

Assessment date 13 July 2015

<i>Momordica balsamina</i> Central South		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	?	
3.02	Garden/amenity/disturbance weed		
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		
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals		
4.05	Toxic to animals	y	1
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
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		
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	n	0
6.02	Produces viable seed	y	1

6.03	Hybridizes naturally		
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators		
6.06	Reproduction by vegetative propagation		
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	y	1
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed		
7.06	Propagules bird dispersed	y	1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)		
8.01	Prolific seed production	n	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)		
8.03	Well controlled by herbicides		
8.04	Tolerates, or benefits from, mutilation or cultivation		
8.05			
Total Score			11
Implemented Pacific Second Screening			no
Risk Assessment Results			High

section	# questions answered	satisfy minimum?
A		9 yes
B		9 yes
C		13 yes
total		31 yes

Assessment date 13 July 2015

<i>Momordica balsamina</i> NORTH		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	n	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	?	
3.02	Garden/amenity/disturbance weed		
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		
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals		
4.05	Toxic to animals	y	1
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
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		
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	n	0
6.02	Produces viable seed	y	1

6.03	Hybridizes naturally		
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators		
6.06	Reproduction by vegetative propagation		
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	y	1
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed		
7.06	Propagules bird dispersed	y	1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)		
8.01	Prolific seed production	n	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)		
8.03	Well controlled by herbicides		
8.04	Tolerates, or benefits from, mutilation or cultivation		
8.05			
Total Score			10
Implemented Pacific Second Screening			no
Risk Assessment Results			High

section	# questions answered	satisfy minimum?
A		9 yes
B		9 yes
C		13 yes
total		31 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%20lnd.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 (00 Month 0000).	No computer analysis was performed. 1. Global hardiness zone:8, 9, 10, 11, 12, 13 ; equivalent to USDA Hardiness zones: USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15 °F) 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 AFRICA Northeast Tropical Africa: Yemen - Socotra [extirpated] East Tropical Africa: Tanzania West Tropical Africa: Mali; Nigeria; Senegal South Tropical Africa: Angola; Mozambique; Zambia; Zimbabwe Southern Africa: Botswana; Namibia; South Africa - Cape Province, Free State, KwaZulu-Natal, Transvaal; Swaziland ASIA-TEMPERATE Arabian Peninsula: Yemen ASIA-TROPICAL Indian Subcontinent: India - Maharashtra, Punjab, Rajasthan, Uttar Pradesh; Nepal; Pakistan AUSTRALASIA Australia: Australia - New South Wales, Northern Territory, Queensland, South Australia, Western Australia
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf).	1. Distribution in the native/cultivated range occurs in Aw, Am, Af, Bwk, Bwh, Bsh, Cwa, Cwb, Cfa
2.04	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	In southern Africa it grows from about sea level to 1465 m altitude, in dry to wet areas with a rainfall of 200-1200 [7-48 inches] mm annually. [Only suitable for South and Central Zones]
2.05	1. Dave's Garden http://davesgarden.com/guides/pf/go/811/#b (4-27-2016) 2. Constance E.S. Taylor ¹ Lawrence K. Magrath ² , Patricia Folley ³ , Paul Buck ⁴ , and Sydney Carpenter ⁵ . (1996). Oklahoma Vascular Plants: Additions and Distributional Comments. 3. The Global Biodiversity Information Facility: GBIF Backbone Taxonomy, 2013-07-01. Accessed via http://www.gbif.org/species/2874582 on 2015-04-27 4. Atlas of Living Australia http://bie.ala.org.au/species/urn:lsid:biodiversity.org.au:apni.taxon:132178# (4-28-2015)	1. Introduced to Michigan, Ohio, Tennessee, Texas, Hawaii, and Colorado 2. it was introduced into the western hemisphere as an ornamental and for its edible fruits. Correll and Johnston reported that it had escaped and become part of the flora of Texas and Louisiana. 3. The balsam apple was introduced into Europe by 1568 and was used medicinally to treat wounds. 4. Recorded growing throughout Australia
3.01		Unclear, as this species is commonly mistaken for or confused with <i>Momordica charantia</i>
3.02	1. Dave's Garden http://davesgarden.com/guides/pf/go/811/#b (4-27-2016)	no evidence, however, internet threads indicate this species sometimes "takes over" gardens and backyards.
3.03		no evidence
3.04		no evidence
3.05	1. Milliken, W., Klitgård, B. & Baracat, A. eds (2009 onwards). Neotropikey - Interactive key and information resources for flowering plants of the Neotropics. www.kew.org/neotropikey (4-27-2015) 2. PIER http://www.hear.org/pier/species/momordica_charantia.htm (4-27-2015)	1. <i>Momordica charantia</i> L. is an invasive plant. 2. <i>Momordica charantia</i> is invasive throughout the tropics
4.01	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	These characteristics are featured in the species description.

4.02		no evidence
4.03		no evidence
4.04		no evidence
4.05	1. Invasive Species Compendium http://www.cabi.org/isc/datasheet/34677 (4-28-2015)	Poisonous to mammals
4.06	1. Invasive Species Compendium http://www.cabi.org/isc/datasheet/34677 (4-28-2015)	1. Major host of: <i>Dacus ciliatus</i> (lesser pumpkin fly); <i>Rhizobium radiobacter</i> (crown gall); <i>Rhizobium rhizogenes</i> (gall) Minor host of: <i>Anastrepha suspensa</i> (Caribbean fruit fly); <i>Bactrocera cucurbitae</i> (melon fly); <i>Pseudoperonospora cubensis</i> (cucumber downy mildew); <i>Rotylenchulus reniformis</i> (reniform nematode) Wild hosts Cucumber mosaic virus (cucumber mosaic) ¹
4.07	1. South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015) 2. Dave's Garden http://davesgarden.com/guides/pf/go/811/#b (4-27-2016) 3. South Texas Poison Control Center http://www.texaspoison.com/wildplants.asp (4-27-2015) 4. Mladenovic E., J. Berenji, M. Kraljevic-Balalic, J. Cukanovic, and I. Blagojevic (2012): Multivariate analysis of species from Cucurbitaceae family. - <i>Genetika</i> , Vol 44, No. 2, 227 - 234.	1. There are conflicting reports on the toxicity of the fruit, both green and ripe. The green fruit contains a resin, toxic alkaloids and a saponic glycoside that cause vomiting and diarrhoea; these substances are denatured in the cooking process. 2. Parts of plant are poisonous if ingested 3. This is listed as a toxic plant of Texas 4. as the active substance contained in the fruit of balsam apple has similar effects to insulin, it must be used with extreme caution.
4.08		no evidence
4.09	1. South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015) 2. Dave's Garden http://davesgarden.com/guides/pf/go/811/#b (4-27-2016) 3. NC Cooperative Extension https://plants.ces.ncsu.edu/plants/all/momordica-balsamina/ (4-28-2015)	1. It thrives in full sun and semi-shade 2. Sun Exposure: Full Sun 3. Exposure: Sun
4.10	1. South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015) 2. USDA Natural Resource Conservation Service Soils, Global Soil Regions Map http://www.nrcs.usda.gov/Internet/FSE_MEDIA/nrcs142p2_050722.jpg (3-25-2015)	1. The balsam pear grows in white, yellow, red and grey sandy soil, also loam, clay, alluvial, gravelly and calcareous soil. [Similar in description to soils in all three zones] 2. The native range of this plant includes soil zones congruent with those in all three zones of Florida
4.11	1. Gulab Singh Thakur, Manoranjan Bag, Bhagwan S. Sanodiya, Pratiksha Bhadauriya, Mousumi Debnath, G. B.K.S. Prasad and P. S. Bisen <i>Momordica balsamina</i> : A Medicinal and Nutraceutical Plant for Health Care Management. <i>Current Pharmaceutical Biotechnology</i> Pages 667-682 (16) 2. Constance E.S. Taylor ¹ Lawrence K. Magrath ² , Patricia Folley ³ , Paul Buck ⁴ , and Sydney Carpenter ⁵ . (1996). <i>Oklahoma Vascular Plants: Additions and Distributional Comments</i> . 3. South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	1. <i>Momordica balsamina</i> , African pumpkin (Cucurbitaceae), is a tendril-bearing, wild climber 2. Balsam-apple is an herbaceous, annual, vine that climbs via tendrils. 3. As a climber, the stems will need some support to give a showy effect.
4.12		no evidence
5.01		Family: Cucurbitaceae
5.02		Family: Cucurbitaceae
5.03		no evidence
5.04	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	no evidence of these structures
6.01		no evidence

6.02	1. South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015) 2. Mass Spectrum Botanicals http://massspectrumbotanicals.com/shop/momordica-balsamina/ (4-28-2015)	1. The balsam pear can be grown from seed in most areas 2. garden seeds widely available for purchase on the Internet
6.03		no evidence
6.04	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-28-2015)	Flowers solitary, male and female flowers on the same plant (monoecious).
6.05		no evidence
6.06		no evidence
6.07		no evidence
7.01	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	It thrives in full sun and semi-shade in grassland, savanna, woodland, forest margins, coastal dune forests and in river bank vegetation as well as disturbed areas
7.02	1. Invasive Species Compendium http://www.cabi.org/isc/datasheet/34677 (4-28-2015) 2. South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015) 3. Mass Spectrum Botanicals http://massspectrumbotanicals.com/shop/momordica-balsamina/ (4-28-2015)	1. Ornamental 2. It has been cultivated in gardens in Europe since the 1800's. 3. Widely available from internet nurseries as an ornamental and home grown supplement.
7.03	ORGANISATION EUROPEENNE ET MEDITERRANEENNE POUR LA PROTECTION DES PLANTES http://www.invasive.org/library/eppo/Rse-0408.pdf (4-28-2015)	The EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION reports M. balsamina is traded internationally as a vegetable alongside other vegetables.
7.04	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	No evidence of adaption for wind dispersal
7.05		no evidence
7.06	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	The fruit is eaten by birds, ants, probably by some mammals (though not recorded) and also by humans.
7.07	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	no evidence of mechanism for attachment
7.08	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	The fruit is eaten by birds, ants, probably by some mammals (though not recorded) and also by humans.
8.01	South African National Biodiversity Institute http://www.plantzafrica.com/plantklm/momordbalsam.htm (4-27-2015)	Fruit spindle shaped, dark green with 9 or 10 regular or irregular rows of cream or yellowish short blunt spines, ripening to bright orange or red, 25-60 mm long, ... Seeds ovate in outline, rather compressed, up to 11 mm long, light brown, surface sculptured; encased in a sticky scarlet red fleshy covering that is edible and sweet, tasting like watermelon. [Information on seed characteristics insinuate this plant does not produce prolific seed.]
8.02		no evidence
8.03		no evidence
8.04		no evidence
8.05		no evidence