Propagation of Ferns from Spores©

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INTRODUCTION

It is an honour to have this opportunity to share with you my findings over the past 5 years in the propagation of ferns from spores. My passion for plants began in childhood when I would work alongside my father in the garden. I have fond memories of sharing not only in the creating of our own little paradise but also the satisfaction in completing each little scene. This joy of fulfillment through creative imagination has stayed with me and about 5 years ago, shortly after starting my first job in the plant industry at Lyndale Nurseries, I received the creative challenge I could not refuse.

It happened one day after work while cutting the boss's hair, Malcolm Woolmore. He asked if I had ever thought of growing ferns, as there was a large gap in the market for them. It was like music to my ears. Immediately my imagination sprang into overdrive and I began experimenting; collecting spores, trying various growing media, and designing several germination units.

With the assistance of the I.P.P.S. Carann Scholarship, which I received in 2001, I converted a 12-m^2 bedroom into a propagation room. I built glass incubation tanks to house over 100 trays, installed an air conditioning unit to keep the temperature between 16 and 22 ºC and a dehumidifier. For lighting I set up fluorescent fittings vertically on stands to maximize even light penetration to the shelved units.

COLLECTION AND STORAGE OF SPORES

When collecting the spores I placed the fronds or sections of leaflets underside down, between newspapers. The edges are then folded to form a large envelope. This is left for several days over which time the spores have been released. The foliage and any fine debris are then removed and the spores folded into a small envelope of the newspaper. These are kept in an airtight container in the fridge to prolong their viability. Green spores remain viable for 2 days to less than 1 year. Spores that are not green may be viable from 1 to 48 years with one record of 70 years.

PROPAGATION — STAGE 1

The spores are sown into hygiene trays which have been cut down to 20 mm depth. The growing media consists of:

- Two parts fine pumice sand,
- One part sieved peat,
- Slow release fertiliser and dolomite.

It is essential that the sowing trays are well dampened prior to sowing as any watering within the first 6 to 8 weeks would wash the minute spores down into the mix. The volume of spores sown is also crucial — about $^1/_{16}$ teaspoon per hygiene tray. This amount can yield from 1 to 4 thousand plants, depending on species, viability of the spores, and of course vigilance in pricking out. If too many spores are sown they choke themselves into retarded development and don't mature.

PROPAGATION — STAGE 2

After 3 to 6 months, with the faster-growing types, the prothallia are ready to divide. They are taken in 5- to 10-mm clumps and set in the same shallow hygiene trays. The growing medium is a little heavier, consisting of:

- Three parts medium-fine pumice sand,
- Two parts coconut fibre (palm peat),
- Two parts sieved peat,
- Slow release fertiliser and dolomite.

They remain in these trays until their first leaves appear and are then transferred as individual plants into plug trays. The appearance of the first leaf can take from 3 months to 2 years or more from sowing, depending on the taxon.

PROPAGATION — STAGE 3

The development of the prothallia into sporophytes, or baby ferns, is normally quite staggered, so when it's time to divide them into plug trays there is quite a variation in size. The rooted sporophytes are transferred into 128 cell plug trays. The unsterilised growing media consists of:

- One part fine – medium pumice sand
- One part coconut fibre (palm peat)
- Two parts peat
- Slow release fertiliser and dolomite

The unrooted sporophytes go into 512 cell plug trays using the same growing media as in propagation stage two, to be later transferred into the larger plug trays. The mix, as with the spore sowing mix, is sterilised in the microwave oven on 70% power, with added water for steaming, for 50–60 min.

WATERING AND VENTILATION

All watering is done with boiled water and 1/4 to 1/2 strength foliar feed using a back-pack sprayer. Boiling the water helps minimise the risk of introducing algal and fungal growth. Ventilation in the growing cabinets is gradually increased as the young ferns develop. When sufficiently mature they are placed in the hot house under plastic and shade for 1 to 4 weeks, and then shaded only for 3 to 4 months when they are then ready to be tubed into 5-cm tubes.

CONCLUSION

From the sowing of spores to tubing takes around 15–18 months with the faster growing varieties. Ferns are among the most splendid of all the primal plant species and captivating varieties such as *Cyrtomium falcatum*, *Polystichum richardii*, *Doodia media,* and *Dicksonia antarctica*, which are very hardy, have enormous potential for enriching the character and ambience of any well designed landscape. Any feedback on market demands or potential would be greatly appreciated. All of my ferns are grown under contract to Lyndale Nurseries.

The species I have grown successfully are: *Adiantum hispidulum, Asplenium oblongifolium, Cyathea dealbata, C. robusta, C. falcatum, D. antarctica, D. media, Phymatosorus diversifolius, Platycerium bifurcatum, Cyclosorus pennigerus* (syn. *Pneumatopteris pennigera*), *P. richardii, Polystichum vestitum,* and *Pteris cretica*

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ADDITIONAL READING

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New Plants from Around the World©

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INTRODUCTION

My name is Dick Alderden; I come from Holland and have businesses in both Holland and Thailand. I am glad to tell you something about my job, because I absolutely love it.

I am scouting the world trying to find new or unknown plant species, which can be developed for the market. I want to provide innovation in the market by making new and previously unknown species available to consumers. My job is completely different from plant breeders who are busy trying to breed new colours from known species, like roses, chrysanthemum, and others. For example; with chrysanthemum, about 270 "new" yellow colours have been bred in Holland since after World War II. The fact is no consumer has any real interest in there being so many yellow colours in the market. However, new cultivars can make the production time shorter, optimize quality, and better the vase-life. There are a lot of worthwhile reasons to increase quality through breeding and selection.

But to the consumers yellow is yellow and red is red. In my mind, consumers want real innovation and something that is new and unknown will get their interest. Developing these new crops and marketing them is also exciting for the growers.

With this in mind, I sold my nursery in Holland and went to University again for about 1 year. I wanted to learn more about species, which are similar or comparable to species already in cultivation, but with different shapes or properties. I also wanted to learn which species could be used for crossing or selections with the known ones, to make novel cultivars.

Through the Internet I tried to contact plant hobbyists world wide, sometimes I was successful, sometimes not. I requested seeds of novel plants. I got many sent to me, which I sowed, grew on, and evaluated to see if they were worth developing or not. I also got seeds and cutting material from several universities worldwide.

Hobbyists and scientific people are always willing to exchange species, just to get the ones they do not have. In this way, it was not hard to find many of the species of interest that I was searching for. Most scientific people don't have any sense of commerce. Maybe this is the reason why there are still so many interesting species that have not been developed commercially.