**SPORAES DISPERSAE IN THE COALS OF PENCH-KANHAN AND PATHAKHERA COALFIELD (M.P.), INDIA**

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**ABSTRACT**

The present paper contains a systematic description of the miospore assemblage recovered from the Lower Gondwana coals of Pench-Kanhan and Pathakhera coalfields. It has been referred to 37 genera and 61 species out of which 5 species are new. The morphographic characters of the new species have been described in detail.

**INTRODUCTION**

So far no account of Sporae dispersae from the coals of the above said areas is known. The present work contains a detailed morphographic description and classification of the miospores occurring in the coals of Pench-Kanhan and Pathakhera (Lower Barakar) coalfields.

The material for the present investigation consists of some bore-hole coal samples from Pathakhera and Pench-Kanhan Coalfields and channel samples from the working collieries of Pench-Kanhan Coalfield.

**SYSTEMATIC DESCRIPTION**

The Sporae dispersae of Pench-Kanhan and Pathakhera coalfields include a number of trilete, monolete, monosaccate, bisaccate, and alete miospores. Large number of specimens were studied and the important exine characters were taken into consideration for the delimitation of various genera and species. The species referred to the spore genera are more or less similar to those already discussed by Bharadwaj (1962) and Bharadwaj and Salujha (1964). The various genera and species have been classified and arranged according to the scheme of Potonie (1956, 1958, 1960). All the 37 genera and 61 species recovered in the present investigation have been listed here. The species marked by the asterisk are new and have been described in detail.

- Callumispora barakarensis Bharad. & Sriv.
- Callumispora gretensis (Balme & Henn.) Bharad. & Sriv.
- Callumispora pretensis (Balme & Henn.) Bharad. & Sriv.

- Hennellysoporites diversiformis (Balme & Henn.) Tiw.
- Hennellysoporites indicus Tiw.
- Lophotritiletes rectus Bharad. & Sal.
- *Horriditritiletes pathakheraensis* sp. nov.
- Brevitritiletes levits (Balme & Henn.) Bharad. & Sriv.
- Brevitritiletes jhingurdahiensis Sinha
- Brevitritiletes unicus (Tiw.) Bharad. & Sriv.
- Microbaculispora tentula Tiw.
- Microbaculispora barakarensis Tiw.
- Microbaculispora indica Tiw.
- Microfoveolatispora directa (B. & H.) Bharad.
- Pseudoreticulatispora barakarensis Bharad. & Sriv.
- Indotritiletes surangei Tiw.
- Indotritiletes sparsus Tiw.
- Plicatipollenites indicus Lele.
- Cannanoropollis mehlae (Lele) Bose & Maheshw.
- Cannanoropollis densus (Lele) Bose & Maheshw.
- Cannanoropollis talcherensis Sriv.
- Crucisaccites indicus Sriv.
- Parasaccites korbaensis Bharad. & Tiw.
- Parasaccites distinctus Tiw.
- Parasaccites diffusus Tiw.
- Parasaccites singraulensis Sinha
- Cahniasaccites indicus Sriv.
- Potonicisporites barrelis Tiw.

*Potonicisporites denscorpus* sp. nov.
- Poloniesporites sp.
- Misrapollenites barakarensis Anand-Prakash
- Lueckisporites sp.
- Primuspollenites obscurus Tiw.
- Primuspollenites ovatus Sinha
- Primuspollenites distinctus Sinha
- Rhizomaspora indica Tiw.
- Striatides communis Bharad. & Sal.
- Striatides tentulus Tiw.
- Striatides multistriatus (B. & H.) Tiw.

*Verticipollenites simplex* sp. nov.
- Lahirites raniganjensis Bharad.
- Strotersporites indicus Tiw.
- Striatopodocarpites magnificus Bharad. & Sal.
- Striatopodocarpites decorus Bharad. & Sal.
**Striatopodocarpites venustus** Bharad. & Sal.

**Lunatisporites fuscus** Bharad.

**Fauntpollenites varius** Bharad.

**Fauntpollenites perexigus** Bharad. & Sal.

**Ilílites hennelí (Hart) Sinha**

**Ilílites rectus** (Leschik) Gr. & Schw.

**Ilílites sp.**

**Suálisporites maximus** (Hart) Singh

**Suálisporites tenuílus** Tiw.

**Vesicaspora distincta** Tiw.

**Vesicaspora ovata** (B. & H.) Hart

*Platysaccus densicorpus* sp. nov.

**Cuneisporites sp.**

**Ibisporites diplosaccus** Tiw.

**Vítalína permegna** Tiw.

**Tívariasporis ívaiatus** Maheshw. & Kar

**Tívariasporis gondwaníensis** (Tiw.) Maheshw. & Kar

**Tívariasporis simplex** Maheshw. & Kar

**Gíngkócycadophytus címbatú** (B. & H.) Pot. & Lele

**Pilasporites simplex** var. major Sinha

**Hémíspáheríum singráulisíónis** Sinha

*Hémíspáheríum punctálius* sp. nov.

**Anteturma — Sporites H. Pot., 1893**

**Túrma — Tríletes (Reins.) Pot. & Kr., 1954**

**Subturma — Azonotríletes Lub., 1935**

**Infraeturma — Apículatí (Benn. & Kidst.) Pot., 1956**

**Genus — Horriditríletes** Bharad. & Sal., 1964

**Genotype — Horriditríletes curvíbaculosus** Bharad. & Sal., 1964.

**Horriditríletes pathákheraíensis** sp. nov.

Pl. 1 Figs. 1-3

**Holotype** — Pl. 1, Fig. 1.

**Isototype** — Pl. 1, Fig. 2.

**Locus typicus** — Bore-hole No. PK-82. 1574 A(C)E, Pathákhera Coalfield, M.P. India.

**Stratum typicum** — Barakar Stage, Damuda Series, Lower Gondwana, India.

**Diagnosis** — Pollen grains subcircular to sub-oval; holotype 98×130 μ in size; central body big, ± 74 μ in holotype, circular and dense; monolete mark distinct; saccus narrow, uniformly wide or lesser in width on two sides, finely intrareticulate.

**Description** — Known size is 110-130 μ. Central body is dark brown, thick and finely intrapunctate. Monolete mark is usually distinct, straight or bent and about 1/2 the body radius long. The body infolds are small and usually not prominent. Saccus intrareticulation is fine in nature; the width of the saccus is uniform all round but some times it is lesser on two lateral sides.

**Comparison** — The present species differs from **Potoniéisporites neglectíus** Pot. & Lele (1961) in having a denser body and ill-developed peripheral folds in the body. **Potoniéisporites barrelíis** Tiwari (1965) has a thinner barrel-shaped body. From other known species, **Potoniéisporites densícorpus**
Potonieisporites sp.

Pl. 1, Fig 6

Description — Pollen grains are oval to subcircular in over all shape. Known size ranges from $70 \times 120 \mu - 180 \times 110 \mu$. Central body is mediumly thick and finely intramicroreticulate. Monolete mark is usually indistinct, straight and small in size. Body folds are distinct. Width of saccus is usually uniform all round but in some specimens it is less on two lateral sides. Saccus intrareticulation is fine in nature.

Remarks — The specimens differ from Potonieisporites barreli in the nature of the body and the monolete mark.

Verticipollenites simplex sp. nov.

Pl. 1, Figs. 7-8

Holotype — Pl. 1, Fig. 7
Isotype — Pl. 1, Fig. 8
Locus typicus — Main working seam, Kalichhappar Colliery, Pench-Kanhan Coalfield, M. P., India.
Stratum typicum — Barakar Stage, Damuda Series, Lower Gondwana, India.
Diagnosis — Bilateral pollen grains. Holotype $30 \times 70 \mu$. Central body subcircular, dense, bearing 5-8 horizontal striations, without any vertical partitions. Saccus narrow, slit like. Sacci small, pitcher-shaped.

Description — Pollen grains are diploxylonoid in shape. Size range is $37 \times 47 \mu$ to $65 \times 85 \mu$. Central body is distinct, $35 \times 37 \mu - 30 \times 35 \mu$ in size, marginal rim around central body is absent. Proximally exine is microverrucose. Sacci are subspherical, pitcher shaped, zones of sacci attachment are not full length. Sulcus is straight. Saccus intrareticulation is medium sized.

Comparison — Present specimens can be compared with Verticipollenites subcircularis Bharad. & Sal. (1964) in the morphological characters but for the marginal rim around the central body which is absent in the specimens from the present assemblage.

Lueckisporites sp.

Pl. 2, Fig. 20

Description — Pollen grain is bilaterally oval in shape, $60 \times 96 \mu$ in size. Central body is thin, laevigate and horizontally oval. Proximally two taeniae are present over the central body, measuring $28 \times 70 \mu$ each. Taeniae are coarsely intramicroreticulate. Sacci are proximally equatorially attached and distally inclined forming a $\pm 10 \mu$ wide and straight sulcus. Sacci coarsely intrareticulate.

Remarks — The present specimen is characterised by the presence of a wide sulcus, horizontally oval central body and a distinct zone of sacci attachment, but since the number of specimens is less, the range of variation could not be studied.

Genotype — Verticipollenites Bharad., 1962

forms with more bisaccoid tendency should find their place in *Illinites*. This view point has been followed in the present work.

*Illinites* sp.

*Pl. 2, Fig. 13*

**Description** — Pollen grain is bilaterally oval in overall shape and size measuring 60×100 μ. Central body is distinctly defined, thick, circular in shape and is 50 μ in diameter. Monolete mark is distinct, simple and slightly curved. Saccus is slightly larger than the central body, lateral continuation is ± 8 μ wide; saccus is intrareticulate, meshes being fine.

**Remarks** — Only one specimen of the above circumscription has been found which does not resemble with the known species of the genus.

Infraturma — *Podocarpoiditi* Pot., Thom. & Thierg., 1950

**Genus** — *Platysaccus* (Naum.) Pot. & Kl., 1954

**Genotype** — *Platysaccus papilionis* Pot. & Kl., 1954

*Platysaccus densicorpus* sp. nov.

*Pl. 2, Figs. 14-15*

**Holotype** — *Pl. 2, Fig. 14.*

**Isotype** — *Pl. 2, Fig. 15.*

**Locus typicus** — III Seam, Chandameta Colliery, Pench-Kanhan Coalfield, M.P., India.

**Stratum typicum** — Barakar Stage, Damuda Series, Lower Gondwana, India.


**Description** — Pollen grains are bisaccate and are usually 70×94 μ - 90×140 μ in size. Central body is circular, 32-62 μ in size, dense but without any marginal rim, exine is finely microverrucose, no stria­tions are present over the proximal surface. Sacci are larger than the central body being 70-94 μ high; their attachment on the distal surface of the body is full length. Laterally the sacci come close to each other. Zone of saccus attachment is not sharply defined.

**Comparison** — *Platysaccus ovatus* Maithy (1965) differs in having elliptical body, and *Platysaccus hingi­rensis* Tiwari (1968) has usually thinner body with laevigate exine. *Platysaccus brevizonatus* Tiwari (1968) has pitcher-shaped sacci hence it differs from the present species. *Platysaccus leschihi* Hart (1960) has thinner body and mono­saccoidal construction with smaller sacci.

**Genus** — *Cuneatisporites* Lesch., 1955

*Cuneatisporites* sp.

*Pl. 2, Fig. 16*

**Description** — Size of the pollen grain is 70×110 μ. Central body is vertically oval in shape with round ends, 40×60 μ in size. Exine is finely intramicroreticulate and without striations. Saccus attachment is full length, and a 8 μ wide sulcus is present. Saccus intrareticulation is fine in nature.

**Turma** — *Aletes* Ibr.

**Subturma** — *Azonaletes* (Lub.) Pot. & Kr., 1954

**Infraturma** — *Psilonapiti* Erd., 1947

**Genus** — *Hemisphaerium* Hemm. & Nyg., 1967


*Hemisphaerium punctatus* sp. nov.

*Pl. 2, Figs. 17-19*

**Holotype** — *Pl. 2, Fig. 17.*

**Isotype** — *Pl. 2, Fig. 18.*

**Locus typicus** — IIIrd. seam, Chandameta Colliery, Pench-Kanhan Coalfield, M. P., India.

**Stratum typicum** — Barakar Stage, Damuda Series, Lower Gondwana, India.

**Diagnosis** — Holotype 50×62 μ, circular to subcircular miospores, size range 38×52-60 μ, usually splitting into two equal halves or getting folded to acquire oval shape; exine thin, finely and uniformly sculptured, *extrema lineamenta* ± smooth.

**Description** — Miospores are circular to subcircular in over all shape and usually
split into two halves. Size ranges from 38-60 μ. Spores are usually folded in the middle. Exine is thin, lowly and densely sculptured, elements are distributed uniformly over the body. *Extrema lineamenta* is slightly uneven.

Remarks — The present specimens vary from the other species of the genus in their smaller size and the uniform and more prominent distribution of the sculptural elements.

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REFERENCES


EXPLANATION OF PLATES

(All photomicrographs magnified 500 X)

**PLATE 1**

1-3. *Horriditriletes pathakheraeensis* sp. nov. Slide nos. 4231, 4232, 4221.

4-5. *Potonieisporites densicorpus* sp. nov. Slide nos. 4233, 4215.


7-8. *Verticipollenites simplex* sp. nov. Slide nos. 4234, 4235.

9.10. *Faunipollenites varius* Slide nos. 4236, 4237.

**PLATE 2**

11-12. *Faunipollenites perexiguus* Slide nos. 4238, 4239.

13. *Illinites* sp. Slide no. 4218.


