

***GAULTHERIA AKAENSIS* PANDA & SANJAPPA (ERICACEAE: VACCINIOIDEAE):  
A CRITICALLY ENDANGERED, ENDEMIC ETHNOMEDICINAL PLANT FROM  
INDIAN EASTERN HIMALAYA ON THE VERGE OF EXTINCTION<sup>1</sup>**

SUBHASIS PANDA<sup>2</sup>

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<sup>2</sup>Angiosperm Taxonomy Lab, Department of Botany, Maulana Azad College, Kolkata 700 013, West Bengal, India.

Email: bgc.panda@gmail.com

## Introduction

*Gaultheria akaensis* Panda & Sanjappa was first discovered in December, 2002 from Aka Hill in Arunachal Pradesh by S. Panda (Coll. no. 30824, CAL) and described by Panda and Sanjappa (2006). Since its discovery in 2002, till the present author's last field visit in November 2017, the Aka Hill population survives as a few plants with scanty flowering and irregular fruit formation without viable seeds (as observed during field visits in 2004, 2009, 2011, 2014, 2017). There is no trace of any other known population in Arunachal Pradesh since its discovery. Fortunately, four smaller discrete populations of *G. akaensis* were observed in Darjeeling Himalaya across extensive field visits (December 2011, June 2012, June 2014, October 2016, May 2017, and November 2018). The Darjeeling populations are comparatively better than the Aka Hill population with respect to the number of individuals, but less flower and fruit formation followed by less viable seeds was noticed in them. Very few individual plants were seen with flowers, and even flowering occurs irregularly.

Unfortunately, there is no increase in the number of individuals of *Gaultheria akaensis* observed since its discovery in 2011. Therefore, there is an urgent need to conserve this species in its natural habitats by increasing their population and protecting the natural habitats which are vulnerable, as they comprise rocky roadside slopes. The present work monitors these natural habitats regularly, putting up signboards to create awareness among the local people. The study attempts to observe the species' natural biology and reproduction. The present work also provides taxonomic details, field description, phenological observations, live images, distribution, uses and conservation aspects to enable field identification and other natural habitats if found, as well as to conserve it before its extinction in the wild.

## Taxonomy

*Gaultheria akaensis* Panda & Sanjappa, *Edinburgh J. Bot.* 63(1): 15. 2006; Panda *et al.*, *Phytoneuron* 2012–35: 1. 2012; Panda, *J. Threatened Taxa* 5(7): 4118–4121. 2013;

Panda & Sanjappa in Sanjappa & Sastry, *Fasc. Fl. India Fasc. 25 Ericaceae*: 205. 2014.

Type: INDIA: Arunachal Pradesh, West Kameng district, Aka Hill, 3 km from Nechephu, 27 km toward Tenga, left bank of the bridge, 1,800 m, 25.xii.2002, *S. Panda* 30824 (holo. & iso. CAL). *Diplycosia indica* M.R. Debta & H.J. Chowdhery, *J. Bot. Res. Inst. Texas* 3: 147. 2009.

Type: INDIA: West Bengal, Darjeeling, Singalila National Park, Kaniyakata to Kalapokhri, 2,950 m, 02.vi.2006, *M.R. Debta* 40813 (holo. CAL; iso. BSD). Fig. 1.

Decumbent, bushy, dwarf, stout shrub, 0.2–1.0 m high. Stem terete, profusely branched, rust red hirsute; branches terete, densely rust red hirsute. Leaves papery to subcoriaceous, lamina narrowly ovate, ovate-elliptic to elliptic, 2.5–4.2 × 1.6–2.8 cm, serrate at margin with long setose cilia, cilia *c.* 5 mm long, rounded to broadly cuneate at base, mucronate at apex, glabrous, dark green above, light green and setulose beneath; venation conspicuous brochidodromous with 3–4 pairs lateral veins; petioles stout, 2–3 mm long, setulose. Racemes 6–13 mm long, white puberulous, 3–5-flowered. Flowers *c.* 8 mm long; pedicels



Fig. 1: *Gaultheria akaensis* Panda & Sanjappa population at Chitrey-Lamedhura, Darjeeling

greyish-white to light green, c. 3 mm long, glabrous; bract 1, basal, pinkish, ovate, c.  $2 \times 1.5$  mm, ciliate at margin, acute at apex, glabrous; bracteoles 2, opposite, median on pedicel. Calyx campanulate, persistent in fruits, light green, c. 3 mm long; lobes light green to greyish-white, ovate-triangular, c.  $2 \times 1$  mm, ciliate at margin, acuminate at apex, glabrous. Corolla deciduous, urceolate, light pink to white, c. 5 mm long, glabrous, lobes ovate, c.  $1 \times 1$  mm, entire at margin, rounded at apex. Stamens 5 (–7), c. 2 mm long, loosely epipetalous; filaments greyish-white, c. 1 mm long, slender, papillose, glabrous, dilated at middle; anthers dark brown, oblong, c. 1 mm long, each lobe with 2 minute apical awns. Pistil c. 3.5 mm long; ovary globose, light green, c.  $1 \times 1$  mm, puberulous; ovules numerous on axile placenta in each locule; disc minutely 10-dentate; style impressed, light green, c. 2.5 mm long, slender, glabrous. Capsule globose, dark pink, c.  $3 \times 3$  mm, enclosed in a dry accrescent calyx with c. 2 mm long pedicel, puberulous. Seeds numerous, minute, obconical, scarious.

**Distribution:** Endemic to Indian Eastern Himalaya (**Arunachal Pradesh:** West Kameng district, Aka Hill, 3 m from Nechephu ( $27^{\circ} 16.434' \text{ N}$  &  $92^{\circ} 57.439' \text{ E}$  at 1,800 m); **West Bengal:** Darjeeling district, Chitrey-Lamedhura ( $26^{\circ} 59.488' \text{ N}$  &  $88^{\circ} 06.690' \text{ E}$  at 2,377 m), Lamedhura ( $27^{\circ} 00.731' \text{ N}$  &  $88^{\circ} 05.302' \text{ E}$  at 2,744 m), Gairibas-Kaikata ( $27^{\circ} 03.377' \text{ N}$  &  $88^{\circ} 01.844' \text{ E}$  at 2,872 m), Kaikata-Kalipokhri ( $27^{\circ} 04.327' \text{ N}$  &  $88^{\circ} 00.277' \text{ E}$  at 2,902 m).

**Habitat:** Grows in moist and humus-covered loose rocky soil, rarely in landslide areas, in association with *Gaultheria fragrantissima* Wall., *G. stapfiana* Airy Shaw, *G. nummularioides* D. Don, *Lyonia ovalifolia* (Wall.) Drude, *Rhododendron arboreum* Sm., *Polygonum barbatum* L., *Impatiens discolor* DC., and *Lycopodium clavatum* L. at an altitude of c. 1800 m.

**Flowering:** Usually during late May–June and December–January (both in Darjeeling and Aka Hill populations); uncommonly noticed in Darjeeling populations during April, September, and November. **Fruiting:** July–August; December–January.

#### Specimens examined:

**Arunachal Pradesh:** West Kameng district, Aka Hill, 3 km from Nechephu, 1,800 m, 25/12/2002, *S. Panda* 30824 (CAL); 15.v.2010, *S. Panda* 274 (Barasat Govt College Herb.); 21.xi.2014, *S. Panda* 334 (Darjeeling Govt College Herb.).

**West Bengal:** Darjeeling district, 3 km from Chitrey toward Lamedhura, 11.xii.2011, 2,300 m, *S. Panda* 78 (Darjeeling Govt College Herb.-DGC); near Lamedhura, 2,400 m, 11.xii.2011, *S. Panda* 79 (DGC); Singalila National

Park, Kaikata-Kalipokhri road, near Kaikata, 2,900 m, 12.xi.2011, *S. Panda* 80 (DGC); Kaikata to Kalipokhri, 2,950 m, 2.vi.2006, *M.R. Debta* 40813 (BSD, CAL; type material of *Diplycosia indica*).

**Ethnomedicinal uses:** Tender leaf extract mixed with *Gaultheria fragrantissima* leaves (1:1) applied to cure acute rheumatic and sciatic pain by the Akas. Nepalese of Manebhanjang, Chitrey and Lamedhura use its tender leaves in a paste to relieve rheumatic pain.

**Conservation Status:** As a result of detailed herbarium consultations in different Indian herbaria as well as extensive field visits in different localities of Arunachal Pradesh (2002–2004, 2009–2011, 2014, 2017), Sikkim (2002–2004, 2007, 2009, 2013), Darjeeling Himalaya (2011–2018), and Northeastern states (2002, 2003, 2007), two different populations of *G. akaensis* were discovered and documented. (1) Aka Hill population in West Kameng district of Arunachal Pradesh (survived by a few individual plants – 0.5 sq. m area), and (2) four discrete populations in the Darjeeling Himalaya in West Bengal (i. Chitrey-Lamedhura – 2 sq. m area (Fig. 1), ii. Lamedhura – 5 sq. m area, iii. Gairibas-Kaikata – 3 sq. m area, and iv. Kaikata-Kalipokhri – 1 sq. m area). Unfortunately, both Arunachal and Darjeeling Himalayan populations do not produce viable seeds due to irregular fruit formation. Formation of flowers is also low, and flowering



Fig. 2: Informative signboard posted at the site of the Chitrey-Lamedhura population, Darjeeling

does not occur in all the plants. The Aka Hill population did not flower in 2004, 2007, 2011, 2014, and 2017.

Fortunately, all four discrete populations of Darjeeling produce flowers, but only in approximately 30% individuals. The author posted signboards in front of the Aka Hill and Darjeeling populations (Fig. 2) in 2011 and 2014, to create conservation awareness among the local people. *Gaultheria akaensis* is not assessed yet under IUCN (2017) Red List of Threatened Species (version 13, 2017), but would qualify as Critically Endangered based on Criteria A[A3c+A4c], B[B1ab(i+ii+iii) + B2ab(i+ii+iii)], C[C1a+C2a] and D.

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## REFERENCES

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