PROPAGATION OF HARDY WATER LILIES
by Joe F. Duft

Of the genus *Nymphaea* in the family Nymphaeaceae. The name comes from Greek meaning 'water nymph'. At least 40 species of *Nymphaea* are found naturally around the world, including the 'hardy' water lilies that survive northern winters, and the 'tender' water lilies, tropicals or subtropicals, that are not cold winter hardy. Aquatic plant growers usually classify water lilies as either hardies or tropicals. Propagation and culture is quite different for the two groups. The species and cultivars described are further divided into natives and hybrids, which apply to either hardies or tropicals. In most cases, hybrids are more popular than natives or true species, particularly those cultivars developed to combine desired traits and to provide variety.

This genus contains our most popular water gardening plants; they produce large showy flowers continually throughout summer. By comparison, yellow pond lilies (*Nuphar*) may bloom only for brief periods. No ornamental pond should be without water lilies. Besides adding interest and beauty, the floating leaves cover and shade waters, help to clear and establish biological balances in water, reduce diurnal water temperature fluctuations, reduce evaporation, and provide cover for fish and other aquatic organisms.

The size of your pond may determine the size of plants needed. Dwarf or miniature varieties are often used in tub gardens and very small ponds. In larger ponds, position the larger lilies near the center in the deeper areas, and the dwarfs and smaller varieties near the margins. For best effect, no more than 50 percent of the water surface should be covered with water lily leaves.

Several native species and numerous cultivars of hardy *Nymphaea* are available for pond use. Most are from northern latitudes, but one is subtropical.

The hardies have large, thick tubers or rhizomes, that store energy for growth in spring and are much better adapted to the cooler climates. They generally differ from tropicals, in having entire or smooth margined leaves or pads, and flowers not much elevated above the water. Some varieties may have speckled or mottled leaves, usually purple or bronze on green. The speckles fade with age, perhaps to solid green leaves.

In temperate regions, blooming begins in early summer and continues into early autumn. Being day-bloomers, the flowers open in mid to late morning and close in mid to late afternoon. Most flowers float on the surface with the leaves. Some are fragrant. If conditions are favorable, plants can have a dozen or more blooms at a time. Blossoms last 3 to 4 days, but soon are replaced by new blossoms. The position of the stamens tell the age of blossoms. On the first day, the stamens are erect or out-reaching. By the last day, stamens are reaching to the center of the flower and covering it.

After a few days of blooming and pollination, flowering pedicels of true species may coil and draw the spent blossoms under water. If the spent blossoms are removed at this time, plant energy will go into producing new blossoms rather than developing seed pods. Most hybrids or cultivars have sterile flowers, that simply rot and disintegrate in the water.

Most water lilies prefer slightly alkaline waters and dislike water turbulence, flowing or splashing, and wind. More hours of sunshine bring on more flowers and added plant growth, and these plants should have at least half a day of sunshine. Periods of prolonged hot sun, however, bring lighter flower colors and shorter blooming periods per day.

Propagation: Although true species, and some cultivars of hardy water lilies, produce viable seed, starting new plants from seed is not common practice by water gardeners. The tubers are easily divided and new plants are established with little difficulty. Since many varieties are the products of hybridization, new plants remain true to form through cloning.

Water lily plants received from a nursery usually have a portion of tuber, bare roots and some foliage attached. If any of the leaves and petioles are damaged, it is best to trim them off. Newly arrived plants, that can not be potted and placed in the pond immediately, can be stored in a pail or tub of water for several days before planting. Water lily leaves will not survive very long if out of water and exposed to dry air, and, although the tubers may not die, losing the foliage will set them back. Cover the plants with wet newspaper or plastic when out of the water. When transporting plants, place them in large plastic bag and out of the sun.

Hardy water lilies are cloned by dividing the tubers. There must be at least one eye or growth bud on each tuber portion. Division can be at anytime, but spring or fall is best. When dividing tubers, some prefer to remove all but one eye from the section. This directs the plant's energy to one growth point and can speed development and flowering. Every growth bud can potentially start a new plant, but the amount of tuber remaining with the bud will influence the rate of growth and development. Take care not to injure the buds. Lilies usually require a two to three week adjustment period, after division and replanting, before new growth begins. Potted plants can be transferred to larger containers, at any time during the season, without much affecting their performance.

Another form of natural reproduction that can occur is by the formation of brood bodies. Yellow flowered-plants with *Nymphaea mexicana* as a parent, and especially those hybrids that do not set seed, are known for this phenomenon. Brood buds can develop beside the flower buds, and grown into brood bodies, a new tuber with roots and leaves. The peduncle remains attached to the original plant until a new plant is developed and breaks away.

Selecting containers: Plant water lily tubers in pots for best control and results. Although potting and planting procedures are similar for all hardies, some consideration might be given to

the type of rhizome or tuber (horizontal and running vs. vertical or semi-vertical). The horizontal rhizome prefers a wide pot, at least 12 inches in diameter and 8 inches deep.

The size of the container and amount of soil can influence the size of the plants and blooms. Flower size will be in proportion to leaf size. For larger, more robust water lilies, use larger containers (3 gal. or more).

Several European water gardening guides recommend the use of basket weave containers lined with burlap. These containers were developed, and are popular, in England. The baskets allow water to flow through, keeping the soil aerobic and fresh, yet keep soil from leaching out into the water. Drawbacks to the baskets are that fertilizer chemicals can easily leach into the water, and the burlap eventually deteriorates (usually within a year), thus allowing soil and roots to escape the baskets. Using a weed barrier fabric, which is more durable and longer lasting in place of burlap, would be a better choice.

Most U.S. water gardeners prefer solid containers, which better confine soil, roots and fertilizers. Studies at Lilypons Nursery in Texas, showed no noticeable differences in growing water lilies in solid pots versus perforated baskets. Soils sometimes tend to sour in the solid pots, bothering people more than the plants. If ordinary plastic nursery pots with drain holes are used, line the pots with plastic or a root barrier fabric. The practice of using newspaper to cover the holes is not satisfactory, as the paper deteriorates and opens the holes in a matter of weeks.

Planting procedure: Fill the container one-third full of good, rich garden top soil. Heavy, fine-textured soils, such as clay, are much preferred over organic soils or commercial potting mixes, which can float away and dirty the water. Growers often add fast-release fertilizers, in granular or tablet form, and some slow-release fertilizers, in tablet form, to the lower levels of soil in the pots. Some use and mix well-rotted barnyard manure into the soil, as a slow lease fertilizer. Add soil to one-half full. Position the tuber at an angle in the container, with the growing crowns up and near the center of the pot, and the cut and lower end of the tuber closest to the pot wall. This provides room for new growth. Gently spread the roots and add soil around the tuber and roots, tamping around them. Cover all but the crowns and saturate the soil with water. Now cover the soil with a layer of small stone, 1/4 to 3/4 inch in size, to hold the soil in place and keep fish from mucking in the soil. Make sure the crown or growing points are well exposed. See Illustration.

Lower the pot into the pond to initial depths of 6 to 12 in. After growth and vigor is established, lower to a more appropriate depth of 18 to 30 in, depending on size and vigor of the plants. When lowering the plants, the leaf stalks will adjust rapidly to the new depth and submersed leaves will soon float. Lowering a new plant too early can result in poor performance or even eventual demise.

Chunks of lawn turf are useful for starting water lily plants, without pots, in the bottom of natural ponds. Roll the plant tuber, soil and fertilizer together in the turf; bind it with twine and lower the bundle into the pond. The roots will soon spread out into the pond substrate.

Maintenance: Under favorable conditions of light, warmth and nutrients, water lilies grow rapidly and will need to be divided at least every 3 years, but usually sooner. Overgrown lilies, that completely fill the container with tuber and roots, will deplete soil nutrients and produce smaller and smaller leaves from the multiple growing points on the tuber. It is time to divide lilies when the tubers are spreading well outside the container.

Water lilies are heavy feeders as they produce large amounts of biomass, and require periodic application of fertilizers. Remember that nitrogen promotes foliage growth and phosphorus promotes flowering. Use the proper mix or proportions of chemicals in a fertilizer for desired results. Don't use fast-release fertilizers on dormant plants. See Fertilizing Plants.

Water lily leaves live about 2 to 3 weeks, then turn yellow and die. Remove the dead leaves and spent blossoms, to prevent decomposition in the pond. Their presence adds to the pond's bio-load, lowering oxygen levels, and invites fungal infections and insect attacks. Cut these off; do not tear or yank them from the plant crown. Hailstorms can decimate lily leaves; remove the damaged leaves to prevent fungal infections.

Winterizing: Hardy water lilies expect and require a period of dormancy each year. This usually occurs when water temperatures drop below 50 degrees F. During dormancy, they must be kept wet and their tubers should not be allowed to freeze. There are several ways to accomplish this.

First, remove the surface leaves and peduncles in the fall after the first good frost when plant growth appears to have stopped. Leaves should not be trimmed up too early, however, as nutrients from the leaves are drawn back into the tubers in preparation of winter. Smaller submersed leaves may be left on the rhizome, as these will probably survive the winter under water.

The usual method of winterizing is to lower the potted plants, to the bottom of a pool, deep enough to prevent freezing. If the pond is not deep enough, or is drained during winter, the potted plants, or just the tubers, can be placed in plastic bags and stored in a cool cellar. Or the tubers can be buried in the garden, covered with deep mulch that will prevent frost from reaching them. When spring arrives and water temps rise above 50 degrees, perform the usual spring maintenance.

Natural species of hardy *Nymphaea*, mostly from the northern latitudes, are used in natural and ornamental ponds. The better known species are described below.

N. alba EUROPEAN WHITE WATER LILY. The tubers are mostly vertical, often very thick, 2 to 3 in dia, with a few stout

branches strongly attached. Leaf peduncles are clustered, at the top of the tubers, and not scattered. See Illustration. Leaves are without markings. Flowers are white and non-fragrant. This Eurasian species is parent to many popular cultivars, including many of Joseph Bory Latour Marliac's creations. Marliac was a French horticulturalist, famed for his hybridization and development of many popular cultivars during the late 19th century. Hybrids from this parentage are good performers in cooler climates of N. Europe, N. Asia and N. America. The true species is not generally available to U.S. water gardeners. Zone 5.

N. alba var. rubra EUROPEAN PINK WATER LILY. Cold-water lilies, found naturally in Sweden, have rosy pink to red flowers. Used for hybridization of many pink and red flowered cultivars. Examples are 'Andreana', 'Aurora' and 'Froebeli'. Zone 3.

N. leibergii LEIBERG'S WATER LILY. This species is easily confused with N. tetragona. Tubers and rhizomes unbranched, erect and cylindical. Stolons absent. Leaves green above, purplish below, ovate to elliptical, to 19 cm long, with diverging sinuses. Flowers white, to 7.5 cm diameters, sepals and petals in whorles of 4. Stamen yellow. Canada, ranging slightly into several northern states. Zone 2.

N. mexicana *(Castalia flava)* YELLOW WATER LILY. Semi-tropical, this species is more winter hardy than tropical water lilies, but less than the hardies. Plants have small, erect, tuberlike rhizomes rather than the massive tubers of hardies; they spread by runners. Flowers are yellow, about 4 in across, and float on the surface. Leaves are slightly larger in diameter than the flowers, have a deep cut to their center where the flaps overlap, are slightly toothed, and are deep red to purple-colored beneath. They require lots of sunlight and warm waters, and winter protection in colder climates. The tubers can survive in moderate winter conditions when placed well below frost level in ponds. This species is commonly used in hybridizing, especially yellow-flowered cultivars, as 'Chromatella' and 'Texas Dawn'. These crosses are usually sterile, not producing seed. Hardy cultivars, with *N. mexicana* heritage, are better adapted to the warmer regions as zones 8 through 10 than other hardies. Southeast U.S. and C. America. Zone 7.

N. odorata ssp. odorata FRAGRANT WHITE POND LILY, AMERICAN WATER LILY. Hardy water lilies growing, from horizontal rhizomes of 3/4 to 2 in diameters that branch, and extend several ft long. The branches are firmly attached, with their bases 1/2 to 3/4 in across. Rhizomes are whitish with long black hairs. Leaf petioles are well-distributed, along the rhizomes See Illustration, and support heart-shaped, floating leaves. Leaves are leathery, thick, roundish, deeply notched, up to 10 in across, dull green above and purplish below. Several recognized varieties or natural hybrids, originating from different localities, vary in size and flower color from white to pink. Flowers are solitary, fragrant, floating and sometimes quite large (6 in or more across). Leaf and flower size vary according to variety and amount of nutrients available to the plants. Where plants are well established in natural lakes, dense

networks of rhizomes can be found in the muddy bottoms. Dense lily populations will eventually deplete nutrients, from the substrate soils, and plants will grow progressively smaller. Their attractive flowers bloom throughout summer, opening in morning and closing in late afternoon. This species is easy to grow and tolerates a fairly wide range of pH conditions. Varieties of *N. odorata* have proven capable of surviving dried up ponds, especially in late season. Parent of many of our popular cultivar water lilies, as 'American Star', 'Arc-en-Ciel', 'Dallas', 'Firecrest', 'Rose Arey' and 'Rosy Morn'. Naturally found in non-alkaline lakes and ponds in eastern U.S., introduced into West. Zone 5.

***N. odorata* 'Rosea'** *(N. odorata* var. *rosea)* CAPE COD PINK WATER LILY. Natural pink-flowered variety found in some eastern U.S. localities. Leaves brownish green and mottled with purple. Flowers rise above the water surface. Found in several eastern U.S. states. Zone 5.

***N. odorata* 'Sulphurea Grandiflora'** (*N.* 'Sunrise'). Cultivar with pale yellow flowers from natural hybridization with *N. mexicana*. *N. odorata* 'Sulphurea', with smaller pale yellow flowers, is also a cross with *N. mexicana*, and neither are varieties. Both hybrids have sterile flowers, not setting seed. Clone by tuber division or brood bodies. Zone 5.

N. odorata* ssp. *tuberosa *(N. tuberosa)* TUBEROUS WHITE WATER LILY. Originally known as a separate species, it has been placed under *N. odorata* as a subspecies. It has larger tubers, large, non-fragrant flowers held above the water, large roundish leaves, and a limited natural range. Its thick rootstocks or tubers have numerous, slenderly attached tuber-like branches, often compound, that detach easily. Tubers are pale in color with fine dark hairs. Leaves, to 15 in across, are green above and below. Flowers are white, 4 to 9 in across, petals tips blunt, opening about 8:00 am and closing during midafternoon. A parent to many cultivars, including 'Gladstone', 'Gonnere' and 'Mayla'. Natural range Great Lakes region of U.S., often in more alkaline waters than other subspecies. Zone 3.

N. tetragona PYGMY WATER LILY. Tubers, leaves and flowers similar to *N. leibergii* with some exceptions. Young leaves are mottled with reddish brown or purple on top and brownish below. The fragrant flowers have recepticals with a distinct tetragon appearance, and have prominent lines of insertion for the petals. The name *N. pygmaea* was misapplied to this species in some earlier publications. A parent to several of our dwarf hybrids including 'Helvola' (a cross with *N. mexicana* that is fertile) and a few of Marliac's 'Laydekeri' series. Circumboreal, of colder latitudes, natural populations probably do not exist in the contiguous U.S. Zone 2.

Hardy hybrids: This is the most popular group of water lilies for water gardens. There are hundreds of cultivars to choose from, in different sizes and colors. Hybrids are often produced by cross-pollination of two or more native species and even with other hybrids, as long as their seed remains viable. Origins and parentages of some may be evident from rootstock growth habits,

as described for each major parent species, *N. odorata, N. tuberosa, N. alba,* and *N. tetragona*. *N. mexicana* is semi-hardy, but is a parent to many yellow-flowered cultivars of hardy water lilies.

Other hardy species sometimes used in hybridization efforts are *N. candida, N. candidissima, N. fennica, N. gladstoniana, N. occidentalis* and *N. sphaerocarpa*. After several cross-pollination efforts, it becomes difficult to determine the parentage of the cultivars. The end result of hybridization is often sterile cultivars that do not produce seed.

Some varieties are termed 'changeables', that is, flowers change colors over their several days of blooming, usually lighter to darker in color. Flower color can depend, to some extent, on the amount of sun received and the ages of plants. Darker colors normally come with less sun and with older plants.

See **Selected Cultivars of Hardy Nymphaea** for a listing and information on some of the more popular cultivars.

FERTILIZING PLANTS: Plants that require rich soils and produce considerable bio-mass during a season, can be described as 'heavy feeders'. Plants such as water lilies and lotus are heavy feeders and require periodic fertilizing. Fertilize in the spring after the roots are established and growth has begun. By midsummer, when leaves get smaller and plants have fewer blooms, it is probably time to fertilize again.

Fertilizer tablets are a convenient way to fertilize on a regular basis. They come in various sizes, starting with 5 gram tablets. Even the large tree fertilizer spikes can be divided and portions used. Fertilizers contain several important elements; the primary three are designated by a formula on the container giving the percentages of nitrogen, phosphorus and potassium in that order. A formula as 15-10-5 indicates 15% Nitrogen, etc. Nitrogen is most important, as it promotes foliage and overall growth. Phosphorus promotes bloom production, while potassium is essential for the life processes of plants. Which formulation to use depends on the species and the time of season. New plants starting in spring need nitrogen for development. Later in the season, when plants are fully developed, phosphorus will help produce more blooms. A formulation or ratio of 10-14-8 is suggested for waterlilies and lotus during summer. This ratio is not as important for marginal plants.

Fertilizers are developed to provide slow to fast time release of essential elements to the plants, thus affecting the amounts and frequency in which fertilization may be required. Two commercial tablets used for water plants are Pondtabs(R), a faster release tab, and Aquatic-tabs(R), a slower release tab.

Place the tabs near the pot bottom during potting, or push the tabs well into the potted soil and cover them to prevent leaching of compounds into the water. The recommended amount is usually 2 to 3 tablets per application for a 3-gal pot.

Granular garden fertilizers can be used during potting by mixing with soil, or granules can be wrapped in paper or cloth and placed near the bottom of the pot. Since most granular products are fast release, fertilizer compounds can leach into the water and be responsible for an algal bloom.

It is important not to over fertilize plants. For example, if potassium is too high, it can create a magnesium deficiency in some plants. This has been observed with golden club, water arum, lotus and pickerel weed. During spring potting, one or two slow release fertilizer tabs are recommended. Wait until growth has started before applying highly concentrated, fast acting fertilizers. Fertilizing too late in the season is probably of little value and may harm the plants.

Organic fertilizers, as well-rotted manure, bone meal and compost can be used. They have a much lower concentration of elements than commerical fertilizers, and provide a slow release of nutrients. During initial potting, mix these with soil, half and half, and fill the bottom half of the pot with the mix. Fill the top half with soil only. Wet and firm up the organic materials during potting. Compost typically compresses and shrinks as it becomes saturated and soil levels may drop in the pot. The pond water may stain brown for a period from tanic acids in manure, but this is easily removed through water filtration or water change.

A product called the Water Snake(R) is an alternative to using tabs or solid fertilizer. It is produced by, and kits are available from, Davis Creek Nursery, McCalla, AL. A coiled plastic tube with tiny holes is placed in the bottom of a solid plant container, and is covered with a porous, root barrier fabric. Soil and the plant are placed on top as with normal potting. A portion of larger tube, attached to the tube coil at the bottom, extends up the side and out the top of the container for injection purposes. Small amounts of liquid fertilizer are injected through the tube into the bottom of the plant container. Since all of the tube is normally under water, a small stop valve prevents the fertilizer from draining out into the water. Fertilization is easily accomplished on a regular basis without disturbing the container or roots of the plant.

SELECTED CULTIVARS OF HARDY NYMPHAEA

Spread: (L)arge = 12+ sq ft//(M)edium = 6-12 sq ft//(S)mall = 1-6 sq ft
Sunlight: (F)ull = >6 hrs direct //(P)artial = 3-6 hrs direct // (S)hade = as little as 2 hours direct sun, (?) = not rated.
Flowers: Flower petal colors (may change with age).
Leaves: Mature leaf colors or patterns, as blotched, mottled, marbled, speckled or edges (margins) darkened. Young leaves are often darker, speckled, blotched, etc., while mature leaves are solid color.
Tubers: Prominent parent type, as (O)dorata, (T)uberosa, (M)arliac or alba, and tetra(G)ona.

Name	Spread	Sun	Flowers	Leaves	Tubers
N. 'Alba Plenissima' (Hermine)	S/M	?	white	bronze/green	T
N. 'Albatross'	S/L	?	white	olive green	M
N. 'Amabilis' (Pink Marvel)	M/L	?	med pink	dark green	M
N. 'American Star'	S/M	F	salmon/pink	purple/green	O
N. 'Andreana'	M	?	red/orange	blotched	M
N. 'Apple Blossom Pink'	M/L	?	shell pink	green	O
N. 'Arc En Ciel'	M	F	white/pink	mottled	O
N. 'Arethusa'	S/L	?	dark red	purple blotch	M
N. 'Atropurpurea'	M	?	deep red	purple/green	M
N. 'Attraction'	L	F/P	garnet red	green	M
N. 'Aurora'	S	?	peach/pink	mottled	M
N. 'Bory de Saint-Vincent'	S/L	?	red/pink	purple mottled	M
N. 'Brackleyi Rosea'	M/L	?	ivy/pink	purple/green	O
N. 'Caroliniana Nivea'	S/M	?	white	green	O
N. 'Caroliniana Perfecta'	M/L	?	salmon/pink	dark green	O
N. 'Charlene Strawn'	S/L	F/P	light yellow	green/blotched	M/O
N. 'Charles de Meurville'	M/L	F	wine-red	green	M
N. 'Charlie's Choice'	M	F/P	copper	dark green	?
N. 'Cherokee'	S/L	?	red	purple mottled	M
N. 'Chrysantha' (Graziella)	S/M	F	pink/orange	marbled purple	M
N. 'Colonel A. J. Welch'	M/L	F/P	light yellow	green/edged	M/O
N. 'Colorado'	M/L	F	salmon/pink	.	?
N. 'Colossea'	L	?	light pink	dk green/edged	M
N. 'Comanche'	M/L	F/P	copper/orange	speckled purple	M
N. 'Conqueror'	M	?	red/pink	dk green/edged	M
N. 'Dallas'	M	F	pink	.	O
N. 'Darwin' (Hollandia)	M/L	F	pink	dk green/edged	M
N. 'Ellisiana'	M	F	red	purple blotched	M
N. 'Escarboucle' (Aflame)	M/L	F/P	red	green/edged	M
N. 'Eugene de Land'	M/L	?	pink	green	O
N. 'Fabiola' (Pink Beauty)	S/M	F	pink/flecked	dark green	M
N. 'Firecrest'	S/M	F	pink/red	dk green/edged	O
N. 'Formosa'	M/L	?	pink	olive grn/edged	M
N. 'Froebeli'	S/M	F	wine red	green/edged	M
N. 'Fulva'	S	?	orange/red	purple mottled	M
N. 'Gladstoniana' (Gladstone)	L	F/P	white	dark green	T
N. 'Gloire du Temple-sur-Lot'	L	F	pink/yellow	brown/grn/edged	T
N. 'Gloriosa'	S/M	F/P	rose/red	purple blotched	M
N. 'Gold Medal'	M/L	?	yellow	purple mottled	M
N. 'Gonnere' (Snowball)	S/L	F	white	dark green	T
N. 'Hal Miller'	S/L	F/P	white	dark green	M

N. 'Helen Fowler'	M/L	?	med pink	bronze/green	O
N. 'Helvola' (Yellow Pygmy)	S	F/P	yellow	purple blotched	G
N. 'Hermine'	S	F/P	white	olive green	M
N. 'Indiana'	S/M	F/P	red/orange	purple mottled	M
N. 'Irene Heritage'	S/M	?	red	bronze/green	M/O
N. 'James Brydon'	M	F/P	dark red	purple marbled	M
N. 'Japanese Pygmy Red'	S/M	?	light pink	purple/green	G
N. 'Joanne Pring'	S	?	pink	purple marbled	G
N. 'Joey Tomocik'	M	F/P	yellow	.	?
N. xlaydekeri 'Alba'	S	F	white	blotched/green	G
N. xlaydekeri 'Fulgens'	S/M	F/P	crimson	dark green	G
N. xlaydekeri 'Lilacea'	S	?	pink lilac	purple blotched	G
N. xlaydekeri 'Purpurata'	S/L	?	pink/white	purple blotched	G
N. xlaydekeri 'Rosea'	M	?	pink	purple marbled	G
N. 'Lilypons'(P. Double Pink)	M	F	pink	dark green	?
N. 'Little Sue'	S	?	orange	.	?
N. 'Louise'	M/L	F	red	bronze/green	O
N. 'Luciana'	S/L	?	med pink	bronze/green	O
N. 'Lucida'	S/L	F/P	rose/pink	marbled	M
N. 'Lustrous'	S/L	?	salmon/pink	dk green/edged	M
N. 'Mansaniello'	M/L	F/P	rose/pink	green	?
N. xmarliacea'Albida'(White)	M	?	white	dark green	M
N. xmarliacea'Carnea'(Flesh)	M	F/P	shell pink	green/edged	M
N. xmarliacea'Chromatella'	M	F/P	light yellow	blotched/edged	M
N. xmarliacea'Flammea'	M	?	red	brown blotched	M
N. xmarliacea'Rosea'(Rose)	M/L	?	rose	bronze/green	M
N. xmarliacea'Rubra Punctata'	S/M	?	red/purple	green	M
N. 'Mayla'	M/L	F	dark pink	dark green	T
N. 'Mananiello'	S/L	F/P	dark pink	green	M
N. 'Maurice Laydeker'	S/M	?	strawberry	purple blotched	M
N. 'Meteor'	M	?	red/pink	dark green	M
N. 'Mme Wilfron Gonnere'	M/L	F	red/pink	green	M
N. 'Moorei'	M	?	med yellow	purple blotched	M
N. 'Mrs. C. W. Thomas'	M/L	F	light pink	dark green	O
N. 'Newton'	S/L	?	wine red	purple blotched	M
N. 'Norma Gedye'	M/L	?	med pink	purple/grn/edges	M
N. odorata 'Sulphurea'	M	F	yellow	purple blotched	O
N. 'Paul Hariot'	S	F/P	copper/red	green	E
N. 'Paul Hoffman'	S/M	?	yellow	green/flecked	M
N. 'Peaches & Cream'	M	F	peach/yellow	green/mottled	?
N. 'Pearl of the Pool'	S/L	F	pink	green/veiny	O
N. 'Perry's Baby Red'	S	?	dark red	purple/green	M
N. 'Perry's Black Opal'	M/L	?	dark red	bronze/green	M
N. 'Perry's Double White'	M	F	white	green	M/T
N. 'Perry's Dwarf Red'	S	F	red	bronze/green	M/T
N. 'Perry's Fire Opal'	M	F	rose	green/veiny	O
N. 'Perry's Magnificent'	M/L	?	dark rose	bronze/green	O
N. 'Perry's Pink'	L	F	rose pink	purple/green	O
N. 'Perry's Pink Opal'	M	F	pink	.	?
N. 'Peter Slocum'	M/L	F	pink	purple/green	O
N. 'Picciola'	S/M	?	purple/red	dark green	M
N. 'Pink Opal'	S/M	F	pink	bronze/green	O
N. 'Pink Sensation'	M/L	F	pink	purple/green	M
N. 'Pink Starlet'	M/L	?	light pink	bronze/olive	T
N. Xpygmaea'Rubra'(Red Pygmy)	S	?	red/pink	bronze marbled	G
N. 'Queen of Whites'	M/L	F	white	green	?
N. 'Radiant Red'	S/L	F	red/flecked	green	M
N. 'Ray Davies'	M/L	F	pink	green	O

N. 'Red Sensation'	L	?	red	bronze/green	M
N. 'Red Spider'	M	?	light red	.	?
N. 'Rembrandt'	M/L	F	maroon/red	coppery	?
N. 'Rene Gerard'	M/L	?	dark rose	bronze/green	M
N. 'Robinsoniana'	M/L	?	orange/red	blotched/edged	M
N. 'Rosanna'	M/L	?	med pink	purple/green	O
N. 'Rosanna Supreme'	S/L	?	light pink	mottled/green	M
N. 'Rose Arey'	S/M	F/P	rose pink	purple/green	O
N. 'Rose Magnolia'	L	?	light pink	bronze/green	T
N. 'Rosy Morn'	M/L	F	shell pink	purple/grn/edged	M
N. 'Sanguinea'	M/L	?	red	purple mottled	M
N. 'Seignoureti'	S/L	?	apricot/pink	maroon blotched	M
N. 'Sioux'	M/L	F/P	copper/orange	green/purple	M
N. 'Sirius'	M/L	F/P	vermilion	blotched	M
N. 'Solfatare'	S/M	?	yel/apricot	green/mottled	M
N. 'Somptuosa'	M/L	F	pink/red	purple mottled	M
N. 'Splendida'	S/M	F/P	ruby red	purple/green	M
N. 'Sultan'	L	F	red/pink	green	M
N. 'Sunrise' (s. Grandiflora)	L	F	yellow	green	O
N. 'Superba'	M/L	?	white	bronze/green	O/T
N. 'Super Red'	M	?	red	dark green	?
N. 'Texas Dawn'	M/L	F/P	light yellow	green/blotched	M
N. tuberosa 'Maxima'	L	?	white	dark green	T
N. 'Venus'	M/L	?	red	green	M/T
N. 'Vesuve'	S/M	F	red	green	M
N. 'Virginalis'	M/L	F	white	purple/green	M
N. 'Virginia'	M/L	F/P	white	dark green	M
N. 'William B. Shaw'	M	?	rose	.	O
N. 'William Falconer'	M/L	F	dark red	maroon blotched	M
N. 'Wow'	M/L	?	red/purple	red/green	O
N. 'Yellow Comanche'	M/L	?	yellow/orange	bronze/green	M
N. 'Yellow Princess'	S/L	?	yellow	dark olive	M
N. 'Yellow Queen'	L	?	yellow	dark olive	M
N. 'Yellow Sensation	L	?	yellow	olive	M