The Palaeobotanist, 32(3): 230-235, 1984.

PALYNOLOGICAL CORRELATION OF COAL SEAMS IN KUSMUNDA BLOCK, KORBA COALFIELD, MADHYA PRADESH, INDIA

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ABSTRACT

Six bore-core samples from four bore holes in Kusmunda block of the Korba Coalfield, Madhya Pradesh have been studied palynologically. The distributional pattern of various palynotaxa suggests the occurrence of three palynological assemblages. Assemblage A is characterised by the dominance of *Horriditriletes* and sub-dominance of *Striatites* and *Faunipollenites*. Assemblage B is marked by the dominance of *Faunipollenites* while *Horriditriletes* is subdominant. Assemblage C is characterised by dominant *Scheuringipollenites* whereas *Faunipollenites* and *Horriditriletes* are subdominant. Assemblage A and B show a younger aspect of the Barakar Stage and are present in the two successive coal seams, Upper and Lower Kusmunda, of bore-hole nos. NCKK-7 and NCKK-11. Assemblage C is present in coals supposed to be Upper Kusmunda seam of bore-hole nos. NCKK-16 and NCKK-18 but shows an older aspect. Apparently the so-called Upper Kusmunda seam met with in these two bore-holes is not palynostratigraphically the same as its name sake occurring in bore-hole nos. NCKK-7 and NCKK-11 and could more reasonably be older, underlying the Lower Kusmunda seam.

Key-words — Palynostratigraphy, Seams correlation, Korba Coalfield, Lower Gondwana (India).

सारांश

मध्य प्रदेश (भारत) में कोरबा कोयला-क्षेत्र के कुसमुन्डा खंड में स्थित कोयला-सीमों के परागाणविक सहसम्बन्ध — सुरेश चन्द्र श्रीवास्तव

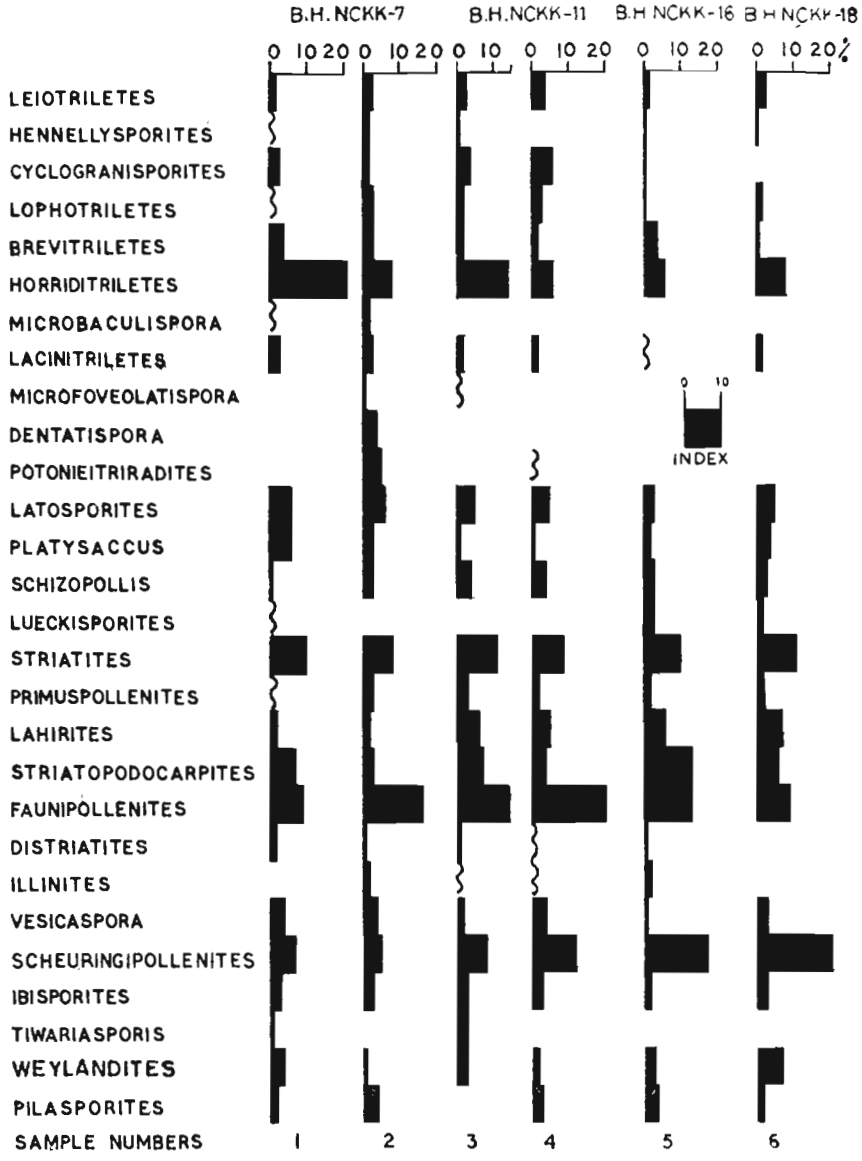
कोरबा कोयला-क्षेत्र (मध्य प्रदेश) के कुसमुन्डा खंड में चार वेध-छिद्रों से प्राप्त छः वेध-कोड़ों के नमूनों का परागाणविक अध्ययन किया गया है। इन नमूनों में विभिन्न वर्गकों के वितरण से तीन परागाणविक समुच्चयों की उपस्थिति इंगित होती है। समुच्चय अ होरिडीट्राइलिटीज़ की बाहुल्यता तथा फ़ॉनिपोलिनाइटिस एवं स्ट्रिआटाइटिस से उपप्रभावी है। समुच्चय-ब में फ़ॉनिपोलिनाइटिस की बाहुल्यता है तथा यह होरिडीट्राइलिटीज़ से उपप्रभावी है। समुच्चय-स श्यौरिपोगीलिनाइटिस की बाहुल्यता तथा फ़ॉनिपोलिनाइटिस एवं होरिडीट्राइलिटीज़ के उपप्रभाव से अभिलक्षणित है। समुच्चय-अ और ब प्रारम्भिक बराकार चरण को प्रदर्शित करते हैं तथा दो उत्तरोत्तर सीमों में ये दोनों समुच्चय विद्यमान हैं। समुच्चय-स वेध-छिद्र संख्या ऍन-सी-के-के० 16 एवं ऍन-सी-के-के० 18 की उपरि कुसमुन्डा सीम के कोयलों में मिलती है। अतएव इन दोनों वेध-छिद्रों में विद्यमान उपरि कुसमुन्डा सीम परागाणविक दृष्टि से वह सीम नहीं है जो कि वेध-छिद्र संख्या ऍन-सी-के-के० 7 एवं ऍन-सी-के-के० 11 में मिलती है और सम्भवतया अधरि कुसमुन्डा सीम के नीचे पाये जाने के कारण इससे अधिक आयु की है।

INTRODUCTION

THE Korba Coalfield, named after the village Korba in Bilaspur District of Madhya Pradesh, is nearly 4.8 km wide and 64 km long spread over an area of 520 sq km west of Mand-River Coalfield. The Geological Survey of India, the geologists of Madhya Pradesh Government and the Indian Bureau of Mines have made extensive drilling in the area and have established a number of coal seams in the Lower Barakar and Upper Barakar horizons. The sporae dispersae of the Korba Coalfield

TABLE 1 — SHOWING DETAILS OF THE COAL SAMPLES FROM KUSMUNDA BLOCK, KORBA COALFIELD, MADHYA PRADESH

Sample Nos.	Bore Hole Nos.	Overall Sample Nos.	Strata	Depth (in meter) from Surface		Thickness
				From	To	
	NCKK-7		Details above 50.93 m	Not known	—	—
			Grey carbonaceous shale	50.93	53.37	2.44
1.		CACI-BH/IA(C1-C40) bcs	Coal seam	53.37	79.99	26.62
			(Upper Kusmunda)	79.99	80.02	0.03
			Arenaceous shale			
			Parting details	Not known		
			Shale	151.72	153.44	1.72
2.		CACI-BH/IB(C1-C98)bcs	Coal seam (Lower Kusmunda)	153.44	217.65	64.21
			Inferior coal	217.65	222.03	4.38
			Grey shale and Carbonaceous shale	222.03	226.63	4.60
			Details below this depth	Not known		
	NCKK-11	-	Details above 16.17 m	do		
3.		CACI-BH/5A(C1-C27)bcs	Coal seam (Upper Kusmunda)	16.17	34.72	18.55
			Carbonaceous shale	34.72	34.78	0.06
			Arenaceous shale	34.78	38.81	4.03
			Fine grained sandstone	34.81	34.90	0.09
			Parting details	Not known		
			Carbonaceous shale	102.18	102.38	0.20
			Shaly coal	102.38	103.20	0.82
4.		CACI-BH/5B(C3-C90)E	Coal seam (Lower Kusmunda)	103.20	167.34	64.14
			Inferior coal	167.34	168.10	0.76
			Carbonaceous shale	168.10	168.57	0.47
			Details below this depth	Not known		
	NCKK-16		Details above 15.25 m	Not known		
			Carbonaceous shale	15.25	15.35	0.10
			Inferior coal	15.35	16.86	1.51
5.		CACI-BH/24A(C4-C19)E	Coal seam (Upper Kusmunda)	16.86	32.32	15.46
			Carbonaceous shale	32.32	32.45	0.13
			Sandstone	32.45	33.84	1.39
			Details below this depth	Not known		
			Carbonaceous shale	103.36	103.69	0.33
			Coal	—	106.41	2.72
			Details below this depth	Not known		
	NCKK-18		Details above 13.29 m	Not known		
			Shale and carbonaceous shale	13.29	16.43	3.14
			Coal	16.43	18.21	1.78
			Arenaceous shale	18.21	18.24	0.03
			Sandstone	18.24	18.93	0.69
			Parting details	Not known		
			Shale and carbonaceous shale	88.63	90.63	2.00
			Shaly coal	90.63	91.81	1.18
6.		CACI-BH/26B(C4-C38)bcs	Coal seam (Upper Kusmunda)	91.81	117.13	25.32
			Shale	117.13	117.93	0.80
			Fine grained sandstone	117.93	119.13	1.20
			Details below this depth	Not known		



Histogram 1 — Showing percentage distribution of miospore in different coal seams of Kusmunda block, Korba Coalfield.

have earlier been studied by Bharadwaj and Tiwari (1964a) and Tiwari (1964, 1965) who have instituted a number of new genera and species. Bharadwaj and Tiwari (1964b) have also suggested the correlation of coal seams in the bore-hole samples of Rajgamar, Ghordewa and Korba sectors. The subsurface palynological succession of the Korba Coalfield has also been studied by Bharadwaj and Srivastava (1973) in a deep bore-hole No. NCKB-19. Srivastava (1973) has furthur studied the mioflora of the Talchir Formation in Dhengur Nala of the same coalfield. Thus, the succession of miofloras in the subsurface sediments of Korba Coalfield is fairly known from the Talchir

Formation to Barakar Formation from the above sectors. However, the mioflora from the Kusmunda block of the Korba Coalfield is being described for the first time which includes six coal samples from four different bore-holes of this area, the details of which are given in Table 1. These samples were made available through the kind courtesy of the authorities of Central Fuel Research Institute, Regional Coal Survey Station, Bilaspur, to whom the author is thankful.

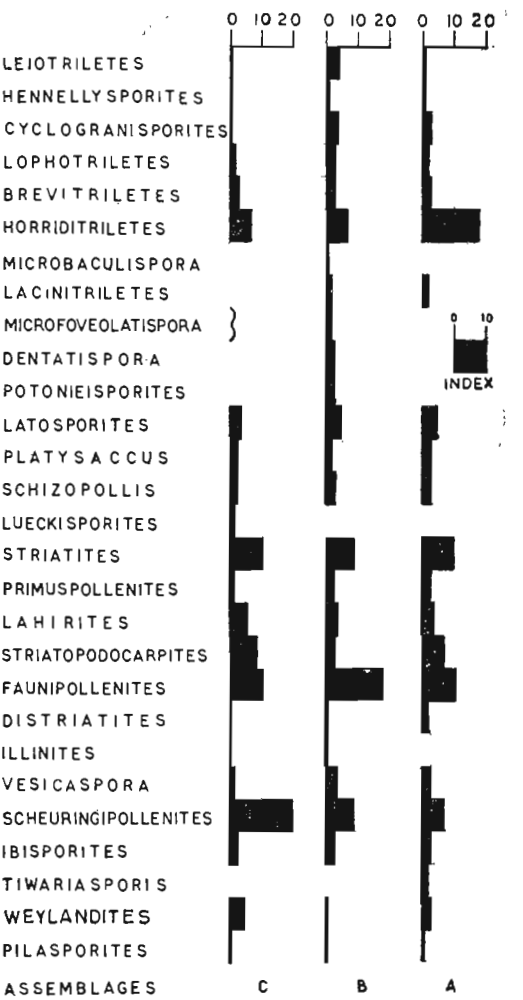
MIOFLORAS

The miofloral assemblage in the Kusmunda block of Korba Coalfield consists of 38 genera which are mentioned below:

Leiotriletes, Callumispora, Hennellysporites, Cyclogranisporites, Lophotriletes, Brevitriletes, Horriditriletes, Microbaculispora, Lacinitriletes, Microfoveolatispora, Potonieitriradites, Dentatispora, Latosporites, Barakarites, Platysaccus, Schizopollis, Lueckisporites, Striatites, Circumstriatites, Primuspollenites, Rhizomaspora, Lahirites, Striatopodocarpites, Verticipollenites, Faunipollenites, Distriatites, Illinites, Vesicaspora, Scheuringipollenites, Ibisporites, Tiwariasporis, Weylandites, Ginkgocycadophytus, Pilasporites, Hemisphaerium, Hindisporis, Peltacystia and *Leiosphaeridia.*

Amongst these, *Horriditriletes, Striatites, Faunipollenites* and *Scheuringipollenites* characterise the miofloral assemblage at various levels of the bore-core by their quantitative abundance. *Callumispora, Microbaculispora, Microfoveolatispora, Lueckisporites, Illinites* and *Tiwariasporis* occur rather inconsistently and rarely too. The zonate triletes are represented by *Potonieitriradites* and *Dentatispora* which are present in one sample only. The alete sporomorphs also show a great inconsistency in their occurrence and hence, all of them have been merged with the percentage of the genus *Pilasporites.*

Thus, the quantitative as well as the qualitative distribution of various palynotaxa (Histogram 1) permit segregation of the mioflora into three different assemblages (Histogram 2). The oldest association is represented by Assemblage C in which *Scheuringipollenites* marks the dominance being present up to 20 per cent. *Horriditriletes* (7%) and *Faunipollenites* (11%) occur as subdominants. The percentage of nonstriated-disaccates and striated-disaccates occur at their maximum in this assemblage (29% & 48% respectively). The laevigate+apiculate triletes and varitriletes on the other hand are present up to 12 per cent and 3.5 per cent respectively. Such an assemblage is found in sample nos. 5 and 6.



Histogram 2 — Showing percentage of miospores in different assemblages of Kusmunda block, Korba Coalfield.

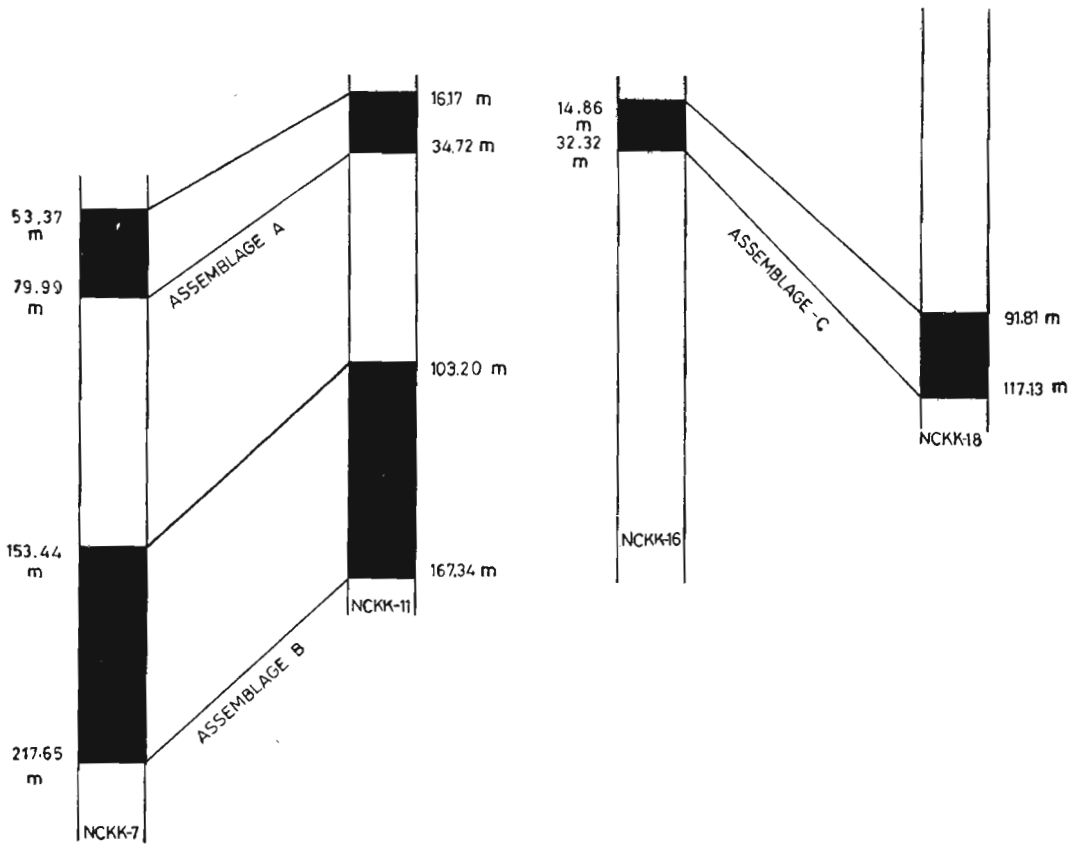
Assemblage B is characterised by the dominance of *Faunipollenites* (18%) closely associated with *Striatites* (9%), *Sulcatisporites* (8%) and *Horriditriletes* (7%). The

assemblage is enriched by the abundance of striated-disaccates (38%) although less commonly than Assemblage C. The nonstriated-dissaccates (18%) also reduce significantly while the laevigate+apiculate triletes (19%) show a slight increase in their percentage. Varitriletes (6%) also mark a significant increase similar to the other triletes. Zonate triletes (6%) are associated significantly in this assemblage whereas in others it is absent. Assemblage B is present in sample nos. 2 and 4.

Assemblage A is considered to be the youngest assemblage in the present investigation and is distributed in sample nos. 1 and 3. The trilete genus *Horriditriletes* marks the dominance by its presence up to 18 per cent while *Faunipollenites* (11%) reduces to subdominance and remains associated with *Striatites* (10%) and *Scheuringipollenites* (7%). The total percentage of laevigate+apiculate triletes increases to their maximum, i.e. 26% while varitriletes decline correspondingly. However, the general dominance of the assemblage is still characterised by the striated-disaccates (37%).

CORRELATION

The quantitative as well the qualitative distribution of various palynotaxa among six samples investigated from Kusmunda block of Korba Coalfield reveals that the miofloras of all the coal seams in general are marked by the overall abundance of striated-disaccate pollen grains. The miospore Assemblage B (Text-fig. 1) characterises the older seams of the bore-hole no. NCKK-7, (Lower Kusmunda seam-sample no. 2) and bore-hole no. NCKK-11 (Lower Kusmunda seam-sample no. 4). The genus *Faunipollenites* marks the dominance over and above other group of miospores. *Horriditriletes* and *Scheuringipollenites* occur as subdominants. *Potonieitriradites* is characteristically associated with the Lower Kusmunda seam while it is absent in others.



TEXT-FIG. 1 — Showing correlation of coal seams in various bore-holes of Kusmunda block, Korba Coalfield.

In the overlying Upper Kusmunda seam of the bore-hole nos. NCKK-7 and NCKK-11 the total population of striated and non-striated-disaccate pollen grains and also varitriletes remain almost similar to that of Lower Kusmunda seam (Assemblage A). However, a sharp increase in the percentage of laevigate+apiculate triletes is distinctly distinguishable in the Upper Kusmunda seam of the bore-hole nos. NCKK-7 (sample no. 1) and NCKK-11 (sample no. 3). The zonate triletes are absent but the monolete miospores maintain the same level of occurrence. Thus, the Upper Kusmunda seam of the above mentioned bore-holes can be easily differentiated from the Lower Kusmunda seam underlying it in their respective bore holes.

The Upper Kusmunda seam of the bore-hole no. NCKK-16 (sample no. 5) and NCKK-18 (sample no. 6) palynologically shows a different association. The overall dominance of the assemblage is marked by the genus *Scheuringipollenites*. The striated-disaccate genera, viz., *Faunipollenites* and *Striatites* follow as subdominants. It is interesting to note that the total representation of laevigate+apiculate triletes and varitriletes is at its minimum in Assemblage C. They increase in Assemblage B and again decrease in Assemblage A. On the other hand, the total representation of nonstriated-disaccate is at its maximum in this seam and so also the striated-disaccate pollen grains which decreases in other assemblages. Thus, a gradual decrease in the percentages of striated and nonstriated-disaccates and a corresponding increase in the percentage of laevigate+apiculate triletes is evident in Assemblage sequence C-B-A. The overall abundance of striated and non-striated pollen grains suggests its closer relationship with the older coal seams of the bore-hole nos. NCKK-7 and NCKK-11 yet it retains its own identity.

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