



ADVANCED AG SYSTEMS'S

Crop Soil News

The Helping Hand to Better Agriculture

November 2025

"It is the crops
that feed the
cows that make
the milk
which creates
the money."

Advanced Ag Systems
Research, Education, Consulting

Saving Fertilizer; Optimizing Winter Forage Crude Protein

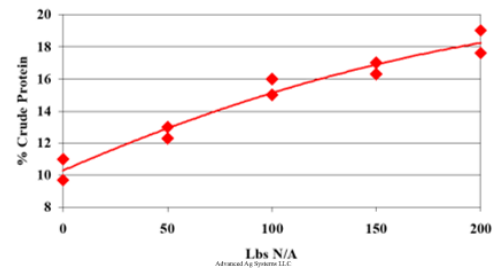
Research on optimum management for high winter forage quality has shown that nitrogen plays a key role in both the fall and spring growth and protein. Fall nitrogen is critical to maximize fall tillering (sets spring yield potential) and is applied at planting, so that management time has passed. Spring is when nitrogen (and critical sulfur) is applied for maximum yield and high crude protein. This is specifically for winter triticale. Our replicated research has found that increasing the nitrogen on winter rye will simply mean more of the crop is flat on the ground at harvest. Winter triticale is 2/3 as tall as rye but many more tillers produce a thicker stand and higher yields without lodging.

A 4 ton DM/A (a yield commonly reached in Pennsylvania and Ohio south) that has 18% crude protein, is removing 230 lbs. of N/Acre (3.5 tons, common in NY with good management; at 18% CP is 200 lbs. of N removed). If the nitrogen is not there, the crude protein and yield will not be there. With 60 lbs. of N plus sulfur applied at planting to maximize fall tillering, that still leaves 170 lbs. of nitrogen removed in the plant the next spring. That nitrogen has to come from somewhere or you will not have crude protein in the forage. As winter triticale yields have increased, the amount of nitrogen that is taken up to meet yield and protein targets also increases (see graph at right).

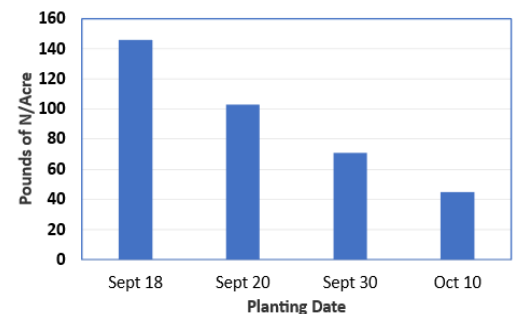
There is considerable concern this year as nitrogen prices are up. Should we be cutting back on the winter triticale fertilization? On the flip side, research has found that the crude protein produced by nitrogen and sulfur fertilizer applied to winter forage is only 1/3 or 1/4 the cost of getting that protein through soybean meal in the grain mix. Thus, shortening the nitrogen fertilizer on the winter triticale forage ends up costing the farm more because you then need to buy more soybean meal, which is more expensive.

Dairy farms have an advantage in that there is considerable manure that can supply the nitrogen and sulfur for the crop. Unfortunately, just throwing it out on top of the ground means the majority of the expensive nitrogen goes off into the air and is lost. Adding insult to injury, applying it before planting triticale is not economical as our research found that the yield lost by delayed planting does not make up for any nitrogen savings. An **absolute disaster** is to topdress manure on growing triticale in the fall. As you can see in the photos on the next page, not only do you lose most of the nitrogen, the manure stays entrained in the forage as it grows the next spring and will get harvested when you mow. Highly digestible forage with manure mixed in is a prescription for disaster – **it will kill cows. Been there, done that, don't even consider it.**

Crude Protein increased with N Fertilization (2 yr avg.)



Impact of Planting Date – Total Spring Nitrogen Uptake



At 2.5 tons of Dry Matter/Acre from the late planting date-Sept 18, it still is removing over 140 lbs. of nitrogen to reach 18% crude protein.

With manure storages, the timing can be held until it balances the work load and plant need. Fortunately, more than a decade ago, agribusiness developed another option: manure injection units. The early ones were knife units that injected well but tore up the soil, left stones on the surface, and required more horsepower to pull. Those dribbling on the surface are also exposed to considerable loss. The more recent models have rolling coulters that operate at an angle, lift the soil, and inject the manure into the slot and then cover it again. There is very little, if any, root damage when the plants that are lifted are placed back in the soil. When we applied at a 16 – 17 inch spacing, the nitrogen spread in the soil, and there was uniform green stands the next spring. At the slight angle and watching forward speed, few, if any, stones are brought up. We need to watch forward speed anyway in order to apply enough manure nitrogen to meet the needs of the crop. 10-15,000 gal/A of manure are common for the nitrogen needs of a crop planted on time with starter nitrogen and proper seed treatment. Some with more dilute manure have applied up to 20,000 gal/acre. **These are justified, environmentally sound rates.** The soil needs to be at 50°F or less when the manure is injected, so the ammonia stays in that form. The positive charge of ammonia attaches to the soil's negative charge and so will not leach or denitrify. Only after the soil temperature goes above 50°F does the manure ammonia convert to nitrate that the plant takes up. As winter triticale will often start growing at 40° F, it means the crop is growing as soon as the nitrogen becomes available. This is a very efficient, environmentally sound application method. You can unload a lot of manure in November, December, or January.

The added advantage of this system was proven by Dr. Ketterings of Cornell. She conducted replicated research on growing a full corn crop with just injected manure. After harvesting the triticale in the spring, you inject the manure into the stubble and then no-till or strip till plant the corn over it. The slight delay in corn planting to inject manure is more than made up for by supplying all the fertilizer needed for the corn crop. The injection keeps the nitrogen from volatilizing and being lost. There are compounds that you can add to the manure to keep it in the ammonia form until the corn is ready to use it. Corn uses roughly 6 pounds of nitrogen the first 6 weeks, and then uses 6 lbs. of nitrogen per day at the rapid growth phase.

I have run calculations on both 80 cow and 800 cow operations, and they were able to pay for the injectors in one year on fertilizer savings.



Top dressed manure is a disaster fall or spring. The manure stays on the forage at harvest and can kill cows.



Rolling coulter manure injectors can fertilize established winter forage in the late fall, meeting all the nitrogen needs. Repeating the application after winter forage is harvested, can supply all the nitrogen for the following corn crop.

Sincerely,

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