FROM THE GROUND UP

AGRONOMY NEWS

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COLORADO STATE UNIVERSITY 1992 EASTERN COLORADO WHEAT AND CROP MANAGEMENT FIELD DAYS

We have finalized the schedule for the Winter Wheat Field Days at the various locations around the state and would like to share this schedule with everyone. It should be noted that no program will be held at the Briggsdale site because of poor stands. We encourage interested parties to attend another program such as at Bennett or Willard.

We are in the process of organizing an agenda for each event and feel that this agenda will be of great interest to all wheat producers. The agenda will include information about potential new winter wheat and feed grain varieties, soil fertility recommendations, Russian wheat aphid control, as well as other wheat production factors.

A representative from the Soil Conservation Service will be on the program to address issues pertaining to the SCS conservation tillage requirements for compliance in farm programs. ▫Shanahan

Colorado State University

DATE	TIME	COOPERATOR	COUNTY	DIRECTIONS TO THE FARM
June 8	5:00 p.m.	Research Center	Baca	WALSH - ⅛ W, 4 N, 1 W
June 9	8:00 a.m.	John Stulp	Prowers	LAMAR - 6 S on Hwy 287
June 9	5:00 p.m.	Eugene Splitter	Kiowa	SHERIDAN LAKE - ¾ W on 385, 3 S
June 10	8:00 a.m.	Barry Hinkhouse	Kit Carson	BURLINGTON (DRY) 1 ½ S on 385
June 10	4:30 p.m.	Gary Mulch	Kit Carson	BURLINGTON (IRR)-Peconic 7 S on Rd 55 to Rd N, ½ S
June 11	8:00 a.m.	Roy Andersen	Lincoln	GENOA - 9 N, 3¾ E
June 11	5:00 p.m.	Miltenberger Bros.	Kit Carson	STRATTON - 4 E on Hwy 24
June 15	5:00 p.m.	Mark Mertens	Logan	WILLARD - 3 E on 18, ½ S on 17
June 16	8:00 a.m.	Jim Carlson	Sedgwick	OVID - 6 ½ S of I-76
June 17	8:30 a.m.	Research Center	Washington	AKRON - 4 E on Hwy 34
June 17	5:00 p.m.	Gilbert Lindstrom	Logan	STERLING - ¼ S of Intersec. of Co. Rd 6 & 59
June 22	5:00 p.m.	Kevin Helzer	Adams	BENNETT - N on 79 to Rd 144, ¼ E
June 23	9:00 a.m.	Univ of Neb Research Center		SIDNEY, NEBRASKA 5 N on 385, 2 W, ½ N

*Gary Peterson's and Dwayne Westfall's Crop Management Study

Field Day programs will include information on:

- ***potential new winter wheat and feed grain varieties***
- ***soil fertility recommendations***
- ***Russian wheat aphid control***
- ***conservation tillage requirements for compliance in farm programs***

PATTERSON HOLLOW WATER QUALITY PROJECT

The Lower Arkansas River in Colorado is the most saline stream of its size in the United States. Some two-thirds of the 290,000 irrigated acres in the Arkansas River Valley are being irrigated with Class 4 water, the U.S. Salinity Laboratory's highest salinity hazard classification. The average salinity levels of canal systems east of Pueblo increase from 300 ppm Total Dissolved solids (TDS) to 4,000 ppm TDS near the Kansas state line.

Colorado State University Cooperative Extension, the Soil Conservation Service, and the Agricultural Stabilization and Conservation Service are working together on the Patterson Hollow Hydrologic Unit Area Project in an effort to reduce salinity, as well as nitrates, sediment, and other pollutants in the Arkansas River and its groundwater basin. The Patterson Hollow area consists of 89,850 acres in Otero and eastern Pueblo counties and some 59,700 acres of irrigated cropland. Although water quality in the Patterson Hollow area averages about 500 ppm TDS, the lack of Best Management Practices (BMP's) being applied in the area permits over and under irrigation, deep percolation, and erosion which contribute to the salt, nutrient, sediment, and pollutant buildup in the Arkansas River and in downstream canals. Salinity levels change rapidly in this 25 mile section of the river as the Arkansas River downstream from the project areas has a salinity concentration of approximately 2,500 ppm TDS.

Surge irrigation demonstrations will be held at Wiley Hay Days on June 18-20 and at the Arkansas Valley Research Center at Rocky Ford on September 10.

Cooperative Extension's role in the project is:

- to provide eduction and information to the farmers in the proper use of the BMP's implemented
- to demonstrate BMP's to other farmers in the area
- to collect technical data necessary for the economic evaluation of BMP's
- to conduct an information program targeted at Lower Arkansas irrigators on the importance of the salinity issue and how BMP's can address the issue

Jim Valliant, irrigation specialist, is working with cooperating farms on surge irrigation, dirt ditch transit losses, and trash screens to demonstrate the value of BMP's to area farmers. Jeff Tranel, farm management specialist, is working with cooperating farmers to collect the financial information necessary to evaluate BMP's and help improve the farmers's financial position through the use of the BMP's. Bill Hancock, Otero County Unit Leader, is serving as Project Leader.

In 1991, cost sharing of $420,000 in Long Term Agreements and annual sign ups involved some 10,612 acres and resulted in the installation of nearly 13 miles of gated pipe, underground pipe, and concrete conveyance ditches. Corn yields were increased 9 bushels per acre by surge irrigation to 162 bushels per acre form 153 with conventional irrigation. Profits increased $17, from $105 to $122 per acre with surge irrigation. The cost of the surge valve and controller were prorated over a five year period.

Education programs presented last year included a tour of the surge sites and a surge irrigation workshop.

Cooperative Extension's effort is to make the public aware of Best Practices. Surge irrigation demonstrations will be held this year on June 18-20 at the Wiley Hay Days and on September 10 in conjunction with the Arkansas Valley Research Center at Rocky Ford. ▫Jim Valliant

THE EFFECTS OF NITROGEN FERTILIZER ON SOIL

N source selection should be based primarily on:

- *cost of N appiled*
- *adaptability of the source to the producers*
- *crop-tillage system*
- *availability*

Does the use of anhydrous ammonia change the physical condition (hardness) of the soil? Does it cause the soil to become more compacted? A long term experiment has been conducted in Kansas to evaluate the effect of four nitrogen (N) sources on the physical and chemical properties of soil. During a 20-year period (1969 through 1988), four nitrogen fertilizer sources (anhydrous ammonia, ammonium nitrate, urea-ammonium nitrate solution (UAN), and urea) were applied annually to field plots at four Kansas locations. The four N sources were applied in the spring and corn, grain sorghum, or winter wheat were grown on the field plots.

After 20 years of cropping and N source treatments, the field plots were sampled to determine the status of selected soil, physical, and chemical properties. Two soil layers sampled were the 2.5 to 5.5 inch and the 8.5 to 11.5 inch layers. Chemical tests results show no significant chemical property differences of either soil layer among the four N sources. The treatments receiving N did have a significantly lower soil pH than the no-nitrogen check. All four N sources reduced pH (more acid) compared with the no-nitrogen check. There was no significant difference in pH among the four N sources. The properties of the soil layers that were evaluated included bulk density, optimum water content for compaction, geometric mean diameter of aggregates, particle-size distribution, and clod density. The clod density values enable a comparison of compaction levels among treatments. The clod density comparison found no evidence of different compaction levels among the N fertilizer sources.

In summary, the results show no significant difference in the effect on soil from the four N sources. Thus, N source selection should be based primarily on cost of the N applied, adaptability of the source to the producers, crop-tillage system, and availability. All N sources are agronomically equal on a per pound of N basis when they are properly applied. ▫Follett

DETERMINANTS OF SEED QUALITY

The quality of seed reflects the significant factors that have acted on them in the past. Thus, they are a product of their past. But, their past is a passive role. The only changes they encounter have been inflicted upon them. Since seed is alive, these changes can only deteriorate the quality of the seed. It is these factors that determine its quality.

Inheritance

The farmer cannot change the genetic makeup of the seed. He must be aware of the variety characteristics and manage the crop so that quality seed is produced.

Source of Seed

Planting mixed, low quality, or low

vigor seed may affect the quantity and quality of the crop produced. The seed buyer must be aware of the reputation of the dealer or grower and select seed that will perform up to specifications.

Field Contamination

The best seed can be contaminated if weeds, other crops or varieties, or diseases infest the field. The grower should consider land history and choose a field that has the potential for the least problems.

Growing Conditions

Soil fertility, uniformity, drainage, application of herbicides or insecticides, and cultural practices effect the quantity and quality of seed produced. Some conditions, such as precipitation or high temperatures cannot be controlled, but the grower should manage the seed field for optimal production of quality seed.

Colorado Seed Growers will be conducting a Seed Field Management Clinic on Small Grains at the Fort Morgan Extension Office on June 15.

For more information, call Jim Stanelle 491-6202 or Bruce Bosley 867-2493.

Post-Maturation To Pre-Harvest Conditions

Seed attains physiological maturity well before moisture percent level is low enough for harvest. As seed dries, temperature fluctuations, high relative humidity, and frequent precipitation can reduce seed quality even before seed is harvested. These factors should be considered before producing a specific crop in an area subject to problems.

Harvest

Harvesting at excessive seed moisture can cause damage and storage problems while harvesting when seed is too dry results in broken kernels and lower yield due to shattering. Proper combine settings prevent damage and maintain seed quality.

Handling, Processing & Storage

Mechanical damage occurs by seed conveyors set improperly or if excessive force happens such as long drops on baffles or paddles. The amount of mechanical damage is proportional to seed moisture, the lower the moisture below standard, the greater potential for damage.

Age

Time reduces viability of seed, other things being equal. Seed vigor declines faster than germination, therefore old seed with good germination may be excessively low in vigor and should not be planted.

Homogeneity

A seedlot has many seeds, all genetically similar. Non-uniform fields and storage and handling methods can cause reduced quality of seed from production fields. Blending seedlots can improve seed quality.

The quality of seed is the product of its history. From fertilization through planting seed is subjected to many conditions and operations which can affect quality. A complete seed quality control program insures that the detrimental effects of the conditions and operations are minimized. ▫Stanelle

CROP PRODUCTION AND FIELD MANAGEMENT RECORDS

The Food, Agriculture Conservation and Trade Act of 1990 (FACT ACT) states that certain pesticide application records must be kept by the private applicator beginning in

1992. Guidelines have emerged and forwarded to the user; however, total procedures are not in place. Because the record keeping rule has not yet been published by USDA, it may be assumed there may be changes in policy and wording.

The attached Crop Production and Field Record sheets (last two sheets of the newsletter) address initial concerns of the Act. These record forms are designed to register data fulfilling record keeping requirements for restricted use pesticide applicators, provide an organized way to manage information regarding pesticide application on a field by field basis, and aid problem investigations.

Look on the last two pages of this newsletter for the Crop Production and Field Management Record form.

Each form (4 pages) is designed for one field. The final printing will be a one page format folded and punched for a 3 hole notebook. Information requested is: 1) general field and planting information, 2) irrigation and/or rainfall and sprayer information, 3) pesticide application information and 4) soil, water, manure analysis, and fertilizer applications.

Pesticide applications are provided for 6 different applications per crop. One of these columns may be used for stored grain products if necessary. Limited supplies of the forms financed by the Colorado Dry Bean Advisory Board (CDBAB) will be sent to Extension offices when available. ▫Croissant

NITRIFICATION INHIBITORS

Nitrification inhibitors (NI), such as N-serve, are chemicals that reduce the rate of nitrification, a process defined as the conversion of ammonium ions (NH_4^+) to nitrites (NO_2^-) and then to nitrates (NO_3^-) (see Figure 1). Why is it desirable to delay formation of nitrates?

Nitrates are soluble, can be leached out of the root zone, then eventually enter the groundwater. Presence of excessive nitrate in ground water is undesirable.

Denitrification is a process when nitrates change to gaseous forms of nitrogen and escape into the atmosphere. This may result in reduced yields and in economic losses for farmers.

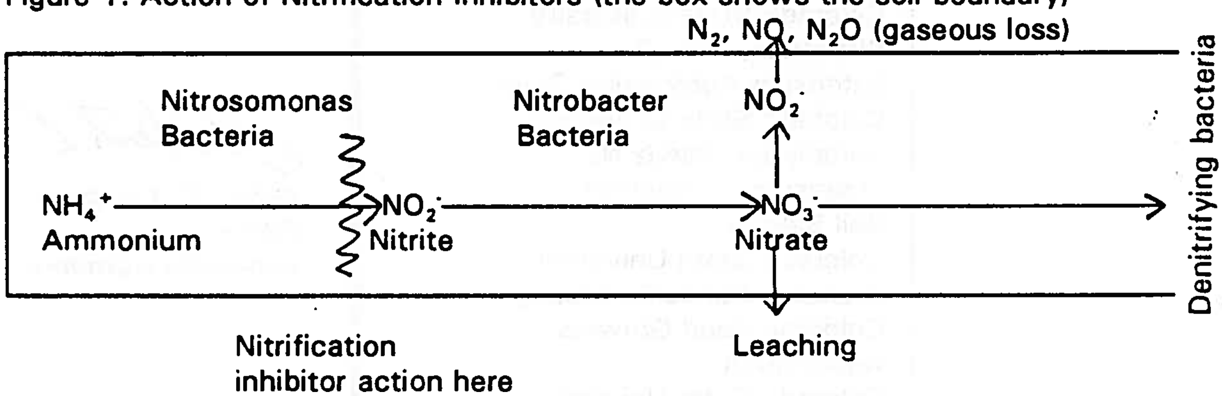
Denitrification is significant when high levels of nitrates are present and oxygen is limited in the soil profile, e.g., in flooded soils or in soils that have received heavy rates of manure or sewage sludge or other organic material. The organic material increases the microbial activity in the soil which may result in depletion of oxygen thus promoting denitrification. Organic materials also provide a source of energy for denitrifiers. Denitrification is promoted by high soil moisture, soil crusting, and compaction that slows down the rate of oxygen diffusion into the soil. Warm temperatures increase the denitrification rate. There are more than 14 bacterial genera with members that are capable of denitrification. Some bacteria are active at very high temperatures found in desert soils.

Nitrification inhibitors reduce microbial activity and delay the change of ammonium to nitrates. This provides a moderate nitrate level in the soil allowing crops to use it as plants develop, reducing the amount of nitrate available for subsequent leaching. The non leachable nitrogen as ammonium is attracted to clay and organic matter. Plant roots can

Nitrification inhibitors reduce leaching and denitrification if soils are subject to denitrification. Is the use of nitrification inhibitors economical? Only when the savings in nitrogen fertilizers or return due to higher yield is greater than the cost of the inhibitor. In some areas of Nebraska, the use of nitrification inhibitors is required when nitrate leaching potential is high. In Colorado, research has shown very little response to the use of nitrification inhibitors. However, these experiments were conducted under conditions where leaching and denitrification were not a problem. It is expected that under condition mentioned before, use of NI will pay off. Nitrification inhibitors are used with anhydrous ammonia, urea, uran, and other ammonium containing fertilizers. How is the nitrification inhibitor applied? Fertilizer dealers either mix it with dry fertilizers before application or custom apply it with anhydrous ammonia.

In summary, nitrification inhibitors are tools that may be used to manage fertilizer nitrogen in an economic and environmentally sound manner. It should be used only when nitrate leaching potential or denitrification potential is high. For more information, contact your local Extension agent and your fertilizer dealer. ▫Soltanpour

Figure 1. Action of Nitrification Inhibitors (the box shows the soil boundary)



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

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Sincerely,

Robert L. Croissant
Editor
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CROP PRODUCTION AND PEST MANAGEMENT FIELD RECORD

Year ____________________

Grower ____________________

Address ____________________

____

Telephone # ____________________

Field No. ____________________

Consultant ____________________

Land Owner ____________________

Time	Crop	Variety	Acres
CurYr	______	______	______
LastYr	______	______	______
2YrAgo	______	______	______
NextYr	______	______	______

Current Crop Information

Crop ____________________

Acres:
Planted ______ Harvested ______

Variety ____________________

Seed(Size,Type,Rate) __________

Plant Date ________ Depth ______

Planted Pop. ________ Final ____

Row Width ____________________

Type Planter ____________________

Inoculant Type _____ Amt ______

Yield Goal ____________________

Yield Obtained ________________

Field Map

S________ T ________ R ________

Soil - Tillage

Soil Type _____ pH ___ O.M.___

Tillage Performed	Dates
____________	________
____________	________
____________	________
____________	________
____________	________
____________	________
____________	________
____________	________

Carryover Residue

Condition ________ Kind ________

Amt: Low______ Med______ High___

Other ____________________

Planting Conditions

Plant Time Soil Temp ________ °F

Soil: v.dry ______ dry ______
medium ______ wet ______
cloddy ______ loose ______

Irrigation Practices

Sprinkler ____________ Gravity ____________ Other ____________

Irrigation Date	Amt/A	Growth Stage	Other Nutrients Added (lbs)	Comments e.g. rain

Ground Equipment Specifications

Sprayer: floater ______ boom ______ swath width ________

Pump type: roller _____ centrifugal _____ turbo _____

Spray pres. __________ Tank size __________ Ground speed ________

Type of agitation: by-pass ____ jet ____ paddle ____ none ____

Was agitation adequate? ___________ yes ___________ no

Nozzle type: flat fan ____ flood ____ hollow cone ____

even flat fan ____ solid cone ____ other _______

Nozzle size (8004, TX-12, etc.):__________ Nozzle spacing__________

Type of application: PPI ____ post ____ band ____ broadcast ____

If PPI, was incorporation immediate? yes _______ no _______

Number of passes __________ If no, time delayed ______________ hrs.

If PPI, did soil condition facilitate good herbicide incorporation?
yes _______ no _______

Sprayer calibration date ____

Pesticide Applications

	1	2	3	4	5	6
Pest						
Date Pest Appeared						
Crop Stage						
% Plants Affected						
% Damage						
Consultant Rec.						
Applicator Name Cert. Number						
Product Name						
Location Purchased						
App. Date						
App. Time						
A. Treated						
Carrier - rate/A						
ai/A						
Product/A						
EPA Reg. #						
Lot NO.						
Wind Dir, Speed						
App (A,G,S)*						
Application Site**						
Air Temp						
Humidity (L-M-H)*						
Cloud Cover (N-PC-C)*						

*A=aerial, G=ground, S=sprinkler, L=low, M=medium, H=high, N=no clouds, PC=partly cloudy, C=cloudy
**Example: B=banded, Br=broadcast, F=foliar, I=in-furrow

Fertilizer Practices

Soil Test Results: Lab ________________ Test Date ____________

- - - - - - - - units (____) - - - - - - -

Lab No.	pH	Salt	O.M.	NO_3-N	P	K	ZN	Fe	Texture

Fertilizer Applied

Date	Method	N	P_2O_5	K_2O	Other Nutrients	Micronutrients
		- - - - - - - - - - - - - lb/A - - - - - - - - - - - -				

Manure Application (Rate, Date, When Incorporated) ____________

Manure Analysis: Lab ________________ Test Date ____________

- - - - - - - - - - - - - - - - - - units (______) - - - - - - - - - - - - - - -

% Water	N	P	K

Water Analysis: Lab ________________ Test Date ____________

- - - - - - - - - - - - - - - - units (______) - - - - - - - - - - - - - - - - -

pH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4	NO_3	SAR

EC micromhos/cm________

COMPLIMENTS OF:

This form was developed by Robert Croissant, Department of Agronomy, Howard Schwartz, Department of Plant Pathology and Weed Science, and Jerry Alldredge, Weld County Cooperative Extension Office, Colorado State University
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