

Family: *Cucurbitaceae*

Taxon: *Luffa operculata*

Synonym: *Elaterium quinquefidum* Hook. & Arn.
Luffa quinquefida (Hook. & Arn.) Seem.
Momordica operculata L. (basionym)

Common Name: sponge cucumber
 wild loofa
 sponge gourd

Questionnaire :	current 20090513	Assessor:	Assessor	Designation:	EVALUATE
Status:	Assessor Approved	Data Entry Person:	Assessor	WRA Score	2
101	Is the species highly domesticated?		y=-3, n=0		n
102	Has the species become naturalized where grown?		y=1, n=-1		
103	Does the species have weedy races?		y=1, n=-1		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"		(0-low; 1-intermediate; 2-high) (See Appendix 2)		High
202	Quality of climate match data		(0-low; 1-intermediate; 2-high) (See Appendix 2)		High
203	Broad climate suitability (environmental versatility)		y=1, n=0		n
204	Native or naturalized in regions with tropical or subtropical climates		y=1, n=0		y
205	Does the species have a history of repeated introductions outside its natural range?		y=-2, ?=-1, n=0		n
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205		n
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)		
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)		n
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)		n
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)		y
401	Produces spines, thorns or burrs		y=1, n=0		n
402	Allelopathic		y=1, n=0		
403	Parasitic		y=1, n=0		n
404	Unpalatable to grazing animals		y=1, n=-1		
405	Toxic to animals		y=1, n=0		
406	Host for recognized pests and pathogens		y=1, n=0		
407	Causes allergies or is otherwise toxic to humans		y=1, n=0		
408	Creates a fire hazard in natural ecosystems		y=1, n=0		n
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0		n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0		n

411	Climbing or smothering growth habit	y=1, n=0	y
412	Forms dense thickets	y=1, n=0	
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: EVALUATE

WRA Score 2

Supporting Data:

101	1988. Heiser, C.B./Schilling, E.E./Dutt, B.. The American Species of Luffa (Cucurbitaceae). Systematic Botany. 13(1): 138-145.	[Is the species highly domesticated? No] No evidence
102	2013. WRA Specialist. Personal Communication.	NA
103	2013. WRA Specialist. Personal Communication.	NA
201	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Species suited to tropical or subtropical climate(s) 2-High] "The somewhat variable Luffa operculata is the only species native to the American tropics and subtropics. It ranges from northern Mexico south to Peru and Ecuador."
202	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Quality of climate match data 2-High]
203	2013. Tropicos.org. Tropicos [Online Database]. Missouri Botanical Garden, http://www.tropicos.org/	[Broad climate suitability (environmental versatility)? No evidence from botanical collections] Collected from 0-600 m elevation, and from 02°01'00"S to 22°10'02"N latitude [Elevation range and latitude suggest adaptations to lower elevation tropical to subtropical climates]
204	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "The somewhat variable Luffa operculata is the only species native to the American tropics and subtropics. It ranges from northern Mexico south to Peru and Ecuador."
205	1988. Heiser, C.B./Schilling, E.E./Dutt, B.. The American Species of Luffa (Cucurbitaceae). Systematic Botany. 13(1): 138-145.	[Does the species have a history of repeated introductions outside its natural range? No] "Luffa operculata is widely used for the treatment of sinusitis..." [Mostly within introduced range]
205	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Does the species have a history of repeated introductions outside its natural range? No] "...locally cultivated in their native areas as medicinal plants (Jeffrey 2001)."
301	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Naturalized beyond native range? No] No evidence, although regarded as a weed of unspecified impacts within its native range of Peru
302	1979. Holm, L. G./Pancho, J.V./Herberger, J.P./Plucknett, D.L.. A Geographical Atlas of World Weeds. John Wiley and Sons, New York, NY	[Garden/amenity/disturbance weed? Possibly] In Peru, listed as "X - for present as a weed (the species is present and behaves as a weed, but its rank of importance is unknown."
303	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? No] No evidence [But listed as a weed of unspecified impacts]
304	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Environmental weed? No] No evidence
305	2011. BioNET-EAFRINE. Keys and Fact Sheets - Luffa cylindrica (Vegetable Sponge Gourd). http://keys.lucidcentral.org/keys/v3/eafrinet/weeds/key/weeds/Media/Html/Luffa_cylindrica_%28Vegetable_Sponge_Gourd%29.htm [Accessed 17 May 2013]	[Congeneric weed? Yes] "Luffa cylindrica is naturalised in parts of Kenya and Tanzania and invasive in parts of Uganda (A.B.R. Witt pers. obs.)." ... "This species is capable of invading disturbed areas."
305	2011. Reddy, G.P.. Survey of invasive plants on Guam and identification of the 20 most widespread. Micronesica. 41(2): 263-274.	[Congeneric weed? Impacts unspecified] "Table 2. List of invasive plant species recorded on Guam, in descending order of estimated coverage of the island." [Luffa cylindrica - Total acreage covered on Guam (estimated) = 37.96]
401	1937. Macbride, J.F./Dahlgren, B.E. Flora of Peru, Part VI. No. 2. Fieldiana. Botany Series. 13: 1-491.	[Produces spines, thorns or burrs? Produces spiny fruits] "The fruit is dry, spiny, about 6-8 cm. long by 3-4 cm. across."
401	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Produces spines, thorns or burrs? Not on vegetative parts] "Monoecious, tendriled vines; stems 5- to 10 sulcate, hispidulous, puberulent, or glabrate. Leaves suborbicular, 5-15 cm long, as wide or slightly wider than long, shallowly to deeply 5- to 7 lobate, sometimes subentire, the apex rounded to acute, the base deeply cordate, the margin dentate, somewhat undulate, chartaceous, the upper surface scabrous with pustular-based trichomes, the lower surface scabrous; petioles 3-8 cm long, slender, hispid or pubescent, striate; tendrils 2- to 3-branched, hispid or pubescent."

402	2013. WRA Specialist. Personal Communication. [Allelopathic? Unknown]	
403	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Parasitic? No] "Monoecious, tendriled vines..." [Cucurbitaceae]
404	1994. Domínguez-Bello, M.G./Michelangeli, F./Ruiz, M.C./García, A./Rodríguez, E.. Ecology of the Folivorous Hoatzin (<i>Opisthocomus hoazin</i>) on the Venezuelan Plains. The Auk. 111(3): 643-651.	[Unpalatable to grazing animals? Consumed by Hoatzin birds] "The diet of the Hoatzin consisted of young leaves and twigs of some of the most abundant trees in its habitat. Although there are no reports on the phytochemistry of dietary plants, families to which these plants belong include plants known to contain secondary compounds. The crop, which functions as a mediator in plant Hoatzin interactions and as a detoxification chamber, deserves further study."
405	2008. Duke, J.A.. Duke's Handbook of Medicinal Plants of Latin America. CRC Press, Boca Raton, FL	[Toxic to animals? Unknown] "Though <i>L. operculata</i> is applied intranasally, inducing profuse mucous secretion and relieving nasal symptoms, it may irritate nasal mucosa, aggravating epistaxis or anosmia...As of July 2007, the FDA Poisonous Plant Database listed four titles alluding to toxicity of this species."
406	2011. Achigan-Dako, E.G./N'danikou, S./Vodouhè, R.S.. <i>Luffa cylindrica</i> (L.) M.Roem. [Internet] Record from PROTA4U. Brink, M. & Achigan-Dako, E.G. (Editors). PROTA (Plant Resources of Tropical Africa, Wageningen, Netherlands http://www.prota4u.org/search .	[Host for recognized pests and pathogens? Unknown. Related species affected by pests and pathogens] "A number of common cucurbit diseases and pests are also found in <i>Luffa cylindrica</i> cultivation. These include powdery mildew, downy mildew, pumpkin flies and red spider mite. For instance several species of pumpkin flies (including <i>Bactrocera depressa</i> and <i>Bactrocera scutellata</i>) attack the immature fruit. These dark brown insects penetrate the fruit skin and the tissue around the puncture mark dries and becomes darker and slightly sunken."
406	2013. Sunshine Seeds. <i>Luffa operculata</i> . http://www.sunshine-seeds.de/Luffa-operculata-53363p.html?language=en [Accessed 29 May 2013]	[Host for recognized pests and pathogens?] Spider mites [Greenhouse cultivation]
407	1961. Cutler, H.C./Whitaker, T.W.. History and Distribution of the Cultivated Cucurbits in the Americas. American Antiquity. 26(4): 469-485.	[Causes allergies or is otherwise toxic to humans? Seeds] " <i>Luffa operculata</i> (L.) Cogn. is the only New World native of this genus. It is used widely in folk medicine (the seeds are a violent purgative)..."
407	2008. Duke, J.A.. Duke's Handbook of Medicinal Plants of Latin America. CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? Possibly] "Though <i>L. operculata</i> is applied intranasally, inducing profuse mucous secretion and relieving nasal symptoms, it may irritate nasal mucosa, aggravating epistaxis or anosmia...As of July 2007, the FDA Poisonous Plant Database listed four titles alluding to toxicity of this species."
408	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Creates a fire hazard in natural ecosystems? No] "It grows at low elevations, scrambling over rocks and low shrubs in thickets, open areas, usually near the edge of rivers, ponds, or in coastal plains." [No evidence. Climbing vines could presumably act as fuel ladders in natural ecosystems, but no evidence of increased fire hazards or flammability was found in the existing literature]
409	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Is a shade tolerant plant at some stage of its life cycle? Probably No] "It grows at low elevations, scrambling over rocks and low shrubs in thickets, open areas..."
409	2013. Dave's Garden. PlantFiles: Ball Luffa, Luffa, Sponge Cucumber, Estropajo - <i>Luffa operculata</i> . http://davesgarden.com/guides/pf/go/168632/ [Accessed 28 May 2013]	[Is a shade tolerant plant at some stage of its life cycle? No] "Sun Exposure: Full Sun"
410	2013. Dave's Garden. PlantFiles: Ball Luffa, Luffa, Sponge Cucumber, Estropajo - <i>Luffa operculata</i> . http://davesgarden.com/guides/pf/go/168632/ [Accessed 28 May 2013]	[Tolerates a wide range of soil conditions? No] "Soil pH requirements: 5.6 to 6.0 (acidic) 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral)"
411	1976. Nash, D.L.. Flora of Guatemala - Vol. 24 - Part XI - Number 4. Fieldiana, Botany Series. 24: 1-431.	[Climbing or smothering growth habit? Yes] "Herbaceous vines, often forming dense masses of scandent or prostrate growth" ... "This species is easily confused with <i>Momordica charantia</i> L., which it closely resembles in habit and overall appearance. It may be readily distinguished, however, by its fibrous, operculate fruits, or by its racemes of staminate flowers."
411	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Climbing or smothering growth habit? Yes] "Monoecious, tendriled vines..."

412	1976. Nash, D.L.. Flora of Guatemala - Vol. 24 - Part XI - Number 4. Fieldiana, Botany Series. 24: 1-431.	[Forms dense thickets? Possibly] "Herbaceous vines, often forming dense masses of scandent or prostrate growth; stems rather slender, striate, freely branching; tendrils mostly bifid on peduncles 1-6 cm. long;"
501	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Aquatic? No] "It grows at low elevations, scrambling over rocks and low shrubs in thickets, open areas, usually near the edge of rivers, ponds, or in coastal plains."
502	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Grass? No] Cucurbitaceae
503	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Nitrogen fixing woody plant? No] Cucurbitaceae
504	1978. Woodson, Jr., R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Monoecious, tendriled vines;..."
601	1988. Heiser, C.B./Schilling, E.E./Dutt, B.. The American Species of Luffa (Cucurbitaceae). Systematic Botany. 13(1): 138-145.	[Evidence of substantial reproductive failure in native habitat? No] No evidence
602	2013. Dave's Garden. PlantFiles: Ball Luffa, Luffah, Sponge Cucumber, Estropajo - Luffa operculata. http://davesgarden.com/guides/pf/go/168632/ [Accessed 28 May 2013]	[Produces viable seed? Yes] "Propagation Methods: From seed; direct sow after last frost"
602	2013. Native Seeds/SEARCH. Catalog. www.nativeseeds.org/pdf/seedlistingcatalog.pdf	[Produces viable seed? Yes] "Seedsaving: This annual is insect pollinated. Allow fruits to dry on the plant before harvesting the seeds, which can often be shaken directly out of the fruits."
603	1988. Heiser, C.B./Schilling, E.E./Dutt, B.. The American Species of Luffa (Cucurbitaceae). Systematic Botany. 13(1): 138-145.	[Hybridizes naturally? Probably Yes] "Artificial hybrids between L. aegyptia- ca x L. astorii, L. aegyptiaca x L. operculata, L. echinata x L. operculata, and L. operculata x L. graveolens have been reported previously (Heiser and Schilling 1988). Seeds of the first three hybrids were readily secured but numerous crosses were necessary before a single seed of the last hybrid was obtained. All the hybrids were sterile." ... "Those hybrids within L. astorii and L. operculata were fully fertile where- as those within L. quinquefida showed some re- duction in pollen stainability (46-71%) but seed set was equal to that of the parental accessions"
604	1957. Fryxell, P.A.. Mode of Reproduction of Higher Plants. Botanical Review. 23(3): 135-233.	[Self-compatible or apomictic? Unknown] "The principal caution in classifying a species in this category is that some species are incompletely dioecious or polygamous and occasionally or regularly produce monoecious or hermaphroditic individuals. In some species which show a direct and simple genetic control of such sexual polymorphism (e.g., Luffa acutangula and Origanum vulgare) and where this polymorphism is relatively stable, one can, of course, deduce that cross-pollination must be the rule on the basis of the genotypes involved." ..."VI. Tabulation of Modes of Reproduction" [Related species, Luffa acutangula, presumably requires cross-pollination]
604	2011. Achigan-Dako, E.G./N'danikou, S./Vodouhè, R.S.. Luffa cylindrica (L.) M.Roem. [Internet] Record from PROTA4U. Brink, M. & Achigan-Dako, E.G. (Editors). PROTA (Plant Resources of Tropical Africa, Wageningen, Netherlands http://www.prota4u.org/search .	[Self-compatible or apomictic? Unknown] "Luffa cylindrica is self-compatible and natural propagation is by seed." [Related species self-compatible]
605	2011. Adamson, N.L.. An Assessment of Non-Apis Bees as Fruit and Vegetable Crop Pollinators in Southwest Virginia. PhD Dissertation. Virginia Polytechnic Institute and State University, Blacksburg, VA	[Requires specialist pollinators? No] "Appendix E: Alternative forage in flower during target crop bloom Plants observed in flower during crop bloom at farm sites in southwest Virginia during the 2008 and 2009 growing seasons. Plants in bold were observed with bee visitors." [Luffa operculata flowers visited by bees]

605	2013. Luffa.info. How to Grow Your Own Luffa Sponges. http://www.luffa.info/luffagrowing.htm [Accessed 28 May 2013]	[Requires specialist pollinators? No] "After the vines bloom pollination has to occur before a pod will form. Bees of all types are attracted to the big yellow flowers and perform much of the work. Ants also spend a lot of time on luffa vines. There are small triangular leaf-like structures at the base of the flowers that attract ants. The blooms will fall off and the pollinated ones will form the start of a loofah sponge at the base of the former female flower. If pollinating insects are in short supply the flowers can be hand pollinated. Pull off a male flower and gently rub it on the females or else use a cotton swab to move pollen between flowers. The female flowers are the solitary large stemmed ones. The males are located in clusters of buds with thin stems. Both flowers are large and yellow. "
606	2013. Sunshine Seeds. Loofah operculata. http://www.sunshine-seeds.de/Luffa-operculata-53363p.html?language=en [Accessed 29 May 2013]	[Reproduction by vegetative fragmentation? No] "Propagation: Seed"
607	1937. Macbride, J.F./Dahlgren, B.E. Flora of Peru, Part VI. No. 2. Fieldiana. Botany Series. 13: 1-491.	[Minimum generative time (years)? 1] "A very common, annual vine, reaching a height of 10 meters at least when support is available." [Annuals reach maturity within one growing season]
701	1937. Macbride, J.F./Dahlgren, B.E. Flora of Peru, Part VI. No. 2. Fieldiana. Botany Series. 13: 1-491.	[Propagules likely to be dispersed unintentionally? No] "When the fruit is ripe, a circular piece about 3 cm. across drops off the apex, and the seeds are gradually shaken out by the wind." [No evidence. Fruits and seeds relatively large and lack means of external attachment]
702	2013. Dave's Garden. PlantFiles: Ball Luffa, Luffah, Sponge Cucumber, Estropajo - Luffa operculata. http://davesgarden.com/guides/pf/go/168632/ [Accessed 28 May 2013]	[Propagules dispersed intentionally by people? Yes] "8 members have or want this plant for trade."
702	2013. WRA Specialist. Personal Communication.	[Propagules dispersed intentionally by people? Yes] Several websites sell seeds commercially. Grown for medicinal purposes and for use as sponges
703	1978. Woodson, Jr.,R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Propagules likely to disperse as a produce contaminant? No] "Fruits green or gray green, ellipsoidal, 5-10 cm long, 8- to 10-costate, costae tuberculate or shortly echinate, puberulent, glabrate in age, dehiscent by a conical, long-beaked operculum; seeds gray or brown, faintly mottled with darker markings, ovoid, compressed, 6-10 mm long, 4-5 mm wide, 2 oblique bumps present above the hilum on each face, the testa smooth or rugulose." [Although grown as a crop, unlikely to contaminate other produce as fruit and seeds are fairly large]
704	1937. Macbride, J.F./Dahlgren, B.E. Flora of Peru, Part VI. No. 2. Fieldiana. Botany Series. 13: 1-491.	[Propagules adapted to wind dispersal? Yes] "When the fruit is ripe, a circular piece about 3 cm. across drops off the apex, and the seeds are gradually shaken out by the wind. The fruit is dry, spiny, about 6-8 cm. long by 3-4 cm. across."
705	1937. Macbride, J.F./Dahlgren, B.E. Flora of Peru, Part VI. No. 2. Fieldiana. Botany Series. 13: 1-491.	[Propagules water dispersed? No evidence] "When the fruit is ripe, a circular piece about 3 cm. across drops off the apex, and the seeds are gradually shaken out by the wind."
705	1978. Woodson, Jr.,R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Propagules water dispersed? Possibly] "It grows at low elevations, scrambling over rocks and low shrubs in thickets, open areas, usually near the edge of rivers, ponds, or in coastal plains." [Found near rivers and ponds. Fruit may float]
706	1937. Macbride, J.F./Dahlgren, B.E. Flora of Peru, Part VI. No. 2. Fieldiana. Botany Series. 13: 1-491.	[Propagules bird dispersed? No] "When the fruit is ripe, a circular piece about 3 cm. across drops off the apex, and the seeds are gradually shaken out by the wind. The fruit is dry, spiny, about 6-8 cm. long by 3-4 cm. across."
707	1978. Woodson, Jr.,R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Propagules dispersed by other animals (externally)? No] "Fruits green or gray green, ellipsoidal, 5 10 cm long, 8- to 10-costate, costae tuberculate or shortly echinate, puberulent, glabrate in age, dehiscent by a conical, long-beaked operculum; seeds gray or brown, faintly mottled with darker markings, ovoid, compressed, 6-10 mm long,"
708	1937. Macbride, J.F./Dahlgren, B.E. Flora of Peru, Part VI. No. 2. Fieldiana. Botany Series. 13: 1-491.	[Propagules survive passage through the gut? Unknown] "When the fruit is ripe, a circular piece about 3 cm. across drops off the apex, and the seeds are gradually shaken out by the wind." [Fruit and seeds not adapted for consumption and internal dispersal]
801	1978. Woodson, Jr.,R.E./Schery, R.W./Wunderlin, R.P.. Flora of Panama. Part IX. Family 182. Cucurbitaceae. Annals of the Missouri Botanical Garden. 65(1): 285-366.	[Prolific seed production (>1000/m2)? No] "Fruits green or gray green, ellipsoidal, 5 10 cm long, 8- to 10-costate ... seeds gray or brown, faintly mottled with darker markings, ovoid, compressed, 6-10 mm long, 4-5 mm wide" [Unlikely that relatively large fruits and seeds would be produced in such high densities]

802	2013. Luffa.info. What is a Loofah? http://www.luffa.info/ [Accessed 28 May 2013]	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown from field conditions] "Seeds should be allowed to dry enough so they won't rot or mold and then stored in a cool place. Refrigerate or freeze in a sealed airtight container for long term storage. We've had reports of seeds as old as ten years still germinating. If the seeds are allowed to get too hot and dry they become hard. Some hard seeds can still germinate but may take a month to sprout."
803	2009. Englberger, K.. Invasive weeds of Pohnpei: A guide for identification and public awareness. Conservation Society of Pohnpei, Kolonia, FM	[Well controlled by herbicides? Probably Yes] "Triclopyr (Garlon 4) and glyphosate (Roundup) can be used" [Control information for <i>Luffa aegyptiaca</i> (syn. <i>L. cylindrica</i>) should be applicable to <i>L. operculata</i>]
804	2004. Grubben, G.J.H. (ed.). Plant Resources of Tropical Africa. Volume 2. Vegetables. PROTA, Wageningen, Netherlands	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown] "Lateral stems are pruned if they grow too abundantly. Some top and leaf pruning may promote flower and fruit development, resulting in a higher yield." [Related species tolerate some pruning]
805	2013. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

Summary of Risk Traits

High Risk / Undesirable Traits

- Thrives in tropical climates
- Listed as a weed of unspecified impacts in Peru (within native range)
- Related species are invasive and weedy
- Seeds may be toxic to animals and people
- Climbing and possibly smothering habit
- Reaches maturity quickly (<1 year)
- Seeds wind-dispersed

Low Risk / Desirable Traits

- No reports of naturalization documented outside native range.
- Requires full sun to thrive
- Medicinal uses
- Fibrous interior used as a rough cloth or sponge
- Relatively large fruits and seeds may limit dispersal potential
- Herbicides may provide effective control