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General characteristics of Calamites(contd.):

4. Cones:

The cone of Calamites has a central axis bearing alternating whorls of peltate sporangiophores and sterile appendages called bracts.

There are a number of different forms of cones in Calamites which may be distinguished on the basis of two important features:

(i) the position of sporangiophore attachment, and

(ii) the number of sporangia per sporangiophore.

These include:

(a). Calamostachys:

Here verticels of sporangiophores are attached at right angles midway between successive verticels of sterile bracts. This Lower Carboniferous cone type is supposed to be an ancestral form which gave rise to the other Upper Carboniferous forms. Each peltate sporangiophore bore four sporangia which faces the cone axis.

The number of sporangiophore and bracts per whorl also varies depending upon the species. Generally 6-18 sporangiophore per whorl and 10-45 bracts are borne. The bracts of a whorl are usually laterally fused at the base forming expanded discs

with free tips. Calamostachys binneyana is a homosporous member bearing isospores with three circinate coiled elaters (Fig. 7.82C).

(b). Palaeostachya:

This cone-type is more or less similar to Calamostachys and is characterised by the arrangement of its sporangiophores in the axils of bracts at an angle of 45°. In addition, the sporangiophore trace arose from the node ascended at an oblique angle and then descended to enter the axillary sporangiophore. The general ratio of bracts to sporangiophores is about 2:1. Palaeostachya andrewsii is a heterosporous member bearing microspores (56-110 µm in diameter) with elaters- and megaspores (235-345 µm in diameter) devoid of elaters.

(c). Mazostachys:

Here sporangiophores are borne in a whorl just below the vertical of bracts. The ratio of bracts to sporangiophores is 2 : 1, where a whorl of 12 bracts subtended by a whorl of 6 sprangiophores. The sporangiophores bear two pendant sporangia. The sporagiophore trace arose directly from the node before bending outward into the sporangiophore.

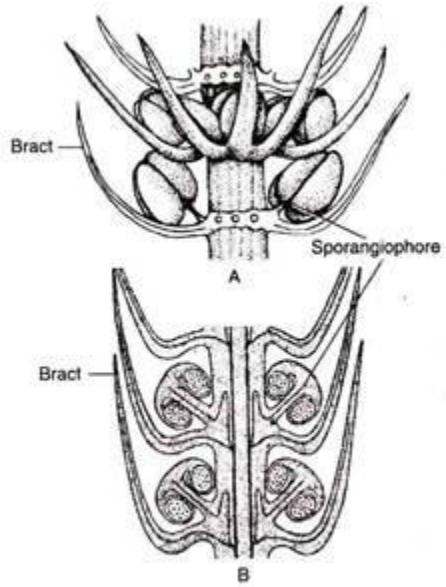

Fig. 7.80 : *Palaeostachya* : A. Three-dimensional view of a part of strobilus, B. Median L.S. of strobilus (a part)

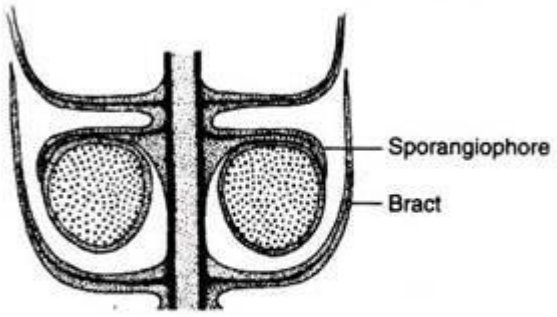

Fig. 7.81 : *Mazostachys* (Median L.S.)

(d). Cingularia:

In general, it resembles Mazostachys. Here both the whorls of bracts and sporangiophores are fused and develop horizontally. The sporangiophores are flat and bifurcate at their tips bearing four pendant sporangia.

(e). Calamocarpon:

It is the most highly evolved cone among Calamites. In general organisation, Calamocarpon resembles Calamostachys. The bracts to sporangiophores ratio is 1 : 1. There are variable numbers of bracts per whorl. Each sporangiophore bears four sporangia. Calamocarpon shows true heterospory. The megasporangium contains a single functional megaspore surrounded by sterile tissue and epidermis which were shed from the cone as a unit.

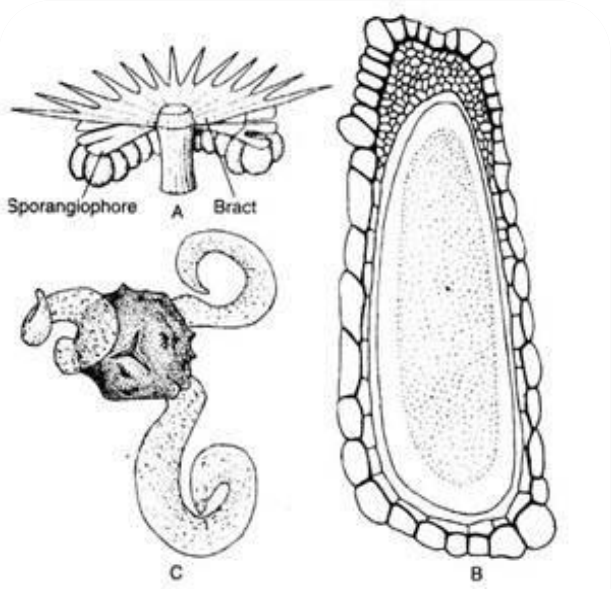

Fig. 7.82 : A. *Cingularia*, B. *Calamocarpon*, C. *Calamostachys* spore with elaters