Growing ferns from spores – how, when, where and what

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While many members grow plants from seed, I suspect that growing ferns from spores is a much more uncommon pastime. It is often regarded as more trouble than growing other perennials from seed and has the image of needing expert skills or specialist equipment. I thought so myself until about 6 years ago when I decided to give it a try. However, I found that nothing could be further from the truth and I thought my experience might help other Hardy Planters feel emboldened to take the plunge with this rewarding method of obtaining plants.

While there are differences between seed and spore propagation, the basic steps of sowing, pricking out and potting on are essentially the same, so anyone who grows from seed should have no problem with spores. The main difference is that the sowing containers must be sterile, which makes preparing them more time consuming. However, this is more than offset by the fact that they are kept in sealed plastic bags for most of the propagation period, making these stages almost maintenance free – no weeding, no watering and no pests. It also generally takes longer to produce plants of a reasonable size, but, given the ease of maintenance, this is no problem.

Spores grow only slowly into their final form and start life as very small, liverwort-like structures which are easily overwhelmed by weeds. There are also many unwanted spores in the atmosphere, containers and compost, and it would be tragic to go to all the effort of growing from spores only to find you had the wrong thing and were only growing a contaminant. For these

Fig. 1 A pan two months after sowing, with a healthy growth of prothalli.

Fig. 2 In this pan the prothalli have died, to be replaced by their offspring, a nice collection of little ferns.

Fig. 3 Fern plants growing on.

reasons it is important to make sure your sowing pans are thoroughly sterile before adding the spores you wish to grow. So how do I prepare those sowing pans? Many books advocate using boiling water, but I find the use of a microwave a convenient and trouble-free method.

First, fill a small, flat tray with sieved compost – any sort will do although I find ferns do not appreciate coir-based composts and do not need high levels of feed at any stage. Water well and allow to drain. Label a seal-easy plastic bag with the type of spores to be sown, place the drained tray in it and seal. I then sterilise the sealed package in a microwave. In my model, two trays are sterilised by around 2 minutes on high power, although you may need to experiment with your model, starting with shorter periods. Beware of bursting the bags! Leave these packages to cool overnight before sowing the spores – they will keep for several months prior to sowing if necessary. When ready, open the bag, scatter the spores on the top, reseal and keep in a shady spot.

These packages are now relatively trouble free. As they are sterilised and sealed, they need no weeding or watering and can be left to their own devices with the occasional (2 or 3 times a year) inspection on progress. I keep the plastic bags in a shady frame with the top lights ajar to stop the bags collapsing on to the contents in the rain. I also use the bottom of a 4pt plastic milk bottle, cut off at about 3 ins and with holes in the bottom, as the seed tray, as the high sides also add protection for the contents.

Fig. 4 *Dryopteris filix-mas* 'Linearis Polydactyla', a lacy form of the common male fern.

The first thing you will see is a thin layer of the liverwort-like structures referred to earlier (fig. 1). Technically called prothalli, they are at the stage in the life cycle of ferns when they produce their equivalent of pollen: cross-fertilisation occurs, and a new fern plant is produced. As you have probably only sown spores from a single individual plant, the level of variation in the offspring is less than you would expect with seed, and, indeed, unlike flowering plants, deliberately producing fern hybrids is a complicated business way beyond the scope of this article. These prothalli can appear within a month, or take 18 months or more, so be patient!

Once you see the prothalli there is no need to do anything, provided the compost is still moist. The cross-fertilisation requires damp conditions, so surface moisture on the

compost is important. A light misting with boiled water may be given if it seems rather dry, although I have not found this necessary. Little fern fronds can grow almost at the same time as the prothalli, although it can take a year or so for fertilisation to occur and ferns to appear. When they seem large enough (fig. 2), they can be pricked out much as you would do with seedlings. Once again, I use sterilised trays in sealed bags, prepared in the same way as for spore sowing. Although I think the sealed bag is essential to limit the change in conditions on pricking out, the sterilisation is not so important at this stage as your little fern plants have a head start on any contaminants.

Following pricking out, leave the small fern plants to grow until large enough to pot up individually. This can take from a month to a year depending on the vigour of the variety. At this stage I dispense with the plastic bag and the fern plants are kept well watered in a shady spot until large enough to plant out (fig. 3).

So, what ferns have I found the easiest to grow by this method? Number one must be any *Dryopteris*. I have found these to be quick and reliable from spores and they contain many of the finest species for garden use. The stalwart British native *Dryopteris filix-mas*, the common male fern, although not the handsomest of ferns, is a real toughie and grows in a very wide range of conditions – anywhere except a real bog. It has some fine varieties which will come fairly true from spore, and two of my favourites are *D. filix-mas* 'Linearis Polydactyla' with fine, lacy fronds (fig. 4), and *D. filix-mas*

Fig. 5 *Dryopteris filix-mas* 'Grandiceps Wills', a good crested form of this reliable native.

Fig. 6 *Dryopteris affinis*, a striking British native shown here in a Monmouthshire wood.

'Grandiceps Wills' (fig. 5) with exuberant cresting. Both are as reliable as the type and will grow into an upright shuttlecock about 3ft high. Of similar growth habit but a more striking plant is another British native, *D. affinis*, the golden-scaled male fern (fig. 6). It is less tolerant of very dry conditions than its relative, but repays a modicum more moisture with heavily scaled stems, wonderful unfurling crosiers in the spring and a more evergreen temperament. Even more striking and needing similar conditions is *D. wallichiana*. This is like a larger *D. affinis*, but with black rather than golden scales.

Similarly tolerant of dry and shady conditions, but with very different, evergreen foliage are the Cyrtomiums or holly ferns. This has been amongst the quickest and most successful genus I have grown, and they form a lovely contrast to the more 'ferny' types in these difficult spots. The hardiest is *C. fortunei*, but the most striking I grow is *C. macrophyllum* with larger leaves (fig. 7). There are many other species, although the differences are not marked. One I grew from spores but lost to cold was *C. juglandifolium*, with even larger leaves. One to try again next year and grow in a pot, I think.

Fig. 7 *Cyrtomium macrophyllum*, a reliable fern for dry shade, with bold evergreen foliage.

Another group of ferns which are easy from spores are the Polystichums, which include many of our loveliest ferns. Again, these are British native species and are good, reliable plants for dry shade. While they are generally seen in limy conditions in the wild, they grow adequately (although perhaps not as luxuriantly) in my acid soil. The commonest British native is *P. setiferum*, the soft shield fern, which is available in a myriad of varieties such as this unnamed lacy divisilobum (fig. 8). These are less likely than Dryopteris varieties to come true from spores, but a good variety

Fig. 8 A lovely divisilobum form of the soft shield fern, *Polystichum setiferum*.

will undoubtedly give you a range of good, albeit different, offspring. We are on firmer ground with the species, and a favourite of mine which I have growing in terrible conditions under a large shrub is *P. neolobatum*. The close-up of the frond (fig. 9) shows it's wonderful ladder-like appearance and glossy finish. It is evergreen and grows, even with my appalling care, to around 2ft high. There are several species with similar foliage but on a more diminutive scale, such as *P. rigens* and *P. tsussimense*, which are suitable for raised beds and the front of borders in shade where they make a year-round foil for more transient partners.

Where conditions are moister, athyriums or lady ferns are a good choice. As long as you avoid a bog, they will thrive in good soil, producing bright-green, lacy fronds which are deciduous and disappear in early autumn, making them excellent companions for spring bulbs and other winter ephemera. Our British native, *A. filix-femina*, comes in various forms, of which I like best the ultra-lacy plumose forms such as 'Axminster'. Again, exact varieties cannot be guaranteed from spores, but all progeny will be good. This genus is also notable for adding other colours to the fern palette, with many Japanese species having purple and silver-marked foliage. The Japanese painted fern (*A. niponicum* var. *pictum*) is typical and is now available in several varieties such as 'Silver Falls', 'Ursula's Red' and 'Burgundy Lace' (fig. 10), whose names speak for themselves. In similar but more muted colours are *A. otophorum* and *A. vidalii* which form a more upright shuttlecock than other Japanese species.

Fig. 9 *Polystichum neolobatum*, a tough and reliable evergreen for dry shade.

Fig. 10 *Athyrium niponicum* var. *pictum* 'Burgundy Lace', the darkest form of the Japanese painted fern.

Lastly I come to two genera which are reliable from spores and which, while they have hardy representatives, give much greater scope with pot culture. I include them as they are significantly different in their form from those above and add variety to a mixed fern planting.

First is *Adiantum* or the maidenhair ferns. They have wonderful sprays of bright-green orbicular leaves trembling on top of wiry, often black stems. Typical is the hardy *A. aleuticum*, a lovely clump former for humusy soil in shade. More running, and with a triangular frond outline, is *A. venustum*, whose leaves go a lovely bronze in the autumn. Both have coppery new foliage in the spring. If you are prepared to keep them just frost- free in winter, two further species are *A. raddianum* and *A. poiretii*. The former is particularly attractive in its form *A. raddianum* 'Micropinnulum' which has, as the name suggests, very finely divided leaflets. The latter has quite large leaflets with an attractive wavy edge (fig. 11).

Fig. 11 Variations on a theme.

A *Adiantum aleuticum* has its leaflets in pedate sprays.

B *A. venustum* has elegant triangular sprays of foliage.

C *A. raddianum* 'Micropinnulum' has the tiniest leaflets of all

D *A. poiretii* has large wavy-edged pinnules.

Last but by no means least I have to mention a genus that summarises for me all that is beautiful in ferns, *Araiostegia*. These have wonderful creeping rhizomes covered in golden scales from which arise large, triangular fronds of mid-green lace. They neither run too fast nor produce their fronds too sparsely and, if planted at the top of a wall, will produce a cascade of green as their fronds tend to droop. The one I have seen growing best outside (I am only trying a piece of mine this year) is *A. parvipinnata* (fig 12), although another that I have as small sporelings (*A. perdurans*) is also thought to be hardy. However, they are all very amenable to pot culture and a small piece of rhizome can always be risked outside when they are large enough.

Having enthused you with fern growing I can now hear shouts of 'but where can I get the spores from?' Well, there are basically two options. First, you can collect your own, either from gardening friends or from plants in the wild. As a single leaflet produces a very large number of spores, neither the garden nor the wild would be greatly depleted by this. I keep a sharp eye open when out walking and have collected spores from a few native ferns which looked to be a variation on the norm to me and am awaiting the results with interest. A small hand lens can be useful to look at the underside of the frond to check that it is producing spores and is not either too immature (still looks green) or has already shed (is brown and shaggy). An easier option is to join The British Pteridological Society (BPS for short) which has an excellent spore list which is available free to members and contains many unusual species and varieties. Details are available on their website.

Fig. 12 *Araiostegia parvipinnata* creating a curtain of green.

If you enjoy growing ferns, why not give this a go – I'm sure you won't be disappointed.

Sue Dockerill is a founder member of the South Wales Group and has gardened in a shady plot in the Welsh Valleys for over 30 years. Ferns, both in the garden and in the wild, have always appealed to her, and her garden allows her ample scope to indulge this interest.