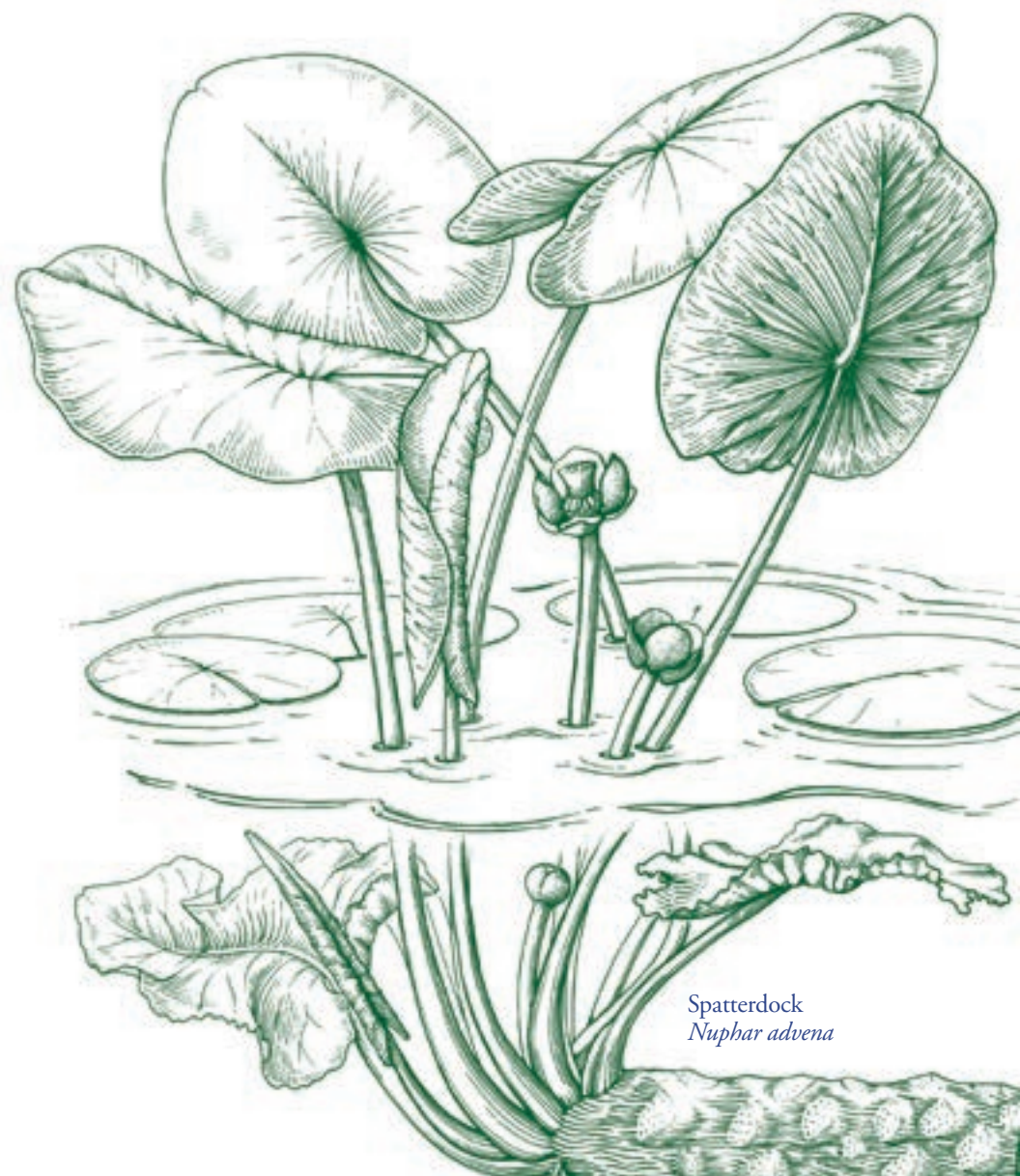


How to  
Establish •  
**Aquatic Plants**  
in Your Pond



Spatterdock  
*Nuphar advena*

# Introduction

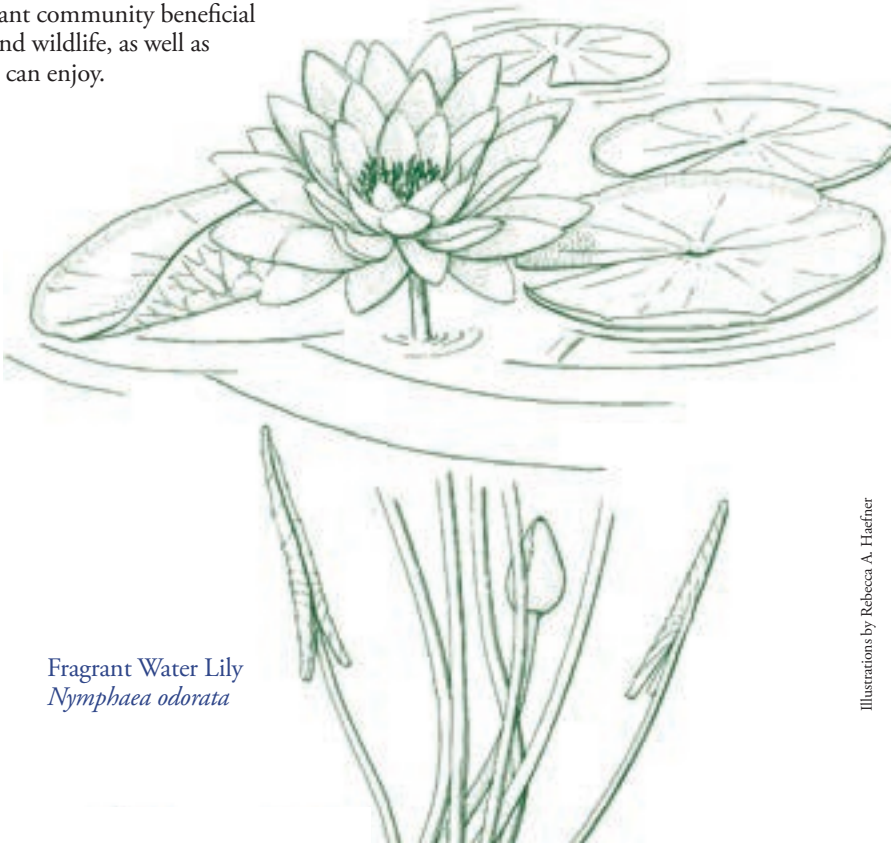
## Aquatic Plants are Essential for a Quality Pond or Lake

- Aquatic plants form the base of the food chain and provide energy for nearly every form of life in the aquatic ecosystem.
- In addition to providing food for invertebrates, fish, mammals, and waterfowl, plants also create shelter and reproductive habitat for countless aquatic organisms.
- Plants also help improve water quality and control erosion.

This guide is intended to help you choose and establish appropriate plants for your pond or small lake. Some people mistakenly lump all aquatic plants together, referring to them as “seaweed” or grass. While some species do cause problems for boaters, swimmers, or anglers, many native species are desirable in lakes and ponds.

Most ponds will develop an aquatic plant community over time. Often, the first plants to appear in new ponds are nuisance species — not those best suited for a quality pond — and the end result is a plant community that requires considerable management. It often takes years for some desirable species to colonize.

By planting those species best suited to the conditions of your pond and your preferences, you can improve plant diversity and reduce the number of nuisance species in the lake, especially algae. Selecting species that reproduce more slowly, are easy to control, and that grow in a select range of water depths can help you develop a pond plant community beneficial to fish and wildlife, as well as one you can enjoy.



Fragrant Water Lily  
*Nymphaea odorata*

## Reasons for Establishing Aquatic Plants

There are many benefits to establishing aquatic plants, such as improving appearances, improving fishing, and stabilizing shoreline. Before you add plants to your pond you should:

- Establish objectives for your pond concerning its use.
- Assess the physical characteristics of your pond.
- Choose appropriate plants.

Plantings may be made anytime after early May. Later plantings often exhibit higher survival because of warmer water, longer growing days, and more stable water levels.

Plants should not be planted later than the end of August.

## Categories of Aquatic Plants

- Emergent
- Floating
- Shoreline
- Submerged

Not all species within each category are well suited for all water bodies. Typically, small lakes and ponds do best with slow-growing, shorter species that grow sparsely. This booklet highlights the following plants because they are well suited for Missouri ponds, lakes, and wetlands and are easy to obtain and manage. For more information, consult *Water Plants for Missouri Ponds*, published by the Missouri Department of Conservation, which is a thorough reference book describing more than 40 species of aquatic plants. Before planting, consider consulting Conservation Department staff for advice.



Arrowhead  
*Sagittaria calycina*

# Shoreline

Plants growing at the water's edge



Don Kurz

## Mud Plantain

*Heteranthera* species

Small, glossy, kidney-shaped leaves and a trailing stem; will not inhibit fishing. Plants grow well in ponds, sloughs, and river bottoms in south and central Missouri. Plants can be grown from slips or cuttings, which are peices of the stem or roots that will produce a new plant.

**Habitat:** Shoreline

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



Jim Rathert

## Sweet Flag

*Acorus calamus*

Looks like young cattails; ranges from 2–4 feet tall; grows in clumps. Found statewide in wet meadows, marshes, along spring branches, sloughs, and ponds. Sweet flag is a relatively short shoreline plant that can be fished over. Roots can be divided in the spring and rhizomes planted just below the soil in shallow water.

**Habitat:** Shoreline

**Benefits:** Fishing, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



## Water Plantain

*Alisma triviale*

Oval leaves with a thick flower stalk in middle; grows 1–3 feet tall; bears many tiny white flowers and small seed heads. Found statewide in ponds, streams, and marshes. Water plantain can be grown from dividing a clump of plants or from seed.

**Habitat:** Shoreline

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



Don Kurz

## Lizard's Tail

*Saururus cernuus*

Striking plant with heart-shaped leaves and a zigzag stem. Grows well in shady areas. Found in most Missouri counties south of the Missouri River in swamps, marshes, lakes, and streams. Plants can be started from pieces of rhizome placed in shallow water. Plants prefer to grow in shaded shoreline areas.

**Habitat:** Shoreline

**Benefits:** Fishing, attractive

**Ease of establishment:** Fair

**Future management:** Minimal



Don Kurz

# Shoreline

Plants growing at the water's edge



Richard A. Howard Image Collection,  
courtesy of Smithsonian Institution

## Burhead

*Echinodorus berteroi*

This shoreline plant gets its name from clusters of beaked seeds that develop in the fall. It has many small white flowers, each with three petals. Found in ponds and streams, wet woods in the Bootheel, and backwaters of the Missouri and Mississippi rivers. Burhead can be propagated from seed or cuttings from the rootstock.

**Habitat:** Shoreline

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



## Water Willow

*Justicia americana*

Grows about knee-high; leaves look like willow tree leaves; can be prolific and not recommended for small ponds; stabilizes streambeds and shorelines. Found statewide with a preference for shallow running water near streams. Plants or roots should be placed about 3 feet apart in 6–10 inches of water.

**Habitat:** Shoreline

**Benefits:** Fishing, attractive, wildlife

**Ease of establishment:** Easy

**Future management:** Likely, only recommended for larger ponds and lakes where establishment of other emergent species has proven difficult.

Troy Evans, Great Smoky Mountains National Park, Bugwood.org

## Wild Iris

*Iris* species

Wild iris is among the most beautiful of all waterside plants. It should be planted in one or two large clumps for best visual effect. Southern blue flag is found statewide in open wet areas such as marshes, wet meadows, and prairies near river bottoms. Copper iris is found only in southeastern Missouri in roadside ditches, drainage canals, and ponds. Division of the rootstock can easily propagate wild iris.

**Habitat:** Shoreline

**Benefits:** Wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



Jim Rathert

## Swamp Smartweed (Water Pepper)

*Persicaria hydropiperoides*

Jointed stems and spikes of small pinkish flowers; stays fairly small and will not grow in deep water. Found in marshy and moist area throughout Missouri. Plants can be grown easily from seeds or rooted stems.

**Habitat:** Shoreline

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



Joseph M. DiTomaso, University of California - Davis, Bugwood.org

# Emergent

Plants rooted in the water with stems and leaves standing above water



Jim Rathert

## Spike Rushes

*Eleocharis* spp.

Grasslike species that come in a variety of sizes, from ankle- to shoulder-high. Missouri is home to 12 different species. Found statewide in moist soil areas. Divide the plants and place in shallow water 1–3 feet apart.

**Habitat:** Emergent

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



Jim Rathert

## Soft Rush

*Juncus effuses*

Grows in dense clumps of a few to several hundred leafless stems. Grows in shallow water, but doesn't invade deeper areas. Found statewide in moist soil areas. These plants can be propagated by division of the rhizome or by seed.

**Habitat:** Emergent

**Benefits:** Fishing, attractive

**Ease of establishment:** Easy

**Future management:** Minimal



## Thalia

*Thalia dealbata*

Plant stands up to 6 feet tall, with huge, canna-like leaves sprouting from a thick base. Grows slowly and can be easily controlled. *Thalia* is a rare plant found in Missouri's Bootheel. Plants should be obtained from aquatic nurseries or well established ornamental stands. Plants should be protected against freezing temperatures north of the Bootheel.

**Habitat:** Emergent

**Benefits:** Wildlife, attractive

**Ease of establishment:** Fair to easy

**Future management:** Minimal



Courtesy Missouri Botanical Garden Plant Finder: Tammy Palmier

## Pickereel Weed

*Pontederia cordata*

Pickereel weed is one of the few water plants to produce striking blue flowers. It has heart-shaped leaves and grows up to 3 feet tall. Found in scattered locations in eastern and western Missouri. Grow plants with roots collected from dense stands with landowner's permission or obtained from an aquatic nursery.

**Note:** Do not mistakenly use the invasive heartshape false pickereelweed (*Monochoria vaginalis* or *Pontederia vaginalis*).

**Habitat:** Emergent

**Benefits:** Wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Occasionally necessary



Jim Rathert

# Emergent

Plants rooted in the water with stems and leaves standing above water



Jim Rathert

## Spatterdock

*Nuphar advena*

In the water lily family; has oval, floating, and emergent “lily pad” leaves; blossoms are unassuming greenish globes 2 inches wide. Plant is common south of the Missouri River along streams, in ponds, and in sloughs. Spatterdock can be grown from seed or planting small pieces of rhizome.

**Habitat:** Emergent

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Fair

**Future management:** Occasionally necessary



Don Kurz

## Arrowheads

*Sagittaria* spp.

Arrow-shaped leaves; bears a stalk with white, three-petaled flowers in whorls; spread easily by runners; one species has grasslike leaves. Found statewide. Plants can be grown from seed or be set out as small plants or tubers. Place arrowheads 3 feet apart in water up to 1 foot deep.

**Note:** Do not mistakenly use the invasive Hawaii arrowhead (*Sagittaria sagittifolia*).

**Habitat:** Emergent

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Minimal

## Broadfruted Bur Reed

*Sparganium eurycarpum*

Zigzag flower stems; grows up to 5 feet tall; grasslike leaves. Commonly found in marshy, floodplain areas around large Missouri rivers. Plants may be divided and set out in shallow water.

**Habitat:** Emergent

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Occasionally necessary



Jim Rathert

# Floating

Plants with many floating leaves



Jim Rathert

## Fragrant Water Lily

*Nymphaea odorata*

Round, emerald green leaves with white (rarely pink) flowers up to 6 inches across. Leaves and flowers are attached to flexible underwater stalks growing from thick rhizomes. Introduced statewide and commonly found in nurseries culturing aquatic plants. Fragrant water lily can be started by planting tubers.

**Note:** This plant can become a nuisance if left unmanaged.

**Habitat:** Floating

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy

**Future management:** Likely



# Submerged

Plants completely under the water or nearly so

## Wild Celery

*Vallisneria americana*

Leaves almost completely submerged, with just the tips showing. Grows up to 7 feet. Species occurs mostly in Ozark streams. Plants or rootstocks should be set out in water at least one foot deep.

**Habitat:** Submerged

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Fair to difficult

**Future management:** Minimal



Jim Rathert

## Water Star Grass

*Heteranthera dubia*

Attractive yellow flowers near or just above the water's surface. Grows up to 6 feet long. Commonly found in Missouri, growing in most Ozark streams as well as some rivers, lakes, and ponds. Grows readily from cuttings or plant division.

**Habitat:** Submerged

**Benefits:** Fishing, wildlife, attractive

**Ease of establishment:** Easy to fair

**Future management:** Minimal



Photo by E. Haug, courtesy of Smithsonian Institution

# Acquiring Aquatic Plants

Some aquatic plants are easy to locate because they are commercially produced. Others are more difficult to find. It is strongly recommended that you obtain plants from Missouri or the Midwest, since these plants are most likely to survive Missouri's weather and habitats. Local nurseries and water garden stores may have some species, especially emergent and floating.

Another way to obtain plants is by transplanting or harvesting them from the pond of a neighbor or other private landowner that lives within a county or two from your pond. Always ask for permission first. Plants may not be removed from conservation areas without permission from the Missouri Department of Conservation. They also may not be removed from a right of way of any state or county highway or roadway without permission from the Missouri Department of Transportation (MoDOT).

# Don't Spread Invasive or Unwanted Species

Do not use plants that come from a lake or pond that has any undesirable plants and animals. Find another source. Thoroughly inspect any plant, so that you are not also moving any unwanted or invasive plant or animal. Carefully dig the plant and wash all soil, twigs, dead branches, and seeds from the plant before transplanting. If undesired plants or animals do appear, eliminate them quickly. More information on invasive species can be found at [mdc.mo.gov/node/21445](https://mdc.mo.gov/node/21445). Nuisance aquatic plant identification can be found at [mdc.mo.gov/node/4841](https://mdc.mo.gov/node/4841).

# Establishing New Plants

Establishing aquatic plants takes a bit more work than simply planting a shoot and watching it grow. When transplanting, pay attention to the habitat where the plant originally grew. Relocate to locations with similar conditions. Sometimes conditions in a pond, lake, or wetland make them only marginally suited for plant establishment. These conditions — and ways to solve some of the obstacles they present — are described on the next page.

# Obstacles

## Turbid Water (Excessively Murky)

Turbid water and excessive algal growth can obscure the sunlight plants need. If your pond's turbidity is due to microscopic green algae (green water) you may be able to improve clarity by eliminating nutrient input. Limiting algal growth by selectively using herbicides may be needed when other methods fail. Consult the Missouri Department of Conservation's Aquaguide publication, *Algae Control in Lakes and Ponds*, at [mdc.mo.gov/node/16234](http://mdc.mo.gov/node/16234).

If turbidity is due to suspension of clay particles, you may be able to improve clarity by spreading dry hay or gypsum in the pond to encourage the clay particles to settle to the bottom. If the turbidity is the result of fish or aquatic animals disturbing bottom sediments, the numbers of these animals must be reduced in order to improve water clarity. See the Aquaguide publication, *Clearing Ponds That Have Turbid (Muddy) Water*, at [mdc.mo.gov/node/16232](http://mdc.mo.gov/node/16232).

## Extreme Fluctuations in Water Level

Dramatic water level fluctuations can strand and kill plants. Water level fluctuations are difficult to address, especially if water levels drop more than 18 to 24 inches during the growing season. However, here are a few planting tips to improve the chances of new plant survival.

Plant submerged and floating species in water at least 3 feet deep. This allows adult plants to experience a substantial water level drop and still remain in adequate water. It also allows adult plants to spread into deeper water as levels drop.

Be sure to place emergent plants in water 6 to 12 inches deep. Most species will survive water level drops as long as the soil remains moist.

Plant a couple of times as water levels drop. This helps ensure that some plants are at an optimal water depth during the peak-growing season.

## Poor Soil

Poor bottom material, such as rock or hard clay, also limits plant survival. Aquatic plants can grow well in most soil and bottom types with a few exceptions. Bottoms composed of bedrock, large rock, or very hard clay are unsuited for plants. However, loose gravel and clay that can be dug into with a hand trowel can grow aquatic plants. It often takes a few trial plantings to determine whether a species will survive and thrive in a particular bottom type.

## Grazing Animals

Turtles, grass carp, muskrat, waterfowl, and even deer can impact young aquatic plants. Establishing new plants can be especially challenging in older ponds that have many plant-eating animals. New plants usually need to be protected by protective cages and fences. In new ponds with smaller populations of plant-eating animals, it may not be necessary to physically protect plants.

## Protective Cages and Fences for New Plants

Simple designs can be used to protect new plants. Designs must be durable and strong enough to protect the plant colonies, sometimes for a few years. Recommended materials:

- 2x4 welded wire or coated welded wire that is 36 or 48 inches tall, depending upon the water depth
- Metal T-posts or rebar
- Aluminum fence ties typically used in chain link fence construction
- Hog rings (½ inch) for connecting two ends of wire together



◀ Fences are useful for protecting emergent plants or very large areas of submerged plants. The fence should have no openings, and the bottom of the fence should be flush with the bottom of the pond. The top of the fence should be at least 12 inches above the maximum water level to prevent animals from climbing, crawling, or jumping over.



◀ Round cages are used to protect floating species and larger plantings of submerged species. For stability, secure one piece of plastic water line pipe to the top of the round cage and one to the bottom using plastic zip ties. Secure the cage to the pond bottom with two stakes.



◀ Submersible boxes are practical for protecting smaller plantings of submerged species. A rectangular box with an open bottom is placed over the plantings and secured to the bottom of the pond with a stake.



# Handling, Planting, and Caring for New Plants

## Bare-Root vs. Potted Plants

### Bare-root

- Can be difficult to secure to the pond bottom. Most emergent species, including arrowhead, often can be successfully planted as bare-root transplants.
- Less vigorous growth
- Slower spread of new plants
- Lower survival rate

### Potted (transplants with soil)

- Easier to secure to pond bottom
- Vigorous growth
- Faster spread of new plants
- Higher survival rate

Remember to keep plants moist when transporting them.



Water Star Grass  
*Heteranthera dubia*

# Culturing Plants in Pots

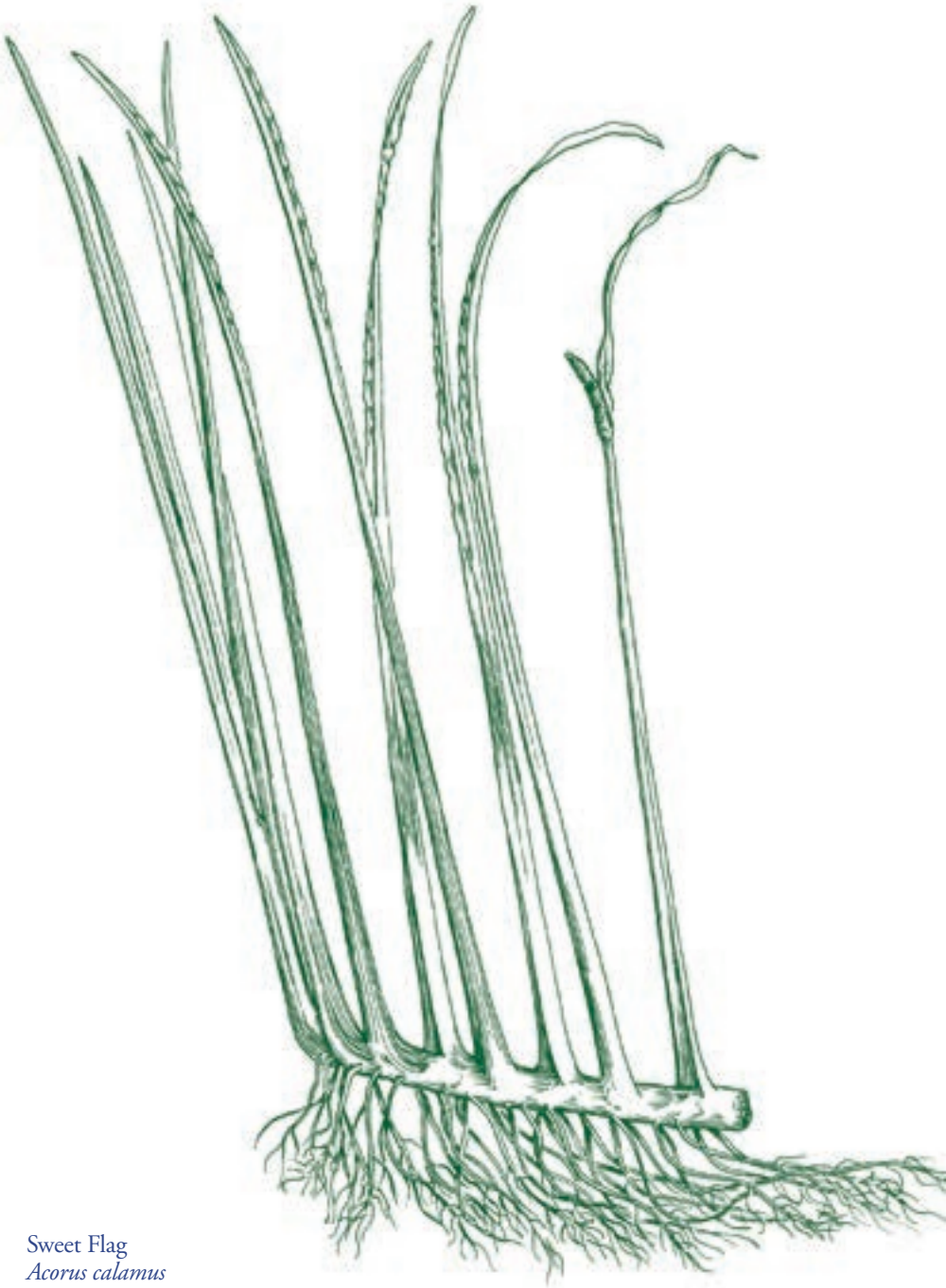
Many species will grow and thrive if they are cultured in pots for a few weeks before they are planted permanently in the pond bottom. Cultured plants often exhibit extensive growth and expansion far exceeding that of bare-root transplants.

- Place plants in regular plastic nursery pots and cover the roots with the darkest and most fertile pond soil available.
- Place these potted plants within a protected area.
- Tying three or four pots together with wire or zip ties will help keep them from tipping over.

Once the plants have grown new shoots, sprouts, and roots, remove the plants and soil from the pots and place them in the pond bottom. Handle them carefully to minimize damage to foliage.

## Planting

- Space approximately 3–4 feet apart in rows to allow for growth.
- Place submerged and floating-leaved plants along the 3- to 4-foot depth contour of the pond.
- Place emergent plants near the shore from the waterline out to depths of 6 to 12 inches.
- Do not place floating plants next to submerged plants so adequate light can reach young submerged plants.



Sweet Flag  
*Acorus calamus*

Excerpted from “Water Plants for Missouri Ponds,” by James Whitley, Barbara Bassett, Joe Dillard, and Rebecca Haefner, Missouri Department of Conservation, 1999.



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