

Assessment date 19 June 2015

<i>Dioscorea alata</i> (winged yam)		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) 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	n	0
3.04	Environmental weed	y	4
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	n	0
4.06	Host for recognised pests and pathogens	unk	0
4.07	Causes allergies or is otherwise toxic to humans	n	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	y	1
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	y	1
6.01	Evidence of substantial reproductive failure in native habitat	unk	0
6.02	Produces viable seed	unk	-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)		
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	y	1
7.05	Propagules water dispersed	y	1
7.06	Propagules bird dispersed		
7.07	Propagules dispersed by other animals (externally)	y	1
7.08	Propagules dispersed by other animals (internally)	n	-1
8.01	Prolific seed production	n	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	y	1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05			
Total Score		14	
Implemented Pacific Second Screening		n/a	
Risk Assessment Results		High	

section	# questions answered	satisfy minimum?
A		11 yes
B		7 yes
C		15 yes
total		33 yes

	Reference	Source data
1.01		Cultivated but no evidence of selection for reduced weediness
1.02		Skip to question 2.01
1.03		Skip to question 2.01
2.01	<p>1. PERAL NAPPFAST Global Plant Hardiness. http://www.nappfast.org/Plant_hardiness/2012/PHZ%20update201230%20yr%20%20300dpi.tif (Accessed 16 June 2015). 2. Missouri Botanical Garden. Plant Finder [Online Database]. St. Louis, Missouri. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=279847&isprofile=0&ispro (Accessed: 16 June 2015). 3. 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?14175#dist (Accessed: 16 June 2015).</p>	<p>No computer analysis was performed. 1. Florida North Zone: Hardiness zones 8 and 9. Central Zone: Hardiness zones 9 and 10. South Zone: Hardiness zone 10. 2. Present in the following global plant hardiness zones: 9, 10, 11. 3. Native to ASIA-TEMPERATE: Eastern Asia: Taiwan, ASIA-TROPICAL: Indian Subcontinent: India, Nepal, Indo-China: Myanmar, Thailand, Vietnam, Malesia: Borneo, Indonesia, Celebes, Java, Lesser Sunda Islands, Sumatra, Malaysia, New Guinea, Philippines. 3. Adapted to Northeast Tropical Africa, East Tropical Africa, West-Central Tropical Africa, South Tropical Africa, Western Indian Ocean, China, Australia, Southeastern USA, Northwestern Pacific, South-Central Pacific, Southwestern Pacific, Caribbean, Mesoamerica, Northern South America, Brazil, and Western South America.</p>
2.02		<p>No computer analysis was performed. Native range is well known. Hardiness zone 8 only accounts for part of the North Zone. Refer to 2.01 source data.</p>
2.03	<p>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?14175#dist (Accessed: 16 June 2015). 2. The University of Melbourne. Köppen-Geiger Climate Map of the World. http://people.eng.unimelb.edu.au/mpeel/koppen.html (Accessed: 17 June 2015)</p>	<p>1. Present in the following Köppen-Geiger Climate zones: Af, Am, Aw, BWh, BWk, BSh, BSk, Csa, Csb, Cwa, Cwb, Cfa, Cfb. 2. Native to ASIA-TEMPERATE: Eastern Asia: Taiwan, ASIA-TROPICAL: Indian Subcontinent: India, Nepal, Indo-China: Myanmar, Thailand, Vietnam, Malesia: Borneo, Indonesia, Celebes, Java, Lesser Sunda Islands, Sumatra, Malaysia, New Guinea, Philippines. 2. Adapted to Northeast Tropical Africa, East Tropical Africa, West-Central Tropical Africa, South Tropical Africa, Western Indian Ocean, China, Australia, Southeastern USA, Northwestern Pacific, South-Central Pacific, Southwestern Pacific, Caribbean, Mesoamerica, Northern South America, Brazil, and Western South America.</p>
2.04	<p>1. Climate Charts. World Climate Maps. http://www.climate-charts.com/World-Climate-Maps.html#rain (Accessed: 17 June 2015)</p>	<p>1. Native to areas with rainfall in this range.</p>
2.05	<p>1. Florida Exotic Pest Plants Council, University of Georgia. http://www.fleppc.org/ID_book/Dioscorea%20alata.pdf (Accessed: 17 June 2015) 2. Economic Botany. Edward S. Ayensu, D. G. Coursey. Guinea yams the botany, ethnobotany, use and possible future of yams in West Africa. http://link.springer.com/article/10.1007%2FBF02860700?LI=true (Accessed: 17 June 2015) 3. 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?14175#dist (Accessed: 16 June 2015)</p>	<p>1. Introduced to the Americas by European traders in the 1500s. Introduced to Florida (first noted in 1977) for ornamental purposes and has escaped cultivation. 2. Adapted to parts of Africa, Pacific islands, and other regions. 3. Listed as Naturalized in Ethiopia, Tanzania, Cameroon, Central African Republic, Gabon, Rwanda, Zaire, Benin, Mali, Togo, Angola, Malawi, Mozambique, Zambia, Camoros, Madagascar, Seychelles, China, Australia, United States, Mexico, Micronesia, French Polynesia, Pitcairn, Fiji, Niue, Samoa, Tonga, Dominican Republic, Jamaica, Puerto Rico, Trinidad and Tobago, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, French Guiana, Guyana, Suriname, Venezuela, Brazil, Colombia, and Peru.</p>

3.01	<p>1. Florida Exotic Pest Plants Council, University of Georgia. http://www.fleppc.org/ID_book/Dioscorea%20alata.pdf (Accessed: 17 June 2015)</p> <p>2. Economic Botany. Edward S. Ayensu, D. G. Coursey. Guinea yams the botany, ethnobotany, use and possible future of yams in West Africa. http://link.springer.com/article/10.1007%2FBF02860700?LI=true (Accessed: 17 June 2015)</p> <p>3. 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?14175#dist (Accessed: 16 June 2015)</p>	<p>1. Introduced to the Americas by European traders in the 1500s. Introduced to Florida (first noted in 1977) for ornamental purposes and has escaped cultivation. 2. Adapted to parts of Africa, Pacific islands, and other regions. 3. Listed as Naturalized in Ethiopia, Tanzania, Cameroon, Central African Republic, Gabon, Rwanda, Zaire, Benin, Mali, Togo, Angola, Malawi, Mozambique, Zambia, Camaros, Madagascar, Seychelles, China, Australia, United States, Mexico, Micronesia, French Polynesia, Pitcairn, Fiji, Niue, Samoa, Tonga, Dominican Republic, Jamaica, Puerto Rico, Trinidad and Tobago, Belize, Costa Richa, El Salvador, Guatemala, Honduras, Nicaragua, Panama, French Guiana, Guyana, Suriname, Venezuela, Brazil, Colombia, and Peru.</p>
3.02	<p>1. Global Compendium of Weeds, Hawaiian Ecosystem at Risk, Department of Agriculture and Food, Australia. http://www.hear.org/gcw/species/dioscorea_alata/ (Accessed: 17 June 2015)</p>	<p>1. Listed as casual alien, cultivation escape, environmental weed, garden thug, naturalized, noxious weed, weed.</p>
3.03		<p>No evidence of crop yield loss.</p>
3.04	<p>1. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 19 June 2015)</p> <p>2. Global Compendium of Weeds, Hawaiian Ecosystem at Risk, Department of Agriculture and Food, Australia. http://www.hear.org/gcw/species/dioscorea_alata/ (Accessed: 17 June 2015)</p>	<p>1. "This species also has the capability to completely out-compete native vegetation communities by displacing native species, changing community structures and altering ecological functions" 2. Listed as environmental weed</p>
3.05	<p>1. University of Florida, IFAS Extention. http://edis.ifas.ufl.edu/ag112 (Accessed: 17 June 2015)</p> <p>2. Wildland Weeds. Miami-Dade Park & Recreation Department. http://www.se-eppc.org/wildlandweeds/pdf/w98-hammer-p-8-10.pdf (Accessed: 17 June 2015)</p> <p>3. Holm</p>	<p>1. Dioscorea bulbifera is classified as a weed in Florida, US. 2. Dioscorea sansibarensis and Dioscorea bulbifera demonstrate weediness in south Florida. 3. D. bulbifera, D pentaphylla listed as serious weed and present as a weed.</p>
4.01	<p>1. Florida Exotic Pest Plants Council, University of Georgia. http://www.fleppc.org/ID_book/Dioscorea%20alata.pdf (Accessed: 17 June 2015)</p>	<p>1. These features are not in the description of the species.</p>
4.02		<p>No evidence</p>
4.03		<p>No evidence</p>
4.04	<p>1. African Plant Databse. http://www.ville-ge.ch/musinfo/bd/cjb/africa/details.php?langue=an&id=11277 (Accessed: 17 June 2015)</p> <p>2. Center for Aquatic and Invasive Plants, University of Florida, IFAS. http://plants.ifas.ufl.edu/node/133 (Accessed: 17 June 2015)</p>	<p>No conclusive evidence found regarding toxicity to animals. Other plants in the Dioscoreaceae family are highly toxic. 1. Dioscorea sansibarensis is described as very toxic. 2. Dioscorea bulbifera are also described as very toxic and should not be consumed.</p>
4.05	<p>1. Mammalia. http://www.degruyter.com/view/j/mamm.1975.39.issue-3/mamm.1975.39.3.343/mamm.1975.39.3.343.xml (Accessed: 18 June 2015)</p> <p>2. Plant Foods for Human Nutrition. Nutritional assessment of yam (Dioscorea alata) tubers. Kluwer Academic Publishers. http://link.springer.com/article/10.1007%2FBF01088459 (Accessed: 17 June 2015)</p> <p>3. African Plant Databse. http://www.ville-ge.ch/musinfo/bd/cjb/africa/details.php?langue=an&id=11277 (Accessed: 17 June 2015)</p> <p>4. Center for Aquatic and Invasive Plants, University of Florida, IFAS. http://plants.ifas.ufl.edu/node/133 (Accessed: 17 June 2015)</p>	<p>No conclusive evidence found regarding toxicity to animals. 1. The plant is naturalized in Africa and is listed as one of the main food sources of the African giant rat. 2. Dioscorea alata is cooked and consumed by humans. Other plants in the Dioscoreaceae family are highly toxic. 3. Dioscorea sansibarensis is described as very toxic. 4. Dioscorea bulbifera are also described as very toxic and should not be consumed.</p>
4.06		<p>No evidence that the plant is a significant primary or alternate host</p>

4.07	1. Plant Foods for Human Nutrition. Nutritional assessment of yam (<i>Dioscorea alata</i>) tubers. Kluwer Academic Publishers. http://link.springer.com/article/10.1007%2FBF01088459 (Accessed: 17 June 2015)	1. The tubers of <i>Dioscorea alata</i> are cultivated and consumed in some countries such as Sri Lanka.
4.08	1. USDA Forest Services, FEIS. http://www.fs.fed.us/database/feis/plants/vine/diospp/all.html (Accessed: 17 June 2015)	1. Vines can climb into tree canopies and serve as ladder fuels, encouraging crown fires. However, these conclusions are speculative and more evidence is needed about how yams may affect fire ecology.
4.09	1. Dave's Garden. http://davesgarden.com/guides/pf/go/32242/#b (Accessed: 17 June 2015)	1. Sun exposure: Full Sun to Partial Shade
4.10	1. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 19 June 2015)	Not enough information available 1. "D. alata is sensitive to aluminium toxicity in the soil, but tolerates poorer soils than most other cultivated yam species." Also tolerates shallow soil
4.11	1. Florida Department of Agriculture and Consumer Services. http://www.freshfromflorida.com/Divisions-Offices/Plant-Industry/Plant-Industry-Publications/Weed-of-the-Month/July-2010-Dioscorea-alata-the-white-or-winged-yam (17 June 2015) 2. USDA Forest Services, FEIS. http://www.fs.fed.us/database/feis/plants/vine/diospp/all.html (Accessed: 17 June 2015)	1. <i>Dioscorea alata</i> is reported as "vigorous, smothering shrubs" that "grow high into trees" 2. It is also commonly reported that the Dioscoreaceae family has a tendency to smother trees and other plants.
4.12	1. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 19 June 2015)	1. "D. alata is considered an aggressive and fast-growing vine with the potential to form dense colonies that engulf native vegetation. It climbs high into mature tree canopies and shades trees and shrubs in the understory (Langeland et al., 2008). This species also has the capability to completely out-compete native vegetation communities by displacing native species, changing community structures and altering ecological functions (Florida Exotic Pest Plant Council, 2011)."
5.01	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?14175#dist (Accessed: 16 June 2015)	1. Family Dioscoreaceae
5.02	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?14175#dist (Accessed: 16 June 2015)	1. Family Dioscoreaceae
5.03	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?14175#dist (Accessed: 16 June 2015)	1. Family Dioscoreaceae
5.04	1. Royal Botanical Gardens, Kew. http://apps.kew.org/wcsp/namedetail.do?name_id=239747 (Accessed: 18 June 2015)	1. Lifeform is listed as a geophyte.
6.01		No evidence found of substantial reproductive failure.
6.02	1. Dave's Garden. http://davesgarden.com/guides/pf/go/32242/#b (Accessed: 18 June 2015) 2. Genetrica, Kluwer Academic Publishers. http://link.springer.com/article/10.1007%2FBF00058525 (Accessed 18 June 2015)	1. States that the plant does not produce a viable seed. 2. This study found that not all plants were able to produce viable seeds, but some plants produced viable seeds. However, these plants were hand pollinated in a laboratory setting.
6.03		No evidence

6.04	1. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 18 June 2015)	1. Species is dioecious.
6.05	1. Euphytica, Kluwer Academic Publishers. http://download.springer.com/static/pdf/535/art%253A10.1007%252F00028959.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2F00028959&token2=exp=1434655275~acl=%2Fstatic%2Fpdf%2F535%2Fart%25253A10.1007%252F00028959.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252F00028959*~hmac=6d3a291c2d7b6b579315d032d1b811251b531dd943afccb9d7722658e7cef24 (Accessed: 18 June 2015) 2. Life Science Journal 2014; 11(2). http://www.lifesciencesite.com/lj/life1102/060_B00049life110214_436_444.pdf (Accessed: 18 June 2015) 3. University of Florida, IFAS. http://nfrec.ifas.ufl.edu/MizellRF/WoodyBug/thrips.htm (Accessed: 18 June 2015)	1. In this study, only thrips were found to visit <i>D. alata</i> . 2. Thrips were found to be pollinators of <i>D. alata</i> . 3. Multiple species of thrips are commonly found within Florida.
6.06	1. Nature and Science, 2009; 7(12). http://www.sciencepub.net/nature/ns0712/09_2047_FResponse_ns0712_48_51.pdf (Accessed: 18 June 2015) 2. Invasive Plant Atlas of the United States. http://www.invasiveplantatlas.org/subject.html?sub=5535 (Accessed: 18 June 2015)	1. Diocoreaceae are reported to be a vegetative propagated crop. 2. Chief means of reproduction is reported by bulbils located at the leaf axils and by underground tubers.
6.07		No evidence
7.01	1. USDA Forest Service FEIS. http://www.fs.fed.us/database/feis/plants/vine/diospp/all.html (Accessed: 19 June 2015)	1. "Although yam bulbils are easily dislodged from the parent [45], primarily dispersed by gravity, and often fall near the parent plant, secondary dispersal by water, animals, or humans can increase dispersal distance."
7.02	1. Mass Spectrum Online Store. http://massspectrumbotanicals.com/shop/dioscorea-alata/ (Accessed: 19 June 2015)	1. Plant is available for purchase on the internet.
7.03		No evidence
7.04	1. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 19 June 2015)	1. " <i>D. alata</i> spreads by seeds which can be dispersed by wind and by water and vegetatively by underground tubers and bulbils"; when they do set seed, seeds are winged
7.05	1. USDA Forest Service FEIS. http://www.fs.fed.us/database/feis/plants/vine/diospp/all.html (Accessed: 19 June 2015) 2. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 19 June 2015)	1. "Although yam bulbils are easily dislodged from the parent [45], primarily dispersed by gravity, and often fall near the parent plant, secondary dispersal by water, animals, or humans can increase dispersal distance." 2. " <i>D. alata</i> spreads by seeds which can be dispersed by wind and by water and vegetatively by underground tubers and bulbils"
7.06		No evidence
7.07	1. USDA Forest Service FEIS. http://www.fs.fed.us/database/feis/plants/vine/diospp/all.html (Accessed: 19 June 2015)	1. "secondary dispersal by water, animals, or humans can increase dispersal distance."
7.08		Unlikely bulbils are dispersed internally. Unknown if seeds are dispersed internally by animals.

8.01	<p>1. Dave's Garden. http://davesgarden.com/guides/pf/go/32242/#b (Accessed: 18 June 2015) 2. Genetrica, Kluwer Academic Publishers. http://link.springer.com/article/10.1007%2FBF0005 3. Invasive Plant Atlas of the United States. http://www.invasiveplantatlas.org/subject.html?sub=5535 (Accessed: 18 June 2015)</p>	<p>1. States that the plant does not produce a viable seed. 2. This study found that not all plants were able to produce viable seeds, but some plants produced viable seeds. However, these plants were hand pollinated in a laboratory setting. 3. Chief means of reproduction is reported by bulbils located at the leaf axils and by underground tubers.</p>
8.02	<p>1. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 19 June 2015) 2. Seed Information Database, Royal Botanical Gardens, Kew. http://data.kew.org/sid/SidServlet?ID=7902&Num=9ze (Accessed: 18 June 2015)</p>	<p>1. States that the plant "has propagules that can remain viable for more than one year" 2. Lists storage behaviour as Orthodox?</p>
8.03	<p>1. The University of Georgia Center for Invasive Species and Ecosystem Health. http://www.bugwood.org/2012InvasivePlants.pdf (Accessed: 19 June 2015)</p>	<p>1. Reports that sometimes the yams will take up the herbicide, but other times they will need to be manually removed.</p>
8.04		<p>No evidence</p>
8.05	<p>1. Invasive Species Compendium, CABI. http://www.cabi.org/isc/datasheet/19293 (Accessed: 19 June 2015)</p>	<p>1. <i>Glomerella cingulata</i>, the yam beetle, scale insects, mealybugs, and nematodes are listed as natural enemies of <i>Dioscorea alata</i>. <i>Glomerella cingulata</i> and nematodes occur naturally in Florida, but no evidence was found of substantial reduction in growth and reproduction.</p>