

Taxon: <i>Abutilon grandifolium</i>	Family: Malvaceae
Common Name(s): hairy abutilon Royal ilima	Synonym(s): <i>Abutilon molle</i> Sweet <i>Sida grandifolia</i> (basionym) <i>Sida mollis</i>

Assessor: Assessor	Status: Assessor Approved	End Date: 24 Sep 2014
WRA Score: 10.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Tropical, Shrub, Naturalized, Disturbance Weed, Pathogen Host

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
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	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
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		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	y
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
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		
604	Self-compatible or apomictic		
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	y
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	n
705	Propagules water dispersed	y=1, n=-1	y
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). Prota 16: Fibras/Plantes à fibres. [CD-Rom]. PROTA, Wageningen, Netherlands	[No evidence of domestication] "Although <i>Abutilon grandifolium</i> has been cultivated in Mozambique as a potential fibre crop, very little information is available on the properties of the fibre as well as on other uses made of the plant in tropical Africa. Therefore it is difficult to assess the potential of this plant."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 23 Sep 2014]	"Native: SOUTHERN AMERICA Brazil: Brazil Western South America: Bolivia; Peru Southern South America: Argentina; Paraguay; Uruguay"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed]	

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). Prota 16: Fibres/Plantes à fibres. [CD-Rom]. PROTA, Wageningen, Netherlands	[Elevation range does not exceed 1000 m in tropical Africa] " <i>Abutilon grandifolium</i> occurs at 500–1400 m altitude, along rivers, in wasteland and as a weed in cultivation."
	Dave's Garden. 2014. PlantFiles: Hairy Indian Mallow - <i>Abutilon grandifolium</i> . http://davesgarden.com/guides/pf/go/52985/ . [Accessed 23 Sep 2014]	USDA Hardiness Zones: 8a-10b

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). Prota 16: Fibres/Plantes à fibres. [CD-Rom]. PROTA, Wageningen, Netherlands	" <i>Abutilon grandifolium</i> is native to South America. It is cultivated in the tropics and has widely become naturalized. Countries where the species is recorded in tropical Africa include Cape Verde, Senegal, Burkina Faso, Mali, Mozambique and Réunion."
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Naturalized on all the main Hawaiian Islands

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). Prota 16: Fibres/Plantes à fibres. [CD-Rom]. PROTA, Wageningen, Netherlands	" <i>Abutilon grandifolium</i> is native to South America. It is cultivated in the tropics and has widely become naturalized."

301	Naturalized beyond native range	y
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). Prota 16: Fibres/Plantes à fibres. [CD-Rom]. PROTA, Wageningen, Netherlands	" <i>Abutilon grandifolium</i> is native to South America. It is cultivated in the tropics and has widely become naturalized. Countries where the species is recorded in tropical Africa include Cape Verde, Senegal, Burkina Faso, Mali, Mozambique and Réunion."
	Verloove, F., & Sánchez Gullón, E. 2008. New records of interesting xenophytes in the Iberian Peninsula. <i>Acta Botanica Malacitana</i> 33: 147-167	" <i>Abutilon grandifolium</i> , a native of South America, is more or less established in the surroundings of Cádiz (Paiva & Nogueira 1993). It is fully naturalized in the Canary Islands (Hohenester & Welss, 1993). The present record near Barcelona (probably only ephemeral) apparently is the first for Catalonia (Casasayas I Fornell, 1989)."

Qsn #	Question	Answer
	Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. 1988. Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand	"Perennial shrub to 1-(2) m high. Stems densely clothed in stellate hairs and with long erect simple hairs at least above. Lvs densely clothed in fine stellate hairs, velvety to touch, lighter green below, broadly ovate, acute to acuminate, cordate to almost sagittate at base, not lobed, irregularly serrate, 4-15 cm long; petioles 2-12 cm long; stipules oblong, 5-15 mm long, often deciduous. Fls axillary and solitary or 2-4 (rarely more) in irregular axillary infls; fruiting peduncles 2-7 cm long; calyx shallowly campanulate; calyx teeth much > tube, ovate-triangular, acute to acuminate, densely clothed in stellate hairs, somewhat recurved at fruiting; petals orange-yellow, 15-20 mm long. Cells c. 10 per fr., covered in fine stellate hairs and with long stellate hairs particularly along the ridged back; dorsal apical angle shortly awned. Seeds brown, hairy, particularly on back, 2-3 mm diam. FL Jan-Apr. N.: known from Auckland City only. "
	Tassin, J., Riviere, J.-N., Cazanove, M. & Bruzzese, E. 2006. Ranking of invasive woody plant species for management on Reunion Island. Weed Research, 46(5): 388-403	"Table 1 Woody non-indigenous plants to Reunion Island and their invasive status" [Abutilon grandifolium = known as a coloniser in Reunion Island]
	Queensland Government. 2014. Weeds of Australia - Hairy Indian mallow. <i>Abutilon grandifolium</i> . http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Abutilon_grandifolium.htm . [Accessed 23 Sep 2014]	"Widely naturalised in eastern Australia (i.e. in south-eastern Queensland and in many parts of eastern and southern New South Wales). Also naturalised near Perth in south-western Western Australia, sparingly naturalised in Victoria, and naturalised on Norfolk Island. Naturalised overseas in New Zealand and on some Pacific islands (e.g. Niue, French Polynesia and Hawaii)."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Naturalized on all the main Hawaiian Islands

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Queensland Government. 2014. Weeds of Australia - Hairy Indian mallow. <i>Abutilon grandifolium</i> . http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Abutilon_grandifolium.htm . [Accessed 23 Sep 2014]	"Hairy Indian mallow (<i>Abutilon grandifolium</i>) is regarded as a minor environmental weed or potential environmental weed in south-eastern Queensland and eastern New South Wales. This garden escape is a relatively common weed of waste areas, disturbed sites, roadsides and drains, but is also an occasional weed of disturbed and undisturbed natural ecosystems (e.g. tall shrublands, grasslands and riparian areas)."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"naturalized in waste areas, fields, and along roadsides, especially in arid regions..." ... "now a widespread tropical weed"

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Not reported to reduce crop yields or increase costs] "naturalized in waste areas, fields, and along roadsides, especially in arid regions"
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
304	Environmental weed	
	Source(s)	Notes
	Queensland Government. 2014. Weeds of Australia - Hairy Indian mallow. <i>Abutilon grandifolium</i> . http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Abutilon_grandifolium.htm . [Accessed 23 Sep 2014]	[Potential or minor environmental weed] "Hairy Indian mallow (<i>Abutilon grandifolium</i>) is regarded as a minor environmental weed or potential environmental weed in south-eastern Queensland and eastern New South Wales. This garden escape is a relatively common weed of waste areas, disturbed sites, roadsides and drains, but is also an occasional weed of disturbed and undisturbed natural ecosystems (e.g. tall shrublands, grasslands and riparian areas)."

305	Congeneric weed	y
	Source(s)	Notes
	Warwick, S. I., & Black, L. D. 1988. The Biology of Canadian Weeds.: 90. <i>Abutilon theophrasti</i> . Canadian Journal of Plant Science, 68(4), 1069-1085	" <i>Abutilon theophrasti</i> Medic. (velvetleaf) forms extensive weed infestations in all major maize and soybean growing areas of Ontario and Quebec. A review of the literature on the biology of the species is presented. Velvetleaf causes crop losses through competition, allelopathic effects and by hosting insect pests and pathogens of crops. Velvetleaf has a number of features which contribute to its success as a weed, including: the production of a large number of seeds that have high viability with prolonged dormancy and sporadic, continuous germination patterns; robust seedling vigor; and the ability to produce seed under competition. Because of sporadic germination patterns, control is difficult. Effective control measures include the application of pre-emergence and/or postemergence herbicides followed by cultivation and additional herbicide applications to control escapes and later flushes of germination. A triazine-resistant bio-type of velvetleaf has recently been reported from the northeastern United States. Key words: Velvetleaf, <i>Abutilon theophrasti</i> , weed biology."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Shrubs 1-2 (-3) m tall, stems, petioles, and pedicels stellate tomentose and pubescent with spreading, shiny, simple hairs up to 5 mm long. Leaf blades ovate to orbicular, 8-15 (-22) cm long, margins dentate, apex acuminate, base deeply cordate with lobes often overlapping, petioles 5-10 (-15) cm long."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Shrubs 1-2 (-3) m tall..." [Malvaceae]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	VanderWerf, E. A., Wood, K. R., Swenson, C., LeGrande, M., Eijzenga, H., & Walker, R. L. 2007. Avifauna of Lehua Islet, Hawai'i: Conservation Value and Management Needs. Pacific Science, 61(1): 39-52	[Probably palatable to rabbits] "Some of the <i>Pluchea indica</i> and <i>Abutilon grandifolium</i> shrubs used for nesting showed evidence of gnawing, probably from feral rabbits."
	WRA Specialist. 2014. Personal Communication	Palatability to other browsing animals unknown

405	Toxic to animals	n
	Source(s)	Notes
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	y
	Source(s)	Notes
	Gardner, D. E. 1996. Rust and smut fungi of Hawai'i: an annotated host index on angiosperms and ferns. Technical Report 100. Cooperative National Park Resources Studies Unit, University of Hawaii at Manoa, Honolulu, HI	" <i>Abutilon grandifolium</i> (hairy abutilon; ma`o" ... Like <i>P. malvacearum</i> , <i>P. heterospora</i> may be found on a number of hosts of the Malvaceae in Hawai'i, including 'ilima and species of <i>Abutilon</i> . <i>Puccinia heterospora</i> produces conspicuous, sometimes large [3/8 inch (1 cm)] blotch-like dark lesions on both leaf surfaces, but often more . prevalent on the undersurface. The lesions appear powdery in texture as a result of the teliospore masses. Teliospores are unusual in morphology, with the two cells delimited by a more or less vertical septum as an extension of the pedicel such that the cells are oriented side by side rather than one distal to the other divided by a horizontal septum as is usually the case. Another unusual feature is the production of mesospores, which are modified, thick-walled one-celled teliospores. In some collections of <i>P. heterospora</i> , mesospores are more numerous than are conventional teliospores, or even are present exclusively of the typical two-celled teliospores. The latter situation makes microscopic recognition of the spore state confusing if one is not familiar with mesospores. Infection with <i>P. heterospora</i> may resemble that with <i>P. malvacearum</i> on hosts such as 'ilima which may be infected with either rust. The rust species on hosts of the Malvaceae are best distinguished from one another by microscopic characteristics. (Gardner and Hodges, 1989)"

Qsn #	Question	Answer
	Nelson, S. 2013. Rusts of 'Ilima (<i>Sida fallax</i>). PD-97. College of Tropical Agriculture and Human Resources (CTAHR), University of Hawai'i, Honolulu, HI. ctahr.hawaii.edu	[<i>Abutilon molle</i> = <i>Abutilon grandifolium</i>] "Several malvaceous species endemic to Hawai'i are hosts to nonnative rust fungi. These fungi attack the plant's leaves, causing spots, curling, chlorosis, blights, and defoliation. These pathogens may have entered Hawai'i on weedy hosts in this plant family. Some important indigenous Hawaiian hosts include <i>Abutilon grandifolium</i> (hairy abutilon; ma'o) ..." ... "Destroy common mallow weeds such as <i>M. parvifolia</i> (cheese weed) or <i>Abutilon molle</i> (hairy abutilon) in the vicinity. They may be the source of the disease." ... "Rust symptoms on the upper (left) and lower (right and below) leaf surfaces of hairy abutilon (<i>Abutilon molle</i>), a malvaceous weed that grows in semi-moist pastures and rangelands below 3,500 ft (1,066 m). These weeds should be destroyed to manage the rust on economic hosts, such as 'ilima."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Quattrocchi, U.. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Medicinal uses. No reports of toxicity] "Used in Sidha. Seeds for cough. Leaves decoction and infusion for snakebites, insect sting, juice from the flowers, external use; leaves mucilaginous demulcent. Roots for eye diseases, leprosy, an infusion cooling."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Occurs in fire prone areas. May contribute some biomass to wildland fires] "naturalized in waste areas, fields, and along roadsides, especially in arid regions..."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Kartuz Greenhouses. 2014. <i>Abutilon grandifolium</i> . http://www.kartuz.com/pc/69142/7RFPA/Abutilon+grandifolium.html . [Accessed 23 Sep 2014]	"Grows to about 6 feet high in sun or part shade with one inch golden flowers."
	Tropical Species Database. 2014. <i>Abutilon grandifolium</i> . http://tropical.theferns.info/viewtropical.php?id=Abutilon+grandifolium . [Accessed 23 Sep 2014]	"Plants in this genus generally require a position in full sun or part day shade, and a fertile well drained soil[200]."
	Dave's Garden. 2014. PlantFiles: Hairy Indian Mallow - <i>Abutilon grandifolium</i> . http://davesgarden.com/guides/pf/go/52985/ . [Accessed 23 Sep 2014]	"Sun Exposure: Full Sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	

Qsn #	Question	Answer
	Source(s)	Notes
	Plant This. 2014. <i>Abutilon grandifolium</i> . http://plantthis.com/plant-information.asp?gardener=24733 . [Accessed 23 Sep 2014]	"Soil Moisture: dry between watering to constantly moist Soil: ordinary soil, enriched soil, mildly acidic to mildly alkaline"
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Widely distributed in Hawaiian Islands. Possibly indicates tolerance of many soil types] "in Hawai'i, naturalized in waste areas, fields, and along roadsides, especially in arid regions, from near sea level up to 600 (-1,075) m"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Shrubs 1-2 (-3) m tall, stems, petioles, and pedicels stellate tomentose and pubescent with spreading, shiny, simple hairs up to 5 mm long. Leaf blades ovate to orbicular, 8-15 (-22) cm long, margins dentate, apex acuminate, base deeply cordate with lobes often overlapping, petioles 5-10 (-15) cm long."

412	Forms dense thickets	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence in Hawaiian Islands] "naturalized in waste areas, fields, and along roadsides, especially in arid regions, from near sea level up to 600 (-1,075) m"
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI	[No evidence of thicket formation] "A weed in semi-moist pastures and rangelands below 3,500 feet."

501	Aquatic	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Terrestrial] "naturalized in waste areas, fields, and along roadsides, especially in arid regions, from near sea level up to 600 (-1,075) m"

502	Grass	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Malvaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Malvaceae

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Shrubs 1-2 (-3) m tall, stems, petioles, and pedicels stellate tomentose and pubescent with spreading, shiny, simple hairs up to 5 mm long. Leaf blades ovate to orbicular, 8-15 (-22) cm long, margins dentate, apex acuminate, base deeply cordate with lobes often overlapping, petioles 5-10 (-15) cm long."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). Prota 16: Fibres/Plantes à fibres. [CD-Rom]. PROTA, Wageningen, Netherlands	"In view of its wide distribution and occurrence in disturbed habitats, <i>Abutilon grandifolium</i> is not threatened by genetic erosion."

602	Produces viable seed	y
	Source(s)	Notes
	Dave's Garden. 2014. PlantFiles: Hairy Indian Mallow - <i>Abutilon grandifolium</i> . http://davesgarden.com/guides/pf/go/52985/ . [Accessed 23 Sep 2014]	"Propagation Methods: From seed; direct sow outdoors in fall From seed; direct sow after last frost"
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Schizocarp dull black, broadly urceolate-truncate, 11-14 mm long, yellowish pubescent, mericarps usually 10, thick-walled and somewhat inflated, short-beaked dorso-ventrally. Seeds usually 3-6 per mericarp, blackish, reniform, 2-3 mm long, sparsely pubescent."

603	Hybridizes naturally	
	Source(s)	Notes
	Mansker, M. L. & Yuh, P. 2008. Final Implementation Plan For Oahu Training Areas: Schofield Barracks Military Reservation, Schofield Barracks East Range, Kawaihoa Training Area, Kahuku Training Area, and Dillingham Military Reservation. United States Army Garrison, Hawaii Directorate of Public Works Environmental Division, Schofield Barracks, HI	" <i>Abutilon grandifolium</i> is a weedy naturalized species of <i>Abutilon</i> that commonly occurs in <i>A. sandwicense</i> habitat. No putative hybrids between the two species have been reported to date. The potential for hybridization between the two species is not known."

604	Self-compatible or apomictic	
	Source(s)	Notes
	De Nettancourt, D. 2001. Incompatibility and Incongruity in Wild and Cultivated Plants. Springer-Verlag, Berlin, Heidelberg, New York	[Unknown for <i>A. grandifolium</i>] "Table 1.4 Discovery of self-incompatibility. (de Nettancourt 1977)" ... "Effects of the environment of self-incompatibility" ... "Pseudocompatibility in <i>Abutilon darwinii</i> "

Qsn #	Question	Answer
605	Requires specialist pollinators	n
	Source(s)	Notes
	Dave's Garden. 2014. PlantFiles: Hairy Indian Mallow - <i>Abutilon grandifolium</i> . http://davesgarden.com/guides/pf/go/52985/ . [Accessed 23 Sep 2014]	"This plant is attractive to bees, butterflies and/or birds"

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Propagate by seed or cuttings."
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI	[No evidence of vegetative spread] "Propagation: By seed."

607	Minimum generative time (years)	1
	Source(s)	Notes
	College of Tropical Agriculture. 2002. Growing plants for Hawaiian lei: 85 plants for gardens, conservation, and business. University of Hawaii, HI	"Flowers in First Year: Yes Time to Flowering: some flower at 4-6 months; maturity after 12-18 months" [This book describes <i>Abutilon grandiflorum</i> as "naturalized in dry areas". The authors are probably referring to <i>A. grandifolium</i> , as <i>A. grandiflorum</i> is not known to be naturalized in the Hawaiian Islands]
	Plant This. 2014. <i>Abutilon grandifolium</i> . http://plantthis.com/plant-information.asp?gardener=24733 . [Accessed 23 Sep 2014]	"Growth rate: fast"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"naturalized in waste areas, fields, and along roadsides, especially in arid regions, from near sea level up to 600 (-1,075) m"

Qsn #	Question	Answer
702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). <i>Prota 16: Fibres/Plantes à fibres</i> . [CD-Rom]. PROTA, Wageningen, Netherlands	" <i>Abutilon grandifolium</i> is cultivated in the tropics as a fibre plant and as an ornamental. For instance in Mozambique it has been grown as a potential fibre crop. In Burkina Faso decoctions of leafy or fruiting stems are applied as enema for the treatment of measles, and the leaves and stems are used internally and externally for the treatment of insect bites."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"now a widespread tropical weed although sometimes cultivated as an ornamental or for fiber"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	No evidence and unlikely. Possible if growing as a weed near cultivated crops, but generally not cultivated intentionally with or near other crops in the Hawaiian Islands.

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No obvious morphological adaptations to wind dispersal] "Schizocarp dull black, broadly urceolate-truncate, 11-14 mm long, yellowish pubescent, mericarps usually 10, thick-walled and somewhat inflated, short-beaked dorso-ventrally. Seeds usually 3-6 per mericarp, blackish, reniform, 2-3 mm long, sparsely pubescent."

Qsn #	Question	Answer
705	Propagules water dispersed	Y
	Source(s)	Notes
	Achigan-Dako, E.G., 2010. <i>Abutilon grandifolium</i> (Willd.) Sweet. In: Brink, M. & Achigan-Dako, E.G. (Editors). Prota 16: Fibres/Plantes à fibres. [CD-Rom]. PROTA, Wageningen, Netherlands	[Distribution along rivers suggests possible dispersal by water] " <i>Abutilon grandifolium</i> occurs at 500–1400 m altitude, along rivers, in wasteland and as a weed in cultivation."
	Queensland Government. 2014. Weeds of Australia - Hairy Indian mallow. <i>Abutilon grandifolium</i> . http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Abutilon_grandifolium.htm . [Accessed 23 Sep 2014]	[Seeds likely moved by water along riparian corridors] "It is relatively common in riparian vegetation in some parts of south-eastern Queensland (e.g. along Enoggera Creek and Ithaca Creek in suburban Brisbane and along Tallebudgera Creek on the Gold Coast). However, it is often mistaken for some of the native mallows (<i>Abutilon</i> spp.), including Asian Indian mallow (<i>Abutilon auritum</i>) and straggly lantern-bush (<i>Abutilon oxycarpum</i>). This species has shown particularly invasive tendencies in the Enoggera catchment in northern Brisbane, where it has spread after being mistakenly introduced into revegetation areas. Hairy Indian mallow (<i>Abutilon grandifolium</i>) is also locally naturalised along creeks in the Sydney region, is a weed of the Pelican Creek catchment in the Lismore region in northern New South Wales, and has been recorded from disturbed shrubland, river flats and grasslands near Perth in south-western Western Australia."

706	Propagules bird dispersed	
	Source(s)	Notes
	Steenft, M. 1988. Flowering Plants in West Africa. Cambridge University Press, Cambridge, UK	[Species unknown] "The seeds of other capsules and follicles may be spread by a censer mechanism, but the seeds of some <i>Abutilon</i> spp. and <i>Hibiscus</i> spp. in Africa are reported to be distributed by birds, ..."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Singh, V., Pande, P.C. & Jain, D.K. 2007. Diversity and Systematics of Seed Plants. Rastogi Publications, New Delhi	[Species unspecified] "Ants help in dispersal of seeds in <i>Sida</i> and <i>Abutilon</i> ."

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Unknown, but fruit & seeds presumably not adapted for zoochory or internal dispersal] "Schizocarp dull black, broadly urceolate-truncate, 11-14 mm long, yellowish pubescent, mericarps usually 10, think-walled and somewhat inflated, short-beaked dorso-ventrally. Seeds usually 3-6 per mericarp, blackish, reniform, 2-3 mm long, sparsely pubescent.""

Qsn #	Question	Answer
801	Prolific seed production (>1000/m²)	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Unknown. Approximately 30-60 seeds per fruit (schizocarp). Plants with 17+ fruit could potentially produce 510-1020+ seeds per plant] "mericarps usually 10" ... "Seeds usually 3-6 per mericarp"

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 24 Sep 2014]	Unknown. Other <i>Abutilon</i> species possess orthodox seeds

803	Well controlled by herbicides	y
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Foliar application of 2% glyphosate to resprouting foliage effectively controls woody <i>Abutilon grandifolium</i>
	Motooka, P. 2000. Summaries of Herbicide Trials for Pasture, Range, and Non-Cropland Weed Control—1999. WC-5. College of Tropical Agriculture and Human Resources (CTAHR), University of Hawaii, Honolulu, HI. ctahr.hawaii.edu	Tebuthiuron was applied at a rate of 2/lb/a to the soil and controlled 75% of the <i>Abutilon grandifolium</i> in the plot.

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Woodier plants will resprout after repeated cutting without the application of herbicide to the stump or foliage.

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Widely distributed, with no apparent natural enemies effectively preventing its persistence" in Hawai'i naturalized in waste areas, fields, and along roadsides, especially in arid regions, from near sea level up to 600 (-1,075) m"

Summary of Risk Traits:

High Risk / Undesirable Traits

- Thrives in dry tropical climates
- Naturalized on all the main Hawaiian Islands, and naturalized elsewhere
- A disturbance-adapted weed
- A potential environmental weed in Australia
- Other *Abutilon* species have become invasive
- Alternative host of rusts of *Sida fallax*, and important lei plant in the Hawaiian Islands
- Produces seeds that may be intentionally or unintentionally dispersed, but that otherwise lack mechanisms for long distance dispersal
- Able to reach maturity in <1 year
- Able to resprout after cutting

Low Risk Traits

- A widespread weed, but impacts to natural environment either minimal or unspecified
- Unarmed (no spines, thorns or burrs)
- Used as a fiber plants in some parts of the world, and as a possible lei plant in the Hawaiian Islands
- Not reported to spread vegetatively
- Herbicides may provide effective control