

A contribution to the study of Viburnaceae Rafinesque in Darjeeling-Sikkim Himalayan Region

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Abstract

The present work records six species of *Viburnum* Linnaeus (*V. colebrookianum* Wallich ex DC., *V. cordifolium* Wallich ex DC., *V. coriaceous* Blume, *V. erubescens* Wallich ex DC., *V. nervosum* D. Don and *V. mullaha* Buchanon-Hamilton ex D. Don), representing the monotypic Viburnaceae Rafinesque in the subtropical to temperate elevations of Darjeeling and Sikkim Himalayan Regions. Artificial key to the identification of the concerned species has been provided along with precise phytography and information about flowering and fruiting periods, distribution and exsiccatae of the species

Key words: Viburnaceae, Darjeeling, Sikkim, phytography, exsiccatae

INTRODUCTION

Viburnaceae, as named by Constantine Samuel Rafinesque-Schmaltz (1820), is the family of European Cranberry bush, Guelder Rose, Water Elder, resides mostly in the temperate regions of the northern hemisphere and secondarily in the subtropical portions of Asia and Latin America. The Himalayas provide very comfortable accommodation to the family in the subtropical and temperate altitudes.

Viburnaceae is monotypic represented globally by about 200 species of *Viburnum* Linnaeus (Takhtajan 1997). It is placed in the order Viburnales Dumortier under the super-order Dipsacaceae of the Magnoliopsid subclass Cornidae by Takhtajan (1997). Cronquist (1988) traditionally retained *Viburnum* Linnaeus under Caprifoliaceae of Dipsacales. Its transfer to Adoxaceae was endorsed by Judd *et al* (1999), Mabberley (2008), APGIII (2009), and Watson & Dalwitz (1992 onwards). Takhtajan (1997) placed *Viburnum* Linnaeus in the family exclusively of its own i.e. Viburnaceae Rafinesque. Interestingly Benko-Iseppon & Morawetz (2000) have extended support to the recognition of Viburnaceae Rafinesque. Hoogland & Reveal (2005) included the Viburnaceae Rafinesque in the *Index nominum familiarum plantarum vascularium*.

It was Donghue (1983) who interpreted the phylogenetic relationship of *Viburnum* (Caprifoliaceae) with 23 presumably cladistic units and 34 characters using cladistic method through WAGNER'78 Computer program. Additional information from such data sources as embryology (Suneson 1933), floral anatomy (Wilkinson 1948) cytology (Edolf 1962; Benko-Iseppon & Morawetz 2000), serology (Hillebrand 1969), palynology (Donghue 1985), molecular taxonomy (Backlund & Bremer 1997; Winkworth & Donoghue 2005) are worthwhile in understanding the taxon. Considering the importance of studies on Viburnaceae, the present work documents the species of *Viburnum* occurring in the Darjeeling and Sikkim Himalayan regions.

MATERIALS AND METHODS

This study is based on thorough study and scrutiny of pertinent literature, specimens preserved in CAL, LBG and those collected during field work in conformity with earlier work (Mukherjee 1988). The concept of Viburnaceae as given by Takhtajan (1997) has been followed. Standard taxonomic methods were adopted to prepare a comprehensive key to identification of species and

brief description of each species. The recorded species have been arranged alphabetically giving their scientific names, citations, basionyms and synonyms wherever necessary along with information about flowering and fruiting periods, distribution and exsiccatae etc.

SYSTEMATIC DISCOURSE

The Viburnaceae is characterized as a taxon mostly of 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, fragrant; carpels 3, syncarpous with the nectaries on top; drupes one-seeded, spherical, oval or somewhat flattened, red to purple, blue, or black.

Key to the Species

1. Corolla rotate or shortly campanulate, lobes spreading 2
1. Corolla tubular, lobes short, erect or shortly spreading 4
2. Leaves ventrally stellate pubescent, seeds grooved 3
2. Leaves almost glabrous, seeds hardly grooved *V. colebrookianum*
3. Leaves elliptic–lanceolate, pubescent beneath all along the surface, seeds 2-grooved on both surfaces *V. stellulatum*
3. Leaves elliptic-cordate, pubescent on nerves beneath, sharply serrate; seeds with a furrow on dorsal surface *V. cordifolium*
4. Drupes 1-3 celled, cyme paniced or subcapitate 5
4. Drupes 1-celled, cymes corymbose *V. coriaceous*
5. Leaves parallel nerved, hairy on nerves beneath, cymes appear before leaves, corolla rosy *V. nervosum*
5. Leaves not distinctly parallel nerved, pilose on nerves beneath, cymes and leaves appear together, corolla white *V. erubescens*

Viburnum colebrookianum Wallich *ex* DC., Prodr. 4: 325.1830; Clarke in Fl. Brit. India 3: 5. 1880. Hara in Fl. E. Him. 127. 2: 1971; R.A. King in Grierson & Long, Fl. Bhutan 2(3): 1359. 2001.

A large spreading shrubs, branches with stellate hairs: lamina 12 – 14 x 4.5 – 5 cm, oblong, crenate-serrate, acuminate, almost glabrous; flowers in umbellate corymbs on short axillary branches, bracts minute and bracteoles lacking; corolla rotate, spreading, white; drupes ellipsoid; seeds dorsiventrally convex-concave.

Flowering & fruiting: October – April

Distribution: Himalayas (Nepal to Bhutan), 300 – 900 m

Exsiccatae: Vararbari plains, Ribu & Rhomoo 3782 (LBG); Mungpoo, W.W. Smith 203 (LBG), YHb's unmarked collections from Duars and Sevoke (LBG); Forest of Sikkim, White 205 (CAL); Jalpaiguri, J.K. Sikdar 595 (CAL). Gangtok, 1860m, N.C. Majumdar & R.N. Banerjee 318 (CAL); Mungpoo, 1050m N.C. Majumdar & R.N. Banerjee 254 (CAL).

Viburnum cordifolium Wallich *ex* DC., Prodr. 4: 327. 1830; Hara in Fl. E. Himal. 319. 1966; Rau, High Altitude Fl. Pl. W. Himal. 117. 1975.

A small tree or a shrub, deciduous; leaves opposite, lamina ovate-obovate, elliptic, 5 – 6 cm x 3.0 – 3.5 cm, serrate, acuminate, veins prominent; flowers in lax, compound umbels, fragrant; corolla rotate with a short tube and larger, ovate, spreading lobes, white, tinged with pink; fruit a small ellipsoid, red drupe.

Flowering & fruiting: April – June

Distribution: Temperate Himalaya (Kumaon to Bhutan from 3000- 3600m), extending to S.W. China

Exsiccatae: Tonglu, in forest, unmarked, YHb (LBG); Kalabori, Ribu & Rhomoo 4310 (LBG); Phalut, W.W. Smith 4591 (LBG); In Rhododendron wood towards Sandakphu, 3000m, G.Watt 5310 (CAL), Phalut to Sandakphu, 3000-3,300m, J.H. Lace 2269 (CAL), Kapuh, 3,900m, Anonymous 140 (CAL), Lachung to Yumthang, 3,000m, Anonymous 139 (CAL).

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. *V. capitellatum* Wight et Arnott, Prodr. Fl. Ind. Or. 388. 1834.

A large shrub or under-tree; leaves alternate, oblong-lanceolate, 10 – 22 x 4 – 6 cm, entire, coriaceous, glabrous, hairy towards axils on nerves beneath; flowers, small, in terminal corymbose or umbellate cymes, bracts small, bracteoles absent; corolla white, glabrous, tubular, tube very short with 5 short erect lobes and five projecting purple anthers from epipetalous stamens; fruit a small, black, succulent drupe; seeds 2-grooved dorsally.

Flowering & fruiting: July to November

Distribution: The Himalaya (Kumaon to NEFA, 1200 – 2500 m), extending to Myanmar, S.E. Asia and S.W. China.

Exsiccatae: Darjeeling, YHb 260/02 (LBG), Darjeeling, YHb 435/03 (LBG), Darjeeling, unmarked, S. Kurz (LBG); Kurseong, W.G. Craib 328 (CAL); Rishee, 4000' Anonymous 25024 (CAL); Nagree, 3000', Anonymous 854 (CAL); Kumsong, W.G. Craib 328 (CAL); Birch Hill, Darjeeling, 6600', G. King 5712 (CAL), West Ressoon, 6000', J.H. Lace 2423; Darjeeling, 6600', E.A.C. Modder 110D (CAL); Darjeeling, 7000', Anonymous 9335 (CAL).

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. Hara in Fl. E. Him. 320. 1966; Mukherjee, Fl. Pl. Darjiling 111. 1988; R.A. King in Grierson & Long, Fl. Bhutan 2(3): 1359. 2001.

A small, deciduous tree; leaves opposite, ovate-oblong, 6 – 7 x 2 – 2.5 cm, thin, distally serrulate, acute, glabrous, pubescent only on nerves in the ventral surface, shortly petiolate; flowers in terminal or lateral paniced cymes; corolla with slender and short tube and spreading rounded lobes, white; anthers dark purple; fruit an ellipsoid, red drupe.

Flowering & fruiting: April to October

Distribution: The Himalayas (Kumaon to Bhutan, 1200 – 2500 m), extending to Myanmar and S.W. China. Also in Deccan mountains, Sri Lanka.

Exsiccatae: Darjeeling unmarked, YHb (LBG), Manebhanjan forest, unmarked, YHb (LBG), K. Biswas 709 (CAL); Jalapahar, Darjeeling Mukherjee 365.

Viburnum mullaha Buchanon-Hamilton ex D. Don, Prodr. H. Nep. 141. 1825. R.R. Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 696.1172. *Viburnum stellulatum* Wallich ex DC; R.A. King in Grierson & Long, Fl. Bhutan 2(3): 1357. 2001.

A large deciduous shrub; leaves opposite; lamina ovate to ovate-lanceolate, acuminate, upto 15 x 6 cm, remotely serrate, acute, pubescent only in ventral surface; flowers tiny, in large compound, stellate-pubescent umbels; bracts oblong, deciduous; calyx tube with stellate hairs and small lobes; corolla shortly tubular with slightly longer spreading lobes, white; drupes subspherical, bright red; seeds 2-grooved dorsiventrally.

Flowering & fruiting: June to September

Distribution: The Himalayas (Kashmir to NEFA 1600 – 3700 m)

Exsiccatae: Chung Tung, Ribu & Shomoo 3077; Campbell 9 (LBG); Chung Tung, YHb 5616 (LBG); Chung Tung, YHb 9199 (LBG); Gangtok, P.K. Hajra 054 (CAL); Jalapahar, Darjiling Mukherjee 374.

Viburnum nervosum D. Don, Prodr. Fl. Nepal 141. 1825. Rau, High Altitude Fl. Pl. W. Himal. 118. 1975; R.A. King in Grierson & Long, Fl. Bhutan 2(3): 1358. 2001.

A large shrub with pilose branches and branchlets; leaves opposite, lamina elliptic-oblong, upto 4.0 – 7.5 x 2.5 – 3.5 cm, serrate, acute, nerves somewhat parallel, pubescent only on ventral nerves; flowers in subcapitate cymes, 3.5 x 4.0 cm; bracts oblong, deciduous; calyx tube with ciliate teeth; corolla tubular with elliptic spreading lobes, pink-rose; drupe elliptic, red.

Flowering & fruiting: April to November.

Distribution: The Himalayas (Tehri-Garhwal, 3300 m; Kumaon to Bhutan, 2500 – 3700 m)

Exsiccatae: Gairibas, Campbell 9 (LBG); Near Chhangu, YHb 2367 (LBG); Kaelle, Dr. Prawn 3997 (CAL), Thangu, 10,000-12500', Dr. K. Biswas 6617 (CAL), Above Lachen, 10,000', G. King's collector 195316 (CAL).

DISCUSSION

The present work records six species of *Viburnum* from the subtropical to subalpine regions of Darjeeling-Sikkim Himalayas. Interestingly, *V. erubescens* is also known to exist in the mountains of South India and Sri Lanka. *V. colebrookianum* is a somewhat warmth loving species since it has been seen to occur mostly in the Duars region of Jalpaiguri and Sevak. While preparing the flowering calendar of the angiospermic flora of Darjeeling Hills, West Bengal (India), Das & Chanda (1987) have recorded most of the species of *Viburnum* of this region. *Viburnum mullaha* has very wide ecological amplitude and distribution stretching from Kashmir to NEFA. *Viburnum coriaceum* spreads from Kumaon to NEFA and finally extends to Myanmar, S.E. Asia and S.W. China. Two of the species of *Viburnum* recorded in this work viz. *V. cordifolium* and *V. nervosum* have reached Tonglu, Sandakphu, Phalut, Gairibas, Chhangu in the sub-alpine zones of Paschimbanga and Sikkim. Distribution of *V. cordifolium* is traceable from Kumaon to Bhutan between 3000 – 3600 m above mean sea level which extends further to S.W. China. These two species were also recorded by Rau (1975) from high altitudes of Western Himalaya. Since species of *Viburnum* especially *V. cordifolium*, *V. nervosum* have become very rare, a thorough periodic taxonomic surveillance for determination of status and execution of conservation is envisaged.

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