

Reproduction in Selaginella:

The sporophyte of Selaginella reproduces by vegetative and sexual methods.

i. Vegetative Reproduction:

The vegetative reproduction in Selaginella takes place by tubers (e.g., *S. chrysocaulis*), bulbils (*S. chrysochloris*), dormant buds (*S. chrysocaulis*) and fragmentation (*S. rupestris*).

Bulbils and dormant buds are produced in aerial branches, while tubers may be aerial or underground. In favourable condition they germinate to produce new sporophytic plants. In *S. rupestris*, the down branches of the stem develop adventitious branches, that separate from the parent plant and grow into new sporophyte.

ii. Reproduction by Spores:

Numerous haploid spores are produced in the sporangium. The sporangium are located in the sporophylls and the sporophylls are compactly arranged to form cones or strobili.

Strobilus:

All the species of Selaginella forms strobili or cones. Generally strobili occur terminally on side branches, but in some species (e.g., *S. patula* and *S. cuspidata*), the apical meristem of the cone may continue meristematic activity producing foliage (vegetative) leaves and, therefore, produces a shoot with sporophylls (sporangium bearing leaves) and foliage leaves in alternate segments along the axis.

Selaginella is heterosporous and, therefore, sporangia are of two types viz., microsporangia and megasporangia. The sporophylls associated with these two types of sporangia are designated as microsporophylls and megasporophylls respectively.

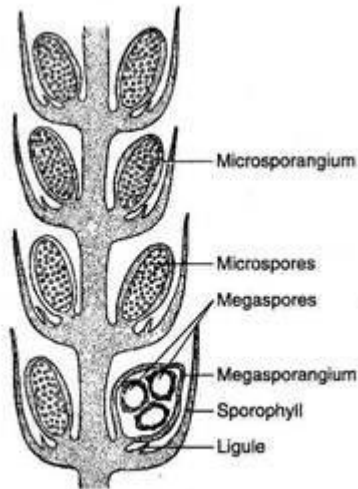


Fig. 7.51 : *Selaginella kraussiana* : L.S. of strobilus

There is variation in distribution of sporangia within the strobili of different species. Strobili either consists entirely of microsporangia or of megasporangia (*S. gracilis*, *S. atroviridis*). However, the mixed condition is more common (Fig. 7.51).

The lower portion of a strobilus consists of megasporangia and the upper portion of microsporangia (*S. helvetica*, *S. rupestris*, *S. selaginoides*) or the two types of sporangia may be mixed indiscriminately.

In some species one side of strobilus bears microsporophylls and other side megasporophylls (e.g., *S. inaequalifolia*, *S. oregana*). In some species, only one megasporangium is present at the base of each strobilus, while the rest are microsporangia (e.g., *S. kraussiana*).

Sporangium:

The mature sporangia are stalked with two-layered jacket (Fig. 7.52A, B). The microsporangia are slightly elongated and reddish to bright orange in colour. Megasporangia are larger than microsporangia and are frequently lobed. The megasporangia are whitish-yellow or light orange in colour.

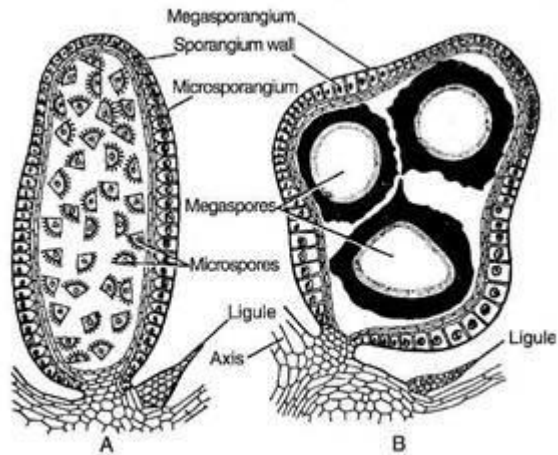


Fig. 7.52 : *Selaginella* : A. A mature microsporangium, B. A mature megasporangium

Gametophytic Generation:

The development of male and female gametophytes (prothalli) takes place from the haploid microspores and megaspores respectively i.e., microspores and megaspores are the unit of male and female gametophytes, respectively.

Spore:

The microspores are small, 0.015 to 0.05 millimeter in diameter, spherical or round in shape and double layered structures. The outer wall is thick and known as exospore (exine). While inner wall is thin and is called endospore (intine, Fig A-C).

The megaspores are much larger than microspores, 1.5 to 5 millimeter in diameter, tetrahedral in shape and show triradiate ridge. The megaspore has three wall layers namely exospore, mesospore and endospore (Fig. D, E). The microspores on germination give rise to male prothalli and megaspores to the female prothalli.

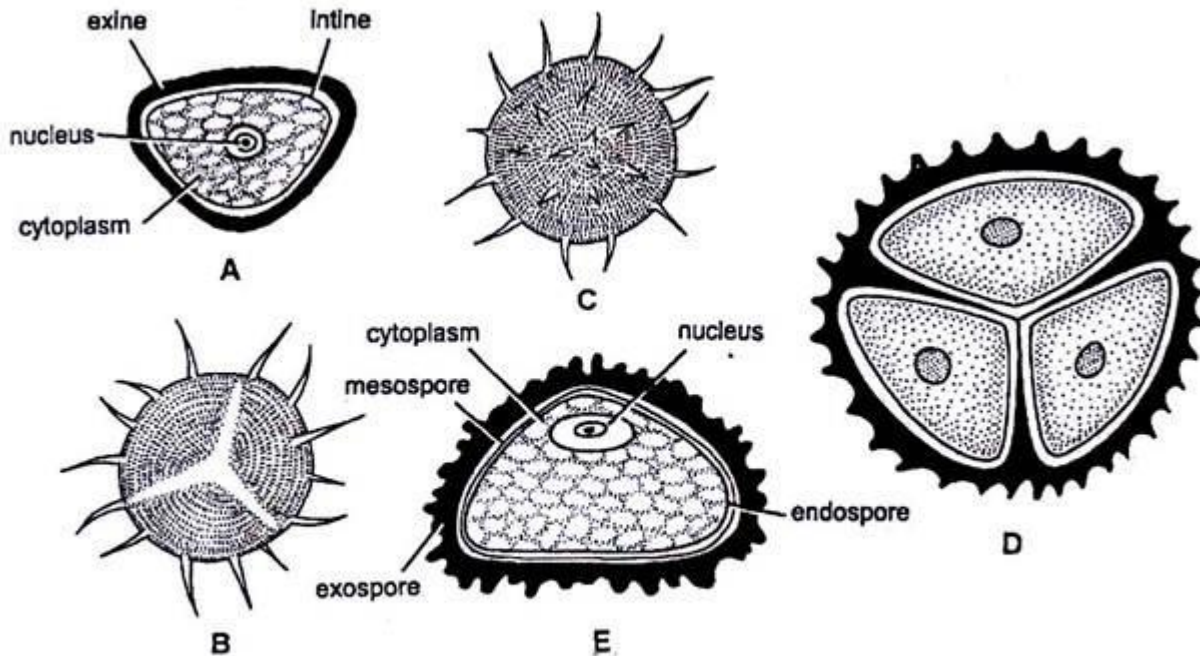


Fig. 11 (A–E). *Selaginella*. Structure of spores : A. A single microspore showing detailed structure, B. Apical view of spore, C. Basal view, D. Megaspore in tetrad, E. A single megaspore.

Fertilisation:

Water is necessary to carry out the process of fertilization. The swimming antherozoids reach the egg through the neck of archegonium and the nucleus of antherozoid fuses with the egg nucleus thus forming a zygotic nucleus. The fertilized egg secretes a wall around it forming a diploid structure known as zygote or oospore (2x). Thus the gametophytic generation ends and the initial stage of sporophytic generation is formed.

In some species e.g. *S. intermedia* the egg develops into embryo without fertilization. This phenomenon is known as parthenogenesis.