

ON SOME LOWER GONDWANA MEGASPORES AND SEEDS FROM MANGARDAHA COAL, WEST BOKARO, BIHAR

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ABSTRACT

This paper deals with the description of four new types of megaspores and one seed. The author also suggests a change in the nomenclature of some species of megaspores described in the previous paper (SURANGE *et al.* 1953).

INTRODUCTION

MEGASPORES from the Mangardaha coal have been previously described (SURANGE *et al.*, 1953). As this coal was found to be very rich in megaspores, it was macerated again and some new forms, along with those already described have been recovered. A few isolated seed-like bodies have also been found in this coal.

Out of four new types of spores described in this paper, two are assigned to the genus *Triletes* (Reinsch) emend. Schopf, and the remaining two, in the absence of definite characters, are described under the form genus *Sporites* H. Potonié emend. Schopf. Seeds are being described under the heading "Semina Incertae Sedis", because they cannot be assigned to any particular group on account of their isolated nature. In order to give them a taxonomic status, they are being provisionally included in the form genus *Spermatites* Miner (1935). Although Miner instituted this genus to include seed-like bodies from the Cretaceous coals, I agree with Arnold (1948) that the term may be extended for other seeds and ovules also.

DESCRIPTION

Genus *Triletes* (Reinsch) emend. Schopf

Triletes Savitrii sp. nov.

(Pl. 1, Fig. 1)

Spore roundly triangular in shape, golden yellow in colour. Spore wall thick, measuring nearly 15 μ . Inside the spore is seen a reddish brown roughly triangular body, measuring 325 \times 290 μ . This body has a very clear triradiate suture. The rays of the triradiate suture extend to the rounded

angles of the inner body up to the margin, measuring about 190 μ . Arcuate lamellae conspicuous, measuring nearly 20 μ in width. The surface ornamentation of the spore looks to be finely reticulate. The overall measurement of the spore is nearly 650 \times 585 μ .

My specimen compares favourably with *Triletes gymnozonatus* Schopf (1938) in its size, length of the triradiate rays, presence of shrunken endospore(?) like body, and reticulate ornamentation of the spore coat. But it strikingly differs from *Triletes gymnozonatus* in having very conspicuous arcuate lamellae, distinct triradiate mark, slightly thinner spore coat and smooth surface of the inner body.

My spore also compares with a figure of *Triletes triangulatus* Zerndt, given by Schopf (1938) in the size range and ornamentation of the spore coat, but differs from that in having no flange and a triradiate mark which is confined to the inner body only.

Triletes Sitholeyi sp. nov.

(Pl. 1, Figs. 2, 3)

Spores roughly rounded in shape and yellowish brown in colour. Spore coat thick, measuring nearly 14 μ . Triradiate mark not distinct. Arcuate lamellae quite prominent. Surface of the spore coat is studded with long, hirsute appendages, slightly pointed towards the apex and flattened at the base. A few long appendages measure as much as 70 μ in length and 14 μ in breadth. The spore is 740 \times 580 μ , excluding the appendages.

These spores compare with *Triletes globosus* Arnold (1950), in the look of the appendages, and thick spore coat, but differ from them in having a bigger size, *Triletes globosus* ranging in size from 390 to 570 μ , obscure nature of the trilete marking and bigger size of the appendages. These spores also compare with *Triletes tenuispinosus* Zerndt (1934) in their approximate size and the look of the appendages but differ from them, in the obscure nature of the triradiate mark.

SPORAE INCERTE SEDIS

Genus *Sporites* (H. Potonié) emend. Schopf*Sporites* sp. A.

(Pl. 1, Fig. 4)

Spore roundly triangular in shape, with a pyramidal apex, dark brown in colour. Triradiate mark not clear. Spore wall thick, measuring nearly $13\ \mu$. Spore coat ornamentation is of the reticulate pattern. On changing the focus at the margin, there are seen very small, spiny appendages, measuring hardly $10\ \mu$ in length. At the pyramidal end of the spore are seen three folds arranged regularly one below the other. These folds give a characteristic shape to the spore and have been found similarly arranged in all the specimens. These folds are more or less arc-shaped, measuring about $50\ \mu$ in thickness. The spore measures $637 \times 546\ \mu$.

Sporites sp. B.

(Pl. 1, Fig. 5)

Spore elongated, sac-like in shape, dark brown in colour. Spore coat somewhat thick, measuring nearly $12\ \mu$ in thickness. Triradiate mark present, but not conspicuous. Rays are nearly $190\ \mu$ long and $15\ \mu$ broad. Arcuate lamellae faintly developed. Surface coat ornamentation is rugose to punctate. At the margin of the spore are seen hirsute appendages, measuring $12\ \mu$ in length and $3\ \mu$ in width. The spore measures $660 \times 445\ \mu$.

Change in Nomenclature of Some Previously Described Spores — Some of the megaspores described in the previous paper (SURANGE *et al.*, 1953) under (1) *Triletes arnoldii* (Miner) Harris, (2) *Triletes litchi* Harris, and (3) *Triletes myrmecodes* Harris compare remarkably well with the figures and descriptions of the above-named species, but as these species are of Mesozoic age, I feel that it will be correct if these spores are described under different specific names. The new names, therefore, proposed are as follows:

- (1) *Trilete barakarensis*, sp. nov. N.C. for my spores described under *Triletes arnoldii* (Miner) Harris
- (2) *Triletes damudicus*, sp. nov. N.C. for my spores described under *Triletes litchi* Harris
- (3) *Triletes biharensis*, sp. nov. N.C. for my spores described under *Triletes myrmecodes* Harris

I also change the specific name of *Triletes pubescens* described as a new species in the previous paper (SURANGE *et al.*, 1953) to *Triletes Hoegii* sp. nov. because a species of similar name has been instituted before by Dijkstra (1949). My spores previously described under this name are very different from the specimens of Dijkstra. This error was caused due to the non-availability of the literature cited above to the author at the time of sending the paper to the press.

SEMINA INCERTAE SEDIS

Genus *Spermatites* Miner*Spermatites indicus* sp. nov.

(Pl. 2, Figs. 6-9)

These specimens are pressed flat and oval in shape. In Fig. 6 is seen a seed cuticle, probably the outer coat of the seed. It is oval in shape and light brown in colour, measuring $1,105 \times 650\ \mu$ in size. At some places, cellular structure is clear, the cells being rectangular, measuring nearly $60\ \mu$ in length and $12\ \mu$ in breadth. These cells possess more or less straight walls.

The outermost seed coat is detachable as some other specimens were found to be devoid of this coat. They show a thin layer of cuticle probably belonging to the nucellus (FIG. 8). The cells of this cuticular layer are long and rectangular with wavy walls, some of them measuring nearly $72\ \mu$ in length and $24\ \mu$ in breadth. What should be a megaspore is seen as a round black body, measuring nearly 1 mm. (FIG. 8). The outer seed coat sometimes shows neck-like portion at the apical end (FIG. 7), the cells of which are arranged end to end. These cells are long and slender having thick wavy walls (FIG. 9).

The only seeds described from the Lower Gondwana coal are those of *Walkomiella indica* Surange & Prem Singh (1953), but my specimens differ very much from them in size, structure of the cuticles and absence of micropyle.

DISCUSSION

Occurrence of megaspores in the Lower Gondwana rocks of India is fairly established now, but very few forms have been described so far. The greatest difficulty arises in the nomenclature and classification of these megaspores. The megaspores from

Lower Gondwanas have generally been assigned to the genus *Triletes*, which, according to Schopf (1938, p. 18), is intended to include the isolated megaspores of probable lycopod affinity. Although a few of the Lower Gondwana megaspores compare remarkably well with some of the European and American species of *Triletes*, the majority of them are quite distinct from the European and American types. This is to be expected since the two floras are essentially rather distinct.

However, for the present, the Lower Gondwana megaspores are provisionally described under the genus *Triletes*. A large amount of data and detailed work is still required to classify them more satisfactorily.

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EXPLANATION OF PLATES

PLATE 1

Megaspores from Mangardaha Coal

1. *Triletes Savitrii*. × 100.
2. *Triletes Sitholeyi*. × 100.
3. *Triletes Sitholeyi*. × 100 (spore coat of one side only).
4. *Sporites* sp. A. × 100.
5. *Sporites* sp. B. × 100.

PLATE 2

Seed from Mangardaha Coal

6. *Spermatites indicus*. × 100 (outer seed coat).
7. *Spermatites indicus*. × 100 (cuticle of the outer seed coat with neck preserved at the apical end).
8. *Spermatites indicus*. × 50 (megaspore with nucellus cuticle attached).
9. *Spermatites indicus*. × 140 (cells of the neck region).



