



Central Alberta Co-op Ltd.

The Path to Protein

Perhaps the hottest topic in agronomy right now is protein production in hard red spring wheat. Central Alberta has had great success growing consistent wheat crops with consistent yields and consistent quality, but also consistently inconsistent protein content. When it comes to protein, its all about nitrogen. Apply too much nitrogen during seeding and we risk the crop laying down flat, complicating harvest operations and sacrificing quality. Apply too little nitrogen and we sacrifice yield. Nitrogen is all about balance, its not just about the amount of nitrogen, but the right amount at the right time.

Traditionally the crops full nutritional needs are supplied during spring seeding in the furrow. Logistically this works very well, making a single pass through the field minimizing soil disturbance and compaction. But agronomically we need to do more. Supplying our crop nutrition upfront all at once would be like eating breakfast, lunch and supper all before 9:00 AM then not eating again for the rest of the day.

To assist with proper nutrition management, industry partners created the **4R's** of Nutrient Stewardship. The **4R's** are the **Right Source** of fertilizer at the **Right Rate** at the **Right Time** in the **Right Place**. These four principles have become the pillars of a good fertility plan. As it pertains to wheat protein each principle is just as important as the next.

Right Source: There are infinite nitrogen products on the market. Ammonium (NH₄⁺) found in liquid products such as Ammonium Thio-Sulphate (ATS: 15-0-0-20) and Urea Ammonium Nitrate (UAN: 28-0-0) are not meant for foliar application through flat fan nozzles, especially post anthesis (after flowering) when the crop canopy has closed in. These products are meant to be soil applied otherwise they will cause leaf burn that will do more harm than good. However, Urea 46-0-0, most commonly applied as a dry granular in the spring, can also be applied to foliage in a liquid form.

Right Rate: How much extra nitrogen is necessary to achieve the protein boost we want? Studies show no less than 30 lbs of actual nitrogen is required to increase protein levels by approximately 1%.

Right Time: Nitrogen applications prior to the 5-leaf stage contribute more towards yield. So, to influence protein, the later the better. The recommendation is to apply the 30 lbs of nitrogen post anthesis right before a rain. At this stage, the plant is entirely focussed on putting all of its energy into the seed.

Right Place: It is often misunderstood that spraying liquid fertilizer must mean the nutrients are absorbed by the leaf and enter the plant foliarly. That is true in some cases for some products, but not all. The reason for spraying the top dress nitrogen is machinery logistics, minimizing crop trample. The reason we target the application right before a rain event is to wash the nitrogen (liquid urea) into the soil for the roots to effectively absorb, not the leaves.

Now I'm sure most of you are questioning the economics of applying an extra 30 lbs of N in a separate sprayer pass for a protein "bump" (a very unscientific unit of measure that is not guaranteed and largely unknown due to various environmental factors). While these reservations are valid, the only outcome that is guaranteed is the one where we do nothing. Calculating return on investment within a commodity market based on protein is a moving target to say the least. Grain premiums and discounts can swing anywhere from \$0.40/bu to \$1.50/bu dependant on a myriad of factors that are as much in our control as the weather. But the one thing we can influence is agronomic management.

In a wet year such as the one we are experiencing, we can really notice the leaching symptoms from heavy and frequent rains, dragging that nitrogen below the rooting zone in the soil profile essentially starving the crop. Supplying another meal later on in the maturity of a crop's development could prove more beneficial this year than others.

Submitted by Calvin Ireland C.C.A., Central AB Co-op (Lacombe)

