Palynological Dating of Sediments From Gattugudem area, Chintalpudi sub-basin, Andhra Pradesh

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The palynological analysis of subsurface sediments of bore hole SGG-1 from Gattugudem area, Chintalpudi sub-basin reveals presence of Raniganj (Late Permian) palynoassemblage at 53.75-55.40 m. The palynoassemblage is dominated by striate disaccates chiefly *Striatopodocarpites* and *Faunipollenites*. Non–striate disaccate *Scheuringipollenites* remains subdominant. *Densipollenites*, an enveloping monosaccate, shows fairly well representation. Presence of some rare taxa, viz. *Falcisporites, Goubinispora, Crescentipollenites, Weylandites, Lunatisporites, Osmundacidites, Stroteisporites, Guttulapollenites, Klausipollenites, Chordasporites* indicates younger aspect of the palynoassemblage and distinguishes it from Barren Measures palynoflora.

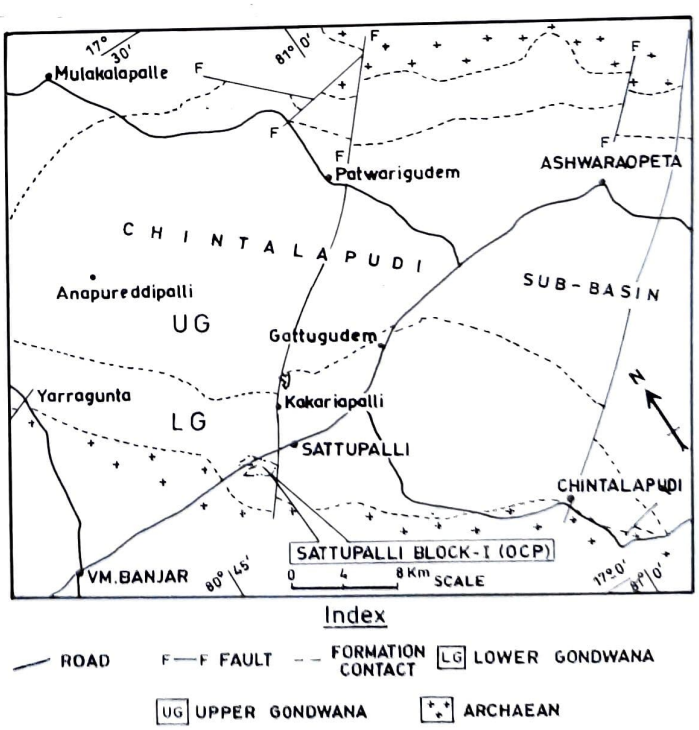
Key-words– Palynology, Gondwana, Raniganj Formation, Godavari, Graben

INTRODUCTION

GODAVARI GRABEN, one of the biggest Gondwana basin among several Gondwana basins of India has been subdivided in to Godavari sub-basin, Kothagudem sub-basin, Chintalpudi sub-basin and Krishna-Godavari Coastal sub-basin. Amongst these Chintalpudi sub-basin represents south easterly continuation of Kothagudem sub-basin. To its further south-east lies coastal Gondwana tract of Krishna Godavari sub-basin.

GEOLOGY

The stratigraphy of Chintalpudi sub-basin is not well understood. The Gondwana rocks of Chintalpudi sub-basin were earlier referred to as Kamthi sandstone (Blanford, 1872), Kamthi Formation (Raja Rao, 1982) and Chintalpudi Formation (Raiverman, 1986). Raja Rao (1982) published brief geology of Chintalpudi sub-basin. Accordingly, the sub-basin is of younger generation as evidenced by the general absence of Barakar and Barren Measures formations over the major part of the sub-basin. Lakshminarayana and Murty (1990) revised the stratigraphy of Chintalpudi sub-basin in which Barakars are unconformably overlain by the Kamthi Formation thus bringing a considerable gap in the stratigraphic sequence. However, palynological studies have shown presence of Talchir, Karharbari and Raniganj palynofloras in Ayyanapalli-Gompana area, Talchir palynoflora in Chintalpudi area (Srivastava & Jha, 1993) and Talchir, Barakar and Raniganj palynofloras in Sattupalli area (Srivastava & Jha, 1994) of Chintalpudi sub-basin. Present palynological investigation has been undertaken in order to date and corre-



Map 1. Showing location of bore core SGG-1

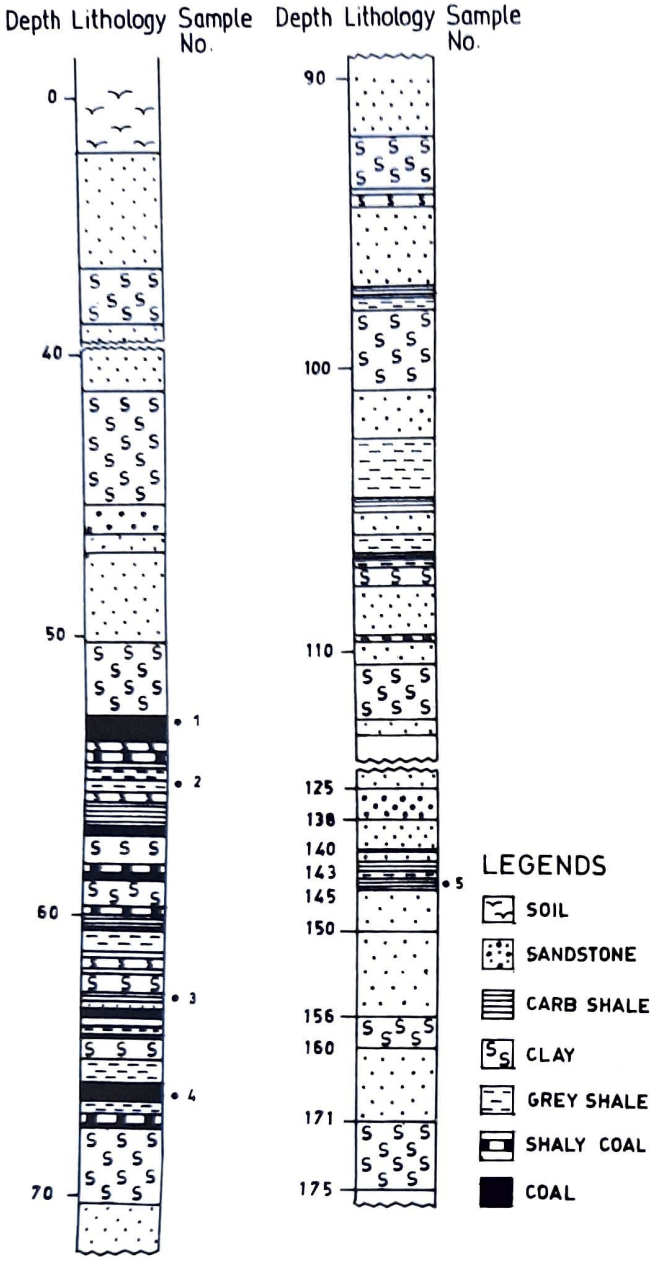


Fig 1. Litholog of bore core SGG-1

late the sediments and to understand the stratigraphy in Chintalpudi sub-basin. The existence of Upper Gondwana rocks has already been confirmed in central part of Chintalpudi sub-basin. There were doubts that the younger sediments in the area may belong to Upper Gondwana. In 175 m deep sedimentary sequence of bore core SGG-1 the upper part (0.8 to 50.5 m depth) is characterized by medium grained brown to brick red ferruginous sandstone, red siltstone, pink brown/grey clays. The middle part (50.5-67.5 m) consists of coal, carbonaceous shale, grey shale and grey clay while the lower part (70.5-175 m depth) mostly consists of grey sandstone and clay sequence with very thin layers of grey shale (Fig. 1).

The samples of bore core SSG-1 from Gattugudem area were provided by Dr. Udai Baskar, Dy. Supdt. Geologist, Singareni Collieries Company Ltd., Kothagudem for palynological studies. The location of bore hole has been shown in Map-1 and details of samples along with composition of palynoassemblage has been given in Table 1.

PALYNOASSEMBLAGE

On the basis of quantitative and qualitative distribution of various palynotaxa distinct palynoassemblage has been recognized at the depth of 53.75-55.40 m. The palynoassemblage shows dominance of striate disaccates chiefly *Striatopodocarpites* and *Faunipollenites* and subdominance of *Scheuringipollenites*. *Densipollenites*, a stratigraphically significant taxon, has been recorded in good percentage (9-12%). The species of *Densipollenites* recorded in the present assemblage includes *D. indicus, D. invisus, D. densus* and *D. magnicorpus*. Presence of *D.magnicorpus* is significant. Some other stratigraphically important taxa present in very low percentage are *Falcisporites, Chordasporites, Hamiapollenites, Corisaccites, Guttulapollenites, Klausipollenites, Goubinispora, Crescentipollenites, Weylandites, Lunatisporites, Osmundacidites, Strotersporites*. The leiosphaerids are high in percentage (16 %). The carbonaceous shale at 62.98 m, shaly coal at 67.00 m and grey shale sample at 144.5 m are poor in spore pollen content. Presence of disaccate taxa like *Striatopodocarpites, Faunipollenites, Scheuringipollenites* and a monolete genus *Latosporites* has been recorded at 62.98 m while presence of *Striatopodocarpites, Faunipollenites* and a trilete genus *Brevitriletes* has been marked at 67.00 m. The palynotaxa identified in grey shale at the depth of 144.56 m includes *Scheuringipollenites* and *Faunipollenites*. Spore pollen species recorded in bore core SGG-1 have been listed in Table 2.

COMPARISON

Present assemblage compares with

Table 1: Palynocomposition of assemblage demarcated in bore core SGG-1 from Gattugudem area, Chintalpudi Sub-basin.

Sample No. & Depth	Lithology	Palynocomposition	Remarks
1 53.75-55.40 m	Coal	Dominance of striate disccates chiefly *Striatopodocarpites* (40%), *Faunipollenties* (14%), Subdominance of *Scheuringipollenites* (12%), *Densipollenites* (9%). Other significant genera includes *Crescentipollenites* (4%), *Chordasporites* (1%), *Falcisporites* (2%), *Guttulapollenites* (2%), *Alisporites* (3%), *Latosporites* (4%), *Verrucosisporites* (2%), *Lueckisporites* (1%), *Klausipollenites* (1%), *Microfoveolatispora* (2%), *Weylandites* (2%).	Raniganj Palynoflora
2 55.40 m	Grey shale	Dominance of striate disaccates chiefly *Striatopodocarpites* (30%), *Faunipollenties* (3%), *Striatites* (5%), *Strotersporites* (2%), *Crescentipollenites* (2%), Subdominance of *Densipollenites* (12%), *Scheuringipollenites* (6%), Other genera includes *Chordasporites* (1%), *Corisaccites* (1%), *Lunatisporites* (2%), *Klausipollenites* (1%), *Hamiapollenites* (1%), *Falcisporites* (1%), *Goubinispora* (1%), *Guttulapollenites* (2%), *Osmundacidites* (1%), Weylandites (1%), *Verrucosisporites* (1%), *Verticipollenites* (1%), Leiosphaerids (16%), *Crustaesporites* (1%), *Lophotrilets* (2%), *Alisporites* (5%), *Brevitriletes* (1%) and *Horriditriletes* (1%).	Late Permian age
3 62.98 m	Carb. shale	Abundance of trachieds and wood fragments. Poor in spore pollen. Identified palynotaxa include *Striatopodocarpites*, *Faunipollenites*, *Latosporites*, *Scheuringipollenites*.	
4 67.00 m	Shaly coal	Abundance of trachieds. Poor in spore pollen. Identified palynotaxa include *Faunipollenites*, *Striatopodocarpites*, *Scheurigipollenites*, *Brevitriletes*.	
5 144.56 m	Grey shale	Abundance of tracheids and wood fragments. Poor in spore pollen. Identified palynotaxa include *Scheuringipollenites*, *Faunipollenites*.	

Striatopodocarpites- Densipollenites assemblage of other areas in Godavari Graben, viz. Ramkrishnapuram, Jaipuram, Ramagundam, and Manuguru areas (Srivastava & Jha, 1988) and Assemblage II of Mailaram area (Srivastava & Jha, 1990), Palynozone 5 of Sattupalli area (Srivastava & Jha, 1994). High percentage of leisphaerids has also been recorded in Assemblage 5 of Sattupalli area indicating possibility of shallow marine influence during the deposition of these sediments.

High incidence of *Densipollenites* along with dominance of striate disaccates chiefly *Striatopodocarpites* and *Faunipollenites* have also been recorded from Bijori Formation of Satpura basin (Bharadwaj, Tiwari & Anand Prakash, 1978), Raniganj Formation of Damodar Basin (Tiwari & Singh, 1986), Kamthi Formation of Kamptee Coalfield (Srivastava & Bhattacharyya, 1996), Raniganj Formation of Ib River and Talchir Coalfield (Tiwari, Tripathi & Jana, 1991; Tripathi, 1997) and Pali Formation of South Rewa Basin (Tiwari & Ram–Awatar, 1989).

PALYNODATING

Dominance of striate disaccates along with fair representation of *Densipollenites* and rare occurrence of certain stratigraphically significant taxa, viz. *Falcisporites, Goubinispora, Crescentipollenites, Weylandites, Lunatisporites, Osmundacidites, Strotersporites* is characteristic association in the assemblage at 53.75-55.40 m. In Lower Gondwana palynosequence, striate disaccates show fairly good representation in Lower Barakar, attain dominance in Upper Barakar and remain dominant component of the palynoflora upto Raniganj Formation. Thus, the striate disaccates lose stratigraphic significance and the associated taxa become important while identifying the assemblage. Occurrence of *Densipollenites* in significant percentage has been recorded at two different levels in Lower Gondwana palynological succession; one in Barren Measures Formation and other in Raniganj Formation. *Densipollenites* along with dominance of striate disaccates is characteristic of Barren Measures. It almost disappears in lower part of Raniganj Formation but appears again in upper part

Table 2: List of spore pollen species identified in bore core SGG-1 from Gattugudem area, Chintalpudi Sub basin

Brevitriletes communis
Lophotriletes sp.
Horriditriletes ramosus
Osmundacidites sp.
Microfoveolatispora foveolata
Verrucosisporites gondwanensis
Latosporites sp.
Scheuringipollenites maximus
S. tentulus
Ibisporites diplosaccus
Densipollenites invisus
D. indicus
D. magnicorpus
D. marginalis
Alisporites landianus
A. indarrensis
Klausipollenites sp.
Falcisporites sp.
Chordasporites sp.
Guttulapollenites hannonicus
Corisaccites alutus
Hamiapollenites sp.
Lunatisporites ovatus
Strotersporites sp.
Goubinispora sp.
Crustaesporites sp.
Lueckisporites virkii
Verticipollenites debiles
Crescentipollenites globosus
C. barakarensis
Faunipollenites varius
F. parvus
F. bharadwajii
Striatopodocarpites diffusus
S. decorus
S. brevis
S. multistriatus
S. subcircularis
Striatites sp.
Weylandites sp.
Inaperturopollenites
Other aletes

of Raniganj Formation and is differentiated by restricted occurrence of *Densipollenites magnicorpus*. This species has been recorded in the present assemblage at 53.77-55.40 m. Further, the presence of some younger taxa like *Falcisporites, Goubinispora, Crescentipollenites, Weylandites, Lunatisporites, Osmundacidites, Strotersporites, Corisaccites, Guttulapollenites, Klausipollenites, Chordasporites* etc. also distinguishes it from the Barren Measures palynoflora. Hence, this palynoassemblage represents Raniganj equivalent palynoassemblage in bore core SGG-1 and Late Permian age has been assigned to this palynoflora. These findings of palynological analysis confirm the lithostratigraphy of Chintalpudi sub basin as established from geophysical well log data (pers. com. Dr. Udai Bhaskar Reddy, SCCL). The samples at 62.98, 67.00, and 144.56 m have not yielded sufficient spores. It needs more samples and careful palynological investigations in order to show the presence of Talchir, Barakar and Barren Measures palynozones.

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