

Assessment date 14 April 2016

<b><i>Aristolochia ringens</i> Central ZONE</b>		<b>Answer</b>	<b>Score</b>
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) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	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 habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	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	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	unk	
3.04	Environmental weed	unk	
3.05	Congeneric weed	y	2
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	unk	-1
4.05	Toxic to animals	unk	0
4.06	Host for recognised pests and pathogens	unk	0
4.07	Causes allergies or is otherwise toxic to humans	unk	0
4.08	Creates a fire hazard in natural ecosystems	unk	0
4.09	Is a shade tolerant plant at some stage of its life cycle	unk	0
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	y	1
4.12	Forms dense thickets	unk	0
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	unk	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	unk	-1
6.04	Self-compatible or apomictic	n	-1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	unk	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
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	y	1
7.05	Propagules water dispersed	unk	-1
7.06	Propagules bird dispersed	unk	-1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	unk	-1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	unk	-1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
<b>Total Score</b>			<b>2</b>
<b>Implemented Pacific Second Screening</b>			<b>yes</b>
<b>Risk Assessment Results</b>			<b>Low</b>

section	# questions answered	satisfy minimum?
A		9 yes
B		4 yes
C		12 yes
total		25 yes

Assessment date 14 April 2016

<b><i>Aristolochia ringens</i> Central ZONE</b>		<b>Answer</b>	<b>Score</b>
1.01	Is the species highly domesticated?	n	0
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2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	1	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	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	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	unk	
3.04	Environmental weed	unk	
3.05	Congeneric weed	y	2
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	unk	-1
4.05	Toxic to animals	unk	0
4.06	Host for recognised pests and pathogens	unk	0
4.07	Causes allergies or is otherwise toxic to humans	unk	0
4.08	Creates a fire hazard in natural ecosystems	unk	0
4.09	Is a shade tolerant plant at some stage of its life cycle	unk	0
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	unk	0
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets	unk	0
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	unk	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	unk	-1
6.04	Self-compatible or apomictic	n	-1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	unk	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
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	y	1
7.05	Propagules water dispersed	unk	-1
7.06	Propagules bird dispersed	unk	-1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	unk	-1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	unk	-1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
<b>Total Score</b>			<b>1</b>
<b>Implemented Pacific Second Screening</b>			<b>yes</b>
<b>Risk Assessment Results</b>			<b>Low</b>

section	# questions answered	satisfy minimum?
A		9 yes
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Assessment date 14 April 2016

<b><i>Aristolochia ringens</i> Central ZONE</b>		<b>Answer</b>	<b>Score</b>
1.01	Is the species highly domesticated?	n	0
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2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	1	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	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	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	unk	
3.04	Environmental weed	unk	
3.05	Congeneric weed	y	2
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	unk	-1
4.05	Toxic to animals	unk	0
4.06	Host for recognised pests and pathogens	unk	0
4.07	Causes allergies or is otherwise toxic to humans	unk	0
4.08	Creates a fire hazard in natural ecosystems	unk	0
4.09	Is a shade tolerant plant at some stage of its life cycle	unk	0
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	unk	0
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets	unk	0
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	unk	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	unk	-1
6.04	Self-compatible or apomictic	n	-1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	unk	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
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	y	1
7.05	Propagules water dispersed	unk	-1
7.06	Propagules bird dispersed	unk	-1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	unk	-1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	unk	-1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05		?	
<b>Total Score</b>			<b>1</b>
<b>Implemented Pacific Second Screening</b>			<b>yes</b>
<b>Risk Assessment Results</b>			<b>Low</b>

section	# questions answered	satisfy minimum?
A		9 yes
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C		12 yes
total		25 yes

	Reference	Source data
1.01		cultivated, but no evidence of selection for reduced weediness
1.02		
1.03		
2.01	1. PERAL NAPPFAST Global Plant Hardiness ( <a href="http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnnd.tif">http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnnd.tif</a> ). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896</a> (3-11-2016).	No computer analysis was performed. 1. Global hardiness zone: 9, 10, 11 ; equivalent to USDA Hardiness zones: USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11a: to USDA Zone (40 °F) USDA Zone 11b: to (45 °F) USDA . 2. Native to South Tropical Africa: Mozambique Southern Africa: South Africa - Cape Province, - KwaZulu-Natal, - Free State, - Transvaal
2.02		
2.03	1. Köppen-Geiger climate map ( <a href="http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf">http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf</a> ). 2. GBIF <a href="http://www.gbif.org/species/3082283">http://www.gbif.org/species/3082283</a> (3-11-2016)	1. Distribution in the native/cultivated range occurs in Aw, Cfb, Csa, Cfa, Bsk, Bwk
2.04	1. Climate Charts. World Climate Maps. <a href="http://www.climate-charts.com/World-Climate-Maps.html#rain">http://www.climate-charts.com/World-Climate-Maps.html#rain</a> (8-19-2015)	Native to regions with 5 inches to 58 inches of rainfall annually.
2.05	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016) 2. Kamehameha <a href="http://kms.kapalama.ksbe.edu/projects/2003/plants/plumbago/">http://kms.kapalama.ksbe.edu/projects/2003/plants/plumbago/</a> (3-15-2016)	1. widely cultivated beyond native range 2. Plumbago auriculata was introduced to the Hawaiian Islands
3.01	1. Wildlife of Hawaii <a href="http://wildlifeofhawaii.com/flowers/1141/plumbago-auriculata-plumbago/">http://wildlifeofhawaii.com/flowers/1141/plumbago-auriculata-plumbago/</a> (3-11-2016) 2. LUTEYN, J. L.. (1990). THE PLUMBAGINACEAE IN THE FLORA OF THE SOUTHEASTERN UNITED STATES. SIDA, Contributions to Botany, 14(2), 169–178.	1. This minimally naturalized and widely cultivated ornamental garden plant is native to southern Africa. 2. Naturalized in the South Eastern United States
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05	1. Holm, LeRoy G. A Geographical Atlas of World Weeds. Malabar, FL: Krieger Pub., 1991. Print.	Plumbago zeylancia is a common weed in Hawaii
4.01	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	no evidence of these features
4.02		no evidence
4.03	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	no evidence
4.04	1. Dave's Garden <a href="http://davesgarden.com/guides/pf/go/414/#b">http://davesgarden.com/guides/pf/go/414/#b</a> (3-11-2016) 2. Texas A and M University Extension <a href="http://aggie-horticulture.tamu.edu/archives/parsons/publications/deerbest.html">http://aggie-horticulture.tamu.edu/archives/parsons/publications/deerbest.html</a> (3-15-2016)	1. This plant is resistant to deer 2. Listed as a deer resistant plant
4.05		no evidence, but is both toxic to humans and unpalatable to grazers
4.06	1. University of Florida IFAS Extension <a href="https://edis.ifas.ufl.edu/fp487">https://edis.ifas.ufl.edu/fp487</a> (3-11-2016)	1. Pest resistance: long-term health usually not affected by pests
4.07	1. Dave's Garden <a href="http://davesgarden.com/guides/pf/go/414/#b">http://davesgarden.com/guides/pf/go/414/#b</a> (3-11-2016) 2. Wildlife of Hawaii <a href="http://wildlifeofhawaii.com/flowers/1141/plumbago-auriculata-plumbago/">http://wildlifeofhawaii.com/flowers/1141/plumbago-auriculata-plumbago/</a> (3-11-2016) 3. NC State Extension <a href="https://plants.ces.ncsu.edu/plants/all/plumbago-auriculata/">https://plants.ces.ncsu.edu/plants/all/plumbago-auriculata/</a> (3-11-2016)	1. All parts of plant are poisonous if ingested 2. The plants are poisonous. 3. Poison Delivery Mode: Dermatitis. Symptoms: Irritation, redness, and blistering following contact. Toxic Principle: Plumbagin, a quinone. Severity:SKIN IRRITATION SEVERE!
4.08		no evidence

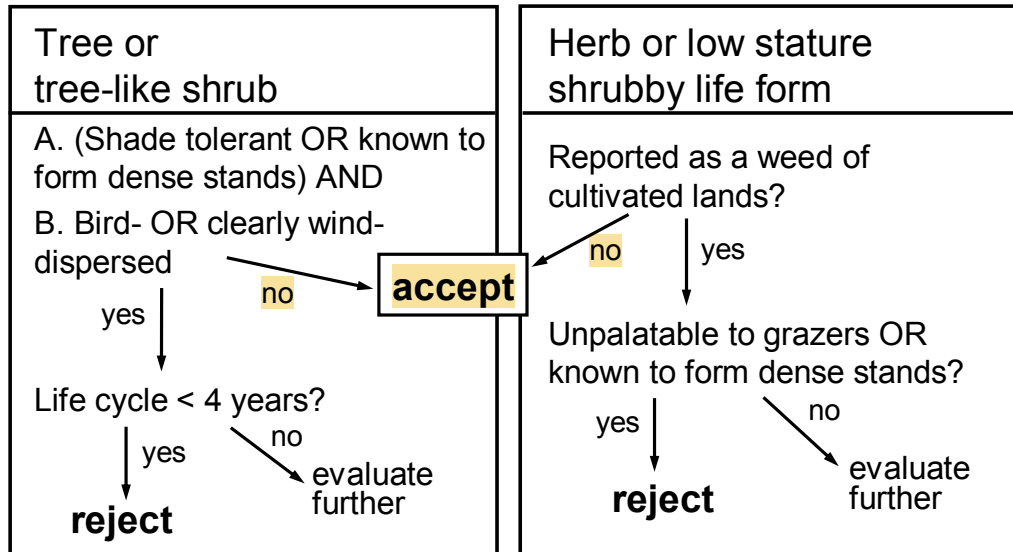
4.09	1. Missouri Botanical Garden <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a542">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a542</a> (3-11-2016) 2. University of Florida IFAS Extension <a href="https://edis.ifas.ufl.edu/fp487">https://edis.ifas.ufl.edu/fp487</a> (3-11-2016) 3. World Heritage Encyclopedia <a href="http://www.gutenberg.us/articles/plumbago_auriculata">http://www.gutenberg.us/articles/plumbago_auriculata</a> (3-15-2016)	1. Full Sun 2. Needing full sun for best growth and flowering 3. Plumbago grow best in full sun to part shade.
4.10		Lack of evidence
4.11	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	1. sometimes semi-climbing
4.12	1. South African Biodiversity Institute <a href="http://www.plantzafrica.com/plantnop/plumbago.htm">http://www.plantzafrica.com/plantnop/plumbago.htm</a> (3-11-2016)	1. Plumbago makes a good, fast growing "exclusion zone" or bush-clump plant for attracting birds such as robins which like dense plant growth.
5.01		Family: Plumbaginaceae
5.02		Family: Plumbaginaceae
5.03	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	Not a woody species
5.04	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	No evidence of these features
6.01		no evidence
6.02	1. University of Florida IFAS Extension <a href="https://edis.ifas.ufl.edu/fp487">https://edis.ifas.ufl.edu/fp487</a> (3-11-2016) 2. South African Biodiversity Institute <a href="http://www.plantzafrica.com/plantnop/plumbago.htm">http://www.plantzafrica.com/plantnop/plumbago.htm</a> (3-11-2016)	1. Propagation is by seed, cuttings, or division 2. Plumbago is propagated easily from seed, cuttings and suckers.
6.03		no evidence
6.04	1. Zhao Zhi Hui. 2012. Preliminary Studies on Biological Characteristics of Plumbago Auriculata. Sichuan Agricultural University	1. <i>P. auriculata</i> was a typical style heterotypic plants, and has a self-incompatibility
6.05	1. Ferrero, V., de Vega, C., Stafford, G. I., Van Staden, J. & Johnson, S. D. 2009. Heterostyly and pollinators in <i>Plumbago auriculata</i> (Plumbaginaceae). <i>South African Journal of Botany</i> 75: 778–784. 2. South African Biodiversity Institute <a href="http://www.plantzafrica.com/plantnop/plumbago.htm">http://www.plantzafrica.com/plantnop/plumbago.htm</a> (3-11-2016) 3. University of Florida IFAS Extension <a href="https://edis.ifas.ufl.edu/fp487">https://edis.ifas.ufl.edu/fp487</a> (3-11-2016)	1. During the period of this study (November and December, 2008), long-proboscid flies ( <i>Philoliche aethiopica</i> , Tabanidae) were the primary visitors to flowers of <i>P. auriculata</i> at the Richmond study site with occasional visits by the large swallowtail butterflies, <i>Papilio demodocus</i> and <i>P. nireus</i> , smaller <i>Pieris</i> butterflies (Lepidoptera) and small, pollen-collecting bees in the family Halictidae 2. Plumbago is visited by butterflies and is one of the larval foods plant for the common blue butterfly 3. attracts butterflies
6.06	1. Grow Plants ( <a href="http://www.growplants.org/growing/plumbago-auriculata">http://www.growplants.org/growing/plumbago-auriculata</a> accessed 14 April 2016) 2. University of Florida IFAS Extension <a href="https://edis.ifas.ufl.edu/fp487">https://edis.ifas.ufl.edu/fp487</a> (3-11-2016) 3. Dave's Garden <a href="http://davesgarden.com/guides/pf/go/414/#b">http://davesgarden.com/guides/pf/go/414/#b</a> (3-11-2016)	1. The best way to propagate <i>Plumbago auriculata</i> : Plant / Seed / Vegetative Reproduction 2. Propagation is by seed, cuttings, or division 2. Propagated by dividing the rootball
6.07	1. Fine Gardening <a href="http://www.finegardening.com/cape-leadwort-plumbago-auriculata">http://www.finegardening.com/cape-leadwort-plumbago-auriculata</a> (3-16-2016)	takes 2 years to flower
7.01	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	1. Hummocks, thickets, dis-turbed sites
7.02	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	1. Widely cultivated outside native range
7.03		no evidence
7.04	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	1. Capsules 8 mm. Seeds brown, 7 mm. [very small seeds, wind dispersal possible]
7.05	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	1. Capsules 8 mm. Seeds brown, 7 mm. [very small seeds, water dispersal possible]
7.06		no evidence
7.07	1. South African Biodiversity Institute <a href="http://www.plantzafrica.com/plantnop/plumbago.htm">http://www.plantzafrica.com/plantnop/plumbago.htm</a> (3-11-2016) 2. Wildlife of Hawaii <a href="http://wildlifeofhawaii.com/flowers/1141/plumbago-auriculata-plumbago/">http://wildlifeofhawaii.com/flowers/1141/plumbago-auriculata-plumbago/</a> (3-11-2016)	1. There are sticky, gland tipped hairs on the flower calyx. The seed capsule retains the stickiness which presumably helps disperse the seed by attaching to animals. 2. sticky seed capsules.
7.08		no evidence of consumption
8.01	1. Encyclopedia of Life <a href="http://eol.org/pages/484539/details">http://eol.org/pages/484539/details</a> (3-11-2016)	1. Capsules 8 mm. Seeds brown, 7 mm.



8.02	1. Zhao Zhi Hui. 2012. Preliminary Studies on Biological Characteristics of Plumbago Auriculata. Sichuan Agricultural University <a href="http://www.research001.com/?showinfo-224-783727-0.html">http://www.research001.com/?showinfo-224-783727-0.html</a>	1. <i>P. auriculata</i> seed does not have dormancy characteristic.
8.03		no evidence
8.04		no evidence
8.05		no evidence

## Pacific second screening: decision rules for species with WRA scores between 1 and 6

(from Daehler *et al.* 2004)



Vines must pass both tests