ABSTRACT

Beef cattle (*Bos taurus*) feedlots pose serious environmental challenges associated with nutrient runoff. Smooth bromegrass is a perennial rhizomatous grass that is widely used in USA and Canada for forage production. The objective of this research is to determine the best management system for producing forage from a vegetated treatment area (VTA) while maintaining the capacity of the VTA to remove nutrients from feedlot effluent. Four harvest management treatments (1-, 2-, and 3-harvest per year and an un-harvested control) were applied during spring 2005 and evaluated over a 3-yr period in a smooth bromegrass sward on a VTA near Howard, SD. Forage production during 2006 ranged from 4.5 Mg ha\(^{-1}\) to 8.5 Mg ha\(^{-1}\) for 1- and 3-harvest systems, respectively. Nutrient removal by the bromegrass was 83 kg ha\(^{-1}\) N and 8 kg ha\(^{-1}\) P for the 1-harvest treatment and 193 kg ha\(^{-1}\) N and 22 kg ha\(^{-1}\) P for the 3-harvest treatment. This indicated that high amounts of forage could be produced from VTAs and that smooth bromegrass was an effective procurer of N and P. Differences were found among harvest treatments for the first harvest during 2007, with the 1-harvest treatment producing 6.0 Mg ha\(^{-1}\) compared with 4.1 Mg ha\(^{-1}\) for the 3-harvest treatment. This indicated that multiple harvests during a growing season could weaken the sward over time and have a negative effect on the runoff capture characteristics of the sward. At the termination of the study in 2008, soil cores will be taken to determine the effect of different harvest treatments on masses of roots and rhizomes.