Trees & Construction Series

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Tree Species Tolerance of Site Development Activities

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Each tree species, and each unique individual, will respond to the stress and strain of site development activities in different ways. Some species vary widely in their response to mechanical injury, pest attack, soil modifications, and micro-climatic changes associated with construction. As more tree tissues, physical space and essential resources are disrupted, the more a tree must effectively react to these changes to insure survival.

The variability of general tree reactions to construction damage represents a range of tolerances. Some trees tolerate damage well -- others tolerate damage poorly. The relative tolerance differences between native species in this region are given in the following table along with the primary limiting factors for each. This list represents only broad expectations of tree reactions and cannot anticipate reactions to specific sites changes and circumstances. It is assumed each species is being evaluated within their home range.

Place In The Table

The key to symbols in the third column of this table, entitled “tolerance” are the relative value of “g” for good, “m” for medium, and “p” for poor. These are broad recognitions of species’ reactions to activities around construction sites within one-and-one-half times the drip line radial distance from the tree. For example, a poor tolerance rating signifies a tree which will have difficulty reacting well to site development activities.

The forth column of this table, entitled “limitations,” symbolizes critical constraints governing species tolerances on development sites. The key to symbols of poor tree reactions includes: physical injury (compartmentalization and decay problems) “I”; pest complications (chronic and acute attacks) “P”; soil constraints (aeration, compaction, and water availability attributes) “S”; limited climatic tolerances (native range, hardiness, and micro-climatic change problems) “C”; and, all of these reactions combined “I + P + S + C = A.”

Table 1: List of tree species and their tolerance to site development activities.

(key to symbols in text above)

scientific name	common name	tolerance	limitations
Acer barbatum	Florida maple	m	IS
Acer leucoderme	chalk maple	p	A
Acer negundo	boxelder	g	
Acer pensylvanicum	striped maple	m	IC
Acer rubrum	red maple	g	
Acer saccharinum	silver maple	p	A
Acer spicatum	mountain maple	m	IC
Aesculus octandra	yellow buckeye	p	IS
Aesculus pavia	red buckeye	m	I
Alnus serrulata	hazel alder	g	
Amelanchier arborea	downy serviceberry	m	IS
Aralia spinosa	devil's walking stick	m	I
Asimina triloba	pawpaw	g	
Baccharis halimifolia	Eastern baccharis	g	
Betula allegheniansis	yellow birch	m	ISC
Betula lenta	sweet birch	m	IC
Betula nigra	river birch	g	
Bumelia lanuginosa	gum bumelia	m	IS
Bumelia lycioides	buckthorn bumelia	m	IS
Carpinus caroliniana	American hornbeam	m	SC
Carya aquatica	water hickory	g	
Carya cordiformis	bitternut hickory	p	S
Carya glabra	pignut hickory	m	S
Carya ovata	shagbark hickory	p	S
Carya pallida	sand hickory	m	
Carya tomentosa	mockernut hickory	mp	S
Castanea alnifolia	Florida chinkapin	m	P
Castanea pumila	Allegheny chinkapin	p	P
Catalpa bignonioides	Southern catalpa	g	
Celtis laevigata	sugarberry	g	I
Celtis tenuifolia	Georgia hackberry	m	IS
Cephalanthus occidentalis	buttonbush	g	I
Cercis canadensis	redbud	m	S
Chionanthus virginicus	fringetree	m	IS
Cladrastis kentukea	yellowwood	p	A
Clethra acuminata	cinnamon clethra	m	IS

Table 1: List of tree species & tolerance to development activities. (continued)

scientific name	common name	tolerance	limitations
Cliftonia monophylla	buckwheat tree	m	IS
Cornus alternifolia	alternate-leaf dogwood	m	I
Cornus florida	dogwood	m	IP
Cornus stricta	swamp dogwood	g	I
Corylus cornuta	beaked hazel	g	
Cyrilla racemiflora	swamp cyrilla	m	I
Diospyros virginiana	persimmon	g	P
Erythrina herbacea	Eastern coralbean	m	I
Euonymus atropurpureus	Eastern wahoo	m	I
Fagus grandifolia	American beech	p	A
Forestiera acuminata	swamp-privet	g	
Fraxinus americana	white ash	m	IS
Fraxinus caroliniana	Carolina ash	g	
Fraxinus pennsylvanica	green ash	g	
Gleditsia aquatica	waterlocust	g	
Gleditsia triacanthos	honeylocust	g	
Gordonia lasianthus	loblolly-bay	g	
Halesia carolina	Carolina silverbell	m	ISC
Halesia diptera	two-wing silverbell	m	IS
Halesia parviflora	little silverbell	m	IS
Hamamelis virginiana	witch-hazel	m	IS
Ilex ambigua	Carolina holly	g	
Ilex cassine	dahoon	g	
Ilex coriacea	large gallberry	g	
Ilex decidua	possumhaw	g	
Ilex montana	mountain winterberry	gm	C
Ilex myrtifolia	myrtle dahoon	g	
Ilex opaca	American holly	g	
Ilex verticellata	common winterberry	g	
Ilex vomitoria	yaupon holly	g	
Juglans nigra	black walnut	p	IS
Juniperus virginiana	Eastern redcedar	m	IS
Kalmia latifolia	mountain laurel	g	

Table 1: List of tree species & tolerance to development activities. (continued)

scientific name	common name	tolerance	limitations
Liquidambar styraciflua	sweetgum	g	
Liriodendron tulipifera	yellow-poplar	p	IS
Magnolia acuminata	cucumbertree	m	I
Magnolia fraseri	Fraser magnolia	p	IC
Magnolia grandiflora	Southern magnolia	m	I
Magnolia pyramidata	pyramid magnolia	p	IC
Magnolia virginiana	sweetbay	g	
Malus angustifolia	Southern crabapple	m	ICP
Malus coronaria	sweet crabapple	m	ICP
Morus rubra	red mulberry	g	
Myrica cerifera	Southern bayberry	g	
Myrica heterophylla	evergreen bayberry	g	
Nyssa aquatica	water tupelo	g	
Nyssa ogeche	Ogeechee tupelo	m	IS
Nyssa sylvatica	blackgum	g	
Osmanthus americana	devilwood	m	I
Ostrya virginiana	Eastern hophornbeam	m	S
Oxydendrum arboreum	sourwood	p	A
Persea borbonia	redbay	g	
Pinckneya pubens	pinckneya	m	I
Pinus echinata	shortleaf pine	gm	P
Pinus elliottii	slash pine	g	
Pinus glabra	spruce pine	g	
Pinus palustris	longleaf pine	gm	C
Pinus pungens	table-mountain pine	gm	C
Pinus rigida	pitch pine	g	
Pinus serotina	pond pine	g	
Pinus strobus	Eastern white pine	m	A
Pinus taeda	loblolly pine	g	
Pinus virginiana	Virginia pine	g	
Planera aquatica	planer-tree	g	
Platanus occidentalis	American sycamore	g	
Populus deltoides	Eastern cottonwood	g	
Prunus americana	American plum	m	IS
Prunus angustifolia	chickasaw plum	m	IS
Prunus caroliniana	Carolina laurelcherry	g	
Prunus pensylvanica	fire cherry	m	I

Table 1: List of tree species & tolerance to development activities. (continued)

scientific name	common name	tolerance	limitations
Prunus serotina	black cherry	m	I
Prunus umbellata	flatwoods plum	m	I
Ptelea trifoliata	hoptree	m	I
Quercus alba	white oak	gm	S
Quercus coccinea	scarlet oak	g	
Quercus durandii	Durand oak	g	
Quercus falcata	Southern red oak	g	
Quercus falcata var. pagodaefolia	cherrybark oak	g	
Quercus incana	bluejack oak	g	
Quercus laevis	turkey oak	g	
Quercus laurifolia	laurel oak	g	
Quercus lyrata	overcup oak	g	
Quercus marilandica	blackjack oak	g	
Quercus michauxii	swamp chestnut oak	g	
Quercus muehlenberrgii	chinkapin oak	g	
Quercus nigra	water oak	g	
Quercus phellos	willow oak	gm	S
Quercus prinus	chestnut oak	gm	S
Quercus rubra	Northern red oak	gm	SC
Quercus shumardii	Shumard oak	g	
Quercus stellata	post oak	g	
Quercus velutina	black oak	g	
Quercus virginiana	live oak	gm	C
Rhamnus caroliniana	Carolina buckthorn	m	IS
Rhododendron catawbiense	catawba rhododendron	m	I
Rhododendron maximum	rosebay rhododendron	m	I
Rhus coppalina	shining sumac	m	I
Rhus glabra	smooth sumac	m	I
Robinia pseudoacacia	black locust	g	P
Salix caroliniana	Coastal Plain willow	g	
Salix nigra	black willow	g	
Salix sericea	silky willow	g	
Sambucus canadensis	American elder	p	A
Sassafras albidum	sassafras	g	
Staphylea trifolia	American bladdernut	g	
Stewartia malacodendron	Virginia stewartia	g	
Stewartia ovata	mountain stewartia	g	
Styrax americana	American snowbell	m	IS

Table 1: List of tree species & tolerance to development activities. (continued)

scientific name	common name	tolerance	limitations
Styrax grandifolia	bigleaf snowbell	m	IS
Symplocos tinctoria	sweetleaf	g	I
Taxodium distichum	baldcypress	g	
Taxodium distichum var. nutans	pondcypress	g	
Tilia caroliniana	Carolina basswood	p	A
Tilia heterophylla	white basswood	p	A
Toxicodendron vernix	poison sumac	m	I
Tsuga canadensis	Eastern hemlock	p	A
Ulmus alata	winged elm	g	
Ulmus americana	American elm	m	P
Ulmus rubra	slippery elm	m	P
Vaccinium arboreum	tree sparkleberry	m	A
Viburnum nudum	possumhaw viburnum	g	
Viburnum obovatum	Walter viburnum	g	
Viburnum rufidulum	rusty blackhaw	g	
Zanthoxylum clava-herculis	Hercules-club	m	I