Grazing Management Effects on Pasture Productivity - Extent & Timing of Grazing

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How does the "take half – leave half" grazing rule actually affect annual pasture productivity? Is residue height a concern when mature grasses are mob grazed, a management alternative to grazing at a vegetative stage? What is the potential impact of more frequent grazing during particular times of the year? A range of grazing management systems was implemented at the U.S. Dairy Forage Research Center at Prairie du Sac on one acre paddocks of meadow fescue, orchardgrass, quackgrass, and reed canarygrass. Within each paddock, two experiments were conducted in 2009 and 2010. The subject of one was how extent of grazing (grazing 50, 75, or 100% of forage) effects growth of cool-season grasses grazed at either the vegetative or mature stage, and the other was how timing of grazing (spring, summer, and fall) more frequently effects grass growth.

Extent of Grazing

For those treatments where 50 or 100% of the biomass was removed at each grazing, environmental factors such as soil temperature, soil moisture, available light, inorganic nitrogen (N) concentration, and net N mineralization rates were also measured throughout the growing season as potential mechanisms explaining differences in grass productivity. Below ground growth was measured in these plots with the use of root ingrowth cores (installed in spring and removed in the fall).

In years with either below or above normal rainfall, orchardgrass and reed canarygrass had greater annual yield than meadow fescue or quackgrass. Grazing vegetative grasses to remove 100% of forage provided no additional annual yield than grazing to remove 75%, but significantly increased the risk of reducing grass persistence and delayed growth the following spring up to one week. Take half – leave half grazing management (50% removal) always reduced annual yield, but shortened the rotation interval and resulted in earlier grazing the following spring. Forage quality was not affected by residue height. For grasses grazed at a mature stage, there was no yield advantage in intentionally leaving any residue above that which is normally trampled by livestock, and no apparent effects of extent of grazing on persistence. Grasses grazed at a mature stage only had about 10% more litter residue on the ground at the end of the season than those grazed at a vegetative stage.

Extent of defoliation had no effect on the root growth of orchardgrass and quackgrass grazed at a vegetative or mature stage. Root growth of meadow fescue and reed canarygrass were not affected by extent of defoliation in a dry year at either maturity stage, but in a wet year root growth was increased by grazing at a mature stage. Several environmental factors were significantly affected by grazing management, but only soil moisture helped explain changes in annual yield and root growth of reed canarygrass. Grazing reed canarygrass at a vegetative stage reduced soil moisture and annual yield compared to a mature stage.

Timing of Grazing

In this experiment, grasses were grazed when they reached 6", 12", or 18" in height to a 3" residue in the spring (early to late May), summer (early to late July), or fall (late August to late September). Grasses were grazed at a 12" height to a 3" residue during the remainder of the season. Yield was measured before each grazing and tillers were counted at the end of the treatment period.

Maximum annual yield was obtained when grasses were grazed at 18" in height in the spring (a situation similar to making hay), although tiller density was reduced compared to grazing at 12" in height throughout the season. Grazing when grasses reached a 6" height in the spring (a situation similar to setting the grazing wedge) reduced annual yield 20% compared to grazing at 12" in height during the whole season. Only meadow fescue tiller density was negatively effected by grazing at a 6" height during the spring. Grazing when grasses reached a 6" height in the summer (a situation similar to grazing drought-stressed pastures) reduced annual yield 10% compared to grazing at a 12" height throughout the season. Grazing when grasses reached 6" in the fall did not influence annual yield the following year, but a 3" residue height was always maintained.