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Nineteen new records of plant species including two new genera recorded from the Bhutan Himalayas

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ABSTRACT: Through the collection of herbarium specimens in Bhutan over the years, new plant species are discovered nearly annually. Thus, this paper reports two new genera and 19 new records of flowering plant species from Bhutan. The new genera include *Eurycorymbus* of the family Sapindaceae and *Homalium* of the family Salicaceae. The new records of plant species are *Eranthemum erythrochilum* (Acanthaceae), *Hemidesmus indicus* (Apocynaceae), *Ilex umbellulata* (Aquifoliaceae), *Canarium strictum* (Burseraceae), *Ehretia acuminata* (Boraginaceae), *Vaccinium sikkimense* (Ericaceae), *Nothapodytes foetida* (Icacinaceae), *Machilus edulis* (Lauraceae), *Grewia asiatica* (Malvaceae), *Hibiscus fragrans* (Malvaceae), *Cipadessa baccifera* (Meliaceae), *Baccaurea javanica* (Phyllanthaceae), *Canthiumera glabra* (Rubiaceae), *Homalium napaulense* (Salicaceae), *Eurycorymbus cavaleriei* (Sapindaceae), *Acmella radicans* (Asteraceae), *Silene latifolia* (Caryophyllaceae), *Cleome rutidosperma* (Cleomaceae), and *Cuphea carthagenensis* (Lythraceae). Morphological determinations of the genera and species were carried out at the National Herbarium (THIM) of the National Biodiversity Centre of Bhutan. Brief descriptions of the species, phenology, and photo plates are provided in this annotated checklist.

Keywords: Bhutan, eastern Himalayas, new records, flowering plants

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INTRODUCTION

Today, Bhutan is distinguished by the world for its rich biodiversity and effective conservation efforts, and the country is home to numerous endangered flora and fauna. Bhutan itself falls under the Eastern Himalayan biodiversity hotspot. It is also home to many endemic species of both flora and fauna. The Himalayan country of Bhutan is renowned for its rich biodiversity consisting of endemic, native, and endangered flora and fauna which inhabit various ecosystems such as tropical, subtropical, temperate, and alpine forest zones; tropical/subtropical grasslands, alpine meadows, and screes. Bhutan has recorded around 11,248 species within all biodiversity taxa which includes 5,114 species from the Kingdom Animalia, 5,369 from Plantae, 690 from Fungi, 55 from Chromista, and 20 species from Eubacteria and Protista. There are around 144 endemic plant species. Around 136

species are threatened of which 64 species are endangered (National Biodiversity Centre, 2019). A total of 70.46% of the nation's land is protected and the elevation ranges from c. 100 meters above sea level (masl) to 7,570 masl at the peak of Gangkhar Phuensum (Gyeltshen and Prasad, 2022).

Flora of Bhutan studies was not conducted until 1970 and the journey of establishing the flora of Bhutan began when the country flourished from the isolation from the outside world. The Flora of Bhutan project was initiated in the 1970s to generate comprehensive information on flora and its diversity along with their distribution. Due to the country's nature of rugged terrains, the diversity listing was an enormous task. The Flora of Bhutan reports 4,523 flowering plants species with 1,416 genera and 266 families. It also reported 22 species of Gymnosperms with 15 genera and eight families (Chhetri and Tenzin, 2012). However, the flora also includes some species from nearby regions of Darjeeling and Sikkim,

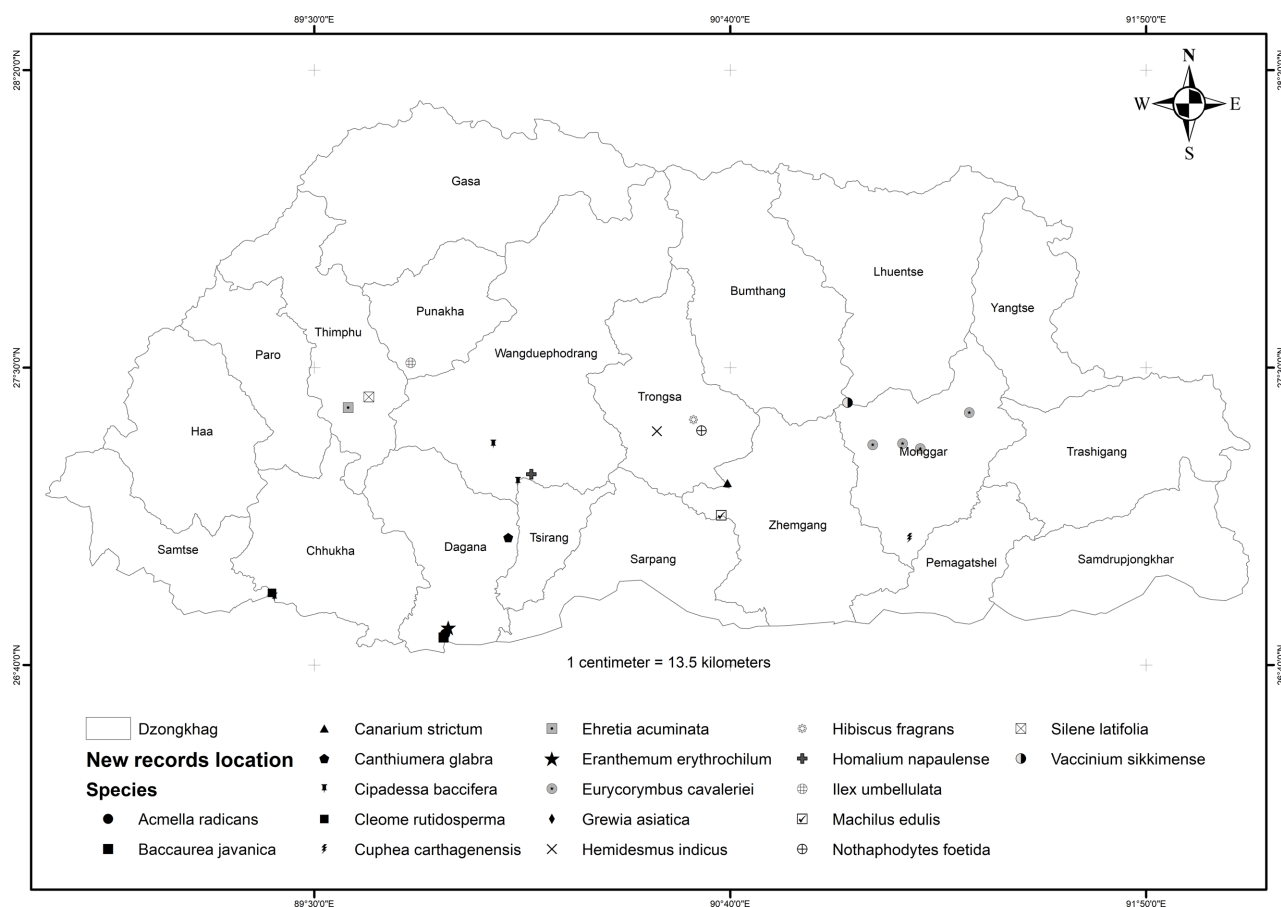


Fig. 1. Distribution of new plants in Bhutan.

India. Some of the species are still not recorded in the list of Flora of Bhutan due to inaccessibility and limited capacities.

On the other hand, more new exotic or alien species are encroaching on the country's native habitats due to its invasiveness and other means of invasive species pathways. Currently, Bhutan recorded more than 16 species of invasive alien plant species with 6 of them listed within the world's 100 worst invasive species (Lowe et al., 2000 as cited in Yangzom et al., 2018). However, due to climate change, a number of species are observed in new habitats with some changes in their phenology. Cultivated plants widely grown in Bhutan are also recorded in the flora including exotic species. In addition, as a result of further exploration and more research in the country, numerous new species or new records are constantly being added every year to the flora of Bhutan.

The Flora of Bhutan acts as the reference for the flowering plants of Bhutan, and the specimen vouchers for the flora have been deposited in various herbaria such as the National Herbarium of Bhutan, Royal Botanic Garden Edinburgh Herbarium, Kew Gardens Herbarium, Calcutta Herbarium, University of Tokyo Herbarium, among others. Thus, this paper aims to provide information on the new plant records discovered

during several herbarium collection expeditions in various parts of Bhutan during the last five years. The specimens collected are deposited at the National Herbarium of Bhutan under the National Biodiversity Centre in Thimphu, Bhutan.

Materials and Methods

The specimens were collected through the collection from the previously unexplored areas and the under-collected species (Fig. 1). The new records of plants were reviewed and species were determined using the Flora of Bhutan, other literatures, and also specimens were consulted from various herbaria. Similarly, thorough literature and databases review of both international and national were conducted, where the species identification keys, descriptions including the original descriptions, illustrations, and photographs were reviewed. Further, various online resources such as Flora of China (Wu et al., 1994–2014), JSTOR Global Plant (<https://plants.jstor.org>), GBIF website, iNaturalist (<https://www.inaturalist.org>), Royal Botanical Garden Edinburgh (E), (<http://data.rbge.org.uk>), World Plants (<https://www.worldplants.de/world-plants-complete-list/complete-plant-list>), and Bhutan Biodiversity Portal (

www.biodiversity.bt) were also used to validate the species identity and other information.

Fresh specimens for the new records were collected from the natural habitat following the proper herbarium specimen collection protocol using the plant press, blotting paper, old newspaper, butter paper, cardboard, secateurs, and other tools. The coordinates of new records of species were recorded using SW Maps, an android mobile app for mapping. The specimens were further dried in the dryer (oven) and dry-mounted with field data record label and deposited in the National Herbarium (THIM) at the National Biodiversity Centre, Bhutan (NBC), Serbithang, Thimphu.

Results and Discussion

This paper reported 19 species of flowering plants that are new to the flora of Bhutan. Among them, 4 species were non-native and were recorded from southern Bhutan. The non-native species recorded are *Acmella radicans* (Jacq.) R. K. Jansen, *Silene latifolia* Poir., *Cleome rutidosperma* DC., and *Cuphea carthagenensis* (Jacq.) J. F. Macbr. While *Acmella radicans* and *Cuphea carthagenensis* are native to America, *Silene latifolia* is native to temperate Eurasia and Northwest Africa and *Cleome rutidosperma* is a native of tropical Africa. While, *Eranthemum erythrochilum*, *Hemidesmus indicus*, *Canarium strictum*, *Vaccinium sikkimense*, *Nothaphodytes foetida*, and *Machilus edulis* are reported from Darjeeling/Sikkim/West Bengal duars but with no location and vouchers records from Bhutan in the Flora of Bhutan. Thus with the collection of specimens and data, it is now confirmed as the new record for Flora of Bhutan after a thorough examination.

Cipadessa baccifera is reflected to be present in Bhutan in Flora of China, GBIF, and other websites originally based on the Flora of Bhutan. However, the Flora of Bhutan reported that it was probably cultivated in Darjeeling, India and it was expected from Bhutan with no location or voucher information from Bhutan. The species distribution ranges from Nepal to south China, and west and central Malesia. The species was not recorded as new, until it was collected as herbarium specimens during a survey and inventory carried out on 4 December 2021 although many field experts encountered it before but could not conclude as a new record.

Following the expedition and taxonomic search, the genus *Eurycorymbus* and *Homalium* were identified and appeared to be new genera that were not covered in the Flora of Bhutan previously. The first known specimen of *Eurycorymbus cavaleriei* (H. Lév.) Rehder & Hand-Mazz. from Bhutan was collected by Grierson & Long above Zimgaon in Mongar district but was misidentified as *Zanthoxylum cf. rhetsa* (Roxb.)

DC. The genus *Homalium* is reflected in the Flora of Bhutan with a lone species, and *Homalium zeylanicum* (Gardner) Bentham is however not reported from Bhutan but from Darjeeling in India. The genus *Eurycorymbus* of the family Sapindaceae and the genus *Homalium* of Salicaceae are now reported here as new genera to the Flora of Bhutan through the taxonomic review. These genera were reported from the warm-broad leaved forests in the sub-tropical zones of Bhutan.

Acanthaceae

1. *Eranthemum erythrochilum* J.R.I. Wood, Edinburgh J. Bot. 51: 18, 1994 (Fig. 2A).—TYPE: INDIA. Buxa Bengal, 2 Feb 1979, J. S. Gamble 6648 (holotype: K000882625!).

Herbaceous, stem pubescent. Leaves subentire. Inflorescences a solitary terminal, spike, 3–12 long. Bracts elliptic-obovate, glandular pubescent all over. Calyx 10–12 mm. Corolla light bluish when young to crimson, tube 27–39 mm long, lobes 7–11 × 5–8 mm, anthers and style exserted.

Flowering: January to February.

Specimens examined: BHUTAN. Dagana, above the road from Lhamoidzingkha to Dagana to the south of Durpini Bir, Karmaling gewog, Lhamoidzingkha Drungkhag, elev. 551 m; 26°46'17.8"N, 89°52'32.7"E, 13 Jan 2020, *Phuentsho et al.* BTN138 15425, 15426, 15427, 15428, 15429 (THIM).

Apocynaceae

2. *Hemidesmus indicus* (L.) R. Br., Hort. Kew., ed. 2 [W.T. Aiton] 2: 75, 1811 (Fig. 2B).—TYPE: INDIA. 22.883478N, 79.616202E, 1813, *Roxburgh* (holotype: BM001014116!).

Small shrubs, stem terete and glabrous, purplish brown, nodes flanged and slightly swollen. Leaves simple, obovate to elliptic, lanceolate-oblong or linear, margin entire, apex obtuse-apiculate to acuminate, base obtuse to cuneate. Flowers generally greenish yellow shiny above, petiole 1–3.5 mm long. Calyx lobes 2–3.5 × 0.5–1.5 mm, lobes ovate to acute. Fruit cylindrical divergently follicles. Roots system is thin, linear and chief root produces few aspect branches (Purohit, 2019).

Specimens examined: BHUTAN. Trongsa, Langthel, ridge south of langyuel herder camp in Waichenchu valley, elev. 2,411 m, 27.32180233N, 90.46117223E, 25 Mar 2020, *Phuentsho* BTN188, 16011 (THIM).

INDIA. Ruhuna National Park, Block I, Opposite Karaugaswala, 10 Dec 1967, *D. Mueller-Dombois and R. G. Cooray* 67121009, det. D. M. - D., det. Gretchen M. Lonta (FLAS), Mar 2011, det. H. Huber, 11/14/1968.

SIRLANKA. Prope Ritigala, in Apricis, elev. 60 m, 18-3-1973, *Bernardi*, 141312, det. A. H. M. Jayasuriya, Apr 1982, det. Gretchen M. Lonta (FLAS), Mar 2011.



Fig. 2. Newly recorded plant species. **A.** *Eranthemum erythrochilum* from Dagana district. **B.** *Hemidesmus indicus* from Langthel, Trongsa. **C.** *Ilex umbellulata* from Menchuna, Punakha. **D.** *Canarium strictum* from Zhemgang. **E.** *Ehretia acuminata* from Nyzerkha, Thimphu. **F.** *Vaccinium sikkimense* from Thrumshingla Pass.

Aquifoliaceae

3. *Ilex umbellulata* (Wall.) Loes., Nova Acta Acad. Caes. Leop.–Carol. German. Nat. Cur. 78: 99, 1901 (Fig. 2C).—TYPE: CHINA. Yunnan, Syemen, elev. 1,524 m, 15 Jun 1948, *A. Henry 13486* (holotype: K000669343!), det. S. Andrews, 1988.

Shrubs or trees, evergreen, up to 25 m tall; young branchlets brown or castaneous, glabrous, plicate, angular; older branchlets gray, terete, plicate, with raised leaf scars; petiole 1–1.5 cm, adaxially sulcate, glabrous; leaf blade olivaceous, opaque on both surfaces, oblong or ovate-oblong, 7–15 × (3.5–)5–6 cm, papery, lateral veins 9–12 pairs, slightly raised abaxially, base rounded or obtuse, margin entire, narrowly recurved, apex abruptly acuminate or obtuse. Terminal buds conical, small, and glabrous. Inflorescences cymes of order 3–5, umbelliform, solitary. Female flowers sterile anthers sagittate; ovary ovoid, style present, stigma 4- or 5-lobed. Fruit red, globose, 5–7 mm in diam.; peduncles 1–2 cm, slightly stout, persistent stigma thickly discoid, center depressed, rotate-lobed; laterally smooth, endocarp woody.

Specimens examined: BHUTAN. Punakha, Menchuna, elev. 2,445 m, 27.51359N, 89.77027E, 21 Nov 2017, *Kezang Tobgay k.ty-510*.

Burseraceae

4. *Canarium strictum* Roxb., Fl. Ind. 3: 138, 1832 (Fig. 2D).—TYPE: Asia. *P. W. Leenhouts* (holotype: BM000798837!).

Trees up to 60 m, bark smooth, gray brown, resinous. Leaves to ca. 40 cm, ovate or elliptic, 6–19 × 3.5–6.5 cm, apex sometimes broadly acuminate or acute, base rounded or subcordate, short petiolules, margin faintly undulate or entire, glabrous above, rusty shiny pubescent beneath. Flower filler form, pinkish white. Sepals 3, basally connate and valvate; petals 3, white, arranged with induplicate-valvate aestivation. Stamens 6, in one whorl, filaments were connate at the base; anthers slightly basifixed and introrse with intrastaminal, cupular nectary disc (Kumer et al., 2014). Fruits obovoid to ellipsoid 2.5–4 × 1.5–2.5 cm, stone triangular sometime.

Specimens examined: BHUTAN. Zhemgang, Trong, Bermo, elev. 541 m, 27.1761833N, 90.65898743E, 17 Mar 2021, *Phuentsho et al. BTN434, 16711* (THIM).

THAILAND. Lampang, Wahng Nua, Poi Luang National Park Wahng Gayo Falls area, elev. 650 m, 25 Apr 1997, *J. F. Maxwell 97-425*; Chiang Mai, Chom Thong, Doi Inthanon National Park Mae Klang Luang (Karen) village, elev. 1,115 m, 18°31.927'N, 98°32.819'E, 5 May 2010, *Pavlos Georgiadis 283*.

Ethretiaceae (Boraginaceae)

5. *Ehretia acuminata* R. Brown, Prodr. 1: 497, 1810 (Fig.

2E).—TYPE: AUSTRALIA. *Robert Brown 2916* (holotype: BM001040652!).

Trees to 15 m tall; bark black-gray, lacinate; branches light brown, smooth; branchlets brown, glabrous, with distinct lenticels. Petiole 1.5–2.5 cm long, glabrous; leaf blade elliptic to obovate or oblong-obovate, 5–13 × 4–6 cm, glabrous or sparsely puberulent, base broadly cuneate, margin regularly serrate with teeth curved upward, apex acute, apiculate. Cymes paniculate, 8–15 × 5–8 cm, short pubescent or subglabrous, axillary buds solitary, compressed. Flowers crowded, fragrant. Calyx 1.5–2 mm; lobes ovate, ciliate. Corolla white, campanulate, 3–4 mm; lobes spreading, oblong, longer than tube. Stamens exserted; filaments 2–3 mm long, inserted on upper part of base, 0.5–1 mm; anthers ovate, ca. 1 mm. Style 1.4–2.5 mm, branches ca. 0.5 mm. Drupes yellow or orange, 3–4 mm in diam.; endocarp wrinkled, divided at maturity into two 2-seeded pyrenes.

Specimens examined: BHUTAN. Thimphu, Nyzerkha, elev. 2,400 m, 27.38759N, 89.59494E, 23 Jun 2021, *Kezang Tobgay k.ty-540*.

AUSTRALIA. Port Jackson, in collibus petrosis, *F.L. Bauer 0049532*; New South Wales, Williams' River, 1802, *R. Brown 2916* (K000998088).

Ericaceae

6. *Vaccinium sikkimense* C. B. Clarke, Fl. Brit. India 3: 451, 1882 (Fig. 2F).

Shrubs up to 25 cm tall, many-branched. Twigs angled, young shoots pubescent, glabrescent. Leaves ovate-elliptic, 1–3 × 1–1.7 cm, acute, base rounded, margins serrulate, glandular, recurved, midrib and veins glandular beneath, subsessile, secondary veins 4 or 5 pairs, ascending, with fine veins inconspicuously raised abaxially, base cuneate or broadly cuneate, margin plane, apex rounded, mucronulate. Inflorescences axillary or terminal, racemose, 1.5–3 cm, pubescent, ca. 6-flowered; ovate-orbicular. Pedicel ca. 6 mm, glabrous. Hypanthium ca. 1.5 mm, glabrous; calyx limb divided to 1/2; calyx lobes broadly triangular or undulate, 0.3–0.6 mm. Corolla urn-shaped, 4–6 mm, pinkish, with red limbs, densely spreading pubescent; lobes darker, very small, recurved. Tubular anther tips c 1mm; dorsal spurs minute; filaments hairy. Fruits not seen.

Specimens examined: BHUTAN. Bumthang, Ura, Phrumsengla, elev. 3,715 m, 27.40163391N, 90.99606755E, 12 May 2022, *Phuentsho et al. BTN625* (THIM).

INDIA. Lachen Sikkim, elev. 3,962 m, 9 Jun 1949, *J. D. Hooker* (K000780578).

CHINA. Yunnan: 1917. *G. Forrest 14337* (K000780629); bor.-occid: Prope fines Tibeto-Birmanicas inter fluos Ludjiang

(Salween) et Djiou-djiang (Irrawadi orient. Super.), in jugi Ulula, elev. 4,042.5 m, 27°52', 4 Jul 1916, *H.O. Sleumer* 6216, 1939 0043109.

Icacinaceae

7. *Nothapodytes foetida* (Wight) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem 15: 247, 1940 (Fig. 3A).—TYPE: SRILANKA. *George Gardner* 98 (holotype: BM000839366!).

Shrubs or small trees, 3–10 m tall; branchlets ribbed, puberulous. Leaves ovate or elliptic, 16–18 × 10.5–13 cm, shortly acuminate, rounded at base, tomentose beneath, soft to touch; petioles 4–7 cm. Flowers not seen. Drupes ellipsoid, black when mature with thin hairs.

Specimens examined: BHUTAN. Trongsa, Langthel, Tongtophey, elev. 1,065 m, 27.323577N, 90.5862E, 13 Mar 2020, *S. Tshewang et al.* 15416, 15415 (THIM).

INDIA. 22.883478N, 79.616202E, *H. Sleumer* (BM000839365).

Lauraceae

8. *Machilus edulis* King ex Hook.f. Fl. Brit. India 5: 138, 1886 (Fig. 3B).

Trees, up to 13 m, branchlets thick; leaf scars prominent; shoots and inflorescence silky villous. Leaves obovate-oblong or sometime oblanceolate, 11–13 × 4–7 cm, subacute, acute or acuminate, base attenuate, brownish villous beneath, petioles 0.5–3.5 cm. Panicles 6–13 cm, pedicels stout, 1–4 mm, pubescent. Fruit globose.

Specimens examined: BHUTAN. Zhemgang, Trong, Tamala, elev. 2,018 m, 27.08593213N, 90.64148078E, 6 Nov 2020, *Phuentsho et al.* BTN368, 17564, 17564, 17565 (THIM).

INDIA. Sikkim: Mudulus water King, 1879, *J. L. Lioter* (K000639250), det. Kosterman 1972, det. D. G. Long May 1983.

Malvaceae

9. *Grewia asiatica* L. Mant. Pl. 122. 1767 (Fig. 3C).

Tall shrubs, up to 4–5 m. The leaves are approximately 5–18 cm long and broad. Leaves may be ovate, suborbicular, acute, subacuminate or cuspidate, sharply and often coarsely, double serrate, subglabrous above, hoary-tomentose beneath and rounded or only slightly cordate at the base. Flowers arranged in cymes of several together, individual flowers yellowish in color with five large (ca. 12 mm) sepals and five smaller (4–5 mm) petals. Flowers ca. 2 cm in diam., flower buds broadly cylindric or clavate, peduncles axillary, usually many, and long and slender. Bracts present beneath the pedicels. Fruits globose, 1.0 to 1.9 cm in diam., 0.8 to 1.6 cm in vertical height, and 0.5 to 2.2 g in weight and is edible

portion of plant.

Specimens examined: BHUTAN. Mongar, Gangola to Lhuntse, Gyelpoizhzing, elev. 800 m, 27.27260N, 91.19989E, 19 Mar 2019, *Kezang Tobgay k.ty*-526.

U.S.A. Florida, Miami-Dade, Cult. Egypt. SES Bl. 1. Homestead, 18 May 1942, *S.J. Lynch* 174, 38632.

VIETNAM. Khanh Hoa Prov., Dien Khanh Dist., Hon Ba Mountains, Suoi Cat Village, road transect Suoi Cat Village to peak at km markers 25–24, along Da Giang River, elev. 110 m, 12.132833, 109.021333, 26 Nov 2004.

Malvaceae

10. *Hibiscus fragrans* Roxb., Fl. Ind. 3: 195, 1832 (Fig. 3D).

Large scrambling perennial shrubs, stellate hairy throughout. Leaves simple, alternate, unlobed, broadly ovate, 2–14 × 1.5–10 cm, acute in smaller leaves, acuminate in larger leaves, base cordate, margin obscurely serrate, glabrescent; petiole 1.2–7 cm, tomentose. Flowers not seen. Capsule ovoid, 4–4.5 × 2 cm, densely stellate hairy, peduncle 4–6 cm, tomentose. Seeds small, hairy, reniform.

Specimens examined: BHUTAN. Trongsa, Langthel, Bashaling, elev. 900 m, 27.35382N, 90.56388E, 9 Mar 2020, *S. Tshewang et al.* 15419, 15420 (THIM).

VIETNAM. Ninh Binh Rprovince, Cue Phuong National Park, 20.311333, 105.633, 14 Aug 2000, *Cuong N.M. et al.* 973 (L. 3914886), det. T. T. Dai, 1 Aug 2000.

Meliaceae

11. *Cipadessa baccifera* (Roth) Miq., Ann. Mus. Bot. Lugduno-Batavi 4: 6, 1868 (Fig. 3E).—TYPE: CHINA. Guizhou, Sud Pin-Fan, Nov 1904, *Cavalerie* 1911 (holotype: E00275635!).

Small trees. Young branches grayish-brown with numerous lenticels. Leaves 11–41 cm; leaflets 4–7 pairs, ovate-elliptic, 3–9 × 2–4 cm, acuminate or acute, base obliquely cuneate, margins entire or bluntly serrate in the upper half, sparsely pubescent along the veins beneath. Young leaves sparsely pubescent throughout. Flowers not seen. Drupes small, 5 lobed, purple when mature.

Fruiting: October–December.

Specimens examined: BHUTAN. Tsirang, Sergithang, above Taksha Park Range Office, elev. 476 m, 27.18103667N, 90.07157174E, 4 Dec 2021, *Phuentsho et al.* BTN606, 18598, 18599, 18638 (THIM); below road Wangdue, elev. 717 m, 27°17'07.8"N, 90°00'07.9"E, 14 Nov 2011, *R. Yangzom* 36 (THIM04280); Chukha, Phuntsholing district, near old hospital, elev. 300 m, 26°51'26.6"N, 89°23'18.4"E, 23 Feb 2012, *Sonam Tshering* 58, 04278 (THIM).



Fig. 3. Newly recorded plant species. **A.** *Nothapodytes foetida* from Langthel, Trongsa. **B.** *Machilus edulis* from Zhemgang. **C.** *Grewia asiatica* from Mongar. **D.** *Hibiscus fragrans* from Langthel, Trongsa. **E.** *Cipadessa baccifera* from Sergithang, Tsirang. **F.** *Baccaurea javanica* from Lamoizhingka, Dagana.

INDONESIA. Java province, 1 Jul 1944, *Blume CL* 41 (L0017141).

Phyllanthaceae

12. *Baccaurea javanica* (Blume) Müll.Arg., Prodr. 15: 465, 1866 (Fig. 3F).—TYPE: Andaman, Sumatra, -0.6, 100.15, 1 Nov 1999, *H. Diepenhorst et al.* 122 (isoelectotype: U0008284!).

Shrubs to trees 3–12 m tall, diameter at breast height (dbh) up to 30 cm, branchlets glabrous, densely hairy when young. Bark (light) brown to pale gray to yellowish to white to silvery green, finely fissured; Leaves petiole 2–45 mm long, (sub)glabrous, sometimes with a tuft of short hairs at base, brown when dry; stipules 1–6 × 1–2 mm, densely hairy on both sides, margin ciliate, hyaline; lamina obovate (to ovate), 2.9–20 × 1.2–9.5 cm, base cuneate; apex acuminate, up to 15 mm long; upper surface glabrous, sometimes granulate; lower surface glabrous, Staminate inflorescences axillary to just below the leaves, many-flowered, flowers scattered along inflorescence. Staminate flowers green to white to light yellow to brownish; pedicel 1.2–4.2 mm long, sepals 4 (or 5), ovate, apex recurved. Pistillate inflorescences axillary to just below the leaves (to ramiflorous), solitary, flowers up to 1 cm diam., green; sepals 4, ovate to lanceolate. Fruits globose to cylindrical, fleshy capsules. Seeds ellipsoid to slightly globose, but laterally flattened.

Distribution: Andaman and Nicobar Islands, Peninsular Malaysia, Sumatra, Java, Borneo, Sulawesi (Talaud Island).

Specimens examined: BHUTAN. Dagana, Lamoizhyngkha, elev. 570 m, 26.744405N, 89.862901E, 12 Jan 2020, *Kezang Tobgay K.ty-505*.

Rubiaceae

13. *Canthiumera glabra* (Blume) K. M. Wong & Mahyuni, Reinwardtia 17: 108, 2018 (Fig. 4A).—TYPE: INDONESIA. Java, Mt. Salak, -6.4247, 106.5547, *Blume CL* (lectotype: L0062935!).

Trees. Stipules triangular-ovate. Leaves opposite and decussate on vertical stem axes but distichous on lateral (horizontal) branches. Inflorescences axillary on lateral branches, pedunculate, cyme-like or sub-umbellate, bracts small and inconspicuous. Flowers bisexual; corolla subrotate-urceolate to broadly cylindric, constricted just below corolla lobes, glabrous or short-pubescent outside, corolla lobes spreading in the open flower; stamens alternate with the corolla lobes, style glabrous or pubescent, stigma globose to club-shaped, with a slight basal recess. Fruits ellipsoid, obovoid or obcordate-compressed. Seeds one in each pyrene.

Specimens examined: BHUTAN. Degapela to Dagana, elev. 1,230 m, 27.02396N, 90.04399E, 6 Feb 2017, *Kezang Tobgay K.ty-520*; Tsangkha, Dagana, 19 Jun 2021, *Kezang Tobgay K.ty-570*; Zhemgang, Buli, 23 May 2019, *Kezang Tobgay K.ty-550*.

Salicaceae

Homalium Jacq., Enum. Syst. Pl. 5, 24, 1760.

Trees or shrubs. Leaves alternate, opposite or verticillate; stipules caducous; usually petiolate; leaf blade pinnate-veined, margin with glandular teeth, rarely entire. Flowers bisexual, small, in terminal or axillary; bracts small, caducous or persistent; pedicels slender in flower. Sepals and/or petals often accrescent after anthesis. Calyx tube obconic. Petals inserted at rim of calyx tube. Stamens inserted singly or in groups before each petal; filaments free; anthers subglobose. Capsule obconic, small, fruit a capsule. Seeds 1 to few. *Homalium* is globally distributed.

14. *Homalium napaulense* (DC.) Benth.—TYPE: NEPAL. 1821 (Fig. 4B), *Wallich* (K000591527!, K000591528!).

Trees 3–15 m tall. Bark brownish, young branches grayish. Branchlets puberulous. Leaves simple, alternate, elliptic-lanceolate, 5–11 × 2.5–5.5 cm, acuminate, base cuneate, margins crenate-serrate, petioles tomentose, 6–8 mm long. Lateral veins end in gland tipped teeth of the leaf margin. Inflorescences in dense axillary or terminal panicles, many flowered. Flowers yellowish white turning brown when old. Petals oblanceolate, ciliate. Calyx lobes oblanceolate, ciliate, tube funnel shaped. Fruits not seen.

Specimen examined: BHUTAN. Wangdue Phodrang, Samthang, Athang, elev. 708 m, 27.20108347N, 90.10890877E, 4 Dec 2021, *Phuentsho et al.* *BTN598, 18597, 18596, 18595* (THIM).

Sapindaceae

Eurycorymbus Hand.-Mazz., Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz. 59: 104, 1922.

Trees, dioecious. Leaves paripinnate, alternate, estipulate; leaflets serrate. Flowers unisexual, actinomorphic. Sepals 5, thinly membranous, imbricate. Petals 5, spoon-shaped, shortly clawed, scale absent. Disk annular, margin crenately lobed. Stamens (male flowers) 8, sometimes 7, exserted; filaments slender, conduplicate in buds; anthers ovoid, small. Ovary (female flowers) obcordiform, 3(or 4)-lobed and 3(or 4)-loculed; ovules 2 per locule, in pairs; style inserted between ovary lobes, erect, filiform. Capsules deeply lobed into 3 schizocarps, usually only 1 or sometimes 2 developed, broadly ovoid or broadly ellipsoid, loculicidal when mature; pericarp

leathery. Seeds only 1 per fertile schizocarp, subglobose; testa rigid, arillode absent; hilum small; embryo convolute. Distributed in southeast Asian countries.

15. *Eurycorymbus cavaleriei* (H. Lev.) Rehder & Hand.-Mazz., J. Arnold Arbor. 15: 8, 1934 Fig. 4C).—TYPE: CHINA. Guizhou: Pin-Fa, 23 Jun 1903, *Cavalerie* 1094

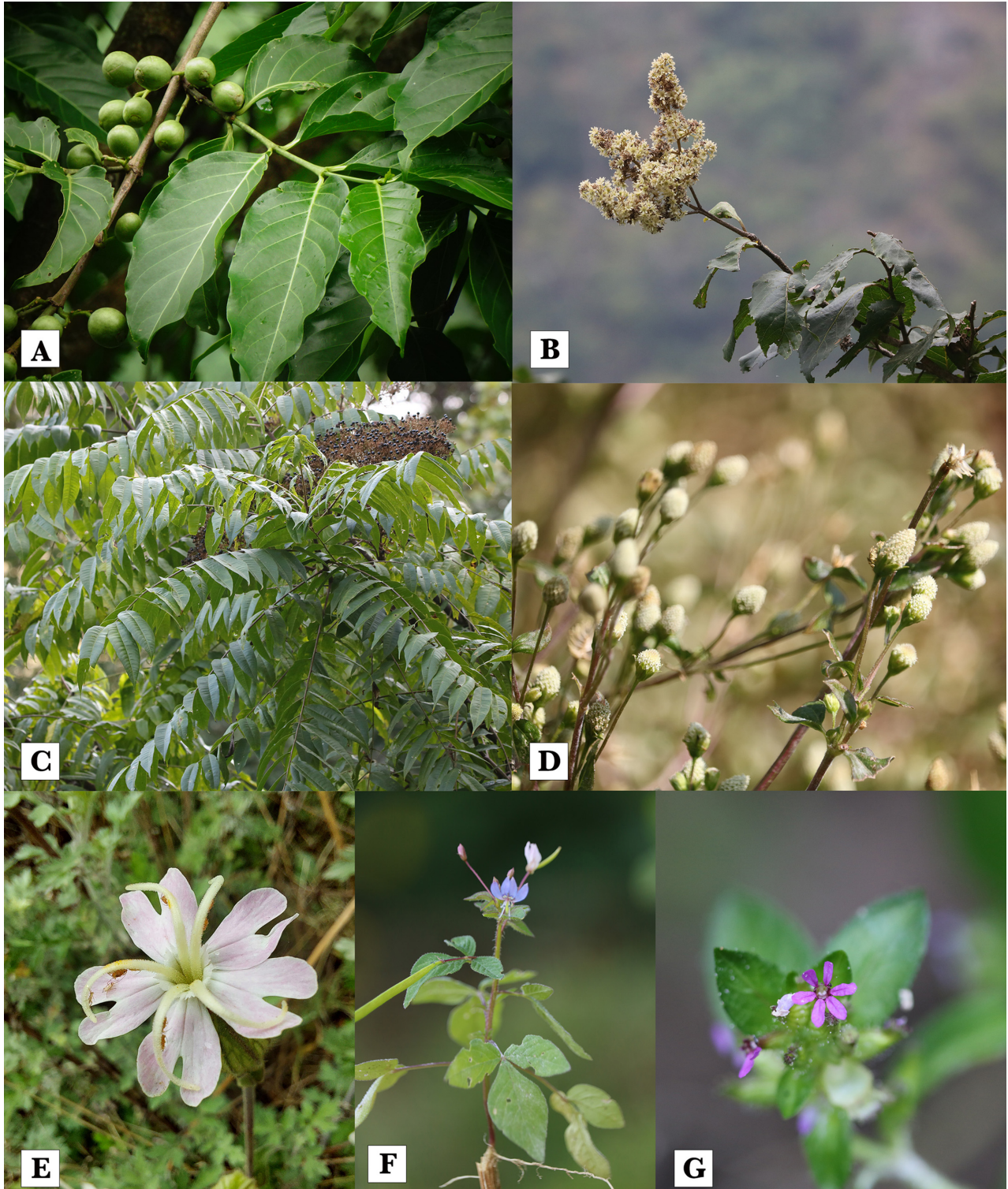


Fig. 4. Newly recorded plant species. **A.** *Canthiumera glabra* from Drujaygang, Dagana. **B)** *Homalium napaulense* from Wangduephodrang. **C.** *Eurycorymbus cavaleriei* from Mongar. **D.** *Acmella radicans* from Dagana. **E.** *Silene latifolia* from Serbithang, Thimphu. **F.** *Cleome rutidosperma* from Phuntsholing. **G.** *Cuphea carthagenensis* Gongdu, Mongar.

(holotype: E00279822!).

Trees, up to 25 m tall, dark gray, branches terete. Petiole 11–31 cm long, axis pilose, blades oblong-lanceolate or oblong-ovate, 6–10 × 1.5–4 cm, abaxially subglabrous, lateral veins dense, slender, base cuneate, apex acuminate. Flowers fragrant. Pedicels 1–4 mm long. Sepals ovate, 0.5–2 mm, abaxially tomentose. Petals ca. 2 mm, abaxially villous. Filaments ca. 4 mm, glabrous. Ovary tomentose. Fertile schizocarps ca. 8 × 7 mm, tomentose. Seeds black; hilum cinnabar.

Flowering and fruiting: May to October.

Specimens examined: BHUTAN. Mongar, above Zimgaon, Shongar Chu, West of Mongar, elev. c 1,500 m, 27°17', 91°04', 4 Jul 1979, *A.J.C. Grierson & D.G. Long 2470*, THIM04245; Mongar, Shermuhung, Serzhong, elev. 1,359 m, 27.37350365N, 91.33714123E, 13 Oct 2021, *Phuentsho et al. BTN577, 18580, 18581, 18583, 18584* (THIM); Mongar, Tredangbe, elev. 680 m, 27.28700N, 91.15029E, *Kezang Tobgay k.ty-525*; Mongar, Gangola, elev. 880 m, 27.27259N, 91.19994E, 23 Jun 2018, *Kezang Tobgay k.ty-522*.

TAIWAN. Taimali Hsiang, Chihpen to Taimali, elev. ca. 200 m, 30 Oct 1993, *Jenn-Che Wang et al. 8971*, det. J. C. Wang.

Asteraceae

16. *Acmella radicans* (Jacq.) R. K. Jansen, Syst. Bot. Monogr. 8: 69, 1985 (Fig. 4D).—TYPE: BOLIVIA. Larecacha, Vacinity of Sorata near Espanda, elev. 2,600 m, 1 Apr 1860, *G. Mandon 63* (holotype: 1898547!).

Herbs, erect, up to 60 cm tall. Stems terete, minutely pubescent, with few ascending branches. Leaves simple, opposite; petioles 1–1.2 cm long, sparsely pubescent; leaf blades 0.4–1.5 × 3–5 cm, 3-nerved, ovate to widely oblong, abaxially and adaxially isolatedly puberulous to pubescent, apically acute, basally obtuse, marginally dentate or serrate and minutely ciliate. Heads few to many, axillary or terminal, 3–8 × 6–8 mm, white, discoid, cone-like, occasionally subglobose, peduncles 1–7 cm long, slightly ciliate at the apex. Flowers per head numerous, discoid, white to greenish white; papillose, base bulbous; ovate, spreading, glabrous, marginally entire, apically obtuse. Styles 1–1.5 mm long, arms short, truncate, densely papillose. Stamens 4, 1.5 mm long, syngenesious, anthers 0.5–0.6 mm long, brown-black, filaments 0.9–1 mm long. Fruit an achene, dimorphic, ellipsoid, obcordate, with corky and densely ciliate at margins, marginal ones trigonous, brownish-black, laterally compressed, 1.5–2.8 mm long (Jena et al., 2020).

Specimens examined: BHUTAN. Dagana, Karmaling, Dorji Phu, elev. 489 m, 26.754468N, 89.867141E, 15 Jan

2020, *Phuentsho et al. BTN145, 17567, 17568, 17569, 17570* (THIM).

Caryophyllaceae

17. *Silene latifolia* Poir., Voy. Barbarie 2: 165, 1789 (Fig. 4E).

Annual herbs, taproot woody. Stems erect, branched, to 70 cm, stem round internode 3–11 cm, leaves blade hirsute on both surface; petiolate, blade oblong-lanceolate to elliptic, apex acute. Flowers open dichasial cymes, bracteates; bracts much reduced, lanceolate, herbaceous. Pedicels 1–3 cm. flower unisexual, grow in cluster, tubular, becoming ovate in pistillate flowers, margin dentate, hirsute and shortly glandular-pubescent, lobes to 4 mm, broadly ovate with apex obtuse, to lanceolate with apex acuminate; petals white forming a corolla, petals 5 in flower, broadly obovate, stamens equaling to slightly longer than calyx. Capsules ovate.

Specimens examined: BHUTAN. Thimphu, Chang, Serbithang near Tenzin Sports Complex, elev. 2,408 m, 27.41766616 N, 89.65310086E, 4 May 2021, *Phuentsho BTN456, 16039, 16040, 16041, 16042* (THIM).

NEW ZEALAND, South Island, Centerbury (EP), 55.03 Whitecliffs, Springfield, Pekoek Road, Bishops Gully Stream, elev. 394 m, 43°20.27'S, 171°55.28'E, 13 Feb 2011, *Sneddon, Barry 11/017, 52 (SP104632)*, det. Sneddon, Barry, 20 Apr 2016.

Cleomaceae

18. *Cleome rutidosperma* DC. Prodr. 1: 241, 1824 (Fig. 4F).—TYPE: Locality unknown, *G. Don 23* (BM000629009!).

Annual herbs, up to 1 m tall, stem erect. Roots fibrous. Alternate leaves 3 palmatisect, palmately tri-foliolate; rhomboid-elliptic to lanceolate leaflets about 8–14 × 2–15 mm, acute to acuminate apex, cuneate at the base, margins subentire, glabrous above and pubescent beneath on the veins, petiole slender up to 5 cm. Flowers in the axil of leaf, axillary and terminal, up to 15 cm long, pedicels in flower up to 2 cm, lanceolate sepals 4, petals 4, white, pink, lilac, violet or blue, oblanceolate to elliptic lamina, acute or obtuse at apex, apiculate. Fruits cylindrical, capsule 3–6 cm × 3–4 mm. Seeds globular-reniform, orange-brown-black (Ghosh et al., 2019). Seeds pod 0.5 to 5 cm long.

Specimens examined: BHUTAN. Chukha, Phuntsholing, PHPA I transit camp campus, elev. 211 m, 26°52'9.974"N, 89°22'52.964"E, 15 Nov 2019, *Phuentsho BTN076, 15374* (THIM).

SIERRA LEONE. *H. Smeathman* (100570818).

U.S.A. Florida, Environs of the Shrine Club on old Okeechobee Road, West Palm Beach, 4 Dec 1968, *Paul M. Cassen 458*, det. H. H. Iltis, Jan 1969.

Lythraceae

19. *Cuphea carthagenensis* (Jacq.) J. F. Macbr, Publ. Field Mus. Nat. Hist., Bot. Ser. 8: 124, 1930 (Fig. 4G).

Perennial spreading herbs. Stem hairy. Leaves opposite, ovate-elliptic, acute, cuneate at base, $1-3.5 \times 0.5-2$ cm, both surfaces rough to touch, younger leaves nearly stalkless. Flowers small, cymose or solitary in the axil of the leaves. Petals 6, small, obovate, ca. 2×1 mm. Stamens 2–3 mm long, linear-elliptical, pale purple in color, longer than floral tube (Das et al., 2018). Capsules not seen.

Specimens examined: BHUTAN. Mongar, Gungdu, Daksa, elev. 1,320 m, 27.02325693N, 91.16993305E, 10 Oct 2021, *Phuentsho et al. BTN565, 18614* (THIM).

U.S.A. Georgia, Dooley, S of State Hwy.27 and E of Flint River (N of Lake Blackshear), 23 Jul 1987, *Robert A. Norris 5398, 00008267*; Florida, Hillsborough Co, N off Vernon Road (Lutz-Lake Fern Road), ca. 3 mi. W of junction with FL 597, R18E, Sec. 5, 28.1511, -82.4615, 10 Jun 1986, *Wunderlin et al 10203, 189581*.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

Literature Cited

- Das, A., S. K. Chaudhary, H. R. Bhat and A. Shakya. 2018. *Cuphea carthagenensis*: A review of its ethnobotany, pharmacology and phytochemistry. Bulletin of Arunachal Forest Research 33: 1–14.
- Chhetri, P. B. and K. Tenzin. 2012. State of Forest Genetic Resources of Bhutan – Country Report. Food and Agriculture Organization (FAO), Rome, 2 pp.
- Ghosh, P., S. Chatterjee, P. Das, A. Banerjee, S. Karmakar and S. Mahapatra. 2019. Natural habitat, phytochemistry and pharmacological properties of a medicinal weed- *Cleome rutidosperma* DC. (CLEOMACEAE): A comprehensive review. International Journal of Pharmaceutical Sciences and Research 10: 1605–1612.
- Grierson, A. J. C. and D. G. Long. 1983. Flora of Bhutan: Including a Record of Plants from Sikkim. Vol. 1, Part 1. Royal Botanic Garden, Edinburgh, 186 pp.
- Gyeltshen, C. and K. Prasad. 2022. Biodiversity checklists for Bhutan. Biodiversity Data Journal, 10: e83798.
- Jena, G. S. J., R. Mishra, S. Nayak and K. B. Satapathy. 2020. New records of occurrence of six flowering plant species from state of Odisha, India. International Journal of Biosciences 16: 156–166.
- Kumar, A., P.K. Singh, R. Parihar, V. Dwivedi, S.C. Lakhoia and S. Ganesh. 2014. Decreased O-Linked GlcNAcylation protects from cytotoxicity mediated by Huntingtin Exon1 Protein Fragment. Journal of Biological chemistry 289(19):13543–13553.
- Lowe, S., M. Browne, S. Boudjelas and M. De Poorter. 2000. 100 of the World's Worst Invasive Alien Species: A selection from the Global Invasive Species Database. Invasive Species Specialist Group (ISSG) of the Species Survival Commission (SSC) of the World Conservation Union (IUCN), Auckland, 12 pp.
- National Biodiversity Centre. 2019. Biodiversity Statistics of Bhutan 2017: A Preliminary Baseline. National Biodiversity Centre (NBC), Ministry of Agriculture and Forests, Thimphu, 66 pp.
- Purohit, P. 2019. A review of important medicinal plant *Hemidesmus indicus* L. R. Br. (Anantamool). World Journal of Pharmaceutical Research 8:476–492.
- Wu, Z. Y., P. H. Raven and D. Y. Hong, 1994–2014. Flora of China, Vols. 1–25. Science Press, Beijing and Missouri Botanical Garden Press, St. Louis, MO.
- Yangzom, R., K. Dorji, T. Dorji, R. Dorji, C. Wangmo and C. Gyeltshen. 2018. A Pictorial Guide to Major Invasive Plant Species of Bhutan. National Biodiversity Centre, Ministry of Agriculture and Forests, Thimphu, 87 pp.