

Taxonomic studies on family Eriocaulaceae of Thrissur district

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ABSTRACT

The family Eriocaulaceae is revised for Thrissur district, based on field observation, literature survey and extensive herbarium studies. Seven species are reported, including one new species. Detailed descriptions, notes, and colour photoplates for species are presented.

Key words: Eriocaulaceae, *Eriocaulon pradeepii*, Thrissur.

1. INTRODUCTION

Eriocaulaceae family contains 11 genera and the genus *Eriocaulon* contains 477 species. In India this family is represented by single genus *Eriocaulon*. Ansari and Balakrishnan (2009) described 85 species from India. Since then more than 10 new species described from India. Some of the recent publications on *Eriocaulon* are Anto and Reshma (2017), C.N.Sunil and V.N.Naveen Kumar (2015), Manu Dev *et al.* (2015), C.N.Sunil (2014), K.Rashmi and G.Krishnakumar (2014), Sunil *et al.* (2013), Biju *et al.* (2012), Swapna *et al.* (2012), Nampy *et al.* (2011), Vivek *et al.* (2010), Shimpal *et al.* (2009), Yadav *et al.* (2008). The intention of present study is to describe different species of *Eriocaulon* distributed in Thrissur district. In the former years any such studies were not done.

2. MATERIALS AND METHODS

Fresh *Eriocaulon* plants were collected from different locations of Thrissur district. Morphological characters are studied using a dissecting stereo microscope, Labomed Digital CCD. Photographs of each floral part are taken using Canon digital camera. Seeds are collected from fresh specimen and kept in labeled containers. The characters of the seed (size, shape, seed morphology) of different species were studied by Scanning Electron Microscopy (SEM). Samples were studied in Sophisticated Test and Instrumentation Centre department, Cochin University of science and technology.

3. RESULTS

The plants of this genus are herbs. Root tubers are reported from different species. Leaves are linear, narrow with acute or acuminate tip. Peduncles with linear markings, twisted often. sheath is present at the lower portion of peduncle. Entire inflorescence is covered by 1- 3 whorls of involucral bract. Flowers are unisexual, both male and female flowers are present on the same head. Each flower is protected by floral bracts. Different grades of hairiness can observed at different floral parts. Petals gland dotted. The glands are usually black in color, but two species with yellow colored gland is also collected. Anthers are 6 in number, black or white in color.

During the study we could collect 7 different taxa of *Eriocaulon* and the results of the study are presented here

1. *Eriocaulon cinereum* R. Br., Prodr. 254. 1810; Ansari & Balakr., Eriocaulaceae India 179. 1994 **Type:-** India, Kerala, Thrissur, Poomala, 10°36'09.1"N, 76°14'28.7"E, 37 m, Reshma. Ashok, 4210, Plate:1

Acaulescent herbs. Leaves rosulate, up to 4 cm long, acicular. Peduncles few, up to 8 cm long, sheaths up to 2 cm long. Heads, hemispherical, grey, Receptacles ovoid, Involucral bracts erect or spreading, c. 1.5 x 0.5 mm, oblong-obovate, obtuse, Floral bracts c. 1.5 x 0.5 mm, oblanceolate, acute, straw colored. Male flowers: Sepals connate into a spathe, c. 1 x 0.5 mm, ovate, acute, not lobed, hyaline. Corolla tube c. 0.5 mm long; lobes 3, with a black gland in each. Anthers 6, globose, white. Female flowers: sepals 2, free, c. 1 mm long, reduced to branched hairs. Petals absent. Ovary stipitate, oblong-ovoid; style 3-fid. Seeds c. 0.5 mm long, oblong-ellipsoid, obtuse, purple; cells of seed-coat transversely elongated; appendages absent.

2. *Eriocaulon palghatense* R. Ansari & N.P. Balakr., Eriocaul. India 111. 1994 & Eriocaul. India (Rev.) 104. 2009. **Type:-** India, Kerala, Thrissur, Kayamboovum, 113 m 10°41'1" N, 76°23'1" E., 113 m, Reshma. Ashok, 4203, Plate:2

Acaulescent herbs; rootstock absent. Leaves rosulate, linear, acute, up to 1.5 x 0.1 cm, glabrous. peduncles few, up to 4 cm long, flexuous, glabrous. Sheaths up to 1.5 mm long, glabrous; limb lanceolate, acute, entire; heads obovoid, ca 1.5 mm across, grey; receptacles ovoid-cylindric, glabrous; involucral bracts erect or spreading, obovate, obtuse, ca 1 x 0.75 mm,

chartaceous, glabrous, straw-coloured; floral bracts oblanceolate, acute or subacuminate, ca 0.75 x 0.5 mm, chartaceous, sparsely hairy towards apex, black. Male flowers: pedicels minute; sepals obovate, connate into a spathe of ca 0.75 x 0.5 mm, 3-lobed with obtuse lobes, hoary towards apex, black; stipe of corolla ca 0.75 mm long; petals 3, minute, hoary, with a black gland; anthers 6, globose, black. Female flowers: sessile or pedicelled; sepals 3, free, subequal, linear, conduplicate, acute, 0.5-0.75 mm long, sparsely hoary at apex, black; petals 3, free, subequal, linear-spathulate, not clawed, acute, 0.5-0.75 mm long, hyaline pubescent, with a minute black gland; not distinctly stipitate between sepals and petals; ovary sub sessile, ovoid or ellipsoid; style 3-fid. Seeds oblong-ellipsoid, obtuse or acute, ca 0.38 x 0.21 mm, pale purple; cells of seed coat transversely elongated, aligned in vertical rows; appendages in the form of split ribbon-like bands from the transverse radial walls and conforming to the length of cells.

3. *Eriocaulon periyarensis* Sunil, Naveen & Remya Webbia. 72. 1-5. **Type:-** India, Kerala, Thrissur, Athirapilly, 9m, 10⁰17'47.5"N, 76⁰27'21.8"E, 4211, Plate:3

Acaulescent herbs. Rootstock present, upto 3c.m long. Roots arises from one side of rootstock. Leaves rosulate, linear, acuminate, upto 5.5 c.m long, glabrous. Peduncles 4-6 upto 25 c.m long, glabrous. Sheath upto 3.5 c.m. Heads hemispherical, straw colored. Receptacle globose. Involucral bracts reflexed ovate 1.5x1.7mm, chartaceous, glabrous, straw colored. Floral bracts are of two type, floral bract of male flower and floral bract of female flower. Floral bract of male flower acute papillose hair absent 1.3x0.7mm, straw colored. Floral bract of female flower is acute, papillose hairs present, 2x1.3mm, straw colored. Male flower sepals connate into spathe, three lobed, hoary towards the apex, straw colored, petals three sub equal, gland dotted, gland is golden yellow colored. Female flower sepals 3, broad ovate, papillose hairs present. Petals 3 obovate, gland dotted colour of gland is golden yellow, hoary throughout the petal. Style short, stigma trifid, glands present. Seed oblate, Cells of the seed coat is transversely elongated. Aligned in vertical files; appendages absent

4. *Eriocaulon pradeepii* Anto and Reshma, Taiwania 62(4): 371-374 **Type:-** India, Kerala, Thrissur, Kayamboovum, 113 m 10⁰41'1"N, 76⁰23'1"E., Reshma. Ashok, 4205, Plate: 4

Acaulescent herbs. Root stock absent. Plant length about 3-10 c.m. Leaves, few(5-8), up to 0.5-2.3c.m, rosulate, linear, tip acute. Peduncle solitary, slender, up to 9c.m. sheath up to 2.5-3c.m, tip acute. Inflorescence hemispherical, white in color. Receptacle globose, hairs present. Involucral

bracts 1.3×.7m.m, hyaline, straw colored, pappilose hair absent, apex entire ovate. Floral bracts 1.5×1m.m, straw colored, oblanceolate, tip acuminate, pappilose hairs densely arranged towards the tip, base broad, hairs arising from the base. Male flowers 2m.m long, sepals 3, obovate, connate into spathe, tip contain pappilose hairs. Anthers 6, black or brown colored. Female flower 1.5m.m in length, sepals 3 equal 0.8m.m long, hyaline, gland absent, tip with pappilose hair. Petals 3, 0.7m.m in length, subequal, gland dotted, pappilose hairs present at the tip. Ovary trilobed, stigma trifid. seed is dark yellow or greenish yellow. Radially elongated thickened ridges with 5 narrow lines are passing vertically, through the seed surface.

5. *Eriocaulon quinquangulare* L., Sp. Pl. 87.1753; Hook. f., Fl. Brit. India 5:582. Type:- India, Kerala, Thrissur, Kayamboovum, 113m 10⁰ 41'1" N, 76⁰23'1" E. Reshma. Ashok, 4207, Plate:5

Acaulescent herbs. Leaves to 6 x 0.6 cm, falcate, acuminate, glabrous. Peduncles numerous, 10-30 cm high; sheath to 5 cm long, limb small. Head 6 x 5 mm, ovoid; involucre bracts 2 x 2 mm, obovate, toothed at apex, straw-coloured; floral bracts 2.5 x 1.2 mm, cuneate, abruptly acuminate, black, glabrous. Female sepals 3, equal, linear, sparsely hairy, black; petals linear-oblong, hairy, hyaline, glandulose; seeds oblong, appendages entire or cut up into rectangular strips on transverse walls. Male sepals black, united into a split sheath, minutely hairy, lobes truncate; petal equal, hairy; anthers black.

6. *Eriocaulon truncatum* Bunch.-Ham. ex Mart. in Wall., Pl. Asiat. Rar. 3: 29. 1832; Hook. f., Fl. Brit. India 6: 578. 1893; Gamble, Fl. Pres. Madras 1619(1127). 1931 Type:- India, Kerala, Thrissur, Mangadu, 100m, 10⁰ 42' 30" N, 76^o 11' 43" E. Reshma. Ashok, 4210, Plate:6

Acaulescent herbs. Leaves rosulate, upto 5 x 0.6 cm, oblong-lanceolate, apex acuminate. Peduncles many, upto 12 cm long, virgate; sheaths upto 3 cm long. Heads c. 4 mm across, hemispherical, white or straw-coloured. Receptacles convex, glabrous or pilose. Involucre bracts spreading or erect, c. 2 mm long, oblong-obovate, obtuse, hyaline. Floral bracts c. 1.5 mm long, obovate-cuneate, obtuse or acute, hyaline. Male flowers: sepals connate into a spathe to 1.5 mm long, obovate, 2-lobed, hoary towards apex, black. Petals 3, subequal, ovate, hairy, with a black gland in each. Anthers 6, oblong, black. Female flowers: sepals 2 or 3, free, to 1.5 mm long, oblong or linear; the middle one smaller or altogether lacking, black. Petals 3, free, subequal, c. 1 mm long,

spathulate, hyaline, sparsely hoary, with a black gland in each. Ovary sessile, ovoid; style 3-fid. Seeds c. 0.5 mm long, oblong or ovoid, obtuse, pale yellow; cells of seed coat rectangular, vertically elongated; appendages ribbon-like bands.

7. *Eriocaulon xeranthemum* Mart. in Wall., Pl. Asiat. Rar. 3:29.1832; Hook. f., Fl. Brit. India 6:584.1893; Gamble, Fl. Pres. Madras 1620 (1127). 1931, **Type:-** India, Kerala, Thrissur, Kayamboovum, 113 m 10° 41' 1" N, 76° 23' 1" E., 4213, Plate:7

Acaulescent herbs. Leaves rosulate, upto 3 x 0.3 cm, linear, apex acute or subacuminate. Peduncles few, upto 4 cm long, virgate; sheaths upto 2 cm long. Heads hemispherical or cuneate, c. 4 mm across, straw-coloured. Receptacles convex, glabrous. Involucral bracts erect or spreading, 1.5-2.5 x c. 0.5 mm, linear-oblong, or oblanceolate, acuminate, chartaceous, glabrous, straw-coloured. Floral bracts. c. 1 x 0.5 mm, cuneate, truncate, hyaline, hoary at apex. Male flowers: pedicels minute. Sepals cuneate, connate into a spathe of c. 1 x 0.5 mm, 3-lobed with truncate lobes, black, hoary at apex. Petals 3, subequal, minute, with a black gland in each. Anthers 6, globose, black. Female flowers sessile. Sepals 3, free, unequal, c. 1 mm long; the two lateral ones oblanceolate, obtuse, hoary at apex; the middle one linear, much narrower than the lateral ones. Petals 3, subequal, 0.5 - 1 mm long, spathulate, obtuse, hyaline, barbate, with a black gland in each. Ovary ovoid; style 3-fid. Seeds to 0.5 mm long, oblong or ellipsoid; cells of seed-coat transversely elongated; appendages setiform, 2-4 from the transverse radial walls.

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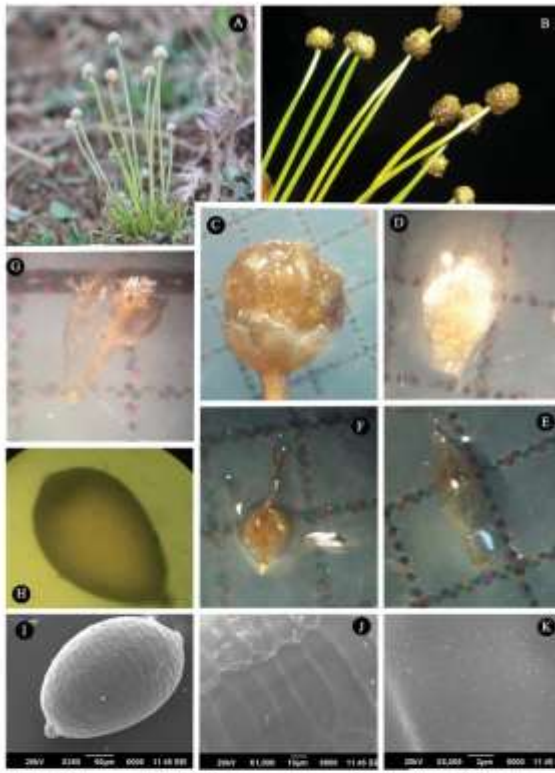


Plate 01. *E. cinereum* – A. Habit; B,C. Heads – enlarged view; D. Involved bract; E. Floral bract; F. Female flower; G. Male flower; H. Seed microscopic view; I,J,K. SEM images of seed 350,1000, 8000 times magnified

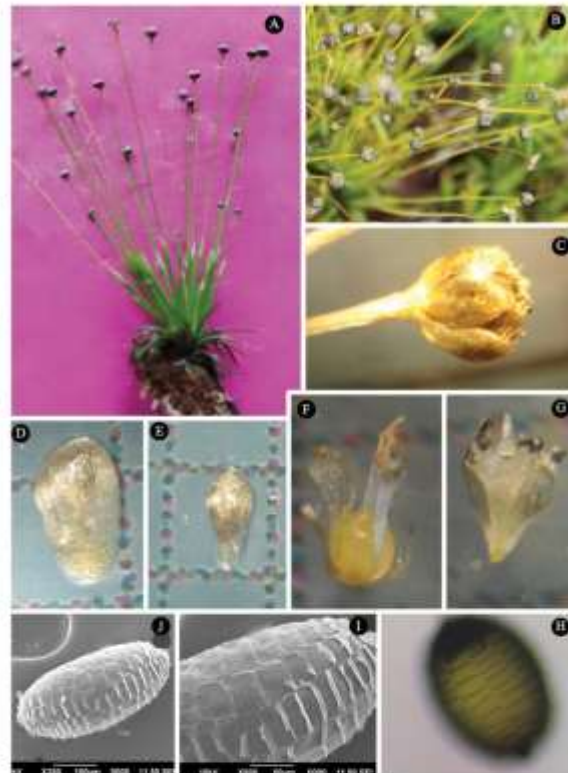


Plate 02. *E. palghatense* – A. Habit; B,C. Heads – enlarged view; D. Involved bract; E. Floral bract; F. Female flower; G. Male flower; H. Seed microscopic view; I,J,K. SEM images of seed 100,500 times magnified

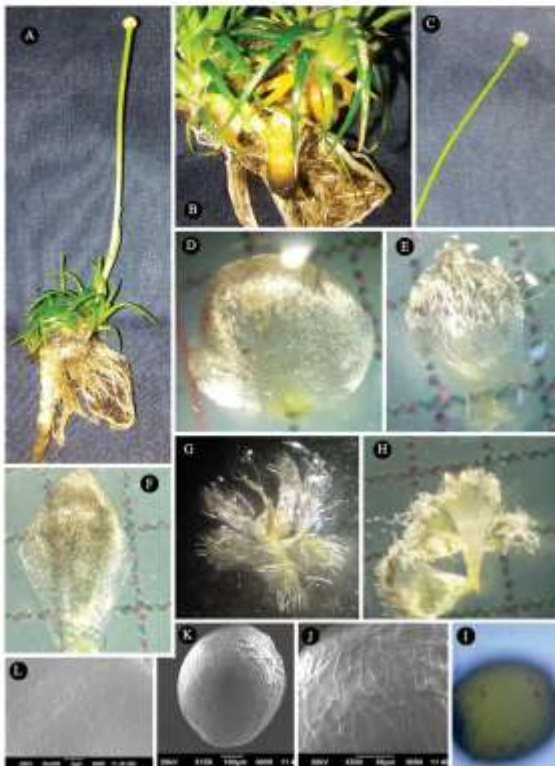


Plate 03. *E. peryvum* – A. Habit; B,C. Heads – enlarged view; D. Involved bract; E. Floral bract; F. Female flower; G. Male flower; H. Seed microscopic view; I,J,K. SEM images of seed 350,1000, 8000 times enlarged

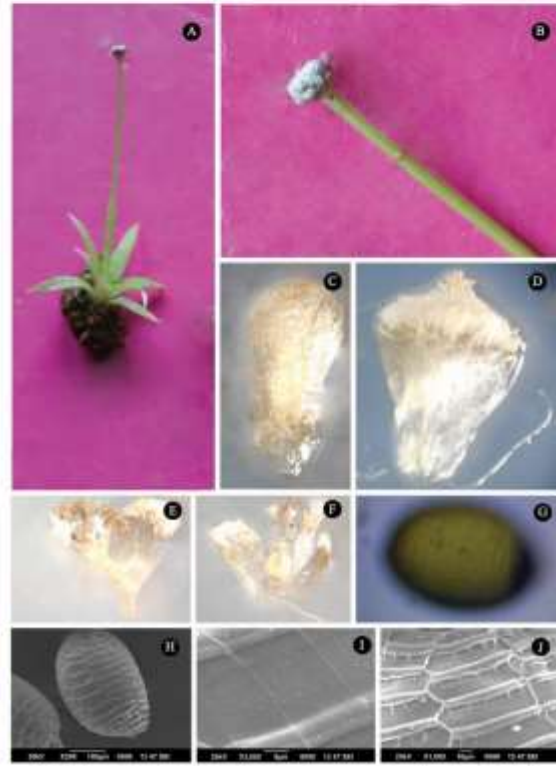


Plate 04. *E. pradepsi* – A. Habit; B,C. Heads – enlarged view; D. Involved bract; E. Floral bract; F. Female flower; G. Male flower; H. Seed microscopic view; I,J,K. SEM images of seed 3500, 1000, 250 times magnified.

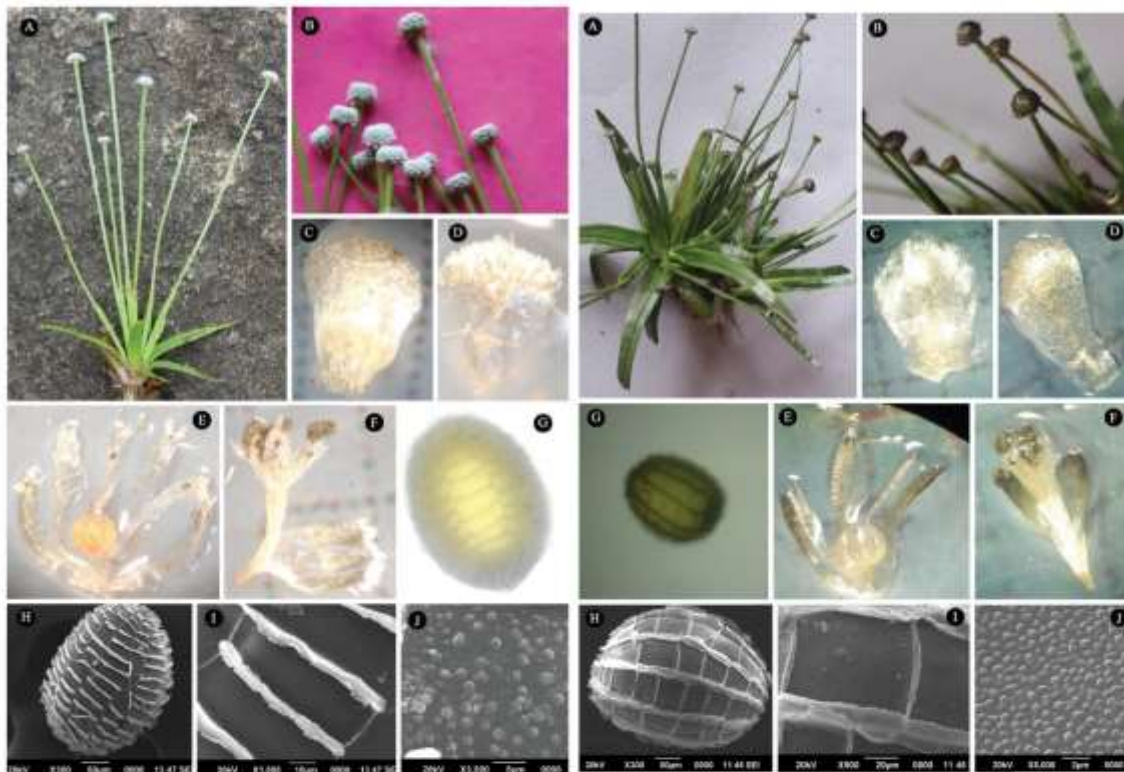


Plate 05. *E. quinquangulata* - A. Habit; B. Heads - enlarged view; C. Involucral bract; D. Floral bract; E. Female flower; F. Male flower; G. Seed microscopic view; H, I, J. SEM images of seed 300, 1500, 3500 times magnified.

Plate 06. *E. tetraeratum* - A. Habit; B. Heads - enlarged view; C. Involucral bract; D. Floral bract; E. Female flower; F. Male flower; G. Seed microscopic view; H, I, J. SEM images of seed 300, 900, 8000 times magnified.

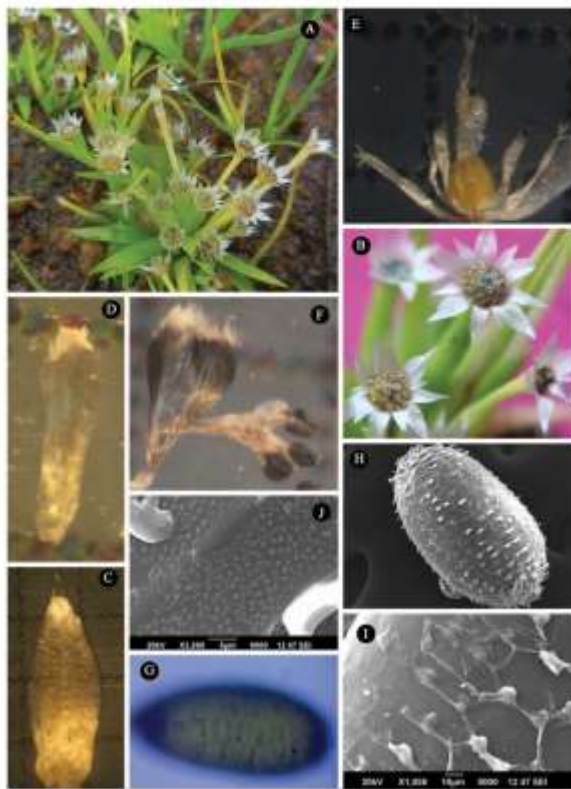


Plate 07. *E. xeranthitum* - A. Habit; B, C. Heads - enlarged view; D. Involucral bract; E. Floral bract; F. Female flower; G. Male flower; H. Seed microscopic view; I, J, K. SEM images of seed 1000, 3500, 2500 times enlarged.