Hybridizing Lotuses

by Stephen Garton

Wholesale growers are constantly searching for new and improved plants for their customers, who in turn supply them to the end consumer. As a grower, I take the responsibility seriously to get a good selection so water gardeners can have much to choose from, with new and improved varieties each year. When we find new plants and knowledgeable people we take notice. One such man is Stephen Garton; he has a passion and knowledge for Nelumbos. Stephen first saw them growing to perfection at Davis Creek Nurseries, which peaked his interest. He then studied the native Nelumbo lutea growing wild in some Alabama lakes and was further intrigued when observing them in chest deep water, with leaves and flowers well over his head. Inspiration came from seeing their beauty in that environment. Then he started collecting both American and Chinese cultivars, and realized there was an opportunity for breeding. Many water gardeners don’t realize the work that goes into the creation of new plants, but I’m sure they appreciate the time and effort of people like Stephen Garton. – Stu Schuck, Charleston Aquatic Nurseries

The group of aquatic plants called lotus includes members of two species in the genus Nelumbo, N. nucifera (Asiatic or Sacred lotus) and N. lutea (American lotus). The Asiatic lotus is native to a large area encompassing parts of Africa, Asia, and Northern Australia, including Egypt, India, Thailand, Indonesia, China, and Japan. The Asiatic lotuses are historically and culturally significant in many parts of Asia, where the flowers represent the Enlightenment of Buddha. Plants within this species have flowers that range from white to a dark reddish pink. Several selections exhibit petals with bicolor characteristics and have combinations of both white and pink. Also, certain varieties exhibit a prolonged flowering season and in China where lotus tubers and seeds are part of the local cuisine, plants have been selected for seed, tuber, and flower production.

The natural range of American lotus is restricted to the North American continent. Plants are found in still or slow-moving water from the East Coast to as far west as Texas and Oklahoma, and north into Minnesota and Wisconsin. All plants of N. lutea produce flowers that

The flowers of Nelumbo ‘Big Ben’ are borne on 5-6’ tall stems and rise more than 6” above the leaves. They keep their color for the full five days of blossom life.
are a pale lemon yellow. The flowers are produced over a short season during mid-summer. Hybrids have been created between the Sacred and American species with several cultivars available commercially from the breeding efforts of Mr. Perry Slocum.

**Procedures**

I started growing lotus in 1995 as a result of a research project I managed while working at Alabama A&M University. Lotus plants quickly interested me so I started collecting varieties with a view to doing some hybridization. Unfortunately there was little published information in library databases about hybridizing or growing from seeds.

I collected seeds from local American lotus and studied various ways to encourage seeds to germinate. During the first summer of cultivation I observed the behavior of insects visiting the flowers, the production of pollen by the anthers, and the apparent maturity of the stigmas. From these observations I concluded that stigmas seemed to be receptive to pollen during maturation of the flower bud and that pollen was dehisced (released) from anthers only after the buds were completely open. I also concluded that there was a discrete period between the stigma surface maturity and the production of pollen by anthers. This favors cross pollination and only as a final resort (absence of another flowers’ pollen) is self pollination possible.

During the first years of cultivation of Asiatic lotus I observed there was much variation in characteristics of the varieties I had collected. These characteristics included vigor, plant size, flower color, length of flowering period, numbers of flowers per plant, and numbers of petals per flower. I was particularly impressed with the wide variation in growth habit, from dwarf plants with leaves of 4” diameter to very large almost giant plants with leaves greater than 2’ diameter. Flowers produced on all sized plants varied from single blooms with five petals to blooms with more than sixty petals. Larger plants tended to produce larger, more robust flowering structures. My objective in breeding was to select plants with a long flowering season that were small to intermediate in size, with potential for production in smaller pots and containers of 10 gallons or less.

I made crosses in the mornings, usually between 7:30 and 9:30 a.m., by removing ripe anthers from open flowers which were producing pollen. The pollen was transferred to unopened flower buds when the stigmas were producing a clear fluid from their surface. The flower buds were selected which I judged to be one or two days prior to opening.

N. ‘Embolene’ is an intermediate sized plant with flowers that fade to a very pale pinkish white. It bears large numbers of flowers from June through August, and even into September if no seed capsules are left on the plants to mature.

N. ‘Alexander the Great’ is a large lotus with leaves about 21” in diameter on stalks 5’ above the water. Flowers rise about 6” above the leaves and are produced over a long season from late June to late August.

The Lotus is historically and culturally significant in many parts of Asia, where the flowers represent the Enlightenment of Buddha. The American lotus is one of North America’s most outstanding native plants.
Pollen was placed on stigmatic surfaces by holding the anthers with tweezers and opening flowers with the aid of a small pencil inserted into the tip of the bud to pry open the flower. I gently brushed the ripe surfaces of the stigmas with the detached anther to allow pollen to stick. It was not necessary to emasculate or remove anthers from such flowers since the stigmatic surfaces changed colors showing their stage of maturation. When available for pollen the stigmatic surfaces were usually pale yellow and generally turned brown when pollen was produced, indicating the period of receptivity had expired. I labeled each flower with a small jewelry tag containing the names of both parents.

Pollinated flowers usually lost petals and anthers within 24 hours. Seed capsules developed rapidly and remained green for about 1 month after pollination before turning brown and reaching maturity. I harvested and stored mature seeds. Seeds were germinated the following spring by soaking in water after filing the hard seed coat to reveal the inner flesh. The soaking water was changed daily and the seeds germinated within 4 to 6 days at around 75-80°F.

The lotus seed is unusual since the first structure to emerge is a petiole or leaf stalk rather than the primary root of the seedling. The petiole produced by the germinating seedling extends rapidly to reach the surface of the water. Seedlings with signs of petiole growth were transplanted to small containers containing about 1-2” of soil and were immersed in watertight 5 or 10-gallon pots.

To my surprise, about one third of the seedlings from my first hybridization attempts produced flowers in the first year of cultivation. After 2 years of cultivation almost 90% of the seedling plants had produced flowers in the growing conditions prevailing in north Alabama.

During the first two summers I selected several plants which showed some desirable characteristics, such as early and persistent ability to produce flowers, general vigor and overall robust nature, lack of susceptibility to insects such as aphids, and adaptation to small containers. After a further 2 years of trial and propagation I have named some of the superior performers.

**Noteworthy New Hybrids**

**‘Embolene’**

This is an intermediate sized plant which bears pink and white bicolor flowers that fade over 4 or 5 days to a very pale pinkish white. The plant bears large numbers of flowers over a long season from June through August, and even into September if no seed capsules are left to mature on plants. Tuber production is very good and plants started from a two or three node tuber generally flower by the last week of June in Alabama. Foliage and flowers of ‘Embolene’ make a magnificent display in ponds or containers and with good management can be a focal point throughout the summer.

**‘Alexander the Great’**

‘Alexander the Great’ is a large lotus with leaves about 21” in diameter on stalks that rise up to 5” out of the water. Flower stems rise about 6” above the leaves and bear magnificent large flowers which are a vivid dark pink to red. Flowers are produced over a long season from late June to late August. Tuber production is good and plants respond to regular application of a complete fertilizer. The plant makes a splendid specimen in containers or ponds. Containers of at least 24” diameter are preferable since this plant may outgrow smaller vessels.

**‘Big Ben’**

The growth characteristics of this plant are similar to ‘Alexander the Great’ but flowers of ‘Big Ben’ are borne on taller stems and flowers are of a rich full pink that hold their pigment for the entire five days of blossom life. Flower season is long and similar to ‘Alexander the Great’.

**‘BonnieClyde’**

This is an exceptional plant with a prolonged flower season from May to September, if spent flowers are removed before seeds are allowed to swell. The leaves are about 12” in diameter and held 24-30” above the water. Flowers are borne on stems which rise about 6-8” above the leaves. Flowers are a rich dark pink that fades to a delicate pale pink on the fifth day of bloom. The tuber production is slight and usually restricted to the two swollen terminal internodes of the runners.

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**To Make Contact**

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