

Australia/New Zealand Weed Risk Assessment adapted for Florida.

Data used for analysis published in: Gordon, D.R., D.A. Onderdonk, A.M. Fox, R.K. Stocker, and C. Gantz. 2008. Predicting Invasive Plants in Florida using the Australian Weed Risk Assessment. Invasive Plant Science and Management 1: 178-195.

<i>Lygodium japonicum (Japanese climbing fern)</i>			
Question number	Question	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 Florida's USDA climate 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)		
2.04	Native or naturalized in habitats with periodic inundation	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	0
3.02	Garden/amenity/disturbance weed	y	0
3.03	Weed of agriculture	y	0
3.04	Environmental weed	y	0
3.05	Congeneric weed	y	0
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	n	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals		
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans	n	0
4.08	Creates a fire hazard in natural ecosystems	y	1
4.09	Is a shade tolerant plant at some stage of its life cycle	y	1
4.1	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils)		
4.11	Climbing or smothering growth habit	y	1
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		
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally		
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative fragmentation	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	y	1
7.04	Propagules adapted to wind dispersal	y	1
7.05	Propagules water dispersed	?	
7.06	Propagules bird dispersed	n	-1
7.07	Propagules dispersed by other animals (externally)		
7.08	Propagules dispersed by other animals (internally)	n	-1
8.01	Prolific seed production	y	1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	y	1
8.03	Well controlled by herbicides	y	-1
8.04	Tolerates, or benefits from, mutilation or cultivation		
8.05	Effective natural enemies present in Florida, or east of the continental divide		
Total Score			25

Outcome	Reject*
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*Used secondary screen from: Daehler, C. C., J.L. Denslow, S. Ansari, and H. Kuo. 2004. A risk assessment system for screening out harmful invasive pest plants from Hawaii's and other Pacific islands. *Conserv. Biol.* 18: 360-368.

section	# questions answered	satisfy minimum?
A	7	yes
B	9	yes
C	17	yes
total	33	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01		used as an ornamental, but no evidence of selection for reduced weediness
1.02		
1.03		
2.01		
2.02		
2.03		
2.04	Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	can occur "in wet ditches, swamps, floodplains, marshes, lakes, creeks"
2.05	1. Miller, James H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control. Gen. Tech. Rep. SRS-62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 93 pp. 2. Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	1. "an ornamental still being spread by unsuspecting gardeners" 2. " <i>L. japonicum</i> has been introduced to Puerto Rico, and the southeastern United States from Texas to North Carolina and Arkansas (Proctor 1989, Nauman 1993)."
3.01	1. Nauman (1993) <i>Lygodiaceae</i> C. Presl. In <i>Flora of North America</i> . Volume 2. Oxford University Press, New York. Pp. 114-116. 2. Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	1. "It is commonly naturalized or escaped from cultivation." 2. "Naturalized populations of <i>L. japonicum</i> now occur in the United States from North Carolina through South Carolina, Georgia,...Alabama, Mississippi, and Louisiana, to east Arkansas and Texas."
3.02	1. Miller, James H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control. Gen. Tech. Rep. SRS-62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 93 p. 2. Weber (2003) <i>Invasive Plant Species of the World</i> . CABI Publishing.	1. "Occurs along highway right-of-ways, especially under and around bridges, invading into open forests, forest road edges, and stream and swamp margins." 2. invades disturbed habitats in the southeastern U.S.
3.03	Holm (1979) <i>A Geographical Atlas of World Weeds</i> . John Wiley and Sons.	Considered a common weed of agriculture in Taiwan, and is present as a weed in the Philippines.

3.04	Nauman (1993) Lygodiaceae C. Presl. In Flora of North America. Volume 2. Oxford University Press, New York. Pp. 114-116.	"It has been reported as weedy in southern Alabama...where its dense canopy can eliminate underlying vegetation."
3.05	Lott, Volin, Pemberton, and Austin (2003) The reproductive biology of the invasive ferns <i>Lygodium microphyllum</i> and <i>L. japonicum</i> (Schizaeaceae): implications for invasive potential. American Journal of Botany 90: 1144-1152.	<i>L. microphyllum</i> invasive in Florida
4.01	Nauman (1993) Lygodiaceae C. Presl. In Flora of North America. Volume 2. Oxford University Press, New York. Pp. 114-116.	no description of these traits
4.02		no evidence
4.03	Nauman (1993) Lygodiaceae C. Presl. In Flora of North America. Volume 2. Oxford University Press, New York. Pp. 114-116.	no description of this
4.04		
4.05		no evidence
4.06		
4.07	Bruneton (1999) Toxic Plants: Dangerous to Humans and Animals. Lavoisier Publishing, Paris.	"Ferns are rarely harmful to humans"; "Allergies to ferns are very rare"
4.08	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	"The dry dead fronds are flammable and in fire-prone regions the fern carries fires from the ground to the forest canopies, thus intensifying wild fires."
4.09	Lemke (2003) U. of Oklahoma, Dept. of Botany and Microbiology, Plant of the Week (http://www.plantoftheweek.org/week206.shtml).	" <i>Lygodium japonicum</i> need light shade to heavy shade"
4.1		
4.11	Nauman (1993) Lygodiaceae C. Presl. In Flora of North America. Volume 2. Oxford University Press, New York. Pp. 114-116.	climbing by means of twining rachis
4.12	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	"It quickly climbs to the canopy and forms dense mats there, shading out the host trees and any other supporting vegetation. It can weaken or even kill smothered trees."
5.01	Nauman (1993) Lygodiaceae C. Presl. In Flora of North America. Volume 2. Oxford University Press, New York. Pp. 114-116.	terrestrial
5.02	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	Schizaeaceae
5.03	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	Schizaeaceae
5.04	Duncan (1994) Ferns and Allied Plants of Victoria, Tasmania and South Australia. Melbourne University Press, Carlton, Victoria.	fern roots are usually fine and fibrous
6.01		
6.02	Ferriter, ed. (2001) <i>Lygodium</i> Management	<i>L. japonicum</i> reproduces by spores.

	Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	
6.03		
6.04	Lott, Volin, Pemberton, and Austin (2003) The reproductive biology of the invasive ferns <i>Lygodium microphyllum</i> and <i>L. japonicum</i> (Schizaeaceae): implications for invasive potential. American Journal of Botany 90: 1144-1152.	"Both species were capable of intragametophytic selfing...over 90% of the <i>L. japonicum</i> isolates produced sporophytes"
6.05		fern
6.06	Miller, James H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control. Gen. Tech. Rep. SRS-62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 93 p.	"persists and colonizes by rhizomes"
6.07	Lott, Volin, Pemberton, and Austin (2003) The reproductive biology of the invasive ferns <i>Lygodium microphyllum</i> and <i>L. japonicum</i> (Schizaeaceae): implications for invasive potential. American Journal of Botany 90: 1144-1152.	"Sexually mature gametophytes of <i>L. microphyllum</i> and <i>L. japonicum</i> were observed within 5 wk of germination. Once sexual maturity was reached, sporophyte production began and continued rapidly through week 12."
7.01	Langeland and Burks, eds. (1998) Identification and Biology of Nonnative Plants in Florida's Natural Areas. University of Florida.	"spores...perhaps carried in dust on moving objects such as vehicles" [speculative]
7.02	Miller, James H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control. Gen. Tech. Rep. SRS-62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 93 p.	"an ornamental still being spread by unsuspecting gardeners"
7.03	Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	" <i>L. japonicum</i> has also been identified as a contaminant in pine straw bales"
7.04	Miller, James H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control. Gen. Tech. Rep. SRS-62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 93 p.	"tiny, wind-dispersed spores"
7.05	Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	"Water and wind of storm events may help disperse millions of tiny spores over long distances, although little is known about <i>Lygodium</i> dispersal mechanisms."
7.06		unlikely for spores
7.07		
7.08		unlikely for spores

8.01		fern
8.02	Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	"Spores of the <i>Lygodium</i> genus have very thick walls, giving these propagules long environmental viability."
8.03	Miller, James H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control. Gen. Tech. Rep. SRS-62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 93 p.	Recommended control procedures: thoroughly wet all leaves with one of the following herbicides in water with a surfactant: Arsenal AC as a 1% solution; Garlon 3A, Garlon 4, or a glyphosate herbicide as a 2% solution; Escort at 1 to 2 ounces per acre in water.
8.04		
8.05		