

The present work contains the results of the investigation on the Deccan Intertrappean exposures of Nawargao, Wardha district, Maharashtra. From these exposures so far five palm woods, Palmoxylon sclerodermum, P. nawargaoensis, P. deccanense, P. livistonoides, P. arviensis have been described. In addition to these the palm petioles, Palmocaulon costapalmatum, P. hyphaeneoides were described. The leaf sheaths of Palmoxylon sclerodermum, Sabalophyllum livistonoides and Palmocarpon coryphoides, a palm fruit were also described. Very few dicotyledonous ^{woods} ~~fruits~~ were described such as Aristolochioxylon prakashii, Ammoroxylon deccanensis, Aschenomenoxylon nawargaoensis, Ardisioxylon indicum, Heterophragmoxylon indicum, Gmelina tertiara.

Palm trunks and numerous silicified dicotyledonous woods are found in plenty in these areas. The impression specimens^s are less in number than petrified ones. These features are typical of Deccan Intertrappean beds particularly of Nagpur, Chhindwara area.

FLORISTIC AND PHYTOGEOGRAPHICAL CONSIDERATIONS :

The fossil species described in this work and their comparable living counter parts are given below -

Name of the fossil	Comparable living form	Locality
DICOTYLEDONS -		
i. <u>Tiliaceoxylon</u> <u>nawargaoense</u> gen.et.sp.nov.	<u>Grewia</u> Tiliaceae	Nawargaon
ii. <u>Lanneoxylon</u> <u>indicum</u> sp.nov.	<u>Lannea</u> Anacardiaceae	- " -
iii. <u>Schreberoxylon</u> <u>deccanense</u> sp.nov.	<u>Ligustrum</u> Oleceae	- " -
MONOCOTYLEDONS :		
iv. <u>Cyperaceocaulon</u> <u>tomlinsoⁿli</u> gen.et.sp.nov.	Cyperaceae	- " -

Four new species and two new form genera have been thus recognized.

The genus Tiliaceoxylon of the family Tiliaceae and genus Cyperaceocaulon of Cyperaceae have been described here for the first time from Deccan Intertrappean beds.

Tiliaceoxylon nawargaoense gen.et.sp.nov. shows maximum resemblance with the different species of genus Grewia in its anatomical characters. The only other fossil wood of Tiliaceae described so far from the Deccan Intertrappean Beds is Grewioxylon (Shallom, 1963 a, Prakash & Dayal, 1963; Prakash & Dayal 1964; Lakhanpal, Prakash & Bande 1976; Trivedi 1976; and Rao 1988). At present the genus Grewia is distributed in Konkan, Malbar Hills, Bombay, in evergreen forests of North Kanara, in Java, East Tropical Africa, and Ceylon. However, it is not found in the forests of Nawargaoon of the Wardha district.

Lanneoxylon indicum sp.nov. resembles closely with the wood features of family Anacardiaceae particularly with the genus Lannea. A fossil wood of Lannea - Lanneoxylon grandiosum has already been described by Prakash and Tripathi, 1967 from Neogen^e beds of Assam. Most of the species of Lannea are distributed

in regions of high altitudes (above 3,000 ft.). This indicates that during Eocene age the climatic conditions of Deccan plateau were congenial for the growth of these plants.

Schreberoxylon deccanense sp.nov. has been assigned to the family Oleaceae. The wood features of Schreberoxylon deccanense resembles closely with the genus Ligustrum of family Oleaceae. Two fossil woods belonging to Oleaceae namely Schreberoxylon mohgaense gen.et.sp.nov. described by Trivedi and Srivastava, 1982 and Schreberoxylon nawargaoensis sp.nov.Rao (1988) have already been described from Deccan Intertrappean beds of Mohgaonkalan and Nawargaon respectively. Of these Schreberoxylon mohgaense resembles the modern taxon Schrebera swietenoides while Schreberoxylon nawargaoense is comparable with Schrebera tricola and Schrebera swietenoides .

The extant genus Schrebera is widely distributed in Tropical Africa ,India and South East Asia. In India it is distributed in higher Ghats of Bombay Presidency and Amboli Ghat in Konkan and also in Mahabaleshwar and Tinai Ghats of Kanara.

In the present work another species of Schreberoxylon has been described as Schreberoxylon deccanense indicating the existence of genus during Eocene period.

Cyperaceocaulon tomlinsoii gen.et.sp.nov., a monocot culm described here resembles with the member of Cyperaceae family. So far ^w/_o other Cyperaceous fossils have been described from the Deccan Intertrappean Beds these are Cyperaceoxylon intertrappeum Chitaley & Patel 1970 described from Mohgaonkalan and Scirpusoxylon indicum described by Shete 1986 from Nawargaon.

The occurrence of Cyperaceae in the present work confirms the existence of this family in the Eocene period.

From the above account of floral considerations it is clear that elements like Grewia and Schrebera are in existence in India particularly in the central part right from the Eocene times. The genus like Lannea has moved away from the central part towards more congenial part at high altitudes. Still others like the members of Cyperaceae have migrated to marshy habitats of our country.



PALAEOECOLOGICAL CONSIDERATIONS :

The growth rings are absent in almost all the dicotyledonous woods described so far from the Deccan Intertrappean beds. Typical ring porous woods are totally absent. This suggests the lack of well marked seasonal demarkation during intertrappean times and thus the climate was uniform.

The existance of abundant palms with well developed aerenchyma in their root cortex and other intertrappean aquatic forms found in intertrappean beds indicate sufficient high rain fall. This fact is further supported by the occurrence of genera like Lanea reported in the present work. Similarly as a palms are very poorly represented in the modern flora of this part it appears that during Eocene times the climate must be more warm and humid than it is today. The existance of aquatic and marshy habitat is also indicated by the presence of Cyperaceae members. Thus warm humid tropical conditions prevailed during deccan intertrappean period in deccan as also suggested by Sahni (1964) ; Prakash (1960 & 1972) ; Lakhanpal (1968) ; and others.

It has been suggested by Lakhanpal (1968 & 1970) and Prakash (1972 & 1974) that the flora of Deccan Intertrappean Beds can be further divided into

number of florules depending upon the floristic assemblage and ecological facies shown by different exposures like

1. Nagpur Chhindwara florul^e dominated by fresh water and estuarine marshy forms and land forms dominated by dicotyledons and palms.
2. Florul^e of Sausar dominated by fresh water aquatic forms like Chara sausari and Azolla intertrappea etc.
3. Mahurzari flora mostly dominated by land forms mostly dicotyledonous woods.
4. The florul^e of Rajahmundry exposures containing algae and Gymnosperms.

The comparison of existing florules of Deccan Intertrappean beds with that of Nawargaon beds of Wardha district shows that it is more close to Nagpur Chhindwara florul than the others.

AGE OF THE DECCAN INTERTRAPPEAN BEDS :

Based on the present work it is not possible to add any information to resolve the controversy pertaining to the age of Deccan Traps and their

intercalated intertrappean beds. (Relevant views are summarized in Chapter - I , on Introduction pages - 4 to 6) . However, on the basis of predominance of Angiosperms in these beds and the minority of Gymnosperms, one can say that the beds must be older than Upper Cretaceous age. It is quite possible as already suggested by some geologists that the Deccan Traps started accumulating towards the close of the Cretaceous and continued into the Tertiary.