Family: ***Poaceae***

Taxon: ***Setaria sphacelata***

Synonym: *Chaetochloa aurea (Hochst. ex A. Braun) Hit*
Panicum sphacelatum Schumach.
Setaria almaspicata de Wit
Setaria anceps Stapf
Setaria aurea Hochst. ex A. Braun
Setaria flabellata Stapf
Setaria neglecta de Wit
Setaria perennis Hack.
Setaria splendida Stapf
Setaria trinervia Stapf

Common Name: African bristle grass
broadleaf setaria
splendida setaria

Questionaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** H(HPWRA)
Status: Assessor Approved **Data Entry Person:** Chuck Chimera **WRA Score 19**

101	**Is the species highly domesticated?**	**y=-3, n=0**	**n**
102	**Has the species become naturalized where grown?**	**y=1, n=-1**	
103	**Does the species have weedy races?**	**y=1, n=-1**	
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**	**n=0, y = 1*multiplier (see Appendix 2)**	
303	**Agricultural/forestry/horticultural weed**	**n=0, y = 2*multiplier (see Appendix 2)**	
304	**Environmental weed**	**n=0, y = 2*multiplier (see Appendix 2)**	**y**
305	**Congeneric weed**	**n=0, y = 1*multiplier (see Appendix 2)**	**y**
401	**Produces spines, thorns or burrs**	**y=1, n=0**	**n**
402	**Allelopathic**	**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**	**y=1, n=0**	
406	**Host for recognized pests and pathogens**	**y=1, n=0**	**y**

407	**Causes allergies or is otherwise toxic to humans**	**y=1, n=0**	**n**
408	**Creates a fire hazard in natural ecosystems**	**y=1, n=0**	**n**
409	**Is a shade tolerant plant at some stage of its life cycle**	**y=1, n=0**	**y**
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y=1, n=0**	**y**
411	**Climbing or smothering growth habit**	**y=1, n=0**	**n**
412	**Forms dense thickets**	**y=1, n=0**	**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**	**y=1, n=-1**	**y**
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**	**y**
607	**Minimum generative time (years)**	**1 year = 1, 2 or 3 years = 0, 4+ years = -1**	**1**
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**y=1, n=-1**	**y**
702	**Propagules dispersed intentionally by people**	**y=1, n=-1**	**y**
703	**Propagules likely to disperse as a produce contaminant**	**y=1, n=-1**	
704	**Propagules adapted to wind dispersal**	**y=1, n=-1**	**y**
705	**Propagules water dispersed**	**y=1, n=-1**	**n**
706	**Propagules bird dispersed**	**y=1, n=-1**	**n**
707	**Propagules dispersed by other animals (externally)**	**y=1, n=-1**	**n**
708	**Propagules survive passage through the gut**	**y=1, n=-1**	**y**
801	**Prolific seed production (>1000/m2)**	**y=1, n=-1**	
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**y=1, n=-1**	**n**
803	**Well controlled by herbicides**	**y=-1, n=1**	**y**
804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y=1, n=-1**	**y**
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	**y=-1, n=1**	

Designation: H(HPWRA) **WRA Score** **19**

Supporting Data:

101	1979. Clayton, W.D.. Notes on Setaria (Gramineae). Kew Bulletin. 33(3): 501-509.	"Morphological relationships are here re examined using a sample of tropical African specimens assignable to the four commonest traditional species...When plotted (Fig. 2) it is evident that S. sphacelata S. anceps and S. splendida represent segments of a continuous gradient of plant size...It is evident that, both in the cytogenetic and morphological sense, these entities form a continuum, and that there is no case for recognizing more than one species."
101	2001. Sotomayor-Ríos, A./Pitman, W.D.. Tropical forage plants: development and use. CRC Press, Boca Raton, FL	Several cultivars & varieties, but no indication that any are highly domesticated to the point in which there ability to naturalize or invade would be minimized
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	"Tropical and South Africa, Yemen, Arabia."
202	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	[Species highly suited to tropical and subtropical climates]
203	1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands	"…widespread in East Africa, mainly in the humid Zone II (3.4.2), independent of altitude (from sea level to 3000 m), and the wetter parts of Zone III. Setaria occurs in Kikuyu- and Stargrass zone but also in the humid lowlands in central Zaire (Blouard & Behaeghe, 1961)…Its natural occurrence at altitudes above 2500 m, occasionally to about 3000 m, makes it not surprising that Setaria tolerates light frosts well." [broad elevational range within the tropics]
203	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Best suited to non-equatorial conditions. Found in its native environment from sea level to 3,300 m, most commonly between 600 and 2,700 m asl. Grows best at about 18 22°C. Moderate early season growth in the subtropics and upland tropics, with 'Narok' and 'Solander' producing up to four times the cool season yield of the other cultivars. Frost tolerance varies with provenance/cultivar, with 'Narok' and 'Solander' the most frost tolerant, sustaining little leaf damage at grass temperatures down to -3°C (similar to Paspalum dilatatum). 'Kazungula' is more cold tolerant than 'Nandi' in which plants are killed at -4°C."
204	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	"Tropical and South Africa, Yemen, Arabia." [Native or naturalized in regions with tropical or subtropical climates]
205	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Commonly planted in Africa, Asia, and Australia, becoming naturalised beyond the planted areas." [refers to Setaria sphacelata var. anceps]
301	2002. Starr, F./Martz, K./Loope, L.L.. New plant records from the Hawaiian archipelago. Bishop Museum Occasional Papers. 69: 16-27.	"Setaria sphacelata Stapf & Hubb. Ex M.B. Moss New naturalized record Native to Africa, S. sphacelata is cultivated in experiment stations and escaped along irrigation ditches in California (Hitchcock, 1971: 720). In Hawai'i, it has recently been found in mesic pastures in Kokomo, Maui. R. Hobdy recalls collecting this species near the Pi'iholo experimental station in the 1980s, about one mile from the Kokomo site. This collection documents the naturalized status on Maui and represents a new state record. Tufted perennial, glabrous or nearly so, often with stout rhizomes; culms 0.5–1.5 m tall, flattened; blades flat, rather lax, 4–10 mm wide; panicle dense, cylindric, 8–15 cm long, usually orange to purple, bristles mostly 5 or more, 3–6 mm long; spikelets 2.5–3 mm long; fruit finely rugose (Hitchcock, 1971: 720). Material examined. MAUI: E. Maui, Kokomo, pastures on Kaupakulua Rd, 1500 ft [457 m], 4 Aug 1999, Starr & Martz 990804-1."
301	2003. Laegaard, S./Garcia, P.P.. Invasive grasses in the Galapagos Islands. Lyonia. 6: 171-175.	"Setaria sphacelata is also of African origin. Only in a couple of places in Galápagos it has been observed as cultivated for grazing. In the mainland of Ecuador it can become invasive but mainly at higher altitudes and in rather moist climate."

301	2004. Herbst, D.R./Staples, G.W./Imada, C.T.. New Hawaiian plant records for 2002-2003. Bishop Museum Occasional Papers. 78: 3-12.	"First reported from the island of Maui as a naturalized species in Hawai'i (Starr et al., 2002: 23), Setaria sphacelata has now been documented from three additional islands: Kaua'i, O'ahu, and Hawai'i. Material examined. KAUA'I: Hanalei National Wildlife Refuge, uncommon weedy grass on bank of dried pond, 12 Jul 2002, C. Imada & T. Perkins 2002–11. O'AHU: On roadcut above the H- 3 Freeway between the Käne'ohe and Kailua exits, above the Ho'omaluhia Botanical Garden, growing along 1 to 2 miles of the highway, 21º23'N, 157º48'W, 250 ft, 22 May 2002, K. Kawelo & J. Rohrer s.n. (BISH 687842). HAWAI'I: Honoka'a Sugar Company, 18 May 1979, R. Kami s.n. (BISH 427545, 516906)."
301	2011. Calflora. The Calflora Database - Setaria sphacelata. http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=7538	"Setaria sphacelata, a monocot, is a perennial herb that is not native to California; it was introduced from elsewhere and naturalized in the wild. "
302	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Ability to spread: Spreads effectively by seed, readily colonising disturbed areas such as roadsides. Weed potential: Listed as a weed in some regions but rarely invades undisturbed areas." [threatens native plant communities in Australia. See 3.04]
303	1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands	"A drawback of Setaria when fields are ploughed is that seedlings volunteer in subsequent crops. Seedlings can achieve a complete cover and dominate other grasses. This characteristic is shared with Brachiaria and Panicum, but not with Rhodesgrass (Table 6.6)."
303	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Weed potential: Listed as a weed in some regions but rarely invades undisturbed areas.""
303	2011. WRA Specialist. Personal Communication.	Possibly an agricultural weed, but apparently of minor significance, as Setaria sphacelata is usually considered a desirable species used for fodder
304	1998. Rhoades, C.C./Eckertl, G.E./Coleman, D.C.. Effect of Pasture Trees on Soil Nitrogen and Organic Matter: Implications for Tropical Montane Forest Restoration. Restoration Ecology. 6(3): 262-270.	"In lower-montane ecosystems of Ecuador, Setaria sphacelata (foxtail grass), the predominant introduced pasture species, forms a tussock grassland that reduces soil nitrogen and resists recolonization of forest vegetation."
304	2002. Batianoff, G.N./Butler, D.W.. Assessment of Invasive naturalized plants in south-east Queensland. Appendix. Plant Protection Quarterly. 17: 27-34.	[S. sphacelata ranked #85 out of 200 invasive naturalised plants in Southeast Queensland]
304	2003. NSW NPWS. Invasion of native plant communities by exotic perennial grasses as a key threatening process – an overview. NSW National Parks and Wildlife Service, Hurstville, Australia	"Exotic perennial grasses are those that are not native to NSW and have a life-span of more than one growing season. More than a hundred species of exotic perennial grasses occur in New South Wales. A relatively small number of these perennial grasses threaten native plant communities, and it is these species which are of concern. Exotic perennial grasses of special concern include Hyparrhenia hirta (Coolatai grass), Cortaderia spp. (pampas grasses), Sporobolus fertilis (giant Parramatta grass), Nassella neesiana (Chilean needlegrass), Nassella trichotoma (serrated tussock) and invasive forms of Eragrostis curvula (African lovegrass). Some other perennial grasses that may invade native plant communities (in alphabetical order) include Agrostis capillaris (browntop bent), Andropogon virginicus (whisky grass), Cenchrus ciliaris (buffel grass), Chloris gayana (Rhodes grass), Ehrharta erecta (panic veldtgrass), Melinis minutiflora (molasses grass), Panicum repens (torpedo grass), Paspalum urvillei (Vasey grass), Pennisetum clandestinum (kikuyu), Phalaris aquatica (phalaris), Setaria sphacelata (South African pigeon grass), Sporobolus natalensis (giant rat's tail grass) and Urochloa mutica (Para grass). Refer to Table 1 for further information." [threaten native plant communities in Australia]
304	2007. Randall, R.P.. Global Compendium of Weeds - Setaria sphacelata [Online Database]. http://www.hear.org/gcw/species/setaria_sphacelata/	Listed as an environmental weed [Also see 3.02]
305	1992. Stone, C.P./Cuddihy, L.W./Tunison, J.T.. Responses of Hawaiian Ecosystems to Removal of Feral Pigs and Goats. Pp. 666-704 in Stone et al. (eds.). Alien Plant Invasions in Native Ecosystems of Hawai`i: Management and Research. U of Hawaii Coop. Nat.	"Yellow Himalayan raspberry (Rubus ellipticus), Hilo grass (Paspalum conjugatum), meadow ricegrass, strawberry guava, kahili ginger, firetree, banana poka (Passiflora mollissima), and palm grass (Setaria palmifolia) are the rain forest invaders of most concern in the Park, once feral pigs are gone." [Setaria palmifolia invaded native ecosystems]

305	2001. Dekker, J./Lathrop, J./Atchison, B./Todey, D.. The weedy Setaria spp. phenotype: how environment & seeds interact from embryogenesis through germination. Pp 65-74 In: Proceedings 2001 Brighton Crop Protection Conference Weeds. CABI, Brighton, UK	"Setaria spp. are very successful invasive, agricultural weeds. Their success is founded on genetic and phenotypic biodiversity, which results in complex, dynamic soil seed bank behaviour (dormancy, after ripening, germination and seedling emergence). Observed seed behaviour is a consequence of interactions between heterogeneous seed and changing environmental inputs. Given the restraints imposed by seed morphology and the stimulatory effects of oxygen and carbon monoxide on seed germination, it is hypothesized that foxtail seed behaviour is regulated by the amount of oxygen dissolved in water taken into the seed over time. This hypothesis implies that the signal stimulating foxtail behaviour is the quantity of oxygen within the water content of the seed symplast (caryopsis) per time unit: mass O2-1 volume H2O-1 time-1 seed-1. If this hypothesis is true, then the nature of the signal stimulating foxtail seed behaviour can be deduced by computations with hourly soil temperature and daily moisture weather data and used as a predictive tool. We discuss the knowledge with which this hypothesis is derived and present sample calculations of the acute and chronic H2O-O2 signals we are currently attempting to correlate with observed foxtail seedling emergence patterns in the field. Sustainable weed management systems could be improved when real-time information is available to the producer about weedy pests. Predicting foxtail seedling emergence may be possible by combining information about the heterogeneity of dormancy states among seed in the soil and computations of oxygen mass per seed from real-time soil meteorological data."
401	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Perennial tussock to 2 m tall, with short rhizomes. Leaves bluish grey-green, leaf blades soft, glabrous, to 50 cm long and up to about 1 cm wide. Lower parts of culms and the basal leaf-sheaths flattened. Inflorescence a tightly contracted panicle producing a false spike , 7-25 cm long and about 8 mm wide (excluding the dense, radiating golden-yellow bristles); stigmata purple or white." [no spines, thorns, or burrs]
402	1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands	No evidence of allelopathy
402	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Compatibility (with other species) "A very competitive species, suppressing most weeds once established. In the first season, it can be suppressed by short-lived weeds, but assumes dominance in the second or third year. Setaria combines well with legumes if soil fertility , particularly potassium, is maintained. 'Kazungula' is more competitive than other cultivars." [competitive grass, but no evidence of allelopathy]
403	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	Not parasitic
404	1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands	"…preferred by dairy farmers, especially in the wetter areas towards the higher altitudes." [forage for cattle]
404	1999. Wiersema, J.H./León, B.. World Economic Plants: A Standard Reference. CRC Press, Boca Raton, FL	"Animal food (forage)"
404	2001. Sotomayor-Ríos, A./Pitman, W.D.. Tropical forage plants: development and use. CRC Press, Boca Raton, FL	"High oxalate concentrations may reduce animal intake."
404	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Extremely palatable when young but becomes stemmy and unacceptable with maturity."
404	2005. Suttie, J. M./Reynolds, S.G./Batello, C. (eds.). Grasslands of the world. Plant production and protection series No. 34. Food & Agriculture Org., Rome, Italy	"Important grass species that contribute significantly to cattle production include Panicum maximum, P. deustum, Digitaria eriantha and Setaria sphacelata."

405	1972. Jones, R.J./Ford, C.W .. Some factors affecting the oxalate content of the tropical grass Setaria sphacelata. Australian Journal of Experimental Agriculture and Animal Husbandry. 12(57): 400 - 406.	"Cattle deaths through oxalate poisoning following grazing of Setaria sphacelata have been reported (Jones, Seawright and Little 1970) and differences in oxalate content between introductions of this grass noted. The earlier work suggested that higher oxalate contents were associated with higher nitrogen levels in the plant material (Jones, Seawright and Little 1970)...The suggestion made in the earlier work that nitrogen concentration in setaria was related to the oxalate concentration (Jones, Seawright and Little 1970) was confirmed in the present studies although no clear-cut relationship has emerged...From the practical point of view this work has established that nitrogen and potassium fertilizer can lead to increased oxalate in the plant tissue and that the content is highest at night. Where cattle deaths occurred (Jones, Seawright and Little 1970) the setaria on offer had been dressed with heavy amounts of both nitrogen and potassium before grazing, the sward was entirely leafy and the pasture was grazed during the night and day. From the results reported, the combination of these factors could have resulted in a very high oxalate intake." [can be toxic in certain circumstances & under some fertilizer regimens]
406	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Pests and diseases: Leaf spot caused by Pyricularia grisea affects 'Nandi' and 'Narok' under hot, humid conditions but usually not 'Kazungula'. Fungal diseases caused by Tilletia echinosperma (bunt) in Kenya and Sphacelotheca sp. and Fusarium nivale var. majus in Zaire can seriously reduce seed crops. The buffel grass seed caterpillar (Mampava rhodoneura) can also damage seed crops. Attacked by insects such as army worm (Pseudaletia convecta in Australia and Spodoptera exempta in Africa) that attack other tropical grasses."
407	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	No evidence of toxicity to humans [but probably allergenic to susceptible individuals]
408	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Rarely grown in areas where fire is an issue."
409	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Moderate shade tolerance, producing to 60-70% of full light yield at 50% light."
410	2001. Sotomayor-Ríos, A./Pitman, W.D.. Tropical forage plants: development and use. CRC Press, Boca Raton, FL	"It is not well adapted to acid soils below about pH 5.0 or to alkaline soils."
410	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Most commonly found on soils with texture ranging from sand to clay loam and light clay, but will grow on heavy clay. Survives low fertility conditions but responds to improved fertility. Not well adapted to alkaline or very acid soils, most wild collections coming from soils of pH 5.5-6.5. Generally low salt tolerance...Adapted to a wide range of soils. "
411	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Perennial tussock to 2 m tall, with short rhizomes. " [not climbing or smothering]
412	1997. Sarmiento, F.O.. Landscape Regeneration by Seeds and Successional Pathways to Restore Fragile Tropandean Slopelands. Mountain Research and Development. 17(3): 239-252.	"Studies were undertaken on the lack of regeneration of montane forests in northwestern Ecuador (Figure 1), where the presence of an introduced tussock grass (Setaria sphacelata) is now the dominant feature of the landscape. Here, arrested succession has prevented recolonization by forest trees into cleared slopelands and has exacerbated soil erosion and overall degradation of the area. Other grasses (Table 1) are also used for pasturelands in the area; however, the popularity of 'pasto miel' among the local farmers is regrettable...When Setaria sphacelata grass was removed from the quadrat by hand, the regeneration included a great proportion of forbs from Asteraceae, Fabaceae, Malvaceae, Euphorbiaceae, and Poaceae."

412	1998. Rhoades, C.C./Eckertl, G.E./Coleman, D.C.. Effect of Pasture Trees on Soil Nitrogen and Organic Matter: Implications for Tropical Montane Forest Restoration. Restoration Ecology. 6(3): 262-270.	"Setaria pastures form a dense root mat that may deter establishment of other plant species."
412	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"A very competitive species, suppressing most weeds once established. In the first season, it can be suppressed by short-lived weeds, but assumes dominance in the second or third year."
501	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	Terrestrial
502	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	Poaceae [A large proportion of the grass family (Poaceae/Gramineae) are weeds in some context. As with congeneric weed species, there is a high probability that a species from this family will be a weed.]
503	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	Poaceae [not a nitrogen fixing woody plant]
504	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	Poaceae [Not a geophyte]
601	2006. Quattrocchi, U.. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. Volume I. CRC Press, Boca Raton, FL	No evidence of substantial reproductive failure in native habitat
602	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Establishes easily from seed."
603	1979. Clayton, W.D.. Notes on Setaria (Gramineae). Kew Bulletin. 33(3): 501-509.	"Setaria sphacelata is an aggregate of tropical African taxa whose considerable morphological amplitude has led to the description of many segregate species (Stapf & Hubbard 1930). Despite evidence of hybridization at least some of these appear to maintain their identity in the field (Bogdan 1961), although the morphological boundaries between them are very indistinct (Clayton 1966)."
603	1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands	"Setaria sphacelata is a polymorphous species and different names were used at times at the (sub)species level. However, inter-specific hybridization with other Setaria species was easy (Bogdan, 1961d). Within Setaria sphacelata a whole range of ploidy levels can be found; diploid (nandi) and tetraploid (Kazungula; Narok), but Hacker (1966) reported accessions also of 2n = 45, 54, 72, and 90 with chromosome pairing in most of the combinations that had even chromosome numbers. Between ploidy levels cross-fertilization commonly occurs."
604	1950. Gildenhuys, P. J.. Fertility studies in Setaria sphacelata (Schum) Stapf and Hubbard. Science Bulletin No. 314. Department of Agriculture and Forestry, ,Union of South Africa	"Two new methods of estimating the fertility of several morphologically distinct ecotypes of S. sphacelata are described, with data from statistical analyses. The results of fertility tests show that high open and self fertility is accompanied by a stoloniferous growth habit, and low self fertility is generally found in vigourous single-tufted ecotypes. It is concluded that this species is normally cross pollinated; the small amount of segregation in the progeny of the highly self fertile type indicates the occurrence of a certain degree of natural self pollination. Different methods of breeding and their application to improving seed setting in this species are discussed." [self-compatible under certain conditions]
605	1994. Zomlefer, W.B.. Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill & London	Wind-pollinated [Poaceae]

606	1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands	"Vegetative propagation is easy…Mortality of root splits is much less than in Rhodes-grass. However, since the grass is tufted many splits need to be planted to achieve a closed sward. In Zaire, vegetative propagation is possible when seed storage facilities are poor (Behaeghe, 1960)…Unfavourable growth conditions favour the development of leafy shoots in the ripening panicles. This is called vivipary or vegetative proliferation (Langer & Ryle, 1958) and occurs usually over the whole length of the panicle. When such panicles are removed and planted, root formation occurs and many new plants grow up."
607	2010. Mushtaque, M./Ishaque,, M./Ahmad, M./Bukhsh, H.A.. Growth and herbage yield of Setaria sphacelata grass in response to varying clipping stages. The Journal of Animal & Plant Sciences. 20(4): 261-265.	"Four clipping stages i.e. clipping at 1 month (CS1), 2-month (CS2), 3-month (CS3) and 4 month (CS4) were studied where CS1, CS2, CS3 and CS4 represented vegetative, flowering, seeding and seed fall growth stages, respectively." [able to set seed in <1 year]
701	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Spreads effectively by seed, readily colonising disturbed areas such as roadsides."
702	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Commonly planted in Africa, Asia, and Australia, becoming naturalised beyond the planted areas."
703	2011. WRA Specialist. Personal Communication.	Unknown. No evidence, but possible if grown with other desirable pasure grasses
704	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Spreads effectively by seed, readily colonising disturbed areas such as roadsides." [presumably wind-dispersed for short distances, as well as gravity]
705	2011. WRA Specialist. Personal Communication.	No evidence of water dispersal
706	2011. WRA Specialist. Personal Communication.	No evidence of bird-dispersal, and not fleshy fruited.
707	2011. WRA Specialist. Personal Communication.	No evidence of external dispersal by animals [no means of external attachment]
708	1991. Jones, R.M./Noguchi, M./Bunch, G.A.. Levels of germinable seed in topsoil and cattle faeces in legume-grass and nitrogen-fertilized pastures in south-east Queensland. Australian Journal of Agricultural Research. 42(6): 953-968.	"Seedlings of the sown species were very rare; the highest levels recorded were 0.02 Siratro seedlings g-l of faeces from the stable legume pasture and 0-02 setaria seedlings g-I in the lightly-grazed nitrogen fertilized pasture, both in the autumn sampling. The calculated annual output of germinable seed in faeces within each pasture (Table 6) is based on the average of four samplings from October 1979 to July 1980. The impact of stocking rate on the number of seeds dispersed in faeces per unit area of pasture is also shown in Table 6. The overgrazed nitrogen fertilized pasture had fewer seeds per gram of faeces than the overgrazed legume pasture, but had more faecal seed per unit area of pasture."
801	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Flowering occurs over a long period. Presentation yields ranging from 40-560 kg seed/ha are quoted in the literature, although good commercial yields are usually of the order of 100 kg/ha. Crops fertilised with 100-150 kg/ha N are usually direct headed when 10-15 percent of the seed has shattered." [high seed output in cultivated setting. Possibly high seed output in natural settings. See 4.12]
802	1987. McIvor, J.G.. Changes in germinable seed levels in soil beneath pastures near Townsville, North Queensland. Australian Journal of Experimental Agriculture. 27(2): 283 - 289.	"The perennial native grasses also had low germinable seed numbers. In a study in south-eastern Queensland (R. M. Jones, pers. comm.), the sown grass Setaria sphacelata also had low soil seed levels." [apparently does not produce a persistent seed bank]
803	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Herbicide effects: Established setaria is tolerant of 2,4-D, dicamba and MCPA. It can be controlled with glyphosate."

804	1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands	"Nandi Setaria is relatively susceptible to damage by fire. For instance, when grown in seed fields in wide rows, regrowth is greatly impaired when the grass catches fire in or at the end of the dry season."
804	2005. Cook, B.G./Pengelly, B.C./Brown, S.D./Donnelly, J.L./Eagles, D.A./Franco, M.A./Hanson, J./Mullen, B.F./Partridge, I.J./Peters, M/Schultze-Kraft, R.. Tropical Forages: an interactive selection tool., [CD-ROM],. SIRO, DPI&F(Qld), CIAT and ILRI, http:	"Fairly tolerant of cutting and grazing...Mostly not burnt, but will survive the occasional fire. Higher basal area and tiller number under late burning compared with early or no burning."
805	2011. WRA Specialist. Personal Communication.	Unknown