Taxon: Festuca ovina L. **Family:** Poaceae

Common Name(s): ovina
sheep fescue

Synonym(s): Avena ovina Salisb.
Bromus ovinus Scop.
Festuca calligera (Piper) Rydb.
Festuca chiisanensis (Ohwi)
Festuca curvifolia Lag. ex Lange

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 14 Dec 2016

WRA Score: 9.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Temperate Grass, Naturalized, Palatable, Self-Incompatible, Animal-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	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		
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	y

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	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	n
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)	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		
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)	y=1, n=-1	y
708	Propagules survive passage through the gut	y=1, n=-1	y
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		
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**
	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	"Numerous variants have been recognized at infraspecific rank, often from different habitats and based on small differences in pubescence, size, proportion of vegetative and floral parts, and other characters."

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 12 Dec 2016]	"Native: Africa Macaronesia: Portugal - Madeira Islands Northern Africa: Algeria; Morocco Asia-Temperate Caucasus: Armenia; Azerbaijan; Georgia; Russian Federation-Ciscaucasia - Ciscaucasia China: China Eastern Asia: Japan; Korea Mongolia: Mongolia Russian Far East: Russian Federation-Far East - Far East Siberia: Russian Federation-Eastern Siberia - Eastern Siberia; Russian Federation-Western Siberia - Western Siberia Western Asia: Turkey Europe Eastern Europe: Belarus; Estonia; Latvia; Lithuania; Russian Federation-European part - European part; Ukraine Middle Europe: Austria; Belgium; Czech Republic; Germany; Hungary; Netherlands; Poland; Slovakia; Switzerland Northern Europe: Denmark; Finland; Ireland; Norway; Sweden; United Kingdom Southeastern Europe: Croatia; Romania; Serbia; Slovenia"

202	**Quality of climate match data**	**High**

Qsn #	Question	Answer
	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 12 Dec 2016]	

203	Broad climate suitability (environmental versatility)	y
	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	"Alpine meadows, steppe, grassy places in forests; 1600–4400 m." [Elevation range exceeds 1000 m, demonstrating environmental versatility]
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Habitat: Sheep fescue occupies diverse habitats. Collections show altitudinal variation in habitat extending from 1,000 to 13,000 ft. Although it may be found at any elevation between these extremes, it is most prevalent from about 3,000 to 8,000 ft."
	Plants for a Future. (2016). Festuca ovina. http://www.pfaf.org/user/Plant.aspx?LatinName=Festuca+ovina. [Accessed 12 Dec 2016]	"USDA hardiness 4-8" [5 hardiness zones, but in regions with temperate climates]

204	Native or naturalized in regions with tropical or subtropical climates	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	"Northern temperate regions, Europe."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Distribution: Sheep fescue is a cool season perennial grass native to Europe (Barkworth 2007). Within North America, sheep fescue has been planted in open forests and mountain and foothill slopes from Alaska to North Dakota and south to Arizona and New Mexico. It has also been introduced to many locations in eastern North America. For current distribution, consult the Plant Profile page for this species on the PLANTS Web site."
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 12 Dec 2016]	Naturalized: . natzd. elsewhere Cultivated: . also cult.

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"weed species, turf, lawn, ornamental grass cultivated and naturalized elsewhere,"

Qsn #	Question	Answer
	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 12 Dec 2016]	No evidence to date

302	Garden/amenity/disturbance weed	
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"It is not considered "weedy", but can spread into adjoining vegetative communities under ideal climatic and environmental conditions."
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"weed species ... cultivated and naturalized elsewhere"
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Cited as a weed in numerous publications. Impacts vary] "Festuca ovina L. Poaceae Cultivated, Pasture, Crop Arid - Refs: 25 1251-N, 1238-W, 1222-W, 1209-A, 1030-N, 919-N, 878-I, 819-N, 791-N, 648-A, 642-A, 519-N, 507-U, 396-N, 286-W, 280-N, 272-W, 151-E, 101-N, 91-W, 87-W, 85-NZW, 80-E, 70-W, 21- EW"

303	Agricultural/forestry/horticultural weed	
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	Possibly. Cited as a weed of agriculture. Impacts unspecified

304	Environmental weed	
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	Possibly. Cited in references as an environmental weed. Impacts unspecified

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 foetuses 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**
	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	[No evidence] "Plant densely tufted; shoots intravaginal. Culms 10–60 cm tall; node 1. Leaf sheaths glabrous or basal leaf sheaths occasionally with trichomes; auricles present as erect swellings or absent; leaf blades filiform, conduplicate, (3–)8–25 cm × 0.3– 0.6 mm, margins usually scabrid, veins 5(–7); adaxial to abaxial sclerenchyma strands absent, abaxial sclerenchyma in a continuous ring; ligule (0.1–)0.2–0.5 mm, margin ciliate."

402	Allelopathic	
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"It is often found in association with big bluegrass, mountain brome, bluebunch wheatgrass, slender wheatgrass, geranium, western yarrow, mountain big sagebrush, antelope bitterbrush and ponderosa pine." ... "Sheep fescue is an excellent weed control species because it has an extensive and dense bunch type root system. Once a good stand is established, it excludes the invasion of most weeds."

403	Parasitic	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." [Poaceae]

404	Unpalatable to grazing animals	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Monsen, S. B., Stevens, R., & Shaw, N. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO	"Forage production is low, but of fair to good quality (Hassell and others 1983)."
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Grazing/range/pasture: In rangeland and pastureland plantings, sheep fescue is a competitive understory grass that controls erosion. Although it is sometimes grazed by sheep, it is seldom utilized by cattle or horses and is not considered to be an important forage species."

405	Toxic to animals	n
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Although it is sometimes grazed by sheep, it is seldom utilized by cattle or horses and is not considered to be an important forage species."
	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

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	CABI, 2016. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Festuca ovina ... Major host of: Anguina agrostis (nematode, bentgrass); Puccinia coronata (crown rust) Wild hosts Barley yellow dwarf viruses (barley yellow dwarf); Parnara guttatus (rice skipper)"
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Pests and Potential Problems - Sheep fescue is a low maintenance plant requiring little treatment or care. Its primary pests include grasshoppers. It is resistant to common turf diseases"

407	Causes allergies or is otherwise toxic to humans	y
	Source(s)	**Notes**
	Pollen Library. (2016). Sheep Fescue (Festuca ovina). http://www.pollenlibrary.com/Specie/Festuca+ovina/. [Accessed 12 Dec 2016]	"Allergenicity: Sheep Fescue (Festuca ovina) is a severe allergen."
	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 of toxicity

408	Creates a fire hazard in natural ecosystems	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"It can withstand fire in autumn, but requires 2 to 3 years to fully recover after burning." [Could possibly carry fire in certain situations]
	Monsen, S. B., Stevens, R., & Shaw, N. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO	"Sheep fescue is used for postfire seedings, mined land reseedings, recreation areas, ditchbanks, and other disturbances in mountainous areas to reduce soil erosion." [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**
	Massachusetts Invasive Plant Advisory Group. (2005). The Evaluation of Non-Native Plant Species for Invasiveness in Massachusetts (with annotated list). http://www.mass.gov/eea/docs/dfg/nhesp/land-protection-and-management/invasive-plant-list.pdf. [Accessed 14 Dec 2016]	"Festuca ovina L. (Sheep fescue) A perennial grass that grows in full sun. More data needed on its ability to outcompete native species in minimally managed habitats."
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"It has excellent cold tolerance, good drought tolerance, and moderate shade tolerance."
	Monsen, S. B., Stevens, R., & Shaw, N. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO	"Sheep fescue is cold tolerant and provides stability to surface soils. It is somewhat tolerant of finer soils and shading."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"It grows on all exposures in a wide variety of soil conditions. It is best adapted to silt loam or sandy loam soils, however is occasionally found on loamy sand soils, and on shallow, dry, gravelly soils."
	Monsen, S. B., Stevens, R., & Shaw, N. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO	"Sheep fescue is a long-lived, drought-hardy variety. It grows on coarse, dry, infertile soils on sites receiving 10 to 18 inches (25 to 46 cm) of annual precipitation (Jensen and others 2001)." ... "Sheep fescue is adapted to shallow, moderately to well-drained soils with pH 5.5 to 7.5. Plants are heat tolerant."

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	"Perennial bunchgrass, small, forming dense tussocks or clumps, stems flimsy and upright"

412	Forms dense thickets	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Sheep fescue is an excellent weed control species because it has an extensive and dense bunch type root system. Once a good stand is established, it excludes the invasion of most weeds."

501	Aquatic	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	[Terrestrial grass] "Alpine meadows, steppe, grassy places in forests; 1600–4400 m."

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 12 Dec 2016]	Family: Poaceae (alt.Gramineae) Subfamily: Pooideae Tribe: Poeae Subtribe: Loliinae

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	"Perennial bunchgrass, small, forming dense tussocks or clumps, stems flimsy and upright, sheaths glabrous or scabrous, auricles very reduced or absent, ligules very short and ciliate, stiff blades filiform and infolded, leaves yellowish green or glaucous, panicles erect and branched, spikelets elliptic to oblong, glumes acute and stiff, lemmas acute, lodicules ciliate, ovary apex glabrous"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	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	"Perennial bunchgrass, small, forming dense tussocks or clumps, stems flimsy and upright"

601	Evidence of substantial reproductive failure in native habitat	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	[No evidence] "Anhui, Gansu, Guizhou, Jiangsu (cultivated), Jilin, Nei Mongol, Ningxia, Qinghai, Shaanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Japan, Korea, Mongolia, Russia; SW Asia (Caucasus), Europe, North America"

602	Produces viable seed	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Planting: Sheep fescue seed should be planted with a drill at a depth of 1/4 inch or less. The single species seeding rate is 4 pounds Pure Live Seed (PLS) per acre or about 60 PLS per square foot (Ogle et al., 2009). If used as a component of a mix, adjust to percent of mix desired. When broadcast planting seed and for harsh critical planting areas, the seeding rate should be increased to 8 pounds PLS per acre or 120 PLS per square foot. Mulching and irrigation during the establishment year are beneficial for stand establishment."
	Plants for a Future. (2016). Festuca ovina. http://www.pfaf.org/user/Plant.aspx?LatinName=Festuca+ovina. [Accessed 12 Dec 2016]	"Propagation Seed - sow spring in situ[162]. The seed usually germinates within three weeks. Division in sprin [162]. Very easy, the clumps can be replanted direct into their permanent positions."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Sheep fescue hybridizes with Idaho and western fescue resulting in somewhat larger plants."

604	Self-compatible or apomictic	n
	Source(s)	**Notes**
	Bengtsson, B. O., Weibull, P., & Ghatnekar, L. (1995). The loss of alleles by sampling: a study of the common outbreeding grass Festuca ovina over three geographic scales. Hereditas, 122(3), 221-238	"The species is self-incompatible, has the diploid chromosome number 14 (plus occasional B-chromosomes (ONDER and JONG 1977; GHATNEKAR, unpublished results)), and is one of the most common perennial grasses in Scandinavia."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Bengtsson, B. O., Weibull, P., & Ghatnekar, L. (1995). The loss of alleles by sampling: a study of the common outbreeding grass Festuca ovina over three geographic scales. Hereditas, 122(3), 221-238	"The natural interpretation is that even in a common wind-pollinated outbreeder like F. ovina, fertilizations are often due to closely situated neighbouring plants."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"It is long-lived, and spreads primarily via seed distribution. It is not considered "weedy", but can spread into adjoining vegetative communities under ideal climatic and environmental conditions."

607	Minimum generative time (years)	2
	Source(s)	**Notes**

Qsn #	Question	Answer
	Engler, R., Randin, C. F., Vittoz, P., Czáka, T., Beniston, M., Zimmermann, N. E., & Guisan, A. (2009). Predicting future distributions of mountain plants under climate change: does dispersal capacity matter?. Ecography, 32(1), 34-45	"Appendix S3. Dispersal category, generation time and resilience time assigned to each of the 287 species used in the study" [Festuca ovina - Generation time [yr] = 2]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Clifford, H. T. (1956). Seed dispersal on footwear. Proceedings of the Botanical Society of the British Isles 2: 129-131	"Table 1. Plants Raised from Mud off Footwear" [Includes Festuca ovina]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"Distribution: Sheep fescue is a cool season perennial grass native to Europe (Barkworth 2007). Within North America, sheep fescue has been planted in open forests and mountain and foothill slopes from Alaska to North Dakota and south to Arizona and New Mexico. It has also been introduced to many locations in eastern North America."

703	Propagules likely to disperse as a produce contaminant	
	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 13 Dec 2016]	"Weed: potential seed contaminant"

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. Functional Ecology, 19(3): 478-486	"Table 2. ... Festuca ovina ... Dispersal unit = seed; Structure = Bristly" [Possibly dispersed short distances by wind, but primarily dispersed internally & externally by animals]

Qsn #	Question	Answer
705	**Propagules water dispersed**	
	Source(s)	**Notes**
	Sarneel, J. M. (2016). Effects of experimental snowmelt and rain on dispersal of six plant species. Ecohydrology 9: 1464-1470	[Seeds able to be disperse by simulated rainfall] "Water flows affect dispersal of propagules of many plant species, and rivers and streams are therefore very important dispersal vectors. However, small water flows such as trough rain and snowmelt are much more common, but their effects on dispersal are barely studied." ... "Mean dispersal distances increased with seed mat angle, but only in the rain treatment ..." ... "At the steepest slope, 16% was found on the lowest third of the seed mat. This pattern was also observed within the individual species as significant interaction terms between precipitation type and seed mat angle were found for Betula, Festuca, Filipendula and Solidago'

706	**Propagules bird dispersed**	**n**
	Source(s)	**Notes**
	Fazelian, S., Kohyani, P. T., & Shirmardi, H. A. (2014). Endozoochorous seed dispersal of plant species in semi-steppe rangelands. International Journal of Advanced Biological and Biomedical Research, 2(2), 473-486	"Between the seeds of grasses family, Most of the species Festuca ovina seeds pass through the animal's digestive tract." [Primarily dispersed internally & externally by mammals]

707	**Propagules dispersed by other animals (externally)**	**y**
	Source(s)	**Notes**
	Mouissie, A. M., Lengkeek, W., & Van Diggelen, R. (2005). Estimating adhesive seed-dispersal distances: field experiments and correlated random walks. Functional Ecology, 19(3): 478-486	"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. Agrostis capillaris, Festuca ovina, Juncus squarrosus and Nardus stricta attached when the sheep grazed in an oligotrophic acid grassland vegetation"

Qsn #	Question	Answer
708	**Propagules survive passage through the gut**	**y**
	Source(s)	**Notes**
	Fazelian, S., Kohyani, P. T., & Shirmardi, H. A. (2014). Endozoochorous seed dispersal of plant species in semi-steppe rangelands. International Journal of Advanced Biological and Biomedical Research, 2(2), 473-486	"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 Festuca ovina seeds pass through the animal's digestive tract."
	Welch, D. (1985). Studies in the grazing of heather moorland in north-east Scotland. IV. Seed dispersal and plant establishment in dung. Journal of Applied Ecology, 22(2): 461-472	"TABLE 1. Germinations obtained in a glasshouse from dung deposited on heather moorland by different herbivores" [Festuca ovina - A small number of seeds germinated from cattle dung]
	Pakeman, R. J., Digneffe, G., & Small, J. L. (2002). Ecological correlates of endozoochory by herbivores. Functional Ecology, 16(3): 296-304	"Table 4. Species with the highest relative abundance (> 1·0 seeds g−1 per 100% cover) of germinable seed per unit cover in rabbit and sheep dung" [Includes Festuca oviina in rabbit dung]

801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	[Possibly, but unknown from natural settings] "Seed fields are generally most productive for four to five years. Average production of 300 pounds per acre can be expected under dryland conditions in 16 inch plus rainfall areas. Average production of 700 pounds per acre can be expected under irrigated conditions. Harvesting is best completed by direct combining or swathing in the hard dough stage, followed by combining of the cured windrows. Sheep fescue averages 680,000 seeds/pound (Smith et al., 1998)."
	Monsen, S. B., Stevens, R., & Shaw, N. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO	[Unknown from natural settings] "Sheep fescue seeds ripen in early fall (Sampson 1924). They can be combined directly or first windrowed and dried for 5 to 7 days (Smith and Smith 1997; Wheeler and Hill 1957). Lodging is generally not a problem, but seeds begin shattering after reaching the hard-dough stage (Smith and Smith 1997). Seed is cleaned using a debearder and fanning mill. An indent cylinder may be used to increase purity. Seeds are not generally harvested during the establishment year. Stand life is 4 to 5 years. There are about 500,000 seeds per pound (1,100,000 per kg) (Smith and Smith 1997)."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**y**
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/. [Accessed 12 Dec 2016]	"Storage Behaviour: Orthodox. Storage Conditions: p50= 4.84 years for seeds stored under open storage in a temperate climate (Priestley, 1986); long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 15 years; average germination change 95.3to 96.3%, mean storage period 12 years, 4 collections"

Qsn #	Question	Answer
	Thompson, K. B. S. R., Band, S. R., & Hodgson, J. G. (1993). Seed size and shape predict persistence in soil. Functional Ecology, 7: 236-241	"Table 1 ... Festuca ovina ... Persistence = (t) species with diaspores which persist in the soil for <5 years"

803	Well controlled by herbicides	
	Source(s)	**Notes**
	Bayer CropScience. (2016). Sheep's fescue - Festuca ovina. http://www.bayercropscience.co.uk/your-crop/crop-diseases-weeds-and-pests/grass-weeds/sheeps-fescue/. [Accessed 13 Dec 2016]	"Not usually considered to be a significant arable weed species but difficult to control with post emergence herbicides on account of the narrow leaves which restrict herbicide uptake."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	**Notes**
	Ogle, D., M. Stannard, P. Scheinost, & L. St John. (2010). Plant guide for sheep fescue (Festuca ovina L.). USDA-Natural Resources Conservation Service, Idaho and Washington Plant Materials Program	"It can withstand fire in autumn, but requires 2 to 3 years to fully recover after burning."
	Monsen, S. B., Stevens, R., & Shaw, N. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO	"Plantings reduce the spread of weeds and are tolerant of grazing if properly managed. Excessive grazing can damage the stands; recovery is slow (Jensen and others 2001)."

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 & elevation range exceeds 1000 m, demonstrating environmental versatility
• Widely naturalized (but no evidence in Hawaiian Islands)
• Regarded as a weed or weedy
• Other Festuca species have become invasive
• Listed as a severe allergen to susceptible individuals
• Moderate shade tolerance
• Tolerates many soil types
• Reproduces by seeds
• Hybridizes with other Festuca species
• Seeds dispersed by animals (internally through ingestion & through external attachment) & intentionally by people
• Seeds may persist in the soil for up to 5 years
• Tolerates fire & grazing

Low Risk Traits
• Despite designation as weedy, impacts are unspecified, & generally regarded as a desirable cover species
• Unarmed (no spines, thorns, or burrs)
• Provides fodder for livestock (esp. sheep)
• Self-incompatible
• Not reported to spread vegetatively