Hardy Fern Foundation Quarterly

Winter 2021

THE HARDY FERN FOUNDATION

P.O. Box 3797
Federal Way, WA 98063-3797
Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Affiliate fern gardens are at the

Bainbridge Island Library, Bainbridge Island, Washington;

Bartlett Arboretum & Gardens in Stamford, Connecticut; ***NEW 2020!***

Bellevue Botanical Garden, Bellevue, Washington;

Birmingham Botanical Gardens, Birmingham, Alabama;

Cornell Botanic Gardens, Ithaca, New York;

Dallas Arboretum, Dallas, Texas;

Denver Botanic Gardens, Denver, Colorado;

Dixon Gallery and Gardens, Memphis, Tennessee;

Ganna Walska Lotusland, Santa Barbara, California;

Georgia State University Perimeter College Native Plant Botanical Garden, Decatur, Georgia;

Inniswood Metro Gardens, Columbus, Ohio;

Lakewold, Lakewood, Washington;

Lewis Ginter Botanical Garden, Richmond, Virginia;

Powell Gardens, Kingsville, Missouri; ***NEW 2020!***

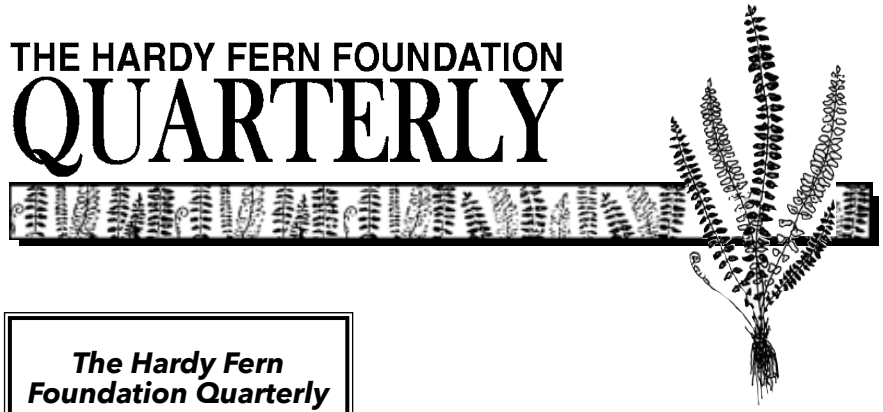
Rotary Gardens, Janesville, Wisconsin;

Whitehall Historic Home and Garden, Louisville, Kentucky.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover design by Willanna Bradner

THE HARDY FERN FOUNDATION QUARTERLY



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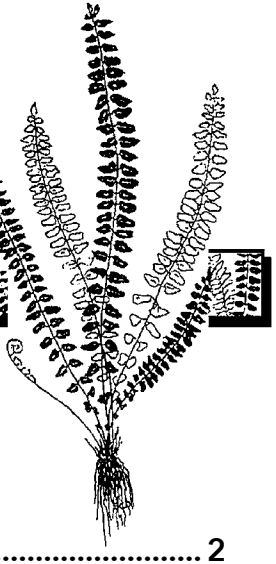

President's Message 2021

HFF Quarterly – Winter Issue

This issue of the Quarterly will reach you as we have turned the page from 2020 and look towards a very different and hopefully more stress free 2021. Many of us were able to turn to our gardens as the pandemic took hold to start new projects, finish old ones, and add more plants while tidying, pruning, weeding and watering our gardens to perfection. Although it appears that we will continue our gardening in a socially distant way well into 2021, we can see hope and an end to the isolation, and I am very much looking forward to seeing all my fern-loving friends again later in the year.

Last year brought many changes including a new HFF program manager, Kyra Matin. Kyra started in April and has been a great help through the limitation imposed by the coronavirus. Kyra's talents were many and she was so delightful and capable she was hired for a fulltime position by our sister organization, the Rhododendron Species Botanical Garden where our headquarters and growing facilities are housed. Although we are sad to lose her as an employee of the HFF, we are delighted that she will still be close at hand, and I am sure she will continue to share her talents as a volunteer for our organization.

With Kyra leaving, we were extremely fortunate to quickly bring on a new and talented program manager. Dennis Beatty came on board with us in early December and is excited to have an opportunity to work with a lot of great plants, our board and most importantly, our members. Originally a student of engineering, Dennis realized that his passion was for plants and he is near completion of the Edmonds Community College horticulture program where he will receive certificates in Landscape Horticulture, Nursery Growers, and Urban Agriculture Production. I am particularly pleased to have Dennis working for the HFF as he is currently an intern with the Elisabeth C. Miller Botanical Garden, where I am executive director. As he finishes the last half of his internship, I know he will bring the skills he has learned to the HFF. I hope you will have a chance to interact with him in the near future.

Thank you to all the participants in the end of the year fundraising campaign. The contributions made are very much appreciated and were a positive note at the end of such a trying year. If you still want to donate, it is easy to do so by visiting our website, www.hardyferns.org, and click the donate button.

Also, as a final note, since the last Quarterly issue, we have added another public garden to our Affiliate Garden program, Bartlett Arboretum & Garden in Stamford, Connecticut. This 93-acre garden features 12 different gardens including the Alice Smith Fern Allée planted with a diverse collection of ferns including many native ferns. We are excited to have them join our program, and I hope you will stop in to see their display if you are visiting that area in the future.

I am looking forward to a better and brighter New Year. Watch our website for new digital programs for 2021.

All the best,
Richie

Richie Steffen
HFF President

Nomenclature Editorial from 1901

Willard Clute
The Fern Bulletin Vol. IX No. 3

That is a significant paragraph of Prof. Underwood's book in which he says: "The question of the proper use of botanical names is by no means a simple one. The botanical literature of the world must be ransacked before stability can be reached. An obscure local publication in the Italian language, on the plants of Sicily, in this case furnishes the generic name for a plant which grows in the Northeastern States." (This refers to the proposal to substitute *Metteuccia* of Todaro for *Struthiopteris*). When botanists realize the full import of this statement, many will, no doubt, cease chasing will-o'-the-wisps and return to the solid ground of conservative nomenclature. The stability to be gained by absolute priority, proves to be instability itself. If we are not to have stability until all the obscure local botanical publications in the world are ransacked, the case is indeed hopeless. No matter how painstaking a student may be-no matter how carefully he has gone hunting in the shades of obscurity for buried fern names-the day after his work is published, another botanist who took a different path through these same shades may return with another dead name, galvanize it into life and therewith undo he work of his predecessor. And so the merry Science of Nomenclature goes on. We can never be sure that the last change has been made in the name of any genus. From their very obscurity and general worthlessness, most of the pamphlets like Todaro's have been consigned to oblivion, but who will assure us that after we have settled down to "stable nomenclature', some inquisitive student, delving into the waste basket of time, may not get hold of another pamphlet and treat us to an earthquake. We need stability more than we need priority and the two seem incompatible by present methods. For the ordinary student of ferns who would be understood, there seems no way out of the dilemma except to stick to the names used in all but the very latest botanical text books, to establish a priority of those names who got there first and stayed, and not allow them to be ousted by new comers, even if they can prove their claims to hoary antiquity. It is not which name ought to prevail but which one did, that should concern us. ❧

Joint Hardy Fern Foundation / British Pteridological Society Zoom Meetings

See details on page 11

Revisiting a Lush Fernery in Far Northern Wisconsin

Mike Heim
Photos by Mike Heim
Hayward, WI

The symmetrical crystalline beauty of ferns never ceases to inspire and amaze me. Just as with snowflakes, no two kinds are exactly alike. Having described how I became enamored with these fractal beauties and thus ended up studying and cultivating ferns both exotic (Spring 2018 issue) and native to my property (Winter 2019 issue), I thought the time right for a bit of an addendum and update. Along with that some pretty pictures to brighten up your wintertime blahs. Oh, and speaking of winter, my ferns are growing about an hour's drive south of Lake Superior, so they must take extended cold if they are to survive here.

There have been two developments since my last article was published. The first is that *Osmunda japonica* failed to appear this spring after surviving in the woods of our creek flat for twenty-four years. Hopefully, it is just one of those strange idiosyncratic things that some plants like orchids, trilliums, adder's-tongue ferns *Ophioglossum* and grape ferns *Botrychium* do…vanishing for a year or more and then suddenly reappearing as healthy as ever. If not, I am out of luck. After all, my plant did originate on warm-temperate Emei Shan in Sichuan Province, China. *O. japonica* has tolerated much colder temperatures than this past winter's -2F (-19C), so if it did succumb, it was likely due to a lack of hardening before the onset of winter, as we had an exceptionally cool and wet summer last year.

The other development is of the positive sort. What I mean is really, really good. The alpine water fern *Blechnum penna-marina*, a tiny species from the Southern Hemisphere reportedly hardy to USDA Zone 5, survived exposure to the -2F/-19C cold of this past winter with only some foliage injury. The plants, which I raised from the HHF Spore Exchange, grew back strongly and spread this year. Currently I have a baby food jar filled with gametophytes of *Blechnum penna-marina alpina* which I obtained from Prof-Seeds, an excellent and reliable online source of fern spores collected in Russia. These may be hardier yet. The alpine water fern is native throughout the cool-temperate parts of South America, Australia, and New Zealand. Whether this is a prehistoric distribution pattern from the time of the Gondwanan supercontinent or, more likely, due to the long-distance dispersal of spores is unclear. Either way, it is quite remarkable. It thrives in a loose, humus-rich soil in a shady, moist site or amongst rocks and can make a wonderful groundcover. Occasionally it makes itself at home in lawns and is small enough to be mowed over. However, it does likes copious moisture and should never be allowed to dry out. Fallen leaves should not be allowed to smother it. In alpine Australia it is found in heaths, open expanses of bog or near streams in the alpine herb fields or the margins of subalpine forests

growing amongst grasses, wildflowers, and mosses. In New Zealand, *B. penna-marina* is common throughout the South Island from lowland to alpine areas, altho it is most abundant in the latter. There it can be found up to the permanent snowline at around 6500 ft./1981 m in moraines, moist grasslands or alpine vegetation, but also under or along the margins of shrubs. On drier mountains it is limited to the shade of cliffs. The dwarf form, *B. penna-marina alpina*, is specific to the alpine regions of the South Island. In Tierra del Fuego it is present in all plant communities, from moist grasslands to the herbaceous layer of both evergreen and deciduous southern beech (*Nothofagus*) forests.

Adiantum aleuticum subpumilum

A different type of tiny fern obtained from the HFF Spore Exchange which has turned out to surprisingly cold hardy is the dwarf western maidenhair fern *Adiantum aleuticum subpumilum*. Possessing tardily deciduous foliage (killed back at -2F/-19C), it is normally listed as being hardy only to USDA Zone 6, as it hails from coastal cliffs along the Pacific side of Vancouver Island, Canada. There a mere four populations occur on the wet metamorphic rock of the exposed cliffs of the Brooks Peninsula. My plants are doing well both on steep mossy slopes in the woods and on mossy hummocks along the forest edge. In the latter sites they appear more vigorous. Thus, they seem to prefer brighter conditions than other hardy maidenhairs. I suspect that like the alpine water fern, they are intolerant of dry conditions.

Another delicate fern, this one a definite deep woods plant, is the upside-down fern *Arachnoides standishii*. No other woodland fern of mine possesses such fine lacy tracery of pinnae. As is the case with others in this genus, I find it to be a slow grower. It is native to Korea and Japan. In the latter country, its fairly broad evergreen fronds

are commonly seen in the moist soil of valley flats associated with *Hydrangea*, *Rodgersia*, and plum-yews *Cephalotaxus* beneath a canopy of Katsura *Cercidiphyllum*, elm, ash, magnolia, and maple. It also frequents wooded mountainsides. In Korea, it is often the most abundant fern, forming huge clonal colonies (genets), particularly in forested low mountains. The upside-down fern requires shade and a moist, humus-rich soil. It is listed as hardy to either USDA Zone 4 or 5. In the north, one should obtain plants originating for instance in Hokkaido or northern Honshu, as those from farther south would not likely be as hardy. I have had a plant for many years and last winter it shrugged off being exposed at -2F/-19C.

Athyrium deltoidofrons

The robust fronds of the broad lace fern *Athyrium deltoidofrons* are also finely cut, but being deciduous are more delicate in texture. As with *Arachnoides*, it thrives in the valley flat near our creek. Native to Japan, Korea, and China, typically in elm/ash swamps and along streams. However, it does not require woodland, sometimes occurring in moist semi-open grassy sites as it prefers brighter conditions than other species in the genus.

Also having broad deciduous fronds, but native closer to home just two counties south of here is the broad beech fern *Phegopteris hexagonoptera*. However, having never found it in Wisconsin, it took a trip to the Appalachians of South Carolina before I finally came across it and propagated it. I had expected that it would be growing on a cool, moist streamside bank like our northern long beech fern *Phegopteris connectilis*. Much to my surprise, it was thriving on a hot, dry ridge top and that is also where I planted it. I understand that the broad beech fern is not fussy regarding its habitat requirements. In southern Illinois it grows in ravine bottoms with blue-beech *Carpinus* and spicebush *Lindera* beneath a canopy of sugar maple, beech, and tulip tree.

Another deciduous fern native to southern Wisconsin that is not particular regarding habitat is the hay scented fern *Dennstaedtia punctilobula*. In the wild it will grow just as contentedly on sandstone as on shale, in old fields as well as in deep forested ravines. It is considered a weed of pastures and of lowbush blueberry fields. The hay scented fern gets its common name from the scent of the crushed, finely divided foliage. After many attempts, I finally was able to establish this species, so it is certainly difficult to divide and transplant. Where it is happiest, such as amongst rocks or in light sandy soils it will spread rambunctiously via rhizomes. I successfully established mine at the foot of a slope when trees had blown down, in relatively dry sandy soil. Trichomes on the fronds add a soft, hairy feel to the plant.

Phegopteris hexagonoptera

Epitomizing deep undisturbed woods for me is the genus *Polystichum*. In my last article I discussed the evergreen Christmas fern *P. acrostichoides*, native to southern Wisconsin, but thriving when brought up to the north. In fact, it likes it so much here that self-sown sporelings are now lining one of my woodland paths. Along with the typical species originating from various sites across the eastern United States, I have two horticultural forms which I grew from spores. One has crispate, wavy foliage and the other crested. These traits are not dominant, so the majority sporelings grown from these respective forms will not carry these traits and will end up being the typical species.

A new species for me which I grew from HFF spores is Wilson's holly fern *Polystichum wilsonii* from western China, where the amazing Ernest Wilson, later director of the Arnold Arboretum, went plant hunting around the turn of the last century. One of the mysteries of plant distribution is why this species also is widespread at high elevations throughout the moister parts of Africa, altho it is also found from Taiwan to Pakistan. There it frequents subalpine coniferous forests and meadows. According to the literature it is not supposed to stay evergreen. Mine most definitely are. Their foliage was uninjured at -6F/-21C.

Most of the ferns which I have grown from spores from the temperate parts of the

Dryopteris amurensis

Northern Hemisphere belong to the daunting genus Dryopteris. Why daunting? Because these wood ferns, as they are known, have an incredible number of species, many of which are similar. In addition to that they take great pleasure in challenging (or tormenting) taxonomists by promiscuously hybridizing with one another. Thus, I must sheepishly admit that I have lost track of the identity of some of my species. Watch for a contest in a future issue.

The broad evergreen fronds of the Amur wood fern *Dryopteris amurensis* are fairly easy to identify. They are reminiscent of oak fern fronds, but much larger. Seeing these lush ferns brings to mind Siberian tigers…not always the best imagery to have when admiring my ferns deep in the woods. Native from Japan to eastern Siberia, it prefers growing near subalpine conifers, altho sometimes also found with hardwoods. On Hokkaido for instance it is found in spruce/fir forests. It is listed as hardy to USDA Zone 4. At 0F/-18C the fronds of my plants were fine to slightly injured. The following winter they were killed back at 11F/-12C, likely due to a lack of sufficient hardening.

Dryopteris chinensis

Similar, but with a more delicate texture and brighter green, is the Chinese wood fern *Dryopteris chinensis*. Personally, I find this to be one of the most beautiful of the

wood ferns, with its finely cut triangular fronds growing to one foot/30 cm tall. It is native to China, Korea, and Japan at 656 ft./200 m to 3937 ft./1200 m in elevation. One of the places it thrives in Japan is in sugi *Cryptomeria* duff. Listed as only hardy to USDA Zone 6, it has been happy and reliable here in USDA Zone 3b (now 4a). The foliage is slightly injured at 0F/-18C. Interestingly, last winter large old leaves died, but small young ones were fine at -6F/-21C.

Hailing mostly from the Caucasus Mountains, the Caucasian wood fern *Dryopteris caucasica* resembles a condensed form of the more western golden male fern *Dryopteris affinis*. It inhabits montane regions from Iran to Turkey. It is listed as being hardy to USDA Zone 4 or 5 and as being semi-evergreen, altho during winters with early snowcover it is fully evergreen here. The foliage is killed back at 0F/-18C and mostly killed back at 11F/-12C.

Also similar to the golden male fern, but having thinner, more widely spaced pinnae is the robust *Dryopteris sichotensis* (aka *D. coreano-montana*) from northeastern Asia. It is listed as being hardy to USDA Zone 6.

From the same part of the world comes the evergreen Tokyo wood fern *Dryopteris tokyoensis*. This is a water lover, favoring very moist, acidic sites such as the swampy banks of our creek where our native crested wood fern *Dryopteris cristata* also thrives. In fact, Tokyo wood fern is considered one of the ancestral parents of *D. cristata*. In

DRYOPTERIS TOKYOENSIS

Japan it reportedly grows in the woods, in elm/ash swamps, and in relatively open sites with *Hosta*, altho it does require at least some shade. It can reportedly grow to nearly 4 ft./1.2 m in height, but mine are not nearly that tall. The fronds are even more narrow than those of the crested wood fern. Listed as hardy to USDA Zone 5, they have had no issues with winter hardiness here. Mine stayed evergreen exposed to

-13F/-25C, altho one plant was injured at 0F/-18C one winter.

Finally, we get to the horticultural genius of the wood ferns, the male fern *Dryopteris filix-mas*, spewing out a remarkable variety of cultivars in bursts of creative energy. The drought-tolerance of male ferns is greater than that of most wood ferns and they also tolerate heavier, more poorly drained soils. However, they reach their greatest potential in moist, well-drained soils with a good mineral content. They are seldom found on poor, sandy soils. In the wild they can be found in the moderate shade of rich coniferous or deciduous woodlands, particularly on rocky north-facing slopes. Male fern shows a decided preference for rocky ground. One way to distinguish it from the golden male fern *D. affinis*, with which it sometimes hybridizes in the wild, is by its heavily toothed secondary pinnae with rounded ends. In addition, the fronds of male fern, to nearly 5 ft./1.5 m long, are tardily deciduous. In Europe (and parts of western Asia) male fern is common in oak/hornbeam woods, beech woods, moist fir forests, and in montane spruce forests. In the Alps it is abundant in beech/mixed hardwood forests on limestone. As in Europe, North American *D. filix-mas* are usually found growing on limestone across the continent, altho generally much less abundant here than across the Atlantic. In Wisconsin they can rarely be found in moist hemlock/northern hardwood forests, usually on basaltic slopes. One region where male fern can be found in abundance is in the moist montane woodlands of Glacier National Park. It is present throughout much of the Rocky Mountains, even in relatively dry, but shaded, rocky places. In Idaho, it can be found in the mountains on cliffs, talus slopes, and deeply shaded moist ravines. In South Dakota, ravines near Harney Peak in the Black Hills host this species. Extracts of the rhizome of *D. filix-mas* is a traditional vermifuge, eliminating intestinal tapeworms. Male fern is listed as being hardy to USDA Zone 4. The foliage of my plants varies from being killed back at 0F/-18C to fine at -2F/-19C. Cultivars, all of which originate in Europe, which are growing with great success here in northern Wisconsin are:

'Barnesii', the narrow male fern, is listed hardy to USDA Zone 2.

'Furcans', the forked male fern, has forked pinnae.

'Linearis Polydactyla', the slender crested male fern, has very narrow skeletal multi-forked pinnae. Its foliage was killed back at -4F/-20C.

'Parsley', the parsley male fern, is ruffly, compact, and crested, growing to 2 ft./61 cm tall.

'These ferns are just a sample of what can be grown in a truly cold climate. One of the pleasures of gardening is trying new plants, particularly those which are not supposed to be hardy, and then being elated when they end up thriving. My "dead list" is extensive, but the "live list" is not too shabby either. Hopefully, this information will start a fire beneath our readers, encouraging them to boldly search out and grow ferns that they like, but did not think would survive in their climate. Take part in changing Reality…grow something fantastic! ❧

2020 Virtual Annual Meeting & Lecture

Rick Peterson
Poulsbo, Washington

As with so many other horticultural organizations this year, the Hardy Fern Foundation went virtual for its annual meeting and lecture on October 24, 2020. Being online allowed for a much greater number of participants; indeed, there were many more local members plus those from across the United States and around the world! Typically, a meeting hosts between 50 and 75 members, but over 100 attended the HFF's first ZOOM event.

After the business portion which included reports on finances, affiliate gardens, and the education program, the main event launched speaker Daniel Mount into the homes of attendees. Daniel is a HFF board member and, according to the event program, he "hails from a long line of peripatetic gardeners. He has settled in the Carnation, Washington, east of Seattle. He currently works as an estate gardener and writer. His fascination with ferns began in the sugar maple forests of his grandparents' farm in the Upper Peninsula Michigan. He grows over 200 types of ferns in his very wet garden in the floodplain of the Snoqualmie River."

Daniel's talk, *Of Fronds and Friends: A Walk Through the Fern-rich Forests of Japan,* featured his three botanical trips to Japan between 2016 and 2019, traveling with pteridophiles and plant enthusiasts from the United Kingdom and United States. With Japanese botanists and fern experts in the lead, the group traversed upland forests, subtropical swamps, and everything in between. What a treat it was to virtually travel with Daniel on his adventures and enjoy his myriad of beautiful images.

If you missed Daniel's presentation, he has written and shared images of his Japanese travels on his blog at *www.mountgardens.com*. As well, our webfolks, Dave and Lori Gibson, have downloaded many issues of *The Hardy Fern Foundation Quarterly* to the HFF website, *www.hardyferns.org*, where you will also find a write-up detailing one of the trips Daniel went on: *2016 Horticultural Tour: The Ferns of Japan*. As well, other botanical trips are featured in the *Quarterly* including the joint British Pteridological Society – Hardy Fern Foundation 2014 Fern Tour of Japan (see 2015 Spring, Summer, and Fall issues) authored by several participants. A bounty of other articles also can be found in past *Quarterly* issues to while away the winter nights ahead. ❧

Joint Hardy Fern Foundation British Pteridological Society Zoom Meetings

A special members-only series of free fern lectures are being conducted by the HFF and BPS through the spring. Although these lectures are free, members must register for each event. Watch your emails for more information and for registration details.

February 20, 2021 10:00am (PST), 6:00pm (GMT) "Polystichum Cultivars" by Julian Reed BPS

March 20, 2021 10:00am (PST), 6:00pm (GMT) "Ferns of the Siskiyou Mountains and N California" by Richie Steffen HFF

April 17, 2021 10:00am (PST), 6:00pm (GMT) "Athyrium Cultivars" by Julian Reed

The Making of the Alice Smith Fern Allée at Bartlett Arboretum & Gardens

Barbara Thanhauser
Coordinator of "Woodland Treasures"

Located in Stamford, Connecticut, the Alice Smith Fern Allée is an ongoing project of the UConn Extension Master Gardener Woodland Treasures Outreach Group. Situated on the grounds of Bartlett Arboretum and Gardens, its goal is to include and label any fern (or fern ally) that can tolerate Zone 6 conditions. The garden is eight years old and has doubled in size over the years.

Photo Courtesy of Andrea Swenson

GARDEN GENESIS.In 2012, Alice Smith and Phyllis Atkinson (Master Gardeners, Bartlett volunteers and great friends) were trekking through the Bartlett's ninety-plus acres of woodland, placing fern identification signs in some hard-to-reach places. Realizing that few people would benefit from this endeavor, they opted to dig up these isolated specimens and bring them back to an easily accessible shady location. In so doing, they created a teaching garden. An existing centrally located allée of *Juniperus virginiana* (Red cedar) seemed ideal. The Bartlett agreed and planting started in the summer of 2013.

For the first three years, sourcing ferns for the garden relied on the small team of Master Gardener volunteers finding specimens either at Bartlett or at their own homes (or homes of friends). They also purchased some plants with their own funds. By the end of 2014, the garden looked "respectable" with at least 40 different varieties. Then, in the spring of 2015, the privately-owned Rocky Hills Garden in Mt. Kisco, N.Y. made a generous contribution of ferns and companion plants, significantly increasing the number of varieties in the collection. Perhaps more importantly, it provided a link to Dr. John Mickel, curator emeritus of ferns for NYBG, who had also curated at Rocky Hills. Unable to identify some of the new additions, the team contacted Dr. Mickel for help. He soon spent a day at Bartlett identify ferns, explaining fern culture, and instilling in all a better appreciation of the plant class. Dr. Mickel and his wife Carol also invited our team to their home to see his private collection. One trip led

Photo Courtesy of Don Dempsey

to several, with the Woodland Treasures group always gaining more knowledge and sometimes digging up ferns and companion plants the Mickels generously donated. This year, the Mickels introduced us to Dr. Robbin Moran who has lectured us on ferns and has supplied us with answers to our never-ending questions.

NAMING. The allée wasn't always the "Alice Smith Fern Allée." That came about in October 2017, when the Bartlett Board of Directors renamed it in recognition of all Alice had done, not just to create the fern garden, but also for decades of volunteer

work for both the Arboretum and the Master Gardener Program. Master Gardeners and friends took the opportunity to fundraise for more ferns as a special tribute to Alice. (Sadly, Alice Smith passed away in the fall of 2019, leaving a history of thousands of hours of volunteering and a lasting legacy in this fern allee.)

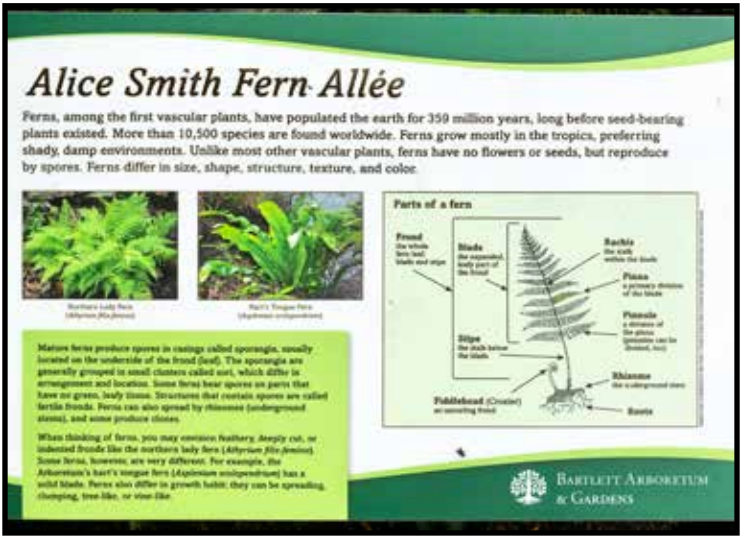

Image Courtesy of Don Dempsey

CHALLENGES. The choice of the juniper allée as the setting had two major drawbacks: it was very dry and it bordered a path often use by dog walkers.

Connecticut experienced drought conditions during the summers of 2015 – 2017, and the thirsty red cedars exacerbated the problem. Before purchasing more ferns, it was decided to install drip irrigation. Once more, funders were friends and members of Woodland Treasures.

To protect the gardens from dogs, a border of narrow-leaved hosta was planted along the pathway's edge. This has been an effective way of making sure that the dogs don't stray from the path and hosta seems to be impervious to urine.

INNOVATIONS. With the aim of finding as many ferns that would survive Zone 6 conditions as possible, the group did not want to be limited by light, moisture, or pH requirements. The garden does have some sections sunnier than others, so placing ferns that require more light isn't a problem. Ferns requiring more alkaline soil are placed in discrete areas where the pH can be monitored, with lime added if necessary. Ferns usually found on rocky cliffs are planted in an existing stone wall.

The problem was finding a place for ferns that prefer "wet feet". Having an actual water feature was discarded as a solution for two reasons. First, standing water without an aerator was an invitation for mosquitos. With no electricity near the shady allée, there was no way to power a pump. Second, a pond would be an attractive

nuisance for children. The solution – a "dry pond". A "pond-like" depression, 10 inches deep by three feet wide by six feet long, was dug, lined, and then filled with a mixture of soil, peat moss, and compost, correcting for pH. Irrigation lines were placed over the "pond". The pond liner keeps the soil soggy; plants normally found in or near true ponds thrive there.

MAINTENANCE. Regular maintenance is mostly weeding and mulching, although mapping the garden seems to be an unending task. "Volunteers" appear unexpectedly, a few varieties revert to species, some die off. And, of course, new ferns are always being added. Since this is an educational garden, it's especially important to keep the signs where they belong.

PHOTO COURTESY OF DON DEMPSEY

During the autumn, fallen leaves are carefully removed and run over with a mulching lawnmower with a bag attachment to create mulch, which is bagged for future use. Any dead foliage is cut back. Very thin wooden skewers are placed next to each fern to facilitate locating the ferns in the coming spring. When the ground freezes hard, the garden is mulched to mitigate freeze and thaw cycles. Last, for further protection, conifer branches are placed over the ferns that are borderline-hardy in Zone 6.

FUTURE PLANS. Plans for 2021 include further extending the garden and acquiring approximately 30 new varieties of ferns. The new extension will have a section devoted to ferns preferring drier conditions than the present garden offers.

As a teaching garden and as part of the UConn Master Gardener's program we have been developing educational outreach activities. We have been photographing and chronicling our ferns for a web-site we hope to soon establish. Hopefully, COVID will disappear and guided tours can resume.

LEGACY. The Alice Smith Fern Allée is a testament to what can be created when a group of Master Gardeners teams up with a public institution. It is also a fitting tribute to both Alice Smith and Phyllis Atkinson, two gardening friends who dreamed up a wonderful idea. ❧

Cutting Back Ferns – The Art of Fern Maintenance

Richie Steffen
Poulsbo, Washington

When I am speaking about ferns, I am often asked about cutting back ferns. All too frequently, and with little thought, I give the quick and easy answer to cut them back in late winter or early spring, except for the ones that don't like that. This generally leads to the much more difficult question, "Which ones are those?" This exposes the difficulties of trying to apply one cultural practice to a complicated group of plants that link together a possible 12,000 species. There is no one size fits all rule of thumb.

First of all, cutting back your ferns is purely for aesthetics. Ferns have managed for millions of years without being cut back by someone. This means that for ferns you may not be familiar with, it is fine to not cut them back and wait to see how they react to your growing conditions and climate.

There are three factors to consider when cutting back ferns:

Is your fern evergreen, semi-evergreen, winter-green or deciduous?

Deciduous ferns are relatively easy to decide whether to cut back – when they start to yellow and brown in the autumn, cut them to the ground. Some deciduous ferns have very thin fronds and finely divided foliage that may not even need to be cut back in the winter. A light layer of mulch may be enough to cover the old, withered fronds, and they can decay in place.

Semi-evergreen types are also relatively easy to manage. Often, semi-evergreen species will enter winter looking fine, but by mid-winter the fronds collapse or begin to deteriorate. Semi-evergreen species can all be cut back in mid-winter once the fronds begin to decline. Fronds should be removed close to the base to give a clean and neat appearance to the remaining crown.

There are only a small number of ferns that are winter-green. Winter-green ferns are deciduous ferns that are dormant during the summer and produce foliage in fall and

winter. Most of winter-green ferns are *Polypodium* species. When the fronds begin the yellow and brown in late spring early summer they can be removed. Be careful not to accidently cut these ferns back in late winter with the evergreen ferns.

Evergreen species are more complicated. While most evergreen ferns can be cut to the ground in late winter or early spring before the new fronds start to emerge, there are many exceptions to this rule. The remaining two factors for considering when to cut back ferns will help you decide when to cut back evergreen ferns.

Vigor of the species or cultivar.

Evergreen fronds allow for photosynthesis to happen year-round. When evergreen fronds are removed, it eliminates the ability of the fern to produce carbohydrates and forces the fern to live off stored energy reserves. If we cut back fronds in late winter or early spring, the fern only needs to use these energy reserves for a short period of time before new fronds emerge, allowing for photosynthesis to begin again. The more robust growing an evergreen fern is, the more likely it can successfully tolerate having its fronds removed without loss of vigor. Slow-growing and dwarf species and cultivars generally do not recover well from being cut back and it is best to either carefully trim the old fronds off once new fronds emerge or remove old fronds only when they are fading and brown.

Region and climate in which you garden.

Fern performance can vary depending on where they are grown. Few of our hardy ferns grow the same across all temperate regions. Ferns that love the heat and humidity may grow much slower in cool-summer climates and the reverse maybe likewise. If your evergreen fern seems to be a slow grower, it is best to wait for the new fronds to emerge and, if the fern is particularly slow growing, mature before removing the old fronds.

Guidelines for Cutting Back Ferns

The following is a list of some of the cultivated ferns in North America. These cultural care suggestions will be biased slightly toward the modified Mediterranean climate of the maritime Pacific Northwest; but, if the three factors above are taken into consideration, this list is useful for anyone growing hardy ferns. This list will also be published on the Hardy Fern Foundation's website where additions will be made as more information is gathered.

Adiantum 'Golden Michael'	cut back in autumn
Adiantum aleuticum	cut back in autumn
Adiantum × *mairisii*	cut back in autumn
Adiantum monochlamys	wait until new growth emerges then cut old faded fronds
Adiantum pedatum	cut back in autumn
Adiantum × *tracyi*	cut back in early winter, groom in spring

Adiantum venustum	cut back in early winter
Anisocampion cuspidatum	wait until new growth emerges then cut old faded fronds
Arachniodes aristata	wait until new growth emerges then cut old faded fronds
Arachniodes davalliaeformis	wait until new growth emerges then cut old faded fronds
Arachniodes simplicior 'Variegata'	wait until new growth emerges then cut old faded fronds
Arachniodes standishii	cut back in autumn
Asplenium adiantum-nigrum	wait until new growth emerges then cut old faded fronds
Asplenium ebenoides	remove faded fronds as necessary in spring or summer
Asplenium pinnatifidum	remove faded fronds as necessary in spring or summer
Asplenium platyneuron	cut back in late winter to early spring, before new growth
Asplenium resiliens	cut back in late winter to early spring, before new growth
Asplenium rhizophyllum	remove faded fronds as necessary in spring or summer
Asplenium scolopendrium	cut back in late winter to early spring, before new growth
Asplenium trichomanes	cut back in late winter to early spring, before new growth
Asplenium ceterach (*Ceterach officinarum*)	remove faded fronds in spring
Astrolepis sinuata (*Cheilanthes sinuata*)	remove faded fronds as necessary in spring
Athyrium 'Branford Beauty'	cut back in autumn
Athyrium 'Ghost'	cut back in autumn
Athyrium 'Godzilla'	cut back in autumn
Athyrium 'Ocean's Fury'	cut back in autumn
Athyrium filix-femina	cut back in autumn
Athyrium niponicum	cut back in autumn
Athyrium otophorum	cut back in autumn to early winter
Athyrium vidalii	cut back in autumn
Blechnum appendiculatum	cut back in late winter before new growth
Blechnum australe	cut back in late winter to early spring, before new growth
Blechnum hastata	cut back in late winter to early spring, before new growth
Blechnum niponicum	cut back in late winter to early spring, before new growth
Blechnum penna-marina (*Austroblechnum penna-marina*)	cut back in late winter to early spring, before new growth
Blechnum discolor (*Lomaria discolor*)	remove faded fronds as necessary in spring
Blechnum nudum (*Lomaria nudum*)	cut back in late winter to early spring, before new growth
Blechnum nova-zelandiae (*Parablechnum nova-zelandiae*)	cut back in late winter to early spring, before new growth
Blechnum wattsii hort.	cut back in late winter to early spring, before new growth

(*Parablechnum montanum*)	
Blechnum spicant	cut back in late winter to early spring, before new growth
(*Struthiopteris spicant*)	
Blechnum chilense	remove faded fronds as necessary in spring
(*Parablechnum cordatum*)	
Bommeria hispida	remove faded fronds as necessary in spring
Cheilanthes argentea	remove faded fronds as necessary in spring
Cheilanthes eckloniana	remove faded fronds as necessary in spring
Coniogramme emeiensis 'Golden Zebra'	wait until new growth emerges then cut old faded fronds
Coniogramme intermedia	wait until new growth emerges then cut old faded fronds
Coniogramme japonica	wait until new growth emerges then cut old faded fronds
Cryptogramma acrostichoides	cut back in late winter to early spring, before new growth
Cyathea australis	remove faded fronds as necessary in spring
Cyrtomium caryotideum	cut back in late winter to early spring, before new growth
Cyrtomium falcatum	cut back in late winter to early spring, before new growth
Cyrtomium fortunei	cut back in late winter to early spring, before new growth
Cyrtomium lonchitoides	cut back in late winter to early spring, before new growth
Cyrtomium macrophyllum	cut back in late winter to early spring, before new growth
Cystopteris bulbifera	cut back in autumn
Cystopteris fragilis	cut back in autumn
Davallia mariesii 'Korea Rocks'	cut back in autumn
Dennstaedtia punctilobula	cut back in autumn
Deparia acrostichoides	cut back in autumn
Deparia japonica	cut back in autumn
Deparia lobatocrenata	wait until new growth emerges then cut old faded fronds
Deparia subsinuata	wait until new growth emerges then cut old faded fronds
Dicksonia antarctica	remove faded fronds as necessary in spring
Doodia media	wait until new growth emerges then cut old faded fronds
(*Blechnum medium*)	
Dryopteris affinis	cut back in late winter
Dryopteris affinis 'Crispa Gracilis'	cut back in late winter
Dryopteris x *australis*	cut back in autumn to mid-winter when fronds collapse
Dryopteris bissetiana	remove faded fronds as necessary in spring
Dryopteris blanfordii	cut back in autumn
Dryopteris cambrensis	cut back in late winter
Dryopteris campyloptera	cut back in autumn
Dryopteris carthusiana	cut back in autumn
Dryopteris celsa	cut back in autumn
Dryopteris championii	cut back in late winter

Dryopteris complexa	*cut back in late winter*
Dryopteris crassirhizoma	cut back in autumn
Dryopteris crispifolia	cut back in late winter
Dryopteris cristata	cut back in autumn
Dryopteris cycadina	cut back in late winter
Dryopteris cystolepidota	cut back in late winter
Dryopteris dickinsii	cut back in late winter
Dryopteris dilatata	cut back in late winter
Dryopteris erythrosora	wait until new growth emerges then cut old faded fronds
Dryopteris expansa	cut back in late winter
Dryopteris filix-mas	cut back in autumn
Dryopteris formosana	cut back in late winter
Dryopteris goldiana	cut back in autumn
Dryopteris hondoensis	remove faded fronds as necessary in spring
Dryopteris intermedia	cut back in late winter
Dryopteris koidzumiana	remove faded fronds as necessary in spring
Dryopteris labordei	remove faded fronds as necessary in spring
Dryopteris lepidopoda	cut back in late winter
Dryopteris ludoviciana	cut back in mid to late winter when fronds collapse
Dryopteris marginalis	cut back in late winter
Dryopteris namegatae	cut back in late winter
Dryopteris pulcherrima	cut back in late winter
Dryopteris purpurella	remove faded fronds as necessary in spring
Dryopteris pycnopteroides	cut back in late winter
Dryopteris remota	cut back in late winter
Dryopteris scottii	cut back in late winter
Dryopteris sieboldii	wait until new growth emerges then cut old faded fronds
Dryopteris stewartii	cut back in late winter
Dryopteris sublacera	cut back in late winter
Dryopteris tokyoensis	cut back in autumn
Dryopteris uniformis	cut back in late winter
Dryopteris wallichiana	cut back in late winter
Dryopteris yigongensis hort.	cut back in late winter
Gymnocarpium disjunctum	cut back in late summer to early autumn
Gymnocarpium dryopteris	cut back in late summer to early autumn
Homalosorus pycnocarpos (*Diplazium pycnocarpon*)	cut back in autumn
Lemmaphyllum microphyllum	remove faded fronds as necessary in spring
Lepisorus bicolor	remove faded fronds as necessary in spring

Lygodium japonica	cut back in late winter
Macrothelypteris torresiana	cut back in autumn
Matteuccia orientalis (*Pentarhizidium orientale*)	cut back in autumn
Matteuccia struthiopteris	cut back in autumn
Microlepia strigosa	cut back in late winter to early spring, before new growth
Myriopteris lanosa (*Cheilanthes lanosa*)	remove faded fronds as necessary in spring
Myriopteris lindheimeri (*Cheilanthes lindheimeri*)	remove faded fronds as necessary in spring
Myriopteris tomentosa (*Cheilanthes tomentosa*)	remove faded fronds as necessary in spring
Myriopteris wootonii (*Cheilanthes wootonii*)	remove faded fronds as necessary in spring
Myriopteris wrightii (*Cheilanthes wrightii*)	remove faded fronds as necessary in spring
Myriopteris rufa (*Cheilanthes eatonii*)	remove faded fronds as necessary in spring
Onoclea sensibilis	cut back in autumn
Onychium japonicum	cut back in autumn
Osmunda claytoniana	cut back in autumn
Osmunda japonica	cut back in autumn
Osmunda lancea	cut back in autumn
Osmunda regalis	cut back in autumn
Osmundastrum cinnamomeum	cut back in autumn
Pellaea atropurpurea	remove faded fronds as necessary in spring or summer
Pellaea glabella	remove faded fronds as necessary in spring or summer
Pellaea ovata	remove faded fronds as necessary in spring
Pellaea viridis	remove faded fronds as necessary in spring
Phegopteris connectilis	cut back in autumn
Phegopteris hexagonoptera	cut back in autumn
Pleopeltis lepidopteris	remove faded fronds as necessary in spring
Pleopeltis guttatum (*Polypodium guttatum*)	remove faded fronds as necessary in spring
Polypodium appalachianum	cut back in late winter to early spring, before new growth
Polypodium × *calirhiza*	cut back in late spring to early summer as fronds fade
Polypodium cambricum (*Polypodium australe*)	cut back in late spring to early summer as fronds fade
Polypodium glycyrrhiza	cut back in late spring to early summer as fronds fade

Polypodium interjectum	cut back in late winter to early spring, before new growth
Polypodium × *mantoniae* 'Cornubiense'	cut back in mid to late spring as new growth begins
Polypodium scouleri	remove faded fronds as necessary in spring
Polypodium virginianum	cut back in late winter to early spring, before new growth
Polypodium vulgare	cut back in late winter to early spring, before new growth
Polystichum acrostichoides	cut back in late winter to early spring, before new growth
Polystichum aculeatum	cut back in late winter to early spring, before new growth
Polystichum alticola	cut back in late winter to early spring, before new growth
Polystichum andersonii	cut back in late winter to early spring, before new growth
Polystichum andersonii × *munitum*	cut back in late winter to early spring, before new growth
Polystichum braunii	cut back in late winter to early spring, before new growth
Polystichum × *dycei*	cut back in late winter to early spring, before new growth
Polystichum × *illyricum*	cut back in late winter to early spring, before new growth
Polystichum makinoi	cut back in late winter to early spring, before new growth
Polystichum mayebarae	cut back in late winter to early spring, before new growth
Polystichum monticola	cut back in late winter to early spring, before new growth
Polystichum munitum	cut back in late winter to early spring, before new growth
Polystichum neolobatum	cut back in late winter to early spring, before new growth
Polystichum polyblepharum	cut back in late winter to early spring, before new growth
Polystichum rigens	cut back in late winter to early spring, before new growth
Polystichum setiferum	cut back in late winter to early spring, before new growth
Polystichum tripteron	cut back in autumn
Polystichum tsus-simense	cut back in late winter to early spring, before new growth
Polystichum wilsonii	cut back in late winter to early spring, before new growth
Polystichum xiphophyllum	cut back in late winter to early spring, before new growth
Pteris cretica	remove faded fronds as necessary in spring
Pteris multifida	remove faded fronds as necessary in spring
Pteris wallichiana	cut back in autumn
Pyrrosia davidii	remove faded fronds as necessary in spring or summer
Pyrrosia hastata	remove faded fronds as necessary in spring or summer
Pyrrosia lingua	remove faded fronds as necessary in spring or summer
Pyrrosia polydactyla	remove faded fronds as necessary in spring or summer
Pyrrosia sheareri	remove faded fronds as necessary in spring or summer
Thelypteris noveboracensis	cut back in autumn
Thelypteris palustris	cut back in autumn
Thelypteris simulata	cut back in autumn
Woodsia obtusa	cut back in autumn
Woodsia polystichoides	cut back in autumn
Woodsia subcordata	cut back in autumn

Woodwardia areolata	cut back in autumn
Woodwardia fimbriata	remove faded fronds as necessary in spring or summer
Woodwardia orientalis	remove faded fronds as necessary in spring or summer
Woodwardia radicans	remove faded fronds as necessary in spring or summer
Woodwardia unigemmata	remove faded fronds as necessary in spring or summer
Woodwardia virginica	cut back in autumn

A BIG THANK YOU!

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Adiantum monochlamys

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James R. Horrocks
Salt Lake City, Utah

Originally considered a variety of *A. venustum*, this rather dainty little fern is now known to be a distinct species. The species epithet means "one cloak" or "covering" referring to the single false indusium that protects the usually solitary sorus found midway in the upper pinnule margin. This species, true to the name adiantum, sheds water, the leaflets being "unwettable".... most of the time.

A. monochlamys is native to China, Korea, Japan, and Taiwan where it grows in mountainous areas on stony slopes and in dryish woodlands, often along earthen banks where the fronds can drape downward, giving it a very neat appearance. It is often confused with *A. venustum* but placing the fronds side by side, the differences are quite obvious. The frond outline of *A. monochlamys* is narrowly triangular whereas *A. venustum* has more broadly triangular fronds. The latter also creeps about producing substantial colonies over time while *A. monochlamys* is more compact. In fertile specimens, *A. monochlamys* displays the aforementioned solitary sori on each segment while *A. venustum* displays two. By comparison, the ubiquitous *A. capillus-veneris*, which *A. monochlamys* is sometimes mistaken for, displays two to four sori per pinnule as does the much rarer *A. capillus-junonis*. *A. monochlamys* is considered rather difficult to cultivate while *A. venustum*, once established, is quite easily grown, as is also *A. capillus-veneris*. The latter two seem to thrive in soils on the alkaline side. According to David L. Jones, *A. monochlamys* prefers soils a tad more acidic.

Description: The rhizomes are short-creeping and clump-forming, with purplish-brown to dark brown scales that are broadly linear. The stipes are smooth and lustrous, being dark brown to purple-brown in color, and about one-third the length of the frond. The glabrous, somewhat evergreen fronds are narrowly triangular-ovate, four to twelve inches or occasionally even up to sixteen inches long in the wild, but much shorter in cultivation.

The fronds are tripinnate to even four times divided, with four to six pinnae on each side. The pinnules are best described as cone-shaped or obtriangular to be technical, and subcoriaceous, meaning somewhat leathery. They have a short dark brown stalk or petiole and are slightly lustrous on the upper side but often somewhat glabrous beneath. The slender free veins fan out from a dark basal point on the pinnule and run to the tips of the small marginal teeth. The upper margins of fertile pinnules are deeply notched in the middle, usually with a single sorus covered by a reniform false indusium.

Culture: Not so nearly as hardy as other "hardy" maidenhairs, *A. monochlamys* is confidently hardy in zones 8 through 10. In zone 6, it would have to be well protected.

Its difficulty of cultivation may be due in part to soil requirements, possibly being more at home in acid soils than alkaline. Found in rocky woods in the wild, it may appreciate the companionship of metamorphic or igneous rocks in the garden. It is particularly attractive where its fronds can hang over an edge. The new spring growth may be somewhat pinkish to salmon-colored, turning a medium green as the season progresses. Although considered common in its native haunts, this little fern is a unique and rare addition to any garden once established.

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Drynaria sinica

Ben van Wierst (b.vanwierst@gmail.com)
Photos by Ben van Wierst and Remko Beuving

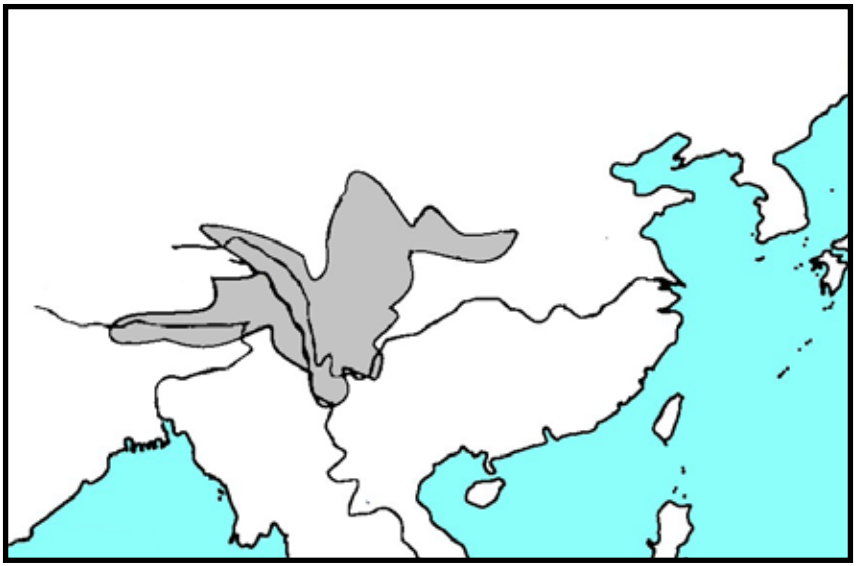
The Netherlands

Two years ago (2018) I bought a specimen of *Drynaria sinica* (oak leaf fern?). I was assured that, within the mainly tropical genus Drynaria, this species must be a hardy. There was quite a bit of doubt in my mind, to just put the plant in the ground. However, my mistrust turned out to be unjustified; the plant easily survived the first (mild) winters here. Once planted in open ground, the plant started to grow.

The genera Drynaria and Aglaomorpha are closely related and are known in Dutch as basket ferns. The exact status of Drynaria in relation to Aglaomorpha is not yet entirely clear. There is also a cross between two species of both genera. *Drynaria sinica* is synonymous with *Aglaomorpha baroni*. Reputable authorities still make contradictory statements about the status of these genera.

The oldest fossils of Drynaria have been found in China and come from the Pliocene (2.55 - 5.3 million years ago). These fossils turned out to be closely related to the modern *D. sinica* during DNA research. Drynaria are found in

Africa, Asia and Northeast Australia and the genus includes about 15 species. Most species come from Asia, with nine species in China.



OCCURRENCE IN CHINA

DRYNARIA IN SUMMER

A characteristic of many Drynaria species is the fact that there are often two different types of leaves. These are the fertile leaves on which spores can form and are green. The second type are sterile leaves, brown in color, due to the lack of leaf green, whose task is to collect humus and thus a source of

DRYNARIA SPROUTING IN SPRING

nutrients and moisture. This is an adaptation of these plants to life in places that can dry out, such as in trees and on rocks. The two types of leaves of Drynaria often form a decorative whole. For this reason, the plants are often kept as house plants. A well-known Drynaria is *D. quarcifolia*. This species shows the two types of leaves well. There are also Drynaria species that combine the functions of collecting humus and a fertile green part in one kind of leaf. In that case the lower part of the leaf collects the humus and the upper part is green and fertile. A small number of species, including *D. sinica*, very rarely form humus collecting leaves.

D. sinica comes from central China. The leaf grows to a length of 20 to 30 cm. Not much can be found on the internet about the requirements of the plant in the garden. I found recommended a humus-rich soil with good drainage as well as that the plant should be tied up to a substrate such as wood or stone and an epiphyte substrate must be given as soil type.

My plant grows in partial shade in improved sandy soil. Here the plant is doing very well. The plant that fitted perfectly in its pot end of 2018 has now taken up at least four times this surface. In winter, the plant loses its leaves. In the spring, the new leaves emerge beautifully reddish-brown. So in my garden the plant grows in the open ground. But the second method was also tried by Remko Beuving. In his garden the plant attaches itself to tuff stone and is also good growing.
Neither in Remko's, nor in my garden the second type leaf that collects humus has been formed in any way. That may still come. Searching on the internet you will find some pictures of this species that form the second type of leaf.

If this plant continues to grow fast like this, it will soon be offered regularly at swap fairs.

Literature:

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DRYNARIA IN THE GARDEN OF REMKO BEUVING GROWING ON TUFF.