

A TYPE-BASED REASSESSMENT OF *SIDA FRYXELLII* (MALVACEAE)

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The genus *Sida* L. (Malvaceae) comprises approximately 277 species distributed mainly in tropical and subtropical regions (POWO, 2026). Several species within the genus, particularly those belonging to the *Sida rhombifolia* complex, exhibit considerable morphological variation, leading to long-standing taxonomic difficulties and differing interpretations of species limits. In India, *Sida rhombifolia* has often been treated in a broad sense, with several distinct taxa reduced to synonymy or infraspecific rank (Paul, 1993). *Sida fryxellii* was described by Sivarajan & Pradeep (1990) based on collections from coastal Kerala and was distinguished by its leaf dimorphism, dense stellate indumentum, and distinctive mericarp awns. Subsequently, Paul (1993), in *Flora of India*, reduced *S. fryxellii* to synonymy under *S. rhombifolia* subsp. *rhombifolia* var. *rhombifolia*, reflecting a broad species concept applied to the complex. In a later treatment, Sivarajan & Pradeep (1996) discussed *S. fryxellii* in detail and expressed a preference to maintain it as a distinct species, rather than a declarative taxonomic decision. Thus, his opinion was deliberately non-formal and did not explicitly reinstate the species or reject the earlier synonymy. As a result, secondary sources, including Plants of the World Online (2026) recognized *S. fryxellii* as an accepted species but World Flora Online (2026) considered *S. fryxellii* as a synonym of *S. rhombifolia* var. *rhombifolia*. Given the continued ambiguity surrounding the status of *Sida fryxellii*, a re-evaluation based on direct comparison of type material is necessary. The present paper aims to clarify the taxonomic status of *S. fryxellii* through a critical reassessment of morphological characters observable on the nomenclatural types and associated evidence.

The present study is based on a detailed examination of the holotype & isotypes of *Sida fryxellii* (Pradeep 6018, K) and the lectotype of *Sida rhombifolia* L. (Herb. Linn. 866.3, LINN). High-resolution digital images of the type specimens were studied, and diagnostic morphological characters were compared, including habit, branching pattern, leaf morphology, indumentum, and mericarp and awn structure. Observations from the original protologues and subsequent taxonomic treatments were critically evaluated. Ecological and distributional information was derived from label data and published sources.

Taxonomy

Sida fryxellii Sivarajan & Pradeep, 1990

≡ *Sida rhombifolia* L. subsp. *rhombifolia* var. *rhombifolia* sensu Paul (1993), syn. fide Paul (1993).

Type: INDIA. Kerala, coastal region, roadside vegetation near sea level, Pradeep 6018 (holotype K!, Barcode K000659351 © RBG Kew; isotype CALI!, NY!).

Additional specimen examined: INDIA. KERALA: Bepore, Calicut, 25 Oct. 1986, A.K. Pradeep, 6018(K) **Holotype**; Bepore, Calicut, 25 Oct. 1988, A.K. Pradeep, 6018(CALI) **Isotype**; Bepore, Calicut, 25 Oct. 1986, A.K. Pradeep, 6018(NY) **Isotype**; KSEB Campus, Kalamasseri,

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31 Oct.1988, A.K. Pradeep 5066(CALI); HMT Colony, Kalamasseri,5068,31 Oct. 1988, A.K. Pradeep 5068(CALI); West Hill, 9 Oct.1990, A.K. Pradeep 5222(CALI); Kadalundi,10 Oct.1988, A.K. Pradeep 5016(CALI); Koyilandy, 27Sep.1990, V.V. Sivarajan & A.K. Pradeep 50411(CALI); Kadalundi, 16 Oct.1988, A.K. Pradeep 5014(CALI); Anthikkad, 20 Aug.1992, V.V. Sivarajan & A.K. Pradeep 47766(CALI); Engandiyur, 4 June1991, T.S. Devi 1089(CALI); Feroke, 7Aug.1990,P.I.Nazeemol,1013 (CALI); West Hill, 20 Apr.1988, A.K. Pradeep 6063(CALI); Alapuzha town, 22 Sep.1992, Sunil C. N.,1145 (CALI).



Figs 1-3. 1. Holotype of *Sida fryxellii*; <http://specimens.kew.org/herbarium/K000659351> (Reproduced with kind permission), 2. Isotype of *Sida fryxellii*. (Ramirez et.al., 2026), 3. Lectotype of *Sida rhombifolia* (Reproduced with kind “Permission of the Linnean Society of London”).

Notes: Examination of the holotype of *Sida fryxellii* and the lectotype of *Sida rhombifolia* reveals consistent and correlated morphological differences between the two taxa. The holotype of *S. fryxellii* represents an erect, compact, well-branched undershrub with marked leaf dimorphism, the early ones obovate to orbicular, obtuse, retuse or emarginated at apex & later ones ovate, elliptic, obtuse, rounded or acute at base (Shivrajan & Pradeep, 1996). In contrast, the lectotype of *S. rhombifolia* shows a more slender habit with relatively uniform rhomboid to lanceolate leaves along the stem (Herb. Linn. 866.3, LINN). The indumentum in *S. fryxellii* is predominantly stellate throughout, including on the mericarps and their awns, a diagnostic feature absent in the lectotype of *S. rhombifolia*, where the mericarp awns lack stellate pubescence. In addition, the overall morphology of the *S. fryxellii* type indicates affinity with sect. *Cordifoliae*, whereas *S. rhombifolia* conforms to sect. *Sidae*. These distinctions, observable directly on the respective type specimens, support the treatment of *Sida fryxellii* as a taxonomically distinct species (Figs 1 and 2) and do not justify its inclusion within the *S. rhombifolia* complex (Fig. 3). The following stable and correlated differences are evident (Table 1). The reduction of *Sida fryxellii* to synonymy under *S. rhombifolia* by Paul (1993) appears to have been based on a broad species concept that accommodates wide morphological variation within a single species. While such an approach simplifies taxonomy, it may obscure biologically and morphologically coherent entities. In the present case, multiple stable characters particularly leaf dimorphism, indumentum type, and mericarp awn morphology and other characteristics (Table 1) separate *S. fryxellii* from *S.*

rhombofolia. The statement by Sivarajan & Pradeep (1996) expressing a preference to maintain *S. fryxellii* as a distinct species, anticipated the present conclusions but was intentionally non-formal and did not alter the prevailing nomenclatural treatment. The current study provides an explicit, type-based justification for recognizing *S. fryxellii* at species rank, thereby clarifying its status within Indian *Sida*. Recognition of *S. fryxellii* also has ecological significance, as the species appears to be restricted to coastal sandy habitats in Kerala, in contrast to the widespread and ecologically generalist *S. rhombifolia*. Such ecological specialization further supports its recognition as a distinct taxon.

Table 1. Morphological, sectional and ecological comparison between *Sida fryxellii* and *Sida rhombifolia*.

Character	<i>Sida fryxellii</i> (Sivarajan and Pradeep, 1990; 1996)	<i>Sida rhombifolia</i>
Leaves	Distinctly dimorphic; juvenile leaves obovate-orbicular, mature leaves ovate-elliptic	Not dimorphic; usually ovate to oblong, often more or less rhomboid, occasionally lanceolate, rarely long obovate (Van Borssum Waalkes, 1966).
Nerve from base	3–5 nerved from base	At base 3(–5)-nerved
Petiole	1–5 cm long	Usually 0.5–0.6 cm (Shivrajan and Pradeep, 1996)
Stipules	Up to 1.8 cm long	Up to 0.3–1.0 cm mm (Van Borssum Waalkes, 1966).
Indumentum	Stem and pedicels terete, green, densely stellate-pubescent with occasional simple hairs.	Stems, petioles, and pedicels cinereous by minute stellate hairs, glabrescent. (Van Borssum Waalkes, 1966).
Corolla diameter	1–1.5 cm	About 1 cm (Shivrajan and Pradeep, 1996)
Petals	Petals yellow, 0.8 cm long, obliquely obovate, truncate or retuse at apex, ciliate at base.	Petals yellow to pale orange, 0.9–1.0 cm, cuneate, mostly more or less oblique, usually emarginate, glabrous or nearly so (Van Borssum Waalkes, 1966; Shivrajan and Pradeep, 1996).
Staminal column	Densely stellate-hairy	Short stellate hairs or nearly glabrous
Ovary	Ovary subglobose, densely clothed with minute stellate	Ovary conical, minutely stellate hairy or glabrous (Van Borssum Waalkes, 1966; Shivrajan and Pradeep, 1996).
Number of Mericarp	8–10 (Sivarajan and Pradeep, 1990)	9–12 (Van Borssum Waalkes, 1966)
Mericarp awns	Stellately hairy, up to 0.2 cm	Stellate hairy or glabrous, 0.1–0.3 cm (Van Borssum Waalkes, 1966).
Mericarp surface	Prominently reticulate	Distinctly and transversely rugose on the sides and back (Shivrajan and Pradeep, 1996).
Habitat	Roadsides, railway embankments, sandy coastal belt of Kerala.	Broad ecological amplitude (Shivrajan and Pradeep, 1996).
Phenology	Flowers open around 9:00 a.m., close before 3:00 p.m. (Shivrajan and Pradeep, 1996).	Flowers open late morning 10:45–11:00 a.m. (Shivrajan and Pradeep, 1996).
Sectional affinity	Shows affinity to sect. Cordifoliae ; morphologically closer to <i>S. cordifolia</i> except for mericarp awns	Belongs to sect. Sidae (Shivrajan and Pradeep, 1996).
Ecology and distribution	Known from coastal sandy habitats and roadside vegetation near sea level in Kerala	Widespread and ecologically generalist; occurs across broad altitudinal and climatic ranges (Shivrajan and Pradeep, 1996).

Based on critical examination of type specimens and correlated morphological, sectional, and ecological evidence, *Sida fryxellii* is here accepted as a distinct species, separate from the *Sida rhombifolia* complex. This treatment represents an explicit taxonomic acceptance rather than a formal reinstatement and provides a clear framework for future floristic, ecological, and systematic studies of the genus *Sida* in India.

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