Occurrence of *Acrostichum* spores from the Langpar Formation, Early Palaeocene of Meghalaya, India*

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Fossil spores closely resembling the extant spores of *Acrostichum aureum* Linn. were recovered from the Langpar Formation (Early Palaeocene) exposed at Therriaghat on Um Shrongkew River, Meghalaya. To accommodate these fossil spores, *Acrostichumsporites gen. nov.* is proposed.

Key-words - Palynology, *Acrostichum*, Tertiary, Therriaghat, Meghalaya, India.

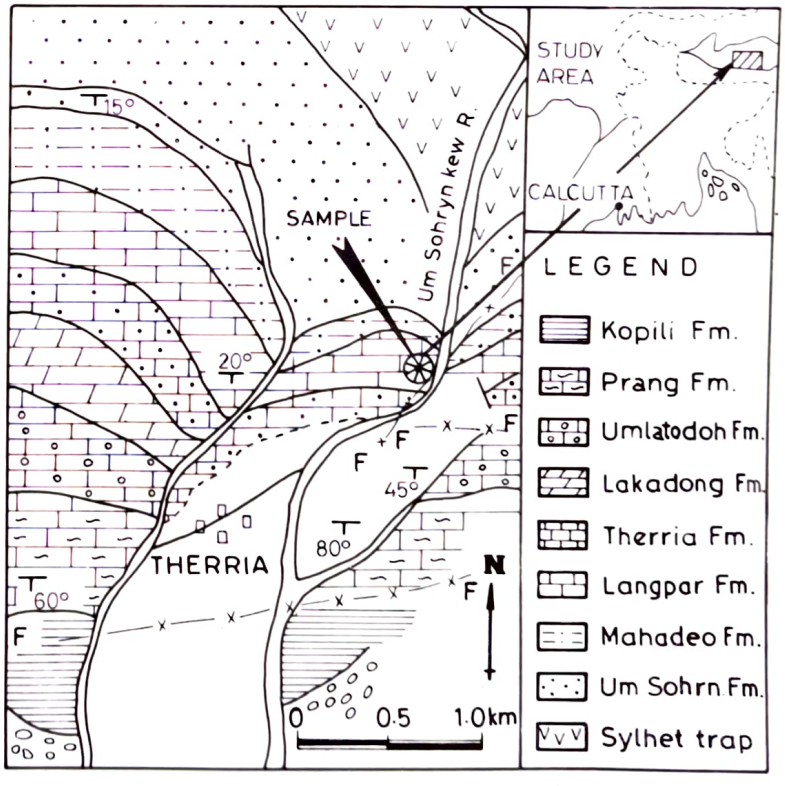
INTRODUCTION

Acrostichum aureum Linn. belonging to the family Polypodiaceae is the only pteridophyte which has pantropical distribution in mangrove swamps (Chapman, 1975; Daubenmire, 1978). It is an erect, rather strong, pinnate plant, attaining a height of 2 m with upper pinnae fertile and smaller in size than the sterile fronds. It is not an epiphyte like most of the other taxa of the family.

Beddome (1883) and Rao and Sastry (1974) recorded the occurrence of this fern in the tidal brackish water mangrove of India and Bangladesh growing profusely in clumps. Blasco (1975), however, observed this plant growing near the proximity of *Cerbera manghas* Linn. of Apocynaceae in Kerala, south India. It grows in the same soil conditions as *Cerbera*, constantly invaded by a thin stream of water.

ACROSTICHUM SPORES

Spores of *Acrostichum aureum* Linn. are triangular-subtriangular in shape with rounded apices and straight to slightly concave/convex lateral sides (Pl. 1, figs 10-12). They are heteropolar with proximal side thicker than the distal. Exine is 1-2.5 µm thick, proximally granulose, distally laevigate, often rupturing in the central part in circular fashion, grana are about 1 µm high, closely placed, sometimes fused to form rugulae, foldings of the exine are common. Size range 55-70 µm . Trilete distinct, rays slightly raised, laesurate, uniformly broad or slightly tapering at ends, extending up to three-fourths of equatorial margin; commissure is well defined.



Text-figure 1. Geology of the area around Um Shrongkew River Sextion (Modified after Pandey & Ravindran, 1988).

Fossil spores referable to *Acrostichum* were recovered

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from the Early Palaeocene, Langpar Formation (Pandey, 1981). This formation having calcareous shale at the base, is underlain by Mahadeo Sandstone (Late Cretaceous) and overlain by Therria Formation (Early-Middle Palaeocene). According to Pandey (1981), the Upper Member of Mahadeo Formation at Therriaghat is represented by light to dark grey and greenish grey silty shales and calcareous and noncalcareous sandstone, whereas the Therria Formation is recognized by the first appearance of arkosic, whitish sandstone with leaf impressions. The shale from Langpar were collected from the western bank of the Um Shrongkew River, just before the bend (Text-fig. 1).

Spores comparable to those of *Acrostichum* are found in good percentage (5-10%) in the samples. They are associated with *Spinizonocolpites* Muller (1968), *Saturna* Salard-Cheboldaeff (1977), *Tercissus* (Tschudy) Kieser & Jan du Chene (1979), *Matanomadhiasulcites* Kar (1985), *Proxapertites* van der Hammen (1956) and dinoflagellates. This indicates that palaeoecological conditions of deposition were similar to that of a mangrove swamp. Macko (1957) referred some monolete, laevigate-granulate spores to *Acrostichum* from the Lower Miocene of Upper Silesia. Potonie' (1967) pointed out that these spores were referable to Polypodiaceae but not related to *Acrostichum*. Caratini *et al.* (1991) recorded *Acrostichum* spores from the Palaeocene sediments of Walalane bore hole, Senegal.

Banerjee and Sen (1986) recorded fertile leaf, sporangia and spores of *Acrostichum aureum* Linn. from the Late Holocene peat from near Calcutta. Thanikaimoni (1987) noted *Acrostichum* spores in the subrecent sediments from Sri Lanka. Bir (1976) and Santa Devi (1977) studied the modern spores of *Acrostichum*.

Spores assignable to *Acrostichum* in the present material closely resemble spores of the extant *Acrosti chum aureum* Linn. in shape, heteropolarity, ornamentation pattern, thickness of exine and nature of the haptotypic mark. In fossil spores perine is mostly lost, and the grana on the proximal side are more varied. In some specimens, grana are up to 1 µm high, sparsely placed while in others, they may be upto 2 µm high, closly placed and sometimes fused and aligned in rows forming rugulae (Pl.1, fig.3). The size range of modern spores is higher than the fossile ones. Distal side is always thinner and laevigate resulting in the formation of folds of various kinds. The fold is initiated mostly opposite to the trilete rays transforming the spores into ovoid shape. The thinner distal side leads us to postulate that the spores perhaps germinate from the distal side (Pl.1, fig. 11).

The fossil spores resemble the living one in shape, heteropolarity and ornamentational pattern, and may be referred to *Acrostichumsporites* gen. nov. and the type species *Acrostichumsporites meghalayaensis* sp .nov. with the following diagnosis.

Acrostichumsporites meghalayaensis gen. et sp. nov.

Diagnosis - Spores triangular- subtriangular in shape with rounded apical and straight to slightly concave/convex interapical margins. Spores heteropolar, proximal side thicker than the distal; exine 1-2.5 µm, proximally granulose, distally laevigate, grana up to 1 µm high, generally uniformly placed, fused. Size range 45-65 µm. Trilete mark distinct, rays up to three-fourths spore radius, tapering at ends; commissure distinct. Exine irregularly folded, generally on distal side.

Holotype - Pl.1, figs. 6-7, size 55x 46 µm, BSIP slide no. 10675, J 22.

Comparison - *Scantigranulites* Kar (1978) resembles the present genus in shape, size range and granulose ornamentation, but in the former the grana are present on both proximal and distal surfaces.

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PLATE 1

(All photographs are enlarged ca. x 1000)

1-9. *Acrostichumsporites meghalayaensis* gen. *et* sp. nov.
Holotype - Figs 6-7 (slide no. B.S.I.P. 10675, J22). Slide nos B.S.I.P. 10673, K18/3; B.S.I.P. 10671, T13; B.S.I.P. 10672, 019; B.S.I.P. 10674, P15/2; R17/3; B.S.I.P. 10674, 042/4; B.S.I.P. 10672, 019.

10-12. Spores of *Acrostichum aureum* Linn.; Fig. 10. Proximal view showing grana; Fig. 11. Rupturing of exine on distal side; Fig. 12. Distal view showing the laevigate exine.

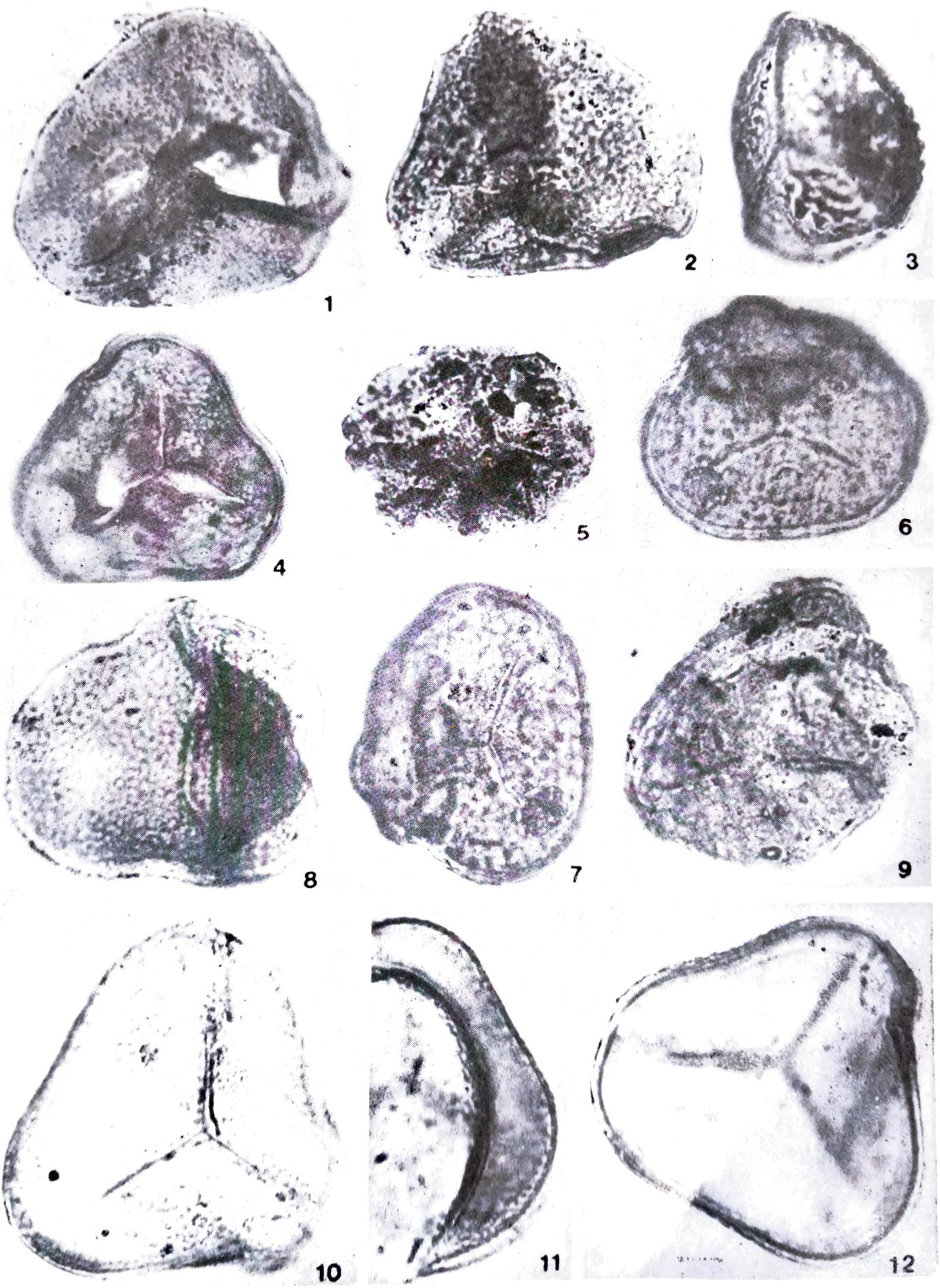

PLATE I

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