INT. J. BIO. BIOTECH., 2(3): 553-556, 2005.

THE POLLEN MORPHOLOGY OF THE GENERA *NESLIA, OCTOCERAS, BRAYA, DICERATELLA* (BRASSICACEAE) FROM PAKISTAN

Rehana Khan

Department of Botany, Federal Urdu University of Arts, Sciences and Technology, Gulshan-e-Iqbal Karachi, Pakistan

ABSTRACT

The pollen morphology of the 4 genera of Brassicaceae has been examined by light microscope. The shape of pollen grains are prolate spheriodal to prolate. On the basis of the shape, the pollen grains are divided in two groups.

Key words: Pollen morphology, *Neslia, Octoceras, Braya, Diceratella,* Brassicaceae

INTRODUCTION

Brassicaceae is comprised of 350 genera and nearly 3000 species. Primarily the family grows in cooler climates and lesser or greater degree. Of these only 90 genera and 250 species are reported from Pakistan, including 5 genera and 14 species are cultivated (Jafri, 1973). The modern classification of the family Brassicaceae at least at the generic level was suggested by Schulz (1874, 1936). He recognized 360 genera throughout the world.

The term palynology was coined by Hyde and Williams (1945) that means pollen and spore science. The importance of palynology in plant taxonomy has been stressed by Wodchous (1935), Erdtman (1952), Raj (1961), Praylowski (1970). Palynology has shown a broad contact with plant taxonomy (Clark *et al.*, 1980). Taxonomical amendment based on morphological characters are confirmed on the palynological evidences. Pollen morphology of Brassicaceae has also attracted many workers. Mohal (1834, 1835), Fisher (1890), Khan (2003, 2004) studied the pollen morphology of the genera *Arabidopsis*, *Alyssum* and *Thlaspi* belonging to the family Brassicaceae from Pakistan. The present investigation is based on the pollen morphology of 4 taxa representing 4 genera of the family Brassicaceae by light microscope.

MATERIALS AND METHODS

Pollen samples were obtained from Karachi University Herbarium (KUH) or collected from the field. The list of voucher specimen is deposited in KUH. The pollen grains were prepared for light microscope (LM) by the standard methods in unstained glycerine jelly and observations were made with a Nikon type microscope, E-40 and oil immersion (E-100, 1.25) using 10 x eye piece.

The measurement are based on 15-20 readings from each specimen. Pollen diameter, polar asix (P) and equatorial diameter (E) aperture size, apocolpium, mesocolpium in diameter and exine thickness were measured.

The terminology for pollen description has been borrowed from Erdtman (1952), Faegri and Iversen (1964), Kremp (1965), Clark (1977) and Walker and Doyle (1975).

1. *Braya* Sterub & Hoppe in Danka

Pollen grains intersubangular, isopolar prolate spheriodal to prolate, in shape, small size, polar axis 21 (20) 22 μm, equatorial diameter 19 (20) 20 μm, mesocolpia 14.3 μm, in diameter, apocolpia 5.5 μm in diameter. 3-colpate, colpi 16.5 x 1.1 μm long, exine 2.2 μm thick, tectum reticulate, hetrobrochater.

Species included: *Braya rosea* (Turcz) Burge in Del.

2. *Diceratella* Boiss.

Pollen grains, intersubangular, slightly circular, prolate spheriodal to subprolate, medium size, polar axis 22 (27) 31 μm, equatorial diameter 20 (22) 23 μm, mesocolpia 15.4 μm, in diameter apocolpia 7.7 μm in diameter. 3-colpate, colpi 20 x 2.2. μm long, exine 1.5-2.2 μm thick, tectum reticulate, sexine more or less as thick as nexine.

Species included: *Diceratella canescens* (Boiss.) Boiss.

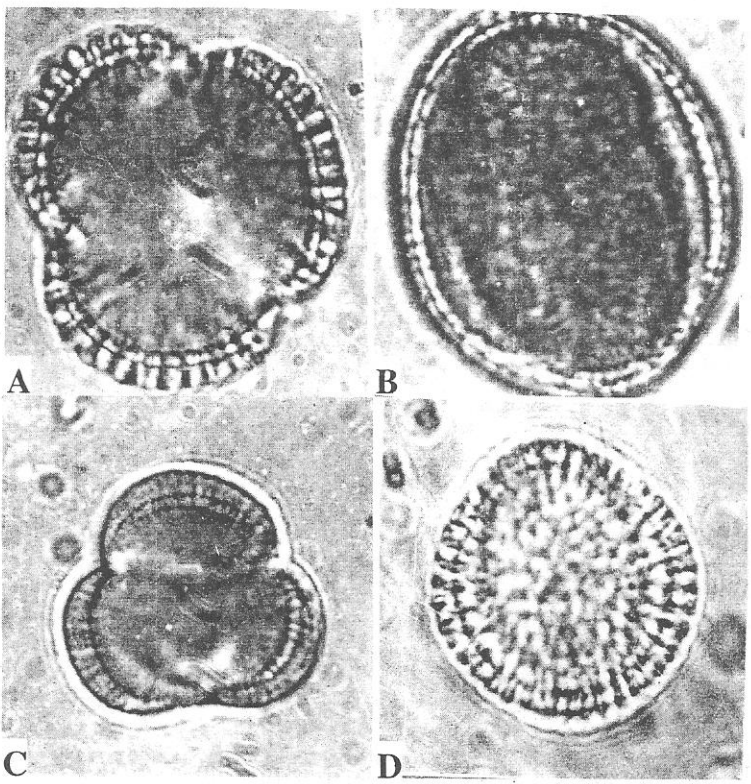

Fig. 1. Light micrograph of pollen grains *Braya rosea*. A. Polar view, B. Equatorial view. *Diceratella canescens*. C. Polar view, D. Equatorial view.

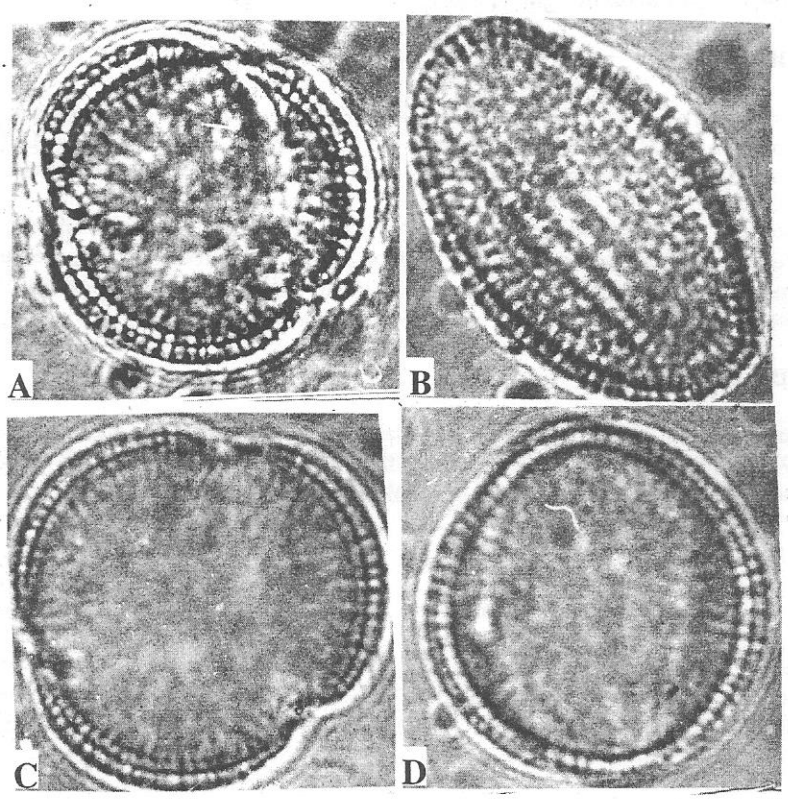

Fig. 2. Light micrograph of pollen grains *Neslia apiculata*. A. Polar view, B. Equatorial view. *Octoceras lehmannianum*. C. Polar view, D. Equatorial view.

3. *Neslia* Desvt.

Pollen grains, intersubangular, prolate, small size, polar axis 24 (28) 32 μm, equatorial 22 (24) 25 μm, mesocolpia 18.4 μm in diameter, apocolpia 2.2 μm in diameter. 3-colpate, colpi 22 x 2.2 μm long, board in the middle, exine 1.1-4.4 μm thick, tectum reticulate tenuimarginate, semitectate.

Species included: *Neslia apiculata*, Fisch C.A. May & Ane-Lau.

4. *Octoceras* Bunge

Pollen grain intersubangular, isopolar, prolate spheriodal, rather small size, polar axis 22 (26) 31 μm, equatorial diameter 21 (23) 27 μm, mesocolpia 17.6 μm in diameter, apocolpia absent due to long colpi. 3-colpate, colpi 22 x 2.2 μm long, exine 1.1-3.3 μm thick tanuimarginate, tectum reticulate sexine much thicker than nexine.

Species included: *Octoceras lehmannianum* Bunge.

Comments

The application of pollen morphology to the plant systematic is comparatively recent trend. Pollen morphology has proved to be a valuable tool in plant taxonomy. Pollen characters have proved useful for systematic studies. Haung (1978) also used pollen character for systematic purpose. The potential influence of pollen morphology on the classifications of flowering plant cannot be over emphasized.

The Brassicaceae family is stenopalynous (Erdtman, 1963) pollen grains are generally 3-colpate and reticulate tectum. Apple and Al-Shehbez (2003) also reported tricolpate and reticulate pollen in the family Brassicaceae. Moore and Webb (1987) classified the family in tricolpate with reticulate pollen. The present findings are based on 4 taxa by light microscope. However, on the basis of pollen shape two distinct pollen group are recognized viz., two genera are included in group A: *Braya rosea* and *Diceratella canesens* which have prolate spheriodal to subprolate shape pollen and group B: has prolate shape pollen in *Neslia apiculata* and *Octoceras lehmannianum*.

Pollen morphological characters of the 4 taxa are differentiated by having several common characters such as thickness of exine, length of colpi and mesocolpia. These pollen characters are further divided on the basis of colpi length, mesocolpia and exine thickness.

ACKNOWLEDGEMENT

I am highly indebted to the Director of the Karachi University Botanical Herbarium (KUH) for providing the specimens used in the study. My thanks are also to Prof. Dr. Qaiser Abbas, Federal Urdu University of Arts, Sciences and Technology, Karachi for the encouragement and support. My thanks are also to Dr. Anjum Perveen of Karachi University for co-operation.

REFERENCES

Appel, O. and I.A. Al-Shehbez (2002). Cruciferae. In: *Families and genera of vascular plants,* volume; V. Flowering Plant Dicotyledons Maludles, Capparales and Non-Betalain Caryophollaceae (K. Kubitzki, C. Bayer eds). Pp.75-174. Springer-Verlarg Berlin Heidelberg, New York.

Carter, A.L., S.T. Rilloms and T. Meneilly (1975). Scanning electron microscope studies of pollen behaviour on immature and mature brussels sprout (*Brassica oleracea* var. *gemunifera*) Stigmas. *Euphytica.*, 24: 133-141.

Clark, W.D., G.K. Brown and R.A. Mayes (1980). Pollen morphology of *Haplopappus* and related genera (Compositae-Astereae). *Amer. J. Bot.*, 67: 1391-1393.

Erdtman, G. (1952). *Pollen morphology and plant taxonomy. Angiosperms*. Chronica Botanica Co., Waltham, Mass/Alumgvist and Wiksell, Stock hols

Erdtman, G. (1966). *Pollen morphology and plant taxonomy. Angiosperms* (An introduction of palynology revised edition), Hanerphtb. Co. New York London.

Faegri, K. and J.K. Iverson (1964). *Text book of pollen analysis*. Munksgaard, Copenhagen.

Fischer, H.J. (1890). *Beitray zur vergleichenden. Morphological der pollen Korner Presien.* Thesis.

Hang, T. (1978). *Pollen flora of Taiwan*. National Taiwan University Botany Department Press.

Hyde, H.A. and D.A.A. Williams (1945). *Nature*, Lond. 156-265.

Jafri, S.M. (1973). *Flora of West Pakistan*. No. 55 Brassicaeae. Department of Botany, University of Karachi.
Jonsell, B. (1986). A monograph of *Farsetia* (Cruciferae). *Acta. Univ. UPS. Symp. Bot. Up. Sal.*, 25: 107.
Kremp, G.O.W. (1965). *Encyclopaedia of pollen morphology*. Univ. Arizona Press, Tuscon, U.S.A.
Lahham, J.N. and D. Al-Essawi (1987). Pollen morphology Jordanian cruciferae. *Mitt. Bot. Staatssamml. Muchen*, 23: 355-375.
Moore, P.D. and J.A. Webb (1978). *An illustrated guide to pollen analysis*. Hoader and Stoughton, London.
Khan, R. (2003). Studies on the pollen morphology of the genus *Alyssum* (Brassicaceae) from Pakistan. *Pak. J. Bot.*, 35: 7-12.
Khan, R. (2004). Studies on the pollen morphology of the genus *Arabidopsis* (Brassicaceae) from Pakistan. *Pak. J. Bot.*, 36: 229-234.
Khan Rehana and Erum (2004). Studies on the pollen morphology of the genus *Thlaspi* (Brassicaecae) from Pakistan. *J. Nat. Hist. Wildl.*, 4: 71-73.
Mohl, H. (1834). *Beitrage zur, Anatomie and phsiologioder, Gewelse frstes heft. Uber, Bau and die forman der pollen korner Bern.*
Mohl, H. (1836). Sur les structure et les formes des grains de pollen. *Ann. Sci not*, 2. Ser, 3.
Perveen, A., M. Qaiser and R. Khan (2004). Pollen flora of Pakistan XLII. Brassicaceae. *Pak. J. Bot.*, 36: 683-700.
Praytowski, J. (1970). The pollen morphology of the Hatoragaeced. *Grana*, 10: 159-239.
Raj, B. (1961). *Grana Palynol.*, 31: 1-108.
Schulz (1936). *In die maturlicheus pflanzen families,* Vol. 2. (A. Englar and H. Harms, eds.) 17b: pp. 227-658.
Selling. (1974). *Studies in Hawaiian pollen statistics Part-II the pollen of the Hawaiian*. Phanerogams. Spac. Public Bishop Mus. Gothenbrig.
Sharma, P.K. and P.K.K. Nair (1973). Study on the pollen production in *Brassica. Palynological Bulletin*, 6: 62-66.
Walker, J.W. and J.A. Doyle (1975). The basis of *Angiosperm Phylogeny Palynology. Ann. Bot. Gard.*, 62: 666-723.
Wodchous, R.P. (1936). *Pollen grains their structure, identification and significance in science and medicine.* MC Laraw-hill, New York, pp. 674.

(*Accepted for publication June 2005*)