

<i>Ottelia alismoides</i> (Ducklettuce, ottelia, water-plantain ottelia) -- FLORIDA		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 FL climates (USDA hardiness zones; 0 low, 1 intermediate, 2 high)	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 regions with an average of 11 60 inches of annual precipitation		
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	?	
3.04	Environmental weed	y	4
3.05	Congeneric weed		
4.01	Produces spines, thorns or burrs	y	1
4.02	Allelopathic		
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals		
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans	n	0
4.08	Creates a fire hazard in natural ecosystems		
4.09	Is a shade tolerant plant at some stage of its life cycle	?	
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.		
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	?	
5.01	Aquatic	y	5
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	n	0
6.06	Reproduction by vegetative propagation	n	-1
6.07	Minimum generative time (years)	1	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	y	1
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed	y	1
7.06	Propagules bird dispersed		
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	?	

8.01	Prolific seed production	y	1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	?	
8.03	Well controlled by herbicides	y	-1
8.04	Tolerates, or benefits from, mutilation or cultivation	y	1
8.05	Effective natural enemies present in U.S.		
Total Score		20	
Implemented Pacific Second Screening		No	
Risk Assessment Results		High Risk	

section	# questions answered	satisfy minimum?
A	8	yes
B	5	yes
C	19	yes
total	32	yes

	Reference	Source data
1.01		No evidence found.
1.02		Skip to 2.01
1.03		Skip to 2.01
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 (19 February 2014). 3. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	No computer analysis was performed. 1. Global plant hardiness zones 9-13; equivalent to USDA Hardiness zones (8b/9a?-) 9b-11b+. 2. Distribution range: native to Australia (Northern Territory, Queensland); India; Solomon Islands. 3. Widespread in the tropical and warmer regions of Asia and Australia, extends from northeastern India (except Pakistan) eastwards through China and S.E. Asia to Korea, Ussuriysk (Sikhote-Alin, U.S.S.R.) and Japan, reaching eastwards to Bougainville and the Solomon Islands. In the east it extends from the southern part of Sikhote-Alin, U.S.S.R. and the northern part of Honshu, Japan southwards to southern Queensland, Australia. Within this area it is probably indigenous.
2.02		No computer analysis was performed. Native range is well known; refer to 2.01 source data.
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Sosef, M.S.M. & van der Maesen, L.J.G., 1997. <i>Ottelia alismoides</i> (L.) Persoon [Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 19-Feb-2014.	1. Distribution range occurs in 3 or more climatic groups. 2. Often growing gregariously up to 700-1000 m altitude.
2.04	1. World Climate Maps. http://www.climate-charts.com/World-Climates-Maps.html . Accessed 23 January 2014.	1. Native distribution mean annual precipitation 725 mm-7474 mm (28.6"-294.3").
2.05	1. Cook, CDK et al. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 1. Generic considerations. <i>Aquatic Botany</i> , 18: 263-274.	1. Has spread out of Asia and has become established in Africa, Europe and North America.
3.01	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177. 2. Van Dyke, J. Accessed from Center for Aquatic and Invasive Plants, University of Florida, http://plants.ifas.ufl.edu/node/300 . 20 February 2014.	1. In other regions of the world it is almost certainly introduced (e.g., Iraq where the Tigris and Euphrates Rivers come together; the rice-growing regions of northern Italy; established since 1939 in Louisiana and eliminated in California in 1977; Africa: common in the Nile Delta, has been collected from the oases of the Libian Desert, known from the Sudan and isolated gatherings from Tanzania) and is usually associated with irrigated crop plants. 2. Has naturalized to Louisiana, California, and more recently Missouri and Florida.
3.02	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?409896 (19 February 2014).	1. Meets the USDA-APHIS requirements of limited distribution and capable of causing economic and/or environmental harm. A declared aquatic (FL, IN, NC, OK, SC, TX) or terrestrial (AL, MA) noxious weed.
3.03	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?409896 (19 February 2014).	1. Meets the USDA-APHIS requirements of limited distribution and capable of causing economic and/or environmental harm. A declared aquatic (FL, IN, NC, OK, SC, TX) or terrestrial (AL, MA) noxious weed. 2. In spite of its frequent occurrence in agricultural land it does not seem to be a seriously detrimental weed.

3.04	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?409896 (19 February 2014).	1. Meets the USDA-APHIS requirements of limited distribution and capable of causing economic and/or environmental harm. A declared aquatic (FL, IN, NC, OK, SC, TX) or terrestrial (AL, MA) noxious weed.
3.05		
4.01	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. The leaves or particularly their margins are sometimes smooth or they may bear spines. When the juvenile leaves bear spines then the adult ones or at least their sheaths usually also bear spines. However, it is often found that the juvenile leaves are smooth but that the adult ones bear spines or that only the largest and most mature adult leaves bear spines.
4.02		No evidence found.
4.03	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?409896 (19 February 2014).	Family: Hydrocharitaceae (not a parasitic family).
4.04		No evidence found.
4.05	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. Cook noticed that the pulpy mass of dissepiments and seeds is very attractive to fish, and it is usually picked to pieces and eaten before the capsule is fully open.
4.06		No evidence found.
4.07	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. The leaves and inflorescences are eaten by humans in southern and eastern Asia (Raynal-Roques, 1978).
4.08		No evidence found.
4.09	1. Jiang, M & Y Kadono. 2001. Growth and reproductive characteristic of an aquatic macrophyte <i>Ottelia alismoides</i> (L.) Pers. (Hydrocharitaceae). <i>Ecological Research</i> , 16: 687-695. 2. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177. 3. Yin, L et al. 2009. Cold stratification, light and high seed density enhance the germination of <i>Ottelia alismoides</i> . <i>Aquatic Botany</i> , 90: 85-88.	1. <i>Ottelia alismoides</i> is a submerged aquatic plant. 2. Grows in still or flowing water from ca. 5 cm to 1 m or more deep. 3. In the present study, seed of <i>O. alismoides</i> require light for germination.
4.10		No evidence found.
4.11	1. Jiang, M & Y Kadono. 2001. Growth and reproductive characteristic of an aquatic macrophyte <i>Ottelia alismoides</i> (L.) Pers. (Hydrocharitaceae). <i>Ecological Research</i> , 16: 687-695.	1. <i>Ottelia alismoides</i> is a submerged aquatic plant.
4.12	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. Usually gregarious, and in suitable habitats is often the dominant aquatic plant.
5.01	1. Jiang, M & Y Kadono. 2001. Growth and reproductive characteristic of an aquatic macrophyte <i>Ottelia alismoides</i> (L.) Pers. (Hydrocharitaceae). <i>Ecological Research</i> , 16: 687-695. 2. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. <i>Ottelia alismoides</i> is a submerged aquatic plant. 2. Grows in still or flowing water from ca. 5 cm to 1 m or more deep. It is found in a wide variety of aquatic habitats, such as shallow lakes, ponds, water storage tanks, ricefields, canals, irrigation ditches and in sluggish rivers.
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?409896 (19 February 2014).	Family: Hydrocharitaceae.

5.03	1. Jiang, M & Y Kadono. 2001. Growth and reproductive characteristic of an aquatic macrophyte <i>Ottelia alismoides</i> (L.) Pers. (Hydrocharitaceae). <i>Ecological Research</i> , 16: 687-695.	1. <i>Ottelia alismoides</i> is a submerged aquatic plant.
5.04	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177. 2. Yin, L et al. 2009. Cold stratification, light and high seed density enhance the germination of <i>Ottelia alismoides</i> . <i>Aquatic Botany</i> , 90: 85-88.	1. Stems: erect, contracted and corm-like. It is usually found loosely rooted in mud.
6.01		No evidence found on controlling factors.
6.02	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177. 2. Yin, L et al. 2009. Cold stratification, light and high seed density enhance the germination of <i>Ottelia alismoides</i> . <i>Aquatic Botany</i> , 90: 85-88.	1. The hypocotyl emerges from the seed, bends downwards and develops a ring of hairs at the distal end. The ring of hairs anchors the seedling which then develops in an upright position. It is not quite clear whether the anchoring hairs are developed from the hypocotyl or from the root itself. 2. Cold stratification can break dormancy, and light and high seed density promotes germination.
6.03	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. Kaul (1969) crossed <i>O. alismoides</i> as male parent with <i>O. cordata</i> and obtained a fertile and bisexual hybrid.
6.04	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. In bisexual flowers there is a very high degree of autogamy.
6.05	1. Jiang, M & Y Kadono. 2001. Growth and reproductive characteristic of an aquatic macrophyte <i>Ottelia alismoides</i> (L.) Pers. (Hydrocharitaceae). <i>Ecological Research</i> , 16: 687-695.	1. During the survey we occasionally observed insects (flies, water spiders, beetles and bumble bees) visiting the showy flowers of <i>O. alismoides</i> (autogamy has been repeatedly confirmed, as well).
6.06	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177. 2. Chen, Y et al. 2008. Genetic diversity of the threatened aquatic plant <i>Ottelia alismoides</i> in the Yangtze River. <i>Aquatic Botany</i> , 88: 10-16.	1. There are no perennating organs or specialized means of vegetative propagation such as offsets, hibernacula, stolons or fragmenting rhizomes. However, it is usually found loosely rooted in mud, and it is not unusual to see numerous uprooted plants floating just below the surface; it is not known if this is a natural phenomenon or caused by disturbance but, nevertheless, these floating plants often continue to flower and develop fruits. 2. This species lacks specialized organs for vegetative reproduction and the recruitment and expansion of its population solely depends on the sexual reproduction.
6.07	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. <i>Ottelia alismoides</i> is often found in bodies of water that naturally dry out each year or are artificially drained at regular intervals; under these conditions it maintains itself as an annual.
7.01	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. it is not unusual to see numerous uprooted plants floating just below the surface; it is not known if this is a natural phenomenon or caused by disturbance but, nevertheless, these floating plants often continue to flower and develop fruits.
7.02	1. Philippine Medicinal Plants, http://stuartxchange.com/Kalabua.html . 20 February 2014. 2. Sosef, M.S.M. & van der Maesen, L.J.G., 1997. <i>Ottelia alismoides</i> (L.) Persoon [Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 19-Feb-2014.	1. It is used as aquariums/pond plants. 2. The plants are used to improve the water quality in fish ponds by capturing floating mud particles. The petioles and leaves are eaten as a vegetable with excellent flavour, the leaves are used in Thailand for seasoning rice. The fruit is also edible. The plant is used in topical treatment of haemorrhoids, and applied as a poultice against fever. It is also grown as an aquarium plant.

7.03		There is a possibility of <i>O. alismoides</i> propagules to be dispersed as a produce contaminant because it can be found in rice fields and the size of the seed is quite small, only 1.2–1.6 mm long and 0.6–0.8 mm wide.
7.04	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. Based on the behavior of the pulpy mass of dissepiments and seeds, which is eventually released from the open capsule and floats to the surface. If undisturbed the seeds drop out of the pulp and sink.
7.05	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. The pulpy mass of dissepiments and seeds is eventually released from the open capsule and floats to the surface. If undisturbed the seeds drop out of the pulp and sink.
7.06		No evidence found.
7.07		No morphological descriptions that would suggest propagules could be temporarily attached to an animal.
7.08	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. Cook noticed that the pulpy mass of dissepiments and seeds is very attractive to fish, and it is usually picked to pieces and eaten before the capsule is fully open. It is likely that many seeds are eaten by fish but it is not known if this affects their germination.
8.01	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. Seeds: numerous, up to 2000 or more in each fruit.
8.02	1. Yin, L et al. 2009. Cold stratification, light and high seed density enhance the germination of <i>Ottelia alismoides</i> . <i>Aquatic Botany</i> , 90: 85-88. 2. Yin, L et al. 2013. The effect of temperature, substrate, light, oxygen availability and burial depth on <i>Ottelia alismoides</i> seed germination. <i>Aquatic Biology</i> , 111: 50-53.	1. In the present study, seed of <i>O. alismoides</i> require light for germination. This characteristic is in favor of forming persistent seed banks and then adapted to unstable environments such as rice fields and irrigation ponds that are subject to water-level fluctuations and drying out. 2. Limited germination of buried seeds may result in persistent seedbanks. However, whether <i>O. alismoides</i> forms a persistent seedbank is yet unknown.
8.03	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. <i>O. alismoides</i> was eliminated in California in 1977 by spraying with Diuron (Turner, 1980).
8.04	1. Cook, CDK & K Urmi-König. 1984. A revision of the genus <i>Ottelia</i> (Hydrocharitaceae). 2. The species of Eurasia, Australasia and America. <i>Aquatic Botany</i> , 20: 131-177.	1. it is not unusual to see numerous uprooted plants floating just below the surface; it is not known if this is a natural phenomenon or caused by disturbance but, nevertheless, these floating plants often continue to flower and develop fruits.
8.05		No evidence found.