Forage Research Updates *Compiled and edited by Paul Peterson, University of Minnesota*

South Dakota - Smooth Bromegrass Harvest Management on a Feedlot Vegetated Treatment Area

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Feedlots pose serious environmental issues via runoff of N and other nutrients. A vegetated treatment area (VTA) is down-slope from a feedlot often composed of perennial grasses. It receives effluent from the feedlot and 'treats' runoff through filtration, evapotranspiration, absorption, and infiltration. The objective was to determine the best harvest management to maximize forage production and nutrient removal from a 2.1 ac smooth bromegrass VTA adjacent to a small (<1,000 head) feedlot in eastern SD.

Table 1. *Smooth bromegrass yield on a VTA in SD.*

Harvests/ Year	Year				
	2005	2006	2007	2008	2009
	----------*Tons DM/ac*----------				
1	2.76	2.01	3.34	2.80	3.59
2	4.69	3.64	4.22	3.68	4.18
3	4.42	3.78	4.51	3.84	4.41
LSD (.05)	0.47	0.63	0.82	0.52	0.38

Research was conducted from 2005-2009. There were 0, 1, 2, or 3 harvests per growing season. Individual plot size was 100 ft^2. The first harvest was at peak standing biomass after flowering in early July, except in 2009 when it was delayed until August 3 due to wet soil. The 2nd harvest for the 3-harvest system varied among years from August 1-31, when there was adequate forage to harvest. The last harvests for the 2- and 3-harvest systems were near November 1. The 2- and 3-harvest systems yielded similarly, both out-producing the 1-harvest system. Stockpiling regrowth from early July until around November 1 resulted in forage yield comparable to that produced from 2 regrowth cycles. The increase in forage production from multiple harvests vs. a single harvest ranged from 17% in 2007 to 46% in 2006 (Table 1). Month-later first harvest date in 2009 shortened regrowth period, resulting in a greater fraction of total production from the 1st harvest.

Table 2. *N removed by smooth bromegrass on a VTA in SD.*

Harvests/ Year	Year		
	2005	2006	2007
	-----*lbs N/ac*-----		
1	74	166	143
2	165	241	190
3	172	278	215
LSD (.05)	25	38	31

Forage quality of regrowth harvested in August or November was better than that of the initial growth harvested after early-July flowering. For example, CP of regrowth harvests averaged ~25%, compared with ~14% for the initial July harvests. Multiple-harvest systems removed more N than a single harvest. Although the first harvest comprised >70% of total forage production, 75% greater N concentration in regrowth resulted in >40% more N/ac removed by multiple harvest systems (Table 2).

Smooth bromegrass yield was maintained at a high level (>4 tons/ac) over a long period in 2- and 3-harvest systems on a VTA that receives supplemental water and nutrients from feedlot runoff. However, the size of the VTA relative to the size of the feedlot (0.17:1.00) was determined to be inadequate to fully utilize the water and nutrients 'applied' during the study.