

A contribution to the study of Caprifoliaceae Jussieu in West Bengal and Sikkim, India

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Abstract

The present paper records 3 genera (*Lycesteria*, *Lonicera*, and *Triosteum*) and 8 species of Caprifoliaceae *sensu stricto* from subtropical to subalpine elevations of Darjeeling and Sikkim Himalayan Regions. *Lonicera* was found to dominate with 4 species. Artificial keys to the identification of concerned genera and species have been provided along with precise phytography and information about flowering and fruiting periods, distribution and exsiccatae of the species.

Key words: Caprifoliaceae, Darjeeling, Sikkim, phytography, exsiccatae.

INTRODUCTION

Caprifoliaceae A. L. de Jussieu, 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 bell-shaped 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). Takhtajan (1997) included 12 genera and 260 species in the family and Watson and Dallwitz (1992 onwards) have considered 12 genera and 330 species. The Angiosperm Phylogeny Group Classification (APGIII 2009) puts Caprifoliaceae in Dipsacales under the subgroup Euasterid II of the clade Asterid of the Core Eudicot, the largest group under Eudicots which is one of the major groups of Angiosperms having tricolpate or tricolpate-derived pollen types. The family is cosmopolitan in distribution, the main centres of diversity being North America and Eastern Asia. Interestingly the taxon is absent in tropical and southern Africa.

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* (Hara 1966 & 1971; Ohashi 1975; Rau 1975; Heywood 1978; Willis 1982). 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*. The traditional inclusion of *Sambucus* and *Viburnum* in the Caprifoliaceae is presently debatable and their transfer to Adoxaceae appears to be more reasonable at the present state of knowledge. Their transfer from Caprifoliaceae to Adoxaceae has been endorsed by Judd *et al* (1999); Mabberley (2008), APGIII (2009), Watson & Dallwitz (1992 onwards). Transfer of *Sambucus* to Adoxaceae and *Viburnum* to monotypic Viburnaceae by Takhtajan (1997) may also deserve appreciation. Although the family Caprifoliaceae has been included under Dipsacales in APGIII system (2009), within its domain such families as Diervillaceae Pyck, Dipsacaceae Jussieu, Linnaeaceae Backlund, Morinaceae Rafinesque, Valerianaceae Batsch have also been included.

Information from such disciplines as conventional taxonomy (Fukuoka 1972, 1974), floral anatomy (Wilkinson 1949), serology (Hillebrand & Fairbrothers 1970a & b), cytology (Sax & Kribes 1930), chemistry (Bohm & Glennie 1971), palynology (Bohne-Gutlein & Weberling 1981), molecular taxonomy (Donghue *et al.* 1992, Downie & Palmer 1992) prove very useful in understanding the taxon. Pyck *et al* (1999) suggested Caprifoliaceae to be paraphyletic based on cladistic methods

using the data obtained through sequencing of 52 half of *ndhF* gene of chloroplast genome of 14 taxa.

This family, attractively adorned with beautiful flowers, has been always encouraging taxonomists for its delimitation as a natural biotic entity. Unfortunately many of the members of this

MATERIALS AND METHODS

This work is based on thorough study and scrutiny of pertinent literature, specimens preserved in the Herbarium of Lloyd Botanic Garden (LBG), the Central National Herbarium (CAL) and those collected during field trips in conformity with earlier work (Mukherjee 1988). The concept of Caprifoliaceae as adopted by Judd *et al* (1999); Mabberley (2008), APGIII (2009) has been followed. Standard Taxonomic methods were followed to prepare comprehensive keys to identification of genera and species and brief descriptions of the species to facilitate their identification. The taxa are arranged alphabetically giving their scientific names, citations, synonyms and basionyms wherever needed along with information about flowering and fruiting periods, distribution, voucher specimens etc.

SYSTEMATIC DISCOURSE

Caprifoliaceae (*sensu stricto*) is recognized on the basis of the following characters:

Plants are 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; 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 herbaceous, opposite pairs of leaves connate at the base | <i>Triosteum</i> |
| 1. Plants ligneous, opposite pairs of leaves are free at the base | 2 |
| 2. Stem and branches mostly fistular, erect; the flowers in each ultimate axillary pair basally free | <i>Leycesteria</i> |
| 2. Stem and branches solid, mostly scandent; the flowers in each ultimate axillary pair are basally fused | <i>Lonicera</i> |

Leycesteria Wallich

Key to the Species

- | | |
|--|------------------------|
| 1. Stipules very large, leafy, orbicular; leaves distichous; stem and branches solid | <i>L. stipulata</i> |
| 1. Stipules absent; leaves not distichous; stem and branches fistular | 2 |
| 2. Branches stout; leaves ovate, bracts large and leafy, ovary 5 chambered | <i>L. formosa</i> |
| 2. Branches slender; leaves lanceolate, bracts small; ovary 7-8 chambered | <i>L. glaucophylla</i> |

Leycesteria formosa Wallich in Roxburgh, Fl. Ind. 2: 182.1824; C.B. Clarke in Hook.f., Fl. Brit. India 3: 16.1880; Banerji in Rec. Bot. Surv. Ind. 19(2): 50. 1966; Hara in Fl. E. Him.317. 1966, 2: 124. 1971; R.A. King in Grierson & Long, Fl. Bhutan 2(3): 1355. 2001.

A deciduous undershrub with glaucous stem, upto 180cm; branches almost from base, stout, fistular; leaves simple, opposite, ovate, 4 - 5 x 13 - 15 cm, irregularly dentate, acuminate, whitish beneath, distinctly petiolate; flowers in drooping axillary spike, bracts large, leafy, purple; bracteoles variable:

corolla funnel shaped, 5- short lobed, red- purplish to whitish pink; fruits dark redturning white, subglobose, 5-celled berry, subtended by persistent calyx teeth; seed semitransparent.

Flowering & fruiting: June to October.

Distribution: Himalayas (Kashmir to Bhutan) stretching upto Assam.

Exsiccatae: Palmooghra, YHb(LBG), Jalapahar (Darjeeling), 2250 m, Mukherjee 344, East of Phalut, 3050 m, I.H. Burkill 25319 (CAL), Darjeeling, Anonymous 8539 (CAL), Gromfoliar, G. King 4786 (CAL), Yoksum to Rampook, 1500 – 1800 m, T. Anderson 661 (CAL).

Leycesteria glaucophylla (Hook.f. et Thomson) Clarke in Hook.f., Fl. Brit. India 3: 16. 1880; Hara in Fl. E. Him. 317. 1966, 2: 124. 1971; R.A. King in Grierson & Long, Fl. Bhutan 2(3): 1355. 2001.

A slender undershrub with fistular stem and branches; leaves narrow lanceolate, sinuate-dentate, shortly petioled; flowers few in axillary pinkish spike, bracts much shorter than ovary; fruit a 7-8 celled berry.

Flowering & fruiting: Almost throughout the year.

Distribution: Himalayas from 1800 m to 2500 m

Exsiccatae: Karponang, Ribu & Rhomoo 4676 (CAL); Karponang YHb (CAL); Sandamjuk, Dr. Prain's collector (CAL); Ressayum, Ribu & Rhomoo 3720 (CAL); Sim long, T. Anderson 84 (CAL); Ruchi La, Riba 437 (CAL); Kumba Forest, Nathula Road, Gangtok, K. Tothathri 9483.

Leycesteria stipulata (Hook.f. et Thomson) Fritsch. in Engl. Pfl.-fam. IV, 4: 169. 1891. Hara in Fl. E. Him. 318. 1966, 2: 125. 1971. R.A. King in Grierson & Long, Fl. Bhutan 2(3): 1355. 2001.

Lonicera stipulata Hook.f. et Thomson in Journ. Linn. Soc. 2: 165. 1858. *Pentapxyxis stipulata* (Hook.f. et Thomson) Clarke in Hook. f., Fl. Brit. India 3: 17. 1880; Mukherjee, Fl. Plants of Darjiling 109. 1988.

An erect shrub with solid stem and branches and dense wooly cover; leaves distichous, opposite, lamina ovate-lanceolate, 10 - 20 x 5 - 7 cm, sinuate-toothed, acuminate, with prominent nerves; spikes pinkish red, fruit a pubescent berry; seeds ellipsoid.

Flowering & fruiting: March to August.

Distribution: Sikkim Himalayas and vicinity.

Exsiccatae: Senchal, YHb unmarked (LBG); Jalapahar, Darjeeling, 2200m, Mukherjee 349; Gangtok, 2000m, A. Mukherjee 336.

Lonicera L.

Key to the Species

- | | |
|---|----------------------|
| 1. Scandent, bracteoles minute | 2 |
| 1. Style glabrous or scarcely hairy; flowers in panicles | 3 |
| 2. Corolla tube shorter than 2cm ; leaves thickly coriaceous, calyx and corolla glabrous; flowers in panicles of short spikes | <i>L. glabrata</i> |
| 2. Corolla exceeding 2 cm; leaves thickly coriaceous, calyx and corolla hairy; flowers in panicles of peduncled heads | <i>L. macrantha</i> |
| 3. Style densely fulvous hairy, flowers in heads, sometimes two in axillary peduncles .. | <i>L. acuminata</i> |
| 3. Erect, bracteoles connate into a cup | <i>L. lanceolata</i> |

Lonicera acuminata Wallich in Roxburgh, Fl. Ind. 2: 176.1824; Clarke in Hook.f., Fl. Brit. India 3: 10. 1880; Hara in Fl. E. Him. 318. 1966; Meyer in Grierson & Long, Fl. Bhutan 2(3): 1353. 2001.

A scandent shrub; lamina oblong-cordate, acute; flowers many forming peduncled heads, some times 2-flowered, creamy white; bracts small, bracteoles ciliate, yellow, calyx almost glabrous; corolla funnel like, lobes hairy outside; styles densely fulvous; fruits berries.

Flowering & fruiting: June to October.

Distribution: Himalayas (Nepal to Bhutan), S.W. China

Exsiccatae: Lachen 6120 (LBG), 8000 (LBG); Lachung, 2400 m, Rhomoo & Lepcha 2311(LBG); Lachung, YHb 1951(LBG), Sikkim, 1200 m, G. King 767 and 770 (CAL).

Lonicera glabrata Wallich in Roxb., Fl. Ind.2: 175. 1824; Clarke in Hook.f., Fl. Brit. India 3: 10. 1880; Hara in Fl. E. Him. 318. 1966, 2: 125. 1971; Meyer in Grierson & Long, Fl. Bhutan 2(3): 1354. 2001.

A glabrous, scandent shrub; leaves cordate-oblong, up to 7.5 X 4.0 cm, acute, coriaceous, glabrous, inflorescence pyramidal panicle of leafy spikes; flowers with glabrous calyx and conspicuously 2-lipped corolla, whitish yellow, glabrous outside; bracts small, lanceolate; bracteoles minute; fruits black berries.

Flowering & fruiting: July to September.

Distribution: Himalayas (Nepal to Bhutan), within 1900 - 2300m; Myanmar, S.W. China

Exsiccatae: Sukia, 1800 m G.S. Lepcha 2627 (LBG); Darjeeling, G. Bahadur (LBG); Darjeeling, YHb (LBG), Mirik, YHb 2000 (LBG); Jalapahar, Darjeeling, 2200m, Mukherjee 93. Darjeeling, 1800 m, Anonymous, Accession No.195873 and of Griffith 3410 (CAL).

Lonicera lanceolata Wallich in Roxburgh, Fl.Ind. 2: 177. 1824; Hara in Fl. E. Him. 2: 125. 1971; Meyer in Grierson & Long, Fl. Bhutan 2(3): 1353. 2001. *L. decipiens* Hook.f. et Thomson in J. Linn. Soc. Bot. 2: 170. 1858; Clarke in Hook.f., Fl. Brit. India 3: 14. 1880.

A small erect bushy shrub, deciduous; leaves opposite, lamina oblong-lanceolate, 7 – 9 x 4 – 6 cm, acuminate, with micro- pubescence, almost sessile; flowers paired on 4-10 mm long, pubescent peduncles; bracts small, linear; bracteoles as long as calyx tube; calyx tubular with minute teeth, ciliate; corolla 2-lipped, reddish purple; fruit a subglobose, black drupe.

Flowering & fruiting: June to October.

Distribution: Himalayas (Nepal to Bhutan), within 2700 – 3800 m; Tibet, S.W. China.

Exsiccatae: Ribu & Rhomoo 2918 (LBG); YHb(LBG); Sandakphu, 3350 m, Anonymous 25236 (CAL); Sikkim, 3000 m, G.A. Gammie 430 (CAL);

Lonicera macrantha (D.Don) Sprengel, Syst. Veg. 4(2): 82. 1827; Hara in Fl. E. Him. 318. 1966; Clarke in Hook.f. Fl. Brit. India3: 10. 1880. Meyer in Grierson & Long, Fl. Bhutan 2(3): 1354. 2001. *Caprifolium macranthum* D. Don, Prodr. Fl. Nep. 140. 1825.

A scandent shrub; lamina cordate-oblong, 5.5 – 6.5 x 2.0 – 2.5 cm, acute, coriaceous, pubescent beneath; heads peduncled in subterminal panicles; calyx tubular with small distal linear bristly lobes, persistent, hairy when with fruit; corolla 2-lipped with very long tube, upto 5 cm long, white turning yellowish; fruit a berry surmounted by calyx teeth.

Flowering & fruiting: May to August

Distribution: Himalayas (Nepal to Bhutan), Assam, China, S.E. Asia.

Exsiccatae: Labha, YHb 98 (LBG), Under Pedong, 1200 m, I.H. Burkill 32268 (CAL); Yoksum, 2700 m, Dr. King 257 (CAL).

Triosteum L.

Triosteum himalayanum Wallich in Roxburgh, Fl. Ind. 2: 180.1824. R.A. King in Grierson & Long, Fl. Bhutan 2(3):1362.2001. Polunin & Stainton, Fl. Him. 164. 2001. *Triosteum hirsutum* Wallich in Roxburgh, Fl. Ind. 2: 180.1824; Rau, High Alt. Fl. Pl. W. Himalaya 116-118. 1975.

A small, perennial, herb, up to 90 cm, hirsute with glandular and eglandular hairs; leaves opposite, broadly elliptic, obovate-elliptic, 10 – 15 x 4 – 4 – 5 cm, entire-undulated, obtuse, sessile, connate at the base and adnate to stem, hairy on nerves, interspersed with glandular hair; flowers in short terminal spikes or whorls; corolla funnel shaped, bilabiate- 4 obtusely lobed in upper lip and one

relaxed lobe in lower lip; tube 7 – 8 mm long, slightly curved near base with a shallow spur, hairy, yellowish- green; lobes violet to purple-brown; stamens yellow; fruit a red berry with glandular trichomes, 8 – 10 mm across, 3-seeded.

Flowering & fruiting: May to September.

Distribution: Himalayas (sub-alpine zone eastern Kumaon, Bhutan, Sikkim- within 3048 - 3962 m alt.), Tibet, China.

Exsiccatae: Zemu Valley, 3900 m, Smith & Cave 1135 (CAL), Kyanghosta, B. Krishna 2204 (CAL), Lachung valley, 3660 m, G.A. Gammie 762 (CAL).

DISCUSSION

The present work records 3 genera and 8 species of Caprifoliaceae *sensu stricto* from West Bengal and Sikkim. So far the distribution of this family in West Bengal is concerned, it is confined to the Darjeeling Himalayan part of North Bengal. Sikkim state appears to be a comfortable home for them. Most of the members of this family are cold loving with residence in the subtropical to temperate elevations of the Darjeeling and Sikkim Himalayas. Existence of *Triosteum himalayanum*, a rare sub-alpine species of Kumaon, could not be traced in the high altitudinal regions of West Bengal. However, their presence in Sikkim (Zemu Valley, Kyanghosta, Lachung valley above 3660 m) could be known from a few specimens preserved at CAL. Since most of the species of Caprifoliaceae especially *Triosteum himalayanum*, *Leycesteria glaucophylla*, *Lonicera lanceolata* and *L. macrantha* have become very rare, a thorough periodic surveillance for taxonomic documentation and conservation is envisaged.

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