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## HYBRIDIZING, SELECTING, AND GROWING NEW FORMS OF *KALMIA LATIFOLIA*

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### HISTORY AND BACKGROUND

Although grown by relatively few nurseries until recently, the native mountain laurel, *Kalmia latifolia*, has had a number of devotees over the years. It was one of the first broadleaf evergreens we grew at Weston Nurseries; we first listed it for sale in our 1935 catalog. Those early plants were collected from the wild and grown in our fields to regenerate roots. It wasn't long before we noticed a significant amount of variation in flower color and began to see potential for interesting color in late spring landscapes.

In 1937 we bought some plants from Ernest Borowski, a nurseryman from Norwood, Massachusetts, who grew pink-flowered seedlings. These plants were originally grown and perhaps hybridized by Charles O. Dexter in his quest for more colorful flowers. Dexter was the first person we know who worked on improving mountain laurel. We soon found that our customers enjoyed having more colors from which to choose and by about 1945 we were beginning to raise seedlings of our own.

Things do not happen quickly in the nursery industry. Even though we had sold colored forms for some years it was not until 1959 that we grew enough to list in our catalog. At that time we charged a 50% premium for pinks selected from our growing fields. Since then we have refined our selection process and growing techniques. By the 1970's we were separating colored forms into three major groups: pink, red-bud-

ded, and fuscata (banded). However, the majority of our sales were still the mixed seedlings (whites to light pinks) that we grew as regular *K. latifolia*. In the late 1950's we began noticing significant variation in plant growth habit and foliage. We started separating and observing some of the best, propagated some by grafting, and tried to root them from cuttings. Further development of named clones was seriously hindered by their difficulty of propagation. We continued to select seedlings and began to build up a rather large collection of unusual plants, but were unable to grow very many because of difficulties in propagating them efficiently.

Today, thanks in large part to tissue culture and clones that root more easily, we are growing and listing more forms of *Kalmia* than ever before. In 1985 we sold over 7500 *K. latifolia* in the 15 in. to eight ft size range. Almost 90% of them were the white to light-pink forms. *Kalmia* sales accounted for about 4% of our total income in 1985. We see a large potential for increased sales, especially with the newer selections now becoming available, and particularly to home gardeners who are largely unfamiliar with *Kalmia*.

#### BREEDING AND GROWING FROM SEED

There are four methods we use to produce mountain laurel seed. Collecting open-pollinated seed from field-grown or native plants is the easiest method and yields mostly white to light-pink flowered plants. Using open-pollinated seed from selected individuals is another approach which yields a large percentage similar to the parent, but we have experienced regression if isolated plants are used. The third method, caging, was used extensively by Dick Jaynes in his hybridizing programs. Seeds formed on plants that are enclosed in a cage with bumble bees have produced relatively predictable results. Lastly, hand pollinating between selected parents is the surest, though most tedious method. It also produces smaller numbers of plants but most are very predictable in flower color.

We harvest seed in October when capsules are mature, brown in color, and beginning to open. Cleaned seed is sown indoors in 6 in deep seed pans during December without stratifying. Our medium consists of about 1 in. of pure leaf-mold from the forest on top of 3 in. of perlite which is on a mesh screen over crushed stone. Germination occurs within 2 weeks and we transplant to flats during January and February. Seedlings grow in the greenhouse until danger of frost has passed and are then moved to outdoor frames where they remain until the spring of the next year. Minimal fertilizer is used during this period and top growth is sheared to encourage branching. Most often we transplant the 3 to 6 in. plants

into 5 ft beds about 7 in. apart until they are large enough to be grown in the open field 2 to 3 years later. Shade lath (50%) is used the first season in beds. In recent years we have transplanted some plants into containers both at the mature flat size and at the mature bed size. We are finding that containerized plants grow faster and more uniformly than comparable field-grown ones, but are more susceptible to root diseases.

When the 5-year-old seedlings are moved from beds to the open fields they are planted on an 18 × 18 in. format and mulched with wood chips or bark mulch. Over the next 5 years most of them are sold. The remainder are transplanted to 4- or 5-foot rows and grown until they are about 3 or 4 feet tall. We have had best results with bareroot *Kalmia* when it is transplanted in spring, although all seasons have proven successful. Plants moved bareroot in summer, fall, or winter tend to take about a year longer to recover from transplant shock. Balled and burlapped plants show no significant seasonal differences.

Growing tissue culture propagated plants requires a somewhat different approach until the time they are transplanted into flats. Much more detailed attention must be given the unrooted cuttings from the time they are harvested until they root and put on a flush of growth. Their dormancy requirement is also critical; we have experienced difficulties in restarting growth without a dormancy period. We now harvest plantlets so they can be kept in active growth until they can conform to the normal seasons and then be treated similarly to seedlings. Based upon our limited experience in growing tissue culture plantlets, the culture in beds, fields, and containers seems to be the same as that for seedlings.

## EVALUATING AND SELECTING

We observe the plants growing in our fields and evaluate for characteristics of flowers, foliage, and growth. Flowers are judged by bud and corolla pigment, how the color changes as the flower matures, size and shape of individual flowers, distribution of flowers on the plant (truss or loose), date of flowering, bud set, alternate-year-flowering tendencies, and comparative earliness or lateness of bloom. Foliage is rated by size, color, shape, texture or leaf density, gloss, insect and disease susceptibility, color of stems and new shoots, and tendency to discolor in winter. Growth is characterized as upright, spreading, bushy (suckering readily), fast, slow, or compact; and winter hardiness is also evaluated.

Evaluation of flower color is a very subjective process. I have seen plants classified as "red-budded" whose buds are not as dark as some pink forms. Seasonal variation, maturity of the flowers, planting location, and other factors can apparently influence color of flowers, especially pink and red-budded forms.

We begin evaluating red-budded and pink forms when the first flowers begin to open. There is a period of about a week and a half in Hopkinton during which the most reliable evaluations can be made each year. Before or after this period some of the red-budded forms may appear pink, or vice versa. Banded flowers require a fully open corolla because bud color can be the same in continuous or non-continuous bands. We choose only the continuous bands to be designated as fuscata. Red-budded forms are selected only from those flowers whose buds are truly red, not merely dark pink. Pink forms are best chosen when about half the flowers have opened and many pinks tend to intensify at this stage.

We tag plants individually as we select for color using commercially available vinyl tape. Pinks are tagged with orange (which fades far less than pink or red in the outdoors). Fuscata is tagged with blue tape. Red budded selections are tagged with individual red metal labels. These selections are either sold as tagged from their growing areas or individually transplanted to larger rows and grown on as "selected" forms. Blooming time is when we often begin evaluating because that's when we observe all the plants we grow. A better time to evaluate, though, is when they are not blooming because observations are not influenced by dramatic flower characteristics. We have found that soil fertility and consequent plant vigor can drastically alter the appearance of foliage. For this reason we try to observe foliage and growth characteristics of selected individuals over a period of years. Tissue culture now offers us the opportunity to propagate an appropriate number of plants to grow in different conditions and evaluate more reliably.

Growth characteristics tend to be most apparent in older plants. Our selection 'Twenty' was observed for at least a dozen years before it became apparent that it might be a truly compact growing form. Again, tissue culture would have been of great value because the original plant would not have had to be "chopped up" to get enough propagating stock. It could have been evaluated more readily along with the younger plants that were growing in different areas and many years might have been saved.

## THE FUTURE

It is hard to envision the implications that tissue culture propagation creates for *K. latifolia*. Rarely has technology provided such a sudden impact on the availability of a previously hard-to-propagate major native plant. Tissue culture, in combination with dramatic improvements in color and form, creates the potential for vastly expanded availability of choice landscape plants unlike any the buyer has ever seen.

We are very excited about the prospects of *Kalmia* finally becoming a major landscape plant. The majority of the plants we grow and sell for the next few years will probably continue to be seedlings and selections. The testing and growing of clones will be expanding and we will offer many named cultivars within a few years. During this time we will be concentrating on properly developing a market to meet the anticipated supply of new forms.

I see three challenges to the nursery industry that are particularly evident with *Kalmia* but really apply to all nursery crops. These are:

(1) Establishing industry-wide standards for evaluation — rhododendrons and roses already have such criteria; a similar set of guidelines should be set up for *Kalmia*.

(2) Setting parameters for landscape performance. Because of the more exact cultural needs of *Kalmia*, our industry has an obligation to let the customer know how to succeed with it in the landscape.

(3) Develop effective marketing to maximize benefits to the consumer as well as the grower. We must have a system to assure that these superior new forms are grown and offered for sale to take best advantage of their virtues and create high customer satisfaction.

### **PROPAGATING AND PRODUCING *KALMIA LATIFOLIA* CONVENTIONALLY**

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We had been experimenting with rooting cuttings of native mountain laurel taken from burned-over areas of our mountains for several years prior to the introduction of the