

POLLEN FLORA OF PAKISTAN - II. SPHENOCLEACEAE

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Abstract

Pollen morphology of the family Sphenocleaceae has been studied from Pakistan by light and scanning electron microscope. Pollen grains are generally colpulate, small, trilobed, oblate - spheroidal with subsilate tectum.

Introduction

Sphenocleaceae, a monogeneric family comprising of 2 species is represented by only one pantropical species in Pakistan i.e., *Sphenoclea zeylanica* Gaertn., and *S. pongatium* DC., which is endemic in Western Africa.

Sphenoclea zeylanica Gaertn., an erect or suberect, glabrous, semi-aquatic annual herb is generally found inside the cultivated field. There does not appear to be any report on the pollen morphology of the family *Sphenocleaceae*.

The family was first recognized by Lindley (1830) but Subramanyam (1950), Bhattacharyya (1972); Hutchinson (1973) and Monod (1980) recognized a close relationship between *Sphenoclea* and Campanulaceae. On the basis of similarities in habit and unspecific anatomical characters, Airy Shaw (1942) suggested a close relationship between *Sphenocleaceae* and Phytolaccaceae. However, Phytolaccaceae and its allies differ from *Sphenoclea* in their anomalous secondary growth, betalin pigment and numbers of other anatomical characters (Lammers, 1992). However, Schönland (1889); Takhtajan (1980), Hutchinson (1973), Dahlgren (1983) and Throne (1983) have included *Sphenoclea* within Campanulaceae, but *Sphenoclea* lacks the unique stylar hair which is a characteristic feature of Campanulaceae. Besides, it also differs from Campanulaceae by its circumscissile capsule, imbricate corolla lobes, distinct anther, pollen sub-prolate, never spinuliferous (Lammers, 1992). However, presently the genus *Sphenoclea* is treated as distinct in the family *Sphenocleaceae* under the order Campanulales (Wagenitz, 1964; Cronquist, 1981, Dahlgren, 1975).

In the present paper, palynological information based on the affinities and relationship on pollen characters of the family Sphenocleaceae from Pakistan is described,

Materials and Methods

Pollen samples were collected from the Karachi University herbarium (KUH) or from the field. The material was acetolysed according to the method outlined by Erdtman (1952). For light microscopy the pollen slides were examined using Nikon-Type-102 under (E, 0.65) using 10x eye piece. Scanning electron microscopic examination was carried out by (JSM-T200) Joel microscope. Twenty measurements for pollen size

polar axis (P), equatorial diameter (E) and colpus length (C) were made for each sample. The terminology of Erdtman (1952) and Faegri & Iversen (1964) has been followed.

GENERAL CHARACTERS OF POLLEN GRAINS

Pollen grains usually radially symmetrical, isopolar, oblate-spheroidal, tricolporate, small sized, trilobed fossaperturate, colpi long, narrow, margins not distinct, acute, colpal membrane densely granulated or small circular or slightly la-longate, sexine thicker than or as thick as nexine. Tectum sub-psilate with sparse punctate.

Pollen description

Sphenoclea zeylanica - type (Fig. 1A-D)

Pollen class: Tricolporate

P/E ratio: Subtransverse

Shape: Oblate-spheroidal

Apertures: Ectoapertures - Colpus usually long, sunken, narrow, ends acute, margins not distinct, colpal membrane densely granulated. Endoaperture - Small circular or slightly la-longate.

Exine: Exine thick, sexine thicker than nexine rarely as thick as nexine.

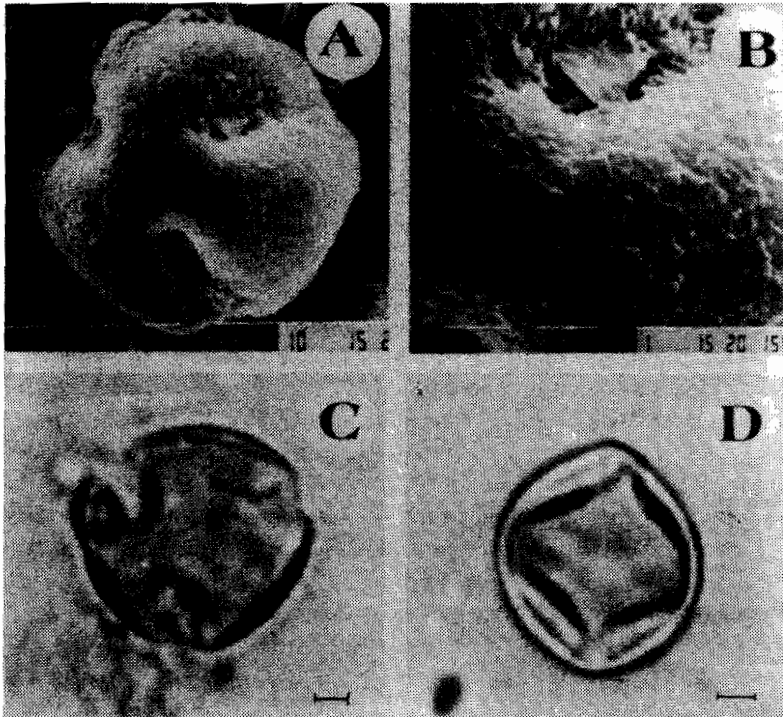


Fig. 1 *Sphenoclea zeylanica*: A & B = Scanning micrographs; C & D = Light micrographs. A, Polar view; B, Exine pattern; C, Polar view; D, Equatorial view.

Scale bar A = 10 μm , B = 1 μm ; C & D = 20 μm .

Ornamentation: Sub-psilate with sparse puncta.

Outline: Equatorial view - elliptic or circular, polar view usually trilobed, fossaperturate, side concave.

Measurements: Polar axis 14.11 - (14.61 \pm 0.75) - 16.8 μ m, Equatorial diameter E 14.11 - (16.11 \pm 0.71) - 18.21 μ m, P/E ratio: (0.88 - 0.89), colpi 9.8- (11.10) - 14.10 μ m long, Exine 1.26 - (1.37 \pm 0.03) - 1.54 μ m thick.

Species: *Sphenoclea zeylanica* Gaertn.

Comments: Palynology of the family Sphenocleaceae is significantly important for better understanding the relationships and taxonomic disputes of the family, although it is small monotypic family.

Previously the genus *Sphenoclea* Gaertn., was placed under the family Campanulaceae (Subramanyam, 1950; Monod, 1980, Takhtajan, 1980), Erdtman (1952) also described *Sphenoclea* under the family Campanulaceae in a subtribe Campanuloideae - sphenocleae but now several workers have assigned it a separate family status (Takhtajan, 1969; Dahlgren, 1975; Wagenitz, 1964).

Our present palynological findings also support the above taxonomic treatment because the family Campanulaceae has spinulose or micro reticulate medium - large, colpate or porate pollen, while the genus *Sphenoclea* is characterized by small, colpate, non-echinate (sub-psilate) pollen.

Specimens examined: *Sphenoclea zeylanica* Gaertn. - Pakistan: Karachi, On way to Pagar Moree, inside cultivated field, Anjum Perveen 276 (KUH); Thatta inside cultivated field, Ghara, Abrar Hussain 41 (KUH).

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