

Taxon: <i>Melinis repens</i> (Willd.) Zizka	Family: Poaceae
Common Name(s): blanketgrass Holme's grass Natal grass Natal redtop red Natal grass	Synonym(s): <i>Rhynchelytrum repens</i> (Willd.) C. E. Hubb. <i>Saccharum repens</i> Willd. <i>Tricholaena repens</i> (Willd.) Hitchc.

Assessor: Chuck Chimera	Status: Approved	End Date: 9 Jul 2024
WRA Score: 24.0	Designation: H(Hawai'i)	Rating: High Risk

Keywords: Annual or Perennial Grass, Environmental Weed, Fire Hazard, Prolific Seeder, Wind-Dispersed

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	y
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		
303	Agricultural/forestry/horticultural weed	y = 2*multiplier (see Appendix 2), n = 0	y
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	y
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	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		

Qsn #	Question	Answer Option	Answer
408	Creates a fire hazard in natural ecosystems	y = 1, n = 0	y
409	Is a shade tolerant plant at some stage of its life cycle	y = 1, n = 0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y = 1, n = 0	y
411	Climbing or smothering growth habit	y = 1, n = 0	n
412	Forms dense thickets	y = 1, n = 0	y
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	y = 1, n = -1	y
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	y
704	Propagules adapted to wind dispersal	y = 1, n = -1	y
705	Propagules water dispersed	y = 1, n = -1	n
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)	y = 1, n = -1	y
708	Propagules survive passage through the gut	y = 1, n = -1	y
801	Prolific seed production (>1000/m ²)	y = 1, n = -1	y
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	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
	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] "Native to Africa, now widely naturalized throughout the tropics"

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2024). 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
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Tropical and South Africa, Benin, Tanzania, Mozambique, Malawi, Namibia, Uganda, Zimbabwe, Saudi Arabia, Yemen, India."

202	Quality of climate match data	High
	Source(s)	Notes
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Tropical and South Africa, Benin, Tanzania, Mozambique, Malawi, Namibia, Uganda, Zimbabwe, Saudi Arabia, Yemen, India."

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 2 Jul 2024]	" <i>Melinis repens</i> is able to grow in tropical to subtropical climates at elevations from sea level up to 2000 m. It prefers areas with temperature ranging from 15° to 30°C (but tolerates 4°-38°C) and mean annual rainfall in the range 700-1500 mm (tolerates 500-2500 mm). This species endures temperatures as low as -6.6°C and survives as an annual in colder climates. It is adapted to a wide range of soil textures with pH 6-8. It does not tolerate shade, but is tolerant of moderate salinity and low annual rainfall and thus it is able to thrive in arid and semiarid habitats. It is also able to grow in soil contaminated with heavy metals (Langeland et al., 2008; AusGrass2, 2015; PIER, 2018)."
	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.	[Broad elevation range and environmental versatility in the Hawaiian Islands] "Native to Africa, now widely naturalized throughout the tropics; in Hawai'i naturalized in disturbed, usually dry areas, including urban and agricultural land, dry shrubland, dry forest, and subalpine forest, 0-1,950 m, on Midway Atoll and all of the main islands."

204	Native or naturalized in regions with tropical or subtropical climates	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.	"Native to Africa, now widely naturalized throughout the tropics; in Hawai'i naturalized in disturbed, usually dry areas, including urban and agricultural land, dry shrubland, dry forest, and subalpine forest, 0 -1,950 m, on Midway Atoll and all of the main islands. First collected on Hawai'i in 1903 (Carter s.n., BISH)"
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Tropical and South Africa, Benin, Tanzania, Mozambique, Malawi, Namibia, Uganda, Zimbabwe, Saudi Arabia, Yemen, India."

205	Does the species have a history of repeated introductions outside its natural range?	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	"cultivated fine ornamental grass widely naturalized elsewhere"
	Kaufman, S.R. & Kaufman, W. (2023). Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Third Edition, Revised and Updated. Stackpole Books, Essex, Connecticut	"Native to Africa and to the Arabian Peninsula, natal grass was grown in the southern United States as early as 1866 as an ornamental plant and was trialed by the U.S. Department of Agriculture as a forage grass from the 1870s until the first cultivar was released in 1892. The grass was planted on over 12,000 acres in Florida by 1915 as well as between rows of citrus trees. It is considered invasive in Hawaii and Australia as well."
	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.	"Native to Africa, now widely naturalized throughout the tropics"

301	Naturalized beyond native range	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.	"Native to Africa, now widely naturalized throughout the tropics; in Hawai'i naturalized in disturbed, usually dry areas, including urban and agricultural land, dry shrubland, dry forest, and subalpine forest, 0 -1,950 m, on Midway Atoll and all of the main islands. First collected on Hawai'i in 1903 (Carter s.n., BISH)"
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"This grass has become naturalized in many regions of the tropics. It spreads in open and dry forests, shrublands and agricultural land. In Hawaii it is found from 0- 1950 m altitude (Wagner et al., 1999). It displaces low-growing grasses and forbs and increases fire hazards by accumulating large amounts of dead biomass (Motooka et al., 2003)."

302	Garden/amenity/disturbance weed	
	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.	[A disturbance weed with negative environmental impacts] "in Hawai'i naturalized in disturbed, usually dry areas, including urban and agricultural land, dry shrubland, dry forest, and subalpine forest, 0-1,950 m, on Midway Atoll and all of the main islands."

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	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	"A pest in drier forests, roadsides, and agricultural lands. Environmental impact: Displaces low-growing natives; a fire hazard."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	" <i>Melinis repens</i> ... Weed of: Bananas, Cereals, Orchards and Plantations, Pastures" ... " <i>Rhynchelytrum repens</i> ... Weed of: Grapevines, Orchards & Plantations, Pastures, Vegetables"
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redbtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 8 Jul 2024]	" <i>Melinis repens</i> is considered a significant weed in small-scale cropping systems in northern Zambia (Åfors, 1994), in cotton fields in Brazil (Vieira et al., 1998) and in citrus groves in Florida, USA (Futch and Hall, 2004). It is listed as a 'serious' weed in Australia, Brazil and Ghana, and a 'principal' weed in Malaysia and Zambia (Holm et al., 1979)."

304	Environmental weed	y
	Source(s)	Notes
	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	"common throughout Hawai'i in dry to wet disturbed environments(70) . A pest in drier forests, roadsides, and agricultural lands. Environmental impact: Displaces low-growing natives; a fire hazard."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud. This grass has become naturalized in many regions of the tropics. It spreads in open and dry forests, shrublands and agricultural land. In Hawaii it is found from 0- 1950 m altitude (Wagner et al., 1999). It displaces low-growing grasses and forbs and increases fire hazards by accumulating large amounts of dead biomass (Motooka et al., 2003)."

Qsn #	Question	Answer
	Loope, L.L., Nagata, R.J. & Medeiros, A.C. (1992). Alien plants in Haleakala National Park Pp. 551-576 in Stone et al (eds) Alien plant invasions in native ecosystems of Hawaii. Coop. Nat. Park Resources Studies Unit, University of Hawaii, Honolulu, HI	"Rattail grass, <i>Sporobolus africanus</i> , and Natal redtop, <i>Rhynchelytrum repens</i> These grasses are abundant on leeward Haleakala at 3,000-6,000 ft (915-1830 m) as well as in pastures of lower Kipahulu. Currently, these two grass species make up much of the alien grass cover of western Kaupo Gap. They produce sufficient combustible material to carry wildfires once feral goats are controlled. Fire would enormously retard recovery of native shrubs and herbs. However, the threat of these grasses is considerably less than that presented by molasses grass."
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 8 Jul 2024]	"Six Hawaiian species growing on Lanai and/or Maui are threatened by <i>M. repens</i> because of its impact on fire frequency. Three of those species are on the IUCN Red list as endangered or critically endangered. The other species are listed as endangered in the USA or are proposed for listing (US Fish and Wildlife Service, 2012). One species in California (<i>Chorizanthe orcuttiana</i>) is also threatened by the ecosystem changes caused by <i>M. repens</i> (US Fish and Wildlife Service, 2007). Control of <i>M. repens</i> is being tested on the Lake Wales Ridge in Florida because the region is home to 30 threatened and endangered state or federally listed species (Florida Natural Areas Inventory, 2010)."
	Kaufman, S.R. & Kaufman, W. (2023). <i>Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species</i> . Third Edition, Revised and Updated. Stackpole Books, Essex, Connecticut	"WHAT IT DOES IN THE ECOSYSTEM Natal grass forms dense stands that can increase fire frequency, a fact that is very important in dry fire-prone areas of California and the Southwest. Little research has been done on its impact on early successional plant diversity. A patch of natal grass can have a dense layer of seeds on the ground up to 2 in."

305	Congeneric weed	y
	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	" <i>Melinis minutiflora</i> Beauv. (Molassesgrass) This spreading, perennial mat grass smothers everything around it. Once established, it forms monotypic stands from rooted runners. It is considered a good forage grass and therefore is not a candidate for biological control. The seeds are dispersed by wind. It is adapted to fire, and the dense mats are generally only partly consumed. Regeneration from the remaining portions is rapid, and colony expansion into adjacent burned areas generally follows."
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"Molasses grass reproduces by seeds and vegetatively by its creeping stems, rooting at nodes. Seeds are wind dispersed and also attach to animal fur and clothing. The species is a fast-growing fire-adapted C4 grass. Where it becomes invasive, it climbs over shrubs and forms dense and impenetrable mats up to 1.5 m deep on the floor, completely covering large areas and eliminating all native vegetation (Pivello et al., 1999a, 1999b). Plant and animal species richness is strongly reduced in such areas. The grass accumulates a large amount of dead biomass and increases fire hazards (Motooka et al., 2003; Hoffmann et al., 2004). An increased fire intensity caused by molasses grass and other alien grasses can lead to river-accompanying gallery forests diminishing in their area (Hoffmann et al., 2004). Altered fire regimes and extensive patches of molasses grass alter the geochemistry of soils in invaded habitats (Asner and Beatty, 1996). Molasses grass has the potential to transform seasonally dry forests on Hawaii into monospecific grasslands (D'Antonio et al., 2001). A number of cultivars have been developed from molasses grass. At least two cultivars exhibit similar invasive behaviour to the wild species (Martins et al., 2009). In the Brazilian cerrado, molasses grass transforms the savanna into a species-poor grassland (Hoffmann and Haridasan, 2008). The grass successfully competes with tree seedlings for light and suppresses their growth, ultimately eliminating woody plants from this ecosystem."

Qsn #	Question	Answer
	Loope, L.L., Nagata, R.J. & Medeiros, A.C. (1992). Alien plants in Haleakala National Park Pp. 551-576 in Stone et al (eds) Alien plant invasions in native ecosystems of Hawaii. Coop. Nat. Park Resources Studies Unit, University of Hawaii, Honolulu, HI	"Molasses grass, <i>Melinis minutiflora</i> After exclusion of feral goats from the lower elevations of Hawai'i Volcanoes National Park, this mat-forming grass spread explosively throughout formerly open goat-browsed areas, developing local populations with nearly 100% cover. A similar situation occurred on East Maui in the Healanı enclosure in goat-damaged koa forest at 4,000 ft (1,220 m) about 1.5 km south of the Haleakala National Park boundary. Within the enclosure, molasses grass developed dense mats that inhibited reproduction of koa and other native species (Scowcroft and Hobdy 1986). By 1988, after removal of feral goats from the Crater District of the Park, molasses grass had increased its biomass and distribution substantially in Kaupo Gap and on the western edge of the Manawainui planeze at 4,000-5,500 ft (1,220-1,680 m). The most critical aspect of the biology of this species is its ability to fuel, carry, and subsequently quickly recover from wildfires. Wildfires are one of the most serious threats to the long-term perpetuation of dryland forest on leeward Haleakala. Survival within the Park of such rare species as <i>Nothoctrum latifolium</i> , <i>Pelea hawaiiensis</i> , <i>Pouteria sandwicensis</i> , <i>Pleomele auwahiensis</i> , <i>Sanicula sandwicensis</i> , <i>Viola chamissoniana</i> , and <i>Zanthoxylum kauaense</i> is increasingly threatened as fuel increases. Experimental control of molasses grass with glyphosate was initiated at Haleakala in late 1990, with the hope of preventing the (unfortunate) scenario that occurred with molasses grass in the lowlands of Hawai'i Volcanoes from recurring in the middle elevations of the leeward Crater District of the Park. The outcome of this experimental control is still being evaluated as of April 1991."

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] "Annuals or perennials; culms loosely tufted, subcoriaceous, erect or ascending, 3-10 dm tall, often many-branched, glabrous. Sheaths 7-10(-20) cm long, the lower ones sometimes papillose-pilose; ligule densely ciliate, ca. 1 mm long; blades usually glaucous, flat or folded, 5-30 cm long, 2-10 mm wide, striate, upper surface scaberulous, lower surface glabrous. Panicles fluffy, glossy, pink or purple, color fading with age, ovoid to oblong, 5-20 cm long, branches ascending, 3-9 cm long, scaberulous, pedicels usually pilose in upper part; spikelets ovate, 2.5-8.5 mm long, villous, the hairs extending 1-4 mm beyond apex; first glume narrowly oblong, 0.3-3.5 mm long, pilose, separated from second glume by an internode 0.1-1.2 mm long, second glume chartaceous, conspicuously gibbous, tapering to a glabrous membranous beak V4-V2 the length of the glume, emarginate, mucronate, or with an inconspicuous awn up to 7(-10) mm long; first lemma narrower and less gibbous than second glume, first palea ciliate on the keel; second lemma ca. 2.5 mm long, short-stipitate, second palea similar to second lemma but thinner, pale green to white, smooth, glossy, 1.6-1.8 mm long, faintly 2-nerved, apex obtuse, awnless. Caryopsis pale brown, narrowly ovoid, 1.2-1.5 mm long, smooth."

402	Allelopathic	
	Source(s)	Notes
	Ishak, M. S., Ain, M. N., Sahid, I., & Mardiana-Jansar, K. (2021). Allelopathic screening of Malaysian noxious weeds and several medicinal plants as potential alleloherbicides. <i>Journal of Environmental Biology</i> , 42, 762-774	"Table 4 : Allelopathic activity (% inhibition of lettuce hypocotyl growth) based on 100 common weed species found in Malaysia using dish pack method" [Rhynchelytrum repens extracts demonstrate allelopathic effects]

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.	"Annuals or perennials; culms loosely tufted, subcoriaceous, erect or ascending, 3-10 dm tall, often many-branched, glabrous." [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	"fodder, hay, palatable but of low grazing value"
	Gutiérrez Gutiérrez, O. G., Morales Nieto, C. R., Villalobos González, J. C., Ruíz Barrera, O., Ortega Gutiérrez, J. Á., & Palacio Nuñez, J. (2019). Botanical composition and nutritive value of the diet consumed by cattle in an area invaded by natal grass [<i>Melinis repens</i> (Willd.) Zizka]. <i>Revista mexicana de ciencias pecuarias</i> , 10(1), 212-226	[Grazed, but less palatable than other species] "The objective was to evaluate the botanical composition and nutritional value in the diet of bovine cattle in areas invaded by natal grass [<i>Melinis repens</i> (Willd.) Zizka]. The research was conducted at the Salinas Ranch, in the municipality of Satevó, Chihuahua, in a brush grassland. Botanical composition of the area was determined by the line-point intercept method. Sampling was conducted from August 2013 to February 2014. The botanical composition of the diet (microhistological technique) and the nutritional value were determined using two esophageal-fistulated Hereford/Angus heifers (350 ± 5 kg). The data were subjected to a variance analysis, and the chemical composition of the diet was fitted using the PROC MIXED procedure of SAS to a mixed model. The average available forage during the four phenological stages was 1,279 kg DM ha ⁻¹ , with a presence of 87.5 % natal grass (1,119.13 kg DM ha ⁻¹). The highest preference indexes were for <i>Aristida divaricata</i> (8.43) and <i>Croton pottsii</i> (12.95) during the growing stage; whereas the least preferred species was <i>Melinis repens</i> (0.33 to 0.41). The highest crude protein content was observed during the growing (13.23 %) and flowering stages (10.71 %). During this study the best quality of the diet was determined during the growing and flowering stages and was mainly composed of <i>Melinis repens</i> during four stages."

405	Toxic to 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	"fodder, hay, palatable but of low grazing value" [No evidence]
	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] "grown for fodder, young plants palatable and tender, mature plants woody and tough"

406	Host for recognized pests and pathogens	
	Source(s)	Notes

Qsn #	Question	Answer
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 8 Jul 2024]	"Host of (source-data mining) Curvularia australiensis (leaf blight of grasses) Leifsonia xyli subsp. xyli (sugarcane ratoon stunting disease) Notes on Natural Enemies <i>Melinis repens</i> is often a host plant for the southern Florida grasshopper (<i>Achurum carinatum brevipenne</i>) (Bland, 1987). It has been reported to be attacked by larvae of <i>Atherigona orientalis</i> in Paraguay (FAO, 1972) and elsewhere is fed on by Rhodesgrass mealybug (<i>Antonina graminis</i>) (Filho and Silva, 1988). Within its native distribution range (i.e. South Africa) populations can be reduced by gerbils (<i>Tatera brantsii</i>) (Korn and Korn, 1989)."

407	Causes allergies or is otherwise toxic to humans	
	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 reports of toxicity] "grown for fodder, young plants palatable and tender, mature plants woody and tough"
	Ramavovololona, Sénéchal, H., Ramamonjisoa, Z. R., Andrianarisoa, A. C. F., Rakotoarimanana, V. M., Sutra, J. P., & Peltre, G. (2013). Allergy to pollen of six common grasses in the highlands of Madagascar. <i>Current Allergy & Clinical Immunology</i> , 26(4), 184	[Pollen is allergenic to susceptible individuals] "Conclusion: This is the first report of cross-reactivity between these six pollen allergen sources. Among them, <i>R. repens</i> pollen was the dominant source of allergens. The allergens of the tropical grass pollens studied have a high impact on Madagascan grass-pollen-allergic patients and could also have a real impact on patients from other regions worldwide where some of these grasses are present, mainly as invasive weeds."

408	Creates a fire hazard in natural ecosystems	y
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. (2023). <i>Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species</i> . Third Edition, Revised and Updated. Stackpole Books, Essex, Connecticut	"Natal grass forms dense stands that can increase fire frequency, a fact that is very important in dry fire-prone areas of California and the Southwest."
	Loope, L.L., Nagata, R.J. & Medeiros, A.C. (1992). Alien plants in Haleakala National Park Pp. 551-576 in Stone et al (eds) <i>Alien plant invasions in native ecosystems of Hawaii</i> . Coop. Nat. Park Resources Studies Unit, University of Hawaii, Honolulu, HI	"Rattail grass, <i>Sporobolus africanus</i> , and Natal redtop, <i>Rhynchelytrum repens</i> These grasses are abundant on leeward Haleakala at 3,000-6,000 ft (915-1830 m) as well as in pastures of lower Kipahulu. Currently, these two grass species make up much of the alien grass cover of western Kaupo Gap. They produce sufficient combustible material to carry wildfires once feral goats are controlled. Fire would enormously retard recovery of native shrubs and herbs. However, the threat of these grasses is considerably less than that presented by molasses grass."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Xaba, P. M. A. (2018). <i>Melinis repens</i> . PlantZAfrica. SANBI. https://pza.sanbi.org/melinis-repens . [Accessed 9 Jul 2024]	"Aspect: Full Sun"
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 9 Jul 2024]	"It does not tolerate shade, but is tolerant of moderate salinity and low annual rainfall and thus it is able to thrive in arid and semiarid habitats."

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

Qsn #	Question	Answer
	Source(s)	Notes
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 9 Jul 2024]	"It is adapted to a wide range of soil textures with pH 6-8. It does not tolerate shade, but is tolerant of moderate salinity and low annual rainfall and thus it is able to thrive in arid and semiarid habitats. It is also able to grow in soil contaminated with heavy metals (Langeland et al., 2008; AusGrass2, 2015; PIER, 2018)."
	Xaba, P. M. A. (2018). <i>Melinis repens</i> . PlantZAfrica. SANBI. https://pza.sanbi.org/melinis-repens . [Accessed 9 Jul 2024]	"Soil type: Sandy, Loam"

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.	"Annuals or perennials; culms loosely tufted, subcoriaceous, erect or ascending, 3-10 dm tall, often many-branched, glabrous."

412	Forms dense thickets	y
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. (2023). Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Third Edition, Revised and Updated. Stackpole Books, Essex, Connecticut	"Natal grass forms dense stands that can increase fire frequency, a fact that is very important in dry fire-prone areas of California and the Southwest. Little research has been done on its impact on early successional plant diversity."

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] "in Hawai'i naturalized in disturbed, usually dry areas, including urban and agricultural land, dry shrubland, dry forest, and subalpine forest, 0-1,950 m"

502	Grass	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch . [Accessed 2 Jul 2024]	"Genus: <i>Melinis</i> Family: Poaceae (alt. Gramineae) Subfamily: Panicoideae Tribe: Paniceae Subtribe: Melinidinae"

503	Nitrogen fixing woody plant	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	Poaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
-----	---	----------

Qsn #	Question	Answer
	Source(s)	Notes
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Annual or perennial bunchgrass, very variable, rapidly growing, weak, short-lived, tufted to loosely tufted"

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.	"Native to Africa, now widely naturalized throughout the tropics"

602	Produces viable seed	y
	Source(s)	Notes
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud."
	Stokes, C. A., MacDonald, G. E., Adams, C. R., Langeland, K. A., & Miller, D. L. (2011). Seed biology and ecology of natalgrass (<i>Melinis repens</i>). Weed Science, 59(4), 527-532	"Natalgrass is an invasive species that has become increasingly problematic in natural areas in Florida and other subtropical and tropical regions around the world. Natalgrass is a prolific seed producer, but little information is available regarding its seed biology and ecology. Research was conducted to determine levels of seed dormancy and to examine the effects of light, temperature, pH, water stress, and depth of burial on natalgrass seed germination. In addition, seed persistence under field conditions was examined both on the soil surface and while buried. Seeds appeared to undergo afterripening. Seed germination was not light dependent and occurred from 15 to 35 C, with optimum germination occurring at 20 to 35 C. Germination occurred at pH levels of 6 and 8 and was affected by water stress; no germination was observed at osmotic potentials less than 20.2 MPa. Seeds emerged from depths of at least 5 cm. Under field conditions, germination was reduced after burial; however, burial lengths of 3 to 15 mo did not result in differences in germination levels. Seedling numbers from seed deposits on the soil surface were greatly reduced after 1 mo, and no seedling emergence was observed after 4 mo."

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Subba Reddi, C., Raju, N. S. N., & Subba Rao, M. V. (2010). Pollination and seed set in tropical wetland grasses. Nordic Journal of Botany, 28(3), 354-365	"Some species like <i>Eragrostis riparia</i> (168), <i>E. tenella</i> (210), <i>Rhynchelytrum repens</i> (285), <i>Dactyloctenium indicum</i> (351), <i>D. aegyptium</i> (381), <i>Digitaria longiflora</i> (540) with low P/O ratios are found to be equally successful through xenogamy and autogamy."

605	Requires specialist pollinators	n
-----	--	---

Qsn #	Question	Answer
	Source(s)	Notes
	Bawa, K. S., & Hadley, M. (Eds.). (1991). <i>Reproductive Ecology of Tropical Forest Plants</i> . UNESCO, Paris, France	"Table 12.1 ... <i>Rhynchelytrum repens</i> ... Mode of pollination - Wind"
606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud."
607	Minimum generative time (years)	1
	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.	"Annuals or perennials; culms loosely tufted, subcoriaceous, erect or ascending, 3-10 dm tall, often many-branched, glabrous."
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud."
702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Quattrocchi, U. (2006). <i>CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	"cultivated fine ornamental grass widely naturalized elsewhere"
703	Propagules likely to disperse as a produce contaminant	y
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Contaminant, Crop, Herbal, Ornamental, Pasture Dispersed by: Humans, Vehicles, Escapee"
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 8 Jul 2024]	"Seeds of <i>M. repens</i> have been reported as contaminants in agricultural produce (i.e. fodder and pasture seed) (Queensland Government, 2018; USDA-ARS, 2018)."
704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud."
705	Propagules water dispersed	n

Qsn #	Question	Answer
	Source(s)	Notes
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud."
	Stokes, C. A., MacDonald, G. E., Adams, C. R., Langeland, K. A., & Miller, D. L. (2011). Seed biology and ecology of natalgrass (<i>Melinis repens</i>). <i>Weed Science</i> , 59(4), 527-532	"Natalgrass is a prolific producer of windborne seeds."

706	Propagules bird dispersed	
	Source(s)	Notes
	Xaba, P. M. A. (2018). <i>Melinis repens</i> . PlantZAfrica. SANBI. https://pza.sanbi.org/melinis-repens . [Accessed 9 Jul 2024]	"Birds eat the seeds and use the plant for nesting material." [Birds might disperse seeds in nesting material, but otherwise act as seed predators]
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud."
	Stokes, C. A., MacDonald, G. E., Adams, C. R., Langeland, K. A., & Miller, D. L. (2011). Seed biology and ecology of natalgrass (<i>Melinis repens</i>). <i>Weed Science</i> , 59(4), 527-532	"Natalgrass is a prolific producer of windborne seeds."

707	Propagules dispersed by other animals (externally)	y
	Source(s)	Notes
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"Natal grass reproduces mainly by seeds, which are wind dispersed and also attach to clothing and animal fur. They can also be carried by mud."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	de Andrade Mendonça, D., Reis, D. O., Junior, J. G., & Fabricante, J. R. (2021). Bovine manure as a dispersing agent for weeds and invasive alien plants. <i>Research, Society and Development</i> , 10(8), e9410816833-e9410816833	[<i>Melinis repens</i> present in bovine manure] "Fertilization is the act of adding fertilizers to the soil in order to provide essential nutrients for the development of cultivated plants. However, the use of bovine manure can act as a source of weed propagules, including non-native species. Due to the importance and lack of research on the topic, the objective of the present study was to evaluate the seed bank present in bovine manure used by farmers in the municipality of Itabaiana, SE. For that, samples of bovine manure were collected in 10 rural properties in the municipality of Itabaiana, SE. The evaluation of the seed bank was carried out by accounting for emerged seedlings. Usual phytosociological indices were calculated for each species. Altogether 35 species were sampled, of which 28 native and seven non-native. The native species with the highest importance value was <i>Euphorbia hirta</i> , as it has the highest density (AD = 1122 ind.m ⁻²) and is present in 28 sample units. The non-native species with the highest importance value was <i>Eleusine indica</i> , because it has the third highest density (AD = 171.2 m ²) and is present in 21 sample units. The obtained results reveal that bovine manure has a high number of weed, which is quite worrying, as they are species that generate important environmental and economic impacts."

801	Prolific seed production (>1000/m2)	y
	Source(s)	Notes

Qsn #	Question	Answer
	Diaz Romo, A., Flores Ancira, E., De Luna Jimenez, A., Luna Ruiz, J. D. J., Frías Hernández, J. T., & Olalde Portugal, V. (2012). Aerial biomass, seed quantity and quality in <i>Melinis repens</i> (Willd.) Zizka in Aguascalientes, Mexico. <i>Revista Mexicana de Ciencias Pecuarias</i> , 3(1), 33-47	"In the present study, aerial biomass output and seed yield, viability, germination, and dormancy were evaluated in <i>Melinis repens</i> (Natal grass) growing at different locations in Aguascalientes, México. Four grazing excluded sites with high population of Natal grass were selected in the municipalities of El Llano, Jesús María, San Francisco de los Romo and Calvillo. In October 2008 and 2009, forage and seed were harvested by hand. Forage and spikelet yield and seed number were estimated. Seed viability, germination and dormancy were evaluated at different post harvest times. Significant differences were found in aerial biomass output, with means from 2,913 to 1,736 kg DM ha-1 in 2008 and from 1,488 to 707 kg DM ha-1 in 2009 (lower rainfall); Calvillo site showed higher production. Seed yield showed differences (P<0.05), ranging from 1,239 to 2,401 seeds m-2 in 2008 and from 1,452 to 3,906 seeds m-2 in 2009. Seed viability means went from 32 to 54 %, without significant differences. In Calvillo, seed germination (25 %) was higher than in the other sites, and was similar to viability at 18 mo post harvest (43 %), but in El Llano, germination was lower (2 %) because of higher dormancy, with low increment even at 24 mo post harvest, reaching only 15 %. This grass presented relatively high levels of aerial biomass and seed yield, and these factors can favor invasive ability of this species. Seed yield and dormancy were greater in unfavorable moisture conditions."
	Stokes, C. A., MacDonald, G. E., Adams, C. R., Langeland, K. A., & Miller, D. L. (2011). Seed biology and ecology of natalgrass (<i>Melinis repens</i>). <i>Weed Science</i> , 59(4), 527-532	"Natalgrass is a prolific producer of windborne seeds. Tracy (1916) suggests that 45.4 kg (100 lb) of seeds per 0.4 ha (1 acre) could be expected from the initial growth of a natalgrass crop. In areas where severe natalgrass infestations occur, dense layers of seeds up to 5 cm thick have been observed on the soil surface (C. A. Stokes, unpublished data). Natalgrass seeds appear to be key to the rapid spread of this species, and extensive seed deposits are likely a reason for the persistence of natalgrass in a given area."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Stokes, C. A., MacDonald, G. E., Adams, C. R., Langeland, K. A., & Miller, D. L. (2011). Seed biology and ecology of natalgrass (<i>Melinis repens</i>). <i>Weed Science</i> , 59(4), 527-532	"Although natalgrass can form dense seed deposits in infested areas, the seed bank appears to quickly become depleted when conditions are favorable for germination and further seed rain is prevented."
	Cooper, C. A. (2012). <i>Melinis repens</i> Seed Bank Longevity in Miami-Dade County. MS Thesis. Florida International University	[One year or possibly longer] "On the basis the results of this study it is likely that <i>M. repens</i> has a shortterm persistence of at least one year in the seed bank in ecosystems, but further research is needed to determine the full longevity of this species in the seed bank. According to a study conducted in Western Europe most invasive species have a transient (less than one year) to short-term persistence in the soil seed bank (Thompson et al. 1995)."

803	Well controlled by herbicides	y
	Source(s)	Notes
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching, L. (2003). <i>Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide</i> . CTAHR, UH Manoa, Honolulu, HI	"Management: HAVO staff reported control with glyphosate at 1% of product sprayed to wet (Chris Zimmer, HAVO)."

Qsn #	Question	Answer
	Stokes, C. A. (2010). Biology, Ecology and Management of Natalgrass (<i>Melinis Repens</i>) MS Thesis. University of Florida, Gainesville, FL	"Metsulfuron and fluazifop offer little to no control of natalgrass at labeled use rates. The rates required to significantly reduce natalgrass populations are above the maximum labeled use rates. These herbicides offer little utility to land managers attempting to control natalgrass. Glyphosate provides excellent control of natalgrass at fairly low rates. However, glyphosate does not have residual activity. As a result, natalgrass populations quickly became reestablished from seed. Glyphosate may offer good control short-term, but may cause an overall increase in natalgrass density long-term by eliminating competing plants. Pendimethalin and metolachlor both offer good control of natalgrass when applied preemergence. However, both compounds were detrimental to native plant populations. These herbicides would be best utilized at a site with little to no seed bank present for native species. Hexazinone and sulfometuron provided good control of natalgrass both pre- and postemergence. These herbicides were also harmful to most native plants present at the study sites. As a result, these herbicides would also be best utilized when few native plant species are present. Imazamox, imazapyr and imazapic provided less control of natalgrass on average than hexazinone and sulfometuron, but were less harmful to native plant populations. These compounds did not result in a large decrease in natalgrass cover, but did result in severe stunting of natalgrass and delay of flowering and seed set. Of the three herbicides, imazapic appears to be the best choice when many native species are present. Many native plants in Florida are tolerant to this compound and gain a competitive advantage when imazapic is used."
	Kaufman, S.R. & Kaufman, W. (2023). Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Third Edition, Revised and Updated. Stackpole Books, Essex, Connecticut	"Plants can be sprayed with glyphosate or fluazifop before flowering and seed set or after seed germination."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. (2023). Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Third Edition, Revised and Updated. Stackpole Books, Essex, Connecticut	"Cut grass prior to flowering or cut off the seed heads. Fire kills seeds and adult plants, but long-term effective control has not been tested."
	Rojas-Sandoval, J. (2023). <i>Melinis repens</i> (Natal redbtop). CABI Compendium. https://www.cabidigitallibrary.org/doi/pdf/10.1079/cabicompendum.116730 . [Accessed 9 Jul 2024]	"Physical/Mechanical Control - Seed-set can be prevented by removing or cutting grass prior to flowering. Small populations must be cut out (Florabase, 2013). Fire can destroy seeds and adult plants but may be ineffective in reducing <i>M. repens</i> if rainfall is abundant after the fire (Wilkinson, 2003)."

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.	[Widely distributed, with no natural enemies affecting its persistence and spread] "in Hawai'i naturalized in disturbed, usually dry areas, including urban and agricultural land, dry shrubland, dry forest, and subalpine forest, 0-1,950 m, on Midway Atoll and all of the main islands."

Summary of Risk Traits:

Melinis repens (Natal) is an annual or perennial grass native to Africa and widely naturalized throughout the world. In Hawai'i it is naturalized in disturbed, usually dry areas, including urban and agricultural land, dry shrubland, dry forest, and subalpine forest, 0 -1,950 m, on Midway Atoll and all the main islands. Its seeds are carried by wind, and can also be dispersed attached to clothing, fur, or stuck in mud. Where invasive, it may form dense cover that excludes other vegetation and can increase fire risk by accumulating large amounts of dead biomass.

High Risk / Undesirable Traits

- Broad elevation range
- Widely naturalized including all the main Hawaiian Islands
- A weed of disturbed sites that may impact crops and natural areas
- Other *Melinis* species are invasive weeds
- Pollen is allergenic to some people
- Increases fire frequency and risk
- Tolerates many soil types
- Able to form dense stands
- Reproduces by seeds
- Autogamous (capable of self-fertilization)
- Annual or perennial, capable of reproducing in the first year of growth
- Seeds dispersed by wind, attached to clothing, fur, mud, as a contaminant in agricultural produce (i.e. fodder and pasture seed) and sometimes through intentional cultivation
- Prolific seed production
- May form a persistent seed bank
- No natural enemies or limiting factors in the Hawaiian Islands

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Palatable, but of low grazing value
- Non-toxic
- Grows best in high light environments (dense shade may inhibit spread)
- Not reported to spread vegetatively
- Herbicides may provide effective control

