3-18-1994

CropWatch No. 94-1, March 18, 1994

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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

No. 94-1
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Winter wheat yields may benefit from early nitrogen

Test now for residual soil nitrate

Winter wheat in Nebraska often shows dramatic yield responses to applied nitrogen. It is not unusual to increase grain yield by 10 to 25 bu/acre with adequate nitrogen; however, adding nitrogen will only profitabilty increase yield if available soil nitrogen is low.

The best way to determine the nitrogen status of the soil for winter wheat is to sample soil to a depth of 2 to 3 feet and have it analyzed for residual soil nitrate. While it is preferable to sample soil in fall or late winter, there is still time to sample and obtain analysis if the soil test laboratory turnaround is fast.

In most years nitrogen should be applied before April 15. Applying nitrogen after April 15 tends to increase grain protein, however, the beneficial effect on grain yield decreases the later nitrogen is applied. The optimum time for spring application is influenced greatly by the amount of wheat growth at the time of application. Plant growth is determined by the amount of heat or growing degree days received each year. When growing-degree-day heat units are below average, nitrogen can be applied later in April. So far this spring wheat development is a little later than normal in many areas of the state; however, this can change very quickly with Nebraska's weather.

Farmers have several nitrogen source options for topdressing wheat. All three nitrogen sources, 28% nitrogen solution (urea-ammonium nitrate), 33% ammonium nitrate, or 45% urea may be successfully used. However, because of volatilization or nitrogen loss as ammonia, ammonium nitrate is the preferred source for topdressing. Since availability of ammonium nitrate is sometimes a problem, either solution nitrogen or urea may have to be used. Solution nitrogen may have a slight advantage, but on the average, both sources probably will perform about the same.

While volatilization losses of nitrogen from topdressing can be high, topdressing in early spring when temperatures are low can reduce the potential. In addition, the probability of some precipitation to move the fertilizer into the soil is relatively high. Topdressing nitrogen on wheat generally works well and is probably the best time for most producers. While yield response to nitrogen applied in the fall or the spring average nearly the same, spring topdressing has the advantage of being able to better evaluate yield potentials based on stands and soil moisture supply.

Ammonia also can be successfully used to topdress winter wheat, but this source requires an applicator equipped with narrow knives and coulters to prevent excessive tillage. Normal ammonia applicators cause excessive tillage, and therefore, stand loss. Unfortunately, few ammonia applicators suitable for topdressing wheat are available to rent. While ammonia is an excellent source and the cheapest nitrogen form, its price advantage disappears, because of the higher cost of application compared to other sources. In addition, the lower application rates on wheat compared to irrigated corn reduce the advantage of the lower cost of nitrogen with ammonia. Generally, the application rate needs to be more than 70 lbs N/acre to be cost effective.

Don Sander
Soil Extension Specialist

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New herbicides labeled for Nebraska

Several new herbicides have recently been labeled and others have undergone a label change for use in Nebraska:

Bicep Lite 5L (Ciba) is a combination of metolachlor (Dual) + Atrazine containing 3.3 + 1.7 lbs ai, respectively per gallon. Bicep 6L contains 3.3 lbs of metoachlor + 2.7 lbs of atrazine per gallon so Bicep Lite has 37% less atrazine than Bicep. At an application rate of 2.4 qt/A, Bicep Lite will provide 2.0 lbs of metoachlor and 1.0 lb of atrazine. Bicep Lite was introduced in 1993 but not sold in Nebraska.

Broadstrike (Dow Elanco) is in the sulfonylamide chemical family and an ALS (acetolactate synthase) enzyme inhibitor. Broadstrike will only be marketed initially in package mixtures with Dual (Broadstrike + Dual) and Treflan (Broadstrike + Treflan) for soil application in corn and soybeans. Broadstrike has soil activity on many broadleaf weeds such as pigweed, velvetleaf, sunflower, lambsquarter, smartweed, cocklebur, nightshade, etc. The package mixtures extend preemergence control to include many annual grasses. Corn, soybeans, alfalfa, barley, wheat, and rye are tolerant crops. The broadcast application rate of Broadstrike + Dual or Broadstrike + Treflan will be about one quart per acre which contains about one ounce active ingredient (ai) of Broadstrike.

Broadstrike is mainly metabolized by soil microorganisms. Chemical hydrolysis is not a major factor in breakdown. Its soil activity increases as pH increases and organic matter decreases. In soils with a pH of 6 to 7 and organic matter content of 2 to 4%, the half-life of Broadstrike is one to two months in summer temperatures. Rotational guidelines are expected to be 12 months for grain sorghum and sunflower and 26 months for sugarbeets and canola.

Clarity (Sandoz) is a diglycolamine sale of dicamba, the active ingredient of Banvel. Clarity is only registered for use postemegence in corn and appears to have many of the same characteristics as Banvel.

Concert (Dupont) is a one-to-one combination of Classic and Pinnacle for broadleaf weed control in soybeans.

Frontier (San 582H, Sandoz) is a thiophene-based chloroacetamide herbicide registered for use in corn. Frontier is a preemergence herbicide for control of most annual grasses, certain annual broadleaf weeds and sedges. Frontier's water solubility is 1140 when used at a labeled rate of 1.2 lb ai per acre. Frontier contains 7.5 lbs ai per gallon and can be used in minimum tillage or no-till production systems. Frontier can be applied alone or in tank mixtures up to 45 days before planting.

Guardsman (Sandoz) is a combination of 2.33 lbs ai of dimethenamid (Frontier) and 2.67 lbs ai of Atrazine for preemergence weed control in corn.

Tough (pyridate, Cedar Chemical) was labeled for postemergence broadleaf control in corn. Tough is usually combined with atrazine or 2,4-D.

John McNamara
Extension Assistant, Weed Science

CROP WATCH

Crop Watch is published from March through November by the University of Nebraska Institute of Agriculture and Natural Resources Communication and Computing Services, PO Box 830918, 108 Agricultural Communications Bldg., UNL, Lincoln, NE 68583-0918. To order a subscription or to change your address, write to *Crop Watch*, Box 830918, 108 Agricultural Communications Bldg. or call (402) 472-7981.

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Scout alfalfa fields now; plan control

Warm weather spurs the development of winter annual weeds in alfalfa. Downy brome, pennycress and other mustards can be effectively controlled if herbicide treatments are applied now before alfalfa greens up. Often a weed problem isn't recognized until the alfalfa greens up and it's too late for most herbicides. Scout alfalfa fields now and plan control programs accordingly.

If alfalfa has been established one year or longer, Lexone, Sencor and Sinbar can be used. These herbicides control both winter annual grasses and broadleaf weeds including pennycress and downy brome. Alfalfa injury may occur on soils containing less than 1% organic matter. If dormancy has broken, Sencor can be impregnated on dry fertilizer and applied before there is 3 inches of new alfalfa growth. Foliage should be dry.

Kerb and Karmex also are labeled for use on established alfalfa. Kerb controls downy brome and other grasses; Karmex controls mostly broadleaf weeds. Karmex has performed well in western Nebraska, but the heavier soils in eastern Nebraska usually result in reduced weed control.

Butyrac or Butoxone (2,4-DB) is "so-so" on pennycress and other mustards that have "overwintered" in the spring, but it can be used in both established alfalfa and new seedings where plants have at least two trifoliate leaves. Do not use these herbicides if temperatures may drop to 40°F within three days after application. Buctril can be used for broadleaf weed control in new seedings of alfalfa after plants have at least two trifoliate leaves. It should be used when the temperature is below 70°F. Buctril provides only fair control of pennycress and mustards that have overwintered.

Treflan TR-10 is registered for the control of annual grasses including downy brome and cheat in established alfalfa. Rainfall or irrigation of 0.5 inches is required to activate Treflan. Because Treflan does not control established weeds, it needs to be applied in late summer to control downy brome. Spring treatments will not control established downy brome.

Alex Martin
Extension Weeds Specialist

Band herbicides and cultivate to reduce costs, chemical use

When combined with timely cultivation, banding residual herbicides on behind the planter may be a logical choice for a reduced cost weed control program. This is particularly true for soybean herbicides, which are typically more expensive than corn herbicides.

The goal of all weed control programs is to achieve the optimum level of weed control at the minimum cost. This means suppressing undesired plants by chemical and/or mechanical means.

Convert rates when banding

Banding can be a real money-saver because it cuts the amount of herbicide used per acre. It won't save a dime, however, if you don't adjust your mixing calculations to reflect the number of acres treated as opposed to the number of acres passing under the sprayer.

After picking the most appropriate herbicide, an obvious way to decrease out-of-pocket expenses is to use less product per field. Rather than decrease the rate at which the product is applied, the area on which the herbicide is applied is decreased to a narrow band covering the crop row. In this way, herbicide cost per acre can be reduced by 50 to 75 percent of that from a broadcast application. The width of the band should be based on the operator's personal experience with cultivation: the closer he can cultivate to the row, the narrower the required band.

Calibration tips

Converting broadcast rates to band rates can sometimes be confusing. Here are six steps for calibrating equipment.

1. *Consult the product label.* Besides checking for any special restrictions or limitations on the herbicide's use, determine if the label gives guidelines concerning band application.

2. *Select operating conditions.* Accurately measure the planter's ground speed and nozzle spacing (usually corresponds to row width), and desired band spray volume (GPA), according to product label.

3. *Convert band GPA to broadcast GPA.* The broadcast GPA is used in determining the number of acres that can be covered per tankful. The band GPA is used for tank mix calculation. It is also used in Step 4 to determine required nozzle discharge.

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Eastern winter wheat in good condition

This is about the time when wheat growers start worrying about winter kill and crown and root rot in their wheat. In February, I conducted wheat surveys in eastern and southeastern Nebraska and found the crop to be in relatively good condition. The wheat is very short due to cool weather last fall. It was also planted very shallow since the seed is at crown level. In all of the fields I surveyed, there was very little evidence of winter injury and crown and root rot. Although the plants are small, their crowns and roots are healthy. I have not surveyed wheat condition in the west central or Panhandle yet.

If growers are concerned about the health of their crop, they can do some simple things to determine its condition. Randomly dig several plants within the field. After removing soil, examine the crown and roots. If the plant is healthy, these tissues should be white. Diseased crowns and roots will be tan to brown and when sliced with a knife the internal crown tissues will be discolored. Questionable plants can be potted in the house, and if alive they will start to grow in about 10 days.

Should I leave or destroy my winter wheat? This question always comes up in spring where fields have marginal stands. To help growers decide what to do with these fields, consider these guidelines. Many factors contribute to this decision; they include the estimated yield, soil moisture for replacement crops, other cropping options, partial field loss, government programs, soil erosion, and effect on rotations. Estimating the yield of winter wheat in late winter is difficult. The following table provides an estimate of the potential winter wheat yields based on healthy plants per foot of row in various row spacings.

Table 1. Estimated potential yield in bushel of winter wheat based on five tillers/plant, 22 seed/head and 16,000 seed/lb.

	Drill Row Spacing in Inches				
Healthy Plants/ Foot of Row	6	8	10	12	14
1	10	7.7	6	5	4.3
2	20	15.0	12	10	8.6
3	30	22.5	18	15	12.9
4	40	30.0	24	20	17.1
5	50	37.5	30	25	21.4
6	60	45.0	36	30	25.7
7		52.5	42	35	30.0
8		60.0	48	40	34.3
9			54	45	38.6
10			60	50	42.9
11				55	47.1
12				60	51.4
13					55.7
14					60.0

If part of the stand is reduced, do not thicken it with spring wheat. This results in a mixture of winter and spring wheat classified as mixed grade.

For more information consult NebGuide G92-1097A, *Root and Crown Rot - Winterkill Complex of Winter Wheat.*

John Watkins
Extension Plant Pathologist

Starch: renewable pesticide protection

Researchers have found that ordinary laundry starch on regular cotton clothing protects pesticide applicators from many harmbul chemicals. Starch binds with most chemical pesticides and keeps them away from the skin until the clothing can be washed. It is biodegradable, inexpensive, and familiar to most consumers.

Cotton and cotton-polyester garments that have been starched provide a durable finish that traps pesticides and prevents their transfer to the skin, and allows moisture vapor to be transported away from the skin. The starch-bound chemicals are rinsed away in the wash.

Remember, however, that it is important to always wear the appropriate protective clothing when applying chemicals.

Rose Marie Tondl
Extension Clothing Specialist

Selecting cultural practices to control crop pests

This article is the first in a series of three reviewing the range of cultural practices useful for crop insect pest management, beginning with planting and harvest dates and variety maturity.

Various decisions related to crop production such as planting date, variety selection, crop rotations, cultivation, and harvest dates may influence the severity of insect problems. These cultural practices are an important part of insect pest management, and can contribute to reducing serious outbreaks of many insect pests.

Cultural practices and plant resistance are generally compatible with biological controls. Together they form the foundation for nonchemical insect control in integrated pest management systems.

Plant growth stages vary in their susceptibility to different pests, and pests may prefer certain growth stages upon which to feed or lay eggs. Planting date, variety maturity, and harvest date may influence the degree of damage from certain pests. For example, first generation European corn borer moths prefer to lay their eggs on the taller corn in an area, and these later growth stages are more favorable for corn borer larval survival, thus early planting may result in more damage from first generation corn borers.

Earliest planted soybeans are most at risk from adult bean leaf beetles, which are active early in the season, and capable of searching out first emerging soybean fields to colonize.

Planting dates have been used for a long time to managae Hessian flies. Fly-free dates have been established to guide fall planting dates, based on the seasonal occurrence of Hessian fly adults. Planting after the fly-free dates avoids much of the fall egg-laying by Hessian flies.

Harvest date can be an important factor in management of alfalfa weevil. If economically threatening levels of alfalfa weevils are present, and the crop is close to the bud stage, early harvest can be an effective control for larval alfalfa weevils. The lack of food and hot, dry conditions after harvest can cause considerable mortality to the weevil larvae. Some additional examples of pests influenced by planting dates and variety maturity in Nebraska crop production are shown in Table 1.

Bob Wright, Extension Entomologist, South Central Research and Extension Center, Clay Center

Table 1. *Possible effects of planting date and variety maturity on several crop insect pests*

European corn borer	Early planting of corn increases risk from first generation corn borers. Late planting increases risk from second generation corn borers; plants in green silk stage during moth flight are most attractive for egg laying
Bean leaf beetles	Earliest emerging soybeans are most at risk from adult feeding.
Hessian fly	Wheat planted before fly-free dates in fall is most likely to be infested.
Corn rootworms	Earliest silking fields are most at risk from silk clipping by rootworm adults. Late silking corn may attract rootworm beetles from nearby fields in brown silk stage, resulting in more eggs being laid in late maturing fields.
Western bean cutworm	Least mature corn in an area is most at risk from egg laying by moths; moths are most attracted to corn at beginning tassel.

Don't ignore stored grain management

Don't forget to monitor stored grain and run the dryer as necessary to maintain quality. If the grain is not frozen and will be fed by June, aerate only as needed to control "hot spots" and heating problems.

If the grain is frozen, thaw by moving a warming zone completely through the grain as soon as outside air temperatures remain above freezing.

Check the grain temperature and condition at least every two weeks and as needed to monitor warming zone progress.

It may seem counterproductive to warm grain in the spring after cooling it down in the fall. In fact, there is little reason to warm the grain if it is to be marketed or fed by May. One exception is that frozen grain should always be

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Banding herbicides

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When selecting the correct nozzle size for banded applications, it's critical to calculate using the band width rather than the nozzle spacing on the boom. If multiple nozzles are used in a band, divide the band width by the number of nozzles per band. This assures the correct flow rate for each nozzle.

$$\text{Broadcast GPA} = \frac{\text{(Band GPA x Row Spacing)}}{\text{Band Width}}$$

4. *Determine Required Nozzle Discharge.* Determine nozzle discharge, in gal/min (GPM), based on travel speed (MPH), nozzle spacing (inches), and broadcast GPA.

$$\text{GPM} = \frac{\text{(MPH X Spacing X GPA)}}{5940}$$

5. *Select Proper Nozzle.* Consult a nozzle manufacturer's catalog to choose a nozzle that most closely meets the GPM requirements from Step 4 in the range of 15-30 psi. Generally, even flat fans give the best coverage. The nozzle should be mounted at a height that gives correct band width.

6. *Calibrate the Sprayer.* After thoroughly flushing the system, install screens and nozzles. The system can now be calibrated using the Ounce Calibration Method, as described in NebGuide EC87-728, adjusting system pressure until the collected discharge equals the desired broadcast volume.

Bobby Grisso
Extension Engineer

Water supply levels good in Platte River system

As the spring planting season approaches, it's time to examine water availability for irrigators dependent on the Platte River system. The following water supply summary was compiled by the United States Department of the Interior Bureau of Reclamation as of Feb. 1.

Colorado, Montana, and Wyoming reported above average temperatures with below to far below average precipitation for each month since November. Snowpack in Montana east of the continental divide ranged between 60% and 90% of average. Snowpack ranged from 58-103% of average in the Wind and Bighorn basins of Wyoming.

The monsoonal rains during the 1993 growing season reduced irrigation demands for the second consecutive season in Nebraska. In fact, many reservoirs throughout the High Plains region have storage levels within their flood control pools. Reservoirs in North and South Dakota have been releasing water to evacuate storage in anticipation of spring runoff.

In Montana and Wyoming, Feb. 1 storage levels ranged from 96% of average at Bighorn reservoir to 183 percent of average at Fresno Reservoir. In eastern Colorado, the Feb. 1 storage levels ranged from 68% of average at Pueblo reservoir to 128% of average at Horsetooth Reservoir. In the North Platte river basin area, Pathfinder Reservoir registered 68 percent of normal, while Guernsey reservoir was 206% of average. In the Nebraska-Kansas project area, Cedar Bluff reservoir reported 67% of normal, while Webster reservoir was 312% of average.

Forecasts for the April-July runoff volume forecasts on Feb. 1 were 56-83% of average for reservoirs in Montana and Wyoming, 77% to 120% of average for reservoirs in the Colorado-Big Thompson area, and 64% to 123% in the North Platte river basin. Although current snowpack and winter climatic conditions in Montana and Wyoming resemble conditions during the 1988-1992 drought, it is expected that the majority of water users will receive a full supply in the spring/summer of 1994.

Al Dutcher, Climatologist
Agricultural Meteorology

Maintaining stored grain

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thawed before being handled in warm weather. Operate aeration fans continuously when thawing frozen grain to prevent freezing of condensed moisture on the grain.

Since average outside air temperatures change at the rate of 2.5 to 3°F per week, move one warming zone per month through the grain to maintain uniform grain temperatures and to warm the grain to 60°F in preparation for summer storage. This temperature is cool enough to slow insect activity, yet warm enough to minimize condensation if the aeration fans need to be operated to control localized heating in the bin. Fans should be operated continuously for each successive warming zone.

Dave Jones, Engineer
and Bobby Grisso, Extension Engineer
Biological Systems Engineering