Evaluation of CRP for Cellulosic Biomass Production, 2010

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The adoption of fertility management to pastures and non-legume hayland has been limited in this region. This study was conducted as a preliminary investigation to determine the potential of CRP for cellulosic biomass production through increased nitrogen (N) fertility management. The study was conducted in Foster County, ND. The site was CRP that had not been fertilized for many years. The site was a warm- and cool-season grass mixture. The nitrogen rates were 0 lbs, 50 lbs, and 100 lbs N/ac broadcast as urea fertilizer on June 8, 2008, June 15, 2009, and May 21, 2010. Two biomass harvest timings were evaluated: 'Peak Standing' at the time of anthesis; and 'Killing Frost'. The 'Peak Standing' harvest was harvested on September 7, 2008, September 3, 2009, and August 24, 2010. The 'Killing Frost' harvest was harvested on October 31, 2008, October 23, 2009, and November 1, 2010.

Year alone did not have an effect on yield, however the proportion of Smooth Bromegrass in the stand has increased over time primarily when no additional nitrogen was applied. By harvesting these plots annually, without additional fertilization, the early growth of the sod-forming Smooth Bromegrass gives it a competitive advantage over some of the more productive, efficient nitrogen-using, later growing species. Harvest timing alone did not have an effect on yield, however the proportion of Kentucky bluegrass in the stand was higher when harvest occurred at Peak Standing harvest than in the later Killing Frost harvest. By harvesting these plots earlier in the season, the early growth of the sod-forming Smooth Bromegrass gives it a competitive advantage over some of the later growing species which are more productive later in the season. As expected with most grass crops, yield was increased with increasing nitrogen fertility levels. The nitrogen fertilizer response due to the nitrogen fertilizer treatments was 0.7 ton/ac at 0 added N, 1.2 ton/ac at 50 lbs added N, and 1.6 ton/ac at 100 lbs added N.

In conclusion, increasing N fertilization increased yield, however exceeding 50 pounds of N with current yields, N prices, and grass hay prices is cost prohibitive. Harvest timing may have an impact on quality of the feedstock and stand longevity as the study progresses.