Taxon: Ophiopogon jaburan (Siebold) Lodd. et al. **Family:** Asparagaceae

Common Name(s): giant lilyturf
white lilyturf

Synonym(s): Slateria jaburan Siebold

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 12 Oct 2020

WRA Score: **-3.0** **Designation:** L **Rating:** Low Risk

Keywords: Temperate Herb, Tufted, Unarmed, Rarely Flowers, Vegetatively Propagated

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)	Low
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	n
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	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
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	y
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
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	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)		
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		
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	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
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		
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**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	[Cultivars exist, but not domesticated] "Cultivars: Ophiopogon jaburan (Sieb.) Lodd. 'Argenteo vittatus,' 'Aureovariegatus,' 'Caeruleus,' 'Variegatus,' 'Vittatus.' The foliage of these cultivars, with the exception of Caeruleus, is variegated. The leaves are longitudinally striped with white or yellow and green stripes. The variable variegated foliage usually makes it difficult to distinguish one cultivar from another. The cultivar Caeruleus has dark green leaves like the parent species and violet blue flowers."

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

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**Low**
	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 9 Oct 2020]	"Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Ryukyu Islands, Shikoku]"

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 9 Oct 2020]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	"Native to Japan, Korea, and Taiwan. Native habitats are primarily forests in coastal localities; ca. 5–50 meters elevation."
	Nurseries Caroliniana. (2020). Ophiopogon jaburan 'Vittatus'. https://nurcar.com/products/ophiopogon-jaburan-vittatus. [Accessed 9 Oct 2020]	"Zones 7-10"

204	**Native or naturalized in regions with tropical or subtropical climates**	**n**
	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 9 Oct 2020]	"Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Ryukyu Islands, Shikoku]"
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	"The Asian natives Liriope spicata, L. muscari, Ophiopogon jaburan, and O. japonicus have been reported to be naturalized at various localities in the USA; reports of O. jaburan have been based on misidentifications. The naturalized occurrence of two Liriope species in Texas is documented here: (1) L. spicata occurs abundantly in large colonies along a forested creek within a city park in Fort Worth (Tarrant Co.) and it has been collected from a bottomland hardwood forest in the Big Thicket National Preserve; (2) a large plant of L. graminifolia is growing in low woods in a city park in Euless (Tarrant Co.). A key, brief descriptions, and basic synonymy are provided for the naturalized species as well as for L. gigantea, O. intermedius, O. jaburan, and O. planiscapus, which also are sold and commonly cultivated in the USA." … "Native to Japan, Korea, and Taiwan. Native habitats are primarily forests in coastal localities; ca. 5–50 meters elevation."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Dave's Garden. (2020). Ophiopogon, Aztec Grass, Giant Lilyturf, Snakebeard, Variegated Mondo Grass 'Vitattus' - Ophiopogon jaburan. https://davesgarden.com/guides/pf/go/57864/. [Accessed 9 Oct 2020]	"This plant is said to grow outdoors in the following regions: Mobile, Alabama Tuscaloosa, Alabama Brooksville, Florida Deltona, Florida Hollywood, Florida Jacksonville, Florida Lakeland, Florida Miami, Florida Navarre, Florida Plant City, Florida Riverview, Florida Ruskin, Florida Spring Hill, Florida West Palm Beach, Florida Winter Haven, Florida New Orleans, Louisiana Batesville, Mississippi Cleveland, Ohio Vieques, Puerto Rico Johns Island, South Carolina Ladys Island, South Carolina Myrtle Beach, South Carolina Summerville, South Carolina Germantown, Tennessee Alvin, Texas Belton, Texas Bryan, Texas Houston, Texas Mc Kinney, Texas"

Qsn #	Question	Answer
	Deputy, J. & Hensley, D. (1998). Mondo Grass. Ornamentals and Flowers. OF-28. CTAHR, University of Hawaii, Honolulu, HI	[Cultivated in Hawaii] "Ophiopogon jaburan 'Variegatus', commonly called aztec grass, is similar to 'Silver Mist', with variegated snow-white-and-green foliage. However, its leaves are longer (about12–18 inches) and its tufts are larger than those of 'Silver Mist'." … "O. jaburan 'Evergreen Giant' is a very tall, upright, clumping species of mondo grass with light purple to white flowers. It has coarse, solid-green leaves 18–36 inches long, and the clumps may reach 12 inches in diameter. Because this is a larger clumping type, it is normally used not as a groundcover but rather in groups of two to five clumps for accent and to provide depth and variability to a landscape arrangement."

301	Naturalized beyond native range	n
	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 9 Oct 2020]	"Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Ryukyu Islands, Shikoku] Cultivated (also cult.)"
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	"The Asian natives Liriope spicata, L. muscari, Ophiopogon jaburan, and O. japonicus have been reported to be naturalized at various localities in the USA; reports of O. jaburan have been based on misidentifications."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Not naturalized in North America. See Nesom 2010] "Dispersed by: Humans References: United States of America-N-101, Japan-I-741, India-W-1977."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
305	**Congeneric weed**	
	Source(s)	**Notes**
	Gilman, E. F. (1999). Ophiopogon japonicus. Fact Sheet FPS-446. University of Florida, IFAS, Gainesville, FL. http://edis.ifas.ufl.edu. [Accessed 9 Oct 2020]	"Invasive potential: aggressive, spreading plant"
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	[Ophiopogon japonicus described as invasive, which apparently refers to its ability to spread vegetatively. Negative impacts are not specified in this publication] "Liriopogons are generally described as “clumping” or “spreading” in horticultural information but below-ground parts are almost never described. Unequivocally “spreading” or “colonial” forms, which sometimes are also termed “invasive,” are L. spicata, L. graminifolia, and Ophiopogon japonicus." … "Naturalized distribution in the USA: Alabama (fide Kartesz 2010). Diggs et al. (1999) noted that Ophiopogon japonicus in north central Texas is widely cultivated and persists and spreads vegetatively. A photo on the Bayou Preservation Association website <http://www.bayou preservation.org/> shows fruits of O. japonicus and the species is included among "The Invasive Exotic “Dirty Dozens” — presumably the photograph was taken of a naturalized plant somewhere in the bayou area around Houston in southeastern Texas but no documentation is provided. See Spaulding et al. (2010) for another photo of a fruiting plant of O. japonicus in a naturalized population. I have rarely seen fruits in cultivated plants."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Possibly. A few other species listed as naturalized and/or weedy. Detrimental impacts have not been corroborated

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	[No evidence] "Description: An acaulescent, sod-forming, perennial herb. Plants tufted, grasslike, 8-16 in.!2-4 dm high; roots stout, cordlike, not tuberous. Foliage dark green, fine to medium in texture. Leaves erect to arching, grasslike, smooth, narrowly linear, 18-24 in.! 4.5-6.0 m long, 0.4-0.5 in.!10-13 mm wide, margins smooth, long attenuate. Inflorescence racemose; flowers closely arranged in axillary fascicles, in short simple racemes on flattened stems, 9-15 in.!2.3-3.8 dm long; flowers usually nodding, white or white tinged with lilac, 0.5-0.9 in.! 13-23 mm long; perianth six-merous, segments separate; ovary inferior; fruit baccate, violet blue, oblong, about 0.25 in.! 6 mm long."

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

Qsn #	Question	Answer
403	**Parasitic**	**n**
	Source(s)	**Notes**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	"An acaulescent, sod-forming, perennial herb." [Asparagaceae. No evidence]

404	Unpalatable to grazing animals	y
	Source(s)	**Notes**
	Nurseries Caroliniana. (2020). Ophiopogon jaburan 'Vittatus'. https://nurcar.com/products/ophiopogon-jaburan-vittatus. [Accessed 12 Oct 2020]	"So far deer have avoided it even though they stripped Aucubas in the same vicinity."
	NC State Extension. (2020). Ophiopogon jaburan 'Vittatus'. https://plants.ces.ncsu.edu/plants/ophiopogon-jaburan-vittatus/. [Accessed 12 Oct 2020]	[Suggests plants may be unpalatable] "Resistance To Challenges: Deer Drought Rabbits"

405	Toxic to animals	
	Source(s)	**Notes**
	Plant Care Today. (2020). Mondo Grass Plant Care: How To Grow Ophiopogon jaburan. https://plantcaretoday.com/mondo-grass.html. [Accessed 12 Oct 2020]	[Possibly mildly toxic, but unlikely to be ingested] "While the plant isn't severely toxic, keep it away from children or pets which may attempt to chew on the grass-like leaves. Mondo grass has a low level of toxicity but may cause mild gastrointestinal distress when ingested."
	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

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Shoot Gardening. (2020). Ophiopogon jaburan (White lilyturf). https://www.shootgardening.co.uk/plant/ophiopogon-jaburan. [Accessed 12 Oct 2020]	"Specific pests Slugs Diseases Generally disease free"
	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	[Unknown, but possibly no] "Pest problems are few: scale insects, slugs, and snails may be troublesome from time to time."

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**
	Plant Care Today. (2020). Mondo Grass Plant Care: How To Grow Ophiopogon jaburan. https://plantcaretoday.com/mondo-grass.html. [Accessed 12 Oct 2020]	[Possibly mildly toxic, but unlikely to be ingested] "While the plant isn't severely toxic, keep it away from children or pets which may attempt to chew on the grass-like leaves. Mondo grass has a low level of toxicity but may cause mild gastrointestinal distress when ingested."

Qsn #	Question	Answer
	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

408	Creates a fire hazard in natural ecosystems	n
	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 12 Oct 2020]	[No evidence. An herb of temperate regions not known for frequent fires] "Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Ryukyu Islands, Shikoku]"
	Urban Tree Farm Nursery. (2020). Fire Resistant Shrubs. https://www.urbantreefarm.com/fire-resistant-shrubs.html. [Accessed 12 Oct 2020]	Ophiopogon jaburan included in list

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	"It is good in understory plantings in the shade of other ornamentals in border plantings." … "Moderate temperatures are required, and the plants thrive in full sun and light or medium shade. In addition to the dark green form, typical of the species, usually the cultivar Variegatus is most commonly available in the trade. The foliage of the green form is usually light green when plants are grown in full sun; shade-grown plants are usually dark green."
	Dave's Garden. (2020). Ophiopogon, Aztec Grass, Giant Lilyturf, Snakebeard, Variegated Mondo Grass 'Vitattus' - Ophiopogon jaburan. https://davesgarden.com/guides/pf/go/57864/. [Accessed 9 Oct 2020]	"Sun Exposure: Partial to Full Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Dave's Garden. (2020). Ophiopogon, Aztec Grass, Giant Lilyturf, Snakebeard, Variegated Mondo Grass 'Vitattus' - Ophiopogon jaburan. https://davesgarden.com/guides/pf/go/57864/. [Accessed 9 Oct 2020]	"Soil pH requirements: 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline)"
	Shoot Gardening. (2020). Ophiopogon jaburan (White lilyturf). https://www.shootgardening.co.uk/plant/ophiopogon-jaburan. [Accessed 12 Oct 2020]	"Soil type Clay, Loamy, Sandy Soil drainage Moist but well-drained, Well-drained Soil pH Acid, Neutral"

411	Climbing or smothering growth habit	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	"An acaulescent, sod-forming, perennial herb."

412	Forms dense thickets	n
	Source(s)	**Notes**
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	[No evidence] "Native to Japan, Korea, and Taiwan. Native habitats are primarily forests in coastal localities; ca. 5–50 meters elevation."

501	Aquatic	n
	Source(s)	**Notes**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	[Terrestrial] "An acaulescent, sod-forming, perennial herb."
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	[Terrestrial] "Native habitats are primarily forests in coastal localities; ca. 5–50 meters elevation."

502	Grass	n
	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 12 Oct 2020]	Family: Asparagaceae Subfamily: Nolinoideae Alternate family(ies): Convallariaceae, Liliaceae, Ruscaceae

503	Nitrogen fixing woody plant	n
	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 12 Oct 2020]	Family: Asparagaceae Subfamily: Nolinoideae Alternate family(ies): Convallariaceae, Liliaceae, Ruscaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	
	Source(s)	**Notes**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	"An acaulescent, sod-forming, perennial herb. Plants tufted, grasslike, 8-16 in.!2-4 dm high; roots stout, cordlike, not tuberous."
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	"Stolons absent or very short and vertically oriented. Roots with tuberous swellings."
	WRA Specialist. (2020). Personal Communication	Conflicting references state tuberous roots may be absent or present

Qsn #	Question	Answer
601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	[No evidence] "Native to Japan, Korea, and Taiwan. Native habitats are primarily forests in coastal localities; ca. 5–50 meters elevation."
	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 12 Oct 2020]	[No evidence] "Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Ryukyu Islands, Shikoku] Cultivated (also cult.)"

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Kondo, T., Takahashi, K., Fukai, S., Ishimoto, S., & Shimomura, T. (2003). Germination, method of seed storage, and growth of young seedlings of Ophiopogon jaburan Lodd. [Liliaceae]. Horticultural Research (Japan) 2 (4): 269-274	"Ophiopogon jaburan Lodd is an important ground cover plant. We investigated its seed germination, methods of seed storage, and the effects of fertilizer on seedling growth. Seeds collected in late December remained green, while seeds collected in January were blue. Both seed types hardly germinated at 10 deg C in an incubator, but showed germination percentages of 85% or more at 20-30 deg C. Therefore, seeds sown immediately after collecting did not emerge as seedlings until June outdoor. Intact seeds and depulped seeds retained their germinability for 1 month and 6 months, respectively, when stored at 4 deg C with humidity of 80% or more. When depulped seeds stored in moist sphagnum peat at 4 deg C were sown in the beginning of June, near the suitable temperature for germination, seedlings emerged simultaneously in the middle of July. The starting of emergence was promoted and seedlings grew to sufficient commercial size within a year, when the seeds were sown in a heated greenhouse at 15 deg C or more in February and the seedlings were subsequently transplanted in May after fertilizing with 50 mg or more nitrogen per individual. "
	Nurseries Caroliniana. (2020). Ophiopogon jaburan 'Vittatus'. https://nurcar.com/products/ophiopogon-jaburan-vittatus. [Accessed 9 Oct 2020]	"This accession looks like a giant form of our very familiar Liriope muscari 'Variegata,' but it differs in having much longer and wider leaves and white flowering spikes rather than purple, which gently recurve outward. These are followed by electric blue berries along the flowering scapes. One can plant the seed and many seedlings will also be variegated."

603	**Hybridizes naturally**	
	Source(s)	**Notes**
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	"Chromosome number variation appears to have originated in natural populations; I have not encountered any discussion or indication of hybridization involved in the production of cultivars."

604	**Self-compatible or apomictic**	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Lilianae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	"Jessop (1979) reports that Ophiopogon caulescens is self-fertile."
	He, T. H., Rao, G. Y., & You, R. L. (2000). Reproductive biology of Ophiopogon xylorrhizus (Liliaceae sl): an endangered endemic of Yunnan, Southwest China. Australian Journal of Botany, 48(1), 101-107	[Unknown. Another species in genus is autogamous with autonomous self pollination] "Reproductive biology of Ophiopogon xylorrhizus Wang et Tai was studied from 1995 to 1997 in Mengla County of Yunnan Province, Southwest China. The small, white or pale pink flowers with stigmas above anthers appeared from late March to early April in the study years, and produced abundant pollen, but no nectar. Pollen : ovule ratios were 17 185 ± 2175. Every flower opens only once and remains functional for 10–12 h. Pollen remains viable for the same period. During anthesis, flowers were visited only by single species of thrips (Taeniothrips sp., Thripidae). No airborne pollen grains were collected throughout the blooming season, indicating that flowers are not wind-pollinated. About 28% of stigmas of unopened flowers were found with germinated pollen grains and seed set took place in single flowers that were bagged at the bud stage, which indicated autogamy and autonomous self-pollination. Ovary walls ruptured 4–5 days after fertilisation, allowing seed production to occur. About 75% of ovules were fertilized and developed into young seeds, but only 12.5% developed into mature seeds in open pollination treatments. The remainder of ovules were aborted or destroyed by insects or animals during the long developmental phase from April to December. Individuals of O. xylorrhizus commonly produced a single inflorescence with 2–24 flowers (15.3 ± 6.5, n = 33), and 1–43 seeds (12.7 ± 6.7, n = 33) during the study period. Conservation management for this endangered species is urgently required and in situ conservation is probably the best method to conserve this species."

605	Requires specialist pollinators	
	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	[May be irrelevant if plants rarely flower] "Plants rarely flower in warm climates and as a result no seed is produced in Hawai'i."
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	[Possibly] "The occurrence of inferior to semi-inferior ovaries in Ophiopogon is viewed by Rudall (2002) as one among numerous multiple and independent origins of epigyny within monocots in general and Asparagales in particular, probably linked with the evolution of different pollination syndromes. As in Liriope, flowers of most taxa of Asparagales are hypogynous, the primitive condition; the predominantly epigynous to perigynous flowers of Ophiopogon are specialized."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Oakes, A. J. 1990. Ornamental Grasses and Grasslike Plants. Van Nostrand Reinhold, New York, New York	"Cultivation: Propagation is by plant division." [Can be vegetatively propagated, but under natural conditions, plants do not form horizontal stolons]

Qsn #	Question	Answer
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	"Elongating stolons usually are not formed in Liriope muscari and Ophiopogon jaburan, which are “caespitose” forms that increase and slowly spread by production of new shoots from lateral buds in the caudex crown." … "Stolons absent or very short and vertically oriented."

607	Minimum generative time (years)	2
	Source(s)	**Notes**
	Shoot Gardening. (2020). Ophiopogon jaburan (White lilyturf). https://www.shootgardening.co.uk/plant/ophiopogon-jaburan. [Accessed 12 Oct 2020]	"2-5 years To maturity"
	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	[May not flower in lower elevations] "Plants rarely flower in warm climates and as a result no seed is produced in Hawai'i. When the rare flowering specimen is seen, it has usually been recently moved into a garden shop for sale from a cooler climate, either from higher elevations in Hawai'i or from the mainland." [Generic description of all species cultivated in the Hawaiian Islands]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	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	[Fruits and seeds, if produced, lack means of external attachment] "Propagation is usually by division of clumps or removal of offshoots, with the new plugs watered moderately until established. Plants rarely flower in warm climates and as a result no seed is produced in Hawai'i."

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	[Cultivated in the Hawaiian Islands] "The following highly artificial key is intended to help identify various ophiopogons grown in Hawai'i, using vegetative material as much as possible." … "The cultivar 'Vittata' has pale green stripes and white edges on the young foliage, the older leaves gradually turning solid green."

703	Propagules likely to disperse as a produce contaminant	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	[No evidence, and fruits and seeds rarely produced in the Hawaiian Islands] "Propagation is usually by division of clumps or removal of offshoots, with the new plugs watered moderately until established. Plants rarely flower in warm climates and as a result no seed is produced in Hawai'i."

704	Propagules adapted to wind dispersal	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	"Fruits oblong, 10–15 mm long, violet-blue to dark violet at maturity. Seeds ellipsoid to oblong, (5–)8–14 mm long, white to deep blue at maturity."

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	[No evidence. Fleshy-fruited, and not identified as a primarily riparian species] "Fruits oblong, 10–15 mm long, violet-blue to dark violet at maturity. Seeds ellipsoid to oblong, (5–)8–14 mm long, white to deep blue at maturity. 2n = 36. Native to Japan, Korea, and Taiwan. Native habitats are primarily forests in coastal localities; ca. 5–50 meters elevation."

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	Nakanishi, H. (1996). Fruit Color and Fruit Size of Bird Disseminated Plants in Japan. Vegetatio, 123(2), 207-218	"Appendix 1. Ripe season, color and size of bird disseminated fruits in warm-temperate and cool temperate Japan" [Includes Ophiopogon jaburan]
	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	"Plants rarely flower in warm climates and as a result no seed is produced in Hawai'i. When the rare flowering specimen is seen, it has usually been recently moved into a garden shop for sale from a cooler climate, either from higher elevations in Hawai'i or from the mainland." [Generic description of all species cultivated in the Hawaiian Islands. If fruits are produced at higher elevations, seed dispersal by birds could theoretically occur]
	Nesom, G. L. (2010). Overview of Liriope and Ophiopogon (Ruscaceae) naturalized and commonly cultivated in the USA. Phytoneuron, 56, 1-31	[Fleshy-fruited and presumably adapted for frugivory. Fruit and seed size would be conducive for dispersal by birds] "Fruits oblong, 10–15 mm long, violet-blue to dark violet at maturity. Seeds ellipsoid to oblong, (5–)8–14 mm long, white to deep blue at maturity."

707	Propagules dispersed by other animals (externally)	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	[Fruits and seeds, if produced, lack means of external attachment] "Propagation is usually by division of clumps or removal of offshoots, with the new plugs watered moderately until established. Plants rarely flower in warm climates and as a result no seed is produced in Hawai'i."

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**
	Nakanishi, H. (1996). Fruit Color and Fruit Size of Bird Disseminated Plants in Japan. Vegetatio, 123(2), 207-218	[Presumably yes, if fruits and seeds are produced] "Appendix 1. Ripe season, color and size of bird disseminated fruits in warm-temperate and cool temperate Japan" [Includes Ophiopogon jaburan]

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	**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	"Plants rarely flower in warm climates and as a result no seed is produced in Hawai'i. When the rare flowering specimen is seen, it has usually been recently moved into a garden shop for sale from a cooler climate, either from higher elevations in Hawai'i or from the mainland." [Generic description of all species cultivated in the Hawaiian Islands]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Baskin, C.C. & Baskin, J.M. 2014. Seeds Ecology, Biogeography, and Evolution of Dormancy and Germination. Second Edition. Academic Press, San Francisco, CA	[Unknown, but seeds may be rarely produced in Hawaiian Islands] "Two general kinds of things must happen before seeds with MPD can germinate: (1) the embryo must grow (inside the seed) to a critical size, and (2) PD of the embryo must be broken. The secret to germinating seeds with MPD is to figure out what environmental conditions promote each event. In some species, embryo growth and dormancy break are promoted by the same environmental conditions, while in others they require different conditions." … "TABLE 10.17" [Ophiopogon jaburan - MPD*

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	Hoose, S. (2020). How to Kill Monkey Grass. https://homeguides.sfgate.com/kill-monkey-grass-22085.html. [Accessed 12 Oct 2020]	[Herbicides used to kill other species would likely be effective] "The easiest way to quickly kill monkey grass, whether it's a Liriope or an Ophiopogon, is to use a product containing glyphosate, generally Roundup. The product recommended by Roundup is Roundup Poison Ivy Plus Tough Brush Killer. Glyphosate attacks broad-leaved plants, which is why it's so effective on most weeds found in lawns; the slim blades of your typical lawn grasses are not affected if sprayed accidentally. To use Roundup, allow the offending plant to develop fully enough to display prominent leaves, because glyphosate enters the plant through its leaves. Do not mow the area just before you apply the herbicide. Wait for a sunny day, as rain will wash off the chemical and you will have wasted your time and money. In addition, avoid windy days or spraying next to any edible plants."
	WRA Specialist. (2020). Personal Communication	No evidence that this species is chemically controlled. Herbicides used to kill other species would likely be effective

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	GardenersHQ. (2020). How to Grow Ophiopogon Plants. https://www.gardenershq.com/Ophiopogon-Jaburan.php. [Accessed 12 Oct 2020]	"Tidy plant appearance by cutting back at the start of spring." [Possibly]

Qsn #	Question	Answer
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	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	[Unknown, but possibly no] "Pest problems are few: scale insects, slugs, and snails may be troublesome from time to time."

Summary of Risk Traits:

High Risk / Undesirable Traits
• Unpalatable to deer, rabbits and possibly other browsing animals
• Possibly mildly toxic
• Shade tolerant
• Tolerates many soil types
• Reproduces by seeds (in temperate climates), and by division
• Reaches maturity in 2 years
• Seeds, if produced, adapted for dispersal by birds and other frugivorous animals

Low Risk Traits
• No reports of invasiveness or naturalization
• Unarmed (no spines, thorns, or burrs)
• Not reported to spread vegetatively
• Rarely flowers, or produces seeds, in warmer climates, limiting chances for inadvertent dispersal
• Herbicides may provide effective control if needed