Chewings fescue

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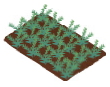
Chewings fescue is part of the red fescue complex but the subspecies has very different growth habits, including no rhizomes but extensive tillering, which results in dense sod. Chewings fescue is commercially available at low cost and requires little maintenance owing to its low stature. However, it is rated only as Fair to Good (grade = C+) owing to several management concerns:

Chewings fescue resists weed invasion through dense turf but this attribute also limits diversity. Wildlife value is poor.

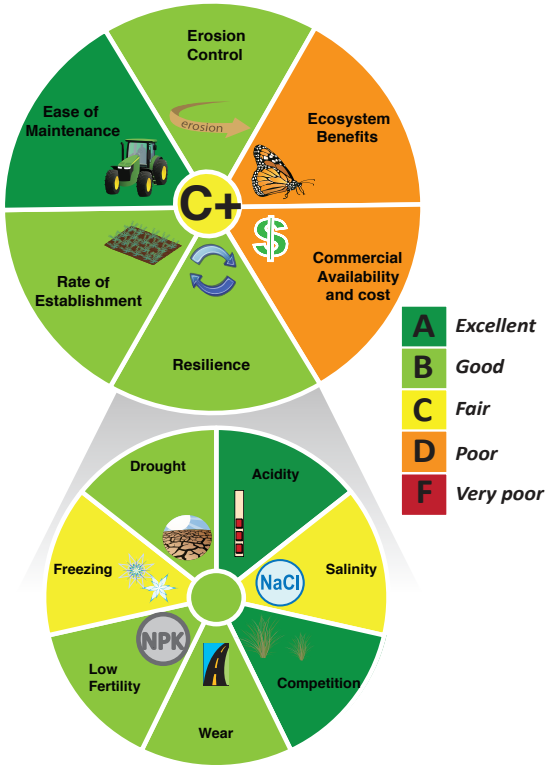
Chewings fescue is moderately expensive when planted over large areas.

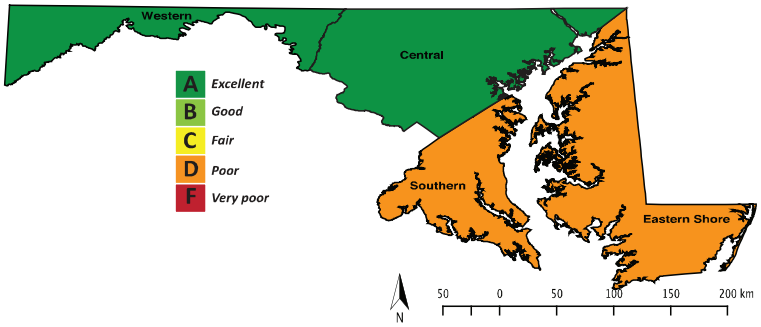
Chewings fescue does not produce rhizomes. Combined with shallow rooting, this species may not be suitable for stabilizing steep banks.



Chewings fescue germinates well but turf quality establishes slowly, often requiring 6 months.

Chewings fescue is only fair in its tolerance to soil salinity and cold temperatures. Drought and heat negatively affect turf quality.





Chewings fescue is suitable for roadsides in Western and Central Maryland. However, its use is not recommended for Southern Maryland and the Eastern Shore.

Chewings fescue cultivars that are recommended for Maryland in 2016 include Fairmont, Intrigue 2, Longfellow 3, Treazure II, Wrigley 2, Zodiac (new varieties) and Radar. Updates to recommended cultivars in Maryland are published annually in the University of Maryland Turfgrass Technical Update TT77 (Maryland Turfgrass Council).

Biology: Chewings fescue is a perennial cool-season grass native to Europe that has been introduced widely in other parts of the world including New Zealand (first cultivation) and the United States (Ruemmele et al. 2003). Chewings fescue is part of the red fescue complex but is treated separately owing to its differences in growth habit from the creeping red fescues – chewings fescue is a bunch-type species that lacks rhizomes (Ruemmele et al. 2003). However, tillering is extensive (Beard 1973) and maintains high density in turfs (Ruemmele et al. 2003).

*Seeds per pound:*500,000 seeds per pound (University of Tennessee extension)
Cost per pound: $2.38 per pound from Ernst Conservation Seed
Cost per acre: $416.50 per acre
Suggested sowing rate: 175 pounds per acre (Chesapeake Valley Seed); 130 pounds per acre (Bertin et al. 2009)
Sowing depth: <1/2 inch (John et al. 2012)
Germination time: 7-14 days (University of California IPM)
Seeding timing: spring or early fall
Length of growing season: spring to fall with a period of dormancy in hot summers
Leaf height: 1.5-6 inches (Ruemmele et al. 2003)
Height at seed head stage: 10-35 inches (Ruemmele et al. 2003)
Shade tolerance: good (Beard 1973, VanHuylenbroeck and VanBockstaele 1999)
Suggested mowing height: 4-6 inches (Doak et al. 2004); avoid scalping because it will cause substantial mortality (Booze-Daniels pers. communication)
Tolerance of wet conditions: needs well-drained soil
Humidity tolerance: Adapted to cool humid climates (Beard 1973) and therefore tolerant of high humidity.
Disease resistance: Good overall disease resistance. Chewings fescue is susceptible to *Puccinia graminis* ssp. *graminicola*; leaf spot resistance is moderate; and resistance to *Laetisaria fuciformis* is intermediate between hard fescue and creeping red fescue (Ruemmele et al. 2003). The presence of endophytes in some cultivars ('Longfellow') is increasing disease resistance to *Blissus leucopterus* and *Sclerotinia homeocarpa.*

Services:

Commercial availability and cost: Chewings fescue seed is somewhat more expensive than creeping red fescue but less so than hard fescue and sheep fescue. It is commercially available.

Rate of establishment: Establishment rate from seed is good (Beard 1973). However, turf quality is slow to develop and only emerges after 6-18 months of growth (Erdmann and Harrison 1947, Bertin et al. 2009, Watkins et al. 2010, Turner pers. communication). Using photosynthetic measurements, VanHuylenbroeck and VanBockstaele (1999) found that chewings fescue had a slower growth rate than red fescue. Among 80 cultivars tested in New York, chewings fescue cultivar 'Sandpiper' was among the top 6 fine fescue cultivars showing high seedling vigor (Bertin et al. 2009).

Ease of maintenance: Chewings fescue, similarly to all fine fescues, prefers low-input environments with minimal fertility and irrigation (Beard 1973). Chewings fescue does not

have to be mowed between mid-June and mid-September because the species becomes dormant during these months. During hot summers, mowing should even be avoided as it can damage the turf.

Erosion control: Chewings fescue does not produce rhizomes and therefore produces less root mass in the upper soil layers than creeping red fescue (Ruemmele et al. 2003). Thus, chewings fescue may not be as good at stabilizing soil as creeping red fescue. Depth of rooting is unknown.


Ecosystem benefits: Ecosystem benefits for chewings fescue are generally not differentiated from its close cousins the creeping red fescues. Red fescues are generally non-native although John et al. (2012) suggest that some red fescues have North American origins. Red fescue produces a dense turf (chewings fescue through extensive tillering and creeping red fescue through rhizomes), which decreases weed invasion but also limits species diversity (John et al. 2012). Bertin et al. (2009) showed that some chewings fescue cultivars produce phytotoxins that affect the growth and survival of other species in the community. Wildlife will feed on red fescue but red fescues are generally not recommended for forage production owing to their low nutritional value and some endophyte containing cultivars (John et al. 2012).


Resilience:


Drought: Chewings fescue is drought resistant and can tolerate dry soils (Ruemmele et al. 2003). Chewings fescue avoids drought by having a lower evapotranspiration rate (Beard and Kim 1989, McCann and Huang 2008) than other cool-season grasses such as tall fescue, perennial ryegrass and Kentucky bluegrass. Beard (1973) rates drought tolerance of chewings fescue as good; however, it does not tolerate temperature extremes. It maintained evapotranspiration, quality and leaf growth under limited soil moisture compared to Kentucky bluegrass and perennial ryegrass, which declined rapidly when soil water potential reached -50 to -80 kPa (Aronson et al. 1987). Chewings fescue had one of the highest survival rates among 15 turfgrass species when soil moisture was reduced and when soil temperature was increased. However, survival was severely reduced (20%) when air temperature was increased to 50°C for 6 hours (Carroll 1943). Chewings fescue was more drought tolerant than creeping red fescue in low fertility soils but was less drought tolerant in higher fertility soils (Carroll 1943). In a low-maintenance study in the Ridge and Valley of Virginia (Doak et al. 2004), two chewings fescues produced 50% and 60% cover, after 4 years, including a severe drought in the third year of the study. Under the same conditions, two sheep fescue cultivars maintained 60% cover, five creeping red fescue cultivars produced 60-80% cover, and 6 hard fescue cultivars maintained 80-90% cover suggesting that drought tolerance in the Ridge and Valley of Virginia ranks chewings < sheep < creeping red < hard fescue. In contrast, at a Piedmont site, creeping red fescue had the least drought tolerance with cover mean = 40%, closely followed by chewings fescue at mean cover = 51.5%, then sheep fescue with mean = 67.5% and hard fescue at 69% (Doak et al. 2004). In a 3-year study in southern Alberta, McKernan et al. (2001) observed chewings fescue cultivar 'Shadow' to be drought sensitive. Drought resistant cultivars of chewings fescue are 'Ambrose', 'Ambassador', 'Treazure', and 'Bridgeport' (McCann and Huang 2008).

Low fertility: Chewings fescue cultivars ('Intrigue', 'Jamestown II', 'Culumbra') performed consistently well in the summer and fall across eight North Central states

in low-maintenance trials that tested performance of 25 turfgrass cultivars representing 10 species (Watkins et al. 2014). Chewings fescue had one of the highest survival rates among 15 turfgrass species in low-N conditions (Carroll 1943). Chewings fescue cultivars 'Longfellow' and 'SR 5100' and a strong creeping red fescue and chewings fescue mix had the best turf quality among 15 monoculture and polyculture treatments at low rates of fertilizer use and also recovered faster after disturbance (Horgan et al. 2007). Watkins et al. (2010) also observed chewings fescue to be superior in quality among 17 species, including tall fescue, perennial ryegrass, and Kentucky bluegrass but only in the second growing season. In contrast, after comparing turf quality of four cultivars of fine fescues and one cultivar of tall fescue in a Maryland low-input study, Dernoeden et al. (1998) concluded that chewings fescue is not as tolerant to low fertility, low input environments than some of its fescue cousins.

Freezing*:* Although Stier and Fei (2008) highlight the cold-hardiness of all fescues, Bear (1973) suggests that chewings fescue does not tolerate extreme cold temperatures. Percent survival of chewings fescue was 75-90% up to -10°C but no survival was observed at -15°C and below (Carroll 1943). When also subjected to soil drying, survival decreased to 25%.

Salinity: Unlike its close cousins, strong creeping and slender creeping red fescue, chewings fescue is considered a salt sensitive species (Humphreys 1981, Marcum 2008a, Brown et al. 2011, Friell et al. 2013, Uddin and Juraimi 2013).

Acidity: Chewings fescue is adapted to acidic soils with high sand content (Beard 1973) and has good resistance to acid soils with high aluminum content (Liu et al. 2008). This tolerance is further increased by some endophyte-infected cultivars (Liu et al. 2008).

Wear tolerance: Beard (1973) suggests that chewings fescue has better wear tolerance than most cool-season turfgrasses, and Horgan et al. (2007) observed chewings fescue and hard fescue to be more wear tolerant than other fine fescues. Similarly, chewings fescue had better wear tolerance than red fescue (Canaway 1981, Ruemmele et al 2003). Watkins et al. (2010) showed that out of 17 species, chewings fescue ('Jamestown II') maintained acceptable quality on-low input fairways in Minnesota when subjected to three levels of traffic. Average turf grass quality for all other species besides sheep fescue was not acceptable for fairways. This superior performance, however, was only manifested in the second year of growth; chewings fescue was ranked low in wear tolerance (below Kentucky bluegrass, supine bluegrass, perennial ryegrass, tall fescue, and several bentgrasses) in the first year. Chewings fescue was only ranked 6th out of 7 species in wear tolerance (Glab et al. 2015), and Shearman and Beard (1975) observed that wear tolerance of chewings fescue was less than perennial ryegrass and Kentucky bluegrass. Chewings fescue overseeded on Bermudagrass in California showed marginal tolerance to traffic simulation (Cockerham et al. 1990), and was severely damaged by traffic in a similar experiment in Missouri (Dunn et al. 1994). Traffic, including mowing, will cause severe mortality while plants are dormant in the summer months (mid-June to mid-September). In a 3-year study, Willmott et al. (2001) found that chewings and hard fescue maintained better quality than tall fescue and prairie junegrass in an orchard that was mowed in the summer. However, hard and chewings fescue suffered damage from maintenance equipment and the damage was most severe in the summer during heat and drought stress. Thus, Willmott et al. (2000) stress that equipment traffic on chewings fescue during

heat and drought stress needs to be avoided. In contrast, Doak et al. (2002) observed no change in cover in experiments in Virginia when chewings fescue was subjected to mowing once in May, twice in May and September, or three times in May, July, and September, suggesting some wear tolerance if mowing height is high (>6 inches) and scalping is minimized (Booze-Daniels *personal communication*).

Competition: Ryegrass negatively affected the growth of chewings fescue in polyculture owing to the initial rapid growth of ryegrass (Erdmann and Harrison 1947). When grown together, chewings fescue and Kentucky bluegrass showed equal competitive ability and could therefore be used in mixture without a decrease in yield of either species (Erdmann and Harrison 1947). Chewings fescue is competitive in low-input environments. In a low-input study in Utah, chewings fescue (cultivar 'Jamestown II') and creeping red fescue were more competitive than buffalograss in mixture (Johnson 2003). Chewings and hard fescue maintained the best quality and the lowest weed populations in a 3-year orchard study (Willmott et al. 2000). Similarly, Bertin et al. (2009) found that chewings fescues, as a group, were strongly weed suppressive with >70-80% weed suppression. Chewings fescue cultivars with the best and consistent weed suppression included 'Sandpiper', 'Intrigue', and 'Columbra'. Root exudates of the chewings cultivar 'Intrigue' showed strong phytotoxicity that suppressed numerous weed species (Bertin et al. 2009). Thus, weed suppression in cultivars of chewings fescue may be a function of rapid establishment and the maintenance of a dense canopy and vigorous root system in combination with the production of allelochemicals (Bertin et al. 2009).

Mixes: Chewings fescue is used in seed mixes with Kentucky bluegrass (Beard 1973, Ruemmele et al. 2003) because the species are similar in competitive ability (Erdmann and Harrison 1947). This species combination can be used in sun or partial shade lawns either alone or with Agrostis species or red fescue (Ruemmele et al. 2003). A 'no-mow mix' containing 25% chewings fescue, 25% sheep fescue, 25% red fescue, and 25% hard fescue performed adequately in a low-maintenance study in Minnesota but was ranked lower in turf quality, color and cover over three years than other mixes containing perennial ryegrass (Meyer and Pedersen 1999). 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. Chewings fescue is sometimes used for overseeding lawns to maintain adequate winter color and cover (Ruemmele et al. 2003) in bermudagrass (Nelson et al. 2005) and buffalograss (Severmutlu et al. 2013). A mix of chewings fescue with buffalograss may allow irrigation levels to be lowered in semi-arid regions; however chewings fescue tends to be more competitive than buffalograss in mixture (Johnson 2003).

Cultivars: The first cultivars were released in New Zealand. In the United States, cultivar 'Checker' was released by the Oregon Agricultural Extension Service in 1978. Cultivar 'Victory' was released in 1988 for improved seed yield, disease resistance, uniformity, tolerance to close mowing, and tolerance to acidity, shade, and low fertility. Other cultivars such as 'Longfellow', 'Jamestown' and 'Banner' were released to contain endophytes and be more heat resistant. Other cultivars were released for their slow growth ('SR5000', 'Tiffany'), low maintenance ('SR5000', 'Silhouette'), and drought/heat tolerance ('Silhouette'; Ruemmele et al. 2003).

Hybrids: Cultivar 'Seabreeze' is a hybrid between slender creeping red fescue and chewings fescue but is released as a slender creeping red fescue cultivar (Ruemmele et al. 2003).