

Species Dataform and Scoresheet for *Berberis thunbergii* DC. (Japanese barberry).

<b>Species Dataform and Scoresheet</b>		
<b><i>Berberis thunbergii</i> DC. (Japanese barberry)</b>		
Native range: Japan		
Date evaluated: May 28, 2009		
	<b>Answer Choices</b>	<b>Response</b>
<b>Introductory Questions</b>		
<b>1. Current federal and state regulations</b>	Y/N	N
Comments: Sale of prohibited in Massachusetts and New Hampshire (Lubell et al. 2008). Appears on several invasive species lists (not laws) in the Southeastern U.S., including Tennessee (Rank 2, Significant threat), Kentucky (Rank b, Significant threat), Virginia (Rank b, Medium invasiveness), and the National Forest Service (Category 1, species known to be invasive and persistent) (Invasive.org 2009).		
<b>2. Occurrence in the horticultural trade</b>	Y/N	Y
<b>3. North Carolina nativity</b>		
	Y/N	N
Comments: Native to Japan (Weakley 2008)		
<b>4. Presence in natural areas</b>	Y/N	Y
Comments: Japanese barberry infestations may occur in undisturbed closed-canopy forests (Ehrenfeld 1997).		
<b>5. Non-invasive cultivars</b>	Y/N	N
Comments: Some ornamental Japanese barberry genotypes have reduced fruit and seed production and limited fecundity (Lubell et al. 2008). Researchers at North Carolina State University are working on developing new, seedless, noninvasive cultivars for landscape applications.		
	Maximum Point Value	Number of Points Assigned
<b>Section 1. Ecological Impact</b>		
<b>1a. Impact on abiotic ecosystem processes</b>	10	4
Comments: Alters soil chemistry (raises soil pH and nitrification) and microbial communities of deciduous forests in New Jersey (Ehrenfeld et al. 2001). Impacts soil ecosystem, nitrogen cycling, soil biota, soil structure, and function (Kourtev 2002). Reduces litter layer (Kourtev 2002).		
<b>1b. Impact on plant community structure and composition</b>	20	15
Comments: Japanese barberry may limit tree regeneration and herbaceous plants in the forest understory (Ward et al. 2009). <i>Berberis thunbergii</i> has the ability to outcompete native species in the understory (Xu et al. 2007). Biomass of co-occurring species is suppressed by Japanese barberry (Silander and Klepeis 1999).		
<b>1c. Impact on species of special concern</b>	5	2
Comments: May displace native flora (Lubell et al. 2008). In eastern deciduous forests, Japanese barberry has replaced the native blueberries ( <i>Vaccinium</i> spp.) normally found in the forest understory (Kourtev 2002). In North Carolina, <i>Vaccinium macrocarpon</i> (Cranberry) and <i>V. virgatum</i> (Small-flower blueberry) are significantly rare (Franklin		

2004).		
<b>1d. Impact on higher trophic levels</b>	5	3
Comments: Impacts earth worm populations (Ehrenfeld et al. 2001). Barberry-infested forests have especially high populations of blacklegged ticks ( <i>Ixodes scapularis</i> ) that are the major vectors for several diseases, including Lyme disease (Ward et al. 2009).		
<b>Section 1. Subrank</b>	<b>40</b>	<b>24</b>
<b>Section 2. Current Distribution and Potential for Expansion</b>		
<b>2a. Local range expansion</b>	7	4
Comments: Found in mountains, piedmont and coastal plain of NC (Weakley 2008). In New England, there has been a slow increase in the frequency with which Japanese barberry has been observed in mature forest (Ehrenfeld 1997).		
<b>2b. Long-distance dispersal potential</b>	13	13
Comments: Japanese barberry produces large numbers of bird dispersed fruits that allow the plant to effectively spread across the landscape (Silander and Klepeis 1999). Seed contained within berries spread by birds and small rodents (Lubell et al. 2008). Japanese barberry infestations may occur in areas distant from disturbed or open areas, sometimes up to 100 m into undisturbed forest (Ehrenfeld 1997). Songbirds, white-tail deer ( <i>Odocoileus virginianus</i> ), wild turkeys ( <i>Meleagris gallopavo</i> ) and grouse ( <i>Bonasa umbellus</i> ) may utilize and distribute the berries (Ehrenfeld 1997).		
<b>2c. Reproductive characteristics</b>	8	6
Comments: Plants thrive under a variety of light and soil moisture conditions and reproduce readily from seed (Silander and Klepeis 1999). Produces large number of seeds that have a high germination rate (Swearingen 2005). Branches that are in contact with the ground root freely at nodes and facilitate vegetative spread (Swearingen 2005). Root fragments regenerate to form new plants (Swearingen 2005).		
<b>2d. Range of communities</b>	6	4 (Unknown)
Comments: Rich forests, old fields in North Carolina, uncommon (Weakley 2008).		
<b>2e. Similar habitats invaded elsewhere</b>	6	4
Comments: Forms dense stands in canopy forests, open woodlands, wetlands, pastures, and meadows in New England and northern states in the Southeast U.S. (Swearingen 2005). Natural communities of North Carolina (Shafale and Weakley 1990) = Low elevation mesic forests, low elevation dry and dry-mesic forest and woodlands		
<b>Section 2. Subrank</b>	<b>40</b>	<b>31</b>
<b>Section 3. Management Difficulty</b>		
<b>3a. Herbicidal control</b>	5	3
Comments: Herbicides, including glyphosate and triclopyr, applied mid-to-late season following an initial pre or early-season mechanical (cutting), prescribed fire, or directed flame treatment provide effective control in a single growing season (Ward et al. 2009). Glyphosate applied in early spring at first leaf-out is an effective chemical control option (Silander and Klepeis 1999).		
<b>3b. Nonchemical control methods</b>	2	2
Comments: Manual control methods must be combined with herbicide applications in moderate to heavy infestations (Swearingen 2005). Initial pre- or early-season mechanical		

<p>(cutting), prescribed fire, or directed flame treatments applied prior to herbicide treatments of glyphosate or triclopyr provide effective control of dense infestations (Ward et al. 2009). In dense infestations where Japanese barberry plants are waist high or taller, medium (drum chopper) or heavy (bulldozer) equipment is necessary (Ward et al. 2009). However, medium and heavy equipment may be limited by terrain, forest density, and operator experience (Ward et al. 2009). No biological control organisms are available (Swearingen 2005).</p>		
<b>3c. Necessity of individual treatments</b>	2	2
<p>Comments: Root wrenching and herbicide applications to cut stems are effective, but labor intensive (Ward et al. 2009).</p>		
<b>3d. Average distribution</b>	2	1
<p>Comments: Dense stands may form in the forest understory (Ward et al. 2009). Distribution patters may be sparse, moderate, or dense populations (Ehrenfeld 1997).</p>		
<b>3e. Likelihood of reestablishment</b>	2	2
<p>Comments: Seed spread by birds and small rodents (Lubell et al. 2008) and may be reintroduced to treated area. Nearly all Barberry clumps treated once with mechanical control methods or prescribed fire had new sprouts by the end of the growing season (Ward et al. 2009).</p>		
<b>3f. Accessibility of invaded areas</b>	2	1
<p>Comments: Japanese barberry is capable of invading closed canopy forests (Ehrenfeld 1997). Extensive patches of Japanese barberry have been documented to exist within the forest interior in protected forest areas in New York (Ehrenfeld 1997).</p>		
<b>3g. Impact on native species and environment</b>	5	2
<p>Comments: The nonselective herbicides glyphosate and triclopyr must be applied carefully to individual plants to avoid impacting non-target native plants (Swearingen 2005).</p>		
<b>Section 3. Subrank</b>	<b>20</b>	<b>13</b>
<b>Section 4. Economic Value</b>		
<b>4a. Estimated wholesale value in North Carolina</b>	-7	-4
<p>Comments: The estimated wholesale value attributed to Japanese barberry in North Carolina is \$16,123,300 (Trueblood 2009).</p>		
<b>4b. Percentage of total sales</b>	-5	-3
<p>Comments: Among the producers that sell this species, the highest percentage of total sales attributed to this species from any one grower is estimated to be: 11-25% (Trueblood 2009).</p>		
<b>4c. Ecosystem services</b>	-1	0
<b>4d. Wildlife habitat</b>	-1	0
<b>4e. Cultural and social benefits</b>	-1	0
<b>Section 4. Subrank</b>	<b>-15</b>	<b>-7</b>
<b>Overall Score</b>	<b>100</b>	<b>61</b>
<p><b>Overall Recommendation:</b> Moderately weedy and recommended for use with specific guidance – These species have less than high ecological impact, distribution and invasive potential, and management difficulty in relation to economic value. These plants should not</p>		

be grown in close proximity to natural areas that have communities similar to those where this plant has been found to naturalize or near natural areas that have sensitive or threatened plants and/or natural communities. (Overall Score: 34 – 66)

**Summary:** *Berberis thunbergii* (Japanese barberry) is moderately weedy and recommended for horticultural use in North Carolina with specific guidance. Japanese barberry may suppress herbaceous plants in the forest understory and outcompete native species. Japanese barberry has high long-distance dispersal potential and may invade additional natural areas. The difficulty of managing Japanese barberry is moderate considering the availability of control methods, but management may be costly considering the time and labor required to effectively treat stands of this species. Japanese barberry is economically valuable to the nursery industry. Researchers at North Carolina State University are working on developing new, seedless, noninvasive cultivars for landscape applications. Use of seedless cultivars would be desirable when they become available.

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