Unit 4: Gymnosperm

Affinities of Gnetum

Brief detail about Ginkgo and its affinities

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Dr. Gaurav Kumar

Department of Botany

Dyal Singh College

Delhi University

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Gnetum and Other Gymnosperms:

Gnetum shows several resemblances with gymnosperms and has, therefore, been finally included under this group.

Some of the characteristics common in both Gnetum and other gymnosperms are under mentioned:
1. Wood having tracheids with bordered pits.
2. No sieve tubes and companion cells are present.
4. Absence of fruit formation because of the absence of ovary.

Refer to the other similarity points figure provided to you on your whatsapp/email group.
Gnetum and Angiosperms:

A key position to Gnetum has been assigned by scientists while discussing the origin of angiosperms. Both Gnetales and angiosperms originated from a common stalk called “Hemi-angiosperm”.

Refer to the other author view (Thompson, Hagerup etc.) figure provided to you on your whatsapp/email group

In a beautiful monograph on Gnetum, Maheshwari and Vasil (1961) have stated that “Gnetum remains largely a phylogenetic puzzle. It is gymnospermous, but possesses some strong angiospermic features”.
Some of the resemblances between Gnetum and angiosperms are:
1. The general habit of the sporophyte of many species of Gnetum resembles with angiosperms.
2. Reticulate venation in the leaves of Gnetum is an angiospermic character.
3. Presence of vessels in xylem is again an angiospermic character.
4. Clear tunica and corpus configuration of shoot apices is a character of both Gnetum and angiosperms.
5. Strobili of Gnetum resemble much more with angiosperms than any of the gymnosperms.

Refer to the other Gnetum-Angiosperms resemblance points explained in figure provided to you on your whatsapp/email group.
Affinities of Ginkgo biloba

*Ginkgo biloba* is the only extant species of the Order Ginkgoales. The name ginkgo comes from the Chinese *yin-kuo* (silver fruit); these characters are pronounced *ginkyo* in Japanese. The scientific name *Ginkgo biloba* comes from the fact that the leaves of the tree are notched and therefore appear to have two lobes.

Refer to the other Ginkgo- Peltaspernum-Callistophytales affinities points explained in figure provided to you on your whatsapp/email group

The reason why botanists have this much trouble placing the Ginkgoales is because ginkgoes have reproductive structures similar to that of the cycads and vegetative morphology of the conifers.
As mentioned before, ginkgoes and cycads have similar reproductive systems.

Both of these groups have motile sperm, which is a rarity amongst living seed plants.

Both cycads and ginkgoes are dioecious, which means male and female reproductive structures are located on different plants.

Refer to the other ginkgo – Cycads seed comparison explained in figure provided to you on your whatsapp/email group.
The mature *Ginkgo* seed is anatomically similar to its cycad counterpart. For example, its seed coat is divided into two parts, the sclerotes and scarcotesta.

In comparison the conifers and the *angiosperms* have only a single undivided seed coat.

The only difference is that in the ginkgoes, the vascular system consists of two bundles that extend throughout the innermost region of the integument.

Furthermore, the cycad genus *Nilssoniacladus* has a *Ginkgo*-like branching pattern.

Refer to the other ginkgo –gymnosperms distinguishable points comparison explained in figure provided to you on your whatsapp/email group