

Botanical Diversity in the Landscape

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Diversity and sustainability are terms bantered about without much consideration of their relationship and value to human welfare. How much botanical diversity in landscapes is enough? What type of diversity is important? There are no simple formulas or templates for your landscape, but the opportunity to experiment and be creative makes gardening fun. Failures can always be composted.

What is Diversity?

Botanical diversity is the degree of variation within a system. The area can be as small as a home landscape or as large as a continent. The number of species per unit area is highest in the equatorial tropics and decreases as you move toward the two poles. In the tropics, plants grow in an environment where insects and diseases feed on them 24 hours a day, 365 days a year. Though there are natural cycles, usually varying with wet/dry periods, there is no long period of dormancy. Plant growth never slows to a virtual stop, and insects and diseases remain equally active.

Most insects and pathogens are host specific. Most pests feed on only a single species or a limited number of closely related species within the same genus. Peninsula Malaysia is approximately the same size as Kentucky yet has more than 35 times as many species of native woody plants. The large number of woody species results in considerable distances between individuals of the same species, with the result that it is more difficult for diseases or insects to move from one plant to another for feeding. This lesson illustrates the valuable role that diversity plays in plant survival in areas where there is daily pressure from insects and disease.

Table 1. Regionally overused and problematic trees.

Botanical name	Common name	Concerns
<i>Acer palmatum</i>	Japanese maple	Does not thrive in heat and low humidity
<i>Acer rubrum</i>	red maple	Over-planted; susceptible to flat-headed apple tree borer
<i>Betula nigra</i>	river birch	Over-planted; susceptible to aphids; unsuitable for alkaline soils
<i>Cercis canadensis</i>	redbud	Susceptible to borers, verticillium wilt, botryosphaeria canker
<i>Cornus florida</i>	flowering dogwood	Over-planted; susceptible to numerous diseases and insect pests
<i>Fraxinus</i> spp.	ash	All North American species of ash are susceptible to emerald ash borer. Existing ash of importance should be treated to prevent infestation when insect has been found in the area.
<i>Gleditsia triacanthos inermis</i>	thornless honeylocust	Over-planted; susceptible to numerous diseases and insect pests
<i>Juniperus</i> spp.	juniper	Over-planted
<i>Malus</i> spp.	crabapple	Over-planted
<i>Picea abies</i>	Norway spruce	Susceptible to spruce mites
<i>Picea pungens</i>	Colorado spruce	Over-planted
<i>Pinus strobus</i>	white pine	Not suitable for hot, dry sites, those that are periodically wet or those that contain soils with high % clay
<i>Prunus</i> spp.	ornamental cherry	Over-planted, especially weeping cherry (<i>P. subhirtella</i>)
<i>Pyrus calleryana</i>	callery pear	Over-planted, all cultivars including "Bradford," "Aristocrat," "Cleveland," etc.
<i>Quercus palustris</i>	pin oak	Over-planted
<i>Quercus</i> spp.	oak	Over-planted; oaks account for more than 20% of plants in landscapes
<i>Thuja occidentalis</i>	arborvitae	Over-planted
<i>Taxus</i> spp.	yew	Over-planted
<i>Ulmus</i> spp.	elm	While not significantly overused, Dutch elm disease may mutate, resulting in a new round of disease.

Reluctance to Diversity

Conservationists believe that the greater the species diversity in an ecosystem, the more robust and stable that ecosystem will be. But this knowledge does not alter human nature. Humans like order, repetition, and familiarity.

We humans tend to go with the tried and true. Nowhere is this more dramatically illustrated than in residential subdivisions. Plants of the same species are lined out in straight rows. Straight avenues and boulevards lined with mature

trees give the impression of orderliness. This repetition and the familiarity of species are considered desirable, and they enhance property values. As we drive the streets we see the monoculture of species throughout the neighborhoods, making it difficult to distinguish one metropolitan area from another.

Retail nurseries are not principally in the business of public service or education. Their goal is to make money, and they generate income by providing a product (plants) that the public wants to purchase. The customer primarily wants

the species that he or she has seen recently or is already familiar with—plants that are probably growing in a neighbor’s landscape. Few nurseries have the ability to hire highly knowledgeable experts in plant materials and who can help consumers match plant species with the cultural and aesthetic characteristics of a site.

When Is Something Overused?

Green industry professionals recognize the lessons of conservationists: The greater the species diversity, the healthier and more sustainable the landscape. A rule of thumb is that a region should have no more than 10 percent of the same species, 20 percent of the same genus, and 30 percent of the same family. Overriding this rule are constraints on design that necessitate uniformity, such as agricultural crops in production, golf greens, and athletic fields. An allée lined with trees or boulevards lined with a single species that is repeated on lateral streets are violations of species diversity. The cost of aesthetic effect is greater susceptibility to problems, and where possible these situations should be minimized.

Botanic gardens, arboreta, public parks, and zoological gardens are more than pretty places for recreation. These public areas provide an opportunity to observe plant material in functioning

Table 2. Regionally overused and problematic shrubs.

Botanical name	Common name	Concerns
<i>Berberis thunbergii</i>	Japanese barberry	Invasive
<i>Euonymus alatus</i>	burning bush	Invasive
<i>Euonymus fortunei</i>	bigleaf winter creeper	Invasive
<i>Hydrangea macrophylla</i>	hydrangea	Over-planted, especially “Endless Summer”
<i>Ilex x meserveae</i>	Meserve holly	Over-planted, especially “China Girl” and “Blue Princess”
<i>Liriope muscari</i>	liriope	Over-planted
<i>Rosa</i> spp.	rose	Over-planted, especially “Knockout” and other cultivars
<i>Spiraea bumalda</i> ‘Anthony Waterer’	Anthony Waterer spirea	Over-planted

landscapes and to learn about their characteristics and cultural requirements through signage.

Each of us may legally own and care for the plants in our personal landscapes. In reality, our personal plants provide benefits for the entire community. Communities with significant green infrastructures are more pleasant and healthier places to live and work. Communities with large numbers of trees have higher property values and properties resell more quickly. With each plant contributing to the well-being of the community, we need to do everything that we can to select species that will remain healthy and provide these valuable benefits for years to come.

One of the easiest ways to have greener communities is to resist the urge to replicate the same overused species found in other landscapes. Greater distance

between similar plants reduces disease and insect problems; pests have to travel further to find their preferred foods. Diverse landscapes also support a greater range of song birds. The community’s green infrastructure runs a lower risk of a single problem destroying everything. Landscapes with fewer pests require fewer pesticides to control problems, saving time and money. With proper planning a diversity of species in your landscape will provide interest throughout all four seasons.

For assistance in planning for diversity in your landscape contact a Kentucky Certified Nursery Professional (http://www.knla.org/pdf/2011_kentucky_certified_nurserymen.pdf) or International Society of Arboriculture Certified Arborist (www.treesaregood.com).