

# ON THE PALYNOSTRATIGRAPHY OF ARGADA 'S' SEAM IN SOUTH KARANPURA COALFIELD, BIHAR

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## ABSTRACT

The miospore assemblage from the coal of Argada 'S' seam, South Karanpura Coalfield, has been described and compared with similar miofloras of the other coalfields of Indian Lower Gondwanas. This miospore assemblage closely resembles the mioflora of the shale associated with Argada 'S' seam described by Lele and Kulkarni (1969). In view of the mioflora from a shale band 70' above the Argada 'S' seam described by Lele and Kulkarni (1969) being similar to the mioflora of the Giridih Coalfield described by Maithy (1965), the type area for the Karharbari Stage, Argada 'S' seam has been considered older than the Karharbari Stage of Giridih Coalfield. However, in view of striking difference between the mioflora of Argada 'S' seam and that of the Talchir Stage, it is suggested that Argada 'S' seam should be considered as a part of Karharbari Stage and as compared to the Karharbari Stage in the Giridih Coalfield, it should be recognized as of Lower Karharbari Stage.

## INTRODUCTION

THE present paper deals with the stratigraphic position of Argada 'S' seam in the Lower Gondwanas of India. Argada 'S' seam has so far been considered as the basal most seam of South Karanpura Coalfield. Recently, one more seam (Argada 'T') has been reported occurring below Argada 'S' from the Argada Sector in a bore hole. So far, Argada 'S' seam and the associated strata have been considered as a part of basal Barakars (Fox, 1934). Recently, Basu (1964) and Savanur (1968) have indicated the presence of the Karharbari Stage in this coalfield. The findings of these authors are mainly based on the petrographic and lithologic characteristics of the coal. The detailed palynological account concerning with the age of these beds is not known. Lele and Kulkarni (1969) have described the miospore assemblage from a shale associated with the Argada 'S' seam and a shale 70' (as recently informed this may be about 200') above Argada 'S' seam but could not decide about the age or stratigraphic position of these shales. On the basis of the present investigation the Argada 'S' seam

and the strata associated with it (Argada 'T' seam and the shale above the Argada 'S' seam described by Lele & Kulkarni, 1969) have been placed in the Lower Karharbari Stage, whereas, the Karharbari mioflora described by Maithy (1965) from the type area has been considered to be the representative of Upper Karharbari Stage.

Maceration of the coal samples has been carried out in the usual way by keeping the coal for three to four days in commercial Nitric Acid. The macerates, after proper washing, were treated with 10 per cent KOH solution to release the spores. Slides were prepared in glycerine jelly. 200 spores were counted for obtaining the percentage frequency of the miospores.

## MIOSPORE ASSEMBLAGE FROM THE COAL OF ARGADA 'S' SEAM

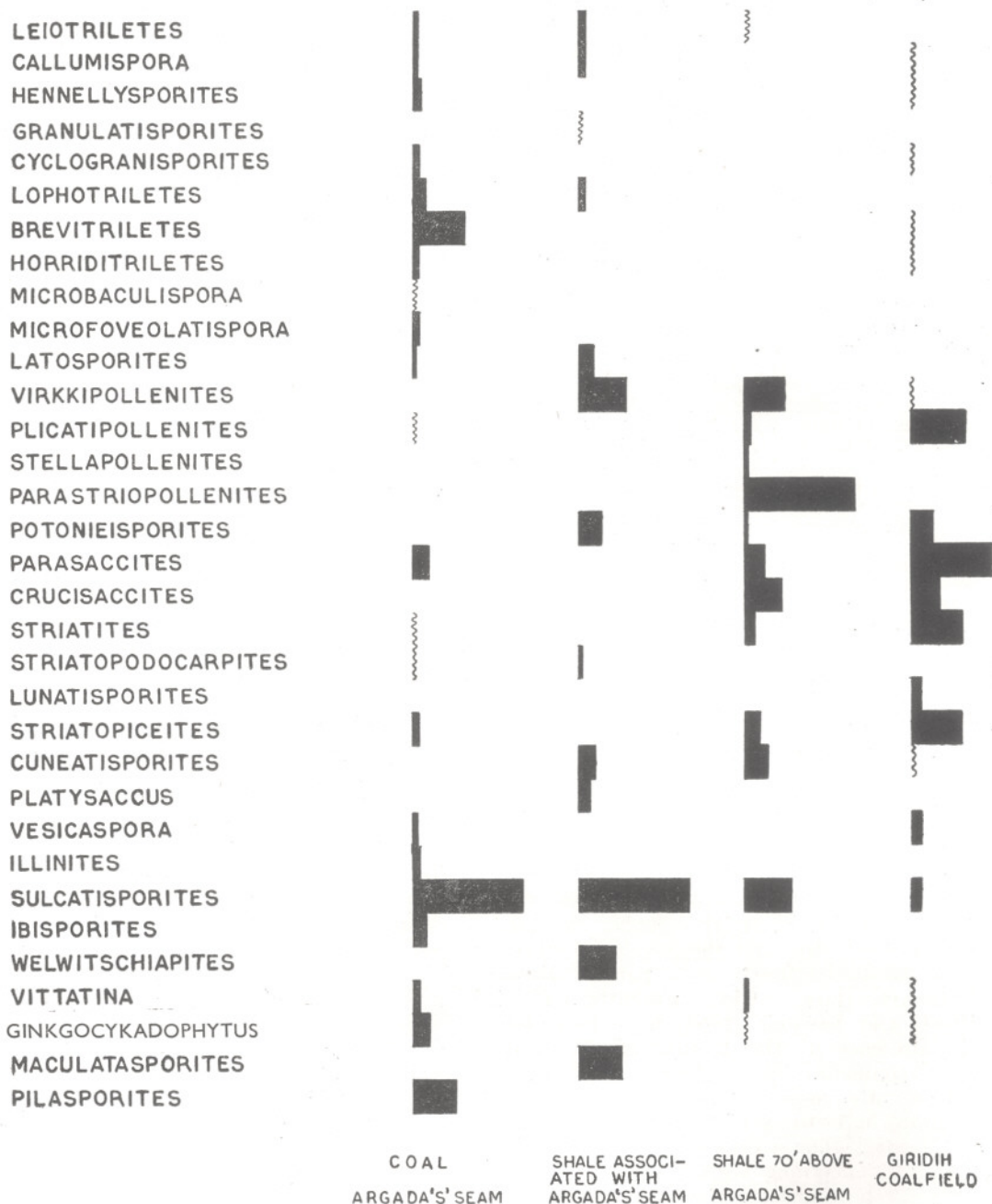
The quantitative evaluation of the miospore assemblage has shown the presence of 22 genera out of which the following are more prominent forming the characteristic assemblage (Histogram).

<i>Sulcatisporites</i>	33%
<i>Brevitriletes</i>	16%
<i>Pilasporites</i>	13%
<i>Parasaccites</i>	5%
<i>Ginkgocycadophytus</i>	5%

The undermentioned miospores occur consistently, closely following the quantitatively more prominent genera:

<i>Lophotriletes</i>	4%
<i>Hennellysporites</i>	2%
<i>Cyclogranisporites</i>	2.5%
<i>Horriditriletes</i>	2.5%
<i>Microfoveolatispora</i>	2%
<i>Striatopiceites</i>	2%
<i>Vesicaspora</i>	2%
<i>Illinites</i>	2%
<i>Tiwarisporis</i>	2%
<i>Ibisporites</i>	4%

Apart from these genera, *Leiotriletes*, *Callumispora*, *Microbaculispora*, *Latosporites*, *Plicatipollenites*, *Striatites*, and *Striatopodocarpites*, are also represented in the assemblage.



HISTOGRAM 1 — Histogram giving percentage frequency of miospore genera in relevant strata.

The miospore assemblage from the shale associated with Argada 'S' seam (Lele & Kulkarni, 1969) contains *Sulcatisporites* 33.4%, *Welwitschiapites* 10.8%, *Maculatasporite*, 12.8% and *Virkipollenites* 14.4%

as the dominant genera. The subdominant genera are *Latosporites* 4.6%, *Cuneatisporites* 5.2%, *Platysaccus* 3.6%, *Lophotriletes* 2.2%, *Callumispora* 1.8% and *Leotriletes* 2.2%.

The miospore assemblages of coal as well as of the shale from Argada 'S' seam are quite similar suggesting that the miospore composition hardly changes in the case of coal and shale if they belong to the same horizon.

#### MIOFLORISTICS AND STRATIGRAPHY

In view of the very close similarities between the miospore assemblages of Argada 'S' seam and the shale of Argada 'S' seam both are placed together in one biozone representative of the entire Argada 'S' coal seam. So far, a similar mioflora has not been described from any well dated horizon. However, the mioflora recovered from a shale lying 70' above this seam (Lele & Kulkarni 1969) and containing *Parastriopollenites* (a radial monosaccate) 33%, *Sulcatisporites* 14% and *Crucisaccites* 11% (Histogram 1), is considered by us to be rather similar to the type Karharbari mioflora described by Maithy (1965) which has dominance of *Parasaccites*, *Plicatiopollenites*, *Striatites* and *Striatopiceites* and the subdominant genera being *Crucisaccites*, *Potoniopsisporites*, *Vesicaspora* and *Sulcatisporites*. An important difference between these assemblages is the occurrence of different radial monosaccate genera in the two, viz., *Parastriopollenites* and *Virkkipollenites* in South Karanpura Coalfield in place of *Parasaccites* and *Plicatiopollenites* of the Giridih Coalfield. Such a difference is considered here to be insignificant because in our opinion the genera belonging to the same morphological spore group could inter-change between the coal basins. This contention is further supported by the occurrence of the Karharbari index spore genus *Crucisaccites* in similar quantities in both. These correspondences suggest that the two assemblages belong to one and the same biozone. However, the higher percentage of *Sulcatisporites*

and lower percentage of striated bisaccates in the shale 70' above Argada 'S' seam and *vice versa* in the shale of Giridih Coalfield, lends an older aspect to the former.

Evidently, the biozone of Argada 'S' seam is older as compared to that of the Karharbari strata of Giridih Coalfield and seems to lie between Talchir Stage and the Karharbari Stage of the type area. The mioflora of Talchir Stage (Bharadwaj, 1966) is very rich in radial monosaccates and thus, it is strikingly different from that of Argada 'S' seam. On the other hand, the mioflora of Karharbari Stage (Giridih) is also rich in radial monosaccates though not to the same extent as that of the Talchir Stage. Evidently, the mioflora of Argada 'S' seam is interpolated between two radial monosaccates rich mioflora. Interpreting the richness of radial monosaccates to be associated with colder conditions it seems that the mioflora of Argada 'S' seam represents a warmer phase which accounts for the striking difference in its miospore contents as compared to the colder underlying and overlying phases.

The mioflora of Argada 'S' seam is rich in *Sulcatisporites* which is represented also in the Karharbari mioflora of Giridih Coalfield although to a much lesser extent, but it is virtually absent in the mioflora of Talchir Stage. Moreover, lithologically, coal seams are rarely known to have been deposited in the Talchir Stage. Hence, it is considered preferable to include Argada 'S' strata in the Karharbari Stage rather than in the Talchir Stage. In view of the striking difference between the Argada 'S' miospore assemblage and that from the Karharbari strata of Giridih Coalfield it is proposed to assign them to two substages, viz., Lower Karharbari Stage and Upper Karharbari Stage, respectively.

#### REFERENCES

- BASU, T. N. (1964). On the inter-correlation of Gondwana coalfields of India. *Met. Min. Rev.*, 3(12): 5-31.
- BHARADWAJ, D. C. (1966). Distribution of spores and pollen grains dispersed in the Lower Gondwana formations of India. *Symp. Floristics Stratigr. Gondwld, Sahni Inst. Palaeobot. Lucknow*, 1964: 69-84.
- FOX, C. S. (1934). The Lower Gondwana coalfields of India. *Mem. geol. Surv. India*, 59: 1-386.
- LELE, K. M. & KULKARNI, S. (1969). Two miospore assemblages from the Argada Sector, South Karanpura Coalfield, Bihar, with remarks on their probable age. *Palaeobotanist*, 17(3): 288-294.
- MAITHY, P. K. (1965). Studies in the Glossopteris flora of India-27. *Sporae dispersae* from the Karharbari beds in the Giridih Coalfield, Bihar. *Palaeobotanist*, 13(3): 291-307.
- SAVANUR, R. V. (1968). A revision of the thickness of coal seams in the South Karanpura Coalfield, Bihar. *J. Mines Metall. Fuels*, 6(2): 325-333.