

Pentoxylales

Stem – *Pentoxylon sahnii*

Leaf - *Nipaniophyllum sahnii*

Male fructification - *Sahnia nipaniensis*

Female - *Carnoconites compactus*

Pentoxyleae

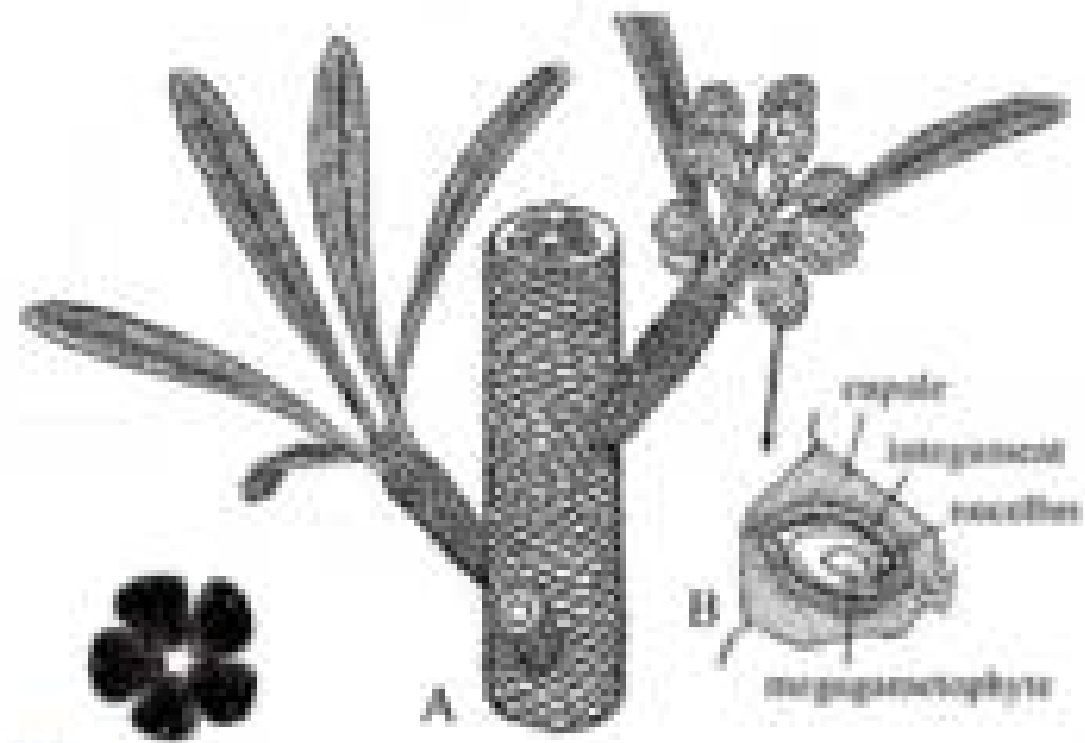
- This unique group of Gymnosperms appeared in the Rajmahal flora was erected by Prof Birbal sahani in 1948
- Sir B.P. Srivastav in 1946 reported a petrified stem which he named as *Pentoxylon sahnii*.
- Much of the information of this **unique group** was made available by Birbal sahani, B.P. Srivastav, Vishnu mittre, A.R.Rao, M.N.Bose, and B.D.Sharma

Pentoxylalis

- Habit : small trees or shrubs that possessed long and short shoots.
- Stem : called Pentoxylon because it frequently showed five segments of triangular vascular tissue arranged in a ring around a central ground tissue. The primary xylem is mesarch and secondary xylem is pycnoxylic (resembling the wood of conifers). The short and long shoot are covered by an armour of spirally arranged leaf bases. The short shoots often terminated in a crown of spirally arranged *Nipariophyllum*-type of leaves. Besides foliage leaves some short shoots were terminated by clusters of ovulate cones or pollen organs.

Discovery of Pentoxylales:

This group has been discovered and named as "Pentoxyleae" by well-known Indian Palaeobotanist Professor Birbal Sahni (1948). This is a group of some fossil plants described from Rajmahal Hills in Amrapara District (Santhal Parganas) of Eastern Bihar (India) revealing their existence in Jurassic Period.



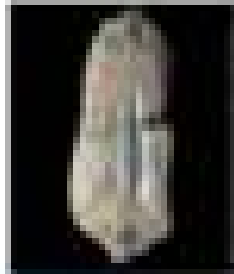
Pentoxylon (stem),

Short: a long-short morphology like stipe less to 2 cm diameter Each state had its own centron. The centrons was uniformly white in the young stems, but at maturity more secondary tissue developed towards the centre, and thus the secondary wood appeared darker.

Radial arrangement of bundles The primary xylem is towards the secondary xylem (secondary xylem) maintaining the aspect of radiality. In fact, in the younger stems radial secondary primary xylem strand (Pentoxylon)

The short and long short are covered by an armour of spirally arranged leaf bases.

The short shoots often terminated in a series of spirally arranged *Microphylls* type of leaves. Besides foliage leaves some short shoots were terminated by clusters of



Hydrophyllum-like leaves are sometimes incorporated into preformed vascular bundles resulting in compound leaves. These are also known as compound leaves. However, these are not true compound leaves but are called Hydrophyllum.

Leaves are often short, narrow, and have a central vein. These are commonly seen.

Leaves long narrow (Hydrophyllum)

Hydrophyllum leaves

Hydrophyllum leaves

Secondary veins arising at right angles and subparallel to the leaf margin.

Sahnia (male flower Sahnia nipaniensis)

Pollen organs borne in clusters on short stalks. They were present normally on the stems and found rarely in a shallow disc. Thomas & Thomas (1955) reported as many as 28 such pollen-bearing organs.

It consisted of a scape with from which rose the calyx and numerous microgametophytes or microgametophytes. The stamens gave rise to secondary branches that terminated in several staminal pollen sacs.

Each microgametophyte possessed many small, rounded, spherical organs. The terminal portion of the scape was also occupied by a long-stemmed.

The base of the pollen sac is homogeneous while the middle is present in the form of the dark color. In the region of apertures, the operculum is highly folded. Thomas & Thomas (1955) observed a few females in the region of apertures. Other details of the male flowers are not yet fully known.

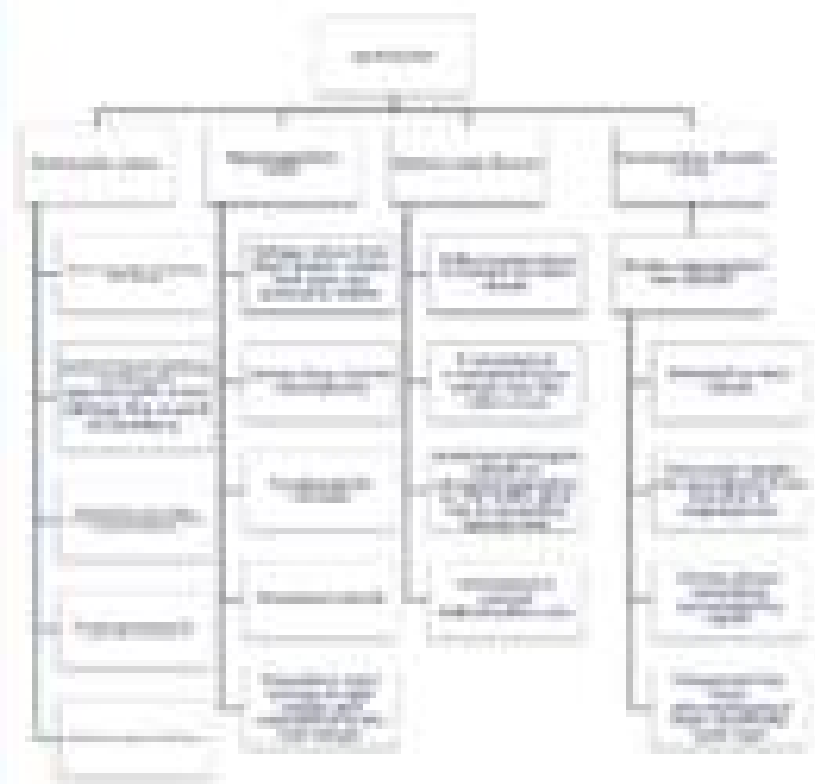
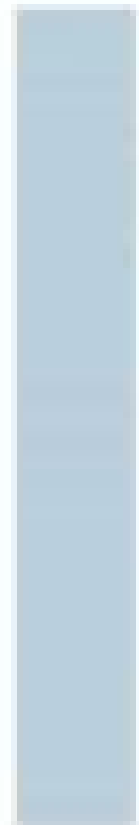
Carnoconites (female cone)
C. compactum and *C. laxum*

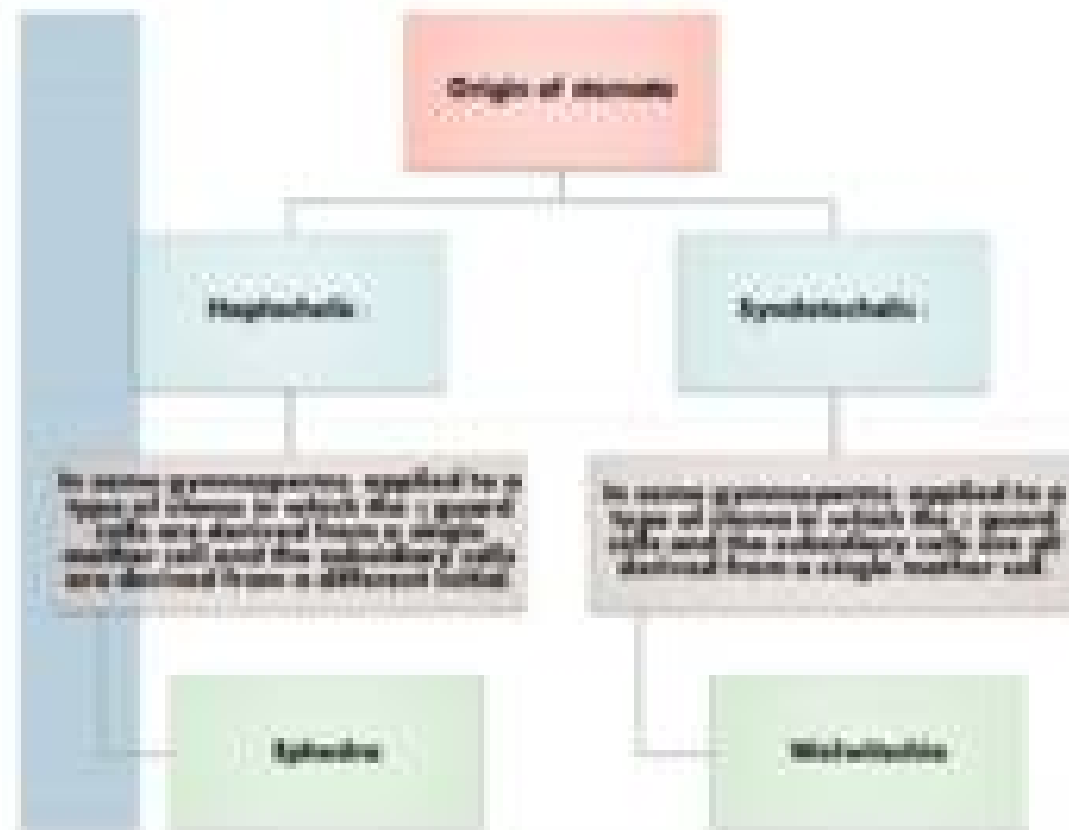


Quercus aggregata (Oak, scruboak). They were collected by us and arrived in length of about 18 cm in (dormant) stage, and 4 cm in \pm leaves. They were, however, collected at 25 months, collected by about 1000 (dormant) Quercus (as specified in the records in the appendix).

About 30 people, mostly men, were attached to the compound, and there were no other persons inside. They possessed the equipment they had just captured in the case of about 1000. About 100000 and the water table for these structures. The water was covered by a high temperature. The results are the same for the compound. The water almost completely surrounded the compound.

Intergovernmental Tax Issues: Administrative/Technical Issues and Budgetary Issues





Pentoxylon (stem),

Short: a long-short morphology like distylium less to 2 cm diameter. Each stem had its own cambium. The cambium was uniformly active in the young stems, but at maturity more secondary tissue developed towards the centre, and thus the secondary wood appeared concentric.

Radial movement of distylium The primary xylem is towards the secondary xylem (secondary xylem) maintaining the aspect of radiality. In this, the wood is towards the secondary primary xylem strand (Pentoxylon).

The short and long short are covered by an armour of spirally arranged leaf bases.

The short shoots often terminated in a series of spirally arranged *Microphylls* type of leaves. Besides foliage leaves some short shoots were terminated by clusters of

Affinities of Pentoxylon