

Keep them Standing

Management strategies to minimize lodging in cereals

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Lodging management in cereal crops is a moving target. Although driven by environment, the occurrence of lodging is heavily dependent on agronomic management. When lodging occurs, yield loss of 1 bushel/acre/day until crop maturity is a common estimation of the yield loss that results from lodging. Lodging also greatly reduces harvest speed and efficiency, forcing much greater volumes of straw to be put through the combine, resulting in increased grain loss, slower travel speeds, and higher risk of damage from stones.

Physiology: Lodging can occur either as stem breakage, or from root lodging. While stem break generally has a greater impact, root lodging is more common. Either type interrupts the flow of nutrients upward in the plant, reducing water and nutrient availability to the leaves for photosynthesis and movement of photosynthate down to the roots for nutrient uptake and root growth. Nutrient transport concerns are not the only driver of yield loss however: the shading of leaves by lodged plants causes reduced photosynthesis and results in corresponding yield reductions.

Genetics: The first line of defense against lodging must always be genetics. Cereal species and varieties within species vary widely in their lodging susceptibility: ie oat is much more lodging prone than spring wheat. Excellent lodging data exists from provincial variety trials. In lodging prone fields or situations, chose a lodging resistant variety or more resistant crop species.

Planting date: Winter wheat planting date has a significant impact on plant height and resulting lodging risk. Earlier planting dates are taller and much more lodging prone, especially if seeding rates are kept constant. Spring cereal planting dates show less impact on plant height and lodging risk, although some data shows a trend suggesting ultra-early seeding may reduce plant height and lodging risk slightly.

Seeding rate: High seeding rates increase lodging risk significantly in winter and even more so in spring wheat. Winter wheat seeding rates should be targeted to seeding dates to manage lodging risk, and spring wheat seeding rates should be kept low in lodging prone scenarios. Stem counts is another tool for determining lodging risk in winter wheat fields, but is of less value in spring wheat.

Nitrogen management: Nitrogen is the “big gun” in managing lodging risk. The more nitrogen that is applied, the higher the lodging risk. Split nitrogen applications, or inclusion of controlled release nitrogen products, are excellent management options to reduce lodging risk. Both management options have their accompanying risks: split nitrogen requires rainfall to make later applications available, and controlled release products can release either too early or too late in the development of the crop.

Plant growth regulators: Another excellent tool that growers can utilize are plant growth regulators (PGR's). PGR's shorten plants and strengthen stems to make plants more lodging resistant. As with all management options, PGR's have risks. Varieties differ in their sensitivity to PGR applications, and applications on sensitive varieties can reduce yields. Applications made under adverse weather conditions can increase plant shortening unacceptably, reducing grain and straw yield. However, in most cases, PGR's improve lodging resistance and increase yield in fields where lodging does occur. PGR's can increase root mass and improve crop uniformity. Growers that use PGR's often report increased combine efficiency (up to 1.6 Km/hr increase in forward speed) when PGR's are applied, even in the absence of lodging.

Summary: Lodging risk increases as grain yields increase, and growers increase inputs to support high yields. Lodging management options exist, with many tools in the management toolbox. Growers and agronomists that understand and utilize appropriate lodging management strategies will be able to prevent lodging, and harvest excellent yields of high quality grain.