Improved Wheatgrass Turf for Limited Irrigation Golf Course Roughs

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The severity of recent droughts and the long-term impact of climate change have heightened the need for water conservation in the U.S. Golf courses are now actively pursuing methods to limit areas that require supplemental irrigation. One approach employed by golf courses is the conversion of out-of-play areas from traditional turfgrasses to xeriscapes or to low-maintenance turfgrasses. In the northern semi-desert regions of the western U.S. the wheatgrasses provide a source of turfgrass that survive without supplemental irrigation. Wheatgrass turfgrass quality is less than that that of traditional species, but their use allows for substantial water savings without the need to xeriscape areas of golf courses.

The USDA Forage and Range Research wheatgrass breeding program has focused on the development of four wheatgrass species: crested wheatgrass (*Agropyron* cristatum), intermediate wheatgrass (*Thinopyrum intermedium*), thickspike wheatgrass (*Elymus lanceolatus*), and western wheatgrass (*Pascopyrum smithii*). Crested wheatgrass and intermediate wheatgrass are native to Eurasia. Thickspike wheatgrass and western wheatgrass are native to North America. Intermediate, thickspike, and western wheatgrass are highly rhizomatous. The crested wheatgrass breeding populations exhibit some rhizome development. To determine the turfgrass potential of these wheatgrass populations, we designed a study to compare elite breeding populations against standard cultivars. Populations will be grown alone and in two- and three-way combination with other species (Table 1) and will be managed under high (3 in) and low mowing (2 in) treatments and limited (50 % evapotranspiration replacement) and no supplemental irrigation.

Table 1. List of species and populations included in the turfgrass quality evaluation.

Species	Population
Crested wheatgrass	RoadCrest
Crested wheatgrass	CWG-Select
Intermediate wheatgrass	Tegmar
Intermediate wheatgrass	IWG-Select
Thickspike wheatgrass	Sodar
Thickspike wheatgrass	TWG-Select
Western wheatgrass	Rosana
Western wheatgrass	WWG-Select
Kentucky bluegrass	Park
Hard fescue	Durar

We seeded experimental plots of the 45 treatments at the Utah State University Evans Farm (Millville, UT) in late May 2016. Plots were hand seeded at a rate of 6 pounds 1000 ft^{-2} for all entries but Park Kentucky bluegrass, which was seeded at a rate of 2 pounds 1000 ft^{-2}. Component ratios of mixed treatments corresponded to the percentage of the mixture multiplied by the stand alone seeding rate. The experimental design was a split plot modification of a randomized complete block design. Whole plots corresponded to mowing heights and sub-plots corresponded to treatment. Irrigation levels were

separated spatially and will be treated as an additional factor in the experimental analysis. Following seeding, plots were established with the use of germination fabric and uniform irrigation. Uniform irrigation was maintained weekly throughout the establishment year at a 75 % evapotranspiration replacement rate. This ensured uniform establishment prior to initiating mowing and irrigation treatments in 2017 (Figure 1). Substantial warm-season grass weed pressure occurred during the summer of 2016. Due to sensitivities of different treatment species to various herbicides at the seedling stage, weed control consisted of mowing the warm-season grasses at a moderate height. Following full plot establishment, we used pre-emergent herbicide to control wee establishment.

Figure 1. Photo of established wheatgrass plots at Millville, UT in summer 2016.

Conclusions

1) **Plots successfully established, despite warm-season grass weed pressure.**
2) **Data collection begins in 2017 and will include quality, color, and ground cover.**
3) **Comparisons to fescue and bluegrass species will allow the potential of wheatgrasses in out-of-play areas to be determined.**