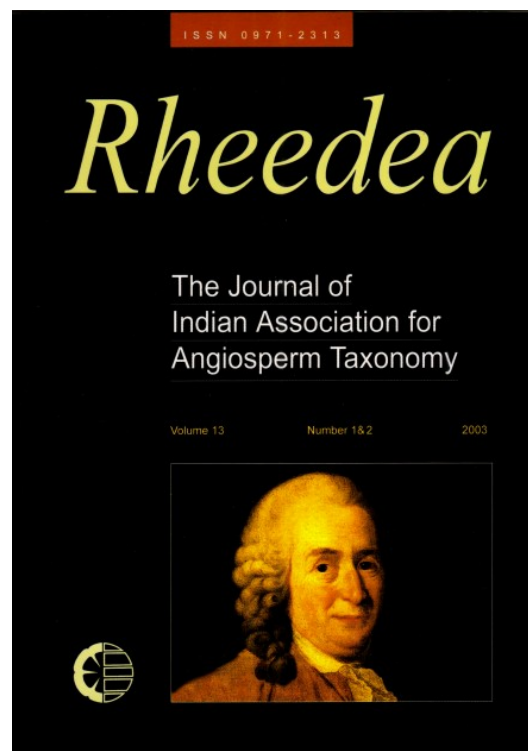




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Five New Species of *Eriocaulon* L. (Eriocaulaceae) from the Western Ghats, India

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Abstract

Five new species of *Eriocaulon* L. (Eriocaulaceae), viz.: *E. apetalum*, *E. cookei*, *E. koynense*, *E. maharashtrense* and *E. sahyadricum*, are described from the Western Ghats of India. *E. apetalum* allied to *E. achiton* is described from Ahmednagar (Harishchandragad) and Satara (Mahabaleshwar) districts of Maharashtra State. *E. cookei* allied to *E. ritcheianum* occurs in Ahmednagar (Harishchandragad and Ratangad), Pune (Junnar), Satara (Panchgani) and Thane (Kedarnath hill) districts of Maharashtra. *E. koynense* allied to *E. cuspidatum* is described from Satara district (Koyna Wildlife Sanctuary) of Maharashtra. *E. maharashtrense* allied to *E. minutum* occurs in Pune district (Mulshi Taluka) of Maharashtra. *E. sahyadricum* allied to *E. stellulatum* is collected from Goa (Sanguem Taluka), Karnataka (Shimoga and North Kanara districts) and Maharashtra (Ahmednagar, Pune, Satara, Sindhudurg and Thane districts). Detailed descriptions and illustrations of these five species are provided.

Keywords: *Eriocaulon*, Five new species, Maharashtra-Karnataka states

Introduction

The genus *Eriocaulon* L. consists of c. 400 species (Mabberley, 2000) which are distributed throughout the tropical and subtropical regions of both the hemispheres. Karthikeyan *et al.* (1989) enumerated 72 species, 14 varieties and 1 forma from India. Ansari and Balakrishnan (1994) rendered a systematic account of the genus in India, wherein 65 species were treated. To these, Yadav *et al.* (1998), Khanna *et al.* (2000), Punekar and Lakshminarasimhan (in press), Gaikwad *et al.* (2002) and Punekar *et al.* (2003) added *Eriocaulon ratnagiricus* from Maharashtra, *E. raipurensis* from Madhya Pradesh, *E. peninsulare* from Karnataka, *E. kolhapurensis* from Maharashtra and *E. balakrishnanii* from Karnataka respectively. Das Das and Singh (2001) have reported 35 species from Karnataka and Gaikwad and Yadav (2002), 40 species from Maharashtra. During intensive and extensive survey of the Western Ghats of Maharashtra and Karnataka, five interesting species of *Eriocaulon* were collected. A perusal of literature, critical observations and comparison of our specimens with those at BSI and K helped us to come to the conclusion that these species were new and hitherto undescribed. They are described and illustrated here.

***Eriocaulon apetalum* Punekar, Malpure *et* Lakshmin., *sp. nov.* Fig. 1.**

Eriocaulon apetalum Punekar *et al.* *E. achiton* affinis sed receptaculo convexo, bracteis involucribus ad apicem dorsaliter sparse pilosis, sepalis florum femineorum canaliculatis atque ad apicem subacutis vel acutis et seminibus non appendiculatis differt.

Types: INDIA, Maharashtra, Ahmednagar district: Harishchandragad, between Lavhali and Pachnai village (N 19° 25. 823' and E 073° 47. 944'), 20 October 2002, Punekar & Malpure 186485 (Holotype, CAL; Isotypes, BSI, MH); Satara District: Mahabaleshwar, Kate's point (N 17° 56. 270' and E 073° 41. 488'), 25 October 2002, Punekar 186101 (Paratype, BSI).

Acaulescent herbs; rootstock absent, roots fibrous. *Leaves* linear, acuminate, 2 - 3 x 0.08 - 0.15 cm, glabrous. *Peduncles* solitary or many, up to 10 cm long, 4-ribbed, twisted, glabrous. *Sheaths* 2 - 3 cm long, glabrous; limb lanceolate, acuminate, entire. *Heads* obconic, convex - flat at apex, c. 4 mm across, white-black; receptacles convex, villous; involucrial bracts spreading, oblong-obovate, obtuse, 1.8 - 2 x 1 - 1.2 mm,

straw coloured, entire or notched at apex, sparsely hairy dorsally at apex; floral bracts oblanceolate, acute or obtuse at apex, 1.7 - 2 x 0.7 - 0.9 mm, black, densely hairy dorsally towards apex. *Male flowers*: pedicels c. 0.25 mm long; sepals 2, free, oblanceolate, subacuminate, c. 0.8 x 0.1 mm, glabrous, black; stipe of corolla c. 0.6 mm long; petals 3, equal, minute, glabrous with a black gland in each; stamens 6, anthers globose, c. 0.1 x 0.1 mm, black. *Female flowers*: pedicels absent; sepals 2, free, linear-falcate,

canaliculate, not keeled, subacute to acute at apex, c. 1.8 x 0.15 mm, black, sparsely hairy at apex; petals absent; ovary stipitate, ovoid, c. 0.3 mm long; style c. 0.3 mm long, trifid. *Seeds* oblong-ellipsoid, obtuse, c. 0.5 x 1.5 mm, pale purple; cells of seed coat transversely elongated, aligned in vertical rows; appendages absent.

Etymology: The specific epithet '*apetalum*' indicates the absence of petals in female flowers.

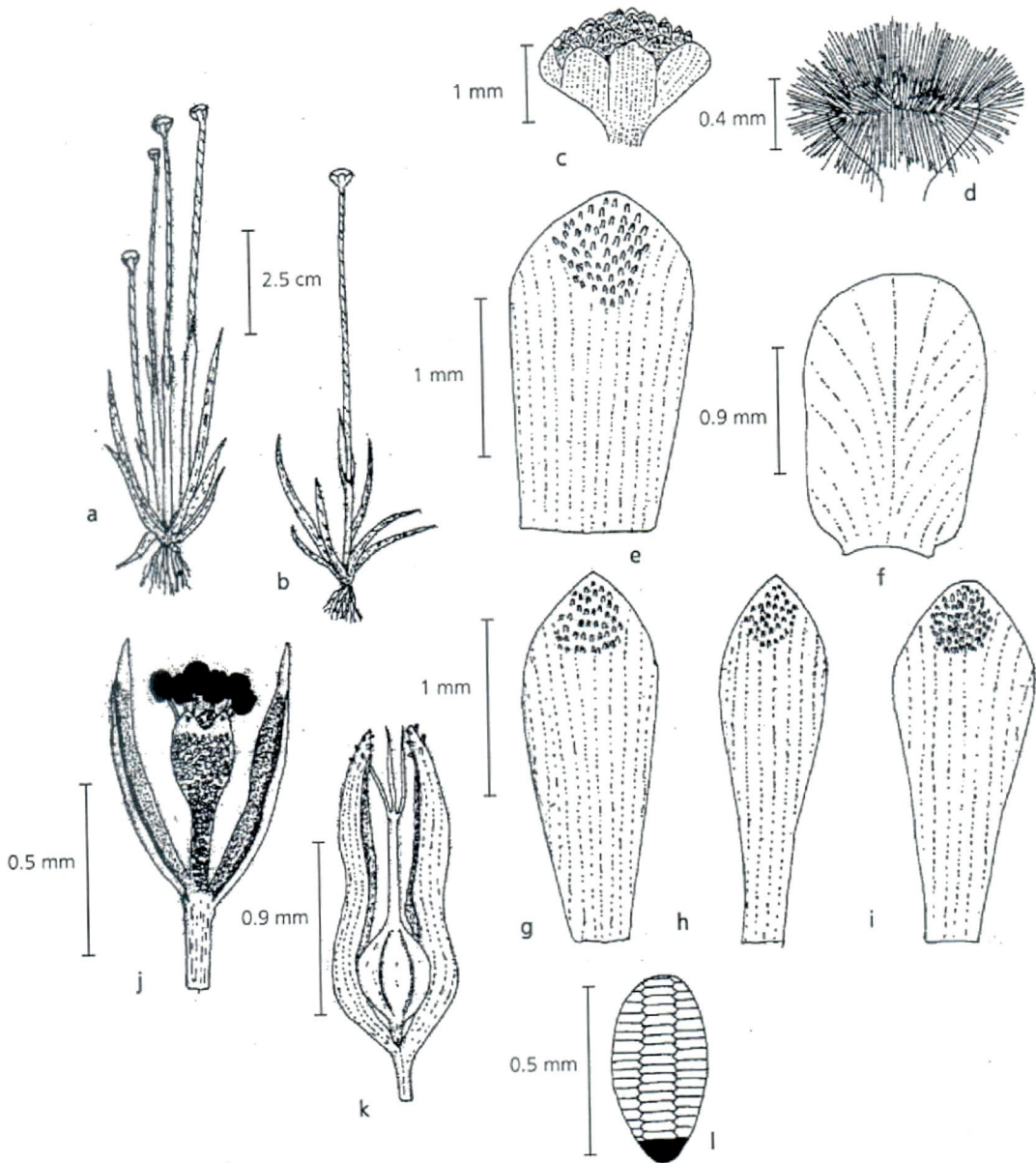


Figure 1. *Eriocaulon apetalum* Punekar, Malpure & Lakshmin. - a, b. Habit; c. Head; d. Receptacle; e, f. Involutral bracts; g-i. Floral bracts; j. Male flower; k. Female flower; l. Seed.

Flowering & Fruiting: August - November.

Habitat: It grows at Harishchandragad at an altitude of c. 850 m. in colonies along the fringed areas of ephemeral streams and in tufts of grasses in association with *Eriocaulon eurypeplon*, *E. cookei*, *E. heterolepis*, *Jansenella griffithiana*, *Swertia minor* etc. At Mahabaleshwar it grows at an altitude of c. 1350 m. on lateritic hill slopes in clumps of *Strobilanthes reticulatus* in association with *Hitchenia caulina*, *Fimbristylis* sp., *Panicum* sp., *Eriocaulon sahyadricum*, *E. sedgwickii*, *Exacum pumilum* etc.

Occurrence: **Maharashtra**, Ahmednagar District: Harishchandragad, between Lavhali and Pachnai villages; Satara District: Mahabaleshwar, Kate's point road.

Note: *Eriocaulon apetalum* Punekar et al. is allied to *E. achiton* Koern. but differs from it in having convex receptacle, sparsely hairy (dorsally at apex) involucre bracts, female flower sepals canaliculate, subacute to acute at apex and seeds without appendages.

Eriocaulon cookei Punekar, Malpure et Lakshmin., sp. nov. **Fig. 2.**

Eriocaulon cookei Punekar et al. *E. ritchieano* affinis sed foliis semper linearibus longioribus (usque 15 cm longis), pedunculis plerumque solitariis (raro binis), vaginis longioribus integrisque, receptaculis conicis, bracteis involucrelibus 1-3 numero atque ad apicem incisus, lobis sepalorum masculorum ad apicem truncatis vel rotundatis differt.

Types: INDIA, **Maharashtra**, Ahmednagar District: Harishchandragad, between Lavhali and Pachnai villages (N 19° 25. 823' and E 073° 47. 944'), 20 October 2002, Punekar & Malpure 186484 (Holotype, CAL; Isotypes, BSI, MH).

Acaulescent herbs; rootstock absent, roots fibrous. **Leaves** rosulate, linear, acuminate, up to 15 x 0.3 cm, glabrous. **Peduncle** solitary or rarely two, up to 25 cm long, twisted, 5-ribbed, glabrous. **Sheaths** up to 9 cm long, glabrous; limb lanceolate, entire, acute. **Heads** hemispherical, c. 4 mm across, white-black; receptacles conical, c.1 mm long, glabrous; involucre bracts spreading, obovate, obtuse or rounded, 2 x 1.8 - 2 mm, notched at apex, glabrous, black; floral bracts cuneate-oblongate, acute, rounded or acuminate at apex, 2.2 - 2.5 x 1 mm, densely hairy dorsally at apex, black. **Male flowers:** pedicels minute; sepals obovate, connate into a spathe of 1.5 - 1.8 x 1.2 - 1.8 mm, 3-lobed, lobes mostly truncate at apex or rarely the lateral two obtuse and middle truncate at apex, densely hairy dorsally at apex, black; stipe of corolla 1 - 1.2 mm long; petals 3, subequal, oblong, hairy at apex, largest petal hairy ventrally, with a black gland

in each; stamens 6; filaments c. 0.6 mm long; anther lobes pale yellow, ovoid, c. 0.1 x 0.1 mm. **Female flowers:** pedicels short; sepals 3, free, dissimilar, all densely hoary dorsally at apex, lateral two oblanceolate, acute, black or straw coloured, canaliculate, 1.6 - 1.7 x 0.3 mm, middle sepal flat, oblong, subacute at apex, c. 1.2 x 0.15 mm; petals 3, free, subsimilar, all obtuse at apex, densely hairy at apex and pilose along the margin, with a black gland in each, middle spatulate, c. 1.8 x 0.2 mm, lateral 2 oblanceolate, c. 1.5 x 0.1 mm, stipitate between sepals and petals; ovary sessile, globose, c. 0.3 x 0.3 mm; style c. 1 mm long, trifid. **Seeds** spherical, obtuse, c. 0.4 x 0.3 mm, pale purple; seed coat cells transversely elongated, aligned in vertical rows; appendages absent.

Etymology: The specific epithet 'cookei' is given in honour of Theodore Cooke, the former Principal of the College of Science at Poona (Pune) and Director, Botanical Survey of Western India for his outstanding contribution to the 'Flora of Presidency of Bombay'.

Flowering & Fruiting: September-December.

Habitat: The species grows at an altitude between 800 - 1300 m. in fringed areas of ephemeral streams on grass covered rocks in association with *Eriocaulon apetalum*, *E. eurypeplon*, *Swertia minor*, *Jansenella griffithiana* etc.

Occurrence: **Maharashtra**, Ahmednagar District: Harishchandragad and Ratangad; Thane District: Kedarnath Hill; Pune District: Junnar, Dhak plateau; Satara District: Panchgani plateau.

Specimens Examined: **Maharashtra**, Satara District: Panchgani, August 1892, W. A. Talbot 263 (BSI); Panchgani plateau, 28 January 1962, A. S. Rao 77974 (BSI); Pune District: Dhak plateau, Junnar, 29 September 1965, K. Hemadri 107481 & 27 September 1967, K. Hemadri 77974 (BSI); Thane District: Kedarnath hill slopes, 17 January 1968, K. V. Billore 115510 (BSI).

Note: *Eriocaulon cookei* Punekar et al. is allied to *E. ritchieanum* Ruhl. but differs from it in having always linear and longer (up to 15 cm long) leaves, usually solitary and rarely paired peduncles, longer and entire sheaths, conical receptacles, 1-3 times incised involucre bracts at apex and truncate or rounded male sepal lobes at apex. This species was earlier collected by many botanists and deposited at BSI under the name *Eriocaulon ritchieanum*.

Eriocaulon koynense Punekar, Mungikar et Lakshmin., sp. nov. **Fig. 3.**

Eriocaulon koynense Punekar et al. *E. cuspidato* affinis

sed foliis sparse pilosis, receptaculo villosa, bracteis floralibus ad apicem dense pilosis, sepalis masculis carinatis atque canaliculatis, parietibus radialibus semini appendiculas 3-4 numero ferentibus, appendiculis ad apicem dilatis atque T-formis differt.

Types: INDIA, Maharashtra, Satara District: Koyna Wildlife Sanctuary, Old Vasotagad, 20 December 2002, Rahul

Mungikar 186488 (Holotype, CAL; Isotypes, BSI, MH).

Acaulescent herbs; rootstock absent. Leaves rosulate, linear, acute or obtuse at apex, c. 12 x 0.4 cm, sparsely hairy. Peduncles many, twisted, glabrous. Sheaths c. 7 cm long; limb lanceolate, entire. Heads globose or oblate, 5-6 mm across, whitish-grey coloured; receptacles convex, villous tomentose; involuclral

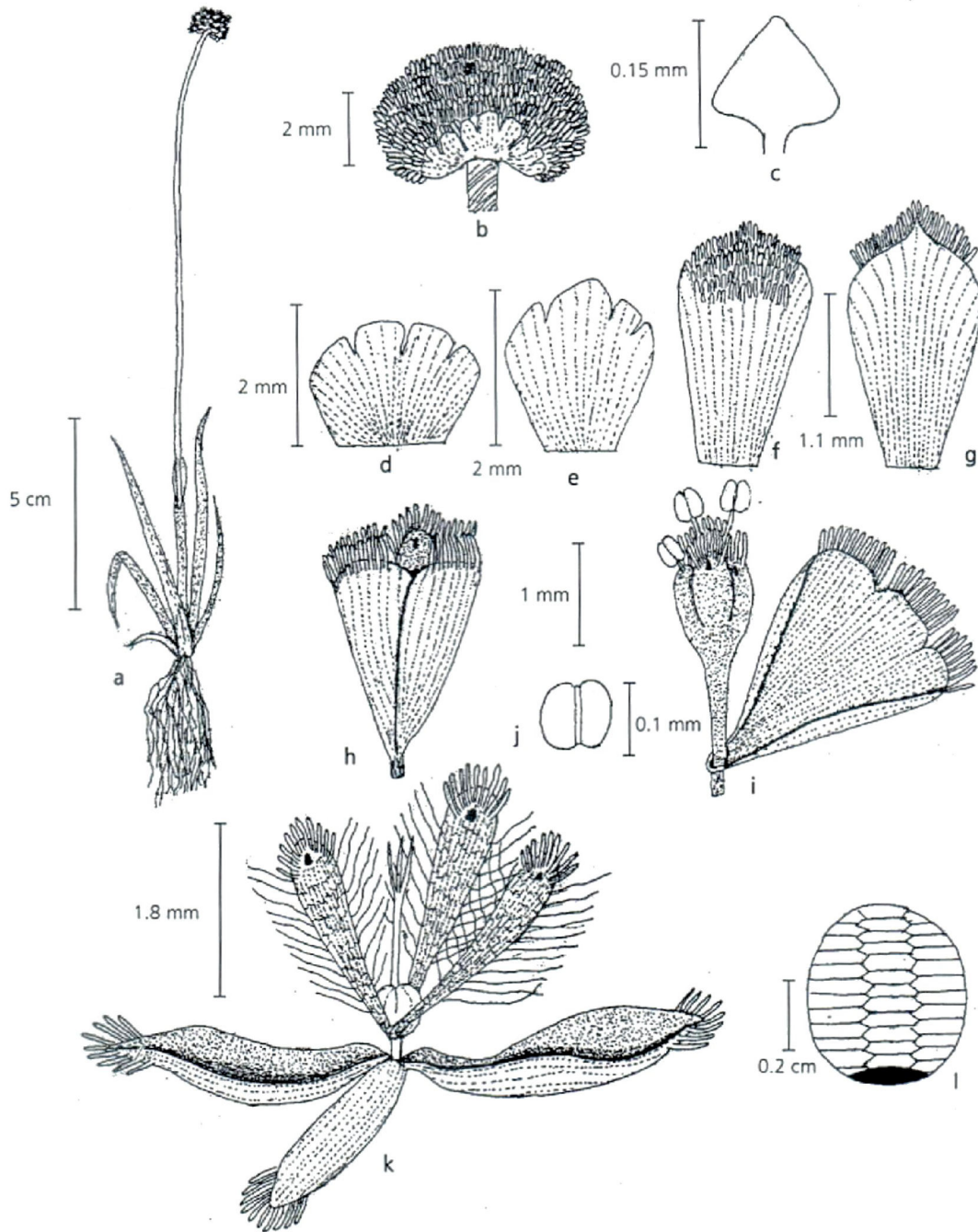


Figure 2. *Eriocaulon cookei* Punekar, Malpure & Lakshmin. – a. Habit; b. Head; c. Receptacle; d, e. Involuclral bracts; f. Floral bract, dorsal view; g. Floral bract, ventral view; h. Male flower; i. Male flower, sepal spread out; j. Anther lobe; k. Female flower, sepals spread out; l. Seed.

bracts dimorphic, outermost oblong-obovate, truncate or rounded at apex, reflexed, black, whitish at base, slightly dentate at apex, glabrous, c. 2.6 x 1.5 mm; innermost oblong, almost rectangular, slightly dentate at apex, hoary at apex near sides, c. 2.2 x 1.3 mm; floral bracts dimorphic, floral bracts covering female flowers cuneate, acute, straw-black coloured, sparsely hairy dorsally at apex, 1.9 - 2 x 1.6 mm; floral

bracts covering male flowers cuneate-oblongate, concave, subacute to obtuse at apex, hoary dorsally at apex, straw-black coloured, 1.8 - 2 x 0.9 - 1 mm. *Male flowers*: mostly at the centre of the head surrounded by female flowers; pedicels 0.3 - 0.4 mm long, hairy at base; sepals 2, free, oblanceolate-spathulate, conduplicate, slightly keeled on the back, truncate with slightly dentate and hairy at apex, c. 2

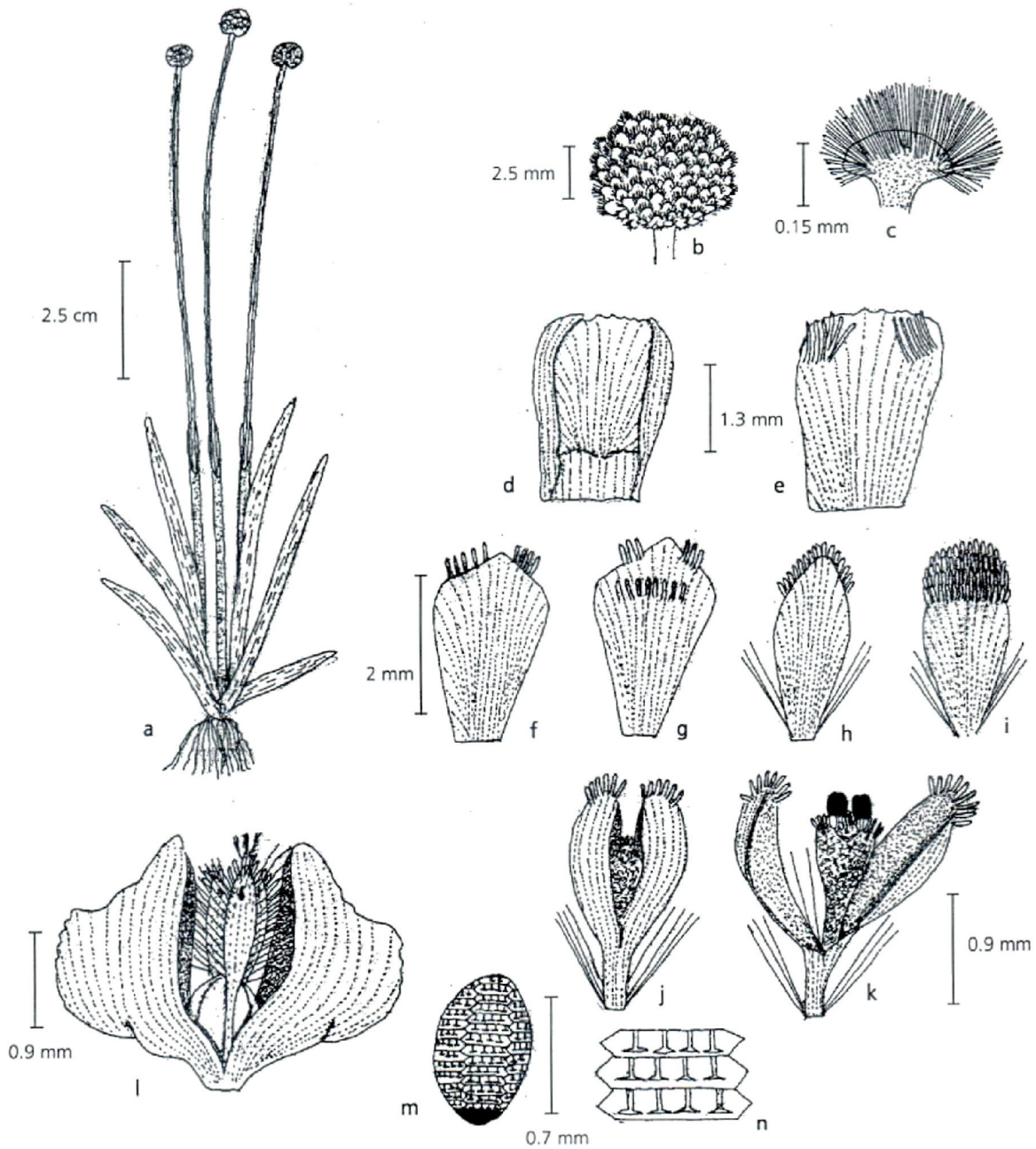


Figure 3. *Eriocaulon koyense* Punekar, Mungikar & Lakshmin. - a. Habit; b. Head; c. Receptacle; d. Involucral bract, ventral view; e. Involucral bract, dorsal view; f. Floral bract covering female flower, ventral view; g. Floral bract covering female flower, dorsal view; h. Floral bract covering male flower, ventral view; i. Floral bract covering male flower, dorsal view; j. Male flower; k. Male flower, sepals spread out; l. Female flower; m. Seed; n. Part enlarged of seed showing transversely elongated cells with setiform appendages dilated at apex (not to scale).

x 0.8 mm; stipe of corolla 0.7-1 mm long, straw coloured, widening towards apex, almost residing inside the sepal; petals 3 with a black gland at tip in each, usually equal or sometimes unequal, ovate, brownish, hoary at apex, if unequal, the lateral two oblong, 0.1 - 0.2 mm and the middle linear, c. 0.4 mm long; stamens 6; filaments short; anther lobes black, globular, basifixed, c. 0.2 x 0.2 mm. *Female flowers*: pedicels absent; sepals 2, free, similar, oblanceolate, conduplicate, obtuse or subacute at apex, keeled, distinct, entire or slightly dentate, glabrous, 1.8 - 2 x 0.8 - 1 mm; petals 3, equal, spatulate with a black elongated, beaked gland at apex in each, hoary at apex, densely pilose along the margin, 1.8 - 2 x 0.2 mm, hyaline; ovary sessile, ovoid, trilobular, c. 0.4 x 0.4 mm; style c. 0.3 mm long, trifid, feathery. *Capsules* trilobular, straw coloured, 0.5 mm long. *Seeds* ovoid-ellipsoid or oblong, obtuse, orange tinged with dark purple ring at apex, c. 0.7 mm long; cells of seed coat transversely elongated, aligned in vertical rows; appendages 3 or 4 from the transverse radial walls, setiform, distinctly dilated at apex.

Etymology: The specific epithet 'koynense' is based on the type locality, Koyna Wildlife Sanctuary.

Flowering & Fruiting: August-February.

Habitat: It grows at an altitude of c. 650 m. on lateritic plateau along fringed areas of monsoon puddles in association with *Dimeria* sp., *Swertia minor* etc.

Occurrence: **Maharashtra**, Satara District: Koyna Wildlife Sanctuary, Old Vasotagad.

Note: *Eriocaulon koynense* Punekar et al. is allied to *E. cuspidatum* Dalz. but differs from it in having the sparsely hairy leaves, villous receptacles, densely hairy (at apex) floral bracts; keeled, canaliculate male sepals with 3-4 appendages from the radial walls dilated and T-shaped at apex.

Eriocaulon maharashtrense Punekar et Lakshmin., *sp. nov.* **Fig. 4.**

Eriocaulon maharashtrense Punekar et Lakshmin. *E. minuto* affinis sed foliis vaginae brevissimis (usque 7 mm longis), receptaculis conicis, lobis antherarum sepalis femineis linearibus canaliculatis ecarinatis atque in marginem ad medium pilos duos tantum ferentibus, petalis femineis semper carentibus et cellulis tunicae seminis transverse elongatis atque in seriebus verticalibus dispositis differt.

Types: INDIA, **Maharashtra**, Pune District: Mulshi Taluka, Nive village, between Tamhini and Dongarwadi, 12 February 2002, Punekar 186495 (Holotype, CAL; Isotypes, BSI, MH).

Acaulescent herbs; rootstock absent, roots fibrous. *Leaves* rosulate, many, linear, acute, up to 7 x 0.3 mm, glabrous. *Peduncles* many (up to 40), up to 2.5 cm long, glabrous, twisted. *Sheaths* up to 7 mm long; limb ovate, acuminate at apex, entire, glabrous, papery, straw coloured after drying. *Heads* obconic-hemispherical, white- straw coloured, c. 2 mm across, echinate; receptacles pilose, hairs silvery white, conical c. 0.5 mm long; involucre bracts oblong, acute to acuminate at apex, rarely notched at one side in upper $\frac{1}{3}$ part, hyaline, glabrous, concave, exceeding or equal to the head, c. 1 x 0.3 - 0.4 mm; floral bracts oblanceolate, acuminate at apex, faintly 3-lobed, middle lobe longer, lateral two short, sparsely hairy dorsally at apex, concave, hyaline, c. 0.8 x 0.2 mm. *Male flowers*: pedicels c. 0.2 mm long, glabrous; sepals forming a spathe, obovate, 2-lobed, 3-lobed or truncate at apex with dentation in lobed sepals lobes acuminate, sparsely hairy dorsally at apex, 0.6 x 0.3-0.4 mm; stipe of corolla 0.3-0.4 mm long; petals oblong, equal, glandular, obtuse at apex, glabrous, c. 0.2 mm long, hyaline; stamens 6, anther lobes 6, ovoid, black. *Female flowers*: pedicels absent; sepals 2, free, equal, canaliculate, linear, hyaline, long acuminate, c. 0.8 x 0.1 mm, becoming curly upon drying, 2 hairs present at the margin in the middle, hairs long; petals absent; ovary stipitate, stipe c. 0.2 mm long; style trifid. *Seeds* yellow, dark purple ring at one end, ellipsoid-ovoid, apiculate, c. 0.3 x 0.15 mm; seed coat cells transversely elongate, aligned in rows; appendages absent.

Etymology: The specific epithet 'maharashtrense' is based on the name of the state where from this species was collected.

Flowering & Fruiting: November-February.

Habitat: This species grows in dried paddy fields in association with *Eriocaulon parviflorum*, *Ammannia baccifera*, *Swertia minor* etc.

Occurrence: **Maharashtra**, Pune District: Mulshi Taluka, Nive village between Tamhini and Dongarwadi Villages.

Note: *Eriocaulon maharashtrense* Punekar et Lakshmin. is allied to *E. minutum* Hook. f. but differs from it in having very short leaves and sheaths (up to 7 mm long), conical receptacles, black anther lobes, linear, canaliculate, not-keeled female sepals with only 2 hairs along the margin in the middle, no female petals and transversely elongated seed coat cells aligned in vertical rows.

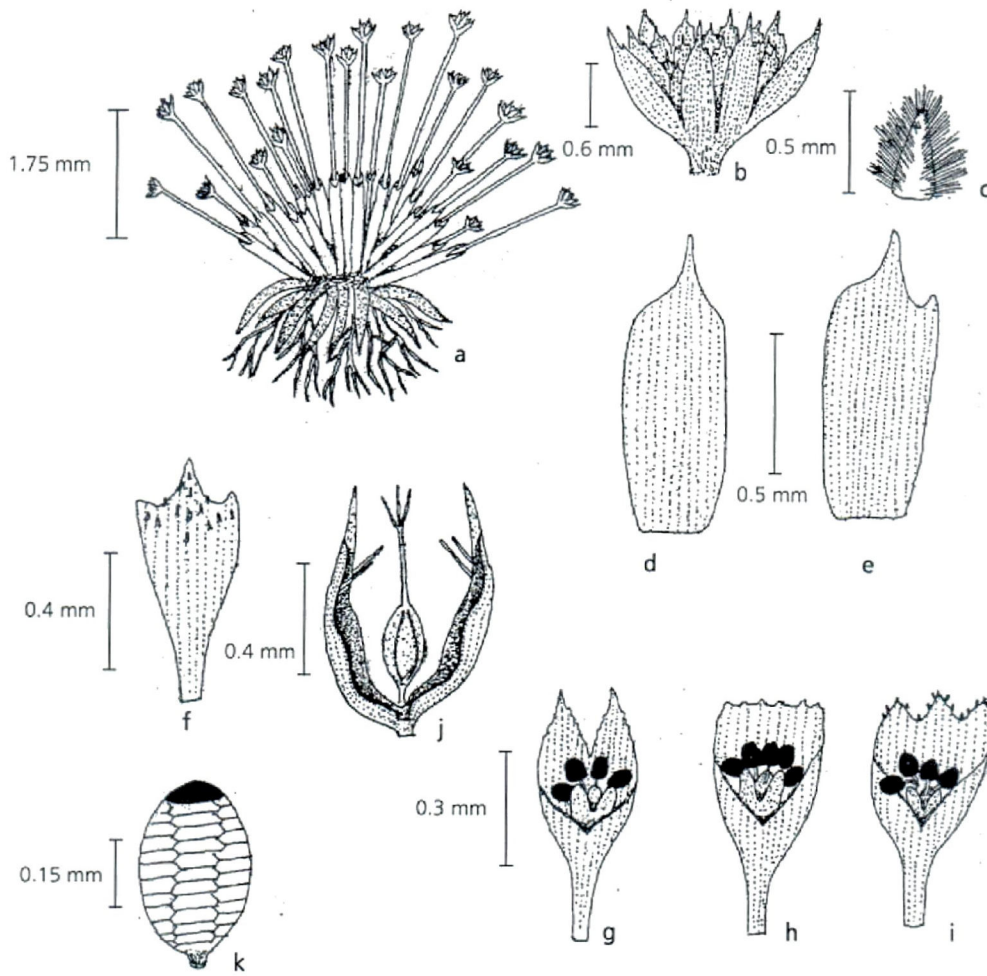


Figure 4. *Eriocaulon maharashtrense* Punekar & Lakshmin. – a. Habit; b. Head; c. Receptacle; d,e. Involucral bracts; f. Floral bract, dorsal view; g-i. Male flowers; j. Female flower; k. Seed.

***Eriocaulon sahyadricum* Punekar, Malpure et Lakshmin., sp. nov. Fig. 5.**

Eriocaulon sahyadricum Punekar et al. *E. stellulato* affinis sed pedunculis dense pilosis, bracteis involucralibus ellipticis vel late ellipticis, bracteis floralibus anguste trullatis, extus sparse pilosis, sepalis masculis obovatis, sepalis femineis variiformibus, sepalo externo oblanceolato-cuneato, plano, sepalis duobus interioribus glabris ellipticis, carina ad marginem dentata, petalis femineis variiformibus et seminibus non appendiculatis differt.

Types: INDIA, Maharashtra, Satara District: Mahabaleshwar, Kate's Point (N 17° 56. 270' and E 73° 41. 488'), 25 October 2002, Punekar 186500 (Holotype, CAL; Isotypes, BSI, MH); Sindhudurg District: Amboli plateau, 10 February 2003, Malpure 186115 (Paratype, BSI).

Acaulescent herbs; rootstocks absent, roots fibrous. *Leaves* rosulate, broadly lanceolate to lanceolate, acute or subacuminate, upto 6 x 1.2 cm, glabrous, grass green coloured. *Peduncles* c. 20, upto 15 cm long, twisted, 4-ribbed, densely pilose. *Sheaths* upto 5 cm long, densely pilose in lower half, more or less glabrous in upper half; limb lanceolate, acuminate, entire. *Heads* hemispherical-spherical, upto 9 mm across, echinate, straw coloured; receptacles ovoid, villous; involucral bracts broadly elliptic to elliptic, acuminate, reflexed, hyaline, 2.5 - 3 x 1 - 1.2 mm, glabrous; floral bracts narrowly trullate, acuminate, stellately spreading, 2.5 - 3 x 0.5 - 0.8 mm, hyaline, dorsally and ventrally sparsely hairy in upper $\frac{2}{3}$ part, hairs prominent on the bent portion. *Male flowers*: pedicels c. 0.2 mm long, glabrous; sepals obovate, connate into a spathe of c. 1.3 x 1 mm, 3-lobed at apex,

lobes mostly acuminate, rarely the middle lobe obtuse, sparsely hairy towards apex, margin of the lobes somewhat dentate, hyaline; stipe of corolla c. 0.5 mm long, straw coloured; petals 3, equal, oblong-ovate, acute, hairy at apex with a black gland in each, c. 0.2 mm long; stamens 6, anther lobes oblong, black. *Female flowers*: pedicels minute; sepals 3, free, dissimilar, outermost covering sepal oblanceolate-cuneate, flat, furrowed in the middle, caudate to long acuminate at apex, keeled on the back, c. 1.6 x 0.5 mm, hyaline, inner two sepals elliptic, conduplicate, long acuminate at apex, keeled at back, keel dentate along margin, glabrous, hyaline, whitish-green, c.

1.8 mm long; petals 3, dissimilar, lateral two oblanceolate, obtuse at apex, sparsely hairy at apex, densely pilose along the margin with a black gland in each, c. 0.8 x 0.1 mm, middle spatulate, sparsely hairy at apex, densely pilose along the margin, obtuse at apex, with a black gland, c. 1 x 0.2 mm; ovary sessile, spherical, c. 0.3 x 0.3 mm, style c. 0.6 mm long, 3-fid. *Seeds* ellipsoid-oblong, obtuse to acute at apex, dark purple, c. 0.4 x 0.2 mm; seed coat cells transversely elongated, aligned in vertical rows; appendages absent.

Etymology: The specific epithet '*sahyadricum*' is named after Sahyadri Hill ranges of the Western Ghats.

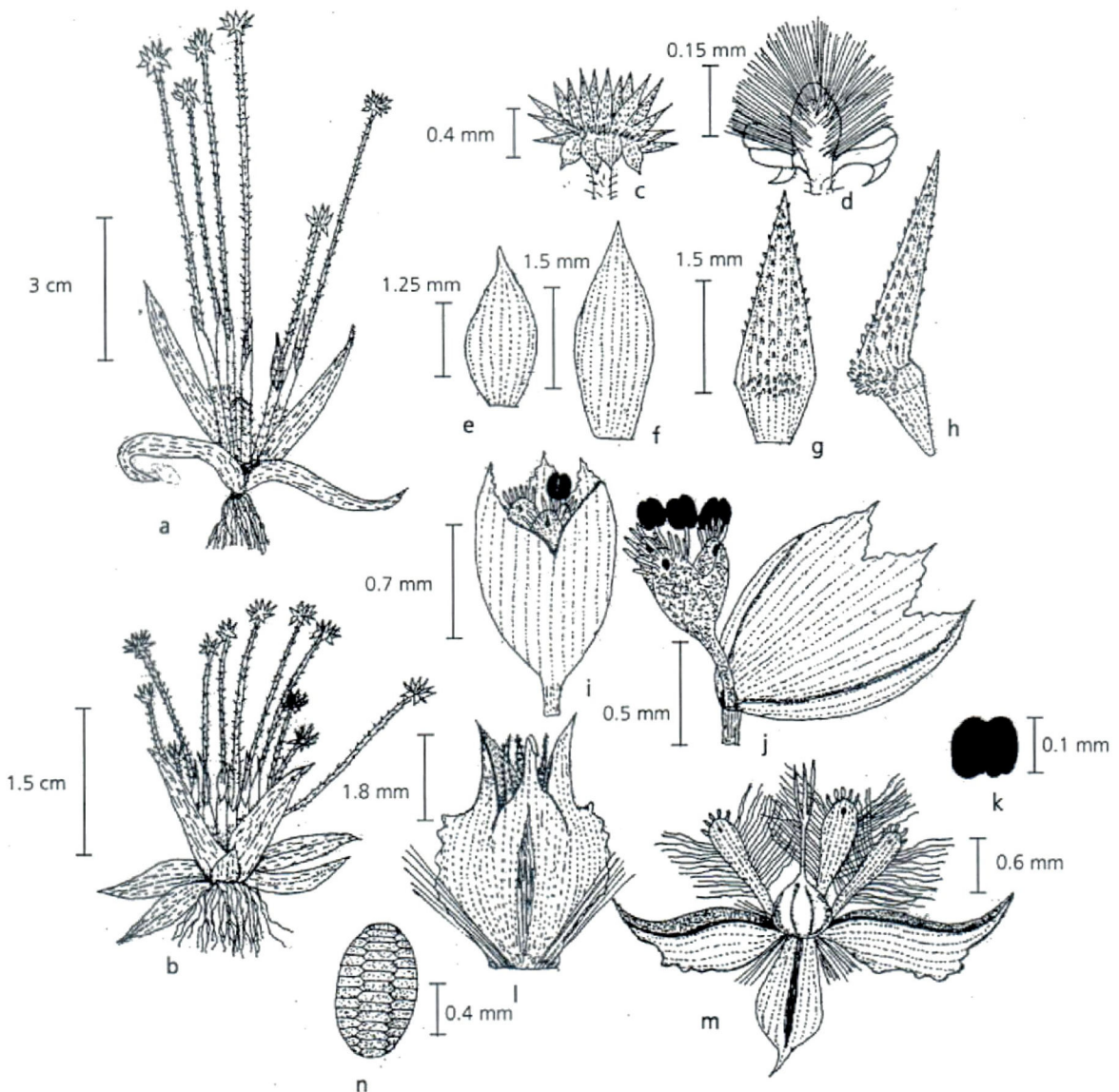


Figure 5. *Eriocaulon sahyadricum* Punekar, Malpure & Lakshmin. – a, b. Habit; c. Head; d. Receptacle; e-f. Involucral bracts; g. Floral bract, dorsal view; h. Floral bract, Lateral view; i. Male flower; j. Male flower, sepal spread out; k. Anther lobe; l. Female flower; m. Female flower, sepals spread out; n. Seed.

Flowering & Fruiting: September-February.

Habitat: It grows at Mahabaleshwar at an altitude of c. 1350 m. on grassy lateritic hill slopes in well exposed areas. They are also found in *Strobilanthes reticulatus* strands in association with *Eriocaulon apetalum*, *E. sedgwickii*, *Exacum pumilum*, *Impatiens lawii*, *Fimbristylis* sp., *Hitchenia caulina*, *Panicum* sp., etc. In Amboli it grows at an altitude of c. 600 m. on exposed lateritic hill slopes in association with *Dimeria* sp., *Eriocaulon sharmae*, *Fimbristylis* sp. etc.

Occurrence: **Goa:** Surla, Waghai and Varlem; **Karnataka,** North Kanara district: Castle Rock; Shimoga district: Karodi, Balehalli, Barkara and Kavaledurga. **Maharashtra,** Ahmednagar district: Harishchandragad; Pune district: Bhimashankar; Satara district: Mahabaleshwar, Kate's Point; Sindhudurg district: Amboli plateau; Thane district: Kedarnath and Pachnai plateau.

Note: *Eriocaulon sahyadricum* Punekar et al. is allied to *E. stellulatum* Koern. but differs from it in having densely pilose peduncles, broadly elliptic to elliptic involucre bracts, narrowly trullate, sparsely outside hairy floral bracts, obovate male flower sepals, dissimilar female flower sepals, oblanceolate-cuneate, flat outermost covering sepal, glabrous, elliptic inner two sepals, dentately margined keel, dissimilar female flower petals and seeds without appendages.

Specimens Examined: **Goa:** Surla, 27 September 1970, N. P. Singh s. n. (BSI); Waghai, 29 September 1970, N. P. Singh 124812 (BSI); Verlem, Bhutabaicha Dongar, 12 October 1970, N. P. Singh 125358 (BSI). **Karnataka,** Shimoga District: Balehalli forest, Agumbe, 28th November 1960, R. S. Raghavan 67842 (BSI); Karodi near Tirthahalli, 28 September 1962, R. S. Raghavan 82755 (BSI); Kavaledurga, 2 October 1962, R. S. Raghavan 82918 (BSI); Barkara, Agumbe, 31 August 1963, R. S. Raghavan 90352 (BSI); North Kanara District: Castle Rock, 19 September 1970, M. Y. Ansari 124122 (BSI). **Maharashtra,** Ahmednagar District: Harishchandragad, 26 September 1970, B. M. Wadhwa 127692 (BSI); Pune District: Bhimashankar, southern slopes of Choura hills, 11 October 1962, K. P. Janardhanan 81840 (BSI); Satara District: Mahabaleshwar, 28 October 1956, G. S. Puri 9206 (BSI); Mahabaleshwar near Venna Lake, 4 January 1957, S. D. Mahajan 13047 (BSI); Mahabaleshwar, Dhobi fall, 15 October 1959, S. D. Mahajan 24763 (BSI); Mahabaleshwar, Machutar forest on Satara Road, 10 October 1960, M. Y. Ansari 67538 (BSI); Sindhudurg District: Amboli, 4 October 1964, R. S. Raghavan 103221 (BSI); Thane District: Pachnai

Plateau, 15 November 1968, K. V. Billore 115481 (BSI); Kedarnath Hill slopes, Harishchandragad, 17 November 1968, K. V. Billore 115532 (BSI).

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