UF IFAS UNIVERSITY of FLORIDA

Assessment of Non-native Plants in Florida's Natural Areas

assessment.ifas.ufl.edu

Assessment date 9 August 2016

	Ipomoea batatas **ALL ZONES**	**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	n	0
3.03	Weed of agriculture	n	0
3.04	Environmental weed	n	0
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	y	1
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-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	n	0
4.08	Creates a fire hazard in natural ecosystems	n	0
4.09	Is a shade tolerant plant at some stage of its life cycle	n	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	n	0
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	n	0
6.02	Produces viable seed	?	

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)	y	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	n	-1
7.05	Propagules water dispersed	?	
7.06	Propagules bird dispersed	n	-1
7.07	Propagules dispersed by other animals (externally)	n	-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)	n	-1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	unk	-1
8.05	Effective natural enemies present in U.S.	?	
	Total Score	**3**	
	Implemented Pacific Second Screening	**yes**	
	Risk Assessment Results	**Low**	

section	**# questions answered**	**satisfy minimum?**
A	11	yes
B	12	yes
C	17	yes
total	40	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 (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnd.tif). 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?409896 (6-27-2016).	No computer analysis was performed. 1. Global hardiness zone: 9, 10, 11, 12 ; 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 Zone 12a: to (50 °F) USDA Zone 12b: to (55 °F). . 2. Native to Northern America, Southern Mexico: Mexico - Veracruz Naturalized: widely natzd. in tropics Cultivated: cult. worldwide ,
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. GBIF http://www.gbif.org/species/2928551 (6-23-2016)	1. Distribution in the native/cultivated range occurs in Am, Aw, Cfa, Csa
2.04	1. Climate Charts. World Climate Maps. http://www.climate-charts.com/World-Climate-Maps.html#rain (8-19-2015)	Native or naturalized in areas with annual rainfall between 19 inches and 97 inches.
2.05	1. PIER http://www.hear.org/pier/species/ipomoea_batatas.htm (6-23-2016) 2. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. Introduced in Hawaii, the Cook Islands, Ecuador, and Chile 2. Pantropical, but of American origin, widely cultivated
3.01	1. PIER http://www.hear.org/pier/species/ipomoea_batatas.htm (6-23-2016) 2. GBIF http://www.gbif.org/species/114707756 (6-27-2015) 3. Purdue University https://hort.purdue.edu/newcrop/hort_403/pp_pdf/pp_28.pdf (6-27-2016)	Introduced and naturalized in undisturbed habitats in the Galápagos Islands. 2. Naturalized in Brazil 3. New World Origin, has become naturalized in the Pacific.
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.	1. Ipomoea triloba is a serious weed in Australia and the Phillipines. Ipomoea Aquatica is a serious weed India, Mozambique and Thailand.
4.01	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. Vines; stems erect, procumbent, or occasionally twining, often rooting at the nodes, usually somewhat succulent but sometimes slender and herbaceous, up to 4 m or more long, but often shorter in cultivars, glabrous or pubescent, from a tuberous root. [No evidence of these features]

4.02	1. C. F. Reinhardt , Ruth Meissner & P. C. Nel (1993) Allelopathic effect of sweetpotato (Ipomoea batatas) cultivars on certain weed and vegetable species, South African Journal of Plant and Soil, 10:1, 41-44 2. Howard F. Harrison, Jr., & Peterson, J. (1991). Evidence That Sweet Potato (Ipomoea batatas) Is Allelopathic to Yellow Nutsedge (Cyperus esculentus). Weed Science, 39(2), 308-312. 3. Howard F. Harrison, Jr., & Peterson, J. (1986). Allelopathic Effects of Sweet Potatoes (Ipomoea batatas) on Yellow Nutsedge (Cyperus esculentus) and Alfalfa (Medicago sativa). Weed Science, 34(4), 623-627.	1. Nine indicator plants, three weeds: yellow nutsedge (Cyperus esculenlus L.), purple nutsedge (Cyperus rotundus L.) and common pigweed (Amaranthus hybridus L.), and seven crop species: carrot (Daucus carota L. cv. Kaapse Mark), tomato (Lycopersicon esculentum Mill. cv. Heinz 1370), cucumber (Cucumis sativus L. cv. Special Rust Resistant), radish (Raphanus sativus L. cv. White Icicle), onion (Allium cepa L. cv. Pyramid), lettuce (Lactuca saliva L. cv. Great Lakes).and oats (Avena sativa L. cv. SWK 001) were grown in soil from field plots previously cropped with these sweetpotato cultivars..... From the results of this study, it is concluded that a growth-inhibiting allelochemical or a complex of allelo- chemicals was produced by sweetpotato cultivar Brondal, and that this substance(s) was selective by significantly inhibiting the growth of yellow nutsedge only. It is also possible that lower concentrations of the same substances, or completely different chemicals, were in fact produced by the other sweetpotato cultivars, thereby stimulating the growth of oat, cucumber, lettuce and tomato plants. 2. In field studies, 'Regal' sweet potato greatly reduced yellow nutsedge growth when the two species were grown together using standard cultural practices. At the end of the growing season, yellow nutsedge shoot dry weight per m2 in plots where the two species were planted together was less than 10% of shoot weight in plots where nutsedge was grown alone. Presence of yellow nutsedge did not markedly affect sweet potato growth. When grown together in a greenhouse experiment designed to minimize the competitive effects of sweet potato on yellow nutsedge, yellow nutsedge growth was reduced more than 50% by sweet potato 8 and 12 weeks after planting. The most polar fraction of serially extracted sweet potato periderm tissue was highly inhibitory to yellow nutsedge root growth. These results indicate that sweet potato interference with yellow nutsedge under field conditions is partially due to allelopathy. 3. In summary, the results of the first experiment demonstrated an inhibitory effect of soils in which sweet potatoes had grown in
4.03	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. The vines and leaves were used as pig food, or if old, as padding under floor mats. The tubers also were used as bait for opelu (mackerel scad) or to fatten hogs.
4.04	1. Encyclopedia of Life http://eol.org/pages/580962/overview (6-22-2016) 2. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. 3. Invasive Species Compendium http://www.cabi.org/isc/datasheet/28783 (6-23-2016)	1. Young leaves and shoots are also edible, and the entire plant is used as animal feed. 2. he vines and leaves were used as pig food, or if old, as padding under floor mats. The tubers also were used as bait for opelu (mackerel scad) or to fatten hogs. 3. Animal feed, fodder, forage
4.05	1. Encyclopedia of Life http://eol.org/pages/580962/overview (6-22-2016) 2. Invasive Species Compendium http://www.cabi.org/isc/datasheet/28783 (6-23-2016) 3. Texas A&M AgriLife Extension http://aggie-horticulture.tamu.edu/archives/parsons/publications/vegetabletravelers/sweetpotato.html (6-25-2016)	1. Young leaves and shoots are also edible, and the entire plant is used as animal feed. 2. Animal feed, fodder, forage 3. In the South a large part of the crop is fed to livestock

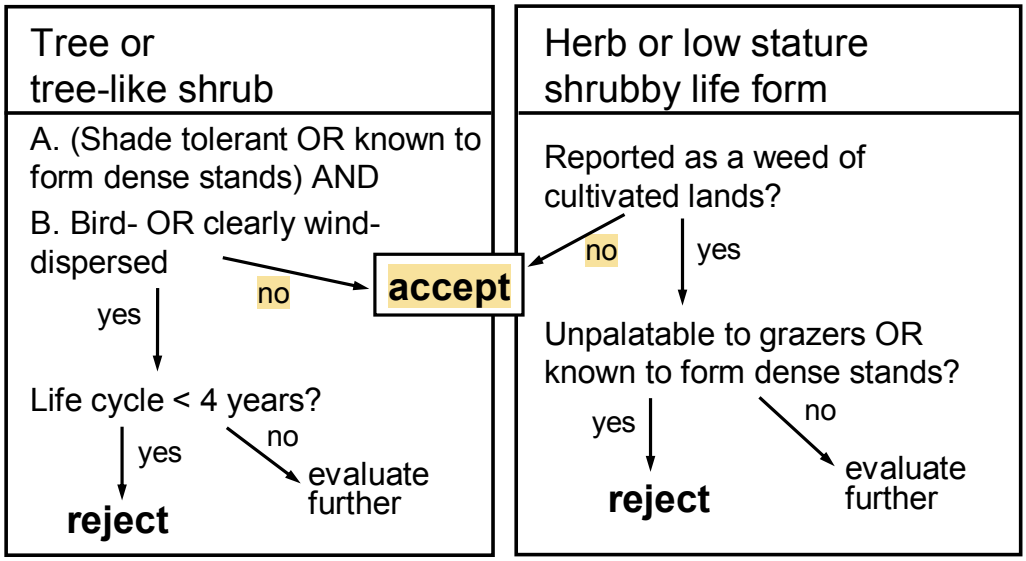
4.06	1. Purdue University Center for New Crops and Plant Products https://www.hort.purdue.edu/newcrop/duke_energy/Ipomoea_batatas.html (6-23-2016) 2. University of Florida IFAS http://edis.ifas.ufl.edu/ig159 (6-27-2016)	1. Sweetpotato is subject to injury from a number of diseases that may attack the young plants in the hot bed or the growing crop in the field or may cause decay in storage. The worst of these are stem-rot, black-rot, foot-rot, soft-rot or ring-rot,and in the Southwest, root-rot. These are described and illustrated, and control measures are given in Farmers' Bulletin No. 1059, Sweet Potato Diseases. The sweetpotato is not seriously injured by many insects but the sweetpotato root weevil has been very injurious in sections of the South, especially in the Gulf States. This insect threatens to become a serious menace to sweetpotato growing. Cutworms frequently destroy the young plants by cutting them off soon after they are set in the field 2. Sweet potatoes are widely grown in Florida. In addition to the traditional moist, orange-fleshed varieties, a dry, white-fleshed type, the boniato, is extensively grown in south Florida. Both types are the same species (Ipomoea batatas), however, and their pest problems are similar. Foliar pests are generally not too difficult to manage and include agromyzid leafminers, sweetpotato whitefly, (also called silverleaf whitefly), and morningglory leafminer, which is a small caterpillar. Armyworms will also feed on foliage. Natural enemies of these pests can be conserved by using pesticides specific for the pest and avoiding broad-spectrum insecticides, if at all possible.The most serious pests are those whose immature stages feed on roots: sweetpotato weevil, wireworms, banded cucumber beetle, pale-striped and sweetpotato flea beetles, and in south Florida, Diaprepes weevil and Cuban May beetle. Other white grubs will also feed on sweet potato roots. There are very few soil insecticides available at this time. One of the few that remain, chlorpyrifos, has a 125 days-to-harvest interval which rules out its use with early-maturing varieties. Foliar insecticides aimed at the adult stage can give some control.
4.07		no evidence, common agricultural crop
4.08		no evidence
4.09	1. Missouri Botanical Garden http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a587 (6-22-2016) 2. Plants for a Future http://www.pfaf.org/user/Plant.aspx?LatinName=Ipomoea+batatas (6-22-2016)	1. Full Sun 2. It cannot grow in the shade.
4.10	1. Purdue University Center for New Crops and Plant Products https://www.hort.purdue.edu/newcrop/duke_energy/Ipomoea_batatas.html (6-23-2016) 2. USDA Globa Soil Regions Map http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/?cid=nrcs142p2_054013 (6-26-2016)	1. Soils rated good for sweetpotatoes include moderately deep, very friable fine sandy loams, sandy loams, or loamy fine sands. Soils must be well-drained. Subsoils of clay are satisfactory unless they are tight and sticky. Some friable, well-drained loams and silt loams are highly productive. Excellent soils have surface layers more than 30 cm in depth, those from 15–30 cm are considered good. Slopes should be gentle, with little tendency to become eroded. If soils are too deep, tubers grow too deep for harvesting machines. 2. [Native to regions with congruent soil characteristics to all three Florida zones.]
4.11	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. 2. Encyclopedia of Life http://eol.org/pages/580962/overview (6-22-2016)	1. Vines; stems erect, procumbent, or occasionally twining,..." 2. Because the rapidly growing vines shade out weeds, little weeding is needed.
4.12		no evidence
5.01		Family: Convolvulaceae.
5.02		Family: Convolvulaceae.
5.03	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. Herbaceous

5.04	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. Vines; stems erect, procumbent, or occasionally twining, often rooting at the nodes, usually somewhat succulent but sometimes slender and herbaceous, up to 4 m or more long, but often shorter in cultivars, glabrous or pubescent, from a tuberous root.
6.01		no evidence
6.02	1. Missouri Botanical Garden http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a587 (6-22-2016) 2. Plants for a Future http://www.pfaf.org/user/Plant.aspx?LatinName=Ipomoea+batatas (6-22-2016) 3. PIER http://www.hear.org/pier/species/ipomoea_batatas.htm (6-23-2016) 4. 2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	1. This is a tuberous plant that is not grown from seed. 2. Seedlings can be very variable and are likely to be less productive than vegetatively produced plants 3. Propagation: Seed 4. Flowers are not (or only rarely) produced in some cultivars, and seed productions in likewise erratic.
6.03	1. 1957. Ting, Y.C./Kehr, A.E./Miller, J.C.. A Cytological Study of the Sweet Potato Plant Ipomoea Batatas (L.) Lam. and its Related Species. The American Naturalist. 91(858): 197- 203.	1. Despite the many pollinations made in two directions, only in the cross Ipomoea batatas x I. pes-caprae, did there seem to be any stimulation of the ovules of the sweet potato plant. Two non viable seeds were harvested from this cross. However, no true interspecific hybrid F1 plants involving the sweet potato as one parent were obtained from any combinations among the crosses
6.04	1. 1982. Stucky, J.M./Beckmann, R.L.. Pollination Biology, Self-Incompatibility, and Sterility in Ipomoea pandurata (L.) G. F. W. Meyer (Convolvulaceae). American Journal of Botany. 69(6): 1022-1031.	1. Previous studies of sweet potato, I. batatas (Martin, 1965a, b, 1967; Martin and Ortiz, 1966), and other species of Ipomoea (Martin, 1968, 1970; Williams and Cope, 1967) have demonstrated genetic self- incompatibility in the genus. In each instance, the failure of pollen germination following self-pollination was cited as evidence for sporophytic self- incompatibility.
6.05	1. 1981. Real, L.A.. Nectar Availability and Bee- Foraging on Ipomoea (Convolvulaceae). Biotropica. 13(2): 64-69.	1. The relationship between nectar scheduling and availability and the patterns of a pollinating guild's foraging on two species of co-occurring morning glory was investigated in disturbed habitats of the lower montane rain forests at Monteverde, Costa Rica. Ipomoea indica and Ipomoea batatas partition pollinating resources, presumably according to tongue length, with long tongued bees visiting I. indica. Bees visiting 1. batatas show staggered visitation times with larger bees visiting in the early morning when nectar is most available and smaller bees visiting in the late morning and afternoon when nectar availability is at its minimum. The larger bee species of the early morning return in the late afternoon after nectar availability has in creased from its early afternoon low. Since no aggression was observed between bee species, small bees may be pre- vented from foraging in the early morning by cold temperatures. The larger bees probably do not forage when there is very little nectar available. I. indica shows no such pattern. Due to the deeper effective corolla of I. indica, nectar may be inaccessible to most bees in the habitat, consequently, no pattern should be expected. However, lack of a pattern may also be the result of this plant's recent introduction to the area.
6.06	1. Encyclopædia Britannica http://www.britannica.com/plant/sweet-potato (6-22-2016) 2. Purdue University Center for New Crops and Plant Products https://www.hort.purdue.edu/newcrop/duke_energy/Ipomoea_batatas.html (6-23-2016)	1. Propagated vegetatively by sprouts arising from the roots or by cuttings of the vines 2. In more northern areas where plants never flower, all propagation is by vegetative means, from transplants produced by bedding mother roots, or from rooted cuttings
6.07	1. 2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	1. Flowers are not (or only rarely) produced in some cultivars, and seed productions in likewise erratic. [This species flowers sporadically (possibly assoicated with climate) making a determination uncertain at this time.]
7.01	1. PIER http://www.hear.org/pier/species/ipomoea_batatas.htm (6-23-2016) 2. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. sometimes naturalized (up to 1,050 m) near cultivated areas, along roadsides, and in thickets along rivers and streams 2. in Hawaii a Polynesian introduction, escaping cultivation and persisting near abandoned homesites and dumps, probably on all of the inhabited main islands

7.02	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. Pantropical introduction, widely cultivated
7.03	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. [Although winged seeds are present, no other evidence of wind dispersal]	1. Capsules rarely formed, brown, ovoid, sparsely pubescent, becoming glabrate. Seeds 0-1(-4), orbicular, glabrous or with wings of short hairs.
7.04	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. [Although winged seeds are present, no other evidence of wind dispersal]	1. Capsules rarely formed, brown, ovoid, sparsely pubescent, becoming glabrate. Seeds 0-1(-4), orbicular, glabrous or with wings of short hairs.
7.05	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	1. sometimes naturalized (up to 1,050 m.) near cultivated areas, along roadsides, and in thickets along rivers and streams..." [Distribution suggests possibly water dispersal of tubers or stem fragments]
7.06	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI. 2. Texas A&M AgriLife Extension http://aggie-horticulture.tamu.edu/archives/parsons/publications/vegetabletravelers/sweetpotato.html (6-25-2016)	1. No evidence of mechanism to attract consumption by birds. 2. Except in the Tropics, the sweet potato rarely flowers under ordinary field conditions and more rarely sets seed.
7.07	1. 1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	No evidence of a mechanism for attachment
7.08		no evidence
8.01	1. Texas A&M AgriLife Extension http://aggie-horticulture.tamu.edu/archives/parsons/publications/vegetabletravelers/sweetpotato.html (6-25-2016)	1. Except in the Tropics, the sweet potato rarely flowers under ordinary field conditions and more rarely sets seed. Thus sweet potato breeders in the Temperate Zones, as in Japan or the United States, must resort to special methods of training and greenhouse culture, or even send their parent varieties to the Tropics for flowering and hybridization.
8.02	1. 2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	1. Flowers are not (or only rarely) produced in some cultivars, and seed productions in likewise erratic.
8.03		no evidence of herbicide use for control
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