UF IFAS UNIVERSITY of FLORIDA

Assessment of Non-native Plants in Florida's Natural Areas

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Assessment date 1 AUG2017

	Hyparrhenia rufa **ALL ZONES**	**Answer**	**Score**
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	n	0
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	unk	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	n	-1
4.05	Toxic to animals	unk	0
4.06	Host for recognised pests and pathogens	n	0
4.07	Causes allergies or is otherwise toxic to humans	unk	0
4.08	Creates a fire hazard in natural ecosystems	y	1
4.09	Is a shade tolerant plant at some stage of its life cycle	n	0
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	y	1
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	y	1
5.03	Nitrogen fixing woody plant	n	0

5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	unk	-1
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	unk	-1
6.07	Minimum generative time (years)	1	1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y	1
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant	n	-1
7.04	Propagules adapted to wind dispersal	y	1
7.05	Propagules water dispersed	unk	-1
7.06	Propagules bird dispersed	unk	-1
7.07	Propagules dispersed by other animals (externally)	y	1
7.08	Propagules dispersed by other animals (internally)	unk	-1
8.01	Prolific seed production	unk	-1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	unk	-1
8.03	Well controlled by herbicides	unk	1
8.04	Tolerates, or benefits from, mutilation or cultivation	y	1
8.05		?	
	Total Score	**16**	
	Implemented Pacific Second Screening	**no**	
	Risk Assessment Results	**High**	

section	# questions answered	satisfy minimum?
A	11	yes
B	8	yes
C	15	yes
total	34	yes

	Reference	Source data
1.01		cultivated, but no evidence of selection for reduced weediness
1.02		
1.03		
2.01	1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnd.tif). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?409896 (0-00-0000).	No computer analysis was performed. 1. Global hardiness zone: 8, 9, 10, 11, 12, 13; equivalent to USDA Hardiness zones: USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15°F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11a: to USDA Zone (40 °F) USDA Zone 11b: to (45 °F) USDA Zone 12a: to (50 °F) USDA Zone 12b: to (55 °F).. 2. Native to East Tropical Africa: Kenya; Tanzania; Uganda Northeast Tropical Africa: Eritrea; Ethiopia; Sudan Southern Africa: Botswana; Namibia; South Africa - Transvaal; Swaziland West Tropical Africa: Benin; Burkina Faso; Cote D'Ivoire; Gambia; Ghana; Guinea; Guinea-Bissau; Mali; Mauritania; Nigeria; Senegal; Sierra Leone; Togo West-Central Tropical Africa: Cameroon; Zaire Western Indian Ocean: Madagascar
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf).	1. Distribution in the native/cultivated range occurs in Af, Am, Aw, Cfa, BSh, Cwb
2.04	1. Climate Charts. World Climate Maps. http://www.climate-charts.com/World-Climate-Maps.html#rain (8-19-2015)	1. Native to regions with annual rainfall of 15 to 97 inches
2.05	1. Williams DG, Baruch Z, 2000. African grass invasion in the Americas: ecosystem consequences and the role of ecophysiology. Biological Invasions, 2:123-140. 2. Encyclopedia of Life http://eol.org/pages/1114975/details (2-20-2017)	1. H. rufa is a tall perennial grass widely naturalized in tropical and subtropical regions of the world where it has been intentionally introduced principally to enhance livestock production 2. Introduced as a forage grass, sparingly cultivated and escaping in the tropics of the New World (Piauí, Brazil, Martius, the type); originally introduced from tropical Africa.
3.01	1. Queensland Government http://keyserver.lucidcentral.org/weeds/data/media/Html/hyparrhenia_rufa_subsp._rufa.htm (2-12-2017) 2. Williams DG, Baruch Z, 2000. African grass invasion in the Americas: ecosystem consequences and the role of ecophysiology. Biological Invasions, 2:123-140.	Naturalised in northern and eastern Australia (i.e. the coastal districts of the Northern Territory and northern, central and south-eastern Queensland)... Also widely naturalised in other parts of the world, including tropical Asia, the Caribbean, tropical Southern America, the Mascarenes and Hawaii. 2. H. rufa is a tall perennial grass widely naturalized in tropical and subtropical regions of the world where it has been intentionally introduced principally to enhance livestock production
3.02	1. Queensland Government http://keyserver.lucidcentral.org/weeds/data/media/Html/hyparrhenia_rufa_subsp._rufa.htm (2-12-2017) 2. CABI http://www.cabi.org/isc/datasheet/27716 (2-19-2017)	1. This tall grass is mainly a weed of roadsides and disturbed sites 2. Weedy in disturbed fields, pasture
3.03		no evidence

3.04	1. Queensland Government http://keyserver.lucidcentral.org/weeds/data/media/Html/hyparrhenia_rufa_subsp._rufa.htm (2-12-2017) 2. D'Antonio CM, Vitousek PM, 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global chance. Annual Review in Ecology and Systematics, 23:63-87. 3. Weber, E (2003) Invasive plant species of the world: A reference guide to environmental weeds, CAB international, Wallingford, U.K., pg. 384.	1. Thatch grass (Hyparrhenia rufa subsp. rufa) is regarded as an environmental weed Queensland and a potential environmental weed in other parts of northern Australia. This tall grass is mainly a weed of roadsides and disturbed sites, however it is starting to spread away from these habitats and is beginning to dominate native pastures and grasslands. It replaces native grasses, particularly after fires, and dominates the understorey of open woodland areas. This adds to the fuel load of these areas, which increases the frequency and intensity of future fires. This leads to a destructive cycle, eventually replacing the native savannas and woodlands with an exotic grassland. 2. Has spread over hundreds and acres and displaced native grasses 3. It forms dense swards ... that displace native grasses and forbs, preventing the establishment of other species and transforming native savannas into species pure stands.
3.05	1. Holm, LeRoy G. A Geographical Atlas of World Weeds. Malabar, FL: Krieger Pub., 1991. Print. 2. Northwest weeds (http://www.northwestweeds.com.au accessed 8-10-2017) 3. McArdle and Sindel (2004) "Invasion of native vegetation by Coolatai Grass Hyparrhenia hirta: impacts on native vegetation and management implications" Pacific Consevation Biology 10: 49-56.	1. Principle weed in Mozambique 2. Coolatai grass (Hyparrhenia hirta) has taken over large areas of the north west and is still spreading. It continues to cause serious ecological damage within national parks and the like, where it displaces other desirable plant species. 3. "Coolatai Grass Hyparrhenia hirta is an exotic perennial grass and environmental weed that is spreading rapidly in parts of southeastern Australia." "Coolatai Grass infestation reduced the richness of native ground strata plants and their projected groundcover" "Coolatai Grass appears to increase in abundance following fire; it persists under heavy grazing and is resistant to many herbicides."
4.01	1. Wagner WL, Herbst DR, Sohmer SH, 1999. Manual of the flowering plants of Hawaii. Revised edition. Honolulu, Hawaii, USA: University of Hawaii 2. Press/Bishop Museum Press, 1919 pp.	no evidenence of these features
4.02		
4.03	1. Wagner WL, Herbst DR, Sohmer SH, 1999. Manual of the flowering plants of Hawaii. Revised edition. Honolulu, Hawaii, USA: University of Hawaii Press/Bishop Museum Press, 1919 pp.	no evidence of these features
4.04	1. Daubenmire, R. (1972). Ecology of Hyparrhenia rufa (Nees) in derived savanna in north-western Costa Rica. Journal of Applied Ecology, 11-23. 2. Encyclopedia of Life http://eol.org/pages/1114975/details (2-20-2017)	1. Grazed by cattle 2. In Africa it has an excellent reputation as a fodder for grazing animals, as, although it has a strong stem, grazing induces the production of a great deal of leaf. It can be used for silage and is also cut and fed to stock
4.05		no evidence
4.06	1. FAO http://www.fao.org/ag/agp/agpc/doc/gbase/data/pf000259.htm (2-19-2017) 2. Daubenmire, R. (1972). Ecology of Hyparrhenia rufa (Nees) in derived savanna in north-western Costa Rica. Journal of Applied Ecology, 11-23.	1. Strong disease resistance 2. No significant fungus, bacterial or virus diseases affect Hyparrhenia in the Cañas area, although a minor leaf-spot is everywhere evident
4.07		no evidence

4.08	1. Queensland Government http://keyserver.lucidcentral.org/weeds/data/media/Html/hyparrhenia_rufa_subsp._rufa.htm (2-12-2017) 2. D'Antonio CM, Vitousek PM, 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global chance. Annual Review in Ecology and Systematics, 23:63-87. 3. Encyclopedia of Life http://eol.org/pages/1114975/details (2-20-2017)	1. Thatch grass (Hyparrhenia rufa subsp. rufa) is regarded as an environmental weed Queensland and a potential environmental weed in other parts of northern Australia. This tall grass is mainly a weed of roadsides and disturbed sites, however it is starting to spread away from these habitats and is beginning to dominate native pastures and grasslands. It replaces native grasses, particularly after fires, and dominates the understorey of open woodland areas. This adds to the fuel load of these areas, which increases the frequency and intensity of future fires. This leads to a destructive cycle, eventually replacing the native savannas and woodlands with an exotic grassland. 2. H. rufa-fueled fires can burn into successional and even intact tropical dry forest and represent serious threat to ecosystems. 3. Not only does the grass make wildfire events more severe, but it increases in response to fire.
4.09	1. Daubenmire, R. (1972). Ecology of Hyparrhenia rufa (Nees) in derived savanna in north-western Costa Rica. Journal of Applied Ecology, 11-23.	1. it is relatively intolerant of shade, appearing among trees only where fire runs through the forest frequently and forest grasses such as Oplismenus are not already established.
4.10	1. Daubenmire, R. (1972). Ecology of Hyparrhenia rufa (Nees) in derived savanna in north-western Costa Rica. Journal of Applied Ecology, 11-23. 2. FAO http://www.fao.org/ag/agp/agpc/doc/gbase/data/pf000259.htm (2-19-2018) 3. USDA Global Soil Regions https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/?cid=nrcs142p2_054013 (2-24-2017)	1. Vigorous in lithosols, grumusols and zonal soils, so long as the water table is not near the surface 2. Prefers black clays and latosols. 3. Native to regions with soil congruent with all three zones
4.11		no evidence, grass
4.12	1. PIER http://www.hear.org/pier/species/hyparrhenia_rufa.htm (2-12-2017) 2. CABI http://www.cabi.org/isc/datasheet/27716 (2-19-2017) 3. Northern Territory Government (2013) Thatch grass (Hyparrhenia rufa): NT Weed Risk Assessment Technical Report, Northern Territory Government, Darwin.	1. It forms dense swards where invasive that displace native grasses and forbs, preventing the establishment of other species and transforming native savannas into species-pure stands. 2. It has escaped from cultivation and rapidly naturalized into natural areas where it colonizes new areas forming dense stands and displacing native vegetation. 3. Promotes and is aided by fire, forming monocultures and replacing native vegetation. Tall dense swards burn readily and intensely.
5.01	Wagner WL, Herbst DR, Sohmer SH, 1999. Manual of the flowering plants of Hawaii. Revised edition. Honolulu, Hawaii, USA: University of Hawaii Press/Bishop Museum Press, 1919 pp.	Family: Poaceae
5.02	Wagner WL, Herbst DR, Sohmer SH, 1999. Manual of the flowering plants of Hawaii. Revised edition. Honolulu, Hawaii, USA: University of Hawaii Press/Bishop Museum Press, 1919 pp.	Family: Poaceae
5.03	Wagner WL, Herbst DR, Sohmer SH, 1999. Manual of the flowering plants of Hawaii. Revised edition. Honolulu, Hawaii, USA: University of Hawaii Press/Bishop Museum Press, 1919 pp.	Family: Poaceae, herbaceous
5.04	Wagner WL, Herbst DR, Sohmer SH, 1999. Manual of the flowering plants of Hawaii. Revised edition. Honolulu, Hawaii, USA: University of Hawaii Press/Bishop Museum Press, 1919 pp.	no evidence of these features
6.01		no evidence

6.02	1. PIER http://www.hear.org/pier/species/hyparrhenia_rufa.htm (2-12-2017) 2. Daubenmire, R. (1972). Ecology of Hyparrhenia rufa (Nees) in derived savanna in north-western Costa Rica. Journal of Applied Ecology, 11-23. 3. FAO http://www.fao.org/ag/agp/agpc/doc/gbase/data/pf000259.htm (2-19-2018)	1. Spread by seed 2. Spread by seed 3. Produces viable seed
6.03		
6.04	1. Crop Gene Seed Bank http://cropgenebank.sgrp.cgiar.org/images/file/forage_grasses/isolation_information_for_grasses.pdf (2-24-2017) 2. CABI http://www.cabi.org/isc/datasheet/27716 (2-19-2017)	1. Apomictic 2. H. rufa is a facultative apomictic grass. Seeds can be produced through both selfing and outcrossing, and pollination is probably wind-aided
6.05		Family: Poaceae, grass
6.06		no evidence
6.07	1. Daubenmire, R. (1972). Ecology of Hyparrhenia rufa (Nees) in derived savanna in north-western Costa Rica. Journal of Applied Ecology, 11-23.	1. Plants are capable of reproducing after one year
7.01	1. PIER http://www.hear.org/pier/species/hyparrhenia_rufa.htm (2-12-2017) 2. Williams DG, Baruch Z, 2000. African grass invasion in the Americas: ecosystem consequences and the role of ecophysiology. Biological Invasions, 2:123-140. 3. CABI http://www.cabi.org/isc/datasheet/27716 (2-19-2017)	1. Spread is also by vehicles and machinery, e.g. road graders. 2. H. rufa is one of a number of African grasses that were introduced into the humid tropics of Central and South America during the nineteenth and early twentieth centuries, mostly to enhance livestock production. As with many other African grasses, this species escaped from planted areas and eventually became invasive, aided in part by the opening of native communities by fire and deforestation 3. It is also a potential seed crop contaminant and consequently unintentional introduction could also occur.
7.02	1. FAO http://www.fao.org/ag/agp/agpc/doc/gbase/data/pf000259.htm (8-10-2017) 2. Williams DG, Baruch Z, 2000. African grass invasion in the Americas: ecosystem consequences and the role of ecophysiology. Biological Invasions, 2:123-140. 3. Parsons, JJ (1972) 'Spread of African pasture grasses to the American tropics', Journal of Range Management, 25, 12-17.	1. It is used for grazing and for hay and silage 2. H. rufa is one of a number of African grasses that were introduced into the humid tropics of Central and South America to enhance livestock production. 3. it is recognized as the base of a substantial live-stock industry.
7.03		no evidence
7.04	1. PIER http://www.hear.org/pier/species/hyparrhenia_rufa.htm (2-12-2017) 2. Encyclopedia of Life http://eol.org/pages/1114975/details (2-20-2017) 3. CABI http://www.cabi.org/isc/datasheet/27716 (2-19-2017)	1. Seeds are dispersed by wind. 2. The rough-haired seeds are dispersed in the fur of animals, on the wind, and on vehicles and machinery such as graders. 3. Utilizes wind dispersal
7.05		no evidence
7.06		no evidence
7.07	1. Encyclopedia of Life http://eol.org/pages/1114975/details (2-20-2017) 2. Starr, F, Starr, K & Loope, L (2003) Hyparrhenia rufa, United States Geological Survey - Biological Resources Division, Haleakala Field Station, Maui, Hawai'i.	1. The rough-haired seeds are dispersed in the fur of animals, on the wind, and on vehicles and machinery such as graders. 2. Seeds with long bristles are capable of catching on people...that walk past the plant.
7.08		no evidence
8.01		no evidence
8.02		no evidence
8.03	1. CABI http://www.cabi.org/isc/datasheet/27716 (2-19-2017) 2. McArdle and Sindel (2004) "Invasion of native vegetation by Coolatai Grass Hyparrhenia hirta: impacts on native vegetation and management implications" Pacific Consevation Biology 10: 49-56.	1. Regrowth can then be treated with herbicide (glyphosate) 2. Congener H hirta "is resistant to many herbicides."

8.04	1. Daubenmire, R. (1972). Ecology of Hyparrhenia rufa (Nees) in derived savanna in north-western Costa Rica. Journal of Applied Ecology, 11-23. 2. Getzin, S (2002) Formation and Consequences of Fire-Induced Structures in Tropical and Sub-Tropical Savannas, Masters of Science Thesis, University of Potsdam, Potsdam.	1. This herbaceous plant that prospers under annual burning in the most prevalent type of derived savanna in north-western Costa Rica…. The germination of many pyrophytes has been shown to be stimulated by vegetation fire 2. Even under grazing Hyparrhenia rufa was advantaged because of its growth compensation mechanism.
8.05		no evidence