

Developing New Woody Landscape Plants

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There is tremendous potential for developing superior new landscape plants. New plants create excitement for gardeners. They are the new models for the landscape industry. Breeding, evaluation, selection, and introduction of new plants is a long term process and requires considerable resources. However, nurseries can be involved in plant selection and introduction without devoting a lot of additional resources. To be successful in selecting and introducing new plants a person needs to have a strong interest in plants, have knowledge of existing cultivars of the species of interest, be observant, and hope for some luck. Thus most nurseries can be involved. In fact the vast majority of new plants introduced into the nursery trade come from introductions by nurseries. Production nurseries have the advantage in selecting superior individual plants in that they are normally growing large populations of plants as part of their normal production. If nursery employees are observant during their normal production practices, they can spot the individual plants that are distinctly different from the majority of plants in a population. These can then be tagged and propagated for further evaluation and possible introduction. Thus there is little additional expense. A researcher at a nonprofit institution can not afford to grow comparable-sized populations. Thus they need to expend their efforts on populations that possess much greater diversity than usually grown in a nursery production field. However, at the same time nonprofit institutions can devote the resources required to do controlled breeding if that is their mission. They are not required to make a profit to stay in business. The chance for success in selecting superior individual plants is dependent on the amount of variability in a plant population and the size of the population. Thus the chance of finding that superior individual in a highly variable population of 100 plants may equal that of finding a superior mutant plant in a population of several million plants that are clonally propagated. In comparison of different types of populations for the amount of genetic diversity, and thus, the potential for selection of a new plant, a population of asexually propagated plants would have much less diversity than any seed-produced population. A seedling population from a single seed source would have less diversity than a population of a species that resulted from natural pollination when more than one seed source was growing in close proximity since there would be potential for crossing between the populations. Controlled crosses of a species between selected plants from different parts of the species native range would result in much greater diversity. Collection of naturally pollinated seed of a species growing in close proximity to other species that overlap in bloom time can produce some interspecies hybrids in the resulting population which adds greatly to the diversity of the population and thus the opportunity to select new plants. Controlled crosses between two compatible species would give the greatest degree of diversity and seed from the second generation would have the most variability. One way to produce interspecies hybrids between two compatible species that overlap in bloom period is to plant a single plant or clone of the plants together and let them naturally cross pollinate. Insects are much more efficient pollinators than we are. If the plant

that is chosen as the female parent is self incompatible, then all resulting seedlings would be of hybrid origin unless apomixis is involved. Hybrid populations can be produced rather efficiently by planting plants of species desired as parents together and letting the insects or wind do the pollination assuming that the plants are compatible and bloom period overlaps.

BREEDING OF WOODY LANDSCAPE PLANTS AT THE UNIVERSITY OF MINNESOTA

The University of Minnesota has had an active project in breeding, evaluation, and selection of woody landscape plants for a number of years. The plant introduction part of the project has successfully developed and introduced a number of plants. New introductions result from selection of superior plants from native or planted populations, plants from seed-lots obtained from other arboreta or plant exploration expeditions internationally, and from progeny from controlled hybridization efforts. One of the major breeding efforts has been the development of the hardy deciduous azaleas. These are known as the 'Lights' series of azaleas. Cultivars introduced include: 'Pink Lights', 'Rosy Lights', 'White Lights', 'Orchid Lights', 'Spicy Lights', 'Golden Lights', 'Mandarin Lights', and 'Lemon Lights'. Other plants introduced in the past 15 to 20 years include: *Acer rubrum* Northwood[®] PP5053 red maple, *A. rubrum* 'Autumn Spire', *Aesculus ×arnoldiana* 'Autumn Splendor', *Cornus sericea* 'Cardinal', *Exochorda serratifolia* 'Northern Pearls', *Forsythia* 'Northern Sun', *Gymnocladus dioica* 'Stately Manor', *Lonicera* 'Freedom', *L.* 'Honeyrose', *Phellodendron* 'His Majesty', *Pinus resinosa* 'Wisota', *Prunus nigra* 'Princess Kay', and *Viburnum* 'Emerald Triumph',

Current breeding emphasis includes breeding activities with deciduous azaleas, *Viburnum*, *A. rubrum*, and interspecific hybridization with *A. saccharinum*, shrub roses, and intergeneric hybridization between *Sorbus* and closely related genera.

Goals of the azalea breeding program include developing hardy plants with other flower colors, especially reds, and breeding to combine cold hardiness with resistance to powdery mildew and in general better foliage qualities. Two additional cultivars have been selected for introduction. The first selection is a tricolor with white, pink, and yellow flowers and the second selection has pink flowers.

The shrub-rose-breeding efforts were started several years ago. In addition to hybridization activities, evaluation of a broad range of cultivars and species for disease resistance, flower color, quality, degree of repeat bloom, cold hardiness, plant size, form, etc. has been emphasized. Goal of the breeding effort is to develop disease resistant, repeat-flowering plants with good cold tolerance.

Breeding activities with *Viburnum* has been limited to interspecific hybridization within the section Lantana. Goal is to develop small, compact plants with glossy dark green foliage. Several selections look quite promising. These are results from crosses between earlier selections. Most of our selections trace their background to hybrids between *V.* 'Alleghany' × *V. burejaeticum*. *Viburnum* 'Alleghany' introduced by the National Arboretum is a hybrid between *V. lantana* and *V. rhytidophyllum*.

Goals of the hybridization efforts with *A. rubrum* and interspecies hybridization with *A. saccharinum* are to develop cold-hardy cultivars with good fall color and other aesthetic qualities and better tolerance to soil-related stresses such as drought, poor soil fertility, etc. Northern sources are being used as *A. rubrum* parents. Selections from hybrids between *A. saccharinum* 'Wieri Laciniatum' and *A. rubrum* 'Autumn Spire' PP7803 look promising.