Effects of Nitrogen Fertilizer on the Forage Yield and Quality of Quackgrass *(Agropyron repens)*

Allan Foster M.Ag [1] and S.S. Malhi [2]

[1] Grazing and Pasture Technology Program, Tisdale, Saskatchewan
[2] Agriculture and Agri-food Canada, Melfort, Saskatchewan

Background

Quackgrass, ***(Agropyron repens)*** is an introduced wheat grass from Eurasia. It has established itself throughout the moister parts of the prairies in hay fields, pastures abandoned farms, and crop land.

Quackgrass has a reputation as a noxious weed in cultivated fields. Whereas, some livestock producers have recognized its usefulness as palatable, digestible, and nutritious pasture during the spring and an acceptable hay for winter feeding. Quack grass is said to cure on the stem. The few chemical analyses available indicate a similar protein trend to other wheat grasses but lower contents of energy and total nutrients. Two of its most useful characters for pasture purposes are its early emergence and rapid spring growth.

As with the closely related western wheatgrass, quackgrass has a three-way root system. Scaly, yellow, creeping underground stems spread rapidly, and surface feeding roots fill the upper 50 cm with a dense mass of fibre; a few deeper feeding roots grow to a depth of 2.5-3 m. A 'sod-bound' condition develops in 3-5 years after establishment, and production declines accordingly.

More producers may consider utilizing quackgrass if the production could be maintained through fertilization, however little information is available on the response of quackgrass to fertilizer. Thus, the purpose of this study is to determine how nitrogen fertilizer effects quackgrass production and quality.

Materials and Methods

The project is being conducted on a area of reverted farmland dominated by quack grass 3 miles southwest of Tisdale, Saskatchewan. The stand had not been worked for at least 7 years. The soil type is a Tisdale clay loam.

Plots were fertilized at 0, 56, 112 and 168 kg N /ha rates with ammonium nitrate. Treatments were arranged in a randomized complete block design with four replicates. Each fertilizer treatment plot measured 1.85m x 7.6m Fertilizer was applied with a Gandy applicator on May 2 1 1998. This was slightly later than is usually recommended for spring fertilizer application for the area. Precipitation for the growing season was slightly below normal.

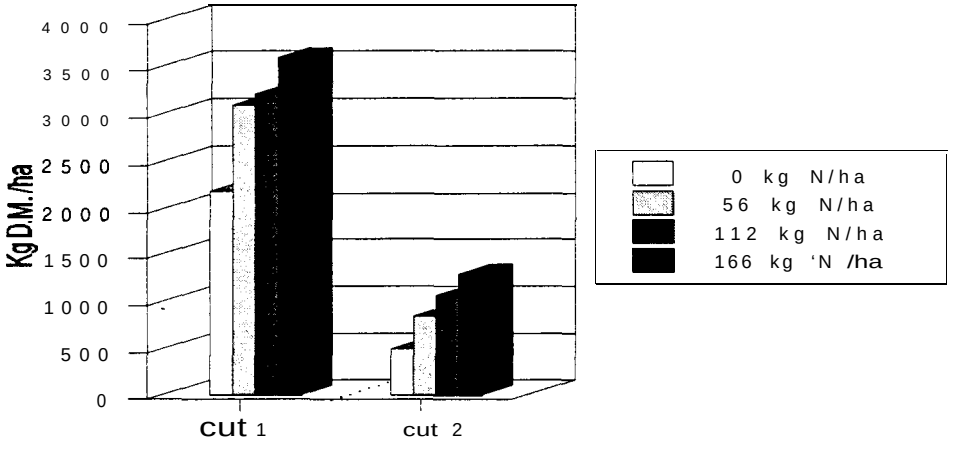
Three 0.25 m^2 samples per plot were cut on July 15 to measure primary growth (Cut 1) and again on September 29 to measure regrowth (Cut 2). All samples were oven dried prior to

weighing for dry matter yield **(DMY).** Quality was measured by analyzing for protein and estimated energy (% total digestible nutrients, TDN) by testing one sample per plot from each of the two cutting dates. All analyses were completed by Enviro-Test Laboratories in Saskatoon.

Summary of Results

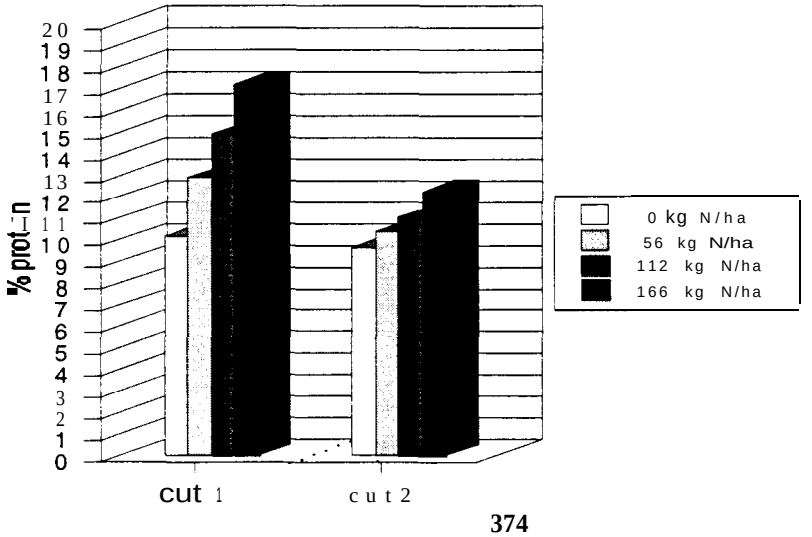
Figure 1 indicates the response of quackgrass to nitrogen in 1998. Forage yields were substantially increased by the addition of nitrogen fertilizer. Total dry matter yield was increased by 47% 60% and 83% with the addition of 56, 112, and 168 kg N/ha, respectively.

Figure 1: The Effect of Four Levels of Nitrogen Fertilization on the Forage Dry Matter Yield (DNY) of Primary Growth (Cut 1) and Regrowth (Cut 2) of Quackgrass at Tisdale, Saskatchewan in 1998.



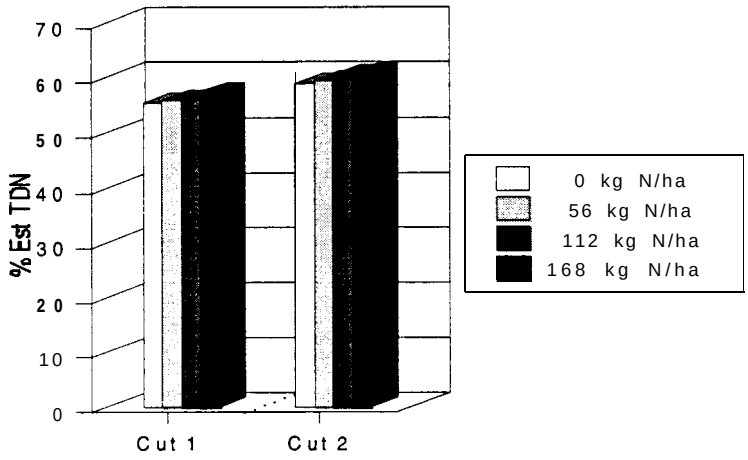
The protein content of the primary growth and regrowth is given in Figure 2. The protein content of both the primary growth and regrowth increased in response to increasing rates of nitrogen fertilizer, although primary growth was most effected. Protein contents of the primary growth were 10.2%,12.9%, 14.9% and 17.2% for the 0, 56, 112, and 168 kg N/ha rates, respectively. Protein contents of the regrowth were 9.7% 10.4% 1 1.1% and 12.2% for the 0, 56, 1 12, and 168 kg N/ha rates, respectively.

Figure 2: The Effect of Four Levels of Nitrogen Fertilization on the Protein Content of Primary Growth (Cut 1) and Regrowth (Cut 2) of Quackgrass at Tisdale, Saskatchewan in 1998.



The estimated energy (%TDN) for primary growth and regowth are provided in Figure 3. TDN was not influenced as much as protein by the addition of nitrogen fertilizer.

Figure 3: The Effect of Four Levels of Nitrogen Fertilization on the Estimated Energy (%TDN) of Primary Growth (Cut 1) and Regrowth (Cut 2) of Quackgrass at Tisdale, Saskatchewan in 1998.



Conclusion

Based on this one year study the results suggest adding nitrogen fertilizer will increase both the production and quality of quackgrass for forage.

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