

POLLEN FLORA OF PAKISTAN -XIV. CISTACEAE

ANJUM PERVEEN AND M. QAISER

*Department of Botany,
University of Karachi, Karachi-75270, Pakistan*

Abstract

Pollen morphology of the family Cistaceae has been examined from Pakistan by light and scanning electron microscope. Pollen grains are generally tricolporate, triangular, prolate-spheroidal with striate - rugulate tectum.

Introduction

Cistaceae, a small family of 8 genera and about 200 species is distributed in North temperate zone especially in the Mediterranean region (Willis, 1973; Mabberley, 1987). Takhtajan (1969, 1980) and Cronquist (1981) placed the family Cistaceae under the order Violales near Bixaceae and Flacourtiaceae, whereas Thorne (1983) and Dahlgren (1983) kept the family Cistaceae in the order Malvales. In Pakistan it is represented by a single genus with one species i.e. *Helianthemum lippii* (L.) Pers. (Jafri, 1977).

Pollen morphology of the family has been studied by Erdtman (1952); Faegri & Iversen (1964); Wilbur & Perry (1967); Kultina & Spiridonova (1972); Ukrantseva (1976, 1977); Nilsson *et al.*, (1977) and Moore & Webb (1978). Saenz de Rivas (1979) described few species of the family Cistaceae from Spain. There are no reports on the pollen morphology of the family Cistaceae from Pakistan. In the present paper, the pollen morphology of the family Cistaceae from Pakistan has been examined by light and scanning electron microscope.

Materials and Methods

Pollen samples were obtained from Karachi University Herbarium (KUH) or collected from the field. The pollen grains were prepared for light (LM) and scanning electron microscopy (SEM) by the standard methods described by Erdtman (1952). For light microscopy, the pollen grains were mounted in unstained glycerine jelly and observations made with a Nikon Type-2 microscope, under (E40,0.65) and oil immersion (E100,1.25) using 10x eye piece. For SEM studies, pollen grains suspended in a drop of water were directly transferred with a fine pipette to a metallic stub using double sided cellotape and coated with gold in a sputtering chamber (Ion-sputter JFC-1100). Coating was restricted to 150A. The S.E.M examination was carried out on a Jeol microscope JSM-T200. The measurements were based on 15-20 readings from each specimen. Polar axis (P) and equatorial diameter (E), aperture size, apocolpium, mesocolpium and exine thickness were measured.

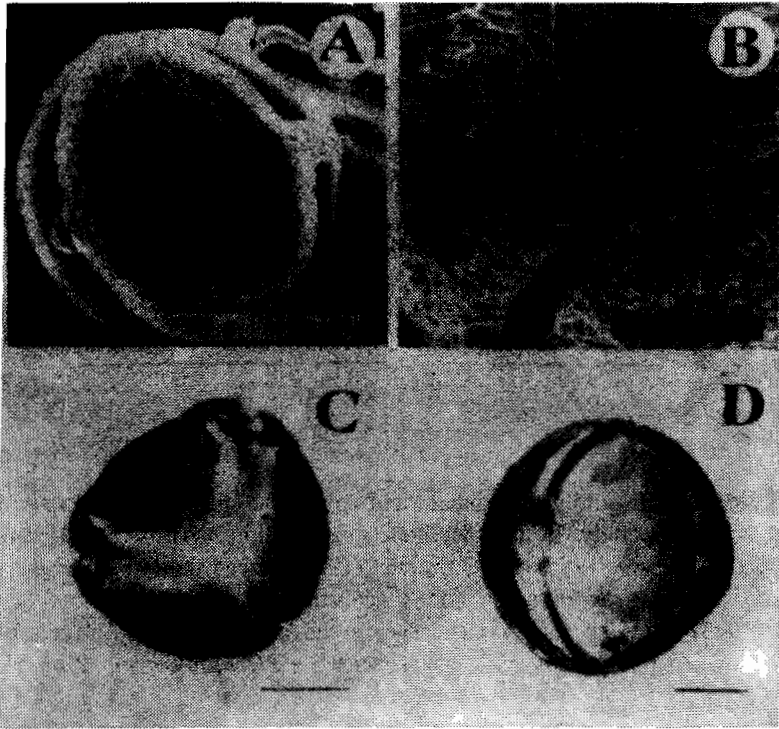


Fig. 1. Pollen of *Helianthemum lippii*:

A & B = Scanning Electron micrographs: A, Equatorial view; B, Exine pattern.

C & D = Light micrographs (LM): C, Polar view; D, Equatorial view

Scale bar = A, C-D = 10 μm ; B = 1 μm

The terminology used is in accordance with Erdtman (1952); Kremp (1965); Faegri & Iversen (1964) and Walker & Doyle (1975).

General pollen characters of the family Cistaceae

Pollen grains generally radially symmetrical, isopolar, prolate - spheroidal, equatorial view elliptic, polar view triangular, colpi long with distinct ora. Tectum striate - rugulate.

Description of pollen type

Helianthemum lippii - type (L.) Pers. (Fig. A-D)

Pollen class: Tricolporate, zonoaperturate.

P/E ratio: Suberect.

Shape: Prolate-spheroidal.

Apertures: Ectoaperture - colpus long, narrow, not sunken, colpi with vestibuli.

Endoaperture - Ora circular distinct. Colpal membrane granulated.

Exine: Sexine thicker than nexine.

Outline: \pm triangular in polar view and elliptic in equatorial view.

Ornamentation: Tectum striate-rugulate,

Measurements: Polar length P(35.01-) 37.62 ± 0.45 (-40.11) μm , and Equatorial diameter E(32.5-) 34.79 ± 0.56 (-37.5) μm . P/E ratio: 1.08 Colpi (30-) 32.43 ± 0.56 (-33.9) μm long. Mesocolpium (25-) 25.62 ± 0.32 (-27.5) μm . Exine (2.75-) 2.96 ± 0.35 (-3.75) μm thick. P.A.I: 0.73

Species included: *Helianthemum lippii* (L.) Pers.

Comments:

Pollen grains of *Helianthemum lippii* type is characterized by tri-zonocolporate pollen with striate - rugulate tectum. Similar type of pollen grains in the genus *Helianthemum* have also been reported by Erdtman (1952); Moore & Webb (1978); Kultina & Spiridonova (1976) and Wilbur & Perry (1967).

The pollen grains of closely related families i.e., Bixaceae and Flacourtiaceae are more or less similar to Cistaceae as both the families have colporate pollen (Erdtman, 1952). However, in the family Flacourtiaceae tectum is reticulate (Keating, 1973).

The placement of Cistaceae within the order Violales by Takhtajan (1969, 1980) and Cronquist (1981) therefore seems to be justified.

Specimens examined: *Helianthemum lippii*: c. 20 km from Baloytan on way to Hoshab, Tahir Ali 828 (KUH); behind Khuzdar, Abdul Ghafoor & Steve M. Goodman 4988 (KUH).

References

- Cronquist, A. 1981. *The Integrated System of Classification of Flowering Plants*. Columbia Univ. Press, New York.
- Dahlgren, R. 1983. General aspects of angiosperm evolution and macrosystematics. *Nordic J. Bot.* , 3: 119-149.
- Erdtman, G. 1952. *Pollen Morphology and Plant Taxonomy. Angiosperms*. Chronica Botanica Co., Waltham, Massachusetts.
- Fægri, K. and J. Iversen. 1964. *Testbook of Pollen Analysis*. Munksgaard, Copenhagen.
- Jafri, S. M. H. 1977. In: *Flora of Pakistan - Cistaceae*, 112: 1-3, (Eds.) E. Nasir and S.I. Ali. Karachi University.
- Keating, R. C. 1973. Pollen morphology and relationships of the the Flacourtiaceae. *Ann. Mo. Bot. Gard.* , 60: 273-305
- Kremp, G. O. W. 1965. *Encyclopaedia of Pollen Morphology*, Univ. Arizona Press, Tuscon, U.S.A.
- Kultina, V. V. and E. A. Spiridonova. 1972. Fossil records of pollen of the genus *Helianthemum* Mill. *Bot. J. Leningrad.* , 57: 1240-1252.
- Mabberley, D. I. 1987. *The Plant Book*. Camb. Univ. Press, Cambridge, New York. 1987.
- Moore, P. D. and J. A. Webb. 1978. *An Illustrated Guide to Pollen Analysis*. Hodder and Stoughton, London.
- Nilsson, S., J. Praglowski and L. Nilsson. 1977. *Atlas of airborne pollen grains and spores in Northern Europe*. Natur Och Kultur, Stockholm.159

- Saenz de Rivas, C. 1979. Pollen morphology of Spanish Cistaceae. *Grana*, 18: 91-98.
- Takhtajan, A. 1969. *Flowering plants (Origin and dispersal)* Oliver & Boyd, Edinburgh.
- Takhtajan, A. 1980. Outline of the classification of flowering plants (Magnoliophyta). *Bot. Rev.* , 46: 225-359.
- Thorne, R. F. 1983. Proposed new realignments in the angiosperms. *Nordic J. Bot.* , 3: 85-117.
- Ukrainitseve, V. V. 1976. The morphological evolution of the pollen of Cistaceae Juss. In IV Int. Palynol. Conf. Luknow. Nauka, Moscow, 28-29
- Ukrainitseve V. V. 1977. The pollen of *Cistus tauricus* Persl from the Odintsovsk deposits of interglacial period in Ivanovo district. *Bot. Jour. SSSR*, 62: 553-554.
- Walker, J. W. and J. A. Doyle. 1976. The basis of Angiosperm phylogeny: Palynology. *Ann. Mo. Bot. Gard.* 62: 666-723. 1976.
- Wilbur, R. L. and J.D. Perry. 1967. Palynological notes on American species of *Helianthemum* (Cistaceae). *Rhodora* , 69: 184-194.
- Willis, J. C. 1973. *A Dictionary of the flowering Plants & Ferns*. VII University Press, Cambridge. 1973.

(Received for publication 26 March, 1997)