

Effect of wheat forage maturity and preservation method on forage chemical composition and performance of growing calves fed mixed diets

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Abstract :

Three 2.4-ha wheat (*Triticum aestivum* L.) fields were used to test the effects of maturity at harvest (boot vs. dough) and preservation method (hay vs. silage) on forage yield, chemical composition, and animal performance when fed in mixed diets. Forages were incorporated into 4 diets in a 2 x 2 factorial arrangement of treatments with hominy feed, soybean hulls, and cottonseed meal as the primary concentrate ingredients. In Exp. 1 diets contained 20% wheat forage (DM basis) and were fed to 96 beef calves (n = 48 steers and 48 heifers; initial BW 229 ± 6.0 kg) in 12 mixed-sex pens. In Exp. 2 diets contained 40% wheat forage (DM basis) and were fed to beef steers (n = 48; initial BW 198 ± 6.8 kg) in 12 pens. These diets were also individually fed to 32 calves (Exp. 1, n = 16, BW = 187 ± 9.4 kg; Exp. 2, n = 16 calves, BW = 160 ± 8.2 kg) to determine DM and NDF digestibility and gastrointestinal tract passage kinetics. Advanced maturity increased ($P < 0.01$) DM yield, decreased ($P < 0.01$) CP concentrations, and tended ($P = 0.10$) to increase nonfiber carbohydrate concentrations, but did not affect ($P \geq 0.22$) NDF, ADF, or TDN concentrations. Maturity at harvest, preservation method, or their interaction did not affect ($P \geq 0.15$) ADG when wheat forage was fed as 20 or 40% of the diet. When calves were fed the 40% wheat forage diets, maturity at harvest did not affect ($P \geq 0.27$) DMI or G:F. Calves fed 40% hay diets consumed more ($P = 0.04$) feed DM as a percentage of BW than calves fed silage diets, but tended ($P = 0.09$) to be less efficient. With 20 or 40% wheat forage diets, there were no differences ($P \geq 0.13$) in passage rate, ruminal retention time, or fecal output due to maturity or preservation method. Digestibility of DM tended ($P = 0.07$) to be greater for silage than hay diets when fed in 20% wheat forage diets. Dry matter and NDF digestibility of 40% boot-stage wheat forage diets were greater ($P < 0.01$) than diets containing forage harvested in dough stage. Forty percent hay diets also tended ($P = 0.07$) to have greater DM digestibility, and NDF digestibility was greater ($P < 0.01$) compared with silage diets. Although differences in performance were not noted in the present experiments, increased maturity at harvest and preservation as silage can cause differences in DMI and digestibility of DM and NDF in diets containing 40% wheat forage.

Key Word :

cattle, forage quality, hay, silage, *Triticum aestivum* L

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