

RESEARCH LABORATORY TECHNICAL REPORT



Relative Tolerance of Tree Species to Construction Damage

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Each tree species, and each unique individual, will respond to the stress and strain of construction 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 ensure 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 are given in this table as are the primary limiting factors. This list represents only broad expectations of tree reactions and cannot show specific reactions to specific sites changes and circumstances. It is assumed each species is being evaluated within their home range.

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 distance from the tree. For example, a poor tolerance rating signifies a tree which will have difficulty reacting well to construction damage.

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

Scientific name	Common name	Tolerance	Limitations
<i>Acer barbatum</i>	Florida maple	m	IS
<i>Acer saccharum</i> ssp. <i>leucoderme</i>	chalk maple	p	A
<i>Acer negundo</i>	boxelder	g	
<i>Acer pensylvanicum</i>	striped maple	m	IC
<i>Acer rubrum</i>	red maple	g	
<i>Acer saccharinum</i>	silver maple	p	A
<i>Acer spicatum</i>	mountain maple	m	IC
<i>Aesculus octandra</i>	yellow buckeye	p	IS
<i>Aesculus pavia</i>	red buckeye	m	I
<i>Alnus serrulata</i>	hazel alder	g	

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<i>Amelanchier arborea</i>	downy serviceberry	m	IS
<i>Aralia spinosa</i>	devil's walking stick	m	I
<i>Asimina triloba</i>	pawpaw	g	
<i>Baccharis halimifolia</i>	Eastern baccharis	g	
<i>Betula allegheniensis</i>	yellow birch	m	ISC
<i>Betula lenta</i>	sweet birch	m	IC
<i>Betula nigra</i>	river birch	g	
<i>Sideroxylon lanuginosum</i>	gum bumelia	m	IS
<i>Bumelia lycioides</i>	buckthorn bumelia	m	IS
<i>Carpinus caroliniana</i>	American hornbeam	m	SC
<i>Carya aquatica</i>	water hickory	g	
<i>Carya cordiformis</i>	bitternut hickory	p	S
<i>Carya glabra</i>	pignut hickory	m	S
<i>Carya ovata</i>	shagbark hickory	p	S
<i>Carya pallida</i>	sand hickory	m	
<i>Carya tomentosa</i>	mockernut hickory	mp	S
<i>Castanea pumila</i>	Allegheny chinkapin	p	P
<i>Catalpa bignonioides</i>	Southern catalpa	g	
<i>Celtis laevigata</i>	sugarberry	g	I
<i>Celtis tenuifolia</i>	Georgia hackberry	m	IS
<i>Cephalanthus occidentalis</i>	common buttonbush	g	I
<i>Cercis canadensis</i>	redbud	m	S
<i>Chionanthus virginicus</i>	fringetree	m	IS
<i>Cladrastis kentukea</i>	yellowwood	p	A
<i>Clethra acuminata</i>	cinnamon clethra	m	IS
<i>Cliftonia monophylla</i>	buckwheat tree	m	IS
<i>Cornus alternifolia</i>	alternate-leaf dogwood	m	I
<i>Cornus florida</i>	dogwood	m	IP
<i>Cornus stricta</i>	swamp dogwood	g	I
<i>Corylus cornuta</i>	beaked hazel	g	
<i>Cyrilla racemiflora</i>	swamp cyrilla	m	I
<i>Diospyros virginiana</i>	persimmon	g	P
<i>Erythrina herbacea</i>	Eastern coralbean	m	I
<i>Euonymus atropurpureus</i>	Eastern wahoo	m	I
<i>Fagus grandifolia</i>	American beech	p	A
<i>Forestiera acuminata</i>	swamp-privet	g	
<i>Fraxinus americana</i>	white ash	m	IS

Scientific name	Common name	Tolerance	Limitations
<i>Fraxinus caroliniana</i>	Carolina ash	g	
<i>Fraxinus pennsylvanica</i>	green ash	g	
<i>Gleditsia aquatica</i>	waterlocust	g	
<i>Gleditsia triacanthos</i>	honeylocust	g	
<i>Gordonia lasianthus</i>	loblolly-bay	g	
<i>Halesia carolina</i>	Carolina silverbell	m	ISC
<i>Halesia diptera</i>	two-wing silverbell	m	IS
<i>Halesia parviflora</i>	little silverbell	m	IS
<i>Hamamelis virginiana</i>	witch-hazel	m	IS
<i>Ilex ambigua</i>	Carolina holly	g	
<i>Ilex cassine</i>	dahoon	g	
<i>Ilex coriacea</i>	large gallberry	g	
<i>Ilex decidua</i>	possumhaw	g	
<i>Ilex montana</i>	mountain winterberry	gm	C
<i>Ilex myrtifolia</i>	myrtle dahoon	g	
<i>Ilex opaca</i>	American holly	g	
<i>Ilex verticillata</i>	common winterberry	g	
<i>Ilex vomitoria</i>	yaupon holly	g	
<i>Juglans nigra</i>	black walnut	p	IS
<i>Juniperus virginiana</i>	Eastern red cedar	m	IS
<i>Kalmia latifolia</i>	mountain laurel	g	
<i>Liquidambar styraciflua</i>	sweetgum	g	
<i>Liriodendron tulipifera</i>	yellow-poplar	p	IS
<i>Magnolia acuminata</i>	cucumber tree	m	I
<i>Magnolia fraseri</i>	Fraser magnolia	p	IC
<i>Magnolia grandiflora</i>	Southern magnolia	m	I
<i>Magnolia pyramidata</i>	pyramid magnolia	p	IC
<i>Magnolia virginiana</i>	sweetbay	g	
<i>Malus angustifolia</i>	Southern crabapple	m	ICP
<i>Malus coronaria</i>	sweet crabapple	m	ICP
<i>Morus rubra</i>	red mulberry	g	
<i>Morella cerifera</i>	Southern bayberry	g	
<i>Myrica heterophylla</i>	evergreen bayberry	g	
<i>Nyssa aquatica</i>	water tupelo	g	

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<i>Nyssa ogeche</i>	Ogeechee tupelo	m	IS
<i>Nyssa sylvatica</i>	blackgum	g	
<i>Osmanthus americana</i>	devilwood	m	I
<i>Ostrya virginiana</i>	Eastern hophornbeam	m	S
<i>Oxydendrum arboreum</i>	sourwood	p	A
<i>Persea borbonia</i>	redbay	g	
<i>Pinckneya pubens</i>	pinckneya	m	I
<i>Pinus echinata</i>	shortleaf pine	gm	P
<i>Pinus elliotii</i>	slash pine	g	
<i>Pinus glabra</i>	spruce pine	g	
<i>Pinus palustris</i>	longleaf pine	gm	C
<i>Pinus pungens</i>	table-mountain pine	gm	C
<i>Pinus rigida</i>	pitch pine	g	
<i>Pinus serotina</i>	pond pine	g	
<i>Pinus strobus</i>	Eastern white pine	m	A
<i>Pinus taeda</i>	loblolly pine	g	
<i>Pinus virginiana</i>	Virginia pine	g	
<i>Planera aquatica</i>	planer-tree	g	
<i>Platanus occidentalis</i>	American sycamore	g	
<i>Populus deltoides</i>	Eastern cottonwood	g	
<i>Prunus americana</i>	American plum	m	IS
<i>Prunus angustifolia</i>	chickasaw plum	m	IS
<i>Prunus caroliniana</i>	Carolina laurelcherry	g	
<i>Prunus pensylvanica</i>	fire cherry	m	I
<i>Prunus serotina</i>	black cherry	m	I
<i>Prunus umbellata</i>	flatwoods plum	m	I
<i>Ptelea trifoliata</i>	hoptree	m	I
<i>Quercus alba</i>	white oak	gm	S
<i>Quercus coccinea</i>	scarlet oak	g	
<i>Quercus sinuata</i>	Durand oak	g	
<i>Quercus falcata</i>	Southern red oak	g	
<i>Quercus falcata</i> var. <i>pagodaefolia</i>	cherrybark oak	g	
<i>Quercus incana</i>	bluejack oak	g	
<i>Quercus laevis</i>	turkey oak	g	
<i>Quercus laurifolia</i>	laurel oak	g	
<i>Quercus lyrata</i>	overcup oak	g	
<i>Quercus marilandica</i>	blackjack oak	g	
<i>Quercus michauxii</i>	swamp chestnut oak	g	
<i>Quercus montana</i>	chestnut oak	gm	S

Scientific name	Common name	Tolerance	Limitations
<i>Quercus muehlenbergii</i>	chinkapin oak	g	
<i>Quercus nigra</i>	water oak	g	
<i>Quercus phellos</i>	willow oak	gm	S
<i>Quercus rubra</i>	Northern red oak	gm	SC
<i>Quercus shumardii</i>	Shumard oak	g	
<i>Quercus stellata</i>	post oak	g	
<i>Quercus velutina</i>	black oak	g	
<i>Quercus virginiana</i>	live oak	gm	C
<i>Rhamnus caroliniana</i>	Carolina buckthorn	m	IS
<i>Rhododendron catawbiense</i>	catawba rhododendron	m	I
<i>Rhododendron maximum</i>	osebay rhododendron	m	I
<i>Rhus coppalina</i>	shining sumac	m	I
<i>Rhus glabra</i>	smooth sumac	m	I
<i>Robinia pseudoacacia</i>	black locust	g	P
<i>Salix caroliniana</i>	Coastal Plain willow	g	
<i>Salix nigra</i>	black willow	g	
<i>Salix sericea</i>	silky willow	g	
<i>Sambucus canadensis</i>	American elder	p	A
<i>Sassafras albidum</i>	sassafras	g	
<i>Staphylea trifolia</i>	American bladdernut	g	
<i>Stewartia malacodendron</i>	Virginia stewartia	g	
<i>Stewartia ovata</i>	mountain stewartia	g	
<i>Styrax americana</i>	American snowbell	m	IS
<i>Styrax grandifolia</i>	bigleaf snowbell	m	IS
<i>Symplocos tinctoria</i>	common sweetleaf	g	I
<i>Taxodium distichum</i>	bald cypress	g	
<i>Taxodium distichum</i> var. <i>nutans</i>	pond cypress	g	
<i>Tilia caroliniana</i>	Carolina basswood	p	A
<i>Tilia americana</i> var. <i>heterophylla</i>	white basswood	p	A
<i>Toxicodendron vernix</i>	poison sumac	m	I
<i>Tsuga canadensis</i>	Eastern hemlock	p	A
<i>Ulmus alata</i>	winged elm	g	
<i>Ulmus americana</i>	American elm	m	P
<i>Ulmus rubra</i>	slippery elm	m	P
<i>Vaccinium arboreum</i>	tree sparkleberry	m	A
<i>Viburnum nudum</i>	possumhaw viburnum	g	
<i>Viburnum obovatum</i>	Walter viburnum	g	

Scientific name	Common name	Tolerance	Limitations
<i>Viburnum rufidulum</i>	rusty blackhaw	g	
<i>Zanthoxylum clava-herculis</i>	Hercules-club	m	I

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