

The genus *Osbeckia* (Melastomataceae) in India

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Abstract: The genus *Osbeckia* L. comprises about 50 species worldwide, is principally Asiatic in distribution. The genus is represented by 23 species and 4 varieties under four sections in India. The main centers of endemism are in Eastern Himalayas and the Western Ghats. A taxonomic treatment of *Osbeckia* in India is presented here with morphological descriptions, geographic distribution, notes, photo plates and identification key for sections, species and infra-specific taxa. Seven names are lectotypified and eight names are synonymised.

Keywords: Endemism, India, Lectotypification, *Osbeckia*, Taxonomy.

Introduction

The genus *Osbeckia* was established by Linnaeus (1753) in honour of Pehr Osbeck (1723–1805) who brought specimens of this plant to Sweden from China. Linnaeus named it *Osbeckia chinensis* L., the only species of this genus included in his *Species Plantarum*. Subsequently one more species, *O. zeylanica* L.f. was added to this genus from Sri Lanka by Carl Linné in *Supplementum Plantarum* (1781). Since then, a number of species were added to this genus from different parts of the world, mostly from Asia. *Osbeckia* is easily distinguished by its hypanthium covered with different types of hairs, bristles and emergences, isomorphic stamens, and ribbed capsules dehiscing apically by 4 or 5 pores. Naudin (1850) recognized five groups, viz. *Macrodsmiae*, *Antierotoma*, *Arrhinae*, *Oxyrhinae* and *Amphibolium*. However, he did not indicate the

rank of these infrageneric groups. Triana (1871) in his treatment of *Osbeckia* included 32 species under 4 sections viz. *Amblyanthera*, *Genuinae*, *Ceramicalyx* and *Asterostoma*. Subsequently, Cogniaux (1891) in his monograph of Melastomataceae treated 51 species in six sections, viz. *Asterostoma*, *Arrhinae*, *Genuinae*, *Ceramicalyx*, *Antherotoma* and *Pseudodissotis*. C.B. Clarke (1879) in *Flora of British India* followed Triana (*l.c.*) and placed 26 species under 4 sections. However, Hansen (1977) did not follow any of these classifications in his revision of Asian *Osbeckia* and has opined that there is no necessity to define any subdivisions under this genus. The genus is currently placed under the tribe Melastomateae by Veranso-Libalah *et al.* (2017) based on phylogenetic data.

Hansen (1977) reported 17 species and 7 varieties from India. Since then, several taxa were described by various authors (Giri, 1983; Giri & Nayar, 1983; Giri & Nayar, 1984; Nayar & Giri, 1984; Giri & Nayar, 1986; Manickam & Murugan, 2002; Kottaimuthu & Gnanasekaran, 2015; Prashob *et al.*, 2018) bringing the total number into 27 taxa. The present work is a comprehensive taxonomic treatment of the genus in India based on extensive field explorations and studying live and herbarium specimens in consultation with relevant types and protologue. The sectional classification of Triana (1871) is adopted with some modifications in this treatment. Twenty three species and four varieties under 4 sections are reported from India.

Materials and Methods

The study area comprises the entire political boundary of India which lies between 8°4' and 37°6'

North latitudes and between 68°07' and 97°25' East longitudes. It comprises 28 states and 9 union territories. Specimens collected were processed for herbarium following Vogel (1987) and Bridson and Forman (1992). Plants were photographed with a Nikon D90 DSLR camera and photomicrographs using Leica Z4HD Stereo microscope attached with a Leica HD camera. The specimens were deposited at CALI, DEV and MH. The specimens from BLAT, BSI, CAL, CALI, DEV, FRLH, JCB, MGM, MH, SPU and SUK (acronyms as per Thiers, 2018) were studied. Photographs of herbarium sheets (types and authentic specimens) were obtained (or downloaded) from E, G, K, LINN, NY and W. The nomenclature was updated following Turland *et al.* (2018). All the species have been evaluated for their threat status using IUCN criteria (2001, 2019).

Taxonomic treatment

Osbeckia L., Sp. Pl. 345. 1753; L.f., Suppl. Pl. 215. 1782; D.Don, Prodr. Fl. Nepal. 221. 1825; A.DC., Prodr. 3: 142. 1828, Blume, Flora 14: 474. 1831; Naudin, Ann. Sci. Nat., Bot. ser. 3, 14: 56. 1850; Triana, Trans. Linn. Soc, London 28: 53. 1871; C.B.Clarke in Hook.f., Fl. Brit. India 2(6): 513. 1879; Cogn. in A.DC. & C.DC., Monogr. Phan. 7: 311. 1891; C.Hansen, Ginkgoana 4: 84. 1977; Jie & S.Renner., Fl. China 13: 361. 2007. *Type: Osbeckia chinensis* L.

Asterostoma Blume, Mus. Bot. 1(4): 50. 1849.

Ceramicalyx Blume, Mus. Bot. 1(4): 50. 1849.

Annual or perennial herbs or shrubs, erect, procumbent, much branched, rarely unbranched, 0.3–7.5 m tall. Young stems sub-quadrangular to quadrangular, very rarely winged at angles, covered with thin to dense hairs or bristles, hairs brown or purple, short to long, appressed to patent, straight or curved, rarely bulbous, sometimes shaggy, very rarely glabrous or hairy at nodes only. Leaves simple, opposite, petiolate, rarely sessile; petioles 1–15 mm long; lamina ovate to elliptic, or narrowly ovate to lanceolate, 1–15 × 0.5–9 cm; 3–5 or 5–7-nerved, venation acrodromous, very rarely non

acrodromous; apex acute, attenuate or very rarely acuminate; base obtuse to attenuate, subcordate, or sometimes cordate; margins entire, ciliate, glabrous on both surfaces or only above, or much more often with a thin or rarely dense indumentum of hairs, ascending or appressed or patent. Inflorescence terminal, consisting of few to many flowers, arranged in dense clusters in cymes or cymose, panicles, subtended by 1 or 2 pairs of leaves, occasionally solitary in upper leaf axils. Flowers actinomorphic, 4 or 5-merous; bracts ovate, triangular or orbicular, 1–17 mm long, margins ciliate, glabrous or with few to many appressed hairs; pedicels 0.5–5 mm long. Hypanthium urceolate, campanulate, obconic or globose, 2–14 × 1–7 mm, thinly to densely clothed with appressed to patent emergences or hairs or both. Intersepal emergences 0.5–7 mm long, terete, glabrous or with few to many patent hairs, rarely appressed hairy, head stellate or with few hairs; other emergences similar, but smaller, size decreases towards base, restricted to the upper or lower part of the hypanthium; hairs patent, rarely reflexed, ascending or appressed, short to long, sometimes bristly, often curved, rarely bulbous. Sepals triangular, ovate, oblong or subulate, 1–14 × 1–7 mm, apex obtuse, acute, rarely asymmetrical, often resembling the head of the stellate emergences, with few indistinct nerves, or with a single distinct, prominent nerve, glabrous dorsally, or with few to many, patent hairs mostly confined to nerve, caducous or persistent. Petals obovate, elliptic or orbicular, 5–29 × 2–18 mm, with various shades of purple, white, white tinged with pink, ciliate at least on apical part of margin, caducous. Stamens 8 or 10, equal; filaments 2.5–15 mm long; anthers narrowly ovate, 4–17 mm long including 2–7 mm long beak, yellow, twisted or not, pore 1 or 2, on ventral side at the apex; connective widened into a variously shaped collar-like body surrounding the insertion of the filament immediately below the anther sacs. Ovary 4 or 5-celled, adnate to hypanthium for about half the length, deep anther pockets present or absent, crown present or absent; style 2–25 mm long, glabrous, stigma capitate.

Capsules urceolate, campanulate, obconic or globose, 3–19 × 2–10 mm. Seeds minute, numerous, curved, 0.1–0.5 mm long.

Flowering & fruiting: July–March.

Habitat: Occur in a wide variety of habitats such as evergreen forests, sholas, forest margins, mountains, grasslands as well as rock crevices and marshy swamps in higher elevations (c. 1000 m).

Distribution: About 50 species (Mabberley, 2017), distributed in Africa, Australia, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Sri Lanka and Thailand; 23 species and 4 varieties in India.

Key to the sections of *Osbeckia* in India

- 1a. Flowers tetramerous 2
- 1b. Flowers pentamerous sect. *Asterostoma*

- 2a. Anthers not beaked sect. *Amblyanthera*
- 2b. Anthers beaked 3
- 3a. Herbs; hypanthium campanulate, neck absent sect. *Osbeckia*
- 3b. Shrubs; hypanthium urceolate, neck present sect. *Ceramicalyx*

Osbeckia* sect. *Amblyanthera

The section *Amblyanthera* was originally established by Triana (1871) to include three species viz., *O. truncata*, *O. brachystemon* and *O. parvifolia*. The section is characterized by tetramerous flowers, anthers without a beak and campanulate or obconic hypanthium with emergences and hairs. Clarke (1879) included four species namely, *O. truncata*, *O. cupularis*, *O. parvifolia* and *O. rheedii*, of which, the

Table 1. Sectional placement of *Osbeckia* in India

Section	Name of taxa
<i>Amblyanthera</i>	<i>Osbeckia brachystemon</i> Naudin
	<i>Osbeckia muralis</i> Naudin
	<i>Osbeckia saddlepeakensis</i> Prashob, Manudev, Sibichen & Nampy
	<i>Osbeckia parvifolia</i> Arn.
<i>Asterostoma</i>	<i>Osbeckia abrahamii</i> G.S.Giri & M.P.Nayar
	<i>Osbeckia aspera</i> (L.)Blume
	<i>Osbeckia gracilis</i> Bedd.
	<i>Osbeckia leschenaultiana</i> DC.
	<i>Osbeckia mehrana</i> G.S.Giri & M.P.Nayar
	<i>Osbeckia nepalensis</i> Hook.
	<i>Osbeckia nepalensis</i> Hook. var. <i>albiflora</i> Lindl.
	<i>Osbeckia nutans</i> Wall. ex C.B.Clarke
	<i>Osbeckia reticulata</i> Bedd.
	<i>Osbeckia tirunelvelica</i> Murugan & Manickam ex Kottaim. & Gnanasek.
	<i>Osbeckia travancorica</i> Bedd. ex Gamble
	<i>Osbeckia virgata</i> D.Don ex Wight & Arn.
	<i>Osbeckia wightiana</i> (Benth.) Wight & Arn.
	<i>Osbeckia wynaadensis</i> C.B.Clarke
<i>Ceramicalyx</i>	<i>Osbeckia nayarii</i> G.S.Giri
	<i>Osbeckia rostrata</i> D.Don
	<i>Osbeckia stellata</i> Buch.-Ham. ex D.Don
	<i>Osbeckia stellata</i> Buch.-Ham. ex D.Don var. <i>hispidissima</i> (Wight) C.Hansen
	<i>Osbeckia stellata</i> Buch.-Ham. ex D.Don var. <i>crinita</i> (Benth. ex Naudin) C.Hansen
<i>Osbeckia</i>	<i>Osbeckia capitata</i> Benth.
	<i>Osbeckia chinensis</i> L.
	<i>Osbeckia chinensis</i> L. var. <i>pusilla</i> (Zoll.) Triana
	<i>Osbeckia zeylanica</i> L.f.

latter is a native of Sri Lanka. In India, this section consists of four species including the new taxa described recently (Prashob *et al.*, 2018).

Osbeckia sect. Amblyanthera Triana, Trans. Linn. Soc., London 28: 53. 1871; C.B. Clarke in Hook.f., Fl. Brit. India 2(6): 514. 1879. *Type: Osbeckia truncata* D. Don (= *O. muralis* Naudin)

Arrhinae Naudin, Ann. Sci. Nat. Bot. ser. 3. 14: 56. 1850; Cogn. in A.D.C. & C.D.C., Monogr. Phan. 7: 313. 1891.

Annual herbs; flowers tetramerous; anthers non-beaked; hypanthium campanulate or obconic with emergences and hairs.

Distribution: Along wet tropical and subtropical Asia including India and Sri Lanka.

Key to the species of sect. *Amblyanthera*

- 1a. Anthers truncate at apex 2
- 1b. Anthers acute or obtuse at apex 3
- 2a. Petals purple; bracts ciliate *O. muralis*
- 2b. Petals white tinged with pink; bracts densely hairy *O. brachystemon*
- 3a. Hypanthium obconic with emergences only on the lower half; sepals elliptic
..... *O. saddlepeakensis*
- 3b. Hypanthium globose with emergences throughout; sepals triangular *O. parvifolia*

Osbeckia brachystemon Naudin, Ann. Sci. Nat. Bot. ser. 3, 14: 57. 1850; C. Hansen, Ginkgoana 4: 100. 1977; Manilal, Fl. Silent Valley 111. 1988; Subram., Fl. Thenmala Div. 141. 1995; Sasidh., Fl. Shenduruny W.L.S. 130. 1997; Sasidh., Fl. Periyar 144. 1998; Mohanan & Sivad., Fl. Agasthyamala 278. 2002. *Type:* INDIA, **Tamil Nadu**, Nilgiris (as Nellighery), 1840, *M. Perrottet* 189 (holo P02441103 digital image!).

O. cupularis D. Don ex Wight & Arn., Prodr. 323. 1834; C.B. Clarke in Hook.f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 1: 494. 1919, *pp.*
Fig. 1

Annual, erect, branched herbs, 10–65 cm tall, generally with profuse short branches at the base.

Stems covered with appressed, long, thin hairs. Petioles 1–4 mm long; lamina ovate, 2.2–4.5 × 1.5–2.5 cm, apex acute to broadly acute or acuminate, base obtuse, margins ciliate, 3–5-nerved, both surfaces with patent, thin, long hairs. Inflorescence a terminal condensed panicle of 5–9 flowers, subtended by 1 or 2 pairs of leaves. Flowers tetramerous; bracts green, narrowly ovate, 1–2.5 × 0.5–1.5 mm long, densely hairy; pedicels 1–1.5 mm long. Hypanthium campanulate, 3–7 × 2–5 mm, thinly clothed with hairs and stellate emergences; intersepal emergences stalked, 0.5–2 mm long, stalk with patent short hairs, head stellate with long bristles; other emergences a few, occurring only on the uppermost part of the hypanthium, hairs patent, light brown, long and thin. Sepals 4, persistent in fruit, triangular to attenuate, 1.2–3 mm long, 1-nerved, margins ciliate, tip stellate with long hairs, hairy on nerves. Petals 4, obovate, 4–8 mm long, white tinged with pink, ciliate at apex. Stamens 8; filaments 2–3 mm long, white, glabrous; anthers oblong, 1–1.5 mm long, yellow, not twisted, not beaked, pores one or two, oblique on dorsal side; connective prolonged into a small collar. Ovary united with hypanthium for about half of its length; anther pockets absent; crown absent, clothed with bristles around base of style; style 3.5–5 mm long, glabrous. Capsules campanulate, slightly ribbed, 4–4.5 × 3–4 mm; seeds minute, 0.1–0.2 mm long, curved, muricate.

Flowering & fruiting: August–November.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Seen mostly on borders of evergreen forests and grasslands at an elevation above 500 m. This species occur as large clusters, usually in association with *O. virgata* and *O. parvifolia*.

Distribution: Endemic to South India.

Specimens examined: INDIA, **Kerala**, Idukki district, Anamudi Shola N.P., 08.11.14, Prashob & Sibichen 5552 (DEV); Devikulam, 12.1910, A. Meebold 171757 (CAL); on the way to Edamalakudi, 23.08.2014, Prashob & Sibichen 5530

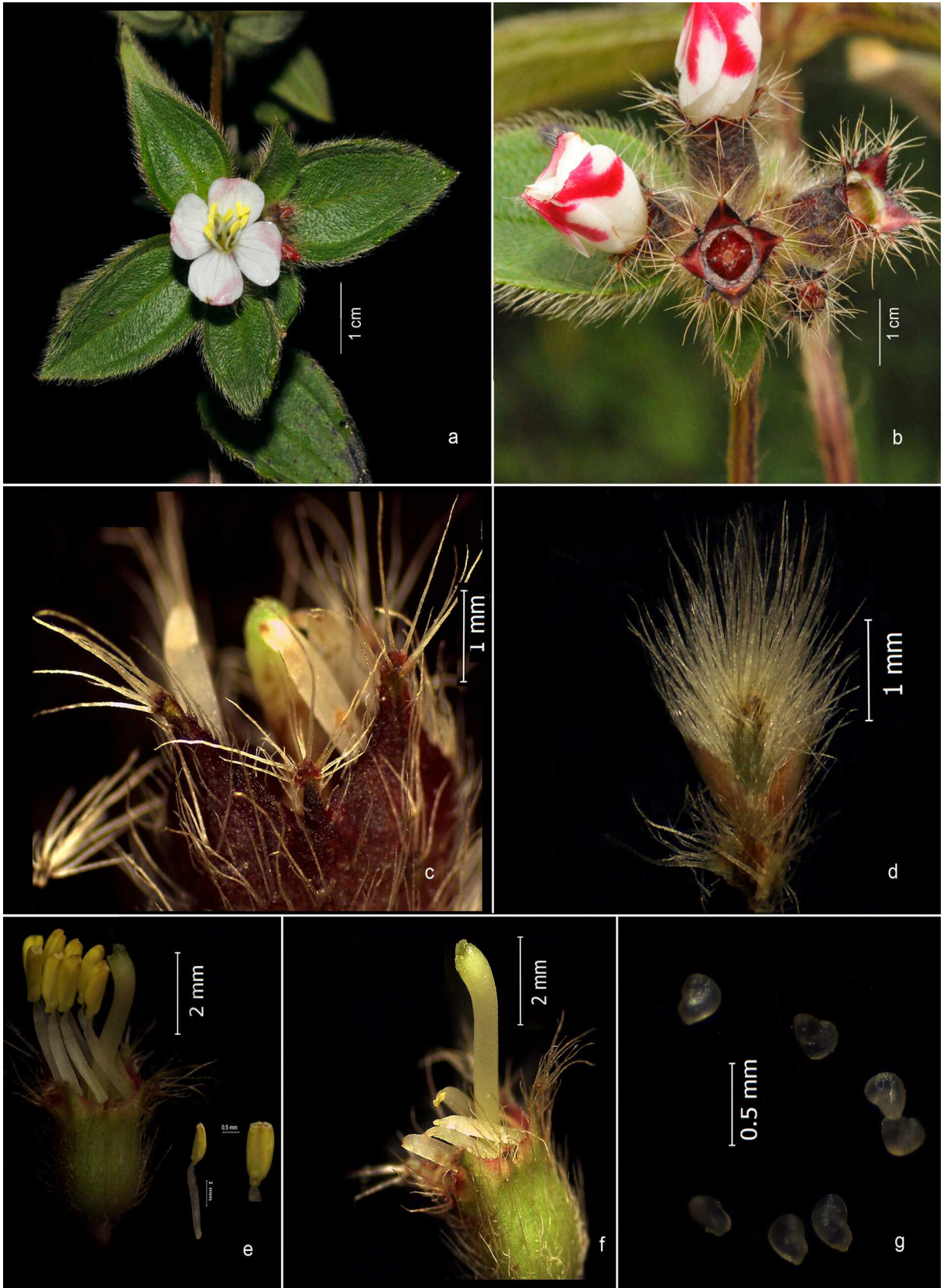


Fig. 1. *Osbeckia brachystemon* Naudin: a. Habit; b. Inflorescence; c. Calyx lobes with intersepal emergences; d. Bract; e. Stamens and hypanthium; f. Gynoecium; g. Seeds.

(DEV); Eravikulam N.P., Petimudi, 23.08.14, Prashob & Sibichen 5528 (DEV); Methap, 08.11.14, Prashob & Sibichen 5555 (DEV); Munnar, Lockhurt gap, 10.10.1963, K.M. Sebastine 17507 (CAL); Palakkad district, Silent Valley, Anginda, 12.10.14, Prashob & Sibichen 5539 (DEV); Sispara, 12.10.14, Prashob & Sibichen 5537 (DEV); Vengitapal, 12.10.14, Prashob & Sibichen 5540 (DEV). **Tamil Nadu**, Coimbatore district, *s.loc., s.d., C.E.C. Fischer* 171760 (CAL); Valparai, Anaimalais, 02.10.1984, K.M. Matthew 18314 (RHT); Dindigul district, Berijam slope, Kodaikanal, 06.08.1984, K.M. Matthew 40604 (RHT); Berijam Lake, Mathikettan range, 06.10.1994, V.S. Ramachandran 10333 (FRLH); Kodaikanal, 15.09.1956, J. Pallithanam 2135 (RHT); Leving path, Kodaikanal, 09.1955, K.M. Matthew 240 (RHT); Pillar rocks, Kodaikanal, 13.08.1912, S.J. Manju 171749 (CAL); *Ibid.*, 27.07.1965, K.M. Matthew 24555 (RHT); Thoopithooki parai, 16.08.1987, K.M. Matthew 50254 (RHT); Upper Palani, 06.09.1911, C.E.C. Fischer 171756 (CAL); Vandaravu Marian shola, Kodaikanal, 29.08.1987, K.M. Matthew 50534 (RHT); Nilgiri district, Cinchona plantation, 24.02.19707, A.A. Ansari 1005 (CAL); Coonoor, 08.1883, J.S. Gamble 171743 (CAL); Kodanad, 10.11.1970, E. Vajravelu 3815 (MH); Kotagiri-Aravenu, 22.10.1956, K. Subramanyam 1063 (CAL); Kunnacombai road, 01.09.1957, K.M. Sebastine 4205 (CAL); Mettukal, 28.07.1990, V.B. Hosagondan 162905 (MH); Morley lake, 20.07.1948, V. Narayanaswami 2232 (CAL); Mukuruti N.P., 20.09.2006, K. Ravikumar, R. Murugan & Shyla 105175 (FRLH); Mullimund, 12.10.1972, K. Vivekananthan 42920 (MH); Naduvattam, 02.10.1956, N.P. Balakrishnan 141 (MH); Parsons valley, Ooty, 10.07.1970, J.E. Ellis 34607 (MH); way to Pykara, 12.09.1930, V. Narayanaswami 4216 (MH); Sholar, 26.08.1970, B.D. Sharma 35761 (MH); *s.loc.*, 10.1910, A. Meebold 171755 (CAL); *s.loc.*, 08.1887, G. King 171761 (CAL).

Notes: Osbeckia brachystemon is closely similar to *O. parvifolia*. They are usually found growing together at elevations above 500 m. However, *O. brachystemon* can be distinguished by its white

flowers with pink blotches and 2-pored short anthers as opposed to pink to purple flowers and single pored, long anthers in *O. parvifolia*.

Osbeckia muralis Naudin, Ann. Sci. Nat. Bot. ser. 3, 14: 56. 1850; C.Hansen, Ginkgoana 4: 41. 1977; C.J.Saldanha, Fl. Karnataka. 42. 1984; Mohanan, Fl. Quilon Dist., 187. 1984; J.L.Ellis, Fl. Nallamalais 187. 1987; Ramach. & V.J.Nair, Fl. Cannanore Dist. 187. 1988; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 18. 1996; Sasidh. & Sivaraj., Fl. Pl. Thrissur 190. 1996; Sivaraj. & Mathew, Fl. Nilambur 273. 1997; Pull. & Chennaiah, Fl. Andhra Pradesh 389. 1997; B.D.Sharma *et al.*, Fl. Maharashtra, Dicot. 28. 2000; S.R.Yadav & M.M.Sardesai, Fl. Kolhapur Dist., 196. 2002; Pull. *et al.*, Fl. Eastern Ghats 56. 2002. K.G.Bhat, Fl. Udupi 219. 2003; G.V.S.Rao & G.R.Kumari, Fl. Visakhapatnam Dist. Andhra Pradesh 339. 2003; Anil Kumar *et al.*, Fl. Pathanamthitta 223. 2005; Sunil & Sivad., Fl. Alappuzha Dist. 296. 2009. *Lectotype* (designated by Hansen, 1977): INDIA, **Karnataka**, Mangalore, R.F. Hohenacker 577 (P02441130 digital image!).

O. zeylanica Steud. ex Naudin., Ann. Sci. Nat. Bot. ser. 3, 14: 56. 1850.

O. truncata D.Don ex Wight & Arn., Prodr. 332. 1834. C.B.Clarke in Hook.f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 1: 494. 1919. *O. truncata* var. *kurzii* C.B.Clarke in Hook.f., Fl. Brit. India 2: 514. 1879. *Type*: INDIA, **Bihar**, Parasnath, *s.d.*, Kurz *s.n.* (holo K000890021 digital image!).

O. truncata Arn., Companion Bot. Mag. 2: 308. 1837, *nom. illeg.* Fig. 2

Annual, erect, branched, herbs, 5–55 cm tall. Stem quadrangular, sparsely covered with patent thin hairs, laxly villous. Petioles 2–9 mm long; lamina elliptic to ovate, 1–4.5 × 0.8–2 cm, apex acute, base obtuse, margins ciliate, both sides thinly clothed with ascending to thin patent hairs, 3-nerved. Inflorescence a terminal dense panicle of 6–15 flowers, subtended by 1 or 2 pairs of leaves, occasionally one or a few flowers arise from adjacent nodes. Flowers tetramerous; bracts

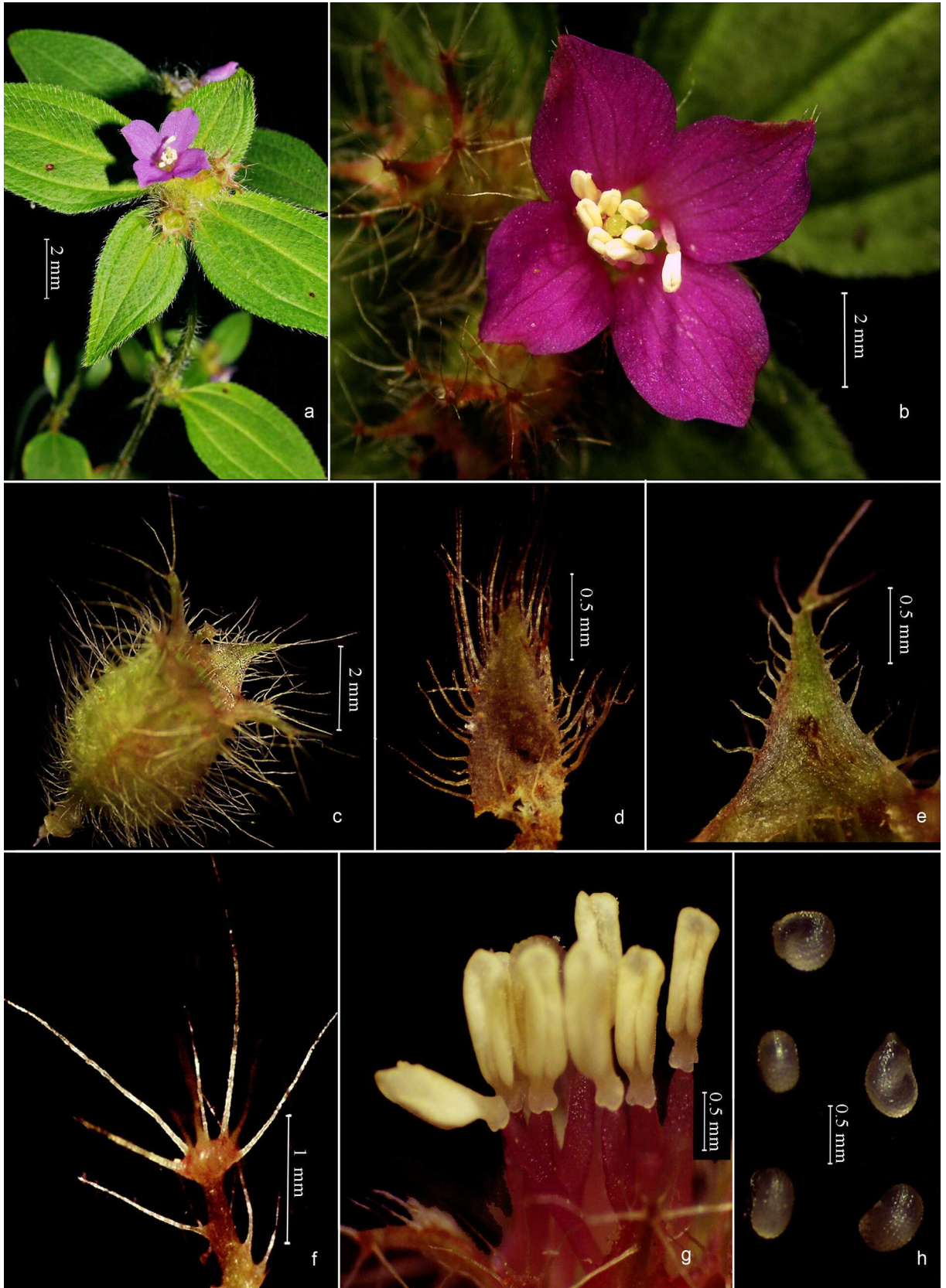


Fig. 2. *Osbeckia muralis* Naudin: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Stamens; **h.** Seeds.

triangular, 1.5–3 mm long, margins ciliate; pedicels 1–3 mm long, covered with patent thin hairs. Hypanthium campanulate, 3–4.5 × 2–3.5 mm, sparsely covered with patent emergences and long hairs. Intersepal emergence stalked, 0.5–1.5 mm long, stalk terete with patent hairs, head stellate with a few long persistent hairs. Other emergences similar, smaller in size towards base, or restricted to uppermost part of hypanthium. Sepals 4, broadly triangular, 0.5–2 mm long, 1-nerved, persistent in fruit, margins ciliate, apex with one to few patent hairs and sometimes emergences on nerves dorsally. Petals 4, broadly ovate, 4–6 × 3–4 mm, pink, with few hairs at apex. Stamens 8, isomorphic; filaments 1–2 mm long; anthers ovate-oblong, 2–4 mm long, yellow, glabrous, apex truncate not twisted, pore large, oblique on dorsal side, connective prolonged into a small, slightly widened collar. Ovary united with hypanthium for about half its length, 1.5–2.5 mm long, 4-locular, anther pockets absent; crown absent, apically with many erect bristles; style 2–4 mm long, glabrous; stigma slightly widened. Capsules campanulate, ribbed, 3–4.5 × 2–3.5 mm; seeds numerous, 0.1–0.2 mm long, minute, curved.

Flowering & fruiting: July–December.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Occurs as clumps in lateritic soil and in rock crevices, between 50–650 m elevation. It appears on earth cuttings immediately after the monsoon.

Distribution: Endemic to India.

Specimens examined: INDIA, **Karnataka**, Mysore district, Hosuru Agumbe, 05.10.1962, R.S. Raghavan 83008 (CAL); Shimoga district, *s.loc.*, 26.09.1978, K.P. Sreenath & K.R. Keshava Moorthy 2910 (CAL). **Kerala**, Ernakulam district, Tripunithura, 10.10.1975, K.N. Subramanyam 5366 (CAL); Idukki district, Kattappana, 08.11.1981, R. Ramanujan & C.N. Mohanan 72426 (CAL); Kozhikannam, 11.11.1975, K. Viveakanathan 46629 (CAL); Kannur district, Karimbam,

16.11.1977, *s.coll.* 52369 (CAL); Kollam district, Parackode, 11.08.1978, C.N. Mohanan 58464 (CAL); Kozhikode district, Medical College campus, 22.09.2014, Prashob & Sibichen 5946 (DEV); Thodayad, 21.09.2014, Sibichen & Prashob 5944 (DEV); Malappuram district, Calicut University campus, 17.07.1984, A. Babu 38296, (CAL); Palakkad district, Attapadi, South Malabar, 10.1910, C.E.C. Fischer 2305 (CAL); Kanjarampuzha, 26.10.1964, K.M. Sebastine 21074 (CAL); Pathanamthitta district, Punaloor, 24.08.1913, M. Ramaswami 1412 (CAL); Thrissur district, Chalakudi, 11.1910, A. Meebold 171884 (CAL); Edamadathara peak, 02.09.1913, C.C. Calder & S. Ramaswami 497 (CAL); Travancore, 09.1884, J.S. Gamble 14694 (CAL). **Maharashtra**, Pune district, Ambavne village, 29.12.1964, *s.coll.* 101092 (CAL); Dajipur, *s.d.*, Milind Sardesi *s.n.* (SUK); Dalkhand forest, 15.10.1967, K.V. Billore 111878 (CAL); Malani forest, 26.10.1967, K.V. Billore 113026 (CAL); Jamboti, *s.d.*, Nilesh V. Mulpure 2381 (SUK). **Uttarakhand**, Hindugragh, 11.1891, Prain 171724 (CAL); *s.loc.*, 12.1869, G. King 171717 (CAL). **West Bengal**, Jambalpur-Hatigirdha, 04.11.1986, S. Panda & A.P. Das 270 (CAL).

Notes: *Osbeckia muralis* is one of the smallest species of the genus. It is often confused with *O. chinensis* var. *pusilla*, but can be distinguished by its thin patent hairs on the stem and much smaller flowers (4–8 mm diam.).

Osbeckia parvifolia Arn., Companion Bot. Mag. 2: 308. 1837; C.B. Clarke in Hook.f., Fl. Brit. India 2: 515. 1879; C.Hansen, Ginkgoana 4: 104. 1977; Ramach. & V.J.Nair, Fl. Cannanore Dist. 188. 1988; B.D. Sharma *et al.*, Fl. Maharashtra, Dicot. 28. 2000; S.R.Yadav & M.M.Sardesai, Fl. Kolhapur Dist. 196. 2002. *Amblyanthera parvifolia* Blume, Mus. Bot. 1(4): 50. 1849. *O. cupularis* D.Don ex Wight & Arn. var. *parvifolia* (Arn.) Trim., J. Ceylon Branch Roy. Asiat. Soc. 9: 34. 1885. *Lectotype* (designated by Hansen, 1977): SRI LANKA, *s.d.*, Walker 332 (K000867959 digital image!).

O. cupularis D.Don ex Wight & Arn., Prodr. Fl. Indi. Orient. 1: 323. 1834, *p.p.*

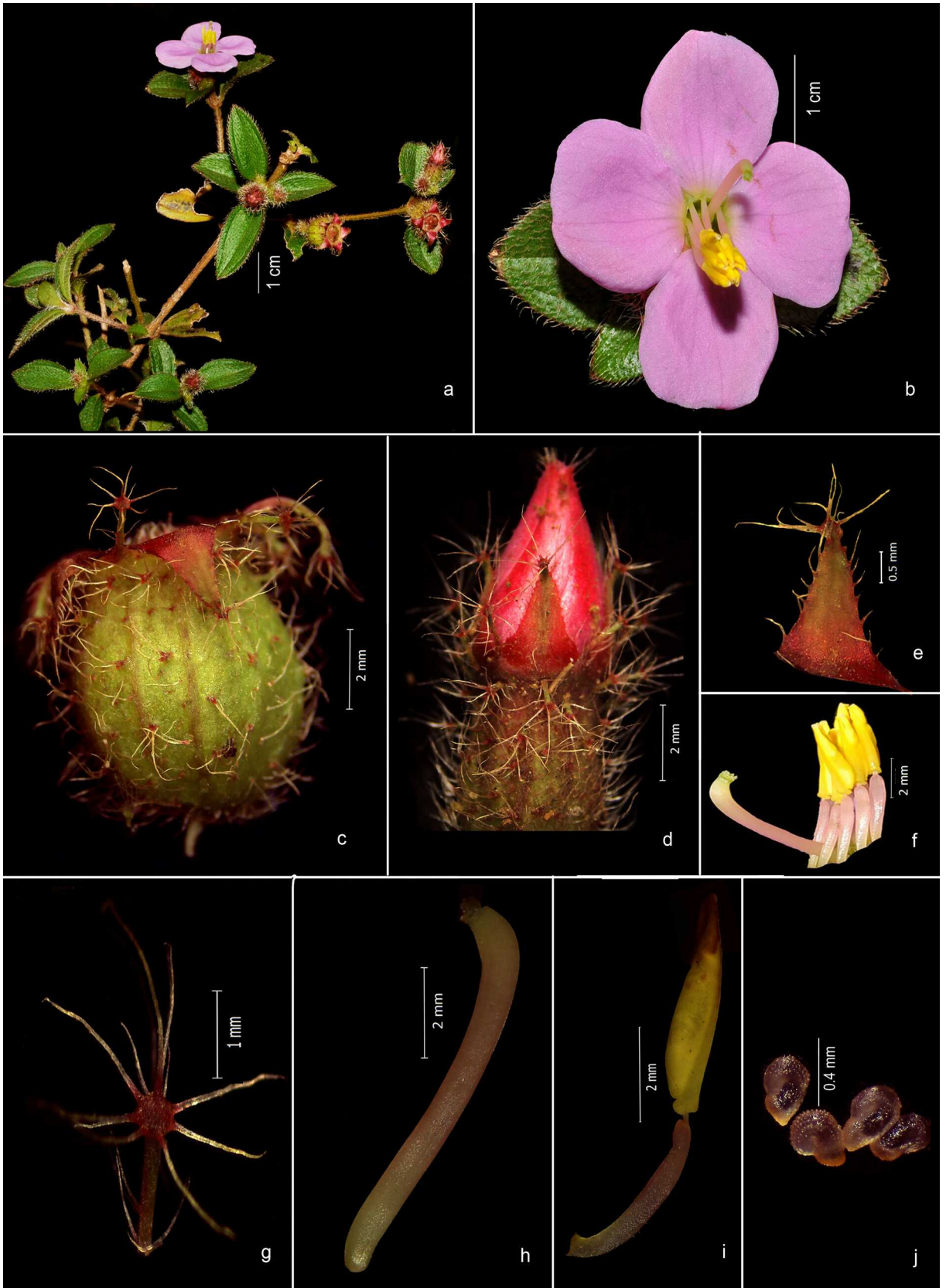


Fig. 3. *Osbeckia parvifolia* Arn.: **a.** Habit; **b.** Flower; **c & d.** Hypanthium; **e.** Calyx lobe; **f & i.** Stamens; **g.** Intersepal emergence; **h.** Style; **j.** Seeds.

O. confertiflora Naudin, Ann. Sci. Nat. Bot. ser. 3 14: 59. 1850. *Type*: INDIA, Tamil Nadu, Nellore, *s.d.*, Perrottet 235 (holo P02441140 digital image!).

O. erythrocephala Naudin, Ann. Sci. Nat. Bot. ser. 3, 14: 58. 1850. *Osbeckia cupularis* var. *erythrocephala* (Naudin) C.B. Clarke in Hook.f., Fl. Brit. India 2: 514. 1879. *Type*: SRI LANKA, 1838, Macrae *s.n.* (holo P02441138 digital image!).

O. cupularis var. *purpurascens* Wawra, Itin. Princ. S. Coburgi 1: 33. 1883. *Type*: SRI LANKA, Piselava, *s.d.*, H. Wawra 1163 (holo W0056490 digital image!).

O. rosea Fyson, J. Indian Bot. Soc. 11: 49. 1932. *Type*: INDIA, Tamil Nadu, Nilgiri, *s.d.*, Fyson 5731 (not traced). **Fig. 3**

Prostrate to erect, branched herbs, *c.* 30–90 cm tall. Stems quadrangular, brownish, with appressed or patent to slightly retrorse, long hairs. Petioles 3–6 mm long; lamina green, ovate, 1.5–6 × 0.8–3 cm, 3-nerved, apex acute to acuminate, base acute to broadly attenuate, both sides with ascending to patent, thin long hairs. Inflorescence a terminal loose cluster of 5–15 flowers, subtended by the upper 1 or 2 pairs of leaves; bracts ovate, 1.5–4 × 0.5–1.5 mm, green, ciliate. Flowers tetramerous or pentamerous; pedicels 1–5 mm long. Hypanthium globose, 2–5 × 1.4–4 mm, clothed with emergences and hairs; intersepal emergences 1–2 mm long, stalk slender, terete to slightly flattened, with a few patent hairs, head small, stellate with a few long purplish bristles, persistent; other emergences similar, patent, large on upper part and much reduced below; hairs patent, white to purplish. Sepals 4, triangular, 2–4 × 0.5–2 mm long, one nerved, margins ciliate with a few patent hairs on nerve, persistent. Petals 4, broadly obovate, 5–12 × 4–10 mm long, pink to purple, ciliate at apex. Stamens 8, filaments 2–5 mm long; anthers narrowly ovate, 2–3.5 mm long, subobtusate at apex, pore slightly oblique on dorsal or ventral side, connective prolonged into a collar with a small dorsal lobe and a larger ventral lobe. Ovary united with hypanthium for about half of its length; anther

pockets not extending to the base of ovary; crown ciliate; style 5–9 mm long. Capsules globose, 5–7 × 4.5–6.5 mm; seeds minute, 0.1–0.2 mm long, numerous, curved.

Flowering & fruiting: August–March.

Chromosome number: $n = 10$ (Subramanyam, 1946)

Habitat: In forest margins, open grasslands and tea plantations at elevations between 600–1700 m.

Distribution: India and Sri Lanka.

Specimens examined: INDIA, **Karnataka**, Chikmagalur district, Bababudangiri, 03.03.2016, Prashob & Sibichen 6023 (DEV); Kadur, 09.1893, W.A. Taecot 171759 (CAL); Kemmanaguddi, 05.09.1997, Ravikumar & Udayan 09643 (FRLHT); *Ibid.*, 29.09.1996, Devar 09463 (FRLHT); *Ibid.*, 03.03.2016, Prashob & Sibichen 6024 (DEV); Kutheramukha, 16.03.1997, Ramesh, Udayan & Subramani 10220 (FRLHT); Tithkole, 19.10.1965, R.K. Arora 5080 (CAL). **Kerala**, Idukki district, Kadar, Munnar, 09.1937, Barnes 119542 (DD); Marapalam, 20.01.1957 K.M. Sebastine 2109 (CAL); Rajamala, 02.02.1970, B.V. Shetty 31787 (CAL); Thiruvananthapuram district, Kallar, 09.1037, Barnes 119539 (DD); Wayanad district, Chembra, 08.12.2014, Prashob & Sibichen 5559 (DEV); Tirunelli, 16.11.1978, V.S. Ramachandran 17804 (CAL). **Tamil Nadu**, Coimbatore district, Sholayar submergible, 25.12.1963, K. Ramamurty 18097 (MH); Nilgiris district, Coonoor, 10.1910, Meebold 171754 (CAL); *Ibid.*, *s.d.*, J.S. Gamble 21380 (MH); *Ibid.*, 18.11.1940, Brown 85986 (MH); Gudalur, 09.1937, Barnes 119540 (DD); Gudalur light house, 10.1910, A. Meebold 172075 (CAL); Gudalur-Naduvattam Road, 17.11.1958, K.M. Sebastine 7313 (CAL, MH); Marapalam, Coonoor, 18.11.1940, Brown 85986 (MH); *Ibid.*, 20.01.1957, K.M. Sebastine 2109 (MH); *Ibid.*, Hulical Droog, 27.08.1957, K.M. Sebastine 4140 (CAL, MH); Kengarai, Kotagiri, 25.01.1972, E. Vajravelu 39636 (MH); Kotagiri Avenue, 22.10.1956, K. Subramanyam 1063 (MH); Naduvattam, 30.08.1970, B.D. Sharma 35929 (MH); Ooty, 09.1883, J.S. Gamble 12456 (DD); Nilgiri,

10.1884, *J.S. Gamble* 172072 (CAL); Sholurmattam, 23.07.1970, *E. Vajravelu* 35058 (MH).

Notes: *Osbeckia parvifolia* closely resembles and often confused with *O. brachystemon* but can easily be distinguished by its globose hypanthium.

Osbeckia saddlepeakensis Prashob, Manudev, Sibichen & Nampy, *Phytotaxa* 344 (2): 185–190.

Type: INDIA, **North Andaman Islands**, Saddle Peak, 690 m, 29.09.2010, *Santhosh Nampy & K.M. Manudev* 3526 (holo CAL; iso CALI, DEV, MH).
Fig. 4

Erect, branched, annual herbs, 1.5–8 cm tall. Stems quadrangular, sparsely covered with patent thin hairs, laxly villous. Petioles 1–3 mm long; lamina ovate, 0.5–1.5 × 0.3–1 cm, apex acute, base obtuse, margins ciliate, both sides sparsely clothed with ascending to patent thin hairs, 3-nerved. Inflorescence a terminal short panicle, 3–5-flowered, subtended by 1 or 2 pairs of leaves. Flowers tetramerous, 1–2 mm; pedicels 0.3–1.0 mm long, covered with thin hairs; bracts triangular, 0.3–0.8 mm long, ciliate. Hypanthium obconic, 1.8–2.5 × 1.5–2.3 mm, sparsely covered with emergences on lower portion, upper portion glabrous. Intersepal emergences 0.5–1.0 mm long; head stellate with a few long persistent hairs; stalk terete, 0.2–0.5 mm long, glabrous. Other emergences sessile, smaller in size, restricted to lowermost part of hypanthium. Sepals 4, lanceolate, 1.5–2.5 mm long, ciliate, caducous. Petals 4, obovate, 1.5–3.0 × 1–2 mm, with few hairs at apex, pink. Stamens 8; filaments 2–2.5 mm long, pink; anthers ovate, 1–2 mm long, glabrous, acute at apex, not twisted; pore single, oblique on dorsal side, connective with conspicuous collar having two small dorsal lobes or tubercles and two ventral lobes. Ovary 4-locular, 1.8–1.5 mm long, united with hypanthium for about half its length; anther pockets present; crown absent; style 2–4 mm long, glabrous; stigma capitate. Capsules obconic, 4-ribbed, 1.8–2.5 × 1.5–2.3 mm, many seeded; seeds 0.2–0.5 mm long, minute, curved.

Flowering & fruiting: August–November.

Habitat: Grows as a forest under growth at elevation between 650–700 m.

Distribution: Endemic to India.

Notes: The species is named after the type locality ‘Saddle Peak’, the highest peak in Andaman and Nicobar Islands. *Osbeckia saddlepeakensis* is similar to *O. muralis* and *O. brachystemon*, but differs by its small flowers (2–4.5 mm across), triangular bracts, obconic hypanthium with emergences on basal portion only, short stalked intersepal emergences, lanceolate and ciliate sepals and oblong to narrowly ovoid anthers with a single apical pore.

Osbeckia* sect. *Asterostoma

The section *Asterostoma* was established by Triana (1871) to include 19 species. The section is characterized by pentamerous flowers and campanulate hypanthium with emergences and hairs. Cogniaux (1891) followed the same sectional classification and accommodated 23 species. The members of this section are perennial shrubs except *O. reticulata* Bedd. which is a woody shrub. Clarke (1879) in Hooker’s *Flora of British India* placed 14 species in this section. In the present treatment 13 species and one variety are recognized.

Osbeckia* sect. *Asterostoma Triana, *Trans. Linn. Soc., London* 28: 54. 1871; C.B. Clarke in Hook.f., *Fl. Brit. India* 2(6): 518. 1879; Cogn. in A.DC. & C.DC., *Monogr. Phan.* 7: 313. 1891. *Type:* *Asterostoma aspera* Blume

Oxyrhinae Naudin, *Ann. Sci. Nat. Bot. ser.* 3, 14: 60. 1850.

Amphibolium Naudin, *Ann. Sci. Nat. Bot. ser.* 3, 14: 74. 1850.

Perennial, erect, shrubs. Flowers pentamerous; hypanthium campanulate, either simple hairy or with emergences and hairs; anthers attenuate, straight, not beaked.

Distribution: Along wet tropical and subtropical Asia, including Bhutan, China, India, Nepal, and Sri Lanka.

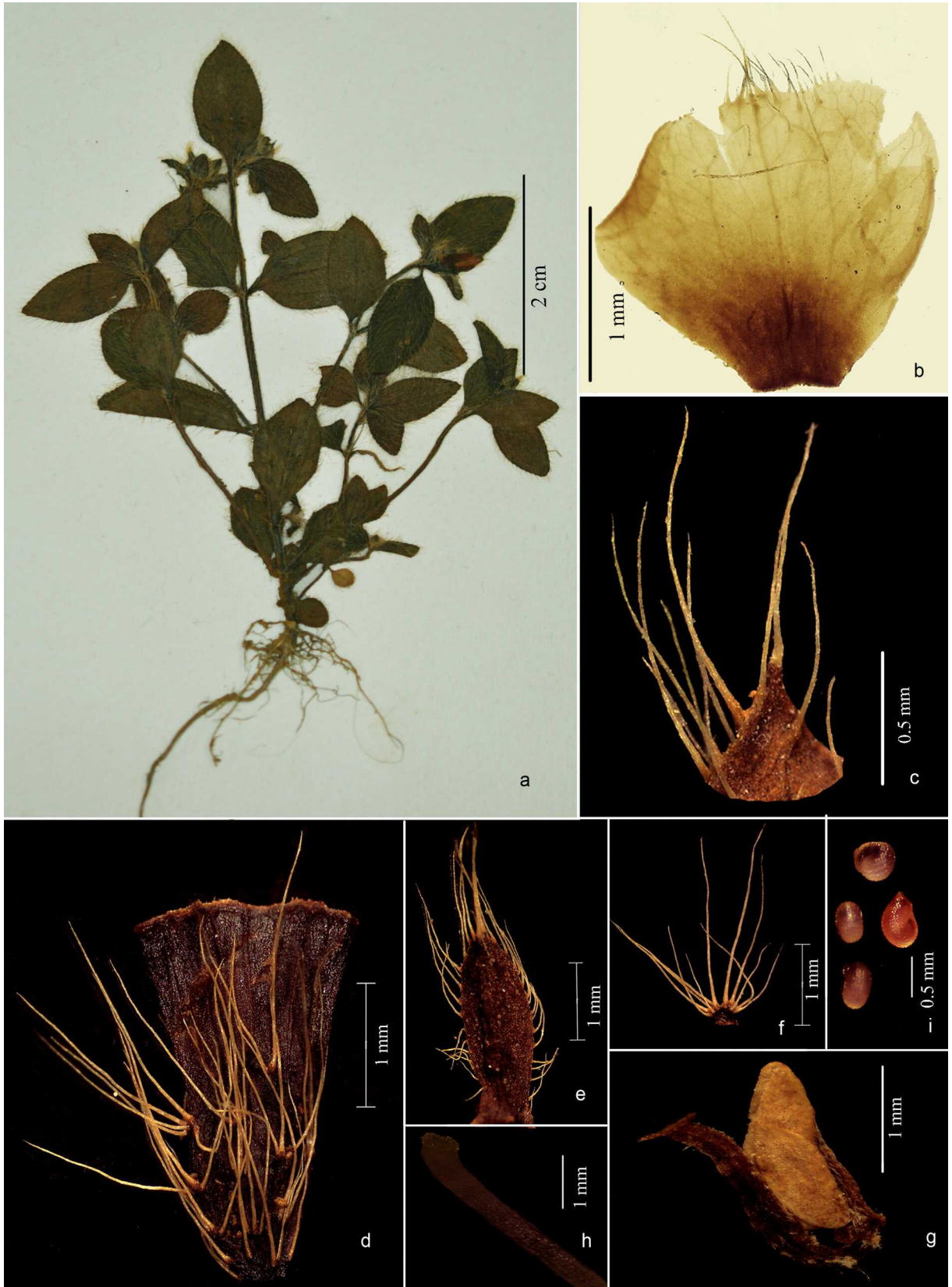


Fig. 4. *Osbeckia saddlepeakensis* Prashob, Manudev, Sibichen & Nampy: **a.** Habit; **b.** Petal; **c.** Bract; **d.** Hypanthium; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Stamen; **h.** Style; **i.** Seeds.

Key to the species of sect. *Asterostoma*

- 1a. Hypanthium with simple hairs only 2
- 1b. Hypanthium with simple hairs, emergences and bristles 4
- 2a. Hairs (on hypanthium) with a bullate base, lamina turning yellow when dry ... *O. gracilis*
- 2b. Hairs (on hypanthium) without a bullate base, lamina not turning yellow when dry 3
- 3a. Sepals subulate; intersepalal emergences stalked, with terminal and lateral hairs
..... *O. tirunelvelica*
- 3b. Sepals triangular; intersepalal emergences sessile, with hairs at apex only *O. aspera*
- 4a. Hypanthium clothed with large scale-like emergences only 5
- 4b. Hypanthium clothed with stellate headed emergences 7
- 5a. Leaves 4 × 1 cm; panicle 2–3-flowered; sepals exceeding hypanthium *O. nutans*
- 5b. Leaves 8 × 3 cm; panicle 8–12-flowered; sepals not exceeding hypanthium 6
- 6a. Lamina sessile, base truncate *O. nepalensis*
- 6b. Lamina petiolate (0.5–1.5 cm long), base obtuse *O. wynaadensis*
- 7a. Branchlets pilose; leaves sessile, ascending; bracts orbicular *O. leschenaultiana*
- 7b. Branchlets otherwise; leaves petiolate; bracts ovate to cordate 8
- 8a. Leaves 5–7-nerved 9
- 8b. Leaves 3–5-nerved 10
- 9a. Lamina bullate, densely hairy; base subcordate; venation acrodromous *O. reticulata*
- 9b. Lamina not bullate; sparsely hairy; base obtuse; venation non-acrodromous *O. wightiana*
- 10a. Inflorescence a terminal cluster of cymes; lamina lanceolate *O. virgata*

- 10b. Inflorescence a terminal panicle; lamina ovate to elliptic 11
- 11a. Bracts ovate, woolly dorsally; sepals triangular *O. mehrana*
- 11b. Bracts cordate, sparsely hairy; sepals subulate 12
- 12a. Calyx lobes symmetrical; branches sparsely hirsute *O. travancorica*
- 12b. Calyx lobes asymmetrical; branches densely strigose *O. abrahamii*

Osbeckia abrahamii G.S.Giri & M.P.Nayar, J. Bombay Nat. Hist. Soc. 81(2): 434. 1984. *Type*: INDIA, Kerala, Travancore, *s.d.*, Narayanaswami 1379 (holo CAL0000015606!). Fig. 5

Erect, perennial shrubs, 1–1.5 m tall. Stems quadrangular, branched, densely strigose. Petioles 5–15 mm long; lamina elliptic to lanceolate, green, 10–16 × 3–5 cm, 5-nerved, apex acute, base attenuate, both surfaces thinly clothed with short stiff sub-appressed to ascending hairs, hairs on the nerves longer. Inflorescence terminal or axillary lax panicles of 7–17 flowers. Flowers pentamerous; pedicels 1–3 mm long, covered with patent thin hairs; bracts ovate to cordate, 1.5–4 × 2–6 mm, green, broader than long, margins ciliate, appressed hairy above, glabrous beneath. Hypanthium campanulate, 4.5–7.5 × 3.5–6.5 mm, densely clothed with stellate or stalked emergences, intermixed with bristles and brown hairs; intersepalal emergences stalked, 1–3 mm long, stalk terete, with patent hairs, head stellate with tuft of hairs, caducous; other emergences smaller. Sepals 5, subulate, asymmetric, 1.5–3.5 × 2.5–4.5 mm, broader than longer, with a prominent midrib having patent hairs dorsally; margins ciliate; apex with stellate emergences, caducous. Petals 5, obovate, 15–20 × 11–14 mm, pink. Stamens 10; filaments 5–8 mm long, glabrous; anthers narrowly ovate to oblong, 5.5–7 mm long, yellow, twisted, glabrous, pore apical large, oblique on dorsal side; connective prolonged in to a small, indistinctly lobed collar. Ovary 4–7 mm long, united with

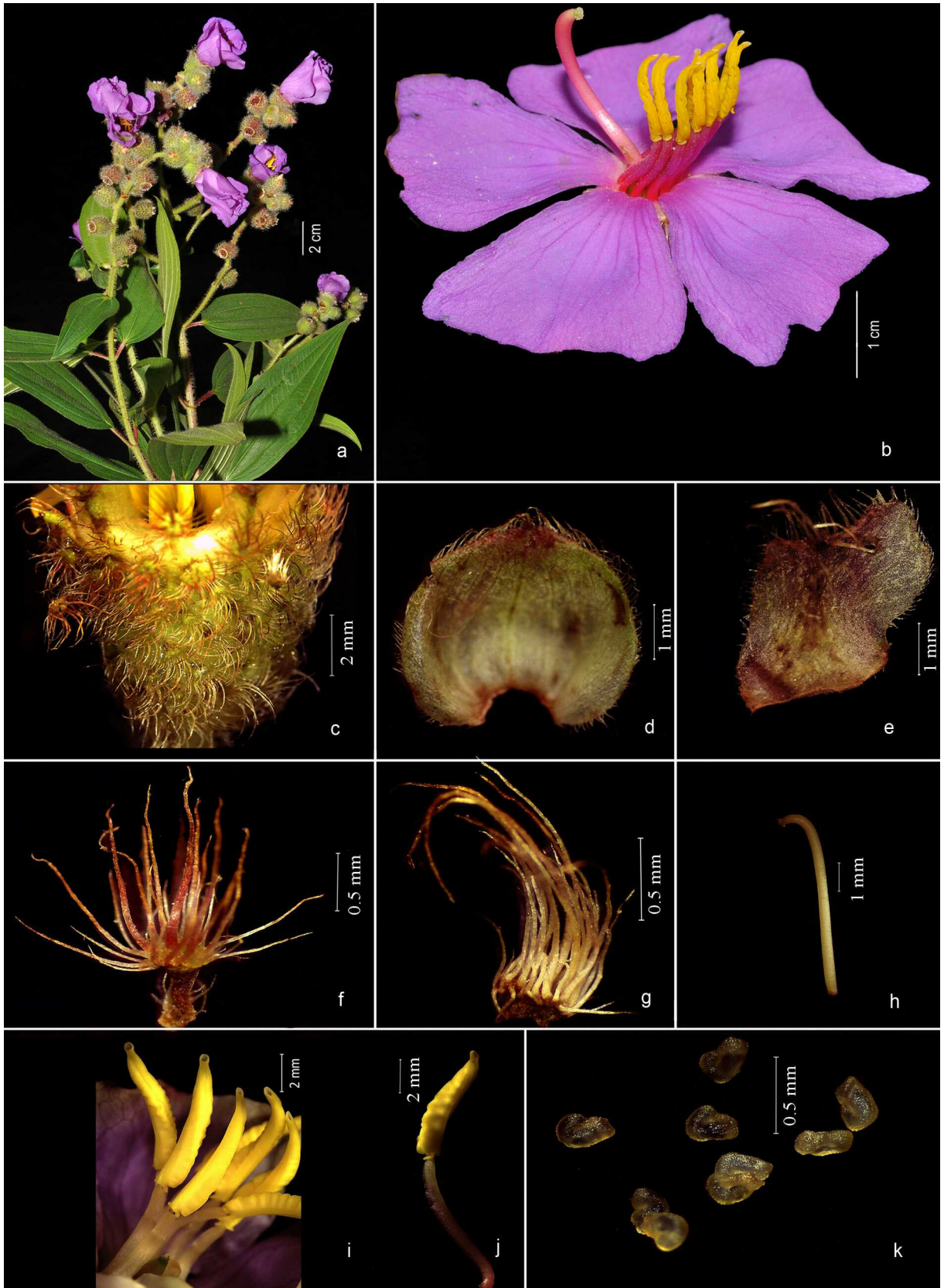


Fig. 5. *Osbeckia abrahamii* G.S.Giri & M.P.Nayar: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Other emergences; **h.** Style; **i** & **j.** Stamens; **k.** Seeds.

hypanthium; anther pockets covered with brownish appressed hairs; crown absent; style 15–19 mm long, glabrous, curved; stigma slightly swollen. Capsules broadly urceolate, 7–9.5 × 4–5.5 mm; seeds numerous, minute, 0.1–0.2 mm long, curved.

Flowering & fruiting: July–December.

Habitat: Found in forest borders and in open grasslands of elevation above 300 m.

Distribution: Endemic to South India.

Specimens examined: INDIA, Kerala, Kottayam district, Vagamon, 20.11.2014, Prashob & Sibichen 5564 (DEV); Pathanamthitta district, Ranni, 30.07.2014, Prashob & S. Syam Radh 5510 (DEV).

Notes: It resembles *O. travancorica* but distinguished by its long, lax panicles and asymmetric sepals as opposed to the short, compact panicles and symmetric sepals in *O. travancorica*.

Osbeckia aspera (L.) Blume, Flora. 14: 474. 1831; C.B. Clarke in Hook.f., Fl. Brit. India 2: 519. 1879; Gamble, Fl. Pres. Madras 1: 492. 1919. *Melastoma aspera* L., Sp. Pl. 391. 1753. *Asterostoma aspera* (L.) Blume, Mus. Bot. 1(4): 50. 1849. *O. aspera* (L.) Blume var. *aspera*, Ginkgoana 4: 82. 1977; Vivek. in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1: 161. 1983; Mohanan, Fl. Quilon Dist., 186. 1984; Manilal, Fl. Silent Valley 110. 1988; Vajr., Fl. Palghat Dist., 203. 1990; M. Mohanan & Henry, Fl. Thiruvanthapuram 198. 1994; Subram., Fl. Thenmala Div. 142. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 24. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 189. 1996; Sasidh., Fl. Periyar Tiger Reserve 143. 1998; Sasidh., Fl. Parambikulam W.L.S. 127. 2002; Mohanan & Sivad., Fl. Agasthyamala 278. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 222. 2005; Manickam *et al.*, Fl. Tirunelveli Hills 406. 2008; Sunil & Sivadasan, Fl. Alappuzha Dist., 296. 2009. *O. aspera* (L.) Blume var. *typica* C.B. Clarke in Hook.f., Fl. Brit. India 2: 519. 1879. *Lectotype* (designated by Hansen, 1977): SRI LANKA, *s.d.*, Herman *s.n.* (BM000621501 digital image!).

O. kleinii Wight & Arn., Prodr. Fl. Ind. Orient. 1: 323. 1834. *Asterostoma kleinii* (Wight & Arn.) Blume, Mus. Bot. 1(4): 50. 1849. *Osbeckia aspera* Blume var. *kleinii* (Wight & Arn.) C.B. Clarke in Hook.f., Fl. Brit. India 2: 519. 1879. *Type*: SRI LANKA, Trincomalee, 25.01.1796, Klein *s.n.* (holo K000867979 digital image!).

O. glauca Wall. ex Naudin, Ann. Sci. Nat., Bot. sér. 3, 14: 68. 1850

O. kewensis C.E.C. Fisch., Bull. Misc. Inform. Kew 1938(1): 34. 1938. *Lectotype* (designated here): SRI LANKA, *s.loc.*, *s.d.*, *s.n.* (K000867986 digital image!).

O. minor Triana, Trans. Linn. Soc. London 28(1): 55. 1872. *Type*: SRI LANKA, *s.loc.*, *s.d.*, Thwaites 1569 (holo K000867985 image!).

O. courtallensis Gamble, Bull. Misc. Inform. Kew 1918(7): 242. *Type*: INDIA, Tamil Nadu, Courtallum, Tirunelveli, Wight 1103 (holo K000867983 digital image!).

O. lawsonii Gamble, Bull. Misc. Inform. Kew 1918(7): 242. *Type*: INDIA, Travancore, 650 m., 03.12.1893, M.A. Lawson 46 (holo K000867989 digital image!).

Melastoma glaucum Wall., Numer. List n. 4055. 1831, *nom. nud.*

Katou kadalai Rheede, Hortus Malabaricus. 43.91.1493, *non. inval.* Fig. 6

Perennial, erect shrubs, 1–2.5 m tall. Stems branched, young stems quadrangular, sparsely clothed with appressed to patent hairs, intermixed with curved strong bristles. Petioles 5–10 mm long; lamina green, ovate to lanceolate, 2–11 × 1–4.5 cm, 3–5-nerved, apex acute to acuminate, base acute, both sides thinly clothed with patent hairs. Inflorescence terminal, 6–12-flowered cymes or a panicle of 2 or 3 such cymes, subtended by bracts and a pair of leaves. Flowers pentamerous, pedicels 2–5 mm long; bracts green, ovate to cordate, 1–5 mm long, ciliate and densely appressed-hairy. Hypanthium campanulate, 4–8 × 3–6 mm, with a thin cover of hairs; intersepalal emergences 0.5–2.5 mm long, sessile, ending in a tuft of hairs;



Fig. 6. *Osbeckia aspera* (L.) Blume: **a.** Habit; **b.** Inflorescence; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Stamens; **h.** Style; **i.** Seeds.

other emergences restricted to the upper part of the hypanthium or absent; hairs short, bristly, sub-appressed, patent, curved upwards. Sepals triangular, 2–5 × 2–3.5 mm, apex attenuate, 1-nerved, hairy at apex, caducous. Petals obovate, 1–2.5 × 1–1.5 cm, pink to purple. Stamens 10; filaments 5–10 mm long; anthers narrowly ovate to oblong, 5–9 mm long, yellow, twisted, pore oblique on ventral side of the tip; connective with collar having one tubercle dorsally and another irregularly lobed one ventrally. Ovary united with hypanthium about half of its length; anther pockets extending to base of ovary; crown with short bristles; style 8–19 mm long, glabrous, curved; stigma slightly pointed. Capsules campanulate, 4–8 × 3–6 mm; seeds minute, 0.1–0.2 mm long, numerous, curved.

Flowering & fruiting: October–March.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Found on the margins of evergreen forests at an elevation above 500 m in association with *O. virgata* and *O. parvifolia*. Variations in size and appearance are noticed among populations at different altitudes. Plants growing in lower altitudes are generally tall with larger leaves whereas, those at higher altitudes are usually short with smaller leaves.

Distribution: India and Sri Lanka.

Specimens examined: INDIA, Kerala, Idukki district, Munnar, 13.05.1935, *E. Barnes* 118853 (DD); Palakkad district, Nelliampathy, Karapara forest, Pothumalai, 19.12.1980, *N.C. Nair & P. Bharghavan* 6928 (MH); Thiruvananthapuram district, Agasthyamala, Peppara, 08.03.1994, *N. Mohanan & T. Shaju* 01973 (FRLH); Athirumala, Agasthyamala, 16.03.2016, *Prashob & Sibichen* 6030 (DEV); Bonacaud, 16.03.2016, *Prashob & Sibichen* 6029 (DEV); Ponmudi hills, 14.09.1977, *N.C. Nair* 51071 (MH); *Ibid.*, 16.08.1980, *M. Mohanan* 69224 (MH); *Ibid.*, 13.12.2014, *Prashob & Sibichen* 5566 (DEV); Thrissur district, Karimala hills, 23.10.1990, *N. Sasidharan* 5736 (KFRI); Travancore, 28.08.1902, *S.F. Baurdillon* 1237/7104 (DD);

Vazhachal, 04.11.1989, *N. Sasidharan* 5500 (KFRI). Tamil Nadu, Coimbatore district, Attakatti, 06.07.1961, *J. Joseph* 12753 (MH); Dindigul district, Kodaikanal, Palamalai path, 10.05.1985, *K.M. Matthew & N. Rajendren* 44923 (RHT); Kodaikanal, Puthur-Kavalapatty path, 02.05.1988, *K.M. Matthew* 52853 (RHT); Perumal peak, 14.12.1989, *K.M. Matthew* 53859 (RHT); Vandaravu-Marion shola Levinge path, 25.10.1988, *K.M. Matthew* 53634 (RHT); Kanyakumari district, Alagiapandiapuram, Mahendragiri hills, Kurusadi mortai, 24.09.1998, *V.S. Manickam* 17508 (XCH); Pechiparai, Kalasekaram range, 20.07.1975, *S.P. Subramani* 14620 (FRLH); Road to Karimoni, 26.02.1998, *V.S. Manickam* 14798 (XCH); Madurai district, Maharajamethu, 15.08.1990, *V. Lakshmanan*, 91166 (MH); Tirunelveli district, Inchikuzhi, 22.09.1988, *R. Gopalan* 88717 (MH); Kakachi, 12.10.1957, *K.M. Sebastine* 4416 (MH); Kakachi, Kothayar, 02.02.1997, *V.S. Manickam* 12250 (XCH); Kakachi to Sengaltheri path, 21.12.1996, *V.S. Manickam* 11840 (XCH); Kallar hills, 03.02.1998, *V.S. Manickam* 14707 (XCH); *Ibid.*, 10.11.1959, *K.M. Sebastine* 9614 (MH); Kannikatti, 08.06.1957, *K.M. Sebastine* 409 (MH); Kudamadi hills, Mundanthurai, 26.06.1997, *V.S. Manickam* 13058 (XCH); Kuthiravetti shola, View point, 20.12.1996, *V.S. Manickam* 11796 (XCH); Manjanam parai, 30.05.1963, *A.N. Henry* 16377 (MH); Manjolai hills, 25.06.1957, *K.M. Sebastien* 3595 (MH); Martanamparai, 04.09.1962, *A.N. Henry* 17450 (MH); Muthukuzhi Vayal, 09.09.1976, *A.N. Henry* 48311 (MH); *Ibid.*, 26.08.1976, *A.N. Henry* 47592 (MH); Sengaltheri, 09.03.1963, *J. Joseph* 15872 (MH); Upper Kothayar hills, 07.08.1996, *V.S. Manickam* 10049 (XCH); Vullar forest, Agastiar hills, 06.08.1998, *V.S. Manickam* 16838 (XCH).

Notes: Hansen (1977), treated *O. travancorica* and *O. wightiana* as varieties of *O. aspera*. However, the latter two are distinct in their habitat, altitudinal preferences, and micro-morphological characters and hence reinstated as distinct species in the present work. A comparison of morphological characters is provided in **Table 2**.

Table 2. Comparison of *O. aspera*, *O. travancorica* and *O. wightiana*

Characters	<i>O. aspera</i>	<i>O. travancorica</i>	<i>O. wightiana</i>
Leaves	Acrodromous, 3-nerved	Acrodromous, 3–5-nerved 5–7-nerved	Non-acrodromous,
Hypanthium	Emergences absent	Emergences all over	Emergences all over
Bracts	Ovate to cordate, 1–5 mm long	Cordate, 3–8 mm long	Ovate, 6–10 mm long
Sepals	Triangular	Subulate	Subulate
Intersepalmer emergences	Sessile, ending in a tuft of hairs	Stalked; stalk terete, hairy, head stellate with a tuft of bristles	Stalked; stalk hairy, ending in a small tuft of patent stellate hairs
Other emergences	Absent	Stalked, with a stellate head	Stalked, with a stellate head

Osbeckia gracilis Bedd., Madras J. Lit. Sci. ser. 3, 1: 45. 1864; Bedd. Trans. Linn. Soc. 24: 216. 1865; C.B. Clarke in Hook. f., Fl. Brit. India 2: 518. 1879; Gamble, Fl. Pres. Madras 1: 494. 1919; C. Hansen, Ginkgoana 4: 77. 1977; Mohanan, Fl. Quilon Dist. 187. 1984; M. Mohanan & Henry, Fl. Thiruvanthapuram 198. 1994; Sasidh., Fl. Shenduruny W.L.S. 130. 1997; Sasidh., Fl. Periyar Tiger Reserve 144. 1998; Sasidh., Fl. Parambikulam W.L.S. 127. 2002. *Type*: INDIA, Kerala, Sispara Ghats, 4000 ft., *s.d.*, *Beddome* 2975 (holo BM000944355 digital image!).

O. sublaevia Cogn. in A. DC. & C. DC., Monogr. Phan. 7: 321. 1891; Gamble, Fl. Pres. Madras 1: 492. 1919. *Type*: INDIA, Tamil Nadu, Nilgiris, *s.d.*, *Perrottet* 377 (holo BR0000005208722 digital image!).

O. lineolata Gamble., Kew Bull. Misc. Inform. 7: 241. 1918; Fl. Pres. Madras 1: 492. 1919. *Lectotype* (designated here): INDIA, South India, *s.d.*, *Sauliere* 312 (K000867991 digital image!).

O. lineolata Gamble var. *anamalayana* G.S. Giri & M.P. Nayar, Bull. Bot. Surv. India 25: 244. 1983. *Type*: INDIA, Tamil Nadu, Coimbatore (as Coimbatour), Kanalar, Anamalai Hills, 1950 m, 17.11.1980, *M. Chandrabose* 57793 (holo CAL!).

O. walkeri *auct.* Amitha Bachan & Pradeep, Int. J. Adv. Res. 5(7): 339. 2017. *non* Arn., 1837. Fig. 7
Perennial, erect, branched shrubs, c. 1 m tall. Stems quadrangular, winged at angles, sparsely covered

with short rigid hairs, hairs at nodes larger. Lamina lanceolate or oblanceolate, 2–7 × 1–2.5 cm, apex attenuate to acute, base attenuate, rarely acute, 3–5-nerved, both sides sparingly clothed with ascending short hairs, turns yellowish green when drying. Cymes terminal or sometimes axillary, 3–7-flowered. Flowers pentamerous; pedicels 0.5–2 mm long; bracts green, ovate, 5–10 mm long, ciliate, both sides spatially clothed with short hairs. Hypanthium campanulate, 3.5–5.5 × 3–5 mm, clothed with patent or ascending hairs with bullate base; intersepalmer emergences rounded, tuberculoid with elongated slightly flattened tips ending in a tuft of bristles, caducous; other emergences usually absent. Sepals 5, triangular to oblong, 2–5.5 mm long, ciliate, with a very prominent midrib having appressed to patent hairs, apex with a tuft of long hairs, caducous. Petals 5, broadly obovate, 20–25 × 12–17 mm, purple, ciliate. Stamens 10; filaments 7–12 mm long; anthers narrowly ovate to oblong, yellow, 7–9 mm long, twisted, pore slightly oblique on ventral side; connective with two small dorsal and two ventral tubercles. Ovary partially fused with hypanthium, usually exceeding hypanthium, anther pockets present, crown distinct in fruit; style 1.5–3 cm long. Capsules campanulate, 5–8 × 4.5–7 mm; seeds minute, 0.1–0.2 mm long, numerous, curved.

Flowering & fruiting: September–December.

Chromosome number: Not reported.

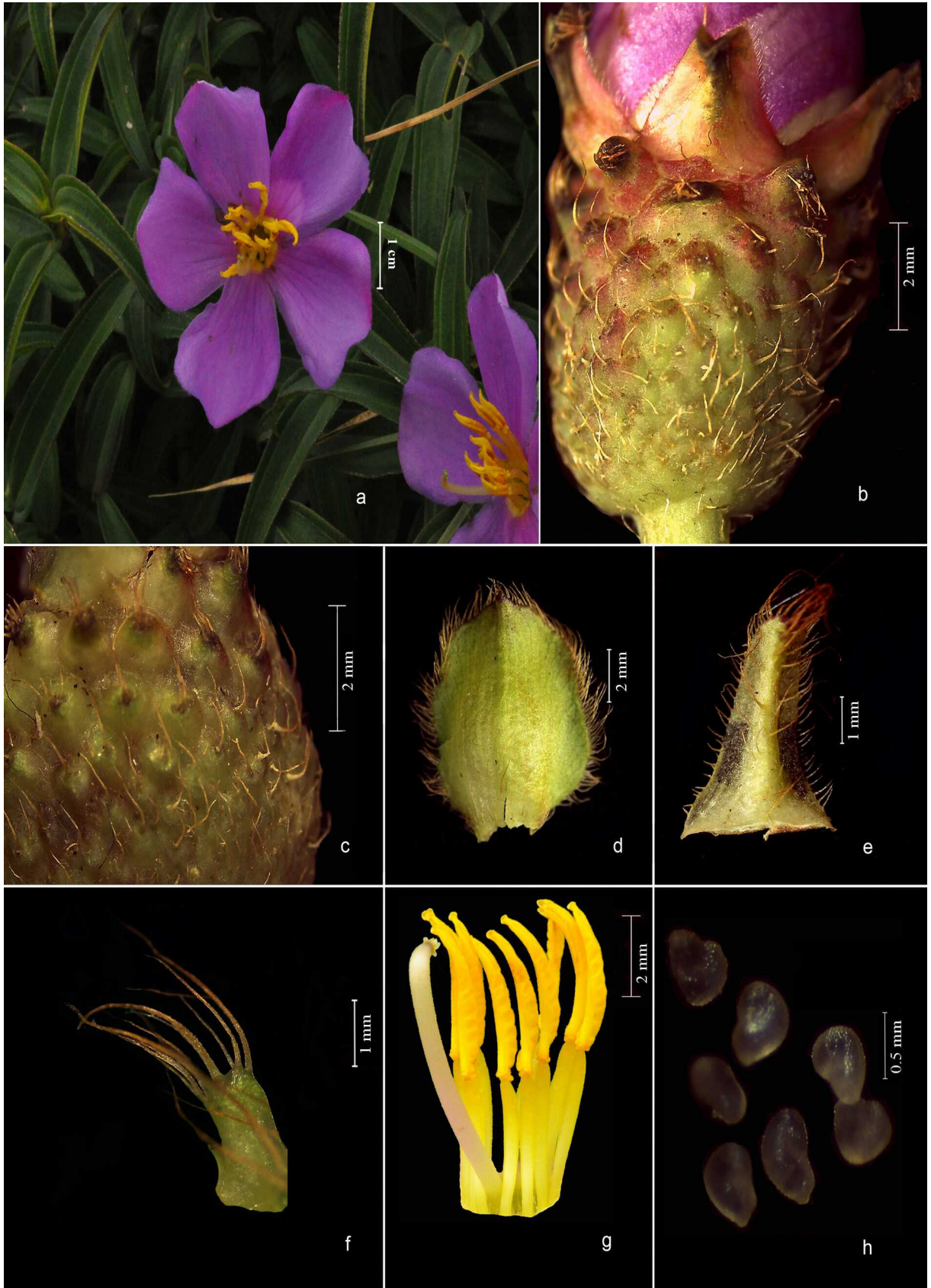


Fig. 7. *Osbeckia gracilis* Bedd.: **a.** Habit; **b & c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Stamens; **h.** Seeds.

Habitat: This species occurs commonly in borders of shola forests and in open grasslands, between 1000–2000 m elevation. Plants at lower altitude are characterized by their tall size, long inter nodes and pale green leaves whereas, those at higher altitude are shorter, having short internodes and dark green leaves. The species is usually seen associated with *O. leschenaultiana* and *O. brachystemon*.

Distribution: Endemic to India.

Specimens examined: INDIA, Kerala, Idukki district, Devikulam, 11.09.1968, *D.B. Deb* 62192 (MH); Munnar, Lockhart gap, 10.10.1963, *K.V. Sebastian* 17480 (MH); Pamba range, 05.10.1976, *K. Vivekananthan* 48604 (MH); Upper Vagaruai, 16.11.1965, *B.V. Shetty* 62192 (MH); Palakkad district, Silent Valley N.P., Sispara, 13.10.2014, *Prashob & Sibichen* 5543, 5544, 5545 (DEV); Silent Valley N.P., Wallakad station, 13.10.2014, *Prashob & Sibichen* 5547 (DEV). Tamil Nadu, Coimbatore district, Anamali, 12.09.1961, *J. Joseph* 13327 (MH); Berijam road to Periar path, 07.07.1986, *K.M. Matthew & N. Rajendren* 45727 (RHT); Blackburne cliff, 10.08.1987, *K.M. Matthew & K.T. Mathew* 50036 (RHT); Valparai, 06.09.1983, *K. Ramamurty & R. Chandrasekaran* 78431 (MH); *Ibid.*, 23.03.1990, *V.B. Hosagovsan* 92472 (MH); Dindigul district, Kodaikanal-Leving, 09.08.1984, *K.M. Matthew* 40809 (RHT); *Ibid.*, 03.09.1985, *S.J. Britto* 42147 (RHT); Kodaikanal-Leving path, 09.07.1986, *K.M. Matthew & N. Rajendran* 45769 (RHT); Kodaikanal- Shembaganur path, 03.08.1985, *K.M. Matthew* 41634 (RHT); Korappur, 09.09.1986, *K.M. Matthew & M. Charles* 46804 (RHT); Palani hills, Perumal peak, 12.12.1986, *K.M. Matthew* 47911 (RHT); Madurai district, Thenkikalparai, 25.08.1990, *V. Lakshmanan* 94321 (MH).

Notes: Analysis of populations from various localities has shown diversity in the indumentum pattern of *O. gracilis*. Hairs on the hypanthium are long and profuse in higher altitude specimens (from Sispara, Silent valley) whereas, it is short and sparse in lower altitude specimens (Munnar hills). Similarly, leaves are broadly ovate to lanceolate in lower altitude specimens whereas it is lanceolate among high altitude specimens. Irrespective of these

variations, all populations are characterized by the brown, patent, curved, bristly hairs at least on the lower part of the hypanthium.

In the protologue of *O. gracilis*, Beddome (1864) described the flower as tetramerous with 8 anthers. However, pentamerous flowers with 10 stamens are noticed throughout the collections (including specimens from type locality).

Osbeckia leschenaultiana DC., Prodr. 3: 42. 1828. C.B. Clarke in Hook.f., Fl. Brit. India 2: 520. 1879; Gamble, Fl. Pres. Madras 1: 493. 1919; C.Hansen, Ginkgoana 4: 87. 1977; Swarup. *et al.*, Shola For. Kerala 59. 1998; Sivar. & Mathew, Fl. Nilambur 272. 1997; Sasidh., Fl. Periyar Tiger Reserve 145. 1998; Sasidh., Fl. Chinnar W.L.S. 131. 1999; Sasidh., Fl. Parambikulam W.L.S. 129. 2002; Mohanan & Sivad., Fl. Agasthyamala 279. 2002. *Type:* INDIA, Tamil Nadu, Nilgiris (as Nellygerry), 1823, *Leschenault* 10, (holo G00310433 digital image!).

O. gardneriana Wight, Icon. Pl. Ind. Orient. 3: t.997. 1845. *Lectotype* (designated here): INDIA, Tamil Nadu, Nilgiris, Sispara, 04, *Wight* 1085 (M0165759 digital image!).

O. wightiana Benth. var. *erythrotricha* Benth. ex Wall., Numer. List 4060. 1831, *nom. nud.* Fig. 8 Perennial, erect shrubs, c. 1 m tall. Stems quadrangular, branched, covered with thin, patent, ascending, curved, brown to reddish hairs. Lamina ovate, 1.3–4.5 × 0.8–2.5 cm, sessile, dark green on upper side and light green on lower side, 3–5-nerved, apex acute, base obtuse to subcordate, both sides thinly clothed with hairs. Inflorescence terminal, dense panicles of 5–7-flowers, subtended by 2–4 pairs of leaves, upper pair of leaves reduced to semi bracts; bracts orbicular, 3–6.5 mm broad, green, apex acute, margins ciliate, appressed-hairy dorsally. Flowers pentamerous; pedicels 2–5 mm long. Hypanthium campanulate, 8–13 × 5–9 mm, densely clothed with patent emergences and hairs; intersepal emergences 1–3 mm long stalked; stalk terete with patent short hairs; head disc-like with stellate long hairs with thick bases, persistent in young fruit; other emergences similar but smaller;



Fig. 8. *Osbeckia leschenaultiana* DC.: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Stamens; **h.** Style; **i.** Seeds.

a few hairs present in between the emergences. Sepals triangular, 4–6.5 × 0.5–2 mm, narrowed into an oblong lobe, with acute to obtuse apex, margins ciliate, 1-nerved, with many patent hairs on nerves. Petals obovate, 15–22 × 10–15 mm, purple, apex ciliate. Stamens 10; filaments 5–8 mm long; anthers yellow, narrowly ovate to oblong, 5–8 mm long, twisted, pore oblique on ventral side; connective tuberculate with a small dorsal and a large ventral lobe. Ovary united with hypanthium for about half of its length, densely covered with hairs; anther pockets extending to base of ovary; crown hairy; style 12–18 mm long, glabrous. Capsules campanulate, 8–12 × 5–9 mm; seeds numerous, minute, 0.1–0.2 mm long, curved.

Flowering & fruiting: August–December.

Chromosome number: Not reported.

Habitat: In higher elevations from 1800 to 2500 m above sea level, seen in forest borders and in open grasslands in association with *O. reticulata*, *O. brachystemon* and *O. gracilis*.

Distribution: Endemic to South India.

Specimens examined: INDIA, **Kerala**, Idukki district, Anamudi shola N.P., 10.11.2014, Prashob & Sibichen 5556, 5557, 5586 (DEV); Devikulam, 02.02.1970, B.V. Shetty 31788 (CAL, MH); Edamalakudi, 16.01.2015, Prashob & Sibichen 5587, 5589, 5591 (DEV); Eravikulam N.P., 16.01.2015, Prashob & Sibichen 5593 (DEV); Eravikulam N.P., Pettimudi, 16.01.2015, Prashob & Sibichen 5592 (DEV); Eravikulam N.P., Rajamala, 16.01.2015; Kulamavu, 12.10.1982, C.N. Mohanan & V.S. Ramachandran 74592 (MH); Eravikulam Western slope, 04.12.1987, P. Bhargavan 87329 (CAL, MH); Mathikettan shola, 06.12.1986, K.M. Matthew & M. Charles 47752 (RHT); Kollam district, Shenduruny high range, 05.1937, E. Barnes 118851 (DD); Travancore hills, 09.1937, E. Barnes 112219 (DD). **Tamil Nadu**, Coimbatore district, Anamalai, Akkamalai Grass hills, 11.03.1978, D.K. Hore 657 (CAL); Dindigul district, Kodaikanal, 25.08.1898, A.G. Bourne (CAL); *Ibid.*, 21.03.1956, Pallithanam 1576 (RHT); *Ibid.*, 19.03.1950, Danial Sundaraj &

Sankaran Rao 94117 (MH); Kodaikanal, Berijam slope above the shola, 24.07.1984, K.M. Matthew 40496 (RHT); Kodaikanal to Berijam road, 19.11.1985, K.M. Matthew 42860 (RHT); Kodaikanal, Berijam–Vembadi, 19.11.1985, K.M. Matthew 42739 (RHT); Kodaikanal, Kukkal, 08.04.1987, K.M. Matthew & M. Charles 49087 (RHT); Kodaikanal, upper Palani, 16.08.1911, C.E.C. Fischer 2856 (CAL); Kodaikanal, Vandaravu, 09.01.1987, K.M. Matthew 48151 (RHT); Kodaikanal, Vandaravu main shola, 29.08.1987, K.M. Matthew 50553 (RHT); Pulney hills, 1869, Beddome 21180 (MH); Vandaravu peak, Kerala peak (Kerala border), 12.05.1985, K.M. Matthew 41430 (RHT); Nilgiri district, Bhavani, 19.12.1970, B.V. Shetty 37489 (MH); Ketu, 24.01.1957, K.M. Sebastine 2206 (CAL); Kotagiri–Ooty road, 26.04.1971, N.C. Rathakrishnan 38086 (MH); Kottabettu, 25.02.1970, A.A. Ansari 1046 (CAL); Mullimand–Avalanche, 26.12.1970, B.V. Shetty 37605 (MH); Nilgiri, 20.03.1870, C.B. Clarke 111188 (CAL); Ooty, 10.1910, A. Meebold 11867 (CAL); Perumal hills, 12.04.1987, C. Sudharsan 281 (CAL); Pykara river bank, 12.09.1930, V. Narayanaswamy 4245 (MH); Sispara, 05.1889, J.S. Gamble 21174 (MH); Tirunelveli district, way to Pothagiri, 05.02.1989, R. Gopalan 88727 (MH).

Notes: Plants found in higher altitudes are short (*c.* 0.5 m), profusely branched with very short internodes (*c.* 5 mm long) and those found in lower altitudes are tall (*c.* 1 m), sparsely branched with long internodes (*c.* 3–5 cm long).

Osbeckia mehrana G.S.Giri & M.P.Nayar, Kew Bull. 41(2): 429. 1986. *Type:* INDIA, **Kerala**, Thiruvananthapuram, way to Chemungi, 1200 m, 08.03.1979, M. Mohan 61706 (holo CAL0000015811!). Fig. 9

Perennial, erect, woody shrubs, *c.* 3 m tall. Stems branched, quadrangular, densely clothed with long, brown ascending or sub-patent hairs. Petioles 7–13 mm long, clothed with thin ascending hairs; lamina ovate, 1.5–4.5 × 0.8–3 cm, 5-nerved, dark green, apex acute, base obtuse, margins entire, upper side with ascending to sub patent hairs, lower side

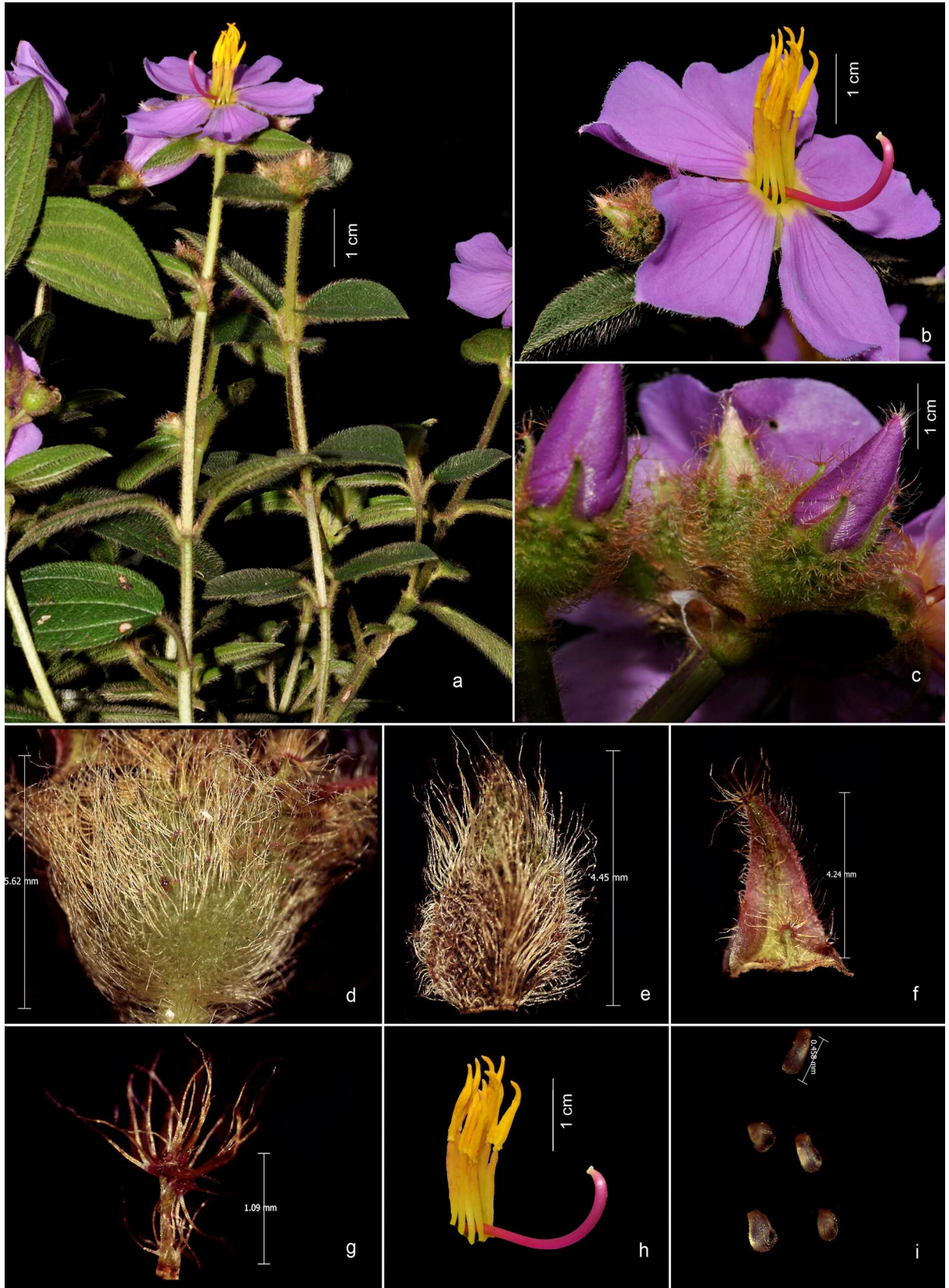


Fig. 9. *Osbeckia mehrana* G.S. Giri & M.P. Nayar: **a.** Habit; **b.** Flower; **c & d.** Hypanthium; **e.** Bract; **f.** Calyx lobe; **g.** Intersepal emergence; **h.** Stamens & Style; **i.** Seeds.

with patent hairs, hairs on the nerves are longer. Inflorescence terminal and axillary panicles, 5–7-flowered; bracts ovate, 2.5–4.5 × 1–2.5 mm, green, margins ciliate, woolly dorsally, caducous; Flowers pentamerous, pedicels 2–5 mm long. Hypanthium campanulate, 4–6 × 3–5 mm, densely clothed with patent hairs and stellate emergences, sometimes emergences absent; intersepal emergences stalked 1–2 mm long, stalk terete with ascending hairs, head disc-like with stellate long hairs, caducous; other emergences similar but smaller. Sepals 5, triangular, 3–5 × 1.5–2 mm, with acute apex, 1-nerved, margins ciliate, hairs at apex longer, midrib prominent with long patent hairs dorsally. Petals 5, obovate, 11–23 × 6–8 mm, pink, margins ciliate. Stamens 10; filaments 4–6 mm long, glabrous; anthers narrowly ovate, 4.5–5.5 mm long, yellow, pore oblique on ventral side of the tip; connective extended to a small collar with small dorsal and ventral lobe. Ovary 3–4.5 mm long, united with hypanthium for about half of its length; anther pockets extending to base of ovary, with dense cover of ascending hairs; crown with ascending hairs; style 12–17 mm long, glabrous, curved; stigma capitate, papillose. Capsules campanulate, 6–10 × 6–8 mm, enclosed by the calyx tube; seeds minute, numerous, 0.1–0.2 mm long, curved and muricate.

Flowering & fruiting: November–April.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Occurs in evergreen forests and in grasslands at an elevation above 1500 m., in association with *O. aspera* var. *wightiana* and *O. tirunelvelica*.

Distribution: Endemic to South India.

Specimens examined: INDIA, Kerala, Thiruvananthapuram district, Agasthyamala, Chemungi, 08.03.1979, *M. Mohanan* 61706 (CAL); Agasthyamala, Pongalapara, 15.03.2016, *Prashob & Sibichen* 6025, 6026, 6028 (DEV); near Natarikal, Travancore boundary, 04.03.1917, *s.coll.* 21111 (MH); Poonkulam, on the way to

Agastyarkudam, 05.03.1980, *M. Mohanan* 115996 (MH). Tamil Nadu, Tirunelveli district, Kothayar Dam house, 16.04.1997, *V.S. Manickam* 12532 (XCH); Kothayar Hills, Dam valley, 12.03.1998, *V.S. Manickam* 14994 (XCH); Kothayar, Muthukuzhivayal, 11.03.1998, *V.S. Manickam* 14944 (XCH); Kothayar Hills, Stream across Dam house, 10.03.1998, *V.S. Manickam* 14878 (XCH); Papanasam hills, Uppuma mottai, 07.04.1999, *V.S. Manickam* 18856 (XCH).

Notes: This taxon is morphologically allied to *O. gracilis* but can be easily distinguished by dense, long hairs on stem and leaves, hypanthium with emergences and stellate headed intersepal emergences. But in *O. gracilis* the stems and leaves are thinly covered with hairs and the hypanthium is without emergences.

Osbeckia nepalensis Hook., Exot. Fl. 1(2): t. 31. 1822; C.B. Clarke in Hook.f., Fl. Brit. India 2: 521. 1879; C. Hansen, Ginkgoana 4: 67. 1977; N.P. Balakr, Fl. Jowai & Vicinity 205. 141. 1983. *Lectotype* (designated by Hansen, 1977): NEPAL, **Katmandu**, *J.E. Smith s.n.* (K000867999 digital image!).

O. chulesis D. Don, Prodr. Fl. Nepal. 221. 1825. *Type:* NEPAL, Narainhetty, 27.07.1802, *Hamilton s.n.* (holo BM 000521788 digital image!).

Melastoma nepalensis Lodd., Bot. Cab. 8: t. 707. 1823, *nom. nud.*

Melastoma chulesis Ham. ex D. Don, Prodr. Fl. Nepal. 221. 1825, *pro. syn.*

O. speciosa D. Don, Prodr. Fl. Nepal. 222. 1825, *nom. illeg.*

Perennial, erect, branched shrubs, c. 2 m tall. Stems clothed with appressed to ascending or shaggy hairs. Leaves sessile or sub sessile (petioles 0.5–1.5 mm long); lamina lanceolate, 5–16 × 2–5.5 cm, 5–7-nerved, apex acute, base cordate or subcordate, both sides clothed with ascending shaggy hairs above, soft beneath. Inflorescence terminal or axillary panicles, 5–10-flowered. Flowers pentamerous; pedicels 1–6 mm long; bracts ovate

to broadly ovate, 7–15 × 5–9 mm, ciliate and appressed-hairy. Hypanthium campanulate, 6–10 × 5.5–7 mm, with few to several subappressed scale like emergences, simple hairs absent; intersepal emergences 1–1.5 × 1–2 mm, lobed, with a tuft of short bristles, caducous; other emergences similar in shape. Sepals 5, ovate, 8–11 × 4–7 mm, apex often acute, with few indistinct nerves, margins ciliate, caducous. Petals 5, broadly obovate to obcordate, 15–20 × 4–7 mm long, pink, margins ciliate. Stamens 10; filaments 4–6 mm long; anthers narrowly ovate, 6–9 mm long, attenuate, not twisted, pore oblique on ventral side at the apex, connective sometimes slightly prolonged between collar and sacs. Ovary united with hypanthium for about half of its length; anther pockets extending to the base of ovary; crown distinct; style 13–19 mm long. Capsules campanulate, 6–10 × 5–8 mm, rim of hypanthium exceeding the crown; seeds minute, curved, 0.1–0.2 mm long, numerous.

Key to the varieties

- 1a. Petals pink or rarely purple var. *nepalensis*
 1b. Petals white var. *albiflora*

Osbeckia nepalensis Hook. var. *nepalensis*, Exot. Fl. 1(2): t. 31. 1822. Fig. 10

Flowering & fruiting: June–December.

Chromosome number: $n = 19$ (Favarger, 1962), $n = 20$ (Mehra & Khosla, 1969).

Habitat: Common in open grasslands of higher altitudes (500–1500 m) and in swampy areas of evergreen forests.

Distribution: Bhutan, China, India (Arunachal Pradesh, Assam, Meghalaya, Manipur, Nagaland, West Bengal and Sikkim), Laos, Malaya, Myanmar, Nepal, North Vietnam and Thailand.

Specimens examined: INDIA, **Arunachal Pradesh** East Siang district, Pasighat, Pangin, 12.07.2015, Prashob & Hareesh 6121 (DEV); Lohit district, 28.09.1969, A.S. Rao 48174 (CAL); Subansiri district, Kameng F.D., Kalaktang, 14.01.1958, G. Panigrahi 15515 (CAL); Nyapin, 21.11.1964, A.R.K.

Sastry 40837 (ASSAM); Pagba, 11.17.1974, C.L. Malhotra 55927 (ASSAM); Tirap district, Bimalpur, 07.09.1958, G. Panigrahi 17044 (ASSAM); West Kameng district, Kalaktang, 14.11.1973, P.K. Hajra 54112 (ASSAM); Sessa Orchid Sanctuary, Tippi, 01.07.2015, Prashob & Sibichen 6118 (DEV). **Assam**, Darrang district, Bornadi W.L.S., 19.03.2012, N. Sarma 124700 (ASSAM); Goalpara district, Goalpara, 08.09.1937, G.K. Deka 17057 (ASSAM); Kachugaon, 02.1947, M.M. Srinivasan 21937 (ASSAM); Ultapani, 27.12.1975, B.N.M. & party 5583 (ASSAM); Kamrup district, Digboi gorhat, 11.07.1959, G. Panigrahi 19002 (ASSAM, CAL); Ghagrachuk, 18.06.1964, A.S. Rao 38964 (ASSAM); Ghagrachuk forest, 18.07.1964, A.S. Rao 38946 (CAL); Kimini river, 23.11.1957, G. Panigrahi 11476 (ASSAM, CAL); Kokrajhar district, Chakrasila W.L.S., 04.11.2006, Ranjit Daimary 111929 (ASSAM); Newgong district, Belsiri river, 22.07.1958, G. Panigrahi 14219 (CAL); Dhoka R.F., 25.08.1964, N.P. Balakrishnan 39424 (ASSAM, CAL); Kohora, 22.09.1957, R.S. Rao 9779 (CAL); Upper Dikking river, 08.07.1957, G. Panigrahi 18746 (ASSAM, CAL). **Manipur**, Kangpokpi district, Laimakhong, 31.08.1952, D.B. Deb 594 (CAL); Lakhama, 03.1906, A. Meebold 5604 (CAL). **Meghalaya**, East Khasia hills district, Barapani road, 11.09.1970, A.S. Rao 38634 (CAL); Barapani, 13.10.1954, G.K. Deka 11425 (ASSAM); Cherrapunji, 21.12.1956, G. Panigrahi 4959 (CAL); East Khasi hills, Pommora, 07.09.2011, Santhosh Nampy 4725 (DEV). Karhan, 05.10.1948, S.K. Mukherjee 3617 (CAL); *Ibid.*, 08.1880, C.E.C. Fischer 172171 (CAL); Khasia, 12.1887, H. Collett 172173, 172171 (CAL); Khasia-Bhilasa, 06.08.1886, C.B. Clarke 172175 (CAL); Khasia & Jaintia Hills, 25.08.1956, G. Panigrahi 3003 (CAL); *Ibid.*; 25.08.1918, H.H. Haines 172210 (CAL); *Ibid.*, 25.08.1956, R.S. Rao 3003 (ASSAM, CAL); *Ibid.*; 21.12.1956, G. Panigrahi 4959 (ASSAM); *Ibid.*; 09.10.1930, S. Sharma 2565 (ASSAM); *Ibid.*, 23.01.1931, S. Sharma 9002 (ASSAM); Lockhart hills, 1905, Abu Hassan 167 (CAL); Makum, 21.11.1911, I.H. Burkill 35744 (CAL); Pynursla, 12.09.2015, Prashob & Sibichen 6131, 6132 (DEV);

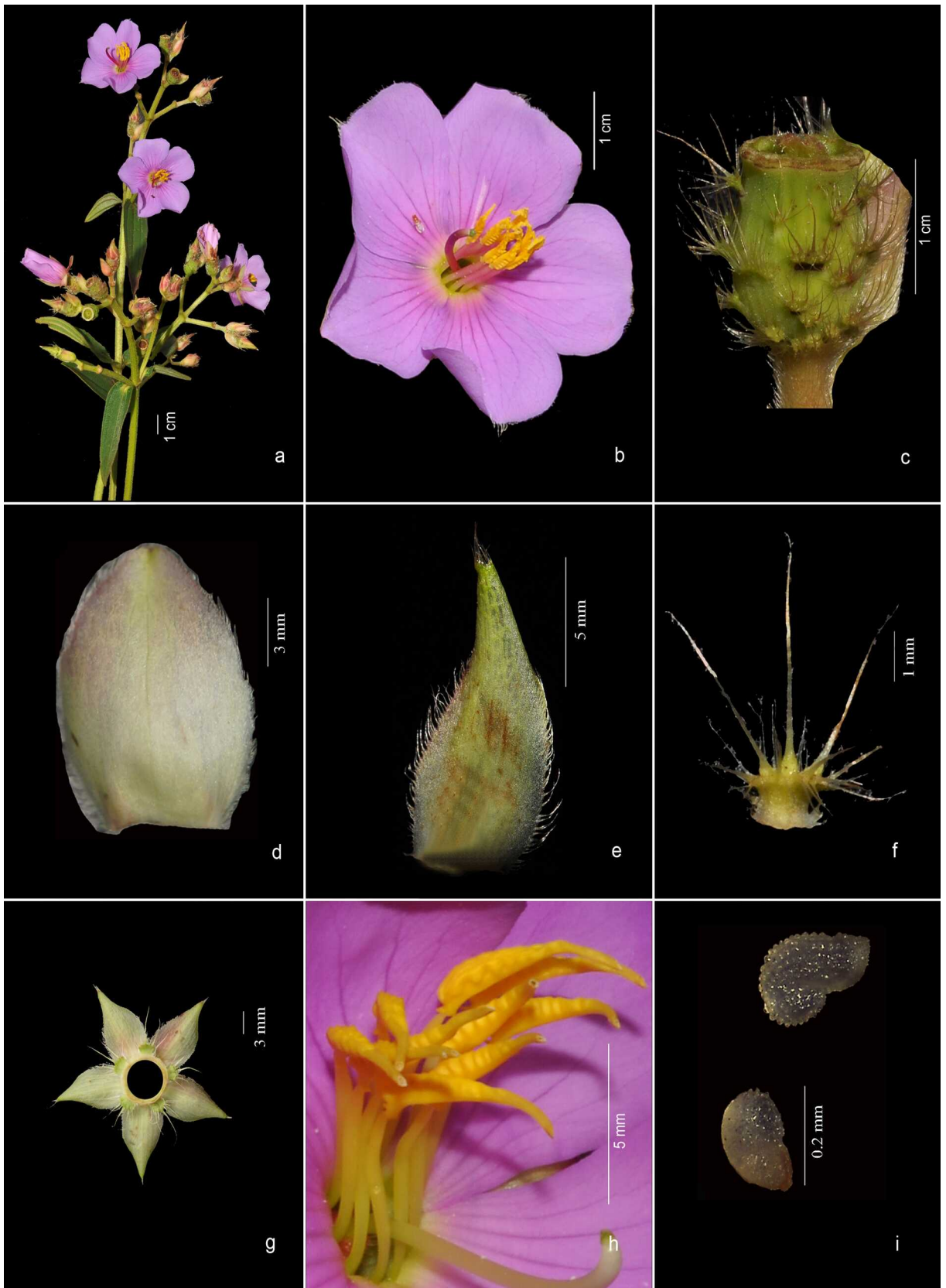


Fig. 10. *Osbeckia nepalensis* Hook. var. *nepalensis*: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Calyx lobes & intersepal emergences; **h.** Stamens; **i.** Seeds.

Tipperah, Champamoor hills, 23.10.1915, *P.M. Debbarman* 172212 (CAL); Jaintia hills district, Jowai, 18.11.1969, *N.P. Balakrishnan* 49990 (ASSAM); Jarain pitcher plant garden, 19.09.2015, *Prashob & Sibichen* 6144 (DEV); Jowai to Jarain, 16.08.1968, *N.P. Balakrishnan* 42961 (ASSAM); Nongtalang village, 19.09.2015, *Prashob & Sibichen* 6147 (DEV); Garo hills district, Garo hills, 01.1903, *J. Marten* 172193 (CAL); Napak area, 19.09.1975, *M.K.V. Rao* 64181 (ASSAM); Raling, 21.08.1968, *N.P. Balakrishnan* 46892 (ASSAM); *Ibid.*, *s.d.*, *T.D. Srinivasan* 246 (CAL); Songsak R.F., 29.11.2006, *R. Shanprne* 113114 (ASSAM); Ri-Bhoi district, Nongpoh, 07.1949, *B.B. Sagma* 22779 (ASSAM).

Nagaland, Kohima district, Dzulake valley, Naga hills, 09.1935, *N.L. Bor* 6161(DD); Naga hills, 09.1886, *Prain* 172189 (CAL); *Ibid.*, 09.1939, *N.L. Bor* 90571 (DD); *Ibid.*, 07.1944, *N.L. Bor* 21001 (ASSAM); *Ibid.*, 11.1979, *R.R. Fernandes* 008 (DD).

Sikkim, East Sikkim district, Baluwa khani khola, 04.08.1980, *P.K. Hajra* 271 (CAL, BSHC); Chumbi valley, 12.1904, *G.L. Searight* 0096 (CAL); Dikchu, 08.09.1997, *B.K. Singh* 19603 (BSHC); East Sikkim, 1862, *T. Anderson* 172198 (CAL); *Ibid.*, 06.10.1875, *C.B. Clarke* 6073 (CAL); *Ibid.*, 11.1900, *Prain's collector* 58 (CAL); ; *Ibid.*, 08.1903, *Prain's collector* 169 (CAL); Faramsa, 08.10.1986, *S. Singh* 4500 (BSHC); Gangtok, 06.08.1981, *B. Krishna* 1659 (BSHC); Gangtok, Lower Sinchey, 09.09.1981, *B. Krishna* 1696 (BSHC); Kalpana Nag, 01.17.1876, *G. King* 187 (CAL); Rung Beliver Valley, 22.09.1908, *W.W. Smith* 61 (CAL); Ruspo, 14.11.1998, *S.S. Dash* 20961 (BSHC); Saramsa, 23.08.1980, *P.K. Hajra* 598 (BSHC); Tarku, 21.09.1968, *N.C. Majumdar & R.N. Banerji* 583 (CAL); Taring to Dikchu, 07.09.1989, *N.R. Mandal* 11336 (BSHC). North Sikkim district, Dzangu, 24.11.1995, *Sujit Kumar Janna* 17955 (BSHC); Lingza, 14.09.1986, *B. Mitra* 6868 (BSHC); Nampik, 12.09.2000, *D. Maity* 23124 (BSHC); Rangrang bridge, Mangan-Rangrang Bridge, 25.08.2002, *S.K. Rai* 20586 (BSHC); *Ibid.*, 17.09.2016, *Prashob, Sibichen & Anilkumar* 6616 (DEV); *Ibid.*, 09.09.1968, *N.C. Majumdar & R.N. Baner* 341 (CAL); Singhik, 21.10.1984, *B. Krishna* 3237 (BSHC); Tingbong, 14.08.1989, *N.R. Mandal* 10163 (BSHC); South Sikkim district, Kewzing, 18.08.1985, *A.K. Verma* 4231 (BSHC); Sakyong to Pentong, 16.09.1986, *A.K. Verma* 7070 (BSHC); Sulphuk, 13.12.1985, *A.K. Verma* 4948 (BSHC); West Sikkim district, Dentam, 29.08.1997, *P. Singh* 16338 (BSHC); Dantam to Pelling, 13.09.2016, *Prashob, Sibichen & Anilkumar* 6604 (DEV).

West Bengal, Darjeeling district, Darjeeling, 06.1880, *J.S. Gamble* 749 (DD); *Ibid.*, 09.1880, *J.S. Gamble* 172187 (CAL); below Mangpoo, 20.02.1914, *s.coll.* 40646 (CAL); between Sukia & Siliguri, 07.1957, *N.L.H. Krauss* 323 (CAL); Jalpaiguri district, Kathambari, New Jalpaiguri, 25.04.1962, *S.K. Mukarji* 5550 (CAL); Kalimpong district, Kalimpong, 11.1879, *J.S. Gamble* 4000 (DD); Missiva compound, 10. 1913, *H.J.C. Kinghoran* 172177 (CAL); Nemati, 18.11.1999, *G.S. Giri* 20486 (CAL); New Jalpaiguri, 26.08.1912, *N.C. Banargi* 4048 (DD); Rajavathkhawa forest, 05.09.1981, *B. Safui & Party* 10359 (CAL); *s.loc.* 08.12.1995, *S. Chandra & S.K. Mandal* 1080 (CAL).

Notes: Osbeckia nepalensis can be recognized easily by its large sessile leaves with cordate or subcordate base and the large scale-like intersepalal emergences on the hypanthium with a tuft of bristles. It closely resembles *O. wynaadensis*, but can be distinguished by the characteristic cordate or subcordate leaf base, as opposed to obtuse leaf base in the latter. Moreover, both are allopatric in distribution.

***Osbeckia nepalensis* Hook. var. *albiflora* Lindl.**, *Edwards's Bot. Reg.* 17: t.1475. 1831. *Lectotype* (designated here): *Edward's Bot. Reg.* 17: t.1475.

Fig. 11

Perennial, erect, branched shrubs, *c.* 2 m tall. Stems clothed with appressed to ascending or shaggy hairs. Leaves sessile or sub sessile (petioles 0.5–1.5 mm long); lamina lanceolate, 5–16 × 2–5.5 cm, 5–7-nerved, apex acute, base cordate or subcordate, both sides clothed with ascending shaggy hairs above, soft beneath. Inflorescence terminal or axillary panicles, 5–10-flowered. Flowers pentamerous; bracts ovate to broadly ovate, 7–15 × 5–9 mm, ciliate and appressed-hairy; pedicels 1–

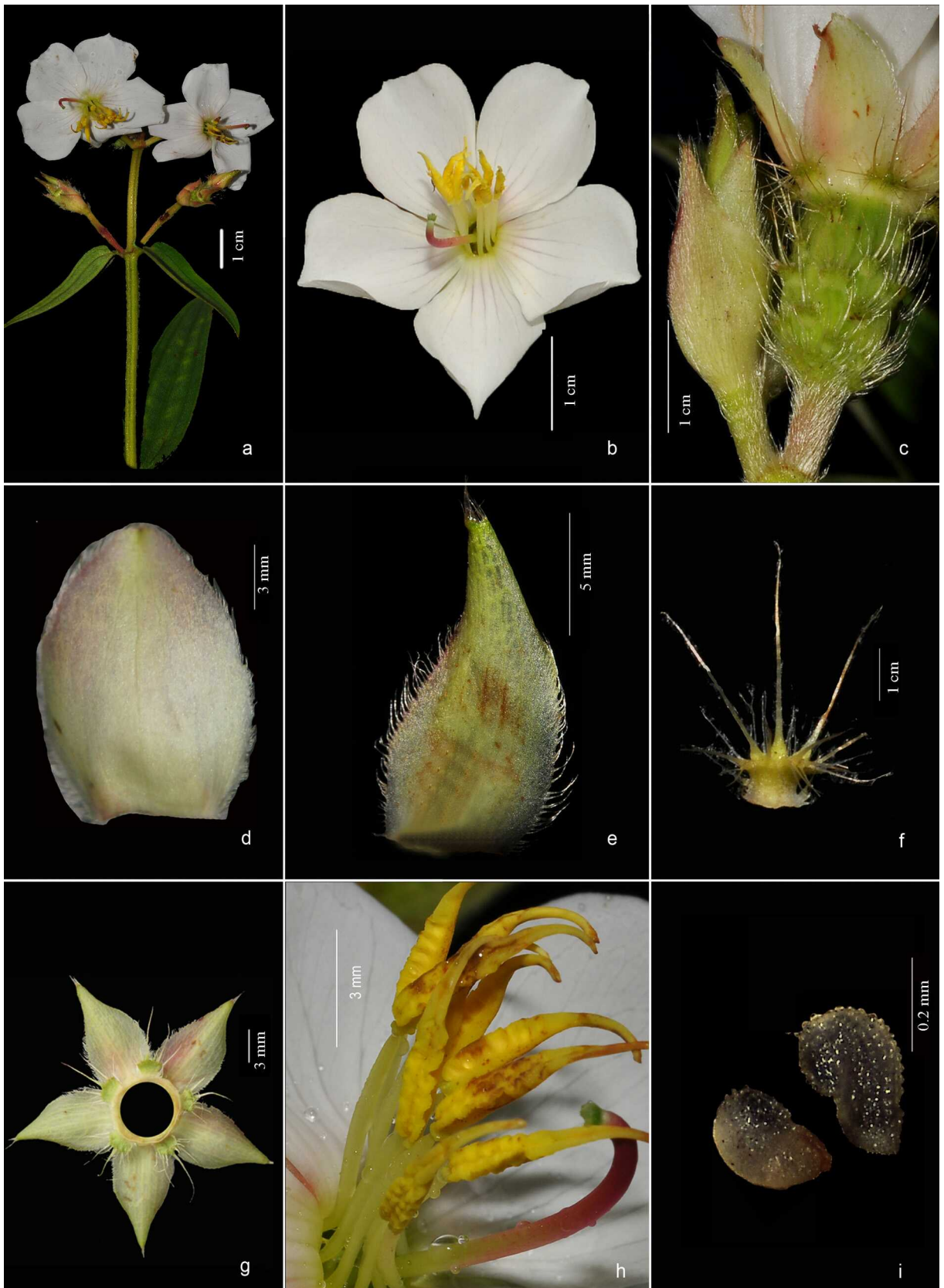


Fig. 11. *Osbeckia nepalensis* Hook. var. *albiflora* Lindl.: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Calyx lobes & intersepal emergences; **h.** Stamens; **i.** Seeds.

6 mm long. Hypanthium campanulate, 6–10 × 5.5–7 mm, with few to several sub appressed scale like emergences, simple hairs absent; intersepal emergences 1–1.5 × 1–2 mm, lobed, with a tuft of short bristles, caducous; other emergences similar in shape. Sepals 5, ovate, 8–11 × 4–7 mm, apex often acute, with few indistinct nerves, margins ciliate, caducous. Petals 5, broadly obovate to obcordate, 15–20 × 4–7 mm long, white, margins ciliate. Stamens 10; filaments 4–6 mm long; anthers narrowly ovate, 6–9 mm long, attenuate, not twisted, pore oblique on ventral side at the apex, connective sometimes slightly prolonged between collar and sacs. Ovary united with hypanthium for about half of its length; anther pockets extending to the base of ovary; crown distinct; style 13–19 mm long. Capsules campanulate, 6–10 × 5–8 mm, rim of hypanthium exceeding the crown; seeds minute, curved, 0.1–0.2 mm long, numerous.

Flowering & fruiting: June–December.

Chromosome number: $n = 19$ (Favarger, 1962), $n = 20$ (Mehra & Khosla, 1969).

Habitat: Occurs in swampy areas of evergreen forests while in high altitudes it is seen in open grasslands.

Distribution: Bhutan, China, India, Laos, Malaya, Myanmar, Nepal, North Vietnam and Thailand.

Specimens examined: INDIA, **Arunachal Pradesh**, East Siang district, Kameng F.D., Kalaktang, 14.01.1958, *G. Panigrahi* 15615 (CAL); West Kameng district, Kalaktang, 14.11.1973, *P.K. Hajra* 54102 (ASSAM); Sessa Orchid Sanctuary, Tippi, 01.07.2015, *Prashob & Sibichen* 6110 (DEV). **Meghalaya**, East Khasi hills district, Barapani, 13.10.1954, *G.K. Deka* 1435 (ASSAM); Khasia & Jaintia Hills, 21.12.1956, *G. Panigrahi* 4949 (ASSAM); Pynursula, 12.09.2015, *Prashob & Sibichen* 6133 (DEV); Shillong, 23.01.1931, *Shriram Sharma* 9003 (ASSAM); Jaintia hills district, Jowai, 18.11.1969, *N.P. Balakrishnan* 49989 (ASSAM). **Sikkim**, West Sikkim district, Dantam to Pelling, 13.09.2016, *Prashob, Sibichen & Anilkumar* 6105 (DEV); Khecheopalri lake, 14.09.2016, *Prashob, Sibichen & Anilkumar* 6609 (DEV).

Osbeckia nutans Wall. ex C.B. Clarke in Hook. f., Fl. Brit. India 2: 521. 1879; C. Hansen, Ginkgoana 4: 75. 1977; N.P. Balakr., Fl. Jowai 206. 141. 1983; Hajra & Verma, Fl. Sikkim 296, 1996; Noltie, Fl. Bhutan 1994. *O. nepalensis* Hook. var. *nutans* (Wall. ex C.B. Clarke) D. Maity, Econ. Taxon. Bot. (27) 1235. 2003. *syn. nov. Lectotype* (designated by Hansen, 1977): INDIA, *s.loc., s.d., Wallich* 4068 (K000867997 digital image!).

O. nutans Wall., Numer. List 144, no. 4068. 1831, *nom. nud.* Fig. 12

Perennial, erect, branched shrubs, *c.* 1.5 m tall. Stems covered with appressed hairs. Petioles 1–3 mm long; lamina narrowly lanceolate, 3–6.5 × 0.5–1 cm, 3-nerved, apex acute, base obtuse, glabrous throughout except on nerves below. Panicles terminal, 4–6-flowered, subtended by a pair of reduced leaves. Flowers pentamerous; pedicels 3–5 mm long; bracts green, ovate to cordate 4–7 mm long, both sides spatially clothed with short hairs. Hypanthium campanulate, 4–4.5 × 4–4.5 mm, glabrous or with appressed scale like emergences having hairs at apex; intersepal emergences exactly resembles normal emergences, both are caducous. Sepals 5, triangular, 6.5–7.5 mm long, with a few indistinct nerves, minutely ciliate, otherwise glabrous, caducous. Petals 5, obovate, 13–16 mm long, pink or purple, apex ciliate. Stamens 10; filaments 4–6 mm long; anthers narrowly ovate to oblong, 3–6 mm long, not twisted, pore oblique on ventral side of the tip; connective slightly prolonged into an undulating lobed collar. Ovary united with hypanthium; anther pockets extending to base of ovary, free part densely covered with appressed hairs; crown small, distinct, with short hairs; style 13–14 mm long. Capsules campanulate, 6.5–8.5 × 5–6.5 mm; seeds minute, curved, 0.1–0.2 mm long, numerous.

Flowering & fruiting: August–March.

Chromosome number: Not reported

Habitat: Occurs in swampy areas and river margins.

Distribution: Bhutan, India Myanmar and Nepal.



Fig. 12. *Osbeckia nutans* Wall. ex C.B. Clarke: **a.** Habit; **b.** Hypanthium; **c.** Calyx lobe; **d.** Intersepal emergence; **e.** Stamens; **f.** Seeds.

Specimen examined: INDIA, **Arunachal Pradesh**, Changlang district, Namdapha National Park, 10.06.1982, *J. Joseph* 81114 (ASSAM); Vijaynagar, 26.12.1996, *Das Chauhan* 99555 (ASSAM); Lohit district, Chamba village, 17.12.1969, *A.S. Rao* 48687 (CAL, ASSAM); Deopani river, north of Roing, 03.10.1969, *A.S. Rao* 48210 (CAL, ASSAM); Zunglua-Rusa, 05.09.1958, *G. Panigrahi* 16775 (CAL); Papum Pare district, Kimin to Zero, 23.11.1957, *G. Panigrahi* 11465 (ASSAM); Subansiri district, Subansiri Reserve forest Kimin-Kumin, 24.09.1959, *G. Panigrahi* 19302 (CAL, ASSAM); West Kameng district, Chaku, 21.04.1957, *G. Panigrahi* 6307 (CAL, ASSAM); Champari, 03.12.1916 *H. Haines s.n.* (CAL); Kameng, *s.d.*, *A.S. Rao* 50761 (ASSAM); Kameng, Chopai forest camp, 18.02.1974, *A.S. Rao* 56443 (ASSAM); Orchid Research centre, Tippi, 30.06.2015, *Prashob & Sibichen* 6117 (DEV); Shukhanala, *s.d.*, *P.K. Hajra* 54483 (ASSAM); Sissini to foot hill camp, 18.04.1957, *G. Panigrahi* 7042 (ASSAM); Tippi to Balupara 16.09.2016, *Prashob & Arun* 6117 (DEV); Tirap district, Zunghua-Rusa, 05.09.1958, *G. Panigrahi* 16775 (ASSAM). **Assam**, Goalpara district, *s.loc.*, 03.12.1918, *Upendranath Kanjilal* 7450 (ASSAM); Kokrajhar district, Chakoarila W.L.S, 03.07.2003, *Ranjit Daimary* 118075 (ASSAM); Lakhimpur district, Kimin river, 23.11.1957, *G. Panigrahi* 11465 (CAL, ASSAM); North Lakhimpur, Naharani Reserve, 17.05.1966, *D.M. Verma* 46390 (ASSAM); Subansiri Reserve forest Lakhimpur, 24.09.1959, *G. Panigrahi* 16775 (CAL); Upper Assam, Dikhow river forest, 30.03.1895, *s.coll.* 11093 (CAL). **Manipur**, Chamoo, 14.01.1882, *George Watt* 172153 (CAL); Naga hills, 12.1907, *A. Meebold* 7339 (CAL). **Meghalaya**, East khasi hills district, Shillong, *s.d. Griffith s.n.* (CAL); Garo hills district, Napak lake, 19.07.1976, *M.K.V. Rao* 64614 (ASSAM); Jaintia hills district, 17.12.1911, *I.H. Burkill s.n.* (CAL); West Jaintia Hills, Nartiang, 28.08.1968, *N.P. Balakrishnan* 47194 (ASSAM). **Sikkim**, East Sikkim district, Bumbing on the way to Rangto, 19.12.1981, *P. Chakrabarty* 2001 (BSHC); *s.loc.* 18.12.1903, *Prain* 25 (CAL); East Sikkim, 25.07.1985, *D.C.S. Raju*

3921 (BSHC); 20th Mile side, Bordang, 17.11.2001, *S.S. Dash & S.K. Rai* 23920 (BSHC); East Sikkim, 24.11.1980, *S.B. Ram* 00870 (CAL); Rangpo, Namthang, 19.12.1981, *P. Chakrabarty* 867 (CAL); Rhenock, 24.11.1980, *S.B. Ram* 00841 (BSHC); Rongly, 07.12.1980, *P. Chakrabarty* 1030 (CAL); Reshi, 02.01.1996, *S.K. Jana* 18013 (BSHC); way to Rongli, 07.12.1980, *P. Chakrabarty* 1030 (BSHC); South Sikkim district, Teesta valley, 15.11.1901, *Prain s.n.* (CAL); West Sikkim district, Labdang, 11.1990, *Dr. Prain* 60 (CAL); Sikkim, 10.1874, *C.B. Clarke* 28650 (CAL).

Notes: *Osbeckia nutans* can be recognized by its lanceolate leaves and large sepals exceeding the hypanthium. It is interesting to note that both glabrous or hypanthium with scaly emergences are found on the same plant.

Maity (2003) treated *O. nutans* as a variety of *O. nepalensis*. But critical examination of the type, protologue and live specimens led us to reinstate its original species status. Leaves are small (3–6.5 × 0.5–1 cm), narrow, petiolate and glabrous in *O. nutans* whereas it is large (5–16 × 2–5.5 cm), sessile, with shaggy hairs in *O. nepalensis*.

Osbeckia reticulata Bedd., Trans. Linn. Soc. 25: 216. 1865; C.B. Clarke in Hook.f., Fl. Brit. India 2: 520. 1879; Gamble, Fl. Pres. Madras 1: 493. 1919; C. Hansen, Ginkgoana 4: 115. 1977. *Lectotype* (designated by Hansen, 1977): INDIA, **Tamil Nadu**, Coimbatore, Anamallais, *s.d.*, *Beddome* 2998 (BM000944342 digital image!).

O. alveolata Bedd., Icon. Pl. Ind. Or. 1: 37. 1874. *Type*: INDIA, **Tamil Nadu**, Coimbatore, Anamallais, 6–7000 ft, *s.d.*, *Beddome* 239 (holo K000867948 digital image!).

O. reticulata Bedd., Madras J. Lit. Sci. ser. 3(1): 45. 1864, *nom. nud.* Fig. 13

Perennial, woody shrubs or small trees, 2–7.5 m tall; stems branched; young branches quadrangular with dense cover of patent hairs and brownish bristles. Petioles 7–18 mm long; lamina ovate, 4–10 × 2.5–6 cm, 5–7-nerved, acrodromous, apex acute, base subcordate, margins reticulate, upper



Fig. 13. *Osbeckia reticulata* Bedd.: a. Habit; b. Hypanthium; c. Bract; d. Intersepal emergence; e. Calyx lobe; f. Stamens; g. Seeds.

side bullate, densely covered with ascending, incurved and bristly hairs, lower side with patent hairs. Inflorescence a terminal cluster of cymes, 3–9-flowered. Flowers pentamerous; pedicels *c.* 5 mm long; bracts brownish, cordate, 4–6 × 5–7 mm, margins ciliate, densely appressed hairy dorsal. Hypanthium campanulate, 9–13 × 8–9 mm, covered with large emergences with hairs; intersepal emergences short, having many patent strong curved bristles, caducous; other emergences few, similar. Sepals 5, triangular, 4–7 × 1.5–3 mm, prominently 1-nerved with patent hairs on nerves, margins ciliate, caducous. Petals 5, obovate, 2–3.5 × 1.4–2.5 cm, purple, apex ciliate. Stamens 10; filaments 7–12 mm long; anthers narrowly ovate, 8–11 mm long, yellow, not twisted, beak absent, pore single, more or less oblique on dorsal side, connective with conspicuous collar having two small dorsal lobes or tubercles and two large ventral lobes. Ovary united with hypanthium about half of its length; anther pockets extending to base of ovary; crown distinct with groups of united hairs; style 16–22 mm long, glabrous; stigma capitate. Capsules campanulate, 9–12 × 8–11 mm, ribbed; seeds numerous, curved.

Flowering & fruiting: November–April.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Occurs in shola forests and grass lands above 1000 m.

Distribution: Endemic to South India.

Specimens examined: INDIA, **Kerala**, Idukki district, Anamudi shola N.P., Methap, 09.11.2014, *Prashob & Sibichen* 5554, 5555 (DEV); Eravikulam N.P., 15.01.2015, *Prashob & Sibichen* 5580, 5581, 5582, 5583, 5584, 5585 (DEV); Palakkad district, Perumalmudi, 21.04.1970, *s.coll.* 559 (MH). **Tamil Nadu**, Dindigul district, Bear shola, Kodaikanal, 07.03.1987, *K.M. Matthew & Rajendren* 48545 (RHT); Kodaikanal, 19.03.1950, *Daniel Sundaraj & Sakharan Rao* 93805 (MH); Poomparai, Kodaikanal, 22.04.1965, *Ramamurthy* 23362 (MH); Poomparai, 09.04.1987, *K.M. Matthew & Charles*

49116, 49146 (RHT); *Ibid.*, 20.05.1987, *K.M. Matthew & Charles* 49577 (RHT); Kodaikanal, 19.03.1956, *Pallithanam* 1551 (RHT); Kodaikanal, St. Mary's road, 10.05.1979, *K.M. Matthew* 16634 (RHT); Berijam, Kodaikanal, 19.11.1985, *K.M. Matthew* 42755 (RHT); Pambar shola, Kodaikanal, 07.02.1986, *K.M. Matthew* 44103 (RHT); *Ibid.*, 29.04.1986, *K.M. Matthew & Rajendren* 44696 (RHT); Vandaravu peak, Kodaikanal, 24.01.1998, *K.M. Matthew* 55124 (RHT).

Notes: This species is distinct from other taxa by its small tree-like habit, 7–9-nerved, large bullate leaves with minutely reticulate margin. The emergences on hypanthium are also unique.

Osbeckia tirunelvelica Manickam & Murugan ex Kottaim. & Gnanasek., *Phytotaxa* 231(3): 300. 2015. *Type:* INDIA, **Tamil Nadu**, Tirunelveli District, Manjolai hills, Road below Manjolai, *s.d.*, *Manickam & Murugan* 15109 (holo XCH!).

O. tirunelvelica Manickam & Murugan, *J. Econ. Taxon. Bot.* 25(3): 626. 2002, *nom. inval.* Fig. 14

Perennial, erect, branched shrubs, *c.* 1 m tall. Stems subterete, sparsely scabrous. Petioles 5–10 mm long; lamina elliptic to lanceolate, 2–6.5 × 1.5–3 cm, 3–5-nerved, green; apex acute to acuminate, base acute, both sides thinly clothed with patent hairs. Inflorescence terminal, condensed cyme or cluster of 6–9-flowers or 2–3 such cymes together, panicle subtended by bracts and a pair of leaves; bracts green, small ovate to broadly ovate, 1–3 mm long, ciliate and densely appressed hairy. Peduncle 2–5 mm long. Flowers pentamerous. Hypanthium campanulate, 4–8 × 2–4 mm, with a thin cover of simple hairs below and tufted hairs above; intersepal emergences 1–2.5 mm long, oblong, stalked, with terminal and lateral hairs; other emergences restricted to the upper part of the hypanthium, or absent; hairs short, bristly, subappressed, patent, curved upwards. Sepals 5, subulate, 2–5 × 2–3.5 mm, prominently 1-nerved, margins ciliate with long hairs at apex, a few patent hairs on nerves, persistent in fruit. Petals 5, obovate, 1–2.5 × 1–1.5 cm, pink to purple. Stamens 10;

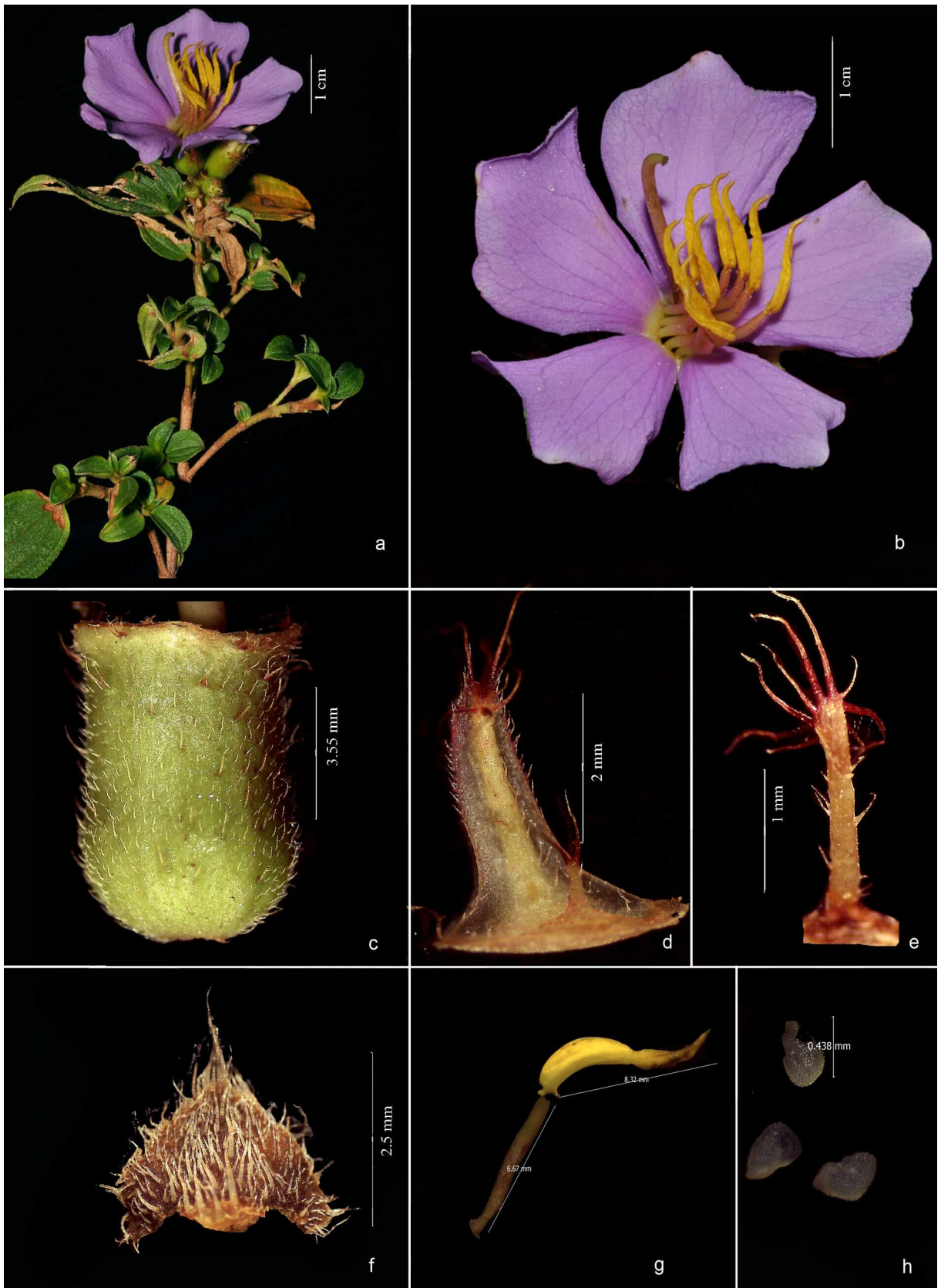


Fig. 14. *Osbeckia tirunelvelica* Murugan & Manickam ex Kottaim. & Gnanasek.: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Calyx lobe; **e.** Intersepal emergence; **f.** Bract; **g.** Stamen; **h.** Seeds.

filaments 5–10 mm long; anthers narrowly ovate to oblong, twisted, yellow, 5–9 mm long, pore oblique on ventral side of tip; connective with collar having one tubercle dorsally and slightly or irregularly lobed ventrally. Ovary united with hypanthium about half of its length, anther pockets extending to base of ovary; crown with short bristles, style 8–19 mm long, glabrous, curved; stigma slightly pointed. Capsules campanulate, 4–8 × 3–6 mm; seeds minute, 0.1–0.2 mm long, numerous, curved.

Flowering & fruiting: August–January.

Chromosome number: Not reported

Habitat: In evergreen forests and tea plantations at an elevation above 750 m in association with *O. aspera* and *O. mehrana*.

Distribution: Endemic to India.

Specimens examined: INDIA, **Tamil Nadu**, Tirunelveli district, Manjolai hills ±1115 m, 06.01.2016, *Prashob & Sibichen* 6023 (DEV); Tirunelveli, Kothayar ±1206 m, 06.01.2016, *Prashob & Sibichen* 6025 (DEV); Tirunelveli, on the way from Kakachi to Ooth ±1161 m, 06.01.2016, *Prashob & Sibichen* 6027 (DEV).

Notes: The publication of *O. tirunelvelica* by Manickam and Murugan (2002) is invalid as two collections were simultaneously indicated as “type” in the protologue. The name was later validated by Kottaimutu and Gnanasekaran (2015) following Art. 40 of ICN (Turland *et al.*, 2018).

Osbeckia travancorica Bedd. ex Gamble, Bull. Misc. Inform. Kew 1919(10): 404. 1919; Gamble, Fl. Pres. Madras 493. 1919. *O. aspera* (L.) Blume var. *travancorica* (Bedd. ex Gamble) C.Hansen, Ginkgoana 4: 84. 1977. *syn. nov.*; Mohanan, Fl. Quilon Dist., 187. 1984; Babu, Fl. Malappuram Dist. 257. 1990; M.Mohanan & Henry, Fl. Thiruvanthapuram 198. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996; Sivar. & Mathew, Fl. Nilambur 272. 1997; Sasidh., Fl. Periyar Tiger Reserve 144. 1998; Sasidh., Fl. Parambikulam W.L.S. 127. 2002; Anil Kumar *et al.*, Fl.

Pathanamthitta 222. 2005. *Type:* INDIA, **Kerala**, Travancore, 23.11.1851, *Wight* 1100 (holo K000867975 digital image!). **Fig. 15**

Perennial, erect, shrubs, 1–2 m tall. Stems branched, quadrangular; sparsely hirsute, hairs dense at nodes. Petioles 2–6 mm long; lamina ovate to lanceolate, 4–11 × 1–4.5 cm, green, 3–5-nerved, apex acute to attenuate, base obtuse, both sides thinly clothed with patent hairs. Inflorescence terminal panicles to cluster of cymes, 5–8-flowered. Flowers pentamerous; pedicels 4–7 mm long; bracts green, cordate, 3–8 mm long, margins ciliate, densely appressed-hairy. Hypanthium campanulate, 5–10 × 3–6 mm, densely covered with emergences, bristles and hairs; intersepal emergences stalked, 1–3 mm long, green turns brown, stalk terete, base flat with patent hairs, head stellate with tuft of bristles, caducous; other emergences smaller. Sepals 5, subulate, 2–5 × 1–4 mm; symmetrical, prominently 1-nerved, patent hairs occur on the midrib dorsally, margins ciliate, apex with caducous stellate emergences. Petals 5, obovate, 13–20 × 10–17 mm, pink to purple, margins ciliate. Stamens 10; filaments 6–10 mm long; anthers narrowly ovate to oblong, yellow, 5–11 mm long, twisted; connective prolonged into a collar with a dorsal and a slightly lobbed ventral tubercle. Ovary united with hypanthium for about half of its length; style 8–12 mm long. Capsules campanulate, 6–12 × 4–9 mm; seeds minute, numerous, 0.1–0.2 mm long, curved.

Flowering & fruiting: September–March.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Found in evergreen forest margins at an elevation above 300 m, commonly seen in association with *O. virgata* and *O. abrahamii*.

Distribution: Endemic to South India.

Specimens examined: INDIA, **Kerala**, Ernakulam district, Neriya Mangalam, 01.12.1993, *E.S. Santhosh kumar* 18389 (FRLH); Idukki district, Bison valley, Munnar, 09.1937, *E. Barnes* 118824 (DD); Devikulam, 12.1919; *A. Meebold* 13191 (CAL);

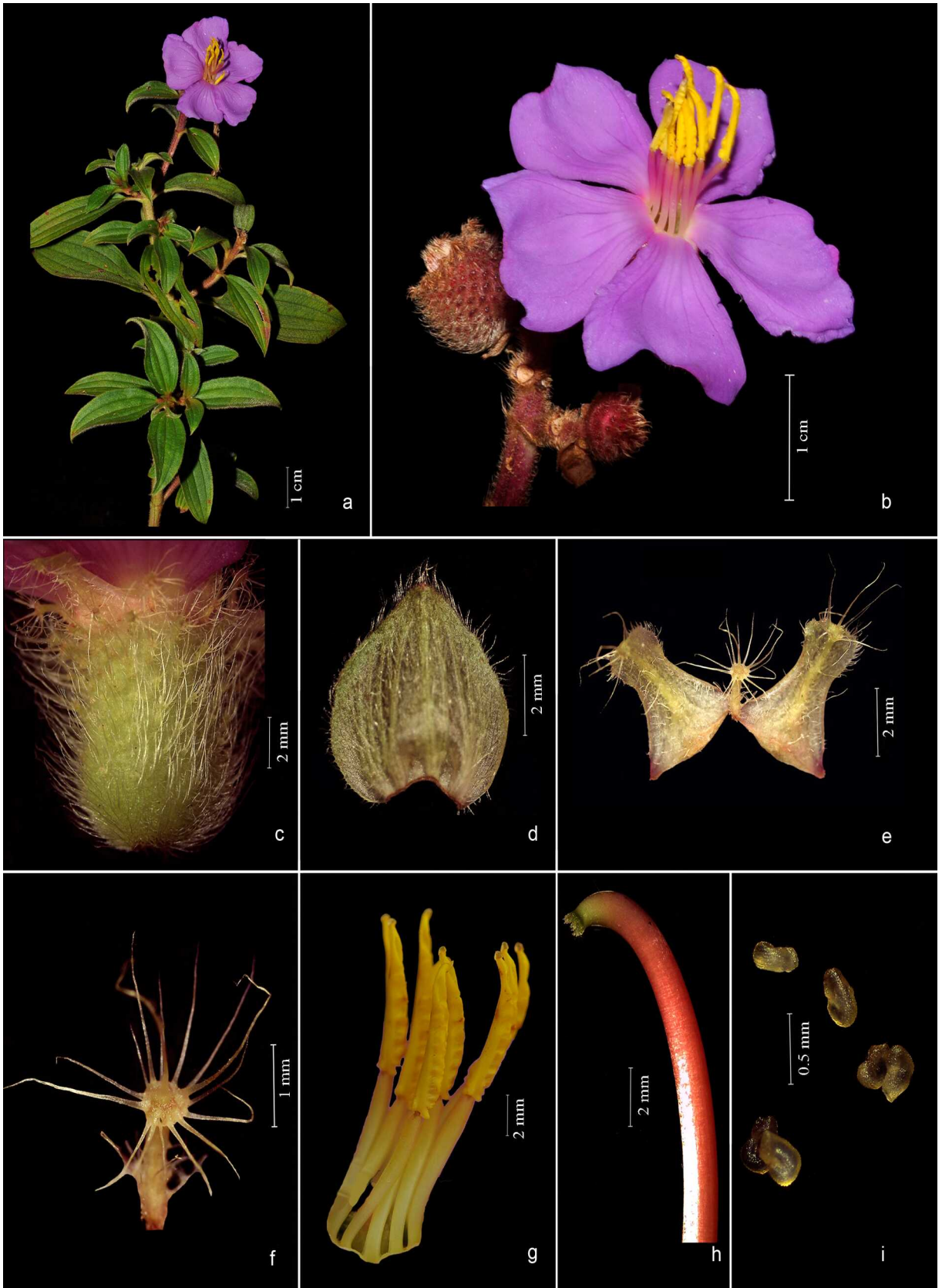


Fig. 15. *Osbeckia travancorica* Bedd. ex Gamble: **a.** Habit; **b.** Inflorescence; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobes & intersepal emergence; **f.** Intersepal emergence; **g.** Stamens; **h.** Style; **i.** Seeds.

Devikulam, 24.03.1980, K. Ramamurthy 66344 (CAL); Kattappana, 08.11.1981, B. Ramanujan & C.N. Mohanan 72415 (MH); *Ibid.*, 27.09.1981, B. Ramanujan & C.N. Mohanan 7203 (CAL); Kurisuhmala, 20.11.2014, Prashob & Sibichen 5564 (DEV); Meemutty, 12.12.1982, C.N. Mohanan 76018 (MH); Microwave station, 08.11.1981, V.S. Raju & V.S. Ramachandran 71207 (CAL); Vagamon, 20.11.2014, Prashob & Sibichen 5562 (DEV); Vazhikkadavu, Pindimedu, 02.10.1996, P. Bhargavan 92055 (MH); Kollam district, Mukkapuzha, 22.12.1972, C.N. Mohanan 59605 (MH); Kottayam district, Kangazha, 29.09.1989, V.T. Antony 48476 (MH); Kurisumala, 08.11.1984, V.T. Antony 930 (CAL); Palakkad district, Mukkali forest office, 05.11.1976, E. Vajravelu 94523 (MH); Muthikulam, Shiruvani, 02.03.1970, A. A. Ansari 1070 (CAL); Nillical, Silent Valley, 23.11.1937, N.L. Bor 9161 (DD); Pathanamthitta district, Pamba to Anathode, 16.12.1974, K. Vivekananthan 45316 (MH); Thiruvananthapuram district, Ponmudi, 17.11.1977, M. Mohanan 52541 (CAL); Poonkulam, Agastyarkudam, 05.03.1981, M. Mohanan 66049 (CAL); Thrissur district, Athirapally, 14.10.1994, N. Sasidharan 686 (FRLH); Thumboormuzhi, 12.09.1976, K. Ramamurthy 48476 (MH). **Tamil Nadu**, Coimbatore district, Anaimali hills, Pariuipare, 02.04.1912, C.E.C. Fischer 172106 (CAL); Dindigul district, Kodaikanal, 16.08.1911, C.E.C. Fischer 2865 (CAL); Pillar rock, 14.09.1968, D.B. Deb 30847 (CAL); Upper Palani, 16.08.1911, C.E.C. Fischer s.n. (CAL); Kanyakumari district, Upper Kothayar, s.coll. 53370 (CAL); Nilgiris district, Coonor, 06.1889, J.S. Gamble 21437; *Ibid.*, 11.1889, J.S. Gamble, 13246; *Ibid.*, 02.1899, Prains 13246 (CAL); Gudalur, Naduvattam, 18.01.1961, B.V. Shetty 1191 (CAL); Kotagiri Aravenu, 04.01.1957, K. Subramanyam 1888 (CAL); Upper Tiger shola, 19.01.1957, K. Subramanyam 2069 (CAL).

Notes: Hansen (1977) reduced *O. travancorica* Bedd. ex Gamble as a variety of *O. aspera* and remarked that the variety is distinct due to the asymmetrical calyx lobe and curved strong bristles on the stem.

After verifying the protologue and examining the type, and illustration on it by Gamble, we came to the conclusion that *O. travancorica* Bedd. ex Gamble is a distinct species, which can be very well distinguished by the downwardly curved, strong, bristles on the stem and uniform triangular sepals with obtuse or slightly emarginate apex.

Osbeckia virgata D. Don ex Wight & Arn., Prodr. Fl. Ind. Orient. 1: 323. 1834; C. Hansen, Ginkgoana 4: 107. 1977; Mohanan, Fl. Quilon Dist. 188. 1984; Ansari, Fl. Kasaragod Div. 165. 1985; Manilal, Fl. Silent Valley 111. 1988; Antony, Syst. Stud. Fl. Kottayam Dist. 167. 1989; Babu, Fl. Malappuram Dist. 259. 1990; M. Mohanan & Henry, Fl. Thiruvananthapuram 199. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996; Sasidh., Fl. Shenduruny W.L.S. 131. 1997; Sivar. & P. Mathew, Fl. Nilambur 274. 1997; Sasidh., Fl. Periyar Tiger Reserve 145. 1998; Sasidh., Fl. Chinnar W.L.S. 132. 1999; Mohanan & Sivad., Fl. Agasthyamala 280. 2002; Pull. *et al.*, Fl. Eastern Ghats 59. 2002; Sasidh., Fl. Parambikulam W.L.S. 129. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 223. 2005; Sunil & Sivadasan, Fl. Alappuzha Dist. 297. 2009. *Asterostoma virgata* (D. Don ex Wight & Arn.) Blume, Mus. Bot. 1(4): 50. 1849. *Lectotype* (designated by Hansen, 1977): INDIA, s.loc, s.d., Wight 1147B (E00174614 digital image!).

O. cupularis D. Don ex Wight & Arn., Prodr. Fl. Indiae Or. 1: 323. 1834, *pro parte*; C.B. Clarke in Hook.f., Fl. Brit. India 2(6): 514. 1879; Gamble, Fl. Pres. Madras 1: 494. 1919. *Type:* INDIA, Kerala, Thiruvananthapuram, 03.1827, Wallich 4074 (holo K001038091 digital image!).

O. octandra auct. C.B. Clarke in Hook.f., Fl. Brit. India 2(6): 521. 1879. *non* DC., 1828; Gamble, Fl. Pres. Madras 1: 493. 1919; Manilal & Sivar., Fl. Calicut 110. 1982; Subram., Fl. Thenmala Div. 141. 1995.

Melastoma glomeratum J.G. Klein ex Wight & Arn., Prodr. Fl. Ind. Orient. 1: 323. 1834, *pro. syn.*

O. wightiana Benth., Numer. List. No. 4074. 1831, *nom. nud.* Fig. 16

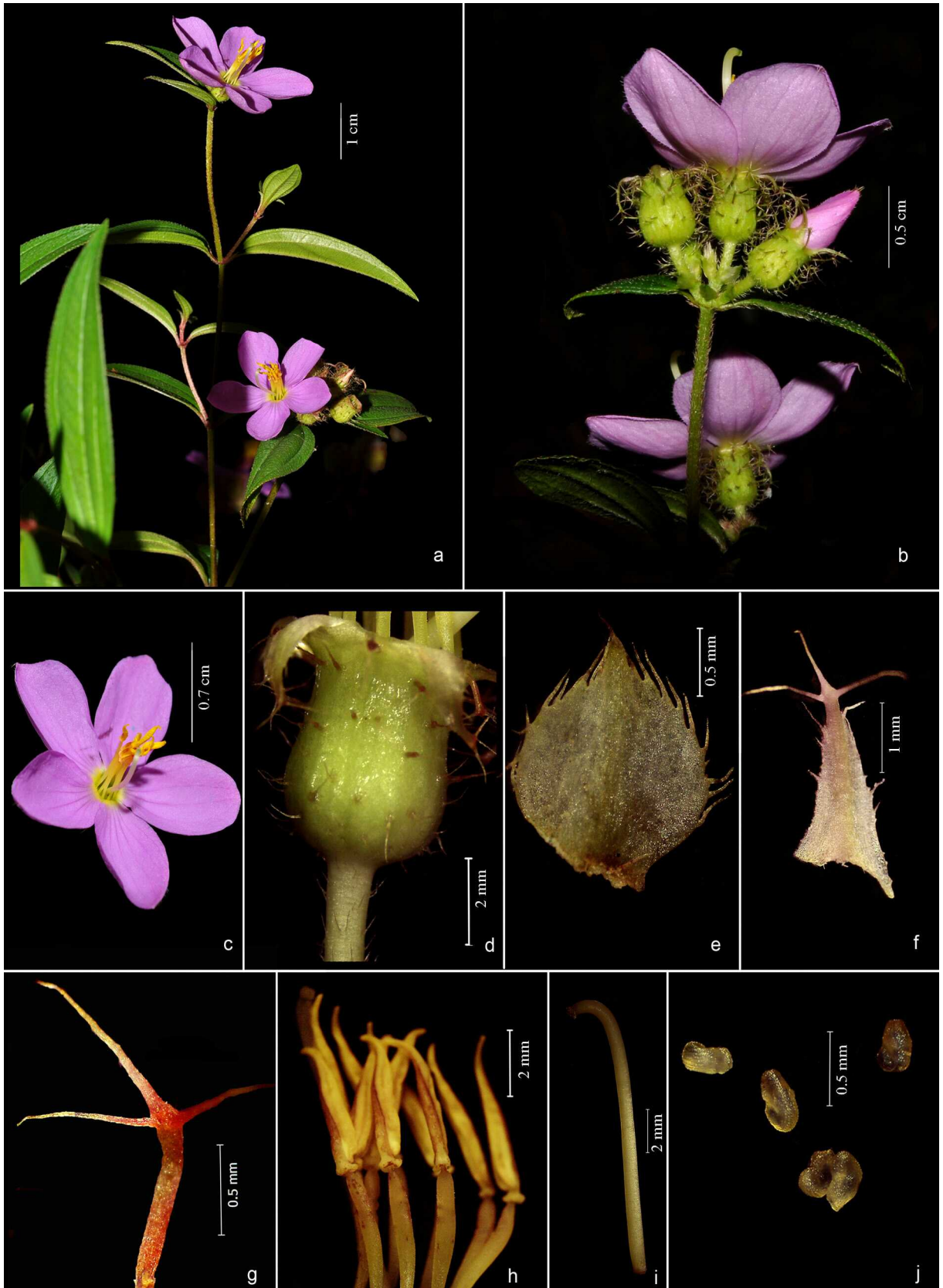


Fig. 16. *Osbeckia virgata* D. Don ex Wight & Arn.: **a.** Habit; **b.** Inflorescence; **c.** Flower; **d.** Hypanthium; **e.** Bract; **f.** Calyx lobe; **g.** Intersepalal emergence; **h.** Stamens; **i.** Style; **j.** Seeds.

Perennial, erect, shrubs, 30–50 cm tall. Stems branched, young branches quadrangular, with appressed short hairs. Petioles 1.5–4 mm long; lamina lanceolate, 2–4.5 × 0.5–1.5 cm, apex acute to acuminate, base attenuate, 3–5-nerved, both sides sparsely clothed with short to very short ascending, rarely appressed bristles. Inflorescence a terminal cluster of cymes, 5–11-flowered, subtended by the upper pair of small reduced leaves. Flowers pentamerous; bracts ovate, 1–2 × 0.5–1 mm, green, margins ciliate, both sides glabrous; pedicels 1–2 mm. Hypanthium campanulate, 3–5 × 2–3.5 mm, sparsely clothed with emergences and bristly hairs; intersepal emergences stalked, 0.7–2 mm long, stalk terete, narrow, glabrous, head small, with 2–3 spreading bristles, caducous; other emergences similar, occurring only on upper part of the hypanthium, smaller or reduced to terminal bristles, hairs patent. Sepals 5, triangular, 2–4 × 1–2 mm, narrowed into an attenuate or terete bearing stellate emergence at the apex, margins ciliate with few hairs, 1-nerved with few patent bristles dorsally, caducous. Petals 5, obovate to orbicular, 7–16 mm long, apex ciliate, pink. Stamens 10; filaments 4–6 mm long, glabrous; anthers narrowly ovate, yellow, twisted, 3–5.5 mm long, pore oblique; connective with undulating collar. Ovary united with hypanthium for about half of its length; anther pockets extending to base of ovary; crown with a few strong bristles; style 7–11 mm long. Capsules, campanulate, 4–6 × 4.5 mm; seeds minute, 0.1–0.3 mm long, numerous, curved muricate.

Flowering & fruiting: June–April.

Chromosome number: $n = 11$ (Meenakumari & Kuriachan, 1990).

Habitat: Commonly occurs in evergreen and shola forest margins at an elevation above 1000 m; rarely seen below 100 m.

Distribution: Endemic to India.

Specimens examined: INDIA, **Karnataka**, Chikkamagaluru district, Charmudi ghats, 17.04.1979, *Saldanha & Ramesh* 786 (CAL); Kodagu district, Virajapete, 18.01.1953, *K.M. Vaid* 23417

(DD); Shimoga district, Agumbe, 15.05.1962, *Sundara Raghavan* 80673 (CAL); Agumbe, Begar road, 13.10.1962, *Sundara Raghavan* 67965 (CAL); *Ibid.*, 15.05.1962, *Sundara Raghavan* 80667 (CAL); Agumilar Ghats Edge, North Kanara, 09.03.1960, *R.S. Rao* 61264 (CAL); Ghat road to Agumbe, 13.10.1962, *Sundara Raghavan* 83177 (CAL); Udupi district, Someshwar, 06.02.1961, *Sundara Raghavan* 69368 (CAL). **Kerala**, Ernakulam district, Pooyamkutty, 14.02.1986, *K.K.N. Nair* 4304 (KFRI); Idukki district, Kalveri Mount, 08.11.1981, *Ramanujan & Mohanan* 72429 (CAL); Kuttikanam, 25.09.1964, *Vivekananthan* 21370 (MH); Peerumedu, Kuttikanam, 15.07.1966, *Vivekananthan* 29325 (MH); Vallakkadavu, 11.03.1973, *B.D. Sharma* 84519 (MH); Kannur district, Thalappalli, 28.01.1979, *V.S. Ramachandran* 59273 (MH); Kollam district, Paravur, 07.08.1978, *Mohanan* 58401 (CAL); Kulathupuzha, 19.12.1980, *Sasidharan* 1438 (KFRI); Kozhikode district, Muthapanpuzha, Vellarimala, 11.07.2014, *Prashob & Sibichen* 5521 (DEV); Pakranthalam, 10.07.2014, *Prashob & Sibichen* 5520 (DEV); Thamarassery, 29.10.1965, *J.L. Ellis* 25766 (CAL); Malappuram district, Nadukani, 08.1956, *E. Barnes s.n.* (DD); Pathanamthitta district, Konni, 30.07.1908, *M. Rama Rao* 0064 (DD); *Ibid.*, 21.11.1928, *V. Narayanaswami* 1763 (MH); *Ibid.*, 22.12.1957, *S. Negi* 25887 (DD); Manniyar River, Puthukulam, 07.07.1988, *Arunkumar* 640 (CAL); Ranni, 10.11.1976, *Chandra Bose* 49075 (MH); Ranni, 30.08.1977, *N.C. Nair* 507088 (MH); Thiruvananthapuram district, Bonacaud, 04.10.1973, *J. Joseph* 44546 (MH); Nedumangad, 11.1901, *s.coll. s.n.* (MH); Ponmudi, 11.09.1970, *K.M. Matthew* 12328 (RHT); *Ibid.*, 17.11.1977, *Mohanan* 52547 (MH); *Ibid.*, 17.01.1989, *Sasidharan* 5282 (KFRI); *Ibid.*, 01.08.2014, *Prashob & Sibichen* 5513 (DEV); *s.loc.*, 12.1937, *N.L. Bor* 83037 (DD); Thrissur district, Vazhachal, 04.11.1989, *Sasidharan* 5500 (KFRI); Wayanad district, Brahmagiri, 16.11.1978, *V.S. Ramachandran* 58761 (CAL, MH); Chandanathode, 20.12.1979, *V.S. Ramachandran* 65354 (CAL, MH); Chembra lake, 08.12.2014, *Prashob & Sibichen* 5558 (DEV);

Pookode lake, 04.06.2014, *Prashob & Sibichen* 5509 (DEV); *Ibid.*, 08.07.2014, *Prashob & Sibichen* 5517, 5518, 5519 (DEV); Sulthan Bathery, 09.05.1965, *J.L. Ellis* 24009 (MH); Tirunelli, 09.02.1978, *V.S. Ramachandran* 53830 (MH); *s.loc.*, 1881, *Beddome s.n.* (MH); *s.loc.*, 11.1884, *J.S. Gamble* 172054 (CAL). **Tamil Nadu**, Coimbatore district, Atakatti, Anaimalai hills, 12.1911, *C.E.C. Fischer* 2214 (CAL); Sholayar, 20.04.1986, *Sasidharan* 1756 (KFRI); Nilgiri district, Conoor, 08.1883, *J.S. Gamble* 12307 (DD); Gudalur, 11.03.1969, *D.B. Deb* 31651 (CAL); Namakkal district, Kolli hills, 24.01.1968, *K.M. Matthew* 8478 (RHT); *Ibid.*, 11.01.1976, *K.M. Matthew & Alphonse* 711 (RHT); *Ibid.*, 13.08.1976, *K.M. Matthew & Alphonse* 3154 (RHT); *Ibid.*, 03.02.1978, *Mohan* 11587 (RHT); Kolli hills, Ariyur shola, 22.04.1980, *K.M. Matthew* 27636 (RHT); *Ibid.*, 28.04.1981, *K.M. Matthew* 28285 (RHT); Kolli hills, Kolathukadu shola, 20.04.1978, *Mohan* 13192 (RHT); Kolli hills, Kolathukadu, 03.02.1978, *Mohan* 11624 (RHT); Kolli hills, Kuzhivalavu shola, 24.06.2001, *K.M. Matthew* 62736 (RHT); Kolli hills, Kasam, a pond near Sempaththu village, 08.02.1979, *Perumal* 21663 (RHT); Kolli hills, Selur, 17.10.1978, *K.M. Matthew & Venugopal*, 18378 (RHT); *Ibid.*, 07.02.1979, *Perumal* 21591 (RHT); *Ibid.*, 21.04.1979, *K.M. Matthew* 22963 (RHT); Kolli hills, Solakkadu, 18.12.1979, *K.M. Matthew* 25185 (RHT); Kolli hills, Solakkadu, Pongal Koil shola, 22.02.1980, *K.M. Matthew* 26668 (RHT); Kolli hills, Kuzhivalavu top, 15.03.2002, *K.M. Matthew* 63342 (RHT); Kolli hills, Sothupparai, 17.03.2003, *K.M. Matthew* 63604 (RHT); Salem, 06.02.1979, *Perumal* 21663 (CAL); Salem, Mooduballi village, 15.04.1977; Ramanathapuram district, Deviar estate, 11.06.1979, *Srinivasan* 63515 (CAL); Sethur hills, 13.03.1981, *Srinivasan* 68051 (CAL).

Notes: *Osbeckia virgata* and *O. octandra* resembles in habit. Hansen (1977) also made a similar observation. But *O. virgata* is distinct from the latter due to the sparse vestiture of the hypanthium, thread-like intersepal emergences having one or a few bristles, much reduced intersepal emergences

and by the deciduous sepals. Both species are found in Sri Lanka but in India there is only *O. virgata*.

Osbeckia wightiana (Benth.) Wight & Arn., Prodr. Fl. Ind. Orient. 1: 323. 1834; C.B. Clarke in Hook.f., Fl. Brit. India 2: 519. 1879; Gamble, Fl. Pres. Madras 1: 493. 1919; Fyson, Fl. Ind. Hill 173. 1932; Mohanan & Sivad., Fl. Agasthyamala 280. 2002; Anil Kumar *et al.*, Fl. Pathanamthitta 223. 2005. *O. wightiana* Benth. in Wallich, Numer. List. n. 4060. 1831 (*nom.nud.*). *O. aspera* (L.) Blume var. *Wightiana* (Benth. ex Wight & Arn.) Trimmen, Fl. Ceylon 2: 196. 1894, *syn. nov.*; C.Hansen, Ginkgoana 4: 85. 1977; Vivek. in N.C.Nair & A.N.Henry, Fl. Tamil Nadu 1: 161. 1983; Mohanan, Fl. Quilon Dist., 187. 1984; Vajr., Fl. Palghat Dist., 203. 1990; M.Mohanan & Henry, Fl. Thiruvanthapuram 198. 1994; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 37. 1996; Swarup. *et al.*, Shola For. Kerala 59. 1998; Sasidh., Fl. Periyar Tiger Reserve 144. 1998; Sasidh., Fl. Chinnar WLS 131. 1999; Manickam *et al.*, Fl. Tirunelveli Hills 407. 2008. *Lectotype* (designated by Hansen, 1977): *s.loc.*, 1831, *Wallich* 4060A (K000867973 digital image!). *O. koti-gueda* Naudin, Ann. Sci. Nat. Bot. ser. 3, 14: 64. 1850. *Lectotype* (designated by Hansen, 1977): INDIA, Tamil Nadu, Nilgiris (as Nellyghery), *s.d.*, *Leschenault* 41 (P02441100 digital image!)

Fig. 17

Perennial, erect, branched, woody shrubs, 1–3.5 m tall. Young stems quadrangular, thinly clothed with appressed or sub appressed, short bristles. Petioles 4–8 mm long; lamina ovate, 3–7 × 2–3.5 cm, apex acute, base obtuse, 5–7-nerved, non-acrodromous, adaxial surface of leaf covers with dense silky sub-patent hairs, abaxial side with patent, flexuous hairs. Inflorescence terminal cymes, 3–7-flowered, subtended by large bracts; bracts ovate, 6–10 mm long, green, margins ciliate, densely rufous hairy. Flowers pentamerous; Pedicels 1–3 mm long, covered with thin patent hairs. Hypanthium campanulate, 7–13 × 7–12 mm, densely clothed with large emergences mixed with small hairs and bristles; intersepal emergences stalked, 1.5–2.5 mm long, hairy, ending in a small

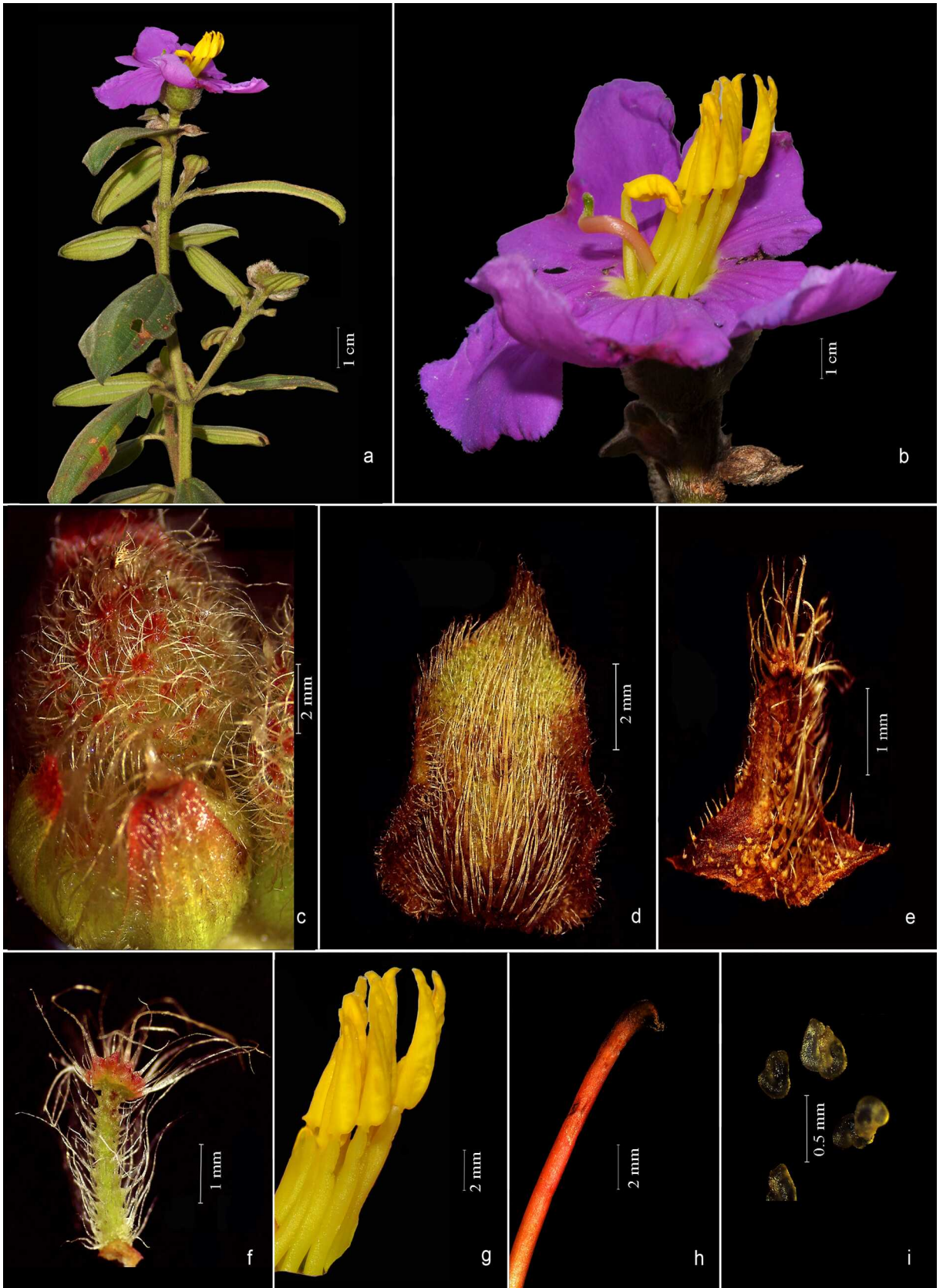


Fig. 17. *Osbeckia wightiana* (Benth.) Wight & Arn.: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepal emergence; **g.** Stamens; **h.** Style; **i.** Seeds.

tuft of patent stellate hairs; other emergences similar, mixed with small hairs and bristles. Sepals 5, subulate, 2.5–4 × 1.3–3.5 mm long, sparsely hairy, margins ciliate, apex with stellate emergence, caducous. Petals 5, obovate, 15–25 × 10–20 mm long, pink to purple; margins ciliate. Stamens 10; filaments 7–12 mm long, glabrous; anthers narrowly oblong, yellow, 5–9 mm long, twisted, pore apical, oblique on dorsal side; connective prolonged in to a small, indistinctly lobed collar. Ovary 4–8 mm long, united with hypanthium; anther pockets covered with brownish appressed hairs; crown ciliate; style 1–1.5 cm long, glabrous, curved; stigma, swollen. Capsules campanulate, 5–7.5 × 4–5.5 mm; seeds numerous, minute, 0.1–0.2 mm long, curved.

Flowering & fruiting: July–April

Habitat: Occurs in evergreen forests at an elevation above 1000 m, seen in association with *Osbeckia virgata* and *O. parvifolia*.

Distribution: Endemic to South India.

Specimens examined: INDIA, Kerala, Idukki district, Kattappana, 08.11.1981, B. Ramanujan & C.N Mohanan 72415 (CAL); Mathikettan, 08.05.1994, V.S. Ramachandran 1778 (FRLH); Palakkad district, Poovancholai, Silent valley, 07.03.1984, N.C. Nair & P. Bhargavan 8112 (CAL); Silent valley R.F., 22.12.1969, E. Vajravelu 33259 (MH). Tamil Nadu, Coimbatore district, Vadakumalai, 22.12.1970, M.V. Viswanadhan 860(MH); Velliengiri hills, 21.02.1932, S.R. Raju & Rethnavelu 215 (MH); Dindigul district, Gundur shola, Kodaikanal, 10.07.1986, K.M. Matthew & N. Rajendren 45840 (RHT); 6th road to Kodaikanal, 09.03.1958, K. Subramanyam 5525 (MH); Kodaikanal, 13.03.1956, S.J. Pallithanam 1352 (RHT); *Ibid.*, 14.10.2015, Prashob & Sibichen 6012 (DEV); Kodaikanal, Perumal peak, 21.07.1984, K.M. Matthew 40344 (RHT); Leving path, Kodaikanal, 29.04.1986, K.M. Matthew & N. Rajendren 44662 (RHT); Observatory slope, 11.08.1969, K.M. Matthew 10386 (RHT); Palamalai, 19.02.1986, K.M. Matthew 44159 (RHT); Palamalai

Machur path, 10.05.1985, K.M. Matthew & N. Rajendren 44923 (RHT); Palani hills, 29.11.1985, K.M. Matthew & N. Rajendran 43446 (RHT); Perumal malai, 21.05.1969, K.M. Matthew 10243 (RHT); Berijam slope, 06.08.1984, K.M. Matthew 2150 (RHT); Perumal malai, St. Joseph's farm, 07.02.1985, K.M. Matthew 40953 (RHT); Moir point slope, 04.08.1985, K.M. Matthew 41688 (RHT); Kodaikanal, Pillar Rock, 11.06.1986, C. Sundhersen 004 (CAL); *Ibid.*, 14.09.1968, D.B. Deb 30847 (MH); Kodaikanal hills, 18.10.1919, C.K. Jacob 21171 (MH); Kanyakumari district, Mahendragiri R.F., 25.02.1983, A.N. Henry & R. Gopalan 77157 (CAL); Upper Kothayar, 02.02.1978, A.N. Henry 53370 (MH); Sengamalai estate to Mahendragiri, 06.12.1969, B.V. Shetty 33058 (MH); Kandakki estate, Panagudi, 03.12.1969, B.V. Shetty 33015 (MH); Madurai district, Varayattu mottai, Pachakamatchi, 16.08.1990, V. Lakshmanan 91197 (MH); Nilgiris district, Kotagiri Avenue, 04.01.1957, K. Subramanyam 1888 (MH); Naduvattam, 18.01.1961, B.V. Shetty 11925 (MH); Upper Tiger shola, 19.01.1957, K.M. Sebastine 2069 (MH); Mettupalayam–Kotagiri road, 07.03.1969, D.B. Deb 31481 (MH); Kotagiri, 31.07.1970, E. Vajravelu 35184 (MH); Lamb's rock, Coonoor, 28.04.1971, N.C. Rathakrishnan 38105 (MH); Koil mattam, Elanad, 25.03.1972, G.V. Subbaro 40476 (MH); Nilgiri, Coonoor, 01.1883, J.S. Gamble 11925 (DD); *Ibid.*, 10.1886, J.S. Gamble 21155 (MH); *Ibid.*, 10.1889, J.S. Gamble 21437 (DD); Nilgiri, Sispara, 10.1889, J.S. Gamble 21155 (MH); Ooty, Kotagiri, 18.12.2014, Prashob & Sibichen 5577, 5578 (DEV); Tirunelveli district, Pachayar bund, Sengaltheri, 22.12.1980, E. Vajravelu 76430 (CAL); Theni district, Periakulam, Shembaganur-Periakulam, 21.11.1985, K.M. Matthew, N. Rajendren & A. Usha 42933 (RHT).

Notes: Trimen (1894) treated this taxon as a variety under *Osbeckia aspera*. However, this taxon is recognized as a distinct species in the present treatment. Substantiating characters are summarized in the Table 3 below.

Table 3. Comparison of *O. aspera* and *O. wightiana*

Character	<i>O. aspera</i>	<i>O. wightiana</i>
Leaves	Acrodromous, 3-nerved	Non-acrodromous, 5–7-nerved
Hypanthium	Simple hairs only	Simple hairs and emergences all over
Bracts	Ovate to cordate, 1–5 mm long	Ovate, 6–10 mm long
Sepals	Triangular	Subulate
Intersepalal emergences	Sessile, ending in a tuft of hairs	Stalked, hairy, ending in a small tuft of patent stellate hairs
Other emergences	Absent	Present, stalked with stellate head

Osbeckia wynaadensis C.B. Clarke in Hook.f., Fl. Brit. India 2(6): 521. 1879; Gamble, Fl. Pres. Madras 1: 493 (348). 1919; C. Hansen, Ginkgoana 4: 62. 1977; Ramach. & V.J. Nair, Fl. Cannanore District 188. 1988; M. Mohanan & Henry, Fl. Thiruvananthapuram 199. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996; Sasidh., Fl. Periyar Tiger Reserve 145. 1998; Sasidh., Fl. Parambikulam W.L.S. 129. 2002. *Lectotype* (designated by Hansen, 1977): INDIA, **Tamil Nadu**, Gudalur, Wayanad, 4000 ft, 29.03.1870, C.B. Clarke 11328A (K000890001 digital image!) **Fig. 18**

Perennial, erect, shrubs, 1–2.5 m tall. Stems profusely branched, branches thinly covered with appressed shaggy hairs. Petioles 0.5–1.5 cm long; Lamina ovate to elliptic, 9–20 × 2.5–5 cm, 5-nerved, green, apex acute, base obtuse, upper side covered with ascending strong shaggy hairs, lower side with patent short hairs. Inflorescence terminal panicles, 9–15-flowered. Flowers pentamerous; bracts ovate, 10–14 × 4–8 mm, green, appressed hairy along the dorsal side; pedicels 0.5–1.5 mm long. Hypanthium campanulate, 6–9 × 3–5 mm, with a few, large scale like emergences, simple hairs absent; intersepalal emergences strongly bristled scale like, caducous; other emergences similar to those on the hypanthium. Sepals 5, triangular, 7–12 mm long, acute, with indistinct nerves, margins finely ciliate, both sides glabrous, caducous. Petals 5, broadly obovate, 15–19 × 8–12 mm long, purple, with ciliate apex. Stamens 10; filaments 7–11 mm long, glabrous; anthers narrow, ovate, 6–10 mm long, yellow, attenuate, not twisted; pore oblique

on ventral side; connective with a collar having dorsal and ventral lobes. Ovary united with hypanthium; anther pockets extending to the base of ovary; crown distinct with appressed short hairs; style 12–18 mm long. Capsules campanulate, 7–8 × 5–6 mm; seeds minute, numerous, muricate and curved.

Flowering & fruiting: September–April.

Chromosome number: $n = 12$ (Meenakumari & Kuriachan, 1990).

Habitat: Usually found in large population, in swampy areas along the forest margins also occurs in open grasslands.

Distribution: Endemic to South India.

Specimens examined: INDIA, **Kerala**, Idukki district, Munnar, 30.04.1937, E. Barnes s.n. (DD); Palakkad district, Parambikulam Submergible area, 20.11.1962, K.M. Sebastine 15049 (CAL, MH); Wayanad district, Meenmutty, 14.02.1982, C. N. Mohann 73252 (CAL); *Ibid.*, 27.01.15, Prashob & Sibichen 6015, 6016, 6017 (DEV); Pookode lake, 27.01.15, Prashob & Sibichen 6011, 6012, 6013, 6014 (DEV); Sulthan Bathery, 08.02.1964, J.L. Ellis 18623 (CAL, MH); Tirunelli, 09.02.1978, V.S. Ramachandran 53819 (CAL, MH); *s.loc., s.d.*, E. Barnes s.n. (MH). **Tamil Nadu**, Dindigul district, Kodaikanal, *s.d., s.coll. s.n.* (RHT); Nilgiri district, Benne R.F., 20.01.1961, B.V. Shetty 11944 (MH); *Ibid.*, 10.04.1972, K. Vivekanandhan 79662 (MH); Gudalur, *Ibid., s.d.*, C.B. Clarke s.n. (MH); *Ibid., s.d.*, E. Barnes s.n. (DD); Tirunelveli district, Mahendragiri, 09.1903, C.E.C. Fischer s.n. (CAL).

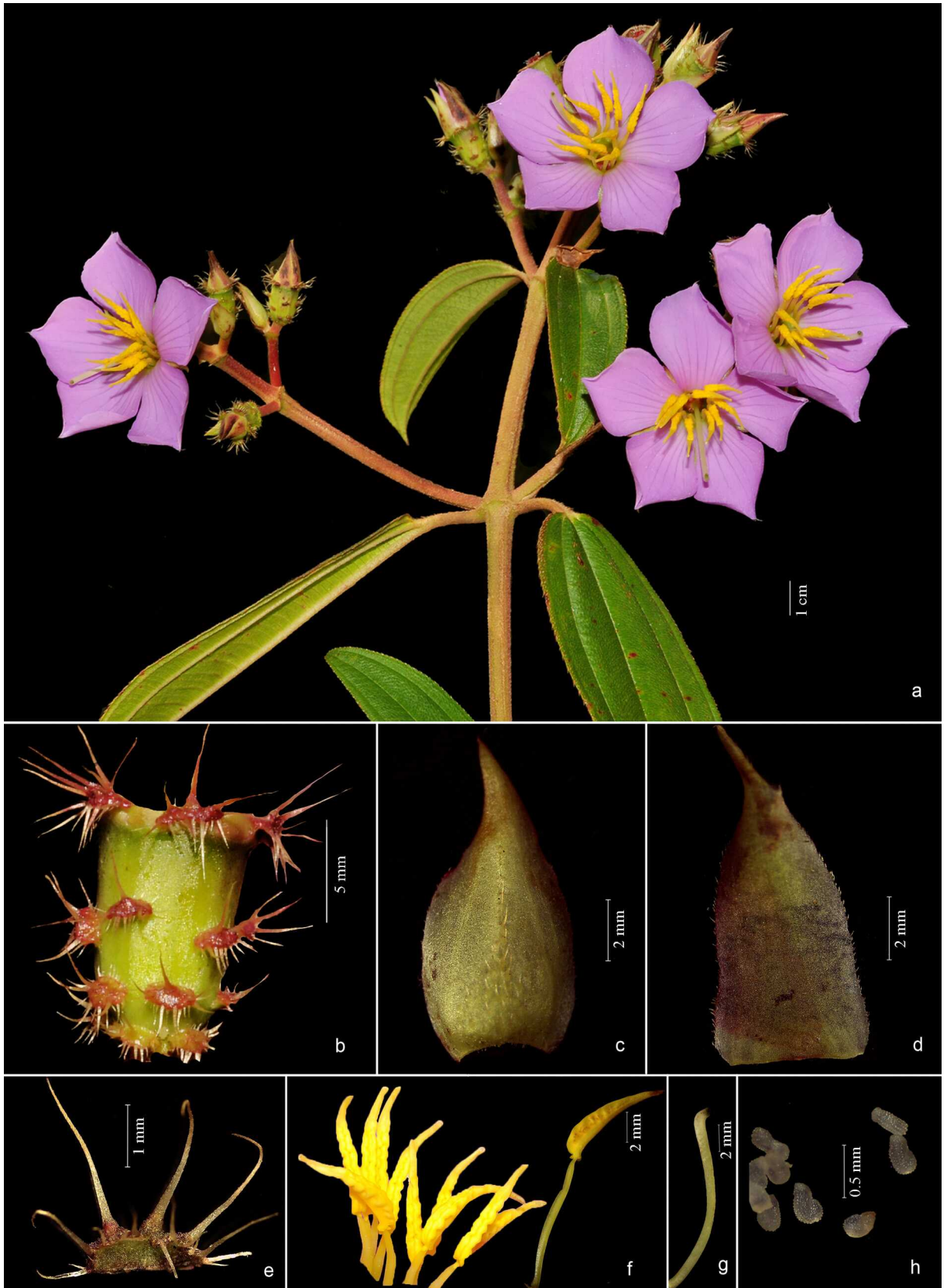


Fig. 18. *Osbeckia wynaadensis* C.B.Clarke: **a.** Habit; **b.** Hypanthium; **c.** Bract; **d.** Calyx lobe; **e.** Intersepal emergence; **f.** Stamens; **g.** Style; **h.** Seeds.

Notes: *Osbeckia wynaadensis* closely resembles *O. nepalensis* both in vegetative and floral characters. Both of them occur in altitudes above 700 m. The allopatric distribution (*O. wynaadensis* is restricted to South India whereas *O. nepalensis* found only in North East) and the length of the petioles are the two major differences by which the species can be segregated. In *O. wynaadensis* leaves are petiolate (0.5–1.5 cm long) but in *O. nepalensis* the leaves are sessile.

Osbeckia sect. Ceramicalyx

The section *Ceramicalyx* was established by Triana (1871) with five species namely *O. stellata*, *O. hispidissima*, *O. crinita*, *O. gracilis* and *O. rostrata* and its varieties viz., var. *longicollis*, var. *pulchella* and var. *ternifolia*. Clarke (1879) treated all the above species except *O. gracilis* and *O. rostrata* var. *ternifolia* under this section. Besides these, Clarke (*l.c.*) also included a new variety of *O. rostrata* viz., var. *marginulata*. Later, Cogniaux (1891) adopted the section *Ceramicalyx* Triana, excluding *O. gracilis*. The exclusion of *O. gracilis* by subsequent authors is justifiable as the species is fairly distinct due to its pentamerous flowers and the anthers without beak. The members of the section *Ceramicalyx* are perennial shrubs with tetramerous flowers, urceolate hypanthium and “S” shaped anthers with long beak. The section is represented by 3 species and 2 varieties in India.

Osbeckia sect. Ceramicalyx Triana, Trans. Linn. Soc, London 28: 53. 1871; C.B. Clarke in Hook.f., Fl. Brit. India 2(6): 516. 1879; Cogn. in A.D.C. & C.D.C., Monogr. Phan. 7: 322: 1891. *Type:* *Ceramicalyx stellatus* Buch.-Ham. ex D. Don (= *Osbeckia stellata* Buch.-Ham. ex D. Don).

Oxyrhinae subsect. *Longicolles* Naudin, Ann. Sci. Nat. Bot. ser. 3. 14: 74. 1850.

Perennial, erect, branched shrubs. Flowers tetramerous; hypanthium urceolate with stellate emergences and hairs; anthers ‘S’ shaped with long beak.

Distribution: Distributed mainly along wet tropical

and subtropical Asia including Indo China, Nepal, and Bhutan.

Key to the species of sect. Ceramicalyx

- 1a. Plant glabrous; branchlets distinctly winged; hypanthium without emergences and hairs; intersepal emergences absent *O. nayarii*
- 1b. Plant hairy; branchlets not distinctly winged; hypanthium with emergences and hairs; intersepal emergences present 2
- 2a. Intersepal emergences having terete stalk with lateral hairs and stellate head *O. stellata*
- 2b. Intersepal emergences linear without lateral hairs and stellate head *O. rostrata*

Osbeckia nayarii G.S.Giri, J. Econ. Taxon. Bot. 4(2): 609. 1983. *Type:* INDIA, Meghalaya, Khasia, 2000 ft., 14.09.1886, C.B. Clarke 44776A (holo CAL0000015810!).

Melastoma pulchella Roxb., Fl. Ind., ed. 2, 2: 403. 1832. *Type:* INDIA, *s.loc.*, 1814, Roxburgh *s.n.* (holo BM000944362 digital image!).

Ceramicalyx pulchellus Blume, Mus. Bot. 1(4): 50. 1849. *Type:* BANGLADESH, Chittagong, *s.d.*, Wallich 4059B (holo K000639584 digital image!).

O. pulchella Benth. ex Wall., Numer. List Pl. 143, no. 4059. 1831. *nom. nud.* non Benth. ex Naudin, 1850. Fig. 19

Perennial, erect, shrubs, 1–1.5 m tall, with straggling branches. Stems and branches strongly quadrangular, winged at angles: wings thick, more or less fleshy, glabrous throughout. Petioles 5–10 mm long; lamina elliptic to lanceolate, 10–15 × 3–6 cm, 5–7-nerved, apex acute to acuminate, base cuneate, glabrous, dark green. Inflorescence terminal condensed panicles, 5–12-flowered. Flowers tetramerous; pedicels 3–7 mm long; bracts green, ovate, 8–13 × 2–6 mm long, glabrous on either side, caducous. Hypanthium urceolate, 12–14 × 4–6.5 mm, glabrous; intersepal emergences absent. Sepals 4, narrowly ovate with prominent midrib, 10–13 × 2.5–3.5 mm, glabrous, not persistent in fruit. Petals 4, ovate to orbicular, 16–20

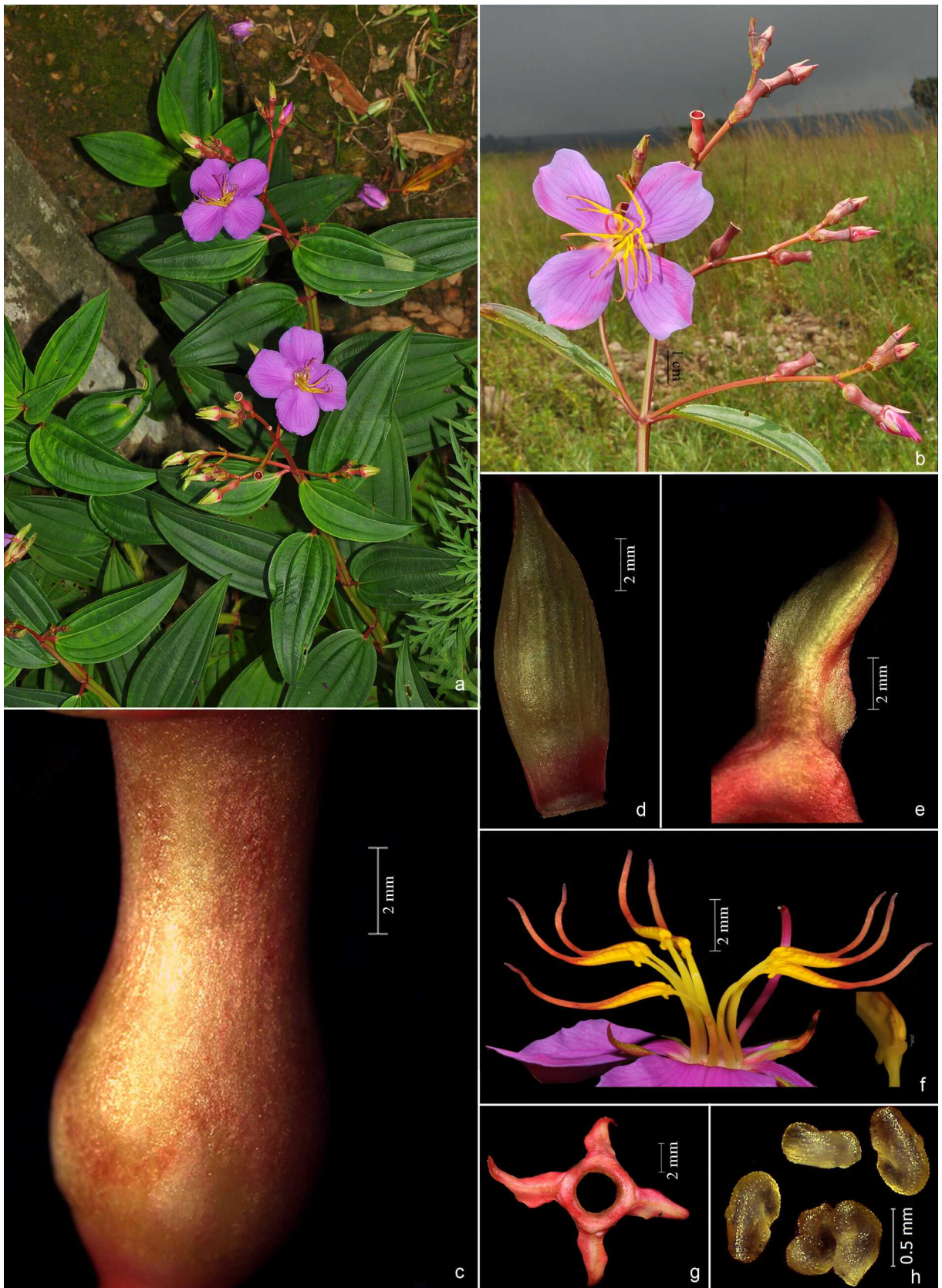


Fig. 19. *Osbeckia nayarii* G.S.Giri: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Stamens; **g.** Calyx lobes without intersepalal emergence; **h.** Seeds.

× 10–14 mm, pink to purple. Stamens 8, filaments 2–4 cm long, glabrous; anthers ‘S’ shaped, 2–4.5 cm long, attenuate into a narrow, tubular beak (4–8 mm long), yellow, glabrous, pore apical, connective prolonged into a small, indistinctly lobed collar. Ovary 12–14 mm long, 4-locular, united with hypanthium; anther pockets and crown covered with appressed hairs; style 2.5–4 mm long, glabrous, curved; stigma slightly swollen. Capsules urceolate, 12–14 × 4–6.5 mm, glabrous with a long neck; seeds numerous, minute, 0.1–0.2 mm long, curved and muricate.

Flowering & fruiting: July–November.

Habitat: Found in open grasslands above 1000 m.

Distribution: India.

Specimens examined: INDIA, **Assam**, Golpara district, Golpara, 1914, *U. Kanjilal* 6914 (CAL). **Meghalaya**, East Khasia hills district, Pynursla, 1755 m, 15.09.2015, *Prashob & Sibichen* 6112 (DEV); Ri-Bhoi district, Nongpoh, 987 m, 06.08.2014, *K.M. Manudev & Prashob* 57412 (DEV). **Tamil Nadu**, Coimbatore district, Valparai, Sholayar dam, 1225 m, 03.10.2015, *Prashob & Sibichen* 6018 (DEV). **Kerala**, Kozhikode, St. Joseph’s College Botanical garden (cultivated), 55 m, 06.10.2015, *Sibichen & Prashob* 1620 (DEV).

Notes: Roxburgh (1832) described *Melastoma pulchella* in his *Flora of India* based on specimens collected from Chittagong. Prior to the publication of Roxburgh, Wallich (1831) included this name in his catalogue as a species of *Osbeckia* viz., *O. pulchella* Benth., treating Roxburgh’s name (*Melastoma pulchella*) as its basionym. However, Wallich’s name is not valid as it is not accompanied by a description, diagnosis, or reference to any published diagnosis. Later Blume (1849) adopted Wallich’s specific epithet and placed this taxon under the genus *Ceramicalyx* and validly published as *C. pulchellus*. The specific epithet “*pulchella*” cannot be validly combined with the genus *Osbeckia* as it was preoccupied for another taxon, *O. pulchella* Benth. ex Naudin, (= *O. rostrata* D. Don). Therefore, the

present valid name for the taxon is *O. nayarii* G.S.Giri.

Osbeckia rostrata D. Don, Prodr. Fl. Nep. 221. 1825; N.P. Balakr, Fl. Jowai & Vicinity 205. 141. 1983. *O. stellata* Buch.-Ham. ex D. Don var. *rostrata* (D. Don) C. Hansen, Ginkgoana 4: 28. 1977, *syn. nov.* *Type:* NEPAL, **Narainhetty**, 11.08.1802, *Hamilton s.n.* (holo BM000521786 digital image!).

O. recalva Bedd. ex Gamble, Fl. Pres. Madras 1: 494. 1919

O. ternifolia D. Don, Prodr. Fl. Nep. 221. 1825. *Ceramicalyx ternifolius* Blume, Mus. Bot. 1(4): 50. 1849. *O. rostrata* D. Don, var. *ternifolia* (D. Don) Triana, Trans. Linn. Soc., London 28: 54. 1872. *Type:* NEPAL, *s.d.*, *Hamilton s.n.* (holo BM000521785 digital image!).

O. quaterna Buch.-Ham. ex D. Don Prodr. Fl. Nep. 221. 1825, *pro syn.*

Ceramicalyx calvus Blume, Mus. Bot. 1(4): 50. 1849. *Type:* *s.loc.*, *s.d.*, *Wallich s.n.* (holo G00310438 digital image!).

O. pulchella Benth. ex Naudin, Ann. Sci. Nat. Bot., ser. 3, 14: 73. 1850. *O. rostrata* D. Don var. *pulchella* Triana, Trans. Linn. Soc., London 29: 54. 1872, *nom. nud.* *Type:* INDIA, Meghalaya, Khasia, *s.d.*, *Griffith s.n.* (holo P02441144 digital image!).

O. rostrata D. Don, var. *longicollis* Triana, Trans. Linn. Soc., London 28: 54. 1872, *nom. nud.*

O. chinensis L. var. *lancifolia* Kuntze, Rev. Gen. Pl. 1: 247. 1891. *Type:* CHINA, *s.loc.*, *s.d.*, *Kuntze* 7209 (holo NYBG00229578 digital image!).

O. rostrata D. Don var. *sexangulata* Haines, Bot. Bihar & Orissa 370. 1922. *Type:* INDIA, Jarkhand, Chota Nagpur, wet places, 3000 ft, *s.coll. s.n.* (holo CAL!).

O. arunkumarensis M.P. Nayar & G.S. Giri, J. Bombay Nat. Hist. Soc. 81(2): 436. 1984. *syn. nov.* *Type:* INDIA, Sikkim, East Himalaya, *s.d.*, *Griffith* 2248 (holo CAL0000016807!).

O. campestris Buch.-Ham. in Wall., Numer. List 143, no. 4063. 1831, *nom. nud.*

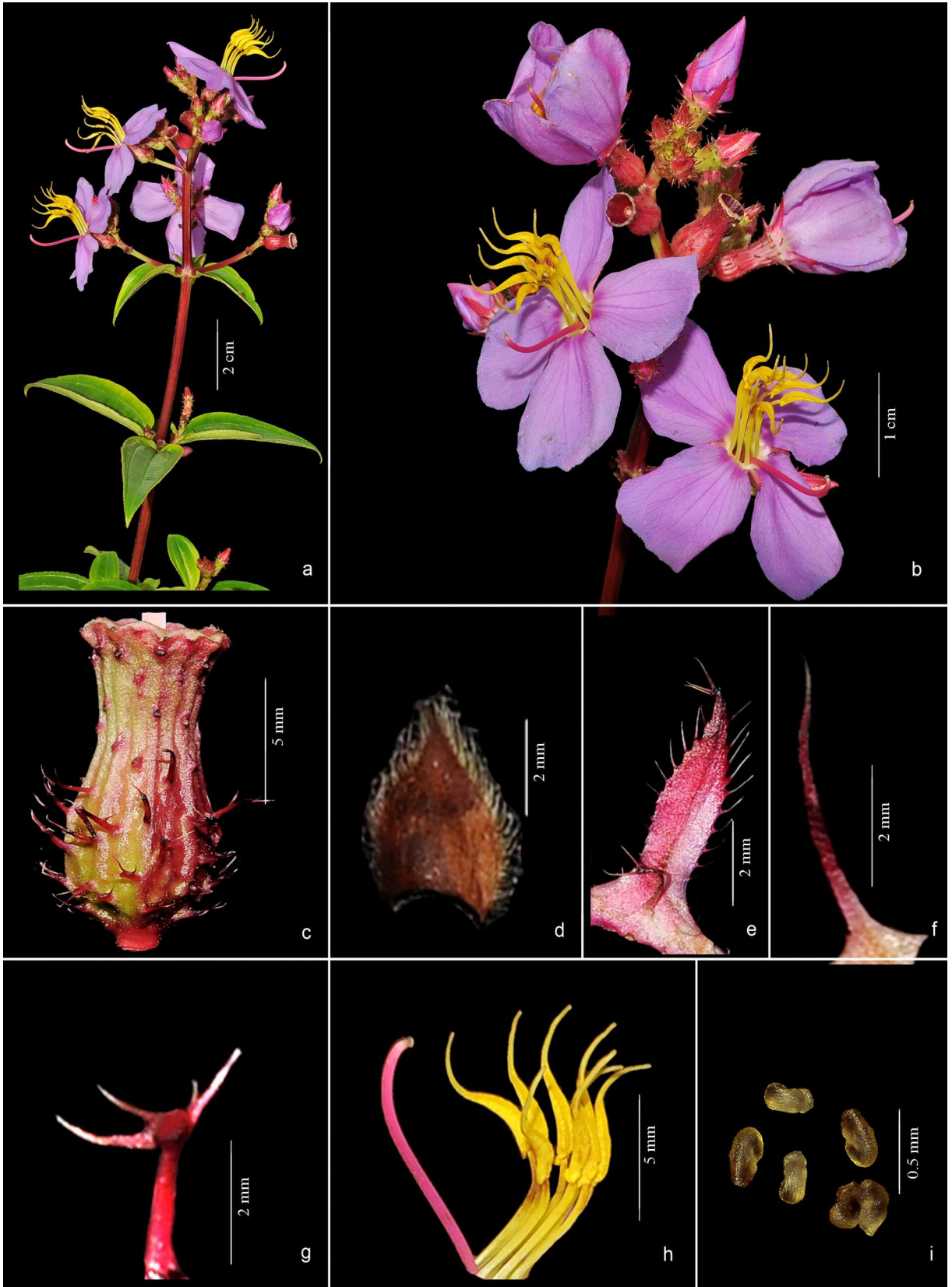


Fig. 20. *Osbeckia rostrata* D.Don: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Calyx lobe; **f.** Intersepalal emergence; **g.** Other emergence; **h.** Stamens; **i.** Seeds.

O. longicollis Benth. in Wall., Numer. List 143, no. 4065. 1831, *nom. nud.* Fig. 20

Perennial, erect, shrubs, 0.5–2 m tall. Stems branched; young branches quadrangular, with short, rigid, appressed hairs, sometimes occurring only at nodes. Petioles 3–8 mm long, upper leaves often sessile; lamina ovate to lanceolate, 5–17 × 2–6 cm, 5-nerved, green, apex acute to attenuate, base obtuse, both sides densely clothed with patent hairs. Inflorescence a terminal panicle, 6–12-flowered. Flowers tetramerous; pedicels 0.5–3 mm long; bracts ovate to broadly ovate, 4–8 mm long, glabrous, with a few to many appressed hairs dorsally. Hypanthium urceolate, 7–13 × 2.5–4 mm, usually longer than ovary, covered with emergences having a few to several patent hairs on the stalk; intersepalar emergences linear without lateral hairs and stellate head, caducous; other emergences similar. Sepals 4, lanceolate, 6–12 × 1.5–3 mm long, ciliate and with few to many patent hairs dorsally, caducous. Petals obovate to broadly obovate, 13–18 × 10–15 mm, glabrous pink to purple. Stamens 8; filaments 7–10 mm long; anthers 7–13 mm, 'S' shaped, attenuate into a narrow long beak, yellow; pore oblique on ventral side; connective prolonged into a slightly undulating collar with large dorsal lobes. Ovary united with hypanthium for about two thirds of its length, anther pockets extending to the base of the ovary; remaining part glabrous or often thinly clothed with short appressed hairs, crown present; style 15–25 mm long, glabrous. Capsules urceolate, 7–11 × 2–6 mm, covered with emergences, neck widens towards rim, emergences fall off at maturity; seeds minute, 0.1–0.2 mm long, numerous, curved.

Flowering & fruiting: August–October.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Occurs in evergreen forest of North East Himalaya at an elevation above 500 m. in association with *O. stellata* var. *stellata*.

Distribution: India.

Specimens examined: INDIA, **Andhra Pradesh**, Visakhapatnam district, Visakhapatnam, Sunkerimetta. 21.09.1961, *N.P. Balakrishnan* 730 (CAL). **Assam**, East Karbi Anglong district, Phulai, 28.06.1963, *D.B. Deb* 35403, 35404 (ASSAM); Goalpara district, Dudhnai, Rangjuli East, 25.06.1964, *A.S. Rao* 39113 (ASSAM); Nowgong, Sonaikushi R.F., Tapatala, 20.08.1964, *N.P. Balakrishnan* 39300 (CAL); *s.loc.*, 31.07.1908, *W.G. Craib* 30 (CAL); *s.loc.*, 31.07.1908, *W.G. Craib* 30 (CAL). **Manipur**, Bishnupur district, Bishnupur, 11.1907, *A. Meebold* 171996 (CAL); Tamenglong district, Mala naga-Cachar hills, 05.1882, *G. Watt* 171995 (CAL); Naga-Cachar hills, 05.1881, *G. Watt* 7278 (CAL); Ukgrul district, Yhirighak, 11.1907, *A. Meebold* 5724 (CAL); *s.loc.*, 11.1907, *Meebold* 5980 (CAL). **Meghalaya**, East Khasi hills district, Mawlynnong, 12.09.2015, *Prashob & Sibichen* 6130 (DEV); Mawsmi, 21.09.1967, *H. Deka* 37719 (ASSAM); Shillong, 24.06.1938, *S.R. Sharma* 18392 (ASSAM); Garo hills district, *s.loc.*, *s.d.*, *N.E. Parrey* 1929 (CAL); Jaintia Hills district, Jarain garden, 19.09.2015, *Prashob & Sibichen* 6145 (DEV); Jarain to Syndi, 17.08.1968, *N.P. Balakrishnan* 46164 (ASSAM); Jowai, 19.09.2015, *Prashob & Sibichen* 6152 (DEV); Nongtalang village, 19.09.2015, *Prashob & Sibichen* 6148 (DEV); *s.loc.*, 09.08.1840, *H.F. Mooney* 1299 (ASSAM); *s.loc.*, 26.10.1956, *P.O. Khant* 5158 (ASSAM). **Mizoram**, Aizawl district, Dampa Tiger reserve, Teirei, 21.09.2006, *B.K. Sinha & N. Odyuo* 112739 (ASSAM). **Tripura**, Bajapara, 29.08.1957, *D.B. Deb*, 1115 (CAL); Charilam, 04.06.1959, *D. bfer* 1763 (CAL). **West Bengal**, Darjeeling district, Darjeeling, 26.16.1876, *J.S. Gamble* 1730 (DD); Sukhia Pokhri, 26.10.1876, *J.S. Gamble* 1735 (DD).

Notes: Hansen (1977) treated *O. rostrata* as a variety of *O. stellata*. But it differs from the latter by linear lanceolate to falcate intersepalar emergences and fleshy stellate emergences on hypanthium hence it is treated here as a distinct species. Nayar and Giri (1984) described *O. arunkumarensis* from the herbarium collections of Griffith from Sikkim. The diagnostic characters of *O. arunkumarensis* such as winged branches, subsessile leaves, intersepalar

emergences terminated by a bristle are overlapping with *O. rostrata*, and hence treated here as conspecific.

Osbeckia stellata Buch.-Ham. ex D. Don., Bot. Reg. 8: t. 674. 1822; Osmaston, Fl. Kumaon 247. 1927; C. Hansen, Ginkgoana 4: 23. 1977; M. B. Raizada & H. O. Saxena, Fl. Mussoorie 247. 1978; N. P. Balakr. Fl. Jowai & Vicinity 206. 1983; R. K. Gupta, Fl. Nainitalensis 134. 1993; Hajra & Verma, Fl. Sikkim 1996; D. S. Dhaliwal & M. Sharma, Fl. Kullu district 290. 1999; R. D. Gaur, Fl. Garhwal 317. 1999; Pull., D. M. Rao & K. S. Ramamurthy, Fl. Eastern Ghats 57. 2002. *Ceramicalyx stellatus* Buch.-Ham. ex D. Don Blume, Mus. Bot. 1(4): 50. 1849. *Lectotype* (designated by Hansen, 1977): NEPAL, **Narainhetty**, 10.08.1802, *Hamilton s.n.* (BM000944402 digital image!).

O. marginulata Wall., Numer. List 143, no. 4064. 1831, *nom. nud.* *O. rostrata* D. Don var. *marginulata* C. B. Clarke in Hook. f., Fl. Brit. India 2: 518. 1879. *O. stellata* Buch.-Ham. ex D. Don var. *marginulata* (C. B. Clarke) C. Hansen, Ginkgoana 4: 27. 1977. *syn. nov.* *Type*: MYANMAR, Tong Dong, *s.d.*, *Wallich* 4064 (holo K001038066 digital image!).

O. racemosa Craib, Bull. Misc. Inform. Kew 1911(1): 51. 1911. *Type*: THAILAND, Chiengami, Doi-Sootep, *s.d.*, *Kerr* 836 (holo K000867939 digital image!).

O. hildebrandii Stapf, Bull. Misc. Inform. Kew 6: 269. 1911. *Type*: MYANMAR, Shan States, Toungyi, Cult. Hort. Kew, 1901, *Hildebrand* 599-99 (holo K000890027 digital image!).

O. speciosa Naudin, Ann. Sci. Nat., Bot. Sér. 3, 14: 73. 1850. *Type*: INDIA, Missouri, *s. d.*, *Jacquemont s.n.* (holo P02441142 digital image!).

O. darjeelingensis G. S. Giri & M. P. Nayar, Bull. Bot. Surv. India 25(1-4): 241. 1985. (*syn. nov.*) *Type*: INDIA, West Bengal, Darjeeling, Jhenaikuri, 12.1879, *Gamble* 7597 (holo CAL0000016808!).

Fig. 21

Perennial, erect, branched, shrubs, 0.50–2.5 m tall. Stems branched, young branches quadrangular,

with appressed, short, crooked, rigid hairs. Petioles 4–10 mm long; lamina green, lanceolate, 6–20 × 2–9 cm, 5–7-nerved; apex acuminate, base obtuse to attenuate, densely clothed with patent hairs on either side. Inflorescence terminal, paniced cyme, 5–9-flowered. Flowers tetramerous; pedicels 0.5–3 mm long; bracts ovate to broadly ovate, 7 × 12 mm, ciliate, with few to many appressed hairs dorsally. Hypanthium urceolate, 9–20 × 3–7 mm, longer than ovary, covered with emergences and bristles inter mixed with patent or appressed hairs; intersepal emergences 5–9 mm long, with a terete stalk bearing lateral hairs and terminating in a head of stellate hairs, caducous; other emergences smaller in lower portion of hypanthium. Sepals 4, triangular to lanceolate, 8–17 × 2–4 mm long, ciliate and with a few to many patent hairs dorsally, caducous. Petals 4, obovate to broadly obovate, 18–25 × 22–30 mm, glabrous, margin ciliate, pale pink to purple. Stamens 8; filaments 7–18 mm long; anthers 'S' shaped, yellow, 11–21 mm long, attenuate into a narrow, tubular beak (5–7 mm long), not twisted; pore oblique on ventral side; connective prolonged into slightly undulating collar with large dorsal lobe. Ovary united with hypanthium for about two third of its length, anther pockets extending to the base of the ovary; remaining part glabrous or thinly clothed with short appressed hairs: style 15–25 mm long, glabrous. Capsules urceolate, 11–19 × 4.5–10 mm, neck widens towards rim, densely covered with emergences and hairs which often fall off when mature; seeds minute, 0.1–0.2 mm long, numerous, curved, muricate.

Key to the varieties

- 1a. Stalk of intersepal emergences glabrous
..... *O. stellata* var. *hispidissima*
- 1b. Stalk of intersepal emergences hairy 2
- 2a. Hypanthium (>1.5 cm), sepals subulate
..... *O. stellata* var. *stellata*
- 2b. Hypanthium (<1 cm), sepals narrowly triangular *O. stellata* var. *crinita*

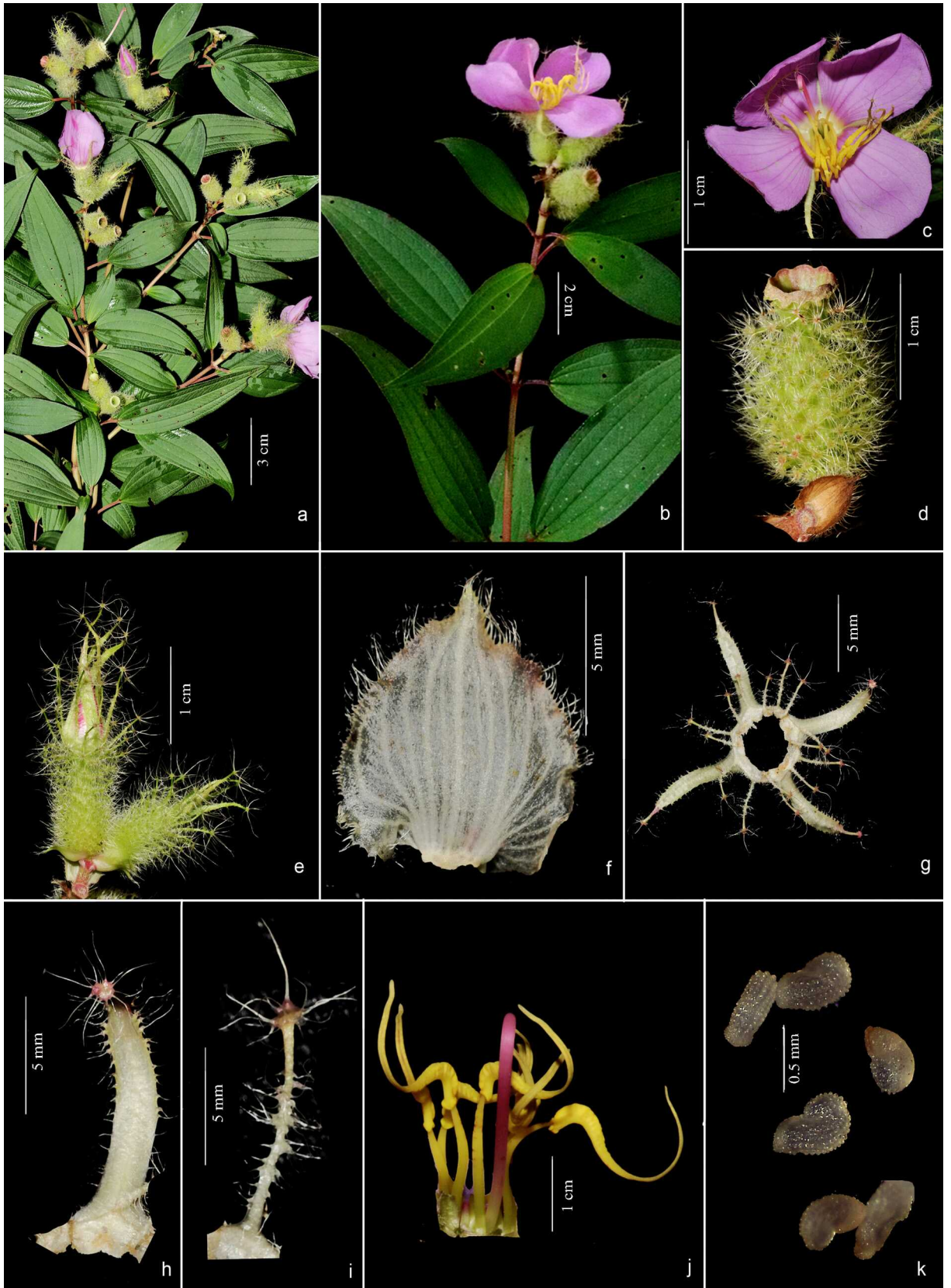


Fig. 21. *Osbeckia stellata* Buch.-Ham. ex D.Don var. *stellata*: **a & b.** Habit; **c.** Flower; **d & e.** Hypanthium; **f.** Bract; **g.** Calyx lobes with intersepal emergences **h.** Calyx lobe; **i.** Intersepal emergence; **j.** Stamens; **k.** Seeds.

Osbeckia stellata* Buch.-Ham. ex D. Don. var. *stellata

Flowering & fruiting: August–March.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990)

Habitat: Seen in cluster on the margins of evergreen forests at an elevation above 500 m. The associated species are *O. stellata* var. *crinita* and *O. stellata* var. *hispidissima*.

Distribution: India.

Specimens examined: INDIA, **Arunachal Pradesh**, East Siang district, Yambung Camp, 07.01.1911, *I.H. Burkill s.n.* (CAL); Lohith district, Khamti village, 09.09.1969, *A.S. Rao* 47760 (CAL, ASSAM); Khopa village, 26.09.1969, *A.S. Rao* 48128 (CAL, ASSAM); Lohith, 24.11.1969, *J. Joseph* 48314 (CAL); Lohith–Payanava, 17.11.1957, *R.S. Rao* 10674 (CAL); Siang F.D., Tuting, 06.11.1958, *R.S. Rao* 17366 (CAL, ASSAM). *Ibid.*, 03.04.1958, *G.K. Murty* 13126 (CAL, ASSAM); Lower Subansiri district, Subansiri F.D., Kherbavei, 28.09.1959, *G. Panigrahi* 19732 (CAL); Subansiri–Klerbari, 28.09.1954, *G. Panigrahi* 19732 (CAL); Ziro, 01.10.1959, *G. Panigrahi* 19900 (CAL). **Himachal Pradesh**, Kangra district, Baslahar, 26.06.1923, *R.N. Rarker s.n.* (DD); *Ibid.*, 13.06.1928, *R.N. Parker* 3013(DD); *Ibid.*, 07.10.1940, *H.F. Mooney* 87460 (DD); *Ibid.*, 13.10.1950, *M.B. Raizada* 19962 (DD); *Ibid.*, 12.09.1969, *C.N. Nair* 30666 (CAL, BSD); *Ibid.*, 12.09.1969, *C.N. Nair* 30666 (CAL, BSD); Palampur, 26.09.1896, *G.A. Gammie* 18722 (DD); Upper Baslahar, 07.1950, *S.P. Selhi* 20360 (DD); Kullu district, Shaman, 20.08.1977, *S.K. Murti & R. Prasad* 61917 (BSD); Shimla district, Fifth Water fall, Yamunotri, 20.06.1953, *S.N. Mitra* 9430 (CAL); North West Himalaya, 10.1891, *J.H. Lace s.n.* (DD). **Manipur**, Bishnupur district, Limatak, 27.08.1887, *George Watt* 7175 (CAL). **Sikkim**, East Sikkim district, Machong, Chota pathing, 09.07.1991, *N.R. Mandal & P. Singh* 13583 (BSHC); Rangpo, 14.10.1949, *K. Biswas* 9848 (CAL); Rumtek, 06.08.1981, *B. Krishna* 1629 (BSHC); Singtam, 12.05.1967, *N.C. Mazudia & R. M Dutta* 210 (CAL);

North Sikkim district, Chungthang to Lachen, 16.08.1989, *N.R. Mandal*, 10447 (BSHC); Mangan, 15.11.1901, *Dr. Prain s.n.* (CAL); Mangan, Rang Rang bridge, 17.09.2016, *Prashob, Anilkumar & Sibichen* 6616 (DEV); near Tista bridge, 26.07.1986, *D.C.S. Raju & S. Singh* 6312 (BSHC); South Sikkim district, Mogipokri, *s.d.*, *R.C. Srivastava* 14530 (BSHC); Namchi forest, 10.08.1992, *R.C. Srivastava* 10989 (BSHC); Rateypani Suntale, 11.09.1981, *B. Krishna* 1752 (CAL, BSHC); West Sikkim district, Dentam, 29.08.1994, *P. Singh* 16340 (BSHC); Dherap, 14.09.2016, *Prashob, Anilkumar & Sibichen* 6608 (DEV); Geyzing, 13.09.2016, *Prashob, Anilkumar & Sibichen* 6601 (DEV); Pelling, 13.09.2016, *Prashob, Anilkumar & Sibichen* 6602 (DEV); *Ibid.*, 14.09.2016, *Prashob, Anilkumar & Sibichen* 6610 (DEV); Pelling to Yuksom, 16.08.1985, *D.C.S. Raju* 4304 (BSHC). **Uttar Pradesh**, Saharanpur district, Sharanpur, 09.1898, *Rao s.n.* (CAL); *s.loc.*, 04.05.1916, *R.S. Hole* 252 (CAL). **Uttarakhand**, Almora district, Dinapani, 12.10.1975, *J.N. Vohra* 57813 (BSD); Debra, 13.10.1975, *B.M. Wadhwa* 57694 (BSD); Dwarahat, 05.10.1975, *B.M. Wadhwa* 57392 (BSD); Bageshwar district, Kapkot, 19.09.1957, *T.A. Rao* 4187 (BSD); Chamoli district, Gopeswar to Mandal, 29.08.1978, *Panigrahi & Wadhwa* 65596 (BSD); Narayan bagarah, 07.09.1985, *H.J. Chawdhary* 78256 (BSD); Sital, 09.1993, *s.coll.* 77199 (BSD); Sital–Sital, 09.1993, *s.coll.* 87956 (BSD); Dehradun district, Dehradun–Sahasradhara, 06.09.1963, *S.K. Malhothra* 29271 (CAL, BSD); *Ibid.*, 14.09.1962, *S.K. Malhothra* 23788 (CAL, BSD); Mussori, 08.1895, *P.W. Mackinnon s.n.* (CAL); *Ibid.*, 1859, *G. King s.n.* (CAL); *Ibid.*, 06.09.1960, *Hari Om Saxena s.n.* (DD); Thangaon, *s.d.*, *Bipin Balodi & Megh Singh* 73076 (BSD); Garhwal district, Garhwal, 10.09.1972, *B.D. Naithani* 3677 (DD); Garhwal–Dodital, 09.1995, *Raj K. Gupta* 933 (CAL); Garhwal–Gauri kund, 14.08.1968, *M.A. Rao* 38752 (CAL, BSD); Garhwal–Mondal, 01.10.1970, *B.D. Naithani* 41974 (CAL, BSD); Garhwal–Vishnuprayag–Govind Ghats, 14.08.1963, *U.C. Bhattacharya* 29324 (CAL, BSD); Kumaon, Dalfia, 01.09.1973, *C.M. Arora* 53231 (DD); Kumaon–

Girgaon, 29.08.1969, *Pant & Naithani* 38565 (CAL, BSD); Kumaon-Munsiari, Pithoragarh, 30.08.1900, *Juayal* 24438 (CAL, DD); *Ibid.*, 12.06.1960, *T.A. Rao* 11788 (CAL, BSD, DD); *Ibid.*, 10.06.1960, *T.A. Rao* 11672 (CAL, BSD); *Ibid.*, 12.10.1962, *Surendra Singh* 23622 (CAL, BSD); *Ibid.*, 05.05.1965, *C.N. Nair* 35674 (CAL, BSD, DD); *Ibid.*, Askol, 31.01.1971, *C.M. Arora* 45452 (BSD); Kumaon-Tavaghat, 10.06.1960, *s.coll. s.n.* (CAL); Naitwar, Tehri-Garhwal, 21.09.1955, *K.C. Sahni* 21513 (DD); Napainkoli, 22.09.1958, *M.A. Rao* 6468 (BSD); Rampur Garhwal, 20.10.1938, *Kirt Ram* 8969 (DD); Ringalgarh, Tehri-Garhwal, 26.09.1954, *K.C. Sahni* 21513 (DD); Tehri, Budhalcedar, 02.10.1974, *M.V. Viswanathan* 55224 (BSD); Tehri, Ghuttu, 18.08.1978, *A.K. Goel* 64588 (BSD); Pauri district, Balakhal, 09.08.1976, *R.P. Srivastav* 57078 (BSD); Khirsu, 18.09.1975, *A.S. Rao* 56332 (BSD); Khirsu road, 19.08.1978, *G. Panigrahi* 65000 (BSD, DD); *s.loc.*, 15.05.1989, *P.S. Karki* 68633 (BSD); Pithoragarh district, Didihat, 01.10.1970, *C.M. Arora* 41366 (BSD); Didihat, Narayan nagar, 30.09.1975, *C.M. Arora & P. Prasad* 56631 (BSD); Dhanliganga, 10.09.1985, *H.J. Chawdhary* 76267 (BSD); Sobla, 08.08.2004, *S.K. Srivastava* 105907 (BSD); Bungling, 04.08.1998, *B.P. Uniyal & Bipin Balodi* 93811 (BSD, DD); Lilam, 15.09.1983, *Bipin Balodi* 75241 (BSD); Maitli, 01.10.2001, *M.S. Pundir* 97034 (BSD); Tawaghat, 09.1986, *Bipin Balodi* 83210 (BSD); Uttarkashi district, Govind Pashu Vihar National Park & Sanctuary, Thalluka, 24.09.2010, *R. Manikandan* 113706 (BSD); Mori, 17.09.1995, *Surendra Singh* 89861 (BSD); on way to Sangam, 07.1999, *Bipin Balodi* 95004 (BSD); on the way to Thalluka, 19.09.1995, *Bipin Balodi* 89349 (BSD). **West Bengal**, Darjeeling district, Kalimpong, 14.09.1914, *Thornton Ripley s.n.* (CAL); *Ibid.*, 17.09.1914, *Thornton Ripley s.n.* (CAL); Rimbik, 06.08.1981, *B. Krishna* 1629 (CAL); Rishyap, 23.10.1870, *C.B. Clarke s.n.* (CAL); Sureil, 21.09.1908, *W.W. Smith* 006 (CAL).

Notes: *O. stellata* can be easily recognized by the more or less 'S' shaped large anthers with long beak,

urceolate hypanthium with dense emergences and hairs. However, wide variations in vestiture created confusion in the delimitation of taxa and often resulted in the description of too many taxa which are not tenable. Presently two varieties have been recognized under *O. stellata* such as var. *crinita* and var. *hispidissima*. Var. *crinita* differs from the latter by patent hairy stems and green emergences on the hypanthium. Similarly, var. *hispidissima* differs from var. *stellata* and var. *crinita* by its reddish brown emergences on the hypanthium.

Osbeckia stellata Buch.-Ham. ex D. Don var. ***crinita*** (Benth. ex Naudin) C. Hansen, *Ginkgoana* 4: 31. 1977. *O. crinita* Benth. ex Naudin, *Ann. Sci. Nat. Bot.*, ser. 3, 14: 72. 1850; C.B. Clarke in Hook.f., *Fl. Brit. India* 2: 517. 1879; Kanjilal *et al.*, *Fl. Assam.* 2: 292. 1983; N.P. Balakr., *Fl. Jowai & Vicinity* 206. 141. 1983. *Lectotype*. (designated by Hansen, 1977): INDIA, Assam, *s.d.*, *M. Walker s.n.* (P02441145 image!).

O. cinerea Cogn. in A. DC. & C. DC., *Monogr. Phan.* 7: 1177. 1891. *Type*: BANGLADESH, Sylhet, 1887, *M. Balansa* 4055 (holo P02441151 digital image!).

O. paludosa Craib, *Bull. Misc. Inform.*, Kew. 262. 1916. *Type*: THAILAND, Siam, Chiangmai, 330 m, 21.10.12, *A.F.G. Kerr* 2740 (holo K000867937 digital image!).

O. garrettii Craib, *Bull. Misc. Inform.* Kew. 262. 1916. *Type*: THAILAND, Doi Kar Intanon, 18° 40' N, 98° 30' S, 1050 m, 16.09.1910, *H.B.G. Garrett* 51 (holo K000867935 digital image!).

O. robusta Craib, *Notes Roy. Bot. Gard. Edinburgh* 10: 54. 1917. *Type*: CHINA, Yunnan, *s.d.*, *Forrest* 8561 (holo E00225554 digital image!).

O. mairei Craib, *Notes Roy. Bot. Gard. Edinburgh* 10: 54. 1917. *Type*: CHINA, Yunnan, 690 m, *s.d.*, *E.E. Maire s.n.* (holo E00225556 digital image!).

O. septemnervia Buch.-Ham. ex Craib, *Notes Roy. Bot. Gard. Edinburgh* 10: 55. 1917. *Type*: INDIA, Assam, Goalpara, *s.d.*, *Hamilton* 916 (holo E00225749 digital image!).

O. yunnanensis Franch. ex Craib, Notes Roy. Bot. Gard. Edinburgh 10: 57. 1917. *Type*: CHINA, Yunnan, 2500 m, 26.09.1884, *Delavay* 191 (holo P02441147 digital image!).

O. sikkimensis Craib, Notes Roy. Bot. Gard. Edinburgh 10: 56. 1917. *Type*: INDIA, Sikkim, Yoksom, 10.10.1875, *C.B. Clarke* 25207B (holo E00225751 digital image!).

O. wattii Craib, Notes Roy. Bot. Gard. Edinburgh 10: 57. 1917. *Type*: INDIA, Nagaland, Naga hills, 05.1882, *Watt* 7280 (holo K000890023 digital image!).

O. pulchra E.T.Geddes, Bull. Misc. Inform., Kew 1930(4): 171. 1930. *Type*: THAILAND, (Doi Sootep), 1600 m, 24.11.1912, *Kerr s.n.*, (holo ABD!).

O. pulchra var. *rubra* Craib, Fl. Siam. Enum. 1: 677. 1931. *Type*: THAILAND, Siam, Doi Sootep, 1200 m, 17.11.1922, *Kerr s.n.* (holo BM000944334 digital image!).

Melastoma crinitum Roxb., Fl. Ind., ed. 2, 2: 402. 1832, *non* Vahl, 1807. *Type*: INDIA, *s.loc.*, 05.1811, *Roxburgh* 347 (holo BM000944403 digital image!).

M. crinitum Vahl, Eclog. Amer. 3: 28. 1807. *Type*: Not seen.

M. crinitum Naudin, Ann. Sci. Nat., Bot. ser. 3, 13: 280. 1850. *Type*: Not seen.

M. mairei H.Lév., Repert. Spec. Nov. Regni. Veg. 11: 300. 1912.

O. crinita Benth. in Wall., Numer. List 143, no. 4066. 1831, *nom. nud.*

O. septemnervia Buch.-Ham. in Wall., Numer. List. 4062 B. 1831, *nom. nud.* Fig. 22

Erect, perennial shrubs, 0.50–2 m tall. Stems branched, young branches quadrangular, with patent, slightly reflexed brown hairs. Petioles 4–8 mm long; lamina ovate to broadly ovate, 4–13 × 2–4 cm, 5-nerved, green, apex acute to attenuate, base acute to rounded, both sides densely clothed with patent hairs. Cymes terminal, 6–12-flowered; bracts ovate to broadly ovate, 4–8 mm long, ciliate, with few to many appressed hairs dorsally. Flowers

tetramerous; pedicels 0.5–3 mm long. Hypanthium urceolate, 7–12 × 2.5–6 mm, covered with emergences, bristles and patent or appressed hairs; intersepal emergences 4–7 mm long, with a terete stalk bearing a few to many patent hairs and terminating in a stellate head, caducous; other emergences differ from intersepal emergences, smaller. Sepals 4, narrowly triangular, 7–13 × 1.5–3 mm long, ciliate with a few to many patent hairs dorsally, caducous. Petals 4, obovate to broadly obovate, 13–18 × 10–15 mm long, glabrous, margins ciliate, pale pink to purple. Stamens 8; filaments 7–14 mm long; anthers 'S' shaped, 11–15 mm long, yellow, narrowly ovate, with long beak; pore oblique on ventral side; connective prolonged into a slightly undulating collar with large dorsal lobe. Ovary united with hypanthium for about two thirds of its length, anther pockets extending to the base of the ovary; free part sometimes glabrous, but more often thinly clothed with short appressed hairs; style 15–25 mm long, glabrous. Capsules urceolate, 7–11 × 2–6 mm, neck often widening towards rim, densely hairy below, more or less glabrous above; hypanthium exceeds ovary and crown; seeds numerous, 0.1–0.2 mm long, minute, curved.

Flowering & fruiting: July–January.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990)

Habitat: In evergreen forests at an elevation above 500 m in association with *O. stellata* var. *stellata* and *O. capitata*.

Distribution: Bhutan, India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim, West Bengal) and Nepal.

Specimens examined: INDIA, **Arunachal Pradesh**, Lohith district, Chowkham, 24.11.1969, *J. Joseph* 48314 (ASSAM); Nansai township, 09.09.1969, *A.S. Rao* 47716 (CAL, ASSAM); Paya nava, 17.11.1957, *R.S. Rao* 10674 (ASSAM); Lower Subansiri district, Khorbar, 28.09.1959, *G. Panigrahi* 19732 (ASSAM); Subansiri, 14.11.1946, *A.R.K. Sastry* 40609 (ASSAM); Tirap district, Deomali, West of Khonsa,

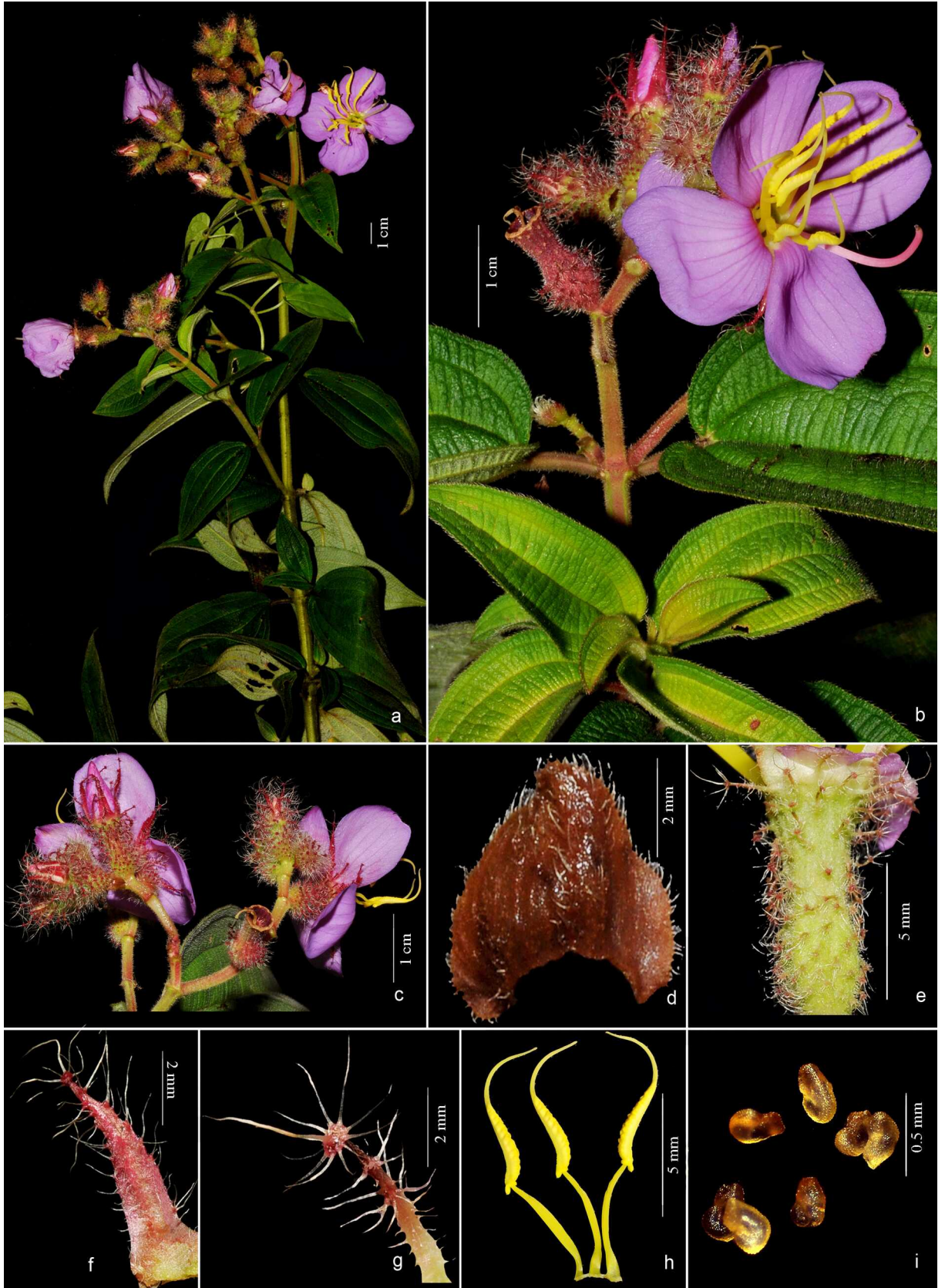


Fig. 22. *Osbeckia stellata* Buch.-Ham. ex D.Don var. *crinita* (Benth. ex Naudin) C. Hansen: **a & b** Habit; **c**, Inflorescence; **d**, Bract; **e**, Hypanthium; **f**, Calyx lobe; **g**, Intersepal emergence; **h**, Stamens; **i**, Seeds.

- 21.06.1961, *F.B. Dub* 25886 (ASSAM); West Siang district, Dirang, 17.09.1964, *J. Joseph* 40058 (ASSAM); Kiak, 25.11.1958, *R.S. Rao* 18022 (ASSAM); Klaktang, 08.08.1973, *P.K. Hajra* 54019 (ASSAM); *Ibid.*, 14.10.1973, *P.K. Hajra* 54113 (ASSAM); Lumla, 24.08.1976, *P.K. Hajra* 68481 (ASSAM); Sepa, 29.10.1970, *A.S. Rao* 49425 (ASSAM). **Assam**, Dima Hasao district, Garodong Bhutan border, 18.09.2010, *C. Deori & D.K. Ray* 119022 (ASSAM); Doboka, 28.06.1963, *D.B. Deb* 35403, 35404 (ASSAM); East Karbi Anglong district, Phulai, 26.06.1963, *D.B. Deb* 35378 (ASSAM); *Ibid.*, 17.09.2010, *C. Deori & D.K. Ray* 119122 (ASSAM); Golaghat district, Kaziranga N.P., 14.08.1975, *P.K. Hajra* 52887 (ASSAM); Jorhat district, Borbhetta, Phutuka, 11.03.1959, *S.N. Bora* 33643 (ASSAM); Khatangpani R.F., 09.07.1959, *G. Panigrahi* 18905 (CAL); Makum, 21.11.1911, *I.H. Burkill* 35746 (CAL); Orang Barseola Bank of Bihari River, 22.07.1958, *G. Panigrahi*, 14220 (CAL, ASSAM); Kamrup district, 24.10.1935, *G.K. Deka* 12848 (ASSAM); Lakhimpur district, near NEFA I.B., 12.05.1966, *D.M. Verma* 41724 (ASSAM); Nagaon district, Sonaibuchi R.F., 20.08.1964, *N.P. Balakrishnan* 39300 (ASSAM). **Manipur**, Imphal district, Chingmairong, 01.08.1952, *D.B. Deb* 777 (CAL); *Ibid.*, 27.10.1952, *D.B. Deb* 546 (CAL); Pipihma, 02.1906, *Meebold* 5605 (CAL); Myanglihing, 20.05.1882, *George Watt* 7157 (CAL); Senapati district, Chingmei Hills, 22.12.1976, *Barin Gherh* 11602 (CAL). **Meghalaya**, Changlang, Khela, 19.08.1958, *G. Panigrahi* 14415 (CAL, ASSAM); Cherrapunji, 18.10.1932, *H.K. Nandi s.n.* (CAL); *Ibid.*, 27.09.1955, *G. Panigrahi* 3488 (CAL, ASSAM); *Ibid.*, 31.10.1972, *R.S. Rao* 47279 (CAL); East Khasi hills district, Barapani, 11.09.1970, *B.K. Sinha* 112013 (ASSAM); Jowai district, Jowai, 26.05.1956, *R.S. Rao* 2571 (CAL, ASSAM); Khasi hills, Old Barapani Road, 11.09.1970, *A.S. Rao* 38637 (CAL); Jaintia Hills district, Raliang to Garampani, 22.08.1968, *N.P. Balakrishnan* 46986 (ASSAM); Khasia & Jaintia Hills, Shillong, 26.10.1915, *Upendranath Kanjilal* 6134 (ASSAM); *Ibid.*, 26.05.1956, *R.S. Rao* 2571 (CAL); Laithkor, 28.06.2014, *Prashob & Sibichen* 6113 (DEV); *Ibid.*, 11.09.2015, *Prashob & Sibichen* 6123 (DEV); Mahadavkala, 21.11.1962, *S. Choudary* 25157 (CAL); Mawphlang, Law-Hyngowh, 20.11.1972, *P.K. Hajra* 51922 (CAL, ASSAM); Mawphlang Sacred forest, 09.09.1972, *P.K. Hajra* 51948 (CAL, ASSAM); *Ibid.*, 17.09.2015, *Prashob & Sibichen* 6139 (DEV); Mawsynram, 25.02.1960, *G. Panigrahi* 21264 (ASSAM); Pynursula, 04.12.1943, *N.L. Bor* 18079 (DD); Sohra, 27.06.2014, *Prashob & Sibichen* 6106 (DEV); *Ibid.*, 20.09.1939, *S.R. Sharma* 9411 (ASSAM); Shillong, 25.05.1911, *I.H. Burkill & S.C. Banerjee s.n.* (CAL); *Ibid.*, 26.05.1911, *I.H. Burkill & S.C. Banerjee* 28 (CAL); *Ibid.*, 22.06.1913, *Upendranath Kanjilal* 2218 (ASSAM); *Ibid.*, 12.09.1913, *Upendranath Kanjilal* 2628 (ASSAM); *Ibid.*, 23.09.1913, *Upendranath Kanjilal* 2618 (ASSAM); *Ibid.*, 29.09.1915, *H.G. Carter* 41409 (CAL); *Ibid.*, 12.10.1931, *S.R. Sharma* 9547 (ASSAM); *Ibid.*, 25.10.1938, *K. Biswas* 3730 (CAL); *Ibid.*, 02.10.1945, *N.L. Bor* 18436 (DD); *Ibid.*, 02.10.1945, *N.L. Bor* 18445 (DD); *Ibid.*, 25.11.1949, *B.B. Syam* 22908 (ASSAM); *Ibid.*, 26.11.1952, *S. Choudary* 25263 (CAL, ASSAM); *Ibid.*, 30.08.1956, *G. Panigrahi* 3199 (CAL, ASSAM); *Ibid.*, 20.06.1958, *G. Panigrahi* 16497 (ASSAM); *Ibid.*, 02.09.1960, *G.K. Deka* 21761 (ASSAM); *Ibid.*, 13.09.1960, *G.K. Deka* 21762 (ASSAM); *Ibid.*, 09.08.1962, *G.K. Deka* 17090 (ASSAM); *Ibid.*, 25.09.1962, *S.L. Kapoor* 73449 (CAL); *Ibid.*, *Ibid.*, 26.11.1962, *S. Choudhary*, 25227, (CAL, ASSAM); 10.12.1962, *R.M. Dutta* 25436 (ASSAM); *Ibid.*, 12.12.1962, *S.K. Kotari* 27944 (ASSAM); *Ibid.*, Behind Bishop falls, 24.12.1962, *R.M. Datta* 25533 (ASSAM); *Ibid.*, 24.12.1962, *S. Choudary* 25234 (CAL); *Ibid.*, 24.12.1962, *R.D. Ulla* 25534 (CAL); *Ibid.*, 28.12.1962, *S.K. Kotari* 29613 (ASSAM); *Ibid.*, *s.n.*, *R.S. Rao* 1693 (CAL, ASSAM); Shillong, Mulki village, 19.11.1962, *S.K. Kar* 29486 (ASSAM); Shillong peak forest, 26.10.1960, *D.C.S. Raju* 22015 (ASSAM); Ukhral, 28.07.1948, *S.K. Mukerjee* 3245 (CAL); *Ibid.*, 22.09.1948, *S.K. Mukerjee* 3528 (CAL); Upper Shillong, 29.09.1915, *H.G. Carter* 41409 (CAL); Woodland, Shillong, 26.11.1962, *s.coll.* 25234 (CAL, ASSAM); *Ibid.*, 10.09.1965, *R.V. Kammathy* 001 (CAL); Ummulong, 16.08.1968, *N.P. Balakrishnan* 42990

(ASSAM); Ri-Bhoi district, Nongpoh 23.09.1935, S.R. Sharma 12397 (ASSAM); *Ibid.*, 23.07.1938, S.R. Sharma 17951 (ASSAM); *Ibid.*, 24.08.1938, S.R. Sharma 18167 (ASSAM); G. Panigrahi 4348 (ASSAM); *Ibid.*, 30.07.1964, J. Joseph 37475 (ASSAM); West Khasi Hills district, Nongstom, 01.04.1962, G.V. Subba Rao 28470 (ASSAM). **Mizoram**, Aizawl district, Buia Hmun Tlang, 11.11.1999, A.A. Mao 107153 (ASSAM); Dampa Tiger reserve, Teirei, 21.09.2006, B.K. Sinha & N. Odyuo 112738 (ASSAM); Dampa Tiger reserve, Way to Chhauthpier top, 28.05.2005, N. Odyuo 109747 (ASSAM); Lawngtlai district, Kawlkhu, 04.10.1989, K.P. Singh 94334 (ASSAM); Kolasib, Bhairawi road, 31.05.1988, K.P. Singh 93191 (ASSAM); *Ibid.*, 16.10.1989, K.P. Singh 92861 (ASSAM); Mizo hills, 12.07.1963, Thalthlone, R.M. Dutta 33925 (ASSAM); *Ibid.*, Vawmbuk, 12.07.1963, R. Dutta 33929 (ASSAM); Zote, 10.10.1989, K.P. Singh 94574 (ASSAM); *s.loc.*, 29.04.1998, S.L. Abbar 102615 (ASSAM). **Nagaland**, Kohima district, Jasma, 12.1955, B.F.O. *s.n.* (ASSAM); Lower Japfu hill, 05.09.2003, A.A. Mao & R. Gogoi 112504 (ASSAM); Naga hills, 06.1935, N.L. Bor 21002, 21000, 21009 (ASSAM); *Ibid.*, 12.1935, N.L. Bor 6213 (DD); *Ibid.*, 06.1936, N.L. Bor 10557 (ASSAM); *Ibid.*, Lzulake valley, 09.1939, N.L. Bor 90574 (ASSAM); *Ibid.*, 25.11.1942, N.L. Bor 17284 (ASSAM); *Ibid.*, 30.11.1986, R.C. Gauri 773 (DD). **Sikkim**, East Sikkim district, North East of Gangtok, 08.11.1960, K. Jhothathri 9475 (CAL); Gangtok, 26.08.1980, P.K. Hajra 865 (BSHC); Takchi, 18.07.1985, D.C.S. Raju 7727 (BSHC); Takchi, Luings, 16.07.1998, S.K. Rai 23404 (BSHC); Tashi view point, Gangtok, 26.08.1980, P.K. Hajra 866 (CAL); North Sikkim district, *s.loc.*, 09.1879, J.S. Gamble *s.n.* (DD); North Sikkim, 11.1879, J.S. Gamble *s.n.* (DD); South Sikkim district, *s.loc.*, 18.09, S. Kurz 171902 (CAL). Rabongla, 23.08.1986, A.K. Verma 12701 (BSHC); South Sikkim, *s.d.*, S. Kurz *s.n.* (DD); West Sikkim district, Damthang-Rawangla, 08.1991, R. Gopalan 97559 (BSHC); Karchi reserve forest, 15.12.1994, G.P. Sinha & S. Pradhan 10862 (BSHC); Ribdi, 07.09.1995, R. Nath

& S.K. Jana 31548 (BSHC); Rengu temple, J.D. Hooker 1867 (CAL); Sikkim, *s.loc.*, 14.08.1870, C.B. Clarke *s.n.* (CAL); *Ibid.*, *s.d.*, R.S. Rao 319 (CAL). **West Bengal**, Darjeeling district, Birchi hills, Darjeeling, 12.11.1944, M.B. Raizada 18939 (DD); *Ibid.*, 22.11.1962, J.K. Maheshwari 5018 (CAL); Chungtang, 26.04.1965, H. Santapau & S.K. Mukerjee 107 (CAL); Darjeeling, 09.1879, J.S. Gamble 7068 (DD); *Ibid.*, 09.1880, J.S. Gamble 8361 (DD); *Ibid.*, 01.10.1902, J.H. Lacek 2382 (CAL); *Ibid.*, 01.10.1902, J.H. Lace 2382 (DD); *Ibid.*, 22.09.1962, B. Sahni 1802 (CAL); Ghong, 07.1996, Sanjoy Ghara 006 (CAL); Jorbangla, 16.04.1961, *s.coll.* 111 (CAL); Singalila National park, Meghma, 15.09.2002, A.K. Ghosh 30621 (CAL).

Notes: *Osbeckia stellata* var. *crinita* differs from var. *stellata* and var. *hispidissima* by its patent hairy stem, shape, colour and size of the hypanthium. The first available name for the taxon was *Melastoma crinitum* Roxb. (1832). However, it is illegitimate being a later homonym of *M. crinitum* Vahl. (1807). Prior to the publication of Roxburgh, Wallich (1831) included *O. crinita* Benth. in his catalogue. However, Wallich's name is not valid as it is not accompanied by a description, diagnosis, or a reference to a published diagnosis. Later Naudin (1850) described the taxon as *O. crinita* Naudin, instead of *O. crinita* Benth. ex Naudin., without mentioning Bentham. Being a variety of *O. stellata* Buch.-Ham. ex D. Don. and the first legitimate specific epithet in the genus *Osbeckia*, i.e. *crinita* Benth. ex Naudin, the correct name becomes *O. stellata* var. *crinita* (Benth. ex Naudin) C. Hansen.

Osbeckia stellata Buch.-Ham. ex D. Don var. ***hispidissima*** (Wight) C. Hansen, Ginkgoana 4: 37. 1977. *O. hispidissima* Wight, Icon. Pl. Ind. Orient. t. 1612. 1850; Gamble, Fl. Pres. Madras 1: 493. 1919; Pull., D.M. Rao & K.S. Ramamurthy, Fl. Eastern Ghats 57. 2002; G.V.S. Rao & G.R. Kumari, Fl. Visakhapatnam Dist. Andhra Pradesh 340. 2003. *Type:* INDIA, *s.loc.*, 25.11.45, *Cleghorn* D-46 (holo K000890022 image!). Fig. 23

Erect, perennial shrubs, 0.5–3.5 m tall. Stems branched, quadrangular; hairs long and stiff, patent

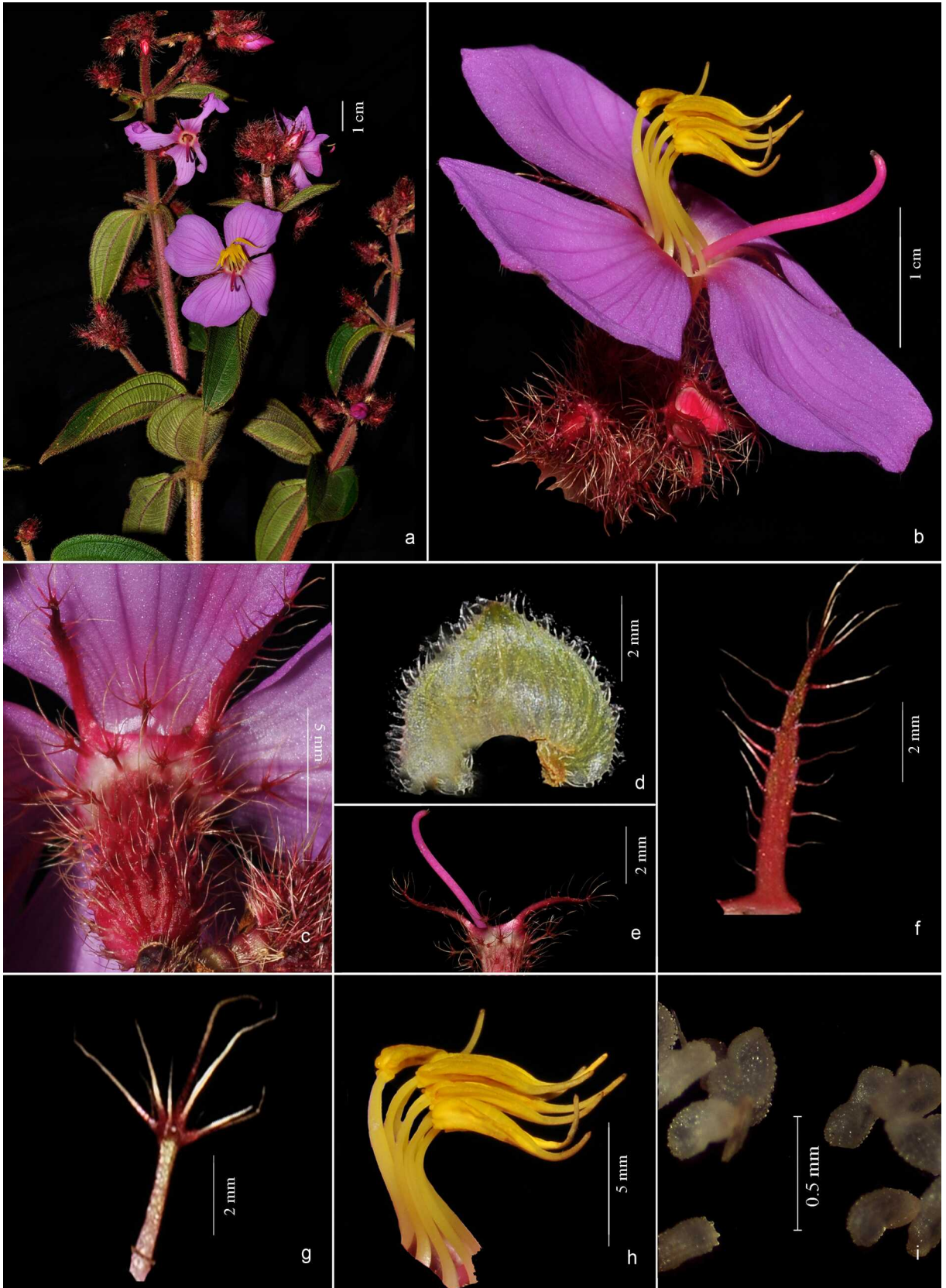


Fig. 23. *Osbeckia stellata* Buch.-Ham. ex D. Don var. *hispidissima* (Wight) C. Hansen: **a.** Habit; **b.** Flower; **c.** Hypanthium; **d.** Bract; **e.** Style; **f.** Calyx lobe; **g.** Intersepal emergence; **h.** Stamens; **i.** Seeds.

at the base, curved upwards. Petioles 5–11 mm long; lamina narrowly to broadly ovate, 8.2 × 3.1 cm, 5-nerved, apex acute to attenuate, base acute, indumentum thin to dense, hairs ascending to patent on both sides. Cymes, 5–10-flowered; bracts green, small, 4 mm long, hairy. Flowers tetramerous; pedicels 0.5–3 mm long. Hypanthium urceolate, 9–11 × 2.5–3 mm, covered with patent emergences and a few bristles at the base; intersepal emergences 5–7 mm long, with a terete glabrous stalk, terminating in a stellate head; other emergences similar but smaller, restricted to uppermost part of hypanthium mixed with appressed hairs. Sepals 4, lanceolate to ovate, margins ciliate or hairy, both sides glabrous, apex stellate. Petals 4, obovate to broadly obovate, 16–28 mm long, pink to purple, glabrous, apex ciliate. Stamens 8; filaments 8–12 mm long, glabrous; anthers narrowly ovate, ‘S’-shaped, yellow, 10–15 mm long, beak narrow, 2–3 mm long, not twisted; pore oblique; connective with undulating collar having large dorsal lobes. Ovary united with hypanthium for about two thirds of its length, anther pockets extending to the base of the ovary, crown appressed hairy; style 13–18 mm long, glabrous. Capsules urceolate, 8–10 × 2.5–3 mm, neck widens towards rim, densely covered with emergences and hairs which often fall off when mature; seeds 0.1–0.2 mm long, numerous, curved, muricate.

Chromosome number: Not reported

Habitat: Evergreen forests at an elevation above 500 m. in association with *O. stellata* var. *stellata*.

Flowering & fruiting: August–February.

Distribution: Endemic to India.

Specimens examined: INDIA, **Karnataka**, Chikmagalur district, Bababoodan Hills, 25.11.1845, *Meebold* 10464 (CAL); Aglatti, Mysore, 11.1908, *s.coll. s.n.* (JCB); Hassan district, Bisle Ghat, 25.4.1970, *Saldanha* 16879 (JCB); Vanagw, 15.05.1968, *Saldanha* 11718 (JCB). **Meghalaya**, East Khasia Hills district, Air force campus, Shillong, 27.10.15, *Prashob & Sibichen* 6623 (DEV); Shillong, 27.10.15, *Prashob & Sibichen* 6622 (DEV).

Notes: This variety is closely related to *O. rostrata* and *O. stellata* var. *crinita*, resembling the former by the hypanthium and the latter by the patent hairy stem. The reddish brown colour of the hypanthium, intersepal emergences with glabrous stalk and inflexed bristles on the stem justifies its varietal status.

Osbeckia sect. Osbeckia

The section comprises annual herbs having tetramerous flowers and long beaked anthers. Triana (1871) included 4 species *viz.*, *Osbeckia chinensis* L., *O. capitata* D. Don ex Wight & Arn., *O. zeylanica* L.f. and *O. perottetii* D.C. ex Naudin under the section *Genuinae*. Clarke (1879) also included the first 3 species under the same section. Cogniaux (1891) followed Triana and included 4 species in the section *Genuinae* in “*Monographie Phanerogamarum*”. However the sectional name *Genuinae* is inadmissible as it is contrary to Art. No. 22.1, 22.2 of ICN (Turland *et al.*, 2018), hence the sectional name “*Osbeckia*”, is used in the present treatment instead of “*Genuinae*”. This section is represented by three species and one variety in India.

Osbeckia sect. Osbeckia

Genuinae Triana, Trans. Linn. Soc., London 28: 53. 1871; C.B. Clarke in. Hook.f., Fl. Brit. India 2(6): 515. 1879; Cogn. in A.DC. & C.DC., Monogr. Phan. 7: 325. 1891. *Type*: *Osbeckia chinensis* L.

Annual herbs; Flowers tetramerous; anthers long beaked.

Distribution: Distributed mainly along wet tropical and subtropical Asia including Indo China, Nepal, Bhutan, and Sri Lanka.

Key to the species of sect. Osbeckia

- 1a. Hypanthium campanulate with emergences and hairs 2
- 1b. Hypanthium urceolate, glabrous or occasionally hairy *O. capitata*

- 2a. Intersepalal emergences persistent, prominently stalked, margins not ciliate
..... *O. zeylanica*
- 2b. Intersepalal emergences caducous, not stalked, margins ciliate *O. chinensis*

Osbeckia capitata D. Don ex Wight & Arn., Prodr. Fl. Ind. Orient. 1: 323. 1834; Walp., Nov. Actorum Acad. Caesp. Leop.-Carol. Nat. Cur. 19. Suppl. 1: 331. 1843; Naudin, Ann. Sc. Nat. Ser. 3. 14. 1850; C.B. Clarke in Hook. f., Fl. Brit. India 2: 517. 1879; C. Hansen, Ginkgoana 4: 47. 1977; N.P. Balakr., Fl. Jowai & Vicinity 206. 141. 1983. *Lectotype* (designated by Hansen, 1977): BANGLADESH, Sillhet, *s.d.*, Wallich 4072 (K000890015, digital image!)

O. glauca Benth. ex Naudin, Ann. Sci. Nat. Bot. Ser. 3. 14: 68. 1850, *non* Benth. ex Triana, 1871. *Type*: BANGLADESH, Sillhet, *s.d.*, Wallich *s.n.* (holo P02441104, digital image!). Fig. 24

Annual herbs, main stem prostrate with erect branches, 7–50 cm tall. Stems quadrangular, branched or unbranched, covered with appressed hairs. Leaves sub-sessile; petioles 0.2–1.2 mm long; lamina ovate to broadly ovate, 1–3 × 0.5–2.3 cm, apex acute, base obtuse to subcordate, 3–5-nerved, both sides clothed with ascending short hairs. Cymes terminal, cluster of 2–3 flowers or solitary, subtended by 1 or 2 pairs of leaves. Flowers tetramerous; pedicels to 1 mm long. Bracts ovate to elliptic, 3.5–6 mm long, margins ciliate, appressed-hairy dorsally. Hypanthium urceolate, 6–8 × 3–5 mm, glabrous or occasionally hairy, with emergences; intersepalal emergences scale-like, 1–2.5 × 0.5–1 mm, caducous, rounded at apex, without a distinct head, length of hairs on margins increases towards the tip, dorsal side clothed with appressed hairs. Sepals 4, triangular or ovate, 6–10 mm long, caducous, dark brown to green in color with indistinct nerves, margins ciliate, dorsal side clothed with appressed-hairs. Petals 4, pink, obovate, 10–17 × 6–11 mm, 10–12-nerved, apical margins ciliate. Stamens 8; filaments 5–11 mm long, dark pink; anthers ovate, 5–8 mm long,

yellow, narrowed into a slender, tubular beak 2–4.5 mm long, not twisted, pore oblique on the ventral side of tip, narrow, connective prolonged into a collar. Ovary united with hypanthium for about half of its length; anther pocket extending to the base of ovary; free part glabrous, crown distinct; style 14–17 mm long. Capsules urceolate, 7–9 × 3.5–5 mm, not ribbed; seeds 0.2–0.4 mm long, numerous, curved.

Flowering & fruiting: August–October.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: This species thrives best in elevation varying from 500–1500 m., commonly seen in borders of evergreen forests as well as grasslands, occurs in massive number in association with *O. stellata* var. *stellata* and *O. stellata* var. *crinita*.

Distribution: China, Bhutan and India.

Specimens examined: INDIA, Assam, Dima Hasao district, Umrangso, N.C. Hills, 12.01.2007, R.S. Baruah 115222 (ASSAM). Meghalaya, Cherrapunji, 27.09.1956, G. Panigrahi 3480 (CAL); Cherrapunji, way to Nokthlang, 30.07.1913, Upendranath Kanjilal 2365 (ASSAM); East Khasi Hills district, Mawphlanag, Hill slope, 29.10.1972, P.K. Hajra 51907 (CAL); Jaintia hills district, Dawki, 12.09.2015, Prashob & Sibichen 6134 (DEV); Jarain pitcher plant lake, 19.09.2015, Prashob & Sibichen 6143 (DEV); Jowai, 03.06.1952, A. Das 39288 (ASSAM); *Ibid.*, 19.09.2015, Prashob & Sibichen 6149 (DEV); Khasia & Jaintia Hills, 13.07.1913, Ranjilal 2365 (ASSAM); *Ibid.*, 22.08.1935, G.K. Deka 13082 (ASSAM); Laitkor Shillong, 28.06.1963, S.K. Kar 18072 (ASSAM); 28.06.2015, Prashob & Sibichen 6112 (DEV); *Ibid.*, 26.09.2016, Prashob & Sibichen 6627 (DEV); Mawphlang sacred forest, 17.09.2015, Prashob & Sibichen 6140 (DEV); Mawsynram, 16.09.2015, Prashob & Sibichen 6138 (DEV); Nongtalang village, 19.09.2015, Prashob & Sibichen 6146 (DEV); Nongthymai, 20.09.1956, G. Panigrahi 3297 (ASSAM); Pynursula, 25.08.1956, G. Panigrahi 2982 (ASSAM); Pynursula, way to Sohra, 27.06.2015, Prashob & Sibichen 6110 (DEV);



Fig. 24. *Osbeckia capitata* D. Don ex Wight & Arn.: **a.** Habit; **b.** Hypanthium with stamens; **c.** Calyx lobe; **d.** Intersepal emergence; **e.** Bract; **f.** Seeds.

Shillong, 20.09.1956, *G. Panigrahi* 3297 (CAL); *Ibid.*, 09.07.1943, *N.L. Bor* 17965 (DD); *Ibid.*, 24.07.1971, *Ramesh Bedi* 434 (DD); *Ibid.*, 24.09.1885, *C.B. Clarke* 40517 (CAL); *Ibid.*, 26.05.1911, *I.H. Burkill & S.C. Banerjee* 42 (CAL); *Ibid.*, 29.05.1911, *I.H. Burkill & S.C. Banerjee* 82 (CAL); *Ibid.*, 29.09.1915, *H.G. Carter* 41408 (CAL); Shillong, Laitkor, 28.06.1963, *S.K. Kar* 18073 (CAL); Shillong, Woodland, 16.07.1964, *H. Deka* 36912 (ASSAM); Shillong peak, 26.10.1960, *D.C.S. Raju* 22023 (ASSAM); Sohra, 11.09.1940, *R.N. Desai* 2044 (ASSAM); *Ibid.*, 26.09.2016, *Prashob & Sibichen* 6628 (DEV); *Ibid.*, 06.09.1962, *G.K. Deka* 23376 (ASSAM); Ummulong to Jowai, 16.08.1968, *N.P. Balakrishnan* 46105 (ASSAM); Upper Shillong, 24.08.1958, *R.S. Rao* 14034 (CAL, ASSAM); West Khasi hills district, Markasa village, 18.06.1958, *G. Panigrahi* 16389 (CAL, ASSAM). **Mizoram**, Lunglei district, Mizo hills, Darzo to Leite, 18.07.1963, *R. Dutta* 34102 (ASSAM).

Notes: Osbeckia capitata resembles *O. chinensis* in having tetramerous, pink flowers with caducous sepals but the latter can be readily distinguished by its sub-sessile ovate leaves, as opposed to the petiolate, linear-lanceolate leaves of the former.

***Osbeckia chinensis* L.**, Sp. Pl. 345. 1753; *C.B. Clarke* in *Hook.f.*, Fl. Brit. India 2(6): 515. 1879; *C. Hansen*, *Ginkgoana* 4: 49. 1977; *T. Pullaiiah & Ramam.*, Fl. East. Ghats, India. 56. 2001; *N.P. Balakr.* Fl. Jowai & Vicinity 206. 141. 1983; *R.S. Rao*, Fl. East Godavari Dist., 366. 1999; *T. Pullaiiah, D.M. Rao & K.S. Ramam.*, Fl. East. Ghats 56. 2002; *G.V.S. Rao & G.R. Kumari*, Fl. Visakhapatnam Dist., Andhra Pradesh, 339. 2003. *Lectotype* (designated by Hansen, 1977): *s.loc., s.d., P. Osbeck s.n.* (LINN digital image!).

O. sessilifolia Stokes, Bot. Mat. Med. 2: 348. 1812. *Type: Not seen.*

O. chinensis L. var. *gerzuina* Kurz., J. Asiat. Soc. Bengal. 2. Nat. Hist. 46: 74. 1877. *nom. illeg.* *Type: Not seen.*

O. chinensis L. var. *typica* Hochr., Candollea 2: 469. 1925. *nom. illeg.* *Type: Not seen.*

O. angustifolia D. Don, Prodr. Fl. Nepal. 221. 1825. *Osbeckia chinensis* var. *angustifolia* (D. Don) C.Y. Wu & C. Chen, Fl. Yunnan. 2: 80. 1979. *Type: Not seen.*

Tristemma angustifolium Blume, Bijdr. Fl. Ned. Ind. 17: 1079. 1826. *Type: Not seen.*

O. linearis Blume, Flora 14: 473. 1831. *Melastoma linearis* Reinw. ex Blume, Flora 14: 474. 1831. (*pro. syn.*). *Osbeckiachinensis* var. *linearis* (Blume) Kurz, J. Asiat. Soc. Bengal pt. 2. Nat. Hist. 48: 74. 1877. *Osbeckia linearis* Blume var. *moluccana* Blume, Mus. Bot. Lugduno-Batavum 1: 51. 1849. *Lectotype* (designated here): Indonesia, *s.d., s.coll. s. n.* (K000867922 digital image!).

O. ciliaris Ser. ex DC., Prodr. 3: 132. 1828. *Type: Not seen.*

O. multiflora Blanco, Fl. Filipinas 293. 1837. *Type: Not seen.*

O. myrtifolia Blume, Mus. Bot. 1(4): 51. 1849. *Type: NEPAL*, 1831, *Wallich 4067A* (holo K000890012 digital image!).

O. japonica Naudin, Ann. Sci. Nat. Bot. Ser. 3, 14: 70. 1850. *Type: JAPAN, s.loc., s.d., Textor (Blume) s.n.* (holo P02441110 digital image!).

O. perrotteti DC. ex Naudin., Ann. sci. Nat. Bot. ser. 3, 14: 71. 1850. *Lectotype* (designated here): PHILIPPINES, Manille, Prape, *s.d., Perrette s.n.* (BR0000005208692 digital image!).

O. chinensis L. var. *linearifolia* Kuntze, Rev. Gen. Pl. 1: 247. 1891. *Type: INDIA*, West Bengal, Silligori-Terrai, *s.d., C.E.O. Kuntze* 6548 (holo NY00229579 digital image!).

O. chinensis L. var. *parasathensis* Haines, Bot. Bihar & Orissa 370. 1922. *Type: INDIA, s.loc., s.d., Clarke* 34727 (holo K000890005 digital image!).

O. watanae Craib, Bull. Misc. Inform. Kew 4: 171. 1930. *Type: THAILAND*, Watana, 14.10.1928, *Put* 1909 (holo K000867933 digital image!).

O. chinensis L. var. *attenuata* Bakh.f., Meded Bot. Mus. Herb. Rijks Univ. Utrecht 91: 50. 1943. *Type: CHINA, s.d., Elbert* 987 (holo L digital image!).

Rhexia napaulensis Ser. ex DC., Prodr. 3 : 142. 1828, *pro syn.*

O. ciliata Ham. in Wall., Numer. List. 143: 4067 C. 1831. (*pro parte*), *nom. nud.*

O. tenuis Buch.-Ham. ex G. Don, Gen. Hist. 2: 760. 1831. (*pro parte*), *nom. nud.*

O. decora Wall., Numer. List 144, 4070. 1831. *nom. nud.*

O. ciliaris Buch.-Ham. ex G. Don, Gen. Hist. 2, 760. 1832. *in syn.* *Type:* Not seen.

O. glabrata Benth. in Wall., Numer. List 144. 4071. 1837. *nom. nud.*

O. ridleyana Hosseus., Bot. Jahrb. Syst. 45: (3) 371. 1911. *nom. nud.* Fig. 25

Annual, erect, branched herbs, *c.* 70 cm tall. Stems branched, branches clothed with appressed hairs. Petioles 0.5–2.5 mm long; lamina ovate to lanceolate, 1.5–4.5 × 0.8–2.4 cm, 3–5-nerved, apex acute, base acute to rounded, both sides thinly clothed with short to long, ascending to patent hairs. Inflorescence a dense terminal cluster of 5–10 flowers, subtended by 1–2 pairs of leaves. Bracts ovate, minute, 1–4 × 6–8 mm, margins ciliate, appressed-hairy along the midline dorsally or sometimes glabrous. Flowers tetramerous; pedicels *c.* 3 mm long. Hypanthium campanulate, 3–7 × 2–4 mm, with a few emergences, hairs simple; intersepal emergences not stalked, flat, 0.3–1 × 0.3–11.5 mm, margins ciliate, caducous; other emergences appressed, but smaller, sometimes much reduced in size. Sepals 4, triangular, 6–7 × 2–5 mm, apex acute, base obtuse, with few distinct nerves, margins ciliate, few appressed hairs dorsally, caducous, or very rarely persistent. Petals 4, pink, ovate, 12–17 × 5–7 mm, ciliate at apex. Stamens 8; filaments 5–6.5 mm long; anthers 1.1–3.7 mm long beak narrowed 0.5–1.5 mm, connective prolonged into a small collar. Ovary united with hypanthium for about half its length, anther pockets extending to base of ovary; the rim of hypanthium extending beyond the crown is glabrous or very rarely with a few bristles, crown very distinct; style 9–14 mm long.

Capsules campanulate to urceolate, 4.5–8 × 3–4 mm; seeds minute, 0.1–0.2 mm long, minute, curved.

Key to the varieties

- 1a. Intersepal emergences caduceous
 var. *chinensis*
- 1b. Intersepal emergences persistent var. *pusilla*

Osbeckia chinensis L. var. ***chinensis***, Sp. Pl. 345. 1753

Flowering & fruiting: September–May.

Chromosome number: *n* = 10 (Meenakumari & Kuriachan, 1990)

Habitat: This species thrives best in elevation varying from 300–500 m., commonly seen in borders of evergreen forests as well as grasslands.

Distribution: Australia, Burma, Cambodia, Celebes, China, India, Japan, Java, Laos, Lesser Sunda Islands, Malaya, Moluccas, Nepal, New Guinea, North Vietnam, Philippines, South Vietnam, Sumatra, Taiwan and Thailand.

Specimens examined: INDIA, Assam, Darrang district, Silburi range office, 30.11.1975, P.K. Hajra 65347 (ASSAM); Goalpara district, *s.loc.*, 15.09.1937, G.K. Deka 17855 (ASSAM); Kochugaum, 27.01.1933, D. Nath 13476 (ASSAM); Golaghat district, Seelampur, 11.10.1885, C.B. Clarke 171801 (CAL); Kamrup district, Garo hills, 01.1904, J. Marten 171804 (CAL). Bihar, Begusarai district, Bomiabuna, 18.11.1938, N.L. Bor 10833 (DD); Kadalim, 08.01.1960, G.V. Subbarao 22927 (ASSAM). Chhattisgarh, Bastar district, North Kanjeer valley, 26.08.1959, K. Subramanyan 8633 (CAL); Dandakaranya, Orkal, 10.11.1963, D.C.S. Raju 1072 (CAL). Himachal Pradesh, Kangra district, Palampur, 25.09.1896, G.A. Gammie *s.n.* (DD). Jharkhand, Giridih district, Parasnath hills, 04.11.1868, *s.coll. s.n.* (DD); *Ibid.*, 21.02.1923., S. Kurz *s.n.* (DD); *Ibid.*, 15.10.1982, G.N. Tribedi 718 (CAL); *Ibid.*, *s.d.*, S. Kurz *s.n.* (DD); *Ibid.*, Madhya Pradesh, Mandal district, Kanha National Park, 11.1970, R.M. Singhal *s.n.* (DD). Manipur, Imphal district, Chingmeirong, 03.09.1952, D.B. Deb 603



Fig. 25. *Osbeckia chinensis* L. var. *chinensis*: **a.** Habit; **b.** Flower (Images by Prasad Kumar Dash, Odisha Biodiversity Board).

(CAL); Khuduk, 18.01.1952, *D.B. Deb* 233 (CAL); Machahl, 04.1882, *George Watt* 171794, (CAL); Kakching district, Kakching, 14.11.1954, *D.B. Deb* 1200 (CAL); Kangpokpi, Sadar hills, 03.10.1943, *N.L. Bor* 17703 (DD); Konprn, 11.1907, *Meebold* 5907 (CAL); Shngnu, 12.09.53, *D.B. Deb* 2676 (CAL); Thoubal district, Wang Jing, 13.09.1954, *D.B. Deb* 2699 (CAL). **Meghalaya**, East Khasi Hills district, Barapani, 31.08.1950, *G.K. Deka s.n.* (ASSAM); Cherrapunji, 13.11.1910, *D. Hooper* 34689 (CAL); *Ibid.*, 13.11.1910, *D. Hooper* 34690 (CAL); Khasia hills, 06.1876, *s.coll.* 274 (CAL); *Ibid.*, 29.09.1915, *H.G. Carter s.n.* (CAL); *Ibid.*, 27.09.1956, *G. Panigrahi* 3480 (CAL); Khasia hills, Cherra, 18.10.1932, *N.K. Nandi s.n.* (CAL); Mawphlang, Lawhyrgdoh, *Ibid.*, 07.08.1885, *C.B. Clarke s.n.*, (CAL); *Ibid.*, 24.09.1885, *C.B. Clarke s.n.*, (CAL); *Ibid.*, 09.1892, *Dr. King's Collector s.n.* (CAL); *Ibid.*, 05.1911, *I.H. Burkill s.n.* (CAL); *Ibid.*, 26. 05 .1911, *I.H. Burkill & S.C. Banerjee s.n.*, (CAL);

29.05.1911, *I.H. Burkill & S.C. Banerjee* 82 (CAL); *Ibid.*, 07.1918, *s.coll.* 889 (CAL); *Ibid.*, 09.1929, *s.coll.* *s.n.* (CAL); *Ibid.*, 20.09.1956, *G. Panigrahi* 3297 (CAL); *Ibid.*, Laitkor, way to Woodland, 28.06.1963, *S.K. Kar s.n.* (CAL); 29.10.1972, *P.K. Hajra* 51907 (CAL); *Ibid.*, *s.d.*, *S.N. Bal* 701 (CAL); *Ibid.*, *s.d.*, *J.D. Hooker s.n.*, (CAL); Shillong, 03.10.1898, *Dr. Prain* 171766 (CAL); *s.loc.*, 09.1878, *Gustavman s.n.* (ASSAM); *Ibid.*, 12.1885, *s.coll.* 350 (CAL); Shillong, Nongthymmai, 20.09.1956, *G Panigrahi* 3297 (CAL); Upper Shillong, 14.08.1958, *R.S. Rao* 14034 (CAL); *Ibid.*, 24.08.1958, *R.S. Rao* 14036 (CAL); West Khasi Hills district, Markasa village, 18.06.1958, *G. Panigrahi* 16389 (CAL); Jaintia Hills district, Raling to Garampani Road, 22.08.1968, *N.P. Balakrishnan* 46953 (ASSAM); Ri Bhoi district, Barapani, 13.10.1954, *G.K. Deka* 11452 (ASSAM); Barapani forest, 25.10.1931, *Shritham Sharma* 9498 (ASSAM). **Mizoram**, Champhai district, Zote, 10.10.1989, *K.P. Singh*

94551 (ASSAM). **Nagaland**, Peren district, Naga hills, 10.1939, *N.L. Bor* 6673 (DD); *Ibid.*, 06.1985, *N.L. Bor* 21000 (DD); Naga Hills, Tushar 04.09.1948, *S.K. Mukerjee* 3429 (CAL). **Orissa**, Koraput district, Deomali, 06.12.1962, *G.V. Subbarao* 29916 (ASSAM); Mayurbhanj district, Similipal Biosphere, Noana vicinity, 26.11.1979, *s.coll.* 12297 (CAL); Similipal Biosphere, Barakamara, 30.11.1979, *s.coll.* 12400 (CAL). **Sikkim**, South Sikkim district, *s.loc., s.d., G. King s.n.* (CAL); *s.loc.*, 09.12.1875, *J.S. Gamble* 323 (DD); West Sikkim district, Gassing to Ralong river, 02.10.1862, *M.D. Anderson s.n.* (CAL); *s.loc.*, 05.10.1875, *C.B. Clarke s.n.* (CAL); *s.loc., s.d., J.D. Hooker s.n.* (CAL). **Tamil Nadu**, Salem district, Omallur, Shevaroy's temple, 19.03.1979, *N. Venugopal & Jayaselin* 22374 (RHT); Yercaud, Servarayan, 29.06.1979, *K.M. Matthew* 23296 (RHT); *Ibid.*, 10.01.1980, *K.M. Matthew* 25635 (RHT); *Ibid.*, 16.12.1980, *K.M. Matthew, Britto & Rani* 28030 (RHT). **Tripura**, Gomati district, Udaipur, 25.04.1965, *D.B. Deb*, 2885 (CAL). **Uttarakhand**, Dehradun district, Lachhiwala, 10.1930, *A.H. Khan s.n.* (DD); Tehri Garhwal, 04.10.1979, *C. Supia* 1056 (CAL, DD); *Ibid.*, 09.1882, *T.F. Dathu s.n.* (CAL); *s.loc.*, 30.08.1704, *s.coll. s.n.* (CAL); *s.loc.*, 09.1869, *Griffith s.n.*, (CAL); *s.loc.*, 10.1891, *J.S. Gamble* 23157 (CAL, DD); Uttarkashi district, Baramgaon, Gori valley, 27.08.1900, *J. Nagar* 24437 (DD); Khela, Kalivally, Kumaon, 18.09.1900, *Fuayal s.n.* (CAL); *Ibid.*, 18.09.1900, *Juagal* 24437 (CAL); Kumaon, Didihat-Narayan nagar, 12.10.1967, *Arora* 36491 (BSD); Sarayu valley, 28.09.1881, *Dutha*, 1607 (DD); *Ibid.*, 19.08.1986, *Dutha* 5575 (DD). **West Bengal**, Darjeeling district, *s.loc.*, 10.03.1995, *Chandra Panday* 21597 (CAL); *s.loc., s.d., Kurz* 171844 (CAL).

Notes: Osbeckia chinensis is the wide spread species of the genus in Asia. It is very variable, and too many species have been published based on specimens falling within its variation. For example, two entities within *O. chinensis* have been recognized such as var. *attenuata* Bakh. and var. *parasnathensis*. Hansen (1977) treated these varieties

as conspecific to *O. chinensis*. He also described var. *procumbens* from northern Thailand owing to its creeping habit. Hansen (*l.c.*) admitted var. *pusilla* and var. *procumbens* as varieties in his Asiatic Revision of *Osbeckia*.

***Osbeckia chinensis* L. var. *pusilla* (Zoll.) Triana**, Trans. Linn. Soc., London 28: 53. 1872. *O. pusilla* Zoll. & Moritzi, Natuur. Geneesk. Arch. Ned.-Indie 2: 586. 1845, non De Wild. 1921. *Lectotype* (designated by Hansen, 1977): INDONESIA, Java, Zollinger 2225 (P02441165 digital image!).

O. truncata D. Don ex Wight & Arn. var. *strigosa* Kuntze, Rev. Gen. Pl. 1: 248. 1891. *Type*: INDIA, *s.loc., s.d., Kuntze* 6219 (holo NY229590 digital image!).

O. boissieuana Guillaumin, Notul. Syst. (Paris) 2: 302. 1912; & in Bull. Soc. Bot. France 365. 402. 1913. *Lectotype* (designated here): VIETNAM, Cochinchine, 1862, *Thorel* 914 (BM000944330 digital image!).

O. parva E.T. Geddes, Bull. Misc. Inform., Kew 2: 70. 1928. *Type*: THAILAND, 3000 ft, 06.10.1912, *Kerr* 2719 (holo K000867932 image!).

Perennial, erect, branched herbs c. 70 cm tall. Stems branched, branches clothed with appressed hairs. Petioles 0.5–2.5 mm long, Lamina lanceolate, usually more than 3 times as long as broad, 2–6 × 1–2.5 cm, 3–5-nerved, apex acute, base acute to rounded, both sides thinly clothed with short to long, ascending to patent hairs. Inflorescence a dense terminal cluster of 5–10 flowers subtended by 1–2 pairs of leaves. Flowers tetramerous; bracts minute, ovate, 1–3 × 3–4 mm, margins ciliate and appressed-hairy along the midline dorsally, sometimes glabrous; pedicels c. 3 mm long. Hypanthium campanulate, 4–6 × 3–4 mm mm, with a few emergences, simple hairs, intersepalar emergences not stalked, flat, 0.3–1 × 0.3–11.5 mm, margins ciliate, persistent; other emergences, appressed, but smaller, sometimes much reduced in size. Sepals 4, triangular, 1–4 mm long, apex acute, base obtuse, margins ciliate, with a few

appressed hairs dorsally, caducous, or very rarely persistent. Petals 4, pink, ovate, 7–10 × 5–7 mm, ciliate at apex. Stamens 8; filaments 2–4 mm long; anthers 2–4.5 mm long beak narrowed, 2–2.5 mm, connective prolonged into a small collar. Ovary united with hypanthium for about half its length, anther pockets extending to base of ovary; free part glabrous or very rarely with a few bristles, crown very distinct; style 5–12 mm long. Capsules campanulate, 4–6 × 3–4 mm; seeds 0.1–0.2 mm long, minute, curved.

Flowering & fruiting: September–May.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990).

Habitat: Species thrives in massive population at elevation varying from 300–1500 m., commonly seen in borders of evergreen forests as well as grasslands.

Distribution: Burma, Cambodia, Java, India, Laos, Lesser Sunda Islands, South Vietnam and Thailand.

Specimen examined: INDIA, **Andaman & Nicobar Islands**, North Andaman, 01.12.1976, *N.P. Balakrishnan & N.G. Nair* 4772 (PBL).

Notes: *Osbeckia chinensis* var. *pusilla* often grows in grasslands. It has been collected at elevation up to 1570 m.

Osbeckia zeylanica L.f., *Suppl. Sp. Pl.* 215. 1782; C.B. Clarke in Hook.f., *Fl. Brit. India* 2: 516. 1879; Gamble, *Fl. Pres. Madras* 1: 494. 1919; C. Hansen, *Ginkgoana* 4: 43. 1977; J.L. Ellis, *Fl. Nallamalais* 186. 1987; Ramach. & V.J. Nair, *Fl. Cannanore district* 188. 1988; Antony, *Syst. Stud. Fl. Kottayam district* 168. 1989; Sasidh., *Fl. Periyar Tiger Reserve* 145. 1998; Sasidh., *Fl. Chinnar W.L.S.* 132. 1999; B.D. Sharma, Karthik. & N.P. Singh, *Fl. Maharashtra, Dicot.* 28. 2000; J.M. Pallithanam & K.M. Mathew, *Fl. Sirumalai Hills, South India* 107. 2001; Mohanan & Sivad., *Fl. Agasthyamala* 281. 2002; Pull., D.M. Rao & K.S. Ramamurthy, *Fl. Eastern Ghats* 60. 2002. *Type: s.loc., s.d., s.coll.* (holo LINN S09-32833 digital image!).

O. debilis Naudin, *Ann. Sci. Nat. Bot. ser. 3*, 14: 65. 1850. *Type: s.loc, s.d., s.coll. s.n.* (holo P02441158 digital image!).

O. serialis Naudin, *Ann. Sci. Nat. Bot. ser. 3*, 14: 67. 1850. *Type:* INDIA, Tamil Nadu, Courtallum, Vendalore, 1836, *Wight* 1143 (holo P02441159 digital image!).

O. zeylanica L.f. var. *non-rostrata* Haines, *Bot. Bihar & Orissa* 369. 1922. *Lectotype* (designated here): *s.loc., s.d., Haines* 4787 (K000890017 digital image!).

Echinophora maderaspatana Pluk. ex Bakh.f., *Meded. Bot. Mus. Herb. Rijks Univ. Utrecht* 91: 48. 1943, *pro syn.* Fig. 26

Annual, erect herbs, 4–45 cm tall. Stems quadrangular, hispid, sparsely appressed-hairy, branched or unbranched. Petioles 1–4 mm long; lamina ovate, 1.5–4 × 0.6–1.5 cm, cuneate at base, acute at apex, densely hairy on both sides, hairs ascending, thin. Inflorescence a terminal cluster of 5–7 flowers or solitary, subtended by a pair of leaves. Flowers tetramerous; pedicels *c.* 3 mm long; bracts triangular, green, 1.5–3 × 1–2 mm, margins ciliate. Hypanthium campanulate, 3–5 × 1.5–2.5 mm, thinly clothed with patent emergences and hairs; intersepal emergences 1–2 mm long, stalk terete, with patent hairs, head with stellate hairs (1–2 mm long), persistent; other emergences similar, decreasing in size towards base of hypanthium. Sepals 4, triangular, 2.5–5.5 × 1–2 mm, prominently one nerved, margins ciliate, stellate hairs at apex, few patent hairs on nerves dorsally, persistent in fruit. Petals 4, obovate, pink to purple, 8–12 × 3–10 mm, ciliate at apex. Stamens 8; filaments 3–5 mm long; anthers twisted, 2.5–6 mm long, yellow, attenuate into a narrow twisted beak of *c.* 1 mm, connective prolonged into a widened collar. Ovary united with hypanthium for about half its length; anther pockets extending to the base of the ovary; crown absent; style 7–12 mm long; stigma slightly widened. Capsules campanulate, 3–5 × 2–3 mm, ribbed, exceeds ovary; seeds minute 0.1–0.2 mm long, numerous, curved.

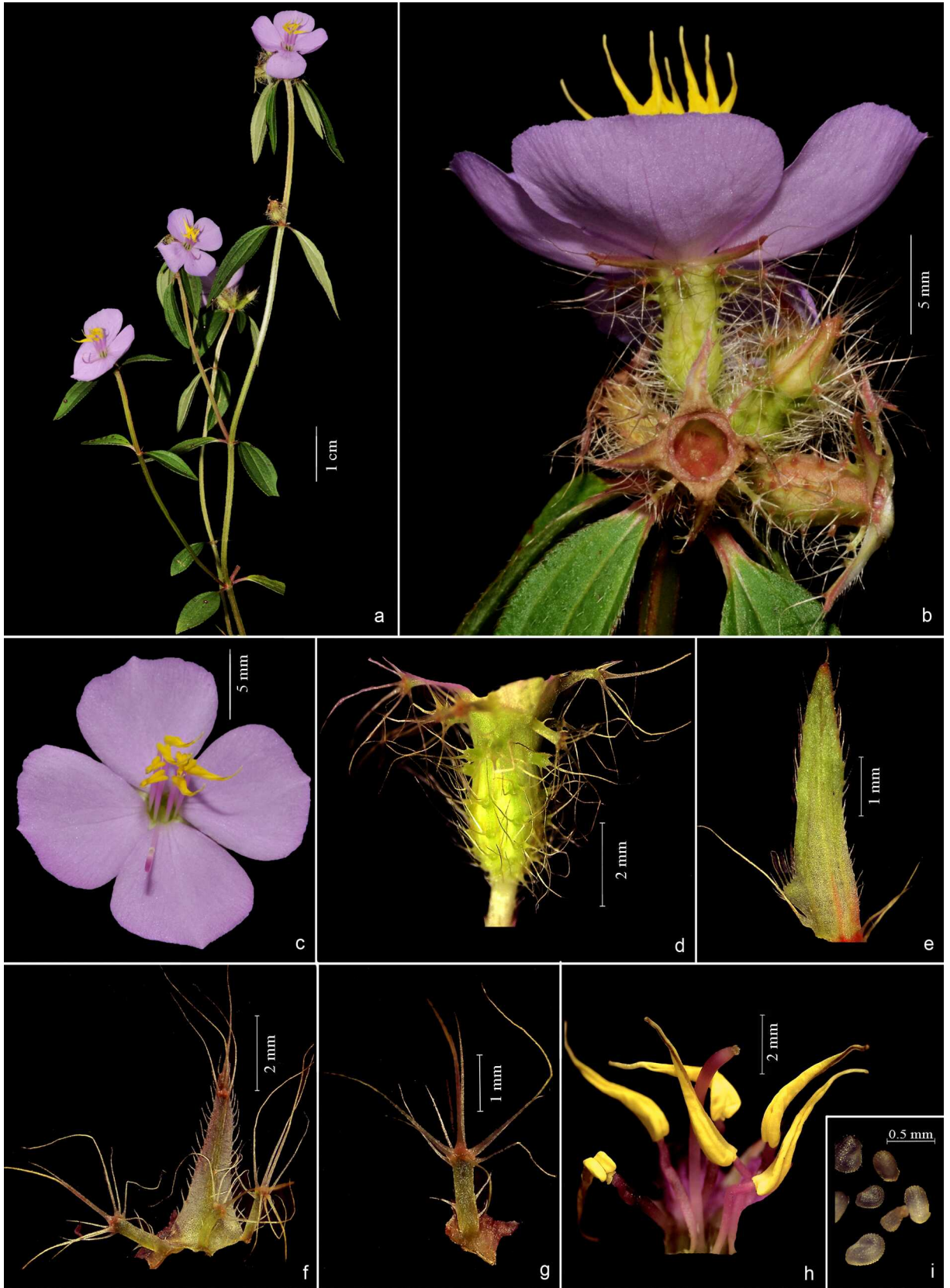


Fig. 26. *Osbeckia zeylanica* L.f.: **a.** Habit; **b.** Inflorescence; **c.** Flower; **d.** Hypanthium; **e.** Bract; **f.** Calyx lobe & intersepal emergences; **g.** Intersepal emergence; **h.** Stamens; **i.** Seeds.

Flowering & fruiting: November–March.

Chromosome number: $n = 10$ (Meenakumari & Kuriachan, 1990)

Habitat: Occurs abundantly in rock crevices in deciduous forests at an elevation above 500 m.

Distribution: India and Sri Lanka.

Specimens examined: INDIA, **Andhra Pradesh**, Chittoor district, Chandragiri, 22.02.1914, *s.coll.* 9979 (MH); Chudregira fort, 04.02.1089, *Ranga* 2267 (MH); Gyanayagundlu, 28.12.1975, G.V. Subbarao 46818 (CAL, MH); Mamandar, 11.03.1918, C.E.C. Fischer 171873 (CAL); Sunnipenta Nallamd, J.L. Ellis 23774 (CAL); Cuddapah district, Balapalle, 23.02.1963, J.L. Ellis 15765 (CAL, MH); East Godavari district, Addateegala, 26.09.1980, G.V. Subbarao 68590 (MH); Karimnagar district, Aklasapur, 30.12.1964, G.V. Subbarao 22485 (CAL, MH); Nellore district, Tada, 03.03.1913, *s.coll.* 21242 (MH); Tada lake vicinity, 26.02.1971, *Sastry* 9748 (CAL). **Karnataka**, Chickmagalur district, Kadur, 14.01.1979, K.R. Keshava Murthy, B.R. Ramesh & P. Prakesh 5685 (CAL). **Kerala**, Kannur district, Iritty, 11.11.1978, V.S. Ramachandran 58660 (CAL, MH); Idukki district, Erattayar, 13.10.1982, V.S. Ramachandran & Mohanan 74611 (MH); Kozhikanam, 11.11.1975, *Vivekananthan* 46629 (MH); Travancore, 27.11.1913, M. Rama Rao 171872 (CAL). **Madhya Pradesh**, Ganjam, 01.1890, J.S. Gamble 21607 (CAL); Indravati Tiger reserve-Bijapur Ghati, 11.10.1987, *Anand Kumar* 16150 (CAL); *s.loc., s.d., s.coll.* 21235 (MH). **Orissa**, Puri district, Puri coast, 02.12.1965, T.A. Rao 5698 (CAL); Orissa coast, 09.03.1909, H.H. Haines 171725 (CAL); Orissa-Konark coast, 04.12.1965, T.A. Rao 5953 (CAL). **Tamil Nadu**, Coimbatore district, Atakathi, Anaimali hills, 26.12.1911, C.E.C. Fischer 771881 (CAL); Dharmapuri district, Harur, Chitteri hills, 12.01.1979, *Venugopal* 20851 (RHT); Kalachipodi Chitteri, 27.12.1990, *Ravishankar* 95555 (MH); Dindigul district, Kodaikanal, 20.02.1986, K.M. Matthew 44218 (RHT); *Ibid.*, 02.05.1988, K.M. Matthew 52873 (RHT); Madras,

02.1889, J.S. Gamble 20390 (CAL); Situmalai, 09.10.1959, *Pallithanam* 5172 (RHT); Kanchipuram district, Chingleput, M.C.C. campus, 05.02.1986, *Narasimhan* 954 (MH); Chingleput, Tirupporur, 01.02.1976, A.N. Henry 47145 (CAL); Puzhuthivakkam, 31.01.2000, K.M. Matthew & Jayanthi 70982 (RHT); Tambaram, M.C.C. Campus, 05.01.2001, *Livingston* 72077 (RHT); Thenpattinam, 06.03.2000, *Augustine* 61955 (RHT); Krishnagiri district, Denkanikottai, 14.11.1979, K.M. Matthew 24576 (RHT); Pudukkottai district, Kulathur, Bommadimalai, 09.03.1984, K.M. Matthew & Britto 29676 (RHT); Kulathur, Narathamalai, *Ibid.*, 09.01.1969, K.M. Matthew 8268 (RHT); *Ibid.*, 20.10.1970, K.M. Matthew 12857 (RHT); *Ibid.*, 15.11.1975, K.M. Matthew 15073 (RHT); *Ibid., s.d., Arulappan. s.n.* (MH); *Ibid.*, 10.01.1971, K.M. Matthew 12981 (RHT); *Ibid.*, 07.02.1980, *Diraviam* 26354 (RHT); *Ibid.*, 16.12.1982, K.M. Matthew & Rani 29336 (RHT); Sathyamangalam, 23.12.1978, *s.coll.*, 16092 (RHT); Tirunelveli district, Agasthiyar falls, 12.02.2015, Prashob & Sibichen 5596 (DEV); Ambasamudram, Kannikketti, 02.01.1978, K.M. Matthew 15826 (RHT); Kalakkad, 22.01.1979, K.M. Matthew 16232 (RHT); *Ibid.*, 12.02.2015, Prashob & Sibichen 5594 (DEV); Kannikketti, 20.02.1913, *Ramaswami* 39396 (CAL); Mundanthurai, 19.02.1913, M.S. Ramaswami, 39340 (CAL); *Ibid.*, 22.02.1960, K.M. Sebastine 9909 (CAL); Papanasam, 12.02.2015, Prashob & Sibichen 5595 (DEV); Sivanapuri, 09.02.1916, C.E.C. Fischer 3876 (CAL); Tanimapatam, 02.1889, J.S. Gamble 20390 (CAL); Viluppuram district, Kallakurichi, 15.01.1979, *Venugopal* 21045 (RHT); Viluppuram, Tonnadu malai, 10.01.1999, K.M. Matthew & Augustine 71081 (RHT); Ulundurpet, South Arcot, 30.12.1981, K.M. Matthew, Britto & Rani 28741 (RHT); *Ibid.*, 01.02.1980, K.M. Matthew, Britto & Rani 26264 (RHT).

Notes: *Osbeckia zeylanica* is a distinct species differing from all other annual species by the twisted anthers, which gradually narrowing into a beak with a small bend near the tip pointing the pore towards the back.

The consistent, but unfounded confusion of *O. zeylanica* with *O. chinensis* has been solved by Hansen (1972).

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