

## *Murdannia nampyana* (Commelinaceae) sp. nov. from Kerala, India

Paul Joby, P. Thomas Rogimon and P. Nisha

P. Joby ([jobypaulses@gmail.com](mailto:jobypaulses@gmail.com)), Dept of Botany, St Thomas' College (Autonomous), Thrissur, Kerala, India. – P. T. Rogimon, Dept of Botany, CMS College, Kottayam, Kerala, India. – P. Nisha, Dept of Botany, St Xavier's College for women, Aluva, Kerala, India.

*Murdannia nampyana* sp. nov. (Commelinaceae), collected from a marshy riparian area by the Kadambrayar River, near Bhramapuram Diesel Power Project, Kakkanad, Ernakulam district, Kerala is described. The new species can be distinguished from the similar species *M. spirata* G.Brückn. by its creeping habit, up to 1.5 m long with no definite base (vs erect, ascending, decumbent habit, with or without definite base), 1.1–2.2 cm wide flower diameter (vs 0.65–0.80 cm), petals 1.1 × 0.5–0.7 cm (vs 0.35–0.40 × 0.25–0.35 cm), 0.6–0.5–0.9 cm long stamen filaments (vs 0.06–0.15 cm), 0.20–0.25 cm long staminode filaments, (vs 0.06–0.15 cm), 2–3 smooth seeds per locule, with ridges and furrows and 1–2 small ventral depression on both side of the linear hilum and dorsal embryotega (vs 3–4 verrucose seeds per locule, with ridges and warts, 1–3 deep ventral pits on both side of elliptic hilum, edges of pits surrounded by warts, brownish powdery material in the testa and semidorsal embryotega).

The genus *Murdannia* Royle (Commelinaceae) is distributed in pantropical and warm temperate regions of the world and diversified in tropical Asia (Faden 2000). The genus has 59 species in the world (Govaerts and Faden 2004) and 25 taxa (including 2 subspecies) in India (Karthikeyan et al. 1989). Recently, Nampy and Joby (2003, 2008), Joby et al. (2011), Nandikar and Gurav (2011), Ancy and Nampy (2012, 2014), Nampy et al. (2012), Rogimon and Joby (2013, 2015) and Ramana et al. (2013) have studied the genus in India. The updated status of the genus in India includes 27 species (Nandikar and Gurav 2015) even though many of them are cryptic. During a floristic investigation in the riparian area of the Kadambrayar river and in the Kakkanad wetland region in Ernakulam district of Kerala state, a species of *Murdannia* was collected. Detailed studies and comparisons with similar species including the type specimen of *Murdannia spirata* G.Brückn. proved it as new to science as described below.

### Material and methods

Voucher specimens were collected and processed based on standard herbarium techniques (Bridson and Forman 1998). Measurements and descriptions of morphological features were made from living material. Figure 1 was prepared from photographs of fresh vegetative and floral parts using Nikon D3300 digital camera. Photomicrographs of seeds were taken using a Labomed CSM2 microscope and Magnüs MIPS. We analysed the *rbcl* sequence by using *rbcl*-PCR universal primers and automated DNA sequencing on ABI3730xl Genetic Analyzer based on Doyle and Doyle (1990). The

newly generated sequence has been submitted to GenBank (accession number KT067732.1).

### *Murdannia nampyana* Joby, Rogi & Nisha sp. nov. (Fig. 1A–N)

Differing from *M. spirata* by having a creeping habit, up to 1.5 m long with no definite base, 1.1–2.2 cm wide flower diameter, petals 0.6–1.1 × 0.5–0.7 cm, 0.5–0.9 cm long stamen filaments, 0.20–0.25 cm long staminode filaments, 2–3 smooth seeds per locule, with ridges and furrows and one or two small ventral depressions on both sides of the linear hilum and dorsal embryotega, vs ascending, decumbent habit, with or without definite base, 0.65–0.80 cm wide flower diameter, petals 0.35–0.40 × 0.25–0.35 cm, 0.06–0.15 cm long stamen filaments, 0.06–0.15 cm long staminode filaments, 3–4 verrucose seeds per locule, with ridges and warts and 1–3 deep ventral pits on both sides of elliptic hilum, edges of pits surrounded by warts, brownish powdery material in the testa and semidorsal embryotega.

**Type:** India, Kerala, Ernakulam District, Kakkanad, Riparian area of Kadambrayar River, near Bhramapuram Diesel Power Project, 9°59'48.28"N, 76°22'06.14"E, 9 m a.s.l., 18 Oct 2014, Joby 1186 (holotype: CAL, isotypes: MH, CALI, CMS and Herbarium St Thomas' College (Autonomous), Thrissur, Kerala, India).

### Etymology

The new species is named after Santhosh Nampy, Professor, Dept of Botany, Univ. of Calicut, Kerala, India for his contributions to the taxonomy of Commelinaceae.

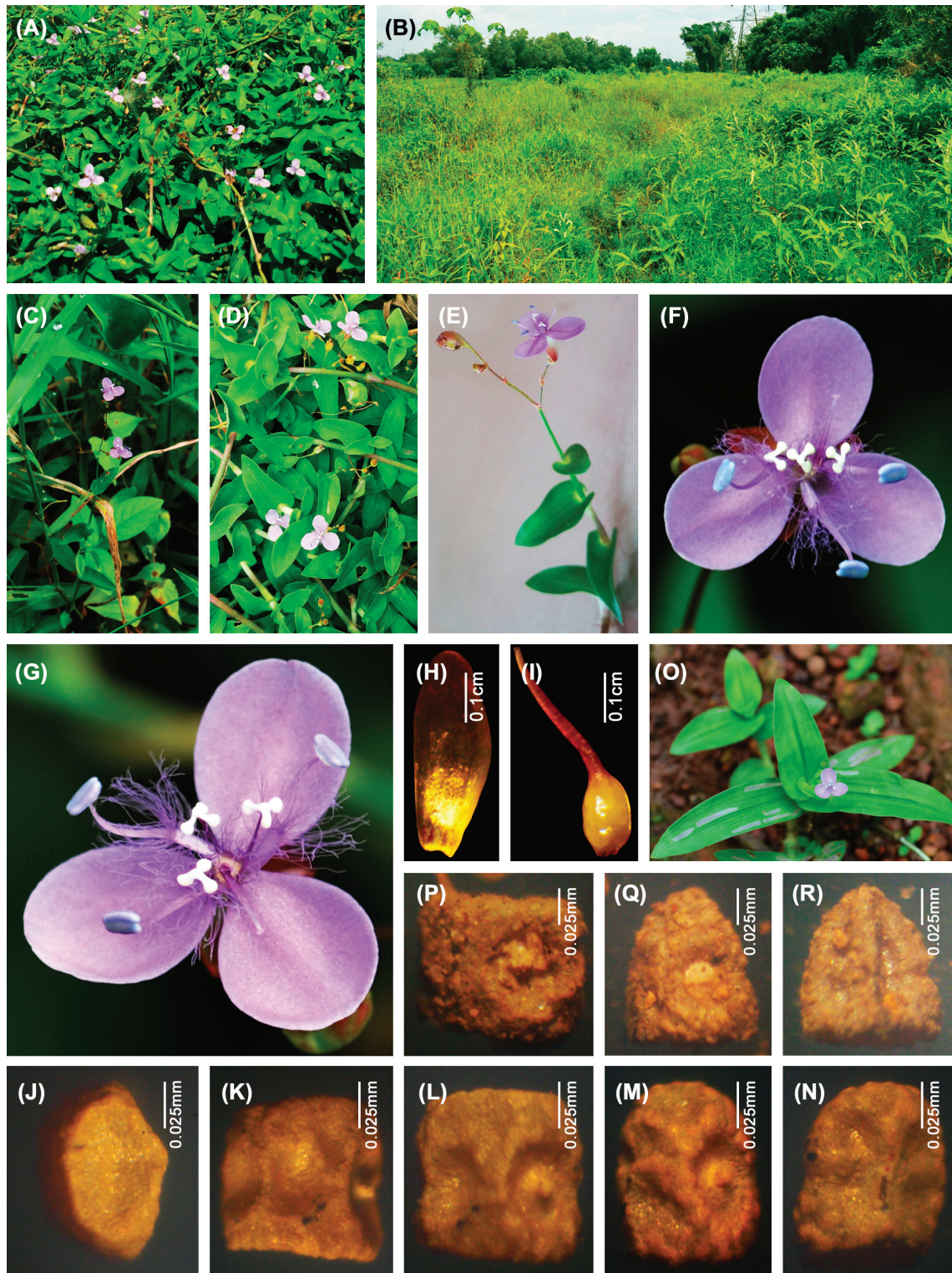


Figure 1. (A)–(N) *Murdannia nampyana* sp. nov. (A) habit, (B) habitat, (C)–(E) associations in the habitat and cincinus, (F)–(G) flower, (H) sepal, (I) pistil, (J) seed (apical view), (K)–(L) middle seed (dorsal view), (M) apical seed (dorsal–lateral view), (N) apical seed (ventral view), (O)–(R) *M. spirata* habit and flower, (P) middle seed (dorsal–lateral view), (Q) apical seed (ventral view), (R) apical seed (dorsal view) (A)–(N) from Joby 1186; (O)–(R) from Joby 1194; [Herbarium, St Thomas’ College (Autonomous), Thrissur, Kerala, India].

### Description

Perennial, mat-forming herb, creeping, up to 1.5 m long, with branches from nodes; terminal branches ascending to erect. Roots fibrous, from lower nodes. Internodes

2.0–6.0 cm. Base glabrous, purple; apex green, sparsely hairy, with white striations, and a thick band of multicellular hairs from the mouth of the sheath to the base of the internodes. Sheath 0.2–0.4 cm long, pale green with

dark green bands, sparsely multi-cellular tuberculate-hairy; mouth ciliate. Leaves cauline, distichous, ovate, undulate at base, amplexicaule, with base margin tuberculate hairy; lamina 1.5–3.5 × 0.5–1.0 cm, thick, with both surfaces glabrous, acute at apex, scabrous; veins 10, slightly undulating. Inflorescences terminal and axillary cymose, cincinni 1–2, alternate, 2.0–6.0 cm long, pale green, glabrous, with 3–4 flowers. Bracteole 0.40 × 0.15 cm, lanceolate, pale green, amplexicaule, with both surfaces glabrous and entire hyaline margin, acute at apex, minutely ciliate. Pedicel 0.5–0.7 cm long, erect–slightly bending, pale green, glabrous. Flowers bisexual, 3–5 per inflorescence, 1.1–2.2 cm in diameter. Sepals 3, 0.4 × 0.15 cm, lanceolate, green at base, pale white and with purple lines at apex, with both surfaces glabrous; margin entire, hyaline; apex rounded, cup-shaped, minutely ciliate, membranous. Petals 0.6–1.1 × 0.5–0.7 cm, broadly elliptic to obovate-elliptic, bluish–violet, with both surface glabrous, entire margin and rounded apex; veins prominent when wet. Fertile stamens 3, antisealous; filament 0.5–0.9 cm long, the middle broad, curved above middle, purple–blue, bearded up to 0.25 cm from base on outer side, and with a band of violet hairs surrounding the broadest portion of the filament; anther lobes 0.2 cm, bithecus, dorsifixed, their upper surface dark blue–violet, and lower surface cream-white; connective cream-white; pollen grains numerous, oblong, white. Staminodes 3, antipetalous; filament thin, 0.25 cm long, bearded, purple–violet; antherode tri-lobed, cream yellow. Ovary 0.15–0.20 × 0.05–0.10 cm, globose-triangular, tri-locular, pale green; ovules 3 per locule; style 0.4 cm long, violet, the terminal pale violet, glabrous, bending away from the fertile stamens; stigma papillose, white. Capsule 0.3–0.4 × 0.15–0.20 cm, ovate-oblong, trivalvate, glabrous, green. Seeds uni-seriate, 2–3 per locule, 0.11–0.15 × 0.07–0.10 cm, gray, rectangular in ventral view, cylindrical to heart-shaped in apical view, their apex rounded in basal and terminal seeds, cupulate in middle seed, smooth, ridged and furrowed, with ridges not surrounded by warts; testa glabrous, with one or two small ventral depression on both side of hilum; hilum linear; embryotega dorsal.

#### Phenology

Flowering and fruiting observed from August to December and flowering time was 09.00 am to 1.30 pm.

#### Distribution and ecology

*Murdannia nampyana* is hitherto known only from the type locality: a marshy riparian area by Kadambrayar River, near Bhramapuram Diesel Power Project and near Smart City campus, Kakkanad, Ernakulam. Here it grows in a riparian marshy wetland, among grasses, forming a floating island community exposed to sunlight and associated with *Acacia pennata* (L.) Willd., *Centrosema pubescens* Benth., *Colocasia esculenta* (L.) Schott, *Commelina diffusa* Burm.f., *Desmodium triflorum* (L.) DC., *Ischaemum travancorense* Stapf ex C.E.C.Fisch., *Leersia hexandra* Sw., *Mikania micrantha* Kunth, *Mimosa pudica* L., *Oryza rufipogon* Griff., *Persicaria barbata* (L.) H.Hara, *Rhynchospora corymbosa* (L.) Britton, *Senna alata* (L.) Roxb. etc.

#### Similar species

*Murdannia nampyana* is analogous to *M. spirata* in general appearance; having terminal and axillary cymose inflorescences of 1–2 cincinni, blue–lavender flowers, fertile and sterile stamens (3 + 3) and seed morphology. Faden (2001) recognized four varieties of *M. spirata* from Sri Lanka viz.: *M. spirata* var. A, *M. spirata* var. B, *M. spirata* var. *spirata* and *M. spirata* var. *parviflora* based on the habit, pubescence and diameter of the flower. However, the Sri Lankan varieties viz. var. A, var. B and var. *parviflora* are so far not collected from the Indian region. We compared our specimens with photographs of the type and protologues of *M. spirata* var. *spirata* (circumscription of *M. spirata* from India is also included), *M. spirata* var. *parviflora* and the new variety described by Nandikar and Gurav (2015) viz., *M. spirata* var. *flavanthera*, and found that the new species is distinguished from these by the characters listed in Table 1 and the key below.

#### Key to the new species and the varieties of *Murdannia spirata*

1. Seeds 5–7 per locule ..... *M. spirata* var. *flavanthera*  
– Seeds 2–4 per locule ..... 2
2. Petals with contrasting darker veins; plants with a definite base ..... *M. spirata* var. *parviflora*  
– Petals without contrasting darker veins; plants with or without a definite base ..... 3
3. Flowers up to 0.8 cm diameter; staminal filament 0.06–0.15 cm; seeds verucose with ridges and warts, and 1–3 deep pits on either side of the hilum, pits surrounded by warts; with brownish powdery material in the testa; hilum elliptic; embryotega semidorsal ..... *M. spirata* var. *spirata*  
– Flowers 1.1–2.2 cm diameter; staminal filament 0.5–0.9 cm; seeds gray, smooth, with ridges and furrows and 1–2 small ventral depressions on both sides of hilum; hilum linear; embryotega dorsal ..... *M. nampyana*

#### Conservation status

The distribution of *M. spirata* ranges from sea level to 1800 m a.s.l. in Kerala state. It is a common midland species and distributed along wet places, agricultural fields, way side ditches, moist open places and near streams in partially or fully exposed conditions. In contrast, *Murdannia nampyana* is confined to the marshy riparian wetlands of Kadambrayar river, near Kakkanad, Ernakulam district of Kerala at an elevation of 9 m a.s.l., with only a small population observed. Due to anthropogenic disturbances such as wetland reclamation and non-point source of water pollution, the riparian marshes and wetlands of Kadambrayar river is under threat. Therefore it is necessary to conserve the natural habitats of *M. nampyana*.

#### Additional specimen examined (paratype)

India, Kerala, Ernakulam District, Kakkanad, Riparian area of Kadambrayar River, near Bhramapuram Diesel Power Project, 9°59'48.28"N, 76°22'06.14"E, 9 m a.s.l., 17 Oct 2015, Joby and Rogi 1193 (CMS, Herbarium St Thomas' College (Autonomous), Thrissur, Kerala, India).

Table 1. Comparison of morphological characters of *M. nampyana* sp. nov. and related species and varieties.

Taxonomic characters	<i>M. nampyana</i> sp. nov.	<i>M. spirata</i>	<i>M. spirata</i> var. <i>parviflora</i>	<i>M. spirata</i> var. <i>flavanthera</i>
Habitat	Marshes and wetlands, exposed	Lateritic soil, marshes, shady or exposed	Marshes, growing under shrubs	Margins of ponds in sandy or muddy soil
Habit	Perennial, creeping to ascending, no definite base, up to 1.5 m long	Annual or perennial, erect, ascending, decumbent, with or without definite base	Annual, ascending, decumbent, with definite base	Annual or perennial, no definite base
Leaves	Sheath 0.2–0.4 cm, lamina 1.5–3.5 × 0.5–1.0 cm, both surfaces glabrous, margin entire, hyaline, scabrous towards the tip	Sheath 0.2–0.8 cm, lamina 1.0–4.7 × 0.2–1.5 cm, both surfaces glabrous to minutely pubescent, margin minutely hyaline, scabrous towards the tip	Lamina 1.0–3.5 × 0.3–1.1 cm, glabrous, rarely sparsely pubescent along the midrib	Lamina (0.5–) 0.8–4.5(–5) × 0.3–0.8(–1) cm, linear–lanceolate–ovate
Cinncinus	Peduncle glabrous	Peduncle glabrous or pubescent	Peduncle glabrous or with a longitudinal line of pubescence	Unknown
Flowers	Bisexual, 1.1–2.2 cm diameter	Bisexual and male, 0.65–0.80 cm diameter	Bisexual, 0.5–0.8 cm diameter	Bisexual
Sepals	0.40 × 0.15 cm, margin entire, hyaline, apex rounded, pale white, cup shaped, minutely ciliate at apex	0.2–0.4 × 0.1–0.2 cm, elliptic, margin entire, hyaline	unknown	Unknown
Petals	0.6–1.1 × 0.5–0.7 cm, broadly elliptic–obovate–elliptic, lavender blue, no contrasting veins	0.35–0.40 × 0.25–0.35 cm, oblong–elliptic–orbicular, blue, no contrasting veins	Pale lilac with darker veins	Obovate–orbicular, lilac to lavender with dark to faint contrasting veins
Stamens	Filament 0.5–0.9 cm long, bearded up to 0.25 cm from base, anther lobes dark violet, 0.2 cm long	Filament 0.06–0.15 cm long, bearded up to lower half, anther lobes purple, 0.06–0.15 cm long	Stamens not dimorphic	Stamen filaments sparsely bearded
Staminodes	Filament 0.20–0.25 cm long, violet, sparsely bearded, hairs violet, antherodes tri-lobed, white	Filament 0.06–0.15 cm long, purple, sparsely bearded, hairs purple, antherodes tri-lobed, white to creamy	Antherodes white, filaments glabrous or bearded	Staminode filament glabrous, antherode yellow to creamy yellow
Gynoecium	Ovary 0.15–0.20 × 0.05–0.10 cm, globose, triangular, Style 0.4 cm long, violet, apex pale violet, stigma papillose, white	Ovary 0.10–0.15 × 0.10 cm, elliptic to ovate, stigma papillate	unknown	Unknown
Capsule	0.3–0.4 × 0.15–0.2 cm	0.2–0.35 × 0.15–0.25 cm	unknown	Capsule ovoid to ellipsoid
Seeds	2–3 per locule, 0.11–0.15 × 0.07–0.10 cm, gray, smooth, with ridges and furrows, one or two small ventral depressions on both sides of hilum, hilum linear, embryotege dorsal	3–4 per locule, 0.075–0.110 × 0.06–0.10 cm, brown, verrucose, with ridges and warts, 1–3 deep ventral pits on both sides of hilum, edges of pits surrounded by warts, brownish powdery material in the testa, hilum elliptic, embryotege semidorsal	unknown	5–7 per locule, uni-seriate, testa smooth–alveolate, or reticulate, slightly raised warts

### Specimens examined for *M. spirata*

s.loc., Linnaeus 65.15 (Type specimen as *Commelina spirata*, digital image LINN); India, Goa, Ponda District, Joby and Nampy 836 (DEV). Kerala, Alappuzha District, Pathiramanal, Cini DC5143 (DEV); Kozhikode District, Manjachely, Joby 976, Palazhi, Joby 488, Thikkody, Joby and Nampy 822 (DEV); Kottayam District, Jaigiri, near Kuravilangad, Joby 923 (DEV), Kaliyarthottom, near Kuravilangad, Joby 1196 (Herbarium St Thomas' College (Autonomous), Thrissur, Kerala, India); Malappuram District, Nedumkayam, Joby DC5106, Parappanangadi, Joby 905 (DEV); Thrissur District, Vazhani, Cini and Joby 936 (DEV); Wayanad District, Chembra, Joby 887, Kabany, Joby 898, Muthanga Wildlife Sanctuary, Joby 884, 894, Thirunelly, Joby 986 (DEV).

*Acknowledgements* – The first author is thankful to the Principal and Head of the Department of Botany, St Thomas' College (Autonomous) Thrissur, Kerala for facilities. The authors are thankful to the Curator, DEV, Centre for Taxonomic Studies, St Joseph's College, Devagiri, Kozhikode, Kerala 673008, India for herbarium specimen citation. We are grateful to Toms Augustine, Babu Padmakumar, Arun Babu, Jayasoryan K. K., Rinoy Varghese and Sreedharan K. for their help during the field work.

### References

- Ancy, A. A. and Nampy, S. 2012. *Murdannia assamica*, a new species of Commelinaceae from India. – *Edinb. J. Bot.* 69: 441–445.
- Ancy, A. A. and Nampy, S. 2014. Taxonomic significance of capsule and seed characters of Indian species of *Murdannia* Royle (Commelinaceae). – *Phytotaxa* 178: 1–22.
- Bridson, D. and Forman, L. (eds) 1998. *The herbarium handbook*, 3rd ed. – R. Bot. Gard. Kew.
- Doyle, J. J. and Doyle, J. L. 1990. Isolation of plant DNA from fresh tissue. – *Focus* 12: 13–15.
- Faden, R. B. 2000. Commelinaceae. – In: Dassanayake, M. D. and Clayton, W. (eds), *A revised handbook to the flora of Ceylon*. – IBH Publishing Co. New Delhi 14: 116–196.
- Faden, R. B. 2001. New taxa of *Murdannia* (Commelinaceae) from Sri Lanka. – *Novon* 11: 22–30.
- Govaerts, R. and Faden, R. B. 2004. World checklist of Commelinaceae. – The Board of Trustees of the Royal Botanic Gardens, Kew, <www.kew.org/wcsp/>, accessed 18 Oct 2015.
- Joby, P. et al. 2011. *Murdannia satheeshiana* – a new species of Commelinaceae from Western Ghats, India. – *Phytotaxa* 22: 41–46.
- Karthikeyan, S. et al. 1989. *Florae Indicae Enumeratio: Monocotyledonae*. – *Bot. Surv. Ind.*, pp. 27–30.
- Nampy, S. and Joby, P. 2003. *Murdannia fadeniana* Nampy & Joby (Commelinaceae), a new species from India. – *Candollea* 58: 79–82.
- Nampy, S. and Joby, P. 2008. On the identity of *Murdannia juncoides* (Wight) R.S. Rao & Kammathy (Commelinaceae). – *Rheedea* 18: 57–60.
- Nampy, S. et al. 2012. *Murdannia sahyadrica*, a new species of Commelinaceae from the north Western Ghats, India. – *Willdenowia* 42: 79–83.
- Nandikar, M. D. and Gurav, R. V. 2011. A new species of *Murdannia* Royle (Commelinaceae) from northern Western Ghats of India. – *Taiwania* 56: 227–230.
- Nandikar, M. D. and Gurav, R. V. 2015. Revision of the genus *Murdannia* (Commelinaceae) in India. – *Phytodiversity* 2: 56–112.
- Ramana, V. et al. 2013. *Murdannia saddlepeakensis* (Commelinaceae) – a new species from Andaman and Nicobar islands, India. – *Phytokeys* 20: 9–15.
- Rogimon, P. T. and Joby, P. 2013. Distribution and ecology of the genus *Murdannia* Royle (Commelinaceae) in south India. – *Int. Interdiscipl. Res. J.* 3: 201–206.
- Rogimon, P. T. and Joby, P. 2015. Notes on recent species bursts in *Murdannia* (Commelinaceae) from India. – *Ind. J. Appl. Res.* 5: 57–59.