On Line Study Material (e-content)

College :- S.S. college, Jehanabad

Department :- Botany

Subject :- Gymnosperm

Topic :- Similarities & Differences of Gymn. with Angiosperm.

Medium of Teaching :- What's App and college Web site (econtentofscience@gmail.com)

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Time :- 11.00 – 12.00

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Class :- Biotech P I - S
B.Sc (BOT.) P II - H.

COMPARISION OF GYMNO. WITH ANGIOSPERMS

Due to its peculiar features this group is placed between Pteridophyta and Angiosperms. Thus, the group of has some common features with angiosperms as well as differences with them. Affinities and differences of gymnosperms with angiosperms are discussed below —

1 Affinities With Angiosperms :-

i) Plant body differentiated into root, stem & leaves.

ii) Shrub or tree like habit is common in both the groups.

iii) Aggregation of sporophylls in strobili or cone in higher gymnosperms is similar to angiospermic flowers.

iv) Pollen tubes for carrying the ♂ gametes is present in both the groups.

v) Retention of megaspore in megasporangium permanently is also a common feature.

vi) Ovule remain surrounded by integument in both the groups.

vii) Suspensor is present and function as placenta.

viii) Seed formation occurs in both the groups.

2. Differences with Angiosperms :-

i) Ovules are naked in gymnosperms while covered in angiosperms.

ii) Vessels are absent from the wood of gymnosperms (except Gnetum) while present in angiosperms.

iii) Companion cells are absent from phloem in gymnosperms

iv) Stigma and styles are absent in gymnosperm.

v) In gymnosperms wind pollination is common while in angiosperms various agencies are found.

vi) Gymnosperms have no coloured bracts, perianth and nectaries.

vii) Archegonia is present in gymnosperm (except Gnetum & Welwitschia) while absent in angiosperms.

viii) Pollen grains have prothallial cells in gymnosperm while it is absent in angiosperms.

ix) In gymnosperms endosperm is formed before fertilization (except Gnetum) while in angiosperm it is formed after fertilization.

x) Double fertilization or triple fusion is absent in gymnosperm but present in angiosperms.

xi) In gymnosperm zygote has free nuclear division while it is absent in angiosperm.

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3. Affinities of Gymn. with Pteridophytes –

i) Gametophytic and sporophytic generation alternate with each other.
ii) Sporophyte differentiated into root, stem and leaves.
iii) Leaves of cycas (Gymno.) has compound nature and circinate vernation like Ferns.
iv) Absence of vessels in xylem and companion cells in phloem in both the groups.
v) Small microspores and large size megaspore of Gymno. resembles with selaginella, Isoetes, Marsilea and some fossil ferns where heterospory is reported.
vi) Reduction in ♂ and ♀ gametophyte.
vii) Megaspore lies in megasporangium.
viii) In cycadales and Pteridophytes, multiflagellate and motile antherozoids are present.

4. Differences with Pteridophytes :-

i) Gymnosperms are mostly large trees.
ii) Gymnosperms have xeric characters than Pteridophytes.
iii) Development of Tap root system in Gymnosperm for better anchorage.
iv) Higher Gymnosperms show excessive Secondary growth.
v) Seed formation occurs in Gymno. Living pteridophytes have no seed formation.
vi) Formation of Pollen grains and pollen tubes in Gymnosp.
vii) Gymnospermous archegonia has no NCC & VCC. In Gnetum & Welwitschia even archegonia are absent.
viii) Permanent retention of female gametophyte inside the megaspore in Gymno.