

## AFFINITIES OF PSILOTALES

PAPER-I

Group-B

TDC Part-I(Hons.)  
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### Introduction:

The Order Psilotales is characterized by a rootless, dichotomously branched sporophyte, which is partly underground and partly sub-aerial. The latter part may be leafless or leafy. The sporangia are in diads or triads. The gametophytes are completely subterranean. The Order includes two genera: Psilotum and Tmesipteris. They are commonly called whisk ferns. On account of their affinities with diverse groups of Pteridophytes, ~~the~~ Psilotales have been assigned variable taxonomic positions among Pteridophytes by different workers in the early phases of study of the order.

### Affinities with different groups:

#### A. Affinities with Lycopodiales

- (i) Campbell and his adherents emphasized the resemblances in the gametophyte structure of Psilotales and Lycopodiales.
- (ii) Both of these groups have subterranean mycorrhizal and radical form.
- (iii) Embedded nature of antheridium in Psilotales resembles the condition in Lycopodiales. However, unlike Lycopodiales, there is a segregation of fertile and sterile regions. Sex organs and antherozoids differ in several important features.

#### B. Affinity with Equisetales

- (i) Bowler and his followers emphasized the similarities between Psilotales and Equisetales in the following features:
  - Morphological and anatomical nature of the young shoot
  - Ribbed stem
  - Nature of the fructification which has been interpreted as sporangiophoric

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(2)

– Similarity in the function of sporogenous cells during the development of the sporangium; all the cells do not develop into spores, some serving nutrition to the developing spores.

(ii) However, in many other characters Psilotales differ from Epilobiales.

### C. Affinity with Ophioglossales

(i) Psilotales resembles Ophioglossales in its gametophytic structure which are similar to that of the sporophyte.

(ii) In both of these groups gametophytes are like the rhizomes in general appearance, in cylindrical shape and dichotomous branching, in determinate apical growth, in radial structure of rhizoids and in the occurrence of endophytic symbiotic fungus.

(iii) Multiflagellate structure of antherozoids and absence of tapetum along with other features were considered by Steward to treat it as an independent group.

### D. Affinity with Psilophytales

Psilotales and Psilophytales are similar in several important characters as below:

- (i) Plant body axis lacks roots.
- (ii) Emergences are found rather than leaves.
- (iii) Sporangia found on the tips of the axes.
- (iv) Sporangium with massive and undifferentiated wall, and with central sterile columella.

Thus these two orders resemble in many characters, but Psilotales differ considerably from Psilophytales in the position of the chambered sporangium and in elaborated anatomical features.

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