

Three more new species of *Ischaemum* L. (Poaceae) from Kerala, India

N. Ravi*, N. Mohanan, T. Shaju, M. S. Kiran Raj, and R. Rajesh

Tropical Botanic Garden and Research Institute, Palode P. O., Thiruvananthapuram - 695 562, Kerala, India

(Received October 15, 1999; Accepted February 23, 2000)

Abstract. Three new species of *Ischaemum* L. (Poaceae), *I. wayanadense*, *I. abrahamii* and *I. fischeri* from India are described and illustrated.

Keywords: India; *Ischaemum*; Kerala; New Taxa; Poaceae.

Introduction

The authors, investigating the endemic plants of Kerala State, India, under a project sponsored by the Ministry of Environment and Forests, Government of India, collected specimens of three species of *Ischaemum* L. from different localities of the State. After critical study and consultation of the different floras and with Dr. Thomas A. Cope of Royal Botanic Gardens, Kew and Dr. Sreekumar, P. V. of Andaman and Nicobar Circle of Botanical Survey of India (B. S. I.), they were confirmed as of species new to the genus.

Ischaemum, a tropical genus of about 73 species of world wide distribution, has so far been represented in India by about 48 species of which 31 are represented in Kerala (Hook. f., 1896; Fischer, 1933, 1934; Bor, 1960; Sur, 1987; Sreekumar and Nair 1991; Ravi et al., 1998). With the addition of the three new species described here, representation of the genus in the state rises to 34.

The three new taxa are described and illustrated below.

1. *Ischaemum wayanadense* Ravi, Mohanan et Shaju, sp. nov.—TYPE: INDIA, Kelloor, Thekkumpara ± 800 m, Ravi 33779, 14 Dec 1996. (holotype: TBGT; isotypes: K, CAL, MH, KFRI). Figure 1

Ischaem vembnadensis Patil et D'Cruz affine, sed habitu non aquatico, foliis rubello-brunneis, culmis repentibus patentibusque ad nodos inferius radicantibus, foliis inferioribus, basi cuneatis vel cuneate rotundatis inferioribus, spiculis brevioribus, lemmate supero spiculorum sessilium integro acutoque ubi mutico aristatove, distinguit.

Perennial. Culms tufted, reddish-brown, creeping, spreading and rooting at the lower nodes, up to 1.5 m long; nodes ciliate to rarely glabrous. Leaves all along the culm; sheath up to 10 cm long, slipping from the culms, closely striate and glabrous; ligule subcoriaceous, triangular, up to 3 mm long, 2-keeled on the back and unevenly rounded at the apex; blade lanceolate to linear-lanceolate or linear-elliptic, up to 15 cm × 12 mm, cuneate to cuneate-rounded at the base in the lower ones to cuneate-rounded in the upper and acuminate at the apex, sparsely bulbous-pilose above and below. Inflorescence of two racemes, up to 7 cm long; joints of rachis triquetrous, oblong-clavate, 3-4 mm long, glabrous to sometimes shortly ciliate on the outer angle especially towards the apex of the raceme. Sessile spikelets: more or less oblong-ovate, 5-6 mm long including the c. 1 mm long glabrous callus, sometimes with sparse cilia at the joints of the rachis. Lower glume oblong-lanceolate to oblong-ovate, 4-5 × 1.5-1.8 mm, crustaceous below, coriaceous above, laterally keeled with the keels narrowly winged on one side and wingless or shortly and slenderly winged on the other towards the acute-notched hyaline apex, nodulose below with or without obscure to slightly prominent interconnecting ridges and furrows, glabrous to sparsely pilose outside especially towards the apex, 11-13-nerved. Upper glume coriaceous, boat-shaped, 4-5 mm long, acute at the apex, shortly incurved on the margins, keeled on the back with the keel shortly and narrowly winged towards the apex, scaberulous outside, sparsely scabrid to shortly ciliate on the incurved margins, 5-nerved. Lower lemma subhyaline, elliptic-lanceolate, 4-5 mm long, acute at the apex, 3-nerved, incurved on the sides, and scaberulous outside in the upper half towards the apex. Lower palea hyaline, elliptic-lanceolate, 3.5 to 4.5 mm long, subacute at the apex, 2-nerved, incurved along the nerves and scaberulous outside in the upper half, especially towards the apex. Upper lemma hyaline, 4-4.5 mm long, mostly cleft to the middle and awned, sometimes entire and acute at the apex when

*Corresponding author. Phone: 91-0472-869626; Fax: 91-0472-869646.

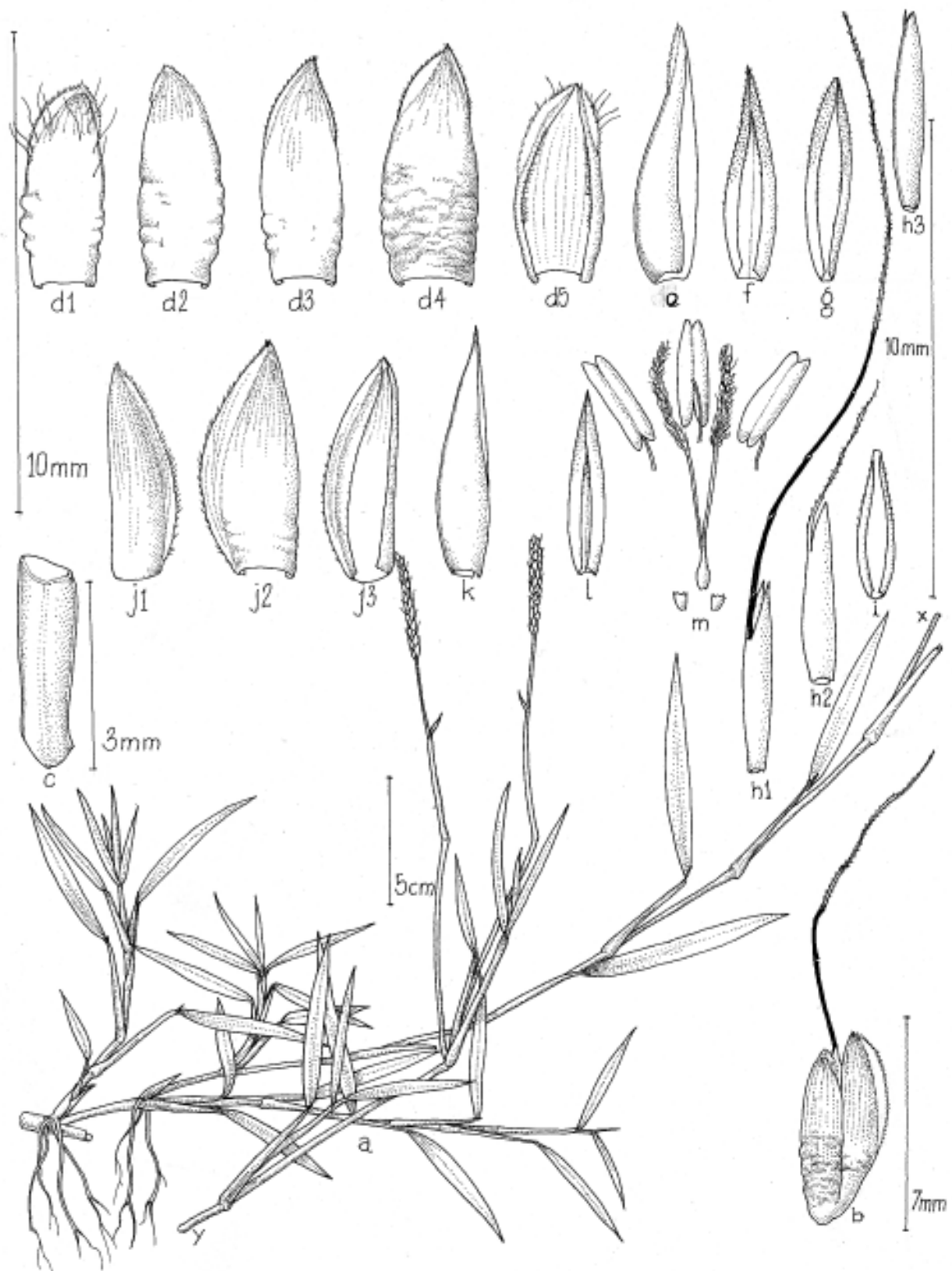


Figure 1. *Ischaemum wayanadense* Ravi, Mohanan et Shaju. a, Habit; b, Spikelet pair; c, Rhachis joint; d1-I, Sessile spikelet: d1, d2, d3 & d4, Lower glumes (from different spikelets); d5, Reverse side of a lower glume; e, Upper glume; f, Lower lemma; g, Lower palea; h1, h2 & h3, Upper lemma (from different spikelets); i, Upper palea; j1-I, Pedicelled spikelet: j1 & j2, Lower glumes (from different spikelets); j3, Reverse side of a lower glume; k, Upper glume; l, Upper lemma; m, Lodicules, stamens & pistil.

unawned or aristate to shortly awned; awn geniculate, up to 15 mm long with a column up to 8 mm long. *Upper palea* hyaline, $2.5\text{-}3 \times \text{ca. } 0.75$ mm, elliptic-lanceolate, subacute at the apex, 2-nerved, incurved on the sides and very sparsely scaberulous outside in the upper half. *Pedicelled spikelets*: Pedicel turbinate, 1-2 mm long, sometimes up to 3 mm long towards the apex of the racemes with reduced spikelets, glabrous, sometimes pilose, especially towards the apex of the racemes. *Lower glume* coriaceous, obliquely oblong-elliptic, $4.5\text{-}5 \times 1.75\text{-}2$ mm, somewhat rounded on one side and straight on the other, laterally keeled with the keels sharply angled on one side and broadly winged on the other and the wing rounded in the middle and scarbrid on the margin towards the apex with a subtruncate, shortly notched, hyaline tip. *Upper glume* 4.5-5 mm long, similar to that of the sessile spikelet in other respects but without the apical wing. *Lower lemma*, *l. palea* & *upper palea* similar to those of the sessile spikelet but slightly smaller. *Upper lemma* 3.5-4.5 mm long, similar to that of the unawned sessile spikelet. *Lodicules* 2, ca. 0.5 mm long. *Stamens* 3; anthers 1-2 mm long, yellow to brown. *Ovary* ca. 0.75 mm long; styles ca. 2.5 mm long; stigmas ca. 2 mm long and purplish black. Flowering and fruiting Sep-Feb.

Additional specimens examined. **INDIA. KERALA:** WAYANAD District.: Kelloor, Near Sulthan Battery Scheduled Tribes' Society ± 800 m, *Ravi 32547*, 13 Jan 1999; **KERALA:** WAYANAD District.: Kelloor, Kallumukku ± 800 m, *Ravi 32548, 32549*, 13 Jan 1999; **KERALA:** WAYANAD District.: Thettuvadi, Kalpetta-Mananthavavdi route ± 750 m, *Ravi 32550*, 13 Jan 1999 (*Para:* TBGT)

Distribution and Notes. The new taxon was originally collected in 1996 from the bunds of a just harvested paddy field from a locality called Thekkumpara in Kelloor, Wayanad District. Subsequently, more specimens were collected from different localities in the District including wet places, by the sides of roads and bunds of water channels in cultivated fields. Though preferring wet areas, it was never found growing in water.

Ischaemum wayanadense is allied to *I. vembanadense* Patil & D'Cruz but is distinct in having non-aquatic habit, reddish brown herbage, creeping and spreading culms rooting at lower nodes, shorter blades cuneate or cuneately rounded at base in lower leaves, shorter spikelets and upper lemma of sessile spikelets entire and acute when unawned or aristate.

The specific epithet *wayanadense* alludes to the District of Wayanad from where specimens were collected.

2. *Ischaemum abrahamii* Ravi, Mohanan et Rajesh sp. nov.—**TYPE:** INDIA, Manathumangalam ± 50 m, *Ravi 33027*, 15 Dec 1996 (holotype: TBGT; isotype: CAL, MH, KFRI). Figure 2

Ischaemum elimalayan Sreek. et al. affine, sed habitu robustiore, racemis longioribus magis dense lanatis, articulis rhachidis pedicellorumque crassis, articulis rhachidis pedicellorum glumisque inferioribus spicularum sessilium et pedicellorum magis dense longiciliatis, gluma

inferiore spicularum sessilium plusminusve oblonga, crasse coriacea ad subcrustacea et transverse subtiliter rugosa in dimidio inferiore et anguste sed inaequaliter alata in lateribus versus apicem subacutum ad obtuso-retusum, gluma inferiore spicularum pedicellorum alata in lateribus ambobus omnino late in uno latere et anguste in altero latere versus apicem subacutum ad obtuso-retusum, distinguit.

Robust perennial. *Culms* tufted, erect to decumbent at the base, rooting at the lower nodes, up to 1.5 m long and 2-3 mm wide at the base; nodes ciliate. *Leaves* all along the culm; sheath up to 15 cm long, keeled on the back, striate, mostly glabrous to bulbous-pilose outside nearer to the margins towards the apex, especially in the lower ones; ligule thickly coriaceous, triangular-ovate, up to 6 mm long, 2-keeled on the back, truncate to shortly-truncate at the apex and bulbous-pilose outside nearer to the base; blade linear to linear-elliptic, up to $40 \text{ cm} \times 12$ mm, long-tapering at the base in the lower ones and cuneately rounded in the upper ones with a tuft of hairs at the base behind the ligule, acuminate at the apex. *Inflorescence* of 2 racemes, up to 10 cm long; joints of rhachis 2.5-3.5 mm long, clavate, triquetrous and densely long pilose on the angles. *Sessile spikelets*: oblong-elliptic to oblong-lanceolate, 5.5-6.5 mm long including ca. 1 mm long densely long-ciliate callus. *Lower glume* oblong-elliptic, $4.75\text{-}5.75 \times 1.75$ mm, thickly coriaceous to subcrustaceous in the lower 1/3 and coriaceous above, laterally keeled in the upper 2/3 and the keels unequally narrowly winged, nodulose and irregularly transversely and finely rugulose in the lower 1/3 and long-pilose, mostly so densely as to conceal the outer surface without except towards the subacute to obtuse-retuse apex, 11-13 nerved. *Upper glume* coriaceous, boat-shaped, $4.75\text{-}5.75 \times 1$ mm (when folded), acute at the apex and shortly inrolled on the margins, keeled on the back with the keel thickened, sharply angled and humped and narrowly winged in the upper 1/3, scaberulous outside, sparsely and shortly ciliate on the inrolled margins, 5-7-nerved. *Lower lemma* hyaline, linear, elliptic-lanceolate, $4.5\text{-}5 \times \text{ca. } 1$ mm, acute at the apex, 3-nerved, incurved on the sides, scaberulous without from the middle upwards and shortly ciliate on the margins in the upper half. *Lower palea* hyaline, linear, elliptic-lanceolate, $4.25\text{-}4.75 \times 1$ mm, acute at the apex, 2-nerved, incurved on the sides and scaberulous outside towards the apex. *Upper lemma* thinly hyaline, elliptic in profile, 4-4.5 mm long, deeply cleft to below the middle and 2-lobed with acuminate lobes, awned from the sinus, sparsely ciliate on the margins and minutely scaberulous outside towards the apex; awn geniculate, 16-19 mm long with a column 7-9 mm long. *Upper palea* thinly hyaline, oblong-lanceolate, ca. 4×0.75 mm, subacute at the apex, 2-nerved, incurved on the margins and minutely scaberulous outside. *Pedicelled spikelets*: Pedicel 2-3.5 mm long, broadly clavate, triquetrous and densely pilose outside. *Lower glume* obliquely oblong-elliptic, $4.5\text{-}5.25 \times 1.75$ mm, thickly coriaceous to coriaceous towards the base and coriaceous upwards, laterally keeled and incurved on the margins, broadly winged on one side and narrowly so on

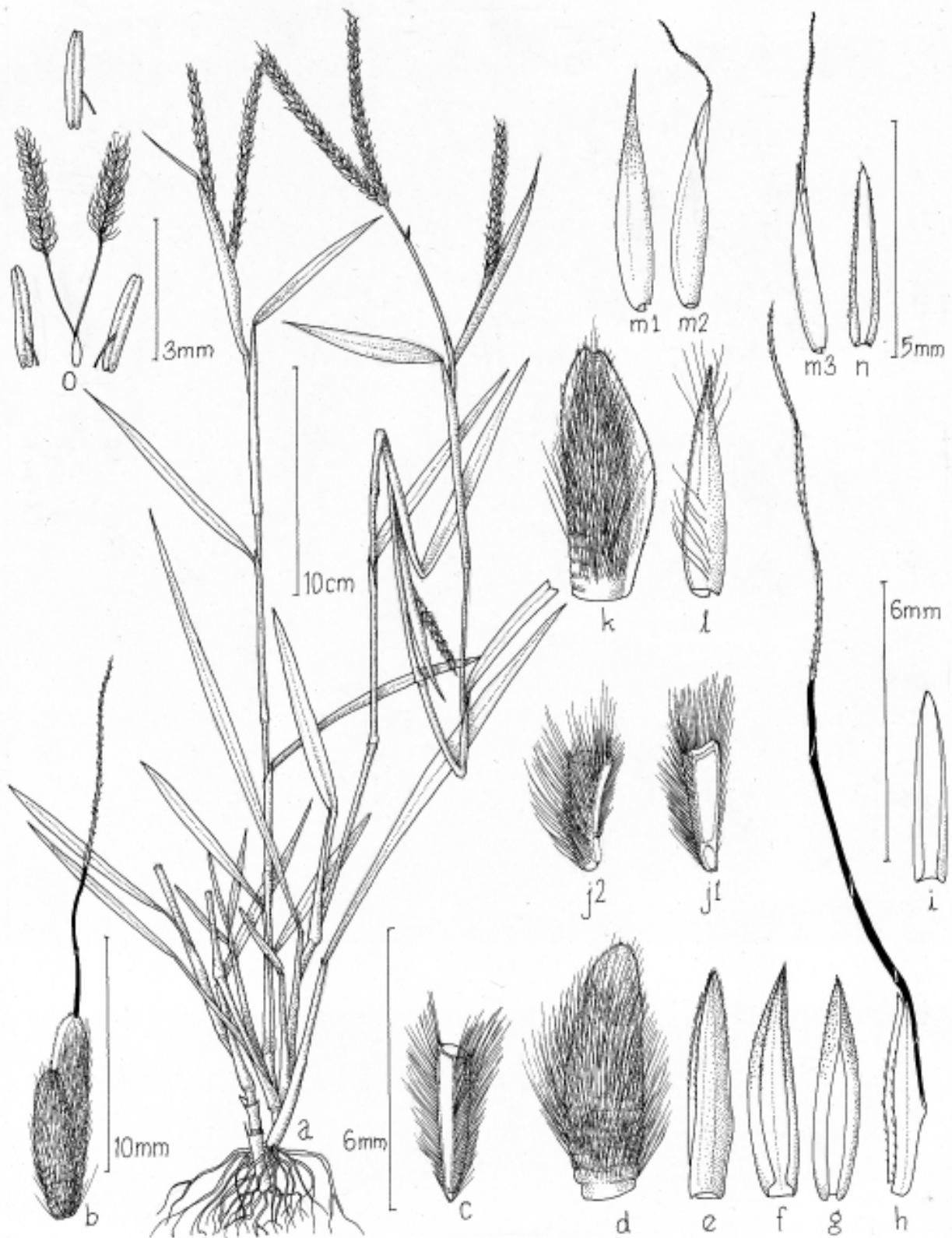


Figure 2. *Ischaemum abrahamii* Ravi, Mohanan et Rajesh. a, Habit; b, Spikelet pair; c, Rhachis joint; d-i, Sessile spikelet; d, Lower glume; e, Upper glume; f, Lower lemma; g, Lower palea; h, Upper lemma; i, Upper palea; j1-n, Pedicelled spikelet; j1 & j2, Pedicel; k, Lower glume; l, Upper glume; m1, m2 & m3, Upper lemma (from different spikelets); n, Upper palea; o, Lodicules, stamens & pistil.

the other in the upper 1/3, long-pilose outside, sometimes so densely as to conceal the surface except towards the subacute to obtuse-retuse apex, 11-13-nerved. *Upper glume* coriaceous, lanceolate, boat-shaped, 4.5-5 × 1.75 mm (when folded), keeled on the back with the keel sharply angled and raised outside, incurved on the margins, acute at the apex, scaberulous outside, sparsely long-pilose outside towards the apex and along the middle in the lower half, short-ciliate on the incurved margins and faintly 5-7-nerved. *Lower lemma*, *lower palea* & *upper palea* similar to those of the sessile spikelet, but slightly smaller. *Upper lemma* hyaline, lanceolate in profile, 4-4.5 × 0.75 mm (when folded), 3-nerved, entire and acute to acuminate at the apex, sometimes aristate or shortly notched and imperfectly awned with an awn up to 4 mm long and scaberulous without towards the apex. *Lodicules* 2, ca. 0.5 mm long. *Stamens* 3; anthers 1.5-2 mm long. *Ovary* ca. 0.5 mm long; styles ca. 2 mm long; stigmas ca. 2.5 mm long. Flowering and fruiting Oct-Jan.

Additional specimens. Kerala, MALAPPURAM District.: Ravi 33026, 15 Dec 1996 (*Para*: K, TBGT).

Distribution and Notes. The new taxon was collected from the side of a water channel running along a road-side in the hilly tracts of Malappuram District. of the State. The plant has a striking appearance with its robust habit and long, silvery-hairy racemes.

Ischaemum abrahamii is allied to *I. elimalayanum* Sreek. et al. but is distinct in having more robust habit, longer, more densely woolly racemes, thicker joints of rhachis and pedicels, more densely long-ciliate joints of rhachis, pedicels and lower glumes of both sessile and pedicelled spikelets, more or less oblong glumes of sessile spikelets, thickly coriaceous to subcrustaceous and finely transversely wrinkled in the lower half, and narrowly but unequally winged on sides towards the subacute to obtuse-retuse apex and lower glume of the pedicelled spikelets winged on both sides, broadly all along on one side and narrowly on the other towards the subacute to obtuse-retuse apex.

The specific epithet *abrahamii* is derived from Dr. A. Abraham who was the first author's Professor and the founder-Director of the Tropical Botanic Garden and Research Institute (TBGRI) in Palode near Thiruvananthapuram in Kerala.

3. *Ischaemum fischeri* Ravi et Kiran Raj, sp. nov.—TYPE: INDIA, Kerala, Thiruvananthapuram District.: Palode-TBGRI campus ± 150 m, Ravi 36706, 12 Feb 1998 (holotype: TBGT; isotypes: CAL, MH, KFRI). Figure 3

Ischaemum rangacharianum C.E.C. Fischer, Kew Bull. 1933, 1933: pp. 352 & 353. *p.p. quoad specim.* (*Paratypus*) V. Narayanaswamy 1743 (CAL).

Ischaemum rangacharianum C.E.C. Fischer affine, sed habitu perenni, culmis repentibus ad nodos radicanibus, tegetes dense formantes, foliis inferioribus cuneatis ad acuminatis ad basin, pedunculo 1 interdum pedunculis 2 non fasciculatis, gluma inferior specularum sessilium cum

tantum 2 vel 3 (vel 4) nodulis lateralibus plus minusve rotundatis separatis a sulcis vadis, differt.

Perennial. *Culms* creeping, rooting at nodes and mat-forming with the flowering culms up to 75 cm tall; nodes sparsely ciliate, glabrous at length. *Leaves* all along the culm; sheath up to 8 cm long, keeled on the back, striate and very sparsely bulbous-pilose closer to the blade, glabrous otherwise; ligule subcoriaceous, triangular-ovate, 2.5-5 mm long, 2-keeled on the back and subacute to obtuse-truncate at the apex; blades elliptic to lanceolate, up to 15 × 1 cm, lower ones acuminate to tapering with the lowest ones tapering into a short or long 'pseudopetiole' at the base and acute to acuminate at the apex, upper ones cuneately rounded at the base towards the culm apex with the margins shortly undulate, prominently so on one side and scaberulous towards the apex and sparsely bulbous-pilose, glabrous at length and with a small tuft of hairs at the base behind the ligule. *Inflorescence* mostly solitary, sometimes 2, terminal on lateral, erect shoots; racemes 2, up to 10 cm long; joints of rhachis oblong-clavate, 3-5 mm long, triquetrous, tridentate at the apex and ciliate on the outer angle. *Sessile spikelets*: oblong to oblong-elliptic, 5-7 mm long including the 0.75-1 mm long, ciliate callus. *Lower glume* oblong-elliptic, 4-6 × ca. 1.25 mm, thickly coriaceous to subcrustaceous below and coriaceous above, laterally keeled and incurved on the margins with the keels thickened and 2 or 3 (or 4) nodulose in the lower 1/3-1/2 and laterally flattened and winged unequally above the middle with scabrid margins, acute to subacute, sometimes apiculate and hyaline-tipped, often ultimately unevenly notched at the apex, 11-13-nerved, and minutely and sparsely scaberulous outside. *Upper glume* coriaceous, lanceolate in profile, boat-shaped, 4.5-6.5 × ca. 1 mm (when folded), keeled on the back and the keel very shortly and narrowly winged or not towards the acuminate to aristate apex, incurved on margins, 5-7-nerved and scaberulous outside in the upper half and also longitudinally along the middle on the sides. *Lower lemma* hyaline, elliptic to elliptic-lanceolate, 3.5-5 mm long, acute at the apex, 3-nerved, incurved on the sides and sparsely short-pilose outside closer to the margins, glabrous otherwise. *Lower palea* hyaline, elliptic to elliptic-lanceolate, 3.5-5 mm long, subacute to shortly obtuse at the apex, 2-nerved and incurved along the nerves with the nerves keeled and very narrowly winged. *Upper lemma* hyaline, oblong to oblong-elliptic in profile, 3-4.5 mm long, deeply cleft to below the middle with acute to acuminate lobes and awned from the sinus; awn geniculate, up to 15 mm long with a column up to 6.5 mm long. *Upper palea* hyaline, oblong-elliptic, 3.5-5 mm long, 2-nerved, incurved on the sides and subacute at the apex. *Pedicelled spikelets*: Pedicel 1-2 mm long, triquetrous and ciliate on the outer angle. *Lower glume* obliquely oblong-elliptic, 4-6.5 × 1.5-2 mm, thickly coriaceous below and coriaceous above, laterally keeled and the keels broadly winged all along on one side with a few hairs on the margin at the extreme base and narrowly winged towards the apex and slightly thickened and somewhat rounded below and 1-3

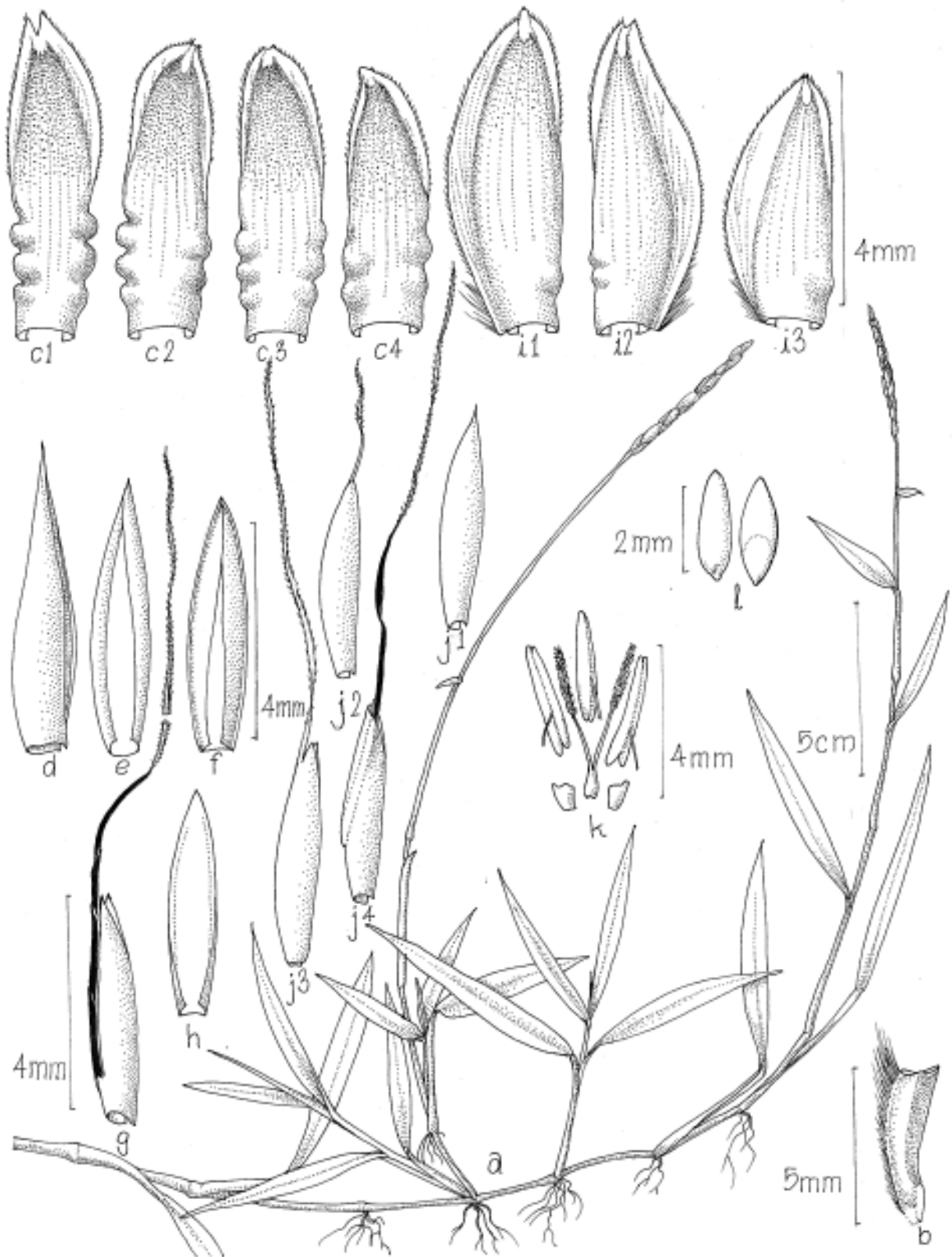


Figure 3. *Ischaemum fischeri* Ravi et Kiran Raj. a, Habit; b, Rhachis joint; c1-h, Sessile spikelets: c1, c2, c3 & c4, Lower glumes (from different spikelets); d, Upper glume; e, Lower lemma; f, Lower palea; g, Upper lemma; h, Upper palea; j1, j2, j3 & j4, Upper lemma (from different spikelets); k, Lodicules, stamens & pistil; l, Grains.

nodulose or not towards the base on the otherside with the wings scabrid on the margins, subacute, sometimes apiculate and hyaline-tipped, often ultimately unequally notched at the apex, 11-13-nerved. *Upper glume*, *lower lemma*, *lower palea* and *upper palea* similar to those of the sessile spikelet, sometimes slightly smaller. *Upper lemma* hyaline, oblong to oblong-elliptic, 3-4 mm long, sometimes very reduced, mostly entire and acute to mucronate at the apex, sometimes shortly bifid with subacute to obtuse lobes and aristate or imperfectly awned or deeply cleft and geniculately awned; when awned, awn usually shorter than that of the sessile spikelet. *Lodicules* 2, 0.5-0.75 mm long, cuneate at the base and truncately lobed at the apex. *Stamens* 3; anthers 2.5-3 mm long, yellow turning to brown. *Ovary* ca. 0.5 mm long; styles ca. 2 mm long; stigmas ca. 2 mm long, glassy-white, turning to brown. *Grains* ellipsoid to oblong-ellipsoid, 2-2.5 × 0.75-0.9 mm, pale white. Flowering and fruiting Oct-Apr.

Additional specimens examined. **INDIA.** Andhrapradesh: GODAVARI District.: without specific locality, *Narayanaswami 1743* (CAL). Kerala, ERNAKULAM District.: Kumbalam ± 10 m, 8 Dec 1997, *Ravi 37002* (TBGT). KOLLAM District.: Nilamel, 24 Nov 1941, *Jacob 20195* (MH). PATHANAMTHITTA District.: Koduman ± 125 m, 2 Apr 1978, *Mohanan 54949* (MH); Pathanapuram ± 100 m, 13 Jan 1998, *Shaju and Kiran Raj 37502* (TBGT). THIRUVANANTHAPURAM District: Thottiyar on way to Cape comorin, 1 Nov 1956, *Agarwal 727* (CAL); Nedumangadu, 22 Nov 1941, *Jacob 20173* (MH); Kottoor RF ± 175 m, 20 Nov 1977, *Mohanan 52598* (CAL); Pallippuram, 3 Nov 1956, *Nanda 777* (CAL); Bharathannoor ± 120 m, 5 Dec 1996, *Ravi 32505* (TBGT). Tamilnadu, THIRUNELVELI District.: Courtallam- Main falls, 16 Dec 1957, *Subrahmaniam 4945* (MH).

Distribution and Notes. The specimens of the new taxon were originally collected from the campus of TBGRI

where they formed extensive mats all over the hilly slopes. Subsequently, the taxon was collected from the hilly tracts of the Southern districts of the State, Thiruvananthapuram, Kollam, Pathanamthitta and also from a low lying area near a marsh in Ernakulam District. On critical study the specimens closely resembled *I. rangacharianum* C.E.C. Fischer in the structure of the lower glume of the sessile spikelets, but were found very distinct in habit, nature of lower leaves, number and nature of the side nodules and indumentum of the lower glume of the sessile spikelets. Detailed examination of a good number of fresh specimens of *I. rangacharianum* and the taxon under description collected from all over the state, the former from districts north of Alappuzha and the latter mostly from the southern districts, clearly brought out the contrasting characteristics of the character types.

Subsequently, the specimens of the new taxon were compared with the type materials of *I. rangacharianum* at Kew through the help of Dr. Cope and the authors also personally compared them with other authentic collections of *I. rangacharianum* at MH and CAL. These studies showed that all these collections of *I. rangacharianum* contained a mixture of 2 distinct entities. Interestingly, the authors also examined 2 of the specimens of *I. rangacharianum* quoted by Fischer in his original description and deposited at CAL. One of these carried the label "Shornur 23, Nov. 1900, Collector, K. Ranga Acharyar" and the other "Rampa country Godavari District., Sept. 1920, Collector, V. Narayanaswamy 1743". Both these specimens were determined as *I. rangacharianum* C.E.C Fischer by Fischer himself. As indicated in the protologue the first sheet is the type of *I. rangacharianum* and the other, one of its paratypes.

On critical examination of the above 2 specimens, the present authors became thoroughly convinced that they represented 2 distinct taxa, Ranga Acharyar's specimen *I. rangacharianum*, and *Narayanaswamy 1743* a hitherto undescribed species.

The differentiating characters of the two are tabulated below:

<i>Ischaemum rangacharianum</i> C.E.C. Fischer	<i>Ischaemum fischeri</i> sp. nov.
1. Annual.	Perennial.
2. Culms diffuse and more or less erect.	Culms creeping, rooting at nodes and mat-forming.
3. Lower leaves rounded to cordate at base with distinct pseudopetioles.	Lower leaves acuminate at base, sometimes lowermost ones tapering into pseudopetioles.
4. Peduncles 1-9, often fasciculate.	Peduncles solitary or rarely 2.
5. Lower glume of sessile spikelets 4-6-nodulose in the lower half with acutely ridged nodules separated by deeper furrows.	Lower glume of sessile spikelets 2 or 3 (or 4)-nodulose with obtusely ridged nodules separated by shallower furrows.
6. Lower glume of sessile spikelets sparsely long-pilose outside in the upper half.	Lower glume of sessile spikelets never pilose, at the most sparsely scaberulous outside.

The new species was named *I. fischeri* in honor of C.E.C. Fischer who published *I. rangacharianum*.

Acknowledgements. The authors wish to express their gratitude to the Ministry of Environment and Forests, Government of India, the sponsor of the present study of endemic plants of Kerala which led to the discovery of the new taxa. The authors are grateful to Dr. Thomas A. Cope of Royal Botanic Gardens, Kew and Dr. P.V. Sreekumar of Andaman and Nicobar Circle of B.S.I. for their help in the identification of the taxa. The Director, B.S.I., Calcutta, Dr. M. Sanjappa, Deputy Director, Central National Herbarium, Howrah and Dr. P. Daniel, Deputy Director, B.S.I., Southern Circle, Coimbatore deserve a word of special gratitude for permitting the authors to examine the specimens of their Herbaria for this study. The authors also wish to record their thanks to Dr. P. Pushpangadan, former Director of TBGRI for his encouragement, Dr. K. Narayanan Nair of TBGRI for his suggestions in the preparation of the manuscript, Dr. N.C. Majumdar, formerly of B.S.I., Calcutta for Latin diagnosis of the new taxa and to Shri. K.P. Pradeepkumar, Artist of TBGRI for India ink drawings.

Literature Cited

- Bor, N.L. 1960. *Ischaemum*. In The Grasses of Burma, Ceylon, India & Pakistan. Pergamon Press, Oxford, pp. 171-186.
- Fischer, C.E.C. 1933. New little known plants from south India: II. Kew Bull. 1933, pp. 352-353.
- Fischer, C.E.C. 1934. *Ischaemum*. In J.S. Gamble (ed.), Flora of the Presidency of Madras. Adlard & Son, Ltd., London, pp. 1717-1723.
- Hooker, J.D. 1896. *Ischaemum*. In Flora of British India. Vol. 7, L. Reeve & Co. Ltd., London, pp. 126-140.
- Ravi, N., N. Mohanan, T. Shaju, M.S. Kiran Raj, and R. Rajesh. 1998. Three new species of *Ischaemum* L. (Poaceae) from Kerala, India. Rheedea 8(2): 149-158.
- Sreekumar, P.V. and V.J. Nair. 1991. *Ischaemum*. In Flora of Kerala Grasses. Calcutta, pp. 116-171.
- Sur, P.R. 1987. Studies in the genus *Ischaemum* Linn. in India - Endemism. J. Econ. Tax. Bot. 9(2): 311-315.

印度 Kerala 產三種鴨嘴草屬（禾本科）新種植物

N. Ravi, N. Mohanan, T. Shaju, M. S. Kiran Raj, and R. Rajesh

Tropical Botanic Garden and Research Institute

Palode P. O., Thiruvananthapuram - 695 562, Kerala, India

本文報導印度產三種鴨嘴草屬新種植物，*Ischaemum wayanadense*，*I. abrahamii* 及 *I. fischeri*，並提供線繪圖。

關鍵詞：印度；鴨嘴草屬；Kerala；新種；禾本科。