FROM THE GROUND UP

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AGRONOMY NEWS

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NITROGEN FERTILIZERS

Most nitrogen (N) fertilizer recommendations are given in pounds (lb N/A) to meet N needs for an expected yield for a certain crop. The suggested N rate usually is given as the rate needed to meet the crop needs for the growing season. It then is up to the grower or fertilizer dealer to decide what N source should be applied, and what is the most efficient method and timing of application for the specific crop and soil situation.

Because there are so many N-containing fertilizers, a brief review is in order. The most commonly used N sources are urea, ammonium nitrate, and anhydrous ammonia. Urea (46-0-0) and ammonium nitrate (33-0-0) are completely water-soluble granular products which also can be applied as solutions. Urea-ammonium nitrate solution (UAN) contains from 28-32% N, while urea solutions contain lower percentages of N. Anhydrous ammonia (82-0-0) is a compressed gas which is the most concentrated N source available. The fertilizer grade listed after each product gives the percentage of N in each product.

Other N-containing fertilizers are monoammonium phosphate (MAP, 11-52-0), diammonium phosphate (DAP,

18-46-0), and ammonium polyphosphate (APP, 10-34-0). "Complete" fertilizers (including N, P, and K) generally contain ammoniated phosphates. The ammonium form of N in all of these products can be absorbed by most plants. Ammonium-N will nitrify in soil to form nitrate-N, which is immediately available to plants. Specialty fertilizers have been developed to release N over a longer period of time (slow release). These products contain all or part of their N in a water-insoluble form which slowly decomposes to release N in a water-soluble form. Other products contain coatings which delay the release of N. These fertilizers are much more costly per unit of N, and are applied to high value crops such as fruits and vegetables or turfgrasses. These products are not economical for use on field crops. Split applications of water-soluble products such as urea, ammonium nitrate, or UAN solutions can achieve a N supply pattern similar to that of the specialty products.

Choice of N fertilizer is dependent upon:

1. ***availability of product***
2. ***equipment available***
3. ***price***

Knowledge of the physical and chemical forms of various N sources and their behavior in soil will help in selecting the most effective N source for the soil-crop situation. Choice of N fertilizer is based on availability of product, equipment available, and price. Cost comparisons are based on a pound of N. To calculate the cost per unit of N, multiply the percent N times 2000 and divide the result into the price per ton. For example, if the price of anhydrous ammonia is $195/ton, the cost per pound of N would be: $195 ÷ (2000 x 0.82) = 11.8 cents/lb of N.

Nitrogen availability in soil is affected by various chemical and biochemical reactions which change N from one form to another. Two of the main reactions are nitrification and denitrification. Nitrification is a process which converts ammonium-N (NH_4^+) to nitrite-N (NO_2^-) and then to nitrate-N (NO_3^-). Nitrates are water soluble and available to plants. They also can be leached out of the root zone and eventually enter the groundwater. Denitrification is a process which converts NO_3-N into nitrogen gas (N_2) that escapes into the atmosphere. This process mainly occurs when the supply of oxygen is limited, as in wet or flooded soils. Such losses decrease the levels of available N in soils.

Another process is volatilization of ammonia (NH_3) gas, which results in N losses from the soil. An example of such losses is shallow knifing of anhydrous NH_3 into dry soil or into very wet soil or bubbling anhydrous NH_3 into irrigation header ditches. Another example is surface broadcast of urea-containing fertilizers on high pH soils. Losses of N are higher if the soil is dry and crop residues are present. Urea-N is hydrolyzed to the NH_4^+ form by the enzyme, urease, which is present in all soils, especially with crops or crop residues. Nitrogen losses can be minimized by incorporation of urea-N soon after application or by band or knife application directly into the soil. ¤Mortvedt

UPDATE ON WHEAT VARIETY TRIAL RESULTS

We have completed harvest of all the winter wheat variety trial sites throughout the state. We are in the process of summarizing the data and our goal is to have the results out by the end of July. We will be sending the data out in hard copy format as well as by satellite transmission over the DTN and FarmDayta systems. ¤Shanahan

1994 DRY BEAN FIELD DAYS

Colorado State University Cooperative Extension personnel have set dates for "Dry Bean Field Days". Extension educational programs will be held at the three dry bean test sites, planted by the CSU Crop Testing program near Burlington, Eaton, and Sterling. Colorado State University Extension specialists and agents will provide an educational program and discuss dry bean variety and research experiments at each of the sites. The field days will be held at the locations and times shown below:

Site	Local Extension Contact	Grower	Directions to the site	Date and Time
Sterling	Wayne Cooley 303-522-3200	Howard Hettinger	1 mile south of Merino on Rd 25, then east 1 3/4 mile on Rd 8 (North side of road)	August 15 10:00 A.M.
Burlington	Ron Meyer 719-346-5571	Steve Scott	South of Burlington on Hwy 385 to Rd K, then east 4 1/2 miles (North side of road)	August 15 4:00 P.M.
Eaton	Jerry Alldredge 303-356-4000	Ed Croissant	South of Eaton on Hwy 85 to Rd 70, then west 1/2 mi (South side of road)	August 16 10:00 A.M.

DRY BEAN STORM DAMAGE

Summer storm damage on bean fields can cause serious losses by abrasion, tearing, and shredding of leaves, buds and blossoms, and young pod damage, and lodging, twisting, and shearing plants, branches, and roots. Hail early in the season may not be as devastating as hail occurring later in the season.

Dry bean production problems aggravated by hail and abrasion include Common Bacterial Blight, Halo Blight, and Brown Spot. Rust doesn't seem to react in a definite manner to hail damage and may increase or decrease, depending on field cover and the individual field.

The incidence of White Mold and Root Rot are not aggravated by hail but poor root systems due to root pathogens may slow down recovery from defoliation.

It is important to understand growth stages when studying plant losses. The vegetative stages (V) relate to growth before any pollination occurs. V1 describes the time when the first primary leaf occurs before any trifoliate leaf formation, about 10 days after planting. V2, V3, V... reflect the

number of nodes of the plant on the main stem. The last vegetative stage ends when blossom clusters occur but are not yet open. Reproductive stages (R) relate to pollination, seed set, and development. R1 refers to the stage when one blossom is open at any node of the plant. R2, R3, R... refers to number of blossoms, pod size, and development until R9, the maturity stage when at least 80% of the pods are yellow and 40% of the leaves are still green. Definitions vary between R1 and R9 depending on the bush or vine-type plant.

Bush-type plants having most of the buds, flowers, and nodes damaged will suffer more unrecoverable damage than vine-type plants.

Summer storms can be extremely hazardous to the health of beans.

To estimate yield losses, determine the original and remaining plant stands. On 30-inch rows, pinto and navy types should have 4 to 5 plants per foot, and kidney types should have 5 plants per foot. A 10% loss of stand will reduce yields less than 10% while a 50% loss of stand may reduce expected yield by as much as 45%, depending on the type of plants involved. This yield loss is added to losses caused by defoliation.

The severity of defoliation losses relate again to plant type, percent leaves lost, and time of hail. A 50% leaf loss at the R6 stage (when seeds within the pods are one-fourth inch long) will relate to an additional 40% yield loss.

What should be done to storm-damaged fields? If possible, have your insurance agent provide an estimate of yield losses. In severe cases, abandonment may be the answer. If reasonable recovery and yields may be expected, it may be beneficial to include a nitrogen foliar feed within 5 to 7 days after damage to stimulate recovery of surviving foliage. Apply copper-based bactericides to reduce the spread of bacterial disease. Maintaining soil moisture by irrigation will be necessary to maximize plant growth. It is probably too late to successfully replant to either beans or another crop. Any replanting attempts must be compatible with herbicide applications previously applied to beans. ¤Croissant

ANIMAL WASTE MANAGEMENT CONFERENCE

The Great Plains Agricultural Council is sponsoring a conference on confined animal production and water quality this October 19-21, 1994 in Denver. This conference is aimed at professionals, such as Extension Agents, with special focus on balancing animal production with environmental quality.

Swine, beef, and dairy industry perspectives on management of wastes will be highlighted with additional input from sheep, horse, and poultry industries. The conference will contain technical sessions on waste management systems with discussions of economic concerns and regulatory approaches.

This conference should be valuable for all agents working on animal production, waste management, or nutrient management as it will cover "state of the art" management systems from around the world, as well as current policy trends. The preregistration fee is $100, which includes conference proceedings, breaks, and food functions. For more information, or for a registration form, contact Reagan Waskom at (303) 491-6201. ¤Waskom

GERMINATION POTENTIAL OF 1994 WHEAT

Hot, dry conditions during the past months have contributed to lower quality seed wheat for fall planting. It is important that seed is conditioned to provide high germination percentages with excellent seedling vigor.

High temperatures have contributed to grain moisture, as low as 5%-9%. Wheat kernels in that moisture range are very brittle and may crack during harvest and subsequent handling. It is important seed be handled gently to avoid any further damage. Augers should be run as slow as possible, seed drop distances held to a minimum, and seed cleaned to remove broken kernels. Remember, damaged seeds may germinate in a lab test, but under field conditions they may not produce a healthy plant.

Because of the strenuous weather conditions this year, it is more important than ever to have your seed cleaned, removing less desired, shrivelled seeds.

From research we know that plump wheat seeds have a tendency to produce higher yields than the shrivelled kernels. Shrivelled seed may not have enough reserves to push a viable plant through the soil. This year is more important than ever to have your seed cleaned removing these less desired, shrivelled seeds. Make sure that your seed conditioner uses slotted screens as a bottom (or sieve screen) to remove these skinny seeds. Round hole or triangle hole screens ARE NOT as efficient to do this job. You may have to accept cleanout percentages of 10%-25%-50% to get an acceptable seed lot.

Field stresses that wheat encountered before harvest may have triggered some dormancy mechanisms in your seed. Normal germination tests on wheat seed this time of year might show 1%-5% dormant seed, but those rates could be even higher this year. But dormancy is good, it is a survival mechanism that allows seed to remain viable in the soil until conditions are right for growth. Don't be dismayed by high dormancy, in most cases seed that expresses dormancy in a July germination test may show none at all if tested again on September 1. If you test your seed in a "Rag Doll" test, you may get a false low reading because the dormant seeds will not express germination without some type of dormancy breaking procedure. The truest results will come from a recognized seed testing lab.

Proper handling, conditioning and testing of your wheat seed will produce a seed lot that will have the best opportunity to produce a strong, high yielding crop. ¤Stanelle

THE SOILS LAB IS MOVING

The Soil, Water, and Plant Testing Laboratory is moving to the new Natural and Environmental Sciences Building (NESB) during the week of August 15-19. The lab must vacate its old location in the Vocational Education Building by the middle of August. If anyone has samples in the lab that they need returned, please contact us by August 1. We plan to save samples from the past year; however, anything older than one year will be discarded.

During the three week period of August 8-26, laboratory personnel will be involved in sorting, packing, and setting up equipment in the new laboratory. Consequently, laboratory services will be greatly reduced. We will accept samples; however, we cannot perform any rush analyses during our moving time.

The laboratory will be situated on the third floor of the NESB. The third floor location was designated primarily because we have several perchloric fume hoods with duct work that needed to be constructed with wash down systems. The top floor location provided direct access to the roof and minimized the cost of the hoods.

Be sure to contact the Soils Lab no later than August 1 regarding any samples over a year old that you wish to keep.

Access to the NESB is possible by entering the CSU campus at College Avenue and Pitkin Street. Proceed west on Pitkin Street to Mason Street, turn right at Mason Street and proceed to "A" Street. Turn left at "A" Street and go to East Drive. After reaching East Drive, the NESB loading area is located just south of the intersection of "A" Street and East Drive. We don't anticipate the lab will be organized until approximately the first of September; however, if you are in town, we will be glad to show you around the lab after August 26. ▫Self

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Where trade names are used, no discrimination is intended, and no endorsement by the Cooperative Extension Service is implied.

Sincerely,

Robert L Croissant

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