

Barley, Oat, And Cereal-Pea Mixtures As Dryland Forages In The Northern Great Plains

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Summary

Oat (*Avena* spp.) is a popular, cool-season annual forage in cool semiarid regions. Barley (*Hordeum vulgare* L.) has produced equal or greater amounts of superior quality forage compared with oat in sub-humid regions. The importance of crop choice, cultivar type, and plant part on forage production were investigated in low soil-N, unfertilized environments in southwestern North Dakota, USA. Barley and oat cultivars were compared for forage yield and quality during 1999 and 2000. Also, the cereal cultivar treatments were compared to intercrops of pea (*Pisum sativum* L. subsp. *sativum*) with barley and oat. Forage dry matter (DM) yield averaged 3.84 Mg ha⁻¹ for oat compared with 2.91 Mg ha⁻¹ for barley, while crude protein (CP) concentration of oat forage averaged 61 g kg⁻¹ compared with 90 g kg⁻¹ for barley ($P < 0.05$). No difference in total forage nitrogen (N) yield occurred between barley and oat. Acid detergent fiber (ADF) and neutral detergent fiber (NDF) concentrations averaged 39 and 41 g kg⁻¹ lower, respectively, for barley compared with oat forage. Calcium and phosphorus concentrations were 0.66 and 0.77 g kg⁻¹ higher, respectively, for barley forage. Cultivar selection within each crop species generally did not affect forage yield or quality. The relative contributions of stem, inflorescence, leaf blade, and leaf sheath to forage yield were similar between cereal species harvested at mid-milk to early soft dough stages of kernel development (Zadoks growth stages 75 to 83) and averaged 20, 44, 14, and 22%, respectively. Intercropping with pea increased forage and N yield. These results support the hypothesis that forage yield is reduced but quality is enhanced when oat is replaced with barley in low soil-N, unfertilized environments in the Northern Great Plains. Furthermore, the results suggest that forage DM, CP concentration, and N yield can be enhanced by intercropping barley or oat with pea.

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