



TIPS ON COLLECTING, PROCESSING AND STORING FERN SPORES

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Some Alaska native ferns such as ostrich fern (*Matteuccia streuthiopteris*) produce spores on specialized fertile fronds that are easily distinguishable from the more leaf-like, sterile fronds. Other ferns produce spores on nearly every frond that is produced in a season. Hundreds of thousands of spores may be produced on each fertile frond.

Spores are produced in a lolli-pop-shaped structure called a sporangium. Clusters of these sporangia occur on the undersides of each frond and may be protected by the curled edges of the frond or by specialized structures called indusia. These indusia may appear like tiny, kidney-shaped flaps of tissue, miniature umbrellas, or bowls. As the spores mature, these indusia usually change color and become papery and dry.

For most ferns, spore maturation coincides with a color change. The indusium and/or sporangium may change from a light green, greenish-yellow, or light brown to a medium brown and then to dark brown or greenish-brown color. Some species have spores and sporangia that are yellow, yellowish-green or orange when mature, but I am not aware of any Alaskan species that fit this description. Concurrent with the color change, is the drying out of the entire sporangium. When moisture within the cells is decreased to a certain level, the sporangium cracks open releasing spores, often explosively, into the air.

The key to collecting spores is to harvest entire fronds just before the spores are released. Examine the fronds with a 10-15X hand lens. If the indusium or sporangium appears papery and ragged, most spores probably have been released. Collect fronds just as most sporangia and/or indusia become light brown.

The spores may be harvested immediately by placing the frond between sheets of newsprint paper. Paper with coarse fibers (i.e. herbarium blotter paper, filter paper) is not appropriate because spores become lodged in the fibers and are nearly impossible to extract. Very smooth papers such as copy machine paper work only with fronds that are not wet. Plain newsprint that has not been printed on is ideal. Printing obscures the spores.

Set the papers in an area that will not be disturbed by even slight breezes. Spore release will usually begin immediately and continue for several days. Also, many spores may adhere to the undersides of the fronds. They can be removed by gently tapping or brushing the undersides of the frond. However, this process usually dislodges quite a bit of trash as well and is not recommended unless spores are rare or valuable.

Spores may be released in clusters as well as singly. Single spores appear like very fine dust, whereas spore clusters are dark brown dots slightly smaller than a pencil point. Spores may be cleaned by removing large pieces of trash with forceps. The paper may be tilted slightly to permit larger trash particles to roll off the paper. Micro sieves and cell sieves are also helpful in separating spores from bits of tissue, sporangia and hairs. Cleaning is important because spore

germination is very susceptible to fungal and algal growth, both of which proliferate in uncleaned samples.

The best method for storing spores is in glassine envelopes or in packets of waxed paper. Spore viability varies among species from just a few days (often the green-colored mature spores are in this category) to several years. The packets are best stored in the refrigerator (1-4°C) or freezer in moisture-tight and air-tight containers.

Spores also may be transported and stored for a short time with the frond in paper packets. After the frond is dried, and spores have been released, double wrap the frond and spores in newsprint paper packets. Enclose the newsprint in a manilla envelope, and then into a zip-loc plastic bag. Make sure that the frond has completely dried out before storing in a plastic bag. This method works well for short term storage, but usually the amount of trash accumulating with the spores increases over time.