Ag Insights

From the Desks of Your Northwest Area Ag Specialists

Oklahoma Cooperative Extension Service - Division of Agricultural Sciences and Natural Resources - Oklahoma State University

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West Area Office, Enid

Phone: (580)-237-7677

Dana Zook

Area Livestock Specialist
dana.zook@okstate.edu

Trent Milacek

Area Ag Economics Specialist
trent.milacek@okstate.edu

Josh Bushong

Area Agronomy Specialist
josh.bushong@okstate.edu

OPREC, Goodwell

Phone: (580)-349-5441

R. Britt Hicks

Area Livestock Specialist
britt.hicks@okstate.edu

Facebook Page:
facebook.com/nwareaosuextension

Website:
http://oces.okstate.edu/nwareaextension

Minimizing Costs with Efficient Nitrogen Application

Trent T. Milacek, NW Area Ag Econ Specialist, OCES

In the farm economy, constraints are tighter than ever. Every dollar spent must produce more yield than before. Over the holiday season, consider ways to improve the efficiency of inputs on your operation. Ensuring minimal nitrogen volatility, minimizing nitrogen costs and correctly identifying nitrogen needs is a crucial step in improving the operation.

Nitrogen is generally safe from volatility when it is applied under the ground. Oklahoma State University research has shown that a significant amount of surface applied urea or 46-0-0 can be lost to ammonia volatilization, which is like throwing dollars into the wind.

Using the ammonia loss calculator found at nue.okstate.edu, a producer can estimate the potential ammonia loss from the application of urea fertilizers to the surface of the soil. This practice is used when spreading urea with a spinner buggy or air machine.

Applying 65 pounds of urea on a 60 degree day, with a soil pH of 5 and wind speed of 10 mph, a producer can expect to lose 30 percent of their applied urea without an incorporating rain event. This is 19 pounds of urea or approximately 9 pounds of actual nitrogen. Wheat requires 2 pounds of nitrogen per bushel, so a producer is losing a potential 4.5 bushels of production or $20 per acre of revenue.

Another popular topdress option available to producers is liquid UAN or 28-0-0. While a portion of this fertilizer is nitrate, which will not volatilize, it is not immune from losses. There is also the potential for leaf burn when applied broadcast to wheat foliage in warmer temperatures. Without immediate incorporating rainfall, it is safer to incorporate this fertilizer into the soil upon application.

Perhaps the least utilized form of nitrogen for topdress application is anhydrous ammonia or 82-0-0. This fertilizer source must be incorporated by specialty low disturbance applicators to minimize plant loss in growing wheat. With a more expensive application method, why would a producer choose to use this nitrogen source?

It all comes down to the cost of the fertilizer. As producers try to minimize costs they must get creative with their production practices. When computing nitrogen costs per pound of actual nitrogen, anhydrous ammonia is the cheapest source. Using current market prices anhydrous ammonia costs $0.27, urea costs $0.36 and UAN costs $0.42 per pound of N. There is $0.15 per

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pound of N difference between anhydrous ammonia and UAN. When used as a single source for a yield goal of 40 bushels, that is a difference of $12 per acre or 2.5 bushels of revenue. This does not account for the added benefit of soil incorporation to reduce loss; nitrogen losses drive up the cost of urea and UAN applications.

If you would like more information on budgeting, topdress fertilizer application or nitrogen application costs please contact your local county extension agent.

Fully Understanding Genetically Engineered Foods

Dana Zook, Extension Area Livestock Specialist

Tis the season for food! There is nothing that speaks holiday season more than delicious eats. My personal family favorites include Grandma Peg's Stuffing Balls and Grandma Bert's dinner rolls. It's not even the eating that I enjoy most, rather the anticipation and the actual process of making recipes that have been handed down for generations.

In this season of food, I am reminded how much food buying and selection of products has changed since my grandmothers were shopping for their families. My grandmothers may have picked up products for their holiday table and there was only one brand to purchase. These days, there could be five different brands of each product to choose from and each of these brands may have a different label.

At the store the other day, a particular brand of black pepper I have bought for years had a small new label on the front of the can that said "GMO free". For those unaware of this acronym, GMO stands for Genetically Modified Organism, a common term for Genetically Engineered (GE) food products. Black pepper has never been genetically modified and the label is a marketing strategy to set it apart from other brands. To consumers that don't understand the "GMO free" label, it may cause some confusion.

Neither one of my grandmothers were likely to see or understand a label describing the biotechnology status of a product 50 years ago. In this age of information and technology, there are still many people who are unclear about GE food products. To clear up this confusion, I will briefly explain the details of GE food products, how they are created, and what GE products can be found in our local grocery stores. In this season of food, let's take a step toward becoming more informed about our food and the products we purchase.

What is a Genetically Engineered Food Product and How is it created?

Genetically Engineered foods refer to a plant or animal with DNA altered using one of a variety of genetic engineering methods. An organism can also be changed using traditional breeding or crossing to develop offspring with a desired combination of traits. Although the goal of both genetic engineering and traditional breeding is to improve traits in an organism, differences exist between them. The traditional breeding process can take many different tries (and many years) to develop the desired offspring and it is limited within a particular species. In comparison, genetic engineering physically moves the genes directly from one organism and places them in another. This allows the movement of one or a few genes between organisms of any species.

What Genetically Engineered Foods are currently in the U.S. Food Supply?

The U.S. Department of Agriculture (USDA) and the U.S. Environmental Agency (EPA) regulate all GE products for safety and conduct numerous evaluations prior to their release. Genetically engineered foods currently available to consumers include field corn, sweet corn, soybeans, cotton, canola, alfalfa, sugar beets, rainbow papaya, summer squash, potatoes, and apples. Many GE crops such as corn and soybeans are developed to increase resistance to disease, insects, and environmental situations such as drought. Other crops such as potatoes and apples are engineered to improved taste, quality, and shelf life.

In the past, GE products were not required to be labeled due to the equality of safety between non GE foods and those that have been genetically modified. More extensive labeling is on the forefront due to 2016 laws signed into effect that will establish labeling requirements for GE food products. This process is on-going but may lead to further labeling requirements for all foods.

For more information about GE products take a look at the OSU Factsheet "Eleven Things to Know about GMO's" at http://factsheets.okstate.edu/documents/agec-1059-eleven-things-to-know-about-gmos/ and the K-State Research and Extension Fact Sheet "Is it Safe?: Information on Genetically Engineered Foods for Consumers" at https://www.bookstore.ksre.ksu.edu/pubs/MF3281.pdf .

Late Broadleaf Management in Wheat

Josh Bushong, NW Area Agronomy Specialist

It is time to start planning for weed management. As the crop slowing progressed into winter there has been very limited vegetative growth on later planted wheat. Weed emergence, especially broadleaf weeds, is often more of an issue whenever the crop fails to achieve significant canopy.

As one would imagine, winter annual broadleaf weeds are typically more of a concern in winter wheat, but if a wheat crop continues to have an open canopy or thin stands going into spring late emerging summer annual broadleaf weeds can be just as economically detrimental.

Similar to many winter annual grassy weeds, winter annual broadleaf weeds can occasionally emerge later in the growing season. Emergence can continue throughout the winter and sometimes into spring. Timing of weed emergence is important. Early fall emerging broadleaf weeds will typically decrease grain yield more compared to winter or early spring emergence.

Luckily, there are several herbicide options for controlling broadleaf weeds in wheat. Herbicide applications made in the fall have shown to provide better control. Young actively growing annual broadleaf weeds are more susceptible to herbicides. However, there are some herbicide options as we enter the dormant portion of the season.

Herbicide products that have residual soil activity can be used in the winter months and still provide decent levels of control. Most of these herbicides belong to the Sulfonylurea chemical family, such as Finesse, Glean, and Amber. In addition to controlling winter broadleaves, many summer broadleaves can be controlled or suppressed with residual products such as these when applied late winter.

While some control can be achieved in the winter months, postponing application until spring will broaden herbicide options and potentially provide better control. Late winter and early spring herbicide applications can be effective as long as growing conditions are favorable. Utilizing herbicide products that depend on foliar uptake need to be applied when weeds are actively growing to be effective.

When using certain herbicides it is also important to keep in mind crop tolerance to injury. Some of the Auxin products, such as 2, 4-D, need to be postponded until the wheat is fully tillered, but products containing dicamba can be applied after wheat has developed at least two leaves. Both products should be applied prior to jointing.

Utilizing a Clearfield wheat variety and applying the herbicide Beyond can also provide broadleaf weed control. To get the most out of a Beyond application, there are multiple application guidelines and requirements to follow. Air temperatures need to be above 40°F around the time of application. Spray volumes with a ground applicator need to be at least 10 gallons per acre and at least 20 gallons per acre when applied to minimum-till or no-till to ensure thorough coverage.

An adjuvant and a nitrogen fertilizer must be added with the Beyond for optimum weed control. A non-ionic surfactant and UAN are often used. If a Clearfield Plus wheat variety is used, then the non-ionic surfactant can be substituted with methylated seed oil or crop oil concentrate to provide better control. Under drought conditions, it is recommended to use as much as a 50/50 ratio of water and UAN as the spray solution. While there is not a grazing restriction, removing cattle seven days prior to application will allow weeds to recover and become easier to control.

Field scouting is the only way to determine if broadleaf weeds are present and if an application of an herbicide is warranted. To protect yield potential, prompt applications can be necessary. The longer the weeds are left growing the more they will rob water, nutrients, and sunlight from the wheat crop.

Always read and follow herbicide labeled directions for proper timing, adjuvants, and rates needed to control specific weeds on your farm. Contact your local Oklahoma Cooperative Extension Office for more information.

Evaluation of Salt and Trace Mineral Sources and Growth Implants on Performance of Stocker Cattle

Britt Hicks, Ph.D., Area Extension Livestock Specialist

Forage surveys suggest that nearly all forages are deficient in one or more minerals and that there is a widespread occurrence of deficient levels of copper and zinc for beef cattle grazing forages. Thus, adequate minerals should always be available in any operation. Recent Kansas State University (KSU) research determined the efficacy of providing salt alone or with injectable trace minerals compared to a complete mineral supplement and growth implants for improving the growth of stocker calves grazing native grass pastures (May – July, 90 days) in the Flint Hills region of Kansas.

In this study, 248 crossbred steers (698 lb) were randomized by initial weight across 15 pastures. The pastures were randomly assigned to three different treatment groups: (1) Salt block only; (2) Salt block and Multimin 90 (MultiMin USA, Inc., Fort Collins, CO) and (3) a KSU complete mineral formulated for 3 oz/day daily consumption. Multimin 90 is an injectable chelated aqueous supplemental source of trace minerals administered at 1 mL/100 lb body weight (1 mL contains 60, 10, 5, and 15 mg of zinc, manganese, selenium, and copper, respectively. The KSU mineral contained 11.9% calcium, 3.9% phosphorus, 32.5% salt, 1278 ppm copper, and 7812 ppm zinc. Within each pasture treatment group, equal number of steers were randomly given either: Ralgro (36 mg zeranol; Merck Animal Health, Madison, NJ) or Revalor-G implants (40 mg of trenbolone acetate and 8 mg estradiol; Merck Animal Health), or no implant.

These researchers reported that there was no growth response to salt block and injectable trace mineral supplementation when compared to a complete mineral supplementation. The average daily gains (ADG) for the three treatment groups were 1.63, 1.61, and 1.73 lb/day, respectively, for salt only, salt + Multimin, and the complete mineral (Table 1). The average block salt intake was approximately 1.43 oz/head daily while the daily intake of the KSU complete mineral was 3.3 oz/head. It was noted that salt and complete mineral intakes of the stockers were fairly consistent throughout the 13-week trial, with greater usage rates associated with periods of high precipitation.

Table 1. Effects of mineral supplementation on stocker performance.

Item	Salt Block	Salt Block + Multimin	Complete Mineral
Number of pastures	5	5	5
Initial Weight, lb	698	685	700
Day 90 weight, lb	847	838	856
ADG, lb/day	1.63	1.61	1.73

Source: Weibert et al., 2018.

These researchers also reported that calves implanted with either Ralgro or Revalor-G gained significantly faster than non-implanted calves (average of 12.7% faster; P=0.02). The ADG for the three treatment were 1.53, 1.75, and 1.70 lb/day, respectively, for no implant, Ralgro, and Revalor-G (Table 2). Implanted calves gained an average of nearly 19 lb more over the 90 day trial. These responses are similar to that reported in a 1997 review of research trials that evaluated the effectiveness of implanting stocker cattle. This review showed that a single implant will increase weight gain 8 to 18 percent, or 15 to 40 pounds, during the grazing season.

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Table 2. Effects of implant on stocker performance.

Item	No Implant	Ralgro	Revalor-G
Number of steers	82	82	81
Initial Weight, lb	693	699	702
Day 90 weight, lb	830	857	855
ADG, lb/day	1.53[a]	1.75[b]	1.70[c]

[a,b,c]Means within a row with uncommon superscripts differ ($P<0.05$).

Source: Weibert et al., 2018.