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POLLEN FLORA OF PAKISTAN – XVII. ILLECEBRACEAE

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Abstract

Pollen morphology of 6 species belonging to 5 genera of the family Illecebraceae from Pakistan has been investigated using light microscope and scanning microscope. It is an eurypalynous family. Pollen grains usually radially symmetrical, isopolar, oblate-spheroidal to spheroidal, tricolpate or porate. Tectum scabrate-punctate. On the basis of apertural types, 2 distinct pollen types viz., *Pteranthus dichotomus* – type and *Herniaria cinerea* – type are recognized.

Introduction

Illecebraceae, a family of 20 genera and about 100 species is distributed in warm dry regions (Mabberley, 1987; Willis, 1973). In Pakistan, it is represented by 5 genera and 7 species (Ghafoor, 1973).

Pollen morphology of the family Illecebraceae has been examined by a number of workers such a Erdtman (1952), Nowicke (1975), Rao & Shukla (1975), Skvarla & Nowicke (1976); Nowicke & Skvarla (1977, 1979; Moore & Webb, 1978). However, there are almost no reports on the pollen morphology of various species of Illecebraceae found in Pakistan.

Materials and Methods

Pollen samples were obtained from Karachi University Herbarium (KUH) or collected from the field. The list of voucher specimens is deposited in KUH. The pollen grains were prepared for light (LM) by the standard methods described by Erdtman (1952). For light microscopy, the pollen grains were mounted in unstained glycerine jelly and observations were made with a Nikon Type-2 microscope under (640, 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 150^{o}A. 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. Pollen diameter, pore diameter and exine thickness were also measured.

The terminology used is in accordance with Erdtman (1952); Kremp (1965); Faegri & Iversen (1964) and Walker & Doyle (1976).

Observations

General pollen characters of the family *Illecebraceae*

Pollen grains usually radially symmetrical, isopolar, or apolar, spheroidal to oblate-spheroidal or prolate – spheriodal, tricolpate or porate, trilobe, colpi long, with tapering ends, colpal membrane finely – coarsely granulate. Sexine slightly thicker than nexine. Tectum scabrate.

Pollen type - 1: *Pteranthus dichotomus* - type (Fig. 1 A, B; D-F).
Pollen class: Tricolpate, zonoaperturate.
P/E ratio: Suberect to sub-transverse.
Shape: Oblate – spheroidal to prolate – spheroidal.
Apertures: Ectoaperture – colpus long, narrow, not sunken. Colpal membrane densely granulated.
Exine: Sexine thicker than nexine, or as thick as nexine.
Outline: ± trilobed in polar view and elliptic in equatrorial view.
Ornamentation: Tectum-scabrate.
Measurements: Polar axis P(30.5–) 31.7±0.59 (– 32.3) µm, and equatorial diameter E(25.1–) 25.21 ± 0.03 (25.5) µm, P/E ratio: 1.25 Colpi (17.9–) 24.27 ± 2.25 (28.7) µm long. Mesocolpium (17.9–) 20.5 ± 0.94 (–25.13) µm. Apocolpium (1.79–) 2.69 ± 0.89 (–3.6) µm. Exine (1.43–) 1.64 ± 0.10 (–2.15) µm thick. P.A.I. 0.81.
Species included: *Cometes surattensis* L., *Pteranthus dichotomus* Forssk., *Sphaerocoma aucheri* Boiss.
Pollen type - II: ***Herniaria cinerea*** - type (Fig. 1C).
Pollen class: 6-12-porate.
P/E ratio: Adequate.
Shape: Spheroidal.
Apertures: Porate-pore ± circular, pore plate scabrate.
Exine: Sexine slightly thicker than nexine.
Ornamentation: Tectum scabrate.
Measurements: Pollen diameter P(18–) 20.11 ± 0.09 (– 22.25) µm, and equatorial diameter E(17.2–) 19.69 ± 0.28 (– 22.5) µm. P/E ratio: 1.02 pore diameter (12.5–) 16.25 ± 1.24 (– 15) µm long. Exine (1.25–) 1.72 ± 0.1 (–2.25) µm thick.

Species included*:*

Herniaria cachemiriana J.Gay, *Herinaria cinerea* DC., *Gymnocarpos decandra* Forssk.

Key to the species

1. \+ Pollen grains 10-12 porate …… *Gymnocarpos decandra*
   \- Pollen grains 6-porate ……... 2

2. \+ Pore 3–3.9 µm in diameter ……..…… *Herniaria cachemiriana*
   \- Pore c. 5 µm in diameter …… *Herniaria cinerea*

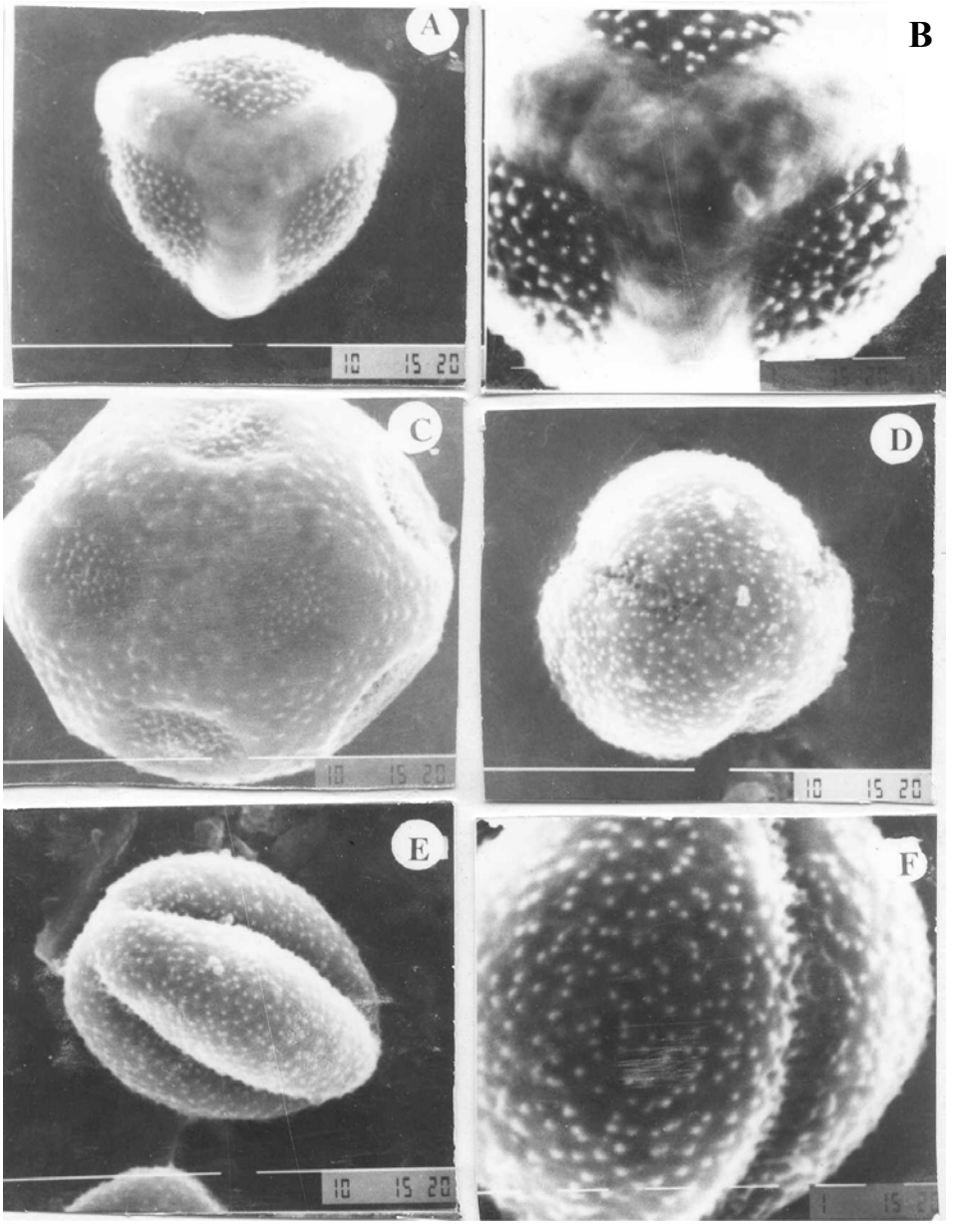

Fig. 1. Scanning micrographs of pollen grains
Pteranthus dichotomus: A, polar view; B, Exine pattern. *Gymnocarpos decander*: C, Pollen grain. *Sphaerocoma aucheri*: D, polar view; E, equatorial view; F, Exine pattern.

Scale bar = A, C-E = 10; B& F = 1 μm.

Discussion

Illecebraceae is an eurypalynous family (Erdtman, 1952). Pollen grains usually radially symmetrical, isopolar to apolar, oblate – spheroidal to prolate-spheroidal or sub-prolate, tricolpate or porate, colpal membrane finely – coarsely granulate. Tectum scabrate-spinulose. Pollen morphology of the family is significantly helpful at the generic and the specific level. On the basis of apertural types, 2 distinct pollen types viz., *Herniaria cinerea* – type and *Pteranthus dichotomus* type are recognized. Pollen type-I: *Herniaria cinerea* – type., is readily distinguished by its porate pollen, 6-12 porate grains are found. Two genera are included in this pollen type, these genera are easily delimited on the basis of number of pores. In *Gymnocarpos* 10-12 porate pollen are found whereas in *Herniaria* 6-8 porate pollen are present. In the pollen type-II *Pteranthus dichotomus* three genera are included i.e., *Cometes, Pteranthus, Sphaerocoma* each representing a single species. Although, these genera are similar in apertural type but differ in the size of the pollen. In *Cometes* and *Pteranthus*, large sized pollen 22-27 µm are found whereas in *Sphaerocoma* 14-17.91 µm pollen are present (Buxbaum, 1961).

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