

Taxon: <i>Festuca trachyphylla</i> (Hack.) Hack.	Family: Poaceae
Common Name(s): hard fescue	Synonym(s): <i>Festuca brevipila</i> R. Tracey <i>Festuca duriuscula</i> auct. N. Amer. <i>Festuca longifolia</i> auct. pl. <i>Festuca ovina</i> subvar. <i>trachyphylla</i> <i>Festuca ovina</i> var. <i>duriuscula</i> auct. N.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 20 Dec 2016
WRA Score: 4.0	Designation: EVALUATE	Rating: Evaluate

Keywords: Temperate Grass, Naturalized, Palatable, Soil Stabilization, Erosion Control

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Low
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	n
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
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		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
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	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		
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	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
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	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
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)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Flora of North America Editorial Committee. 2007. Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	[No evidence] "Festuca trachyphylla is native to open forests and forest edge habitats of Europe. It has been introduced and has become naturalized in many temperate regions. In the Flora region, <i>F. trachyphylla</i> is generally sold under the name 'Hard Fescue', and is popular as a durable turf grass and soil stabilizer. It is particularly common in the eastern United States and southeastern Canada, but is probably grown throughout the temperate parts of the region. Its naturalized distribution can be expected to expand. For many years, <i>Festuca trachyphylla</i> was known, inappropriately, under other names, e.g., <i>F. duriuscula</i> L., <i>F. ovina</i> var. <i>duriuscula</i> (L.) W.D.J. Koch, and <i>F. longifolia</i> Thuill. Some European authors treat it as <i>F. stricta</i> subsp. <i>trachyphylla</i> (Hack.) Patzke. It has frequently been included in <i>F. ovina</i> ."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	Low
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 14 Dec 2016]	"Native: Europe Eastern Europe: Estonia; Latvia; Lithuania; Ukraine Middle Europe: Austria; Belgium; Czech Republic; Germany; Netherlands; Poland; Slovakia; Switzerland Southeastern Europe: Romania"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 14 Dec 2016]	

203	Broad climate suitability (environmental versatility)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Dave's Garden. (2016). Blue Fescue, Sheep's Fescue, Hard Fescue - <i>Festuca trachyphylla</i> . http://davesgarden.com/guides/pf/go/1595/ . [Accessed 15 Dec 2016]	"Hardiness: USDA Zone 4a: to -34.4 °C (-30 °F) USDA Zone 4b: to -31.6 °C (-25 °F) USDA Zone 5a: to -28.8 °C (-20 °F) USDA Zone 5b: to -26.1 °C (-15 °F) USDA Zone 6a: to -23.3 °C (-10 °F) USDA Zone 6b: to -20.5 °C (-5 °F) USDA Zone 7a: to -17.7 °C (0 °F) USDA Zone 7b: to -14.9 °C (5 °F) 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)"

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes
	Flora of North America Editorial Committee. 2007. Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	" <i>Festuca trachyphylla</i> is native to open forests and forest edge habitats of Europe. It has been introduced and has become naturalized in many temperate regions."
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Flora of North America Editorial Committee. 2007. Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	" <i>Festuca trachyphylla</i> is native to open forests and forest edge habitats of Europe. It has been introduced and has become naturalized in many temperate regions."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2006. Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Perhaps introduced in China [Russia (European part); Europe; introduced in North America]. This commercially available species (Hard Fescue or Sheep Fescue) is widely used in North America and Europe for land stabilization on pipelines, mine tailings, and roadside plantings. It may have been introduced to China for similar purposes, but this has not been confirmed."

301	Naturalized beyond native range	y
	Source(s)	Notes

Qsn #	Question	Answer
	Flora of North America Editorial Committee. 2007. Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	"Festuca trachyphylla is native to open forests and forest edge habitats of Europe. It has been introduced and has become naturalized in many temperate regions. In the Flora region, F. trachyphylla is generally sold under the name 'Hard Fescue', and is popular as a durable turf grass and soil stabilizer. It is particularly common in the eastern United States and southeastern Canada, but is probably grown throughout the temperate parts of the region. Its naturalized distribution can be expected to expand."
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/ . [Accessed 14 Dec 2016]	No evidence to date

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	EPPO Global Database. (2016). <i>Festuca trachyphylla</i> . https://gd.eppo.int/taxon/FESTR . [Accessed 15 Dec 2016]	"Widely naturalized elsewhere (invasive in Central Russia)"
	Darbyshire, S.J. (2003). Inventory of Canadian Agricultural Weeds. Agriculture and Agri-Food Canada, Research Branch, Ottawa, Canada	[Possibly agricultural weed] "Perennial; dry open soil and rocky areas, pastures, old fields, lawns, roadsides and disturbed areas"

303	Agricultural/forestry/horticultural weed	
	Source(s)	Notes
	Darbyshire, S.J. (2003). Inventory of Canadian Agricultural Weeds. Agriculture and Agri-Food Canada, Research Branch, Ottawa, Canada	[Possibly. Included among list of agricultural weeds, but impacts unspecified] "Perennial; dry open soil and rocky areas, pastures, old fields, lawns, roadsides and disturbed areas; common and increasing in abundance and distribution." ... "This species is widely planted and escaped in Canada and elsewhere in temperate regions of the world."

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[No evidence] " <i>Festuca trachyphylla</i> (Hack.) Krajina, nom. illeg. Poaceae = <i>Festuca brevipila</i> R. Tracey Cultivated Refs: 11 1243-N, 1178-I, 1020-N, 1009-N, 900-I, 819-N, 756-UC, 644-CN, 642-A, 101-N, 85-N"

305	Congeneric weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	CABI, 2016. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Festuca arundinacea, commonly known as tall fescue, is a cool season, long-lived, perennial, C3 species of bunchgrass native to Europe. In many places it was initially introduced as a lawn and pasture grass. Its use spread from Europe to North America during the early to mid-1800s due to its high growth rate, resilience against drought and protection against herbivory. In its introduced range, F. arundinacea has escaped cultivation and invaded wild areas. It has become an invasive species and noxious weed in native grasslands, woodlands and other habitats, reducing native biodiversity. It has documented associations with fungal endophytes such as Neotyphodium coenophialum, which may be the reason for the plant's success. The endophyte produces bioactive alkaloids which give the plant protection against predation by insects, larger grazers and even nematodes. Following the introduction of F. arundinacea as a forage grass, particularly in North America, reports of poor animal performance emerged. Ergot alkaloids produced within the grass have been linked to fescue toxicosis in animals, which can lead to aborted fetuses in livestock and some wild animals. Endophyte-free grasses are much less aggressive than their infected counterparts, and so do not pose the same threats."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. 2006 onwards. GrassBase - The Online World Grass Flora. http://www.kew.org/data/grasses-db.html . [Accessed 14 Dec 2016]	"HABIT Perennial; caespitose. Butt sheaths persistent and investing base of culm; with compacted dead sheaths. Basal innovations intravaginal. Culms 30–75 cm long. Culm internodes antrorsely scabrous. Leaf-sheaths open for most of their length; with 0 of their length closed; with flat margins; pubescent. Leaf-sheath auricles erect; obtuse. Ligule an eciliate membrane; 0.5 mm long. Leaf-blades filiform; conduplicate; elliptic in section; 0.6–1.1 mm wide; without exudate, or pruinose. Leaf-blade venation comprising 7 vascular bundles; with 5–7 inner ridges; with 3 subepidermal sclerenchyma strands; with subepidermal sclerenchyma free from veins; without layer of subepidermal sclerenchyma masking vein striation, or with sclerenchyma strands widened to form a discontinuous subepidermal layer, or with unevenly thickened subepidermal sclerenchyma layer on the underside. Leaf-blade surface scabrous; glabrous, or pubescent; hairy on both sides."

402	Allelopathic	
	Source(s)	Notes
	USDA NRCS. 2006. Plant Fact Sheet - Hard Fescue - <i>Festuca trachyphylla</i> . https://plants.usda.gov/factsheet/pdf/fs_fetr3.pdf . [Accessed 15 Dec 2016]	"Once established, hard fescue acts as an effective barrier to weed invasion." [Unknown. Competition, rather than allelopathy, may account for the effectiveness as a barrier to weeds]

Qsn #	Question	Answer
403	Parasitic	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	"Europe. Perennial, herbaceous, coarse," [Poaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"forage"

405	Toxic to animals	n
	Source(s)	Notes
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"forage"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
406	Host for recognized pests and pathogens	
	Source(s)	Notes
	USDA NRCS. 2006. Plant Fact Sheet - Hard Fescue - <i>Festuca trachyphylla</i> . https://plants.usda.gov/factsheet/pdf/fs_fetr3.pdf . [Accessed 15 Dec 2016]	"Grubs, leaf spot, dollar spot, summer patch and red thread are potential problems for hard fescue."
	Smiley, R. W., Yan, G., & Gourlie, J. A. (2014). Selected Pacific Northwest rangeland and weed plants as hosts of <i>Pratylenchus neglectus</i> and <i>P. thornei</i> . <i>Plant Disease</i> , 98 (10), 1333-1340	[<i>Festuca brevipila</i> listed as a potential host] "Eighteen rangeland plants and 16 weed species were assayed in the greenhouse for efficiency as hosts of <i>Pratylenchus neglectus</i> and <i>P. thornei</i> . Hosting ability ratings were assigned using the ratio of final versus initial nematode density and by comparing the final nematode density to that of susceptible wheat controls. Good hosts of both <i>Pratylenchus</i> spp. included thickspike bluegrass 'Critana', smooth brome 'Manchar', seven wheatgrasses, and jointed goatgrass. Good hosts of <i>P. neglectus</i> but not <i>P. thornei</i> included two hairy vetches, western wheatgrass 'Rosana', big bluegrass 'Sherman', tall wheatgrass 'Alkar', green foxtail, kochia, large crabgrass, palmer amaranth, redroot pigweed, tumble mustard, and wild oat. Good hosts of <i>P. thornei</i> but not <i>P. neglectus</i> included hard fescue 'Durar', sheep fescue 'Blacksheep', downy brome, and rattail fescue. Poor or minor hosts of both <i>Pratylenchus</i> spp. included two alfalfas, dandelion, horseweed, lambsquarters, prostrate spurge, and Russian thistle. These assays will provide guidance for transitioning rangeland into crop production and for understanding the role of weeds on densities of <i>Pratylenchus</i> spp. in wheat-production systems."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	No evidence, but as a grass, could contribute to fine fuel load in fire prone ecosystems

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Voderberg, D. & Kowalewski, A. (2014). Practical lawn care for western Oregon. EC 1521. Oregon State University Extension Service. Corvallis, OR	"Low fertility, drought and shade tolerant"
	Dave's Garden. (2016). Blue Fescue, Sheep's Fescue, Hard Fescue - <i>Festuca trachyphylla</i> . http://davesgarden.com/guides/pf/go/1595/ . [Accessed 15 Dec 2016]	"Sun Exposure: Full Sun"

Qsn #	Question	Answer
	Hilty, J. (2016). Grasses, Sedges, and Non-Flowering Plants of Illinois. Hard Fescue - <i>Festuca trachyphylla</i> . http://www.illinoiswildflowers.info/grasses/plants/hard_fescue.html . [Accessed 15 Dec 2016]	"The preference is full sun, dry conditions, and a sterile soil containing sand or gravel. However, this grass will also tolerate a limited amount of shade and more moist conditions, if drainage is adequate.

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Learn 2 Grow. (2016). <i>Festuca trachyphylla</i> . http://www.learn2grow.com/plants/festuca-trachyphylla/ . [Accessed 15 Dec 2016]	"Fescues require full to part sun and can tolerate a wide range of soil types, but most prefer average, slightly acidic soil with good drainage"
	Hilty, J. (2016). Grasses, Sedges, and Non-Flowering Plants of Illinois. Hard Fescue - <i>Festuca trachyphylla</i> . http://www.illinoiswildflowers.info/grasses/plants/hard_fescue.html . [Accessed 15 Dec 2016]	"The preference is full sun, dry conditions, and a sterile soil containing sand or gravel. However, this grass will also tolerate a limited amount of shade and more moist conditions, if drainage is adequate."

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	"Europe. Perennial, herbaceous, coarse, densely tufted, bluegreen to pale-green, without rhizomes, dead sheaths remain at the base, auricles present, purplish sheaths open, leaf blade bristle-like and rough, narrow flower head, unequal glumes rounded on the back, lemmas glabrous or hairy"

412	Forms dense thickets	
	Source(s)	Notes
	Ogle, D., St. John, L., Stannard, M. & Holzworth, L. (2010). Grass, Grass-like, Forb, Legume, and Woody Species for the Intermountain West. Plant Materials Technical Note No. MT-59 (Rev. 1). USDA-Natural Resources Conservation Service. Boise, ID - Bozeman, MT - Spokane, WA	"Only pure stands or mixtures with sheep fescue are recommended." [Cultivated in pure stands. Unknown if natural pure stands exist]

501	Aquatic	n
	Source(s)	Notes
	Flora of North America Editorial Committee. 2007. Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	[Terrestrial] " <i>Festuca trachyphylla</i> is native to open forests and forest edge habitats of Europe."

Qsn #	Question	Answer
502	Grass	y
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 14 Dec 2016]	Family: Poaceae (alt.Gramineae) Subfamily: Pooideae Tribe: Poeae Subtribe: Loliinae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 14 Dec 2016]	Family: Poaceae (alt.Gramineae) Subfamily: Pooideae Tribe: Poeae Subtribe: Loliinae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2006. Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Plant densely tufted; shoots intravaginal. Culms 20–75 cm tall, nodes 1–2." [No evidence]

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Flora of North America Editorial Committee. 2007. Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	[No evidence] "Festuca trachyphylla is native to open forests and forest edge habitats of Europe. It has been introduced and has become naturalized in many temperate regions. In the Flora region, F. trachyphylla is generally sold under the name 'Hard Fescue', and is popular as a durable turf grass and soil stabilizer. It is particularly common in the eastern United States and southeastern Canada, but is probably grown throughout the temperate parts of the region. Its naturalized distribution can be expected to expand."

602	Produces viable seed	y
	Source(s)	Notes
	USDA NRCS. 2006. Plant Fact Sheet - Hard Fescue - Festuca trachyphylla. https://plants.usda.gov/factsheet/pdf/fs_fetr3.pdf . [Accessed 15 Dec 2016]	"It is a good seed producer, but seedling vigor is low."

603	Hybridizes naturally	
	Source(s)	Notes

Qsn #	Question	Answer
	Aiken, S.G., Dallwitz, M.J., McJannet, C.L. and Consaul, L.L. 1996 onwards. <i>Festuca</i> of North America: descriptions, illustrations, identification, and information retrieval. Version: 19th October 2005. http://delta-intkey.com . [Accessed 20 Dec 2016]	"Alexeev (1975) described <i>F. trachyphylla</i> as an anthropogenic, introgressive, hybrid species of <i>F. valesiaca</i> Schleich. ex Gaud. × <i>F. ovina</i> L." [Unknown if natural hybrids occur]
	WRA Specialist. 2016. Personal Communication	Unknown. Hybridization documented in genus

604	Self-compatible or apomictic	
	Source(s)	Notes
	Learn 2 Grow. (2016). <i>Festuca trachyphylla</i> . http://www.learn2grow.com/plants/festuca-trachyphylla/ . [Accessed 15 Dec 2016]	"Self-Sowing - Yes"

605	Requires specialist pollinators	n
	Source(s)	Notes
	Abrol, D.P. (2012). <i>Pollination Biology: Biodiversity Conservation and Agricultural Production</i> . Springer, New York	"Wind pollination is the dominant type of abiotic pollination and is especially prevalent in several plant families, including the grasses (Poaceae) and sedges (Cyperaceae)."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Lambert, S. (2005). <i>Guidebook to the Seeds of Native and Non- Native Grasses, Forbs and Shrubs of the Great Basin Including portions of Oregon, Washington, Idaho, Utah, Nevada and California</i> . United States Department of the Interior Bureau of Land Management Idaho State Office	"A fine-leaved, low-growing, perennial, competitive (slow rate of establishment) bunchgrass adapted to well-drained sites where the mean annual precipitation exceeds 14 inches." [No evidence. Bunchgrass habit would limit vegetative spread]
	Casler, M. D. & Duncan, R. R. (eds.). (2003). <i>Turfgrass Biology, Genetics, and Breeding</i> . John Wiley & Sons, Hoboken, NJ	"Plants are perennial and densely tufted, without rhizomes."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Lambert, S. (2005). <i>Guidebook to the Seeds of Native and Non- Native Grasses, Forbs and Shrubs of the Great Basin Including portions of Oregon, Washington, Idaho, Utah, Nevada and California</i> . United States Department of the Interior Bureau of Land Management Idaho State Office	"A fine-leaved, low-growing, perennial, competitive (slow rate of establishment)" [Perennial. Related species with generation time of 2 years]

Qsn #	Question	Answer
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	USDA NRCS. 2006. Plant Fact Sheet - Hard Fescue - <i>Festuca trachyphylla</i> . https://plants.usda.gov/factsheet/pdf/fs_fetr3.pdf . [Accessed 20 Dec 2016]	"Hard fescue's primary use has been for soil protection on road sides, ditchbanks, airports, skid trails in the higher rainfall zones, and as a cover crop in irrigated orchards and windbreaks." [Possibly yes. Occurs in heavily trafficked areas]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Flora of North America Editorial Committee. 2007. Flora of North America: North of Mexico, Volume 24. Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Oxford University Press, Oxford, UK	" <i>Festuca trachyphylla</i> is native to open forests and forest edge habitats of Europe. It has been "

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	USDA NRCS. 2006. Plant Fact Sheet - Hard Fescue - <i>Festuca trachyphylla</i> . https://plants.usda.gov/factsheet/pdf/fs_fetr3.pdf . [Accessed 20 Dec 2016]	"Hard fescue's primary use has been for soil protection on road sides, ditchbanks, airports, skid trails in the higher rainfall zones, and as a cover crop in irrigated orchards and windbreaks." [Could possibly become a seed contaminant, as have other grass species]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Mouissie, A. M., Lengkeek, W., & Van Diggelen, R. (2005). Estimating adhesive seed-dispersal distances: field experiments and correlated random walks. <i>Functional Ecology</i> , 19(3): 478-486	"Table 2. ... <i>Festuca ovina</i> ... Dispersal unit = seed; Structure = Bristly" [No evidence. Closely related species possibly dispersed short distances by wind, but primarily dispersed internally & externally by animals]

705	Propagules water dispersed	
	Source(s)	Notes
	USDA NRCS. 2006. Plant Fact Sheet - Hard Fescue - <i>Festuca trachyphylla</i> . https://plants.usda.gov/factsheet/pdf/fs_fetr3.pdf . [Accessed 20 Dec 2016]	[Could possibly be moved by water along ditchbanks] "Hard fescue's primary use has been for soil protection on road sides, ditchbanks, airports, skidtrails in the higher rainfall zones, and as a cover crop in irrigated orchards and windbreaks."

706	Propagules bird dispersed	n
	Source(s)	Notes

Qsn #	Question	Answer
	Aiken, S.G., Dallwitz, M.J., McJannet, C.L. and Consaul, L.L. 1996 onwards. <i>Festuca</i> of North America: descriptions, illustrations, identification, and information retrieval. Version: 19th October 2005. http://delta-intkey.com . [Accessed 20 Dec 2016]	[No evidence of bird dispersal] "Lemma (3.8–)4–5(–5.5) mm long, nerveless in dorsal view or sometimes with only the centre vein distinct, glabrous or with trichomes, trichomes on the upper portion only or over the entire surface (very variable; almost glabrous, glabrous with long hairs on margins near apex, or surface completely scabrous); apex entire. Lemma awn 0.5–2.5 mm long (Markgraf Dannenberg (1980) describes the awn as about half as long as the lemma). Palea 4–5 mm long, distinctly pubescent between the keels. Lodicules with marginal teeth, glabrous, 0.6–1 mm long. Anthers 2–3 (–3.4) mm long. Ovary apex glabrous. Caryopsis 2.5–3.5 mm long. "

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Mouissie, A. M., Lengkeek, W., & Van Diggelen, R. (2005). Estimating adhesive seed-dispersal distances: field experiments and correlated random walks. <i>Functional Ecology</i> , 19(3): 478-486	[Possibly. Closely related species externally dispersed] "Fig. 3. Seed attachment to real sheep. Bar chart shows the average number of seeds attached to the fleece of a young sheep after 3 h grazing. <i>Agrostis capillaris</i> , <i>Festuca ovina</i> , <i>Juncus squarrosus</i> and <i>Nardus stricta</i> attached when the sheep grazed in an oligotrophic acid grassland vegetation"

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Fazelian, S., Kohyani, P. T., & Shirmardi, H. A. (2014). Endozoochorous seed dispersal of plant species in semi-steppe rangelands. <i>International Journal of Advanced Biological and Biomedical Research</i> , 2(2), 473-486	[Possibly. Related species dispersed internally] "In this paper we examined dung germinating seed content, seed deposition patterns of different domestic animals (Cattle, Sheep and goat), ecological correlate with seed traits (Seed weight, length, width and shape) and the possible correlate of dung seed content characteristics with vegetation in a simulated feeding experiment. 39 native plant species were fed to domestic animals and their germination successes were recorded in a simulated glasshouse experiment." ... "Between the seeds of grasses family, Most of the species <i>Festuca ovina</i> seeds pass through the animal's digestive tract."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Lambert, S. (2005). <i>Guidebook to the Seeds of Native and Non- Native Grasses, Forbs and Shrubs of the Great Basin Including portions of Oregon, Washington, Idaho, Utah, Nevada and California</i> . United States Department of the Interior Bureau of Land Management Idaho State Office	"Average number of seeds per pound: 565,000" [Natural seed densities unknown]

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 20 Dec 2016]	"Storage Behaviour: No data available for species. Of 37 known taxa of genus <i>Festuca</i> , 94.59% Orthodox(p/?), 5.41% Uncertain"

803	Well controlled by herbicides	
	Source(s)	Notes
	Gerlach Jr, J. D., Moore, P. E., Lubin, D. M., Johnson, B., Roy, G., Whitmarsh, P., Graber, D. M. & Keeley, J. E. (2001) Exotic Species Threat Assessment and Management Prioritization for Sequoia Kings Canyon and Yosemite National Parks. U. S. Geological Survey Western Ecological Research Center	[Unknown. Herbicide resistant cultivar developed] "The same company that sponsored the <i>A. stolonifera</i> transgenic research is now marketing glyphosate-resistant cultivars of <i>Festuca arundinacea</i> (tall fescue)and <i>Festuca trachyphylla</i> (hard fescue) that were developed through long term herbicide selection experiments (Rose Fricker 2000). The development of glyphosate-resistant cultivars of these known invaders of riparian habitats means that they will be resistant to Rodeo®, one of the very few herbicides registered for use near riparian areas and wetlands. It is therefore absolutely critical that these cultivars not be introduced into the parks."
	WRA Specialist. 2016. Personal Communication	Unknown, but grass specific herbicides would probably be effective in certain situations

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	DLF Seeds & Science. (2011). Guide to Seed Varieties. http://www.dlf.com/ . [Accessed 20 Dec 2016]	Several varieties tolerate close mowing

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability (, demonstrating environmental versatility)
- Widely naturalized (but no evidence in Hawaiian Islands)
- Regarded as a weed or weedy (but impacts unspecified)
- Other Festuca species have become invasive
- Shade tolerant
- Tolerates many soil types
- Reproduces by seeds
- May hybridizes with other Festuca species
- Seeds may be dispersed by animals & intentionally by people
- Tolerates mowing

Low Risk Traits

- Despite designation as weedy, impacts are unspecified, & generally regarded as a desirable cover species
- Unarmed (no spines, thorns, or burrs)
- Palatable to grazing animals
- Self-incompatible
- Not reported to spread vegetatively

Second Screening Results for Herbs or Low Stature Shrubby Life Forms

(A) Reported as a weed of cultivated lands? Possibly. Regarded as weedy in some locations, but no impacts specified

(B) Unpalatable to grazers or known to form dense stands? No

Outcome = Evaluate Further