

Response of warm-season grass pasture to grazing period and recovery period lengths

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Introduction Grazing period and recovery period lengths are key variables influencing grassland production and composition. Systems with short grazing periods and lengthy recovery periods require numerous pastures. Relatively high facility and management costs associated with multiple-pasture systems can be justified only if plant response is favorable and/or if livestock production is improved. This study determined the effects of 4 different combinations of grazing period/recovery period lengths on percentage basal cover (PBC) and relative species composition (RSC) of seeded, warm-season grass pasture.

Materials and methods Four grazing units (2.24 ha) were seeded in 1990 to a mixture of switchgrass (*Panicum virgatum* L.), big bluestem (*Andropogon gerardii* Vitman), indiangrass [*Sorghastum nutans* (L.)], little bluestem [*Schizachyrium scoparium* (Michx.) Torr.], and sideoats grama [*Bouteloua curtipendula* (Michx.) Torr.] at the University of Nebraska Agricultural Research and Development Center near Mead, Nebraska. Grazing units were fertilized annually with 90 kg N ha⁻¹ in late May and burned in early May of 1995 and 1999. Each grazing unit was fenced into 4 paddocks representing 1/2, 1/4, 1/6, and 1/12 of the grazing unit area to simulate 2, 4, 6, and 12-paddock grazing systems, respectively. From 1995 through 2002, 10 crossbred steers grazed the 4 paddocks in each grazing unit rotationally from mid-June to late August. Stocking rate on all paddocks was equal and was controlled by the number of days in a paddock. Each year, steers were moved through the 4 paddocks of a unit in 3 grazing cycles of 12, 36, and 24 days in length. In June 1995 and 2003, PBC by species and RSC were estimated in each paddock using a modified step-point method (Owensby 1973). Non-seeded species, primarily annual bromegrasses (*Bromus spp.*) and smooth bromegrass (*Bromus inermis* Leys.), were placed in an 'other' category. Experimental design was a modified latin square. Major sources of variation were grazing unit (replication), grazing strategy (grazing period/recovery period length combinations), and species.

Results Averaged across all grazing strategies, total basal cover of the 5 seeded species declined from 17% prior to grazing in 1995 to 7.4% in 2003. The decline in PBC during the study was greatest for big bluestem, switchgrass, and indiangrass; PBC of sideoats grama and little bluestem did not change; and PBC of other species increased (Table 1.) The decline in cover of the 3 warm-season tall grasses occurred coincidentally with the increase in basal cover of the other species. The lack of spring prescribed burning in the last 4 years of the study probably favored the annual bromegrasses and smooth bromegrass. These bromegrasses rapidly invade pastures in eastern Nebraska when not controlled. Little bluestem and sideoats grama were minor components throughout the study period as their RSC and PBC were consistently low. The RSC of the other category increased while RSC of big bluestem, switchgrass, and indiangrass decreased over the 8 years of the study. Grazing strategy did not affect RSC nor the change in percentage total basal cover of the 5 seeded species and the other category from 1995 to 2003.

Table 1 Changes in PBC and percent RSC of 5 warm-season tall grasses and the other grass category following 8 seasons of grazing

Species	PBC	RSC
Big Bluestem	-3.9	-18.3
Switchgrass	-3.1	-21.2
Indiangrass	-2.5	-15.4
Sideoats grama	0.1	0.4
Little bluestem	-0.1	-0.9
Other	14.1	56.2

Conclusions Results of this study suggest that recovery periods associated with a 12-paddock system did not affect persistence of a warm-season tall-grass mixture any differently than shorter recovery periods associated with a 2-paddock system. Bromegrasses became the dominant species in all paddocks regardless of grazing strategy used. Bromegrasses are very competitive in pastures of eastern Nebraska and may have overwhelmed differences in species composition that would have developed in their absence. Results indicate that grazing strategy alone does not affect the extent of invasion of warm-season tall-grass mixtures by the bromegrasses.

References

Owensby, C.E. (1973). Modified step-point system for botanical composition and basal cover estimates. *Journal of Range Management*, 26, 302-303.