEDICANAL PLANTS OF EASTERN GHATS

Clematis roylei Rehder in J. Arn. Arb. 22: 575. 1941; Rau in Flora of India 1: 74. 1993. *C. nutans* Royle. Illus. Bot. Himal. 1. 51. 1834; Gamble 1: 3. 1915.

Silky pubescent climbing shrub, up to 4 m long; branches villous. Leaves 3-5-foliolate or bipinnate or decomposed, 10-15 cm long; leaflets ovate-lanceolate or ovate-elliptic, 1.5-3 x 0.8-1.4 cm, base oblique, margin serrate-dentate, apex acute-acuminate, petiole twining. Flowers creamish-white in axillary panicles. Sepals white, broadly oblong, 2.5 x 0.7 cm, tomentose; stamens numerous. Achenes ovoid, ellipsoid, 0.4 x 0.2 cm, hairy with 3.5 cm long feathery style.

Rare in shaded places in forests along banks of rivers or streams in Northern Eastern Ghats. Fl.: Sept.-Feb.; Fr.: Dec.-April.

Medicinal importance : Leaf paste applied to skin diseases like leucoderma.

Bisu Puram-Galikonda (VSKP), *DMR* 21178; Minumuluru (VSKP), *GVS* 29612 (MH).

Clematis smilacifolia Wall. *Asiat. Res.* 13: 402. 1820; *FBI* 1:3. 1872; *Gamble* 1: 3. 1915; Rau in *Flora of India* 1: 75. 1993. *C. loureiriana* auct. non DC., Merr. in *Trans. Amer. Phil. Soc.*, n.s. 24(2): 154. 1935, pp,

Large climber up to 5 m long, stems and branches glabrous. Leaves simple, ovate or elliptic-ovate, 2.6-7 x 1.3-6 cm, base broadly cordate, margin entire, apex subacute or mucronate, or rarely obtuse, glabrous, petiole twining 2-15 cm. Flowers creamish-white or purple in axillary panicles. Sepals oblong-lanceolate, 2.2 x 1.2 cm. Achenes ovate, compressed, hairy with 3.5-7 cm long feathery styles.

Rare twiner in moist valleys. Fl.: June-Aug.; Fr.: Oct.-Nov.

Mahendragiri hills (GJ), *DMR & KSP* 24097; Vizag hills, Kori road (VSKP), *GVS* 22669 (MH); Madgole-Minumuluru *GVS* 29562 (MH), way Gudem to Chintapalli (VSKP), *JLE* 9147 (MH); Sapparla Gadda (VSKP), *GVS* 42778 (MH); Dariugabadi (GJ), *CAB* 1387 (MH); Yarlagaadda (EG), *VNS* 163 (CAL).

Medicinal importance: Rhizome paste mixed with breast milk, administered orally to infants to cure stomach-ache. INDIA: Andhra Pradesh, Karnataka, Tamil Nadu, Kerala and Orissa.

Endemic.

Clematis wightiana Wall. ex Wight & Arn. *Prodr.* 2: 1834; *FBI* 1: 5. 1872; *Gamble* 1: 3. 1915; Rau in *Flora of India* 1. 80. 1993.

Large woody climber, up to 4 m long branches covered with pale grey or golden brown hairs. Leaves pinnately 3-5-foliolate, leaflets oblong-ovate, 3-5.4 x 2-3.5, base cordate or subcordate, margin irregularly dentate, apex acute to acuminate, softly brown silky villous on both sides; petiole up to 6 cm. Flowers golden yellow in axillary or terminal panicles. Sepals 4, ovate, glabrous inside, 1.5-2.5 cm long. Achenes ovate, compressed, 3-4 mm, hairy, with 1.5 cm long feathery styles.

Rare in moist valleys. Fl.: Dec.-Mar. Fr.: Jan.-May.

Medicinal importance: The leaves pounded with black pepper, garlic and castor oil, made into paste and applied externally to treat rheumatism.

Minumuluru (VSKP), *DMR* 24369; Mahendragiri hills (GJ), Srivastava & Party 66961, 66967 (LWG).

Michelia champaca L. *Sp. Pl.* 536. 1753; *FBI* 1: 42. 1872; *Gamble* 1: 9. 1915. DCS Raju in *Flora of India* 1: 175. 1993. (Magnoliaceae)

Densely foliaceous, evergreen tree, up to 20 m tall; bark grey, thick, smooth; wood light olive-brown or yellowish, even-grained; branches ascending, spreading, forms a close crown. Leaves thinly coriaceous, ovate-lanceolate, 10-19 x 6-9 cm, glabrescent and shining above, minutely puberulous beneath, base sub-acute, margin

wavy, apex long acuminate, secondary nerves 10-18 pairs, petiole 1-8 cm long. Flowers pale yellow, fragrant, solitary, 6 cm across, axillary. Fruit dark brown, an aggregate of follicles, laxly arranged, woody, ovoid, white speckled; seeds numerous, brown, subglobose, 8-10 x 5-7 mm, angular, enclosed by scarlet red aril.

Planted in cool valleys, near and around temples and gardens for the sake of flowers. Fl.: Mar.-May. Fr.: July.

Tirumala hills (CTR), *DMR* 21121; Maredumilli (EG), *DMR* 22081; Simhachalam hills (VSKP), *TP & EC* 7315; Bispuram (VSKP), *GVS* 44281 (MH); Kanchipadu (VSKP), *GVS* 19759 (MH).

Milium montana Gardn. ex Hook. f. & Thoms. Fl. Ind. 148. 1855; Gamble 1: 22 1915; Debika Mitra in Flora of India 1: 218. 1993. *M. indica* Lesch. var. *montana* (Gard. ex Hook. f. & Thoms.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1: 86. 1872.

Shrub, up to 2 m tall, stem dark brown, terete, young branches pubescent. Leaves ovate, ovate-lanceolate, 5-7 x 2-2.5 cm, base rounded, apex acute-acuminate. Flowers dark pink, solitary, axillary, bisexual, fragrant. Sepals 3, 1 mm long. Petals 6 (3+3), 1-2 cm long. Ripe carpels many, subglobose, red.

Rare in Seshachalam hills. Fl. & Fr.: April-June, Fr.: Aug.-Sept.

Medicinal importance: 1. Leaf juice used to cure fever one spoon daily for three days.

Penchalakona (NLR), *ASR* 4012 (VV); Cuddapah, *Dunn* 714 (MH),.

Polyalthia korinti (Dunal) Thw. Enum. Pl. Zeyl. 398. 1864; FBI 1: 64. 1872; Gamble 1: 16. 1915; Debika Mitra in Flora of India 1: 273. 1993. *Gutteria korinti* Dunal Monogr. Annon. 133. 1817.

Small tree, 3-5 m tall, spreading; bark grey, young branches glabrous or subpilose. Leaves coriaceous, elliptic or ovate-elliptic, 3-10 x 1.8 - 5 cm, glabrous, glossy, base acute, margin entire, apex acute to shortly acuminate, secondary nerves 4-6 pairs, tertiary nerves more prominent; petiole 4-8 mm. Flowers bright green, solitary, rarely 1-3, axillary, 1.4-1.8 cm dia; stamens numerous Monocarps numerous, bright crimson, 5 x 4 mm, ellipsoid or subglobose; stalk to 8 mm, seed 1, smooth, shiny grey.

Rare in hills of Seshachalam, Kambakkam and Viskhapatnam. Fl. & Fr.: Apr.-May.

Kambakkam hills (CTR), *MCB* 45117 (MH); Tirumala (CTR), *DR* 2197 (SVU).

Cyclea peltata (Lam.) Hook. f. & Thoms. Fl. Ind. 201. 1855; FBI 1: 101.

p.p.; Gamble 1: 31. 1915; Gangopadhyay in Flora of India 1: 325. 1993. *Menispermum peltatum* Lam. Encycl. 4: 96. 1797. *Cyclea burmannii* Hook. f. & Thoms. Fl. Ind. 201. 1855; FBI 1: 104. 1872. *Clypea burmannii* Wight & Arn. Prodr. 1: 14. 1834. *Cyclea arnottii* Miers in Contrib. Bot. 3: 240. 1871; Gamble 1: 31. 1915. (Menispermaceae)

Twiner, up to 5 m long. Leaves triangular-ovate, deltoid, elongate-ovate, 5-13 x 4-7 cm, truncate, base obtuse or subcordate, margin entire, apex acuminate, apiculate, pilose above, pubescent beneath, 5-nerved; petiole 2-4 cm. Male flowers: green in panicles of congested cymes, 2 cm long, puberulous, peduncled, green; Calyx campanulate, sepals 5-7, connate, unequal. Petals greenish, 4-7, connate; stamens 4. Female flowers in axillary pseudoracemes, bracteoles ovate-lanceolate. Sepal 1, linear. Petal 1, subulate, style 3-fid. Drupe obovoid, 3 x 4 mm.

Rare in Kolli hills, Araku hills and Seshachalam hills. Fl.: Nov-Jan. Fr.: Mar-June.

Medicinal importance: Leaves dipped in castor oil, mildly heated and applied on boils and blisters.

Sunkaramitta (VSKR), *DMR* 24012; Tirumala (CTR), *DR* 22591 (SVU).

Note: A rare climber up to 1300 m, small galls observed on inflorescence; often pollinated by green colour butterfly.

Tinospora sinensis (Lour.) Merrill in *Sunyatsenia* 1: 193. 1934; Pramanik in *Flora of India* 1: 349. 1993; Forman in *Kew Bull.* 36. 386. 1981. *Campylus sinensis* Lour. *Fl. Cochin Ch.* 113. 1790. *Tinospora malabarica* (Lam.) Miers in *Ann. Mag. Hist. Nat. Ser. 2.* 7238. 1851 et in *Contrib. Bot.* 3: 32. 1871; FBI 1: 96. 1872; Subba Rao and Kumari in *Bull. Bot. Surv. Ind.* 9: 186. 1867. *Menispermum malabaricum* Lam. *Encycl.* 4: 96. 1797. (Menispermaceae)

Large fleshy climber, stem puberulous, leaf scars distinct. Leaves ovate to suborbicular, 6-12 x 5-10 cm, base abruptly truncate or cuneate or subcordate, apex acutely acuminate, membranous, sparingly pubescent above, pilose beneath; petiole 4-8 cm. Flowers in pseudo-racemes. Male flowers: Sepals 6, yellowish green, glabrous. Petals 6; stamens 6. In female flowers, pedicels 3-7 mm long.. Drupes globose, red scarlet or orange red, 9-12 mm across, endocarp tuberculate.

Rare climber in Mahendragiri hills.

Medicinal importance: 1. The stem or root paste applied over
for snake bite or scorpion sting.

2. Tuber extract given for stomach ulcers.

Paniganda (GJ), *DMR* 18570 *Bramham & Saxena*, *RRL-B* 3000.

Capparis nilgiriensis Subba Rao *et al.* in *J. Bombay Nat. Hist. Soc.* 78: 146. 1981; Sundara Raghavan in *Flora of India* 2: 281. 1993.

Evergreen tree up to 15 m; branches many from the base. Leaves oblong-lanceolate, 4.5-10 x 2-4 cm, coriaceous, glabrous, base obtuse-round, margin entire. Flowers 2 or 4 on lateral axes. Sepal 4 (2 + 2), glabrous, apex acute. Petals 4, white. Berry oblong. Seeds reniform.

Rare in Melagiri hills in Shola forests. Fl.: March-April, Fr.: May.

Medicinal importance: 1. Leaf decoction given in early stages of fever. 2. Root paste applied on wounds of cattle
Melagiri (DP), *KMM* 27176, 27177 (CAL).

Rare in Melagiri hills in Dharmapuri district.

INDIA: Endemic to Tamil Nadu.

Capparis olacifolia Hook. f. & Thoms. in *FBI* 1: 178. 1872; Gamble 1: 45. 1915. Mooney *Suppl. Bot. Bihar & Orissa* 21. 1950; Jacobs in *Blumea* 12: 475. 1965; Sundara Raghavan in *Flora of India* 3: 283. 1993.

Shrub or small tree up to 4 m tall; young branches pubescent. Leaves 3-9 x 1.5-2 cm, ovate, base rounded-subacute, apex mucronate, or acuminate, chartaceous, petiole 5-7 mm. Flowers white, solitary, axillary or in pairs. Sepals lanceolate or elliptic-lanceolate. Petals ovate-oblong; stamens many. Fruit globose, 8 mm across, rugose, shiny.

Rare in Northern Eastern Ghats. Fl.: Feb.-June; Fr.: July-Dec.

Medicinal importance: Root bark boiled in gingely oil (*Sesamum indicum*) is squeezed into the ear to cure pain and pus formation.

Visakhapatnam hills (VSKP), *GVS* 47318 (MH), Mahendragiri hills (GA), *Saxena & Brahmam* 2215, 3691

(RRL-B), JSG 1394, 5655 (MH).

Capparis roxburghii DC. Prodr. 1: 247. 1824; FBI 1: 175. 1872; Gamble 1: 46. 1915; Sundara Raghavan in Flora of India 2: 288. 1993.(Capparaceae)

Armed scandent shrub, 2-4 m tall, young shoots glabrescent, older shoots glabrous, purplish, spiny. Leaves 5-6 x 1.7-2.7 cm, petiole glabrous, base cuneate, apex obtuse, petiole 1.2 cm. Flowers white in terminal corymbs on long pedicels. Sepals four, concave, two seriate, caducous, glabrous, 10 x 9 mm. Petals four, white, caducous, obovate; stamens many. Fruit globose, about 5-6 cm across, seeds embedded in a pulpy viscous endocarp, reddish brown.

Rare, along rocky slopes in dry deciduous forests up to 600 m. Fl. & Fr.: Apr.-Aug.

Medicinal importance: Leaf paste along with castor oil (*Ricinus communis*) applied on burns.

Chitvel RF (CDP), AMR & ASR 3504 (MH); Barkuda (Ganjam), Annandale 1332 (CAL); Baruni hills near Khurda, Haines 4070 (CAL).

Distribution: This species has a comparatively wider distribution but is mostly confined to the deciduous forests of South India along the Eastern Ghats ranges of Andhra Pradesh and Orissa States.

Note: Roxburgh originally used the binomial *Capparis corymbosa* in Hort. Beng. and described it later in his Flora Indica. As *C. corymbosa* Roxb. was a later homonym for *C. corymbosa* Lamk., an African plant, De Condolle proposed the new name *C. roxburghii* in his Prodromus basing it on a specimen in the Banks Herbarium with the manuscript of *C. agula*. Incidentally 'agula' is also the vernacular name used by Roxburgh under "*C. corymbosa*" in his Flora Indica.

Hypericum gaitii Haines in J. Asiat. Soc. Bengal. n.s. 15: 311. 1919 & Bot. Bihar & Orissa 1: 52. 1925; Saxena & Brahmam Fl. Orissa 1: 111. 112. 1994; Biswas in Flora of India 3: 58. 1993.(Hypericaceae)

Much branched glabrous shrub, 0.8-2 m tall, stem chartaceous, terete, reddish brown. Leaves simple, opposite, elliptic-oblong, to oblong-lanceolate, 1.5-6 x 0.3-1.8 cm, glabrous, pale and black glandular beneath, base subamplexical, margin entire, apex subacute to acute. Flowers yellow, bisexual, 2-5 in dichotomous cymes. Sepals 5, green, 8-10 x 4-6 mm, ovate or ovate-lanceolate, persistent in fruit. Petals obliquely obovate, 3 x 1.7 cm; stamens numerous. Capsule ellipsoid or conical, dehiscent along placenta, 1.2-1.5 cm long, seeds many, brown, 1 mm long.

Rare on slopes of exposed hills. Fl.: Feb.-May. Fr.: Apr.-Jun.

Medicinal importance: Leaf paste or juice used for skin diseases like eczema and herpes.

Galikonda hills (VSKP), KSM 21945 & 21956.

Garcinia xanthochymus Hook. f. ex T. And. in Hook. f. Fl. Brit. India 1: 269. 1874; Singh in Flora of India 3: 129. 1993. *Xanthochymus pictorius* Roxb. Pl. Cor. t. 196. 1805 (Sphal *X. tinctorius* DC. 1824) non *Garcinia pictoria* Roxb. 1824.

G. tinctoria (DC.) W.F. Wight in U.S.D.A. Bur. Pl. Industr. Bull. 137. 50. 1909; Gamble 1: 74. 1915.

Moderate sized tree, 15-20 tall; bark blackish or dark grey, exfoliating in small round flakes. Leaves thick coriaceous, variable in shape, linear-oblong or oblong-lanceolate, 25.5-34.5 x 6.5-11 cm, obtuse, base rounded or acute, margin entire, apex acuminate. Flowers white in axillary fascicles. Berries 7 cm in dia, subglobose, dark yellow, seeds brown, 1-4.

Rare in East Godavari and Srikakulam hills. Fl. & Fr.: Throughout the year.

Vathangi (EG), JSG 12677 (MH).

Medicinal importance: Stems crushed and mildly heated, gently massaged for muscle pain.

Mammea suriga (Buch.-Ham. ex Roxb.) Kosterm. Comm. For. Res. Inst. Indonesia Bogor 72: 23. f. 10. 1961. Singh in Flora of India 3: 132. 1993. *Calophyllum suriga* Buch.-Ham. ex Roxb. Fl. Ind. 2: 608. 1832. *Ochrocarpus longifolius* (Wight) Benth. ex T. And. in Hook. f. Fl. Brit. India 1: 270. 1874; Gamble 1: 75. 1915.

A large evergreen tree with hard wood. Leaves oblong to lanceolate. Flowers white or rose; stamens numerous. Fruit 2.5 cm long.

Cultivated. The flowers are used in Hindu worship.

Shorea tumbaggaia Roxb. Fl. Ind. 2: 617. 1832; FBI 1: 306. 1874; Gamble 1: 83. 1915. Janardhanan in Flora of India 3: 241. 1993. *Vatica tumbaggaia* (Roxb.) Wight & Arn. Prodr. 84. 1834.

Deciduous tree, up to 20 m tall; bark dark brown, thick, rough, longitudinally fissured; wood brown, branchlets tomentose. Leaves ovate, thick coriaceous. 6-18 x 3-10 cm, ovate, glabrous on both surfaces, base cordate, margin entire, apex acuminate, petiole 1.5-5 cm, secondary nerves 8-10 pairs. Flowers white, fragrant, in 15-20 cm long terminal panicles. Capsules yellowish, white, belly (seed part) 2 cm long, ovoid, pubescent; wings unequal, spatulate, to 5 cm long.

This species is distributed in Seshachalam and Veligonda hills in Cuddapah and Tirupati hills of Chittoor district of Andhra Pradesh to North Arcot and Chingleput, districts of Tamil Nadu.

Endemic to Southern Eastern Ghats up to 1000 m. Fl.: Mar.-Apr. Fr. : June-Aug. Vern. : Tel.: *Thamba jalari*.

Tirumala hills (CTR), SSR 16155; Veligonda hills (NLR), MSR 1361 (CAL), Balapalli (CDP), CECF 4734 (CAL). Chitteri on the way to Kalachipady (DP), TR 84163 (MH); Talakona RF (CTR), DR 287 (MH).

INDIA : Tamil Nadu and Andhra Pradesh. Endemic.

Abelmoschus moschatus Medikus, Malv. 46. 1787; Borssum in Blumea 14: 90. 1966; Paul in Flora of India 3: 308. 1993. *Hibiscus abelmoschus* L. Sp. Pl. 696. 1753; FBI 1: 342. 1784; Gamble 1: 97. 1915.(Malvaceae)

Herb, up to 2.5 m tall, covered with hirsute hairs. Leaves extremely variable in shape and size, 4.5-7 x 4-10 cm, 3-6 palmilobed to palmipent, upper leaves narrow, lobes ovate-oblong, obtuse, base 5-9-nerved; stipules 2-10 mm long, linear to filiform, hairy, petiole 4.5 cm. Flowers yellow with narrow centre, axillary, solitary and in terminal racemes. Calyx 2-3 cm long. Corolla yellow with dark purple centre; petals obovate, rounded at apex. Capsules 5-10 x 2.5 cm ovoid to globose, seeds many, 3-5 mm, black with musk scented.

Occasional in Eastern Ghats. Fl.: July-Oct.; Fr.: Oct.-Dec. Vern.: Tel.: *Kasturi benda*; Tam.: *vertilai Kasthuri, Kattu Kasthuri*.

Tender fruits used as vegetable. seed oil is used to treat muscle diseases externally.

Gundlabrahmeswaram (KNL), DMR 24353, JLE 22228 (MH).

Note: Seed oil is used as an adulterant for animal musk and in perfume. The plant is also cultivated for its seeds in different plains and hills of Eastern Ghats.

Decaschistia cuddapahensis T.K. Paul & Nayar in Geobios New Rep. 2: 156. 1983 and in Fasc. Flora of India 19: 105. 1983; Paul in Flora of India 3: 298. 1993.(Malvaceae)

Perennial shrub. Young stems and branches pubescent with light yellowish brown stellate hairs. Leaves 8-13 x 5-8 cm, ovate-oblong, base subcordate, apex acute, obtuse or truncate, subcordate at base, both surfaces densely stellate velutinous, upper surface dark, light brown, lower surface yellowish brown in colour, 5-7-nerved at the base, middle nerve with a small gland at the base; petiole 1.5-2 cm long. Flowers yellow, solitary, axillary, calyx 5-lobed; lobes connate below middle, deltoid, acuminate, hairy. Corolla, yellow with maroon centre, outside densely stellate pubescent, inside glabrous. Capsule enclosed within the calyx, globose, ten-valved, seeds one in each locule, 5 x 3 mm, reniform, ascending, sparsely hairy.

Endemic to Seshachalam hills of Eastern Ghats. Fl. & Fr.: July-March.

Fiber yielding plant.

Tirumala hills (CDP), *DMR* 24069; *KS* 6878 (CAL), Swamipadalu-Kodur (CDP), *JLE* 14332 (CAL).

Note: Differs from *D. rufa* Craib in having larger (8-13 x 5-8 cm), ovate or oblong leaves, petiole length about one eighth to one tenth of the lamina and longer sepals (1.6-2 cm); whereas in *D. rufa* Craib the leaves are smaller (3.5-7.5 x

4-7 cm), almost rounded, petiole length about half to one-third of the lamina and shorter sepals (1-1.2 cm).

Actually Craib described the *D. rufa* species based on Rottler & Wallich's specimen (Wall. Cat. 1901, U.K.

Microfich (type of *D. rufa*. India: Pen. India or without precise locality Herb, Rotter et Wall. Cat. 1901,

UK.) which is rather a poorly preserved specimen and is difficult to discern anything on foliar characters.

However, Craib's (1912) detailed distribution accounts for its foliar variability to some extent. He described

the leaves as "*Subrotunda, ovato-elliptica, elliptica veloblongo-elliptica, apice breviter acuminata, acuta vel sub obtusa basi rotunda, sub cordata, 3-10 cm longa, 1-5 - 7 cm lata*".....

Type: Swamipadalu-Kodur (CDP.), dated 23.7.1962, J.L. Ellis 14332 (Holotype) (CAL) Acc. No. 28457 (MH)(Isotype).

Decaschistia rufa Craib, in Kew Bull. 25. 1912; Gamble 1: 94. 1915; Paul in Flora of India 3: 298. 1993.

(Malvaceae)

Shrub, young branches pubescent with brown hairs. Leaves 3.5-7.5 x 4-7 cm, almost rounded, base subcordate or rounded, apex shortly acuminate, acute or subcordate, densely pubescent on both surfaces, 5-6-nerved at base; petiole

1.5-3.5 cm long, densely pubescent. Flowers yellow, axillary, solitary. Calyx companulate, divided. Corolla 2.5-3 cm across; petals 2-2.5 x 1-1.5 cm. Capsules enclosed within the calyx, globose, ten-valved, seeds one in each locule.

Fiber yielding Plant.

A strict endemic to Eastern Ghats. Fl. & Fr.: July-March.

Tirumala hills (CTR), *SKW* 5557 (BLAT); Tirumala-Tirupati hills (CTR), *KS* 6878 (MH); Balapalli RF (CDP), *Pradeep* 42130, 42132 (CAL); Balapalli (CDP), *JSG* 16561 (CAL); *s.l.* 1260 (CAL).

Note: *Decaschistia rufa* is endemic to peninsular India where it occurs in dry deciduous forest of Chengulput district of Tamil Nadu and Chittoor, Cuddapah districts of Andhra Pradesh. It has also been listed in the Red Data book (Nayar & Sastry, 1987) and marked as "Endangered." According to Subbarayudu, S. and Velemorgan (1999) in their "Endangered Plant Species of Tamil Nadu" they considered as "Extinct species" in Tamil Nadu based on their herbarium study. It has not been reported after 1915 from Tamil Nadu.

Conservation must be necessary for this species.

Eriolaena lushingtonii Dunn in Kew. Bull. 1915: 1915; Gamble 1: 109. 1915; Malick in Flora of India 3: 417. 1993.(Sterculiaceae)

Tree, 4-5 m tall; young branches pubescent, bark greyish red. Leaves orbicular-cordate, 6-11.5 x 5-9.5 cm, base cordate, margin irregularly shortly dentate, apex acute or shortly acuminate, stellate-hairy above, white-tomentose beneath. Flowers yellow, about 2 cm long in axillary, 2-3-flowered racemes, about 8 cm long. Calyx 1.8 cm long, 5-partite, pubescent within, tomentose outside. Petals 5, obovate, 2 cm long, clawed at base, tomentose; stamens 10-12. Capsules ovoid, ca 3.5 cm long, woody; seeds many, winged on one side at top.

Rare in Eastern Ghats. Fl. & Fr.: June - Aug.

Medicinal importance: plant to use as antidote for snake bite and scorpion sting.

Nallamalais (KNL), *DMR* 19092; Potharajupenta (KNL), *SSR* 15987; Chelama (KNL), *JLE* 16714 (MH); Rollapenta (KNL), *JLE* 42284 (MH).

INDIA: Andhra Pradesh, Tamil Nadu, Kerala and Karnataka.

Endemic.

Note: It's type collection was made by Lushington from the Nallamalai hills in Kurnool district of Andhra Pradesh. Subsequently after a lapse of about seventy years, Ellis collected it from Chelama RF of Kurnool district, Andhra Pradesh on 5.7.1963 and adjacent locality Rollapenta on 16.8.1972 in the Nallamalais. It was also collected from the South Srivalliputhur RF in Ramanathapuram district of Tamil Nadu on 24.7.1965 by E. Vajravelu Acc. 24887 (MH). Malick in Flora of India 3: 417. 1993 gave the distribution of the species also in Karnataka and Kerala. Hence this species is endemic to Southern Peninsular India. In Eastern Ghats it is restricted to Nallamalais of Andhra Pradesh mainly in open slopes of moist deciduous forests between 350 and 900 m.

Hildegardia populifolia (Roxb.) Schott & Endl. Melet. Bot. 33. 1832. Malick in Flora of India 3: 432. 1993. *Sterculia populifolia* Roxb. Fl. Ind. 3. 148. 1832; FBI 1: 361. 1874. (*populnifolia*), Gamble 1: 107. 1915.(Sterculiaceae)

Deciduous tree, up to 20 m tall; bark smooth, wood silverish white; branchlets angular, warty. Leaves reniform or deeply cordate, 9.5-11.5 x 8-11 cm, glabrous, base deeply cordate, margin entire, apex long-acuminate, 7-nerved, lateral nerves 4 pairs, basal nerves raised, petiole 5-12 cm. Flowers scarlet, polygamous in axillary and terminal up to 15 cm long panicles. Calyx scarlet, lobes 1.3 cm long, free nearly to the base, obovate-linear; stamens 10. Follicles 5, up to 10 x 5 cm, oblique lanceolate, membranous, inflated, strongly nerved; seeds 2, 1.4 cm long, ovate-oblong, pale brown.

Very rare in dry deciduous forests in Eastern Ghats. Fl.: Apr. Fr.: June-Feb.

Chendrayuni Kona (ATP), *DMR* 24187; Ankalamma Konda (CTR), *DR* 637 (SVU), Kalikiri hills (CTR), *DR* 637 (MH); Godavari hills, *JSG* 15211 (MH); Chendrayunikona (ATP), *BR*, *CJP* & *VS* 19180; *BR* & *AMR* 19734; *SS* & *AMRE* 19732; Barigam, *AMRE* & *GLN* 19748; Devadanampeta (VP), *BR* & *GLN* 19751; *AMRE* & *BR* & *GLN* 19751; Devadanampatti (SM), 8 KM from Ginge town, *DN* & *PR* 97776 (MH), Krishnagiri (SM), *CAB* 14889 (MH). Stem yields Fiber

INDIA : Tamil Nadu, Andhra Pradesh.

Note: In Chendrayuni Kona (ATP), it is associated with *Gyrocarpus americanus* in rocky areas. Inhabitants of that area used this plant for rope making.

Ealeocarpus lanceifolius Roxb. (Hort. Beng. 42. 1814, *nom. nud.*), Fl. Ind. 2: 5. 1832 '*lanceaefolius*;' FBI 1: 402. 1874; Gamble 1: 123. 1915; Murti in Flora of India 3: 543. 1993.

Tree, up to 20 m tall; wood soft, light brown; branchlets pubescent. Leaves lanceolate, elliptic, elliptic-lanceolate, 7-15 x 2-5 cm, thinly coriaceous-chartaceous, glabrous above, margin distantly crenate-serrate, apex acuminate, petiole 7-15 mm. Flowers white, 6-9 mm across, pubescent in stiff racemes. Drupe green, oblong-ovoid to ellipsoid, 2-5-3 cm long. Pyrenes oblong, with 3 longitudinal grooves, unilocular, seed one.

Rare in evergreen forests of Viskhatpatnam district (Gamble). Fl.: Mar.-Aug. Fr.: Oct.-Dec.

Medicinal importance: 1. Leaf or root extract filtered and administered for malarial fever.
2. Leaves ground with turmeric (*Curcuma longa*) and applied on cuts, wounds and skin diseases.

Sloanea sterculiacea (Benth.) Rehder & Wilson in Sarget, Pl. Wilson 2: 362. 1915; Coode in Kew Bull. 38: 386. 1983. Murti in Flora of India 3: 566. 1993. *Echinocarpus sterculiacea* Benth. in J. Linn. Soc. 5 suppl. 2: 72. 1861; FBI 1: 400. 1874; Subba Rao & Kumari in Bull. Bot. Surv. India 12: 208. 1970. (Sterculiaceae)

Large, evergreen tree, 20-25 m tall, often buttressed; branchlets glabrous or tomentose. Leaves ovate or elliptic 11-22 x 4.5-10 cm, glabrous, tomentose beneath, cuneate, rounded or subcordate, serrulate margin, apex acute to short acuminate, petiole to 4 cm. Flowers creamy white in axillary, solitary or few-flowered fascicles. Capsule red, globose, covered with straight, sharp, subulate hispid, persistent spines, 6 cm across; seeds numerous.

Rare in moist deciduous forests, above 1000 m in Eastern Ghats. Fl.: Sept. Fr.: Dec.-May.
Sapparla (VSKP), SSR 15965; Minumuluru (VSKP), GVS 30043 (MH).

Impatiens diversifolia Wall. ex Wight & Arn. Prodr. 139. 1834; FBI 1: 446. 1874; Gamble 1: 146. 1915; Vivekananthan *et al.* in Flora of India 4: 141. 1997.

Annual diffuse herb with succulent stems, glabrous. Leaves opposite, elliptic-oblong, 1-4 x 6.5-2 cm, lower ones shortly petiolate, base cordate, margin serrate, sessile. Flowers solitary pink to white. Lateral sepals linear, acuminate. Spur filiform, 1-1.5 cm long. Capsules ellipsoid, ca 8 mm long; seeds globose, dark-brown, smooth.

Rare in masshy places. Fl. & Fr.: Sept.-Oct.

Medicinal importance: 1. Plants boiled in water used for bathing epilepsy patients.

Araku valley (VSKP), NPBK 608 (CAL).

Citrus medica L. Sp. Pl. 782. 1753; Narayan Nair & Nayar in Flora of India 4: 284. 1997; Gamble 1: 161. 1915. (Rutaceae)

Shrub or small tree, 4-8 m tall; spines stout; wood white, fine grained. Leaves elliptic, oblong or ovate-oblong, 8-15 x 3-8 cm, glabrous, base obtuse or rounded, margin serrate or crenate, apex obtuse. Flowers white, often unisexual, ca 1.5 cm long. Calyx 4 or 5-lobed, each lobe ca 4 mm long. Petals 4 or 5, oblong or oblanceolate, 2-3.5 x 1 cm. Fruit ovoid or oblong or obovoid, yellow, 10-20 cm long, with pale greenish, acidic or sweetish pulp, seeds white, small.

Rare, in Eastern Ghats along streams. Vern.: Tel. *Lungamu*.

Korai Road (VSKP), GVS 22631 (MH).

Medicinal importance: 1. Leaf paste mixed with a pinch of fresh lime
is applied on the wounds.

2. Pounded leaves bandaged to the head for
head ache.

3. Leaf juice applied
for tooth-ache.

Clausena anisata (Willd.) Hook. f. ex Benth. in Hook. Niger Fl. 256. 1849. Narayanan Nair & Nayar in Flora of India 4: 321. 1997; Molino in Bull. Mus. Hist. Nat. (Paris) 16: 128. 1994. *Amyris anisata* Willd. Sp. Pl. ed. 4(2): 337. 1799. *A. dentata* Willd., l.c. *Clausena dentata* (Willd.) M. Roemer, Syn. Mem. Hesper. 44. 1846. *Clausena willdenowii* Wight & Arn., Prodr. 96. 1834, *nom. superfl.*; FBI 1: 506. 1875. *Amryis nana* Roxb. Fl. Ind. 2: 249. 1832. *Clausena willdenowii* Wight & Arn. var *nana* (Roxb.) Balakr. in Bull. Bot. Surv. India 22: 173. 1982.

Small tree, up to 6 m tall; branchlets pubescent to tomentose. Leaves imparipinnate, leaflets 7-13, alternate, ovate, ovate-lanceolate or ovate-oblong, 5-10 x 1.5-3 cm, base oblique, apex obtuse or acuminate, notched at tip, petiolules slender

10 mm. Flowers white in axillary racemes, shorter than leaves. Sepals ovate to rounded, 0.5-1 mm long, acute or obtuse, glandular ciliate. Petals white, oblong, obtuse, concave, 2.5-6 x 1.5-3 mm; stamens 8. Berries globose or ovoid, greenish white or orange before becoming ripe. 7-15 mm across, one-seeded.

Rare in Eastern Ghats in moist deciduous semievergreen or evergreen forests.

Medicinal importance: Leaf paste with turmeric powder used to skin diseases like eczema.

Shevaroy hills (SM), KMM 13952 (CAL); PP & MN 16410 (CAL); Pachamalais (TP), KMM & NVG 15602 (CAL); Tippukadu RF (NA), KR 16594 (MH); way to Malpalti from Puliyur (NA), KS 6125 (MH); Masobial hill (CDP), EV 57996 (MH).

Note: Molino (1994) who united the Indo-Sri Lankan *C. dentata* with the tropical African *C. anisata* recognised two varieties in it. *C. anisata* var. *anisata* and

C. anisata var. *paucijuga* (Kurz.) Molino. Pullaiah & Chennaiah (1997) in Flora of Andhra Pradesh have not reported the occurrence of *C. anisata* var. *anisata* in Andhra Pradesh. But Narayan Nair and Nayar reported its occurrence from Andhra Pradesh.

Clausena austroindica Stone & K.N. Nair in Nord. J. Bot. 14. 491. 1994; Narayan Nair & Nayar in Flora of India 4: 322. 1997; Molino in Bull. Mus. Hist. Nat. (Paris) 16: 127. 1994. *C. heptapylla* auct. non (Roxb.) Wight & Arn. ex Steudel (1840); Gamble 1: 155. 1915. (Rutaceae)

Shrub or small tree, up to 10 m tall; branchlets glabrous. Leaves up to 40 cm long; leaflets sub-opposite to

alternate, lanceolate or obovate, 5.5-16 x 2.5-6 cm, base attenuate to cuneate, margin crenate or undulate, apex acuminate, obtuse or rounded. Flowers white in terminal, axillary panicles. Calyx lobes 0.5 mm long, lobes rounded, deltate. Petals 5 (4), imbricate, elliptic, obtuse, 3-5 x 1.5-3 mm, with obscure glands, white; stamens 10. Berries globose, glandular and greenish.

Rare in Eastern Ghats "Shola" forests. Fl.: Feb.-April. Fr.: May-Sept.

Medicinal importance: Root bark extract poured into ears for ear infection.

Note: This species was previously included in *Clausena heptaphylla* (Roxb.) Steudel., by Gamble (1915). In general, *C. austroindica* resembles *C. heptaphylla*. The most distinctive characters that distinguish *C. austroindica* from *C. heptaphylla* include the presence of a cylindrical-obovoid, conspicuously glandular-papillate, 5-locular (rarely 4-locular) ovary with two collateral ovules in each locule, style shorter than the ovary, and a capitata stigma which is distinctly broader than the style.

Melicope lunuankenda (Gaertn.) T. Hartley in Sandakania 4: 61. 1994; Narayanan Nair & Nayar in Flora of India 4: 369. 1997. *Fagara lunu-ankenda* Gaertn. Fruct. 1: 334. t. 68. f. 1788. *Evodia lunuankenda* (Gaertn.) Merr. in Philipp. J. Sci. 7: 378. 1912. var. *lunu-ankenda* (*Evodia lunuankenda*); Gamble 1: 148. 1915. *Evodia roxburghiana* Benth. Fl. Hongs. 59. 1861; FBI 1: 487. 1875.

Evergreen tree, up to 15 m tall; bark corky, smooth; wood greyish white. Leaves 3-foliolate, rachis to 10 cm long; leaflets ovate, elliptic-oblong or lanceolate, 4-17 x 3-7.5 cm, glabrous, shiny above, pale beneath, base obtuse or acute, apex acute or acuminate, entire at margin. Flowers cream, fragrant, 4 mm across, unisexual, 4-merous in dense axillary cymes. Fruits light brown, globose; seeds black, oblong, 3.5 x 2 mm, shiny muricate.

Rare in Rampa hills of East Godavari. Fl.: July-Aug. Fr.: Throughout the year.

Medicinal importance: Two to three spoons root decoction mixed with black pepper and salt is given for asthma and bronchitis.

Rampa (EG), JSG 15996 (CAL).

Zanthoxylum ovalifolium Wt. Ill. 1: 169. 1840; FBI 1: 492. 1875; Narayanan Nair & Nayar in Flora of India 4: 384. 1997; Gamble 1: 150. 1915. (Rutaceae)

Small tree, up to 8 m tall; branchlets unarmed. Leaves 3-foliolate; leaflets ovate to elliptic-oblong or obovate, 4-17 x 2-7.5 cm, chartaceous to coriaceous, glabrous, margin distantly crenate, base acute to cuneate and slightly oblique. Flowers white, 5 mm across in dense paniculate cymes with alternate branches. Male flowers: sepals 4, triangular, ca 1 mm long. Petals white, 4, elliptic oblong, obtuse, 2-3 mm long; stamens 4. Female flowers: sepals and petals as in male flowers. Fruit solitary, ovoid or subglobose, 5 mm in dia, glabrous, seeds black, globose, shining, smooth.

Rare in Eastern Ghats. Fl.: Nov. -Mar. Fr.: Apr.-June.

Medicinal importance : 1. Seed powder mixed with pepper (*Piper nigrum*) given for constipation. 2. Root juice used as poultice for swollen joints.

Murthivari Cheruvukatta (CTR), GVS 45928 (MH); Shikarline (CTR), GVS 45988 (MH).

Boswellia ovalifoliolata Bal. et Henry in J. Bombay Nat. Hist. Soc. 58: 546-548. 1961; Chitra & Henry in Flora of

India 4: 432. 1997.(Bursuraceae)

Deciduous tree, up to 12 m tall; bark greyish, branchlets red coloured, glabrous. Leaves imparipinnate, about 15-18 cm long, leaflets 5-13, coriaceous, ovate or elliptic-ovate, 2.5-3.5 x 1-2.5 cm, glabrous, glaucous beneath, base inequilateral or rounded, margin entire, apex obtuse; secondary nerves 8-12 pairs, reddish, stamens 10. Flowers greenish white, in monochasial cymes on 15 cm long, much branched panicles. Drupes 3-gonous, pyrenes 3, 1.5 x 0.8 cm; seeds winged and compressed.

Rare and strict endemic to Seshachalam hills and Nallamalais at 600 - 900 m. Fl.: Dec. - Feb. Fr.: Apr.-June. Vern.: Tel. *Konda sambrani*.

Stem Bark used as best Mosquito repellent

Chitvel RF (CDP), SSR 16143; Tirupati (CTR), KMS 7336 (MH) ; Nallamalais (KNL), CBDM 8776 (MH).

Note : Balakrishnan and Henry reported this species from Tirumala hills. Beddome also collected from Nallamalais. But Ellis in his 'Flora of Nallamalais' said that he could not trace the new species from Nallamalais of Kurnool district; may be Beddome might have collected it slightly further south of Nallamalais in Cuddapah and Chittoor districts of Andhra Pradesh which form type locality of new species - the major collecting centres of Beddome.

ACKNOWLEDGEMENTS

Authors are highly thankful to Department of Science and Technology, Govt. of India, Botanical Survey of India, Ministry of Environment and Forest, Govt. of India and Authorities of Sri Krishnadevaraya University, Anantapur and Tribal communities for their moral help.

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