MINNESOTA– Intermediate Wheat Grass Forage Production Potential

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Intermediate wheatgrass (IWG) is a perennial, cool-season forage grass introduced into the U.S. from Asia in the early 20th century. It is widely used for pasture and hay in dryer regions of the Great Plains. It is a rhizomatous plant and has an extensive root system capable of extracting nutrients and water from deep within the soil profile. It also has a relatively large seed size compared to other forage grasses. It is being domesticated as a perennial grain crop and food-grade grain harvested from improved populations of IWG identified as Kernza®. The first grain-type IWG variety (MN-Clearwater) was recently released in MN and has improved grain yield and seed size compared to forage varieties (Bajgain et al., 2020). IWG is currently grown for grain on ~4,000 acres in MN. Grain yields in the year following seeding typically average ~700 lbs/ac but decline significantly with subsequent years of production. A national-scale project led by UM is underway to increase Kernza grain yields, improve markets, measure ecosystem services, and enhance farmer profitability of this new crop. More can be found at kernza.org/kernzacap.

To increase profitability of Kernza production, IWG is being considered for dual use as a forage-grain crop where forage is harvested in spring before heading and in late fall following an early August grain harvest (Table 1). It has potential for grazing and when evaluated under strip grazing in the fall, the dairy heifer gain per day of ~1 lb was similar to that from grazing a mixed cool-season grass-alfalfa pasture.

Table 1. Forage yield and nutritive value of Kernza IWG when harvested in spring and fall for forage. Also shown is summer straw yield and quality following grain harvest.

	Spring Forage	Summer Straw	Fall Forage
Yield	500-1,400 lbs/ac	2,000-7,000 lbs/ac	1,000-3,000 lbs/ac
CP	20-25%	5-10%	12-18%
RFV	180-230	60-90	100-170
Maturity	vegetative	straw	vegetative

Since grain yields of grain-type IWG varieties decline by the 3rd year of production, we also evaluated the season-long forage yield and forage quality of IWG when stands were managed solely as a forage crop harvested for hay. IWG forage yields increased through vegetative and stem elongation stages until plateauing at flowering (Jungers et al., 2018). With development, the leaf fraction decreased while stem fractions increased, resulting in subsequent declines in forage quality. Forage yields at a low fertility site peaked at dough stage at ~2 tons/ac. Yields at subsequent September and November harvests averaged only 30% and 12% of the initial harvest yields. As with other cool-season grasses, IWG forage yields are influenced by N fertilization. With application of 80-100 lbs/ac of N fertilizer, we expect total-season yields at the dough stage of 3-5 tons/ac.