

## Easy Aquarium Plants

### Getting started with easy aquarium plants.

By Karen Randall

There is a growing interest in growing live plants in aquariums — pardon my pun. That's the easy part. The more difficult aspect is knowing what plants are suitable and how to care for them. Although not animated like fish, plants can prove as difficult as fish, perhaps more so, to maintain.

To help you get started and succeed in this endeavor, I will be doing occasional articles on various groups of plants. My goal is to explain the natural history and biology of these plants and, in turn, how to provide the correct conditions for them to thrive in. Once you know what to do, growing live plants can become as important as raising fish.

Within the group of plants known as Cryptogams can be found some of our most accommodating and beautiful aquarium plants. Cryptogams are primitive non-flowering plants incapable of forming seeds. Instead, sexual propagation is by way of the production of microscopic spores.

Because these spores are rarely produced under aquarium conditions, the plants are, for the most part, propagated vegetatively. Cryptogams can be additionally broken down into Hepaticae (leafy liverworts), Musci (mosses) and Pteridophyta (ferns).

#### Hepaticae (Leafy Liverworts)

##### *Riccia fluitans*

Of the plants in the family Hepaticae, only one species regularly makes its way into the aquarium trade — riccia (*Riccia fluitans*). This tiny plant can be found worldwide. Also known as crystalwort, riccia is usually used as a floating plant in this country, but can also be used as a very beautiful ground cover in a well-lit shallow aquarium. Its lacy, bright-green structure is dense enough to make a superb cover for small fry, and it makes a popular nest-building material for anabantoids.

Although riccia is not very picky when it comes to water conditions, it is likely to die off quickly in water with a high nutrient load. It can also become hopelessly infested with algae in an aquarium that is experiencing algae problems. Finally, this plant can be a problem in aquariums with a heavy water flow at the surface. In such instances it tends to be constantly carried throughout the aquarium by the water currents.

#### Musci (Mosses)

##### *Vesicularia dubyana* (Java moss)

For most people, the first plant in this family that comes to mind is the ubiquitous Java moss, *Vesicularia dubyana*. Most aquarists are familiar with this undemanding plant. Java moss is native to Southeast Asia, Malaysia, Java and India. It will survive almost all water conditions suitable for tropical fish and needs only minimal amounts of light and carbon dioxide. Although its aesthetic value can be ruined by infesting algae, even this does not usually kill the plant.

Java moss is often left to float free in the aquarium water. However, for a more decorative look, it can be attached to almost any surface (I have even seen it clinging to the glass walls of the aquarium). Large pieces of driftwood are particularly beautiful with a coat of this emerald green moss. It can also be grown immersed in a damp environment, such as a terrarium.

On the more practical side, Java moss is an excellent plant to include in fry aquariums, as well as for aquariums with spawning egg-scattering fishes. Its low light requirements even make it useful in unlit killifish aquariums. This is one of the few primitive plants that will produce sporophores (tiny, club-like structures) even underwater.

##### *Fontinalis antipyretica* (willow moss)

A very similar, if slightly more demanding, plant is willow moss, *Fontinalis antipyretica*. There are more than two dozen varieties of *Fontinalis* found in subtropical and temperate areas of North America, Europe, Asia and Africa.

Because it is a cool-water plant, *Fontinalis* does not do well for extended periods at high temperatures. In addition to cool temperatures, willow moss also requires bright light, a combination hard to reproduce under aquarium conditions. Some sources suggest placing the plant in the outflow of a power filter. I have had the best luck by placing willow moss in the

flow of a waterfall in my paludarium (an aquarium with plants growing above it). In this position, it seems to be kept cooler by the evaporation and water movement of the flowing water. Although the plant browns out a bit during the summer months in this situation, it comes back strongly with the onset of cooler weather. Willow moss will also grow strongly in a container set on a cool, sunny windowsill in the winter months.

#### Pteridophyta (Ferns)

##### Microsorium pteropus (Java fern)

There is a great deal of diversity among the ferns suitable for aquarium use. Probably the most recognizable member of this group is the Java fern (*Microsorium pteropus*). You will also see this plant listed with the genus name *Microsorium*, but this has recently been discovered to be an incorrect spelling (Claus Christensen, personal communication).

*Microsorium* is found in Southeast Asia, Java and the Philippines. Its native habitat is mountain streams, where it grows attached to rocks or fallen branches and roots. It grows either at the waterline or within the area of the bank that is periodically submerged by flooding. Java fern can also be found within the spray zone of waterfalls.

*Microsorium* has three methods of propagation. First, it produces spores (these can be seen on the back sides of mature leaves, and are very similar to those on terrestrial ferns), which are spread by the wind to produce new plants. While it is possible for experts to propagate *Microsorium* from spores, this is not commonly attempted by the average aquarist. Luckily, there are two easy ways to propagate Java fern vegetatively, and both can be seen in the aquarium regularly.

*Microsorium* increases vegetatively from the base by runner, as is common with many plants, both terrestrial and aquatic. It will also produce plantlets on the tips of mature leaves. These plantlets are tiny replicas of the adult plant. When they have attained sufficient size, they can be gently removed and placed elsewhere in the aquarium.

Although it is not commonly noted in the literature available to the American hobbyist, there are several varieties of Java fern available. Each variety is useful and different enough to warrant a special place in our aquariums.

There are two varieties of Java fern commonly available in this country. The first is a small, dark-green variety. It grows to a height of not much more than 6 inches, even under optimum conditions. This is a very tough variety and can withstand almost any abuse that can be thrown at an aquarium plant. The leaves are narrow ( $\frac{1}{2}$  inch maximum) and the surface of each leaf is relatively flat, although the veining is clearly defined.

The spores on the backs of the leaves are not very noticeable on these plants because of the small size of the leaf and the dark color. While this variety does spread by runner, it seems to prefer the development of plantlets as its main form of reproduction.

Java fern will grow into a huge mass of plant upon plant if the aquarist does not occasionally groom it by removing the smaller plantlets. The plantlets are so loosely attached that it is usually possible to thin them simply by running your fingers through the mass and removing those that drift free. If the aquarist does not remove these plantlets, they will eventually drift free on their own.

The other variety of Java fern commonly available is a much larger bright-green plant with ruffled leaves. Because of the lighter color and larger leaves, the brown spores are very noticeable on the backs of mature leaves. While it is not uncommon to see trilobate (three part) leaves on any *Microsorium*, this variety seems to exhibit this characteristic frequently. You will find that many of the larger leaves on an adult plant become trilobate.

This larger variety grows to a height of up to 18 inches under optimum conditions. Obviously, because of its size, this is not a plant for the smaller planted aquarium. This attractive plant is a wonderful alternative to *Echinodorus* sp. for those who have trouble with that genus.

Another difference between this and the variety previously described is its preference for reproduction by runner. The rhizome of this variety is thick and tough. New leaves grow from this rhizome as it extends outward from the parent plant. New plants can easily be separated by cutting through the rhizome with a sharp knife or pair of scissors. Just be sure to include a few leaves and some roots with each section.

As with the smaller variety, this plant will also produce plantlets on its leaf tips, but not as freely. These plantlets are much more firmly attached than those described previously, and often remain on the parent plant until the adult leaf dies.

In addition to these, Tropica Denmark — a supplier of aquarium plants — has recently announced the introduction of two more "fancy" varieties of *Microsorium* with very distinctive leaves. While I have yet to see these plants in person, the photos

I have seen suggest that they are very beautiful plants. I'm sure that they will be wonderful additions to our planted aquariums when they become available in this country.

Java fern is not the least bit exacting in regard to its care. It prefers moderately hard water, but will grow in soft water and even brackish water if need be. It tolerates a wide temperature range as well, although growth will slow markedly at either extreme.

It is also very tolerant in terms of lighting. In bright light with supplemental CO2 it will grow bigger and faster. But it will do remarkably well in a planted aquarium with marginal lighting as well. The only thing that Java fern is particular about is where it is placed in the planted aquarium. This plant will not prosper with its roots buried in the substrate. The proper method is to attach it to a rough surfaced rock or a piece of driftwood. I find that the easiest way to attach it is to tie it in place with a piece of nylon fishing line, although cotton thread or rubber bands can be substituted. You can even trap the roots between two pieces of rock.

#### Azolla filiculoides

This free-floating surface plant may not be immediately recognized as a member of the fern family. It looks more like a large fuzzy duckweed. It is very adaptable, and reproduces freely although it prefers an open-topped aquarium, or at least one with a few inches between the water surface and the cover.

Azolla is useful as a hiding place for small fry or as shade for less light-tolerant plants in a brightly-lit planted aquarium. If left undisturbed, the plant produces new leaves that overlap like shingles forming patterns that resemble terrestrial ferns lying on the surface of the water.

Azolla lives in a symbiotic relationship with a particular species of cyanobacteria, *Anabaena azollae*. The cyanobacteria lives in the lower leaf lobes of the plant, where it fixes atmospheric nitrogen, which is then available to the plant. In return, the plant provides shelter to the cyanobacteria.

The native distribution of the plant is South and Central America. There is a similar species in Asia, *A. pinnata*, and another in North America, *A. caroliniana*. During the late 1800s it was introduced into Europe as a form of mosquito control. The cover formed by the overlapping leaves was actually dense enough to suffocate mosquito larvae by preventing them from extending their breathing tubes into the air.

#### Marsilea sp. (four leaf clover)

The genus *Marsilea* is represented in both hemispheres, but only a few species are suitable for aquarium use. Most often the plant is available in immersed form, with the characteristic four leaflets on each stem floating on the water surface. The foliage is glossy when it first emerges, then with age becomes covered with a downy coating of small hairs. In submerged culture, the plant loses its four-leafed growth pattern, and reverts to a single leaflet per stem. Still, it makes an attractive ground cover in a planted aquarium with the right conditions.

The plant is very sensitive to transplant shock in its submerged state, so it is best to purchase immerse-grown specimens. *Marsilea* does best in soft water with bright light. In harder water it can be maintained with the use of supplemental CO2 and very bright light.

#### Ceratopteris sp. (water sprite and floating fern)

These are some of our most common aquarium plants, although many people are unaware that they are true ferns. The genus is represented in the tropical areas of Africa, Asia, South America and Australia. There are three species of *Ceratopteris* generally available at this time.

Probably the most common in the hobby is *C. cornuta*, commonly called "broad-leaf" water sprite. The foliage on this plant is extremely variable depending on growing conditions. Grown underwater and planted in the substrate, the leaves are deeply incised, similar in shape to oak leaves, and a light bright green in color. If left to float on the surface, the leaves are much broader, less deeply incised and a medium green color. Immersed growth from either a rooted or floating plant will have an almost tubular, spiky appearance and be still darker in color. The great variability of this plant has led to confusion regarding the other species of *Ceratopteris*.

*C. pteroides* has a strong preference for floating, and its leaves are only slightly incised, especially as they approach full size. It is sometimes known as "floating" fern. Finally, *C. thalictroides* is much less variable in growth pattern than *C. cornuta*. It is often sold under the common name "fine-leaf" water sprite.

Although tolerant in many regards, water sprite does not do well in cool water, where it may subsist but will not thrive, or in

very acid water (below a pH of 6.0), where it will quickly rot away. While *C. thalictroides* will remain happily rooted in the substrate for extended periods, both *C. cornuta* and *C. pteroides* will do so for a while, after which the plant will "bolt" toward the surface and produce numerous plantlets. The parent plant may survive, but the stems become brown and woody and are no longer attractive. At this point, the best course is to remove the parent plant and replace it with one of the larger babies. The plants grow so quickly that it won't be long before the baby fills the void left by its parent.

Water sprite deserves a place in the aquariums of almost every hobbyist. Besides its considerable decorative value, the plant is useful in many other ways. Its weak root system is not capable of pulling the nutrients needed for this fast-growing plant from the substrate. The plant extracts most of its nutrients directly from the water through the leaves, resulting in better water quality. Grown in its floating form, or allowed to emerge from the water of the planted aquarium, *Ceratopteris* sp. are able to use atmospheric CO<sub>2</sub>. This ability makes them useful even in aquariums that are deficient in dissolved CO<sub>2</sub>.

Water sprite is very palatable to herbivorous fish, making it a good food supplement. At the same time, the growth is so vigorous that it quickly regenerates from moderate nibbling. Because it floats happily, it can take advantage of whatever lighting is available in all but the most dimly lit aquariums. It also serves as useful shade for less-tolerant plants in a brightly lit environment.

Finally, floating water sprite serves as an almost perfect cover for fry, and is a "standard" for use in livebearer aquariums where the parents are left with the young. If water sprite has a fault, it is its vigorous growth. It is often necessary to remove handfuls of the plant weekly to keep it from taking over the aquarium. Because it is reportedly grown as a vegetable crop in some areas, maybe we should try it as salad!

#### *Bolbitis heudelotii*

This is the most "ferny" looking of the aquatic ferns. In addition to its finely pinnate foliage, the deep "fir-tree" green color is difficult to match in any other aquarium plant. Under favorable conditions, the plant will grow 16 to 20 inches tall, so it is obviously not a candidate for the smaller aquarium.

*B. heudelotii* is a native of Africa, from Ethiopia to South Africa, where it grows on river banks and in the spray zone of waterfalls, sometimes with immersed vegetation, but typically with the roots submerged. Like Java fern, *Bolbitis* needs to be attached to either a rock or, more preferably, a piece of driftwood.

In the planted aquarium *B. heudelotii* is tolerant of a range of water conditions as long as the water is low in organic wastes and there is sufficient water movement. It does not tolerate infestations of algae well, another good reason to keep organic wastes low.

I have found that this plant needs to attain "critical mass" before it begins to grow strongly. My first specimen was small, with a thin, weak rhizome. It increased only very slowly during the first year in my aquariums. At that point it had reached a size where the rhizome had thickened considerably and was perhaps 4 inches in length. There were six to eight leaves, approximately 10 inches in length. Once this size was reached, the plant began to increase much more rapidly. It has now been divided and spread to most of my other aquariums as well. I am careful when dividing the plant to be sure that the divisions have a robust section of rhizome and several leaves. When this is done, the new plants settle in and grow quickly.

#### *Bolbitis heteroclita*

This *Bolbitis* species is native to the Northeast Himalayas, Southern China, Malaysia and New Guinea. To me, the immersed form of this plant looks a lot like poison ivy! The submerged leaves, although still in the three-leaflet pattern, are a lighter green and ruffled enough to be reminiscent of parsley. This plant is much more delicate than *B. heudelotii*, and the growth is not anywhere near as vigorous, even under optimum conditions.

Like *B. heudelotii*, *B. heteroclita* does best when attached to a piece of driftwood. Until it has firmly wrapped its roots around this base, it is unlikely to put on much new growth. Under the best conditions, with good light and adequate supplies of CO<sub>2</sub>, *B. heteroclita* is still a moderately slow grower. Even so, it is an attractive enough addition to the planted aquarium to be worth a little special attention.

There are other, less common plants in the moss and fern families to be explored by the aquatic gardener. Even if you never move beyond the plants described here, you will still find a wealth of beautiful and useful plants suitable for the planted aquariums of both the novice and advanced aquarist.

#### References

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