

Marvelous Milfoils and the Miracle of Barley Straw

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Water milfoils of the genus *Myriophyllum* are familiar to most aquarium hobbyists. They are commonly encountered in pet shops as bunches of cuttings bound by a lead strip or rubber band, and sold under the colloquial name of foxtail. Most milfoils have finely divided leaves on elongated stems that are rooted in the bottoms of ponds and lakes and reach toward the surface. Most species produce tiny white or bluish flowers, and spikes of out-of-water foliage. Milfoils also often form out-of-water mats, particularly when stranded on mud flats in times of drought, or when washed ashore as fragments of stems. In deep-water habitats milfoils can attain lengths of several feet; under ideal conditions they can form dense beds.

Some of our native milfoils have a dubious reputation for frustrating anglers and fouling the propellers of boats, so a whole industry is devoted to “aquatic weed control.” I find that mildly amusing. In moderation, aquatic plant cover is beneficial to fishes and other aquatic life, providing refuge for forage fishes and a spawning medium for species that broadcast their eggs on vegetation. The finely divided leaves of most milfoils are ideal for receiving the eggs of many minnows and killifishes. They also provide harborage for the fry of these fishes and many livebearers as well. Ironically, the misguided impulse to rid waters of their naturally occurring plant cover may be a contributing factor to the disappearance of many nongame fishes that were quite common just decades ago.

Eight Marvelous Milfoils

There are a number of native species of water milfoil that are splendid for use in aquaria or ponds.

Whorled milfoil One of the most commonly encountered species is the whorled milfoil (*Myriophyllum verticillatum*). It

inhabits clear lakes and wetlands in a circumpolar distribution across the northern hemisphere in Europe and Canada, over the northern U.S. south to New Jersey, and a disjunct range in northern Texas. Dense whorls of fine, light green foliage and thin stems with a slight reddish cast distinguish the species. It is commonly sold as red-stemmed foxtail in the pet trade, along with the similar but smaller southern milfoil (*M. laxum*). Whorled milfoil makes an excellent plant for outdoor ponds since it is winter-hardy in cool climates and will fare well in cool-water aquaria with good lighting. However, because it is generally a northern plant it may not hold up well under tropical conditions.

Variable milfoil *M. heterophyllum*, the green-stemmed foxtail of the trade, is distinguished by its thicker stems, shorter foliage, and prominent out-of-water spikes with oval or linear leaves. This plant ranges across the northern states and south along the East Coast to Florida and the Gulf. In the sandhill regions of the Carolinas it reportedly does well in clear, acidic lakes with sand bottoms. Variable milfoil adapts well to many conditions and does well in the pond or aquarium.

Southern milfoil *M. laxum* is locally abundant in freshwater habitats of the Carolinas and Gulf States. It’s a smaller version of the whorled milfoil and may represent some of what is offered as red foxtail in the trade. In the wild it can be distinguished by its smaller spike, which is nearly leafless.

Low milfoil *M. humile* has thin stems and a fine, loosely packed foliage. It has small out-of-water spikes with tiny flowers and slightly divided or undivided leaves. It also bears flowers underwater along the stem at the base of the leaves. As with most milfoils, pieces often root and grow terrestrially on damp shores. The plant itself is often found in seasonally dry ponds and marshes where it survives in a terrestrial form until the return of wetter weather.

Eastern milfoil *M. pinnatum* is similar to low milfoil but has sparser foliage and more prominent out-of-water spikes. Several dealers offer the variable milfoil (*M. heterophyllum*) under this name but I have not seen it yet in the trade. It ranges widely over much of the eastern U.S.

There are a few more native species of milfoils that might do well in outdoor ponds or aquaria but I am not familiar with them. A good reference to have is *Common Marsh, Underwater and Floating-Leaved Plants of the United States and Canada* by Neil Hotchkiss, a wildlife biologist at the Patuxent Wildlife Research Center in Maryland. This resource features excellent line drawings that can help you identify many species of aquatic plants.

Eurasian milfoil North America has a few naturalized species of milfoils that have become aquatic nuisance species in some waters. The worst of these invaders, the Eurasian milfoil (*M. spicatum*), has caused heavy infestations in the lower Potomac River system of Maryland and Virginia, as well as in many manmade impoundments throughout the country. It spreads primarily by “hitch-hiking” on waterfowl and boat propellers. Even tiny fragments can regenerate into major infestations when introduced into another body of water. Fishermen and “recreational collectors” should clean their gear and boats between lakes. Aquarists and pondkeepers should grow this one with discretion. In some states transport and cultivation of Eurasian milfoil may be illegal.

Eurasian milfoil has less dense foliage than most native species. The leaves are coarser and have a feathery appearance.

Andean milfoil *M. elatinooides* (a.k.a. frill of the aquarium trade) from South America is established in the Deschutes River in Oregon and probably elsewhere in the U.S. Aquarium hobbyists were no doubt responsible for the introduction of this species as well as the introduction of another South American species, the parrot’s feather.

Parrot’s feather *M. brasiliense* does surprisingly well outdoors and can survive cold winters. It is unusual among milfoils in that it has succulent foliage that grows out of the water. It makes an excellent addition to the shallow water zone of an ornamental pond and can also be grown in a paludarium (a marsh terrarium setup). However, parrot’s feather should not be introduced or allowed to escape into public waters!

Collecting and Cultivating Milfoils

For those of you who are interested in growing milfoils and other native aquatic plants in your ponds and aquaria, it is very easy to get started. First, obtain your plants from either

a local pet shop or a mail order specialist. There are many good suppliers that operate on the Internet who can offer better deals than some local suppliers. You can also obtain cuttings from a fellow hobbyist. If milfoils are native to your area, you can collect the plants from the wild. Simply walk along the shores of ponds or lakes and pick up stranded bits that wash ashore. Get familiar with local laws and regulations and be sure to ask permission before going onto private lands. And get familiar with the exotic Eurasian milfoil so you can learn to avoid it.

Cultivation of milfoils is simple. Stock from the aquarium trade comes in bunches of cuttings that should be separated and planted in the substrate of the tank. Some growers place a layer of soil or kitty litter under the gravel or sand, but I have had good results growing the plants in gravel alone. Fish waste is sufficient to fertilize the plants. Frequent water changes supply the plants with essential trace elements.

Outdoors, milfoils are usually grown in pots of soil topped with gravel and set into the deepwater areas of a liner pond. Any pondkeeper looking to achieve a naturalistic setup should not succumb to the temptation to spread soil on the bottom of the pond. In the long run you will end up with a sloppy mess when it comes time to clean out the pond. Milfoils and other aquatic plants are better managed in containers that can be removed from the pond for thinning and repotting. The soil should be heavy clay loam and changed every few years.

Milfoils are not bothered by plant-browsing fishes since their foliage is tough and unpalatable to most species. Even turtles usually leave milfoils alone. But two things that really give milfoils trouble are sedimentation and algae. Milfoils do not grow well if silt settles on the leaves or if algae chokes them. Filamentous algae in particular smothers them. Unlike slicker-leaved plants such as cabomba and vallisneria, which shed algal growth, milfoils accumulate algae. If they cannot outgrow the algae, milfoils will eventually die or, at the very least, not thrive.

Pondkeepers and aquarists should be as careful with the cultivation of aquatic plants as they are about keeping fishes. To help prevent the spread of nonindigenous plants into local waterbodies, surplus trimmings of pond or aquarium plants should either be traded to other hobbyists or destroyed. Plants can be destroyed by first drying them out in the sun, and then placing them in the compost heap or throwing them out with the trash. I prefer composting since it removes excess nutrients from the pond and recycles them into the land-based ecosystem of a vegetable or ornamental garden.

The Miracle of Barley Straw

Algae problems made it difficult for me to grow milfoils in my pond. Only the variable milfoil grew well as it seemed more resistant. Because I wanted to establish other species, I tried a number of remedies and finally settled on barley straw. This turned out to be quite the cure for my algae woes.

The practice of treating ponds with barley straw is recently imported from Great Britain where the art of pondkeeping was first refined by modern western culture. The practice actually dates back to the Middle Ages when straw was first used to control algae in ponds.

Unlike conventional algicides which can harm some species of fish and other pond life, this natural product is actually beneficial to most organisms other than the algae.

One mini-bale will treat about a 1000 gallons of water for six months. It can be purchased at a garden center dealing in pond supplies, and will set you back about \$10 or so. I started off with four such bales in May and began replacing them one by one over the ensuing months. Since the mini-bales are a bit pricey, I hunted around and managed to get several big ones from Agway at about \$3 each! That's a pretty decent stockpile—enough straw to treat my pond for a couple of seasons with some left over for mulch and bedding for turtle pens.


Barley straw also makes a good culture medium for live foods. Add a handful to a bucket of rainwater and you have an instant mosquito farm that will provide your fish with an endless supply of wrigglers. (Be sure to locate this concoction on a remote part of the property and try to use the wrigglers before they turn into more mosquitoes!) When used in the pond, the mass of straw also serves as a refugium for isopods and scuds—two additional sources of live food.

No one fully understands the secret to barley straw. Some researchers think that barley straw generates a weak peroxide that inhibits the growth of algae. It also adds tannins to the water, turning the water to a weak tea color. In my pond, which is filled mostly from rain and runoff, the water is very soft. Prior to the use of barley straw the pH fluctuated wildly from the mid-6.0s to as high as 7.4! This was no doubt driven by the photosynthetic activities of plants. In poorly buffered waters this activity will drive up the pH during daylight hours. Since tannic acids will buffer soft water, I initially tried peat and pine needles. This stabilized the pH around 6.4 and gave the water a tea-like tinge. But it did not control algae.

Barley straw, on the other hand, seems to achieve the desired stability and inhibits algae. The last time I tested the pH it was around 6.0 and the water was slightly tinted. (I am

led to wonder if a similar process might be at work in natural wetlands, maybe from the litter of cattails or other marsh plants.) It takes a month or so for the straw to become fully active and start working on the algae. It does not kill off the algae but slows it down enough for the plants to regain the upper hand. According to the literature the treatment is effective in both hard and soft waters.

The old growth of the milfoils was still fairly well covered and only after I began to prune them did they start to take off. They started producing new growth that was clean and able to outrun the algae. The plants began to regain vigor and turn the vicious cycle in the opposite direction. A combination of barley straw treatment and frequent pruning away of older stems may be the secret to successful cultivation of these plants in outdoor ponds.

I have several plants doing well under the barley straw treatment: *M. heterophyllum*, *M. verticillatum*, and possibly *M. laxum* or a smaller variant of *verticillatum* (I'll have to get them to bloom for a more positive identification). I am hoping to obtain *M. humile* and maybe some of the other species that I believe are worth trying. These are all great plants that enhance the beauty of my pond and the security of my fish. I know that my fish certainly appreciate the opportunities for cover and spawning that these plants afford! 

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