

<i>Berberis thunbergii</i> DC (Japanese barberry)		Answer	Score
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to FL climates (USDA hardiness zones; 0-low, 1-intermediate, 2-high)	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in regions with an average of 11-60 inches of annual precipitation		
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture		
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	y	1
4.02	Allelopathic		
4.03	Parasitic		
4.04	Unpalatable to grazing animals	y	1
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
4.08	Creates a fire hazard in natural ecosystems		
4.09	Is a shade tolerant plant at some stage of its life cycle	y	1
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	y	1
4.11	Climbing or smothering growth habit		
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	?	
6.04	Self-compatible or apomictic		
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	1	1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant	n	-1
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed	n	-1
7.06	Propagules bird dispersed	y	1
7.07	Propagules dispersed by other animals (externally)		
7.08	Propagules dispersed by other animals (internally)	y	1

8.01	Prolific seed production	?	
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	?	
8.03	Well controlled by herbicides	y	-1
8.04	Tolerates, or benefits from, mutilation or cultivation	?	
8.05	Effective natural enemies present in U.S.	y	-1
Total Score		10	
Implemented Pacific Second Screening		n/a	
Risk Assessment Results		High Risk	

section	# questions answered	satisfy minimum?
A		11 yes
B		6 yes
C		15 yes
total		32 yes

	Reference	Source data
1.01		no evidence
1.02		
1.03		
2.01	1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnd.tif). 2. USDA, Oregon State University 2012. USDA Plant Hardiness Zone Map: Florida (http://planthardiness.ars.usda.gov/PHZMWeb/ , 4 April 2013). 3. "Berberis thunbergii". horticultura.com. Horticultura, 2011. Web. 14 May 2013. 4. Dehgan, Bijan. 1998. Landscape Plants for Subtropical Climates. University Press of Florida. Gainesville, FL.	No computer analysis was performed. 1. World hardiness zones: 3-9. 2. US hardiness zones:4A-8A. 3. Native habitat: Eastern Asia (Japan) Hardy range 4A-8A. 4. Hardiness Zone 4; should be grown in north Florida only.
2.02	Refer to all references in 2.01.	No computer analysis was performed. Native range is well known; refer to 2.01 source data.
2.03	Refer to all references in 2.01.	No computer analysis was performed. 1. World hardiness zones: 3-9. 2. US hardiness zones:4A-8A. 3. Native habitat: Eastern Asia (Japan) Hardy range 4A-8A. 4. Hardiness Zone 4; should be grown in north Florida only.
2.04		No data
2.05	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. About 1875, seeds from St. Petersburg, Russia were received at the Arnold Arboretum in Massachusetts and, from there, introduced to North America; known introduced range: North America, Poland, Finland, Italy, Austria, Denmark, Germany, Netherlands, and Australia. 2. Japanese barberry is not native to North America, but it was introduced in the 1800s.
3.01	1. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?6974). 2. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Native range: Japan; Naturalized: Europe, Canada, United States. 2. Japanese barberry was well documented in the United States by 1818.
3.02	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013.	1. When introduced it can invade a variety of habitats from damp lowlands to dry roadsides and waste places. This species forms dense stands in a variety of these habitats, including closed canopy forests and poen woodlands, wetlands, pastures and meadows.
3.03		
3.04	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. When introduced it can invade a variety of habitats from damp lowlands to dry roadsides and waste places. This species forms dense stands in a variety of these habitats, including closed canopy forests and poen woodlands, wetlands, pastures and meadows; occurs in: natural forests, planted forests, ruderal/disturbed, scrub/shrublands. 2. Japanese barberry is most problematic in mature forest communities in the eastern United States. It occurs in upland and riparian settings, wetlands, pastures, and meadows. It occurs more frequently and is more abundant in postagricultural forests than in less disturbed, continuously wooded sites.

3.05	1. Holm, L. et al. 1979. A Geographical Atlas of World Weeds. John Wiley and Sons, New York.	1. Several species of Berberis are weeds in the USA and Canada, including: aquifolium, canadensis, fendleri, haematocarpa, trifoliolata, and vulgaris.
4.01	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. "Berberis thunbergii". Missouri Botanical Garden: Gardening Help. Http://www.missouribotanicalgarden.org accessed 14 May 2013. 3. Dehgan, Bijan. 1998. Landscape Plants for Subtropical Climates. University Press of Florida. Gainesville, FL.	1. The single spines bear small leaves in their axils. 2. has thorns. 3. flexible thorn, 0.5 inch long, at each node.
4.02		
4.03		no data
4.04	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013.	1. The unpalatability of its foliage to deer makes it a favoured landscaping species.
4.05	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013.	1. Japanese macaque prefers it as a food source.
4.06	1. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?6974). 2. "Berberis thunbergii". horticultura.com. Horticultura, 2011. Web. 14 May 2013. 3. Dehgan, Bijan. 1998. Landscape Plants for Subtropical Climates. University Press of Florida. Gainesville, FL.	1. Harmful organism host: crop diseases. 2. Pest tolerant. 3. Host to wheat rust.
4.07	1. Bruneton (1999) Toxic Plants: Dangerous to Humans and Animals. Lavoisier Publishing, Paris.	1. The yellow color of the external part of the roots and stems of Berberis is due to the presence of a quaternary isoquinoline alkaloid, berberine. Berberine is responsible, at least in part, for jaundice in newborn human infants following the ingestion of traditional Chinese medicinal herbal teas.
4.08		
4.09	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. "Berberis thunbergii". horticultura.com. Horticultura, 2011. Web. 14 May 2013. 3. "Berberis thunbergii". Missouri Botanical Garden: Gardening Help. Http://www.missouribotanicalgarden.org accessed 14 May 2013.	1. This plant is highly shade tolerant. 2. Exposure: full shade to full sun. 3. Tolerates shade, but performs best with full sun.
4.10	1. "Berberis thunbergii". horticultura.com. Horticultura, 2011. Web. 14 May 2013. 2. "Berberis thunbergii". Missouri Botanical Garden: Gardening Help. Http://www.missouribotanicalgarden.org accessed 14 May 2013.	1. Suitable soil is well-drained/loamy, sandy or clay. The pH preference is an acidic to alkaline (less than 6.8 to more than 7.7) soil. 2. Tolerates clay soil and dry soil.
4.11		
4.12	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. This species forms dense stands. 2. This plant is most problematic in mature forest communities in the eastern United States, where it often forms dense thickets.
5.01		Family: Berberidaceae
5.02	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013.	Family: Berberidaceae 1. organism type: shrub
5.03		Family: Berberidaceae
5.04		Family: Berberidaceae
6.01		no evidence

6.02	1. "Berberis thunbergii DC". Seed Information Database. Kew. Accessed Online 14 May 2013. 2. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Seed viability maintained for 4 years in hermetic storage at 3°-5° C. 2. Japanese barberry reproduces from seeds, aboveground and belowground spread of clonal shoots, and layering.
6.03	1. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Japanese barberry is also used to breed hybrids for horticultural purposes.
6.04		
6.05	1. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	no evidence 1. this plant is pollinated by small and large bee species.
6.06	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. Dehgan, Bijan. 1998. Landscape Plants for Subtropical Climates. University Press of Florida. Gainesville, FL. 3. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Branches root freely when they touch the ground. 2. Propagation: softwood cuttings in spring or hardwood cuttings in fall, both with rooting hormones. 3. Sprouts occur from rhizomes at variable distances from the root base and form diffuse swarms of stems.
6.07	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. Dehgan, Bijan. 1998. Landscape Plants for Subtropical Climates. University Press of Florida. Gainesville, FL. 3. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Branches root freely when they touch the ground. 2. Propagation: softwood cuttings in spring or hardwood cuttings in fall, both with rooting hormones. 3. Sprouts occur from rhizomes at variable distances from the root base and form diffuse swarms of stems.
7.01		
7.02	1. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2]. 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?6974)	1. Japanese barberry is a popular ornamental. 2. Economic importance - ornamental.
7.03		no evidence
7.04	1. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Most Japanese barberry fruits are dispersed by gravity, and birds are the most common animal dispersers.
7.05	1. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Most Japanese barberry fruits are dispersed by gravity, and birds are the most common animal dispersers.

7.06	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. "Berberis thunbergii". hortocopia.com. Hortocopia, 2011. Web. 14 May 2013. 3. "Berberis thunbergii". Missouri Botanical Garden: Gardening Help. Http://www.missouribotanicalgarden.org accessed 14 May 2013.	1. Its seeds are dispersed by birds, most often ground birds such as turkey and grouse. 2. Fruit is edible by birds. 3. The berries are attractive to birds.
7.07		
7.08	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013. 2. "Berberis thunbergii DC". Seed Information Database. Kew. Accessed Online 14 May 2013.	1. Small mammals can also contribute to the fruit's dispersal. 2. Diaspore is eaten intentionally by non-bat mammals and birds.
8.01	1. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Seed production rates are not well studied for Japanese barberry under field conditions.
8.02	1. "Berberis thunbergii DC". Seed Information Database. Kew. Accessed Online 14 May 2013. 2. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. Seed viability maintained for 4 years in hermetic storage at 3°-5° C. 2. Studies in the greenhouse and on invaded sites in southern Maine suggest that Japanese barberry does not form a large or persistent soil seed bank.
8.03	1. ISSG Database, http://www.issg.org/database/species/ . Accessed: 5/14/2013.	1. Foliar spray method should be considered for large thickets of <i>B. thunbergii</i> where risk to non-target species is minimal. Glyphosate and Triclopyr are suitable for this method.
8.04	1. Zouhar, Kris. 2008. Berberis thunbergii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2013, June 2].	1. At a landscape scale, Japanese barberry occurrence or abundance does not appear to be influenced by disturbances such as harvesting activity. However, several smaller-scale studies indicate a potential for early-successional establishment of Japanese barberry following disturbance of the forest canopy.
8.05	1. Ehrenfeld JG (2009) Extensive Defoliation of Japanese Barberry (<i>Berberis thunbergii</i> DC.) in New Jersey by a Native Moth, <i>Coryphista meadii</i> . <i>Nat Area J</i> 29:57-63	1. "I observed extensive defoliation of current year's shoots on <i>Berberis</i> populations across central and northern New Jersey"..."The defoliating agent was shown to be <i>Coryphista meadii</i> , the barberry geometer, a lepidopteran native to all of North America."