



Palynotaxonomical Studies of *Sida* L. Species Belong to Nalgonda District, Telangana, India

Devarinti Srihari
Reddy

Government Degree College, Ramannapet

A.Vijayabhasker
Reddy

Department of Botany, Osmania University, Hyderabad

ABSTRACT

Sida L. species belong to the family Malvaceae. In ancient literature *Sida cordifolia* is also called as 'Bala' and used as medicinal plant. In the present palynotaxonomical study, 5 species of *Sida* L. genus belong to Nalgonda District, Telangana are investigated. Pollen morphology of *Sida acuta*, *S.cordata*, *S.cordifolia*, *S.mysorensis* and *S.spinosa* is studied. Pollen size, spinal length, aperture pattern of these pollen grains vary among the species which are useful in their identification.

KEYWORDS : *Sida* L. species, *Sida acuta*, *S.cordata*, *S.cordifolia*, *S.mysorensis*, *S.spinosa*, Bala, Nalgonda District, Telangana

INTRODUCTION

The Malvaceae is a family of herbs, shrubs and small trees, distributed worldwide and is comprised of 110 genera and over 2000 species, divided into six tribes: Maloepae, Malveae, Hibiscieae, Abutilieae, Ureneae and Decaschistieae (La Duke & Doebley, 1995; Krebs, 1994, a & base; Bates 1968). Malvaceae sensu APG included Bombacaceae, Sterculiaceae and Tiliaceae based on their phylogenetic relationship (William S. Alverson et. al, 1999).

The pollen of Malvaceae is characterized by large size, spherical shape, colporate or porporate aperture and echinate sculpture. Pollen morphology of this family was studied earlier by Sayeeduddin et al., (1942), Erdtman (1952, 1960), Saad (1960), Nair (1962), Chaudhari (1965), Nayar (1990), El naggar (2004). Culhane & Blackmore (1988) classified this family into six pollen types, based on number of apertures, grain diameter and spinular morphology. Christensen (1986) conducted most comprehensive study of the Malvaceae. Perveen et al., (1994) studied pollen morphology of 42 species belonging to 12

genera from Pakistan. In India, in the recent period not much work has been done on palynotaxonomy of Malvaceae family in general and on *Sida* L. species in particular. Here pollen morphology of 5 *Sida* L. species *Sida acuta*, *S.cordata*, *S.cordifolia*, *S.mysorensis* and *S.spinosa* belong to Nalgonda District, Telangana, India is described.

MATERIALS AND METHODS

During 2015-16, field trips were conducted and species belong to *Sida* L. genus were collected from various localities of the district. Collected specimens were preserved in the form of herbarium, identified and authenticated by Botanical Survey of India, Hyderabad. Pollen extracted from the fresh samples were acetolysed as per Erdtman (1952, 1960), mounted on glycerine jelly and microphotographs of observed specimens were taken with the help of Olympus CH 20i microscope. Measurements are taken in μm (millimicron) after calibration. Each measurement value is based on minimum 15 readings of a specimen.

RESULTS AND DISCUSSION

Table 1: General pollen characters of different species of *Sida* L. genus.

S.No.	Name	Pollen shape	Pollen size (μm) Min. (Mean \pm S.E.) Max.	Exine Sculpture	Aperture character	Aperture No./ diameter (μm)	Spine length (μm)
1.	<i>Sida acuta</i> Burm.f.	Spheroidal	56.7(59.9 \pm 0.88) 62.03	Echinate	Pantoporate	<5/5.8(6.5)6.9	2(2.5) 2.94
2.	<i>S. cordata</i> (Burm.f.)Borss	Spheroidal	61.46(62.5 \pm 0.4) 63.49	Echinate	Pantoporate	5-10/2.5(2.7)2.9	2(2.3)2.8
3.	<i>S. cordifolia</i> L.	Spheroidal	57.71(63.3 \pm 1.7) 67.14	Echinate	Pantoporate	\leq 5/3.6(4.8)5.4	6.33(7)7.63
4.	<i>S.mysorensis</i> Wight & Arn.	Spheroidal	62.7(65.9 \pm 0.8) 68.55	Echinate	Pantoporate	>8/2.2(2.6)2.93	3.6(3.82)4
5.	<i>S. spinosa</i> L.	Spheroidal	63.11(63.4 \pm 0) 63.75	Echinate	Pantoporate	\leq 5/4.25(5)5.8	4.89(5.74)6.3

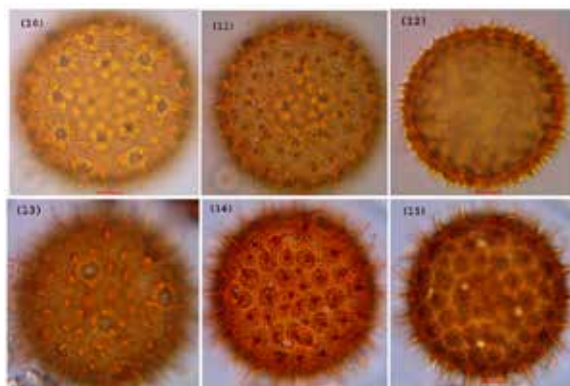
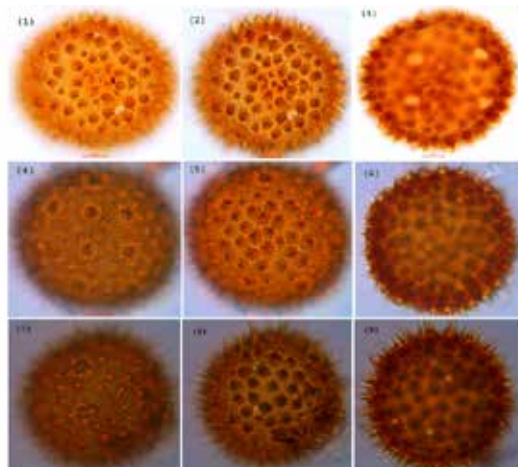


Plate 1: Figures 1-3 (x1000) *Sida acuta*, 4-6 (x1000) *S.cordata*, 7-9 (x1000) *S.cordifolia*, 10-12 (x1000) *S.mysorensis* and 13-15 (x1000) *S.spinosa*; Column 1-low, 2-medium, 3-high focussed; scale bar 10 μm .

Pollen key for identification

1. Aperture number ≤ 5
2. Spine length less than 6.3 μm
3. Aperture diameter $\geq 5.8 \mu\text{m}$ and spine length $\leq 3 \mu\text{m}$ _____
Sida acuta
3. Aperture diameter $\leq 5.8 \mu\text{m}$ and spine length $\geq 3 \mu\text{m}$ _____ S.
spinosa
2. Spine length 6 μm and aperture diameter ~ 3.6 -5.4
 μm _____ S.cordifolia

1. Aperture number ≥ 5

2. Spine length ~ 2 -2.8 μm , aperture number 5-10 _____ S.
cordata
2. Spine length ~ 3.6 -4 μm , aperture number more than 8
_____ S.mysorensis

Pollen of all the species belong to this genus are spheroidal in shape, common in having spinal base and pollen size varies slightly. Aperture number/diameter and spine length varies distinctly (Plate 1 and Table 1), hence taken as criteria for identification in the pollen key. In ancient Ayurveda literature, Sida cordifolia belong to this family was called as 'Bala'. Sida L. species are useful as medicinal herbs (Mahesh, 2008 and Dinba, 2015). Pollen key characters are useful in delimitation of species in this genus.

CONCLUSION:

In this study we investigated Sida mysorensis and S.spinosa for the first time as per the literature available. Pollen flora belong to Sida L. genus of Maharashtra was earlier studied by Nayar T.S. (1990). More extensive work need to be conducted to investigate some more species of this genus. This work might be useful in the identification of pollen in aeropalynological and mellitopalynological samples and in the taxonomical basis for the relationship of taxa belong to different genera of the Malvaceae family.

ACKNOWLEDGEMENT

We are grateful to the Head, Department of Botany, Osmania University and the Principal, Government Degree College, Ramannapet for the facilities provided and cooperation extended. We are thankful to Dr. J. Swamy, BSI, Hyderabad, Dr. T. Pullaiah and Dr. Sadasivaiah for their kind help in identification and authentication of species belong to this genera.

This work is done with the financial support of Minor Research Project grants from UGC, New Delhi.

REFERENCES:

1. Bates, D. M. 1968: Generic relationships in the Malvaceae, tribe Malveae. – Gentes Herbarum 10:117-135.
2. Chaudhuri, S. K. 1965: Pollen morphological studies of the order Malvales II. – Bull. Bot. Soc. Bengal. 19: 147-158.
3. Christensen, P. B. 1986 a: Pollen morphological studies in the Malvaceae. – Grana 25: 95-117.
4. Culhane, K. J., Blackmore, S. 1988: The Northwest European Pollen Flora, 41, Malvaceae. – Rev. Palaeobot. Palynol. 57: 45-74.
5. Dinba B., 2015, The genus Sida L. - A traditional medicine: Its ethnopharmacological, phytochemical and pharmacological data for commercial exploitation in herbal drugs industry, J Ethnopharmacol, 176:135-76.
6. El Naggat, S.M. 2004. Pollen morphology of Egyptian Malvaceae: An assessment of taxonomic value. Turk. J. Bot., 28: 227-240.
7. Erdtman, G. 1952: Pollen Morphology and Plant Taxonomy. Angiosperms. – Stockholm.
8. — 1960: The acetolysis method: A revised description. – Svensk. Bot. Tidskr. 54: 561-564. Erdtman, G. 1969. Handbook of palynology.- 486 pp.
9. Faegri, K. and J. Iversen. 1975. Text Book of Pollen Analysis. 3rd revised edition by K. Faegri, Munksgaard, Copenhagen and Denmark. pp. 295.
10. Krebs, G. 1994b. Taxonomische Untersuchungen in der Subtribus Malvinae II. Dinacrusa. Feddes Report, 105: 299-315.
11. La Duke, J. C. and J. Doebley. 1995. A chloroplast DNA based phylogeny of the Malvaceae. Syst. Bot., 20: 259-271.
12. Mahesh B. and S. Satish, 2008, Antimicrobial Activity of Some Important Medicinal

- Plants Against Plant and Human Pathogens, World Journal of Agricultural Sciences 4 (S): 839-843.
13. Nair, P. K. K. 1962. Pollen grains of Indian plants. III. Bull. Natl. Bot. Gard. Lucknow 63: 1-33.
14. Nayar T.S, Pollen flora of Maharashtra state, India, 1990, Today and Tomorrow's Publication, New Dehli.
15. Nilsson, S. & Muller, J. 1978. Recommended palynological terms and definitions. – Grana 17: 55-58.
16. Perveen, A., S. Siddiqui, A. Fatima and M. Qaiser. 1994. Pollen Flora of Pakistan- I. Malvaceae. Pak. J. Bot., 26(2): 421-440.
17. Prasad, S. S. 1961. Pollen grain morphology of certain Malvaceae. – J. Indian Bot. Soc. 42: 463-469.
18. Presting, D., Straka, H. & Friedrich, B. 1983. Malvaceae. – In: Palynologia Madagassica et Mascarenica (ed. H. Straka). – Trop. Subtrop. Pflanzenwelt 44: 145-157.
19. Reitsma, T. 1969. Size modification of recent pollen grains under different treatments. Rev. Palaeobot Palyno, 19: 175-202.
20. Saad, S.I. 1960. The sporoderm stratification in Malvaceae. Pollen and spore, 2: 13-41.
21. Sayeeduddin, M., M. Saleem and M.R. Suxena. 1942. A comparative study of the structure of pollen grain in some of the families of angiosperms. J. Osmania Univ., 10: 12-15.
22. Srivastava, D. 1982. Studies on the pollen biology of certain cultivated Malvaceae. – In: Advances in pollen spore research (ed. P. K. K. Nair). – 165 pp. Today and Tomorrow's Publication, New Dehli.
23. William S. Alverson et al., 1999. Phylogeny of the core Malvales: evidence from ndhF sequence data. Am. J. Bot., 86(10): 1474-1486.