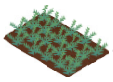
Sheep fescue

Festuca ovina ssp. hirtula

Sheep fescue is a low-growing turf grass with ecotypes that are native to North America. A species that is closely related to hard fescue, sheep fescue has many of the same traits including high resilience to environmental conditions encountered along roadsides, such as excellent drought and low fertility tolerance, and superior competitiveness against weeds. Sheep fescue is available commercially, is an excellent species to plant in areas where infrequent mowing is desired, and can be mixed with other species to enhance biodiversity. Owing to its superior ability to provide services for roadside management, sheep fescue is rated as Good to Fair (grade = B-) for use along Maryland right-of-ways.

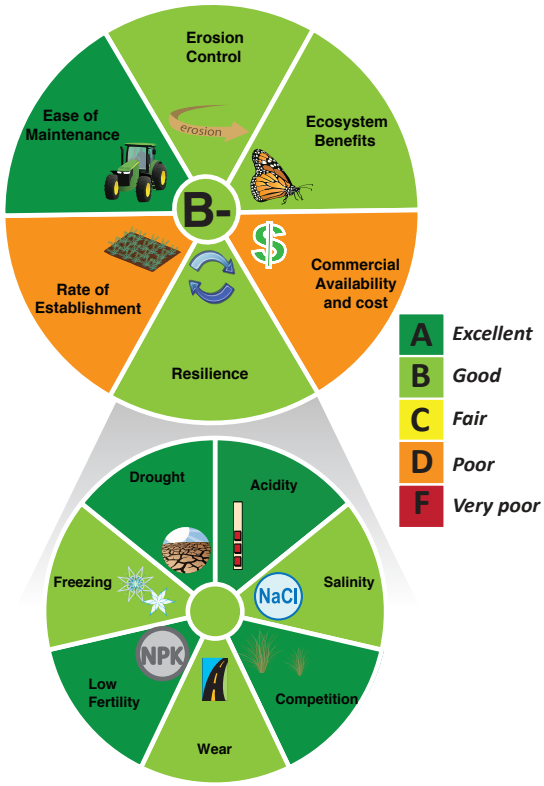


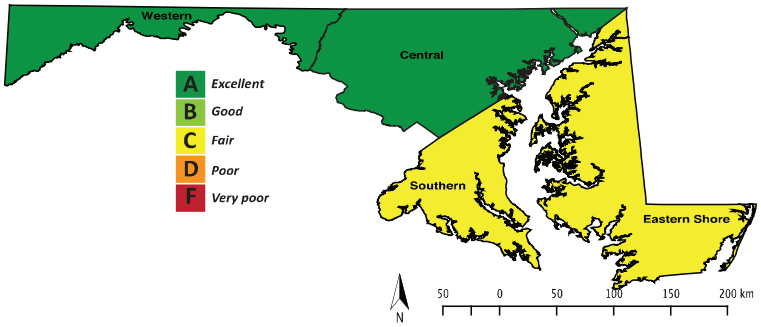
Sheep fescue establishes slowly such that superior performance in most cases will not be realized until after 2 years of growth.

Sheep fescue has the most expensive seed cost compared to other fine fescues. Seeding in a large area is moderately expensive.

Sheep fescue can produce a shallow root system and should therefore not be planted on steep slopes where slope failure is a concern.

Sheep fescue has excellent tolerance to summer heat through summer dormancy, which increases susceptibility to traffic. For maximum establishment, performance and survival, sheep fescue should not be mowed between early June and early October.





Sheep fescue is well adapted to grow in Western and Central Maryland. Although performance is good on sandy and gravelly soils, it is less suitable for use along roadsides in the coastal plain of Southern Maryland and the Eastern Shore, where heat stress may limit growth and survival.

Sheep fescue cultivars that are recommended for Maryland include Bighorn GT, which is more closely related to hard fescue than sheep fescue. Cultivar Quatro may be the only true sheep fescue commercially available. Growers should consider producing native ecotypes for regional plantings.

Biology: Sheep fescue is a perennial cool season turfgrass that is considered native to North America and Eurasia (Beard 1973, Ruemmele et al. 2003, Johnson 2008). The species grows best on sandy and gravelly soils (Beard 1973) and frequently dominates hill and mountain grasslands (Ruemmele et al. 2003). It thrives from sea level to 1,220 m elevation (Ruemmele 2003). Sheep fescue has a fine leaf texture with a densely tufted growth habit. Although it does not spread by rhizomes, it can spread via tillering up to 10 cm per year (Ruemmele et al. 2003). Sheep fescue has been generally overlooked as a turfgrass in favor of the introduced fine fescue species creeping hard fescue, red fescue, and chewings fescue (Johnson 2008). Yet, it produces reasonable quality turf with curving leaves that produces a 'swirly' naturalized appearance (Johnson 2008). Some cultivars have a distinct blue color that provides a unique look to the landscape (Johnson 2008), although these cultivars tend to be genetically more similar to hard fescues. Sheep fescue is typically used in areas that are hard to mow and at mowing heights greater than 3.5 cm and is therefore a valuable species for low-maintenance roadsides, reclamation sites, roughs and railway banks (Ruemmele et al. 2003). It may be sown alone but is also frequently used in lawn and wildflower mixtures (Ruemmele et al. 2003).

Seeds per pound: 680,000 – 720,000 (Cebeco International Seeds)
Cost per pound: $3.75 per pound from Chesapeake Valley Seed
Cost per acre: $656.00 per acre
Suggested sowing rate: 175 pounds per acre (Chesapeake Valley Seed)
Sowing depth: ¼ to ½ inch (Cebeco International Seeds)
Germination time: 8-11 days (Pickseed)
Seeding timing: spring or fall when soil temperatures >60°F (Cebeco International Seeds)
Length of growing season: Growth is in the spring and fall; growth in the summer is minimal and dependent on dormancy (Ogle et al. 2010).
Leaf length: 0.80-3.15 inches (Ruemmele et al. 2003)
Height at seed head stage: maximum height reached = 16.5 inches (McKernan et al. 2001); 4-18 inches (Ruemmele et al. 2003)
Shade tolerance: tolerant of moderate shade (Beard 1973, Ruemmele et al. 2003, Johnson 2008)
Suggested mowing height: does not tolerate low cutting heights (<0.5 inches)
Tolerance of wet conditions: Will not tolerate high water tables or flooding (Ogle et al. 2010).
Humidity tolerance: Sheep fescue is adapted to cool humid environments (Beard 1973) and therefore tolerates high humidity.
Disease resistance: Sheep fescue is susceptible to red thread, *Fusarium* patch, powdery mildew, brown patch, and stripe smut (Beard 1973). Sheep fescue appears to be particularly susceptible to leaf spot and is susceptible to *Laetisaria fuciformis, Microdochium nivale, Erisyphye graminis, Rhizoctonia solani, and Ustilago striiformis* (Ruemmele et al. 2003). Overall, however, it is considered to be relatively resistant to common turf diseases (Ogle et al. 2010).

Services:

Commercial availability and cost: Sheep fescue is not used as much as other fine fescue species in turfgrass culture. However, because of its use in land reclamation, sheep fescue seed is commercially available and affordable. Cost of seed ($3.75 per pound) is the highest of all fine fescue species sowing rate per acre is high such that sowing the species across large areas is expensive.

Rate of establishment: Sheep fescue establishes as seedlings in 21-28 days (Cebeco International Seeds) but stands are slow to develop and seedlings may be hard to find in the establishment year (Ogle et al. 2010). Turf quality, under low input and low maintenance regimes, can be superior. However, superior performance is slow to develop and only emerges after two years of growth (Dernoeden et al. 1994, Watkins et al. 2010). At this time, however, sheep fescue turf quality surpasses tall fescue (Dernoeden et al. 1994, Watkins et al. 2010).

Ease of maintenance: Sheep fescue exhibited adequate turf quality under low maintenance regimes in a wide range of climates (Diesburg et al. 1997, Ogle et al. 2010, Watkins et al. 2011, Watkins et al. 2014). It grows best under nonirrigated and nominal soil fertility (Beard 1973) and was the top performing species among 13 turfgrasses under a no-mow treatment (Watkins et al. 2011).

Erosion control: Rooting depth of sheep fescue tends to be shallow (Beard 1973), especially under close mowing. Given its relatively shallow root system, sheep fescue may not be an effective species for erosion control on steep slopes. However, once established, sheep fescue has excellent ground cover. Thus, it is considered ideal for long-term stabilization of disturbed soils and for protecting roadsides, airport landing strips, skid trails, clear cuts, ski hills and other areas against erosion (Ogle et al. 2010).

Ecosystem benefits: Sheep fescue is native to North America (Beard 1973, Johnson 2008); however many if not all commercially available cultivars originate from Europe. Because sheep fescue does not spread by rhizomes, its sod is not as dense as creeping red fescue. Thus, it can be found in association with other native species and can be mixed in seed mixes with other grass and forb species. Sheep fescue is not considered to be an important forage grass and provides little cover for hiding or nesting habitat (Ogle et al. 2010).

Resilience:

Drought: Sheep fescue, and its cousins within the *Festuca ovina* complex, tolerates droughty, infertile soils and is therefore used in the landscape where soils are infertile and irrigation is minimal, if not absent (Ruemmele et al. 2003). Johnson (2008) contends that native sheep fescue is more drought tolerant than the introduced fine fescue species red, chewings and hard fescue. This may be because of its low evapotranspiration rate of 7-8 mm per day (Cebeco International Seeds). Heat resistance is generally considered poor (Beard 1973, Johnson 2008), as is typical for the fine fescues, although cultivar 'Quatro' is advertised by the breeder (Cebeco Seeds) as having arid climate heat resistance. In a 3-year study comparing 25 species and cultivars at two sites in southern Alberta, sheep fescue cultivar 'Nakiska', two hard fescue cultivars and blue grama maintained long-term superior area coverage despite a drought (McKernan et al. 2001). Similarly, in a low-maintenance study in the Piedmont of Virginia (Doak et al. 2004), two sheep fescue

cultivars ('Quatro' and 'MX86AE') were as drought tolerant as hard fescue with mean percent cover of 67.5% and 69%, respectively, after 4 years of growth and a severe drought in year 3 (Doak et al. 2004). In contrast, creeping red fescue and chewings fescue cultivars only maintained 40% and 51.5% cover, respectively, in the 4th year. Sheep fescue ranked lower in drought tolerance in the cooler climate of the Ridge and Valley of Virginia with equal to slightly higher drought tolerance than chewings fescue but lower tolerance than some creeping red fescue cultivars and most hard fescue cultivars (Doak et al. 2004).

Low fertility: Sheep fescue prefers infertile soils (Beard 1973, Johnson 2008) and requires minimal nitrogen inputs (Ruemmele et al. 2003). Diesburg et al. (1997) argue that sheep fescue and tall fescue are the best adapted species for low-input conditions. However, heat tolerance may be poor (Beard 1973, Diesburg et al. 1997). Once established, sheep fescue showed good quality under low-input conditions in Maryland (Dernoeden et al. 1994, 1998), Minnesota (Watkins et al. 2010), and southern Alberta (McKernan et al. 2001). Sheep fescue (cultivar 'Blacksheep') was a top performing species, especially when not mowed, across 2 years in a low-maintenance eight-state study in the North Central US (Watkins et al. 2011). In the same region, three sheep fescue cultivars ('Azure', 'Barok', and 'Azay') had acceptable turf quality ratings in low-maintenance trials in some but not all of the eight North Central state locations (Watkins et al. 2014). Turf quality ratings were relatively poor in the summer compared to many of the other 22 turfgrass cultivars used in the study but, ratings improved in the fall. Overall quality ratings for sheep fescue were lower than ratings for chewings, hard, and tall fescue. Wakefield et al. (1974) evaluated persistence of turfgrass species along roadsides in Rhode Island and found that sheep fescue had better coverage along roadsides after 2 years of establishment. Persistence of sheep fescue cultivar 'Nakisha' was high in low fertility environments in southern Alberta (McKernan etal. 2001) and the Upper Midwest (Diesburg et al. 1997).


Freezing*:* As a cool-season grass, sheep fescue has excellent cold tolerance (Ogle et al. 2010).

Salinity: Sheep fescue is generally considered to be salt sensitive (Brod and Presse 1980, Brown et al. 2011) although some cultivars show higher tolerance to salinity. Sheep fescue 'Marco Polo' had as high or higher salinity tolerance in germination trials than tall fescue (Wang et al. 2011, Zhang et al. 2011, Friell et al. 2012) and red fescue 'Smirna' (Zhang et al. 2011) but showed reduced salinity tolerance than red fescue in a hydroponic system (Zhang et al. 2011, 2013). In a roadside trial in Minnesota, sheep fescue was among the most salt tolerant species in a trial of 75 cool-season turfgrass cultivars (Friell et al. 2012). Although germination was equal to tall fescue, visual quality of sheep fescue was lower than tall fescue in a greenhouse experiment when exposed to salinity treatments (Wang et al. 2011). Sheep fescue is similar in salt tolerance to hard fescue (Marcum 2008a).


Acidity: Similar to other fine fescue species, sheep fescue is adapted to acidic soils (Beard 1973). It has the least resistance to aluminum toxicity among 58 cultivars tested (Liu et al. 2008).


Wear tolerance: Wear tolerance of sheep fescue is considered to be good (Beard 1973, Ruemmele et al. 2003), including tolerance to mowing and grazing (Ruemmele et al. 2003). It can withstand moderate equipment traffic (Ogle et al. 2010) as long as plants are not dormant. In a Maryland low-input study, Dernoeden et al. (1998) showed that sheep fescue cultivar 'Bighorn' maintained acceptable quality despite being mowed once per month during the summer months

with a rotary mower. Similarly, in a low-input study established at 8 sites in 7 states of the Upper Midwest (Diesburg et al. 1997), common sheep fescue and tall fescue maintained the best quality among 11 turfgrass species despite being mowed once per week while leaves were elongating (i.e., when plants were not dormant). Watkins et al. (2010) showed that out of 15 species, sheep fescue ('SR 3100') had significantly better turfgrass quality than all other species when planted on fairways in Minnesota that were subjected to three levels of traffic. Average turfgrass quality for all other species besides chewings fescue was not acceptable for fairways. This superior performance, however, was only manifested in the second year of growth whereas sheep fescue was ranked 7th in wear tolerance (below Kentucky bluegrass, supine bluegrass perennial ryegrass, tall fescue and several bentgrasses) in the first year. After two years growth in field plots, sheep fescue turf cover ranged between 23% to 71% in control plots and 0-3.3% in plots subjected to a traffic simulator while turf cover for tall fescue, Kentucky bluegrass and perennial ryegrass maintained > 50% cover (Glab et al. 2015). Turf quality and shoot density decreased also. Given these data, Glab et al. (2015) ranked sheep fescue as the least wear tolerant of 7 species.

Competition: Sheep fescue resisted invasion and weed encroachment (McKernan et al. 2001) and is considered a good weed control species once stands are established (Ogle et al. 2010). Sheep and hard fescue cultivars maintained better quality and better resisted weed invasion than two tall fescue cultivars in a three-year study in Maryland without irrigation (Dernoeden et al. 1994). In a fine fescue trial comparing 80 fine fescue cultivars, the only sheep fescue cultivar tested, 'Quatro', did not stand out as being particularly superior or poor in suppressing weeds (Bertin et al. 2009); however the breeder of 'Quatro' (Cebeco International Seeds) indicates that the cultivar is competitive under low-maintenance conditions, advising that it should not be represented in the seed mixture by more than 20%.

Mixes: Sheep fescue (20-25%) mixed with hard fescue (20-25%), red fescue (20-25%), slender wheatgrass (0-20%), and Canada bluegrass (20-25%) had the highest cover ratings out of 10 seed mixes in a 3-year low maintenance study in southern Alberta (McKernan et al. 2001). Weed density in these mixes was lower than in monocultures of the species suggesting a synergistic effect among species. In a New Mexico field study, a mix of 70% hard fescue, 25% sheep fescue, and 5% Kentucky bluegrass showed good germination, excellent turfgrass coverage, and was fastest in achieving 50% coverage at normal and reduced seeding rate and at lower irrigation (Leinauer et al. 2010). In Minnesota, sheep fescue was used in a 'no-mow mix' containing 25% chewings fescue, 25% hard fescue, 25% red fescue, and 25% sheep fescue, and also in a 'fine fescue mix' containing 33% each of hard, red and sheep fescue (Meyer and Pedersen 1999). The fine fescue mix ranked higher than the no-mow mix, especially in turf color but also in turf quality and cover over three years (Meyer and Pedersen 1999). Both mixes generally ranked higher than any of the species planted in monoculture. The fine fescue mixes were also used in Minnesota by Miller et al. (2013) to test performance under low maintenance conditions over 3 years. The fine fescue mixtures had acceptable quality ratings. They ranked lower in quality than a tall fescue cultivar blend and native species mixtures but ranked higher than Kentucky bluegrass. In a road decommissioning study in Montana, Grant et al. (2011) used sheep fescue (20%), orchard grass (20%) and Italian ryegrass (60%) in a non-native seed mix. One year after establishment, each of the three seeded species was only present at less than 1% cover whereas native species established more rapidly. The authors conclude that native seed mixes result in faster vegetative establishment.

Cultivars: Sheep fescue has relatively few cultivars available in the United States compared to the introduced fine fescue species. Cultivars include 'Azay', 'Covar', 'Ovina', 'Paradise', and 'Quatro' (Pawnee Buttes Seed, Inc) although what is labeled as sheep fescue may be genetically more similar to hard fescue than sheep fescue. Cultivar 'Quatro' (Cebeco International Seeds, Netherlands) was released in 1977 by the Washington Agricultural Research Center as the first tetraploid sheep fescue available within the United States. It originated from Turkey and is bred for low-maintenance conditions and remains green under drought-induced dormancy. 'Quatro' can dominate polycultures under low-maintenance conditions and the breeder therefore suggests that the cultivar should not be represented by more than 20% of the seed mixture. Cultivar 'Quatro' may be the only true sheep fescue with all other cultivars actually being blue hard fescue (Brede 2000). Cultivar 'Covar' also originates from Turkey and it is unclear whether it is a true cultivar of sheep fescue or false sheep fescue (*Festuca valesiaca = Festuca pseudovina*; Ruemmele 2003). The cultivar is known to be an aggressive competitor and is suitable for planting along roadsides (Ruemmele 2003). Cultivar 'MX-86' (Jacklin Seed Company) originating from former East Germany and was released in 1988. 'MX-86' produces low-maintenance low-growing turf with improved seedling vigor and improved resistance to some diseases. Seed is enhanced with endophyte for improved disease resistance (Ogle et al. 2010). Accession 'P-274' was selected from material originating from Turkey by the Plant Materials Center at Pullman, Washington (Ruemmele et al. 2003) but never released as a cultivar. 'P-274' is a dwarf and densely tufted. Cultivar 'Career' was released in The Netherlands as a low-growing, drought-tolerant, and shade-resistant cultivar.

Hybrids: Hybridization within the *Festuca ovina* complex is not as extensive as in the *Festuca rubra* complex (Ruemmele et al. 2003). Artificial crosses with perennial ryegrass yielded nonviable seed.