

POLLEN ANALYSIS OF *BLUMEA* SPECIES OF THE FAMILY ASTERACEAE**Sulbha Kulkarni**

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Abstract:

Pollen ornamentation occupies an important diagnostic feature in the pollen grains of the family Asteraceae. In this family varrulate to echinate pollen grains were observed. In the present study variations were observed in the pollen grains of the seven species of *Blumea*. These seven species were *Blumea eriantha* DC, *B. lacera* (Burm. F.) DC, *B. lacineata* (Roxb.), *B. obliqua* (Linn.) Druce, *B. obliqua* (Linn.) Druce var. *aurita* (L.f.), *B. oxydonta* DC and *B. oxydonta* DC var. *prostrata*. Various characters viz. shape, size, symmetry, diameter, ornamentation, exine thickness, number of spines and spine thickness were studied in the species of *Blumea*. All these characters were used to identify the plants at generic and species level. The sculpturing of the exine was highly elaborate in the genus *Blumea* but there were tendencies of simplifications and loss of sculpturing in anemophilous taxa. In this family anemophily is regarded as a derived condition and the reduction in the sculpturing of exine appears to be closely related to the different pollination methods. These pollen characters significantly contributed to the various aspects of agricultural research which are responsible for green revolution in the country.

Keywords: Anemophily, Asteraceae, *Blumea*, ornamentation and sculpturing.

Introduction

The study of pollen morphology was being made to advance the knowledge in morphological botany or to supplement the taxonomic description of plants. The study of pollen grains gained the special significance in various fields of research specially in agricultural research. It is responsible for green revolution in the country. The knowledge of pollen morphology became an essential pre-requisite in applied palynology (Nair, 1970). The analysis of pollen is an important tool for taxonomic purposes and for knowing about the vegetation of past (Echlin, 1968). It is an important adjunct for the systematic assessment of any taxon (Raj, 1961; Tarnavski and Petria, 1968).

Pollen grains are very conservative, thus facilitating the identification of plants at various taxonomic levels. Its investigation served to identify the eurypalynous or stenopalynous group. Family Asteraceae shows eurypalynous type of pollen grains which forms a basis to delimit the taxa. Different characters of pollen helps in simplifying and classifying the taxa at taxonomic level. In this family, anemophily is regarded as a derived condition and the reduction in sculpturing of exine appears to be closely related to the different pollination methods.

Materials and Methods

Pollen grains of *Blumea* taxa were collected from different regions of Nagpur. Matured pollen grains were kept in 70% alcohol of air tight vials. To study the pollen morphology, pollens were acetolysed by

acetolysis method (Erdtman, 1960). Slides were prepared and serial numbers were given to the slides. To study the pollen characters, slides were observed under electron microscope and microphotographs of the pollen were taken.

Observations

In the present work following pollen characters viz. shape, size, symmetry, diameter, ornamentation, exine thickness, number of spines and spine thickness were studied. All these characters were depicted in Table-I, II and Fig.-I.

Blumea eriantha DC.

Pollen grains medium size, isopolar, oblate – spheroidal, radially symmetrical, tricolporate, exine thick, echinate, 5-6 spines in the interapertural region, interspinal area psilate, diameter 29.5μ ($28.5-30\mu$), exine thickness 3.0μ , spine thickness 25μ , clear demarcation between sexine – nexine.

Blumea lacera (Burm. F.) DC.

Pollen grains are of medium size, isopolar, spheroidal, radially symmetrical, tricolporate, exine thick, echinate, 6-7 spines in the interapertural region, interspinal space psilate and foveolate, diameter 29.5μ ($28.5-30\mu$), exine thickness 2.0μ , spine thickness 1.76μ , LO pattern observed, demarcation between sexine – nexine.

Blumea lacineata (Roxb.) DC.

Pollen grains are medium size, isopolar, prolate, radially symmetrical, tricolporate, exine thick, echinate, 4-spines in the interapertural region,

interspinal space psilate, diameter 29.3 μ (28-30) μ , exine thickness 3.0 μ , spine thickness variable 2-2.5 μ , stratification on the spines, LO pattern observed.

Blumea obliqua (Linn.) Druce.

Pollen grains are medium size, isopolar, spheroidal, radially symmetrical, tricolporate, exine thick, echinate, 4-5 spines in the interapertural region, interspinal space foveolate, diameter 29.3 μ (28-30) μ , exine thickness 4.5 μ , spine thickness 3.5 μ , interspinal distance 2 μ , colpi length 3.5 μ clear demarcation between sexine – nexine.

Blumea obliqua (Linn.) Druce var. *aurita*. (L.f)

Pollen grains are medium size, isopolar, zonocolporate, spheroidal, radially symmetrical, tricolporate, exine thick, echinate, 4-6 spines in the interapertural region, interspinal space is foveolate, diameter 28.6 μ (28-30) μ , exine thickness 3.5 μ , spine thickness 2.5 μ , interspinal distance 2, colpi length 4.5 μ , L.O. pattern, clear demarcation between sexine – nexine.

Blumea oxyodonta DC.

Pollen grains are small, isopolar, spheroidal, radially symmetrical, exine thick, echinate, 4-spines in the interapertural region, interspinal space psilate and foveolate, diameter 22.5 μ (22-23.5) μ , exine thickness 2.5, spine thickness 2.0 μ , interspinal distance variable

from 2-2.5 μ , colpi length 3.5 μ , L.O. pattern, clear demarcation between sexine – nexine.

Blumea oxyodonta DC. var. *prostrata*

Similar pollen characters are present in this variety as present in above B, oxyodonta species but difference is that diameter of pollen is less, i.e. 17.55 μ (17-18.5) μ and number of spines are more i.e. six in the interapertural region.

Result and Discussion

Result of the present work was depicted in the Table-I and Table-II. All the pollen grains were eurypalynous type. They showed variations and similarities in all the taxa of *Blumea* DC (nom.cons.). Ornamentations and symmetry were similar in all taxa where as variations were observed in some other parameters like - shape, size, diameter, exine thickness, number of spines and spine thickness. These characters help to study the taxonomic status of the *Blumea* species. All the pollen grains were echinate and radial (Swati And Ramkrishnan, 2012), which is beneficial to increase the yield as it showed the type of pollination. Size of all *Blumea* species was medium where as pollen grains were small in *B. oxyodonta*. In *Blumea eriantha* DC and *Blumea lacineata* (Roxb.) shape was Oblate spheroidal and prolate respectively where as remaining species were spheroidal. Variations were observed in diameter, exine thickness, number of spines and spines thickness in *Blumea* species (Table-II) (Peter, 1971; Bhojraj, 1965).

Table-I: Pollen characters of *Blumea* species.

S. No	Name of pollen Parameters \Rightarrow \Downarrow	<i>Blumea eriantha</i> DC	<i>Blumea lacera</i> (Burm. f.) DC	<i>Blumea lacineata</i> (Roxb.) DC	<i>Blumea obliqua</i> (L.) Druce	<i>Blumea obliqua</i> var. <i>aurita</i> (L.) Druce	<i>Blumea oxyodonta</i> DC	<i>Blumea oxyodonta</i> var. <i>prostrata</i> DC
1	Shape	Oblate spheroidal	Spheroidal	Prolate	Spheroidal	Spheroidal	Spheroidal	Spheroidal
2	Size	Medium	Medium	Medium	Medium	Medium	Small	Small
3	Symmetry	Radial	Radial	Radial	Radial	Radial	Radial	Radial
4	Diameter	29.5 μ	29.5 μ	29.3 μ	29.3 μ	28.6 μ	22.5 μ	17.5 μ
5	Ornamentation	Echinate	Echinate	Echinate	Echinate	Echinate	Echinate	Echinate
6	Exine thickness	3.0 μ	2.7 μ	3.0 μ	4.5 μ	4.5 μ	2.5 μ	2.5 μ
7	No. of spines	5-6	6-7	4	4-5	4-6	4	6
8	Spine thickness	2.5 μ	1.7 μ	2-2.5 μ	3.5 μ	2.5 μ	2.0 μ	2.2 μ

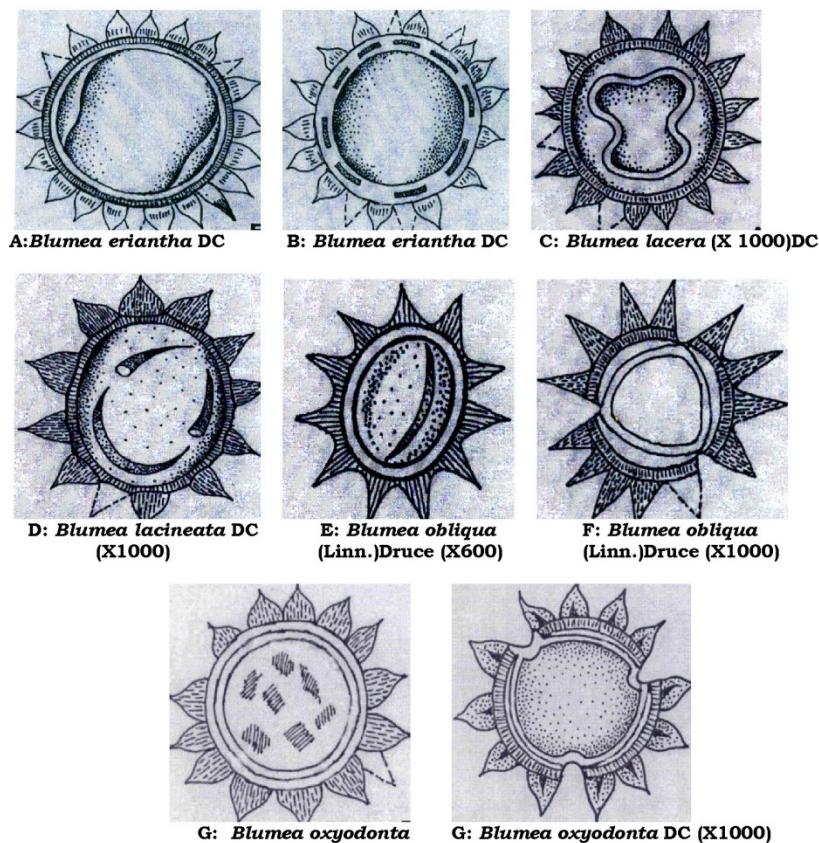


Figure-I

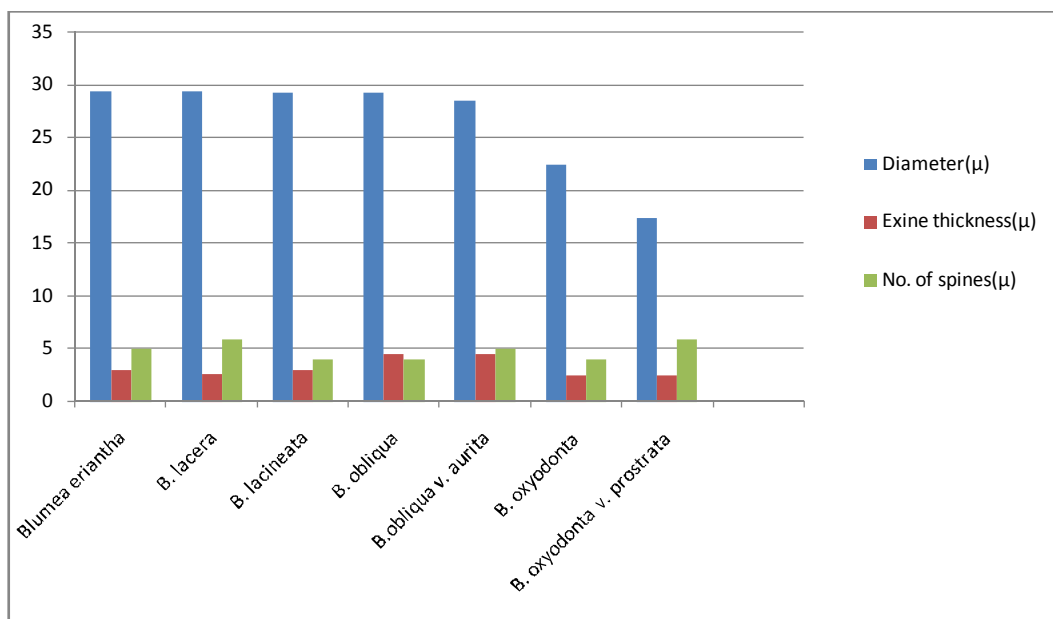


Figure 2 Variations and similarities in pollen characters (Diameter, exine thickness and number of spines)

Conclusion

Present study indicates that pollen morphology showed relationship and not individualization. All the species in single genus have the same pollen type where the some characters were the same but differences were existing in their spine characters. These pollen characters were significantly contributed to the

various aspects of agricultural research. These characters were also helpful to place them at their generic and species level. Pollen ornamentation also shows the type of pollination which is beneficial to increase the yield.

Acknowledgements:

Author is very much thankful to Dr. K.H. Makde, Dr. N.M. Dongarwar and Hon'ble Principal Dr. P.N. Charde for their valuable guidance and support during work.

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