

# ON SOME SPECIES OF *ROUSEISPORITES* POCKOCK OCCURRING IN THE JABALPUR SERIES (LOWER CRETACEOUS) OF INDIA

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## ABSTRACT

The occurrence of *Rouseisporites* Pocock and its potential usefulness in dating the Jabalpur Series of India has been discussed in detail by Singh (1966). In the present paper, 4 new species have been assigned to the genus *Rouseisporites* Pocock. The flask-shaped to conical invagination of the zona in each radial region of the spore, as reported by its original author, has been found to be useful in the identification of *Rouseisporites*.

## INTRODUCTION

THE presence of *Rouseisporites* Pocock in the coalified strata of the Jabalpur Series (Lower Cretaceous) of India was reported for the first time by Singh (1966). In the same paper, it was pointed out that specimen (C) placed under *Incertae sedis* by Dev (1961, pl. 8, fig. 67) from Sehora (Jabalpur Series) agrees to the diagnosis of *Rouseisporites*. The stratigraphical significance of this genus in conjunction with other miospore genera, having restricted range of vertical distribution, was discussed at length by Singh (*l.c.*). Recent study of the miospore assemblage shows the presence of spores referable to *Rouseisporites*. From the morphological and comparative study of these grains 4 new species have been recognized. As noted by Pocock (1962) the flask-shaped to conical invagination of the zona in each radial region is very characteristic for *Rouseisporites*. Later, the importance of this character was duly recognized by Delcourt *et al.* (1963) and Dettmann (1963). So far as the author is aware, all the so far recorded species of *Rouseisporites* are post-Jurassic in distribution. Morphographically the spores of this genus are comparable to those in Ricciaceae and Clevaceae (DETMANN, 1963). Surprisingly enough, *Rouseisporites* has not been found in the Umia beds (Lower Cretaceous) of Cutch (SINGH *et al.*, 1964).

## MATERIAL AND METHODS

Coal samples were collected by the author from the Sher river (Sehora) and Hard river (Hathnapur) in the district of Narsinghpur, Madhya Pradesh in March 1962, at an interval of 6-8 inches in each case. They were packed in thick brown paper envelopes. The coals are jet black. During the course of sampling customary precautions to avoid any contamination were observed. Geology of the area has been already given by Singh (1966).

The usual nitric acid maceration technique for these coals proved successful. The alkali-free macerate was stored in glycerine jelly and slides were prepared in the same medium. All the slides have been registered and deposited at the Museum of the Birbal Sahni Institute of Palaeobotany, Lucknow.

## DESCRIPTION

Dettmann (1963) has instituted a new turma *Hilates* to accommodate spores in which morphographical characters are modified at or in the neighbouring vicinity of distal and proximal poles, with or without a hilum due to the natural destruction of the exo-exine. In the author's opinion these characteristics are not sufficient enough to justify the creation of a new turma. Hence in the present paper *Hilates* have been grouped as an infraturma under Sporites.

*Rouseisporites pallidus* sp. nov.

Pl. 1, Figs. 1-2

*Holotype* — Pl. 1, Fig. 1; Regd. Sl. No. 3221.

*Diagnosis* — Size range 32-42 $\mu$  (including zona), miospores subcircular to convexly subtriangular. Exine two layered, inner layer thin, outer enveloping layer forming

a narrow membranous zona with a funnel-shaped depression in each radial region at equator. Distal muroid ridges 3 in number. Proximal face smooth.

*Description* — Holotype measuring  $42\mu$  across, biconvex and almost subcircular in outline. Exine two layered, inner layer thin,  $\pm 1\mu$  thick appearing faintly but indeterminably sculptured; outer layer membranous forming a narrow,  $2-5\mu$  wide membranous zona, invaginating like a funnel in each radial region at equator, distally having three, thin, sometimes faintly perceptible, membranous muroid elevations, ensuing from the pole and extending to the equator, higher at the pole and enclosing 3 lumina, each measuring  $\pm 20 \times 30\mu$ . Proximal surface smooth, occasionally bearing a faint Y-mark like impression.

*Comparison* — *Rouseisporites reticulatus* Pocock is different from *R. pallidus* in having larger size, thicker exine and membranous reticulum both proximally and distally. *R. simplex* (Cooks. & Dettm.) Dettm. is very closely comparable with *R. pallidus* but the former differs from the latter in having larger size, thicker exine, flask-shaped invaginations and more conspicuous muroid ridges. In *R. radiatus* Dettm. the exine is thicker and the number of muroid ridges are more as compared to *R. pallidus*. *R. granospeciosus* (Delc. & Sprum.) Dettm. possesses a wider zona and an inner layer, which is conspicuously ornamented. *R. laevigatus* Pocock has many, low ridges radiating from the distal pole while *R. triangularis* bears a conspicuous proximal Y-mark with low reticulate ridges. Hence both these species are not comparable with *R. pallidus*.

*Remarks* — *R. pallidus* sp. nov. seems to be a simpler form as compared to the other known species of the genus *Rouseisporites* as the proximal face in *R. pallidus* is almost smooth and the distal face too possesses three incipient type of membranous muroid ridges along with very faint and sometimes imperceptible impressions of funnel-shaped invaginations of the zona in the radial region at equator. So far as the ornamentation of the inner layer is concerned, it is also very faint and possibly consists of very small grana.

*Rouseisporites pseudosulcatus* sp. nov.

Pl. 1, Figs. 3-4

*Holotype* — Pl. 1, Fig. 3; Regd. Sl. No. 3242.

*Diagnosis* — Size range  $45-60\mu$  (including zona), miospores invariably subcircular. Exine two layered, inner layer granulose, outer layer membranous (covering inner one), forming a narrow zona, distally two oval-shaped muroid ridges evident, conical invaginations of zona apparent along longer axis of meshes.

*Description* — Holotype measuring  $52 \times 56\mu$ , biconvex and almost subcircular in equatorial contour. Exine two layered, inner exine  $\pm 1.5\mu$  thick, finely sculptured with small and closely spaced grana, outer layer covering the inner layer and forming a very narrow membranous zona besides instituting two individually independent muroid ridges, enclosing 2 oval-shaped meshes, each measuring  $20-22 \times 34-50\mu$  in size, coming close to each other at the distal pole and simulating configuration of a sulcus, zonal invaginations conical opposite to each other along the longer axis of the meshes. Proximal surface smooth. Trilete mark not noticeable.

*Comparison* — *Rouseisporites pseudosulcatus* sp. nov. hardly compares with any of the known species. *R. reticulatus* Pocock is distinct from *R. pseudosulcatus* in having a broader zona, more number of meshes both proximally and distally, and a distinct Y-mark impression on the proximal face. In *R. laevigatus* Pocock, *R. triangularis* Pocock, *R. simplex* (Cooks. & Dettm.) Dettm. and *R. radiatus* Dettm., the number of muroid ridges and meshes is invariably more than two on the distal face while the proximal exine bears faint to conspicuous Y-mark like impression. *R. pallidus* sp. nov. distinguishes itself from *R. pseudosulcatus* in having a broader zona, less conspicuous ornamentation and 3 meshes on the distal face.

*Remarks* — Although *R. pseudosulcatus* resembles monosulcate forms in surface view, the exine in the present specimens is two layered, outer distal layer being membranous and instituting muroid ridges besides enveloping the inner layer and expanding into a narrow zona. These characteristics are not known in any one of the monosulcate genera as yet.

*Rouseisporites sehcrensis* sp. nov.

Pl. 1, Figs. 5-12

*Holotype* — Pl. 1, Fig. 11; Regd. Sl. No. 3221.



*Diagnosis* — Size range 40-56 $\mu$  (including zona), miospores convexly triangular. Exine two layered, inner layer thinner and matt, outer layer thicker even more at equator, invaginating at each radial region, forming 3 muroid ridges distally, enclosing 3 meshes.

*Description* — Holotype measuring about 44 $\mu$  across, biconvex and almost subtriangular in outline. Exine two layered, inner layer  $\pm 1.5\mu$  thick, almost matt, covered by a  $\pm 2\mu$  thick (thicker at the equator) dark brown, membranous, smooth outer layer, expanding into a 3-5 $\mu$  broad zona, zona invaginating at each radial region. Distal Y-mark like impression (corresponding to low muroid ridges), arising from the distal pole noticeable, Y-rays reaching the equator and almost joining the zonal invaginations, meshes three in number, each mesh measuring  $\pm 18 \times 20\mu$  in size. Proximal exine smooth without any noticeable trilete mark.

*Comparison* — *Rouseisporites sehorensis* sp. nov. is closely comparable to *R. pallidus* sp. nov. but it is distinguishable from the latter in having broader and thicker zona, inner layer is also comparatively thicker. *R. pseudosulcatus* is different by virtue of its lesser number of distal meshes, narrower zona and granulose inner layer. *R. reticulatus* Pocock does not compare with *R. sehorensis* in having reticulate meshes both proximally and distally, a thinner zona and a conspicuous Y-mark proximally. *R. radiatus* Dettm. has thicker inner layer, narrower zona and two ridges near the proximity of the equator. *R. simplex* Dettm. is closely comparable with *R. sehorensis* but it is distinct from the latter in having higher muroid ridges and a faint proximal Y-mark. In *R. laevigatus* Pocock and *R. granospeciosus* (Delc. & Sprum.) Dettm., the number of muroid ridges are usually more than two which tend to bifurcate towards the equator. *R. triangularis* Pocock is distinct from *R. sehorensis* in having low meshes and a distinct proximal Y-mark.

*Rouseisporites* sp.

1961 — Specimen C, Dev, Pl. 8, Fig. 67.

*Description* — Miospore measuring  $98 \times 82\mu$ , biconvex and almost subcircular in outline. Exine two layered, inner layer thin,  $\pm 1\mu$  thick, intragranulose appearing corroded, outer layer thicker and membranous, forming a mediumly broad zona, 4-7 $\mu$  in width, invaginating strongly like a funnel in each radial region at equator, distally three, fairly conspicuous, membranous muroid ridges evident, arising from the pole and expanding towards the equator, each mesh measuring approximately  $40 \times 60\mu$ . Proximal face indeterminably sculptured.

*Comparison* — *Rouseisporites* sp. is larger in size as compared to its other associate species like, *R. pallidus*, *R. pseudosulcatus* and *R. sehorensis*, occurring in the Jabalpur Series. *R. simplex* (Cooks. & Dettm.) Dettm. is very closely comparable to *R. sp.* but the former differs from it in having smaller size, narrower zona and more conspicuous muroid ridges on the distal face.

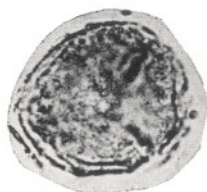
*Remarks* — Dev (1961, Pl. 8, Fig. 67) described this specimen under *Incertae sedis* in which he has stated that the Y-rays are prominent, thick, raised and reaching the equator where their ends are seen joining with curvature of the same breadth. He further believes that this whole structure ultimately girdles the spore body equatorially. But a restudy of the photograph of the same specimen which is described here as *Rouseisporites* sp., clearly contradicts this interpretation. What Dev (*l.c.*, p. 53) has interpreted as the Y-mark apparatus in his specimen, in fact, corresponds to the distal muroid ridges. The marks of curvature have also not been confirmed but this effect has been attributed to the presence of funnel like invaginations of the outer layer of the exine at each radial region at or near the equator. The specimens of this species are larger in size and more robust as compared to other species of the same genus present in the Jabalpur Series.

#### REFERENCES

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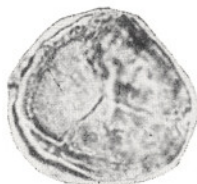
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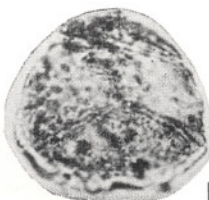
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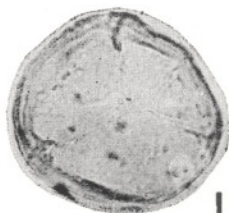
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#### EXPLANATION OF PLATE

(All photomicrographs  $\times 500$  and are from unretouched negatives)

- 1-2. *Rouseisporites pallidus* sp. nov. Regd. Sl. No. 3221, 3245. 3224, 3218.
- 3-4. *R. pseudosulcatus* sp. nov. Regd. Sl. No. 5-12. *R. sehorensis* sp. nov. Regd. Sl. No. 3238, 3222, 3217, 3240, 3241, 3221, 3220.