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RESEARCH ARTICLE

GLOSSOPTERIS TAENIOIDES FEISTMANTEL, 1882 FROM THE BARAKAR FORMATION, EARLY PERMIAN, PRAKASHAM KHANI OPEN CAST MINEII, MANUGURU AREA, TELANGANA, INDIA

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ABSTRACT

The paper deals with the systematic description of *Glossopteris taenioides* from Barakar Formation, Early Permian of Prakasham Khani Open Cast Mine II, Manuguru Area, Telangana, India. Earlier the species was reported from the Karharbari and Raniganj formations of lower Gondwana deposits of India. However, this is the first detailed systematic investigation of *G. taenioides* from the Barakar Formation, Early Permian, lower Gondwana deposits in the area.

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INTRODUCTION

Reports of megafossils from the Godavari Graben are sporadic (King 1881, Lakshminarayana & Murty 1990, Tewari & Jha 2006, Joshi *et al*., 2015). For comprehensive knowledge of plant megafossils of all the Indian Lower Gondwana basins and their comparative studies, it was necessary to carry out the systematic study of plant megafossils from the Godavari Graben which is one of the major coal producing areas. Here, one species of *Glossopteris* namely *G. taenioides* which is being describing for the first time from the Barakar Formation, Early Permian of Prakasham Khani Open Cast Mine II, Kothagudem Area, Telangana.

MATERIALS AND METHODS

The samples collected from the Prakasham Khani Open Cast Mine II (litholog 1) were grouped, sorted, cleaned, photographed and systematically analysed for morphotaxonomical study. For this, shape of leaf, nature of apex, base, margin, midrib and venation pattern were considered. Lawrence 1955, Melville 1969, Chandra and Surange 1979, were followed for exact description. The specimens were studied with the help of a hand lens and low power binocular microscope Leica DFC 290 under incident light for morphotaxonomical characters. The specimens have been deposited in the repository of BSIP Museum.

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Systematic description

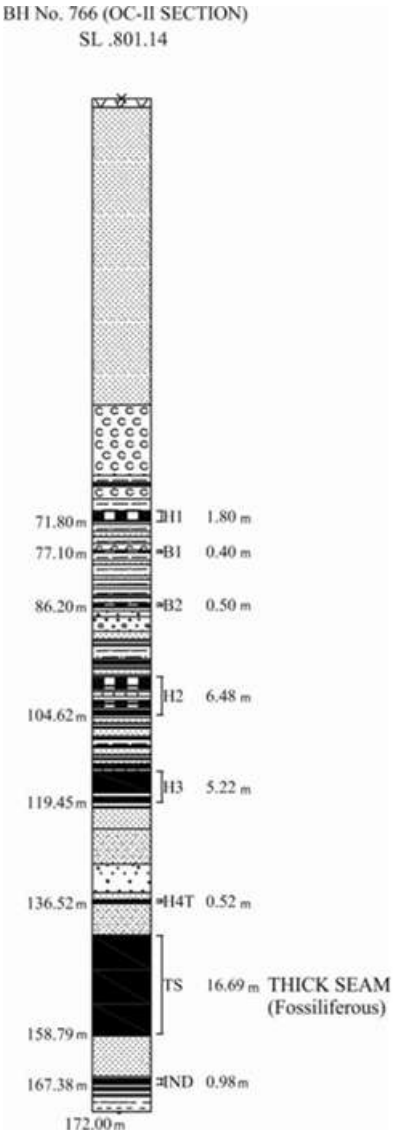
Glossopteris taenioides Feistmantel, 1882

Specimen Nos.: 31/7369, 73/7369.

Locality: Prakasham Khani Open Cast Mine- II, Manuguru Area, Godavari Graben, Telangana.

Horizon & Age: Barakar Formation, Early Permian.

Description: There are two incomplete specimens in the collection. Preserved portions of the specimens measure 5.5 to 6 cm in length and 1.1 to 1.4 cm in width in the middle part. The leaves are narrow, oblong, ribbon like, with an entire margin, apex is acute and base is not preserved. The midrib is distinct, broad, striated lengthwise (with 3-4 striations at the base and 2-3 striations towards the apical part), 1 mm wide at base and 0.4 mm wide near the apex. The secondary veins arise from midrib at an acute angle of about 50°-55° and after successive dichotomies, meet the margin at an angle of about 90° on the left portion of the lamina. The vein dichotomies usually are of Y or Gamma type. Two to three meshes are present in the space between the midrib and the margin. The shape of meshes is arcuate near the midrib and mostly trapezoidal elsewhere.

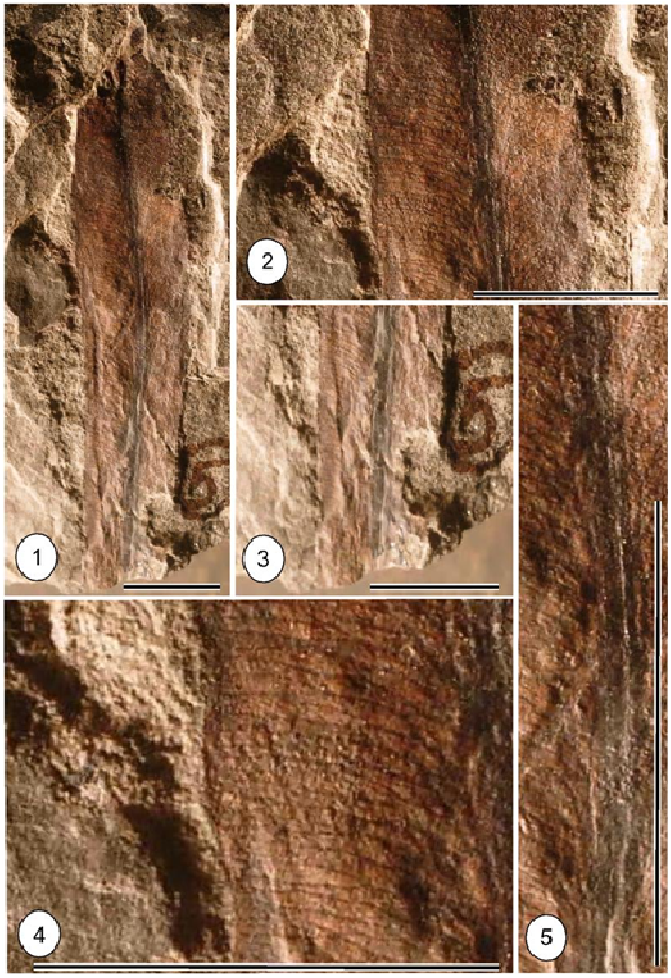


Litholog 1. General lithostratigraphic succession of the Prakasham Khani Open Cast Mine II (after SCCL, 2011)

Meshes near midrib are short and broad, 2-3 mm long and 0.5-1 mm broad near midrib, narrow, long, 3-4 mm and 0.3-0.5 mm broad near margin. The vein density near midrib is 18-20 per cm and 24-26 per cm near the margin.

Remarks

The present specimens resemble *Glossopteris taenioides* described by Feistmantel (1882, Pl.XXI, Fig. 4) from Karharbari Formation of South Rewa Gondwana Basin in narrow, oblong, ribbon like shape, broad and strong midrib and venation pattern. Feistmantel (1882) described the specimens as oblongly lanceolate. Since the present specimens are incomplete, the term lanceolate is avoided. The specimens are also comparable with *G. taenioides* described by Pant and Singh (1974, Pl.31, Figs 64-65, Text-Fig. 3B); Chandra and Surange (1977, Pl.1, Figs 3-4, Pl. 2, Fig. 6, Text-Figs 1-2B, 6-7). One of the leaves described by Pant and Singh (1974) is attached to an axis with two stalked, axillary fructifications. Chandra and Surange (1977) described a fertile leaf of *G. taenioides* bearing *Plumsteadiostrobus* fructification from Raniganj Formation, Raniganj Coalfield, West Bengal. Apex in leaf described by Feistmantel (1882, Pl. XXI, Fig. 4) is not preserved. However, Chandra and Surange (1979, Pl. 4, Fig. 6; Pl. 18, Fig. 5; Pl. 43, Fig. 3; Text-Figs 26 D, d) described the apex as obtuse, though the photographs provided by Chandra and Surange (1977, Pl. 1, Fig. 3-4; Pl. 2, Fig. 6; 1979, Pl. 4, Fig. 6; Pl. 18, Fig. 5, Pl. 43, Fig. 3, Text-Figs 26 D, d) do not show an apex.



Scale bar = 1 cm

Plate 1. Fig. 1. *Glossopteris taenioides* Feistmantel, 1882. Specimen no. 31/7369. Fig. 2. Enlargement of Fig. 1 showing the details of midrib, margin and venation pattern of middle portion of the leaf. Fig. 3. Enlargement of Fig. 1 showing the basal part of the leaf. Fig. 4. Enlargement of Fig. 1 showing the details of venation pattern at margin of the leaf. Fig. 5. Enlargement of Fig. 1 showing the details of midrib

Feistmantel (1882, Pl. XXI, Fig. 4) has not mentioned the angle in which the secondary veins meet the margin. However the photographs (Pl.XXI, Fig. 4) show that the secondary veins meet margin at apparently 70°. According to Chandra and Surange (1979) secondary veins meet margin horizontally. However in the photographs (Chandra & Surange 1979, Pl. 4, Fig. 6, Pl. 18, Fig. 5, Pl. 43, Fig. 3, Text-Figs 26 D, d) the secondary veins meet the margins apparently at about 70°.The present specimens are similar in venation pattern with the holotype (Feistmantel, 1882, Pl. XXI, Fig. 4). However, in the presently studied leaves the lamina on the left side of midrib shows secondary veins meeting the margin horizontally. This may be due to preservation. The leaf described as *G. taenioides* by Srivastava (1957, Pl. 21, Figs 4, 9) from Raniganj Formation, Raniganj Coalfield, West Bengal differs from Feistmantel's specimen (1882, Pl. XXI, Fig. 4) and the present specimens in nature of secondary veins which apparently are straight, do not arch backward and meet margin at acute angle.

DISCUSSION AND CONCLUSION

The study revealed that *Glossopteris taenioides* is sparsely distributed in the lower Gondwana sequences in India mainly from the Karharbari Formation: South Rewa Gondwana Basin, Madhya Pradesh, Feistmantel (1882); Raniganj Formation: Raniganj Coalfield, Damodar Basin, West Bengal (Srivastava 1957; Pant and Singh, 1974; Chandra and Surange, 1977). Occurrence of *G. taenioides* from the Barakar Formation, Early Permian of Prakasham Khani Open Cast Mine II, Manuguru Area, Telangana contributes towards the existing knowledge of this species (Joshi, 2016). The study also helpful to understand the phytogeographic distribution of this species and widens the scope of this species as one of the characteristic forms of Barakar Formation of Early Permian age.

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