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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

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No. 2003-23, September 19, 2003

Relay cropping offers economic benefits and reduces nitrate leaching from soils

Producers are continuously fine-tuning their production practices, seeking ways to use labor and capital more efficiently and increase profits while protecting the environment. This includes making better and more efficient purchasing decisions and developing improved marketing strategies to create more profit from their farming operation. The concept of relay cropping is not new, but is seldom used in Nebraska because of climatic limitations — a relatively short growing season and unpredictable precipitation events. If these obstacles can be overcome, the practice may have significant economic and environmental merit.

Relay cropping is essentially a special version of double cropping, where the second crop is planted into the first crop before harvest, rather than waiting until after harvest as in true double-cropping. In this way, both crops share a portion of the growing season, increasing solar radiation and heat available to each.

The rotation of corn grown for seed and soybean seems to be well suited to relay cropping because seed corn is harvested in mid-September (earlier than full-season field corn) and the remaining residue is not excessive. A winter annual crop, such as winter wheat, could be inserted into the seed corn-soybean rotation to use the solar energy and heat units available between corn harvest in September

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Grain price outlook meetings in eastern Nebraska

If you're watching the markets and USDA reports and trying to decide what to do with this year's harvest, check out one of the NU Fall Livestock and Grain Price Outlook meetings being held this month.

Inside

With a host of marketing and risk management alternatives available and the ever-changing fundamental supply and demand conditions, farmers and ranchers need to evaluate how various marketing tools and decisions will perform given current and expected prices.

These price outlook meetings will help update producers and agribusiness managers on current and projected supply and demand conditions expected to affect prices and marketing decisions for the new crop year, as well as price outlook and risk management strategies for livestock production in turbulent times.

Presenters will include Lynn Lutgen, extension grain marketing specialist; Darrell Mark, extension agribusiness management and marketing specialist; and Dillon Feuz, extension livestock marketing specialist.

The programs are free and sponsored by the University of Nebraska Cooperative Extension and Department of Agricultural Economics. For further information, contact your local county Extension office.

The schedule of remaining programs in the series follows:

Sept. 22, 9:00 a.m. – Ag Auditorium, Hamilton County Fairgrounds, Aurora

Sept. 22, 1:00 p.m. – Merrick County Fairgrounds 4-H Building, Central City

Sept. 23, 7:00 p.m. – Saline Center Hall*, rural Saline County

Sept. 24, 1:30 p.m. – Lancaster County Extension Office, Lincoln

Updates

Paul Hay, Extension Educator in Gage County: Early harvest in the area shows 0-70 bushel per acre corn with average fields at 35-45 bushels per acre. Rains helped some beans, but half of the fields were yellow by then. It appears that alfatoxin levels will be less than last year, but there are lots of surface molds on dryland corn fields.

Keith Glewen, Extension Educator in Saunders County: High moisture dryland corn yields have been reported at 75-130 bushels per acre. Recent heavy rains will have a positive impact on maturity group 3 soybeans and less impact on earlier maturing beans. There has been more interest in seeding wheat this fall than in previous years. Dryland corn and soybean yields will be highly variable this year, depending on location of the field and area within the field.

Gary Zoubek, Extension Educator in York County: Finally, we've received an area-wide measurable rainfall event. The York area received 3-6 inches of rain last week and not much ran off! It will be of some benefit to the late season corn and soybeans as well as the pasture and alfalfa. Hopefully it's only the start of more to come! Producers are harvesting some of the seed corn and pulling gated pipe.

Del Hemsath, Extension Educator in Dakota, Dixon and Thurston counties: These counties received 4 to 7 inches of rain from September 16 to 19. Most of the rain came a little too late for the dryland corn as the crop had already been determined. The later maturing soybeans as well as soybeans which still have green stems will benefit greatly. A majority of the beans are dropping leaves and a few fields are close to harvest. Corn silage was being harvested from fields as a salvage operation for some and as a planned crop for others. That process will be delayed for about a week. The irrigated corn and soybeans look great and should have excellent yields. Pastures were grubbed down to the ground in some areas so they will benefit from the rain and gain some water in the soil bank for next year.

Loren Giesler, Extension Plant Pathologist: In addition to the resources on grain molds and mycotoxins listed in the Sept. 5 *CropWatch*, a videoconference taped in 2002 is also available. In it specialists from the University of Nebraska, Nebraska Department of Agriculture, and the Lincoln Grain Inspection Service explain how mycotoxins develop and address the regulations, sampling, testing, and management of grain containing mycotoxins. The videoconference is available for viewing on-line at *http://g2.unl.edu:8080/ramgen/programs/mj/mycotoxin.rm.* You will need to use Real Player to view it. (Real Player is available free at *http://real.com*) Note that the Sept. 5, 2003 *CropWatch* has updated information regarding blending.

The latest **Pesticide and Noxious Weeds Newsletter**, published by the Nebraska Department of Agriculture, has been posted to the Web at *http://www.agr.state.ne.us/division/bpi/pstnx/news7.pdf* It includes a story on EPA's reregistration eligibility requirements for atrazine, water quality monitoring, and more. The following brief was reprinted with permission from the newsletter:

National Pesticide Information Center: Do you have questions about pesticide safety? Need information on the physical properties of a pesticide? Need an MSDS sheet? New pesticide manufacturer contact information?

Get objective, science-based chemical, health and environmental information about pesticides at the National Pesticide Information Center (NPIC). The toll-free phone line is open from 8:30 a.m. to 6:30 p.m. (CT) at 800-858-7378. Information and links also are available on their web site at *http://npic.orst.edu.*

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Relay cropping (Continued from page 213)

and soybean planting in May. However, winter wheat is not harvested until mid-July -- far after the optimum time to plant soybean. Hence the need to relay crop the winter wheat and soybean in this seed corn-winter wheat-soybean crop sequence. For successful relay cropping, several things would usually be necessary in Nebraska: center-pivot irrigation, glyphosate-tolerant soybeans, and a means of seeding soybeans into wheat at heading (about 30 days before wheat harvest).

System pros and cons

Relay cropping has advantages and disadvantages compared to standard cropping practices. Advantages include the potential to reduce nitrate leaching (wheat acts as a scavenger crop), increase carbon sequestration, and increase income for producers. Unfortunately, a relay system is not without risk. The soybean planting process will likely stress the wheat crop and reduce yield from what would be expected of a non-disturbed crop. Likewise, wheat harvest may stress the soybean crop. The hope is that the two crops will result in greater income (and profit) than either single crop grown without disturbance.

Lastly, relay cropping requires a greater level of management. Wheat must be planted during the soybean and corn harvest season and planting soybean into a standing crop is a new process to most farmers. Also, pest management and control practices must account for more crops being grown in close sequence. The system may not allow time for herbicide carry-over levels to decline and may increase the potential for insect and disease infestations if these pests have more than one host in the crop sequence.

Current relay cropping research

A team of USDA-ARS researchers at the University of Nebraska-Lincoln is conducting a relay cropping trial in cooperation with several producers in south central Nebraska. This evaluation was started in 2002 with 150 acres in cooperation with one farmer, and was expanded to about 1,500 acres with four cooperating farmers in 2003. First year results with the seed corn-wheat-soybean rotation showed that the wheat crop yielded 68 bushels per acre and removed 130 lb nitrogen per acre from the soil (about 90 lb nitrogen per acre in grain) that could have leached beneath the root zone. The wheat produced about 2 tons of residue per acre, which will help build soil organic matter content and control erosion. In addition profit increased by about $100 per acre. This was even after accounting for a 15% reduction in soybean yields (which averaged 55 bushels per acre).

Wheat yields in 2003 ranged from 55 to 75 bushels per acre. In many areas, the yield monitor showed yields may have exceeded 90 bushels per acre. Producers observed that the isolation areas around the perimeter of seed fields (about 90 feet wide) sometimes yielded up to 20% more than in the bulk field where seed corn was previously grown. These isolation areas were planted to wheat, soybean, or sorghum the previous year. Reasons for greater wheat yields in the border areas are unknown, but could hold the key to enhanced production and profitability from rela -cropping. Possible explanations may include herbicide carryover after seed corn, nitrogen immobilization by the corn residue, seedbed and planting differences, different levels of residual nitrogen (nitrate-N) in the bulk field compared with the border area, and disease interactions. Producers noted that plants in the border areas were more vigorous in the early growth stages and more erect at harvest.

One example of relay cropping

Two 10-inch rows of wheat were planted between two rows of seed corn planted on 30-inch centers. Wheat was seeded between the corn rows in late September after the seed corn was harvested. The beans were seeded in late May on top of the old corn rows (thus in 30-inch rows). A tractor with narrow tracks was used to seed soybeans, and the wheat was cut about knee high to avoid clipping off the tops of the beans. The 20-inch spaces between the wheat rows where the soybeans were planted allowed more sunlight to penetrate to the beans and the narrow tracks didn't disrupt the wheat canopy.

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Relay cropping (Continued from page 215)

Nutrient management

Judicious nutrient management is critical to help reduce environmental effects of excess crop nutrients in the soil and maximize profit. Nutrient management is an important component of the relay cropping system. Each crop has different requirements although it may not be convenient or economical to apply nutrients to each crop. Excess nitrate can leach into groundwater while phosphorus can be carried in runoff to surface water where excess levels can enhance algae growth, and in turn reduce oxygen for fish and other aquatic organisms. For the same yield level (60 bushels per acre), each crop removes a different amount of each nutrient in grain (*Table 1*). Soybean removes the greatest amounts of all three nutrients since concentrations of nitrogen, phosphorus, and potassium are much greater than with the other crops (*Table 2*). Nitrogen, phosphorus and potassium applications are recommended when the soil test levels fall below the critical level (*Table 3*). Potassium is usually very high in Nebraska soils and only a few soils would require more. Nitrogen is not normally applied to soybean. All three crops would require adding phosphorus if the soil test level falls below the critical level. The recommended amount of phosphorus applied for each crop is lower than the crop removal since soil provides some of the phosphorus needed for each crop.

Corn hybrids

It may be possible to use short-season corn hybrids instead of seed corn in this relay cropping system. The challenge is to harvest corn early enough (by mid-September) to allow timely planting of wheat or similar winter annual crops. Other challenges of using corn hybrids include residue management, the mechanics of planting wheat into the large quantity of residue produced by hybrid corn, and the possibility that short-season hybrids would produce less grain than full season hybrids, complicating the economics of the relay system.

Winter cover crop after soybean

Soybean fields typically lay idle after harvest until corn is planted in mid to late April. This could be an opportune time to grow a winter cover crop if there are economic or environmental reasons to do so. Soybean is a good scavenger crop for residual soil nitrogen, so the risk of nitrate leaching would probably not provide a strong environmental incentive; however, a winter cover crop would protect soil susceptible to erosion with the limited residue remaining after a soybean crop. Producers with livestock might find the production of triticale (a cross between wheat and rye) a worthwhile alternative for grazing or green-chop.

Further research

The USDA-ARS team is conducting further studies on various components of the relay cropping system. In one study at the Management System Evaluation Area (MSEA) site southwest of Shelton, they are evaluating the yield potential of short season hybrids. Use of short-season hybrids may allow producers without seed corn contracts to try the corn-winter wheat-soybean relay cropping system by permitting timely planting of the winter annual crop. Another study was initiated to assess the ramifications of terminating full-season corn hybrid growth before physiological maturity with glyphosate to allow early harvest so

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Table 1. N, P, and K removal in grain of corn, soybean, and wheat all at 60 bu/acre yield.

Crop	*N*	P_2O_5	K_2O
	lb/acre		
Corn	44	21	14
Soybean	213	51	63
Wheat	77	32	29

Table 2. Typical N, P, and K concentrations in grain of corn, soybean, and wheat.

Crop	*N*	*P*	*K*
	lb/acre		
Corn	1.30	0.27	0.35
Soybean	5.90	0.62	1.45
Wheat	2.15	0.39	0.67

Table 3. Critical soil nitrate, P and K levels above which the University of Nebraska recommends no fertilizer application for each crop.

Crop	*Nitrate to 3 ft soil*	*Bray P to 6 in*	*K to 6 in*
	ppm		
Corn	25	15	125
Soybean	—	10	125
Wheat	15	25	125

Relay cropping

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that a cover crop can be planted earlier and again permit timely planting of the winter annual crop.

Producers cooperating in the relay cropping research project this year are: Paul Gangwish, Shelton; Curtis Rohrich, Wood River; David Brown, Wood River, and Gary Urwiller, Ravenna.

Scientists from the USDA-ARS working on this project, their areas of specialty, and how to contact them:

Jim Schepers, general concept information; 113 Keim Hall, UNL, Lincoln, NE 68583; (402) 472-1513; email: jschepers1@unl.edu;

Bahman Eghball, nutrient and manure management, 121 Keim Hall, Lincoln, NE 68583; (402) 472-0741; email: beghball1@unl.edu;

Dennis Francis, general information and crop sensors; 113 Keim Hall, Lincoln, NE 68583; (402) 472-8494; email: dfrancis1@unl.edu;

John Shanahan, crop stress detection; 110 Keim Hall, Lincoln, NE 68583; (402) 472-1511; email: jshanahan1@unl.edu and

Wally Wilhelm, plant physiology, 117 Keim Hall, Lincoln, NE 68583; (402) 472-1512; email: wwhilhelm1@unl.edu.

Tips for adapting relay cropping with wheat

If you're thinking about trying a relay-cropping system on your farm, UNL researchers offer several tips:

1. Start with a small trial so you can learn the ins and outs of the system with minimal risk. If it performs well in your operation, the number of acres can be expanded the second year.

2. If you're wondering what wheat seed to buy for a trial, Stephen Baenziger, UNL wheat breeder, says several would work well, including: Wesley and Millennium. (The latter probably would crowd out the soybeans with its height, but it would allow a higher combine cut if needed.) Cougar, which looks a lot like the old Thunderbird, also would work, mainly because it is very erect and would allow more light to enter the lower canopy.

3) When planting wheat, don't forget to follow the recommended wheat planting dates to avoid Hessian Fly problems (see the Aug. 22 *CropWatch* for recommended planting dates across the state).

4) The crop insurance deadline for winter wheat is **Sept. 30, 2003**. Talk with your crop insurance specialist regarding your plans, the planting deadline for insurance purposes, and the penalty for planting after the deadline.

5) Keep records throughout the trial year so you can make adjustments in future years.

6) Compare notes and talk with other producers using relay-cropping. To this end, the team of USDA-ARS researchers has invited individuals to share information about their relay cropping experiences with the team. They will compile an electronic and hard copy of this information. To share information, contact one of the specialists listed at left.

Grazing low-yield corn often economical

Grazing standing corn instead of combining the grain may sound a little crazy, but it may offer some sound economic benefits this year. In some cases, steers are gaining over two pounds per day for less than 35 cents per pound and corn yielding only 40 to 50 bushels per acre is providing up to 150 cow-days of grazing per acre.

Grazing corn saves money — money you spend to harvest, dry, store, transport, handle, process, and feed the grain is all left up to the animals to do for you. All that plus no daily yardage fees or manure handling.

This method will require some changes in management, however. Cross-fencing with electric fence is needed to minimize trampling, so train animals to respect an electric fence before turning them out. Then limit animals to no more than a two-day supply of fresh feed at a time. Driving over a strip of corn before placing the fence in the strip makes it easy to set up and helps cattle see where the fence is. Also, animals not adapted to grain feeding may need a few days to slowly get used to it to avoid problems like acidosis.

Determining how much grain to feed and how much of the field to make available requires observation and adjustment. Yearlings should clean up the grain but eat only a little stalk. Dry cows should be forced to clean up almost everything. Adjust area size each time you move fence, based on corn supply and cattle. Cows need no protein; steer gains should range between two and two and one-half pounds per day with one pound of protein supplement daily.

Bruce Anderson
Extension Forage Specialist

Thorough bin and equipment cleaning can help protect your stored harvest

Cleaning and treating your grain bins is one of the first steps in preparing for harvest and protecting your crop investment. Remember that grain harvested in Nebraska is essentially insect-free, but can become infested by storage insects, which originate in or around the bin or in contaminated equipment such as combines and grain augers. Following are some tips on how to prepare bins and equipment to ensure that insect problems are minimized.

First, be sure to store sound, clean, dry grain. It may be advisable to screen out broken grains, trash and fines to increase the quality of the final storage product. Also, eliminating trash will enhance fumigation, should this procedure be required later.

Since stored grain insects can invade new grain from infested harvesting and handling equipment (combines, augers, etc.), cleanup is essential. Carefully remove all traces of old grain from combines, truck beds, grain carts, augers, and any other equipment used for harvesting, transporting, and handling grain. Even small amounts of moldy or insect-infested grain left in equipment can contaminate a bin of new grain. Then clean grain bins thoroughly, disposing of spilled, cracked and broken grain and grain flour, along with the insects feeding on such material. A simple broom and a vacuum cleaner are essential pieces of equipment in cleaning grain bins.

"How clean is clean enough?" is a question many producers ask. A good rule of thumb to follow when cleaning bins and equipment is: If you can tell what was stored or handled last season by looking in the auger, bin, or combine, it is not clean enough to prevent re-contamination of the new crop.

Around the bins, be sure to remove old equipment, junk and clutter to reduce attractiveness to insects and rodents. Make sure that the bin is insect and rodent-proofed by plugging holes, sealing bins, caulking and making general repairs. Grain spilled near the bin attracts insects and draws mice and rats. Clean up and dispose of any spilled grain several weeks prior to harvest. If rats have tunneled under foundations, use baits or traps to reduce or eliminate them. Tall weeds can harbor insects and provide cover for rodents. Mow around the bin site to remove tall grass and weeds to reduce the potential for insect and rodent infestation. If necessary, re-grade the site so that water readily drains away from bin foundations. You can't always wait for the soil to dry before loading or unloading grain from bin sites so make certain that travel lanes have enough rock or gravel to bear the weight of heavy trucks and grain carts.

Landscaping should be maintained well away from grain storage facilities. Leave a 4-foot wide strip of bare gravel around the perimeter of storage bins. If you buy old crop grain for storage with newly harvested grain, watch for insects in the incoming grain. If infested grain is purchased for livestock feed, store it away from the new crop and feed it as soon as possible. Grain stocks may be rotated or moved and a grain protectant applied at the time of turning.

Stored grain insects cannot live on extremely dry grain (less than 10%), however it is impractical to reduce grain moisture much below minimum moisture levels necessary for long-term storage. Insect activity and reproduction are favored, however, by high grain moisture (14% or more), especially when condensation and molds occur and fermentation raises temperature in the grain mass. A bin of 19% moisture corn with a starting temperature of 75°F can lose a full market grade in about five days if the aeration system shuts down, allowing the grain to heat and deteriorate. Electrical system maintenance before harvest can prevent costly downtime. Spoilage and internal heating allow insects to remain active even in winter. Proper aeration can manipulate grain temperature. Since insects are "cold-blooded", they are not active much below 55°F, and grain cooling can be particularly important in reducing insect reproduction. Condensation of moisture in the grain mass is prevented by slow cooling and gradual reduction of the gradient between the grain mass temperature and the outside (ambient) temperature.

Wiring for fans and other electrical components should be inspected for corrosion and cracked, frayed, or broken insulation. Exposed wiring should be run through waterproof, dust-tight conduit. Avoid kinking the conduit and make sure all connections are secure.

Mice often nest in control boxes where they are protected from predators. They can strip insulation from wires for nest material and their urine sometimes causes corrosion on relays and other electrical components. If rodent damage is found, clean and repair or replace damaged wiring, relays, and other electrical equipment and seal over knock-outs and other openings that may permit rodent entry.

Fans, heaters, transitions, and ducts should be checked for corrosion and other damage. Remove any accumulated dust and dirt that

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Test corn stalks to assess nitrogen use

With natural gas supplies predicted to be short this year, high nitrogen prices could develop next spring. If prices increase, there may be a temptation to lower nitrogen application rates. Taking time this fall to evaluate the efficiency of the nitrogen application rate you're currently using can help provide key information on which to base any changes next spring. Taking corn stalk samples now can help determine if the corn was under, adequately or over fertilized with nitrogen. If the nitrogen applied this year was greater than that recommended by the University of Nebraska and this fall's stalk nitrate samples indicated excess nitrogen, nitrogen might be reduced next spring.

(Left) Take an 8-inch segment of cornstalk from 6 inches to 14 inches above the ground. (Right) Stalk samples should be kept cool and wrapped in paper rather than plastic to avoid mold.

Use the corn stalk nitrate test in irrigated fields where moisture was not limiting. Fields that tend to have high stalk nitrate tests are those where manure was applied, fields following alfalfa, and where excess nitrogen was applied. Iowa State University developed the corn stalk nitrate test, and its usefulness has been verified in other states. A full explanation and discussion of the test can be found in the NU Cooperative Extension publication, *The Corn Stalk Nitrate Test*, NF01-491.

What does the test show?

The results of the corn stalk nitrate test indicate whether the corn was over fertilized during the season. The test shows low, optimal and excess stalk nitrate values (*Table 1*). Low values indicate nitrogen may have been deficient. Excess values indicate that there was more nitrogen than the plant needed to produce grain. The scientific basis for this test is the fact that corn will continue to accumulate nitrogen past the level at which grain yield is increased. Since corn does not show visible symptoms of excess nitrogen, analysis of the stalk tissue can determine when this occurs. This test is probably best used for finding excess nitrogen since deficiencies can be spotted visually by leaf yellowing. This season if the test comes back in the "excess" range, that indicates that reductions in nitrogen may be possible next season. (For more information on recommended rates, see the NU Extension publication, *Fertilizer Suggestions for Corn*, G174, or visit the Web site, *Managing Nitrogen Efficiently in Nebraska Crop Produc-*

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Table 1. Interpretation of the test results

Plant nitrogen status	*Stalk nitrate (ppm)*	*Management suggestions*
Low	0-250	Increase nitrogen
Marginal	250-700	Increase nitrogen
Optimal	700-2000	Yields are not limited by nitrogen stress
Excess	Greater than 2000	Plant nitrogen greater than needed

Corn stalk test *(Continued from page 219)*

Table 2. Summary of diagnostic techniques, critical values and error rates. (after Fox et al., 2001. *Agronomy Journal* 93:590-597)

Samples in database	*Diagnostic Technique*	*Critical value*	*Falsely predict N deficient*	*Falsely predict N sufficient*
			%	
	Chlorophyll meter			
702	1/4 Milkline growth stage	52	13.4	1.7
702		48	2.7	4.6
209	Stalk nitrates at black layer	250 ppm	5.3	1.9
209		700 ppm	12.1	0.0

tion at *http://cropwatch.unl.edu/focusnitrogen.htm*, where there are worksheets and an on-line calculator to help determine recommended nitrogen rates.)

How to take the test

Take corn stalk samples any time between one and three weeks after black layer formation in 80% of the kernels. Newly published information indicates that the stalk test can be taken as early as when the milk line is one-fourth of the way down the kernel. To take the test, remove an 8-inch segment from 6 inches to 14 inches above the ground.

Remove the sheaths. Don't take diseased stalks or stalks damaged by hail or insects. Take 15 stalks per sample, keep cool and send to the laboratory immediately. Samples should be sent in paper wrapping and not plastic since plastic wrapped samples may mold. Have the samples analyzed for nitrates.

An article (Fox et al., July 2001) in the Agronomy Journal compared the stalk test, late season chlorophyll meter, and green leaf count techniques. Based on this article, I have summarized their analysis of the results in *Table 2*. The authors used experimental data to determine the error rate of using different critical levels to interpret the test results. Because the tests were conducted on corn grown in replicated experiments, they could determine if the diagnostic test level accurately matched the plant response. Their criteria for whether the test was valid was whether the yield was at 93% of maximum yield. For example, with the chlorophyll readings taken at one-fourth milk line they used a critical value meter reading of 52. They derived the 52 reading from their previous research. Once the criteria was set, they determined if the treatment correctly predicted sufficient nitrogen.

They also divided the errors into two groups: predicted the plant was nitrogen deficient when it wasn't or predicted the plant had adequate nitrogen when it was deficient. Using the chlorophyl meter reading to determine if the plant had adequate nitrogen wrongly predicted the crop was deficient 13.4% of the time. The plant actually had adequate nitrogen even though the meter suggested it was low. Using the same meter reading criteria, 1.7% of the time it falsely suggested the plant had adequate nitrogen when it was low. When the authors lowered the criteria from 52 to 48, the total error rate actually decreased from 15.1% to 7.3% because the percent the meter falsely predicted deficiency decreased from 13.4% to 2.7%. There was not a corresponding increase in the false prediction of adequate nitrogen.

The data on the stalk nitrates also shows the change of error rates when the criteria for predicting deficiency changes. The Fox et al. data indicates that using 250 ppm would keep prediction errors to 5.7%. Using the 700 ppm critical value used by Iowa had a 0% error rate for falsely predicting nitrogen sufficiency.

The Fox et al. data provide more evidence that corn stalk nitrate tests are a useful tool in nitrogen management. They are best used to determine if adequate nitrogen was available. They would be especially useful in fields with manure history where the producer needs reassurance that reducing fertilizer nitrogen will not affect yields. This year they may also help producers determine if reducing nitrogen rates decreased yields.

Charles Shapiro
Extension Soils Specialist
Haskell Ag Lab, Northeast REC

Wheat resources

The *2003 Nebraska Fall-Sown Small Grain Variety Tests*, EC03-103, booklet was recently released and is available from your local Cooperative Extension office or on the Web at *http://varietytest.unl.edu*. The Variety Test Web site also links to variety results for Kansas and Colorado and to the online NU Virtual Wheat Variety Tour and information.

Few controls available for some late-season pasture weeds

Weeds like ragweed, ironweed, goldenrod, and vervain have exploded in many pastures and are abundant, brought on by recent rains. Because many pastures had short grass as competition, these weeds grew almost unchecked. Only pastures or areas in pastures with thick, relatively tall grass stands have few weeds.

Spraying weeds now does little good unless soils have good moisture. On moist soils, herbicides like Tordon, Grazon, Redeem, and Transline work well in the fall, but on dry sites spray just reduces some seed production and makes pastures a bit more attractive. Shredding would actually work better to reduce weed seeds if it's not already too late.

Two other approaches are more important for long-term weed control. First, do more rotational grazing next year to improve the health, vigor, and density of your grass. Healthy, competitive grass stands are essential to reduce weed populations economically.

Second, target herbicide applications for when they will do the most good. Early to mid-June usually is most effective, especially with herbicides like Grazon, Curtail, 2,4-D, and Banvel. Most perennial weeds, and many annuals, are sensitive to chemicals in June. Weed control, along with good grazing, will hasten the thickening of your grass stands so herbicides won't be needed as often in the future.

Bruce Anderson
Extension Forage Specialist

Cleaning bins *(Continued from page 218)*

may reduce operating efficiency and be sure all connections are tight to prevent air leaks that can reduce operating efficiency.

Once empty bins have been thoroughly cleaned, a residual treatment may be applied to bin surfaces to protect incoming grain from insect infestation. Follow label instructions carefully. The following materials can be used to treat bin surfaces:

- silicon dioxide (Cringe, Insecto),
- silica gel + pyrethrins (Prescription treatment/Tri-Die Silica & Pyrethrum Dust),
- cyfluthrin (Storcide),
- malathion (Prentox 50), or
- diatomaceous earth (Agrisolutions dei).

Note that pyrethrins would provide a relatively short residual and that malathion is not effective for some stored grain insects due to resistance. Methoxychlor is no longer labeled as a residual spray in stored grain facilities in Nebraska.

For bins with false floors which are inaccessible for cleaning, chloropicrin, a bin "clean-out" fumigant, is legal to use, prior to binning the grain. Other fumigants that could be used on empty bins would be magnesium phosphide and methyl bromide. Caution! Fumigants are dangerous, restricted-use pesticides and may require gas monitoring devices and respirator protection for the applicator. It is highly recommended that fumigation be done by a commercial pesticide applicator who has been trained and EPA/NDA-certified in safe fumigant handling and application techniques. Refer to current labels for specific details and instructions.

David Keith
Extension Entomologist
Tom Dorn, Extension Educator
Lancaster County
William Campbell, Extension
Agricultural Systems Specialist

USDA production estimates

Nebraska **corn** production based on conditions as of September 1 is forecast at 1.05 billion bushels, 11% more than the 2002 crop with an average yield expected at 137 bushels per acre, 9 bushels above last year. Dryland yields are best in northeast Nebraska, but disappointing across the south and west, according to the report from the USDA Agricultural Statistics Service in Nebraska.

Soybean production is forecast at 181 million bushels, the second highest of record, and 3% above last year. Yield, at 39 bushels per acre, would be just above the 38.5 bushels of 2002.

Sorghum production is forecast at 27 million bushels, 80% above last year. Yield, at 53 bushels per acre, is expected to be 3 bushels higher than last year.

Sugarbeet production of 907 thousand tons is up 19% from 2002. Yield, at 20.7 tons per acre, would be the highest in 13 years.

National yield estimates

U.S. **corn** production is forecast at 9.94 billion bushels, based on September 1 conditions, 10% above 2002. Yields are expected to average 138.5 bushels per acre, up 8.5 bushels from 2002. If realized, both production and yield would be the second largest on record.

Soybean production is forecast at 2.64 billion bushels, 3% below 2002 and the lowest production since 1996. Yields are expected to average 36.4 bushels per acre, 1.4 bushels below 2002.

Sorghum production is forecast at 410 million bushels, up 11% from last year. Yield, at 51.0 bushels per acre, is expected to be up 0.3 bushel from last year.

Sugarbeet production is forecast at 30.7 million tons, 11% above last year's production. Yield, at 22.8 tons per acre, would be the highest in three years.

Niger thistle -- a new crop for Nebraska

Niger thistle (also called Nigerseed or Nyjer) has long been marketed for bird food in the United States, but all of the seed has been imported into the United States. It is estimated than annual imports exceed 60 million pounds at approximately $30 per hundred weight for a total import bill exceeding $15 million per year. Why don't we grow it here in Nebraska instead of using imports at the state's birdseed processing plants?

First, let me state that it is not because it is a thistle – the niger thistle (*Guitzotia abyssinica*) is really more closely related to safflower or sunflower and like these crops is high in oil. The reason it hasn't been grown in the United States is because no varieties were adapted to cultivated production and many types required hand harvesting.

University of Nebraska research conducted at the Panhandle Research and Extension Center for more than five years has led to the development of a population with modest adaptation to Nebraska. Production of more than 1,500 pounds per acre now appears to be within reach in the Nebraska Panhandle under irrigation and even higher yields might be possible if planted further east where there is a longer growing season and more heat units. At a local price of $30 per hundred weight it soon may become something for producers to sing about along with the birds.

In western Nebraska the niger thistle is planted when soil temperatures are above 50°F, usually around May 30. Plants range from 2 to 5 feet in height, depending on growing conditions, and like the sunflower, the flower head produces the seed which could be sold to local bird seed processors.

While this new crop offers many potential benefits, it also has many limitations, including a shortage of labeled herbicides for weed control and a tendency to attract flea beetles, which need to be controlled soon after emergence. It also is occasionally attacked by stem-boring pests.

Niger thistle in a field near Scottsbluff.

This crop is more responsive at pH's under 7.0 and like most agronomic crops, does best in deep fertile soils. Mechanical harvesting is possible if frost occurs as a defoliant. Harvest, which usually occurs approximately two weeks after the first killing frost, requires considerably more effort than with wheat or soybeans. If all goes well, seed increases of nigerseed are planned for the 2004 crop year and commercial production for early adopters could begin as early as 2005.

Nigerseed is native to Africa, from Ethiopia to Malawi, and was probably domesticated in Ethiopia. Early introductions of nigersseed to India were followed by the development of sizeable commercial production; neighboring Pakistan also cultivates the crop. An important oil crop in Ethiopia and parts of India, it provides more than 50% of Ethiopia's edible oil.

The research to develop a cultivated variety was partially funded through a Nebraska Department of Agriculture Nebraska Department of Ag Value Added Grant.

David Baltensperger, Extension Alternative Crops Specialist Panhandle REC

Congratulations to the prize winners

Thanks to all of you who stopped in the Big Red University of Nebraska building at Husker Harvest Days and visited the *CropWatch/ Market Journal* booth.

Congratulations to the following winners of this year's prize drawing:

Dan Javins, Kearney, a complete set of NebGuides, valued at over $80.

Don Pass, Scotia, a copy of NU's Nutrient Management for Agronomic Crops in Nebraska (a $25 value)

Dorothy Miriovsky, Brainard, a copy of NU's Nutrient Management for Agronomic Crops in Nebraska (a $25 value)

Brandon Naylor, Lexington, a copy of NU's Integrated Turfgrass Management for the Northern Great Plains (a $25 value)

Lynn Neujahr, Waverly, a copy of NU's Integrated Turfgrass Management for the Northern Great Plains (a $25 value)

Prizes will be mailed to the winners at the addresses they provided.