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.

Lygodium japonicum (Japanese climbing fern)			
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	У	1
2.05	Does the species have a history of repeated introductions outside its natural range?	у	
3.01	Naturalized beyond native range	У	0
3.02	Garden/amenity/disturbance weed	У	0
3.03	Weed of agriculture	У	0
3.04	Environmental weed	У	0
3.05	Congeneric weed	У	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	у	1
4.09	Is a shade tolerant plant at some stage of its life cycle	у	1
4.1	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils)		
4.11	Climbing or smothering growth habit	У	1
4.12	Forms dense thickets	У	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	У	1
6.03	Hybridizes naturally		
6.04	Self-compatible or apomictic	У	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative fragmentation	У	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	у	1
7.03	Propagules likely to disperse as a produce contaminant	У	1
7.04	Propagules adapted to wind dispersal	у	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	У	1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	у	1
8.03	Well controlled by herbicides	у	-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\*

\*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
В	9	yes
С	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		weediness
1.03		
2.01		
2.02		
2.03		
2.04	Ferriter, ed. (2001) <i>Lygodium</i> Management	
	Plan for Florida. Florida Exotic Pest Plant	can occur "in wet ditches, swamps,
	Council's <i>Lygodium</i> Task Force.	floodplains, marshes, lakes, creeks"
2.05	1. Miller, James H. 2003. Nonnative invasive	
	plants of southern forests: a field guide for	1. "an ornamental still being spread
	identification and control. Gen. Tech. Rep. SRS-	by unsuspecting gardeners 2. "L.
	62. Asheville, NC: U.S. Department of	japonicum has been introduced to
	Agriculture, Forest Service, Southern Research	Puerto Rico, and the southeastern
	Station. 93 pp. 2. Ferriter, ed. (2001) Lygodium	United States from Texas to North
	Management Plan for Florida. Florida Exotic	Carolina and Arkansas (Proctor
	Pest Plant Council's <i>Lygodium</i> Task Force.	1989, Nauman 1993)."
3.01		1. "It is commonly naturalized or
		escaped from cultivation." 2. "Naturalized populations of <i>L</i> .
	1. Nauman (1993) Lygodiaceae C. Presl. In Flora of North America. Volume 2. Oxford	japonicum now occur in the United
	University Press, New York. Pp. 114-116. 2.	States from North Carolina through
	Ferriter, ed. (2001) <i>Lygodium</i> Management	South Carolina, Georgia,Alabama,
	Plan for Florida. Florida Exotic Pest Plant	Mississippi, and Louisiana, to east
	Council's <i>Lygodium</i> Task Force.	Arkansas and Texas."
3.02	1. Miller, James H. 2003. Nonnative invasive	1. "Occurs along highway right-of-
	plants of southern forests: a field guide for	ways, especially under and around
	identification and control. Gen. Tech. Rep.	bridges, invading into open forests,
	SRS–62. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research	forest road edges, and stream and swamp margins." 2. invades
	Station. 93 p. 2. Weber (2003) Invasive Plant	disturbed habitats in the
	Species of the World. CABI Publishing.	southeastern U.S.
3.03	-	Considered a common weed of
	Holm (1979) A Geographical Atlas of World	agriculture in Taiwan, and is present
	Weeds. John Wiley and Sons.	as a weed in the Philippines.

3.04		"It has been reported as weedy in
3.04	Nauman (1993) Lygodiaceae C. Presl. In Flora	southern Alabamawhere its dense
	of North America. Volume 2. Oxford University	canopy can eliminate underlying
	Press, New York. Pp. 114-116.	vegetation."
3.05	Lott, Volin, Pemberton, and Austin (2003) The	regetation
0.00	reproductive biology of the invasive ferns	
	Lygodium microphyllum and L. japonicum	
	(Schizaeaceae): implications for invasive	
	· ·	
	potential. American Journal of Botany 90:	
	1144-1152.	L. microphyllum 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	"Ferns are rarely harmful to
	Humans and Animals. Lavoisier Publishing,	humans"; "Allergies to ferns are very
	Paris.	rare"
4.08		"The dry dead fronds are flammable
		and in fire-prone regions the fern
		carries fires from the ground to the
	Weber (2003) Invasive Plant Species of the	forest canopies, thus intensifying
4.00	World. CABI Publishing.	wild fires."
4.09	Lemke (2003) U. of Oklahoma, Dept. of Botany	" <i>Lygodium japonicum</i> need light
	and Microbiology, Plant of the Week	shade to heavy shade"
4.4	(http://www.plantoftheweek.org/week206.shtml).	Shade to heavy shade
4.1	Naverage (4000) Lyga Bassa C. Dasal Ja Flaga	
4.11	Nauman (1993) Lygodiaceae C. Presl. In Flora	
	of North America. Volume 2. Oxford University	olimbing by magne of twining raphic
4.12	Press, New York. Pp. 114-116.	climbing by means of twining rachis
4.12		"It quickly climbs to the canopy and forms dense mats there, shading out
		the host trees and any other
		supporting vegetation. It can
	Weber (2003) Invasive Plant Species of the	weaken or even kill smothered
	World. CABI Publishing.	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.	fern roots are usually fine and
	Melbourne University Press, Carlton, Victoria.	fibrous
6.01		-
6.02	Ferriter, ed. (2001) <i>Lygodium</i> Management	L. japonicum reproduces by spores.
1 0.02	i onnoi, ou. (2001) Lygoululli Mallagelliellt	L. japonioani 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 Lygodium microphyllum and L. japonicum (Schizaeaceae): implications for invasive potential. American Journal of Botany 90: 1144-1152.	"Both species were capable of intragametophytic selfingover 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	
6.07	Station. 93 p.	"persists and colonizes by rhizomes"  "Sexually mature gametophytes of
0.07	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.	L. microphyllum and L. japonicum 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.	"sporesperhaps 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
7.03	Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	unsuspecting gardeners"  "L. japonicum 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 sperse"
7.05	Ferriter, ed. (2001) <i>Lygodium</i> Management Plan for Florida. Florida Exotic Pest Plant Council's <i>Lygodium</i> Task Force.	"tiny, wind-dispersed spores"  "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
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		