Taxon: Oplismenus hirtellus (L.) P. Beauv. **Family:** Poaceae

Common Name(s): basket grass
bristle basket grass
honohono
woods grass

Synonym(s): Oplismenus hirtellus subsp. capensis
Oplismenus hirtellus subsp. hirtellus
Oplismenus hirtellus subsp. setarius

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 17 Nov 2020

WRA Score: 21.0 **Designation:** H(Hawai'i) **Rating:** High Risk

Keywords: Tropical Grass, Environmental Weed, Shade-Tolerant, Spreads Vegetatively, Sticky Seeds

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	?
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
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	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	y
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	y
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		
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	n

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Not domesticated] "Tropical Africa, Benin, Gabon, Swaziland, South Africa, Pacific, tropical America, Ecuador, Costa Rica, U.S., Florida, Hawaii. Perennial, variable, extremely polymorphic, very slender, flimsy, usually smooth, low, prostrate or procumbent and erect, trailing and scrambling, creeping, sometimes climbing, rooting at the nodes, internodes glabrous, sheaths glabrous with short hairs on the margin, ligule fringed and membranous, leaf blades with margins undulate, short leaves narrow-lanceolate and acuminate, racemes elongate densely arranged, spikelets glabrous and lanceolate, lower floret sterile, upper floret bisexual, lower glume awned, upper glume short-awned, small smooth grains, low grazing value, ornamental foliage, invasive species, a turf weed problem, a common weed in fields and in the St. Augustine grass lawns, coffee plantations, ground cover, occurs naturally in moist places and wet shady areas, in forest shade, wetlands, swamps, along streams, low hammocks, lowland tropical rainforest, disturbed forest, lower montane forest, subcanopy and forest margins, poor soils, silty clay loam soils, plantations in or near the forest, old clearings in forest, clearings in primary forest, open woods, rich woods, disturbed weedy forest, secondary forests"

102	Has the species become naturalized where grown?	
	Source(s)	**Notes**
	WRA Specialist. (2020). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	**Notes**
	WRA Specialist. (2020). Personal Communication	NA

Qsn #	Question	Answer
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, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 13 Nov 2020]	"Native Northern America NORTH-CENTRAL U.S.A.: United States [Oklahoma (s.e.)] SOUTHEASTERN U.S.A.: United States [Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina (s.e.), South Carolina] SOUTH-CENTRAL U.S.A.: United States [Texas] REGION: Mexico Southern America CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador NORTHERN SOUTH AMERICA: French Guiana BRAZIL: Brazil WESTERN SOUTH AMERICA: Bolivia, Colombia, Ecuador SOUTHERN SOUTH AMERICA: Argentina, Paraguay, Uruguay"

202	Quality of climate match data	High
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 13 Nov 2020]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	**Notes**
	Plant This. (2020). Oplismenus hirtellus. http://www.plantthis.com.au. [Accessed 17 Nov 2020]	"Hardiness zones: 9b-13"
	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	"naturalized in wet, shady areas on the larger islands here and may sometimes be cultivated as a ground cover in shaded, moist spots where other grasses will not thrive."
	Johnson, I. (2005). Oplismenus hirtellus. PlantZAfrica. SANBI. http://pza.sanbi.org/oplismenus-hirtellus. [Accessed 17 Nov 2020]	"Zone 1 Coastal summer rainfall, frost free Zone 5 Bushveld summer rainfall, Light 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.	[Elevation range <1000 m] "Common throughout the tropics; in Hawai'i naturalized and common in lightly shaded to densely shaded rnesic valleys and mesic forest, sometimes in disturbed wet forest, 10-920 m"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	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.	"Common throughout the tropics; in Hawai'i naturalized and common in lightly shaded to densely shaded rnesic valleys and mesic forest, sometimes in disturbed wet forest, 10-920 m, on all of the main islands except Ni'ihau and Kaho'olawe. First recorded in 1819 by Gaudichaud-Beaupre (St. John & Titcomb, 1983)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 16 Nov 2020]	"Native Northern America NORTH-CENTRAL U.S.A.: United States [Oklahoma (s.e.)] SOUTHEASTERN U.S.A.: United States [Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina (s.e.), South Carolina] SOUTH-CENTRAL U.S.A.: United States [Texas] REGION: Mexico Southern America CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador NORTHERN SOUTH AMERICA: French Guiana BRAZIL: Brazil WESTERN SOUTH AMERICA: Bolivia, Colombia, Ecuador SOUTHERN SOUTH AMERICA: Argentina, Paraguay, Uruguay"

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"In 1996 Ed Uebel discovered O. hirtellus subsp. undulatifolius in Patapsco Valley State Park and at Liberty Reservoir in Maryland (Kerrie Kyde, MD DNR, personal communication). The introduction and establishment of the subspecies in Hawaii is based on a review and assessment for the Records of the Hawaii Biological Survey for 2008 (Snow and Lau, 2008)."

301	Naturalized beyond native range	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.	"Common throughout the tropics; in Hawai'i naturalized and common in lightly shaded to densely shaded rnesic valleys and mesic forest, sometimes in disturbed wet forest, 10-920 m, on all of the main islands except Ni'ihau and Kaho'olawe. First recorded in 1819 by Gaudichaud-Beaupre (St. John & Titcomb, 1983)."

Qsn #	Question	Answer
	Snow, N. & Lau, A. 2010. Notes on grasses (Poaceae) in Hawai'i: 2. Bishop Museum Occasional Papers 107: 46–60	"Oplismenus hirtellus (L.) P. Beauv. New state record subsp. undulatifolius U. Scholz Scholz (1981) monographed the genus Oplismenus and recognized O. hirtellus subsp. hirtellus as occurring in Hawai'i. Although Wagner et al. (1999) did not recognize taxa at the infraspecific level, other authors (Zuloaga & Morrone 2003; Morales 2003) have followed Scholz (1981) by recognizing at least some infraspecific taxa. Recent review of Hawaiian material at BISH indicates a majority of collections represent the nominate subspecies; however, subsp. undulatifolius is now known from most of the large islands. Subspecies undulatifolius is separable from the typical subspecies by the presence of papillose-pilose hairs on the leaf sheaths (check younger sheaths) and (less frequently) the culms. The collections of Remy from the Big Island, and that of Andersson from O'ahu, suggest that this subspecies has been present in Hawai'i for over 150 years. The collections from Maui indicate the native name for this plant as honohono (or honohono maoli), which is used medicinally for cuts."

302	Garden/amenity/disturbance weed	
	Source(s)	**Notes**
	Yasalonis, A. (2018).Blogs: Basketgrass, A Common Landscape Weed. University of Florida IFAS Extension. http://blogs.ifas.ufl.edu. [Accessed 17 Nov 2020]	"Basketgrass is problematic in shady areas of the landscape where, once established, it can be difficult to eradicate. It is shade-tolerant, low-growing and can easily take over an area where turfgrass may be struggling. It requires little to no irrigation or maintenance and will create a dense groundcover if left alone."
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"invasive species, a turf weed problem, a common weed in fields and in the St. Augustine grass lawns, coffee plantations, ground cover"
	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	[Regarded as a lawn weed in some settings, and used as a shade tolerant grass in others] "naturalized in wet, shady areas on the larger islands here and may sometimes be cultivated as a ground cover in shaded, moist spots where other grasses will not thrive."

303	Agricultural/forestry/horticultural weed	y
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"a turf weed problem, a common weed in fields and in the St. Augustine grass lawns, coffee plantations, ground cover"
	Kifelew, H., Abera, H., Miteku, H., & Hailemichel, G. (2015). Weeds of Major Black Pepper (Piper Nigrum L.) and Cardamom (Eliteria Cardamom) Growing Area of South West Ethiopia. International Journal of Research Studies in Agricultural Sciences 1(5): 26-31	"The most frequent and dominant weed were Oplismenus hirtellus. This single species contributed up to 26.6% the infestation of weed in cardamom field at Benchmaji zone"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Pastures"

304	Environmental weed	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Erwin, T. L., & Young, T. P. (2010). A Native Besieged: Effects of Normative Frugivores and Ground Vegetation on Seed Removal in a Highly Endangered Hawaiian Shrub, Delissea rhytidosperma (Campanulaceae). Pacific Science, 64(1), 33-43	"At the study site, however, the understory cover is nearly 100% nonnative basket grass (Oplismenus hirtellus), a dense mat-forming grass. Such dense vegetation is likely to change the microenvironment near the soil and thus is likely to have an effect on the invertebrate community and may also provide cover for rodents. This dense grass species may also be a strong competitor of native trees at the seedling stage, but that was not the focus of this research. Our results suggest that this grass harbors smaller (invertebrate) frugivores and thus its presence contributes to the removal of fruits and seeds of susceptible native plants."
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	"Environmental impact: Displaces natives on forest floors and trailsides."
	Oppenheimer, H. L., Bustamente, K. M., & Perlman, S. P. (2014). A new species of Hibiscadelphus Rock (Malvaceae, Hibisceae) from Maui, Hawaiian Islands. PhytoKeys, 39: 65 -75	"Herbaceous understory weeds are similarly low in number of taxa but include serious habitat modifi ers such as Adiantum hispidulum Sw., Ageratina adenophora (Spreng.) R.M. King & H. Rob., A. riparia (Regel) R.M. King & H. Rob., Buddlea asiatica Lour., Erigeron karvinskianus DC., and Oplismenus hirtellus (L.) P. Beauv., all of which may hinder establishment of seedlings."
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"In old strawberry guava stands in mesic areas, there is no ground cover. In rain forest areas, Oplismenus hirtellus and Christella dentata dominate the ground cover."
	Westbrooks, R. G., Manning, S. T., & Waugh, J. D. (2014). Early detection and rapid response: a cost-effective strategy for minimizing the establishment and spread of new and emerging invasive plants by global trade, travel and climate change. Pp. 305-325 in Invasive Species and Global Climate Change. CABI, Wallingford, UK	"Once it becomes established, WLBG spreads rapidly through wooded natural areas – crowding out native herbaceous plants and preventing regeneration of native hardwood tree species. Unless it is soon eradicated completely, it will continue to spread and could have a devastating impact on the deciduous forests of eastern North America for many decades to come." [Wavyleaf basketgrass (WLBG) (Oplismenus hirtellus (L.) P. Beauv. subspecies undulatifolius (Ard.) Roem. & Schult.)]
	US Fish and Wildlife Service. (2015). Endangered and Threatened Wildlife and Plants; Endangered Status for 49 Species From the Hawaiian Islands; Proposed Rule. Federal Register Vol. 80, No. 189: 58820-58909	[Threatens endangered plants. Reported in this and other publications in the Federal Register] "Nonnative grasses that negatively impact the lowland wet ecosystem include Axonopus fissifolius (narrow-leaved carpetgrass), Cortaderia jubata (pampas grass), Ehrharta stipoides, Melinis minutiflora, Oplismenus hirtellus (basketgrass), Paspalum conjugatum, Sacciolepis indica (glenwood grass), Urochloa maxima, and U. mutica (TNC 1997, p. 10; Erickson and Puttock 2006, p. 270)" … "Nonnative grasses that negatively impact the wet cliff ecosystem include Axonopus fissifolius, Ehrharta stipoides, Melinis minutiflora, Oplismenus hirtellus, Paspalum conjugatum, and Setaria palmifolia (HBMP 2010)" … "Oplismenus hirtellus (basketgrass) is a perennial grass common through the tropics and now naturalized on all of the main Hawaiian Islands except Kahoolawe and Niihau (O'Connor 1999, p. 1565; Wagner et al. 2012, pp. 96–97). This species forms a dense ground cover, is sometimes climbing, and roots at the nodes, enabling its rapid spread. It also has sticky seeds that attach to animals and birds that results in its spread to new areas (O'Connor 1999, p. 1565; Johnson 2005, in litt.). This species displaces native plants on forest floors and trail sides, and occurs in lowland wet forest and cliffs (Motooka et al. 2003, in litt.; O'Connor 1999, p. 1565)."

Qsn #	Question	Answer
305	Congeneric weed	y
	Source(s)	**Notes**
	Mirghasemi, T., & Seraji, A. (2010). Basket grass (Oplismenus compositus) as a new host for tea root lesion nematode, Pratylenchus loosi. Iranian Journal of Plant Pathology, 46(1): 91-92	"Abstract : Tea root lesion nematode (Pratylenchus loosi Loof, 1960) is the most important damaging agent in tea gardens in the north of Iran. Many parts of tea plantations are infested by this nematode. Tea plant is the main host for this nematode and it has only been reported on the tea plant in Iran, however, other plants such as citrus, apple, pear, quince, grass and several weeds were reported as hosts for this nematode in other parts in the world. Having much spread and compatibility with tea bushes, weeds are very important in tea plantations. Almost 95 species of weeds have been reported in tea gardens until now. Among them Poaceae and Astraceae have much frequency. In this research 13 species of weeds which have the most abundance in tea gardens i.e. Oplismenus compositus, Convolvulus sepium, C. arvensis, Potentilla reptans, Anagalis arvensis, Erigeron canadensis, Paspalum dilatatum, P. disticum, Cyperus esculentus, Acalypha austrialis, Rubus fruticosas, Poa annua, Setaria viritis were examined from the viewpoint of being host for the tea root lesion nematode. Among examined weeds natural infectious to P. loosi was observed in basket grass (Oplismenus compositus) roots. The infested area was in Amalash region located at 50°06′26″N, 37°03′28″E and 132 m a.s.l. Final identification of the nematode was confirmed in Iranian Research Institute of Plant Protection. The mean population density was 70 nematodes per 3 g roots and the maximum population was observed at flowering stage. Basket grass is the annual or perennial plant from Poaceae with adventitious root and 10 species in the world. Basket grass is one of the most important weeds in tea plantations moreover main origin of this weed is Iran. The maximum vegetative growth of basket grass occurs in early summer and flowering in the months of May and June. Seed production is in September and October. O. compositus is the most frequent in the eastern parts of tea producing regions in Iran."
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[O. compositus] "invasive species, potential seed contaminant … weed, open areas, forest, in disturbed areas, plantations in or near the forest, taro plantation, scrub, in the fringes of gardens, lowlands, on moist soil in shady places, shaded woodland, in shady places under trees, gully"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Oplismenus compositus] "Weed of: Bananas, Orchards & Plantations, Potatoes, Vegetables"

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	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] "Perennials; culms decumbent, but flowering culms ascending, 2-4 dm long, glabrous or scabrous to short-pilose, nodes usually densely short-pilose. Sheaths glabrous or appressed pubescent, villous on margins, the surface sometimes hirsute, collar villous; ligule membranous, 0.6-0.8 mm long, truncate, margins with setae, 1-2 mm Jong; blades thin, lanceolate, usually somewhat asymmetrical at base, 5- 10 cm Jong, 8-17 mm wide, upper surface very sparsely hispid, lower surface hispid or glabrous, apex acuminate."

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. (2020). Personal Communication	Unknown. No direct evidence found

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.	"Perennials; culms decumbent, but flowering culms ascending, 2-4 dm long, glabrous or scabrous to short-pilose, nodes usually densely short-pilose." [Poaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"low grazing value"
	Odendaal, P. D. (1983). Feeding habits and nutrition of bush buck in the Knysna forests during winter. South African Journal of Wildlife Research 13(2), 27-31	"Yon Gadow (1970) briefly investigated the feeding habits of bushbuck in the Knysna forests. Shoots and leaves of trees, shrubs, herbs and ferns formed the greater part of their diet, but young grasses, especially Oplismenus hirtellus, and Cyperaceae were also consumed."

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

Qsn #	Question	Answer
406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	WRA Specialist. (2020). Personal Communication	Unknown

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	No evidence
	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	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. Unlikely given habitat] "Common throughout the tropics; in Hawai'i naturalized and common in lightly shaded to densely shaded rnesic valleys and mesic forest, sometimes in disturbed wet forest"
	Hitchcock, A. S. (1922). The Grasses of Hawaii. Memoirs of the Bernice Pauahi Bishop Museum Volume VIII, Number 3. Bishop Museum Press, Honolulu, HI	[No evidence. Unlikely given shaded, wet habitats] "Rain forest and shady slopes."

409	Is a shade tolerant plant at some stage of its life cycle	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.	"Common throughout the tropics; in Hawai'i naturalized and common in lightly shaded to densely shaded rnesic valleys and mesic forest, sometimes in disturbed wet forest, 10-920 m"
	Hitchcock, A. S. (1922). The Grasses of Hawaii. Memoirs of the Bernice Pauahi Bishop Museum Volume VIII, Number 3. Bishop Museum Press, Honolulu, HI	"Grasses are practically absent from the deep forest. Oplismenus hirtellus is a shade grass found in the mountains where the shade is not too deep. It is a creeping grass with lanceolate thin blades conspicuously different from the ordinary long, narrow leaves of most grasses." … "Rain forest and shady slopes."
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"occurs naturally in moist places and wet shady areas, in forest shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Platt Hill Nursery (2020). Variegated Basket Grass Oplismenus hirtellus 'Variegatus'. https://plants.platthillnursery.com. [Accessed 17 Nov 2020]	"It is not particular as to soil type or pH. "

Qsn #	Question	Answer
	Plant This. (2020). Oplismenus hirtellus. http://www.plantthis.com.au. [Accessed 17 Nov 2020]	"Soil Moisture: dry between watering to constantly moist Soil: ordinary soil, enriched soil, mildly acidic to mildly alkaline"
	Johnson, I. (2005). Oplismenus hirtellus. PlantZAfrica. SANBI. http://pza.sanbi.org/oplismenus-hirtellus. [Accessed 17 Nov 2020]	"Soil type: Sandy, Loam" … "PH: Acid, Neutral"

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.	"Perennials; culms decumbent, but flowering culms ascending, 2-4 dm long, glabrous or scabrous to short-pilose, nodes usually densely short-pilose."
	US Fish and Wildlife Service. (2015). Endangered and Threatened Wildlife and Plants; Endangered Status for 49 Species From the Hawaiian Islands; Proposed Rule. Federal Register Vol. 80, No. 189: 58820-58909	[Dense, smothering ground cover] "Oplismenus hirtellus (basketgrass) is a perennial grass common through the tropics and now naturalized on all of the main Hawaiian Islands except Kahoolawe and Niihau (O'Connor 1999, p. 1565; Wagner et al. 2012, pp. 96–97). This species forms a dense ground cover, is sometimes climbing, and roots at the nodes, enabling its rapid spread."
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	[Smothering ground cover] "Environmental impact: Displaces natives on forest floors and trailsides."

412	Forms dense thickets	n
	Source(s)	**Notes**
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	[Dominates ground cover, but low growing, and doesn't form dense stands] "In old strawberry guava stands in mesic areas, there is no ground cover. In rain forest areas, Oplismenus hirtellus and Christella dentata dominate the ground cover."

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] "Common throughout the tropics; in Hawai'i naturalized and common in lightly shaded to densely shaded rnesic valleys and mesic forest, sometimes in disturbed wet forest, 10-920 m, on all of the main islands except Ni'ihau and Kaho'olawe."

502	Grass	y
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 13 Nov 2020]	Family: Poaceae Subfamily: Panicoideae Tribe: Paniceae Subtribe: Boivinellinae

503	Nitrogen fixing woody plant	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 13 Nov 2020]	Family: Poaceae Subfamily: Panicoideae Tribe: Paniceae Subtribe: Boivinellinae

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.	"Perennials; culms decumbent, but flowering culms ascending, 2-4 dm long, glabrous or scabrous to short-pilose, nodes usually densely short-pilose."

601	**Evidence of substantial reproductive failure in native habitat**	**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.	"Common throughout the tropics"

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"O. hirtellus subsp. undulatifolius produces racemes with 3-7 spikelets from August to November in North America. Its seeds can hold dormancy due to an impermeable membrane that must be scarified before a sufficient number of seeds can germinate. The seed coat may be breached after passing through the digestive system of animals, from insect activity, freezing temperatures, wind, rain, animal traffic or microbial activity in the soil. Seeds are somewhat freeze tolerant and may be viable in the soil seed bank for at least two years or more (USDA APHIS PPQ CPHST, 2009)."
	Johnson, I. (2005). Oplismenus hirtellus. PlantZAfrica. SANBI. http://pza.sanbi.org/oplismenus-hirtellus. [Accessed 17 Nov 2020]	"This grass is easy to grow in a mixture of loam, leaf mould, and sand. It may be propagated by runners, or from seed, which is freely produced and germinates readily."

603	**Hybridizes naturally**	
	Source(s)	**Notes**
	Chaudhary, J. D. (1983). Cytological investigations in three species of Oplismenus p. Beauv.(Gramineae). Cytologia, 48(2), 231-236	[Unknown. Hybridization may be possible in genus] "Pentaploid of O. burmannii was found to be an asynaptic taxon and has been discussed as a hybrid between O. burmannii (n=18) and O. compositus (n=27)."

604	**Self-compatible or apomictic**	

Qsn #	Question	Answer
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Possibly] "Reproduction in most Oplismenus species is likely apomictic; florets have both male and female parts (Scholz, 1981). Oplismenus subsp. undulatifolius are wind or self pollinated. USDA-APHIS research produced abundant fertile seeds of O. hirtellus subsp. undulatifolius from greenhouse grown plants that have little to no exposure to pollinators or wind (USDA-APHIS PPQ CPHST, 2009, USDA-APHIS PPQ PERAL, 2012)."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Reproduction in most Oplismenus species is likely apomictic; florets have both male and female parts (Scholz, 1981). Oplismenus subsp. undulatifolius are wind or self pollinated. USDA-APHIS research produced abundant fertile seeds of O. hirtellus subsp. undulatifolius from greenhouse grown plants that have little to no exposure to pollinators or wind (USDA-APHIS PPQ CPHST, 2009; USDA-APHIS PPQ PERAL, 2012)."
	Kellogg, E. A. 2015. The Families and Genera of Vascular Plants. Volume XIII. Flowering Plants. Monocots: Poaceae. Springer International Publishing, Switzerland	[Family description] "Most grasses are wind-pollinated. The tiny flowers, feathery stigmas, versatile anthers, and lack of nectar are all characteristic of the wind pollination syndrome, and anyone who suffers from hay fever is painfully aware of the large amount of grass pollen that may be airborne at some times of year."

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	US Fish and Wildlife Service. (2015). Endangered and Threatened Wildlife and Plants; Endangered Status for 49 Species From the Hawaiian Islands; Proposed Rule. Federal Register Vol. 80, No. 189: 58820-58909	"Oplismenus hirtellus (basketgrass) is a perennial grass common through the tropics and now naturalized on all of the main Hawaiian Islands except Kahoolawe and Niihau (O'Connor 1999, p. 1565; Wagner et al. 2012, pp. 96–97). This species forms a dense ground cover, is sometimes climbing, and roots at the nodes, enabling its rapid spread."
	Hitchcock, A. S. (1922). The Grasses of Hawaii. Memoirs of the Bernice Pauahi Bishop Museum Volume VIII, Number 3. Bishop Museum Press, Honolulu, HI	"Plants perennial, branching, creeping and rooting"

607	Minimum generative time (years)	1
	Source(s)	**Notes**
	Talley, S. (2010). Field observation, export review, and greenhouse experimentation of Oplismenus hirtellus subsp. undulatifolius. USDA APHIS PPQ CPHST, Ft. Collins, CO	"Seeds can germinate in a few days and it takes about 4 months for seedling to mature enough to produce viable seeds"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Michael, S., Flessner, M. & Barney, J. (2020). Identification of Virginia's Noxious Weeds. Virginia Cooperative Extension, Virginia Tech, Blacksburg & Virginia State University, Petersburg	"Seedheads have long, sticky awns that cling to boots, clothing, animals, and anything passing by"

702	Propagules dispersed intentionally by people	y
	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	"A native of tropical regions all over the world, Oplismenus hirtellus (Linnaeus) P. Beauvois, basket grass, or in Hawaiian honohono kukui or honohono maoli, is naturalized in wet, shady areas on the larger islands here and may sometimes be cultivated as a ground cover in shaded, moist spots where other grasses will not thrive."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	**Notes**
	USDA. (2012). Weed Risk Assessment for Oplismenus hirtellus (L.) P. Beauv. subsp. undulatifolius (Ard.) U. Scholz (Poaceae) – Wavyleaf basketgrass . United States Department of Agriculture Animal and Plant Health Inspection Service, Raleigh, NC	[Could probably also occur in Hawaiian Islands] "Oplismenus hirtellus subsp. undulatifolius is found in forested areas and can stick to timber and be transported during months when fruit is ripe (Kyde, 2010)."

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Non-biotic (wind, water) mechanisms of dispersal for O. hirtellus subsp. undulatifolius are not evident (USDA-APHIS PPQ PERAL, 2012)."
	Michael, S., Flessner, M. & Barney, J. (2020). Identification of Virginia's Noxious Weeds. Virginia Cooperative Extension, Virginia Tech, Blacksburg & Virginia State University, Petersburg	"Seedheads have long, sticky awns that cling to boots, clothing, animals, and anything passing by"

705	Propagules water dispersed	
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Non-biotic (wind, water) mechanisms of dispersal for O. hirtellus subsp. undulatifolius are not evident (USDA-APHIS PPQ PERAL, 2012)."
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Distribution along streams suggests movement by water] "occurs naturally in moist places and wet shady areas, in forest shade, wetlands, swamps, along streams"

Qsn #	Question	Answer
706	**Propagules bird dispersed**	
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Possibly externally dispersed] "There is on-going research into biotic modes of dispersal including but not limited to sticking to ground foraging birds, small rodents and deer."

707	**Propagules dispersed by other animals (externally)**	**y**
	Source(s)	**Notes**
	US Fish and Wildlife Service. (2015). Endangered and Threatened Wildlife and Plants; Endangered Status for 49 Species From the Hawaiian Islands; Proposed Rule. Federal Register Vol. 80, No. 189: 58820-58909	"Oplismenus hirtellus (basketgrass) is a perennial grass common through the tropics and now naturalized on all of the main Hawaiian Islands except Kahoolawe and Niihau (O'Connor 1999, p. 1565; Wagner et al. 2012, pp. 96–97). This species forms a dense ground cover, is sometimes climbing, and roots at the nodes, enabling its rapid spread. It also has sticky seeds that attach to animals and birds that results in its spread to new areas (O'Connor 1999, p. 1565; Johnson 2005, in litt.)."
	Michael, S., Flessner, M. & Barney, J. (2020). Identification of Virginia's Noxious Weeds. Virginia Cooperative Extension, Virginia Tech, Blacksburg & Virginia State University, Petersburg	"Seedheads have long, sticky awns that cling to boots, clothing, animals, and anything passing by"

708	**Propagules survive passage through the gut**	
	Source(s)	**Notes**
	WRA Specialist. (2020). Personal Communication	Could be grazed by animals, but viability of ingested seeds unknown

801	**Prolific seed production (>1000/m2)**	**y**
	Source(s)	**Notes**
	USDA. (2012). Weed Risk Assessment for Oplismenus hirtellus (L.) P. Beauv. subsp. undulatifolius (Ard.) U. Scholz (Poaceae) – Wavyleaf basketgrass . United States Department of Agriculture Animal and Plant Health Inspection Service, Raleigh, NC	"Rough calculations for plants in the field have been estimated at 1250 seeds/m2/yr (Kyde, 2012) and in greenhouse trials at 3,155 seeds/m2/yr (McCollum, 2012). Greenhouse grown plants have not been estimated to produce more than 5000 seeds/ m2/yr (Talley, 2010)."
	Shiels, A. B. (2010). Ecology and impacts of introduced rodents(Rattus spp. and Mus musculus) in the Hawaiian islands. PhD Dissertation. University of Hawaii, Honolulu, HI	[Low seed densities documented in this study] "APPENDIX C. Mean flower, fruit, and seed rain (No./m2/day) measured at Kahanahaiki, Oahu, from 20 June 2007-6 July 2010. Each value represents the average of 72 sampling periods (separated by ca. 2 weeks) during the three-year monitoring." [Oplismenus hirtellus - Seeds (No./m2/d) = 0.02]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Cordell, S., Ostertag, R., Rowe, B., Sweinhart, L., Vasquez-Radonic, L., Michaud, J., Cole, T. C., & Schulten, J. R. (2009). Evaluating barriers to native seedling establishment in an invaded Hawaiian lowland wet forest. Biological Conservation, 142(12), 2997-3004	"List of species found in seed traps and seed bank soil cores. Values represent the total number of seeds found in all eight plots." [Oplismenus hirtellus present in seed bank. Longevity of seed bank not specified]
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Seeds are somewhat freeze tolerant and may be viable in the soil seed bank for at least two years or more (USDA-APHIS PPQ CPHST, 2009)."

803	Well controlled by herbicides	y
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Chemical Control. Herbicide trials in Maryland, USA on chemical control of O. hirtellus subsp. undulatifolius using clethodim and glyphosate were effective. Both work well but clethodim is recommended as it is grass-specific and so it leaves behind the woodland wildflowers and the sedges (PCA-APWG, 2010). Current populations in Maryland and Virginia are still relatively small and eradication is still possible. Glyphosate has been found to work best late in the year, while grass inhibitors are more effective early in the season (ISSG, 2012)."
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	"Management: Probably sensitive to glyphosate."
	Westbrooks, R. G., Manning, S. T., & Waugh, J. D. (2014). Early detection and rapid response: a cost-effective strategy for minimizing the establishment and spread of new and emerging invasive plants by global trade, travel and climate change. Pp. 305-325 in Invasive Species and Global Climate Change. CABI, Wallingford, UK	"WLBG may be treated effectively with a 1–2% solution of Roundup® (glyphosate). Current populations in Maryland and Virginia are still relatively small and eradication is still possible. General weed killers such as Roundup® work best late in the year, while grass inhibitors such as Envoy Plus® (clethodim) are more eff ective early in the season."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	**Notes**
	CABI. (2020). Oplismenus hirtellus subsp. undulatifolius (wavyleaf basketgrass). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"In sites where O. hirtellus subsp. undulatifolius is established with indigenous species, manual removal of individual plants is the optimum method of control. PCA-APWG states: "Plants can be pulled by hand fairly easily anytime except when in bloom. If not in flower, pulled material can be left on-site to desiccate and disintegrate. If plants are flowering and the possibility of seeds exists, it is best to bag and remove pulled material. However, once the awns become sticky it is probably best to stop pulling or working in basketgrass infestation because of the likelihood of spreading seeds" (PCA-APWG, 2010)."
	Johnson, I. (2005). Oplismenus hirtellus. PlantZAfrica. SANBI. http://pza.sanbi.org/oplismenus-hirtellus. [Accessed 17 Nov 2020]	"It can be lightly mowed, but this is best done infrequently and with the lawnmower at the highest setting. As with all shade grasses, a large leaf area is essential to receive enough light for photosynthesis, so it will not survive if kept short."

Qsn #	Question	Answer
	Moore, N. A., Camac, J. S., & Morgan, J. W. (2019). Effects of drought and fire on resprouting capacity of 52 temperate Australian perennial native grasses. New Phytologist, 221(3), 1424-1433	[Killed by fire] "The 52 species in our study exhibited a spectrum of responses to fire, ranging from plants being killed outright to plant growth being stimulated. Six species in this study were highly sensitive to fire. These species are nonresprouters that recover from fire by seed stored in the soil; most are C3 species, commonly found in shaded, wet forests (Dryopoa dives, Tetrarrhena juncea, Oplismenus hirtellus, Dichelachne sieberiana) while a fifth (Walwhalleya proluta) is common in grassy wetlands."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	**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 of limiting biotic factors] "Common throughout the tropics; in Hawai'i naturalized and common in lightly shaded to densely shaded rnesic valleys and mesic forest, sometimes in disturbed wet forest, 10-920 m, on all of the main islands except Ni'ihau and Kaho'olawe."

Summary of Risk Traits:

High Risk / Undesirable Traits
• Grows, and able to spread, in regions with tropical climates
• Naturalized on main Hawaiian Islands, and elsewhere
• A weed of lawns, pastures, crops, and the natural environment
• Competes with and threatens native plants in the Hawaiian Islands
• Other species are invasive
• Shade-tolerant
• Tolerates many soil types
• Can form a smothering, dense ground cover
• Reproduces by seeds and vegetatively by stolons
• Reaches maturity in <1 year
• Seeds dispersed externally by sticking to clothing, fur, feathers or equipment
• Prolific seed production
• Seeds may persist in the soil for 2+ years

Low Risk Traits
• Valued as a shade-tolerant grass in some situations
• Unarmed (no spines, thorns, or burrs)
• Palatable to grazing animals, although may not be a preferred forage
• Non-toxic
• Herbicides provide effective control
• Can be controlled mechanically, and killed by fires