

# PALYNO—STRATIGRAPHY OF PARSAPANI COALS, M. P., INDIA

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## ABSTRACT

The paper deals with the palynostratigraphical information on coals from Parsapani, M. P., India. The sporological assemblage is characterized by the dominance of coniferous, chiefly podocarpaceous, genus *Podocarpidites*. Triletes are poorly represented whereas the monolete forms have not been observed in the assemblage. The genera which are 'common' in occurrence are *Callialasporites*, *Podosporites* and *Araucariacites*. Among the miofloral assemblages so far known from India, on a broad-based comparison, it approaches the one reported from the Rajmahal Hills. The age of these Parsapani sediments has been suggested to be a little older than that of the Rajmahal Hills deposits and it might lie in the Middle or Lower Jurassic.

## INTRODUCTION

The present paper deals with the sporological information on Mesozoic coals from Parsapani, Madhya Pradesh, India. Fox (1934) listed a thin coal seam, as exposed in the Denwa valley along Hathidol Nala near the village Parsapani among the coal occurrences from Upper Gondwanas. However, he could not confirm that these coaly beds belong to the Jabalpur Series. CROOKSHANK (1936) for the first time recorded the megaflorestic contents from the sediments occurring north of Parsapani viz., *Dictyozamites*, *Gleichenites*, *Cladophlebis*, *Taeniopteris*, *Nilssonia*, *Ptilophyllum*, *Desmiophyllum*, *Brachyphyllum*, *Araucarites*, and *Ginkgoites* etc. and included these sediments in the Jabalpur Series. Regarding the age, he opined that the genus *Dictyozamites* is especially characteristic of the Middle Jurassic and because others, notably *Nilssonia*, *Taeniopteris* and *Pterophyllum*, are rarely found in younger strata, a Middle to Lower Jurassic age was almost certain for the Jabalpur Series. Recently, *spora dispersa* from the coaly deposits of Parsapani have been recorded by MAHESHWARI (1973) who considers the age of the Parsapani beds miofloristically to be Upper Jurassic. The spore assemblage recovered by him exhibits a dominant association of *Araucariacites* and *Callialasporites*.

**GEOLOGY**—(See Text-fig. 1.) The Upper Gondwana coals are exposed in Hathidol Nala in the Denwa valley (22° 36' : 78° 2') M. P. India. The sandstones, coal and associated shale rest upon the Bagra conglomerate unconformably. Sandstones are greenish in colour, coarse to medium grained, thickly bedded and are mainly composed of quartz and felspar grains. At places the sandstones have become reddish in colour due to ferruginous contents. A thin coal seam is present which is banded in nature and rich in durain and lenticles of vitrain are also present.

## STRATIGRAPHICAL SUCCESSION AT PARSAPANI

Sandstone  
Coal and Carbonaceous shale  
Sandstone  
..... Unconformity .....  
Bagra Conglomerate

## MATERIALS AND METHODS

Two samples of coal and coaly shale were collected from the nala cutting about 1 km SSE of Parsapani village by BHARADWAJ in 1971 for the present palynological investigations.

The usual maceration technique for these coal samples has been followed. The crushed samples were kept in nitric acid (commercial) for a week to get complete oxidation, residue was washed 3-4 times with water and treated with 10% potassium hydroxide solution, warmed up to simmering temperature so that organic contents be released from the matrix. The sporiferous material after washing 3-4 times with water, was kept in glycerine jelly and 10-15 slides were prepared for sporological studies.

## MIOFLORAL COMPOSITION

The present miospore genera and species are recovered from the Parsapani coal and associated coaly shale. Out of the two samples only one (sample no. 1495/2) could yield good miospores. Generally the miospores are poorly preserved and difficult to identify at the specific level in some cases. The identifiable taxa are listed below:—

### MIOSPORE GENERA:

*Cyathidites australis* Couper, 1953

*C. minor* Couper, 1953

*C. densus* Kumar, 1973

*Haradisporites mineri* Singh & Kumar, 1972

*Dictyophyllidites* sp.

*Osmundacidites wellmanii* Couper, 1953

*Klukisporites* sp.

*Callispora potoniei* Dev emend. Bharadwaj & Kumar, 1972

*Lametatriletes indicus* Singh & Kumar, 1972

*Boseisporites sehoraensis* Kumar, 1973

*Contignisporites cooksonii* (Balme) Dettmann, 1963

*Densoisporites indicus* Kumar, 1973

*D. novicus* Kumar, 1973

*Callialasporites dampieri* (Balme) Dev emend. Bharadwaj & Kumar, 1972

*C. trilobatus* (Balme) Dev emend. Bharadwaj & Kumar, 1972

*C. segmentatus* (Balme) Srivastava emend. Bharadwaj & Kumar, 1972

*C. discoidalis* (Döring) Bharadwaj & Kumar, 1972

*Alisporites ovalis* Kumar, 1973

*Podocarpidites ellipticus* Cookson, 1947

*P. cristiexinus* Sah & Jain, 1965

*P. vermiculatus* Kumar, 1973

*Phyllocladidites rui* Cookson, 1947

*Podosporites* cf. *P. tripakashi* Rao, 1943

*Araucariacites indicus* (Singh, Srivastava & Roy) Kumar, 1973

*A. jabalpurensis* Kumar, 1973

*Cycadopites couperi* (Dev) Kumar, 1973

*Classopollis* sp.

The miofloral assemblage as represented in the Parsapani coals consists of eighteen miospore genera and twenty four species of which ten genera are trilete, one monosaccate, three disaccate, one polysaccate, one alete-nonsaccate, one colpate and one operculate nonsaccate. Mostly, these species are known from the Upper Mesozoic Indian deposits. Hence, they are not illustrated and figured here.

The sporological assemblage is chiefly characterized by the presence of mostly coniferous elements. The cryptogamic spores are poorly distributed, of which monolete forms have not been observed in the assemblage.

#### QUANTITATIVE COMPOSITION OF THE MIOFLORA

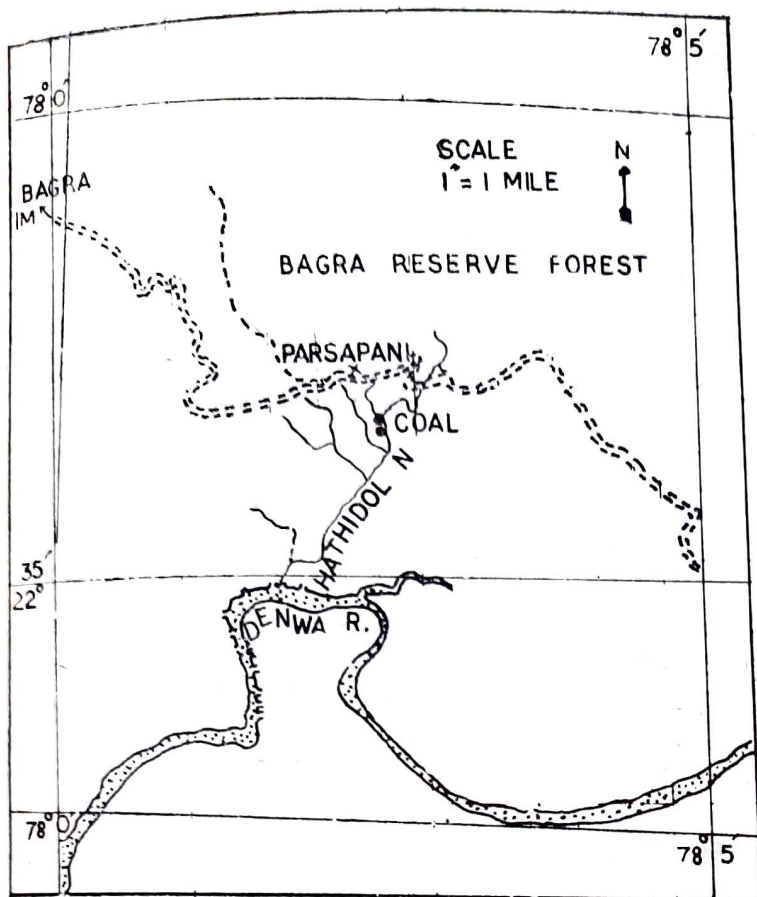
The percentage frequency of each spore and pollen grain dispersed in the assemblage of Parsapani is given in the following table. Quantitative composition of the mioflora is based on a count of 200 spores. Out of 18 miospore genera only 11 have figured in the counting. The remaining genera are extremely low in their numerical distribution in the assemblage.

The genera which are 20% or more have been regarded as *prominent*; between 10 and 19% in distribution are treated as *common* forms. The frequency range between 5 and 9% has been considered as *fair*. The elements between 1-4% are treated as *poor*. Those forms which occur less than 1% have been termed as *rare*; whereas those which do not figure in the counts but have been observed to occur are *very rare*, (Histogram-1).

Spore genera	Percentage frequency
<i>Haradisporites</i> .. ..	1 %
<i>Cyathidites</i> .. ..	1 %
<i>Callispora</i> .. ..	1 %
<i>Callialasporites</i> .. ..	17 %
<i>Alisporites</i> .. ..	9 %
<i>Podocarpidites</i> .. ..	36 %
<i>Phyllocladidites</i> .. ..	2.5%
<i>Podosporites</i> .. ..	12 %
<i>Araucariacites</i> .. ..	16 %
<i>Cycadopites</i> .. ..	3.5%
<i>Classopollis</i> .. ..	1 %

The quantitatively significant miospore genera in the assemblage are: *Podocarpidites*, *Callialasporites*, *Araucariacites* and *Podosporites*.

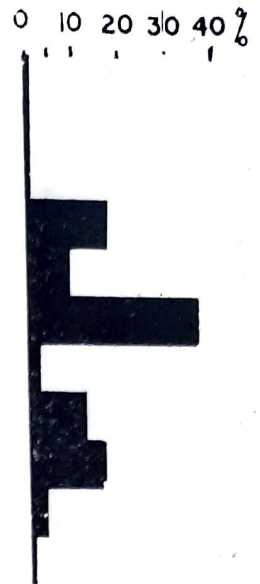
The genus *Podocarpidites* is prominently distributed in the assemblage which is associated with other components viz., *Callialasporites*, *Araucariacites* and *Podosporites* as 'common'. *Alisporites* is 'fair' in occurrence. The genera viz., *Cycadopites*, *Phyllocladidites*, *Classopollis*, *Haradisporites*, *Cyathidites* and *Callispora* are 'poorly' represented in the Parsapani assemblage.



**Fig. 1**

**SPORE GENERA**

- CYATHIDITES
- HARADISPORITES
- CALLISPORA
- CALLIALASPORITES
- ALISPORITES
- PODOCARPIDITES
- PHYLLOCLADIDITES
- PODOSPORITES
- ARAUCARIACITES
- CYCADOPITES
- CLASSOPOLLIS



SAMPLE N<sup>o</sup> 1495/2

TEXT-FIG 1. Showing coal bearing localities near Parsapani Village.

HISTOGRAM-1. Showing frequency range of miospores from Parsapani coals (M. P.), India.

**DISCUSSION AND CONCLUSION**

Fox (1934, p. 247) could not confirm that the Parsapani coal found in the Lower Denwa valley is from the Upper Gondwanas. However, CROOKSHANK (1936) viewed that it is within the Jabalpur beds on the basis of megaflora (*Dictyozamites*, *Nilssonia*, *Pterophyllum* and *Taeniopteris*) found there and also suggested that it might be of Middle to Lower Jurassic age.

The quantitative analysis of the Parsapani miofloral assemblage studied by us reveals the dominance of coniferous pollen grains. Among the coniferous pollen grains, *Podocarpidites* is 'prominent' and is associated with the 'common' occurrence of *Callialasporites*, *Podosporites* and *Araucariacites*. The genus *Alisporites* is 'fair'. *Cycadopites* and *Classopollis* are 'poor' in distribution. The cryptogamic spores are poorly present in the assemblage.

Among the Upper Mesozoic miofloras known from India (BHARADWAJ, 1969; MAHESHWARI, 1973; BHARADWAJ & KUMAR, 1974) the dominance is either of *Classopollis* complex or of *Araucariacites-Callialasporites*-association. Evidently, the *Podocarpidites* dominated sporeflora as reported from Parsapani coals by us is a new one.

Considering the incidence of *Podocarpidites* in the miofloras of the Indian Upper Mesozoic, the spore assemblage from the Rajmahal Stage shows an *Araucariacites-Podocarpidites* rich association. This mioflora is considered to be the oldest among the *Araucariacites* dominated assemblages of Middle Jurassic to Lower Cretaceous age where *Podocarpidites* progressively declines in younger strata (BHARADWAJ, 1969). However, in the Parsapani spore assemblage described by us the association is *Podocarpidites-Callialasporites-Araucariacites*, suggesting that the time of its deposition ought to be slightly older than that of the Basco and Sakrigalighat horizon in the Rajmahal Hills in view of the higher incidence of *Podocarpidites*. With reference to the spore assemblage from Parsapani, described by

MAHESHWARI (1973), that reported by us is distinctly older and this is also indicated by the difference in the stratigraphical position of our samples *vis-a-vis* those of Maheshwari.

According to SHAH, SINGH AND SASTRY (1971), the Rajmahal Plant Formation belongs to *Dictyozamites-Pterophyllum* sub-zone in the *Ptilophyllum* assemblage Zone and represents the older half of the Jurassic Period. The Parsapani spore assemblage reported by us evidently comes from this sub-period but from an older horizon as compared to the Rajmahal Plant Formation (Basco and Sakrigalighat), if the differences in the quantitative incidence of *Podocarpidites* and *Araucariacites* are not due to geographical disparity between the two.

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