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PALYNODATING OF TALCHIR PALYNOFLORA FROM LOWER GONDWANA SEDIMENTS OF GODAVARI VALLEY COALFIELD, SOUTH INDIA

L. Mahesh Bilwa, *Nagamadhu C.J. and Prameela M.

Department of Earth Science, University of Mysore, Manasagangotri

Mysore – 570 006, Karnataka, India

**Author for Correspondence*

ABSTRACT

Palynological investigation in the sub surface of bore core SSP – 304 from Sattupalli area, Chintalpudi sub basin, Godavari Valley Coalfield, Andhra Pradesh have revealed palynoassemblage belongs to Early Permian (Talchir) palynoflora. The present Lower Gondwana Palynoassemblage characterized by dominance of *Parasaccites – Plicatipollenites* along with non striate disaccates *Scheuringipollenites*, *Ibisporites*, *Sulcatisporites* and other taxa like, *Corisaccites*, *Faunipollenites*, *Horriditriletes*, *Tiwariasporis* and *Virkkipollenites*.

Key Words: *Palynology, Lower Gondwana, Permian, Talchir, Godavari Valley Coalfield*

INTRODUCTION

Present palynological investigation from the Sattupalli area of Chintalpudi sub basin has yielded ample of new palynological data which serve in understanding the terminal part of Lower Gondwana of Godavari valley coalfield of Andhra Pradesh. Sattupalli area located in SE part of Godavari valley Coalfield (Lat. N 17° 13' and Long. E 80° 49') and falls in Survey of India topo sheets No. 65^C/₁₆ (Fig.1). For the purpose of convenience, Sattupalli area broadly divided into three blocks namely Block I, Block II and Block III each block contains 15 Sq km. Number of boreholes drilled by different agency like GSI and SCCL for the mapping of coal. Sattupalli-Chintalpudi Coal belt represents south easterly continuation of Kothagudem sub basin and extends upto major lineament, which runs across the coal belt / basin from around Zongareddygudem (17° 07' 25'' N : 81° 18' E) in the east to (17° 04' N : 80° 59' E) in the west.

Geology

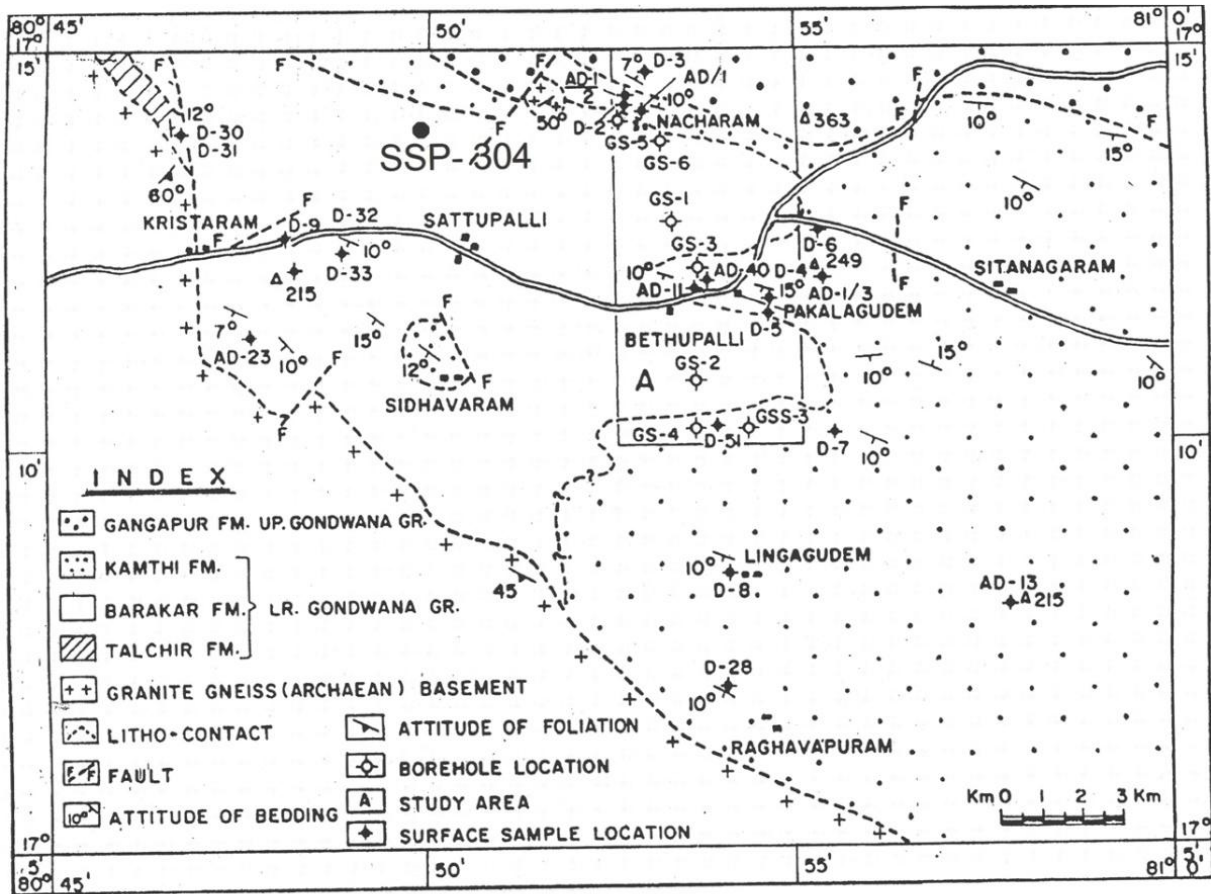
The coal belt covers wide area about 2500 sq km Archaean gneisses, granite and schist's from the basement for Gondwana sequence. This coal belt is relatively younger generation as evidenced by scanty and irregular development of the Permian strata of Lower Gondwana sequence which includes coal measures and associated with old sediments in Kota and Gangpura Formation cover large tracks this coal belt / basin displays the true character of graben and both the limbs are defined by faults (Fig.1). Along the south west margin Archean is the basement rock and the Gondwana Formation is faulted in an echelon pattern with throw towards east. The throw is not uniformly indicated by the basement rocks with the Barakar Formation southwest of Sattupalli, Kamthi Formation Northwest of Chintalpudi and Kota Formation is west of Tollam (Figure1) (SCCL, 1998).

MATERIALS AND METHODS

Singareni Collieries Co. Ltd (SCCL) has taken up extensive exploratory borehole from study area for coal exploration. The total depth of the borehole is 125.50 m and lithology of the borehole is given (Fig.1&2). The borehole lying between N 17° 14' E 80° 50' falls in the survey of India topho sheet 65^C/₁₆. Only 4 samples were collected regular interval from the borehole SSP – 304. Samples are first treated with 10% Hydrochloric acid to remove carbonate materials, followed by 40% Hydrofluoric acid to remove silica materials. To remove humic material Nitric acid used before centrifuging the unconsolidated sediments.

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Residue were treated with preservative Polyvinyl Alcohol, mounted with candablasam and cooked. Out of 4 samples one sample was found very productive and other 3 samples were found less productive.



● Borehole Location

Figure 1: Location of Borehole and geological map of Sattupalli area (After SCCL)

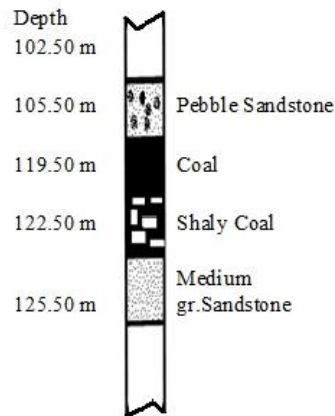


Figure 2: Litholog of SSP – 304

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Palynology

Palynotaxa recovered from the subsurface sediments of borehole SSP - 304 consists of 12 genera and 16 species comprising of triletes, monosaccates, striate bisaccates and non – striated bisaccates. The recovered palynomorphs shows characteristic features like, leathery saccus, thick muri, dense central body, thin central body, haploxylonoid and diploxylonoid construction. The dominance of the palynotaxa shows the presence of radial monosaccates like *Parasaccites*, *Plicatipollenites* and *Virkkipollenites*. Non striate bisaccates are sub dominance mainly *Scheuringipollenites*, *Platysaccus*, *Sulcatisporites* and *Ibisporites* and striate bisaccates like *Faunipollenites* and *Lunatisporites* and other palynotaxa like *Tiwariasporis* and *Corisaccites*. The trilete spores like *Horriditriletes* is present. Monosaccates shows the dominance and non striate bisaccates shows sub dominance group in the present bore hole SSP - 304. Palynoassemblage have been made based on the abundance of palynotaxa in the present borehole. It is very clear that in the present borehole, shaly coal at 122.50 m shows abundance of *Parasaccites* – *Plicatipollenites* represents palynoassemblage A with sub dominant taxa and other palynotaxa. The maximum abundance of *Parasaccites* (40%) – *Plicatipollenites* (25%) at depth of 122.50 m along with *Ibisporites*, *Corisaccites*, *Faunipollenites*, *Sulcatisporites*, *Horriditriletes*, *Tiwariasporis* and *Virkkipollenites* are shown (Fig.3). The sediments from 105.50 – 119.50 and 125.50 m of depth has poor recovery of palynotaxa.

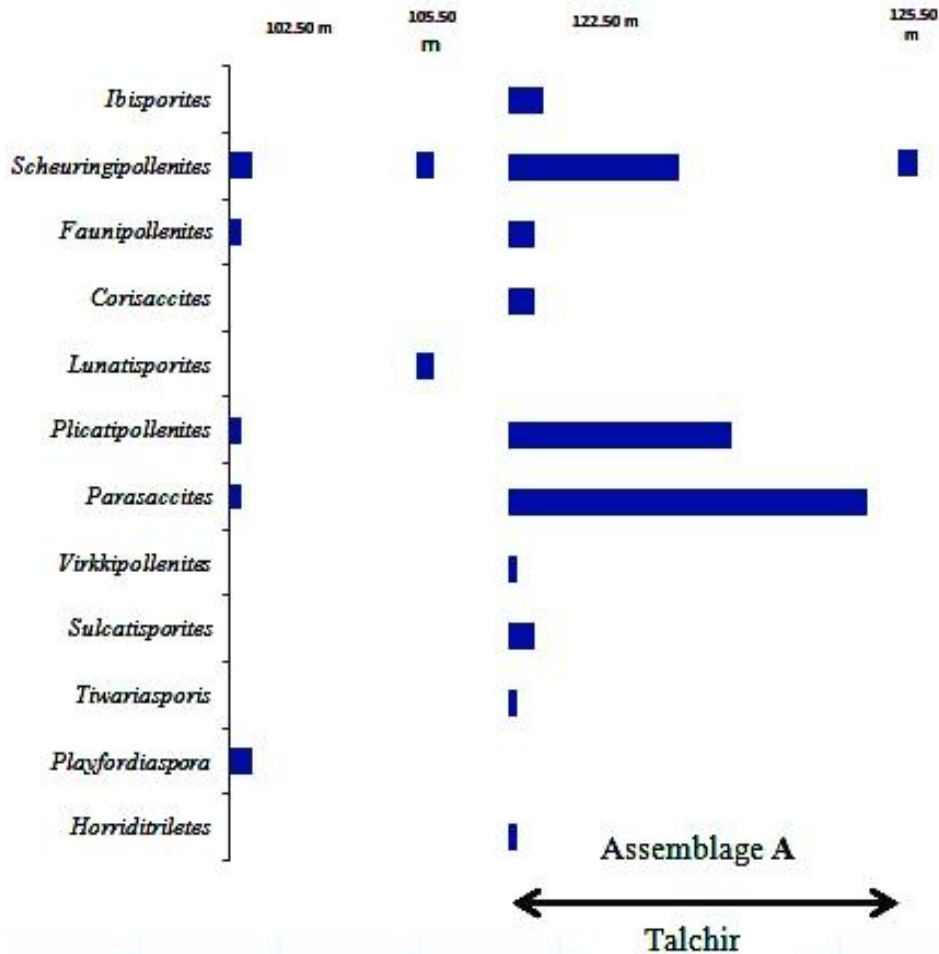


Figure 3: Histogram showing vertical distribution of different palynotaxa in the bore core SSP – 304.

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Table 4: Details of samples, depth control and characters of palynoassemblages in Borehole SSP – 304

S. No.	Depth in Meters	Lithology of the samples	Dominant taxa	Subdominant taxa	Other taxa	Palynoflora	Assemblage	Age
1	105.50 m	Pebble sandstone	<i>Faunipollenites</i> , <i>Parasaccites</i> , <i>Playfordiaspora</i> , <i>Plicatipollenites</i> and <i>Scheuringipollenites</i>	not yielded				
2	119.50 m	Coal	<i>Lunatisporites</i> , <i>Scheuringipollenites</i>	not yielded				
3	122.50 m	Shaly coal	<i>Parasaccites</i> (40%) – <i>Plicatipollenites</i> (25%)	<i>Scheuringipollenites</i> (19%)	<i>Ibisporites</i> (4%), <i>Corisaccites</i> (3%), <i>Faunipollenites</i> (3%), <i>Sulcatisporites</i> (3%), <i>Horriditriletes</i> (1%), <i>Tiwariasporis</i> (1%) and <i>Virkkipollenites</i> (1%).	Talchir Formation	A	Early Permian
4	125.50 m	Medium gr. sandstone	<i>Scheuringipollenites</i>	not yielded				

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Palynoassemblage

Recovered palynotaxa from 122.50 m shows dominance of *Parasaccites* (40%) – *Plicatipollenites* (25%) and *Scheuringipollenites* (19%) along with other palynotaxa viz., *Ibisporites* (4%), *Corisaccites* (3%), *Faunipollenites* (3%), *Sulcatisporites* (3%), *Horriditriletes* (1%), *Tiwariaspis* (1%) and *Virkkipollenites* (1%) belongs palynoassemblage A and distribution of palynotaxa along with lithology is as shown (Table 4).

Correlation

The present palynoassemblage - A is correlated with assemblage I – bore core of GAG – 1 of Ayyanapalli – Gompana block and borehole GCH – 4 of Chintalpudi area of Chintalpudi sub basin (Srivastava & Neerja Jha, 1993) and bore core of GRK -1 (Srivastava & Neerja Jha, 1989) and GRK – 24 (Srivastava & Neerja Jha, 1992) of Ramakrishnapuram area of main Godavari Graben. It is quite common with Sattupalli area palynozone with dominance of radial monosaccates and presence of *Plicatipollenites*, *Parasaccites* and *Virkkipollenites* with other taxa correlate with Drakshrama Argillite of K – G basin (Bijai Prasad, 1996). *Parasaccites* assemblage recorded from Goraia, Johilla Manendragarh – Umara area of Rewa Basin (Potonie & Lele, 1961, Lele & Chndhra, 1969, 1972, 1973, Bhardwaj *et al.*, 1979). The present Palyno assemblages are correlated with Giridih coal field (Lele, 1966, Srivastava, 1973) and also correlates with Bokaro Coalfield (Lele and Karim, 1971, Lele & Makada, 1972), Doltongani (Lele & Srivastava, 1974) with the presence of similar kind of floral remains.

DISCUSSION AND CONCLUSION

Early Permian age pollen found in the Talchir Formation had a leathery saccus construction with massive muri but in later stages, these structures became thinner and finer (Venkatachala *et al.*, 1993). According to Tiwari and Tripathi (1988) have related these characters reveals amelioration climate. Morphology of the saccus had big sacchi and a massive structure of radial arrangement of *Plicatipollenites* in Talchir Formation reveals cooler climatic condition. According to Venkatachala *et al.*, (1993), in Peninsular India glaciers boulder beds were beginning of the Permian. The diversity of plant life during this season was lowest due to extreme cold climate. The lithological features like namely varves, dimicite and rafted boulder in sandstone suggest that cold climate continued throughout the entire Talchir Formation.

Lower Gondwana sediments from Sattupalli area reveals diversified vegetation during the deposition. Qualitative and quantitative palynotaxa reveals Talchir Formation. Palynological studies from the present bore hole SSP – 304 suggests the abundance of *Parasaccites*–*Plicatipollenites* belongs to palynoassemblage - A indicates Talchir Formation has affinity towards Early Permian. According to Vijaya (2006) the Talchir miofloral found indicates the glacial climate condition for the sediment deposition. Similar Talchir palynoassemblages were also found from the study area indicates the glacial climate condition for the sediment during deposition. The present borehole shows sub dominance morphology of big sacchi and radial arrangement of *Plicatipollenites* were also found from the study area indicating cooler climatic condition. The lithological features of sandstone present at the bottom as well as top of the borehole suggest that cold climate continued throughout the entire Talchir Formation.

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