



Water Lilies for the Home Gardener

Plants in the family Nymphaeaceae are collectively called water lilies due to their aquatic nature and represent 5 genera (70 species): *Euryale* (prickly water lilies), *Nelumbo* (lotus), *Nuphar* (cow lilies), *Nymphaea* (water lilies), and *Victoria* (Victoria water lilies). However, only plants in the genus *Nymphaea* are considered true water lilies. The genus name, pronounced *NIM-fe-a*, means “goddess of springs” or “water nymph” in Greek mythology.

Nymphaea species are found in temperate and tropical regions around the world and are one of the most recognized and popular groups of aquatic plants. Throughout history, they have been featured in famous paintings, such as those of Claude Monet, depicted in ancient Egyptian art (*N. caerulea*, known as the Egyptian blue water lily), and they are considered sacred in Egyptian, Chinese, and Indian cultures. In modern uses, *Nymphaea* species that are known for their fragrance have been used for developing perfumes, and their hydrophobic leaf surfaces, which repel water, are being studied to develop household exterior paints that deter water and dirt. However, water lilies are primarily known for their ornamental value as staples in public and private water gardens.

The most common native North American hardy water lily is *N. odorata*, which is native to the eastern half of the United States, stretching from Maine to Florida and from North Carolina to parts of Oklahoma and Texas. It’s also Missouri’s most popular water lily and can be seen growing at Shaw Nature Reserve.

Water Lilies at the Missouri Botanical Garden

The Missouri Botanical Garden has a long history with water lilies that dates to the late 1800s, beginning with the hiring of James Gurney as head gardener in 1867 by Henry Shaw. Gurney was an expert in the cultivation and hybridization of water lilies, particularly tropical night-blooming species. He is most well-known for growing the first Victoria water lily in St. Louis in 1894 at the Missouri Botanical Garden. In 1895, the Victoria water lilies were first displayed at the Garden in a heated pool (located in the present-day Gladney Rose Garden) and drew almost 30,000 visitors in a single day. In addition to his role at the Garden, Gurney became the superintendent of Tower Grove Park and cared for the Victoria water lilies in the park’s heated pools.



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In the early 1900s, the Garden began a new water lily breeding program with the help of water lily expert and Garden superintendent Dr. George H. Pring. Tropical water lilies were an ideal species to work with as they could be produced in less than three years, and few, if any, horticulturists were working tropical species at the time, providing a unique opportunity for experimentation. Throughout his tenure, he developed 40 new water lily cultivars—including 'St. Louis', one of the first hybrids to feature yellow flowers, and 'Mrs. George H. Pring', the first white tropical hybrid, which he named in honor of his wife—and introduced the first hybrids of pygmy forms for home gardeners. The Garden's *Nymphaea* hybrid water lily collection continues to be propagated from tubers utilizing the same methods he developed.

The Garden and Water Lilies Today

The Garden's aquatic collection contains hundreds of specimens, including historical and award-winning hybrids and new and innovative cultivars from today's hybridizers, with new species added each year. The collection also includes species of conservation concern, such as the rare Rwandan pygmy lily, the smallest water lily in the world.

The hot and humid summers of St. Louis afford the Missouri Botanical Garden the opportunity to display its water lily collection outdoors, rather than in a conservatory. Each year, the Garden displays over 100 tropical and hardy water lily specimens from its collection in one of eight unheated reflecting pools—four in front of the Linnaean House, three between the Climatron and Spink Pavilion in the area known as the Central Axis, and two in the Carver Garden at the Center for Home Gardening. A granular black dye is used in the pools to absorb heat and naturally heat the pools faster. The dye also helps provide contrast to highlight the flowers, reflect natural surroundings, reduce the occurrence of algae blooms, and hide the containers at the bottom of the pool.

The central circular pond in the Central Axis is dedicated solely to displaying the Victoria water lilies. Growing the Victorias in St. Louis can be a challenge as they originate from the tropics and require high heat and humidity to thrive. The water temperature of the pool must be at least 72 degrees before the Victorias can be displayed, which could take until mid-June. However, in 2018, the Garden installed a heating system in the Victoria pool, which enables the pool to warm up faster and extend the water lily growing season. The water lilies can now be grown outdoors from late April to early October. As a result, the Garden grew its largest lily pad ever at 91 inches in diameter in 2019, just a few inches shy of passing the largest claim of a Victoria lily pad at 93 inches in diameter.



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Water Lilies

The overall structure of water lilies is uniform throughout the *Nympha* genus. The crowns of water lilies grow beneath the water, while their leaves and flowers float on the surface. The long, flexible stems allow them to move with water currents and extend out to maximize sunlight exposure. Leaves are generally somewhat rounded to oval in shape, with smooth or rough edges, and have a split or sinus where the leaf blade meets the petiole (leaf stem). The majority of a water lily's stomata (sites of gas exchange for photosynthesis) are located on the upper leaf surface and are protected by a waxy, waterproof layer called the cuticle. Leaf undersides can vary in color—green, brown, red, and light or dark purple. However, water lilies can be further divided into two groups: hardy and tropical.

Hardy Water Lilies

As their name implies, hardy water lilies will survive the winter in colder geographic regions. They will enter dormancy during cold conditions, but the rootstock will survive as long as the water does not freeze solid. The foliage and flowers arise from a single point or crown at the end of a fleshy rhizome. As the rhizome grows horizontally, new crowns are produced at points along the stem and can be divided to produce new water lilies. The leaves or pads are typically rounded or heart shaped, leathery in texture, and may be green or reddish in color.

Hardy water lilies bloom during the day, opening in the morning and closing mid to late afternoon. The flowers of wild species are typically white or light pink. However, with the development of hybridization, cultivars are now being developed with bloom colors ranging from dark red to yellow to almost pure white. Changeable water lilies have also been developed in which the bloom color will change slightly each day it is open. For example, the flowers of 'Comanche' start out as a rose-apricot color the first day open, darken to gold orange on the second day, and finally turn a vibrant coppery bronze on the third day.

Tropical Water Lilies

Tropical water lilies are distinguished from their hardy cousins by their inability to tolerate cold temperatures. They will enter dormancy with the onset of cold weather, but they will die if left to overwinter in USDA Hardiness Zones 1 to 9. In the Midwest, tropical water lilies can be grown as annuals from early summer to early fall and will survive if removed from garden ponds in the fall. Foliage and flowers grow upright from a tuber, which can be the size of a small walnut to a large egg. The lily pads are often solid green, mottled or marked



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with purplish patches, and generally are larger than hardy water lilies. They are distinguishable from hardy water lilies by the serrated or toothed margin of their leaves.

Tropical water lilies are very floriferous, having multiple flowers blooming at one time, and some reaching over 12 inches in diameter. Their star- or cup-shaped flowers are displayed above the water. Tropical flowers can be divided into day blooming or night blooming. Day-blooming species will open in the morning and close in the afternoon and have a diverse pallet of colors such as varying shades of pink, true blue, purple, yellow, and white. Many are also fragrant and are said to smell like violet or tea roses. Night-blooming water lilies open at dusk and remain open until noon the next day. Their flower colors are limited to white, pink, or almost red, and some have a musky aroma.

Care Requirements

In St. Louis, hardy water lilies can be grown outdoors from March through November. However, tropical water lilies usually thrive late May through early October, when the air temperature reaches a stable 70°F, and the water temperature is at least 70°F.

Containers and Soil

Water lilies can be planted in a wide variety of containers including clay pots, Rubbermaid containers, oil pans, etc., as long as they are wider than they are tall to prevent tipping over. This is especially true for growing hardy water lilies, due to their horizontal growth. Containers with holes can be lined with layers of newspaper, as drainage is not required. The soil medium should be a weighted material such as a clay loam garden soil. Cat litter can also be used as a substrate. Soilless mediums such as peat moss, bark, or those containing perlite are not recommended because the material will float.

Planting

Before planting, wet the soil medium to keep it compacted. Place only one water lily to a container to control their spread. Water lily crowns should be placed about 2 inches higher than the soil line, as it will pull itself down into the soil as it begins to root.

Hardy Water Lilies – Hardy water lilies can be planted when they are dormant or actively growing. Fill the container 2/3 of the way with potting medium, and make sure it is as firm as possible. Place the rhizome on the edge of the container, with the crown (growth point) turned toward the center of the pot. Cover the rhizome closest to the edge of the pot with soil, but leave the crown exposed above the soil. Pea gravel can be



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placed around the rhizome to help keep it anchored. Hardy water lilies can be set in a pond in spring after surface ice has melted.

Tropical Water Lilies – Fill the container 2/3 of the way with potting medium and make sure it is as firm as possible. Plant the tuber in the center of the potting medium, ensuring the roots are covered, but the crown is not buried. It is not necessary to remove any roots prior to planting, as they will help anchor the plant as it grows and prevent it from becoming dislodged. Place a rock or heavy gravel on top of the soil for approximately one week to anchor the plant. Once in warm water, the plant will root within a week's time. Air and water temperatures should be at least 70°F before placing tropical water lilies in a pond.

The depth of the water above water lily plant crowns should be at least 6 inches deep; 8–10 inches is preferable. Water lilies should be placed in ponds with calm water and have low exposure to windy conditions. Keep away from the spray and splash of waterfalls and fountains. The majority of water lily plant stomata are on top of its leaves, and water that collects in these openings can drown the plant.

Light

Most water lilies will require at least 6–8 hours of direct sunlight. Some cultivars can tolerate partial shade (4–6 hours), but avoid planting water lilies in areas with deep shade, as they will not thrive. Shadows from trees or cloudy days can interrupt flowering cycles: Day blooming flowers will close, and night blooming water lilies will attempt to open at atypical times.

pH and Water Quality

Water lilies should be planted in soil media with a neutral or slightly alkaline pH (7 to 8). Conditions that are too acidic or alkaline will prevent water lilies from taking up nutrients, thus weakening the plant. The pH of the water should also be neutral to slightly alkaline.

In general, water lilies do not perform well in water with high salt concentrations, which affects their ability to move water and nutrients throughout the plant. Water with high salt will cause black spots on leaves and turn the foliage soft, eventually causing the leaf to die.



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Care should be taken when using treated domestic water from a local municipality, due to the water's chlorine content. Chlorine will burn water lily leaves, causing the plant to die. If using chlorinated water, allow the water to sit for a minimum of ten days before submerging the plants. During this time, the chlorine will dissipate naturally, especially in the sun. To speed up the process, use a dechlorinated solution and/or filter the water.

Fertilizing

Both hardy and tropical water lilies should be fertilized from May to September. Hardy water lilies should be fed once a month, while tropical water lilies are typically fed once every two weeks. Use a slow-release fertilizer in the form of dissolving tablets or pellets and push them into the soil as deep as possible into the plant's root zone. The number of tablets to give the plant will depend on the size of the container and plant.

Deadheading

Frequently deadhead leaves and remove spent flowers to discourage algae blooms, which depend on the decomposing plant material to survive. Remove yellowing pads by pinching the petioles off at the crown of the plant. Spent flowers will recede underwater to begin seed production and should be removed once they have dropped below the water surface. Removing the old flowers will also help transfer the plant's energy from seed production to producing more flowers, resulting in larger flowers.

Pests/Diseases

Aphids and caterpillars are the primary pests for water lilies. Aphids can be removed by hosing or brushing them off the plant into the water. When forced off, their piercing/sucking mouthparts are broken off, preventing them from feeding, and they end up dying. Caterpillars are best removed by hand. Leaves should be inspected for insect pests regularly. Other pests include turtles, fish, ducks, and geese. Turtles will uproot a water lily from its pot and eat it, and some fish will chew on the plants. Ducks and geese may remove newly planted water lilies from the water.

Storage and Overwintering

Hardy Water Lilies – During the winter months, hardy water lilies will go dormant. The rootstock can survive cold water, as long as the water does not freeze solid.



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Tropical Water Lilies – At the end of the growing season, water lilies will begin losing their leaves as they prepare for winter dormancy. Fertilizing should cease toward the end of September so that the plant will focus its energy on tuber development. At the end of the season, remove the tubers from the parent plant and wash off any soil or debris. The size of the tuber will depend on the cultivar. Some tubers are as large as a fist, while others may be the size of pea gravel. The tubers can be dusted with the fungicide CAPTAN to help prevent fungal development. Place them in a container or Ziploc bag of damp sand and store in the dark around 50–55°F. Throughout the winter, periodically check the moisture in the sand to ensure it stays damp.