

Planting the Golf Course

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Have you ever thought of a golf course as having character and ability to produce moods in the people who play it?

They do and can. However this subject has either been neglected or studied by only a few.

One of the most complete explorations of the subject is a thesis by Mr. Richard Morgan Phelps, a candidate for a Masters degree at Iowa State University.

Mr. Phelps advances the thought that "by carefully selecting and placing plant materials on any site, the designer may create moods, produce beautiful views and vistas, enclose spaces, enhance architecture and land formations, provide beauty, color, texture, fragrance, and scale, create illusion, provide privacy, and make man's environment more enjoyable in general."

A golf course is an area providing unlimited possibilities for the use of plant materials to create moods and otherwise enhance the enjoyment found in playing.

The following excerpt is taken from Mr. Phelps' thesis and is offered here as a guide to specific plant materials that may be used to satisfy the requirements of a golf course.

Greens

Trees that are to be placed near putting surfaces should possess characteristics that will allow turfgrass on the green to grow without interference. These characteristics include deep rooting, light or filtered shade, absence of litter, small volumes of leaves, strong branching, lack of insects and diseases, and unobtrusive coloration. Unfortunately no tree possesses all these characteristics.

As a result, trees with several of these characteristics are recommended. It must be emphasized that trees of many types are appropriate around greens, depending on their placement. Trees that are deep-rooting, strong, long-lived, and litter-free may cast dense shade or possess volumes of leaves. If these trees are placed so that their shadows are not cast upon the putting surface, they would be considered acceptable. Modern mulching equipment is able to handle the leaf problem easily. Many trees not mentioned in the following list may be used near greens, but they must be used with great care. The oaks (*Quercus* spp.) are of this type.

In general, shrubs are not recommended in the vicinity of greens. In special cases, they may be useful as protection for nearby tees, or to help prevent a ball from going out-of-bounds. Some golf course architects might consider them desirable as obstacles.

Trees may be of any height; however, high-branching varieties are preferred. The outer foliage line of the tree at maturity should be not closer than 15 feet from the edge of the green. Trees to be placed far behind the green will be considered under the listing "backgrounds."

Tees

Plant materials to be used in the vicinity of tees may possess characteristics that differ from those placed around greens. Trees may be lower branching, possess larger volumes of leaves, and be more colorful. Shrubs are often valuable around tees as a means of providing color and fragrance. Care must be taken, however, to insure

adequate air circulation, sunlight, and branching height for the tee area. Deep rooting trees should be specified to eliminate root problems. Many shallow-rooting trees may be used if the tee area is properly watered to encourage deeper rooting by the tree.

Trees placed near the tee should be placed closer to the edges at the rear of the tee and farther from the sides in front to allow ample clearance for a golf shot made from the rear. For the same reason, overhanging trees should not be used near the front of long tees.

Sunlight must reach all parts of the tee during a majority of the day to insure healthy turf. Trees and tall shrubs are valuable as shade providers if they are placed with care. Benches for resting may be placed in this shade while still allowing close proximity to the tee and full vision of the tee and fairway.

Fairways

Plant materials suited for fairways differ slightly from those used near greens and tees. Fairway turf requires adequate amounts of light and nutrients. As a result, trees should be rather open and deep-rooted; shallow-rooted trees rob grasses of water and nutrients. Shrubs should not be used on fairways. Litter should be kept to a minimum, although leaves and small twigs are not as objectionable in fairways as they are on greens. They may be easily mulched or removed by hoses, spray equipment, or rakes. Trees should be high-branching to avoid interference with a player's swing. Trees may possess interesting color such as flowers, foliage, fruit, or bark. They may also be picturesque or symmetrical in shape.

Trees placed on fairways should be used sparingly and set in strategic locations. Placement of any trees in a

fairway should be thoroughly and thoughtfully considered before they are specified. They have a definite place in the design of golf courses, but they must not be over-used.

Roughs

Trees and shrubs to be used in the rough may be of nearly any variety. Much will depend upon the type of golf facility, existing plant materials, and attitudes of local golfers. In general, municipal courses should use trees similar to those recommended for use on fairways. In addition, shrubs for use in the roughs should be avoided. Privately-owned courses open to the public where play is not as heavy, may specify either, or a combination of the two.

Plant materials in the roughs may be valued for their color, shape, bark, texture, specimen or massing use, and qualities as an obstacle. They should allow medium to high amounts of light to filter through to the turf and should be at least moderately free of insects and diseases, litter, and root problems. Some plant materials to be used out of the normal range of play will be mentioned under the subject: "Plants for Wildlife Areas." Other plants to be used in remote areas of the course should be native to the area or should provide material for specific uses such as lumber, specimens for arboretums, or nursery stock.

Table 1
Plant Materials Recommended for
Greens, Tees, Fairways, and Roughs

Scientific name	Common Name	Use*
<i>Acer nigrum</i>	Black Maple	R
<i>Acer rubrum</i>	Red Maple	R
<i>Acer saccharum</i>	Sugar Maple	R
<i>Albizia julibrissin</i>	Silktree Albizzia	G,T,F,R
<i>Alnus</i> spp.	Alders	R
<i>Amelanchier</i> spp.	Serviceberries	R
<i>Betula lenta</i>	Sweet Birch	R
<i>Betula lutea</i>	Yellow Birch	F,R
<i>Betula nigra</i>	River Birch	G,T,F,R
<i>Betula papyrifera</i>	Paper Birch	G,T,F,R
<i>Betula populifolia</i>	Gray Birch	G,T,F,R
<i>Catalpa speciosa</i>	Northern Catalpa	R

<i>Celtis laevigata</i>	Sugar Hackberry	F,R
<i>Celtis occidentalis</i>	Common Hackberry	F,R
<i>Cercidiphyllum japonicum</i>	Katsuratree	F,R
<i>Cercis canadensis</i>	Eastern Redbud	T,R
<i>Chionanthus virginicus</i>	White Fringetree	T,R
<i>Cladrastis lutea</i>	American Yellowwood	R
<i>Crataegus</i> spp.	Hawthorns	T,R
<i>Diospyros virginiana</i>	Common Persimmon	R
<i>Elaeagnus angustifolia</i>	Russianolive	R
<i>Fraxinus</i> spp.	Ash	F,R
<i>Ginkgo biloba</i>	Ginkgo	G,T,F,R
<i>Gleditsia triacanthos</i> in rmis	Thornless, seedless Honeylocust	G,T,F,R
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree	R
<i>Halesia carolina</i>	Carolina Silverbell	R
<i>Kalopanax pictus</i>	Castor Aralia	T,F,R
<i>Koelreuteria paniculata</i>	Panicked Goldenrain- Tree	G,T,F,R
<i>Lagerstroemia indica</i>	Common Crapemyrtle	R
<i>Larix decidua</i>	European Larch	G,T,F,R
<i>Larix laricina</i>	Eastern Larch	G,T,F,R
<i>Liquidamber styraciflua</i>	American Sweetgum	R
<i>Liriodendron tulipifera</i>	Tuliptree	F,R
<i>Malus</i> spp.	Crabapples	R
<i>Nyssa sylvatica</i>	Black Tupelo	G,T,F,R
<i>Ostrya virginiana</i>	American Hornbeam	T,R
<i>Oxydendrum arboreum</i>	Sourwood	R
<i>Paulownia tomentosa</i>	Royal Paulownia	R
<i>Phellodendron amurense</i>	Amur Corktree	F,R
<i>Phellodendron lavallei</i>	Lavalle Corktree	F,R
<i>Pinus banksiana</i>	Jack Pine	G,T,F,R
<i>Pinus flexilis</i>	Limber Pine	R
<i>Pinus nigra</i>	Austrian Pine	F,R
<i>Pinus palustris</i>	Longleaf Pine	G,T,F,R
<i>Pinus ponderosa</i>	Ponderosa Pine	R
<i>Pinus resinosa</i>	Red Pine	R
<i>Pinus rigida</i>	Pitch Pine	T,F,R
<i>Pinus strobus</i>	White Pine	R
<i>Pinus sylvestris</i>	Scotch Pine	T,F,R
<i>Pinus taeda</i>	Loblolly Pine	T,F,R
<i>Platanus acerifolia</i>	London Planetree	F,R
<i>Platanus occidentalis</i>	American Planetree	F,R
<i>Quercus borealis</i>	Northern Red Oak	F,R
<i>Quercus coccinea</i>	Scarlet Oak	F,R
<i>Quercus palustris</i>	Pin Oak	F,R
<i>Quercus velutina</i>	Black Oak	F,R
<i>Quercus</i> spp.	Oak	R
<i>Robinia pseudocacia</i>	Black Locust	F,R
<i>Sassafras albidum</i>	Common Sassafras	R
<i>Sophora japonica</i>	Japanese Pagodatree	T,F,R
<i>Sorbus</i> spp.	Mountainash	R
<i>Syringa amurensis</i>	Amur Lilac	R
<i>Syringa amurensis japonica</i>	Japanese Tree Lilac	R
<i>Ulmus americana</i>	American Elm	T,F,R
<i>Ulmus carpinifolia</i> var.	Christine Buisman Elm	T,F,R
<i>Ulmus glabra</i>	Scotch Elm	T,F,R
<i>Zelcova serrata</i>	Japanese Zelcova	F,R

*Green—G Tee—T Fairway—F Rough—R

Specimens

Almost any plant may be valued as a specimen in planting designs. However, trees and shrubs considered as desirable specimens usually possess an outstanding characteristic, such as beautiful flowers, seasonal color, special form, or special texture. Use of too many specimen plants tends to defeat their purpose and results in a mass of oddities instead of a unified composition of clumps and groupings. Occasional single specimens or small specimen clumps are desirable. The

current trend of making every tree or shrub on the golf course a specimen is illogical, regardless of mowing considerations. Some degree of esthetic feeling must be left on our modern courses.

Table 2
Trees Suited for Use as Specimens

Scientific name	Common name
<i>Abies</i> spp.	Fir
<i>Acer nigrum</i>	Black Maple
<i>Acer palmatum</i>	Japanese Maple
<i>Acer saccharum</i>	Sugar Maple
<i>Acer tataricum</i>	Tatarian Maple
<i>Aesculus</i> spp.	Buckeye; Horsechestnut
<i>Amelanchier</i> spp.	Serviceberry
<i>Betula</i> spp.	Birch
<i>Carya illinoensis</i>	Pecan
<i>Carya ovata</i>	Shagbark Hickory
<i>Cedrus</i> spp.	Cedar
<i>Cercidiphyllum japonicum</i>	Katsuratree
<i>Cercis canadensis</i>	Eastern Redbud
<i>Chamaecyparis</i> spp.	Falsecypress
<i>Chionanthus virginicus</i>	White Fringetree
<i>Cladrastis lutea</i>	American Yellowwood
<i>Cornus florida</i>	Florida Dogwood
<i>Cornus kousa</i>	Kousa Dogwood
<i>Crataegus</i> spp.	Hawthorn
<i>Fagus</i> spp.	Beech
<i>Ginkgo biloba</i>	Ginkgo
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Hamamelis virginiana</i>	Common Witchhazel
<i>Juniperus chinensis</i>	Pyramid Chinese Juniper
<i>Koelreuteria paniculata</i>	Panicked Goldenrain-Tree
<i>Larix</i> spp.	Larch
<i>Liquidamber styraciflua</i>	American Sweetgum
<i>Liriodendron tulipifera</i>	Tuliptree
<i>Magnolia</i> spp.	Magnolia
<i>Malus</i> spp.	Apple; Crabapple
<i>Nyssa sylvatica</i>	Black Tupelo
<i>Ostrya virginiana</i>	American Hophornbeam
<i>Oxydendrum arboreum</i>	Sourwood
<i>Phellodendron amurense</i>	Amur Corktree
<i>Phellodendron lavallei</i>	Lavalle Corktree
<i>Picea</i> spp.	Spruce
<i>Pinus</i> spp.	Pine
<i>Prunus</i> spp.	Apricot; Cherry; Chokecherry; Laurelcherry; Peach; Plum
<i>Quercus</i> spp.	Oak
<i>Salix</i> spp.	Willow
<i>Sciadopitys verticillata</i>	Umbrellapine
<i>Sophora japonica</i>	Japanese Pagodatree
<i>Syringa amurensis japonica</i>	Japanese Tree Lilac
<i>Taxodium</i> spp.	Baldcypress
<i>Taxus cuspidata commutata</i>	Japanese Yew
<i>Thuja</i> spp.	Arborvitae
<i>Tilia</i> spp.	Linden
<i>Toona sinensis</i>	Chinese Toona
<i>Tsuga</i> spp.	Hemlock
<i>Ulmus americana</i>	American Elm

Table 3
Shrubs Suited for Use as Specimens

Scientific name	Common name
<i>Caragana arborescens</i>	Siberian Peashrub
<i>Chaenomeles</i> spp.	Floweringquince
<i>Cotinus coggygria</i>	American Smoketree
<i>Euonymus alatus</i>	Winged Euonymus
<i>Euonymus americanus</i>	Brook Euonymus
<i>Euonymus atropurpureus</i>	Eastern Wahoo
<i>Euonymus europaeus</i>	European Euonymus

Exochorda spp.	Pearlbush
Halesia spp.	Silverbell
Hibiscus spp.	Hibiscus, Rosemallow
Hydrangea spp.	Hydrangea
Lonicera spp.	Honeysuckle
Prunus japonica	Chinese Bushcherry
Prunus triloba	Flowering Plum
Rhododendron spp.	Rhododendron; Acalea
Rhus spp.	Sumac
Viburnum spp.	Viburnum

Background

Many trees and shrubs possess characteristics that are valuable for background purposes. Plants of this type are often used behind greens, as a terminus of a view, for direction indicators, and as backgrounds for flowering specimens.

Trees and shrubs should be dense and heavy in appearance. Usually, their color is dark and ranges from dark green to purple-green or blue-green. Often they branch to the ground; however, this is not a steadfast requirement. Background plant materials may also possess color, texture, form, or fragrance characteristics of their own.

Table 4
Plant Materials for Background

Scientific name	Common name
Abies spp.	Fir
Acer spp.	Maple
Aesculus spp.	Buckeye; Horsechestnut
Alnus spp.	Alder
Cedrus spp.	Cedar
Chamaecyparis spp.	Falsecypress
Cornus florida	Flowering Dogwood
Crataegus spp.	Hawthorn
Diospyros virginiana	Common Persimmon
Fagus spp.	Beech
Ginkgo Biloba	Ginkgo
Hamamelis virginiana	Common Witchhazel
Ilex spp.	Holly
Juniperus spp.	Juniper
Liquidambar styraciflua	American Sweetgum
Nyssa sylvatica	Black Tupelo
Paulownia tomentosa	Royal Paulownia
Phellodendron spp.	Corktree
Picea spp.	Spruce
Pinus spp.	Pine
Pseudotsuga spp.	Douglasfir
Quercus spp.	Oak
Rhamnus spp.	Buckhorn
Rhus spp.	Sumac
Sophora japonica	Japanese Pagodatree
Staphylea trifolia	American Bladdernut
Syringa spp.	Lilac
Taxus spp.	Yew
Thuja occidentalis	Eastern Arborvitae
Tilia spp.	Linden
Viburnum spp.	Virburnum

Plants for wildlife areas

Certain plant materials possess

characteristics that are more favorable for wildlife. These plants may provide nesting areas, protection and food for many kinds of birds and animals. Many of our common plant materials provide seeds or fruits that wildlife require for survival, and these materials can easily be included in most plantings for golf courses.

Table 5
Plant Materials Valuable to Wildlife

Scientific name	Common name
Amelanchier spp.	Serviceberry
Aronia spp.	Chokeberry
Berberis spp.	Barberry
Betula lenta	Sweet Birch
Betula lutea	Yellow Birch
Betula nigra	River Birch
Betula populifolia	Gray Birch
Carya spp.	Hickory
Celastrus spp.	Bittersweet
Celtis spp.	Hackberry
Chionanthus spp.	Fringetree
Cornus spp.	Dogwood
Corylus americana	American Filbert
Cotoneaster spp.	Cotoneaster
Crataegus spp.	Hawthorn
Elaeagnus angustifolia	Russianolive
Euonymus spp.	Euonymus
Gaultheria procumbens	Checkerberry Wintergreen
Hippophae rhamnoides	Common Seabuckthorn
Ilex opaca	American Holly
Ilex verticillata	Common Winterberry
Juglans spp.	Walnut
Juniperus spp.	Juniper
Larix spp.	Larch
Lespedeza spp.	Lespedeza
Ligustrum spp.	Privet
Lindera spp.	Spicebush
Lonicera spp.	Honeysuckle
Malus spp.	Apple, Crabapple
Morus spp.	Mulberry
Myrica spp.	Bayberry; Waxmyrtle
Nyssa spp.	Tupelo
Parthenocissus spp.	Creepers
Picea spp.	Spruce
Pinus spp.	Pine
Prunus spp.	Apricot; Cherry; Chokecherry; Laurelcherry; Peach; Plum
Pyracantha spp.	Firethorn
Quercus spp.	Oak
Rhamnus spp.	Buckthorn
Rhus spp.	Sumac
Ribes spp.	Currant; Gooseberry
Rubus spp.	Blackberry; Dewberry; Raspberry
Sambucus spp.	Elder
Shepherdia spp.	Buffaloberry
Sorbus spp.	Mountainash
Symphoricarpos spp.	Snowberry
Tamarix gallica	French Tamarisk
Tsuga spp.	Hemlock
Vaccinium spp.	Blueberry
Viburnum spp.	Virburnum
Vitis spp.	Grape

Screens and windbreaks

Plant materials that are suitable for windbreaks or screens should possess several important characteristics. They

must be dense and low branching. They may be fast or moderate in growth. They may have thorns in instances where they are needed as boundary screens or barriers. They must be able to withstand effects of wind and exposure. They may or may not be evergreen, depending upon their specific use. Evergreens are useful throughout the year, while deciduous materials are useful as windbreaks only during a portion of the year.

Table 6
Plant Materials for Screens and Windbreaks

Scientific name	Common name
<i>Acer campestre</i>	Hedge Maple
<i>Acer ginnala</i>	Amur Maple
<i>Acer negundo</i>	Boxelder
<i>Acer saccharinum</i>	Silver Maple
<i>Acer tataricum</i>	Tatarian Maple
<i>Ailanthus altissima</i>	Treeofheaven Ailanthus
<i>Berberis</i> spp.	Barberry
<i>Caragana</i> spp.	Peashrub
<i>Carpinus</i> spp.	Hornbeam
<i>Catalpa</i> spp.	Catalpa
<i>Chaenomeles japonica</i>	Floweringquince
<i>Cornus</i> spp.	Dogwood
<i>Cotoneaster</i> spp.	Cotoneaster
<i>Crataegus</i> spp.	Hawthorn
<i>Euonymus alatus</i>	Winged Euonymus
<i>Fagus</i> spp.	Beech
<i>Gleditsia triacanthos</i>	Common Honeylocust
<i>Hamamelis virginiana</i>	Common Witchhazel
<i>Hippophae rhamnoides</i>	Common Seabuckthorn
<i>Juniperus</i> spp.	Juniper
<i>Larix</i> spp.	Larch
<i>Ligustrum</i> spp.	Privet
<i>Lonicera</i> spp.	Honeysuckle
<i>Maclura pomifera</i>	Osageorange
<i>Mahonia aquifolium</i>	Oregongrape
<i>Morus</i> spp.	Mulberry
<i>Phellodendron amurense</i>	Amur Corktree
<i>Philadelphus</i> spp.	Mockorange
<i>Physocarpus opulifolius</i>	Common ninebark
<i>Picea</i> spp.	Spruce
<i>Pinus banksiana</i>	Jack Pine
<i>Pinus ponderosa</i>	Ponderosa Pine
<i>Pinus resinosa</i>	Red Pine
<i>Pinus strobus</i>	Eastern White Pine
<i>Pinus sylvestris</i>	Scotch Pine
<i>Platanus orientalis</i>	American Planetree
<i>Populus</i> spp.	Poplar
<i>Prunus spinosa</i>	Sloe; Blackthorn
<i>Ptelea trifoliata</i>	Common Hoptree
<i>Pyracantha</i> spp.	Firethorn
<i>Rhamnus</i> spp.	Buckthorn
<i>Robinia pseudoacacia</i>	Black Locust
<i>Rosa</i> spp.	Rose
<i>Salix</i> spp.	Willow
<i>Sambucus canadensis</i>	American Elder
<i>Staphylea trifolia</i>	American Bladderhut
<i>Thuja</i> spp.	Arborvitae
<i>Tsuga</i> spp.	Hemlock
<i>Viburnum</i> spp.	Viburnum

Undesirable Characteristics of Plants

Many unsuitable plant materials are used on golf courses, Such plants add

greatly to the yearly cost of maintenance. Most plants possess undesirable characteristics, such as litter, odor, soft wood, troublesome roots, quantities of leaves, or insect and disease. However, some are recommended when their desirable characteristics dominate their undesirable characteristics.

The following lists of plant materials should be regarded as indicators, since all plant materials have not been listed. Of the plants that are listed, many considered to be undesirable in one section of the country may be desirable in another. For example, Siberian elm (*Ulmus pumila*), boxelder (*Acer negundo*), Russianolive (*Elaeagnus angustifolia*), poplars (*Populus* spp.), and willows (*Salix* spp.) may be undesirable in the Northeast (region 1), while serving very well in the Northern plains (region 4).

Table 7
Undesirable Materials Due to Litter

Scientific name	Common name	Problem
<i>Acer negundo</i>	Boxelder	storm damage
<i>Acer rubrum</i>	Red Maple	storm damage
<i>Acer saccharinum</i>	Silver Maple	brittle, storm damage
<i>Aesculus</i> spp.	Buckeye; Horsechestnut	storm damage twigs, fruit
<i>Ailanthus altissima</i>	Treeofheaven Ailanthus	fruit, storm damage
<i>Betula papyrifera</i>	Paper Birch	storm damage
<i>Carya</i> spp.	Hickory	fruit
<i>Castanea dentata</i>	American Chestnut	fruit
<i>Catalpa</i> spp.	Catalpa	fruit
<i>Cedrus</i> spp.	Cedar	fruit (cones)
<i>Citrus</i> genera	Citrus	fruit
<i>Cladrastis lutea</i>	American Yellowwood	storm damage
<i>Diospyros virginiana</i>	Common Persimmon	storm damage
<i>Fagus</i> spp.	Beech	fruit
<i>Fraxinus</i> spp.	Ash	fruit, storm damage
<i>Ginkgo biloba</i> (female)	Ginkgo	fruit
<i>Gleditsia triacanthos</i>	Common Honeylocust	fruit pod
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree	fruit pod, storm damage
<i>Juglans</i> spp.	Walnut	fruit
<i>Koeleruteria paniculata</i>	Paniced Goldenrain-Tree	storm damage
<i>Liquidamber styraciflua</i>	American Sweetgum	fruit
<i>Liriodendron tulipifera</i>	Tuliptree	storm damage
<i>Maclura pomifera</i>	Osageorange	fruit
<i>Malus</i> spp.	Apple; Crabapple	fruit
<i>Morus</i> spp.	Mulberry	weed tree, fruit

Picea spp.	Spruce	cones	Cercidiphyllum japonicum	Katsuratree	surface
Pinus spp.	Pine	cones	Cladrastis lutea	American Yellowwood	surface
Platanus spp.	Planetree	storm damage, fruit	Cornus alba sibirica	Siberian Dogwood	suckers
Populus spp.	Poplar	storm damage, seeds, twigs	Cornum amomum	Silky Dogwood	suckers
Prunus spp.	Apricot; Cherry; Chokecherry; Laurelecherry; Peach; Plum	fruit	Cornum stolonifera	Redosier Dogwood	suckers
Pyrus spp.	Pear	fruit	Fagus spp.	Beech	surface
Quercus spp.	Oak	fruit	Fraxinus spp.	Ash	surface
Robinia pseudoacacia	Black Locust	storm damage, fruit pods	Hydrangea spp.	Hydrangea	suckers
Salix spp.	Willow	storm damage, twigs, seeds	Liriodendron tulipifera	Tuliptree	suckers
Sambucus spp.	Elder	storm damage	Maclura pomifera	Osageorange	surface
Schinus molle	California Peppertree	fruit	Morus alba	White Mulberry	surface
Sorbus spp.	Mountainash	fruit	Morus rubra	Red Mulberry	surface
Tilia americana	American Linden	storm damage	Ostrya virginiana	American Hophorn beam	surface
Ulmus spp.	Elm	fruit, twigs, storm damage,	Phellodendron amurense	Amur Corktree	surface
			Populus spp.	Poplar	surface
			Prunus americana	American Plum	suckers
			Prunus pensylvanica	Pin Cherry	suckers
			Prunus virginiana	Common Chokecherry	suckers
			Rhus spp.	Sumac	suckers
			Robinia pseudoacacia	Black Locust	shallow-suckers
			Salix spp.	Willow	shallow-suckers
			Sambucus canadensis	American Elder	suckers
			Sorbus spp.	Mountainash	shallow-suckers
			Staphylea trifolia	American Bladdernut	suckers
			Syringa vulgaris	Common Lilac	suckers
			Tsuga spp.	Hemlock	surface
			Ulmus spp.	Elm	surface
			Viburnum spp.	Viburnum	suckers
			Zanthoxylum spp.	Pricklyash	suckers
			Zelcova serrata	Japanese Zelcova	surface

Table 8
Undesirable Materials due to Dense Shade

Scientific name	Common name
Abies spp.	Fir
Acer ginnala	Amur Maple
Acer macrophyllum	Bigleaf Maple
Acer nigrum	Black Maple
Acer platanoides	Japanese Maple
Acer saccharum	Sugar Maple
Acer tataricum	Tatarian Maple
Aesculus hippocastanum	Common Horsechestnut
Asimina triloba	Common Pawpaw
Catalpa speciosa	Northern Catalpa
Cornus florida	Flowering Dogwood
Cornus mas	Corneliancherry Dogwood
Euonymus alatus	Winged Euonymus
Euonymus atropurpureus	Eastern Wahoo
Fagus spp.	Beech
Ilex spp.	Holly
Juniperus spp.	Juniper
Kalmia latifolia	Mountainlaurel
Ligustrum spp.	Privet
Magnolia spp.	Magnolia
Morus spp.	Mulberry
Paulownia tomentosa	Royal Paulownia
Picea spp.	Spruce
Pseudotsuga spp.	Douglasfir
Quercus alba	White Oak
Quercus bicolor	Swamp White Oak
Quercus borealis	Northern Red Oak
Quercus macrocarpa	Bur Oak
Quercus robur	English Oak
Rhododendron spp.	Rhododendron, Azalea
Taxus spp.	Yew
Thuja spp.	Arborvitae
Tilia spp.	Linden
Tsuga spp.	Hemlock
Viburnum spp.	Viburnum

Table 9
Undesirable Materials due to Roots

Scientific name	Common name	Problem
Acer negundo	Boxelder	suckers
Acer platanoides	Norway Maple	surface
Aesculus parvifolia	Bottlebrush Buckeye	suckers
Ailanthus altissima	Treeofheaven	
	Ailanthus	suckers
Alnus spp.	Alder	suckers
Amelanchier spp.	Serviceberry	surface
Asimina triloba	Common Pawpaw	surface
Carpinus spp.	Hornbeam	surface

Cercidiphyllum japonicum	Katsuratree	surface
Cladrastis lutea	American Yellowwood	surface
Cornus alba sibirica	Siberian Dogwood	suckers
Cornum amomum	Silky Dogwood	suckers
Cornum stolonifera	Redosier Dogwood	suckers
Fagus spp.	Beech	surface
Fraxinus spp.	Ash	surface
Hydrangea spp.	Hydrangea	suckers
Liriodendron tulipifera	Tuliptree	suckers
Maclura pomifera	Osageorange	surface
Morus alba	White Mulberry	surface
Morus rubra	Red Mulberry	surface
Ostrya virginiana	American Hophorn beam	surface
Phellodendron amurense	Amur Corktree	surface
Populus spp.	Poplar	surface
Prunus americana	American Plum	suckers
Prunus pensylvanica	Pin Cherry	suckers
Prunus virginiana	Common Chokecherry	suckers
Rhus spp.	Sumac	suckers
Robinia pseudoacacia	Black Locust	shallow-suckers
Salix spp.	Willow	shallow-suckers
Sambucus canadensis	American Elder	suckers
Sorbus spp.	Mountainash	shallow-suckers
Staphylea trifolia	American Bladdernut	suckers
Syringa vulgaris	Common Lilac	suckers
Tsuga spp.	Hemlock	surface
Ulmus spp.	Elm	surface
Viburnum spp.	Viburnum	suckers
Zanthoxylum spp.	Pricklyash	suckers
Zelcova serrata	Japanese Zelcova	surface

Table 10
Undesirable Materials due to Susceptibility to Diseases and Insects

Scientific name	Common name
Abies balsamea	Balsam Fir
Acer negundo	Boxelder
Acer saccharinum	Silver Maple
Aesculus hippocastanum	Common Horsechestnut
Alnus japonica	Japanese Alder
Amelanchier spp.	Serviceberry
Betula spp.	Birch
Carya spp.	Hickory
Castanea spp.	Chestnut
Celtis spp.	Hackberry
Cornus alternifolia	Pagoda Dogwood
Crataegus spp.	Hawthorn
Cydonia oblonga	Common Quince
Euonymus spp.	Euonymus
Fraxinus spp.	Ash
Gleditsia japonica	Japanese Honeylocust
Halesia carolina	Carolina Silverbell
Ilex aquafolium	English Holly
Ilex opaca	American Holly
Juglans spp.	Walnut
Juniperus spp.	Juniper
Larix spp.	Larch
Malus spp.	Apple; Crabapple
Photinia spp.	Photinia
Platanus occidentalis	American Planetree
Populus spp.	Poplar
Prunus spp.	Apricot; Cherry; Laurelecherry; Peach, Plum
Ptelea trifoliata	Common Hoptree
Pyrus spp.	Pear
Quercus borealis	Northern Red Oak
Rhamnus spp.	Suckthorn
Rhus spp.	Sumac
Robinia spp.	Locust
Salix spp.	Willow
Sorbus spp.	Mountainash
Syringa spp.	Lilac
Tilia spp.	Linden
Ulmus spp.	Elm