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A Synopsis of the genus *Sida* L. (Malvaceae) from Maharashtra, India

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ABSTRACT: The present paper reports occurrence of 11 species and a variety of the genus *Sida* L. in the Maharashtra state. An artificial key, brief description, flowering and fruiting, phenology, distribution, present status with its taxonomical and ecological notes have been provided in the paper for each species.

KEY WORDS: India, Malvaceae, Mericarp, *Sida*, Taxonomy.

INTRODUCTION

The family Malvaceae Juss. (*s.l.*) are one of the largest flowering plant families and is commonly known as 'Mallow family'. Due to its variously colored larger and showy flowers and ornamental and economical value, the family is of great interest to botanists, horticulturists, farmers etc. Malvaceae (*s.l.*) are distributed in the tropical and subtropical regions of the World, and contains about 245 genera and 4465 taxa (The Plant List, 2013). In India, the family is represented by 22 genera and 93 species (Paul and Nayar, 1988; Paul, 1993).

The name *Sida* L. was validated by Linnaeus in 'Species Plantarum' (1753). The genus comprises about 200 species in tropical and subtropical parts of the World (Paul and Nayar, 1988) and about 20 species in India (Bhandari, 1977; Sivarajan and Pradeep, 1996; Sivadasan and Anil Kumar, 1996; Santosh Kumar *et al.*, 2001). In the Maharashtra state many floristic works have been carried out, however, only few species are reported by various authors such as Graham (1839) 03 species from Bombay and its surrounding area, Dalzell and Gibson (1861) enumerated 05 species in the Bombay Flora, Gibson (1863) and Talbot (1909) both are enumerated 06 species in the forest flora of Bombay Presidency, Cooke (1958) enumerated 07 species in his voluminous work '*The flora of the Presidency of Bombay*', as such there are some species enumerated in district and regional floras with recorded taxa of the genus by earlier taxonomists viz. Santapau (1967) recorded three species from Khandala, Patel (1968) with six species from Melghat forest, Naik (1979) four species from Osmanabad district, Ugemuge (1986) six species from Nagpur district, Mahabale (1987) four species in Botany and Flora of Maharashtra, Dhore and Joshi (1988) six species from Melghat Tiger Reserve, Kamble and Pradhan (1988) four species from Akola district, Kulkurni (1988) three species from Sindhudurg district, Almeida (1990) four species from Savantwadi, Laxminarsimhan and Sharma (1991) five species form Nashik district, Malhotra and Moorthy (1992) with 05 species form Tadoba National Park, Deshpande *et al.* (1993) six species from Mahabaleshwar and its adjoining, Karthikeyan and Anand Kumar (1993) enumerated 04 species from Yavatmal district, Kothari and Moorthy (1993) six 06 species form Raigad district, Moghe (1993) reported six species form Chandrapur Forest Division of Vidarbha Region, Pradhan and Singh (1993) with five species from Ahmednagar district, Naik (1998) with six species from Marathwada region of the state, Bhogaonkar and Devarkar (1999) added one species for the Flora of Melghat, Diwakar and Sharma (2000) enumerated three species from Buldhana district, Venkanna and Das Das (2000) eight species in flora of Maharashtra state, Yadav and Sardesai (2002) six species Kolhapur district, Kumar (2003) five species from Indravati Tiger Reserve, Patil (2003) five species from Dhule & Nandurbar districts, Kshirsagar and Patil (2008) six species from Jalgaon district, Bhagat *et al.* (2008) four species from Baramati tehsil of Pune district, Kahalkar (2009) four species from Gondia district, Gaikwad and Garad (2015) six species from Solapur district, Gore (2015) eight species from Balaghat Ranges of Maharashtra, while, Kawade and Deokule (2015) four species from Chandoli National Park, Spontaneous cultivated or introduced as far as they have been ascertained.

As a part of taxonomic studies on *Sida*, field explorations were conducted to different parts of the area under study. The present paper reports the occurrence of 11 species and 1 variety of *Sida* in Maharashtra state. Artificial key, brief description, reproductive phenology, distribution, present status are provided for all the species along with taxonomical and ecological notes.

TOPOGRAPHY

Maharashtra state is the third largest state of India

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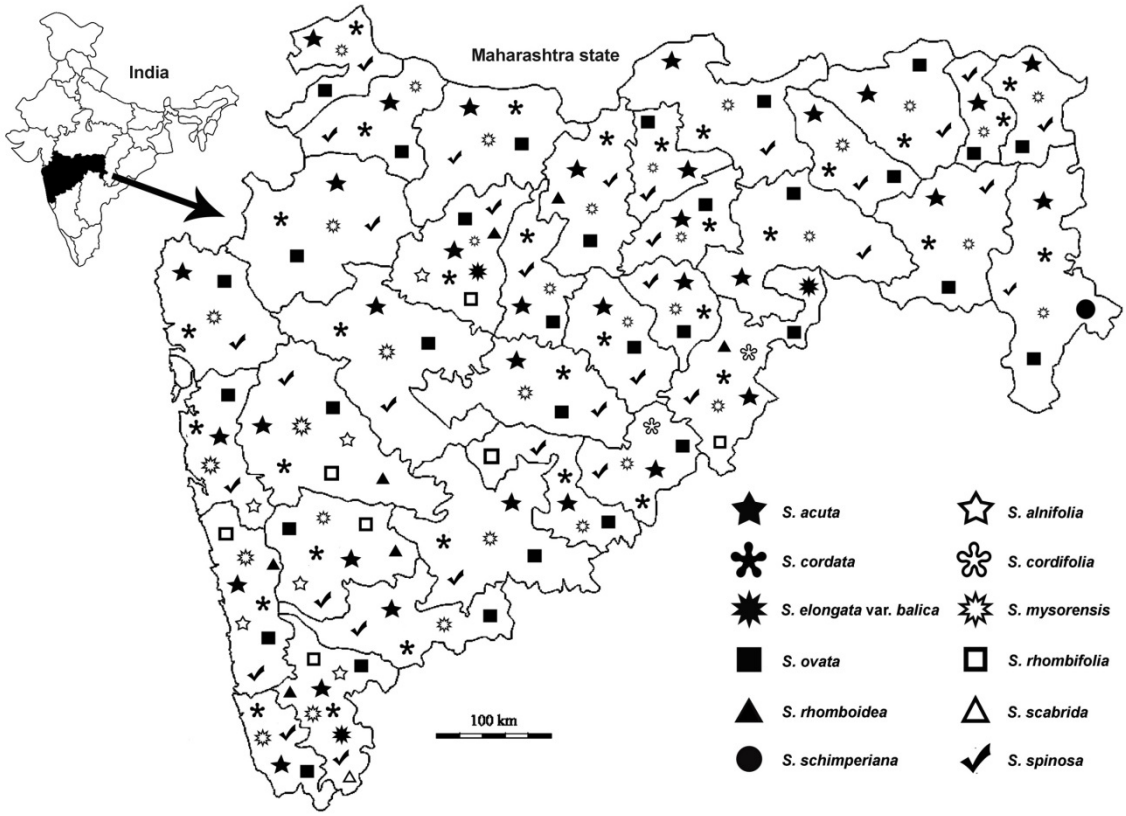


Fig. 1. Map showing the geographical distribution of the genus ***Sida*** L. in Maharashtra state.

and as a part of Peninsula comprising 35 districts. It is situated in between 22°1' to 16°4'N latitudes and 72°6' to 80°9'E longitudes with an average elevation of 1660 m above mean sea level and covers an area of about 3,07,713 km^2. It spreads over 800 km from east to west and about 700 km from north to south. In the east it is surrounded by Chhattisgarh, south-east by Telangana and Andhra Pradesh, north by Madhya Pradesh, south by Karnataka and Goa states, resting on the west is a long coastal line of about 720 km of the Arabian Sea.

The area shows noticeable differences in topographic features. The Western Ghats (Sahyadri Ranges) is one of the mega-biodiversity hotspots in the World. The Sahyadri Ranges lies in between 15°60' to 20°75'N latitudes and 72°61' to 74°40'E longitude and travels through 11 districts of the state. The state is mainly divided in three topographical regions i.e. Konkan, Sahyadri Ranges and Plateau. Konkan region is a narrow strip of about 800 km and running parallel to Sahyadri. Sahyadri is a mountain Range, which flows about 750 km long and about 80 km broad in the north-south direction with an average height of 800–1650 m above mean sea level while the plateau is marked by several hill ranges of average height of 600–800 m which emerge from the main range and develops an eastward trend gently undulating with ridges and valleys. Maharashtra state is well-drained by its main rivers like Bhima, Krishna, Godavari, Narmada, Purna, Tapi, Vainganga, Vaitarana etc. and its tributaries. Rivers pass through the state and move towards the Arabian Sea and the Bay of Bengal (Fig. 1).

MATERIALS AND METHODS

A preliminary list of all the species of genus *Sida* was prepared from available literature and consultation of herbarium specimens deposited in various herbaria like AHMA, BAMU, BSI and SUK. Field trips were arranged to different parts of the state for the collection of specimens. Information about habit, habitat, month of flowering and fruiting, occurrence, present status, GPS data for each species with its local names if any, was gathered during field visits.

At the time of collection 2–3 healthy and mature specimens were collected with flowering and as far as possible in fruiting. The specimens were processed following standard herbarium techniques (Santapau, 1955; Jain and Rao, 1977; Rao and Sharma, 1990). Plant materials were also stored in air tight bottle with dilute (4%) formaldehyde solution for further investigations in the laboratory. Field identifications were confirmed with the help of available taxonomic literature (Paul and Nayar, 1988; Paul, 1993; Sivadasan and Anil Kumar, 1996; Sivarajan and Pradeep, 1996; Almeida, 1996; Venkanna

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and Das Das, 2000). Identifications of the doubtful specimens were confirmed by direct comparison with authentically identified specimens deposited in AHMA, BAMU, BSI, SUK and WCAS herbaria.

Based on field and laboratory observations, an artificial key is provided for correct identification of each species of *Sida*. The species are arranged alphabetically in the text. The distributional map of all species of the genus *Sida* from Maharashtra state has also been provided (Fig. 1).

The voucher specimens of genus *Sida* collected from different parts of the state have been deposited in the AHMA, BAMU, BSI and WCAS.

TAXONOMIC TREATMENT

Sida L., Sp. Pl. 2: 683. 1753; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874; Fryxell, Sida 11: 62-91. 1985; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 201. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 280. 1993; Almeida, Fl. Maharashtra 1: 123. 1996; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 325. 2000.

Malvinda Boeh. in Ludwing, Def. Gen. Pl. ed 3, 74. 1760.
Lamarkia Medik., Vorles. Churpfalz. Phys. Okon. Ges. 4(1): 183. 1788, *nom. rej.*
Dictyocarpus Wight, Madras J. Lit. Sci. 5: 310. 1837.
Pseudomalachra (Schum.) Monterio, Portug. Acta Biol. Ser. B, 12(1-4): 134. 1973. *Sida* sect. *Pseudomalachra* Schum. in Engler & Prantl, Nat. Pflanzenfam. 3(6): 43. 1890.
Dendrosia Fryxell, Brittonia 23(3): 231. 1971.

Type: *Sida alnifolia* L.

Perennial herbs or subshrubs, erect or prostrate, glabrous or pubescent, sometimes viscid. Leaves simple, rarely divided, subsessile to petiolate, blade ovate, elliptic, rhomboid or linear, usually serrate or dentate, without abaxial nectarines. Flowers usually small, axillary, solitary or clustered or in dense or open terminal racemes or panicles. Pedicels slender, articulated. Involucral absent. Calyx 5-lobed, widely campanulate, often 10-ribbed at the base and plicate in bud. Corolla orange-yellow or white often with a dark centre. Staminal column included, antheriferous at apex. Styles 5–12; stigmas capitate. Fruits schizocarpic, glabrous or pubescent; mericarps differentiated in to a lower, one seeded, indehiscent cell ant an upper empty, dehiscent portion that is often ornamented with a pair of spines. Seeds solitary, glabrous or pubescent. Different basic chromosome number i.e. X=7, 8, 9, 11 and 17 occurs in the genus (Fryxell, 1988; Venkatesh *et al.*, 2015).

Key to the species of genus *Sida* L. in Maharashtra

1a. Plants prostrate.....3.***S. cordata***
1b. Plants erect **2**
2a. Petioles with 1–3 spiny emergences (spurs) at base.....12.***S. spinosa***
2b. Petioles without spiny emergence (spur) at base **3**
3a. Leaves linear or oblong; margins wedge shaped.....11.***S. schimperiana***
3b. Leaves cordate, acute, more or less rhomboid; margins crenate, dentate or serrate.....**4**
4a. Pair of each stipules different, one lanceolate and other linear to filiform.....1. ***S. acuta***
4b. Pair of stipules not different.....**5**
5a. Mericarps 5.....**6**
5b. Mericarps 7–10 .....**7**
6a. Plants neither aromatic nor viscid; mericarps not awned.....5.***S. elongata* var. *balica***
6b. Plants aromatic, viscid pubescent; mericarps with two awns.....6.***S. mysorensis***
7a. Leaf base cordate; mericarp awns retrorse .....4.***S. cordifolia***
7b. Leaf base truncate, rounded and obtuse; mericarp awns not retrorse **8**
8a. Mericarps dehiscent **9**
8b. Mericarps indehiscent **11**
9a. Leaves retuse or truncate at apex; mericarps mucronate at apex.....2.***S. alnifolia***
9b. Leaves acuminate at apex; mericarps with two awns at apex.....**10**
10a. Leaves concolorous both surface of leaf, pedicels not jointed.....10.***S. scabrida***
10b. Leaves not concolorous both surface of leaf, pedicels jointed.....8.***S. rhombifolia***
11a. Fruiting pedicels 2–6 mm long.....7.***S. ovata***
11b. Fruiting pedicels 15–25 mm long.....9.***S. rhomboidea***

1. *Sida acuta* Burm. f., Fl. Ind. 147. 1768; Cooke, Fl. Pres. Bombay 1: 98. 1958; Fryxell, Syst. Bot. Monogr. 25: 380. 1988; Paul & Nayar in Nayar *et al.* (eds.)., Fasc. Fl. India 19: 202. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 281. 1993; Sivar. & Pradeep, Malv. South. Penins. India 238, f. 84. 1996; Almeida, Fl. Maharashtra 1: 123. 1996; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 325. 2000. *S. carpinifolia* Mast. in Hook f., Fl. Brit. India 1: 323. 1874 non L.f., 1781. **Figs. 2A** & **3A**

Erect herbs or undersrubs, up to 2 m high. Stems pubescent with simple and minute stellate hairs. Leaves *ca* 6 × 2.5 cm, lanceolate to linear, elliptic-lanceolate, serrate. Flowers solitary or paired in leaf axils.Calyx *ca* 8 × 6 mm, campanulate, ciliate on margins. Corolla creamy-yellow or white, *ca* 10 × 7 mm. Schizocarps *ca* 6 mm long, glabrous; mericarps 6–8, *ca* 5 × 2 mm, apically 2-awned. Seeds *ca* 2 mm long; hilum hairy.

Flowering and Fruiting: July to March.

Specimens examined: **INDIA**: **Buldhana:** Bhingara forest, Jalgaon -Jamod, 20th Nov. 2009, *M. R. Kakpure 1009* (AHMA). **Kolhapur:** Kagal, 21st Sep. 2000, *M. M. Sardesai 723* (SUK); Kotoli road, (16°46'05.0"N 74°09'50.6"E), 4th Dec. 2014, *G. M. Tambde 050* (BAMU) **Nanded:** Kinvat, (19°37'16.9"N 78°11'57.7"E), 1st Oct. 2014, *G. M. Tambde 08* (BAMU). **Osmanabad:** Kunthalgiri, (18°32'56.2"N 75°42'20.1"E), 12th Sept. 2010, *R. D. Gore 231* (WCAS). **Pune:** Ale, Junnar, 22nd Oct. 2003, *S. B. Nagarkar s.n.* (AHMA).

Illus: Sivar. & Pradeep., *op. cit.*

Distribution and Ecology: Throughout the Maharashtra state; commonly grows along roadsides and wastelands.

Note: *Sida acuta* is differs from other species of the genus due to its acute leaf apex and different pair of each stipule.

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Fig. 2. Morphological features of *Sida* L. from Maharashtra, India. **A:** ***Sida acuta*** Burm. f., **B:** ***Sida alnifolia*** L., **C:** ***Sida cordata*** (Burm. f.) Borss., **D:** ***Sida cordifolia*** L., **E:** ***Sida elongata*** Blume var. ***balica*** (Miq.) Borss., **F:** ***Sida mysorensis*** Wight & Arn., **G:** ***Sida ovata*** Forssk., **H:** ***Sida rhombifolia*** L., **I:** ***Sida rhomboidea*** Roxb. ex Fleming, **J:** ***Sida scabrida*** Wight & Arn., **K:** ***Sida schimperiana*** Hochst. ex A. Rich., **L:** ***Sida spinosa*** L. (Photographs by G. M. Tambde).

2. *Sida alnifolia* L., Sp. Pl. 2, 684. 1753; Sivar. & Pradeep, Sida 16(1): 69. 1994 & in Malv. South. Penins. India 241, f. 85. 1996. *S. retusa* L., Sp. Pl. ed. 2. 961. 1763. *S. rhombifolia* L. subsp. *retusa* (L.) Borss. in Blumea 14: 198, f. 21e-h. 1966; Paul in Sharma *et al.* (eds.), Fl. India 3: 289. 1993; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 328. 2000. *S. rhombifolia* L. var. *retusa* (L.) Cooke, Fl. Pres. Bombay 1: 99. 1958; Almeida, Fl. Maharashtra 1: 126. 1996.

Figs. 2B & 3B

Erect herbs or subshrubs up to 1 m high. Stem terete, stellate-tomentose. Leaves *ca* 5 × 4 cm, rarely truncate obovate to elliptic-lanceolate, margins irregularly serrate or crenate to the distal half. Flowers axillary, solitary. Calyx *ca* 7 × 6 mm, stellate hairy. Corolla orange-yellow, *ca* 8 × 6 mm. Schizocarp *ca* 4.5 mm long; mericarps 8–10, *ca* 3 × 2 mm, rugose, with a pair of short stellate hairs. Seeds *ca* 2 mm long; hilum puberulent.

Flowering and Fruiting: August to March.

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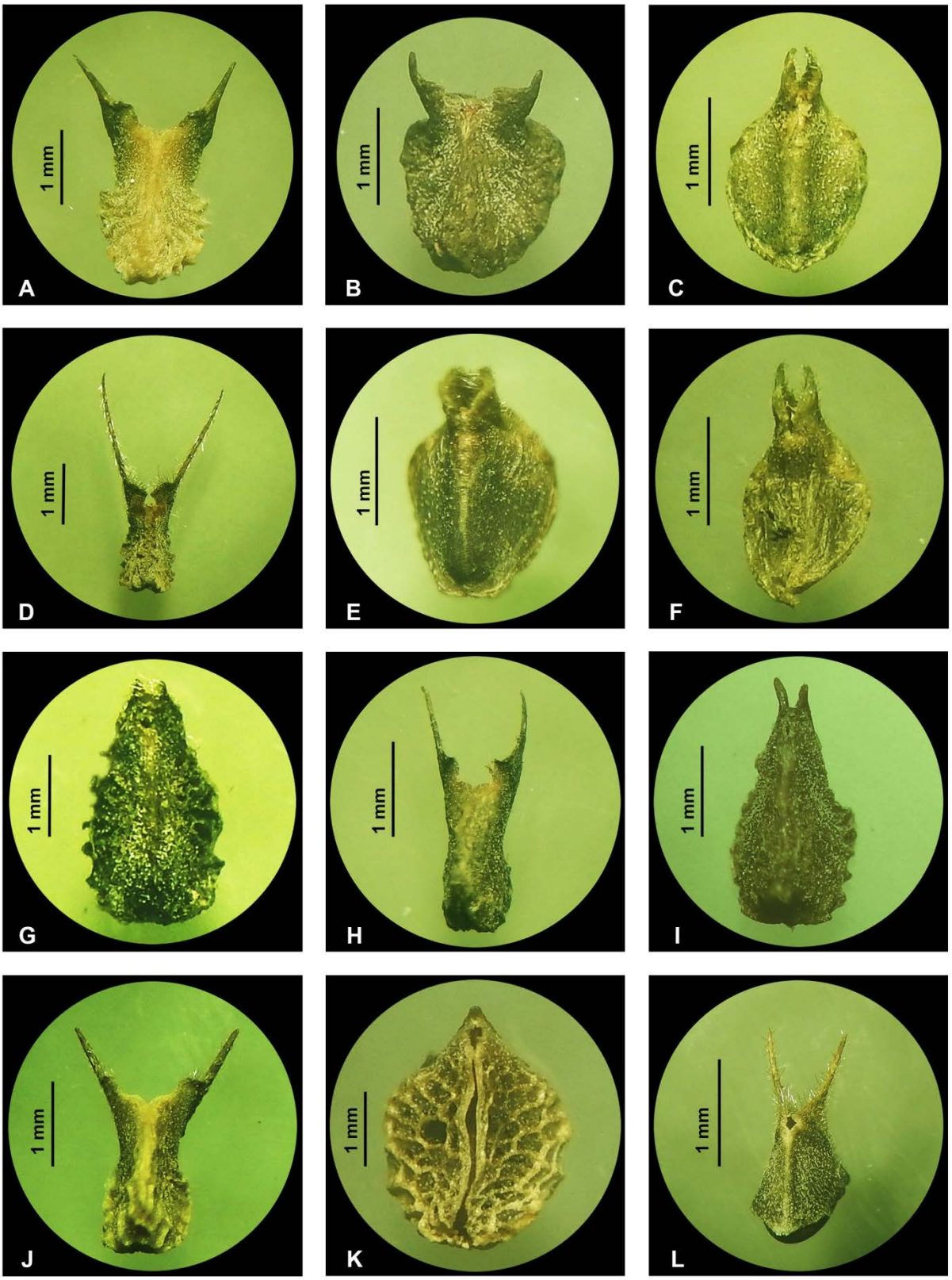


Fig. 3. Mericarp morphology of *Sida* L. from Maharashtra, India. **A:** ***Sida acuta*** Burm. f., **B:** ***Sida alnifolia*** L., **C:** ***Sida cordata*** (Burm. f.) Borss., **D:** ***Sida cordifolia*** L., **E:** ***Sida elongata*** Blume var. ***balica*** (Miq.) Borss., **F:** ***Sida mysorensis*** Wight & Arn., **G:** ***Sida ovata*** Forssk., **H:** ***Sida rhombifolia*** L., **I:** ***Sida rhomboidea*** Roxb. ex Fleming, **J:** ***Sida scabrida*** Wight & Arn., **K:** ***Sida schimperiana*** Hochst. ex A. Rich., **L:** ***Sida spinosa*** L. (Photographs by G. M. Tambde).

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Specimens examined: **INDIA**: **Daman:** Dundorta village, 25th Sept. 1967, *M. Y. Ansari 93640* [as *S. rhombifolia*] (BSI). **Kolhapur:** Vishalgadh, (16°54'16.4"N 73°44'58"E), 29th Nov. 2014, *G. M. Tambde 041*. (BAMU). **Pune:** Junnar, Aptale road, 18th Aug. 2006, *S. B. Nagarkar JI 967* [as *S. rhombifolia* var. *retusa*] (BSI); Nigudghar, 18th Sep. 2010, *P. B. Kamble s.n*. [as *S. rhombifolia* var. *retusa*] (BSI); Sinhagad, 12th Oct. 1955, *V. D. Vartak 1556* [as *S. rhombifolia* var. *retusa*] (AHMA). **Raigad:** Karnala, 25th Dec. 1973, *R. Datar 94* [as *S. rhombifolia* var. *rhombifolia*] (AHMA). **Ratnagiri:** Chiplun, (17°32'28.5"N 73°31'27.1"E), 17th Feb. 2014, *G. M. Tambde 197* (WCAS). **Satara:** Khandala, (18°03'15"N 74°00'57.2"E), 23rd Dec. 2014, *G. M. Tambde 078* (BAMU).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Aurangabad, Kolhapur, Pune, Raigad, Ratnagiri and Satara districts; common, on waste places, lateritic hill slopes, along roadsides and occasionally seen as a weed in upland cultivation.

Note: *Sida alnifolia* is closely allied with *S. scabrida* but, differs due to its retuse or truncate leaf apex.

3. *Sida cordata* (Burm. f.) Borss., Blumea 14: 182. 1966; Fryxell, Sida 11(1): 69. 1985; Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 206. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 283. 1993; Sivar. & Pradeep, Malv. South. Penins. India 268, f. 98. 1996; Almeida, Fl. Maharashtra 1: 124. 1996; Venkanna & Das Das. Fl. Maharashtra St. (Dicot.) 1: 325. 2000. *Melochia cordata* Burm. f. Fl. Ind. 143. 1768. *Sida humilis* Cav. Diss. 5: 277, t. 134, f. 2. 1788; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874. *S. humilis* var. *veronicifolia* (Lam.) Mast. in Hook. f., *op. cit.* 322. *S. veronicifolia* Lam., Encyl. 1: 5. 1783. **Figs. 2C & 3C**

Prostrate herbs, trailing. Stem slender, pubescent with simple and stellate hairs. Leaves *ca* 6 × 5 cm, broadly ovate or orbicular, serrate-crenate. Flowers 8–10 mm diameter, axillary, solitary. Calyx *ca* 5 × 6 mm, campanulate, simple hairs and stellate hairy. Corolla orange-yellow, *ca* 6 × 5 mm. Schizocarp *ca* 3 mm long; mericarps 5, *ca* 2.5 × 2 mm, shortly 2-beaked at apex. Seeds *ca* 2 mm long, glabrous.

Flowering and Fruiting: July to March.

Specimens examined: **INDIA**: **Akola:** Karla near Patur, 28th Aug. 1972, *S. Y. Kamble 150056* (BSI). **Aurangabad:** Himayatnagar, 15th Sept. 1965, *Vyawahre* 6 [as *S. vernocifolia*]; University Campus, (19°54'11.1"N 75°18'37.6"E), 22nd Sept. 2014, *G. M. Tambde 003* (BAMU). **Dhule:** Songir, 1st Sept. 2011, *N. K. More* and *S. M. Khare 031502* [as *S. cordifolia*] (AHMA). **Diu:** Jhorla village- near Airport, 19th Sept. 1914, *S. Rolla Rao 102611* (BSI). **Kolhapur:** Kagal, 21st Sept. 2000, *M.M. Sardesai 722* (SUK); Panhala Fort, (16°48'35.3"N 74°06'33.2"E), 4th Dec. 2014, *G. M. Tambde 066* (AHMA). **Nagar-Haveli:** Dudhri to Bildhari forest, 12th Nov. 1970, *M. Y. Ansari 126924* (BSI). **Osmanabad:** Near caves, 12th Feb. 1962, *V. N. Naik 472* (BAMU); Near Devarjan, Omerga (18°19'22.1"N 77°00'15.4"E), 2nd Jan 2011, *R. D. Gore 514* (WCAS). **Pune:** Pirangut, 18th Oct. 2010, *N. H. Shevate BOT 16* (BSI); Avasari Ghat, 6th Oct. 2010, *P. S. Kore s.n.*; Law Collage hill, 23rd Aug. 1988, *V. N. Joshi VH 570* (BSI); Karnala, 1st Nov. 1974, *R. Datar K 534* (AHMA). **Sangli:** Sonsal, Ganeshkhind, 2nd Oct. 1989, *A. N. Londhe 170193* (BSI). **Satara:** Bhosgaon river, 28th Sept. 1983, *S. D. Deshpande 166404* (BSI).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Throughout the Maharashtra state; common, under the shades of trees and along the road sides.

Note: *S. cordata* is prostrate herb, widely distributed in Maharashtra. Sharply serrate leaves and woody root stocks while those occurring in moist, semi-shaded areas have much larger foliage.

4. *Sida cordifolia* L., Sp. Pl. 684. 1753; Cooke, Fl. Pres. Bombay 1: 99. 1958; Fryxell, Sida 11(1): 69. 1985 & in Syst. Bot. Monogr. 25: 389. 1988; Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 207. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 285. 1993; Sivar. & Pradeep, Malv. South. Penins. India 256, f. 93. 1996; Almeida, Fl. Maharashtra 1: 124.1996; Venkanna & Das Das. Fl. Maharashtra St. (Dicot.) 1: 326. 2000. **Figs. 2D & 3D**

Erect, shrubs or subshrubs up to 2 mm high. Stem branched with stellate and simple hairs. Leaves *ca* 6 × 5 cm, ovate to suborbicular. Flowers *ca* 1.2 cm diameter, axillary, solitary. Calyx *ca* 7 × 5 mm, densely tomentose with stellate and simple hairs. Corolla orange-yellow or creamy-white, *ca* 1.5 × 0.8 cm, obovate. Schizocarp *ca* 6 mm long; mericarps 8–10, *ca* 5 × 2.5 mm, apically 2-awned with simple retrorse hairs. Seeds *ca* 2 mm long; hilum glabrous to minute hairy.

Flowering and Fruiting: August to March.

Specimens examined: **INDIA**: **Latur:** near Tambala village, Nilanga, (17°55'40.1"N 76°52'43.3"E), 12th Sept. 2014, *R. D. Gore 1071* (WCAS). **Nanded:** Mirzapur, (18°27'08.8"N 77°50'42.3"E), 18th Oct. 2014, *G. M. Tambde 039* (BAMU).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Latur and Nanded districts; frequent along roadsides, on dry wastelands.

Note: This species is easily recognized in field due to its densely tomentose and velvety leaves.

5. *Sida elongata* Blume var. ***balica*** (Miq.) Borss., Blumea 14: 182. 1966; Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 208. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 285. 1993; Sivar. & Pradeep, Malv. South. Penins. India 270. 1996. *S. balika* Miq., Fl. Ind. Bot. I, 2: 141. 1858. **Figs. 2E & 3E**

Erect, annual herbs or undershrubs up to 1 m high. Stem mixed with pubescent and simple hairs. Leaves *ca* 10 × 8 cm, broadly ovate or orbicular, irregularly crenate or serrate. Flowers axillary, solitary, sometimes in paniculate, diffused inflorescence. Calyx *ca* 6 × 4 mm, campanulate, densely hairy. Corolla orange-yellow, *ca* 10 × 9 mm, obovate. Schizocarp *ca* 4 mm long, sparsely hairy; mericarps 5, *ca* 3 × 3 mm with a short 2-fid hairy beak. Seeds *ca* 2 mm long; hilum glabrous or minutely hairy.

Flowering and Fruiting: September to March.

Specimens examined: **INDIA**: **Aurangabad:** Gautala, Kannad, (20°26'10.4"N 75°16'07.6"E), 4th Nov. 2014, *G. M. Tambde 040* (BAMU). **Kolhapur:** Panhala, (16°48'19.5"N 74°06'53.7"E), 4th Dec. 2014, *G. M. Tambde 062* (BSI). **Nanded**: Ambadi, (19°40'53.5"N 78°11'55.4"E), 1st Oct. 2014, *G. M. Tambde 009* (WCAS).

Distribution and Ecology: Aurangabad, Kolhapur and Nanded districts; rare, on sandy places.

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Note: The taxon was known originally from Java and the Lesser Sunda Islands of Indian Ocean (Sivarajan and Pradeep, 1996). Present occurrence of this species is a new distributional record for the state.

6. *Sida mysorensis* Wight & Arn., Prodr. 59. 1834; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874; Borss., Blumea 14: 180. 1966; Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 209, f. 51. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 286. F. 78. 1993; Sivar. & Pradeep, Malv. South. Penins. India 271, f. 101. 1996; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 326. 2000. *S. glutinosa*Roxb., Fl. Ind. 3: 172. 1832, non Commers ex Cav., 1785; Almeida, Fl. Maharashtra 1: 125. 1996.

Figs. 2F & 3F

Erect, annual, aromatic herbs or subshrubs. Stem viscid, densely invested with stellate, gland-tipped hairs. Leaves *ca* 10 × 8 cm, broadly ovate, crenate-serrate. Flowers 1–2, axillary, 9–11 mm in diameter. Calyx *ca* 7 × 4 mm, campanulate, divide up to middle. Corolla orange-yellow, *ca* 6 × 5 mm, obovate. Schizocarp *ca* 4 mm long, simple hairy; mericarps 5, *ca* 3 × 2.5 mm, apex with a pair of short divergent awns, pubescent. Seeds *ca* 2 mm long, glabrous.

Flowering and Fruiting: August to March.

Specimens examined: **INDIA**: **Aurangabad:** University campus, (19°54'11.9"N 75°18'37.6"E), 10th Oct. 2014, *G. M. Tambde 015* (BSI). **Buldhana:** Esawi forest, Mehkar, 18th Sept. 2011, *M. R. Kakpure 1288* [as *S. cordifolia*] (AHMA). **Kolhapur:** Panhala, (16°48'17.0"N 74°06'58.6"E), 4th Dec. 2014, *G. M. Tambde 069* (BAMU). **Nanded:** Ambadi, 10th July 1980, *B. R. Zate 1520* (BAMU). **Osmanabad:** Shingoli, (18°14'26.2"N 76°02'02.5"E), 16th Oct 2011, *R.D. Gore 759* (WCAS). **Pune:** Naigaon, Bhor, 1st Oct. 2010, *M. Datar s.n.* (AHMA); Near Narayangaon, Junnar, 12th Oct. 1965, *K. Hemadri 107002* (BSI).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Throughout the Maharashtra state; common, along forest margins usually in shaded sites and also grows along waysides.

Note: *Sida mysorensis* is closely allied with *S. cordata* and mostly confused on account of its cordate leaves, however, it differs due to its erect habit with dense pubescence and pedicels shorter than the petioles.

7. *Sida ovata* Forssk., Fl. Aeg.-Arab. 124. 1775; Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 211, f. 57. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 288. f. 81c-d. 1993; Sivar. & Pradeep, Malv. South. Penins. India 243, f. 86. 1996; Almeida, Fl. Maharashtra 1: 125.1996; Venkanna & Das Das. Fl. Maharashtra St. (Dicot.) 1: 327. 2000. *S. grewioides* Gull. & Perr. in Guill. *et al.* Fl. Seneg. Tent. 1: 71. 1830; Mast. in Hook. f., Fl. Brit. India. 1: 323. 1874. **Figs. 2G & 3G**

Erect subshrubs up to 50 cm high. Stem densely clothed with short stellate hairs. Leaves *ca* 3 × 2 cm, ovate-oblong or suborbicular, serrate-crenate. Flowers solitary, axillary, 10–14 mm diameter. Calyx *ca* 7 × 8 mm, campanulate, stellate-tomentose. Corolla yellow, *ca* 9 × 6 mm. Schizocarps *ca* 5 mm long, glabrescent; mericarps 8–10, *ca* 4 × 3.5 mm, indehiscent, shortly beaked with a pair of convergent apex, sparsely pubescent. Seeds *ca* 2 mm long, glabrous throughout; hilum minutely pubescent.

Flowering and Fruiting: August to February.

Specimens examined: **INDIA**: **Aurangabad:** Daulatabad, 20th Feb. 1978, *D. S. Pokle* 3141; near Daulatabad fort, 17th Sept. 1979, *D. S. Pokle* 3596; University campus, (19°54'16.87"N 75°18'45.36"E), 13th Oct. 2014, *G. M. Tambde 025* (BAMU). **Beed:** Bhayala (18°51'45.9"N 75°37'09.4"E), 28th Oct. 2014, *R. D. Gore 1135* (WCAS). **Jalna:** Kedarkheda, Bhokardan, (20°09'08.7"N 75°48'33.4"E), 30th Dec. 2015, *G. M. Tambde 288* (BSI).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Throughout the Maharashtra state; common on wastelands and also grows along waysides on sandy places.

Note: *Sida ovata* easily identify by its ovate leaves in the field and short pedicels.

8. *Sida rhombifolia* L., Sp. Pl. 684. 1753; Mast. in Hook. f., Fl. Brit. India 1: 323. 1874; Paul in Sharma *et al.* (eds.), Fl. India 3: 289. 1993; Sivar. & Pradeep, Sida 16(1): 71. 1994 & in Malv. South. Penins. India 245, f. 87. 1996; Almeida, Fl. Maharashtra 1: 125. 1996. *S. rhombifolia* L. subsp. *rhombifolia* var. *rhombifolia* Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 214. 1988. *S. rhombifolia* L. subsp. *rhombifolia*; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 327. 2000.

Figs. 2H & 3H

Erect branched herbs or undershrubs up to 1 m high. Stem cinereous with stellate hairs. Leaf blades *ca* 6 × 3 cm, elliptic to rhomboid, serrate-crenate. Flowers *ca* 1.5 cm diameter, axillary, solitary, sometimes in apparent racemes. Calyx *ca* 5 × 6 mm, campanulate, pubescent. Corolla pale-yellow or creamy-white, *ca* 10 × 7 mm. Schizocarp *ca* 5 mm long; mericarps 8–10, *ca* 4 × 3 mm, apex with a pair of short divergent awns. Seeds *ca* 2 mm long; hilum minutely hairy.

Flowering and Fruiting: August to January.

Specimens examined: **INDIA**: **Aurangabad:** Soygaon, 16th Jan. 1980, *D. S. Pokle* 4024 (BAMU). **Kolhapur:** Panhala Fort, (16°48'53.9"N 74°06'32.8"E), 4th Dec. 2014, *G. M. Tambde 063* (BAMU). **Nanded:** Ambadi, (19°40'55.3"N 78°11'58.6"E), 1st Oct. 2014, *G. M. Tambde 010* (BSI). **Osmanabad:** Dindori, Washi (18°27'02.2"N 75°44'59.3"E), 18th Sept. 2011, *R. D. Gore 727* (WCAS). **Ratnagiri:** Dabhol, 27th Oct. 2010, *N. H. Shevate BOT 16* (AHMA).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Aurangabad, Kolhapur, Osmanabad, Pune, Ratnagiri, Nanded and Satara districts; common along roadsides, wastelands, moist places and hills slopes.

Note: In *S. rhombifolia*, the schizocarps are prominently beaked at the apex with projection of awns of the mericarps.

9. *Sida rhomboidea* Roxb. ex Fleming, Asiat. Res. 11. 178. 1810; Roxb., Hort. Beng. 50. 1814 & Fl. Ind. (Carey ed.) 3: 176. 1832; Wight & Arn., Prodr., Fl. Pen. Ind. Orient. 57. 1834; Dunn. in Gamble, Fl. Pres. Madras 1: 90. 1915; Sivar. & Pradeep, Sida 16(1): 73.

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1994 & in Malv. South. Penins. India 246, f. 88. 1996. *S. rhombifolia* L. var. *rhomboidea* (Roxb. ex Fleming) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. *S. rhombifolia* subsp. *rhombifolia*, sensu Borss., Blumea 14: 193. 1966; Fryxell, Syst. Bot. Manogr. 25: 403. 1988; Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 214. 1988. **Figs. 2I & 3I**

Erect subshrubs up to 2.5 m high. Stem branched, purplish, stellate hairy. Leaves *ca* 4 × 6 cm, rhomboid to lanceolate, obovate or suborbicular, stellate-tomentose beneath. Flowers axillary, solitary, *ca* 2 cm diameter. Calyx *ca* 9 × 6 mm, campanulate, 10-ribbed at base; lobes 5, triangular. Corolla pale-yellow, *ca* 8 × 6 mm. Schizocarp *ca* 4 × 3.5 mm; mericarps 8–10, *ca* 3.5 × 2 mm, coherent, indehiscent, apex beaked with a single muticous process. Seeds *ca* 2 mm long, glabrous throughout.

Flowering and Fruiting: August to February.

Specimens examined: **INDIA**: **Buldhana:** Jalgaon, Chalisgaon Ghat, (20°21'46.9"N 75°03'07.2"E), 21st Jan. 2015, *G. M. Tambde 090* (BSI). **Pune:** Talegaon, (18°44'15.5"N 73°41'00.5"E), 16th Oct. 2014, *G. M. Tambde 037* (BAMU). **Kolhapur:** Kotoli, (16°46'27.4"N 74°02'05.5"E), 4th Dec. 2014, *G. M. Tambde 055* (AHMA).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Aurangabad, Buldhana, Jalgaon, Nanded, Pune, Ratnagiri, Kolhapur and Satara districts; common in waste places, roadsides and along lateritic hill slopes.

Note: *Sida rhomboidea* is closely allied to *S. rhombifolia* and *S. scabrida* but it differs from them by its mericarps completely included in the calyx, closely coherent, indehiscent.

10. ***Sida scabrida*** Wight & Arn., Prodr., Fl. Pen. Ind. Orient. 57. 1834; Sivar. & Pradeep, Sida 16(1): 75. 1994 & in Malv. South. Penins. India 250, f. 89. 1996. *S. rhombifolia* L. var. *scabrida* (Wight & Arn.) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. *S. rhombifolia* subsp. *rhombifolia* var. *scabrida* (Wight & Arn.) Mast., Paul & Nayar in Nayar *et al.* (eds.), Fasc. Fl. India 19: 216. 1988; Paul in Sharma *et al.* (eds.), Fl. India 3: 290. 1993. **Figs. 2J & 3J**

Erect subshrubs up to 2 m high. Stem branched, pubescent with stellate and simple hairy. Leaves *ca* 8 × 4 cm, concolorous, rhomboid or oblong-lanceolate, serrate-crenate distally and entire towards base. Flowers axillary, solitary, *ca* 2 cm diameter. Calyx *ca* 9 × 7 mm, campanulate, ovate. Corolla yellow, *ca* 10 × 8 mm, base stellate-hairy. Schizocarp *ca* 5 mm long; mericarps 8–10, *ca* 3.5 × 3 mm, apex paired, divergent with simple and stellate hairs. Seeds *ca* 2 mm long; hilum pubescent.

Flowering and Fruiting: August to April.

Specimens examined: **INDIA**: **Kolhapur:** Shivaji University campus, (16°40'34.9"N 74°15'21.7"E), 4th Dec. 2014, *G. M. Tambde 072* (BAMU).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: So far known from Kolhapur district only; common in disturbed sites of forests.

Note: This species is mostly confused as *Sida rhombifolia* but mainly differs due to leaves and joint of pedicels. *S. scabrida* having concolorous leaves and pedicels without joint, while non-concolorous leaves and jointed pedicels are seen in *S. rhombifolia*.

11. ***Sida schimperiana*** Hochst. ex A. Rich., Fl. Abyss. 1: 66. 1847; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874; Paul in Sharma *et al.* (eds.), Fl. India 3: 292, f. 80a-b. 1993; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 328. 2000. *S. cuneifolia* Roxb., Fl. Ind. (Carey ed.) 3: 170. 1832; Sivar. & Pradeep, Malv. South. Penins. India 261, f. 95. 1996; Almeida, Fl. Maharashtra 1: 125. 1996.

Figs. 2K & 3K

Erect herbs or subshrubs up to 50 cm high. Stem terete, stellate hairy. Leaves *ca*12 × 6 mm, cuneate to obovate, entire, apex notched. Flowers axillary, solitary, *ca*7 mm diameter. Calyx *ca* 4 × 3 mm, appressed hairy. Corolla yellow, *ca* 5 × 2 mm, obliquely obovate. Schizocarp *ca* 4 mm long, oblate, glabrescent; mericarps 5, *ca* 4 × 2 mm, slightly muricate. Seeds *ca* 2 mm long, appressed crisped-hairy to glabrous.

Flowering and Fruiting: August to December.

Specimens examined: **INDIA**: **Gadchiroli:** Mool road (20°09'12.2"N 80°04'51.5"E), 10th Dec. 2013, *M. M. Sardesai 210* (BAMU).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Gadchiroli district; rare in waste places.

Note: This species grows as weed in waste places. This species is only collected from the above locality.

12. ***Sida spinosa*** L., Sp. Pl. 683. 1753; Mast. in Hook. f., Fl. Brit. India 1: 323. 1874; Cooke, Fl. Pres. Bombay 1: 98. 1958; Fryxell, Syst. Bot. Monogr. 25: 407. 1988; 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, f. 80c-e. 1993; Sivar. & Pradeep, Malv. South. Penins. India 280, f. 105. 1996; Almeida, Fl. Maharashtra 1: 126. 1996; Venkanna & Das Das in Singh *et al.*, Fl. Maharashtra St. (Dicot.) 1: 328. 2000. *S. alba* L. Sp. Pl. ed. 2, 960. 1762. **Figs. 2L & 3L**

Erect subshrubs up to 1 m high. Stem stout, stellate hairy often intermingled with simple hairs. Leaves *ca* 4 × 3 cm, narrowly oblong or ovate, serrate-crenate. Petiole with about 3 spiny emergences (spurs) at base. Flowers usually solitary, *ca* 1.2 cm in diameter. Calyx *ca* 5 × 4 mm, angular, minute stellate hairy. Corolla creamy-white or yellow, *ca* 6 × 3.5 mm, apex rounded or emarginated. Schizocarp *ca* 3.5 mm long; mericarps 5, *ca* 2.5 × 1–1.5 mm, apex with a pairs of linear, simple-pubescent awns. Seeds *ca* 2 mm long, glabrous throughout.

Flowering and Fruiting: August to January.

Specimens examined: **INDIA**: **Aurangabad:** Badnapur, 13th Dec. 1968, *V. N. Naik* 37; University campus, (19°54'07.4"N 75°18'40.0"E), 28th Sept. 2014, *G. M. Tambde 004* (BAMU). **Beed:** Thamba-Rajuri; Patoda (18°50'58.3"N 75°29'20.0"E), 17th Oct. 2010, *R.*

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D. Gore 391 (WCAS). **Kolhapur:** Shivaji University campus, (16°40'36.0"N 74°15'21.8"E), 4th Dec. 2014, *G. M. Tambde 070* (BAMU). **Osmanabad:** Paranda, 28th Aug. 1964, *V. N. Naik* 721 (BAMU). **Pune:** Atkarwadi, 16th Sept. 1956, *V. D. Vartak 5859*; Sangvi, 1st Oct. 2010, *J. Jadhav Bot 16* (AHMA). **Solapur:** Gangewadi, 1st Oct. 2010, *J. Jayanti & S. C. Yadav 198289* (BSI).

Illus: Sivar. & Pradeep, *op. cit.*

Distribution and Ecology: Throughout the Maharashtra state; common on waste places.

Note: *Sida spinosa* differs from others species of *Sida* in having 1–2 spiny emergences (spurs) at its leaf petiole base. The plant is heliophilous and prefers loamy or laterite soil with some admixture of humus.

RESULTS AND DISCUSSION

The genus *Sida* L. is represented by about 157 species distributed in the tropical and subtropical parts of the World (The Plant List, 2013), the genus has its main centers of diversity in the New World tropics and in Australia, and hence the genus might be of new World origin. Paul (1993) enumerated occurrence of 12 species from India. Later on Sivarajan and Pradeep (1996) in their monographic work on Malvaceae of Southern Peninsular India reported 17 species. Subsequently, *Sida tiagii* by Bhandari (1977) and *Sida ravii* by Sivadasan and Anil Kumar (1996) were described as new species, while *Sida unicornis* Maris. was reported as new distributional record for India by Santhosh Kumar *et al*. (2001) from Thiruvananthapuram of Kerala state. Thus, 20 species of *Sida* species are reported for India. *Sida alnifolia* Cav., *Sida beddomei* Jacob., *S. ravii* Sivad. & Anil Kumar and *S. fryxellii* Sivar. & Pradeep are endemic to Indian peninsula.

Almeida (1996) and Venkanna and Das Das (2000) have enumerated 8 species and 2 varieties each of genus *Sida* in 'Flora of Maharashtra state'. The present investigation revealed that the actual number of species for Maharashtra state is 11 and a variety on the basis of critical investigation and field observations.

Sida acuta, S. cordata, S. mysorensis, S. ovata and *S. spinosa* are distributed throughout the state and grows on wastelands and along roadsides. *S. alnifolia, S. rhombifolia, S. rhomboidea* and *S. scabrida* occurs more or less throughout the state along hills slopes and undergrowth of disturbed forests. *S. cordifolia* occurs in Kolhapur, Latur and Nanded districts of the state. *S. schimperiana* is rare and collected only once from Gadchiroli district, while *S. elongata* var. *balica* known only from Aurangabad, Kolhapur and Nanded districts. *S. scabrida* is also known to occur only from Kolhapur district.

Sida spinosa and *S. cordifolia* differs from other species due to its white or pale yellow petals. *S. cordata, S. elongata* var. *balica, S. mysorensis, S. schimperiana and S. spinosa* possess 5 mericarps; *S. acuta* differs due to the 6–8 mericarps, while, *S. cordifolia, S. ovata, S. rhombifolia, S. rhomboidea, S. alnifolia* and *S. scabrida* having 8–10 mericarps.

The present investigation indicated that thorough collections and critical observations would reveal new discoveries and better understanding of *Sida* species.

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