RIGHT TREES FOR RIGHT SITES

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When deciding what tree to plant, several important factors to consider include: native range, provenance, cold temperature hardiness, warm temperature hardiness, soil, site, and diversity.

Native trees should be the first plants that become the backbone of the landscape. Native trees are resistant to many indigenous insects and diseases, adapted to temperature extremes, and exhibit tolerance to local or regional climatic conditions. Spruce (*Picea glauca*) is a native of northern boreal forest conditions and, therefore, shows good tolerance to low temperatures (- 40 degrees F), thrives in acid, high water table, and low fertility soils while not having catastrophic insect or disease pests.

Provenance, or local population of a tree species within its native range, is a factor that should encourage regional cultivars. The native range of Red Maple (*Acer rubrum*) is from Northern Michigan to Northern Florida, but a native Red Maple from North Carolina would not survive in Central Michigan. (1) Northern local provenances are more photoperiodic responsive, i.e. as one travels north, native tree populations within the species are more photoperiodic responsive, or day length initiates leaf abscission and dormancy (winter hardiness).

Cold temperature hardiness is extremely important to many of us managing northern landscapes. Dogwood (*Cornus florida*) has been reported hardy to USDA Zone 5, but local populations have been found growing in Flushing, Michigan or Zone 4. This northern population has demonstrated good cold temperature hardiness, outstanding fall color, and flower bud hardiness as far north as Midland and Benzie, Michigan. Further, the University of Minnesota Landscape Arboretum has based its selection and introduction research on cold temperature hardiness, e.g. *Acer rubrum* 'Northwoods ', *X. Rhododendron* 'Northern Lights ', and *Phellodendron sachalinense* 'His Majesty '. (3)

Warm temperature hardiness for northern horticulturists is a difficult concept to perceive, e.g, high temperatures can cause the decline or death of trees. The best example of a tree that must live in northern areas is *Betula paperifera* (White Birch). If one tries to grow this plant in areas where the mean July temperature is above 75 degrees F, it soon succumbs to Bronze Birch Borer or just general decline. (2)

Soils can be too fertile for some plants. Pine is a pioneer species that does well in infertile soils. Red (*Pinus resinosa*) or Scotch Pine (*P. sylvestris*) planted in fertile agronomic soils of Southern Michigan eventually decline and die with diseases such as Diplodia. One can spray to partially control this problem, but planted in infertile sandy soils the two pine species thrive.

Site or exposure to sun light can have a pronounced impact upon tree health. Pine or specifically White Pine (*Pinus strobus*) must grow on a sunny site or it will decline and die. If pine is planted near and thus shaded by a Sugar Maple (*Acer saccharum*), it will soon lose the central leader that is shaded and decline. Conversely, Dogwood (*Cornus florida*), an understory tree planted on a open site in full sun, frequently is attacked by Dogwood Borer, a catastrophic insect pest, that leads to death or disfigurement.

Diversity is critical to a healthy landscape. One should, as a general rule, not plant more than twenty percent of the landscape to any one tree cultivar or species. Gypsy Moth, a catastrophic generalist insect pest, feeds on many different tree species, but it has preferred host species which lead to a rapid build up of this problem. In Dow Gardens, thirty miles west of the site of Michigan's Gypsy Moth introduction (Mt. Pleasant, Michigan), we have not, as yet, had to spray for control of this pest because oak and birch make up only a small part of our tree collection. Further, most areas within one half mile of Dow Gardens have been treated to suppress this problem. Another example is elm which comprised 90% of many golf course and street tree plantings. When Dutch Elm Disease struck, entire landscapes were impacted to the point of devastation. Since so many elms have been lost, one might again consider planting resistant elms as part of the overall program.

When designing park or commercial landscapes, we should be looking for trees that are good companion plants for lawn situations. The requirements for good trees include: deep not fibrous root systems, open shade canopy or allow light to reach the grass, and little competition for nutrients.

Several trees that have tap roots that don't compete with turf grass include Shagbark Hickory (*Carya ovata*), Chinese Chestnut (*Castanea mollissima*), Maidenhair Tree (*Ginkgo biloba*), Butternut (*Juglans cinerea*), Black Walnut (*J. nigra*), Black Gum (*Nyssa sylvatica*), Bur Oak (*Quercus macrocarpa*), Chestnut Oak (*Q. prinus*), Northern Red Oak (*Q. rubra*), and Shumard Oak (*Q. shumardii*). The above trees are often considered slow growing as their first priority is investing in a root system, but after establishment they grow quite rapidly. Further, these trees allow sufficient sun through so that turf flourishes beneath. These trees naturally grow with turf type forbes, be it a simple Oak- Hickory Forest - Red Oak and Shagbark Hickory or the Great Plains - Bur Oak .

Grass is a plant that must grow in fairly open sunny conditions. When looking for trees that will allow turf to thrive, an open canopy is important. Several trees that have a canopy suited for a lawn include Northern catalpa (*Catalpa speciosa*), Hackberry (*Celtis occidentalis*), Thornless Honeylocust (*Gleditsia t.* var. cv.), Ironwood (*Ostrya virginiana*), Amur Corktree (*Phellodendron amurense*), Sawtooth Oak (*Quercus acutissima*), Scarlet Oak (*Q. coccinea*), Black Oak (*Q. velutina*), and resistant elm cultivars (*Ulmus* 'Homestead' and *U.* 'Pioneer'). The afore-listed trees will allow enough light through to keep the lawn healthy and disease free.

There is a group of 'pioneer' trees that require few nutrients to grow, in fact, can become too vigorous and susceptible to disease if excess fertilizer is available or applied. These low nutrient trees include Kentucky Coffee Tree (*Gymnocladus dioicus*), Red Cedar (*Juniperus virginiana*), Pine (*Pinus* sp.), and Black Locust (*Robinia pseudoacacia*).

These trees, suitable for growing in a lawn situation, give us some considerations other that just aesthetics when selecting a diverse group of trees for today's landscapes. Further, knowing the requirements of plants and basing our shade tree program on good biology will lead to a healthier-low maintenance park, commercial grounds, or home landscape.

1) Dirr, Michael A. 1990. Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses. Stipes Publishing Co.

2) Hepting, G. 1971. Diseases of Forest & Shade Trees of United States. USDA. p386.

3) Penett, H. 1983. Deveioping & Identifiying Hardy Landscape plants. Comb. Proc. Int. Plant Prop. Soc. 33:468-472.

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