

Introduction
To
Growing
Water lilies
And
Marginal plants



Contents

Introduction	page 1
Aquatic Flora	page 2
Growing Aquatic Plant	page 3
Potting Water Lily	page 4
Potting Marginals	page 6
Growing Submerged & Floating Plants	page 8
Overwintering Plants	page 9
Water Lily	page 12
Floating & Marginal plants	page 15

Further Reading

- American Horticultural Society Complete Guide to Water Gardening
Peter Robertson, Dorling Kindersley Ltd, London 1996
- Encyclopedia of the Waterlily
Charles O. Master, TFH Publications, Inc. Ltd., USA 1979
- Collins Guide to Waterlilies and other Aquatic Plants
Stapeley Water Gardens, William Collins Sons & Co Ltd, UK 1989
- Plants for Water Gardens
Helen Nash & Steve Stroupe, Sterling Publishing Company, Inc., NY 1999
- Water Gardens
Jaceueline Herriteau & Charles B. Thomas, Houghton Mifflin Co., NY 1994
- Water Gardening (The American Garden Guides)
Tomocik, Joseph & Garisto Leslie, Pantheon Books, Knopf Publishing Group, NY 1996
- Water Gardening Water Lilies and Lotus
Perry D.Slocum & Peter Robinson, Timber Press, Inc. USA 1996

Taking Care of Your Water Lilies and Marginals

Introduction

As modern aquatic gardening places more emphasis on water lilies and marginals in the beautification of the pond apart from the inclusion of ornamental fishes, a lot of attention should be given to their care and maintenance in the pond. The gorgeous flowers of water lilies can provide charm to any water garden. To blend the water garden into the surrounding landscape, the right selection of marginals should be used in and around the edges of the pond.

As much as water lilies and marginal plants are the main focus in water gardening, submerged and floating plants should not be overlooked. Submerged plants otherwise known as oxygenators can enrich the water with oxygen while they prepare food during daytime. Floating plants not only provide shade but also act as 'nutrient sponge' hence the threat of algae bloom can be controlled. Periodic removal of these plants is necessary as they can chalk up the entire pond in a relatively short period of time; posing a threat to other aquatic fauna.

These plants though grown in such an artificially constructed pond in temperate region, there is a need for special care of the waterplants in order to avoid frost related injuries and mortality during winter. The degree of care varies from plant to plant. In other words, tropical water plants will demands more attention than the winter hardy varieties originating from subtropics and temperate regions in order to survive harsh winter conditions.



Aquatic Flora

Aquatic flora in water gardens mainly includes true aquatic, marginal and amphibious plants.

True Aquatic Plants

Water Lily: Water lily is a true aquatic plant as it completes its life cycle in the water. On the basis of origin, they are grouped in to tropical or winter hardy water lilies. Tropical water lilies are the showiest of all water lilies, as they normally keep their blooms well above the water. They are either day or night bloomers. The flowers of day bloomers remain open from mid-morning to late afternoon, while the night bloomers have flowers, which open in the late afternoon and close the following mid morning. Water gardens in temperate zone can accommodate them only when the water temperature maintains over 70°F (>20°C). On the other hand, hardy water lilies can survive through winter and remain dormant as long as the rhizomes are well below the ice level. Generally, hardy water lilies do not flower as profusely as tropical water lilies nor do they bloom at night. Their flowers usually float on the water surface.

Fully Submerged (True Aquatic) and Floating Plants: Fully submerged plants like *Elodea*, *Ceratophyllum demersum* (Coontail or Hornwort), *Cabomba* species, *Vallisneria americana* (Giant Tape grass), etc as well as floating plants such as *Pistia striota* (Water Lettuce), *Eichornia crassipes* (Water Hyacinth), etc., are also true aquatic plants, as they complete their life cycle in the water.

Marginal Plants: Marginal plants are generally those plants growing along the edges of the pond in semi-submerged conditions. Some of these plants cannot tolerate submerged conditions for a lengthy period but can survive intermittent short dry spells. *Acorus* (sweet flag), *Canna*, many *Cyperus* species, etc., are true marginals.



Amphibious Plants: As the name suggests these plants that can survive equally well on land and in water. Certain species of *Echinodorus* (Sword plant), *Eleocharis acicularis* (a winter hardy from sedge family), *Lyssmachia nummularia* (Creeping Jenny), *Myriophyllum aquaticum* (Parrot feather), etc., can be either grown as either oxygenators or marginals in the water garden.

Growing Aquatic Plants

Growing plants in containers is a popular practice. Even though plants can be grown in specially created planting troughs within the pond, this practice is not as convenient as growing them in special containers. Plants in such troughs are more or less permanently placed in the pond, moving them to the deepest part of the pond in winter to keep them in non-freezing conditions is almost impossible. Under such circumstances the procedure will be more tedious for overwintering. Growing water plants in pots can restrict the uncontrollable spread of plants within the pond as well as minimising the leaching of fertilizers from the growing medium into the pond water. Moreover, repotting will be made easier every year by using fresh soil and nutrients. These measures help us to maintain 'a clean pond' as the pond water is not excessively contaminated with fertilizers for the algae to bloom. Plants like water lilies and marginals mainly rely on their root systems to absorb nutrients from the substrate. Supplemental feeding by adding fertilizer tablets to the substrate during potting is very important for these plants to thrive and bloom. Introduction of floating plants such as Water Lettuce, Water Hyacinth can help keep the water relatively free of excess fertilizer, as they are excellent nutrient filters. Fully submerged plants like *Elodea*, *Potamogeton*, *Valisneria* species, etc., can thrive well with fertilizer added in the growing medium at the time of potting. The leaves of these plants are capable of extracting the available nutrients from the water column. Supplementary feeding for these plants can cause explosive growth that may not be advisable for aesthetic reasons.

Planting Containers

Extra attention should be given in the selection of containers for growing plants in the water garden. UV stabilized black plastic containers are superior as they are not only durable but also almost invisible in clear water. When mesh-type containers are



used, they should be lined with natural fabric such as burlap to keep the soil within the container. Even containers without holes can be used as well to grow the plants successfully in ponds. Moreover, such containers prevent the soil build up on the bottom of the pond. The plastic pot for terrestrial plants can also be used after plugging the holes with appropriate materials. Avoid using wooden containers made from treated wood as they may release toxic chemicals to the pond.

Substrate for Aquatics

Garden soil or garden loam is probably the most recommended type of soil for potting as well as repotting of water plants as it contains higher ratio of sand to clay. The sand content allows fresh water enter the rooting medium while the clay particles enhance the fertility by holding the nutrients on its surface. The right combination of sand and clay in garden loam prevents the substrate from becoming too anaerobic (less oxygen content) as such condition may be detrimental to the growth of certain aquatic plants. However, water lilies and lotus can adapt to such conditions very well as they have air channels or air lacunae connecting the floating leaf lamina with the root via petiole (leaf stem). To supply oxygen for the functional roots.

Fertilization

With the advent of well-formulated fertilizer tablets, fertilizing the plants like water lilies, lotus and marginals has become almost trouble free. As these plants demand regular feeding for healthy blooms and sustained growth, it can be done by inserting fertilizer tablets straight in to the growing medium in the pot without disturbing the pond much. While preparing the growing medium some gardeners add well rotten cow manure or compost at a definite ratio. However, many gardeners fear to follow this practice due to the risk from contamination. Using the complete fertilizer in tablet form eliminates such risks and also ensures the balanced application of plant nutrients. The recent introduction of slow release fertilizers has further ensured the release of nutrients as required. The burden of frequent feeding can be avoided by using such controlled release fertilizer.

The dosage of fertilizer depends on the type of plant. In general, water lilies and lotus demand heavy feeding. As tropical water lilies bear more flowers than hardy ones, they need more frequent feeding for the production of flowers. Marginals require less frequent feeding. The oxygenators or the fully submerged plants require no supplementary feeding because the fertilization at the time of potting and the nutrients derived from the pond water can sustain normal (not explosive) growth. When fertilizer tablets are used, manufacturer's instructions should be followed strictly.

Potting the Water Lily

Potting techniques vary from species to species. The growth habits of the plant should be assessed before the right potting technique can be applied. Factors concerning healthy growth of plants such as pot size, planting depth, fertilizer dosage and orientation of rootstock or rhizome in the pot should be carefully considered.

Water Lilies: Potting should be done according to nature of growth of water lily rhizomes.

Rootstock: The rhizome or rootstock exhibits either horizontal or upright growth. Four different types of rhizomes are identified for hardy water lilies; 'mexicana' (fleshy type but with upright growth like that of a tropical water lily), 'odorata' (characterised by

vigorously growing fleshy type), "tuberosa" (rhizome is very thin and almost broom stick-like) and "marilac" (less vigorously growing fleshy type). Only the "mexicana" type rhizome displays vertical growth while the rest grow horizontally. All tropical water lilies have rhizomes with upright growth.

Hint: Recent studies have proved that shallow containers of about 7-9inch deep and a 15-17inch diameter (about 5gallon) are suitable for growing water lilies. "Tuberosa" type of hardy water lilies and tropical water lilies grows vigorously, largest size pots from the suggested range should be chosen. As mentioned earlier mesh type pot should be lined with natural fabric (burlap) to contain the soil.



If the plants purchased from shops are in coco-fiber blocks or bare rooted, they can be potted directly without removing the coco-fiber blocks or trimming the rhizome and root. When using the rhizomes from your own plants taken for repotting, trim the excess roots and leaves close to the rhizome with a sharp knife leaving a few healthy roots and unfurled leaves.

Water Lilies with horizontally extended rhizomes

Place fertilizer tabs (1 tab/gallon or 2 tabs/ gallon if it is controlled release fertilizer tablets) on the bottom of the container. Fill $\frac{3}{4}$ of the pot with garden loam and place the cut end of the rhizome against the wall of the pot by keeping the growing point slightly elevated from the cut end so that the growing tip is above soil level. Spread out the healthy roots across the soil surface. Fill the remaining space of the pot with soil and press down the soil for the air trapped in the pot to escape and also to maximize the root contact with the soil. Top with river stones of $\frac{1}{5}$ to 2 inches (2-5cm) in diameter to discourage the fish from disturbing the growing medium while in search of food. Keep the growing tip free of stones.

Water Lilies with vertically growing rhizomes

Potting procedure is almost the same as above except the rhizome should be placed vertically at the center of the $\frac{3}{4}$ filled pot with garden loam. Fill the remaining space with soil followed by river stone. The growing crown should be kept just above the soil level.

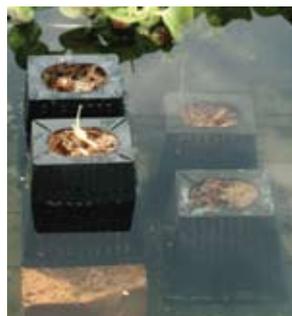
Water lilies in coco-fiber blocks from shops

As coco-fiber (not coco-peat) is relatively free of tannins, there is no need to separate it from the lily tuber while being potted. Rhizomes are properly oriented in the coco-fiber blocks so they can be placed as such along with the block. However, check with your dealer regarding the growth habit of chosen water lily tuber in the block. If the rhizome displays upright growth, it can be placed in the center of the pot without removing the coco-fiber

Potting the Marginals

block. Refer to the potting procedure for water lilies with vertically growing rhizome. If the lily rhizome is with horizontal growth, and its orientation in the block is unclear, separate the tuber from coco-fiber block and follow the potting procedure for horizontally growing rhizome. Blocks are designed with either a broad base or narrow base. If the pot is with a broad base, the broad base should be in contact with the soil. Bury the block as you should with a bare-rooted tuber with the top of pot just exposed to the surface. Do not pot wrongly by keeping a general notion that narrow top with plant should go in to the soil in the 3/4 filled pot. Rest of the procedure is similar to that one given in the prior section.

Hint: Marginals should be encouraged to sprout by standing the pot with the base just in water; avoid drowning the plants. Freshly potted water lilies should not be taken to the deeper water immediately, but placed in shallow region of the pond, keeping to a depth of about 5 inches water over the water lily crown. Once the plants are established in the pot as determined by the normal and healthy leaf production, it can be shifted to deeper water.



Fertilization of Water lilies

In addition to the initial fertilization at the time of potting, regular feeding should be done fortnightly or monthly depending upon the type of fertilizer used to sustain vigorous growth. Tropical water lilies can produce more blooms than winter hardy ones. This necessitates the insertion of plant food tablets every two weeks. On the other hand, feeding every month can satisfy the growth requirements of winter hardy lilies. If controlled release tablets are used, supplementary feeding can be reduced to once a month. It is always advisable to follow the manufacturer's instructions when fertilizer tablets are used.

Hint: Water lilies and most bog plants like nutrient rich media. For pre-potted plants in cocofiber, ensure the roots can reach into a media like heavy top soil once the initial growth is established. Replant out into the pond or in a larger container when the plants show signs of stress or overrunning out of the pot.



Potting Marginals

Marginals can display various growth habits

Clumping habit: Plantlets arise from the mother plant, remain closely attached to the main plant in clumps rather than moving away like runners, e.g. Cyperus, Scirpus, etc.

Horizontal Rhizome: Usually have partially or fully buried horizontally growing rhizome with many growing points (Acorus, Iris, etc.).

Scrambling habit: Plants with such growth habit can develop fast spreading stolons which can quickly take over a large area of pond, e.g. *Menyanthus trifolia*, *Nymphoides*, etc. Stolons are lateral stems growing above the ground or along water surface with roots at every node. Each node with roots and growing point can establish in to an individual plant. Many of them are highly invasive and should be pruned regularly to restrict their growth. As marginals are shallow rooted plants, they can be planted in pots that are shallow but wide mouthed. Heavy topsoil or the garden soil can be used to pot them. Before planting fill the pot with soil by leaving 1-2 inch space at the top.

Plants with Clumping habit: Should be placed in the center of the pot filled with soil. The growing points or crowns should be at the soil surface. As these plants exhibit upright growth, it is not necessary to use wide mouthed pots to pot them.

Plants with Creeping rhizome: Such as Sweet Flag (*Acorus sp*) and Water Iris (*Iris sp*) are generally potted in wide mouthed pots to keep the growing rhizome with in the pot. The rhizome to be potted should have growing points with anchoring roots. Place the rhizome with the cut end against the wall of the container by keeping the anchoring roots firmly in the soil. If the rhizome is without well-established anchoring roots, secure it with a flat stone on the soil. Press down the soil to minimize the air space and ensure maximum contact.

Plants with Scrambling growth habit: Can be potted at the center of the pot by covering the roots with in the soil. The plant received through mail order may be a part of stolon, a long stem with several well-rooted nodes. If so, place the stem across the soil in the pot and secure it with a flat stone.

Hint: In order to prevent the fish from disturbing the soil, the pots planted with marginals or water lies should be topped almost lynch thick with gravel. After potting do not take the pot to deeper water immediately. The established plants as determined by the normal growth with healthy leaves, can then be moved in to deeper water of your choice where they can flourish.



Fertilization of marginals

The heavy topsoil which is rich in nutrients can meet the initial growth requirements of freshly potted plants. However, fertilization at the time of potting followed by regular feeding is crucial to keep them healthy. Application of 1 aquatic plant fertilizer tablet or 2 controlled release fertilizer tablets at the time of potting to every 1-2 gallons (4-8 liters of soil) and regular application (1 normal fertilizer tablet every month or 2 controlled release tablets once in 2 months) can satisfy their growth requirements.

Potting Submerged Plants

Submerged plants such as Cabomba and Ceratophyllum found in water gardens are long stemmed plants. Short-stemmed plants with leaves in rosettes around the compressed stem also have places in water garden e.g. Sagittaria and Vallisneria spp. Long-stemmed plants are commonly sold in bunches of stem cuttings. Usually these are sold tied with a weight to sink them to the bottom of the pond where they can grow by absorbing nutrients from the water. They do develop roots and its primary function is anchoring the plant beneath the water surface rather than extracting nutrients from the growing medium. However, growing them in shallow pots with garden loam can promote healthy growth especially for plants like Dwarf Sagittaria and Tape Grass as these demand initial feeding. Adding half the recommended dose of fertilizer for marginals during potting can accelerate growth even though it is not necessary. A planting technique developed by Scott Bates of Grass Roots Nursery in New Boston enables us to grow aquatic plants in the crevices of rock works along the waterfall, wrapping plants in scape fabric with garden loam and aquatic plant food tablets. For more information, read the book titled 'Plants for Water Gardens' by Helen Nash with Steve Stroupe (page 24).

Growing Floating Plants

Floating plants can be grown in ponds where they extract nutrients from the water. However, their explosive growth not only prevents the light reaching the bottom but also deprives submerged aquatics of available nutrients. They should be grown with caution and periodic removal is highly recommended during the growth season so as to keep our water garden as a vibrant fresh water ecosystem.



Overwintering Plants

As majority of the water plants are of tropical or subtropical origin, special care should be taken to ensure they survive harsh frost conditions. All plants will succumb to frost when they are covered with ice. Some plants such as winter hardy lilies, winter hardy marginals and winter hardy submerged plants can be wintered in the pond itself so long as they are kept in the ice free area of the pond

Wintering Water Lilies

Tropical Water Lilies: Most of the water gardening hobbyists from Zone 8 or below (according to the 'Plant Hardiness Map' designed by United States Department of Agriculture) treat tropical water lilies as annuals and replace with the new plants when the new growing season approaches. However, they can be left in the pond in Zone 10, as these regions are free of frost during winter. In colder regions (Zone 9 and below), remove them from the pond and place them in a green house pond in full sun before the onset of severe frost. Feeding should be avoided, as growth is minimal. It can be transferred back to pond once the outside temperature reaches and stabilises at 21°C. This practice is only possible for those who have such green house ponds. Alternatively, we can salvage tubers (walnut like growths) developed at the base of growing points. Remove the potted plant after the second frost as this practice the soft tuber to become hard. Wash the rhizome with tubers and air-dry them for 2 days. Separate the tubers from the rootstock and wash again before storing them in damp soil or in jars of distilled water at about a temperature of 10-12 °C until the advent of next growing season. The tuber formation is a characteristic feature of tropical lilies but the number of tubers varies from species to species. Follow the same potting technique as that of tropical ones.

Winter Hardies: This group of water lilies can be treated as perennials as they tide over winter in the pond through dormancy. They can flourish at any latitude in United States; maybe even in Alaska. Winter hardy lilies will overwinter successfully in USDA Zones 3-10 provided that their rootstock are protected from ice. Push the containers in to the deepest part of the pond where they can undergo dormancy. If the pond is shallow, cover them with a plastic tent to prevent the water in deeper portion from freezing. If all above measures fail, remove them from the pond, trim off leaves and excess roots. Place them in sphagnum moss and store in around the house where they could be protected from being frozen. In this way, the rootstock would stay viable for replanting next year.

Wintering Marginals

Marginals can be hardy, semi-hardy or tropical. Confirm first, which are hardy or semi-hardy marginals in your Zone. Hardy marginals can be left at the same position in your pond. Trim back to an inch or two above the water level to keep the plant free of dry foliage. The presence of dry leaves may help the harmful insects to overwinter. Semi-hardy ones should be moved in to the deepest part of the pond. Pruning is not recommended for the semi-hardy marginals. However, dead and rotten leaves must be removed

when it is brought back to the water edges in the spring. Tropical marginals should be taken to a green house or placed indoors in a pan of water in a well-lighted window where it can overwinter. Maintaining a photoperiod of 10-12 hours for the tropical ones is always beneficial. Using artificial lights (cool daylight lamps with colour temperature around 6500 K) with the help of a timer can provide the recommended photoperiod in continuum.

Wintering Submerged Plants

Plants such as Anacharis, Elodea, Myriophyllum aquaticum (Parrot feather) are winter hardy and they can be wintered in the pond. Trim them back to an extent to keep the anchored stem in ice-free portion of the pond. Tropical submerged plants are very sensitive and should be transferred to a lighted aquarium. It will be economical to discard and make new purchase in the next spring.

Wintering Floating Plants

It is not feasible to use expensive procedures to winter low-priced floating plants, keeping them in lighted aquarium or green house ponds. They can be treated as annuals and replace them with freshly purchased ones. Do not allow them to rot in the pond in winter as it may foul the pond water. Remove them after the first frost.

General Care of Water Plants in the Pond

A well-constructed pond with a balanced blend of aquatic flora and fauna at the right location requires only minimal maintenance. Regular feeding is the crucial part of pond maintenance to keep the plants especially water lilies and marginals in its prime health during growing season. Fertilization in the form of fertilizer tablets is the most convenient way as it not only ensures balanced feeding but also prevents the pond from being contaminated with excess chemicals.

Occasional pest infestation may occur. In most of the cases, this problem can be overcome by physical means rather than through chemical. If the pond is not too large, using hand is the better way to control this problem. Shaking the infested leaves, keeping them submerged or blasting away the insects colonised on the leaves with water jets are useful measures. When the insects drop on the water surface, fish in the pond can eat them. It is always wise to remove insect damaged leaves and flowers. Pesticide usage should be the last resort as it is detrimental to aquatic fauna. If waterplants are grown in containers, move to another suitable place such as tubs or glass tanks and then treat them with chemicals with the advice of an expert



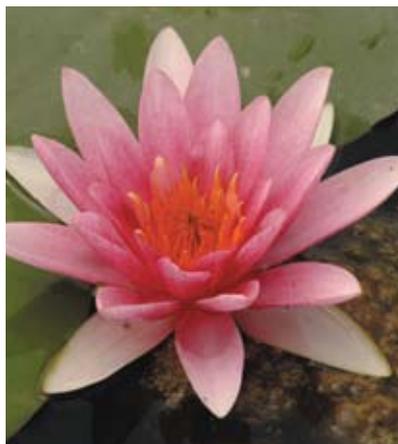
Nymphaea Charles de Meurville

Produces large fragrant flowers. It is a vigorous grower and an exceptional free flowering water lily.



Nymphaea James Brydon

Produces prolific carmine-red fragrant flowers, Grown in water depth 9 to 18 inches, suitable for tubs, medium spread. Award of Merit winner in 1906 and Silver Medal in 1899.



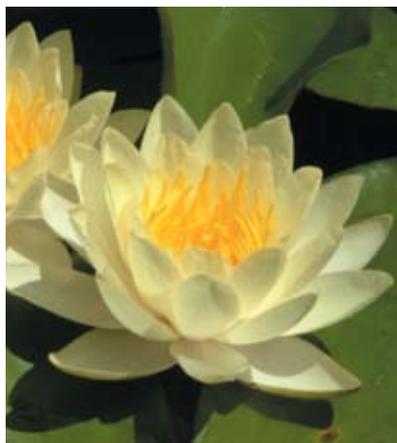
Nymphaea Rene Gerard

A free flowering hybrid with large rose-pink flowers which are star-shaped. Suitable for medium to large size ponds.



Nymphaea Attraction

Large red flower, one of the popular variety. Flower colour becomes deeper as plant matures. Grows well when given ample space and depth. Suitable for medium to deep ponds.



Nymphaea marliacea Chromatella

Also known as “Golden Cup”, Canary yellow flowers which remains open longer than most variety. The dark green foliage is mottled with reddish-brown blotches.



Nymphaea odorata “Sulphurea”

Slightly pointed yellow flowers, which are produced raised well above water. Suitable for mid to large sized ponds.



Nymphaea odorata alba

The freely produced flowers are cup-shaped and highly scented. Suitable for mid-sized ponds.



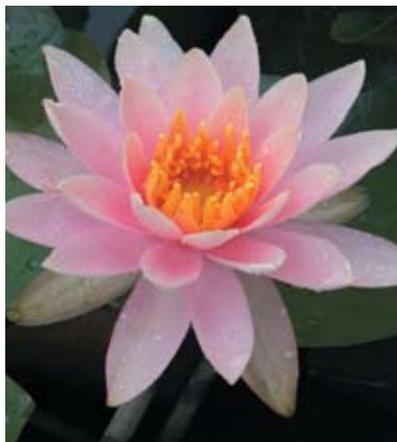
Nymphaea Gonnere

Also known as “Snowball”, produces snow white double flowers. Can grow in shallow water, suitable for small to medium sized ponds.



Nymphaea Arc en Ciel

Exceptional water lily which the appeal lies more in the foliage than blooms. Striking bronze leaves that are blotched with pink markings. Flower are star-shaped, light pink which changes to white with age.



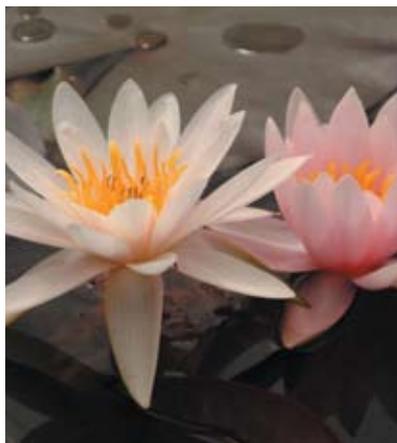
Nymphaea Colorado

Attractive salmon-pink blooms which are produced above water surface. Leaves are mottled, Suitable for medium sized ponds.



Nymphaea Ray Davis

Produces large double shell pink blooms. Suitable for medium sized ponds.



Nymphaea Rosenymphe

Light pink blooms which changes to white with age. A strong grower, suitable for medium to large sized ponds.



Nymphaea Commache

Colour changes from day to day, from apricot-yellow to deep copper red. A prolific flower, suitable for medium sized ponds.



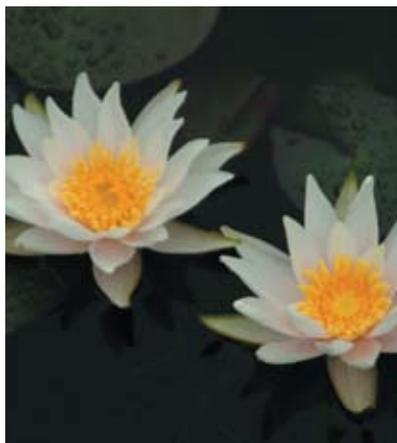
Nymphaea Sioux

Blooms are light yellow on the first day, then changes to deep orange and finally to a coppery red. Suitable for small or medium sized ponds.



Nymphaea pygmaea "Helvola"

Produces small star-shaped canary yellow flowers. Foliage are olive green and mottled with purple brown markings. A prolific bloomer for the tubs.



Nymphaea pygmaea Alba

Small star-shaped white flowers. More tolerant of colder weather. A prolific bloomer for the tubs.



Eichhornia crassipes

A floating plant with purple blooms. This is an undemanding plant. It is a controlled plants in some states. Invasive species and should not he allowed to get in to public waterways.



Pistia stratiotes

Also know as water lettuce. This floating plant has leaves which are tongue shaped and sparsely haired.



Nymphaoides indica

Produces small floating leaves which are kidney shaped. Flowers are are white in colour.

Water Depth: >10cm (4 inches)



Nymphaoides peltata

Bright yellow blooms ae produced in abundant. Leaves are green.

Water Depth: >10cm (4 inches)



Houttuynia cordata "Chameleon"

A variegated form of the normal Houttuynia cordata. Grow along edges of pond or in moist condition.

Plant height: upto 40cm (16 inches)

Hardy plant . Zones 6-10

Water Depth: 0cm (0 inches)



Iris versicolor

Also known as American Water Irises.

Plant height: 60~90cm (2~3ft)

Hardy plant Zones 4-9

Water Depth: 0~10cm (0~4 inches)



Pontederia cordata

Blue pickerel

Plant height: 60~80cm (2~2.5ft)

Hardy plant Zones 3-9

Water Depth: upto 30cm (1 feet)



Typha minima

Dwarf reedmace, a miniature rush

Plant height : 60~80cm

Hardy plant Zones 2-10

Water Depth: upto 30cm (1 feet)



k.v.Bourgondien
P.O.Box 2000
Virginia Beach
VA 23450