

THE EPIPHYTIC FLOWERING PLANTS OF DARJEELING HILLS, OTHER THAN ORCHIDS

G. C. SEN

Curator, Lloyd Botanic Garden, Darjeeling

ABSTRACT

Abundance of Epiphytes has been observed in the hilly region of Darjeeling District. As many as 34 species of epiphytes falling under 22 genera and 15 different families are found to be epiphytic flowering plants other than orchids growing in the region in question between 305 to 3,660 meters.

The abundance of epiphytes may be attributable to various factors viz. topography, altitude, rainfall and humidity prevailing in the District.

The flowering epiphytes have been classified into two main classes—Total type and Partial type in accordance with their mode of epiphytism.

Nature of epiphytism, short description of morphology, flowering time, distribution within the district and also the occurrence in other regions of all the said 34 species have been described in short with reference to Hooker's Flora of British India.

The vegetation of the district of Darjeeling ranging from less than 305 metres to about 3660 metres shows a special ecological feature—the abundance of epiphytes. Out of which as many as 34 species of angiosperms other than orchids, have so far been observed to have epiphytic mode of life, i.e., which grow on other trees or shrubs partially or exclusively. These fall into 22 genera under 15 different families.

Considering the factors like topography, altitude, rainfall, humidity, temperature, etc., which mostly determine, as in other regions, the vegetation of the Darjeeling district the said special feature of epiphytism may be attributed to the following facts:

TOPOGRAPHY

This is a hilly area with steep slopes and terraces. It starts from reaching an elevation of less than 305 metres reaching an elevation of about 3660 metres. This seems to help epiphytism indirectly owing to the seeds being dispersed mechanically by wind, birds, etc. Compared to plains, there are greater possibilities of their seeds falling on crown or aerial parts of trees or shrubs of lower slopes or terraces.

RAINFALL AND HUMIDITY

The region in question is extremely humid and receives good annual rainfall of an average of more than 254 cm. This seems to help in the profuse growth of moss with adjoining humus on trunks and branches. This in turn enables the seeds, carried over to trees, to germinate and to thrive with the help of the moisture and humus held by the moss which holds the entangled mass of the root system of the epiphytic plants.

EXTENSIVE ROOT SYSTEM

A few epiphytic plants under study, e.g., *Vaccinium serratum* Hook., *Pentapterygium serpens* Klotz.,

Pentapterygium hookeri Clarke., *Hymenodictyon flaccidum* Wall., etc. develop a long spreading root system thus drawing the nourishment and moisture from the wide surface area of the bark of host, where humus and moisture accumulate. The root system has in some cases been found to have spread right to the base of the host plant drawing nourishment directly from the soil.

Thus the epiphytic modes of life of the plants appear to have been attained mostly by way of adaptation to different factors viz., climatic, topographical and physiological.

A few such epiphytes, e.g., *Pentapterygium serpens* Klotz., *Vaccinium serratum* Wight., *Hymenopogon parasiticus* Wall., and species of *Aeschynanthus* etc. mentioned under detailed study, show an exclusiveness in their mode of epiphytism.

There are some intermediate types which grow both on trees and on rocks, the nutritional conditions of the latter being better than the former.

In accordance with the degree of epiphytism the plants under observation may be classed as below:

I Total type.

Grown exclusively on trees or shrubs.

II Partial type.

(i) Grown on rocks and trees.

(ii) Grown on soil and trees.

The 34 species in question are described below with reference to Hooker's "Flora of British India".

Nature of epiphytism, short description of morphology, flowering time etc., have been given here. The distribution within the district of Darjeeling has been given and it shows a range of tropical to temperate climate. The occurrence of these species in other regions, e.g., Sikkim Himalayas, Bhotan, etc., has also been described.

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CELASTRACEAE

***Euonymus theaeifolius* Wall. (FBI 1:612)**

Small erect shrub. Branches terete. Leaves ovate or oblong lanceolate. Peduncles about twice divided, short and slender. Flowers red; flowering May to July. A partial epiphyte. Grows on trees and on soil.

Found in Darjeeling district from about 1830-2750 m. Central and Eastern Himalayas, Nepal, Sikkim, 1525-2440 m. Khasia Mountains 1220-1830 m.

ANACARDIACEAE

***Rhus insignis* Hook. f. (FBI 2: 11)**

A small tree leaflets coriaceous, entire, elliptic or oblong. Flowering during July to August.

A partial epiphyte. Found in Darjeeling district, from 305-2135 m. Also in Sikkim Himalayas and Khasia Mountains.

***R. succedanea* Linn. (FBI 2: 12)**

Tree. Leaflets 2-6 pairs, oblong elliptic or ovate lanceolate. Panicles axillary. Flowers yellow green during April to June.

A partial epiphyte. Grows on tree and soil. Found in Darjeeling and Sikkim 610-2135 m. Temperate Himalayas from Kashmir 915-1830 m., to Sikkim 1525-2440 m., and Bhotan, Khasia Mountains 610-1830 m.

ROSACEAE

***Pyrus wallichii* Hook. f. (FBI 2:376)**

A small tree, younger parts clothed with white wool. Leaves with 5-9 pairs of leaflets. Corymbs with white flowers, flowering about April to July.

A partial epiphyte. Grows on trees and rocks. Found in Darjeeling district from 2135-2750 m. Central and Eastern temperate Himalayas; Nepal, Sikkim 2000-2750 m.

***Photinia integrifolia* Lindl. (FBI 2:381)**

Small tree. Leaves glabrous, oblanceolate acuminate, entire, short petioled. Corymbs large spreading with small flowers during May to July.

A partial epiphyte. Grows on tree, rock and soil. Found in Darjeeling district 1525-2135 m. Also Central and Eastern Himalayas from Nepal and Sikkim, 1220-2135 m. to Bhotan.

SAXIFRAGACEAE

***Hydrangea altissima* Wall. (FBI 2:404)**

A spreading shrub of medium height. Leaves ovate lanceolate. Corymb pilose. Flowers many, flowering during April to June.

A partial epiphyte. Grows on trees and on soil. Found in Darjeeling district at about 2135-2440 m. Also in temperate Himalayas from Garwhal to Bhotan 1220-2440 m. and Sikkim 3050 m.

ARALIACEAE

***Pentapanax leschenaultii* Seem. (FBI 2:724)**

A scandant shrub or tree 9.20-15.40 m. Leaflets 3-5 elliptic-acuminate and serrate. Panicles 7.62-15.24 cm., with 3-6 heads. Flowering during July to August.

A partial epiphyte. Grown on tree and on soil. Found in Darjeeling district from 1830-3355 m. Also found in Sikkim 1830-3050 m., South India and Ceylon in mountains and in Burma.

RUBIACEAE

***Hymenopogon parasiticus* Wall. (FBI 3:34)**

Undershrub. Stem curved. Rooting shoots villous. Leaves opposite, short petioled, elliptical, lanceolate or oblong lanceolate at the end of the branches. Corymbs 3-chotomous. Flower colour whitish flowering during June to August.

A total epiphyte. Found in Darjeeling district 1525-2440 m. Temperate Himalayas from Kumaon to Bhotan 1830-2440 m., Khasia Mountains 1220-1830 m.

***Hymenodictyon flaccidum* Wall. (FBI 3:36)**

Deciduous tree. Leaves opposite petioled, elliptic abruptly acuminate. Racemes densely flowered. Flowers subsessile, white flowering during May to July.

A partial epiphyte. Grows both on trees and on soil. Found in Darjeeling district from less than 305—about 1925 m. Temperate Himalayas 915-1830 m., from Garwhal to Bhotan, Khasia Mountains 1220-1525 m.

VACCINIACEAE

***Vaccinium serratum* Wight. (FBI 3:452)**

A stout shrub. Leaves subsessile, 6.25 by 1.75 cm., acute remotely crenate-serrate nearly up to base and glabrous. Branches thickened much at their bases apparently to hold the projecting long branches with advantage by countering the weight of the latter (Fig. 1.). The root system is strong, spreading and clinging to the host trunk and branches. Flowering during March to May months. Racemes springing umbellately from lateral whorl of leaves. Flowers yellow, small.

A total epiphyte on trees of different heights and drawing moisture and nutrient from bark as well as

from moss adhered to the bark. Found in Darjeeling district from about 1220-about 2750 m. Also

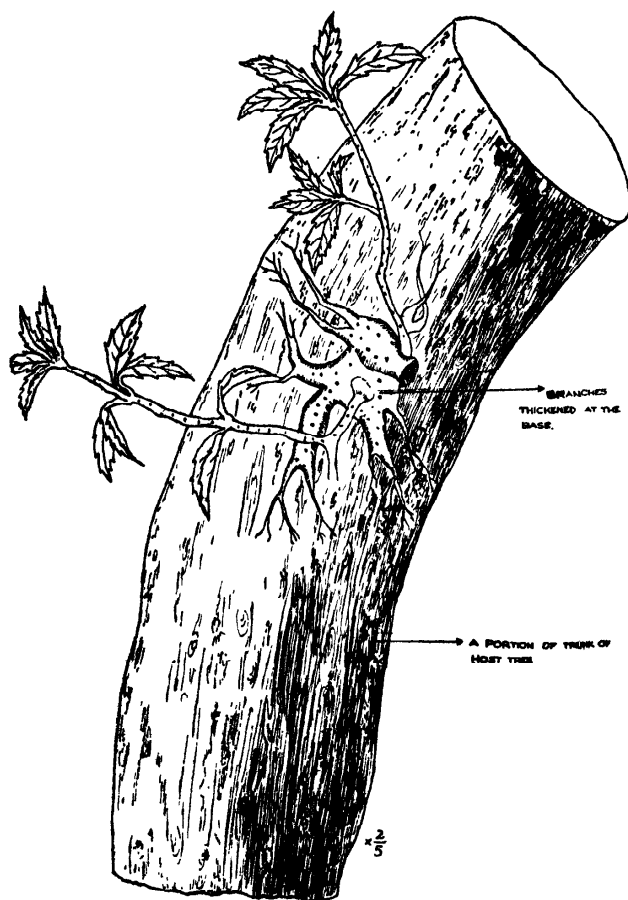


Fig 1. *Vaccinium serratum* Wight (Growing on tree)

in Sikkim, Bhotan and Khasia Mountains 915-2135 m.

***V. retusum* Hook. f. (FBI 3:451)**

Leaves alternate often obtuse or emarginate, glabrous. Margin recurved.

Racemes, white 2.50-5 cm. Bracts elliptical. Corolla white with five red stripes. Flowering April to June. A total epiphyte. Found in Darjeeling district from about 1830-2440 m. Also in Sikkim and Bhotan altitude 2135-2750 m.

***V. nummularia* H. f. & T. ms. (FBI 3: 451)**

A small stout shrub. Branches pendent almost bristly. Leaves alternate, subsessile, glabrous, margin recurved. Racemes with small rose coloured flowers. Flowering during May to June.

A total epiphyte. Found in Darjeeling district and also in Sikkim and Bhotan at 2440-3050 m.

***Pentapterygium hookeri* Clarke (FBI 3:450)**

Shrub. Stem thickened at the base for countering the weight of the hanging branches. Leaves alternate, serrate, elliptical, acute. Flowers in fasciated

or hardly corymbose. Corolla yellow. Flowering during August to October.

Almost a total epiphyte but also on rocks some times. Found in Darjeeling district at 1830-2440 m. and in Sikkim 1525-2440 m.

***P. serpens* Klotzsch. (FBI 3:449)**

A medium sized shrub with many pendulous his-

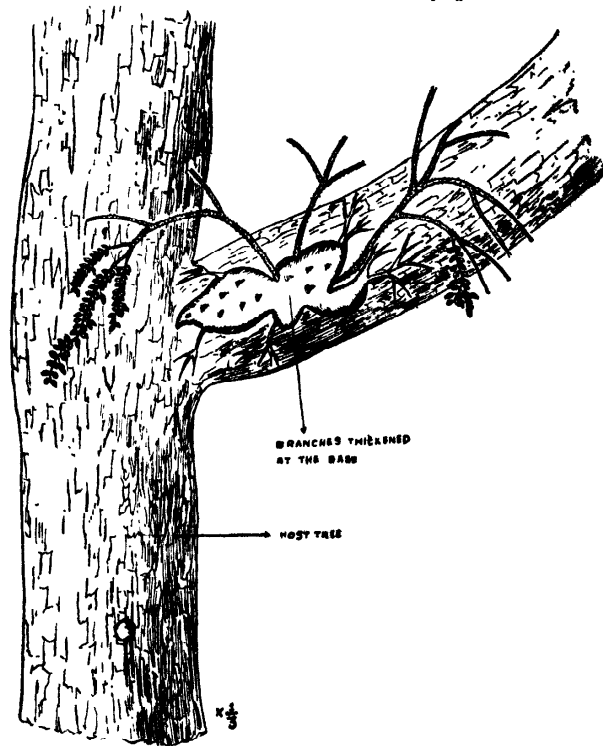


Fig. 2. *Pentapterygium serpens* Klotzsch (Growing on tree)

pid. and densely leafy branches. The bases of the branches thickened apparently to facilitate holding of the branches from host tree (Fig. 2). Leaves alternate, sub-sessile, small, acute and glabrous. Flowers subsolitary, red and flowering during late January to March. Root system stout and elaborate almost reaching to soil.

Almost a total epiphyte. Occasionally grows on rocks also. Found in Darjeeling district between 1830-2135 m. and also in Sikkim and Bhotan 2135-2750 m.

***Agapetes saligna* Hook. f. (FBI 3:444)**

Shrub, branches not thickened. Leaves alternate, sub-sessile or short petioled, lanceolate, entire and glabrous. Flowers in corymbs and bright red flowering during February to April. Root system elaborate.

A partial epiphyte both on tree and on soil. Found in Darjeeling district 915-1525 m. Also in Sikkim and Bhotan 2135 m.

ERICACEAE

***Rhododendron vacinioides* Hook. f. (FBI 3: 464)**

A small 30-90 cm., shrub. Leaves small, ob-

vate oblong, obtuse, glabrous, scarcely petioled. Flowers solitary. Corolla white or pinked. Flowering during April to July.

A partial epiphyte. Grows on trees and on rocks. Found in Darjeeling district at about 2440 m. Also in Sikkim Himalayas 1830-2440 m.

R. dalhousiae Hook. f. (FBI 3: 469)

A laxly branched shrub. Leaves alternate, obovate, oblong. Pedicels 2-5 clustered. Corolla pale yellow tinged green. Flowering during April to June.

A partial epiphyte. Grows on tree and soil. Found in Darjeeling district 1830-2750 m. and Bhotan 2050 m.

ASCLEPIADEAE

Hoya linearis Wall. (FBI 4: 53)

Small shrub. Stem pendulus, flaccid. Leaves opposite. Umbel terminal with many white flowers. Flowering July to September.

A partial epiphyte. Grows on trees and on soil. Found in Darjeeling district from 915-about 2135 m. Also sub-tropical Himalayas, Nepal, Sikkim 915-1830 m.

GESNERACEAE

Aeschynanthus ramosissima Wall. (FBI 4: 339)

Undershrub. Leaves opposite, broadly lanceolate, glabrous, entire and fleshy. Pedicels clustered. Corolla red in colour. Flowering during June to August.

A total epiphyte. Found in Darjeeling district from 610-2440 m. Also in sub-tropical Himalayas from Kumaon to Sikkim 915-1220 m.

A. gracilis Parish. (FBI 4: 340)

Undershrub. Branches slender, hairy. Leaves opposite, small, broad lanceolate, entire and hairy. Flowers solitary. Scarlet. Flowering during June to August.

A total epiphyte. Found in Darjeeling district from about 610-915m. Also in sub-tropical Eastern Himalayas 305-1220 m. Sikkim, Bhotan, Assam, Khasia 1220 m. and Burma.

A. acuminata Wall. (FBI 4: 341)

Undershrub, branches long. Leaves opposite, acuminate. Short petioled, entire and fleshy. Flowers yellow green. Flowering during July to September.

A total epiphyte. Found in Darjeeling district 1525-2135 m. Also in sub-tropical Eastern Himalayas 305-915 m., Sikkim, Bhotan and Upper Assam.

A. bracteata Wall. (FBI 4: 342)

Undershrub. Branches long, terete. Leaves opposite, glabrous, elliptic, acuminate, fleshy and entire.

Peduncles one or more flowered. Flowers coral red, flowering during June to August.

A total epiphyte. Found in Darjeeling district and Sikkim 305-2440 m. Also in Bhotan, Khasia, Upper Assam.

Lysionotus serrata D. Don (FBI 4: 344)

Shrub. Leaves opposite, elliptic to narrow lanceolate serrate. Cymes peduncled, many flowered. Flowers tinted blue to nearly white; flowering during July to September.

A partial epiphyte; grows on both trees and rocks. Found in Darjeeling district from almost plain (Terai) to 2135 m. Also in sub-tropical Himalayas 610-2135 m. from Kumaon to Bhotan. Assam and Khasia Mountains 305-1220 m.

Loxostigma griffithii Clarke (FBI 4: 344)

Undershrub. Leaves opposite, often unequal, elliptic and serrate. Cymes peduncled many flowered. Flowers yellow flowering during October to January.

A partial epiphyte. Grows both on trees as well as on soil. Found in Darjeeling district and Sikkim 915-1980 m. Sub-tropical Himalayas from Sikkim to Mishmee and Khasia Mountains 610-1220 m.

PIPERACEAE

Peperomia heyneana Miq. (FBI 5: 99)

A small herb. Stem slender. Leaves opposite 3-4 nately whorled, linear or obovate, oblong obconate or obcordate. Spike slender with minute flowers during June to August.

Almost a total epiphyte. Grows mostly on trees. Found in Darjeeling district at about 1675-2135 m. Also in sub-tropical Himalayas from Kumaon 1070 m. to Sikkim 1525-1830 m., Khasia Mountains 1220-1525 m.

URTICACEAE

Ficus altissima Blume. (FBI 5: 504)

A spreading tree. Leaves 10.16-17.75 cm., and entire. Receptacles sessile, axillary in pairs. Flowering from March to May.

A partial epiphyte. Grows on tree and soil. Found in Darjeeling district at about 610-1220 m. Also in tropical Himalayas from Nepal to Bhotan, in the plains, lower Hills of Deccan Peninsula and Assam.

F. elastica Roxb. (FBI 5: 508)

Large tree. Glabrous. Leaves 7.62-42.48 cm. shortly petioled, oblong to elliptic entire. Receptacles in pairs, sessile in axiles of fallen leaves appearing during February to April.

A partial epiphyte. Grows on trees and on soil. Found in Darjeeling district from Tarai to about 305 m. Also in damp forest at the base of the Sikkim Himalayas eastwards the Khasia Hills, Assam, Burma, etc.

F. Benjamina Linn. var. **comosa** Kurz. *F. comosa* Roxb. (FBI 5: 508)

A tree. Leaves ovate elliptic, entire. Receptacle sessile in axillary pairs during February to April.

A partial epiphyte. Grows on tree and on soil. Found in Darjeeling district at about 305 m. Also at base of Eastern Himalayas, Assam, Deccan Peninsula.

F. foveolata Wall. (FBI 5: 528)

A creeper or climber. Leaves 3.15-15.24 cm., membranous, ovate, elliptic or oblong or lanceolate. Receptacles ovoid, subsolitary and sessile grown during June to September.

A partial epiphyte. Grows on trees and on soil. Found in Darjeeling district from about 305-1830 m.

SEITAMINEAE

Cautleya lutea Royle (FBI 6: 208)

Stem slender. Leaves 15.24-22.86 cm. by 2.50-3.75 cm., at flowering time, sessile and lanceolate or oblong lanceolate. Spike lax few flowered. Flowers yellow flowering during June to August.

Almost a total epiphyte. Grows mostly on trees. Found in Darjeeling district between 1525-2750 m. Also in temperate Himalayas. Kashmir to Sikkim ascending to 2135-2440 m. Khasia Hills.

Hedychium spicatum Hamilt. (FBI 6: 227)

Leaves oblong or oblong-lanceolate, glabrous. Spike densely flowered. Flowers with white petal and red filament. Bract large oblong, obtuse, green flowering during July to September.

Almost a total epiphyte. Grows mostly on trees. Found in Darjeeling district from 1525-2135 m. Also in Sub-tropical Himalayas. Nepal and Kumaon 1525-2135 m.

H. spicatum Hamilt. var. **acuminatum** Wall. (FBI 6: 227)

Leaves oblong or oblong lanceolate, glabrous beneath. Spike few flowered, bract convolute round the calyx. Petal white or pale yellow. Flowering during July to September.

Almost a total epiphyte. Found to grow on trees. Found in Darjeeling district from 1525-2135 m. Also from Kumaon to Sikkim upto 2135 m.

LILIACEAE

Polygonatum oppositifolium Royle (FBI 6: 320)

Small shrub. Stem tall furrowed, glabrous. Leaves many and opposite. Peduncle-many flowered. Perianth white. Flowering during June to August.

A partial epiphyte. Grows on trees and on rocks. Found in Darjeeling district from 1525-1983 m. Also in temperate Central and Western Himalayas from Nepal Eastwards. Khasia Hills 1220-1830 m. Manipore 1068 m. and Upper Assam.

ARACEAE

Gonatanthus sarmentosus Klotz. (FBI 6: 522)

Tuber small and with slender branched shoots. Leaves peltate, acuminate, dark green above and light green with dark chocolate coloured patches in the back side. Peduncle 5-7.50 cm. Spathe ovoid, green; base of limb as long or longer than the tube, inflated, reclined, the rest suberect with a long recurved tip, golden yellow. Flowering during July to September.

A partial epiphyte. Found in Darjeeling district from 1220-2135 m. Also in temperate Himalayas from Kumaon to Sikkim. Khasia Hills 1220-1525 m.