Original Article

Bulletin of Pure and Applied Sciences.
Vol.37 B (Botany), No.2. Jul-Dec 2018: P.112-116
Print version ISSN 0970 4612
Online version ISSN 2320 3196
DOI 10.5958/2320-3196.2018.00015.0

Palynodiversity of some spices of *Sida* from Bilaspur Region, Chhattisgarh

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Received on 24.05.2018,
Accepted on 12.11.2018

Abstract

Palynotaxonomical studies of 4 species of *Sida* from Bilaspur region were performed with the help of numerical analysis, Hierarchial Cluster analysis by using SPSS. The morphological features namely size, shape, apertures, exine ornamentation, pore number, pore size and spine characters of pollen grains were investigated using Light Microscopy. Generally pollen grains of genus *Sida* are spheroidal and have polyporate aperture. The cluster analysis of pollen characters of genus *Sida* claearly indicates the presence of two major categories on the basis of shape and aperture of pollen grains. Pollen morphological characters are quite important and helpful in delimiting of 4 species of taxa .,viz., *Sida acuta, Sida cordata, Sida rhombifolia* and *Sida spinosa.*

Keywords: Palynodiversity, Palynodiversity, Hierarchial Cluster analysis, SPSS.

INTRODUCTION

The taxa *Sida* L., belongs to the family Malvaceae. In India, the family is represented by 22 genera and 93 species. The members are predominantly annual or perennial herbs (Anami and Jaspin, 2017). Species of Sida are weedy species, small herbaceaous, yellow and white flowers which having five sepals, five petals and numerous monadelphous stamens (Arora, 2014). Studies of morphological features of pollen grains provide a direction to identify and distinguishing the biological variants. The term palynology was coined by Hyde and Williams (1945) on the basis of two Greek words *"Paluno"* meaning "to sprinkle"and *"Pale"* meaning "dust".Wodehouse (1935) has documented the fundamental character of the angiosperm pollen morphology. Erdtman (1952) demonstrated the importance and implication of pollen morphology in angiosperm taxonomy. Pollen grains have characteristic architectural attributes which are useful in comparative morphological studies. Palynology is one of the important taxonomical tools to recognize particular taxon to the species level during the mellisopalynological studies or forensic palynological studies. Hierarchial Cluster analysis

is a numerical analysis which plays significant role in distinct grouping or segregation of closely associated species. The objective of the present paper is to provide an account of the pollen morphology of these 4 species of genus Sida to evaluvate the relationship.

MATERIALS & METHODS

Bilaspur region is located between 22.09°N and 82.15°E. For the present investigation the pollen samples were collected from three different locality *Viz.,* Campus of Guru Ghasidas Vishwavidhyalaya, (Fig. 1).

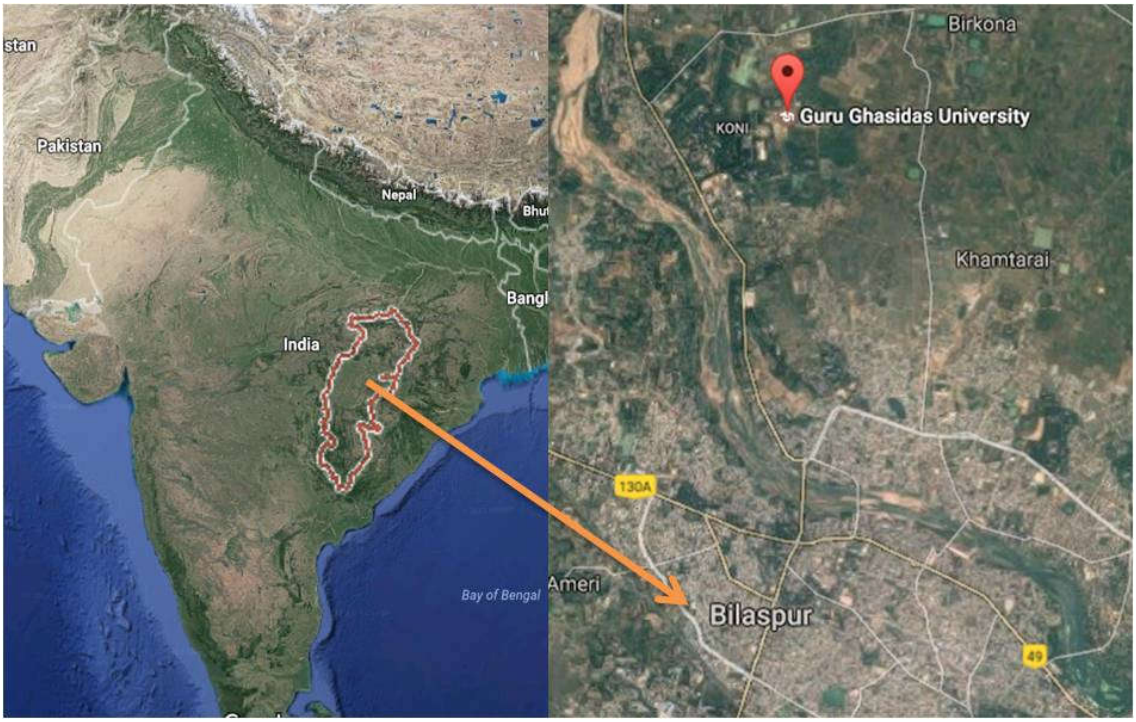

Figure 1: Showing sites of Sample collection. Chhattisgarh state in India, Bilaspur region and Study area namely Guru Ghasidas University. (Source- Google maps).

The pollen samples were collected from unopened anthers. Collected samples of anthers were kept in glass bottle containing 70% alcohol. The pollen grains were acetolysed in acetolysis mixture suggested by Erdtman (1952) with an amendment in the acetolysis mixture, i.e., instead of acetic anhydride, acetyl chloride has been used due to safety purposes. For the staining of pollen grain basic fuchsine is added in the glycerine gelly. The slides were observed under the digital microscope model Leica DM 2000. Morphological characters such as size, shape, number, position and character of aperture (NPC), exine ornamentation, tactum, pore size, length of spine and their shape have been undertaken for the identification of pollen grains. The morphological characters of pollens were analyzed using the terminology suggested by Punt *et al*. (2007).

RESULT AND OBSERVATION

The pollen grains of various species of taxa Sida of have one common character i.e. the nature of poly apertures and echinate nature of exine ornamentation. Most of the pollen grains have been found in spheroidal shape and polyporate. On the basis of the arrangement of pores pollen grains have been devided into two types (1) Polyporate (2) Polyzonocolporate. The difference in some characters in the pollen grains of four species of *Sida* is shown in Table 01 and Table 02.

Table 1: Showing Genus name, Size, Shape, Exine ornamentation and Pores arrangement of pollen grains

No.	Name of Genus	Size	Shape	P/E ratio	Exine ornamentation	Pores arrangement
1.	*Sida acuta*	68.93	Oblate-Spheroidal	0.97	Echinate	Polyzonocolporate
2.	*Sida cordata*	67.1	Spheroidal	1.01	Echinate	Polyporate
3.	*Sida rombifolia*	77	Spheroidal	1.00	Echinate	Polyporate
4.	*Sida spinosa*	79.75	Spheroidal	1.01	Echinate	Polyporate

Table 2: Showing Genus name, Number of pores, Pore length, Length of spine, Tectum and Spine apex and base of pollen grains

No.	Name of Genus	Number of pores	Pore size	Length of spine	Tectum	Spine apex and base
1.	*Sida acuta*	8-10	5.5 µm	4.12 µm	Clavate spinous	Small pointed apex, Broad bulbous base
2.	*Sida cordata*	22-24	4.12 µm	4.67 µm	Spinulous	Small pointed apex, Broad bulbous base
3.	*Sida rombifolia*	8-10	4.95 µm	4.95 µm	Spinulous	Bulbous base
4.	*Sida spinosa*	8-10	5.5 µm	4.95 µm	Spinulous	Bulbous base, Pointed acute spine

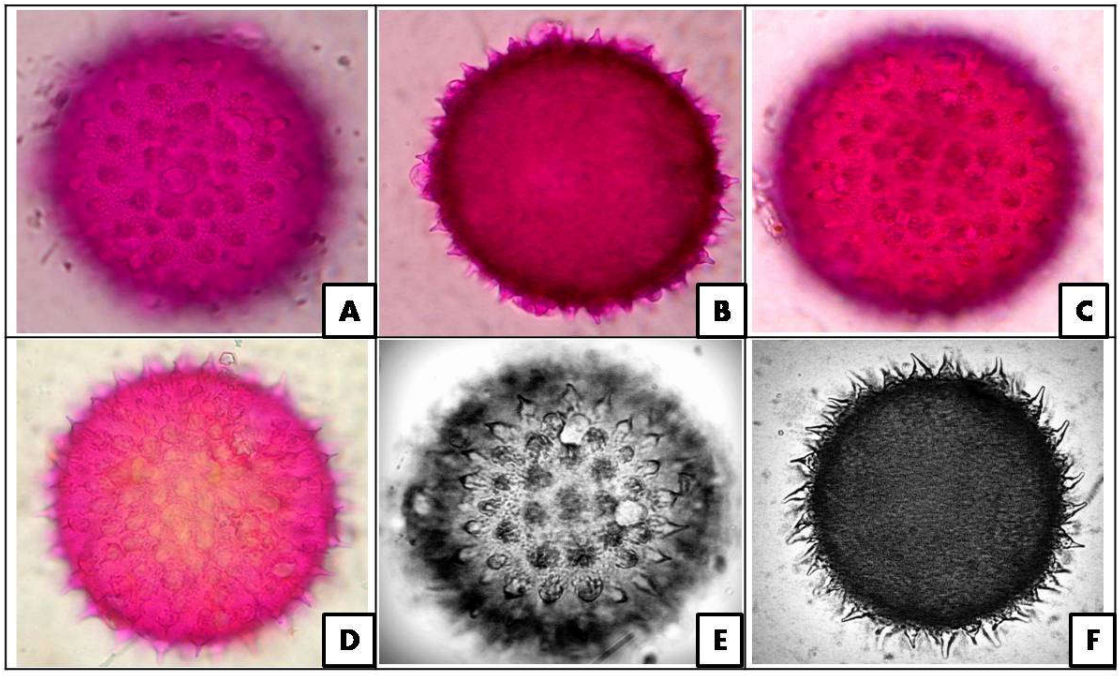

Figure 2: Photomicrograph of pollen grains. A-B. *Sida acuta*, C. *Sida cordata*, D. *Sida rhombifolia* and E-F. *Sida spinosa*.

DISCUSSION

Sida genus is belonging to the family Malvaceae. Hutchinsun (1967) divides Malvaceae into tribes and subtribes. Abtileae tribe is divided into two subtribes Abutilineae and Sidinae. Most of the genera of this family have oblate-spheroidal, spheroidal and prolate-spheroidal pollen grains with polyporate apertures. Generally pollen grains of genus *Sida* are spheroidal and have polyporate aperture. According to Christensen (1986) The pollen of members of Sidinae can be regarded as more advanced in having a higher aperture number, normaly 6-9 apertures. Aperture position varies from zonal area. Spines short, pointed with basel cushions. The numerical analysis was performed by using SPSS. The cluster analysis of pollen characters of genus *Sida* claearly indicates the presence of two major categories on the basis of shape and aperture of pollen grains. Category-1 is comprises of three species of genus *Sida*., viz., *Sida cordata, Sida rhombifolia* and *Sida spinosa*. Pollen grains are spheroidal and polyporate. *S. rhombifolia* and *S. spinosa* have large sized grains with 10-20 pores where *S. cordata* have small sized grains with 20-30 pores present in the surface of pollen grains. *Sida acuta* categorised in Category II according to the shape and aperture of pollen grains. Pollen grains of *S. acuta* are oblate-spheroidal and polyzonoporate. Pollen morphological characters are quite important and helpful in delimiting the taxa. However, in order to reach any diversity, taxonomic conclusion, micro morphological features of the pollen grains should be used.

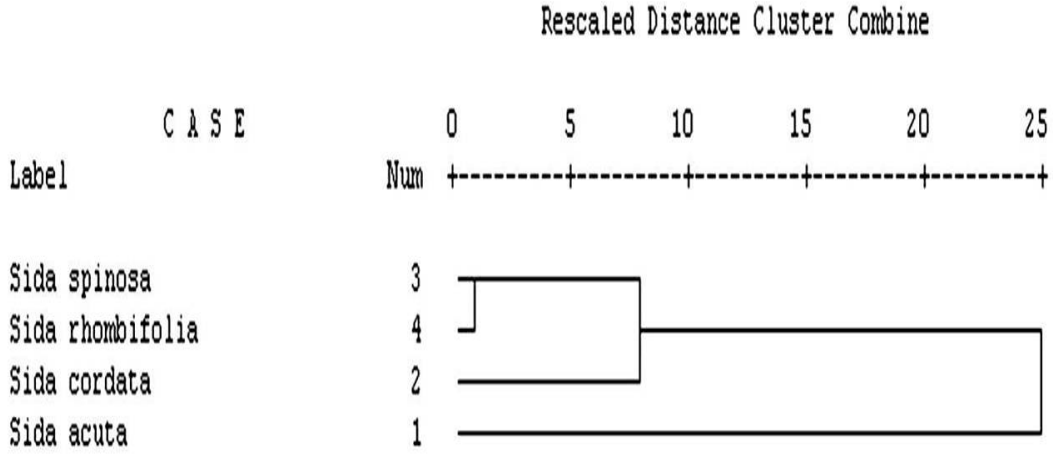

Figure 3: Dendrogram showing the relationships of the species of genus *Sida*.

ACKNOWLEDGEMENTS

The authors are thankful to the Head Department of Botany, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for providing infrastructural facilities during the completion of present investigation. They are thankful to the University Grant Commission, New Delhi, Govt. of India for providing fellowship (JRF) to one of the authors (SS). The thanks are also extended to the Head Department of Zoology, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for extending the facility for photomicrographs of the pollen grains.

REFERENCES

1. Anami, A.A. and Jespin I.C., 2017. Morphological and Anatomical variations seen in Sida L., Kanyakumari District, Tamilnadu. *International Journal of Scientific and Research Publications*. 7.
2. Arora, K., 2014. Pollen Identification of Hibiscus Rosa-Sinensis and Sida acuta Through FTIR Spectroscopy. *Indian Journal of fundamental and Applied Life Sciences*. 4(4): 141-144.
3. Christensen, PB. 1986. Pollen morphological studies in the Malvaceae. *Grana* 25**:** 95-117.

4. Erdtman, G., 1952. Pollen Morphology and Plant Taxonomy, Angiosperm, Chronica Botanica Co., Waltham, Massachusettes.
5. Hutchinson, J., 1967. The genera of flowering plants (Angiospermae) Dicotyledones Vol. II. 659pp. Clarendon Press London.
6. Hyde, H. A., and William, D.A., 1945. Palynology*, Nature*, London. 155-265
7. Punt, W., Hoen, P.P., Blackmore b, S., Nilsson, S., and Thomas, A. Le, 2007, Glossary of pollen and spore terminology, Review *of Palaeobotany and Palynology*. 143: 1–81.
8. Wodehouse, R.P., 1935, *Pollen grains*. New York.