

Exploring the Effect of High Nitrogen Rates on Oat Production

Westman Agricultural Diversification Organization, Scott Chalmers, Justice Zhanda and Carlie Johnston

Scott.chalmers@gov.mb.ca

As the seeded area of oats rises in Canada, there is increased need for insight into the economic thresholds of fertilizer application in oat production, particularly for nitrogen. This study investigated the effect of different nitrogen application rates on oat yield and quality parameters in southwest Manitoba. Oats were grown with total nitrogen levels (residual soil nitrogen + applied nitrogen) ranging from 34 to 176 kg ha⁻¹. Oats grown with nitrogen levels of 114, 136, and 176 kg ha⁻¹ had greater lodging ratings than the control. Leaf disease ratings decreased as nitrogen levels increased, though this decrease was not significant at nitrogen levels greater than 62 kg ha⁻¹. Both NDVI and SPAD readings increased with nitrogen level increase, though this increase was not significant at nitrogen levels greater than 92 kg ha⁻¹. An increase in total nitrogen resulted in a proportional yield increase of oats from 34 to 136 kg N ha⁻¹, followed by a decrease in yield at 156 and 176 kg N ha⁻¹. Grain protein content increased with nitrogen level, though no significant increases were observed at nitrogen levels above 136 kg ha⁻¹. Grain test weight decreased with an increase in nitrogen rate, with oats grown at nitrogen levels greater than 62 kg ha⁻¹ having significantly lower test weights than the control. Overall, a total nitrogen level of 136 kg ha⁻¹ was optimal for oat yield and protein content, though growers should be aware of potential test weight and lodging trade-offs at this nitrogen level. This threshold is greater than those reported by the Prairie Oat Growers Association and Manitoba Agriculture, and offers expanded insight to Western Canadian oat producers as they work to continually improve oat production trends.