crested wheatgrass

Agropyron cristatum (L.) Gaertn.

Synonyms: *Avena cristata* Roem. & Schult., *Bromus cristatus* L., *Costia cristata* (L.) Willk., *Eremopyrum cristatum* (L.) Willk. & Lange, *Triticum cristatum* (L.) Schreb. *Zeia cristata* (L.) Lunell, *Agropyron cristatiforme* Sarkar, *A. desertorum* (Fisch. ex Link) J.A. Schult., *A. imbricatum* Roem. & Schult., *A. pectinatum* (M. Bieb.) *P. Beauv*. *A. pectiniforme* Roem. & Schult.
Other common name: None
Family: Poaceae

Invasiveness Rank: **Not Ranked** - 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

Figure 1 Crested wheatgrass (Agropyron cristatum). Photo by Howard F. Schwartz

Crested wheatgrass is a long-lived perennial grass that grows between 25 and 110 cm tall. The root system is fibrous and occasionally rhizomatous with many roots reaching a depth of 1 m. Inflorescence is a somewhat rectangular and broad spike, 5-25mm wide and 15 cm long that tapers toward the tip, imbricate or often pectinate (comb-like) when mature with dense spikelets having obvious divergence from rachis (main stem of the inflorescence) at an angle of 30-95 degrees. Spikelets are 1 per rachis node, arranged on opposite sides of the rachis, and 7-16 mm long. Both glumes are shorter than the multiple florets within them, 3-5 mm long, ovate-lanceolate, and widely spread at an angle of more than 120 degrees from one another when mature. Lemmas are usually with awns 1-6 mm long. Stems are erect and sometimes geniculate. Sheaths around the leaf base are open and leaf blades can be up to 6 mm wide, flat or involute. Ligules are membranous and grow to 1.5 mm long (Skinner et al. 2012, Hardy BBT Limited 1989).

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Figure 2 Crested wheatgrass (Agropyron cristatum). Pphoto by John M. Randall

Similar Species: Species of wildrye (*Elymus spp.)*, barley (*Hordeum spp.)*, and ryegrass (*Lolium spp.)* can be confused with crested wheatgrass. Crested wheatgrass can be distinguished by visible gaps between spikelets along the mature inflorescence, giving a comb-like (pectinate) appearance. Most other species within this group do not have spikelets diverging from rachis, or inflorescence stem, at such conspicuous angles (30-90 degrees). More specifically, Crested wheatgrass can be distinguished by having one to several spikelets at each node that are all sessile and two to many flowered, perennial habit, and one spikelet at each rachis node with spikes that are closely imbricate and pectinate when mature (Skinner 2012)

Ecological Impact

Impact on community composition, structure, and interactions: May form dense stands in dry areas due to drought and cold tolerance (Shiftlet 1994). Crested wheatgrass is a highly palatable spring forage. Wildlife, including moose, have been known to forage and graze this species and light to moderate grazing can aid in the growth and longevity of crested wheatgrass stands (Zlatnik 1999). In ideal habitats, it can inhibit succession of native species and stands exist in Canada that are up to 40 years in age (Johnson 1986, Allen et al. 1992). Crested wheatgrass does prefer dry, open plains – a habitat not common in Alaska – and is consequently more likely to invade disturbed areas such as agricultural operations in the Mat-Su Valley or Delta Junction and compete for resources with crop plants.

Impact on ecosystem processes: Crested wheatgrass has deep, far-reaching roots and may influence water and nutrient dynamics in dense stands.

Biology and Invasive Potential

Reproductive potential: Crested wheatgrass has high seed production and germination rates, leading to a generous contribution to the seedbank (Hardy BBT Limited 1989). Weak rhizomes may occasionally spread from plant (Shiftlet 1994). With Alaska's changing climate, non-native species could have greater opportunity for establishment within more favorable ecological niches such as warm areas near roadsides or along floodplains (Carlson et al. 2016).

Role of disturbance in establishment: Crested wheatgrass is found growing in

disturbed substrate like gravel and agricultural soils. Similarly, to other invasive plant species, disturbed soils provide excellent substrate for establishment.

Potential for long-distance dispersal: Propagules may be wind-dispersed (Marlette and Anderson 1986). Birds may nest in crested wheatgrass stands, potentially dispersing seed. North American rodents are also known to disperse crested wheatgrass seed. (McAdoo et al. 1986, Miller 2010).

Potential to be spread by human activity: Crested wheatgrass has a history of being transported for agricultural purposes and for soil stabilization (CABI 2017).

Germination requirements: If stored in a dry, cool environment, crested wheatgrass seed may retain 70% viability for up to 12 years (Shiftlet 1994).

Growth requirements: Crested wheatgrass has a high degree of drought and cold tolerance, which has likely been a major factor in its success and longevity in northern, North American climates. It has even been reported of surviving temperatures of under -60 degrees F (Shiftlet 1994). Crested wheatgrass prefers dry, open habitats in temperate zones, and well-drained, moist to dry loamy soils. It may tolerate and survive more mesic conditions but will not withstand prolonged flooding or saturation. Understood to have high tolerance of nutrient poor substrate. (Hardy BBT Limited 1989).

Legal Listings

☒ Has not been declared noxious in AK, Canada or other states.
☐ Listed noxious in Alaska
☐ Listed noxious by other states
☐ Federal noxious weed
☐ Listed noxious in Canada or other countries

Distribution and Abundance

Native and current distribution: Crested wheatgrass is native to northern Africa, temperate Asia, and Europe (USDA, ARS 2017). Outside its native range, it is most commonly found in disturbed habitats including agricultural fields and roadsides. It grows as a weed in 26 US states and all Canadian provinces except for New Brunswick, Nunavut, and Newfoundland (USDA, NRCS 2017, Brouillet et al. 2010+). In Alaska, crested wheatgrass has been reported primarily in the Mat-Su Valley and along the Glenn Hwy from Palmer to Glennallen. It has not been observed in undisturbed habitats in Alaska (AKEPIC, CPNWH 2025, Densmore et all. 2001). To view the most current distribution information, visit the AKEPIC Database.

Management

Research shows mechanical methods, specifically dixie harrow pulled behind a tractor, can be both successful and unsuccessful, and if some cases negatively impact native grasses while the target species remains unaffected (Grant-Hoffman et al. 2012, Hulet et al. 2010). It's likely the physiological responses of this plant to physical damage are complicated. Control via prescribed burns can be effective if conducted during the proper season. Spring fires have been shown capable of reducing crested wheatgrass productivity for several years (Bradley et al. 1992). Herbicide application has been shown effective when utilized during early stages of plant growth. Both

sulfometuron applied to seedlings and rimsulfuron applied during pre-emergence of seedlings drastically reduced crested wheatgrass productivity (Schultz and Creech 2013, Hirsch et al. 2012).

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