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***Leucas lavandulifolia* Sm. (Lamiaceae): The Correct Name for *Leucas indica* of the Flora of Bhutan**

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Abstract

Five *Leucas* species are reported in the *Flora of Bhutan*. During a floristic survey, specimens of *Leucas lavandulifolia* were collected from a subtropical forest in Sarpang District. The collected specimens were identified as *Leucas indica* (L.) Vatke, an illegitimate name as treated in the *Flora of Bhutan*. The correct name for the *Linnaean* species *Leonurus indicus* L. is *Leucas lavandulifolia* Sm. The species is placed in sect. *Plagiostoma*, which is characterised by an oblique calyx, a fan-shaped corolla lip, pedicellate nutlets, and distinctive exocarp cells. *Leucas lavandulifolia* can be distinguished from other closely related species in the genus by its obconical calyx, a puberulous and strongly oblique mouth, 8–10 calyx teeth with the apical tooth larger than the others, and oblong to oblong-obovate nutlets. It occurs in a wide range of habitats, including dry areas and roadsides, disturbed and agricultural fields, as well as moist sites, riverbanks, and thickets at forest margins. A key to the genus is also provided to facilitate accurate identification for conservation and management purposes.

Keywords: Distribution, habitat, *Leonurus indicus*, nomenclature, sect. *Plagiostoma*, taxonomy

1. Introduction

The genus *Leucas* R.Br. belonging to the order Lamiales and the family Lamiaceae, comprises 115 accepted species (POWO, 2025), occurring on dry and disturbed ground across tropical and southern Africa, as well as tropical and subtropical regions of Asia and Australia (Harley et al., 2004). Based on cladistic analysis of morphological variation, Ryding (1998) suggested a northeast African origin for *Leucas*. However, a more recent phylogenetic study by Scheen and Albert

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(2009) suggests an Asian origin for the genus *Leucas*.

Generally, the genus *Leucas* is characterized by herbs or subshrubs with ventricillated flowers, a calyx that is tubular to obconical and truncate or oblique at the throat, a bilabiate, usually white corolla, four stamens, an unequally lobed stigma, and oblong nutlets that are either hairy or glabrous (Li & Hedge, 1994; Clement, 1999; Singh, 2001; Khanam & Hassan, 2005; Kiew, 2022). According to Ryding (1998), Asian *Leucas* species are distinguished from African species by the absence of glands on ovary and nutlets, the anterior corolla lip longer than the posterior corolla lip, and the dorsal side of the calyx exceeding or equalling the ventral side. Within the Asian group, nutlets size is an important character for sectional division (Sajna & Sunojkumar, 2018).

In the *Flora of Bhutan*, Clement (1999) briefly described seven species of *Leucas*, five of which occur in Bhutan: *L. mollissima* Wall. ex Benth. (syn. *L. decemdentata* (Willd.) Sm.), *L. lanata* Benth., *L. ciliata* Benth., *L. cephalotes* (Roth) Spreng., and *L. indica* (L.) Vatke, a synonym of *L. lavandulifolia* Sm. Vatke (1875) transferred *Leonurus indicus* L. to *Leucas* as *L. indica* (L.) Vatke; however, the name *Leucas indica* had already been published by Robert Brown in 1811 based on *Phlomis indica* L., rendering Vatke's name a later homonym and therefor illegitimate under Art. 53.1 of the *International Code of Nomenclature* (Turland et al., 2025). Smith (1812) subsequently adopted *L. lavandulifolia* as the correct name for *Leonurus indicus* L., originally described by Linnaeus (1759).

We provide detailed morphological descriptions, phenology, habitat, and distribution of *L. lavandulifolia*, along with photographs and a key to the genus *Leucas* in Bhutan. This information is intended to facilitate accurate identification of *L. lavandulifolia* and its closely related species, and to support conservation efforts.

Materials and Methods

This study was based on floristic assessments conducted in Bhutan between January 2024 and December 2025. The collected herbarium specimens were processed following Davies et al. (2023) and deposited at the Bhutan National Herbarium (THIM). Relevant literature (Sebald, 1980; Li & Hedge, 1994; Clement, 1999; Singh, 2001; Khanam & Hassan, 2005; Sunojkumar, 2020; Kiew, 2022) was consulted during identification, along with meticulous examinations of specimens housed in the herbaria BRI, CAL, E, K, L, PE, US and THIM (herbarium codes follow Thiers et al., 2025, continuously updated). Author abbreviations follow the International Plant Names Index (IPNI, 2025), and the circumscription and terminology used in the morphological descriptions follow Clement (1999) and Beentje (2024).

Morphological examinations and measurements of vegetative and reproductive parts were conducted on both living and collected specimens. Specimen measurements were taken using a 15 cm ruler, a 3 m measuring tape, and digital callipers. Elevation and geo-coordinates were recorded using a Garmin GPS (eTrex 40), and field photographs were taken with a Nikon D3400 camera. Microimages were photographed using a Z-

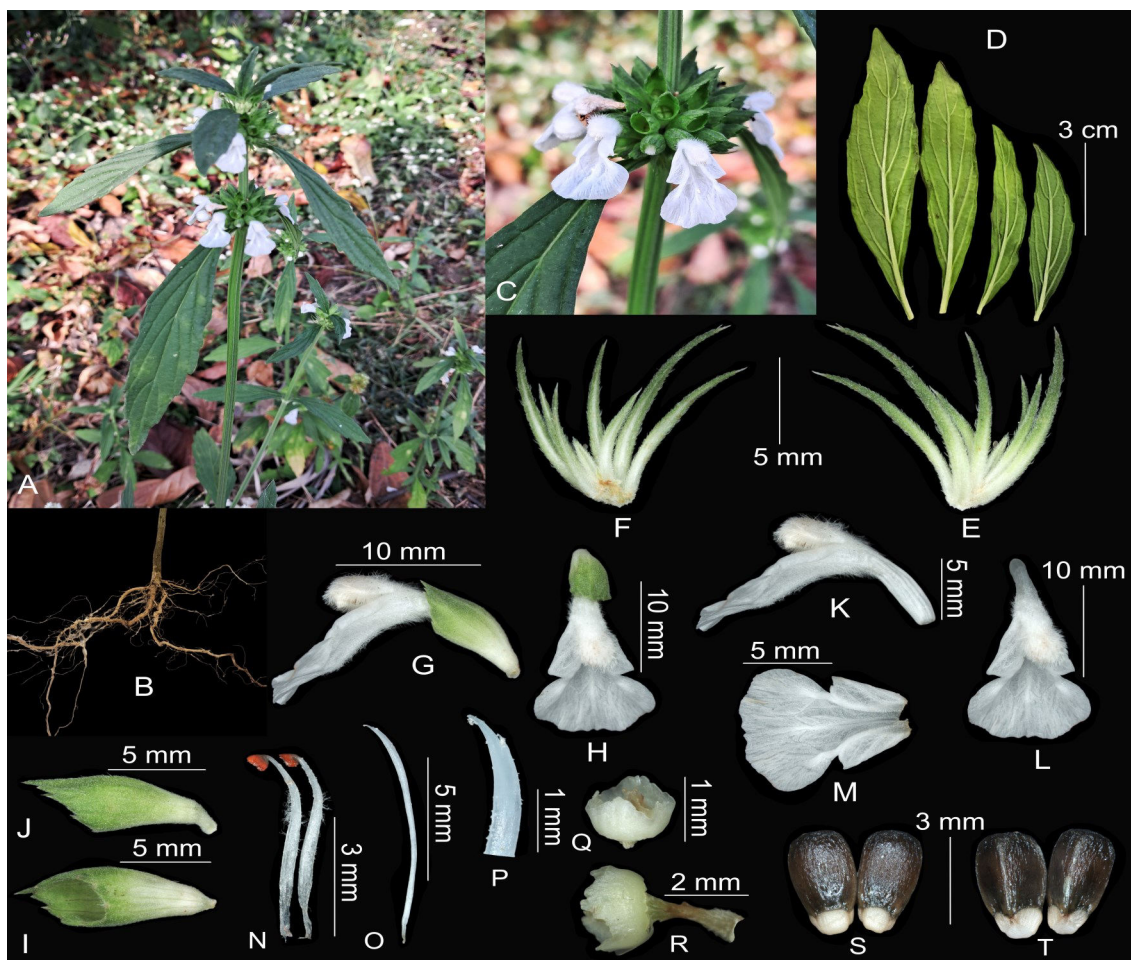


Figure 1. Morphology of *Leucas lavandulifolia* from fresh specimens. **A.** Habit; **B.** Roots; **C.** Verticillaster with flowers; **D.** Abaxial views of the leaves; **E & F.** Abaxial and adaxial view of bracts; **G & H.** Lateral and adaxial view of the flower; **I & J.** Abaxial and lateral view of calyx; **K & L.** Lateral and adaxial view of the corolla; **M.** Adaxial view of lower corolla lip; **N.** Stamens; **O.** Pistil; **P.** Upper portion of the pistil showing falcate stigma; **Q.** Disc with unequal lobes; **R.** Pedicel with disc attached; **S & T.** Abaxial and adaxial view of the nutlets. Photographs and plate designed by Phub Gyeltshen.

stacking microscope at the National Biodiversity Centre, Thimphu. The coloured plates were prepared and edited in Adobe Photoshop and distribution data were plotted on a map using QGIS software version 3.16.2 (QGIS Development Team, 2024).

Results

Taxonomic Enumeration

Leucas lavandulifolia Sm., in A.Rees, Cycl. 20: 2 (1812); Prain, J.As. Soc. Beng. 74, Extra No. (1907) 719; Keng, Gard. Bull. Singapore

24 (1969) 103; Li & Hedge, Fl. China, 17 (1994) 143; Kiew, Fl. Peninsula Malaysia, Ser. II, 9 (2022), 110.

Lectotype (designated by Sebald in Stuttgarter Beitr. Naturk., A 341: 188. 1980): India, *Burman s.n.* in Herb. Linn. No. 739.8 (LINN-image seen). *Erect* annual herb, 15–37 cm high, stem quadrangular and grooved, not much branched, pubescent; internodes 6–12 cm long. *Leaves* opposite, decussate; *petioles* 3–7 mm long, pubescent; *lamina* narrowly elliptic to

elliptic-lanceolate, 1.5–8 × 0.9–2.4 cm, approximately 2 to 3 times longer than broad, base narrowly cuneate to attenuate, apex acute to acuminate, margins remotely setulose dentate, 4–12-teeth, lateral veins prominent, pubescent on both surfaces. *Inflorescence* axillary, 1–3 verticillasters, spreading horizontally, subtended by a pair of leaves, lowermost verticillaster larger, and bearing numerous flowers compared to the uppermost one. *Bracteoles* numerous, subulate, 3–10 mm long, slightly bent toward flowers, pubescent on

both surface margins, apex tip spinulose. *Flowers* numerous, pedicel 1–2.5 mm long, pubescent. *Calyx* obconical, tube, 5–10 mm long, slightly bent at middle, 8–10-nerved, prominent towards the upper half, each nerve excurrent in a tooth, inside glabrous at base, outside puberulous all over, mouth very oblique, adaxial side produced, margins remotely setulose dentate, Calyx teeth 8–10, adaxial longest ones, 0.5–1 mm long. *Corolla* white, 17–19 mm long; tube 7–8 mm long, included in calyx tube, outside hairy above,

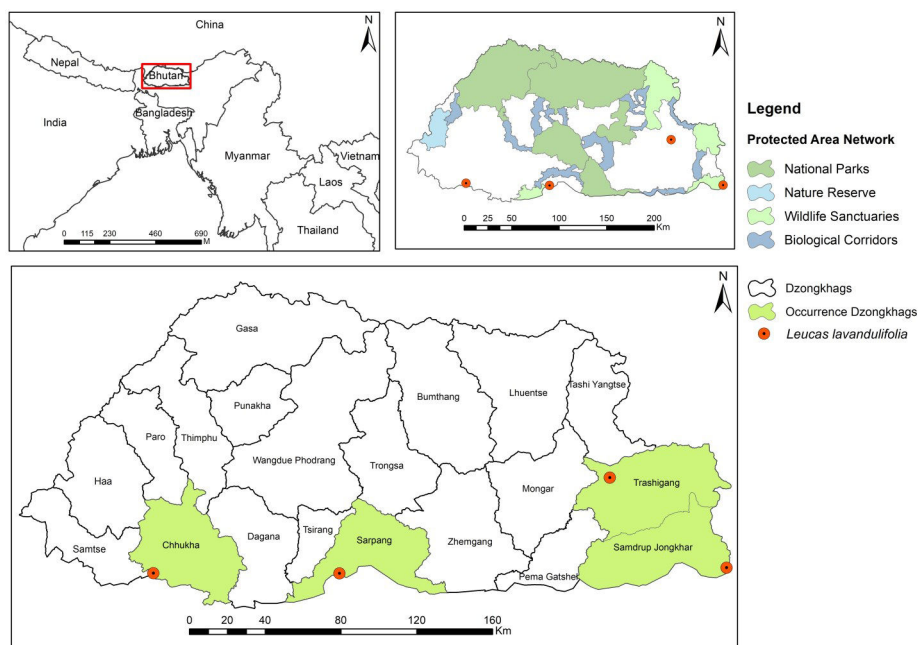


Figure 2. Geographic distribution of *Leucas lavandulifolia* in Bhutan. Map prepared by Phub Gyeltshen.

Key to the species *Leucas* in Bhutan

- 1a. Calyx mouth oblique2
- 1b. Calyx mouth truncate3
- 2a. Bracts lanceolate*L. cephalotes*
- 2b. Bracts subulate or linear *L. lavandulifolia*
- 3a. Leaves lanceolate, 6–9 cm long, calyx densely villous inside the throat*L. ciliata*
- 3b. Leaves ovate, 2.5–4.5 cm long, calyx puberulent or subglabrous inside the throat4
- 4a. Leaves greyish-green, stem indumentum retrorse, appressed*L. decemdentata*

inside middle annulate with a ring of fleshy hairs; *lower lip* 10–11 mm long, middle lobe, flabellate 10 mm wide, side lobes 2 mm broad at free, margin slightly truncate; *upper lip* ca. 4 mm long, concave, bent, white spreading hairs outside, margins ciliate. *Stamens* four, included in the upper lip, light reddish brown, upper pair shorter than the lower; *Filaments* flat, 3.5–5.5 mm long, hairy in the middle; anther lobe 0.5 mm long, confluent theca. *Disc* semi-cup shaped, with unequal lobes, ca. 1 mm long. *Style* 10 mm long, falcate; stigma unequally bilobed, glabrous. *Nutlets* oblong-obovate, 2.6–2.8 × 1.2–1.3 mm, dark brownish, glabrous, shining, apex rounded, distinct white foot-like structure at the base of the nutlets, abaxially rounded, adaxially angular.

Specimens examined: **Bhutan:** Chukha, Phuntsholing, Torsa River, 260 m, 26.867N, 89.383E, 07 May 1979, *A.J.C. Grierson & D.G. Long*, 877 (THIM5756!); Sarpang, 360 m, 26.8666N, 90.2666E, 31 May 1979, *A.J.C. Grierson & D.G. Long*, 1487 (THIM5754!), Gakiling Gewog, Gakiling, 330 m, 26.8754N, 90.2614E, 09 January 2025, *P. Gyeltshen & K. Tobgay*, 479 (THIM21783!, THIM21784!, THIM21785!, THIM21786! & THIM21787!); Trashigang, West bank of Drangmechhu, Chazam, 700 m, 27.337N, 91.545E, 28 June 1979, *A.J.C. Grierson & D.G. Long*, 2325 (THIM5755!), Shalli, Kheni block, 10 June 1992, *C. Parker*, 7230 (THIM5757-photo not seen).

Phenology: Flowering from October to January; fruiting from December to February.

Habitat: *Leucas lavandulifolia* occurs in dry areas, along roadsides, riverbanks and thickets at forest margins, up to elevations of 1,400 m in China (Li & Hedge 1994). In Bhutan and

other parts of the Indian subcontinent, the species is found in moist areas, disturbed grounds, and among shrubs and on stony banks in arid valleys (Clement, 1999).

In the present study, the species was observed growing near human settlements and agricultural fields.

Global Distribution: Australia, Bangladesh, China, India, Indonesia, Malaysia, Myanmar, Nepal, Philippines, South Africa, Taiwan, and Thailand.

Distribution in Bhutan: Chukkha, Samdrup Jongkhar, Sarpang and Trashigang.

Discussion

Smith (1812) recognised *Leonurus indicus* L. as a distinct species and assigned it the name *Leucas lavandulifolia* Sm. to avoid creating a later homonym of *Leucas indica* (L.) R. Br. Later, Vatke (1875) made the combination transferring *Leonurus indicus* L. (1759) to the genus *Leucas*, resulting in the name *Leucas indica* (L.) Vatke. However, in 1811, approximately 64 years prior to Vatke's publication, Robert Brown established the combination based on *Phlomis indica* L., which Linnaeus described in 1753. Consequently, *Leucas indica* (L.) R. Br. has nomenclatural priority over *Leucas indica* (L.) Vatke. The latter name is superfluous and therefore considered an illegitimate later homonym under Article 53.1 of the *International Code of Nomenclature* (Turland et al., 2025). In the early 21st century, *Leucas indica* (L.) Vatke has been treated as a synonym of *Leucas lavandulifolia* Sm., as it was determined to be taxonomically identical to Smith's species (Govaerts, 2003). For a detailed nomenclature and typification of *Leucas lavandulifolia*, refer to Sunojkumar (2020).

Leucas lavandulifolia differs from its closely allied species in the genus *Leucas* by its linear to linear-lanceolate leaves and an obconical or turbinate, puberulous calyx with a strongly oblique mouth, remotely setulose-dentate margins, and a large apical tooth (Sebald, 1980; Li & Hedge, 1994; Sunojkumar, 2020; Kiew, 2022). However, the leaf margin of the type specimen is entire, whereas the specimens examined in the present study showed remotely setulose dentate margins. This contradicts earlier description and suggests that variation in leaf margin may be due to ecological conditions.

In the *Flora of Bhutan*, Clement (1999) distinguished *L. lavandulifolia* from *Leucas aspera* (Willd.) Link by its pubescent bracts and calyx, and by calyx veins that are not prominent, whereas in the present study, veins were prominent and clearly visible. This discrepancy may be attributed to the fact that Clement (1999) examined dried specimens, in which calyx veins may become less prominent due to shrinkage or degradation over time.

Nutlets have been described as brown and ovoid (Li & Hedge, 1994), measuring 2.5 mm length (Sunojkumar, 2009), 2.6×1 mm (Clement, 1999), oblong and 2.29×1.26 mm (Sajna & Sunojkumar, 2018), and 2.5×1.0 mm (Keng, 1969; Kiew, 2022). The largest nutlet size reported for the species, $3.0\text{--}3.2 \times 1.5\text{--}1.7$ mm, was recorded from South Africa (Sebald, 1980). In the present study, the nutlets were oblong-obovate, measuring $2.6\text{--}2.8 \times 1.2\text{--}1.3$ mm. These observations indicate variation not only in leaf morphology but also in nutlet structure and size. The observed difference in nutlet size between Asian popula-

tions ($2.3\text{--}2.8 \times 1.0\text{--}1.3$ mm) and South Africa populations ($3.0\text{--}3.2 \times 1.5\text{--}1.7$ mm) may indicate geographic variation within the species; however, additional morphological and molecular evidence is required to support any taxonomic revision.

Leucas lavandulifolia is placed in *Leucas* sect. *Plagiostoma* Benth., based on the presence of an oblique calyx, a fan-shaped lower lip of the corolla, a foot-like structure at the base of the nutlets, and elongate or unequally thickened exocarp cells (Ryding, 1993; Sajna & Sunojkumar, 2018).

Conclusion

Five species of *Leucas* are known to occur in Bhutan. *Leucas lavandulifolia* is the currently accepted name for *Leucas indica* (L.) Vatke. It can be identified by its obconical calyx with a puberulous, strongly oblique mouth, 8–10 calyx teeth with the apical tooth larger than the others, and oblong nutlets measuring $2.3\text{--}3.2 \times 1.0\text{--}1.7$ mm. The species occurs in diverse habitats, including dry and moist areas, roadsides, riverbanks, forest margins, and near settlements and agricultural fields. It is currently distributed across five Dzongkhags in Bhutan.

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