

## FERN PROPAGATION

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Although it seems easier to understand the life cycle of a flowering plant, it is most fascinating to observe, to learn, and to understand the life cycle of a fern. If I plant 10,000 seeds I can expect 7 to 9 thousand seedlings. If I plant the same number of spores I will feel quite happy to count later 2 to 3 thousand sporophytes.

What is the difference between a spore and a seed? A seed is an embryo (a fertilized egg) surrounded by nutritious tissue which will feed the embryo, and a capsule to protect the embryo. A spore is an asexual cell, unfertilized (no embryo) and containing no nutritious tissue. A seed grows immediately into a plant under the right circumstances. A spore, being asexual, will have to be placed under very exact conditions to develop first into a "stage in between", called the prothallium. Proper conditions are: the right amount of water, light, and a certain temperature. Without these three elements spores may remain dormant but keeping their capacity for germination for many years.

My way of sowing spores is to use a combination of many ideas from other propagators but, more important, I have learned the proper techniques through mistakes, often not well understood.

Because I am growing ferns for commercial reasons I am using, as a medium, a combination of peat, vermiculite, and sand: 2/1/1, with a pH of 5.8 to 6.0. The medium is steamed for 30 min. at 140°F. No fertilizer is used. As a container I am using a plastic tray in which I place an inch of the soil mixture. I mist it quite heavily with distilled water. Then I plant the spores as evenly as possible. Sporing too lightly could mean that later the individual prothallia (intermediate stage) are so far apart that no fertilization can take place; too heavy sporing means that the prothallia will be too crowded and various fungi will have a better chance to develop faster than the spores. Then I cover the tray with glass and keep it a temperature of 60° to 65°F under no more light than 500 foot-candles. In 6 to 40 days after sporing, depending on the type of fern, the soil surface becomes greenish. *Pteris tremula* starts in 4 days, *Adiantum cuneatum* in 10 days, while *Asplenium nidus* starts in 40 to 50 days.

Three to six months later I begin transplanting using the

same soil mixture with no fertilizer and no fungus preventatives, since I will be adding liquid fertilizer every two weeks. During the next three to six months the prothallia produce individual, but still clustered, sporophytes which I then transplant into the 96 cell units in which the ferns are sold.

My technique is to treat the prothallia as little as possible. I am not using any disease preventatives, except that the plastic trays are dipped into 5% Clorox solution in order to be able to use them again.

The biggest production problem is the small white larvae of the fungus gnat. My spore area is relatively small, away from the nursery and other plants, and still quantities of fungus gnats seem to appear overnight. In the spore container I am using lindane powder, ½ teaspoon per gallon of water, and treat only the infected area. Later in the saleable containers I use Diazinon wettable powder at only ½ the recommended strength. I found out that it is best always to use only half of any recommended concentrations in propagating ferns.

A major problem I have to fight is botrytis — the grey mold. Green or black algae are additional problems. Both seem to grow best under similar circumstances: a combination of too high a temperature and too high humidity. In both cases the same treatment works best for me, a mixture of ¼ teaspoon BanRot and ½ teaspoon of Konsan to 1 gallon of water.

## **CONTAINER-GROWN RHODODENDRONS**

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Container growing of rhododendrons on the northern California coast is nearly identical to conventional California nursery operations in southern and northern California interior valleys. At Fort Bragg, however, we have very cool summers, and therein lies the key element of our effort to produce a commercial crop of container-grown rhododendrons.

In addition to cool summers, winters are relatively mild. Minimum temperatures drop to about 22°F., and we have occasional snow flurries, but neither the cold nor the snow is really severe or long lasting. Thus we do not have the problems of Eastern growers of container plants in having to provide winter protection. And the cool summers are certainly an advantage,