

VOYRISEMINITES MAGNUS GEN. ET SP. NOV. A FOSSIL SEED FROM  
TERTIARY COAL OF MALAYA.

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ABSTRACT

A fossil seed, *Voyrioseminites magnus* gen. et sp. nov. has been described from the Eocene coal beds of Malaya. The fossil seed shows close resemblance with the seed of modern genus *Voyria aphylla* Pers. of the family Gentianaceae which is now confined to American tropics. It no longer occurs in Malaya peninsula, the country from which the fossil is described.

INTRODUCTION

The Malayan coal was for a long time, regarded unfossiliferous. During the course of palaeobotanical investigations we have come across quite a rich assemblage of fungal, bryophytic, pteridophytic, gymnospermic and angiospermic spores, pollen grains and other remains (TRIVEDI & CHATURVEDI, 1961; TRIVEDI & VERMA, 1969a, 1969b). These finds belie the contention that this coal is unfossiliferous.

The present find is interesting in this respect that it throws light on the past distribution of *Voyria* which covered more extensive area in the Eocene epoch than it does today.

MATERIAL AND METHOD

The material for the present investigation comes from the coal mines about 10 miles west of Kuala Lumpur, Malaya, the coal is of Eocene age.

Pieces of coal samples were treated with strong Nitric acid ( $\text{HNO}_3$ ) for a day or two, the samples were then washed with water repeatedly so that supernatant liquid was acid free. 10% KOH was later poured on the material. After sometime samples were washed with filtered water till they showed no alkaline reaction. The sediment was centrifuged and permanent mounts in Canada balsam were prepared.

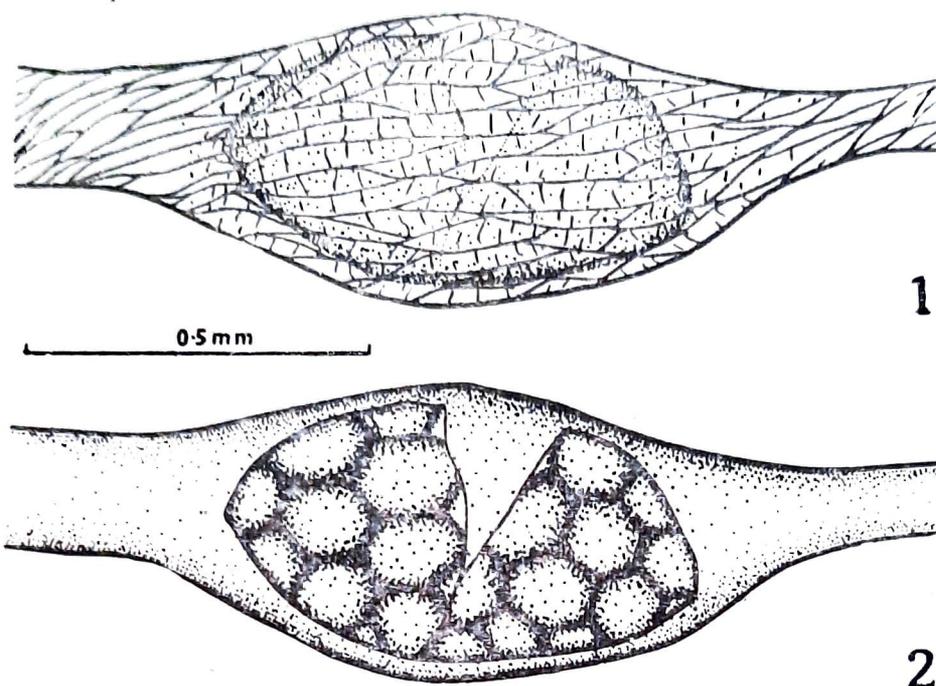
DESCRIPTION

The fossil seed is spindle shaped and consists of a wing with two arms it measures 2—2.2 mm long, the width varies from  $68 \mu$  at the apex to  $392 \mu$  a maximum, at the middle (Pl. 1, fig. 1). The wing is composed of two longitudinally projecting arms. These arise from the seed coat around which they form a sheathing pocket. The cells of the wing are parenchymatous, each cell has 8-12 transverse striations (Text-fig. 1).

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\*Deceased, January 22, 1971.

The two arms are not equal in length when measured from the centre of the seed. The longer arm measures 1.2 mm and the shorter one is 1.05 mm. The width of the shorter arm is more as compared to the longer one.



Text-fig. 1. *Voyrioseminites mangus* gen. et. sp. nov. showing cells of the wing.  
Text-fig. 2. *V. mangus* gen. et sp. nov. showing polygonal reticulum on the seed coat.

The seed without the wing is oval, multicellular, the outer surface of the seed coat forms a honey-comb like reticulum composed of 12-19 cells.

The living material was obtained from the Royal Botanic Gardens, Kew through the kind offices of Dr. R. N. Lakhanpal, Assistant Director, Birbal Sahni Institute of Palaeobotany, Lucknow.

The seed of *Voyria aphylla* Pers. is minute, spindle shaped and winged. The structure of the wing and seed (Pl. 1, figs. 2, 3) is similar to that of the fossil seed except that the number of parenchymatous cells is fewer in living species. These are elongate (Pl. 1, fig. 1). The number of the honeycomb enclosures of the seed coat is 9 to 10. The seed along with the wing measures 738  $\mu$  in length and 76  $\mu$  in breadth, the two arms of the wing are unequal, one of them measures 282  $\mu$  and the other 356  $\mu$  in length; the seed proper is 74  $\times$  36  $\mu$ .

#### DISCUSSION

It is interesting to note that certain plants which in the past, had a very wide range of distribution are now confined to a single or to very few localised areas. SAHNI (1943) described *Rodeites* probably the sporocarps of *Regnellidium* from the Eocene of India. This genus is now restricted to Brazil. SAHNI and SURANGE (1953) discovered a stem of *Cyclanthodendron* from the same locality. The family Cyclanthaceae is now confined to the American tropics. FRENGUELLI (1943) reported occurrence of Casurinaceae in the Tertiary of South America, this family is now almost confined to Australia. Similarly, a number of old world genera, chiefly of Indo-Malaya or regions nearby were discovered in the Cretaceous and early Eocene of North-America, notably *Nipadites* (ARNOLD, 1952). Genera like *Alangium*, *Artocarpus*, *Aleurites*, *Cinnamomum*, *Mallotus*, *Phytocrene* and *Raphis* are now confined to the tropics

only though they extended in the past to areas where they no longer occur. The extant genus *Voyria* Aubl. (Gentianaceae) has 8 species which are distributed in Panama, tropical North and South America and West Africa. *Voyria aphylla* Pers. is confined to American tropics at present.

The seeds of *V. aphylla* Pers. (= *V. uniflora* Pers.) are microscopic ( $738 \mu \times 76 \mu$ ), spindle shaped and winged. They are characterised by a few celled wing. In the cells of the wing specially at the central region there occur transverse striations (Pl. 1, fig. 3) which at times may extend further. The seed occupies a central position, it is enclosed by an envelope which extends laterally on both sides by a wing composed of 9-10 cells. The cell walls form a honey-comb reticulum on the seed-coat. The fossil seed (Pl. 1, fig. 1) superficially resembles the seeds of *Nepanthes mirabilis* Lour (Engler & Prantl 1936) and *Spathoglottis plicata* (Blume) Bijdr. (Orchidaceae). These two plants still grow in Malaya. The possibility of either of the two having affinity with the fossil seed is ruled out because the seed of *N. mirabilis* is four times larger (8 mm) besides it does not show any characteristic morphological features (transverse striations and seed coat reticulum) of the fossil. The seeds of *S. plicata* are somewhat similar in shape and size but in other morphological characters the two are entirely different.

The fossil seed shows close affinities with the seed of *V. aphylla* Pers. in having a spindle shaped wing, transverse striations in the cells of wing and seed-coat reticulum. The fossil can be differentiated from the living by its being three times larger in size, besides it has a large number of spirally arranged wing cells; the number of transverse striations in the wing cells is also more profuse. The number of the honeycomb enclosures on the seed coat is also double.

On the basis of these characters it is clear that the fossil and living seeds cannot be placed in one and the same genus, hence the fossil is kept under a new genus *Voyrioseminites* gen. nov.

On the basis of the evidence advanced above it is proposed to give the fossil seed a new name *Voyrioseminites magnus* gen. et sp. nov.

#### DIAGNOSIS

##### ***Voyrioseminites* gen. nov.**

Microscopic fossil seed winged, seed along with wings spindle shaped,  $2.24 \text{ mm} \times 392 \mu$  in size. Seed centrally situated, wings forming two arms, seed oval,  $304\text{-}464 \mu$  in size, outer seed coat shows 12-19 polygonal areas.

##### ***Voyrioseminites magnus* sp. nov.**

Fossil seed winged, spindle shaped, wings many celled, cells parenchymatous, and spirally arranged on the two arms of the wing. Central cells form loose sheath round the seed and show 8-12 transverse striations in the central cells only.

*Type specimen*—Slide No. 1953/35, deposited in the B. S. Trivedi collection, at present housed in the Botany Department, Lucknow University.

*Locality*—About 10 miles west of Kuala Lumpur, Malaya.

*Age*—Tertiary (Eocene)

*Collection* Coal samples were collected by B. S. Trivedi in 1953 and slide preparations are at present placed with him.

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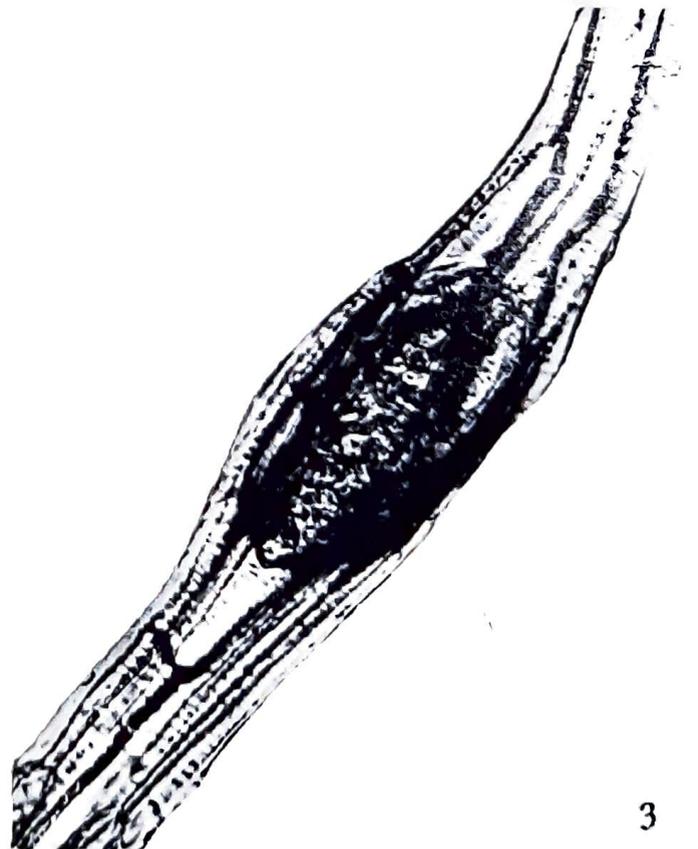
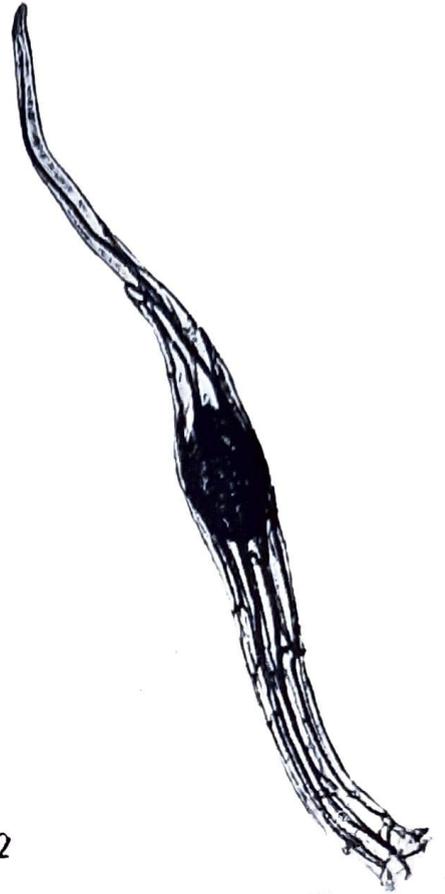
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#### EXPLANATION OF PLATE 1

1. *Voyrioseminites magnus* gen. et sp. nov. ca.  $\times 90$ .
2. *Voyria aphylla* showing transverse striation and spirally arranged cells of wing.  $\times 60$ .
3. *V. aphylla* showing the polygonal reticulum on the seed coat.  $\times 160$ .



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