BULL. BOT. SURV. INDIA
Vol. 36, Nos. 1-4 : pp. 278-284, 1994

THE FAMILY COMBRETACEAE OF ANDAMAN AND NICOBAR ISLANDS

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ABSTRACT

Indian Almond family is represented by 5 genera and 15 species in the Andaman & Nicobar Islands. Of these *Calycopteris floribunda.Combretum decandrum, C. chinense, C. extensum, C. squamosum, Terminalia bialata, T. citrina, & T. procera,* are Roxburghian taxa. Besides these *Terminalia manii* King and *T. procera* Roxb., are endemic to these islands whereas *T. sharmae* Gang. *& T. Chakrab.*and *T. vermae* Gang. & T. Chakrab., are new taxa confined to Mount Harriet and Baratang Islands and South Creeks respectively. *Lumnitzera racemosa* Willd. and *L. littorea* (Jack) Voight are mangrove species which require conservation efforts.

INTRODUCTION

The Andaman-Nicobar archipelago, India, consists of about 321 Islands lying in the Bay of Bengal between the latitudes of 6° 14°N and the longitudes of 92° - 94° E. The total land area of the Islands is about 8290 sq. km. At present about 85% of the area of these Islands are covered by rich tropical forests.

The vegetation of the Islands is unique to India since most of the species exhibit affinity towards S.E. Asia and Malesia. There are also many endemic species. Since several parts of the Islands are still unexplored or under explored, preparation of a complete flora of the Islands requires many more years.

The present paper attempts to contribute towards presenting an account of the family Combretaceae of the Andaman-Nicobar Islands. So far, only 15 species of the family belonging to 5 genera are known from these Islands. Of these, 2 species, *Terminalia manii* King and *T. procera* Roxb., are endemic to this region while *T. bialata* (Roxb.) Steud., do not occur in mainland India but extend to Burma.

KEY TO GENERA

1a. Hypanthium with 2 adnate bracteoles. Leaves alternate .... 3. LUMNITZERA

1b. Hypanthium without adnate bracteoles. Leaves opposite, verticillate or alternate 2

2a. Leaves conspicuously scaly. Petals present 3

2b. Leaves not conspicuously scaly. Petals absent 4

3a. Hypanthium extending into long tube ; style partially adnate to calyx tube .... 4. QUISQUALIS

3b. Hypanthium not extending into long tube; style not adnate to calyx tube .... 2. COMBRETUM

4a. Calyx tubes accrescent, conspicuous, persistent .... 1. CALYCOPTERIS

4b. Calyx lobes not accrescent, not persistent 5. TERMINALIA

1. CALYCOPTERIS Lamk.

1.1. Calycopteris floribunda (Roxb.) Lamk., Encycl. Meth. Bot. Suppl. 2 : 41. 1811 ; Clarke in Hook. f., Fl. Brit. India 2 : 449. 1878 ; Parkins., For. Fl. Andaman Is. 167. 1923. *Getonia floribunda* Roxb., Pl. Corom. 1 : 61, t. 87. 1798.

Scandent shrub. Branchlets terete, glabrous or puberulous to pubescent. Leaves 3 - 20 × 2 – 8 cm, ovate, ovate-lanceolate or elliptic, acuminate at apex, obtuse at base, glabrous or pubescent to tomentose ; lateral nerves 5-10 per side, subparallel, arcuate; nervules reticulate, conspicuous beneath; petioles 4-11 mm, pubescent or tomentose. Inflorescences terminal panicle of racemes; branches di- or trichotomous, ultimately obsolete at apex, hairy; bracts foliaceous, 15-25 × 5 10 mm, ovate or ovate-lanceolate, persistent. Flowers subsessile, 7-10 mm long, greenish-white, bracteolate; bracteoles 2-8 mm long. Hypanthium ovoid, pubescent. Calyx tube pubescent, lobes ovate-lanceolate; pubescent above, puberulous

* Since deceased.

beneath. Petals 0. Stamens 10 ; filaments 2-3 mm long, anthers oblong. Disk cupular. Ovary with 3 pendulous ovules, of them 2 abortive; styles subulate, pubescent. Fruits stalked, 8-10 mm long, 5-ridged and furrowed, crowned by accrescent spreading large calyx lobes; pericarp pubescent or puberulous, endocarp thick. Seed ridged and furrowed, ovoid. Embryo up to 2 mm long.

Flowering : Jan. May ; *Fruiting* : Apr. Nov.

Distribution. : Andamans mainland India, Indo-China, Thailand, Burma, Malaya.

Ecology : Rare.

Specimen : South Andaman Is., without exact locality, 3.2.1894, *King's Coll. s.n.* (CAL).

2. COMBRETUM Loefl.

1a. Flowers 5-merous; fruits with 5 membranous wings .... 1. *C. album*

1b. Flowers 4-merous; fruits with 4 papery or membranous wings 2

2a. Calyx constricted above ovary producing into a cylindrical tube ; fruit with membranous wing .... 3. *C. latifolium*

2b. Calyx not produced into a cylindrical tube above constricted portion; fruit with papery wing 3

3a. Inflorescences racemes; pericarp of fuits glandular, puberulous ; nervules of leaves reticulate .... 2. *C. wallichii var. griffithii*

3b. Inflorescences panicle of racemes; pericarp of fuuit scaly ; nervules of leaves parallel ... 4. *C punctatum* subsp. *squamosum*

2.1. Combretum album Pers., Syn. Pl. 1 : 411. 1805; Gang. & Chakrab. in J. Econ. Tax. Bot. 14(1) : 223. 1990. *C. decandrum* Roxb., Pl. Corom. 1 : 43, t. 59. 1796, *non* Jacq. 1760; Clarke in Hook. f., Fl. Brit. India 2 : 452. 1878. *C. roxburghii* Spreng., Syst. Veg. 2 : 331. 1825.

Scandent shrub. Branchlets pubescent or villous when young. Leaves 5-18 × 2.5-8.5 cm, oblong, ovate-elliptic, elliptic-lanceolate, rarely obovate, obtusely acuminate at apex, obtuse or subacute at base, glabrous excepting pubescent domatia beneath; lateral nerves 6-8 per side, arcuate, faint at margin; nervules parallel, inconspicuous; petioles 5-12 mm long. Inflorescences terminal or axillary racemes in quasipanicles, densely villous or pubescent, bracts foliaceous. Flowers almost sessile, campanulate, 4-5 mm long, white, green; bracteoles linear or linear-lanceolate, 2-7 mm long. Hypanthium 2-2.5 mm long, pubescent. Calyx urceolate, pubescent above, villous within, lobes lanceolate or subulate. Petals oblong-ovate, acute. Stamens inserted, biseriate. Disk pubescent or villous. Ovules pendulous; styles subulate, stigma simple. Fruits sessile, 2-3 × 1.5-2 cm, oblong-ellipsoid, 5-winged, pericarp striated; seeds ovoid-ellipsoid.

Flowering & Fruiting : Period unknown.

Distribution : Andamans India, Burma.

Ecology : Rare.

Specimens examined : ANDAMAN Is.: *Balakrishnan* 804 (CAL).

2.2. Combretum wallichii DC. var. **griffithii** Heurck. & Muell.-Arg. in Heurck., Obs. Bot. 231. 1871. *C. chinense* Roxb. [Hort. Beng. 28. 1814 *nomen*] ex D. Don in Trans. Linn. Soc. London 15 : 434. 1827 ; Roxb., Fl. Ind. 2 : 230. 1832; Clarke in Hook. f., Fl. Brit. India 2 : 457. 1878; Parkins., For. Fl. Andaman Is. 170. 1923.

Scandent shrub. Branchlets glabrous, punctate. Leaves 4-15 × 1.5-8 cm, obovate, oblong, ovate or lanceolate, obtuse, acuminate or apiculate at apex, acute or subacute at base, glabrous, punctate; lateral nerves 6-10 per side, subparallel, conspicuous with axillary domatia beneath; nervules reticulate; petioles 7-15 mm long. Inflorescences axillary and terminal racemes, up to 10 cm long; rachis punctate, puberulous or glabrous. Flowers sessile, 7-9 mm long, yellow; bracteoles linear, deciduous. Hypanthium 3-5 mm, punctate, glabrous. Calyx cupular, toothed, teeth triangular, acute. Petals obovate, truncate or obtuse at apex. Stamens exserted, filaments 1-3 mm long. Disk fulvous. Styles 2-3 mm long, glabrous; stigma simple. Fruits stalked, 2-2.5 × 2-2.5 cm, ovoid, winged; pericarp striated, glandular; seed solitary, ovoid.

Flowering : May Sept. ; *Fruiting* : Dec. May.

Distrubution : Andamans India, Burma to Malesia.

Ecology : Edges of forests on sandy loam, frequent.

Specimens examined : MIDDLE ANDAMAN Is. : Korang Nalla, *Bhargava* 1917 (CAL). SOUTH ANDAMAN Is. : Hobdaypur & Tusonabad, 12.7.1890, *King's Coll. s.n.* (CAL) ; North Bay, 14.5.1892, *King's Coll. s.n.* (CAL); Cadellgunj, 26.8.1892, *King's Coll. s.n.* (CAL); Kalatang, 2.12.1893, *King's Coll. s.n.* (CAL); Mount Harriet, 1.9.1894, *King's Coll. s.n.* (CAL).

2.3. Combretum latifolium Bl., Bijdr. 641. 1826. *C. extensum* Roxb. [Hort. Beng. 28. 1814, *nomen*] Fl. Ind. 2 : 229. 1832; Clarke in Hook. f., Fl. Brit. India 2 : 458. 1878.

Scandent shrub. Branchlets glabrous. Leaves 10-21 × 4-14 cm, ovate, ovate-oblong, elliptic-ovate or rarely obovate, acuminate or acute at apex, obtuse or subacute at base, glabrous or loosely puberulous, punctate; lateral nerves 6-8 per side, distant; nervules conspicuous beneath; petioles up to 20 mm long. Inflorescences axillary, racemes, 5-13 cm long, rachis puberulous, scaly. Flowers sessile, congested 6-7 mm long; bracteoles triangular or ovate, deciduous. Hypanthium up to 3 mm long, glabrescent. Calyx tube up to 3 mm long, glabrescent. Calyx cupular, toothed, teeth triangular-lanceolate, glabrescent above. Petals obovate. Stamens exserted; filaments 4-5 mm long, glabrous. Disk pubescent. Styles terete, glabrous; stigma simple. Fruits 3-3.5 × 2.5-3 cm, oblong; pericarp striated, sparsely puberulous in center; seeds oblong, acute at both ends.

Flowering : Jan. July; *Fruiting* : Apr.-Feb.

Distribution : Andamans & Nicobars - India, Sri Lanka, Burma, Indo-China, Thailand to Malesia.

Ecology : Grows in inland forests.

Vernacular name : *Maunq-make-nwe* (Andamans).

Specimens examined : NORTH ANDAMAN Is. : Austin II, 1.2.1959, *Thothathri* 9151 (CAL); Keralapuram, 5.4.1977, *Balakrishnan* 5476 (PBL); MIDDLE ANDAMAN Is. : Nimbudera, 26.7.1974, *P. Chakraborty* 6010 (PBL) ; SOUTH ANDAMAN Is. : Anikhet, 22.4.1893, *King's Coll. s.n.* (CAL) ; Baratang Is., Baludera, 27.1.1978, *Basu* 6822 (CAL, PBL); LITTLE ANDAMAN Is. : Hut Bay, 11.12.1981, *Premanath* 8452 (CAL, PBL); CAR NICOBAR Is. : n. d., *Kurz s.n.* (CAL); Katchal Is. : 10.6.1977, *P. Chakraborty* 6010 (PBL.).

2.4. Combretum punctatum Bl. var. **squamosum** (Roxb. ex G. Don) Gang. & Chakrab. in J. Econ. Tax. Bot. 17(3) : 680. 1993. *C. squamosum* Roxb. (Hort. Beng. 28. 1814, *nomen* ex Don, Trans. Linn. Soc. London 15 : 419, 438. 1827 ; Roxb., Fl. Ind. 2 : 231. 1832; Clarke in Hook. f., Fl. Brit. India 2 : 450. 1878; Parkins., For. Fl. Andaman Is. 170. 1923. *Combretum punctatum* Bl. ssp. *squamosum* (Roxb. ex Don) Exell in Fl. Males. Ser. I, 4 : 539. 1954.

Scandent shrub. Branchlets glandular, scaly. Leaves 7-18 × 2.5-7 cm, ovate, ovate-elliptic, ovate-oblong or lanceolate, acuminate at apex, acute to subacute at base, scaly, punctate; lateral nerves 5-7 per side, subopposite, inconspicuous above; petioles up to 20 mm long, scaly. Inflorescences axillary and terminal panicle of racemes, branches scaly. Flowers 7-8 mm long, white; bracteoles 2-2.5 mm long, linear. Hypanthium 2-3 mm long, glandular, punctate. Calyx cupular, glandular-punctate above, villous within, toothed, teeth triangular, acute. Petals elliptic-ovate, acute at apex. Stamens exserted; filaments 2.5-3 mm long. Disk globose. Styles terete, glabrous; stigma simple. Fruits stalked, 2.5-3 × 2-2.5 cm, globose; pericarp striated, loosely scaly. Seed ellipsoid pointed at both ends.

Flowering : Oct. Dec. ; *Fruiting* : Feb.

Distribution : Nicobars India, Burma, Thailand, Indo-China to Malesia.

Ecology : On hill-slopes on red lateritic soil.

Specimens examined : Katchal Is. : Feb. 1875, *Kurz s.n.* (CAL) ; GREAT NICOBAR Is., 8.12.1975, *P. Chakraborty* 3251 (PBL) ; *ibid.*, 27.10.1979, *Hore* 7724 (PBL).

3. LUMNITZERA Willd.

1a. Flowers sessile ; calyx lobes obtuse at apex ; filaments 1-1.5 mm long; inflorescences axillary. Pneumatophores absent .... 2. *L. racemosa*

1b. Flowers pedicellate ; calyx lobes acute at apex; filaments 6-7 mm long; inflorescences terminal. Pneumatophores present .... 1. *L. littorea*

3.1. Lumnitzera littorea (Jack) Voigt, Hort. Suburb. Calcutt. 39. 1845. *L. coccinea* Wight & Arn., Prodr. 316. 1834 ; Clarke in Hook. f. Fl. Brit. India 2 : 452. 1878 ; Parkins., For. Fl. Andaman Is. 168. 1923. *Pyrranthus littoreus* Jack in Malay Misc. 2(7) : 57. 1822.

Small tree, 6-12 m high. Branchlets dichotomous, striated, glabrous. Leaves 3-7 × 1-2.5 cm, narrow obovate or oblanceolate, retuse or rarely obtuse at apex, entire or crenulate at incurved margin, tapering at base, dark chocolate when dry; midvein inconspicuous; lateral nerves 3-5 per side, slender, ascending; nervules hidden; petioles 0-3 mm. Inflorescences terminal racemes, 3-4 × 2-3.5 cm, flowers congested; peduncles short, glabrous. Flowers 18-20 mm long, red. Hypanthium warty or glabrous. Bracteoles adnate to hypanthium, 1-2 mm long, ovate, acute. Calyx lobes ovate, acute, fine puberulous at mirgin. Petals ovate-oblong, subacute at apex, glabrous. Stamens exserted, filaments 6-7 mm long; anthers ovoid-oblong. Styles 8-9 mm long, glabrous. Fruits 18-20 mm long; pericarp thin, warty; mesocarp fibrous. Seeds 7-8 mm long, ovoid.

Flowering & Fruiting : Throughout the year.

Distribution : Andamans Tropical Asia, N. Australia, Polynesia, Malesia.

Ecology : Scarce in mangrove vegetation on sandy clay soil.

Specimens examined : MIDDLE ANDAMAN Is. : Long Is., 2.12.1915, *Parkinson* 751 (CAL); *Ibid.*, 22.1.1959, *Thothathri* 9118 (CAL); *Ibid.*, n. d., *Bhargava* 2832 (CAL, PBL). SOUTH ANDAMAN Is. : Without exact locality, *King s.n.* (CAL) ; Baratang Is., Colebrooke Passage, 31.12.1903, *Rogers* 12 (CAL); Baludera, 16.7.1977, *Bhargava* 5914 (CAL); Corbyn's Cove, 31.10.1973, *Balakrishnan* 547 (CAL).

3.2. Lumnitzera racemosa Willd., Neue Schr. Ges. Naturf. Fr. Berl. 4 : 187. 1803; Clarke in Hook. f., Fl. Brit. India 2 : 452. 1878; Parkins., For. Fl. Andaman Is. 168. 1923.

Shrub to small tree, 2-6 m high. Branchlets glabrous or rarely puberulous. Leaves 2-8 × 1-3 cm, obovate or oblanceolate, retuse or rarely obtuse at apex, entire or crenate at margin, tapering at base, thick, glabrous; lateral nerves 3-5 per side, slender, ascending, nervules hidden. Inflorescences axillary peduncled racemes, 2-5 cm long, branches lacking, infructescences up to 9 cm long; peduncles 1-3 cm long, glabrous. Flowers sessile, 4-6 mm long, white; bracteoles adnate to hypanthium, 0.5-1 mm long, ovate-triangular or ovate-oblong, acute or obtuse. Hypanthium ovoid or ellipsoid. Calyx lobes ovate, obtuse at apex, ciliate at margins. Petals ovate-oblong, thin. Stamens 8-10 ; filaments 1-1.5 mm long; anthers ovate. Ovules 3-4, pendulous. Styles 1-2 mm long, glabrous. Fruits sessile, 10-12 × 5-6 mm, ovoid-ellipsoid, sometimes with persistent styles; pericarp thin, smooth, mesocarp fibrous.

Flowering & Fruiting : Sept. Feb.

Distribution : Andamans & Nicobars Tropical Africa, Tropical Asia, N. Australia, Malesia, Polynesia.

Ecology : Grows in mangrove vegetation.

Specimens examined : MIDDLE ANDAMAN Is., Middle straits. *Kurz s.n.* (CAL) ; Ritchee's archipelago Neil, Is., 1.8.1904, *Rogers* 366 (CAL); Havelock Is., 24.2.1916, *Parkinson* 1037 (CAL) ; Car Nicobar Is., Kimus, 10.6.1974. *N. G. Nair* 1579 (PBL) ; Sawai, 24.2.1976, N. G. Nair 3531 (PBL); GREAT NICOBAR Is., n. d., *Kurz s.n.* (CAL).

4. QUISQUALIS L.

4.1. Quisqualis indica L. Sp. Pl. ed. 2, 1 : 556. 1762; Clarke in Hook. f., Fl. Brit. India 2 : 459. 1878 ; Parkins., For. Fl. Andaman Is. 170. 1923.

Woody climbers. Branchlets hairy, glabrous in age. Leaves 3.5-15 × 1.5-5.5 cm, ovate, ovate-oblong, obovate-elliptic, acuminate at apex, obtuse or subacute at base ; glabrous or hairy ; lateral nerves 5-10 per side, subparallel, arcuate ; nervules parallel between the nerves; petioles 4-10 mm long. Inflorescences 5-15 × 6-14 cm, rachis hairy, bracts foliaceous; bracteoles 3-6 mm long, linear, hairy. Flowers sessile, 5-10 cm long, white, pink or reddish-white. Hypanthium 4-7 mm long. Calyx tube 4-8 cm long, glabrous or hairy; lobes acute, glabrous or hairy. Petals 1-2 cm long, oblong or

obovate, obtuse at apex. Stamens inserted, filaments 3-5 mm long, glabrous; anthers oblong. Styles 4-8 cm long, filiform, adnate partially with calyx tube, glabrous or loosely hairy; stigma subcapitate, ciliate or not. Fruits sessile, 28-30 × 10-12 mm, dry, ellipsoid-oblong, acute at both ends, 5-angled and grooved, pericarp thin, smooth, glabrous. Seed solitary.

Flowering : Feb.-July; *Fruiting* : Rare.

Distribution : Andamans (Cult.) indigenous in tropical Africa and Indo-Malesia.

Specimens examined : South Andaman Is. : Chaibagan, 5.3.1969, *Thothathri* 9253 (CAL) ; Humfreygunj, 27.5.1973, *Balakrishnan* 167 (CAL, PBL) ; Viper Is., 21.3.1974, *Balakrishnan* 993 (CAL, PBL).

5. Terminalia L.

1a.	Fruits with 2 large wings	1. *T. bialata*
1b.	Fruits not winged	2
2a.	Inflorescences paniculate	3
2b.	Inflorescences simple	4
3a.	Inflorescences strictly terminal ; fruits prominently 5-ridged, ellipsoid or subglobose	3. *T. citrina*
3b.	Inflorescences terminal and axillary, fruits obscurely 5-ridged, oblong	4. *T. mannii*
4a.	Leaves subopposite to alternate ; branches slender (up to 5 mm thick), without prominent leaf-scars ; fruits smaller (*ca* 1.8 × 1.5 mm), dark-red	7. *T. vermae*
4b.	Leaves always alternate ; branches thick (more than 5 mm), with prominent leaf-scars ; fruits larger, not dark-red ...	5
5a.	Petioles 2-3 cm long ; leaves crenulate	6. *T. sharmae*
5b.	Petioles shorter ; leaves entire	6
6a.	Leaves cuneate-attenuate at base ; petioles eglandular	5. *T. procera*
6b.	Leaves cordate at base ; petioles with 2 glands	2. *T. catappa*

5.1. Terminalia bialata (Roxb.) Steud., Nom. Bot. ed. 2, 2 : 668. 1841; Kurz,. For. Fl. Brit. Burma 1 : 456. 1877; Clarke in Hook. f. Fl. Brit, India 2 : 449. 1878; Parkinson, Far. Fl. Andaman Is. 167. 1923; Gang. & Chakrab in J. Econ Tax. Bot 16(3) : 601. 1992. *Pentaptera bialata Roxb.* [Hort. Beng. 34 : 1814, *nomen*] Fl. Ind. 2 : 441. 1832.

Tree. Leaves 10-20 × 5-12 cm, obovate, obovate-elliptic, cuspidate at apex, slightly obliquely attenuate at base, glabrous ; midvein inconspicuous; lateral nerves 6-9 per side. Inflorescences solitary spikes, rachis puberulous. Flowers sessile. Hypanthium pubescent. Calyx cupular, toothed, teeth triangular, acute, pubescent above, villous within. Stamens biseriate, exserted. Styles simple ; ovules 2, pendulous. Fruits fleshy, 4-5 × 1-2 cm, 2-winged, glossy, coriaceous, puberulous. Seed solitary.

Flowering : Apr. - June ; *Fruiting* : Feb. - Apr.

Distribution : Andamans - Philippines.

Ecology : Growing in inland evergreen forests.

Vernacular name : Safed chuglum (Hindi).

Specimens examined : South Andaman Is., Corbyn's Cove, *Kurz s.n.* (CAL) ; *Ibid., King's Coll.* 350 (CAL) ; Port Mout, 16.1.1892, *King's Coll. s.n.* (CAL). Little Andaman Is., Hut Bay, 13.1.1977, *Bhargava* 5126 (PBL).

5.2. Terminalia catappa L., Syst. Nat. ed. 12, 2 : 674. 1767 et Mant. 1 : 128. 1767 ; Clarke in Hook. f., Fl. Brit. India 2 : 444. 1878 ; Parkins., For. Fl. Andaman Is. 167. 1923.

Tree up to 40 m high. Branchlets tomentose or pubescent when young. Leaves 6-35 × 5-22 cm, obovate, elliptic or elliptic-obovate, obtuse or shortly acuminate at apex, subcordate at base, with 2 glands, glossy, pubescent, tomentose or glabrous; lateral nerves 6-10 per side, distant, arcuate, conspicuous, with domatia beneath ; nervules inconspicuous ; petioles 5-15 mm long, stout. Inflorescences axillary spikes, up to 15 cm long; rachis pubescent or glabrous. Flowers white ; bracts deciduous. Hypanthium 2-4 mm long, glabrous or sericeous. Calyx cupular, glabrous, lobes ovate, triangular, acute. Stamens exserted, filaments up to 2 mm long, anthers below 0.5 mm long. Disk barbate. Styles up to 2 mm long. Fruits fleshy, 30-80 × 20-60 mm, compressed laterally, obsoletely angled. Seed solitary.

Flowering & Fruiting : Throughout the year.

Distribution : Andamans & Nicobars - Tropical Asia, Malesia, N. Australia and Polynesia.

Ecology : Frequent along sea-shores on sandy soil.

Uses : The bark yields tannin. The kernels of seeds are edible.

Specimens examined : South Andaman Is. : Anikhet, 9.12.1893, *King's Coll. s.n.* (CAL);

Havelock Is., 16.5.1974, *Ansari* 1411 (CAL); Peeple dehra, 5.9.1977, *Premanath* 6160 (PBL) ; Rutland Is., Baigan Bageecha, 10.4.1978, *N. G. Nair* 6957 (PBL); Little Cocos Is., ? 1890, *Prain s.n.* (CAL). GREAT NICOBAR Is. : Laful, 16.5.1981, *Dwivedi* 8536 (CAL).

5.3. Terminalia citrina (Gaertn.) Roxb. ex Flem. in As. Res. 11 : 183. 1810 ; Clarke in Hook. f., Fl. Brit. India 2 : 446. 1878. *T. citrina* var. *malayana* Clarke in *l.c.* 447. 1878. *Myrobalanus citrina* Gaertn. Fruct. 2 : 91, t. 97, ff. n-s. 1791.

Tree up to 40 m high. Branchlets pubescent or villous when young. Leaves 3-15 × 1.5-6.5 cm, elliptic, elliptic-oblong, acute to acuminate at apex, rounded to cuneate at base, pubescent or glabrous, punctate; lateral nerves 9-12 per side, close, arcuate; nerves 9-12 per side, close, arcuate; nervules inconspicuous; petioles 5-20 mm long, pubescent or glabrous, with 2 glands. Inflorescences terminal panicle, rachis, branches tomentose or pubescent, bracts deciduous, linear. Flowers pale yellow. Hypanthium sericeous or glabrous. Calyx cupular, glabrous. Stamens exserted, filaments 2-3 mm long, glabrous; anthers up to 0.5 mm long. Disk barbate. Styles 1.5-2.5 mm long, glabrous. Fruits 20-30 × 8-20 mm, prominently 5-ridged, ellipsoid or subglobose.

Flowering : Aug. ; *Fruiting* : Period not known.

Distribution : Nicobars India, Burma, Indo-China, Thailand, Malesia.

Ecology : Scarce in beach forests on sandy soil.

Uses : Wood is used for house for house-making and furniture making. Tannin is extracted from the fruits. Bark yields a blue dye.

Specimens examined : GREAT NICOBAR Is. : Lakshman Beach, 17.8.1975, *Balakrishnan* 2924 (CAL).

5.4. Terminalia mannii King in J. Asiat. Soc. Bengal 66 : 329. 1897 ; Parkins. For. Fl. Andaman Is. 168. 1923.

Tree, up to 50 m high. Branchlets puberulous, lenticellate. Leaves 10-20 × 3-7 cm, elliptic, elliptic-lanceolate or ovate, acuminate at apex, rounded or cuneate at base, glabrous; lateral nerves 9-12 per side, spreading, arcuate; petioles up to 25 mm long, glands present at insertion of blade. Inflorescences axillary and terminal of panicle or spikes, rachis and branches puberulous or glabrous. Bracteoles linear, puberulous. Flowers yellowish or greenish white. Hypanthium cylindrical, pubescent near base. Calyx cupular, toothed, woolly within. Stamens exserted, glabrous. Fruits 15-20 × 7-10 mm, oblong or ovoid, obscurely 5-ridged, pericarp hard, glabrous, seed solitary.

Flowering : May - July ; *Fruiting* : Sept. - Feb.

Distribution : Andamans & Nicobars - Endemic.

Ecology : Grows in dense inland evergreen forests.

Vernacular name : Kala Chuglam (Hindi).

Uses : Wood is used for furniture. Fruits are eaten by local people of the Nicobars.

Specimens examined : MIDDLE ANDAMAN Is. : Long Is., June 1915, *Parkinson* 640 (CAL). SOUTH ANDAMAN Is., Port Mout, 23.1.1892, *King's Coll. s.n.* (CAL) ; Baratang Is., South Creek, 30.10.1979, *Basu* 7613 (CAL). Nicobar Is., without exact locality, 1884, *King's Coll.* 485 (CAL).

5.5. Terminalia procera Roxb. [Hort. Beng. 33. 1814, *nomen*] Fl. Ind. 2 : 429. 1832; Clarke in Hook. f., Fl. Brit. India 2 : 444. 1878; Parkins., For. Fl. Andaman Is. 167. 1923 ; Gang. & Chakrab. in J. Econ. Tax. Bot. 16(3) : 602. 1992.

Tree up to 30 m high. Leaves short petiolate, 9-32 × 5-12 cm, obovate, shortly apiculate at apex, entire, attenuate at base, coriaceous, glabrous, blackish chocolate when dry; midvein slender ; lateral nerves 14-16 per side, distant, subparallel, arcuate, domatia at axils beneath; nervules reticulate, inconspicuous; petioles 10-12 mm long, stout. Inflorescences axillary simple spikes, up to 20 cm long, rachis slender, glabrous. Flowers 7-8 mm long. Hypanthium 4-5 mm long, glabrous. Calyx cupular, lobes ovate, acute or subacute, glabrous above, villous within. Stamens included. Fruits 25-30 mm long, ellipsoid, 5-obscurely angled.

Flowering : Mar. - Apr. ; *Fruiting* : July - Oct.

Distribution : Andamans & Nicobars-Malesia.

Ecology : Common in deciduous and semi-deciduous forests.

Uses : The reddish wood is used for house making and furniture making. Barks yield tannin.

Specimens examined : SOUTH ANDAMAN Is. : Port Mout, *Kurz s.n.* (CAL) ; Corbyn's Cove, n.d., *Kurz s.n.* (CAL) ; Without exact locality, Apr. 1904, *Rogers* 166 (CAL). Kamorta Is., n.d., *Kurz s.n.* (CAL).

5.6. Terminalia sharmae Gang. & Chakrab. in J. Econ. Tax. Bot. 16(1) : 237. 1992.

Tree, *ca* 20 m high. Leaves obovate to elliptic, 15-22 × 7-8.5 cm, cuneate at base, crenulate, rounded or short acuminate at apex, thinly coriaceous, glabrous, brown ; lateral nerves 8-10 per side ; tertiary nerves prominent, reticulate; petioles 2-3 cm long. Flowers unknown. Fruits 2.5-3 × 2-2.5 cm ; ellipsoid, brown, glabrous.

Fruiting : Jan.

Distribution : Andamans - Endemic.

Ecology : Rare in inland hill forest at 300 m above MSL.

Specimens examined : SOUTH ANDAMAN Is. : Mount Harriet, 16.1.1974, *N. G. Nair* 801 (CAL Holotype ; Isotype in CAL).

5.7. Terminalia vermae Gang. & Chakrab. in J. Econ. Tax. Bot. 16(1) : 239. 1992.

Tall tree. Leaves ovate-elliptic to oblong, 12-17 × 5-6.5 cm, acute to obtuse at base, entire, acuminate at apex, coriaceous, glabrous, black-brown when dry; lateral nerves 8-12 per side, prominent; nervules obscure; petioles 3-4.5 cm long, glabrous. Flowers : unknown. Fruits : *ca* 1.8 × 1.5 cm, subglobose, dark-red, glossy, glabrous.

Fruiting : Oct. Nov.

Distribution : Andamans Endemic.

Ecology : Rare in inland moist semi-evergreen forest at sea-leavel.

Specimens examined : SOUTH ANDAMAN Is. : Baratang Island, South Creek, Extraction area, 30 Oct. 1979, *P. Basu* 7613 (CAL Holotype).

ACKNOWLEDGEMENTS

I sincerely thank to Dr. D. M. Verma, Ex Additional Director, and Sri D. C. S. Raju, Ex Joint Director, Potanical Survey of India, for their kindly going through this paper.