

Comparative Study of Sect. *Spinosa* species to solve the complexes in Genus *Sida* L. (Malvaceae) from India

Gajanan M. Tambde

Department of Botany, Shri Vyankatesh Arts, Commerce and Science College, Deulgaon Raja-443204, Maharashtra, India

Email: gmtambde77@gmail.com

Article Info	Abstract
Received: 06-12-2024, Revised: 18-02-2025, Accepted: 12-03-2025 Keywords: Comparative Study, Sect. <i>Spinosa</i> , <i>Sida</i> L., Malvaceae, India	Genus <i>Sida</i> L. having 24 species under the six sections in India. These six sections are Sect. <i>Stenindae</i> , Sect. <i>Sidae</i> , Sect. <i>Malachroideae</i> , Sect. <i>Cordifoliae</i> , Sect. <i>Nelavagae</i> , Sect. <i>Spinosa</i> etc. These sections are formed on the basis of morphological variations among the species. Species of genus <i>Sida</i> L. having many complexes in their morphology. Specially Sect. <i>Sidae</i> and Sect. <i>Spinosa</i> . In this paper to solve the morphological complexes within the three species of Sect. <i>Spinosa</i> .

INTRODUCTION

The genus *Sida* L. comprises about 255 species chiefly distributed in the tropical and subtropical parts of the World (The Plant List, 2025). In India, the genus is represented by about 18 species including infraspecific taxa (Paul and Nayer, 1988; Paul, 1993), Tambde *et al.*, (2016) enumerate 11 species and a variety of the genus *Sida* L. in the Maharashtra state on the basis of mericarps and morphological characters. 21 species belong to the sections *Cordifoliae*, *Malachroideae*, *Nelavagae*, *Sida*, *Spinosa* and *Stenindae* (Tambde *et al.*, 2020). Gavade *et al.*, (2020) recorded *Sida angustifolia* with their appropriate identity, occurrence and typification from India. Recently Tambde (2023) reported *Sida angustifolia* Mill. to the Flora of Marathwada of Maharashtra and also worked on petiole anatomy of the genus *Sida* L. (Malvaceae) in India.

During floristic re-investigation in India, it seen those morphological variations among the species. Species of genus *Sida* L. having many complexes in their morphology. Specially sect. *Sidae* and sect. *Spinosa*. In this paper to solve the morphological

complexes within the three species of Sect. *Spinosa* i.e. *Sida angustifolia*, *Sida spinosa* and *Sida sivarajanii*.

A detailed nomenclature, distribution, specimen examined, table and photographs are provided. The voucher specimens are deposited in the Herbarium of Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

Sida Sect. **Spinosa** Small, Man. Southeast. Fl. 849. 1933; Fryxell, *Sida* 11: 72. 1985 & Syst. Bot. Monogr. 25: 376. 1988; Sivar. & Pradeep, Malv. South. Penins. India 280. 1996. Type: *Sida spinosa* L.

Sida subsect. *Brevi pedicellatae* DC., Prodr. 1: 459. 1824. *Sida* subsect. *Pentacoccae* Monteiro, Anais XV Congr. Soc. Bot. Brasil 54. 1964.

Erect herbs. Leaves oblong-ovate, lanceolate, sometime rounded, leaves petioles usually with 1-3 spiny emergence (spurs). Flowers axillary, solitary. Corolla creamy-yellow or white. Mericarps 5, 2-simple-pubescent awns.

Note: Sect. *Spinosa* includes species from North and Central America, Southern United States and West Indies. It is represented two species in India.

Key to the species

- 1a. Petioles with 1-3 spiny emergences (spurs) at its base;
 mericarps apex with a pair of linear, simple-pubescent awns 2
- 1b. Petioles without any spiny emergences (spurs) at its base;
 mericarps apex with a pair of linear, short stellate-pubescent awns *S. sivarajanii*
- 2a. Mericarp notched between awns *S. angustifolia*
- 2b. Mericarp not notched between awns *S. spinosa*

TAXONOMIC TREATMENT

Sida angustifolia Mill., Gard. Dict., ed. 8 n. 1768.
LectoType: "s.d. Miller s.n. (BM[BM000603894]).

Annual, ca 1 m tall herbs or subshrubs. Stem erect, terete, stout, branched, pubescent with short stellate hairs. Stipules 2, 0.5–1.5 mm long, ensiform, falcate, equal, acuminate, persistent, basifixed, hairy. Petiole 2–10 mm long, usually with 2–3 spiny emergences at base. Leaves 1–5 × 0.4–4 cm, oblong or ovate, acute or subcordate at base, serrate-crenate at margin, acute, rounded to truncate at apex, stellate-pubescent. Flowers axillary, solitary or 2–5 in clusters on small axillary shoots. Pedicels 1.5–6 mm long, jointed towards the middle, pubescent. Calyx 3–5 × 2.5–4 mm, campanulate, equal, triangular; lobes ca 3 × 2 mm, minute stellate hairy externally and along margins,

glabrous inside. Corolla 1–1.2 cm in diameter, pale-yellow; petals 5–6 × 3–4 mm, slightly falcate with blunt apex, obovate, minutely stellate-hairy at base. Staminal column 2–2.5 mm long, stellate-pubescent, antheriferous at apex; anthers pale-yellow, filaments 1–1.5 mm long. Ovary 2–3 mm diameter, conical, stellate hairy; styles and stigmas 5, styles 2–2.5 mm long, stigmas globose, purplish. Fruits schizocarpic, 3–5 × 3–4.5 mm long, rounded; mericarps 5, 3–3.5 × 1.5–2 mm, completely included in calyx, trigonous with 2 divergent awns, ca. 0.2 cm long without awn, notched between awns and lower portion of mericarp, dorsally reticulate or wrinkled, awns 0.18–0.2 cm long, covered with stellate and simple hairs. Seeds 1.5–2 mm long, ovoid, rounded trigonous, brownish-black, glabrous throughout.

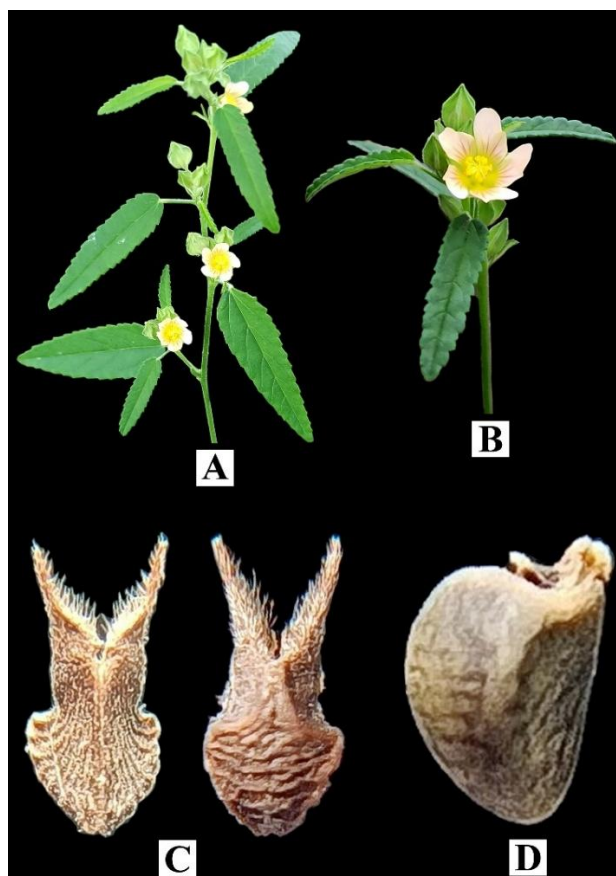


Fig. 1 *Sida angustifolia* a) Habit b) Flower c) Mericarp d) Seed

Flowering & Fruiting: September –March.

Habitat: The species grows on barren lands and along roadside.

Distribution: Throughout the India.

Sida sivarajanii Tambde, Sardesai & A.K. Pande, *Phytotaxa*, 428 (2): 104–112. 2020. *Type:* **India, Maharashtra**, Aurangabad District, Kailas Nagar, N-6-Cidco, *G. M. Tambde 231* (Holotype CAL! isotype BAMU!).

Erect, undershrub, to 1 m tall. Stem branched, terete, green, with minute stellate hairs. Stipules 5–7 mm long, equal, linear, slightly purplish, caducous. Petioles 2–12 mm long, stellate pubescent. Leaves on younger shoot much larger 6–8 × 4–6 cm, concolorous obovate or suborbicular, truncate or rounded at base, sub obtuse or acute at apex; those on flowering shoots smaller, 1–4 × 0.5–3 cm, rhomboid to lanceolate, 3-nerved from base, lateral nerves 3–6 pairs, nerves raised on the lower

surface, margins serrate to crenate, entire towards base, densely stellate-tomentose beneath, sparsely pubescent above. Flowers axillary, solitary; pedicels 0.4–0.6 cm in flowers, 1–1.5 cm in fruiting, filiform, articulated at about middle, pubescent. Calyx 5–7 mm in diameter, campanulate, 10-ribbed at base, 5 lobed; the lobes 1.7–2 mm long, ovate, acuminate at apex. Corolla 0.7–4 cm diameter, orange-yellow; petals 6–8 × 4–5 mm, obovate, retuse or emarginated, minutely stellate hairy at base. Staminal column up to 2.5 mm long, stellate pubescent, antheriferous at apex; anthers pale-yellow, filaments 1–2 mm long. Ovary 1–1.5 mm diameter, conical; styles and stigmas 5, stigma capitate, yellow. Fruits schizocarpic, 2–3 mm long; mericarps 5, 1.5–2 × 2–4 mm, completely included in the calyx, short stellate hairy awns up to 1–1.5 mm long, mericarps completely covered with densely long stellate, sparsely hairs. Seeds 2 × 2 brownish to black, laterally compressed, glabrous at the hilum.

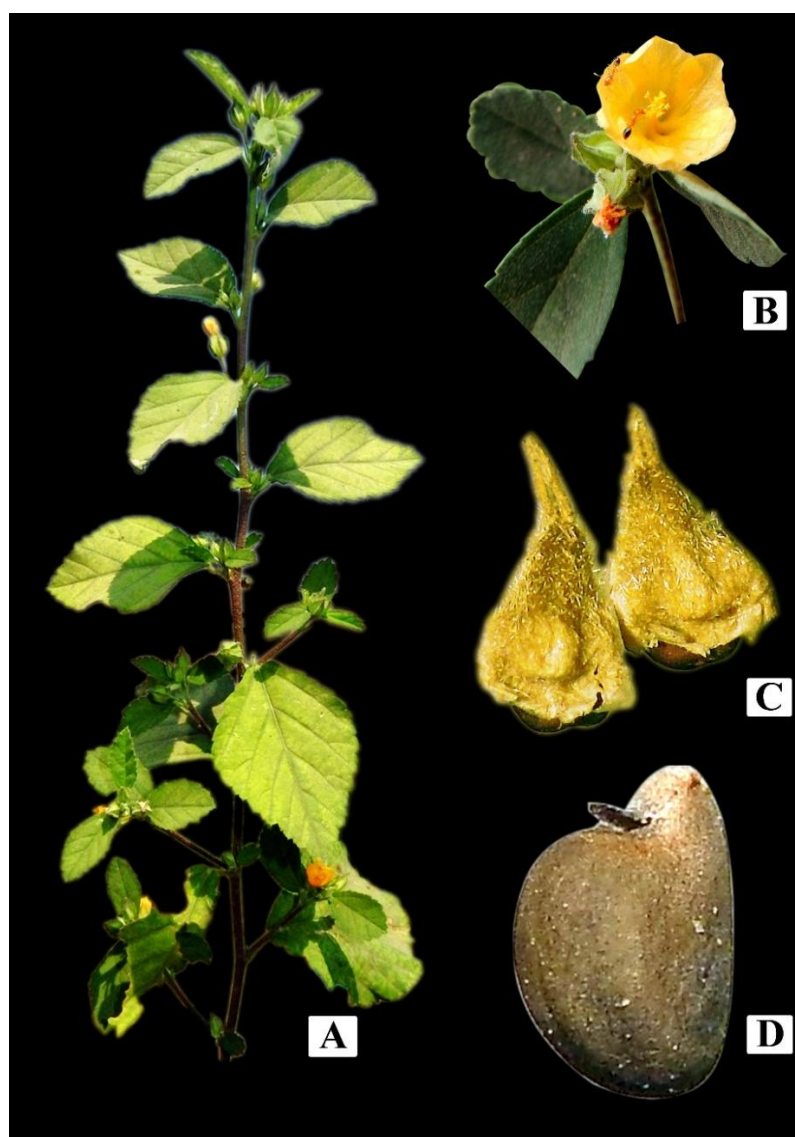


Fig. 2 *Sida sivarajanii* a) Habit b) Flower c) Mericarp d) Seed

Flowering & Fruiting: September–March.

Habitat: Rare, along road sides and wastelands.

Distribution: Chhattisgarh, Maharashtra, Tamil Nadu and Uttarakhand.

Sida spinosa L., Sp. Pl. 2: 683. 1753; Mast. in Hook. f., Fl. Brit. India 1: 323. 1874 Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 218, f. 55. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 292. 1993; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 328. 2000; Mohanan & Rao in Daniel, Fl. Kerala 1: 395. 2005. *Type:* “*spinosa*” (Linn-866. 1).

Annual, *ca* 1 m tall herbs or subshrubs. Stem erect, stout, branched, pubescent with short stellate hairs often intermingled with simple hairs. Stipules 1–3 mm long, linear, equal, filiform. Petiole 3–12 mm long, usually with 2–3 spiny emergences (spurs) at base. Leaves 2–4 × 0.5–3 cm, oblong or ovate, acute or subcordate at base, serrate-crenate at margin, acute, rounded to truncate at apex, stellate-pubescent. Flowers

axillary, solitary or 2–5 in clusters on small axillary shoots. Pedicels 2–7 mm long, jointed towards the middle. Calyx 4–5 × 3–4 mm, campanulate, angular; lobes *ca* 3 × 2 mm, free above middle, deltoid, acute at apex, minute stellate hairy externally and along margins, glabrous inside. Corolla 1–1.2 cm in diameter, creamy-white or yellowish white; petals 5–6 × 3–3.5 mm, obovate, rounded or emarginated at apex, glabrous. Staminal column 2–2.5 mm long, glabrous, antheriferous at apex; anthers pale-yellow, filaments 1–2 mm long. Ovary 2–3 mm diameter, ovoid, glabrous; styles and stigmas 5, styles 2–2.5 mm long, stigmas globose, purplish. Fruits schizocarpic, 3–3.5 mm long; mericarps 5, 2–2.5 × 1–1.5 mm, shorter than the calyx, obtusely triangular, apex with a pair of linear, simple-pubescent horns or awns, 0.5–0.8 mm long. Seeds 1.5–2 mm long, ovoid, rounded trigonous, brownish-black, glabrous throughout.

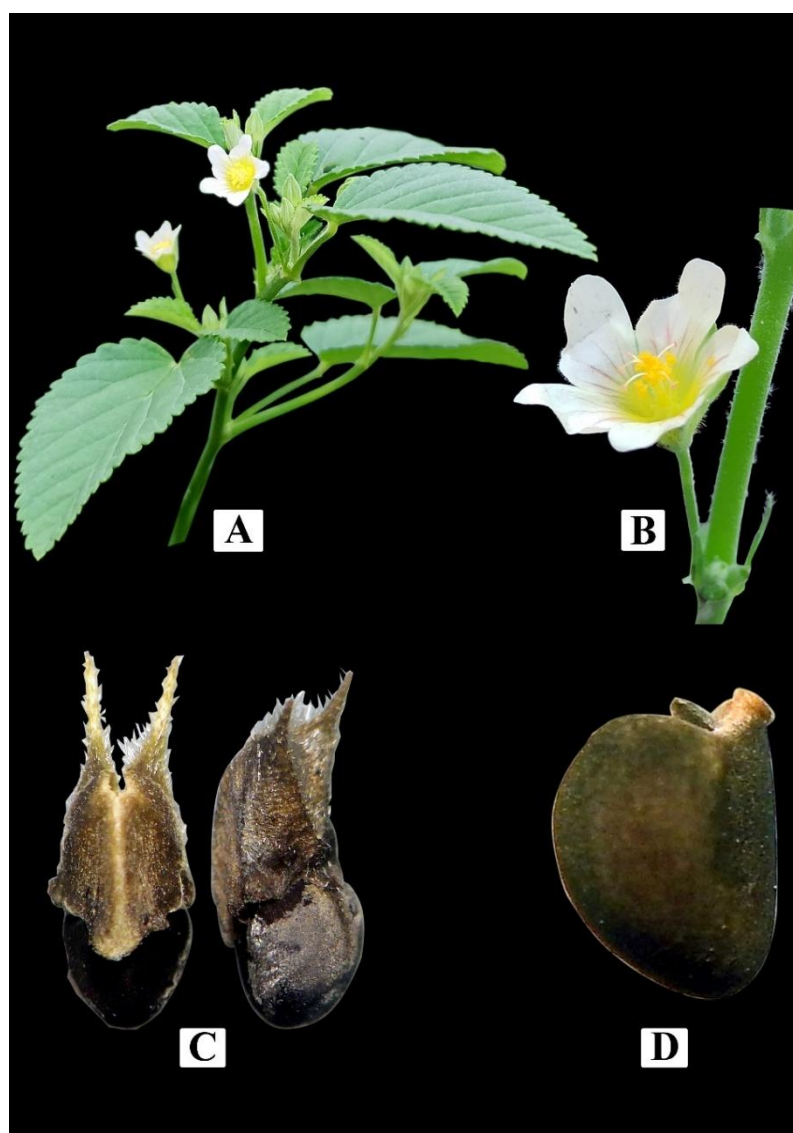


Fig. 3 *Sida spinosa* a) Habit b) Flower c) Mericarp d) Seed *Flowering & Fruiting:* September–March.

Habitat: Common weed of waste places and agriculture fields.

Distribution: Throughout the India.

Table 1. Comparative Study of Sect. *Spinosa*

Characters	<i>Sida angustifolia</i>	<i>Sida sivarajanii</i>	<i>Sida spinosa</i>
Leaves	oblong or ovate, base acute or subcordate	concolorous obovate or suborbicular, base truncate or rounded	oblong or ovate, base acute or subcordate
Stipule	0.5–1.5 mm long, ensiform, falcate, equal, acuminate, persistent, hairy	5–7 mm long, equal, linear, slightly purplish, caducous	1–3 mm long, linear, equal, filiform.
Petiole	2.0–10.0 mm	2.0–12.0 mm	3.0–14.0 mm
Floral pedicel	1.5–6.0 mm	4.0 – 6.0 mm	2.0–7.0 mm
Calyx	3.0–5.0 mm long, stellate hairy externally and along margins, glabrous inside	1.7–2.0 mm long, ovate, simple hairy	4–5 mm long, minute stellate hairy, glabrous inside
Corolla	pale-yellow	orange-yellow	creamy-white or yellowish white
Staminal column	up to 2.0 mm	up to 2.5 mm	up to 2.5 mm
Mericaarp	Length	3.0–3.5 mm long	1.5–2.0 mm long
	Apex	18.0–2.0 mm long, covered with stellate and simple hairs.	1.0–1.5 mm long with densely long stellate, sparsely hairs, acute at apex
Hilum of seed	glabrous throughout	glabrous at the hilum	glabrous throughout

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