

PALYNOLOGY OF THE LOWER GONDWANA SEDIMENTS IN SALTORA (CHAKBOGA) AREA OF BANKURA DISTRICT, WEST BENGAL, INDIA

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Abstract

The present paper records 24 genera and 46 species of palynofossils from the carbonaceous shales and coal samples of Saltora (Chakboga) in Bankura District, West Bengal. The miospore assemblage shows close resemblance with the *Densipollenites* rich assemblage of Barren Measures Formation.

Introduction

The sedimentary rocks of Lower Gondwana System occur in the north-northwest of Bankura District in West Bengal. There is an exposure along the banks of a streamlet near Chakboga (23°35' lat : 85°33' long). The authors undertook a number of excursions during the year 1977-1979 and collected coal, carbonaceous shale and sandy shale. The base of the sequence is not exposed. The top of the exposure is covered by recent alluvium soil. A number of samples were collected from the lowest level rock to the top of the sequence vertically.

Various workers have contributed to the study of miofloral assemblages from the Lower Gondwana sedimentary deposits in different sedimentary basins in India. Agashe and Chitnis (1972); Bandopadhyay (1973); Bharadwaj (1955, 1962, 1966, 1967, 1970, 1974a, 1974b); Bharadwaj & Anand Prakash (1972); Bharadwaj *et al.* (1965, 1979a, 1979b); Bharadwaj & Salujha (1956a, 1956b, 1964); Bharadwaj & Srivastava (1967, 1969a, 1969b, 1971, 1973); Bharadwaj & Srivastava (1969); Bharadwaj *et al.* (1979); Bharadwaj & Tiwari (1964a, 1964b, 1966, 1977); Bhattacharyya (1959); Bhattacharyya *et al.* (1957); Ganguly (1958); Ghosh *et al.* (1947); Ghosh & Mitra (1975); Ghosh & Sen (1948); Ghosh & Lahiri (1972); Ghosh (1973); Ghosh (1972); Goswami (1951); Kar (1966, 1968a, 1968b, 1969, 1969a, 1970, 1973); Lele (1964, 1974, 1975), Lele & Chandra (1972, 1977); Lele & Karim (1971); Lele & Maithy (1964); Maheshwari (1967, 1974, 1976); Maithy (1969); Mehta (1956); Mukherjee (1972), Navale (1972); Potonié & Lele (1961); Rana & Tiwari (1980); Saxena (1974); Salujha (1965); Satsangi *et al.* (1968); Singh & Sah (1972); Srivastava (1973, 1974, 1980, 1980a); Srivastava & Maheshwari (1974); Tiwari (1964, 1965, 1968, 1973, 1973a, 1974a, 1974b, 1976, 1979); Tiwari & Rana (1980, 1981, 1981b, 1984); Venkatchala & Kar (1964, 1965, 1968, 1969); and Virkki (1939).

It is to be noted here that upto now no work has been done on the fossil flora of the Lower Gondwana deposits from Saltora (Chakboga), District, Bankura, W. Bengal. Therefore, the present work by the authors is the first detailed investigations on the miofloral assemblages in these deposits.

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Systematic palynology

The *Sporae dispersae* have been arranged here according to the classifications of Potonié & Kremp (1954, 1955) and Potonié (1956, 1958, 1960, 1966 and 1970). The taxonomic categories proposed by Bharadwaj (1974) have been incorporated.

Genus—*LEIOTRILETES* (Naumova) Potonié & Kremp, 1954

Type species — *L. sphaerotriangulatus* (Kosenk) Potonié & Kremp, 1954

Species recorded — *L. erectus* Kar, 1968

(Pl. 1, Fig. 1)

Genus—*CALLUMISPORA* Bharadwaj & Srivastava, 1969

Type species—*C. barakarensis* Bharadwaj & Srivastava, 1969

Species recovered—*Callumispora* sp.

(Pl. 1, Fig. 4)

Genus—*HORRIDITRILETES* Bharadwaj & Salujha, 1964

Type species—*H. curvibaculosus* Bharadwaj & Salujha, 1964

Species recorded—*H. curvibaculosus* Bharadwaj & Salujha, 1964

(Pl. 1, Fig. 2)

Genus—*LAEVIGATOSPORITES* (Ibrahim) Schopf *et al.*, 1933

Type species—*L. vulgaris* Ibrahim, 1933

Species recorded—*L. plicatus* Kar, 1968

(Pl. 1, Fig. 3)

Genus—*PUNCTATOSPORITES* Ibrahim, 1933

Type species—*P. minutus* Ibrahim, 1933

Species recorded—*P. morosus* Venkatachala & Kar, 1968

(Pl. 1, Fig. 6)

Genus—*DENSIPOLLENITES* Bharadwaj, 1962

Type species—*D. indicus* Bharadwaj, 1962

Species recorded—*D. indicus* Bharadwaj, 1962

(Pl. 1, Fig. 5)

Genus—*Prasaccites* Bharadwaj & Tiwari, 1964

Type species—*P. korbaensis* Bharadwaj & Tiwari, 1964

Species recorded—*P. diffusus* Tiwari, 1964

(Pl. 1, Fig. 8)

Genus—*RANIGANJ AISACCITES* Kar, 1969

Type species—*R. ovatus* Kar, 1969

Species recorded—*R. ovatus* Kar, 1969

(Pl. 1, Figs. 7 & 9)

Genus—*STRIATITES* (Pant) Bharadwaj, 1962

Type species—*S. seawardii* (Virkki) Pant, 1955

Species recorded—*S. communis* Bharadwaj & Salujha, 1964

(Pl. 1, Fig. 11)

Species recorded—*S. rhombicus* Bharadwaj & Salujha, 1964

(Pl. 1 Fig. 12)

Species recorded—*S. tectus* Kar, 1968

(Pl. 1, Fig. 10)

Genus—*LAHIRITES* Bharadwaj, 1962

Type species—*L. raniganejnsis* Bharadwaj, 1962

Species recorded—*L. rarus* Bharadwaj & Salujha, 1964

(Pl. 1, Fig. 13)

Species recorded—*L. naviculus* Venkatachala & Kar, 1968

(Pl. 2, Fig. 24)

Genus—*FAUNIPOLLENITES* Bharadwaj, 1962

Type species—*F. Varius* Bharadwaj, 1962

Species recorded—*F. varius* Bharadwaj, 1962

(Pl. 2, fig. 17)

Species recorded—*F. goriensis* (Lele) Maithy, 1965

(Pl. 2, fig. 23)

Genus—*GONDWANIPOLLENITES* Bose & Maheshwari, 1968

Type species—*Gondwanipollenites consgensis* Bose & Maheshwari, 1968

Species recorded—*G. decorus* (Bharadwaj & Salujha) Bose & Maheshwari, 1968

(Pl. 2, fig. 16)

Genus—*STROTERSPORITES* (Wilson) Bharadwaj, 1962

Type species—*S. communis* (Zoricheva & Sedova) Bharadwaj, 1962

Species recorded—*S. magnificus* Bharadwaj & Salujha, 1962

(Pl. 2, fig. 15)

Genus—*HINDIPOLLENITES* Bharadwaj, 1962

Type species—*H. indicus* Bharadwaj, 1962

Species recorded—*H. globosus* Kar, 1968

(Pl. 2, fig. 20)

Genus—*VERTICIPOLLENITES* Bharadwaj, 1962

Type species—*V. secretus* Bharadwaj, 1962

Species recorded—*V. gibbosus* Bharadwaj, 1962

(Pl. 2, fig. 21)

Genus—*SCHEURINGIPOLLENITES* (Tiwari) Tiwari, 1973

Type species—*S. maximus* (Tiwari) Tiwari, 1973

Species recorded—*S. maximus* (Tiwari) Tiwari, 1973

(Pl. 2, fig. 18)

Species recorded—*S. tentulus* (Tiwari) Tiwari, 1973

(Pl. 1, fig. 14)

Species recorded—*S. barakarensis* (Tiwari) Tiwari, 1973

(Pl. 2, fig. 19)

Genus—*CORISACCITES* Venkatachala & Kar, 1966

Type species—*C. alutas* Venkatachala & Kar, 1966

Species recorded—*C. alutas* Venkatachala & Kar, 1966

(Pl. 2, fig. 25)

Genus—*GONDWANAEPPLICATES* Kar, 1969

Type species—*G. bharadwajii* Kar, 1969

Species recorded—*G. bharadwajii* Kar, 1969

(Pl. 2, fig. 26)

Genus—*GINKGOCYCADOPHYTES* Samoilovich, 1953

Type species—*G. caperatus* (Luber) Samoilovich, 1953

Species recorded—*G. vetus* Balme & Hennelly, 1956

(Pl. 2, fig. 27)

Comparative table of *Sporae dispersae* from Indian Lower Gondwana horizons showing distribution with *Saltora* (Chakboga) Localities : T—Talchir, K—Karharabari, B—Barakar, BM—Barren Measures

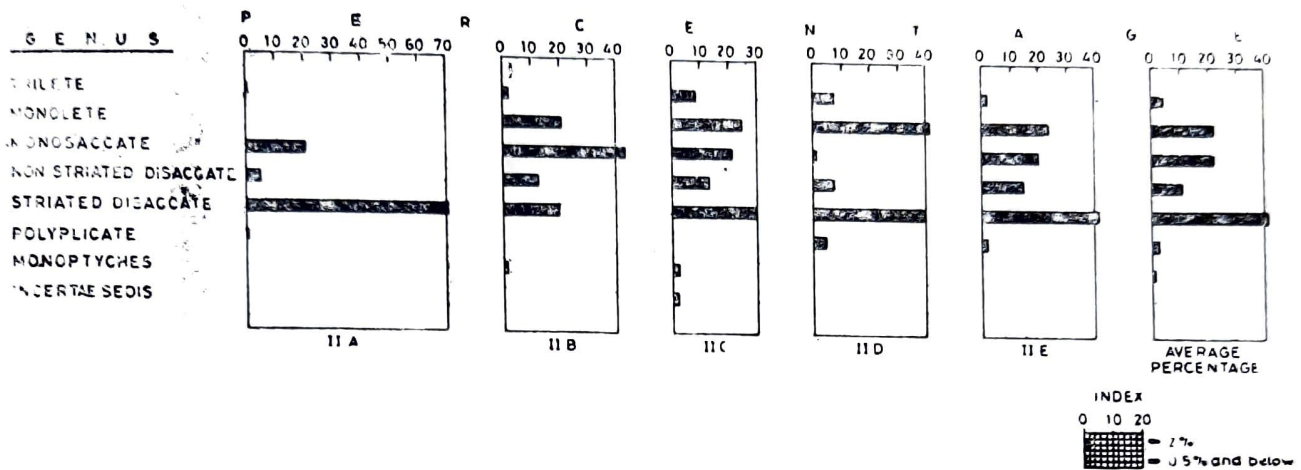
List of species Recorded	T	K	B	BM	R
<i>Leiotriletes erectus</i>			+	+	
<i>Callumispora</i> sp.					
<i>Cyclogranisporites gondwanensis</i>			+	+	+
<i>Horriditriletes curvibaculus</i>			+	+	+
<i>Cyclobaculisporites minutus</i>	+	+	+	+	+
<i>Laevigatosporites colliensis</i>	+	+	+	+	+
<i>L. plicatus</i>				+	
<i>Punctatosporites morosus</i>			+		+
<i>Densipollenites indicus</i>			+	+	
<i>D. invisucus</i>			+	+	
<i>D. densus</i>			+		
<i>Parasaccites diffusus</i>			+	+	
<i>Limitisporites desectus</i>					
<i>Corisaccites alatus</i>			+		
<i>Scheuringipollenites maximus</i>			+	+	
<i>S. barakarensis</i>	+	+	+	+	

List of species Recorded	T	K	B	BM	R
<i>S. tentulus</i>	+	+			+
<i>Raniganjiasaccites ovatus</i>					
<i>Cuneatisporites radialis</i>			+	+	+
<i>C. rarus</i>			+	+	+
<i>Faunipollenites varius</i>	+	+	+	+	+
<i>F. minor</i>	+	+	+		+
<i>F. goriensis</i>		+	+	+	
<i>F. bharadwajii</i>				+	
<i>Striatites seawardii</i>					
<i>S. rhombicus</i>			+		+
<i>S. solitus</i>			+		+
<i>S. communis</i>			+		+
<i>S. alius</i>			+		+
<i>S. tectus</i>			+		+
<i>S. varius</i>			+		+
<i>Hindipollenites globosus</i>				+	+
<i>Verticepollenites gibbosus</i>			+		+
<i>Lahirites rarus</i>					
<i>L. maviculus</i>					+
<i>L. alutus</i>				+	
<i>Crescentipollenites fuscus</i>			+		+
<i>Striatopicities minutus</i>			+		+
<i>S. digredius</i>			+	+	+
<i>Gondwanapollenites decorus</i>			+	+	+
<i>Strotersporites diffusus</i>			+	+	+
<i>S. magnus</i>					
<i>Gondwanaeplicates bharadwajii</i>				+	+
<i>Ginkgocycadophytus vetus</i>			+		

From the above table it is concluded that *Laevigatosporites plicatus*, *Striatopicities degredus*, *Cuneatisporites rarus* are previously recorded from Barren Measures Formation from Jharia coalfield by Kar (1968). *Striatites seawardii* have reported previously from Barren Measures Formation of south Karanpura Coalfield. *Striatites rhombicus*, *S. solitus*, *S. communis*, *Limitisporites desectus*, *Raniganjiasaccites ovatus*, *Gondwanaeplicates bharadwajii*, and *Ginkgocycadophytes vetus* are new forms recovered from Barren Measures Formation of Saltora (Chakboga).

Discussion

The assemblage shows a high frequency of occurrence of *Densipollenites* (22%). The sub-dominant genus is *Laevigatosporites* (21%). *Striatopicites*, *Gondwanaepollenites* are present very frequently (12%). *Striatites*, *Verticepollenites* and *Lahirites* occur in low frequency. *Crescentipollenites*, *Corisaccites* and *Hindipollenites* occur sporadically (1% or less). Nonstriated pollen grain occur only 11%. They are represented by *Scheuringipollenites* (7%) and *Cuneatisporites* (4%) (see Text-fig. 1, Fig. 2).

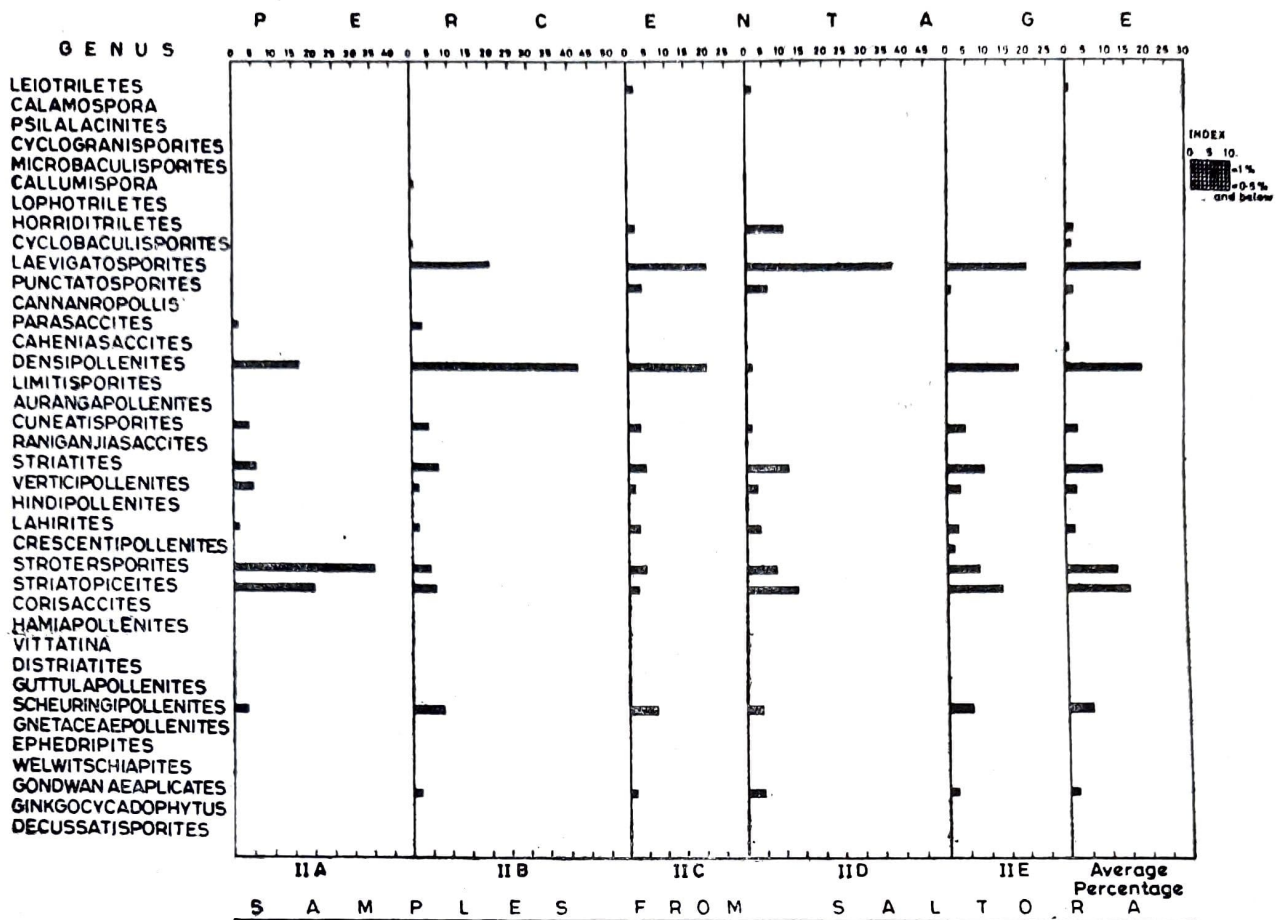


Text-fig. 1—Frequency of occurrence of major groups of spores dispersae from Saltora.

Bharadwaj (1970) divided the Barren Measures Formation into 3 distinct zones on the basis of the frequency of occurrence of *Densipollenites*. The present assemblage is comparable to that horizon of Bharadwaj (1970) which is *Densipollenites* rich combined with low frequency of trilete spores of Barren Measure Formation, i. e. palynozone II. The presence of red-ferruginous shale with *Glossopteris* sp. shows lithological similarity with Barren Measures also.

The major mioflora recovered from Chakboga (Saltora) is also compared quantitatively with the known Barren Measures miofloral assemblages.

Important Genera	Sibbabudih Nala	Katri Nala	Saltora (Chakboga) Average frequency
<i>Lophotriletes</i>	6.5%	3.4%	1.5%
<i>Densipollenites</i>	4.1%	12.4%	22%
<i>Striatites</i>	3.3%	4.7%	9%
<i>Striatopicites</i>	27%	23.6%	14%
<i>Scheuringipollenites</i>	14%	12.7%	7%



Text-fig. 2—Showing the percentage of different spore-pollen genera in Saltora (Chakboga).

Conclusion

It is concluded that the miofloral assemblage of Saltora (Chakboga) is characterised by the association of the following genera: *Densipollenites*, *Faunipollenites*, *Striatites* and *Scheuringipollenites*. The trilete form is represented by *Lophotriletes* by only 1.4%.

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Explanation of Plates

PLATE 1

1. *Leotriletes erectus* Kar (Slide No. 32/3)
2. *Horriditriletes curvibaculosus* Bharadwaj & Salujha (Slide No. 59/1E)
3. *Lavigatosporites plicatus* Kar (Slide No. 113/35)
4. *Callumispora* sp. (Slide No. 111/2)

5. *Densipollenites indicus* Bharadwaj (Slide No. 95/13)
6. *Punctatosporites morosus* Kar (Slide No. 113/12E)
7. 9. *Raniganjiasaccites ovatus* Kar (Slide No. 354/19)
8. *Parasaccites diffusus* Tiwari (Slide No. 101/6)
10. *Striatites tectus* Kar (Slide No. 113/4)
11. *S. communis* Bharadwaj & Salujha (Slide No. 120/34E)
12. *S. rhombicus* Bharadwaj & Salujha (Slide No. 126/2)
13. *Lahirites rarus* Bharadwaj & Salujha (Slide No. 37/19)
14. *Scheuringipollenites tentulus* (Tiwari) Tiwari (Slide No. 126/47).

PLATE 2

- 15, 22. *Strotersporites magnificus* Bharadwaj & Salujha (Slide No. 126/36; Slide No. 96/4).
16. *Gondwanipollenites decorus* (Bharadwaj & Salujha) Venkatachala & Kar (Slide No. 30/18).
17. *Faunipollenites varius* Bharadwaj (Slide No. 45/13, Slide No. 96/4)
18. *Scheuringipollenites maximus* (Tiwari) Tiwari (Slide No. 54/5).
19. *S. barakarensis* (Tiwari) Tiwari (Slide No. 77/21).
20. *Hindipollenites globosus* Bharadwaj (Slide No. 126/36)
21. *Verticipollenites gibbosus* Bharadwaj (Slide No. 120/5)
23. *Faunipollenites goriensis* (Lele) Maithy (Slide No. 85/11E)
24. *Lahirites naviculus* Venkatachala & Kar (Slide No. 93/32)
25. *Corisaccites alatus* Venkatachala & Kar (Slide No. 86/16)
26. *Gondwanaeaplicates bharadwajii* Kar (Slide No. 73/21)
27. *Ginkgocycadophytus aetus* B. & H. (Slide No. 59/6)

