common velvetgrass
Holcus lanatus L.

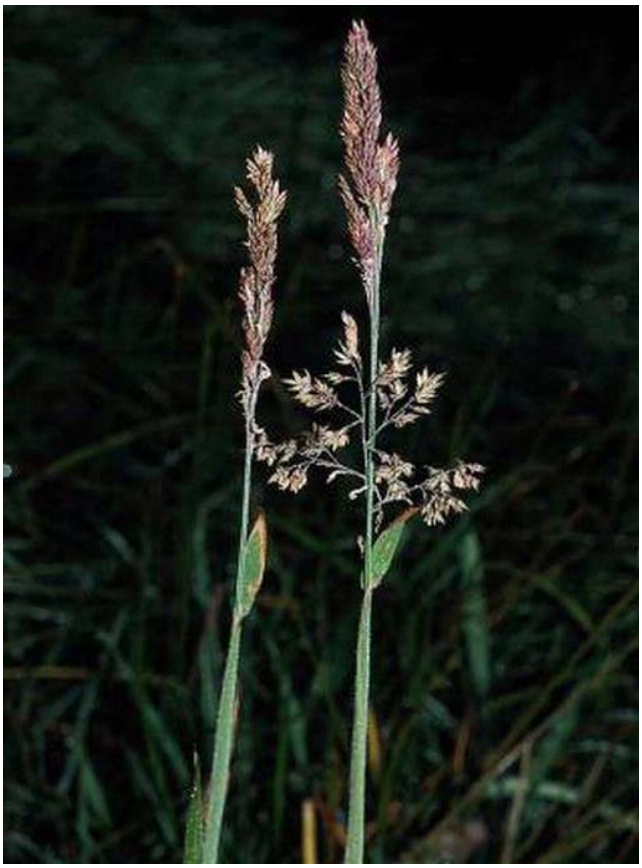
Synonyms: *Aira holcus-lanata* Vill., *A. holcus-lanatus* (L.) Vill., *Avena lanata* (L.) Cav., *A. lanata* (L.) Koeler, *A. pallida* Salisb., *Ginannia lanata* (L.) F. T. Hubb., *G. pubescens* Bubani, *Nothoholcus lanatus* (L.) Nash, *Notholcus lanatus* (L.) Nash ex Hitchc.
Other common names: common velvet-grass, meadow soft grass, mesquite, mesquite grass, sweet velvet grass, tufted softgrass, velvetgrass, Yorkshire fog
Family: Poaceae

Invasiveness Rank: **56** The invasiveness rank is calculated based on a species' ecological impacts, biological attributes, distribution, and response to control measures. The ranks are scaled from 0 to 100, with 0 representing a plant that poses no threat to native ecosystems and 100 representing a plant that poses a major threat to native ecosystems.

Description
Common velvetgrass is a perennial, tufted grass that grows 20 to 100 cm tall. Lower internodes are usually densely hairy. Uppermost internodes are often glabrous. Leaves are flat, soft-hairy, 2 to 25 cm long, and 3 to 12 mm wide with open, densely hairy sheaths. Ligules are strongly hairy and 1 to 4 mm long with irregularly toothed or short-hairy margins. Panicles are 3 to 15 cm long and 1 to 8 cm wide with hairy, dense or open branches. Spikelets are 3 to 6 mm long and contain two florets. Glumes exceed and enclose the florets and are 3 to 4 mm long with stiff hairs on the keels and veins. Veins and tips are often purple-tinted. Upper glumes are wider and longer than lower glumes and often have awns at the tips that are up to 1.5 mm long. Lower glumes lack awns. Lemmas are 1.7 to 2.5 mm long. Upper lemmas have awns that are 1 to 2 mm long, smooth and straight when fresh, and hooked when dry. Lower lemmas lack awns. Seeds are 1.5 to 2.5 mm long (Beddows 1961, Standley 2007, eFloras 2008, Gucker 2008, Klinkenberg 2010).


Hairy stem, leaf, and sheath of *Holcus lanatus* L. Photo by J. DiTomaso.

Similar species: Common velvetgrass is similar to creeping velvetgrass (*Holcus mollis*), a non-native species that has been found in the Pacific Maritime ecogeographic region of Alaska (AKEPIC 2011, UAM 2011). Creeping velvetgrass can be distinguished from common velvetgrass by the presence of rhizomes and awns on the lemmas that are 3 to 5 mm long and straight or angled when dry (Standley 2007). Common velvetgrass is not easily confused with other grasses (Pitcher and Russo 1988).


Purple-tinged panicles of *Holcus lanatus* L. Photo by J. DiTomaso.

Ecological Impact

Impact on community composition, structure, and interactions: Dense populations of common velvetgrass have been shown to reduce the establishment of native species (Gucker 2009) and the growth of tree seedlings (Willoughby et al. 2006). The accumulation of litter from common velvetgrass can prevent the germination of native grasses (Gucker 2008). This species has occurred at up to 80% ground cover in Alaska (AKEPIC 2011) and can likely significantly increase the density of vegetation in disturbed areas. Common velvetgrass provides food for game birds, deer, elk, and insects (Beddows 1961, Gucker 2008). It is associated with many detrimental microorganisms and viruses (Thompson and Turkington 1988).

Impact on ecosystem processes: Litter accumulation from common velvetgrass can increase risk of fires (Gucker 2008). This species rapidly colonizes disturbed areas, where it outcompetes native species for soil moisture and nutrients (Gucker 2008, GOERT 2009). Its long, fast-growing roots, long root hairs, and rapid rate of establishment enable it to aggressively compete for nutrients, especially in nutrient-limited substrates (Thompson and Turkington 1988, DiTomaso and Healy 2007).

Infestation of *Holcus lanatus* L. Photo by J. Randall.

Biology and Invasive Potential

Reproductive potential: Common velvetgrass reproduces sexually by seeds and vegetatively by tillering. A single panicle can produce from 100 to 380 seeds. A single plant can produce up to 240,000 seeds. The average seed production for a dense stand of common velvetgrass in Britain was 19,000 seeds per square meter (Thompson and Turkington 1988, Gucker 2008). A population that occurred at 91% ground cover in California produced 82,300 seeds per square meter (Peart 1989). Seeds can remain viable in the soil for more than 12 years. Germination from seed banks following disturbance is common (Gucker 2008). The contribution of vegetative reproduction is relatively unimportant compared to sexual reproduction (Beddows 1961).

Role of disturbance in establishment: Common velvetgrass readily colonizes bare soil (Beddows 1961). While a few seeds may germinate in established vegetation, seeds primarily germinate when gaps are created by disturbance (Thompson and Turkington 1988, Gucker 2008). Moderate disturbances generally increase the establishment and survival of seedlings (Gucker 2008), but intensive grazing and trampling can reduce populations of common velvetgrass (Beddows 1961, DiTomaso and Healy 2007). In Washington and Oregon, common velvetgrass is common under canopies of red alder (*Alnus rubra*), but it does not typically grow in later successional forests (Gucker 2008). In British Columbia, common velvetgrass commonly grows on exposed mineral soils (Klinkenberg 2010). All infestations recorded in Alaska occur in anthropogenically disturbed areas (AKEPIC 2011).

Potential for long-distance dispersal: Seeds are light, weighing 0.3 to 0.5 mg each, and have large surface areas, enabling them to be dispersed by wind (Thompson and Turkington 1988, Gucker 2008). However, studies show that 90% of seeds land within 5.2 m of the parent plant (Gucker 2008). Seeds are likely dispersed by water; 10% of seeds remain floating for 72 days in stagnant water and 77 days in moving water (van den Broek et al. 2005). Dispersal by animals, including rabbits, cattle, and some birds, also likely occurs (Gucker 2008).

Potential to be spread by human activity: Seeds can be dispersed on mowing equipment (Gucker 2008). They are a known contaminant of grass seed (Thompson and Turkington 1988) and commercial seed sold in Alaska (Conn pers. obs.). Common velvetgrass is sometimes cultivated as a meadow grass in British Columbia (Thompson and Turkington 1988), and it was cultivated in southeast Alaska (Gucker 2008). This species has also been planted for soil stabilization and forage (Thompson and Turkington 1988, DiTomaso and Healy 2007).

Germination requirements: Common velvetgrass seeds germinate best in full light and exposed conditions. Alternation above and below 20°C is optimal for germination, and cold stratification is not required (Gucker 2008, GOERT 2009). Cold temperatures, dry conditions, and increasing burial depth tend to reduce or delay germination. Shade decreases seedling growth and survival (Gucker 2008).

Growth requirements: In Europe, common velvetgrass does not grow in regions where the average January temperature is colder than -2°C (Beddows 1961), and it mainly grows in the milder coastal regions of Nova Scotia and British Columbia in Canada (Thompson and Turkington 1988). Common velvetgrass tolerates a wide range of soil conditions, however it grows best in moist soils (Gucker 2008) with pH between 5.0 and 7.5 (Pitcher and Russo 1988). It can tolerate infertile soils. This species can grow on disturbed soil in shaded

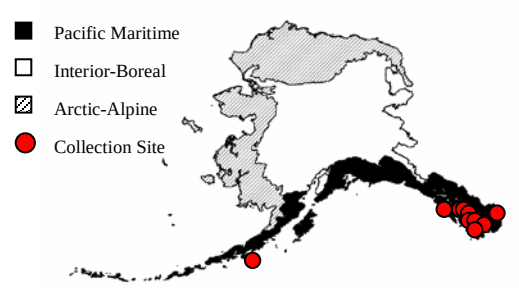
woodlands (Gucker 2008).
Congeneric weeds: Creeping velvetgrass (*Holcus mollis*) is known to occur as a non-native weed in North America (Standley 2007).

Legal Listings

- ☐ Has not been declared noxious
- ☐ Listed noxious in Alaska
- ☒ Listed noxious by other states (considered a restricted noxious weed seed in VA)
- ☐ Federal noxious weed
- ☐ Listed noxious in Canada or other countries

Distribution and Abundance

Common velvetgrass is widely distributed and occurs in a variety of habitats (Gucker 2008). It is sometimes cultivated as a meadow grass in British Columbia (Thompson and Turkington 1988). It was cultivated in southeast Alaska and established outside of cultivation by 1959 (Gucker 2008). This species has also been planted for soil stabilization and forage (Thompson and Turkington 1988, DiTomaso and Healy 2007). It grows along the Salmon River in Oregon and the Hoh River in Washington (Gucker 2009). In Hawaii, it invades high elevation bog communities (Daehler 2005), and it invades coastal prairies in California (Gucker 2008). Common velvetgrass restricts the growth of European white birch (*Betula pendula*) seedlings in the United Kingdom (Willoughby et al. 2006). It invades Garry oak (*Quercus garryana*) ecosystems in British Columbia (GOERT 2009).
Native and current distribution: Common velvetgrass is native to Europe, western Asia, and North Africa (Standley 2007, Gucker 2008). It has been introduced to Asia, Africa, North America, South America, Australia, and New Zealand (Beddows 1961, Standley 2007, eFloras 2008, Landcare Research 2011, Western Australian Herbarium 2011). This species grows in 45 states of the U.S. and much of Canada (USDA 2011). It is known to grow in coastal Norway as far north as 69.7°N (Vascular Plant Herbarium Oslo 2011). Common velvetgrass has been documented from the Pacific Maritime ecogeographic region of Alaska (Hultén 1968, AKEPIC 2011, UAM 2011).



Distribution of common velvetgrass in Alaska

Management

Common velvetgrass can resprout from basal shoots following the removal of the above-ground growth (Gucker 2008). Hand pulling of plants can reduce populations, and removing inflorescences can contain population expansion (Pitcher and Russo 1988). Long-term flooding can eradicate common velvetgrass. Mowing and cutting can increase the reproductive potential of common velvetgrass, and seeds are easily spread by mowing equipment (Gucker 2008). Fluazifop and sethoxydim kill broad-leaved grasses, including common velvetgrass, but do not harm other plants (GOERT 2009). Atrazine, bromacil, dalapon, diuron, glyphosate, paraquat, and simazine can be used to control this species with few plants recovering (Thompson and Turkington 1988).

References:

AKEPIC database. Alaska Exotic Plant Information Clearinghouse Database. 2011. Available: http://akweeds.uaa.alaska.edu/

Beddows, A. 1961. Biological Flora of the British Isles. *Holcus lanatus* L. Journal of Ecology. 49(2). 421-430 p.

Conn, J., Ph. D., Research Agronomist, Agricultural Research Service, U.S. Department of Agriculture, 319 O'Neil Building, 905 Koyukuk St. – UAF Campus, Fairbanks, Alaska 99775. Tel: (907) 474-7652 – pers. obs.

Daehler, C. 2005. Upper-montane plant invasions in the Hawaiian Islands: Patterns and opportunities. Perspectives in Plant Ecology, Evolution, and Systematics. 7(3). 203-216 p.

DiTomaso, J., and E. Healy. 2007. Weeds of California and Other Western States. Vol. 2. University of California Agriculture and Natural Resources Communication Services, Oakland, CA. 974 p.

eFloras. 2008. Published on the Internet http://www.efloras.org [accessed 28 February 2011]. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.

GOERT (Gary Oak Ecosystem Recovery Team). 2009. *Holcus lanatus*: Invasive species in Garry oak and associated ecosystems in British Columbia. Gary Oak Ecosystem Recovery Team. Victoria, BC. [28 February 2011] http://www.goert.ca/pubs_invasive.php

Gucker, C. 2008. *Holcus lanatus*. In: Fire Effects Information System [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. [28

February 2011] Available: http://www.fs.fed.us/database/feis/
Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 pp.
Invaders Database System. 2011. University of Montana. Missoula, MT. http://invader.dbs.umt.edu/
Klinkenberg, B. (Editor) 2010. *Holcus lanatus* L. In: E-Flora BC: Electronic Atlas of the Plants of British Columbia**.** Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia. Vancouver, BC. [28 February 2011] Available: http://www.geog.ubc.ca/biodiversity/eflora/index.shtml
Landcare Research. 2011. *Holcus lanatus* L. (1753). New Zealand Plants. Landcare Research. Lincoln, New Zealand. [28 February 2011] http://nzflora.landcareresearch.co.nz/
Peart, D. 1989. Species interactions in a successional grassland. I. Seed rain and seedling recruitment. Journal of Ecology. 77(1). 236-251 p.
Pitcher, D., and M. Russo. 1988. Element Stewardship Abstract for *Holcus lanatus*. The Nature Conservancy. Arlington, VA. [28 February 2011] http://www.imapinvasives.org/
Standley, L. 2007. *Holcus lanatus* L. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 12+ vols. New York and Oxford. Vol. 24, p. 740.
Thompson, J., and R. Turkington. 1988. The Biology of Canadian Weeds. 82. *Holcus lanatus* L. Canadian Journal of Plant Science. 68(1). 131-147 p.
UAM. 2011. University of Alaska Museum, University of Alaska Fairbanks. Available: http://arctos.database.museum/home.cfm
USDA. 2011. The PLANTS Database. National Plant Data Center, Natural Resources Conservation Service, United States Department of Agriculture. Baton Rouge, LA. http://plants.usda.gov
van den Broek, T., R. van Diggelen, and R. Bobbink. 2005. Variation in seed buoyancy of species in wetland ecosystems with different flooding dynamics. Journal of Vegetation Science. 16(5). 579-586 p.
Vascular Plant Herbarium, Oslo. 2011. Accessed through GBIF (Global Biodiversity Information Facility) data portal (http://data.gbif.org/datasets/resource/1078, 2011-02-28). Natural History Museum, University of Oslo. Oslo, Norway.
Western Australian Herbarium. 2011. FloraBase — The Western Australian Flora. Department of Environment and Conservation. http://florabase.dec.wa.gov.au/
Willoughby, I., D. Clay, F. Dixon, and G. Morgan. 2006. The effect of competition from different weed species on the growth of *Betula pendula* seedlings. Canadian Journal of Forest Research. 36(8). 1900-1912 p.