

## An Amplified Description of a Hitherto Little Known High Altitude Species, *Gaultheria pyrolifolia* Hook.f. ex C.B. Clarke (Ericaceae)

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### Abstract

*Gaultheria pyrolifolia* Hook.f. ex C.B. Clarke, discovered from Sikkim Himalaya by Hook.f. and validly published by C.B. Clarke, is provided for the first time with detailed description, citation, type and illustration.

**Keywords:** *Gaultheria pyrolifolia*, Ericaceae, Sikkim Himalaya.

### INTRODUCTION

As a result of reversionary work on Ericaceae in India under “Flora of India Project”, several field trips in the Eastern Himalaya and North-eastern India as well as consultation of herbarium specimens in several Indian herbaria viz., CAL, BSIS, DD, BSD, ASSAM, BSHC, ARUN (Arunachal Field Station, Itanagar, Botanical Survey of India) and APFH (Arunachal Pradesh Forest Herbarium, Itanagar) were done. *Gaultheria pyrolifolia* Hook. f. ex C. B. Clarke, an ill-described and hitherto little known highly elevated species, was discovered by J. D. Hooker in 1849 (based on his collections including cibachrome type from K) from Sikkim Himalaya (above Lachen) at an altitude of *c.* 13000 ft. C. B. Clarke (1882) described the species for the first time based on J. D. Hooker’s collections from Sikkim. Following C. B. Clarke, Airy Shaw (1941), Merrill (1941), Banerjee (1966), Biswas (1966), Hara (1966, 1982), Rae (1991) and Middleton (1991) enumerated this species without detailed investigations. Subsequently, this species is also enumerated from China (Flora of China, Internet ed.), Nepal (Press *et al.*, 2000) and Myanmar (Kress *et al.*, 2003) without detailed investigation. This work includes an amplified detailed investigations of this species based on available herbarium specimens in the above mentioned Indian herbaria, cibachrome type specimen and authentic specimens (K, BM, CAL), live collections and field data from Sikkim Himalaya by the author (May, 2002; October, 2007) and available taxonomic literature.

The genus, *Gaultheria* was first described by Linnaeus (1751) in his *Nova Plantarum Genera* based on the type species, *G. procumbens* collected by Peter Kalm from Canada. However, none of the herbarium material is still in existence. The original description of the genus (Linnaeus 1751) carries with it an illustration of *G. procumbens* (fig. 6 in the work) and this must now be designated as the lectotype of *Gaultheria*. Subsequently he gave a detailed account in his *Species Plantarum* (1753) and *Genera Plantarum* (1754, ed. 5). The name “*Gaultheria*” was proposed by Kalm (1716 – 1779) for the French Physician Jean Francois Gaultier (1708 – 1756), botanist, Quebec, Canada (Quattrocchi, 2000). The genus consisting of *c.* 134 species (Middleton, 1991; Mabblerley, 1997) is distributed in India, South-western China, Northern Myanmar, Malaysia, Indonesia, Sri Lanka, America, Australia and New Zealand. Among 134 species, 22 species are reported to occur in India and are distributed in the Himalayas (mostly in Sikkim, Darjeeling of West Bengal and Arunachal Pradesh) at altitudes ranging from (600 –) 1300 “ 4800 m, North eastern India (Meghalaya and Nagaland, mostly around 1600 m) and hill tops of South Western Ghats (mostly in 1600 m). Based on size and apex of leaf, shape and indumentum characters of corolla, position of bracteoles and nature of fruits, Middleton (1991) divided the genus into 10 sections. The Indian species represent 4 sections: Chiogenopsis, Monoanthe mona, Brossaeopsis and Brossaea. *G. pyrolifolia* belongs to the section Brossaea.

14000 ft, 07.08.1910, W. W. Smith 4119; Chakung Chhu, 13000 – 14000 ft, 01.08.1910, W. W. Smith 4019; Zemu Valley, 14500 ft, 13.07.1909, Smith & Cave 1369; above Thangu, 14000 ft, 15.08.1909, Smith & Cave 2509; 12000 – 13000 ft, J. D. Hooker *s.n.*, acc. no. 265777; Bijan, 1889, King’s Collector *s.n.*, acc. no. 265754; **Yumthang Valley, 12000 ft, 3.10.2007, S. Panda 30777 (fl.)**; Thaka, 16000 ft, October, 1909, Lepcha Collector 2710 (Lloyd Bot. Garden, Darjeeling); West district: Dzongri, 08.10.1862, 13500 – 15000 ft, T. Anderson

***Gaultheria* L.**

L., Sp. Pl. 1: 395. 1753 (validated against *Nova Plantarum Genera* in 1751 by applying Rule of Priority) and Gen. Pl. 5: 187. 1754; Juss., Gen. Pl.: 161. 1789; R. Hedw., Gen. Pl.: 320. 1806; R. Br., Prodr. 1: 558. 1810; Blume, Bijdr.: 856. 1826; G. Don, Gen. Syst. 3: 839. 1834; Endl., Gen. Pl.: 756. 1839; DC., Prodr. 7 (2): 592. 1839; Miq., Fl. Ind. bat. 2: 1055. 1856 and Ann. mus. lugd.-bat. 1: 40. 1863; Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 582. 1876; A. Gray, Syn. fl. N. Amer. 2 (1): 29. 1878; C. B. Clarke in Hook. f., Fl. Brit. India 3: 456. 1882; Drude in Engl. & Prantl, Nat. Pflanzenfam. 4 (1): 45. 1889; Airy Shaw, *Kew Bull.*: 306. 1941; Sleumer, *Reinwardtia* 4 (2): 164. 1957; C. E. Wood, *J. Arnold Arbor.* 42: 42. 1961; Backer & Bakh. f., Fl. Java 2: 180. 1965; Baas, *Bot. Jahrb. Syst.* 105 (4): 493. 1985; D. J. Middleton, *Bot. J. Linn. Soc.* 106 (3): 231. 1991; Rae in A. J. C. Grierson & D. G. Long, Fl. Bhutan 2 (1): 387. 1991. Lectotype: *G. procumbens* L. (D. J. Middleton, *Bot. J. Linn. Soc.* 106 (3): 233. 1991). *Brossaea* L., Sp. Pl., 1: 1190. 1753 and Gen. Pl. 5: 497. 1754; *Epigaea* L. sect. *Brossaea* DC., Prodr. 7 (2): 591. 1839. Type: *Brossaea coccinea* L. (= ***Gaultheria domingensis*** Urb.). *Pernettya* Gaud. in Mirbel, Ann. Sci. Nat. (Paris) 5: 102. 1825. Type: *P. pumila* (L. f.) Hook. *Phalerocarpus* G. Don, Gen. Syst. 3: 841. 1834. Type: *P. serpyllifolia* G. Don .

***Gaultheria pyrolifolia*** Hook. f. ex C. B. Clarke in Hook. f., Fl. Brit. India 3: 457. 1882 (“*pyrolaefolia*”); Airy Shaw, *Kew Bull.*: 318. 1941; Sealy in Curtis’s *Bot. Mag.* 163: t. 9629. 1941; Hara in Hara *et al.*, Enum. Fl. Pl. Nepal 3: 55. 1982; Rae in A. J. C. Grierson & D. G. Long, Fl. Bhutan 2 (1): 390. 1991. Type: India, Sikkim, Lachen, 13000 ft, 20.06.1849, *J. D. Hooker s.n.* (K, cibachrome photo!). **Fig. 1.**

Stout, decumbent dwarf shrub, 5 (-2) – 20 cm high, rarely creeping, often forming mats on alpine pastures. Stem rhizomatous, creeping, branched, light pink, often with adventitious roots, glabrous; branches terete, reddish pink, usually glabrous to rarely pubescent (*S. Panda* 30777). Leaves coriaceous, lamina obovate, elliptic-obovate to rarely suborbicular, 1 – 5 × 0.5 – 4 cm, serrate to crenate at margin, cuneate at base, retuse to mucronate at apex, deep green to light pink, shiny, glabrous above, light green to light pink, usually glabrous to pubescent beneath (*S. Panda* 30777), hairs deciduous in nature and only seen in live specimens; venation conspicuous brochidodromous with 2 – 3 pairs of lateral nerves; petioles stout, 1 – 4 mm long, glabrous. Racemes short, pseudoterminal, from upper foliate axils; rachis 5 – 25 mm long, 2 – 7-flowered, densely white puberulous. Flowers 7 – 8 mm long; pedicels 2.5 – 3.5 mm long, densely white puberulous; bract 1, basal, light green with pinkish stripes, broadly ovate to ovate-elliptic, 3 – 4 × 2 – 2.5 mm, ciliolate at margin, rounded-acute at apex, sparsely pilose outside, glabrous inside; bracteoles 2, opposite, median to apical on pedicel, light green with pinkish stripes, ovate-elliptic to elliptic, 2 – 3 × 1 – 2 mm, ciliolate at margin, acute at apex, sparsely pilose outside, glabrous inside. Calyx narrowly campanulate, 5-lobed, lobes light pink, broadly ovate-triangular, c. 1.5 × 1 mm, ciliolate at margin, acute at apex, glabrous outside, densely pilose inside (*S. Panda* 30777). Corolla ovoid-urceolate, light pink, 4 – 5 × 3 – 3.5 mm, glabrous, lobes minute to 0.5 mm long. Stamens 10 (rarely 5 in *S. Panda* 30777), 1.5 – 3 mm long, loosely epipetalous; filaments 1 – 2 mm long, pinkish, slender, glabrous to dense pilose (*S. Panda* 30777) dilated at base; anthers oblong, 0.5 – 1 mm long, orange-yellow, glabrous, each lobe with 2 equal minute warty apical yellow awns. Pistil 2.5 – 3.5 mm long; ovary globose, blackish brown, 1 – 1.5 × 1 – 1.5 mm, tomentose to glabrous (*S. Panda* 30777), ovules numerous on axile placenta in each locule; disc minute, dentate; style pink, 2 – 1.5 mm long, slender, longitudinally grooved, glabrous; stigma truncate. Capsule loculicidally 5-valved, enclosed in a fleshy accrescent calyx, globose, c. 4 × 4 mm with c. 3 mm long puberulous pedicel, tomentose. Seeds numerous, minute, obconical, scarious.

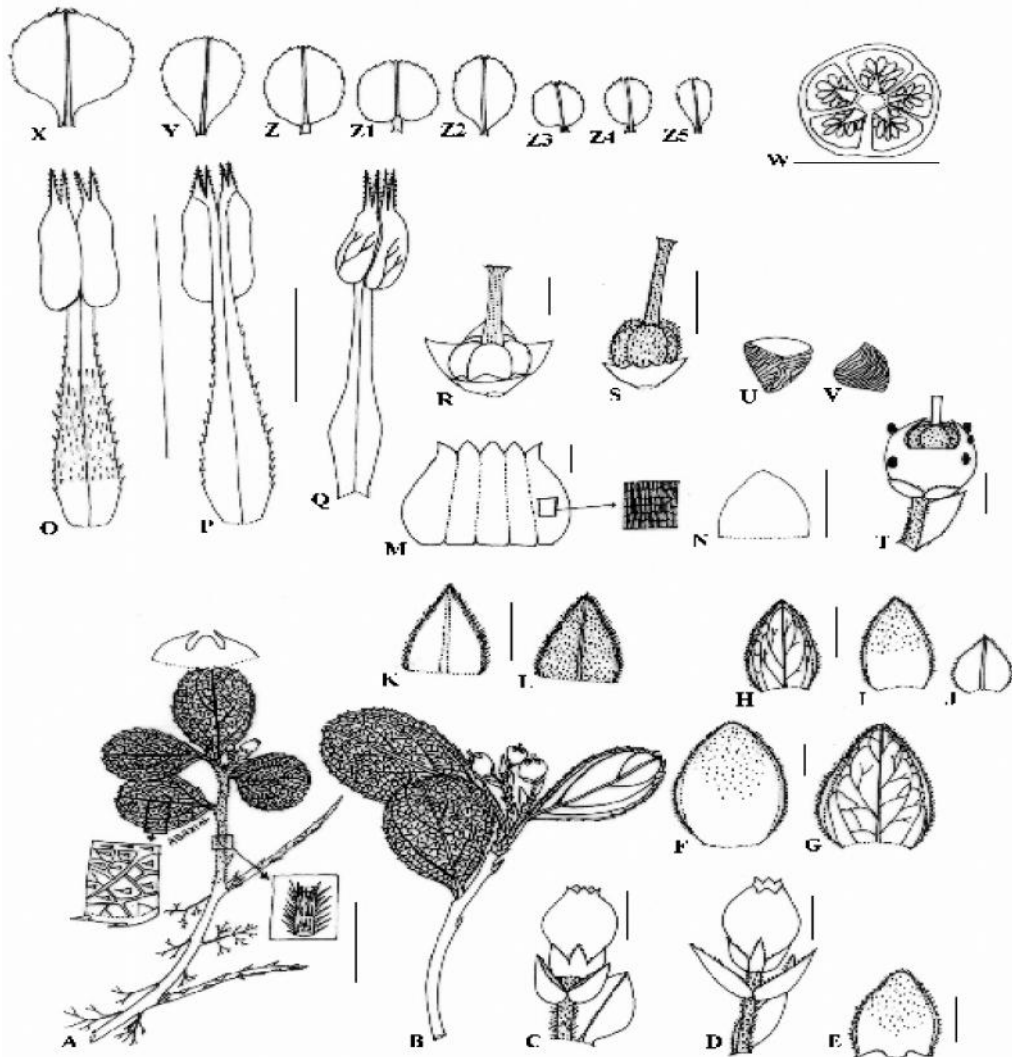
**Distribution:** INDIA: Eastern Himalayas (Sikkim and Darjeeling of West Bengal); NEPAL; BHUTAN; W CHINA and N MYANMAR.

**Habitat:** This species grows gregariously in open cliffs, shallow snow clad soils, often in alpine pastures and scrub clad rocky slopes amongst *Cassiope fastigiata*, *Gaultheria trichophylla*, *Rhododendron anthopogon* and *R. setosum* at altitudes ranging from 3200 – 4600 m.

**Flowering:** June – August (October in Sikkim). **Fruiting:** August – October (May in Sikkim).

**Specimens examined:** Sikkim (all specimens examined are in CAL otherwise mentioned): East district: Lingtoo, 12500 ft, October, 1882, *G. King s.n.*, acc. no. 265768; Lungthang, 12000 ft, 09.06.1945, *Bor & K. Ram* 19852 (DD); North district: Below Kanchenjunga, June, 1888, 14000 ft, *Dr. King’s Collector s.n.*, acc. no. 265766; Tangkar Mt., 15000 ft, 04.08.1892, *G. A. Gammie* 558; Meghu, October, 1908, *Ribu* 238; Mingluil, 13000 –

775; Aluthang to Dzungri, 13200 ft, 04.06.1954, *S. N. Mitra* 9620; Dzungri, 13000 ft, 15.10.1875, *C. B. Clarke* 25811B; **Phodong to Dzungri, 12000 – 13000 ft, 14.05.2002, S. Panda 29943 (fl. bud & fr.)**; specimens at BSHC: Dzungri to Tsoka, 22.06.1993, *S. Pradhan* 15159; Tsoka to Dzungri, 12.05.1994, 3500 ft, *G. P. Sinha* 16052; **West Bengal (Darjeeling)**: Singalelah range, 27.05.1881, *G. Watt* 5260; Phallut, 10000 – 11800 ft, 12.06.1892, *G. A. Gammie* 29; Sandakphu to Phallut, 30.05.1902, *J. H. Lace* 2258; Phallut, 13000 ft, *S. Kurz* s.n., acc. no. 265769; South of Phallut, 11600 ft, 19.10.1904, *I. H. Burkill* 25250; Sabarkum, 11500 ft, 28.09.1906, *I. H. Burkill* 27637 (BSIS); Darjeeling, 04.10.1943, *K. Biswas* 6065 (DD); specimens at Lloyd Bot. Garden, Darjeeling: Phallut, 11000 ft, 01.07.1922, *G. H. Cave* s.n., acc. no. 6595; Phallut, June, 1887, *King's Collector* s.n.



**Fig. 1:** *Gaultheria pyrolifolia* Hook.f. ex C.B. Clarke : A - B habits; C - D flowers; E - G bracts; H - J bracteoles; K - L calyx lobes; M corolla split open (inside); N corolla lobe; O - Q stamens; R - S pistils; T fruit; U - V seeds; W t.s. of ovary; X - Z5 variation in shape of lamina.

Scale bars: A - B = 2 cm; C - E, T = 2 mm; F - M, O - S, W = 1 mm; N = 0.5 mm; X - Z5 = 1 cm [A, C, F - I, K - P, R, W, Y - Z5: drawn from *S. Panda* 30777 (CAL); B, T - V: *S. Panda* 29943 (CAL); D, E, J, Q, S, X: *S. Pradhan* 15159 (BSHC). Drawn by *S. Panda*.

**Notes:** *Airy Shaw* (*Kew Bull.*: 318. 1941) discussed the name *Gaultheria pyroloides* Hook.f. & Thomson ex Miquel (*Ann. Mus. lugd.-bat.* 1: 30. 1863). He kept it for the Japanese species actually described by Miquel. *G. miqueliana* Takeda is a synonym of it. Thus, *G. pyrolifolia* Hook.f. ex C.B. Clarke is a separate valid species and not a synonym of *G. pyroloides* Miquel as treated wrongly in many regional Floras viz., *Flora of Bhutan* (1991), *Enumeration of the Flowering Plants of Nepal* (1982) etc. The Yumthang Valley population in North Sikkim (*S. Panda* 30777) showed densely pubescent abaxial leaf surface, pubescent branches, pilose calyx lobes, c. 1.5 mm

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long stamens, pilose filaments, glabrous ovary and the population of Dzungri in West Sikkim (*S. Panda* 29943) showed minute obconical seeds with scarioso surface in fruits not reported earlier.

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