Potassium Fertilizer Management of Pastures

WISCONSIN GRAZING LANDS CONSERVATION INITIATIVE GRANT PROGRAM

Ken Barnett, Extension Educator with University of Wisconsin-Extension

Research Brief
#1

With managed grazing systems, while there has been a good deal of recent research on nitrogen fertility, there has been virtually none on potassium. With the ever increasing costs of fertilizers and the demands on livestock farmers to develop nutrient management plans, it is critical that nutrient recommendations are based on sound research. This four-year research study (2007 to 2010) examined the relationship between grazed pasture yield and other parameters with varying rates of potassium fertilization based on University of Wisconsin-Extension fertility recommendations.

Potassium fertilizer was applied annually at different percents of the recommended optimum recommended K2O rate: 0 percent (treatment 1); 20 percent (treatment 2); 60 percent (treatment 3); and 100 percent (treatment 4). Increasing the potash fertilization levels to a maximum of 215 to 300 pounds per acre did not result in a significant increase in the total forage produced or grazed/clipped. There were significant fertilizer treatment effects for the net value of production for total grazed/clipped (value of the fertilized pasture minus the cost of fertilizing with K2O). Treatment 1 was significantly greater than treatments 2 to 4. Treatment 4 was significantly less than treatments 1 to 3. Since there was increasing costs as more potash fertilizer was applied and either a decrease or little increase in total forage grazed/clipped, these results were not surprising.

None of the forage quality parameters (percent crude protein; percent acid detergent fiber; percent neutral detergent fiber; total digestible nutrients; relative feed value; and net energy lactation) were significantly affected by the fertilizer treatments.

Soil tests and measurement of legume content were done in 2007, 2008, and 2010. The high treatment (four) had a higher soil K level (104.7 ppm) than the other three treatments. Treatments two and three were not significantly different from each other. Treatment one had the lowest value and was significantly different than the other three treatments. Since the potassium fertilizer rate was based on a higher yield than was achieved at the farms, it was not a surprise that the potassium level increased in the soil. Legume content which can be affected by potassium fertility (and other factors) was not significantly affected by the increasing rates of potassium fertilizer.

These results were a surprise for two reasons. One, the soil test potassium levels (0 to 6 inch soil depth) at the start of the demonstration were in either the very low or low ranges and one would have thought that adding potassium fertilizer would have a significant effect. Second, potassium fertilizer was applied according to the University of Wisconsin-Extension fertility recommendations. Thus, the results bring into question the potassium fertility rates for beef and dairy animals grazing on pasture as are currently recommended.

The Grazing Lands Conservation Initiative Grant Program is a partnership between the private sector GLCI Steering Committee, the USDA Natural Resources Conservation Service and the WI Department of Agriculture, Trade, and Consumer Protection. This series of research briefs summarizes projects funded by this program. Our mission is to expand the use of profitable, grazing-based livestock production systems that foster environmental stewardship. This is accomplished through high quality technical assistance to owners and operators of private land, university and producer coordinated research, and educational programs. For more information on the program or on the research in this Brief, contact: Laura Paine, Grazing and Organic Agriculture Specialist, WI Department of Agriculture, Trade, and Consumer Protection, (608) 224-5120, laura.paine@wi.gov; or Rhonda Gildersleeve, Extension Grazing Specialist, University of Wisconsin-Extension, (608) 723-6243, rhonda.gildersleeve@ces.uwex.edu. This summary was written by Ken Barnett with University of Wisconsin-Extension.