

ANGIOSPERMIC CHARACTERS OF GNETUM

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TDC Part-II(II)

PAPER-III

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The volume of literature about the fascinating group of Gnetales is enormous chiefly on account of the fact that the group approaches more nearly to the angiosperms than do any other gymnosperms. The resemblance between Gnetum and the angiosperms have been greatly emphasized by various authors as portraying a close relationship between the two. Some of these workers suggested that Gnetales and the angiosperms had a common ancestry. Still others believed that the ancestors of angiosperms were like those of Gnetum itself.

A few of these considerations may be outlined as below:

1. Arber and Parkin (1908) put forth the view that both the angiosperms and Gnetales originated from a common stock which they called 'Heuriongiosperms'. The two originated from this hypothetical assemblage and in many respects their evolution continued along parallel lines.

2. Thompson (1916) regarded that the ancestors of angiosperms very closely resembled the ~~or~~ genus Gnetum.

3. Hagerup (1934) studied the floral development of Gnetales, Piperaceae and Juglandaceae and concluded that they closely resemble each other and the differences whatsoever are of minor importance. He postulated that Gnetales could be easily

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included under the angiosperms.

4. Anderson (1934) derived a conclusion from the basic chromosome numbers of Magnoliaceae ($n=19$), Cycadales ($n=12$) and Gnetales ($n=7$). He regarded Magnoliaceae as the transitional form between the gymnosperms and angiosperms. Recent studies have shown that the basic chromosome number in Gnetales is not $n=7$. Thus this view is only of historical importance.

Gnetum, however, resembles angiosperms in many respects. These have been presented below:

Angiospermic Characters of Gnetum:

(i) Leaves in Gnetum have reticulate venation, which is an angiospermic character.

(ii) Presence of vessels in the xylem of Gnetum is also an angiospermic character, but the development of vessels in the two is different.

(iii) Shoot apices in Gnetum and angiosperms exhibit a distinct tunica-cotyledon configuration.

(iv) Inner integument of the Gnetalean ovule is comparable to the ovary that is produced into the long style. Micropylar tube is regarded as the style, and it has a nutritive tissue similar to that of the style in many angiosperms.

(v) Tetrasporic development of the female gametophyte is also identical.

(vi) Female gametophyte is only partly cellular before fertilization and becomes completely cellular only after fertilization. Some of the free nuclei act as eggs as there are no archegonia.

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(vii) The zygote does not undergo any free nuclear division.

(viii) Embryo is dicotyledonous in Gnetum as in angiosperms.

Show that Gnetum approaches angiosperms in some respects. These similarities appear to be cases of parallel evolution and do not portray any close relationship.

In conclusion, we can cite the observations of Maheshwari and Vazir (1961) in their own words: "The genus Gnetum remains largely a phylogenetic puzzle. It is gymnospermous, but possesses some strong angiospermic features."

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