# AN ACCOUNT OF CAPRIFOLIACEAE JUSS. IN SOUTH INDIA

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### ABSTRACT

The present work records the angiosperm family Caprifoliaceae Juss. from South India in form of two genera, viz. *Lonicera* and *Viburnum*, the former getting represented by two (*L.leschenaultii* and *L. ligustrina*) and the latter by four species (*V. coriaceun, V.erubescens, V.hebanthum* and *V. punctatum*). Artificial keys to the identification of the concerned genera and their species have been prepared along with precise phytography and information about flowering and fruiting periods, uses and distribution of each species.

KEYWORDS: Caprifoliaceae, South India, Phytography, Lonicera and Viburnum

Caprifoliaceae Juss., familiar as the family of beautiful "Honeysuckles" is a taxon mostly of shrubs and vines with a few herbaceous ones with typically opposite and exstipulate leaves, and tubular and funnel- or bellshaped corolla with five outwardly spreading lobes and five epipetalous stamens; ovary with more than one ovule per locule and fruits of drupe or berry type.

Caprifoliaceae belongs to the order Dipsacales of the subclass Asteridae under Magnoliopsida and includes about 400 species (Cronquist, 1988). The taxonomic domain of Caprifoliaceae has been frequently revised especially in the context of *Sambucus* and *Viburnum*, which are traditionally given the membership of Caprifoliaceae *sensu lato* (Clarke, 1880; Ohashi, 1975; Rau, 1975; Heywood, 1978; Willis, 1982, Ping-sheng, 1983). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants(APG III,2009) puts the family under Dipsacales of the clade Campanulids belonging to Asterids of Core Eudicots under Eudicots, one of the major clades of Angiosperms.

The circumscription and phylogeny of this taxon has been very judiciously dealt with by Cronquist (1988). According to Cronquist (1988) if *Sambucus* and *Viburnum* are excluded, there seems little doubt that the remainder of the Caprifoliaceae should be associated with Valerianaceae and Dipsacaceae *sensu lato*.

Accordingly the present communication adopts the circumscription envisaged by him to consider *Viburnum* as a member of Caprifoliaceae.

Information from such data sources as embryology (Suneson, 1933), floral anatomy (Wilkinson 1948) cytology (Darlington and Wylie, 1955; BenkoIseppon and Morawetz, 2000), serology (Hillebrand and Fairbrothers, 1970a and 1970b), palynology (Bohne-Gutlein and Weberling, 1981; Donghue, 1985), molecular taxonomy (Downie and Palmer, 1992a and 1992b; Backlund and Bremer, 1997; Pvck et al., 1999; Winkworth and Donoghue, 2005), overall concept of genera (Ferguson, 1966), numerical taxonomy (Ping-sheng, 1983) are worthwhile in understanding the taxon. It was (Donghue 1983a & b) who interpreted the phylogenetic relationship of Viburnum as a member of the family Caprifoliaceae with 23 presumably cladistic units and 34 characters using cladistic method through WAGNER'78 Computer program. Considering the taxonomic importance of Caprifoliaceae (including Viburnum) the present work was undertaken to document the occurrence of Caprifoliaceae in the southern part of the country familiar as South India.

#### Study Site

South India is in the peninsular part of India covering the Deccan plateau in the shape of a vast inverted triangle, bounded on the west by the Arabian Sea, on the east by the Bay of Bengal and on the north by the Vindhya and Satpura ranges. The geography of the region is diverse, encompassing two mountain ranges, the Western and Eastern Ghats and a plateau in between. The rivers Godavari, Krishna, Tungabhadra, Kaveri, and Vaigai are important non-perennial sources of water. The flora of southern part of the country is rich in endemic species. As a biodiversity Hot Spot, Western Ghats covers a significant part of South India where in certain interesting families like Caprifoliaceae are sustained which otherwise prefer the Himalayan accommodation for being more hospitable to them.

### **MATERIALS AND METHODS**

This work is based on thorough study and scrutiny of pertinent literature (Clarke, 1880; Fyson, 1977; Gamble, 1966; Sharma and Singh, 1984), specimens preserved in the Central National Herbarium (CAL) as well as the herbaria of the Southern Circle of Botanical Survey of India, Coimbatore, Burdwan University (BURD) and Western Circle of Botanical Survey of India, Poona and those collected during field work in Nilgiri Hills. The concept of Caprifoliaceae as given by Cronquist (1988) has been followed. Standard taxonomic methods were adopted to describe each species and to prepare a comprehensive key to identification of species. The recorded species have been arranged alphabetically giving their scientific names, citations, basionyms and synonyms wherever necessary along with information about periods of flowering and fruiting, distribution, specimen examined and use.

### Systematic Discourse

### Caprifoliaceae

Jussieu, Gen. Pl. 210. 1789, "Caprifolia," nom. cons.

(HONEYSUCKLE FAMILY): Shrubs or trees, rarely herbs: leaves opposite, simple, entire or occasionally lobed, sometimes stipulate; flowers actinomorphic or zygomorphic, in cymes; calyx 5-4, tube fused with ovary and terminating in small imbricated or open teeth; corolla 5-4,rising above the ovary to have spreading imbricated lobes, sometimes bilabiate; stamens equaling the number of corolla lobes and alternating with them, epipetalous; gynoecium compound with 2-5-8 carpels; ovary inferior, ovules 1-many per locule, pendulous, in axile placentation; style simple with capitate stigma; fruit a fleshy berry or drupe or achene or dehiscent or indehiscent capsules; seeds with fleshy endosperm.

# Key to the Genera

- 1. Plants mostly scandent; flowers in each ultimate axillary pair basally fused .....**1.***Lonicera*

### 1. Lonicera L.

Erect or scandent shrubs. Leaves opposite, petiolate, sessile or sometimes connate, entire or sometimes

sinuate, exstipulate. Flowers of various sizes, usually in peduncled pairs, axillary and solitary or in subterminal heads panicles or clusters; bracteoles 2. Calyx tube ovoid to globose; limb short, 5- toothed. Corolla tubular campanulate or funnel shaped, often irregular; limb 5 cleft. Stamens 5, inserted on the corolla tube. Ovary 2-3 celled; ovules several in each cell in double rows in axile placentation; style slender; stigma capitate. Fruit a fleshy 2-3 celled berry; berries in pairs or sometimes more or less united. Seeds solitary or few in each cell; testa crustaceous; albumen fleshy.

# Key to the Species

- Scandent, leaves ovate-oblong to lanceolate, corolla long-tubular, calyx grey-tomentose ..1. L.leschenaultii
- 1b. Erect shrubs forming thickets, corolla narrowly funnel shaped with gibbous base.....**2.L.ligustrina**

# 1. Lonicera leschenaultii

Wall.ex Roxb., Fl. Ind.2:178.1824. Sharma and Singh, Fl. Karnataka 121.1984. Gamble, Fl. Madras Pres. 1: 407.1915 and 1: 577. 1997 (Rep. ed).

English name: Honeysuckle

Vernacular name: Moulliquedi (Tamil)

A straggling scandent, villous shrub with reddish brown papery bark on the main stem, and the younger parts, calyx and underside of leaves covered with short white hairs. Leaves broadly ovate-oblong to lanceolate, up to 7.5x 4.0cm, dull green above, white below, veins and reticulations impressed on the upper, raised on the lower side. Flowers creamy white, in pairs, on 3-4mm long peduncles in the axils of uppermost leaves, or on short axillary branches, fragrant. Calyx 1-2mm, and teeth minute, grey tomentose. Corolla tubular, white, turning creamy, tube 3cm long, slender, erect as also in bud; upper lip obtuse, curved back; lower 4 lobed, slightly longer and less curved, 6-7mm wide at top, the 2 lateral lobes wider than the middle ones. Stamens 5, filaments long. Ovary 2-3 celled; ovules a few, in 2-rows.Fruits in pairs, globular berries, 0.5-0.7 cm wide, crowned by the calyx; laterally pendent. Seeds 2-3, subglobose, 2-3mm wide.

Flowering and fruiting: May to December.

Use: Often grown in gardens. Leaf paste is warmed and applied on boils and other skin eruptions.

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Distribution: Hills of Tamil Nadu, Karnataka and Western Ghats from 600 to 1800m; Ootacamund and below of Nilgiris especially on eastern plateau; Below Kodaicanal at the level of Shembaganur of Pulneys, Districts of Anna, Nilgiri, Madurai, Tamil Nadu; Green Hills of Shevaroys; Mysore; Bangalore; Chikmagalur, Coorg, Hassan of Karnataka..

Specimens examined: Marcara, 3700'[1110m], B.C.Banerjee BSI (E.C.); Chikkanhalli, Mudigere Road, 900 m, Cecil J. Saldhana KFP 1646, Chikmagalur district, Karnataka (CAL); Peermade, Tadu, 4500'[1350m], A. Meebold 933 (CAL); Sattiar MHEP areas, Sirumalai, 600m, Tamil Nadu, Dr.K. Ramamurthy 83854 BSI(S.C.).Bottom of Bababudan Hills,1200m, Cecil J. Saldhana KFP 8506, Chikmagalur district, Karnataka (CAL); Kundah, Nilgiri District, Tamil Nadu, 1800m, K.M.Sebastine 2169 BSI (S.C.); Kinnacoorie, Nilgiri District, 5000', C.E.C. Fischer 195838, BSI (CAL); Nilgiri Hills, G.King195833, BSI (CAL); Edapalli, Nilgiri District, 2067m K.M. Sebastine 101, BSI (S. C.); Kateri Road to Kundha,1667m, K. M. Sebastine 2691 BSI (S.C.);Kaity, 6000'[1800m] J. S. Gamble 12069 B. S. I. (CAL); Thandigudi, Madurai District, Tamil Nadu, M. Chandrabose 51629 BSI (S.C.); Kinnacoorie, Nilgiri District, 5000'[1500m], C.E.C. Fischer 195840, BSI (CAL);

### 2. Lonicera ligustrina

Wall. ex Roxb., Fl. Ind. 2: 179. 1824.Clarke in Hook.f., Fl. Brit. India 3:12,1880. Wight et Arn., Prodr.380.1834. Wight, Icon. Pl. Ind. Orient.1025.1840-1853. Gamble, Fl. Madras Pres. 1: 408.1915 and 1: 577. 1997 (rep. ed); Ren dong Shu, Fl. China 19: 626. 2011.

Common name: False Privet for similarity of its foliage with Privet (*Ligustrumsinense* Lour of Oleaceae)

An erect shrub forming thickets with twisted stem having grey to light brown, papery bark; branches numerous, ascending, tufted. Leaves opposite, ovate, up to 3.5 x 1.5 cm, entire; erect in bud; purplish with distinctly revolute and ciliate margin becoming well spread and smooth with maturity, petiole 3-5mm. Flowers in opposite pairs, pendent: peduncle of a pair 0.8-1.0cm, axillary bracteoles 3-5mm, linear. Calyx tubular, with minute teeth, spherical part of calyx-tube 3-4mm. Corolla narrowly funnel shaped with gibbous base, tubular parts of a flowerpair divergent, with a very distinct bend 1-1.5mm above the base, lobes unequal, cream coloured. Styles of the pair abruptly bent inwards so that the stigmas nearly touch, very hairy below. Stamens 5 with exserted anthers. Style exerted, villous at base; stigmas capitate. Fruits in pairs, globose, 4-8 mm wide, purple, red, or white. Seeds brownish, ovoid or subglobose, 1-2 mm wide, smooth.

Flowering and Fruiting: March to May.

Use: It was found getting planted as a hedge plant in some gardens in Ootacamund and Kodaikanal.

Distribution: Western Ghats in the Nilgiris (near Ootacamund and plateau) and Palani (near Kodaikanal) [1800-2250m].Also in the Himalayas (Nepal), Khasia Mountains [1200-1800m].

Specimens examined: Ooty, Nilgheri, 7500'[2250m], C.B. Carke 11211(CAL), Nilgiris, G.B. King 1337 (CAL); Baira Hill, Nilgiri Hills, 7300'[2190m], C.E.C. Fischer 3949 (CAL), Nilgiri, Dr. Stahl 196037, BSI (CAL);Ootacamund, 7500' [2250m], J.S. Gamble 11441 (CAL); Levedola, Ooty, 7000'[2100m],, J.S. Gamble 11441 (CAL).

Unresolved species: *L. caprifolioides* C. Koch in Index Seminum Hort. Berol.App. 3. 1871. Sharma and Singh, Fl. Karnataka 121.1984.

### 2. Viburnum L.

Mostly shrubs or small trees having leaves opposite, simple, entire, toothed or lobed; corymbs, 5-15 cm across, in some species with large, showy sterile flowers in the periphery to promote pollination by insects; flowers white to cream or pink, small, 3-5 mm across, corolla tubular-funnel-bell-shaped with five lobes, often fragrant; carpels 3, syncarpous with the nectaries on top; drupes oneseeded, spherical, oval or somewhat flattened, red to purple, blue, or black.

#### Key to the Species

- 1. Leaves alternate, flowers not fragrant ......**2.** *V. coriaceum*
- 1b. Leaves opposite, flowers fragrant:
- 2a. Corolla rotate; peltate scales in lower surface of leaves, branchlets and inflorescence.....**1.** *V.punctatum*

- 2b. Corolla tubular; peltate scales absent:

### 1. Viburnum coriaceum

Blume Bijdr. 656. 1826. Clarke in Hooker f., Fl. Brit. India 3: 5. 1880; Hara in Fl. E. Him. 234. 1966, 2: 127. 1971. Sharma and Singh, Fl. Karnataka 121.1984. Gamble, Fl. Madras Pres. 1: 407.1915 and 1: 575. 1997 (rep. ed); *V. capitellatum* Wight et Arnott, Prodr. Fl. Ind. Or.388. 1834 Vernacular names: Basmol (Hindi), Helusunde, Elesaande (Kannada) Mottumokkan (Malayalam)

An evergreen large shrub or under-tree. Leaves alternate, oblong-lanceolate, 5 13 x 2 5 cm, entire, coriaceous, glabrous, hairy towards axils on nerves beneath, petiolate, petiole ca.2.0-2.5cm, estipulate. Flowers small, white, in terminal corymbose or umbellate cymes, not fragrant; bracts small, bracteoles absent. Corolla white, glabrous, tubular, tube very short, 4mm long with 5 short erect lobes. Stamens 5, epipetalous, anthers purple. Fruit a small succulent drupe, elliptic, compressed, beaked and ribbed, reddish brown turning black. Seeds solitary, 2grooved dorsally.

Flowering and fruiting: May to November.

Distribution: Deccan, Hills of N.Coimbatore; Coonoor in Nilgiris at 1800m or higher, Chikmagalur (Mullayanagiri range), Coorg or Kodagu (Western Ghats), districts in Karnataka, Mancholai (Kerala); more common in Pulneys on the margin of Sholas ; also in the Himalaya (Kumaon to NEFA, 1200 2500 m), extending to Myanmar, S.E.Asia and S.W. China.

Specimens examined: Kundha, 1800m, K.M.Sebastine 2167 (CAL); Hulical Droog, 1733m, K.M.Sebastine 4169 (CAL); Upper Palmis, 6800' [2040m], C.E.C. Fischer 2866 (CAL); Mancholai, 1067m, Kerela, K.M.Sebastine 5450 (CAL).

### 2. Viburnum erubescens

Wallich ex DC., Prodr. 4: 329. 1830; Wall., Pl. As. Rar. 2: 29, t.134. 1831; Clarke in Fl. Brit. India 3: 7. 1880. Gamble, Fl. Pres. Madras 576(407). 1919; Swarup et al., Shola For. Kerala 45. 1998; Sasidh., Fl. Periyar Tiger Reserve 167. 1998. *Viburnum wightianum* Wight and Arn., Prodr. 388. 1834.

Deciduous, reddish under-trees or large shrubs, graceful; bark thin, grey. Leaves opposite, ovate-oblong, variable in size, 4.5- 10x 3-7 cm, thin, serrate-serrulate, acute, glabrous, pubescent only on nerves in the ventral surface, shortly petiolate, up to ca.2cm,exstipulate, Flowers in terminal or lateral pendant thyrsi-form panicled cymes, white or pinkish on red pedicels, appearing with leaves, fragrant, reddish. Corolla hypocrateriform with slender and short tube and spreading rounded lobes, white. Stamens 5, epipetalous; anthers dark purple. Fruit an ellipsoid, red or reddish black drupe. Seeds obovoid, compressed, with 1 broad and deep ventral groove.

Flowering and fruiting: April to October.

Use: Fruits are locally eaten raw or cooked. Root juice is useful in treatment of cough. Soft drink prepared with fruit juice and other ingredients is used as tonic.

Distribution: Western Ghats, in the higher Sholas of Nilgiris and above 2100m, less common in Pulney Hills, in Dindigul (Tamil Nadu), Idduki (Kerala), Sri Lanka; also in the Himalayas (Kumaon to Bhutan: 1200 2500 m), extending to Myanmar and S.W. China(1800-2200m).

Specimens examined: Ooty, Nilgiri, 8000', Anonymous 195227, BSI (CAL); Ootacamund, 7000', G.King, 1952218, 195220 and 195221,BSI (CAL); Ootacamund, 8500', A.Meebold 11876 (CAL); Ootacamund, 7000', J.S.Gamble 11544 (CAL); Ooty, Nilgiri, 8000', C.B.Clarke 11110 and 11104(CAL); Ootacamund, Ph. Guinet 623 (CAL); Nilgiri Hills, 7250' C.E.S. Fischer 3950 (CAL); Nilgiri Hills G.King 1338 and 1343 (CAL); Ootacamund, Madras Province, 7000', D.Brandis 195214 and 195215, BSI(CAL).

### 3. V. hebanthum

Wight and Arnott, Prodr. 388. 1834; Gamble, Fl. Madras Pres. 1: 407.1915 and 1: 576. 1997 (repr. ed). Flora of Tamil Nadu, VOL. I, 1983.

### Vernacular name: Kadambu (Badaga)

A small spreading tree with white or bright green foliage and a strong heavy unpleasant smell, bark brown, prominently lenticellate, thin; wood light reddish brown. Leaves opposite, decussate, erect, in dense tufts at the end of shoots, elliptic to ovate, 4.5-7 x 2.4-4 cm, acute, , distantly sinuate or sinuate dentate, secondary nerves 3 pairs, coriaceous, glabrous, with tuft of hairs in the axil of the nerves beneath; base acute to slightly rounded, petiole ca. 1.5 cm long, canaliculated; ;stipule caducous. Flowers in compound umbels or corymbs, minutely pilose upwards; greenish white; bracteoles 1.2-1.4 cm, linear. Corolla tube densely pubescent. Fruit an ovoid, one-seeded drupe.

### Flowering and fruiting: April to October

Distribution: Endemic to the Western\_Ghats-Sholas of Nilgiris from 1800m to 2400m and Palani (Palani) Hills, common in Ootacamund and below the downs to Pykara Mayavarum (Mayiladuthurai), [2000 and 2400 m]

Specimens examined: Nilgiri and Coorg region[Kodagu], Anonymous 195148 (BSI SC); Nilgiri, Anonymous 195150, BSI (SC); Shola edges and Kundhas of Nilgiri District (7500') C.E.C. Fischer 195147 BSI (SC); Kodanand- Kotagiri (1853m), K. Subhramanyam 1151 BSI (SC); Casin Hill, Ootcamand, Nilgiri Hills,7250'[2175m], C.E.C. Fischer 3958 BSI (SC).

#### 4. V. punctatum

Buch.-Ham ex G.Don, Prodr. Fl. Nep.142. 1825; Keshava Murthy and Yoganarasimhan, Fl. Coorg (Kodagu) 213. 1990; Sasidharan, Biodiversity documentation for Kerala- Flowering Plants, part 6: 209. 2004. Sharma and Singh, Fl. Karnataka 122.1984. *Viburnum acuminatum* Wall. ex DC.,Prodr. 4: 325–1830. Gamble, Fl. Madras 1: 575. 1997 (rep. ed); *V. punctatum* Buch.-Ham var. *acuminatum* Clarke in Hooker f., Fl. Brit. India 3: 5. 1880.

Vernacular names: Konakaram (Tamil), Yelle' sunde' (Badaga), Konakkara (Malayalam), Nonna (Kannada).

A small branched evergreen tree, up to 4-8 m in height; barks thin, greenish-brown, tessellated, lenticelled; wood light red and hard. Leaves opposite, decussate; elliptic or narrowly obovate, up to 10 x 4.5 cm, acute to acuminate, revolute, coriaceous, ventral surface with peltate scales ; base shortly cuneate; petiole up to 1.5 cm long, canaliculated above, peltate scaly. Flowers in compound umbel or corymbiform, buds brownish tomentose, later turning creamy white or white, fragrant. Corolla rotate, creamy white. Fruit a 1-seeded drupe, oblong-ellipsoid, 1 cm long; initially green maturing to pale yellow or white or deep red.

Flowering and fruiting: February to October.

Distribution: Nepal, Bhutan, China (South); Southeast Asia (North Myanmar, Cambodia, Indonesia, Thailand, Vietnam); India in the Western Ghats-South and Central Sahyadri hills; N. Circars, Mahendragiri Hills (1200m); Chikmagalur (Mullayanagiri range), Coorg or Kodagu (Western Ghats), Hassan and Mysore districts in Karnataka; and the hills of North Coimbatore; Western Ghats from Mysore to Travancore in evergreen forests at 900-1800m; on the downs of Nilgiri towards Pykra at 2100m; Lower levelof Pulneys; Green hills of Shevaroys from 900 to 2400 m.

Use: The leaf-decoction is traditionally used for the treatment of fever and dysentery.

Specimens examined: Muthukuzhivayal Sholas (1500m) of Kanniyakumari district, A.N. Henry unmarked, BSI (S.C.); Canoor(6000') [1800m], Anonumous unmarked BSI (SC); Bedguli, on the way to Devagiri betta of Mysore district, A.S.Rao 79812 BSI (S.C.); Bedguli estate surroundings of Mysore district of Karnataka, Seshagiri Rao Rolla 73817,73819, BSI (WC); Eichala Kolmebetta, North of Ketedevargudi of Mysore district, A.S.Rao 80225, BSI (WC); Vaikkapadappu- Thannikudi (900m) of Idukki district of Kerela, N.C.Nair 69870 (BSI SC); Devicolam to Kunuili Road (2000m) of Idukki district, K.Ramamurthy 66318,66311, BSI (SC); Peermade, G.S. Pari 15295, BSI (WC); Way to Manjala Devi temple (775m) of Idukki district, K. Vivekananthan BSI (SC); Thandigudi (1400m), Tamil Nadu, M. Chandrabose 51628, BSI (S.C.); Sankaveri Babab (4500')[1350m] A.Meebold 10150 (CAL); Near Kumili (830m), K. Subhramanyam 8217, BSI (S.C.); Benney forest (1230m), Nilgiri district, B.V.Shetty 11948, BSI (S.C.); Hulical Droog (1733m), Nilgiri district, K.M.Sebastine 4142 BSI (S.C.); Gudaluv- Naduvattam Road (1650m), Nilgiri district, K.M.Sebastine 7316, BSI (S.C.).

#### DISCUSSION

The present work brings to light four species of *Viburnum L.* and two species of *Lonicera L.* mainly from

'Sholas' (cõlai in Tamil meaning groves) i.e. stunted tropical-subtropical montane forests found in valleys and in the higher montane regions of South India. Incidentally *L. caprifolioides* has remained unresolved in the present work. The Plant List (Version 1, released in December 2010) which is the working list of all known plant species prepared through collaboration between the Royal Botanic Gardens, Kew and Missouri Botanical Garden enabled the present authors to detect this species as an unresolved one. The authors i.e. Sharma and Singh (1984) neither described the species nor did refer to any specimen studied by them.

L. leschenaultia is exclusively a South Indian species and the other, i.e. Lonicera ligustrina shows disjunction being also found in the subtropical-temperate realms of the Himalayas. In South India both these species of Lonicera have undergone a sort of spatial (altitudinal) resource partitioning. Spread of L. leschenaultia is from 600 to 1800m and that of Lonicera ligustrina from 1800 to 2250m in South Indian Hills. Interestingly Viburnum coriaceum, V. erubescens and V. punctatum exhibit disjunction by virtue of their distribution in South India and in the Himalayas with a further spread to Southeast Asia and Southwest China. However V. hebanthum is endemic to Western Ghats-Nilgiri and Palani Hills within an altitude ranging from 2000 to 2400m above mean sea level. The family is of little economic importance, aside from the species. Lonicera leschenaultii which is grown in gardens as an ornamental and its leaves have certain medicinal against boils and other skin eruptions. The other species, i.e. Lonicera ligustrina, also called 'False Privet' was found getting used in some gardens in Ootacamund and Kodaikanal as a hedge plant. Fruits and root juice of V. erubescens find edible and medicinal uses respectively among local people. Medicinal use of leaf-decoction of Viburnum punctatum by the local people for the treatment of fever and dysentery is noteworthy.

# REFERENCES

Backlund A. and Bremer B., 1997. Phylogeny of the Asteridae s. str. based on <em>rbcL</em> sequences, with particular reference to the Dipsacales. Plant Systematics and Evolution **207**: 225-254.

- Benko-Iseppon A.M., and Morawetz W., 2000. Viburnales: cytological features and a new circumscription. Taxon, **49**: 5-16.
- Bohne-Gutlein E. and Weberling F., 1981. Palynologische Untersuchungen an Caprifoliaceae. I.Sambuceae, Viburneae und Diervilleae. Trop. and Subtrop. Pflanzenwelt 34: 133-189.
- Chase Mark W. et al. [APGIII], 2009. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. Botanical Journal of the Linnean Society, 161: 105-121.
- Clarke C.B., 1880. Caprifoliaceae. In: J.D.Hooker (ed) Fl. Brit. India. L.Reeve & Co., London **3**: 1-5.
- Cronquist A., 1988. The Evolution and Classification of Flowering Plants. New York Botanical Garden, Bronx, New York.
- Darlington, C. D. and Wylie A. P., 1955. In : Chromosome Atlas of Flowering Plants. University Press, Aberdeen (Great Britain): 519.
- Donghue M. J., 1983a. The phylogenetic relationship of *Viburnum*.Adv. Cladistics **2**:143-166.
- Donghue M. J., 1983b. A preliminary analysis of phylogenetic relationships in *Viburnum* (Caprifoliaceae s.l.). Systematic Botany, **8(i)**: 45-58.
- Donghue M. J., 1985. Pollen diversity and exine evolution in *Viburnum* and Caprifoliaceae sensu lato. J. Arn. Arb., **66**: 421-469.
- Downie S. S. R. and Palmer J. D., 1992a. Restriction site mapping of the chloroplast DNA inverted repeat: A molecular phylogeny of the Asteridae. Ann. Missouri Bot. Gard., **79**:266-288
- Downie S. S. R. and Palmer, J.D., 1992b. Use of chloroplastDNA rearrangements in constructing plantphylogenies. In: P.S. Soltis, D.E. Soltis and J. J.Doyle (eds). Molecular Systematics of PlantsChapman Hall, New York: 14-35.
- Donghue M. J., Olmstead R. G., Smith J. F. and Palmer J. D., 1992b. Phylogenetic relationships of Dipsacales based on rbcL sequences. Ann. Missouri Bot. Gard., **79**:333-345.

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- Ferguson I. K., 1966. The genera of Caprifoliaceae in the southeastern United States. In: Generic flora of the Southeastern United States, 47:33-59. (www.nysm.nysed.gov/research/biology/miller/b iogenflora.html)
- Fyson P. F., 1932. (Rep. ed., 1977) In: The Flora of the South Indian Hill Stations, Today and Tomorrow Publication, New Delhi: 262.
- Gamble J. S., 1967. In: Flora of the Presidency of Madras, Botanical Survey of India, Calcutta I: 574-577.
- Hillebrand G. R. and Fairbrothers D. E., 1970a. Serological investigation of the systematic position the Caprifoliaceae I: correspondence with selected Rubiaceae and Cornaceae. Amer. J. Bot., 57:810-815.
- Hillebrand G. R. and Fairbrothers D. E., 1970b. Phytoserological systematic survey of the Caprifoliaceae. Brittonia 22: 125-133.
- Heywood V. H., 1978.In: Flowering Plants of the World. Oxford University Press, Oxford, London, Melbourne: 259-260.
- Ohashi H., 1975. In: The Flora of Eastern Himalaya. University of Tokyo, Japan.: 317-321.
- Ping-sheng H., 1983. A preliminary numerical study of the family Caprifoliaceae. Acta Phytotaxonomica Sinica 21: 26-33.

- Pyck N., Roels P., Smets E., 1999. Tribal relationships in Caprifoliaceae: evidence from a cladistic analysis using ndhF sequences. Syst. Geogr. Pl.69:145-159.
- Rau, M.A., 1975. In: High Altitude Flowering Plants of West Himalaya, Botanical Survey of India, Howrah: 116-118.
- Sharma B. D. and Sing N. P., 1984. Flora of Karnataka, Botanical Survey of India, Howrah. Series, 2: 121.
- Suneson S., 1933. Zur Embryologie der Gattung *Viburnum*. Bot. Not.: 181-194.
- Wilkinson A.M., 1949. Floral anatomy and morphology of *Triosetum* and of the Caprifoliacea in general. Amer. J. Bot., 36: 481-489.
- Willis J. C., 1982. (Rep. ed. of 1973). In H.K. Airy-Shaw (ed). A Dictionary of the Flowering Plants and Ferns (Ed.8) International Book Agency (India), Dehra Dun: 200.
- Winkworth R. C. and Donoghue M. J., 2005. *Viburnum* phylogeny based on combined molecular data: implications for taxonomy and biogeography. Amer. J. Bot. 92: 653-666.