

# Occurrence of Glossopteris Flora, Pisdura Nand-Dongargaon Sub-Basin

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PLANT evolution witnessed many innovations. Origin and extinction of plants can be understood through the study of plant fossils preserved in ancient sediments. Geological records exemplify both biological and physical changes and subsequent hydrocarbon resource formation. Occurrence of vegetal debris in the continental environment of Gondwana basins filled in with detrital sediments becomes much significant due to the presence of economically exploitable coal.

Pisdura, a treasure for vertebrate fossils (Mohabey & Udhoji, 2000) hitherto, has been brought into the palaeobotanical gambit. Plant fossils showing affinity with coal forming vegetation have been recorded for the first time from the red sandstones underlying the famous Lameta Formation (Maastrichtian) known for dinosaurian fossils (Mohabey, 1990). Megafossils of Glossopteridales, Cordaitales and equisetals characterized by leaf and stem fossils have been reported enriching the knowledge on the occurrence of gondwanan plant fossils in the Wardha Valley. Further efforts to supplement plant fossil data are needed to understand floral evolution and its contribution to hydrocarbon resource.

The Wardha Valley has been known for coal deposits, animal and plant fossils of gondwanan affinity. The geological inputs were made by Blanford (1868), Hughes (1877), Oldham (1880), Ramanamurthy (1979) and Raja Rao (1982). Pisdura, a small village in the Chandrapur District, Maharashtra (refer Mohabey, 1996 for locality Map) falling in the inland Nand-Dongargaon Sub-Basin within the Wardha Valley has been a paradise for vertebrate palaeontologists. Classic dinosaurian and other vertebrate fossil sites belonging to the Lameta Formation from this locality are known (Jain & Sahni, 1985; Mohabey, 1990, 1996; Mohabey & Udhoji, 2000). However, gondwanan fossils are not studied from this locality. Plant fossils, particularly petrified woods along with leaf impressions have been reported from other areas of the Wardha Valley

Taxa	Early Permian	Middle Permian	Late Permian	Early Triassic
Equisetalean stem	+	+	+	+
<i>Glossopteris angustifolia</i>	+	+	+	+
<i>Glossopteris browniana</i>	+	-	+	-
<i>Glossopteris communis</i>	+	+	+	+
<i>Glossopteris conspicua</i>	-	-	+	+
<i>Glossopteris indica</i>	+	+	+	-
<i>Glossopteris lanceolatus</i>	-	-	+	-
<i>Glossopteris longicaulis</i>	+	-	-	+
<i>Glossopteris taeniensis</i>	+	-	-	+
<i>Glossopteris rhabdotaenioides</i>	+	-	+	-
<i>Glossopteris stenoneura</i>	+	+	+	-
<i>Glossopteris subtilis</i>	-	+	+	-
<i>Glossopteris tenuifolia</i>	+	-	+	-

In addition, *Gangamopteris* sp., *Glossopteris* sp. and *Noeggerathiopsis* sp. are also present in the assemblage.

Fig. 1—Check list of plant fossils from Pisdura and their stratigraphic range.

(Lakhanpal *et al.*, 1976; Chandra & Tewari, 1991; Agashe & Prasad, 1989; Agashe & Shashi Kumar, 1996). Present communication brings out the necessity to investigate unexplored areas and trace the geographical extent and evolutionary ramifications of Glossopteris Flora during the Gondwana times.

The Gondwana sediments (Permian-Triassic) in the Pisdura region are characterized by red-brown variegated sandstones, reddish siltstone and red shale. They show a disconformable contact with the Lameta Formation (Fig. 2). Plant fossil impressions have been recovered from the sandstones from a section (79°8' 20°18') exposed at about 2 km north-east of the village.

Articulated equisetalean stems (Pteridophytes) with alternating ridges and furrows, a leaf assemblage of Glossopteridales with tongue shaped leaf impressions with variable morphologies viz., *Gangamopteris* sp., *Glossopteris angustifolia*, *G. browniana*, *G. lanceolatus*, *G. longicaulis*, *G. rhabdotaenioides*, *G. stenoneura*, *G. subtilis*, *G. tenuifolia*, *Glossopteris* sp. and Cordaitales viz *Noeggerathiopsis* sp. are reported in the present note (Pl. 1). This constitutes an addition to the petrified wood data known from the Wardha Valley. A cursory glance at the check list (Fig. 1) suggests an affinity of this flora with the Permian-Early Triassic (250-240 million years) floras known from the Son-Mahanadi, Damodar and related coal basins (Chandra & Tewari, 1991). It corroborates occurrence of Glossopterid forests in the Wardha Valley during Permian-Triassic times which contributed to the rich coal deposits in the Chandrapur and Umrer regions of Maharashtra. A detailed floristic study is in progress to corroborate the present inference.

The Late Permian-Early Triassic Lower Gondwana sediments in the Wardha Valley are assigned under the Kamthi and Mangli beds. Further, detailed systemic studies shall confirm the stratigraphic significance of the Glossopteris Flora reported in this communication. A comparative analysis of the present assemblage with Raniganj/Kamthi palaeobotanical records demonstrates a closer affinity with the latter. Further, the terminal Permian Period witnessed a dramatic change in the global climate with a glaciated to completely non-glaciated state. As leaf fossils are excellent signatures of past atmospheric changes due to their direct contact with outside environment, it is essential to build up fossil leaf database from various niches and interpret past climate patterns.

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Recent	Alluvial sands and clays
Deccan Trap/Intertrappeans	Basalt with thin intertrappean beds containing sandstones and silty clay
Lameta Formation	Laminated clays and shales interbedded with limestones and sandstones, red and green clays, planar and cross bedded sandstone, grey marls, yellow laminated clays and shales
Gondwana Group	Red brown variegated sandstones, reddish siltstone and red shale
Pre Cambrian	Conglomerates with igneous intrusions

Fig. 2—Stratigraphic sequence of Nand-Dongargaon Sub-Basin.

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## PLATE 1

- Glossopteris rhabdotaenioides* Pant & Singh. A portion of leaf showing venation. Specimen No. BSIP 38321. x 2.
- Glossopteris taeniensis* Chandra & Surange. Specimen No. BSIP 38322. x 2.
- Glossopteris subtilis* Pant & Gupta. Specimen No. BSIP 38323. x 2.
- Glossopteris indica* Schimper. Specimen No. BSIP 38324. x 2.
- Glossopteris communis* Feistmantel. Specimen No. BSIP 38325. x 2.5.
- Equisetalean stem. Specimen No. BSIP 38324. x 2.
- Specimen showing impressions of equisetalean axis, *Glossopteris angustifolia* and *G. indica*. Specimen No. BSIP 38324. x 1.
- Glossopteris angustifolia* Brongniart. Specimen No. BSIP 38326. x 2.
- Glossopteris stenoneura* Feistmantel. Specimen No. BSIP 38327. x 2.
- 10, 11. *Glossopteris tenuifolia* Pant & Gupta. Specimen Nos. BSIP 38328, 38329. x 1.



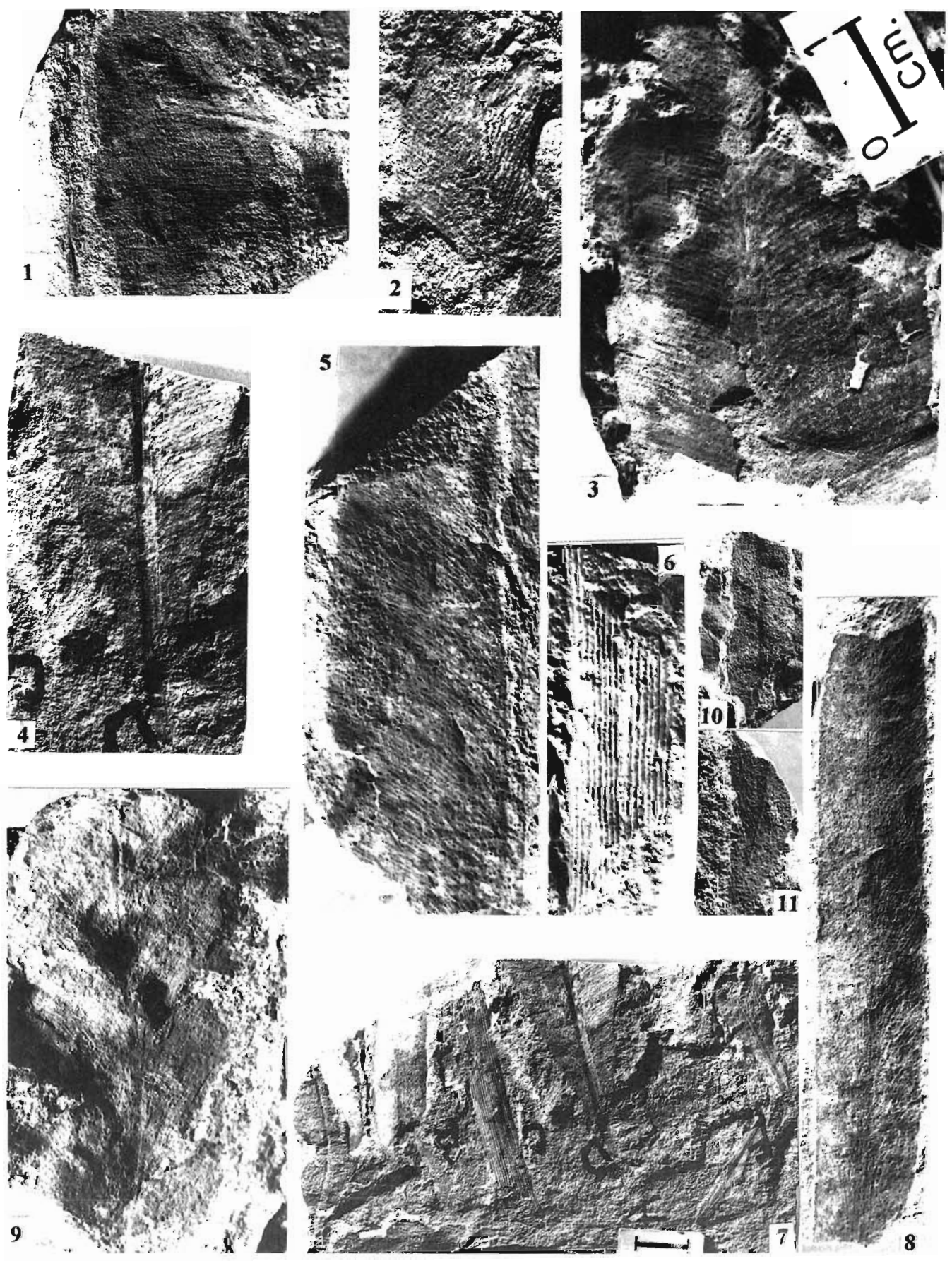


PLATE I

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