Agronomic Management to Maximize Spring Wheat Yield and Protein while Minimizing Lodging Risk

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Improvements in spring wheat genetics and agronomy have resulted in higher yields obtained by producers, but have introduced challenges such as, maintaining grain protein content and managing lodging risk. The objectives of this research were to evaluate the effect of agronomic management practices on spring wheat lodging risk, grain yield and protein content. This was done through two small plot field trials during the 2018 and 2019 growing seasons using cultivars common to, and widely grown across Manitoba. Early season N availability was critical for the development of yield components and allowed the crop to buffer against dry environmental conditions to produce grain protein content. However, increased lodging risk associated with application of large amounts of N early in the season needs to be balanced with lodging management strategies. Low plant densities (150 plants m^{-2}) and PGR applications both improved the crop's ability to resist lodging in this research but are often associated with decreased early season competitive ability against weeds and variable crop maturity. As a result, the ability of PGRs to reduce lodging risk, provides a critical tool for lodging management. Flexibility of application and yield increases, even in the absence of lodging, through increased kernels per spike, support a wide adoption of this technology as yields continue to rise.