Reduce nitrogen and maintain yields; multi-plot research results show the thresholds

While you can't lower the price of anhydrous ammonia, you can manage your fertilizer application to avoid paying for nitrogen the crop won't use. The University of Nebraska has an extensive database of nitrogen field research and demonstrations where various nitrogen rates have been applied to corn and the yields have been measured. These studies can help producers make more informed decisions on nitrogen application.

Through 20 years of on-farm testing, NU Institute of Agriculture and Natural Resources scientists have developed a specific method for determining optimum nitrogen rates for corn. There always is some yield variation, but the data is fairly consistent throughout Nebraska.

The NU recommendations put producers very close to maximum yields, but at nitrogen rates that are 30 to 50 pounds per acre less than what many farmers apply. At today's prices, the savings easily could add up to more than $10 per acre.

Using a realistic yield goal is part of the recommendations. Use a five-year average plus 5%. Our research shows that many farmers use a yield goal higher than that, but fail to reach the yield goal 50% of the time.

NU recommendations indicate that applying 75% to 80% of what was previously applied may actually be the most profitable option, especially at today's nitrogen prices.

When fertilizer prices fluctuate, nitrogen use can be increased or reduced accordingly. Research shows that when corn is $2 per bushel and nitrogen is less than 13 cents per pound or $210 per ton of anhydrous ammonia, it is profitable to add 50 pounds of nitrogen to NU's recommended rate. However, when anhydrous ammonia prices rise above 22 cents per pound of nitrogen or $364 per ton, it is profitable to reduce the recommended rate by 50 pounds. This analysis doesn't include application costs.

Using data from 35 nitrogen demonstrations on sandy soils, average yields were 156 bushels per acre when the total nitrogen applied

(Continued on page 3)

Welcome Back!

If you haven't resubscribed to Crop Watch for 2001, resubscribe now. Use the form on page 8 so you don't miss an issue.
Welcome Back to *Crop Watch*

This is the first issue of the 2001 publication season for *Crop Watch*. Readers who subscribed in 2000, but not yet in 2001 are receiving this issue and a special notice about subscribing.

Extension specialists in the NU Institute of Agriculture and Natural Resources who contribute stories have identified several special issues as well as core topics -- timely information on crop production and pest management -- to be covered in this year’s 26 newsletters.

**Speakers to address check-off programs**

The future of producer check-off programs will be the featured topic on the March 7 web broadcast of “What’s Shaping the Markets.” The Cooperative Extension program will be live from 3 to 3:45 (CDT) on the University of Nebraska Rural Routes web site (ruralroutes.unl.edu) and will be archived for viewing after 5 p.m.

“The defeat of the pork check-off program has sent ripples through the other check-off operations,” said Jim Kendrick, NU marketing specialist emeritus and host of the program.

“The check-off programs play key roles in market development and research of their commodities; however, there is certainly dissatisfaction among some producers,” Kendrick said. “We’ll talk about the issues and what is or can be done to help producers with marketing and developing better crops and livestock,” said Kendrick.

Appearing on the panel with Kendrick will be Sally Atkins, executive director, Nebraska Beef Council; Vic Bohuslosky, executive director, Nebraska Soybean Board; Steve Cady, executive director, Nebraska Pork Producers Association; Roy Frederick, NU public policy specialist; and Don Hutchens, executive director, Nebraska Corn Board.

Of those responding to last year’s readership survey, 82% said they had changed a practice because of recommendations in the newsletter. They also reported reducing costs due to these changes.

The newsletter is available in print and on the Web at cropwatch.unl.edu To order a print subscription, use the form on page 8.

For more information about the newsletter, contact me at (402) 472-7981 or by Email at ljasa1@unl.edu

Lisa Jasa, Editor

**Field update**

Paul Hay, Extension educator in Gage County: Hay supplies in southeast Nebraska are getting tight. Hay stored inside is keeping well with little loss except for rodent damage or leaky roofs. Outside storage losses on hay older than two years may be 50% or more.

Farmers to report on their research

On-farm research with teams of farmers, agribusiness, and University Extension specialists is providing essential information for other farmers. Currently 34 farmers in Butler, Cass, Dodge, Lancaster, Otoe, Saunders and Washington counties are participating in the Nebraska Soybean and Feed Grains Profitability Project (NSFGPP).

Results from 17 research trials conducted in 2000 will be discussed at the NSFGPP annual meeting March 12 at the Agricultural Research and Development Center near Mead. (Topics and cooperators are listed on the *Crop Watch* web site.) The meeting, which is open to the public, will begin at 9 a.m. and conclude mid-afternoon; registration is required to provide a lunch count. The program also will be available via satellite. During the luncheon Dr.

(Continued on page 3)
Reducing nitrogen
(Continued from page 1)

was 50 pounds less per acre than recommended. At the recommended rate, yields were 162 bushels, and at 50 pounds more than recommended, the yields were 165 bushels. Other researchers have found similar results in other areas of the state. (Many of these demonstration sites were on irrigated fields which may have had high nitrate levels. If your field situation is different, adjust the recommended rate accordingly.)

Reports indicate anhydrous ammonia supplies are limited and the cost of nitrogen, if available, will be near the point where reducing nitrogen by 50 pounds per acre from the recommended rate will be profitable. If prices rise to 30 cents per pound of nitrogen, use 75% of the university’s recommendation for nitrogen, then monitor the crop and add more nitrogen by side-dressing if deficiency symptoms appear.

For more information, see the NU Cooperative Extension NebGuide, Fertilizer Suggestions for Corn, G74-174-A.

Charles Shapiro, Extension Soils Specialist, Northeast REC

Farmer research
(Continued from page 2)

Darrell Nelson, dean and director of the UNL Agricultural Research Division, will discuss research being conducted by the Institute of Agriculture and Natural Resources.

The Nebraska Soybean and Feed Grains Profitability Project is in its 10th year. To view research results or learn more about the program and how to participate in it, visit the NSFGPP web site at on-farmresearch.unl.edu/ or contact Extension educators Keith Glewen, Saunders County, at (402) 624-8030 or Dave Varner, Dodge County, at (402) 727-2775. To register for the March 12 meeting, contact the ARDC by calling (402) 624-8000.

Test soils for nitrates; adjust application rate accordingly

A positive outcome of last year’s heat and drought appears to be an increased rate of soil mineralization, potentially increasing the amount of soil nitrogen readily available to plants. Mineralization is a term used to describe the conversion of organic forms of nutrients, which are not available to a plant, to inorganic forms that the plant can use.

University of Nebraska Cooperative Extension technologists working on the Wellhead Area Protection Project (WAPP), an irrigation and nutrient management demonstration project funded by the Nebraska Department of Environmental Quality, the Upper Big Blue NRD and the Little Blue NRD, are finding increased soil residual nitrate-nitrogen in soil samples from demonstration fields. Crop consultants and soil testing labs in central Nebraska also have reported increased soil residual nitrate-nitrogen levels.

Many of the fields showed levels of residual nitrate-nitrogen twice as high as last year, and some were four times as high. These increases, however are not necessarily typical of Nebraska as a whole. The nitrate levels in soil samples submitted last fall by farmers from across the state varied widely. Levels ranged from 13 lb/ A to 240 lb/ A of nitrate-nitrogen available for the 2001 crop. These broad variances further reinforce the need for accurate soil testing when calculating nitrogen credits and the need for purchased nitrogen.

Soil testing

For most soils, the soil sample should be taken down to three feet, unless crop-rooting depth is limited due to soil conditions such as coarse sand or a high water table. In these cases a minimum depth of two feet may be appropriate.

Once the residual nitrate-nitrogen content of the field is known, a nitrogen credit can be determined. The following example is based on results from a WAPP demonstration site in south central Nebraska. The residual nitrate-nitrogen credit, derived from a three-foot soil sample, indicated there was 100 pounds of nitrogen per acre already available for the 2001 crop. These broad variances further reinforce the need for accurate soil testing when calculating nitrogen credits and the need for purchased nitrogen.

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Testing
(Continued from page 3)
nitrogen soil lab analysis will be
approximately $0.20 per acre. This
results in a net value of $19.60 per
acre. (Actual costs for taking the
samples in fields are not included.)

If a soil sample is not taken, a
default value of 32.4 pounds per acre
is assumed.

Soil analysis
For more information on taking
and submitting soil samples and for
soil sample boxes and information
sheets, contact your local Coopera­tive Extension Office. Samples
can be submitted to any certified lab,
including the University of Nebraska
Cooperative Extension Soil and Plant
Analysis Laboratory. Mail samples
to 139 Keim Hall, University of
Nebraska, Lincoln, NE 68503-0916.
The NU Lab also can be reached by
phone at (402) 472-1571; fax: (402)
472-1396; or by Email at
SPAL@unl.edu

For more information, the
following publications are available
in print from your local Cooperative
Extension Office or on the web:
• Guidelines for Soil Sampling,
G91-1000 (Web address: http://www.ianr.unl.edu/pubs/soil/
g1000.htm)
• Soil Sampling for Precision
Agriculture, EC154 (Web address:
http://www.ianr.unl.edu/pubs/soil/ec154/ec154.html)

Mick Reynolds, Extension
Technologist
Kim Peterson, Communications
Coordinator
South Central REC

Soil sampling for nitrogen

Soil test results are only as
good as the sample. Following are
a few tips for getting the most
accurate results.

1. Take a sample from a
depth of two to preferably three
feet.

2. Composite five to ten soil
cores when testing for nitrate. The
sample should not represent more
than 20 acres.

3. Separately sample dead
furrows, alkali spots, terraces,
fertilizer bands or field that have
been limed or managed differently.

4. Air dry dry samples for at
least 24 hours before sending
them to the lab. (Spread the soil
out in a thin layer on a piece of
paper or plastic, being careful not
to contaminate the sample.)

5. Wrap the sample securely
for mailing and place it in a
sealed box available from your
local Cooperative Extension
Office. Be sure to include an
envelope with the fee and com­
pleted sample information sheet.

Take credit for residual nitrogen

To determine the most efficient
fertilizer nitrogen rate for your field:

1. Calculate the total amount of
nitrogen needed, based on a five-year
average yield.

2. Take full credit for available
nitrogen. Evaluate and subtract
nitrogen available from the soil,
irrigation water, manure, and
legumes from total amount needed.

3. Use NU worksheets to
estimate actual amount of purchased
nitrogen needed.

Soil

Soil nitrogen is available to the
crop from two pools, residual soil
nitrate and nitrogen mineralized
from organic matter. Residual nitrate
will remain in the soil from previous
years’ fertilization as well as from
mineralized soil organic matter.

Nitrate is soluble and mobile in
soil and will be distributed through­
out the root zone. Sample to a depth
of three feet. Since nitrate is mobile,
excessive precipitation after the soil
sample can reduce the amount of
nitrate available.

Nitrogen also will be mineral­
ized from soil organic matter.
Mineralization rates are influenced
primarily by temperature, moisture
and the amount of organic matter.

Irrigation water

Sample and test groundwater
samples for nitrogen. The amount of
nitrogen available depends on the
nitrate concentration in the water
and the amount of irrigation water
expected to be applied.

Manure

Livestock manure can be a major
source of nitrogen; however, the
nitrogen content of manure is highly
variable and can deviate widely from
book values. To estimate the amount
of nitrogen actually being applied,
have a representative manure sample
analyzed for ammonium and total
nitrogen, and calibrate the applicator
accordingly.

To get complete use of the
manure nitrogen, it’s necessary to
incorporate the manure during

(Continued on page 5)
Irrigating corn with high-nitrate water

Field work was completed in the fall of 1999 on a three-year study in the central Platte Valley, comparing corn production under irrigation with either high-nitrate or zero-nitrate water. Research plots were located on a Hord silt loam soil at the MSEA Water Quality Project site near Shelton. The research field had been cropped to continuous corn for 15 years or more. The research was directed by NU Biological Systems Engineer Darrell Watts, USDA-ARS soil scientist Jim Schepers and post-doctoral scientist Daneal Fekersellaisse.

Different concentrations of ground water nitrate were obtained by drilling irrigation wells into two aquifers. One well pumped from the shallow, nitrate-contaminated, sand and gravel aquifer (30 ppm nitrate-N) that provides most of the area’s irrigation water, while a second took water from the deeper Ogallala aquifer (0.1 ppm nitrate-N). Water was applied by surge irrigation to a series of quarter-mile long, eight-row strips. Furrow ends were blocked to retain runoff on the field as is customary in the area; however, a buffer area at the lower end of the rows assured that no runoff backed up into the research plots.

Three irrigation treatments included “adequate” irrigation with high-nitrate water, “excess” irrigation with high-nitrate water (to simulate typical practice in the area) and “adequate” irrigation with zero-nitrate water. The adequate irrigation was applied every-other-row with 2-3 inch amounts made according to crop needs. The excess irrigation was applied every-row, about every 10 days. Each irrigation treatment was subdivided into 150 ft-long N fertilizer treatments that ranged from starter-only to 170 lb N/ac. Nitrogen fertilizer was applied as sidedress NH₃ in 1997, and as preplant NH₄, with a nitrification inhibitor in 1998 and 1999. Starter was 3 lb-N/ac in 1997 and 1998. We added an additional 20 lb/ac in 1999.

The distinct combinations of growing season rainfall and spring residual soil N resulted in distinct growing environments each year.

The 1997 growing season began with about 55 lb/ac of residual N in the top three feet of soil. Rainfall was well below normal until August. This essentially eliminated early season nitrate leaching, allowing residual soil N and N mineralized from organic matter to meet most of the crop’s N requirement. There was no yield response to N fertilizer in either treatment using high-nitrate water, and no response to N above 80 lb/ac using zero-nitrate water (Fig. 1-A). There was no yield difference between adequate and excess irrigation with high-nitrate water.

Major differences were seen in residual soil N after harvest. The residual increased linearly with applied N, ranging from 20 lb/ac for starter-only to 80 lb/ac at the 170 lb/ac N rate for the zero-nitrate water and 35 to 125 lb/ac for the high-nitrate water. There was little difference in residual amounts between the two high-nitrate water irrigation treatments.

The 1998 season began with about 60 lb/ac of residual N. All N amounts above starter were reduced because of the lack of yield response the previous season. There was more rainfall during the early part of the season so that most residual N and N from early mineralization was leached below the shallow root zone of the young plants. The starter-only N treatment suffered a substantial N deficit through the six-leaf stage, resulting in significant yield loss. In the high-nitrate water treatments there was no yield response for N

(Continued on page 6)
Irrigating (Continued from page 5)

rates above 50 lb/ac, and no response beyond 100 lb/ac for the zero-nitrate water (Fig 1-B). There was no yield difference between adequate and excessive irrigation with high-nitrate water beyond the starter-only N treatment. Residual N amounts were smaller than in 1997, because of more early season leaching and reduced N fertilizer. Amounts ranged from 17 to 53 lb/ac for the high-nitrate water and 15 to 30 lb/ac for the zero-nitrate water.

In 1999 the experiment was placed on plots with only 15 lb/ac residual N, which in practical terms meant none available for the crop. Rainfall was much above normal during spring and early summer, resulting in a high rate of leaching of both N from mineralization and from preplant N. Although we applied extra starter N, there was major yield loss on the starter-only treatment for all irrigation treatments. In fact, we were unable to obtain maximum yield at any N rate for the adequate irrigation treatment using either zero or high-nitrate waters because of the loss of preplant N (Fig. 1-C). The limited amount of extra N from the adequate irrigation with high-nitrate water was insufficient to make up for leaching losses. In contrast, maximum yield was obtained with only 70 lb-N/ac under the excess irrigation treatment with high-nitrate water. While much of the excess irrigation water moved quickly through the root zone, the crop was able to extract enough additional N to meet its needs. After harvest residual N amounts were 15 to 25 lb/ac.

Conclusions

This study confirms that where irrigators are using high-nitrate water on medium to finer textured soils, N from irrigation water can replace part of the crop’s N needs. With 55+ lb/ac of residual N and limited to average early season leaching, the crop in our study was able to meet more of its N needs from residual N and mineralization than is usually assumed in calculating N fertilizer needs. Under these conditions and adequate irrigation with high-nitrate water, the amount of irrigation water N used by the crop ranged from 50% for starter-only to about 10% with 170 lb-N/ac. Uptake from excess irrigation was only 10-15% for fertilizer amounts above starter. This is because most of the water in excess of the moisture deficit drained from the root zone in two to three days. Excess irrigation was advantageous only in 1999 when much of the mineralized N was lost to early season leaching and there was essentially no residual N. In this case up to 50% of the N in the water was used by the crop when only starter N was applied; however, use efficiency declined linearly to 10% as N increased to 170 lb/ac.

Producers furrow irrigating on medium to fine textured soils with 25-30 ppm nitrate-N water are probably safe in reducing N fertilizer levels 10-20% below recommended amounts this year provided that residual N at planting time is 40+ lb/ac. If there is an extended rainy period any time before milk stage, they should be prepared to irrigate a wet field every 10-14 days to replace N lost to leaching. The key is to use high-nitrate water to replace N taken up by the crop or leached out of the root zone by rainfall. Under center pivot irrigation high-nitrate water can also reduce the N fertilizer requirement. However, most pivot irrigators will normally apply less water than furrow irrigators during the first six weeks of the irrigation season when corn is in the rapid N uptake period. While efficiency of N extraction from irrigation water may be higher under pivots, there will be less applied. N uptake from the water will decline to a low level if enough fertilizer N is applied to fully meet crop needs.

Darrell Watts
Biological Systems Engineer
Planning and placing Bt refuges in corn

Many Nebraska farmers have now had practical experience with Bt transgenic corn that they can rely on when planning their field plantings for this year. During the last few months, several issues concerning transgenic crops have been discussed in the press. One of the most recent issues is farmer compliance with resistance management requirements. A recent survey of corn growers across the Corn Belt found that 71% of farmers planting Bt corn fully complied with resistance management requirements. The survey also found that many of the 29% that did not fully comply did not do so out of disregard for the regulations, but because of a lack of knowledge.

There are several reasons that farmers should comply with resistance management requirements. First, and most importantly, compliance will slow the development of Bt resistant corn borers and preserve Bt as an effective pest management tool for the future. Second, compliance is part of the grower agreement when buying Bt transgenic corn seed. And finally, if the Environmental Protection Agency feels that compliance is not high enough, they could implement regulations to restrict the use of Bt corn.

Management strategies have been designed to prevent or at least delay the development of resistance. Corn borer larvae that feed on Bt corn are exposed to the Bt toxin at much higher levels than from use of foliar Bt insecticides, such as Dipel or M-Peril. Also, corn borer larvae are exposed to Bt toxin for much longer times when feeding on Bt corn. Under this high level of selection pressure, the threat of resistance development is high.

Resistance management for ECB and Bt corn revolves around the use of refuge plantings. A refuge is any ECB host plant (e.g. non-Bt corn, potatoes, and some weeds) not producing Bt proteins or not being treated with conventional Bt formulations. The purpose of the refuge is to supply a source of Bt-susceptible ECB that could mate with resistant ECB potentially emerging from nearby Bt corn. In current resistance management strategies the refuge must be non-Bt corn because other ECB host plants do not produce enough moths. Specific resistance management information will be a part of each corn seed bag label. Be sure and discuss resistance management with your seed dealer.

The resistance management requirements for 2001 are the same as last year:

1. On each farm, growers may plant up to 80% of their corn acres with Bt corn. At least 20% of their corn acres must be planted with non-Bt corn and treated only as needed with insecticides. Decisions to treat the refuge should be based on economic thresholds. Conventional Bt products (liquids or granules) must not be used on the non-Bt refuge.

2. Plant non-Bt corn refuge within, adjacent to, or near to the Bt cornfields. If the grower intends to treat the refuge it should be placed within 1/4 mile of the Bt field, if at all possible. In any case, the refuge must be placed within 1/2 mile of the Bt field.

3. If refuge is established as strips within a field (Figure 1E.), the strips should be no narrower than six rows.

4. If possible, locate refuge plantings in such a manner as to protect potentially vulnerable non-host insects (e.g. Monarch butterfly). Refuge plantings can serve as buffer zones between the Bt cornfield and the habitat of non-target insects.

Figure 1 presents some general within field refuge configurations.

Refuge considerations

- Linear blocks, brackets, or border refuge plantings (Fig 1A, B, and C.) are relatively easy to plant, treat, monitor, and harvest. They have the added advantage of acting as buffer areas between the Bt corn and non-target habitat or non-GMO cornfields.

- Strips (Fig. 1E.) have the advantage of providing susceptible ECB to all parts of the Bt field, but they also have several drawbacks. Strips cannot be treated separately from the Bt corn. Harvest may be difficult if non-Bt strips dry down differently than the Bt corn. Also, it is difficult to keep track of where the strip rows begin and end, so monitoring is more difficult.

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Bt refuges
(Continued from page 7)

- Do not plant strips narrower than six rows or mix seed. This increases the risk of resistance occurring because ECB larvae often move from plant to plant. Corn borer larvae that can survive eating small amounts of Bt (low level resistance or tolerance) can end up on a non-Bt plant and survive.

- The design for planting strips will depend on your planter. For example, dedicating three end row units of a 12-row planter will effectively give you a 25% refuge and maintain the 6-row strip size. If you have a 6-row planter you can achieve the 25%, 6-row minimum refuge by splitting the planter three units Bt, three units non-Bt and only strip 1/2 of the cornfield. Four-row or single-hopper planters are not suitable for this refuge option.

- The Bt-susceptible ECB from the refuge must be present at the same time as possible Bt-resistant ECB from the Bt corn. To achieve this the corn hybrid in the refuge should be agronomically similar (e.g. similar days to maturity) to the Bt hybrid, planted at the same time as the Bt field, and managed in the same manner as the Bt field. In this way the ECB moths will be equally attracted to the refuge and Bt cornfield.

- Using a neighbor’s cornfield as a refuge is not allowed because the hybrid selection, planting time, pest control, and other production activities are not controlled by the grower planting the Bt corn.

- Planting only non-irrigated pivot corners as refuge is not recommended because the corn plants in

\[\text{(Continued on page 10)}\]

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Crop insurance deadline March 15

Subsidies increased, yield option adjusted

The 2000 Agricultural Risk Protection Act provided for several changes in the crop insurance program, including increased subsidies and the ability to adjust or “plug” the actual production history (APH) for low yields. Producers have until March 15 to study the new options, consider how they fit into their total risk management plan, and make any changes in their crop insurance coverage.

For farmers who already have multiple peril crop insurance policies, coverage will continue into this year if no changes are made with their crop insurance agents.

Increased subsidies

The government-paid premium subsidies for crop insurance have been increased substantially, particularly at the higher coverage levels. The other significant change is that the subsidy level, as a percentage of the full risk premium, is now the same for both the regular yield-based APH multiple peril crop insurance (MPCI) and the Crop Revenue Coverage (CRC) at any particular coverage level. (See table for comparison of subsidy changes.) For example, for the 70% coverage level, after the full risk premium is calculated, 59% is deducted and the farmer pays 41%

The two most commonly purchased forms of crop insurance in Nebraska are multiple peril crop insurance and crop revenue coverage.

Multiple Peril Crop Insurance (MPCI) provides comprehensive protection against losses due to natural causes such as drought, excessive moisture, hail, wind, frost, insects, and disease, providing protection against low yields, poor quality, late planting, replanting costs and prevented planting.

Crop Revenue Coverage (CRC) — provides revenue protection based on price and yield expectations by paying for losses below the guarantee at the higher of an early-season price or the harvest price.

Actual Production History (APH): Each insured unit has its own yield for coverage purposes. This figure is based on a minimum of four years of actual production history and a maximum 10-year moving average of actual yields. A number of low yield years can reduce the production history and, hence, future coverage. Now producers can substitute a yield equivalent to 60% of the county yield for each year that the actual yields fall below that yield. This adjusted figure will then be used to calculate coverage. The true history using the actual yields will still be used to calculate the premium.

Prices for 2001

The prices used to calculate premiums and indemnities for the regular APH-MPCI program for this year are:

- Corn $2.05 per bushel
- Grain Sorghum $1.80 per bushel
- Soybeans $5.26 per bushel

The prices to establish the revenue guarantees for the CRC program are based on the February averages of the DEC futures contract for corn and the NOV contract for soybeans. Grain sorghum is 95% of the corn price. As this article goes to press, the corn price is about $2.45 and the soybean price is about $4.60. An official announcement of the prices will be made after March 1.

These prices set up an interesting relationship. The CRC price for corn is considerably higher than the APH price and the converse is true for soybeans. Since the advantage of the CRC program is to complement the forward pricing of the crop, growers should look closely at their marketing plan for corn and grain sorghum and how CRC could

(Continued on page 8)

### Change in crop insurance subsidy levels

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<th>Previous CRC</th>
<th>New law</th>
<th>Farmer payment</th>
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<td>38%</td>
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</tbody>
</table>
Poor germination, shortages plague soybean seed

Lots of heat and little water last summer means this year's soybean seeds are smaller and lower quality than usual. They're also in short supply. Farmers switching from corn to soybeans, which require significantly less nitrogen, could exacerbate the shortage.

In seed samples submitted by members of the Nebraska Crop Improvement Association for testing, the average germination was the lowest it's been in 20 years, said Steve Knox, NCIA field services supervisor. Most years, member samples have had germination rates above 90%, with 80% being the standard. This year the average germination rate was 70% to 75%.

"We have seen a huge range of germination percentages this year, from above 90% to as low as 30%," he said. "There are some good seed lots out there, but there is also some seed that will have to be discarded."

The smaller seeds typical of the 2000 crop also were more apt to be sorted out during processing, said Gary Cross, foundation seed manager for NU's Institute of Agriculture and Natural Resources. "This year we are seeing 25% to 30% cleanout compared to around 10% most years."

All these factors are contributing to a shortage of quality seed. "We have about half of the soybean seed that we planned to have available for sale this year," said Ken Anderson, a marketing manager with NC+ Hybrids. "We have lowered our germination standard from 90% to 85% to increase supplies and we are still short. Some other companies have even lowered the standards to 75% or lower."

Farmers considering a shift from corn to soybeans may be disappointed in the limited types of seed available. While the popular Roundup Ready beans may be sold out, conventional and STS varieties are still good options for Nebraska farmers, Knox said.

Crop insurance

(Continued from page 9)

provide a backstop to price grain before harvest. Soybean is a different situation with the APH price at $5.26 and the CRC price below the loan level.

Units

Growers typically prefer to have their insurance units as small as possible to maximize protection. With the CRC program, "enterprise" units are available which allow grouping all the acreage of a particular crop grown in a county to be aggregated together into one unit, regardless of the ownership or share situation.

The benefit is that a premium discount is offered for an enterprise unit. The discount is typically 10% to 20%, compared to the premiums for separate units. Growers need to look at their individual situations and compare the increased risk they assume with the enterprise unit compared to the reduced cost.

Doug Jose, Extension Farm Management Specialist

<table>
<thead>
<tr>
<th>Planting rates</th>
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<td>Planting rates will need to be adjusted to account for the smaller seeds and poorer germination. NU specialists recommended a planting rate of 150,000 live seeds per acre to have 100,000 mature plants per acre at harvest.</td>
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<td>&quot;It is also important to note that the germination percentage shown on the bag is from a warm germination test, not a cold stress test, so it may be a high estimate of the number of seeds that will germinate in cooler field conditions,&quot; said Jim Specht, an NU crop scientist.</td>
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<td>To find the correct planting rate, divide the desired number of live seeds per acre by the decimal equivalent of the germination percentage. For example, for seed that has 75% germination, divide 150,000 by .75. For 150,000 live seeds per acre with this seed, farmers would need to plant 200,000 seeds per acre.</td>
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<td>For more information, consult the Cooperative Extension NebGuide Soybean Seeding Rates, G99-1395.</td>
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<td>Heather Corley, Newswriter</td>
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<td>IANR News and Publishing</td>
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<th>Bt refuges (Continued from page 8)</th>
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<td>these areas are significantly different and less attractive to ECB moths than the corn under irrigation. Remember, the idea is to produce some Bt-susceptible ECB moths.</td>
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<td>• The closer the refuge is to the Bt field the better. This brings Bt-susceptible ECB in close proximity to any Bt-resistant ECB that may survive in the Bt cornfield. Female ECB generally mate close to where they emerge as adults, so having a refuge nearby increases the chances that susceptible ECB will mate with a resistant ECB.</td>
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<td>• You can combine refuge configurations to meet the required 20% refuge.</td>
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| Figure 2 (Page 8) shows two examples of how you might establish a refuge for a Bt cornfield. |
| Additional information on ECB management, resistance management, and Bt corn hybrids is available through your local County Extension Office. This information also is available through the UNL Entomology Department web site at entomology.unl.edu |
| Tom Hunt |
| Extension Entomology Specialist |
| Jerry Echtenkamp |
| Extension Technologist |
| Both at the Northeast Research and Extension Center |