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POLLEN FLORA OF PAKISTAN - VII. NEURADACEAE

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Abstract

Pollen morphology of the family Neuradaceae has been examined from Pakistan by light and scanning electron microscope. Pollen grains are generally heteropolar, oblate, 3-aperturate with reticulate tectum

Introduction

Neuradaceae is a small family with 3 genera and 10 species distributed from the Mediterranean region to India and South Africa (Willis, 1973). In Pakistan, it is represented by a monotypic genus *Neurada* L. (*Neurada procumbens* L.). The other two genera *Grielum* L., and *Neuradopsis* Bremek. & Oberm., are endemic to South West Africa (Purohit & Panigrahi, 1991). Previously, the genus *Neurada* has been placed within the family Rosaceae - Neurdoideae (Endlicher, 1836-1840; Focke 1891), but *Neurada* differs from Rosaceae by its connate carpels within the calyx tube and aberrant pollen (Purohit & Panigrahi, 1991). *Neurada* also shows some resemblance to Malvaceae in leaf incisions and verticillate carpels but differs from Malvaceae by having petals inserted on the calyx throat (Willis, 1973). Presently, the genus *Neurada* is usually placed within the distinct family Neuradaceae under the order Rosales (Takhtajan, 1980; Cronquist, 1981; Dahlgren, 1983).

Pollen morphology of the family has been examined by Erdtman (1952); Demchenko (1966) and Diniz (1972). In the present paper pollen morphology of the family Neuradaceae from Pakistan has been described 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 and scanning electron microscopy 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 distilled water were transferred on 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, for 6 minutes. S.E.M examination was carried out on a Jeol microscope JSM-T200. Twenty measurements for polar axis (P), equatorial diameter (E), colpi length, apocolpium, mesocolpium and exine thickness were made for each sample by light microscope; lumina size was taken by scanning micrographs. The terminology used is

in accordance with Erdtman (1952), Faegri & Iversen (1964) and Walker & Doyle (1975).

General pollen characters of the family Neuradaceae

Pollen [illegible] 3-armed apertures at both the [illegible].

Description of pollen grain

Neurada *procumbens* [illegible]

Pollen class: 3-aperturate, zonoaperturate

P/E ratio: Transverse.

Shape: oblate.

Apertures 3-armed apertures at both the poles each arm having a circular [illegible].

Exine: Sexine thicker than nexine

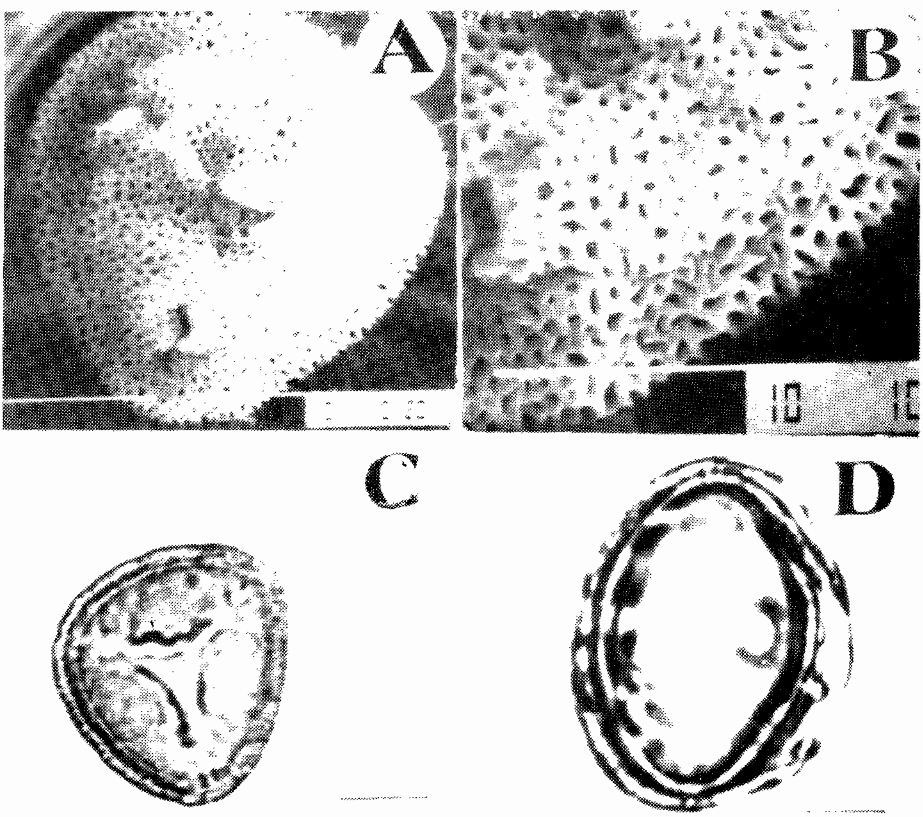

Fig.1 Pollen grains of *Neurada procumbens.* C-D = Light micrographs (LM).
A-B Scanning Electron micrographs (SEM) C = Polar view, D = Equatorial view
A = Polar view, B = Exine pattern Scale bar A–D = 10 µm

Ornamentation: Tectum microreticulate, lumina 0.41 - 0.71 um in diameter variable in size and shape.

Outline: Equatorial view oblate - elliptic, polar view usually rounded triangular

Measurements: Polar length (P) 17.54 (23.31 ± 1.02) 28.72 um, equatorial diameter (E) 28.70 (34.01 ± 0.39) 39.51 um, P\E ratio: (0 67 - 0.68), ora circular. Mesocolpium 25 (26.40 ± 0.85) 28.72 um. Exine 3.41 (3.70 ± 0.12) 4.30 um thick.

Species examined: *Neurada procumbens* L.

Comments:

Pollen grains of *Neurada procumbens* L., is readily distinguished by its sub-saccate grains which posses 3-armed apertures at both poles, each arm having circular ora (Fig.1C & D). Erdtman (1952) reported 6 (occasionally 8) aperturate pollen in the genus *Neurada* (apertures of same type as in *Grielum*). Walker & Doyle (1975) placed *Neurada* grains in miscellaneous apertures type (which are frequently difficult to categorize). Takhtajan (1969) considered Neuradaceae a specialized family with a very peculiar structure of pollen wall. However, palynologically, Neuradaceae is relatively primitive family by having heteropolar, sub-saccate pollen with tri-radiate scar in the center, this type of grains are also found in Gymnosperms (Walker, 1974).

Specimens examined: Near Hub pumping station, 23.9.1986, Anjum Perveen 181 (KUH); Manghopir, 29.1.1995, S.I. Ali & students 343 (KUH); c.30 km from Panjgur on Panjgur Turbat Road, 6.10.1986 A.Ghafoor & S.Omer 1904 (KUH); c. 40 miles from Karachi on way to Bella, S. Abedin & A. Husain 5668 (KUH).

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