

## **GAULTHERIA WATSONII (ERICACEAE): A NEW SPECIES FROM SIKKIM HIMALAYA**

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A new species of *Gaultheria* L. (Ericaceae) from the Sikkim Himalaya, *G. watsonii*, is described and illustrated. This species is morphologically most similar to *Gaultheria heteromera* in terms of habit, especially in its procumbent branchlets and tetramerous flowers. However, it can be readily distinguished from all other known species of the genus, including *Gaultheria heteromera*, by its unique combination of morphological characters, namely prostrate habit with procumbent branchlets, adaxially smooth and smaller leaf blades with strongly acute and mucronulate apices, pseudoterminal 2- to 4-flowered racemes, longer rachis, shorter pedicel, 4-merous flowers, and ovary sparsely white hispidulous with conspicuously 8- to 10-lobed discs. Based on its limited geographical distribution and the continuing decline in habitat quality, the conservation status of the new species is provisionally assessed as Critically Endangered [CR B2ab(iii)] according to the IUCN Red List criteria.

**Keywords.** Critically Endangered (CR), *Gaultheria* series *Leucothoides* (Airy Shaw) D.J.Middleton, Himalaya, IUCN.

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### **Introduction**

The genus *Gaultheria* Kalm ex L. (Ericaceae) comprises approximately 292 species, primarily distributed across temperate and montane regions of East and Southeast Asia and the Americas (POWO, 2025). In India, 23 species have been recorded, of which 11 are known to occur in Sikkim (Panda & Sanjappa, 2014, 2023; Maity, 2024). Sikkim, the small Eastern Himalayan state of India, is one of the centres of diversity of the genus within India (Panda & Sanjappa, 2014; Maity, 2024). The area is exceptionally rich in biodiversity, owing to the diverse environmental conditions created by the elevational gradient from subtropical lowlands to high Himalayan alpine pastures (Maity & Maiti, 2024).

Morphologically, members of the genus are typically evergreen shrubs characterised by expression of methyl salicylate in damaged leaves, an urceolate corolla, awned anther lobes, a superior ovary, and loculicidal 4- or 5-valved globose capsules often surrounded by a

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persistent accrescent calyx (Airy Shaw, 1941, 1948; Kron et al., 2002; Fang & Stevens, 2005; Panda & Sanjappa, 2014).

In recent years, several new species of *Gaultheria* have been described from various parts of the world, reflecting its under-documented diversity (Panda & Sanjappa, 2006; Fritsch et al., 2015a; 2015b; Rojas-Alvarado & Muñoz-Cambronero, 2021). During a recent floristic expedition to the northern region of the Kanchenjunga Biosphere Reserve in Sikkim Himalaya, India, several interesting plants of *Gaultheria* were collected. Preliminary identification and detailed morphological analysis, combined with a thorough review of existing taxonomic treatments of the genus (Airy Shaw, 1941, 1948, 1952; Rae & Long, 1991; Fang & Stevens, 2005; Panda & Sanjappa, 2006; Fritsch et al., 2015b; Fritsch & Lu, 2020; Panda & Sanjappa, 2023; Maity, 2024), including the recent account of the Indian members of *Gaultheria* by Panda & Sanjappa (2014), revealed that the plants do not conform to any described species of the genus. Accordingly, we describe these plants as a species new to science. With the description of this new species, there are now 12 *Gaultheria* species in Sikkim and 24 in India. Notably, only three 4-merous species, namely *Gaultheria heteromera* R.C.Fang, *G. tetramera* W.W.Sm. and our new species, are recorded from India; the latter two are found in Sikkim.

A key to the Sikkimese species of the genus is provided, as is a detailed morphological description of the new species, notes on its habitat and distribution, photographs, and a provisional IUCN threat status.

## Materials and methods

All voucher specimens of the new species were collected during a field expedition to Kanchenjunga Biosphere Reserve, North Sikkim, in August 2025. Field photographs were taken with a Sony Cyber-shot DSC-W830 digital camera (Sony, Tokyo, Japan) and a mobile camera (Samsung Galaxy A33; Samsung, Seoul, South Korea). Morphological observations were conducted using a Leica EZ4 stereo microscope (Leica Microsystems, Wetzlar, Germany). Morphological characters were examined to distinguish the new *Gaultheria* from its most similar species. This comparison was based on the physical examination of herbarium specimens housed at BSHC, CAL and CUH (herbarium codes follow Index Herbariorum, [updated continuously](#)), as well as a critical review of published descriptions in the relevant taxonomic literature (Fang, 1999; Fang & Stevens, 2005; Panda & Sanjappa, 2014). Digital images of type and reference specimens available through virtual herbaria (E, G, GH, K, P, PE) were also consulted to confirm the distinctiveness of the new species.

The holotype has been deposited at the Calcutta University Herbarium (CUH), with isotypes at CAL and CUH. The conservation status of the new species was assessed using *IUCN Red List Categories and Criteria*, version 3.1 (IUCN, 2012) and IUCN guidelines (IUCN Standards and Petitions Committee, 2024).

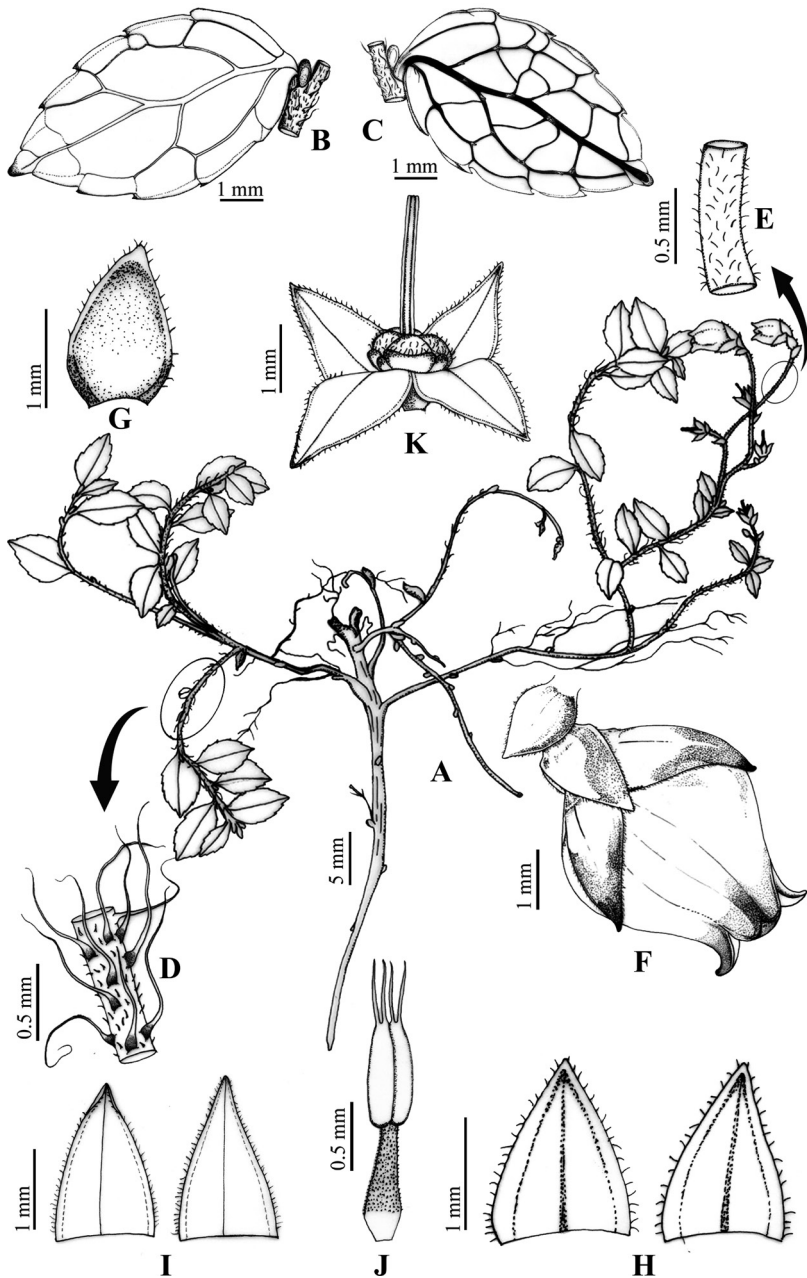
## Taxonomic treatment

### Species description

**Gaultheria watsonii** D.Maity, A.K.Halder and S.Saha, sp. nov.

The new species is most similar to *Gaultheria heteromera*, from which it differs by having smaller leaf blades (4–10 × 3–5 mm vs 8–25(–30) × 5–14 mm), strongly acute leaf apex (vs obtuse), smaller petioles (0.5–0.75 mm vs 1–3 mm), pseudoterminal racemes (vs pseudoterminal and axillary), longer rachis (5–15 mm vs 3–6(–10) mm), shorter pedicel (1–1.75 mm vs 3–6 mm), bract and bracteoles with margins densely ciliolate (vs eciliolate), 8 stamens (vs 8 or 9), and ovary with conspicuous shallowly lobed disc (vs disc absent). In *Gaultheria heteromera* the veins on the adaxial surface of leaves are distinctly impressed, forming prominent reticulations, whereas in the new species although sometimes the midvein is slightly depressed adaxially, the secondary and tertiary veins are not impressed and thus the upper surface appears smooth. Moreover, in *Gaultheria watsonii* the ovary is sparsely white-hispidulous, whereas in *G. heteromera* the ovary is densely hispidulous. – Type: India, North Sikkim, Panchpokhri, 3930 m AMSL, 28 viii 2025, Halder, Jha & Chakroborty 28837 (holotype CUH; isotypes CAL, CUH). **Figures 1, 2.**

Prostrate and stout dwarf shrub with procumbent branchlets, up to 9 cm long, forming mats. Stems rhizomatous, creeping, branched, with adventitious roots, subglabrous; branches and branchlets terete, purple-brown, brown-setose (trichomes often broad-based, spinose in old stems) mixed white-puberulous. Leaves at base of branches bract-like, alternate, usually imbricate at branchlet base, oblanceolate or ovate, often ciliolate, sessile, brown, chartaceous, glabrous; usual green leaves chartaceo-coriaceous, alternate, scattered along branchlets, subsessile or with petioles 0.5–0.75 mm long, glabrous or with 1 or 2 stiff setose hairs; leaf blades narrowly elliptic or narrowly ovate-elliptic, 4–10 × 3–5 mm, acute and mucronulate at apex, serrate and narrowly revolute at margin with teeth strongly apiculate, base broadly cuneate or sometimes rounded at base, both surfaces glabrous or abaxial surface sparsely hirtellous along veins, dull green abaxially, glossy green adaxially, venation conspicuous, brochidodromous with 2–4 pairs of lateral nerves, raised abaxially, smooth adaxially, midvein slightly depressed towards base. *Inflorescences* racemose, simple or branched, pseudoterminal from upper foliate axils; rachises 1–3, 5–15 mm long, 2- to 4-flowered, densely white puberulous, perulate; perulae 2, basal, obovate, 1–1.5 × 0.5–1 mm, glabrous, acute, margin densely ciliolate. *Flowers* tetramerous, 4–5 mm long, with bract and bracteoles; pedicels 1–1.75 mm long, pinkish red, glabrous; bract 1, basal, broadly ovate, 1.5–2 × 1–1.5 mm, glabrous, margin densely white-ciliolate, dark pink; bracteoles 2, opposite, apical or at middle on pedicel, ovate, 1.5–2 × 0.8–1.5 mm, glabrous, margin densely white-ciliolate, pink. *Calyx* broadly campanulate, 4-lobed with 0.5–1.5 mm long



**Figure 1.** *Gaultheria watsonii* D.Maity et al., sp. nov. A, Habit; B, leaf adaxial surface; C, leaf abaxial surface; D, branchlet (part), enlarged; E, rachis (part), enlarged; F, flower; G, bract (adaxial view); H, bracteoles (adaxial view); I, calyx lobes (adaxial view); J, stamen (ventral view); K, pistil and nectar disc with calyx. Drawn from Halder, Jha & Chakroborty 28837 by Arup Kumar Halder (A–E and G–K) and Suparna Saha (F).



**Figure 2.** *Gaultheria watsonii* D.Maity et al., sp. nov. A, Habit and habitat; B, inflorescence; C, flower. Photographs: A. K. Halder.

tube, pink to pinkish red; lobes ovate-triangular,  $1.9\text{--}2.38 \times 1\text{--}1.3$  mm, apex acute, margin ciliolate, glabrous, pinkish red. *Corolla* ovoid-urceolate or globose,  $3.5\text{--}4 \times 2.5\text{--}3$  mm, 4-lobed, glabrous, light pink or white with pinkish red towards apex; lobes ovate,  $0.4\text{--}0.6 \times 0.4\text{--}0.6$  mm, reflexed. *Stamens* 8,  $1.8\text{--}2.2$  mm long, loosely epipetalous; filaments  $1\text{--}1.2$  mm long, slender, glabrous, papillose, dilated at base; anthers ellipsoid or narrowly ovoid,  $0.8\text{--}1 \times 0.4\text{--}0.5$  mm, granular, brown; each theca with 2 equal apical awns, awns  $0.5\text{--}0.8$  mm long, papillose. *Pistil*  $2.5\text{--}3.3$  mm long; ovary depressed-globose,  $0.6\text{--}0.8 \times 0.8\text{--}1$  mm, light green, sparsely white hispidulous, 4-locular; disc conspicuous, dark green, shallowly lobed, half as long as ovary; style columnar with median vertical ridges,  $1.9\text{--}2.5$  mm long, slender, glabrous, light pink; stigma truncate. *Immature fruits* 4-lobed, c.  $1 \times 1$  mm, brownish, sparsely white hispidulous, lower half covered with disc.

*Distribution.* Endemic to the type locality in North Sikkim, India, 3930–4000 m AMSL.

*Habitat and ecology.* The new species is a resident of alpine pastures and only known from North Sikkim, in the Kanchenjunga Biosphere Reserve. It was found growing on moss and the liverwort *Mylia taylorii* (Hook.) Gray in open alpine slopes and rocky crevices at 3930–4000 m AMSL. Several mature individuals and young plants were observed in the type locality. The common associated species include *Bistorta affinis* Greene (Polygonaceae), *Carex* sp. (Cyperaceae), *Cassiope fastigiata* D. Don, *C. selaginoides* Hook. f. & Thomson (Ericaceae), *Corydalis* sp. (Fumariaceae), *Diplarche multiflora* Hook. f. & Thomson (Ericaceae), *Gaultheria pyrolifolia* Hook. f. ex C. B. Clarke (Ericaceae), *Potentilla peduncularis* D. Don, *Potentilla* sp. (Rosaceae), *Salix* sp. (Salicaceae) and *Viola biflora* L. (Violaceae). Flowering and fruiting between August and September.

*Etymology.* The specific epithet '*watsonii*' honours Dr Mark Francis Watson, President of the Linnean Society and Taxonomy and Macroecology Lead at the Royal Botanic Garden Edinburgh. He is engaged in development of e-Floras through the *Flora of Nepal* (a pioneer 'born digital' Flora) and global initiatives such as *World Flora Online*, *Flora of China* and *Flora of the Pan Himalaya*.

*Proposed IUCN conservation category.* Two populations of *Gaultheria watsonii* were recorded during fieldwork within an area of about  $1\text{ km}^2$ , where around 45 mature individuals were observed along with some young plants. The Area of Occupancy and Extent of Occurrence of the species are  $< 10\text{ km}^2$  and  $< 100\text{ km}^2$ , respectively. The habitats are subject to grazing pressure. Considering the high risk this land-use poses to these populations, we propose the IUCN conservation category Critically Endangered (CR B2abiii & D) for this new species (IUCN, 2012; IUCN Standards and Petitions Committee, 2024).

*Notes.* Morphological characters distinguishing *Gaultheria watsonii* from its most similar species are summarised in the Table. *Gaultheria watsonii* is unique in terms of its mat-forming prostrate habit with smaller, adaxially smooth leaf blades, pseudoterminal

racemes and 4-merous flowers. The prostrate habit, chartaceo-coriaceous leaf blades, conspicuously brochidodromous leaf venation, pseudoterminal racemes, perulate inflorescence, basal bract, and two opposite median to apical bracteoles, urceolate corolla, and shallowly lobed conspicuous disc place the species in *Gaultheria* series *Leucothoides* (Airy Shaw) D.J.Middleton (Airy Shaw, 1941, 1948; Stevens, 1971; Middleton, 1991; Kron *et al.*, 2002; Panda & Sanjappa, 2014).

The decumbent dwarf to almost creeping, mat-forming habit, rhizomatous creeping stem with adventitious roots, pseudoterminal, few-flowered racemes, ciliolate bract, bracteoles and calyx lobes, and hispidulous ovary make the new species morphologically similar to *Gaultheria pyrolifolia* Hook. f. ex C.B.Clarke. However, *Gaultheria pyrolifolia* can be distinguished from *G. watsonii* by its larger, elliptic-obovate to suborbicular leaf blades with obtuse-rounded to retuse apex (vs smaller, narrowly elliptic or narrowly ovate-elliptic leaf blades with acute apex), 5-lobed calyx and corolla (vs 4-lobed), 10 stamens (vs 8), and obscure ovary disc (vs conspicuous, half as long as ovary). *Gaultheria watsonii* exhibits similar merosity with *G. tetramera* W.W.Sm. but has a smaller prostrate habit with procumbent branchlets (vs larger, erect, up to 1.5(–4) m tall), much smaller leaf blades with smooth adaxial surface (vs leaf blades (1.5–)2.5–7 × 1–3 cm with impressed veins adaxially – thus reticulate above), pseudoterminal, 2- to 4-flowered racemes (vs racemes axillary as well as often terminal, (2–)6–12-flowered), shorter pedicels and presence of ovarian disc (vs longer pedicels (2.5–4 mm) and ovarian disc absent).

*Additional specimens examined.* INDIA. **North Sikkim:** Panchpokhri, 4000 m AMSL, 28 viii 2025, Halder *et al.* 28849 (CAL, CUH).

**Table.** Morphological comparison of *Gaultheria watsonii*, sp. nov., and two close relatives, *G. heteromera* and *G. pyrolifolia*

| Character      | <i>G. watsonii</i>                           | <i>G. heteromera</i>                          | <i>G. pyrolifolia</i>                         |
|----------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Habit          | Procumbent dwarf shrub                       | Procumbent dwarf shrub                        | Decumbent dwarf shrub                         |
| Height         | Up to 9 cm long                              | 5–20 cm tall                                  | (3–)5–20 cm tall                              |
| Leaf blades    |                                              |                                               |                                               |
| Shape          | Narrowly elliptic or narrowly ovate-elliptic | Elliptic or oblong-elliptic                   | Elliptic-obovate to suborbicular              |
| Size           | 4–10 × 3–5 mm                                | 8–25(–30) × 5–14 mm                           | 10–50 × 5–40 mm                               |
| Apex           | Strongly acute, mucronulate                  | Obtuse (-acute), mucronulate                  | Obtuse-rounded to retuse, mucronate           |
| Petioles       | 0.5–0.75 mm                                  | 1–3 mm                                        | 1–5 mm                                        |
| Inflorescences | Pseudoterminal, 2- to 4-flowered             | Pseudoterminal and axillary, 1- to 4-flowered | Pseudoterminal and axillary, 2- to 7-flowered |
| Rachis         | 5–15 mm long                                 | 3–6(–10) mm long                              | 10–25 mm long                                 |
| Flowers        | Tetramerous, 4–5 mm long                     | Tetramerous, 8–10 mm long                     | Pentamerous, c.8 mm long                      |

Table (continued)

| Character            | <i>G. watsonii</i>                                                                   | <i>G. heteromera</i>                                                                        | <i>G. pyrolifolia</i>                                                                    |
|----------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Pedicels             | 1–1.75 mm long                                                                       | 3–6 mm long                                                                                 | 2–5 mm long                                                                              |
| Flowering bract      | 1.5–2 × 1–1.5 mm, both surfaces glabrous, margin densely ciliolate, dark pink        | 1.5–2 × c.2 mm, both surfaces glabrous, margin eciliolate                                   | 3–4 × 2–2.5 mm, pilose abaxially, glabrous adaxially, ciliolate, pink                    |
| Flowering bracteoles | 1 pair, apical on pedicel, ovate, 1.5–2 × 0.8–1.5 mm, margin densely ciliolate, pink | 1 or 2 pairs; apical or median on pedicel, ovate, 1–1.5 mm long, margin eciliolate, pinkish | 1 pair, opposite, median on pedicel, broadly ovate, 2–3 × 1–2 mm, margin ciliolate, pink |
| Corolla              | Ovoid-urceolate or globose, 3.5–4 mm long, light pink to pinkish red                 | Globose-urceolate, 4–5 mm long, white or pinkish white                                      | Urceolate or globose-urceolate, 4–5 mm long, light pink                                  |
| Stamens              |                                                                                      |                                                                                             |                                                                                          |
| No.                  | 8                                                                                    | 8 or 9                                                                                      | 10                                                                                       |
| Length               | 1.8–2.2 mm                                                                           | c.2 mm                                                                                      | 2–3 mm                                                                                   |
| Filament             | 1–1.2 mm                                                                             | c.1 mm                                                                                      | 1–1.7 mm                                                                                 |
| Anther lobes         | Ellipsoid or narrowly ovoid, granular, with 2 equal, warty apical awns               | Oblongoid, granular, with 2 equal, warty apical awns                                        | Oblongoid, smooth, with 2 equal, warty apical awns                                       |
| Pistil               |                                                                                      |                                                                                             |                                                                                          |
| Length               | 2.5–3.3 mm                                                                           | c.2.5 mm                                                                                    | 2.5–3.5 mm                                                                               |
| Ovary indumentum     | Sparsely white hispidulous with few scattered hairs                                  | Densely white hispidulous                                                                   | White tomentose or glabrous                                                              |
| Ovary size           | 0.6–0.8 × 0.8–1 mm                                                                   | c.1 × 1 mm                                                                                  | 1–1.5 × 1–1.5 mm                                                                         |
| Ovary shape          | Depressed-globose                                                                    | Globose                                                                                     | Globose                                                                                  |
| Disc                 | Conspicuous, half as long as ovary, shallowly lobed                                  | Absent                                                                                      | Obscure                                                                                  |
| Style                | 1.9–2.5 mm                                                                           | c.2 mm                                                                                      | 1.5–2 mm                                                                                 |

### Key to the species of *Gaultheria* in Sikkim

- 1a. Flowers 4-merous \_\_\_\_\_ 2
- 1b. Flowers 5-merous \_\_\_\_\_ 3
- 2a. Leaf blades smaller (4–10 × 3–5 mm); ovarian disc present \_\_\_\_\_ *G. watsonii*
- 2b. Leaf blades larger (25–70 × 10–30 mm); ovarian disc absent \_\_\_\_\_ *G. tetramera*
- 3a. Plants usually prostrate, creeping shrubs; flowers solitary, axillary (*Gaultheria akaensis* S.Panda & Sanjappa and *G. pyrolifolia* sometimes prostrate, then flowers in racemes) \_\_ 4
- 3b. Plants erect or decumbent shrubs; flowers few to several in racemes \_\_\_\_\_ 6
- 4a. Leaf blades broadly ovate or suborbicular; fruiting calyx dark purple or black  
\_\_\_\_\_ *G. nummularioides* D.Don
- 4b. Leaf blades oblanceolate-elliptic or elliptic-oblong; fruiting calyx blue or white \_\_\_\_\_ 5

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- 5a. Anthers 2-awned \_\_\_\_\_ *G. trichophylla* Royle  
 5b. Anthers 4-awned \_\_\_\_\_ *G. sinensis* J. Anthony
- 6a. Plants decumbent (at least branchlets); racemes 2- to 5-flowered \_\_\_\_\_ 7  
 6b. Plants erect, usually bushy; racemes more than 10-flowered \_\_\_\_\_ 8
- 7a. Branchlets densely brown hirsute; leaf blades ovate or ovate-elliptic; capsules enclosed with dry accrescent calyx \_\_\_\_\_ *G. akaensis*  
 7b. Branchlets glabrous (rarely puberulous); leaf blades obovate, elliptic or suborbicular; capsules enclosed with fleshy accrescent calyx \_\_\_\_\_ *G. pyrolifolia*
- 8a. Twigs narrowly winged; flowering branches regularly zigzag; leaf blade apex long acuminate (caudate-acuminate) \_\_\_\_\_ *G. griffithiana* Wight  
 8b. Character combination not as above \_\_\_\_\_ 9
- 9a. Ovary semi-inferior \_\_\_\_\_ *G. semi-infera* (C.B. Clarke) Airy Shaw  
 9b. Ovary superior \_\_\_\_\_ 10
- 10a. Branchlets glabrous \_\_\_\_\_ *G. fragrantissima* Wall.  
 10b. Branchlets bristly hairy \_\_\_\_\_ 11
- 11a. Branchlets densely hairy; racemes up to 5 cm long with up to 15 flowers; anther awns up to 1 mm long \_\_\_\_\_ *G. hookeri* C.B. Clarke  
 11b. Branchlets sparsely hairy; racemes up to 11 cm long with up to 25 flowers; anther awns up to 0.5 mm long \_\_\_\_\_ *G. stapfiana* Airy Shaw

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