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# New Taxa of *Murdannia* (Commelinaceae) from Sri Lanka

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**ABSTRACT.** Three new species and three infraspecific taxa of *Murdannia* are described from Sri Lanka. *Murdannia dimorphoides* Faden, with subsp. *dimorphoides* and subsp. *perennis* Faden, and *Murdannia audreyae* Faden are endemic to Sri Lanka. *Murdannia striatipetala* Faden also occurs in southern India. The new variety, *Murdannia spirata* var. *parviflora* Faden, is recognized as indigenous in Sri Lanka and naturalized in the southern United States (Florida). *Murdannia vaginata* var. *glabrisepala* Faden is described from Sri Lanka, but whether it occurs elsewhere is not firmly established.

**Key words:** Commelinaceae, *Murdannia*, Sri Lanka.

With about 50 species, *Murdannia* Royle is one of the largest genera of Commelinaceae. In the course of working on the family for the *Revised Handbook to the Flora of Ceylon* (Faden, 2000) I recognized 3 new species, among the 14 species of *Murdannia* in Sri Lanka, and several unnamed infraspecific taxa. Among the latter were 3 that were well enough defined to be worthy of formal description. The 3 new species, 1 new subspecies, and 2 new varieties are described below.

***Murdannia dimorphoides* Faden, sp. nov.** TYPE: Sri Lanka. Anuradhapura: Wilpattu National Park, Waliella, 2 mi. [1.2 km] from park gate on road to Maradanmaduwa, ca. 8°20'N, 80°08'E, open sandy area with seepage, 7 Jan. 1977, R. B. Faden & A. J. Faden 77/72 (holotype, US 2890395; isotypes, C, E, F, K, L, MO, P, PDA, US) Figure 1A–G.

Ad *M. dimorpham* (Dalzell) G. Brückner forma seminum similis; foliis angustioribus, cincinnis oppositis vel verticillatis et seminibus parvioribus hilo punctiformi vel oblongo differt. Herbae annuae vel perennes; inflorescentiae (1–)2–4 cincinnis plurifloris oppositis vel verticillatis compositae; flores dimorphi, petalis lilacinis vel caesiis nervatura haud fuscior, filis omnibus barbatis, staminibus 3, polline albo, staminodiis 3, anthera sterili bicolori; capsulae 3.5–4.5(–5) × 1.5–2 mm, loculis 3–4 spermis; semina uniseriata, (0.5–)0.6–1.2(–1.45) × 0.6–0.9 mm, pagina ventrali fovea grandi centrali.

Tufted annuals with thin fibrous roots, or perennials with repent shoots from the lower nodes, and

stipitate, fusiform tubers from the base. Leaves strongly decrescent distally on the flowering shoot, sheaths 0.3–1 cm long, ciliate at the apex, lamina linear to lanceolate-oblong, 1.5–8(–11.5) cm long, 0.25–0.65 cm wide, apex acute to acuminate, base rounded to amplexicaul, both surfaces glabrous to sparsely pilose, margins often ciliate at the base, scabrous apically. Inflorescences terminal (and often axillary in the upper leaves), usually umbelliform, obovoid to ovoid, 1–4 cm long, 1–5 cm wide, glabrous, composed of (1–)2–4, ascending, opposite or whorled cincinni; peduncles 1.2–3(–4.7) cm long, glabrous; cincinni to 4.5 cm long and 12-flowered; bracteoles spaced 1–4(–5) mm apart, amplexicaul, not perfoliate. Flowers bisexual or male, (6.5–)8.5–14.5 mm wide; pedicels erect in fruit, (2.5–)3–7 mm long, glabrous; sepals lanceolate to lanceolate-oblong, lanceolate-elliptic, elliptic or ovate, 2.5–4.5(–5) × 1.2–2 mm; petals obovate-elliptic to obovate, elliptic, obovate-orbicular or ovate-elliptic, (3.6–)4–5.5 × (2.6–)3–4.6 mm, lilac to lavender, the veins not conspicuously darker; stamens 3, bending to one side of the flower, the style to the other in the bisexual flower, symmetrically arranged in the male flower; filaments 2.1–2.75 mm long, densely bearded below the middle with long, patent hairs, anthers elliptic to oblong-elliptic, (0.8–)1.1–1.35 × 0.5–0.75 mm, pollen white; staminodes 3, filaments 1.3–2 mm long, sparsely to densely bearded basally, antherodes 3-lobed, 0.5–1.1 × 0.5–0.95 mm, medial lobe white, lateral lobes creamy yellow; ovary oblong-elliptic, 1–1.3 × 0.5–0.65 mm, green, style 1.6–2.2 mm long, lilac to violet basally, stigma capitate, white. Capsules oblong-ellipsoid, 3.5–4.5(–5) × 1.5–2 mm, brown, glabrous. Seeds uniseriate, 3 to 4 per locule, ovate to rectangular or trapezoidal in outline, (0.5–)0.6–1.2(–1.45) × 0.6–0.9 mm, testa light brown to gray or orange-brown, lightly rugose or striate, occasionally smooth, with a large midventral pit with a central, transverse ridge, hilum punctiform to oblong, on one side of the midventral pit, embryotega semilateral or lateral.

*Murdannia dimorphoides* may be separated into two allopatric taxa, as follows:

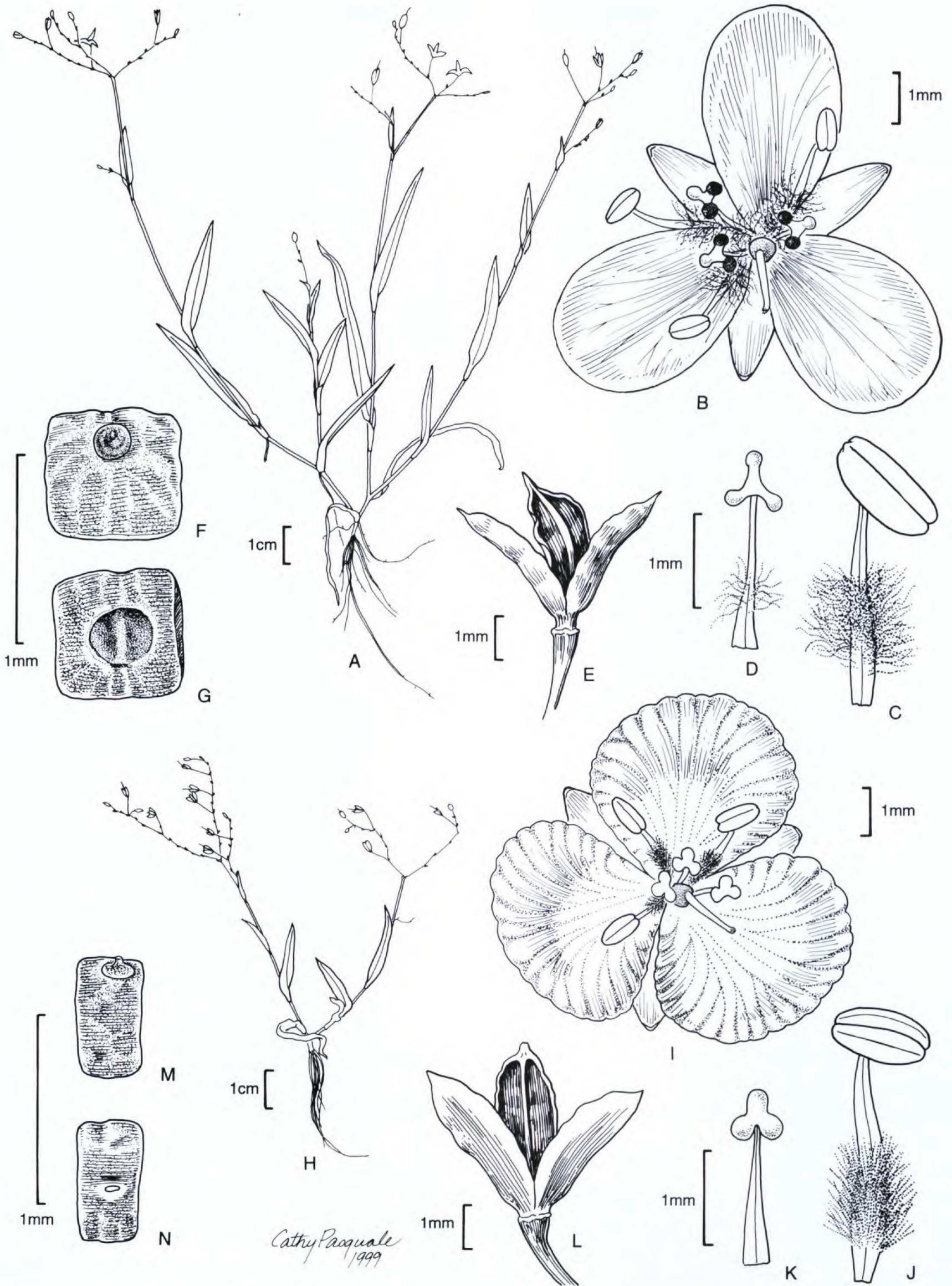


Figure 1. *Murdannia dimorphoides* Faden subsp. *dimorphoides* and *Murdannia striatipetala* Faden. A–G. *Murdannia dimorphoides* subsp. *dimorphoides*.—A. Habit. —B. Bisexual flower. —C. Stamen. —D. Staminode. —E. Capsule. —F. Seed, dorsal view. —G. Seed, ventral view. H–M. *Murdannia striatipetala*.—H. Habit. —I. Bisexual flower. —J. Stamen. —K. Staminode. —L. Capsule. —M. Seed, dorsal view. —N. Seed, ventral view. A is from Faden & Faden 77/115 (US), B–G from Faden & Faden 77/72, H from Faden & Faden 77/227 (US), and I–N from Faden & Faden 77/202. Drawings by Cathy Pasquale.

- 1a. Annuals lacking root tubers and repent stems . . .  
 . . . . . *M. dimorphoides* subsp. *dimorphoides*  
 1b. Perennials with root tubers and repent stems . . .  
 . . . . . *M. dimorphoides* subsp. *perennis*

***Murdannia dimorphoides* subsp. *dimorphoides***

Tufted, rarely unbranched, annuals with erect to ascending or decumbent shoots, (7–)15–30 cm tall; roots thin, fibrous; repent stems lacking; longest leaves usually linear-lanceolate, usually glabrous.

*Distribution.* Sri Lanka (endemic).

*Habitat.* Soil pockets in outcrops, seepage areas on granitic hills, open sandy areas with seepage, edges of woods, roadside ditches, marshy places; 0–300 m (rarely above 100 m); flowering December, January, flowers opening in the field 1045–1200 hr, fading 1330–1430 hr or later.

*Paratypes.* SRI LANKA. **Anuradhapura:** Andarawewa on Puttalam–Anuradhapura road, *Faden & Faden* 77/97 (F, PDA, US); Wilpattu National Park, 0.4 km SE of Maradanmaduwa, *Fosberg et al.* 50734 (US). **Jaffna:** Arukuveli, *Faden & Faden* 77/144 (US), *Faden & Faden* 77/205 (F, PDA, US); Pooneryn–Jaffna road, just before ferry crossing, *Faden & Faden* 77/147 (F, PDA, US); 1.6 km from Pooneryn on Pooneryn–Paranthan road, *Faden & Faden* 77/153 (F, PDA, US); Nallur on Pooneryn–Paranthan road, km 16, *Faden & Faden* 77/218 (F, PDA, US); Puliampokkana on Paranthan–Mullaittivu road, *Faden & Faden* 77/231 (F, PDA, US); Punakari, Feb. 1890, s.lect. (PDA). **Mannar:** Medawachchiya–Mannar road, just before mile post 126/1, *Faden & Faden* 77/115 (F, PDA, US); Nayorpalam, *Faden & Faden* 77/122 (F, PDA, US). **Monaragela:** Kotaveharagala Rock, ca. 2 km E of Wellawaya, *Faden & Faden* 76/606 (F, PDA, US); mile post 24/3 on Buttala–Kataragama road, *Faden & Faden* 76/612 (F, PDA, US); mile post 32/4 on Kataragama–Buttala road, *Faden & Faden* 76/635 (F, PDA, US). **Puttalam:** Colombo–Puttalam road, near mile post 72, *Wambeek et al.* 2654 (US). **Vavuniya:** mile post 120/2 on Anuradhapura–Mannar road, *Faden & Faden* 77/104 (F, PDA, US); Panikkankulam Forest Reserve, Panikkankulam, *Faden & Faden* 77/197 (F, PDA, US); Mullaittivu, *Faden & Faden* 77/245 (F, PDA, US).

***Murdannia dimorphoides* Faden subsp. *perennis*** Faden, subsp. nov. TYPE: Sri Lanka. Polonnaruwa: Mannanpitiya–Maha Oya road, ESE of Gunner’s Quoin, 7°51’N, 81°09’30”E, alt. ca. 30 m, sandy areas in grassland, 27 Jan. 1977, *R. B. Faden & A. J. Faden* 77/268 (holotype, US 2890390; isotypes, C, E, F, K, L, MO, P, PDA, US).

Herbae perennes a subspecie *dimorphoide* surculis repentibus et radicibus tuberosis fusiformibus differt.

Perennials with erect to ascending, sparsely branched flowering shoots 8–20 cm tall, producing repent shoots from the lower nodes, roots with stip-

itate, fusiform tubers 1–1.5 cm long, 0.3–0.6 cm wide; longest leaves usually linear, pubescent.

*Distribution.* Sri Lanka (endemic).

*Habitat.* Open areas in grassland, sometimes near seasonal pools, growing in sandy soil and abandoned rice fields; alt. ca. 3–40 m; flowering January, February.

*Paratypes.* SRI LANKA. **Batticaloa:** Batticaloa–Trincomalee road, mile post 3/4, just after turnoff to Manresa Mission, *Faden & Faden* 77/277 (F, PDA, US). **Badulla:** ca. 12.8 km E of Mahiyangana, *Koyama & Balakrishnan* 13978 (NY, US). **Polonnaruwa:** Dalukana, *Faden & Faden* 77/265 (F, PDA, US).

The new species has been named *Murdannia dimorphoides* because of its similarity to the Indian *M. dimorpha* (Dalzell) G. Brückner. Both species have similarly pitted seeds. The Indian species (see illustration in Wight (1853, fig. 2075, as “*Aneilema paniculata*”)) has broader leaves, strictly alternate cincinni, and larger, darker brown seeds that are covered by raised, short ridges and warts, with a linear hilum. Based on cultivated material of *M. dimorpha* (*Saldanha* 18790), the sepals are more deeply cup-shaped and broader (2.25–2.5 mm) than those of *M. dimorphoides*, and the antherodes are entirely creamy yellow, not bicolored.

In Sri Lanka *Murdannia dimorphoides* most closely resembles *M. striatipetala* and some forms of *M. spirata* (see below). It differs from both by its often whorled cincinni (rare in the other species), bicolored antherodes, and especially by its seeds with a single, large, midventral pit divided by a transverse ridge. It further differs from *M. striatipetala* by its petals lacking contrasting, dark veins, its longer, patent hairs on the stamen filaments, and its bearded staminode filaments. The definite base of the plants further distinguishes *M. dimorphoides* from some forms of *M. spirata*.

*Faden & Faden* 76/635 from the Monaragala District resembles *Murdannia dimorphoides* subsp. *perennis* in its long, narrow, pubescent leaves, but it lacks repent stems and tubers. The plants are definitely annual, so they are intermediate between the two subspecies. The US sheet of *Koyama & Balakrishnan* 13978 is similar to *Faden & Faden* 76/635. However, two plants on the NY sheet show repent stems and a third has tubers, so it certainly belongs to subspecies *perennis*. It is noteworthy that these two collections come from moister habitats (“marshy areas near small seasonal stream” and “abandoned rice field,” respectively) than the other gatherings of subspecies *perennis*.

*MURDANNIA SPIRATA*

*Murdannia spirata* (L.) G. Brückner, which ranges from India and Sri Lanka to Taiwan, the Philippines, and Java, is the most common, widespread, and variable species of *Murdannia* in Sri Lanka. In the field some forms appear distinct and seem to merit taxonomic recognition. One of them has characteristic seeds, and thus it can also be recognized in the herbarium. It is described below as *M. striatipetala* Faden. Among the plants retained in *M. spirata* some variants are more clearly definable than others, but they all seem to intergrade, at least in dried specimens, and they do not have distinctive seeds. However, one of these variants is so easily recognizable in the field that it is described below as *Murdannia spirata* var. *parviflora* Faden.

For the sake of completeness, the infraspecific taxa of *M. spirata* recognized in Faden (2000), including two as yet unnamed, can be distinguished by the following key. In the absence of a detailed study of *M. spirata* throughout its range, these distinctions may not hold outside of Sri Lanka.

- 1a. All leaves 5 mm wide or less, some or all arcuate and conduplicate . . . . . *Murdannia spirata* var. A
- 1b. Some or all leaves broader than 5 mm, leaves rarely arcuate or conduplicate.
  - 2a. Peduncles uniformly pubescent; distal leaves with lamina pubescent on one or both surfaces, at least along the midrib below . . . . . *Murdannia spirata* var. B
  - 2b. Peduncles glabrous (rarely with a longitudinal line of very fine hairs); distal leaves with lamina usually glabrous (rarely pubescent beneath along the midrib).
    - 3a. Plants with or without a definite base; flowers (6.5–)8.5–13 mm wide; petals uniformly colored . . . . . *Murdannia spirata* var. *spirata*
    - 3b. Plants with a definite base, although shoots sometimes decumbent; flowers 5–8 mm wide; petals with contrasting, dark veins . . . . . *Murdannia spirata* var. *parviflora*

***Murdannia spirata* (L.) G. Brückner var. *parviflora* Faden, var. nov.** TYPE: Sri Lanka. Jaffna: Mulamana, mile post 35/1 on Mannar–Jaffna road, 9°16'30"N, 80°08'20"E, alt. under 30 m, growing under shrubs, 11 Jan. 1977, R. B. Faden & A. J. Faden 77/133 (holotype, US 2891062; isotypes, F, K, PDA).

A varietate *spirata* floribus parvioribus petalis nervatura fusca differt.

Ascending to decumbent annual herbs with a definite base; lamina lanceolate or lanceolate-elliptic

to ovate, 1–3(–3.5) cm long, (0.3–)0.5–1.1 cm wide, rarely some conduplicate or arcuate, glabrous (rarely sparsely pubescent along the midrib beneath); terminal inflorescence composed of 1–2 (rarely 3 in an umbel) cincinni; peduncles glabrous or, occasionally, with a longitudinal line of pubescence (rarely with scattered hairs); flowers 5–8 mm wide; petals with contrasting, dark veins; stamens not dimorphic; staminode filaments glabrous or bearded.

*Distribution.* Sri Lanka; naturalized in the United States (Florida).

*Habitat.* Under shrubs and trees, shaded roadsides and ditches, open fields, and edge of rocky areas on forested hills, 0–150 m; flowering December, January (in Sri Lanka), flowers opening in the field 1010–1100 hr, fading 1200 hr.

Chromosome numbers:  $2n = 40$  (from Faden & Faden 77/192, cytology voucher slides #85/146 & 85/147);  $2n = ca. 40$  (from Plowman 13266, cytology voucher slide #85/056, all US).

The characteristic features of *M. spirata* var. *parviflora* are the presence of a definite base in the plants, and, especially, the small flowers that have dark-veined petals and lack stamen dimorphism and enantiostyly, or mirror-image symmetry. This variety is also much less aquatic than any of the others.

In Sri Lanka, I found this plant so distinctive, both morphologically and ecologically, that I thought it might merit specific rank. However, herbarium specimens, in which the diagnostic floral characters were lacking, were not readily distinguishable from the other broad-leaved varieties of *M. spirata*.

It is noteworthy that *M. spirata* var. *parviflora* is tetraploid, whereas the only other count of *M. spirata* obtained from Sri Lankan plants (from Faden & Faden 76/631, *Murdannia spirata* var. B, cytology voucher slides #83/084 & 83/085, US) was diploid. In the literature *M. spirata* has been reported as diploid (Sharma & Sharma, 1958, as *Aneilema spiratum*) and tetraploid (Bhattacharya, 1975) in India (see Rao et al., 1972, for summary) and tetraploid in Taiwan (Peng, 1987). The Taiwanese plant corresponds to *M. spirata* var. *spirata* in Sri Lanka, but I have not seen vouchers for any chromosome count from India.

The naturalized plants of *Murdannia spirata* in Florida all probably belong to variety *parviflora*. Living plants grown from seed of Plowman 13266 (US) definitely matched the Sri Lankan plants. Petals with contrasting dark veins have been observed in Lakela 31640 (UNC, USF), but this character could not be observed in any other collection. Al-

though it is likely that all collections from Florida belong to the same variety, there is no hard evidence to support this. The species was first collected in the United States in 1965. I have seen 13 collections from 5 Florida counties: Charlotte, Collier, Glades, Hendry, and Lee.

*Paratypes.* SRI LANKA. **Anuradhapura:** Wilpattu National Park, Waliella, *Faden & Faden* 77/75 (F, PDA, US); Gnanikkulama, km 118.4–120 on Anuradhapura–Kandy road, *Faden & Faden* 77/164 (F, PDA, US); Mihintale, Mahasana Hill, *Faden & Faden* 77/192 (F, PDA, US). **Jaffna:** 1.6 km from Pooneryn on Pooneryn–Paranthan road, *Faden & Faden* 77/152 (F, PDA, US); Puli-yampokkana, mile post 8/2 on Paranthan–Mullaittivu road, *Faden & Faden* 77/229 (F, PDA, US). **Mannar:** Nayorpalam, Vidathal Tivu Water Supply turnoff road, *Faden & Faden* 77/128 (F, PDA, US). **Trincomalee:** Gatalawa, Gatalawa Hill, *Faden & Faden* 77/256 (F, PDA, US). U.S.A. **Florida:** Lee, Buckingham, Cemetery Road, *Plowman* 13266 (US).

**Murdannia striatipetala** Faden, sp. nov. TYPE: Sri Lanka. Jaffna: Jaffna–Pooneryn ferry road, mile post 7/4, Arukuveli, ca. 9°37'N, 80°10'E, just above sea level, 22 Jan. 1977, *R. B. Faden & A. J. Faden* 77/202 (holotype, US 2890333; isotypes, E, F, K, L, PDA). Figure 1H–N.

Herbae annuae; inflorescentiae plerumque paribus oppositis cincinnorum compositae; flores dimorphi, petalis pallide caseiis nervatura fuscior, staminibus 3 filis barbatis pilis brevibus appressis, polline albo, staminodiis 3 filis glabris; capsulae (2.5–)3–4.5(–5) × 1.5–2 mm, loculis (4–)5–7 spermis; semina uniseriata, 0.35–0.95 × (0.55–)0.6–0.9 mm, testa alveolata, scrobiculata vel alveolato-reticulata.

Unbranched to tufted annual 5–20(–25) cm tall with a definite base, shoots erect to ascending or decumbent and rooting at the lower nodes; roots thin, fibrous. Leaves sometimes decrescent on the flowering shoots, sheaths 0.1–0.5 cm long, glabrous to ciliate at the apex, lamina narrowly lanceolate to lanceolate-oblong, (0.4–)1–3.5(–4.5) cm long, (0.1–)0.2–0.6(–0.8) cm wide, apex acute, base rounded to amplexicaul, both surfaces glabrous, margins scabrous. Inflorescences terminal and axillary from the upper leaves, glabrous, the terminal pedunculate, consisting of a pair (rarely 1, or 3 in an umbel) of opposite, elongate, ascending cincinni; peduncle (0.6–)1–2(–4) cm long, usually glabrous (rarely with a line of pubescence); cincinni to 4 cm long and 13-flowered; bracteoles spaced 1–5 mm apart, amplexicaul, not perfoliate. Flowers bisexual or male, (7.5–)8.5–13 mm wide; pedicels erect in fruit, 2–8.5 mm long, glabrous; sepals ovate to ovate-lanceolate, ovate-elliptic or lanceolate-el-

liptic, (2–)2.5–4 × 1.5–2 mm, glabrous; petals orbicular to ovate-orbicular, 3–5.5 × 3–5.3 mm, pale lavender with dark, contrasting veins, margin crenulate; stamens 3, bending to one side of the flower, the style to the other in the bisexual flower, symmetrically arranged in the male flower, filaments 2–3 mm long, densely bearded below the middle with short, appressed hairs, anthers elliptic to oblong-elliptic, (0.7–)1–1.3 × 0.5–0.7 mm, pollen white; staminodes 3, filaments 1–1.5 mm long, glabrous, antherodes 3-lobed, 0.4–0.5 × 0.5–0.85 mm, creamy white or creamy yellow; ovary ellipsoid-triangular, 1–1.3 × 0.5–0.6 mm, green, style 1.7–2.35 mm long, mauve at least basally, stigma capitate, white. Capsules oblong-ellipsoid, (2.5–)3–4.5(–5) × 1.5–2 mm, brown, glabrous. Seeds uniseriate, (4–)5–7 per locule, ovate to trapezoidal or rectangular in outline, 0.35–0.95 × (0.55–)0.6–0.9 mm, testa gray or gray-brown, alveolate to scrobiculate or alveolate-reticulate, rarely shallowly reticulate-foveolate, hilum punctiform to elliptic, dark brown, embryotega semilateral (rarely lateral or semidorsal).

*Distribution.* Northern Sri Lanka and southern India.

*Habitat.* Abandoned paddies, ditches, vicinity of water holes, moist, open sandy areas dominated by small annuals, seasonally swampy places, grazed grasslands, and edges of small shrubs and thickets; from sea level to 30 m; flowering January, February in Sri Lanka, in November, February, and March in India, flowers opening in the field ca. 1030–1100 hr, fading ca. 1300 hr.

*Faden & Faden* 77/232A (F, PDA, US) is perhaps a mixed collection, one element of which is definitely *M. striatipetala*. One of the two plants on the US sheet has two inflorescences composed of whorls of three cincinni, which would be rare in *M. striatipetala* but common in *M. dimorphoides*. This plant also has the longest leaves among the specimens of *M. striatipetala* examined, but it is well within the range of *M. dimorphoides* in this character. In view of these features, plus the fact that *M. dimorphoides* was collected at the same locality, the possibility of a misidentification was considered. The pressed flowers seem to have the short stamen filament hairs of *M. striatipetala*. Unfortunately, no mature capsules are present on the plant, so certain identification cannot be made. The liquid-preserved flowers are inconclusive. They indicate either a mixed collection or a very variable population. The second plant on the sheet has a seed and is definitely *M. striatipetala*.

*Murdannia striatipetala* is closely related to *M.*

*spirata* and, in view of the great variability in that species, I was tempted not to treat it as a new species. However, in the field plants of *M. striatipetala* were distinct, being recognizable by their definite base, narrow leaves, dark-veined petals, and short appressed hairs on the stamen filaments. Fruiting specimens had generally more seeds per locule (5 to 7 vs. 3 to 4 in most populations of *M. spirata*) and distinctive seeds that lacked warts. In addition, within Sri Lanka, *M. striatipetala* is restricted to the northern part of the island whereas *M. spirata* is much more widespread.

*Murdannia striatipetala* closely resembles *M. dimorphoides*. The differences are discussed under that species (above).

**Paratypes.** SRI LANKA. **Jaffna:** Point Pedro, Clayton 5210 (K, PDA, US); Mulamana, mile post 35/1 on Mannar-Jaffna road, Faden & Faden 77/136 (F, PDA, US); Jaffna-Pooneryn road, mile 4.5, Tanankilappu, Faden & Faden 77/141 (F, PDA, US); Jaffna-Pooneryn road, just before ferry crossing, Faden & Faden 77/148 (F, PDA, US); Jaffna-Kandy road, just before Jaffna town signboard, Faden & Faden 77/200 (F, PDA, US); Jaffna-Pooneryn ferry road, mile post 7/4, Arukuveli, Faden & Faden 77/202 (F, PDA, US); ca. 1.6 km from Pooneryn on Pooneryn-Paranthan road, Faden & Faden 77/217 (F, PDA, US); Nallur on Pooneryn-Paranthan road, km 16, Faden & Faden 77/219 (F, PDA, US); Ampan on Point Pedro-Merutenkeni road, ca. mile post 10/1, Faden & Faden 77/227 (F, PDA, US); between Jaffna-Kandy road and Mullian, ca. 48 km ESE of Jaffna, Townsend 73/82 (K, PDA, US). **Vavuniya:** Paranthan-Mullaittivu road, mile post 27/2, Faden & Faden 77/235 (F, PDA, US); Mullaittivu, Faden & Faden 77/239 (F, PDA, US). INDIA. **Districts unknown:** Tambaram, Barnes 716 (K), 717 (K); Tada, Bourne 2784 (K); Nungambakam, 15 Nov. 1899, Bourne (from K. Rungachari) s.n. (K); Chingput, Guindy, 1885, Lawson s.n. (K).

**MURDANNIA VAGINATA**

*Murdannia vaginata* (L.) G. Brückner is a common lowland species in Sri Lanka. It ranges from there and India to northern Australia. Its inflorescence and floral morphology are so distinctive that *Murdannia* sect. *Vaginatae* was described for it and two related species, *M. medica* (Loureiro) D. Y. Hong and *M. spectabilis* (Kurz) Faden (Faden, 1980). In Sri Lanka there are two very distinct types of plants within *M. vaginata* that are worthy at least of varietal rank. They may be separated as follows:

- 1a. Roots (dried) < 1.3 mm thick; flowers all bisexual, 6–11.5 mm wide; stamen filaments not dimorphic between different flowers; sepals densely to sparsely pubescent; capsules 2.5–3.3 mm wide; seeds 1.6–1.8 mm wide, foveolate-reticulate, without a fine, raised reticulum . . . . .  
 . . . . . *M. vaginata* var. *vaginata*
- 1b. Roots (dried) to 2 mm thick; flowers bisexual or

male, 9–15 mm wide; stamen filaments dimorphic between the bisexual and male flowers; sepals glabrous or subglabrous; capsules 2 mm wide; seeds 1.3–1.6 mm wide, smooth to alveolate-reticulate, with a fine, raised reticulum . . .

. . . . . *M. vaginata* var. *glabrisepala*

***Murdannia vaginata* (L.) G. Brückner var. *glabrisepala* Faden, var. nov.** TYPE: Sri Lanka. Colombo: Muthuraja Wela, Nugape, at junction of road to Bopitya and Kandana, 7°03'N, 79°51'40"E, sea level, 30 Nov. 1976, sedge marsh, R. B. Faden & A. J. Faden 76/419 (holotype, US 2890350; isotypes, AAU, B, C, E, F, G, GH, K, L, MO, NSW, P, PDA, TI, US).

A varietate *vaginata* sepalis glabris vel subglabris, capsulis angustioribus, seminibus angustioribus testa laevi vel alveolato-reticulata reticulo tenui prominenti differt.

Plants apparently perennial, flowers bisexual or male; stamens bending to one side of the flower, the style to the other in the bisexual flower, or symmetrical and divergent in the male flower; sepals glabrous to subglabrous; style white; capsules 3–3.5 × 2 mm; seeds 1.75–2.2 × 1.3–1.6 mm, smooth to alveolate-reticulate, with a fine, raised reticulum.

**Distribution.** Sri Lanka and perhaps elsewhere in tropical Asia (see below).

**Habitat.** Moist, open sandy areas around seasonal pools and sedge marshes with *Xyris*, *Eriocaulon*, and *Drosera*; sea level; flowering November, January, flowers open in the field 0920–0950 hr.

Although *Murdannia vaginata* was correctly considered common in the “low country” in the *Handbook to the Flora of Ceylon* (Hooker, 1898), it was little collected until recently. Despite its very distinctive inflorescence it has sometimes been confused by collectors with other annual species. However, it has many features that make it unique among Sri Lankan species of *Murdannia*: bractless sheaths surrounding fascicles of one-flowered cincinni; pubescent pedicels; usually pubescent sepals; four staminodes with well developed antherodes; orange or orange-yellow pollen; and one-seeded capsule locules. Variety *vaginata* is definitely annual; variety *glabrisepala* might be perennial because of its relatively thick roots.

*Murdannia vaginata* var. *glabrisepala* is decidedly uncommon in Sri Lanka. We encountered it only twice in three months of collecting, whereas we made 13 collections of variety *vaginata*. Both varieties were found growing and flowering together in Batticaloa District (Faden & Faden 77/278, US, etc., and 77/280, US, etc.) without evidence of in-

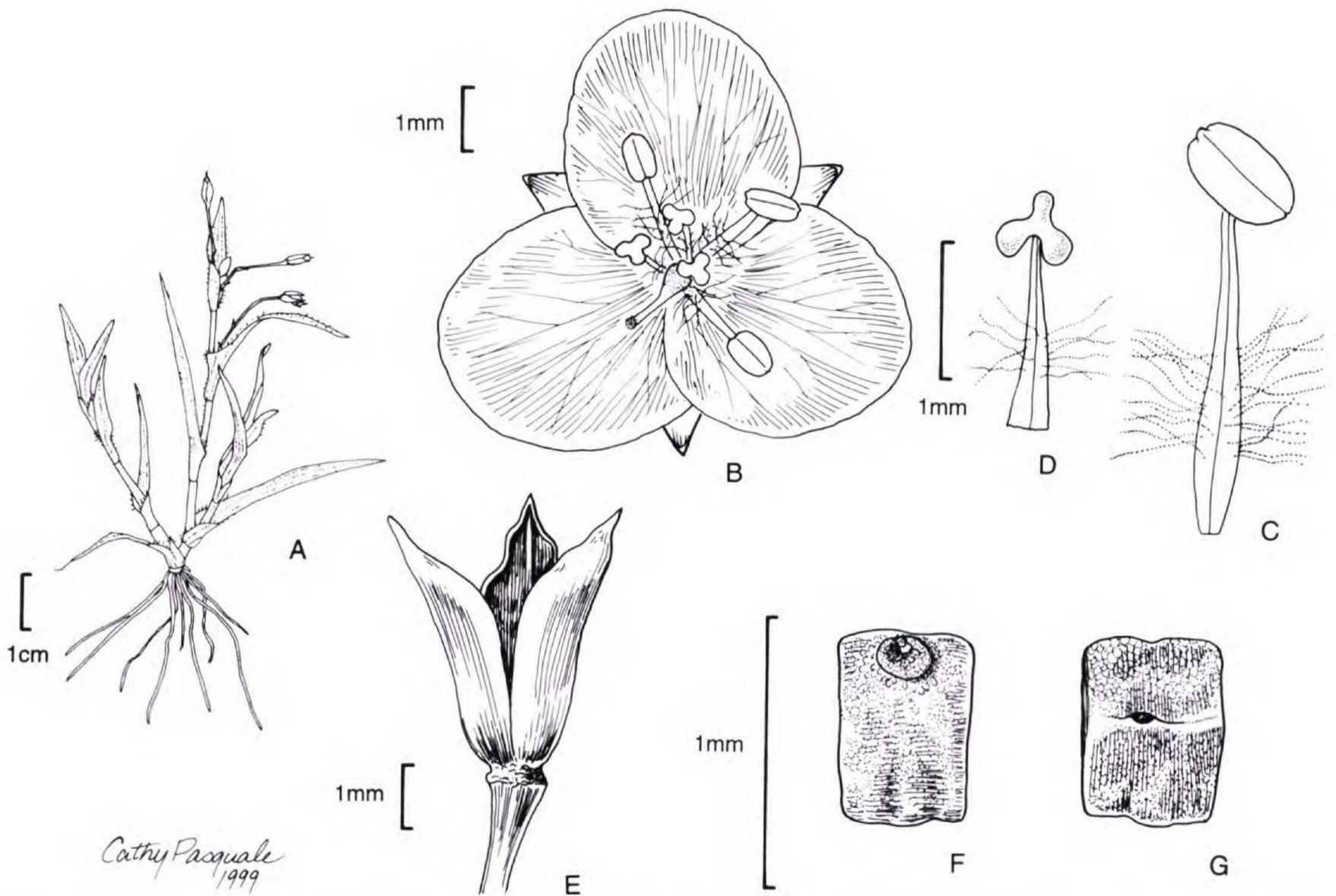


Figure 2. *Murdannia audreyae* Faden. —A. Habit. —B. Bisexual flower. —C. Stamen. —D. Staminode. —E. Capsule. —F. Seed, dorsal view. —G. Seed, ventral view. A and B are from *Faden & Faden 77/146* and C–G from *Faden & Faden 77/204*. Drawings by Audrey J. Faden (A) and Cathy Pasquale (B–G).

intermediates. The two sheets of *C.P. 2328* in PDA (see below) are mixtures of the varieties. The K and BM sheets of this number are entirely variety *vaginata*.

The two varieties recognized here may be easily separated in Sri Lanka. Variety *vaginata* is also easily recognized throughout its wide range. Variety *glabrisepala*, however, is more problematic. Specimens showing some of its characters, e.g., glabrous or subglabrous sepals, have been seen from India, Myanmar, Thailand, Malaysia, Vietnam, and Java, but they do not exactly match the plants from Sri Lanka in all features, so their status is undetermined. It is possible that the two varieties in Sri Lanka represent extreme forms of a very variable species that reached the island independently from the mainland. In Sri Lanka they seem to function as distinct species, although their final status cannot be resolved until the species as a whole is studied throughout its range.

**Paratypes.** SRI LANKA. **Batticaloa:** Karuvakkeni, Batticaloa–Trincomalee road, mile post 19, *Faden & Faden 77/278* (F, PDA, US). **Galle:** near Bentota, May 1859, [*Thwaites in C.P.2328* (PDA [same sheets as *Gardner s.n. in C.P.2328*]) (mixture with var. *vaginata*). **District unknown:** Padcambra, *Gardner s.n. in C.P.2328* (PDA [same

sheets as *Thwaites in C.P.2328*]) (mixture with var. *vaginata*). **Locality Unknown:** *Jonville s.n.* (BM).

***Murdannia audreyae* Faden, sp. nov.** TYPE: Sri Lanka. Northern Province, Jaffna: Jaffna–Pooneryn ferry road, mile post 7/4, Arukuveli, ca. 9°37'N, 80°10'E, just above sea level, 22 Jan. 1977, *R. B. & A. J. Faden 77/204* (holotype, US 2890994; isotypes, AAU, C, E, F, K, L, MO, NSW, P, PDA, TI, US). Figure 2.

Herbae annuae surculis (2–)5–10(–22) longis; inflorescentiae 1–6 cincinnis unifloris compositae; flores violacei vel atrocaesii, staminibus 3, staminodiis 3, filis omnibus barbatis, polline albo; capsulae 3–5 × 1.2–2.2 mm, loculis 4–6 spermis; semina uniseriata, 0.35–0.8 × 0.55–0.75 mm, testa alveolata, rugosa vel scrobiculata.

Unbranched or tufted annual with erect to decumbent shoots (2–)5–10(–22) cm long, usually rooted only at the base, occasionally also along the stems. Leaves strongly decrescent distally on the flowering shoots, sheaths to ca. 0.5 cm long, ciliate at the apex, lamina linear to linear-lanceolate or (uppermost leaf) lanceolate, 1–6 cm long, 0.2–0.4 cm wide, apex acute to acuminate, base amplexicaul or rounded, both surfaces glabrous to hirsute, margins scabrous. Inflorescences terminal and ax-

illary in the upper leaves, consisting of fascicles of 1 to 6 1-flowered cincinni, occasionally some inflorescences more developed and composed of 2 alternate or opposite cincinni, each 1-flowered (rarely up to 3-flowered), 1-flowered cincinni 0.8–2(–3) cm long, with 2 persistent bracts (rarely more), glabrous or rarely pubescent. Flowers bisexual (rarely male), usually vertical, 7.5–11.5 mm wide; pedicels 4.2–8 mm long, always exceeding the cincinnus peduncle, glabrous; sepals lanceolate or lanceolate-oblong to ovate-elliptic, ovate-lanceolate or ovate, 2.5–4.5 × 1.2–1.8 mm, glabrous; petals broadly elliptic to ovate-elliptic, ovate-orbicular or obovate-orbicular, violet to dark lavender; stamens 3, symmetrically arranged or, more commonly, bending to one side of the flower (away from the style), filaments 1.4–2.5 mm long, violet or whitish, densely bearded below the middle with long, patent, violet or lavender-violet hairs, anthers elliptic to oblong-elliptic, (0.7–)0.8–1.3(–1.4) × 0.3–0.6 mm, pollen white; staminodes 3, filaments 0.7–1.5 mm long, pale lavender to violet, sparsely to densely bearded, antherodes 3-lobed, white or creamy yellow, sometimes tinged with lavender in the center; ovary oblong-elliptic, 0.75–1.5 × 0.45–0.7 mm, green or whitish, style central in the flower or curving to one side, 0.8–1.4(–1.7) mm, lavender to violet, stigma capitate, white. Capsule oblong-ellipsoid, 3–5 × 1.2–2.2 mm, locules 4–6-seeded. Seeds uniseriate, mostly rectangular to quadrate or ovate in outline, 0.35–0.8 × 0.55–0.75 mm, testa light tan or beige, alveolate to rugose or scrobiculate, hilum elliptic, lateral on a raised midventral ridge, embryotega lateral.

*Distribution.* Sri Lanka (endemic).

*Habitat.* Open sandy areas dominated by small annuals, sometimes among bushes, in scrub or forest, also abandoned paddies and paddy ridges; 0–50 m; flowering January, flowers opening in the field ca. 1045 hr, fading 1245 hr.

Chromosome number:  $2n = 20$  (from plants grown from seed of *Faden & Faden* 77/204; cytology voucher slide #84/064, US).

In the field the staminode filaments were sometimes recorded as glabrous, but preserved flowers from at least four populations consistently showed them to be bearded.

*Murdannia audreyae* belongs to a group of species that has been defined by reduced inflorescences composed of one-flowered cincinni arranged in terminal and axillary fascicles (group A, Pauciflorae, of Brückner, 1930). Although this is clearly an artificial group, it provides a starting point for looking for morphologically similar species. Among

the Asian species with this inflorescence type, only *M. keisak* (Hasskarl) Handel-Mazzetti, *M. triquetra* (Wallich ex C. B. Clarke) G. Brückner (which is sometimes considered synonymous with *M. keisak*), and *M. yunnanensis* D. Y. Hong have pink to violet flowers and uniseriate seeds. The first two species differ from *M. audreyae* in having broader leaves (3–10 mm wide), larger capsules (5–10 × 2–4 mm), a regularly decumbent to repent habit, and in being more aquatic, commonly growing in water. *Murdannia yunnanensis* differs from the new species in having broader (7–13 mm wide), elliptic to ovate leaves. *Murdannia audreyae* further differs from all of these by occasionally having small, thyriform inflorescences among those composed of single cincinni. Thus it forms something of a bridge between the species that always have thyriform inflorescences and those that always have single-flower cincinni in fascicles.

Two other species of *Murdannia* in Sri Lanka also have one-flowered cincinni, but neither is closely related to *M. audreyae*. *Murdannia blumei* (Hasskarl) Brenan has pink to lilac flowers that are barely exerted from the leaf sheaths, shorter pedicels (2–2.5 mm), larger capsules (6–8 × 2.5 mm), and 14–16 biseriate seeds per capsule locule. *Murdannia vaginata*, as noted above, has the cincinni arising from bladeless sheaths, flowers with two stamens and four staminodes, yellow pollen, and one-seeded capsule locules.

This species is named in honor of my wife, Audrey Joy Faden, who first spotted the plant during our fieldwork in Sri Lanka in 1976 and 1977. The predominantly violet flowers of the new species make it stand out from all other *Murdannia* species in Sri Lanka.

*Paratypes.* SRI LANKA. **Batticaloa:** Karuvakkeni, mile post 19 on Batticaloa–Trincomalee road, *Faden & Faden* 77/273 (F, PDA, US). **Jaffna:** Arukuvveli, ca. km 11.2 on Jaffna–Pooneryn road, *Faden & Faden* 77/146 (F, PDA, US); Nallur on Pooneryn–Paranthan road, km 16, Jan. 1977, *Faden & Faden* 77/220 (F, PDA, US); Soranpattu on road from main Jaffna–Kandy road to Talalady, *Faden & Faden* 77/225 (F, PDA, US). **Vavuniya:** Panikkankulam Forest Reserve, Panikkankulam, Nanukulam–Paranthan road, mile post 144/2, *Faden & Faden* 77/196 (F, PDA, US); Mullaittivu, Mullaittivu–Nankulam road, just before Mullaittivu sign board and mile post 29, *Faden & Faden* 77/243 (F, PDA, US).

## DISCUSSION

The propriety of using both subspecies and varieties within the same genus has been questioned by a reviewer and needs an explanation. I use subspecies for an infraspecific variant that has a geographic basis, regardless of the magnitude of the

differences between it and other variants within the species. I use variety to denote an important difference among infraspecific taxa, but one that does not have a geographic basis. I do not consider minor variation lacking a geographic basis, e.g., flower color, to merit formal taxonomic recognition.

The flowers or stamens have been described as dimorphic in some of the taxa described above. When they are dimorphic (*M. dimorphoides* subsp. *dimorphoides*, *M. dimorphoides* subsp. *perennis*, *M. striatipetala*, *M. vaginata* var. *glabrisepala*, *M. audreyae* (sometimes)), there are usually two types of dimorphism. The first is the dimorphism between the bisexual and male flowers. In the bisexual flowers, the fertile stamens all bend to the same side of the flower, away from the style, which typically bends in the opposite direction. The androecium is manifestly asymmetric. In the male flowers of these species, the stamens are evenly spaced and symmetrically arranged.

The second type of dimorphism is enantiostyly. In the bisexual flowers the stamens may bend either to the left or the right side of the flower. Successive flowers on a cincinnus alternate in the direction in which the stamens bend, so the two flower forms are produced in equal numbers. The pattern of flowering and proportion of the different morphs in taxa that have only one-flowered cincinni, such as *M. vaginata* var. *glabrisepala* and *M. audreyae*, are unknown.

*Acknowledgments.* I thank my wife, Audrey J. Faden, for finding the *Murdannia* that is named

herein in her honor and for illustrating its habit in the field, Cathy Pasquale for the other illustrations, and the late Royce Oliver for help with the chromosome counts. Fieldwork in Sri Lanka was conducted in 1976–1977, when I was employed by the Field Museum of Natural History, Chicago. It was supported by the Smithsonian Institution's Flora of Ceylon Project.

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