

**Spore propagation of ferns.**  
**Collection, preparation and storage of spores**

Although among plant lovers it is believed that growing a fern from spores is difficult and only a professional can do it, this is not entirely true. In fact, it is not difficult. You only need a little knowledge, a little accuracy and patience. Sowing and agricultural technology of ferns is not much different from rhododendrons. And we know how to sow them.

First of all, you need to familiarize yourself, at least in general terms, with the structure and life cycle of ferns. Even a school botany textbook will do for this purpose. Therefore, we will not describe well-known facts here.

So. How to collect spores? First of all, you should understand that spores will not be on all leaves (in ferns they are called fronds). Try turning over some fronds in the summer to see what you can find there. Spores are easy to see with the naked eye. But very young specimens of ferns may not produce spores at all.

*Examples of fern spore arrangement*



*Asplenium rhizophyllum*



*Pellaea glabella*



*Polystichum microchlamys*



*Aleuritopteris argentea*





*Selligiea lehmannii*



*Asplenium nidus*



*Lunathyrium pycnosorum*



*Pseudocystopteris spinulosa*

The spores of different ferns can be arranged in different patterns, creating a certain pattern. The arrangement of the spores, by the way, is the main key to identifying fern genera, as well as many species. Some ferns produce their sporangia (the cells in which spores are formed) on completely different, fertile fronds, which are different from the usual leaves and are often a bright part of the fern's appearance. For example, these are the species of *Plagiogyria*, *Matteuccia*, *Blechnum*, *Osmunda* and others.

Determining when the spores are ready to collect takes some patience and a little practice. Initially, the sporangia will be filled with very pale, immature spores. After a while, the spores will darken, and eventually the sporangia will burst, releasing mature spores. Then only shaggy brown, burst sporangia will remain on the fronds, and it will be too late to collect the spores. Our photos show typical fronds from immature to mature, and finally examples where the spores have already fallen.

On an immature leaf, the main thing you can see is the integument that covers the spore-bearing structures (sporangia). Mature sporangia, full of dark spores, just peek out from the edges or from the middle, and look like clusters of tiny dark balls. After they burst, the empty sporangia look paler (closer to light brown) and hairier.

Most ferns in the northern hemisphere produce spores in late summer, but this depends on the specific region and the phenology/vegetation period.

In the literature, you can find descriptions of different methods for collecting spores, such as, for example, "tap the fern leaf with a stick and the spores will fall out onto a piece of paper placed underneath...".



Of course, they may fall out, but we would not advise relying on chance. Over many years of working with ferns, we have come to the conclusion that of all the variety of options, two are easiest to use.

*Examples of immature spores*



*Dryopteris amurensis*



*Dryopteris assimilis*

*Examples of mature spores. Their color may vary slightly among species. But the spores are quite visible, especially if you use a magnifying glass or the macro mode on your smartphone*



*Polypodium vulgare*



*Polystichum braunii*



*Dryopteris villarii*





*Woodsia ilvensis*



*Woodsia polystichoides*

***Examples of shed spores (empty or nearly empty sporangia)***



*Polypodium vulgare*



*Asplenium adiantum-nigrum*



*Dryopteris carthusiana*



*Polystichum sp. (Nepal)*



*Athyrium monomachii*

***The first way.***

It is used in cases where it is possible to cut off the spore-bearing frond or part of it. It is only important to make sure that the sori (groups of sporangia) on it are ripe, but the sporangia (spherical formations inside which spores are formed) have not yet opened. Such sori, in most cases, look dark and golden brown. The cut parts of the frond are placed in a bag. If the frond does not fit entirely, the rachis (leaf petiole and main axis) is removed and those parts that do not have sori are cut off. The cleaned spores can be packed in paper envelopes or foil bags.

Be sure to indicate the following information on the bag:

a) Name of the plant; b) Where the spores were collected (it would be a good idea to write who collected them); c) Date of collection.

Like this, in bags, they can lie for a long time (some species for several decades) without losing viability. But even if there is no need to store the spores, and you want to sow them immediately after collection, do not rush. Let them lie in a bag, and the bag in a warm and dry place, for at least a week. Why? Only when completely dry, the sporangia open and the spores spill out of them!

The second way.

We use it when it is not possible to cut off the frond. For example, when the owner of the plant does not want to spoil its appearance. You can treat this with understanding. Just open the bag, bring it to the frond from below and scrape sorus after sorus with a hard brush, and sometimes even a scalpel / knife, so that everything scraped off falls directly into the bag. Of course, you should try not to damage the frond itself.

Everything that was scraped off, we dry in the bag in the same way - for a week. When the sporangia inside the bag have opened up and the spores have poured out of them, you can sow.

In fact, if you are not sure that the spores are already ripe, you can take only a piece of the frond and dry it as described above. If the spores are ripe, they will pour out onto the paper within 1-3 days. This is better than waiting until autumn, when the spores may already have scattered in the wind. All you need is a little experience.

Spores of different species have different shelf lives. Many are stored for 20-30 years or more, others from several months to several years.

If the task is long-term storage, then after complete drying, it is best to store the spores in a cool, dry place. A refrigerator is suitable for these purposes.

There are several genera of ferns whose spores should be sown immediately after ripening (usually these spores are still green). These are the species of *Osmunda*, *Onoclea* and some others. There are very few such species and we do not consider them in this guide.



*Some species of ferns with separate fertile fronds*



*Blechnum nipponicum*



*Onychium siliculosum*



*Plagiogyria matsumureana*



*Matteuccia struthiopteris*



*Plagiogyria pycnophylla*



*Matteuccia orientalis*