

Freshwater Flooding Performance of Nursery Grown Container Ornamentals

observations made by Danny Lauderdale, Eastern Region Nursery and Greenhouse Area Specialized Agent

(Plants evaluated following flooding from Hurricane Matthew in fall of 2016 and spring flooding of 2017.) (Evaluations from 10/19/16 to 11/10/16 and 3/9/17 to 4/5/17)

*see general observations at bottom

Ratings based on:

G = Good = performed well and had little or no foliage drop or root loss (plants immediately ready for sale if not silted (see **Silt Note for more)

F = Fair = variable performance, some dead/some alive, or a high value crop with enough tolerance that observation of decent looking plants for several weeks is warranted

P = Poor = majority of plants died within a few weeks following flooding or had significant enough damage that further inputs are not worth the investment, i.e. not saleable

<u>Genus</u>	<u>specific epithet</u>	<u>Cultivar</u>	<u>Foliage Tolerance</u>	<u>Root Tolerance</u>	<u>Overall Tolerance</u>	<u>Notes (depth and length of flooding)</u>
<i>Abelia</i>	<i>x grandiflora</i>	Kaleidescope	G	F	F	2-3 days half foliage
<i>Abelia</i>	<i>x grandiflora</i>	Radiance	G	F	F	2-3 days half foliage
<i>Acer</i>	<i>palmatum</i>		P	P	P	Blew over and submerged, 7 days
<i>Acer</i>	<i>rubrum</i>	October Glory	G	G	G	Root maker container
<i>Aucuba</i>	<i>japonica</i>		F	F	F	Variable depending on depth(2-4 feet) and time(2-4 days)
<i>Betula</i>	<i>nigra</i>		G	G	G	Unless laid down in water and not stood back up after
<i>Buxus</i>	<i>sempervirens</i>		P	P	P	
<i>Callicarpa</i>	<i>x</i>	Pearl Glam	G	G	G	2-3 days half foliage
<i>Callitropsis</i>	<i>leylandii</i>		F-G	P-F	P-F	7-84 hrs with foliage tips out of water, laid down dead
<i>Camellia</i>	<i>japonica</i>		G	G	G	
<i>Camellia</i>	<i>sasanqua</i>		F	F	F	Depends on length under, up to 2 days OK
<i>Cephalotaxus</i>	<i>harringtonia</i>		F	F	F	
<i>Cercis</i>	<i>canadensis</i>		G	F	F	
<i>Cleyera</i>	<i>Japonica</i>		G	G	G	
<i>Chamaecyparis</i>	<i>lawsoniana</i>	Sunkist	P	P	P	1/2 foliage under
<i>Chamaecyparis</i>	<i>obtusa</i>	Crippsii	P	P	P	Variable, half foliage under
<i>Chamaecyparis</i>	<i>pisifera</i>	Gold Mop	P	P	P	Variable, half foliage under
<i>Chamaecyparis</i>	<i>pisifera</i>	Kings Gold	P	P	P	
<i>Chamaecyparis</i>	<i>pisifera</i>	Vintage Gold	P	P	P	Variable, half foliage under
<i>Cornus</i>	<i>florida</i>		F	P	P	Lower half roots dead
<i>Cornus</i>	<i>kousa</i>		G	F	F	
<i>Cortaderia</i>	<i>selloiana</i>		G	G	G	All ornamental grasses OK
<i>Cryptomeria</i>	<i>japonica</i>	Radicans	F	F	F	
<i>Distylium</i>	<i>myricoides</i>		F	F	F	2 ft. water, 3 days
<i>Edgeworthia</i>	<i>chrysantha</i>		F	F	F	
<i>Eucalyptus</i>			F	P	P	
<i>Euonymus</i>	<i>alatus</i>		P	P	P	
<i>Euonymus</i>	<i>japonicus</i>	Silver King	P	P	P	
<i>Ficus</i>	<i>spp.</i>		F	F	F	Fruiting fig
<i>Gardenia</i>	<i>jasminoides</i>		G	G	G	even if submerged for several days

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<i>Gardenia</i>	<i>jasminoides</i>	Frost Proof	G	G	G	"
<i>Gardenia</i>	<i>jasminoides</i>	Kleim's Hardy	G	G	G	"
<i>Gardenia</i>	<i>jasminoides</i>	Radicans	G	G	G	"
<i>Gelsemium</i>	<i>sempervirens</i>		G	G	G	all woody vines good
<i>Hosta</i>			G	G	G	
<i>Hydrangea</i>	<i>macrophylla</i>		P	G	F	Leaf spots msut be managed after
<i>Hydrangea</i>	<i>quercifolia</i>	Alice and Jetstream	F	F	F	mixed bag of good and bad
<i>Hypericum</i>	<i>x</i>	Blue Velvet	G	G	G	2-3 days half foliage
<i>Ilex</i>	<i>cornuta</i>	Burfordii	G	G	G	
<i>Ilex</i>	<i>cornuta</i>	Fineline	F	F	F	7 days, 4 ft
<i>Ilex</i>	<i>cornuta</i>	Needlepoint	G	G	G	up to 1/3 lower foliage under
<i>Ilex</i>	<i>crenata</i>	Compacta	F	F	F	4 days under
<i>Ilex</i>	<i>crenata</i>	Helleri	F	F	F	72 hours with leaf tips out
<i>Ilex</i>	<i>crenata</i>	Hoogendorn	G	F	F	72 hours with leaf tips out
<i>Ilex</i>	<i>crenata</i>	Sky Pencil	F	F	F	4 days under, 1 gallons OK with no foliage under 2 days
<i>Ilex</i>	<i>crenata</i>	Soft Touch	G	F	F	72 hours leaf tips out
<i>Ilex</i>	<i>crenata</i>	Steeds	G-F	P	F	72-84 hours no leaf tips out
<i>Ilex</i>	<i>glabra</i>		F	G	G	72 hours under with leaf tips out
<i>Ilex</i>	<i>vomitorea</i>		G	G	G	
<i>Ilex</i>	<i>x</i>	Emily Brunner	G	G	G	
<i>Ilex</i>	<i>x</i>	Mary Nell	P	P	P	7 days, 4 ft
<i>Ilex</i>	<i>x</i>	Nellie R. Stevens	G-F	G-P	F	Up to 4 days, 2 feet deep, laid down dead
<i>Ilex</i>	<i>x</i>	Oakland amd Oakleaf	G	F	F	
<i>Illiucium</i>	<i>parviflorum</i>		F	F	F	
<i>Juniperus</i>	<i>chinensis</i>	Blue Point	P	P	P	4 days 2 ft deet
<i>Juniperus</i>	<i>chinensis</i>	Gold Lace	P	P	P	
<i>Juniperus</i>	<i>chinensis</i>	Sargent	P	P	P	
<i>Juniperus</i>	<i>chinensis</i>	Spartan	F	P	P	
<i>Juniperus</i>	<i>conferta</i>	Blue Pacific	P	P	P	
<i>Juniperus</i>	<i>davurica</i>	Expansa (Parsons)	P	P	P	
<i>Juniperus</i>	<i>procumbens</i>	Nana	F	P	P	
<i>Lagerstoemia</i>	<i>spp.</i>		G	G	G	Even Pocomoke all folage under 2 days
<i>Ligustrum</i>	<i>japonicum</i>		F	F	F	up to 4 ft water for 7 days
<i>Ligustrum</i>	<i>japonicum</i>	Recurvifolium	G	G	G	4 days, 2 feet deep
<i>Ligustrum</i>	<i>lucidum</i>		G	G	G	
<i>Ligustrum</i>	<i>ovalifolium</i>	Nantucket privet	G	G	G	2-3 days half foliage
<i>Liriodendron</i>	<i>tulipifera</i>		G	P	P	
<i>Lonicera</i>	<i>sempervirens</i>		G	G	G	
<i>Loropetalum</i>	<i>chinense</i>		P	P	P	Up to 4 days, 2 feet deep, foliage out-fair
<i>Magnolia</i>	<i>grandiflora</i>		F	G	G	Poor if blown down in water

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<i>Magnolia</i>	<i>grandiflora</i>	DD Blanchard	G	G	G	
<i>Magnolia</i>	<i>grandiflora</i>	Little Gem	G-F	G-F	G-F	Up to 4 days, 2 ft deep, dead if fell in flood water 2-4 days
<i>Magnolia</i>	<i>stellata</i>		P	G	F	Poor foliage typical in fall anyway
<i>Mahonia</i>	<i>beallii</i>		F	P	P	
<i>Mahonia</i>	<i>confusa</i>	Narihira	F	F	F	2 days under
<i>Mahonia</i>	<i>x</i>	Soft Caress	F	G	G	2 days under
<i>Malus</i>	<i>spp.</i>	Crabapple	G	F	F	
<i>Metasequoia</i>	<i>glyptodtoboides</i>		F	F	F	
<i>Morellia</i>	<i>cerifera</i>		F	G	G	Survived up to 7 days with 4 ft, fell in water dead
<i>Nandina</i>	<i>domestica</i>		F	F	F	
<i>Nandina</i>	<i>domestica</i>	Nana	F	P	P	2 days under
<i>Nandina</i>	<i>domestica</i>	Firepower	P-F	P-F	P	2 days under
<i>Nandina</i>	<i>domestica</i>	Flirt	F	G	G	2 days under
<i>Nandina</i>	<i>domestica</i>	Gulfstream	F	F	F	2 days half way up pot
<i>Nandina</i>	<i>domestica</i>	Harbour Belle	P	P	P	2 days under, leaf spots also
<i>Nandina</i>	<i>domestica</i>	Lemon Lime	F	G	G	2days under
<i>Nandina</i>	<i>domestica</i>	Obsession	F	P	P	2 days under, leaf spot
<i>Nandina</i>	<i>domestica</i>	Twilight	G	G	G	2 days half way up pot
<i>Osmanthus</i>	<i>fragrans</i>		F-G	F-G	F-G	at up to 4 days at 2 ft., P at 7 days with 4 ft.
<i>Osmanthus</i>	<i>hrterophyllus</i>		P	P	P	3 days foliage half submerged
<i>Osmanthus</i>	<i>heterophyllus</i>	Gulftide	P	P	P	2-3 days container
<i>Parthenocissus</i>	<i>tricuspidata</i>		G	G	G	2-3 days container
<i>Pieris</i>	<i>japonica</i>	Temple Belle	F	P	P	2 days under
<i>Pinus</i>	<i>palustris</i>		F	P	P	Submerged roots
<i>Pistacia</i>	<i>chinense</i>		G	P	P	4 days 2 ft deep
<i>Prunus</i>	<i>spp.</i>		F	P	P	
<i>Pittosporum</i>	<i>tobira</i>	Mojo	F	F	F	foliage in water dead, out OK
<i>Pyracantha</i>	<i>spp.</i>		G	F	F	4 days under
<i>Pyrus</i>	<i>calleryana</i>	Cleveland	F	P	P	
<i>Quercus</i>	<i>accutissima</i>		G	F	F	4 days, 2 feet deep
<i>Quercus</i>	<i>phellos</i>		G-F	G-F	G-F	4 days, 2 feet deep
<i>Quercus</i>	<i>virginiana</i>		F	F	F	4 days, 2 feet deep
<i>Rhododendron</i>	<i>spp.</i>	various Azalea cultiva	P	P	P	on ground production 1-3 gallon
<i>Rhododendron</i>	<i>spp.</i>	Azalea liners*	F-G	F-G	F-G	Need to be on bench, dead if not
<i>Rhododendron</i>	<i>spp.</i>	Autum Encore	F	F	F	Fire-F-G; Amethyst, Empress, Debutant, Royalty-F-P
<i>Rosa</i>	<i>spp.</i>	Drift and Knockout	F	F	F	
<i>Rubus</i>	<i>sp.</i>	Blackberry	G	G	G	
<i>Spiraea</i>	<i>spp.</i>		P	P	P	4 days, 2 feet deep
<i>Styra</i>	<i>japonicus</i>		G	G	G	
<i>Syringia</i>	<i>vulgaris</i>	Miss King	P	P	P	

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<i>Taxodium</i>	<i>distichum</i>		F	G	G	
<i>Taxus</i>	<i>spp.</i>		P	P	P	
<i>Thuja</i>	<i>occidentalis</i>	Degroots Spire	P	P	P	
<i>Thuja</i>	<i>occidentalis</i>	Emerald	G	F	F	
<i>Thuja</i>	<i>occidentalis</i>	Green Giant	G	F	F	F If water not on foliage, laid down dead
<i>Trachelospermum</i>	<i>jasminoides</i>		G	G	G	
<i>Ulmus</i>	<i>parvifolia</i>		G	F	G	Rootmaker container, great drainage
<i>Vaccinium</i>	<i>asheii</i>		G	F	F	
<i>Viburnum</i>	<i>awabuki</i>	Chindo	G	G	G	24 hours rise and fall
<i>Viburnum</i>	<i>macrocephalum</i>		F	F	F	4 days, 2 feet deep
<i>Viburnum</i>	<i>plicatum</i>	Popcorn	F	F	F	
<i>Vitex</i>	<i>agnuscastus</i>		G	G	G	2-3 days, half foliage under
<i>Weigela</i>	<i>florida</i>	Sonic Bloom	P	P	P	
<i>Weigela</i>	<i>florida</i>	Wine and Roses	F	P	P	
<i>Wisteria</i>	<i>frutescens</i>	Amethyst Falls	G	G	G	

*Azalea liners: Snow (poor), others good: Hershey, Delaware Valley, Embers, Karen, Flame Creeper, Hino Crimson, Coral Bells, Sangria, Purple Splendor (on 36' high benches)

***General observations:**

Plants laid down in water > 24 hours were dead or unsaleable regardless of normal flood tolerance due to foliar loss.

Plants with foliage completely submerged regardless of the normal flood tolerance are not generally going to be saleable.

Plants that were not fully rooted into containers performed better than fully rooted plants of same species.

Most every plant will be dead or unsaleable if root system is under water for more than 5-7 days.

Gardenia spp. are the exception to the rule, it seems, as all cultivars survived even if submerged for 10 days.

Rooted cuttings and liners in 4 inch pots on benches performed well, even when roots were flooded for several days since complete drainage could occur.

Phytophthora foliar blight was found in azalea liners on flooded benches afterwards but no Phytophthora root rot.

** Silt Note: Washing foliage with irrigation water at high volume (as much pressure as possible) 2 to 3 times performed better at removing silt than any additive to water.

Placement of plants and triage recommendations based on ratings:

Good performing plants grow fine after short term (2-4 day root system) flooding and are a better choice for short term flood prone areas.

All good performing plants should be stood up immediately after the event if irrigation system is functioning to avoid desiccation of root systems.

Fair performing plants should be located in less flood prone areas if they are a high value crop and should be stood up immediately if irrigation system is functioning.

Poor performing plants should be located in the least flood prone areas of the nursery.

Poor performing plants, if flooded for at least 2-4 days, should not receive attention until good performing and fair performing plants with high value are stood up.

No matter the performance, try to keep highest value crops out of flood prone area.