

Plant Propagation Laboratory Introduction and Exercise

Module 1

Germination of Fern Spores

Ferns are non-flowering plants that can be propagated utilizing spores or asexual means. The life cycle of a fern consists of a gametophyte generation and a sporophyte generation. The sporophyte generation of a fern will produce sterile fronds and fertile fronds. Fertile fronds are leaves which have sori (sorus if singular) formed on their undersides. Within a sorus are located sporangia (sporangium if singular) which produce the haploid (1N) spores. The haploid spores are the first stage of the gametophyte generation. Ripe spores may be collected and planted to sexually produce ferns. Upon germination, the fern spores produce a heart-shaped, leaf-like structure called a prothallus. The prothallus will have root-like structures on its underside called rhizoids and male and female structures which produce the gametes that result in the formation of a diploid (2N) zygote. The male structures are called the antheridia (antheridium if singular) and the female structures are called the archegonia (archegonium if singular). The formation of the zygote is the first stage in the sporophyte generation. The sporophyte generation is recognized as the zygote develops into a plant with roots, stems and leaves (fronds).

Fern Spore Germination.

Materials needed for this experiment include: fern spores from two or three fern species, Jiffy-7 peat pellets, petri dishes, clear plastic cups, a permanent marking pen, and a piece of paper for each fern species.

The Jiffy-7 peat pellets should be thoroughly soaked in water prior to placing in the center of a petri dish. Locate a ripe sorus on the underside of the fern frond and tap the frond to release spores onto one of the sheets of paper.

These spores can then be spread over the top of the moistened Jiffy-7 peat pellet. A clear plastic cup is then labeled prior to placing over the Jiffy-7 peat pellet to form a miniature greenhouse.

Repeat this procedure using another fern species and a clean sheet of paper.

These minigreenhouses are then placed under a light source and check frequently to maintain the high moisture content of the Jiffy-7 peat pellets with distilled water. Distilled water is used to prevent soluble salts injury.

Record your observations over the next weeks. You may wish to take a picture each week as the spores begin to ripen. Compare the time to germination of spores, the characteristic shapes of the prothallia and the time to development of the sporophyte for each of the fern species.

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