

**Taxon:** *Urochloa ramosa* (L.) T. Q. Nguyen

**Family:** Poaceae

**Common Name(s):** browntop millet  
dixie signalgrass

**Synonym(s):** *Brachiaria ramosa* (L.) Stapf  
*Panicum ramosum* L.

**Assessor:** Chuck Chimera

**Status:** Assessor Approved

**End Date:** 20 Jul 2022

**WRA Score:** 8.0

**Designation:** H(HPWRA)

**Rating:** High Risk

**Keywords:** Domesticated Grass, Minor Crop Weed, Fodder, Annual, Seed Bank

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	y
102	Has the species become naturalized where grown?	y=1, n=-1	y
103	Does the species have weedy races?	y=1, n=-1	y
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	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic	y=1, n=0	n
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n

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	y
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	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	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	y
	Source(s)	Notes
	Kingwell-Banham, E., & Fuller, D. Q. (2014). Brown top millet: origins and development. <i>Encyclopaedia of Global Archaeology</i> . New York: Springer, 1021-1024	"The domestication of brown top millet probably occurred in South India, in the Deccan, and it spread during prehistory outward to other parts of India (Fig. 2). Charred grains identified as "Brachiaria ramosa type" have been recovered from most Neolithic South Indian sites where systematic archaeobotanical work has occurred. On these sites brown top millet has a high ubiquity and relative frequency. Dating the time of domestication is complicated by the fact that little archaeobotanic work has been carried out on early Neolithic or preceramic period (Mesolithic sites); however, the evidence suggests that this crop, along with other South Indian crops (i.e., <i>Macrotyloma uniflorum</i> , <i>Vigna radiata</i> and <i>Setaria verticillata</i> ), developed from indigenous wild populations around the beginning of the third millennium BCE (Fuller 2006)."

102	Has the species become naturalized where grown?	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 12 Jul 2022]	"Naturalized Australasia AUSTRALIA: Australia Northern America REGION: Mexico, United States (s.e.)"

103	Does the species have weedy races?	y
	Source(s)	Notes
	Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). (2013). <i>Manual of Grasses for North America</i> . Utah State University Press, Logan, UT	"A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States. It is considered a weed in the Manual area, but it is cultivated in India as a grain and forage crop. The grain is sometimes used for birdseed."
	Kingwell-Banham, E., & Fuller, D. Q. (2014). Brown top millet: origins and development. <i>Encyclopaedia of Global Archaeology</i> . New York: Springer, 1021-1024	"Domestic and wild/weedy forms of brown top millet are found in agricultural systems, often within the same field."
	Bryson, C.T. & DeFelice, M.S. (2009). <i>Weeds of the South</i> . University of Georgia Press, Athens, GA	"Erect to decumbent, loosely tufted annual; to o. 7 m tall; cultivated areas, fields, pastures, lawns, turf, roadsides, railroad beds, and waste sites; native of southeastern Asia."

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

Qsn #	Question	Answer
	<p>USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a>. [Accessed 12 Jul 2022]</p>	<p>"Native Africa                      NORTHEAST TROPICAL AFRICA: Eritrea, Ethiopia, Sudan, Somalia                      EAST TROPICAL AFRICA: Kenya, Tanzania                      WEST-CENTRAL TROPICAL AFRICA: Cameroon                      WEST TROPICAL AFRICA: Gambia, Guinea-Bissau, Mali, Mauritania, Nigeria, Senegal                      SOUTH TROPICAL AFRICA: Mozambique, Malawi, Zimbabwe                      Asia-Temperate                      ARABIAN PENINSULA: Saudi Arabia, Yemen                      WESTERN ASIA: Afghanistan                      CHINA: China [Yunnan Sheng, Hainan Sheng]                      Asia-Tropical                      INDIAN SUBCONTINENT: Bhutan, India, Sri Lanka, Nepal, Pakistan                      INDO-CHINA: Cambodia, Myanmar, Thailand, Vietnam                      MALESIA: Malaysia"</p>
	<p>Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL</p>	<p>"Tropical Africa to South Africa, tropical Asia, Arabia."</p>

202	Quality of climate match data	High
	Source(s)	Notes
	<p>Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL</p>	<p>"Tropical Africa to South Africa, tropical Asia, Arabia."</p>

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	<p>Sheahan, C.M. (2014). Plant guide for browntop millet (<i>Urochloa ramosa</i>). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ</p>	<p>"Browntop millet grows in rocky, shallow soils from sea level up to 8,000 ft (FAO, 2007). It is adaptable to almost all upland soil (Mitchell et al., 1989), but does not grow well in water-restricted, droughty conditions. It will not survive in temperature less than 52°F." [Broad elevation range]</p>
	<p>NC State Extension. (2022). <i>Urochloa ramosa</i>. <a href="https://plants.ces.ncsu.edu/plants/urochloa-ramosa/">https://plants.ces.ncsu.edu/plants/urochloa-ramosa/</a>. [Accessed 12 Jul 2022]</p>	<p>"USDA Plant Hardiness Zone: 7a, 7b, 8b, 8a, 9a, 9b, 10a, 10b, 11b, 11a"</p>

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	<p>Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). (2013). Manual of Grasses for North America. Utah State University Press, Logan, UT</p>	<p>"A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States. It is considered a weed in the Flora area, but it is cultivated in India as a grain and forage crop; the grain is sometimes used for birdseed."</p>

Qsn #	Question	Answer
	<p>USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a>. [Accessed 12 Jul 2022]</p>	<p>"Native Africa NORTHEAST TROPICAL AFRICA: Eritrea, Ethiopia, Sudan, Somalia EAST TROPICAL AFRICA: Kenya, Tanzania WEST-CENTRAL TROPICAL AFRICA: Cameroon WEST TROPICAL AFRICA: Gambia, Guinea-Bissau, Mali, Mauritania, Nigeria, Senegal SOUTH TROPICAL AFRICA: Mozambique, Malawi, Zimbabwe Asia-Temperate ARABIAN PENINSULA: Saudi Arabia, Yemen WESTERN ASIA: Afghanistan CHINA: China [Yunnan Sheng, Hainan Sheng] Asia-Tropical INDIAN SUBCONTINENT: Bhutan, India, Sri Lanka, Nepal, Pakistan INDO-CHINA: Cambodia, Myanmar, Thailand, Vietnam MALESIA: Malaysia Cultivated Asia-Tropical INDIAN SUBCONTINENT: India Naturalized Australasia AUSTRALIA: Australia Northern America REGION: Mexico, United States (s.e.)"</p>
	<p>Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL</p>	<p>"Tropical Africa to South Africa, tropical Asia, Arabia."</p>

205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	<p>Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). (2013). Manual of Grasses for North America. Utah State University Press, Logan, UT</p>	<p>"A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States."</p>

301	<b>Naturalized beyond native range</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	<p>Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). (2013). Manual of Grasses for North America. Utah State University Press, Logan, UT</p>	<p>"A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States. It is considered a weed in the Flora area, but it is cultivated in India as a grain and forage crop; the grain is sometimes used for birdseed."</p>
	<p>USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a>. [Accessed 12 Jul 2022]</p>	<p>"Naturalized Australasia AUSTRALIA: Australia Northern America REGION: Mexico, United States (s.e.)"</p>

302	<b>Garden/amenity/disturbance weed</b>	
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	NC State Extension. (2022). <i>Urochloa ramosa</i> . <a href="https://plants.ces.ncsu.edu/plants/urochloa-ramosa/">https://plants.ces.ncsu.edu/plants/urochloa-ramosa/</a> . [Accessed 20 Jul 2022]	"Problems: Weedy"
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	[A weedy grass that can sometimes impact crop yield and quality] "Weedy or Invasive: Browntop millet can become weedy, and may interfere with crop harvest. It produces large amounts of seed and can readily regrow from a viable seed bank, even after several years. It has been found to reduce yield and lower quality of cotton in the southeastern United States (Molin, 2008)."
	Flora of North America Editorial Committee, eds. (1993+). Flora of North America North of Mexico [Online]. 22+ vols. New York and Oxford. <a href="http://beta.floranorthamerica.org">http://beta.floranorthamerica.org</a> . [Accessed ]	[Both values as a crop and regarded as a weed] "A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States. It is considered a weed in the Flora area, but it s cultivated in India as a grain and forage crop; the grain is sometimes used for birdseed."

303	Agricultural/forestry/horticultural weed	y
	<b>Source(s)</b>	<b>Notes</b>
	Bond, J. (2012). Weed of the Week: Browntop Millet. Mississippi Crop Situation August 13, 2012. Mississippi State University. <a href="https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/">https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/</a> . [Accessed 20 Jul 2022]	"Seed are long-lived in the soil, so the species often becomes established as a weed. In Mississippi, browntop millet is found in cultivated areas, lawns, pastures, and along roadsides. When residual herbicides are not utilized, browntop millet can be troublesome late in the season in Mississippi row crops, which may complicate harvest."
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Weedy or Invasive: Browntop millet can become weedy, and may interfere with crop harvest. It produces large amounts of seed and can readily regrow from a viable seed bank, even after several years. It has been found to reduce yield and lower quality of cotton in the southeastern United States (Molin, 2008)."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[ <i>Brachiaria ramosa</i> ] "Weed of: Bananas, Cereals, Orchards & Plantations"

304	Environmental weed	
	<b>Source(s)</b>	<b>Notes</b>
	Queensland Government. (2022). Species profile— <i>Urochloa ramosa</i> . <a href="https://apps.des.qld.gov.au/species-search/details/?id=29239">https://apps.des.qld.gov.au/species-search/details/?id=29239</a> . [Accessed 20 Jul 2022]	"Pest status - Environmental Weed" [No description of impacts. Unable to corroborate with other sources]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[ <i>Brachiaria ramosa</i> ] "Weed of: Bananas, Cereals, Orchards & Plantations"

305	Congeneric weed	y
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Dairel, M., & Fidelis, A. (2020). The presence of invasive grasses affects the soil seed bank composition and dynamics of both invaded and non-invaded areas of open savannas. <i>Journal of Environmental Management</i> , 276, 111291	"In open savannas of the Cerrado, <i>Urochloa brizantha</i> (Hochst. ex A. Rich.) R.D.Webster- synonym <i>Brachiaria brizantha</i> (Hochst. ex A. Rich.) Stapf and <i>Melinis minutiflora</i> Beauv. are African invasive species, being both perennial C4 grasses used mostly for pastures (Pivello et al., 1999a; Pivello et al., 1999b). Although they do not change the physiognomy of the herbaceous layer, they affect plant communities, having a negative impact by decreasing species diversity and altering biomass composition (Aires et al., 2014; Damasceno et al., 2018)."
	Weber, E. (2017). <i>Invasive Plant Species of the World</i> , 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	" <i>Urochloa mutica</i> is a fast-growing grass associated with wet habitats. It has become invasive in a number of regions and forms dense covers along streams and other water bodies. Stems grow out on the water surface and build up floating rafts. Such mats may grow up to 1 m thick. Floating stems may become up to 6 m long (Langeland and Craddock Burks, 1998). The dense and monospecific stands of the weed choke out other plant species (Cowie and Werner, 1993). The grass is tolerant of brackish water and withstands periods of drought. It reproduces and spreads primarily vegetatively by stem fragments, which are carried by water. Viable seeds are rarely produced in Florida (Langeland and Craddock Burks, 1998)."
	Smith, C.W. (1985). <i>Impact of Alien Plants on Hawaii's Native Biota</i> . Pp. 180-250 in Stone & Scott (eds.). <i>Hawaii's terrestrial ecosystems: preservation &amp; management</i> . CPSU, Honolulu, HI	[ <i>Brachiaria mutica</i> = <i>Urochloa mutica</i> ] "This perennial grass can reach heights of 2 m. It forms dense monotypic stands by layering from trailing stems. It will overgrow most shrubs and trees in its habitat. It has mild allelopathic activity (Chou and Young 1975). Man is the principal dispersal agent. Fire is rare in its habitat but the dense stands rapidly regenerate from any damage that they suffer. It has not been evaluated for biological control because it is a valued pasture grass in lowland areas."
	Barbosa, E. G., Pivello, V. R., & Meirelles, S. T. (2008). Allelopathic evidence in <i>Brachiaria decumbens</i> and its potential to invade the Brazilian cerrados. <i>Brazilian Archives of Biology and Technology</i> , 51, 625-631	[ <i>Urochloa decumbens</i> ] "The high dominance of <i>Brachiaria</i> grasses over cerrado native herbs has recently raised investigations on the presence of phytotoxins in some species. In cerrados, <i>B. decumbens</i> (Nees) Stapf. has advanced massively throughout the native vegetation and formed monospecific patches with no other species growing below or close to it. In situ studies in São Paulo State cerrado areas have shown that even <i>M. minutiflora</i> , another East-African grass that invaded the cerrado, could have been displaced by <i>B. decumbens</i> (Pivello et al., 1999a; 1999b), revealing a high competitive advantage of the latter species."

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

Qsn #	Question	Answer
	Flora of North America Editorial Committee, eds. (1993+). Flora of North America North of Mexico [Online]. 22+ vols. New York and Oxford. <a href="http://beta.floranorthamerica.org">http://beta.floranorthamerica.org</a> . [Accessed 12 Jul 2022]	[No evidence] "Plants annual; tufted. Culms 10-65 cm, decumbent, rooting or not at the lower nodes; nodes pubescent. Sheaths usually puberulous, sometimes glabrous or sparsely pilose, margins ciliate; ligules 0.8-1.7 mm; blades 2-25 cm long, 4-14 mm wide, glabrous, margins scabrous. Panicles 3-13 cm, simple, with 3-15 spikelike primary branches; primary branches 1-8 cm, divergent, axils glabrous, axes 0.4-0.6 mm wide, triquetrous, glabrous, scabrous, or pubescent, with or without some papillose-based hairs; secondary branches, if present, confined to the lower branches; pedicels shorter than the spikelets, scabrous or pubescent. Spikelets 2.5-3.4 mm long, 1.3-2 mm wide, ellipsoid, apices broadly acute to acute, paired, appressed to the branches. Glumes scarcely separated, rachilla internode between the glumes not pronounced; lower glumes 1-1.5 mm, 1/3 – 1/2 as long as the spikelets, glabrous, 3-5-veined; upper glumes 2.5-3.4 mm, usually puberulent, sometimes glabrous, margins sometimes somewhat pubescent, 7-9-veined, without evident cross venation; lower florets sterile, lower lemmas 2.4-3.3 mm, usually puberulent or occasionally glabrous, margins not ciliate, without cross venation, 5-veined; upper lemmas 2.3-3.3 mm, acute, mucronate; anthers 0.7-1.2 mm. Caryopses 1.2-2.3 mm; hila punctiform. 2n = 36 (usually); also 14, 28, 32, 42, 46, 72."

402	Allelopathic	n
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Cover crop/green manure: Browntop millet is used to suppress root-knot nematode populations in tomato and pepper crops in the Southeast (McSorley et al., 1999). It is grown as a fast-growing catch crop between commodity crops, and is not known to be allelopathic."

403	Parasitic	n
	Source(s)	Notes
	Flora of North America Editorial Committee, eds. (1993+). Flora of North America North of Mexico [Online]. 22+ vols. New York and Oxford. <a href="http://beta.floranorthamerica.org">http://beta.floranorthamerica.org</a> . [Accessed 12 Jul 2022]	"Plants annual; tufted." [Poaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Forage/Feed: Compared to other warm season forage grasses, browntop millet is relatively low yielding. Its strength is that it is a rapidly maturing grass, often used as a catch crop, cover crop, or nurse crop (Miller and Lord, 2007). Browntop millet can yield 1,800–4,000 lb/ac dry matter (FAO, 2007; UF, 2007). These yields are 60–70% of pearl millet or sorghum x Sudangrass hybrids (Hancock, 2010)."



Qsn #	Question	Answer
	NC State Extension. (2022). <i>Urochloa ramosa</i> . <a href="https://plants.ces.ncsu.edu/plants/urochloa-ramosa/">https://plants.ces.ncsu.edu/plants/urochloa-ramosa/</a> . [Accessed 12 Jul 2022]	"It can be found growing in fields, corn fields, and waste sites. Its primary use is as a forage crop for domestic animals and game animals and birds such as deer, turkey, duck, dove, quail, rabbit and pheasant. With ideal conditions provided, germination can occur within 5 days and the rapidly growing crop can be harvested in two months. Its fine stems and leaves allow the plant to dry sufficiently to create a dry hay product."

405	Toxic to animals	
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet can accumulate toxic/lethal levels of nitrate and should not be fed to livestock if the plant has been stressed by droughty or cold conditions." [Potentially toxic under certain growing conditions]
	Bryson, C.T.& DeFelice, M.S. (2009). Weeds of the South. University of Georgia Press, Athens, GA	"Toxic Properties. None reported."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet may become infested with armyworms (MSU, 2010), grasshoppers (Baker, 1996), and is susceptible to mung bean yellow mosaic bigeminivirus (Brunt et al., 1996)."
	NC State Extension. (2022). <i>Urochloa ramosa</i> . <a href="https://plants.ces.ncsu.edu/plants/urochloa-ramosa/">https://plants.ces.ncsu.edu/plants/urochloa-ramosa/</a> . [Accessed 12 Jul 2022]	"Insects, Diseases, and Other Plant Problems: Army worms and grasshoppers are common insect problems. Self seeding can be an issue that needs to be monitored to prevent it from taking over and causing harvesting of the companion crops."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet can accumulate toxic/lethal levels of nitrate and should not be fed to livestock if the plant has been stressed by droughty or cold conditions." [Potentially toxic to animals under certain growing conditions]
	Quattrocchi, U. (2006). CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"often heavily grazed, human and animal food, used for wildbird feed and as minor forage plant, cereal, forage, in South India grains used in preparing at least nine traditional foods, seeds mixed with bajra (millet) to increase bulk (in India, Rajasthan),"

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	[Fire ecology unknown. May contribute to fine fuel load, but may not commonly grow in dry, fire-prone ecosystems] "Browntop millet grows in rocky, shallow soils from sea level up to 8,000 ft (FAO, 2007). It is adaptable to almost all upland soil (Mitchell et al., 1989), but does not grow well in water-restricted, droughty conditions."

Qsn #	Question	Answer
	USDA Natural Resources Conservation Service. (2022). <i>Bromus biebersteinii</i> . <a href="https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA">https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA</a> . [Accessed 20 Jul 2022]	Fire Resistant No Fire Tolerance None

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"It grows best in sandy loam soils with a pH 5–6.5 (UF, 2007) under full sun."
	NC State Extension. (2022). <i>Urochloa ramosa</i> . <a href="https://plants.ces.ncsu.edu/plants/urochloa-ramosa/">https://plants.ces.ncsu.edu/plants/urochloa-ramosa/</a> . [Accessed 12 Jul 2022]	"Light: Full sun (6 or more hours of direct sunlight a day)"
	USDA Natural Resources Conservation Service. (2022). <i>Bromus biebersteinii</i> . <a href="https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA">https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA</a> . [Accessed 20 Jul 2022]	"Shade Tolerance - Intolerant"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet grows in rocky, shallow soils from sea level up to 8,000 ft (FAO, 2007). It is adaptable to almost all upland soil (Mitchell et al., 1989), but does not grow well in water-restricted, droughty conditions."

411	Climbing or smothering growth habit	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	"Annual, erect or geniculate, loosely tufted, leaves broadly linear, several racemes on a common axis, racemes simple or branched at base, spikelets mostly paired, pedicels shorter than the spikelets, stipe present or absent, upper glume and lower lemma membranous, upper lemma acute and rugose"

412	Forms dense thickets	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	"weed species not aggressive"
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	[Impacts associated with reduced yield and quality, and not competitive exclusion by formation of dense cover] "Browntop millet can become weedy, and may interfere with crop harvest. It produces large amounts of seed and can readily regrow from a viable seed bank, even after several years. It has been found to reduce yield and lower quality of cotton in the southeastern United States (Molin, 2008)."

Qsn #	Question	Answer
	Flora of North America Editorial Committee, eds. (1993+). Flora of North America North of Mexico [Online]. 22+ vols. New York and Oxford. <a href="http://beta.floranorthamerica.org">http://beta.floranorthamerica.org</a> . [Accessed ]	[No indication under natural conditions] "A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States. It is considered a weed in the Flora area, but it is cultivated in India as a grain and forage crop; the grain is sometimes used for birdseed."

501	Aquatic	n
	Source(s)	Notes
	Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). (2013). Manual of Grasses for North America. Utah State University Press, Logan, UT	[Terrestrial] "A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States."

502	Grass	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 12 Jul 2022]	"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
	Source(s)	Notes
	Flora of North America Editorial Committee, eds. (1993+). Flora of North America North of Mexico [Online]. 22+ vols. New York and Oxford. <a href="http://beta.floranorthamerica.org">http://beta.floranorthamerica.org</a> . [Accessed 12 Jul 2022]	"Plants annual; tufted. Culms 10-65 cm, decumbent, rooting or not at the lower nodes; nodes pubescent."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Flora of North America Editorial Committee, eds. (1993+). Flora of North America North of Mexico [Online]. 22+ vols. New York and Oxford. <a href="http://beta.floranorthamerica.org">http://beta.floranorthamerica.org</a> . [Accessed ]	[No evidence. Widespread native and introduced range] "A weedy species of tropical Africa and Asia, <i>Urochloa ramosa</i> has spread throughout the tropics and subtropics, including the southeastern United States. It is considered a weed in the Flora area, but it is cultivated in India as a grain and forage crop; the grain is sometimes used for birdseed."

602	Produces viable seed	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	NC State Extension. (2022). <i>Urochloa ramosa</i> . <a href="https://plants.ces.ncsu.edu/plants/urochloa-ramosa/">https://plants.ces.ncsu.edu/plants/urochloa-ramosa/</a> . [Accessed 12 Jul 2022]	"Life Cycle: Annual Perennial Recommended Propagation Strategy: Seed"
	Bond, J. (2012). Weed of the Week: Browntop Millet. Mississippi Crop Situation August 13, 2012. Mississippi State University. <a href="https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/">https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/</a> . [Accessed 20 Jul 2022]	"Seed are long-lived in the soil, so the species often becomes established as a weed. "
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Seeds and Plant Production. Browntop millet is a short day (<12 hour) plant that will begin to set seed in 60 days (MSUES, 2010). It can produce 140,000 seeds/lb (Woodruff et al., 2010) and 1,500 lb of seed/ac (Warnell, 2014). Seed should be stored at 13% moisture or less (Oelke, 1990)."

603	Hybridizes naturally	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2022). Personal Communication	Unknown. Hybrids documented in the genus

604	Self-compatible or apomictic	
	<b>Source(s)</b>	<b>Notes</b>
	Watson, L., Macfarlane, T.D., and Dallwitz, M.J. (1992 onwards). The grass genera of the world. Version: 20th May 2022. <a href="https://www.delta-intkey.com">https://www.delta-intkey.com</a> . [Accessed 20 Jul 2022]	[Possibly. <i>Urochloa</i> genus description] "Apomictic, or reproducing sexually."

605	Requires specialist pollinators	n
	<b>Source(s)</b>	<b>Notes</b>
	Smith, J. P. Jr. (2005). <i>Agrostology; An Introduction to the Systematics of Grasses</i> . Botanical Studies. 10	"Grasses are heavily adapted for wind pollination and cross-fertilization."

606	Reproduction by vegetative fragmentation	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA Natural Resources Conservation Service. (2022). <i>Bromus biebersteinii</i> . <a href="https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA">https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA</a> . [Accessed 20 Jul 2022]	Vegetative Spread Rate None

Qsn #	Question	Answer
607	Minimum generative time (years)	1
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet ( <i>Urochloa ramosa</i> ) is an introduced, annual/perennial warm-season grass often used in forage/pasture management systems."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	PlantUse English contributors. (2022). <i>Brachiaria ramosa</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 20 Jul 2022]	"Cultivated browntop millet has larger inflorescences than its weedy relatives and has lost the ability of natural seed dispersal. Types with different degrees of spikelet disarticulation commonly occur in the same field."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet ( <i>Urochloa ramosa</i> ) is an introduced, annual/perennial warm-season grass often used in forage/pasture management systems."
	Bond, J. (2012). Weed of the Week: Browntop Millet. Mississippi Crop Situation August 13, 2012. Mississippi State University. <a href="https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/">https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/</a> . [Accessed 20 Jul 2022]	"Browntop millet is native to southeast Asia but has adapted well in the southern United States since its introduction in the early 20th century. It is often planted as a wildlife forage, but it is also used for erosion control and as livestock forage."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet can become weedy, and may interfere with crop harvest. It produces large amounts of seed and can readily regrow from a viable seed bank, even after several years. It has been found to reduce yield and lower quality of cotton in the southeastern United States (Molin, 2008)." [Possibly, if occurring with other crops]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	PlantUse English contributors. (2022). <i>Brachiaria ramosa</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 20 Jul 2022]	"Cultivated browntop millet has larger inflorescences than its weedy relatives and has lost the ability of natural seed dispersal."

Qsn #	Question	Answer
705	<b>Propagules water dispersed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	PlantUse English contributors. (2022). <i>Brachiaria ramosa</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 20 Jul 2022]	"Cultivated browntop millet has larger inflorescences than its weedy relatives and has lost the ability of natural seed dispersal."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans, Water" [Uncorroborated. Water may contribute to secondary dispersal of seeds]

706	<b>Propagules bird dispersed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	[Possibly. Viability of ingested seeds not evaluated] "Wildlife: Browntop millet can represent 10–25% of the diet of terrestrial and water birds (USDA NRCS, 2014). It is a prolific seed producer that is planted to attract wild game like pheasants, turkeys, and ducks. In a two-year study by Futch, Duguay, and Tolson (2013), 50% of ingested seed found in mourning doves' crops was browntop millet. It is also used in deer food plots and as exotic bird feed."

707	<b>Propagules dispersed by other animals (externally)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	PlantUse English contributors. (2022). <i>Brachiaria ramosa</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 20 Jul 2022]	"Cultivated browntop millet has larger inflorescences than its weedy relatives and has lost the ability of natural seed dispersal."

708	<b>Propagules survive passage through the gut</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	[Possibly. Viability of ingested seeds not evaluated] "Wildlife: Browntop millet can represent 10–25% of the diet of terrestrial and water birds (USDA NRCS, 2014). It is a prolific seed producer that is planted to attract wild game like pheasants, turkeys, and ducks. In a two-year study by Futch, Duguay, and Tolson (2013), 50% of ingested seed found in mourning doves' crops was browntop millet. It is also used in deer food plots and as exotic bird feed."

801	<b>Prolific seed production (&gt;1000/m2)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Browntop millet is a short day (<12 hour) plant that will begin to set seed in 60 days (MSUES, 2010). It can produce 140,000 seeds/lb (Woodruff et al., 2010) and 1,500 lb of seed/ac (Warnell, 2014)." [Seed densities under natural conditions unknown, but not expected to be as high]

802	<b>Evidence that a persistent propagule bank is formed (&gt;1 yr)</b>	<b>y</b>
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Bond, J. (2012). Weed of the Week: Browntop Millet. Mississippi Crop Situation August 13, 2012. Mississippi State University. <a href="https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/">https://www.mississippi-crops.com/2012/08/13/weed-of-the-week-browntop-millet/</a> . [Accessed 20 Jul 2022]	"Seed are long-lived in the soil, so the species often becomes established as a weed."
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"Weedy or Invasive: Browntop millet can become weedy, and may interfere with crop harvest. It produces large amounts of seed and can readily regrow from a viable seed bank, even after several years."

803	Well controlled by herbicides	y
	<b>Source(s)</b>	<b>Notes</b>
	Southern Cover Crops Council. (2022). Cover Crop Information Sheet. Browntop millet ( <i>Urochloa ramosa</i> ). <a href="https://southerncovercrops.org">https://southerncovercrops.org</a> . [Accessed 20 Jul 2022]	"Browntop millet can be terminated by heavy grazing. It can also be terminated by mowing after it has headed out, herbicides, and tilling."
	Wood, I. M. W. (1970). Herbicides for the control of grass weeds in pastures of Townsville stylo ( <i>Stylosanthes humilis</i> ). Australian Journal of Experimental Agriculture, 10(47), 790-794	"The use of herbicides to control annual grasses in pastures of Townsville stylo ( <i>Stylosanthes humilis</i> ) was studied at Katherine, N.T. The herbicides chlorthal, trifluralin, benefin, sindone B, and siduron all controlled the annual grasses <i>Digitaria adscendens</i> and <i>Brachiaria ramosa</i> . The outstanding herbicide was chlorthal, which at 6 lb a.i. an acre pre-emergence gave a Townsville stylo dry matter yield of 3250 lb an acre compared with 1130 lb an acre for the unweeded control and 2440 lb an acre for the handweeded control. At maturity there was no grass in the chlorthal plots and 1940 lb an acre in the unweeded control plots. The data suggest that, without defoliation during the growing period, total suppression of Townsville stylo can be expected when the grass population at establishment exceeds 37 per cent of the total plant population."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	<b>Source(s)</b>	<b>Notes</b>
	Southern Cover Crops Council. (2022). Cover Crop Information Sheet. Browntop millet ( <i>Urochloa ramosa</i> ). <a href="https://southerncovercrops.org">https://southerncovercrops.org</a> . [Accessed 20 Jul 2022]	"Browntop millet can be terminated by heavy grazing. It can also be terminated by mowing after it has headed out, herbicides, and tilling."
	Sheahan, C.M. (2014). Plant guide for browntop millet ( <i>Urochloa ramosa</i> ). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ	"It does not regrow well after cutting so is a one-cut crop."
	USDA Natural Resources Conservation Service. (2022). <i>Bromus biebersteinii</i> . <a href="https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA">https://plantsorig.sc.egov.usda.gov/java/charProfile?symbol=URRA</a> . [Accessed 20 Jul 2022]	Fire Resistant No Fire Tolerance None

Qsn #	Question	Answer
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown



**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Broad climate suitability
- Grows and able to spread in tropical regions
- Naturalized in Australia and North America (Mexico and SE USA), but no evidence in the Hawaiian Islands to date
- A weedy grass and minor agricultural weed reported to impact quality and yield of certain crops
- Other *Urochloa* species are invasive weeds
- Can accumulate toxic levels of nitrate and should not be fed to livestock if the grass has been stressed by drought or cold conditions
- Tolerates many soil types
- Reproduces by seeds
- Annual/perennial life cycle (able to reach maturity in one growing season)
- Seeds dispersed by cultivation, possibly water, and potentially by animals or as a crop contaminant
- Seeds may form a persistent seed bank

## Low Risk Traits

- A domesticated crop with cultivated forms that have greatly reduced dispersibility
- Weedy impacts appear to be restricted to certain crops
- Unarmed (no spines, thorns, or burrs)
- Valued pasture grass and source of feed for birds
- Grows best in high light environments (dense shade may inhibit spread)
- Herbicides, mowing and potentially fire may provide effective control