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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

No. 2002-22
Sept. 20, 2002

Immediate drying, bin aeration can minimize effect of molds, mycotoxins in corn

Aflatoxin contamination of corn is being reported in southeast, northeast, and west central Nebraska. Aflatoxin is one of several potentially harmful compounds known as mycotoxins which can develop from grain molds. While molds may not necessarily pose a health threat to animals or humans, mycotoxins can.

The level of aflatoxin contamination being reported ranges from 20 ppb to 300 ppb. The vast majority appear to be on the lower end from under 20ppb to 100ppb, according to Rich Reiman with the Nebraska Department of Agriculture.

Kansas also is reporting increased problems with aflatoxin this year.

In several Nebraska counties fumonisin contamination of food grade corn was a problem in 2001.

This may be even more widespread in 2002.

The widespread drought stress during the growing season and the late season rains provided conditions which were nearly ideal for the development of grain mold and subsequent mycotoxin synthesis in corn. The presence of mold does not necessarily indicate contamination of the grain with mycotoxins. Only certain strains of certain species produce these potentially harmful compounds.

The impact of any mycotoxin contamination depends on the intended use of the grain. The FDA tolerances for aflatoxin are:

- 0.5 ppb for milk,
- 20 ppb for dairy,
- 100 ppb for mature breeding cattle, swine, and poultry,
- 200 ppb for finishing swine,
- 300 ppb for finishing beef.

In many cases the levels being found exceed the FDA minimums for milk and dairy use. The FDA tolerances for fumonisins are much higher: 5 ppm for horses, 10 ppm for swine, and 50 ppm for cattle.

Most grain mold pathogens become associated with the kernel in the field, but they also can grow

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Limiting mycotoxins

To diminish the development of or impact of mycotoxins in corn:

1. Don't store harvested grain in combines, trucks (for more than four hours), or non-aerated storage bins.
2. Separate damaged kernels using gravity tables or screening and avoid storing moldy grain or grain suspected of having mycotoxins with clean grain.
4. Dry grain to less than 15% moisture in less than 48 hours after harvest.
5. Monitor moisture in storage bins often throughout the fall and winter and keep bins well aerated to avoid molds from spreading. Be diligent.
6. If necessary, extensively sample grain to accurately determine contamination level. (Several laboratories test grain for mycotoxins.) If the grain is contaminated, be sure to learn which mycotoxins and at what level. Then market the corn accordingly.

Updates

Field updates

Paul C Hay, Extension Educator in Gage County: Corn and milo harvest is underway in southeast Nebraska. Yields are low for this early harvest of dryland fields. Farmers should be fairly aggressive as most producers are reporting above average ear drop. Also, there is some concerns about alfatoxins, particularly in the food grade and popcorn markets.

Lots of congestion forming in crop insurance field inspections and bin measurements as well as low test weight issues. Producers should be sure they understand clearly all crop insurance communications and keep all records required by their insurance company.

Terry Gompert, Extension Educator in Knox County: Dryland corn and soybeans will be harvested soon. The corn is dropping ears because of corn problems ...so harvest could be early. I would estimate that 50% of the corn was put up as silage.

We caught another inch or more of rain last weekend. It sure is green for having it be a drought year. Much of the blue grass in pastures has drought killed. Still trying to figure out what to do about it.

Bruce Anderson, Extension Forage Specialist, writing in response to the question regarding the loss of blue grass in pastures: It could be a great opportunity to add higher yielding plants like orchardgrass or brome to the pasture next spring or to improve quality by interseeding legumes like alfalfa, birdsfoot trefoil, and clovers. Control of invading weeds, especially winter annuals like mustards, pennycress, and downy brome may be needed late this fall or very early next spring prior to planting to avoid excessive competition for new seedlings.

Management tips Sept. 20-Oct. 4

◆ **Remember to contact your insurance provider before grazing, harvesting or destroying an insured crop.** Also check with the local Farm Services Agency (FSA) office if you're enrolled in NAP (Noninsured Crop Disaster Assistance Program). Also check with the FSA office on eligibility for other drought and livestock assistance programs.

◆ **Cattle feedlot manure can contain about \$6 per ton of fertilizer nutrients.** The nutrient value of swine pit slurry is about \$7 per 1,000 gallons. Calibrate your applicator, test your manure, and calculate crop nutrient needs to get maximum value from it.

◆ **Manure testing is necessary to determine the correct application rate.** See the "Manure testing: What to Request", NF02-507, for analysis guidelines and a submission form for the lab. Your NRD may have a cost-share program on manure tests.

◆ **Check your grain sorghum maturity now.** With the drought this year, some grain sorghum fields matured early and producers may be surprised by how dry it is already.

Paul Jasa, Extension engineer, said, "We harvested all of our grain sorghum at the Rogers Memorial Farm (10 miles east of Lincoln) during the first week of September at a moisture content of 14%. Due to the mid August rains, there were some newly emerged green heads in a few places. These heads hadn't pollinated yet and ran through the combine like leaf material. Those in the field now are pollinating and may be in the milk or soft dough stages later when normal harvest time rolls around."

If producers wait to harvest in a month, these immature heads may create problems with threshing or grain quality. Also, grain sorghum maturity tends to slow down when night temperatures dip below 60°F and there may not be enough heat units left to finish the crop this year.

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Molds and mycotoxins (Continued from page 201)

within the colonized kernel and even spread to adjacent kernels during storage. Consequently, it is imperative to dry down grain as soon as possible. Delaying harvest to let the grain dry in the field increases the risk of stalk rots and grain molds. In some cases it may be better to harvest at higher grain moisture and dry the grain rapidly. No fungicides are labeled in Nebraska for managing molds or mycotoxins of corn postharvest.

While it's always important to monitor stored grain throughout the winter, this year it may be critical to to keep an even closer eye on moisture content, especially in areas where mold and mycotoxin contamination have been common. It also will be important to keep the grain well aerated.

Marketing options

Grain with mold symptoms should be assayed for the presence of mycotoxins prior to use as food or feed. If mycotoxins are confirmed, producers may have several options, depending on the contamination level.

Elevators in some parts of Nebraska that buy corn for both human and animal consumption are reported to have turned away grain with mycotoxin levels above 20 ppb.

Monitor world crops

The USDA's Foreign Agricultural Service has launched a new Web site that provides easy-to-read crop condition information for most ag regions in the world.

Crop Explorer automatically extracts crop and weather indicators from a database and displays the information graphically on about 9,500 charts and pages. The indicators are categorized by crop type, region and season. Weather and satellite data are updated every 10 days. The site is at: <http://www.fas.usda.gov/pecad>.

Toxic effects of mycotoxins.

Acute toxicity	Aflatoxin, fumonisin, vomitoxin, trichothecenes
Carcinogenicity	Aflatoxin, fumonisin, trichothecenes
Reproductive dysfunction	Zearalenone
Immune suppression	Aflatoxin, fumonisin, trichothecenes
Feed refusal	Vomitoxin

Identifying molds and their related mycotoxins.

<i>Fusarium verticillioides</i> (<i>Gibberella fujikuroi</i>)	Fumonisin
<i>Fusarium proliferatum</i> (<i>Gibberella</i>)	Fumonisin
<i>Aspergillus flavus</i>	Aflatoxin
<i>Fusarium graminearum</i> (<i>Gibberella zeae</i>)	Vomitoxin, trichothecenes, zearalenone

While some elevators may not want to risk accidental contamination of food grade corn, the contaminated grain could still be marketed to a number of other outlets, depending on the level of contamination. These might include feedlots or elevators which only buy grain for feeding cattle.

Some grain elevators use the black light test as a preliminary indication of potential toxin contamination; however, this test is very unreliable. Many things will fluoresce under a black light, including insect parts and fungi that don't produce toxins. Consequently, many false positives can result. Only certain laboratory analyses can establish the occurrence and concentration of mycotoxins.

Health and safety

Mycotoxins can be toxic to farm animals, wildlife, or humans. Effects on animals include feed refusal, short-term illness, reproductive dysfunction, and death. Human effects include suppression of the immune system, reproductive dysfunction, cancer, and death. The ultimate effects depend on duration and concentration of exposure.

Most mycotoxins are extremely stable molecules and can withstand drying processes as well as many

industrial processes. Consequently, exposure can result from not only direct consumption of contaminated grain but also from consumption of processed grain and industrial byproducts such as from industrial ethanol production.

Because molds or mycotoxins can develop in stored grain, remember to exercise caution and wear a dust mask to minimize exposure. In addition to mycotoxin concerns, exposure to the spores of the grain mold fungi can lead to acute allergic responses or chronic allergic responses. Clean trucks and bins which held contaminated grain.

Resources

For more information see *Grain Molds and Mycotoxins in Corn*, NebGuide GOO-1408, available from local Cooperative Extension offices or on the Web at <http://www.ianr.unl.edu/pubs/plantdisease/g1408.htm>.

Aflatoxin information: <http://vm.cfsan.fda.gov/~mow/chap41.html> and <http://www.usda.gov/gipsa/newsroom/backgrounders/b-aflatox.htm>

Fumonisin information: <http://vm.cfsan.fda.gov/~dms/fumongui.html>, <http://vm.cfsan.fda.gov/~dms/fumonbg3.html>

Jim Stack, Extension Plant Pathologist, South Central REC

Baling cornstalks for cattle while maintaining crop residue

Crop residues from corn grain production are abundant in Nebraska. Over 10 million tons will be available after harvest. That's enough to feed all the beef cows in Nebraska through the entire winter two times! These residues can provide valuable forage for beef cattle this winter to replace forage lost due to the recent drought. They also can stretch the supply of higher quality hay such as alfalfa. Unfortunately, most cattle and corn stalks are not very close to each other.

One way to overcome this separation is to harvest this residue and haul it to the cows. There are many ways to harvest stalks, such as chopping into a stack wagon or cutting, raking, and baling. These methods, though, remove most of the stalk residue, which is valuable for erosion control and useful in adding organic matter back to the soil.

Grazing alfalfa

Many growers find that fall grazing of alfalfa is beneficial. Alfalfa makes an outstanding weaning pasture for spring calves; yearlings continue to gain weight rapidly on fall alfalfa even after summer grass die; and cows gain excellent condition before winter.

Fall grazing of alfalfa, however, is not without problems. To protect your livestock from bloat, feed them hay before turning them onto alfalfa and provide access to dry hay or cornstalks. Bloat protectants like poloxalene can be fed as blocks or mixed with grain. They work well when animals eat a uniform diet each day, but they can be costly.

With fall grazing, only graze when fields are dry and firm. Reserve a small area for feeding when soils are wet to avoid damaging the entire field.

Bruce Anderson
Extension Forage Specialist

More information

If you're researching for feeding options for your cattle, visit the *CropWatch AgNews* Web site at <http://cropwatch.unl.edu/agnews.htm> for information from Bruce Anderson on grazing cornstalks, with and without corn.

A better method might be to start by removing the chopper from behind the combine. Let all the husks, leaves, escaped grain, and other tailings fall directly behind the combine. Then round bale, square bale, or stack this strip of residue but leave everything else. By gathering most of the best plant parts from four, six, or eight rows and concentrating them in just two rows, a high quality winter feed is produced while soil remains protected.

These bales should have 50%-60% total digestible nutrients (TDN). Protein might be only 5%, but with just a little protein supplement, cows could actually get fat eating these residues. Fields with heavy grasshopper or hail damage may have less feed value than undamaged crops due to less leaf material. Irrigated ground might readily produce one to two tons per acre.

Setting a value for this feed might be difficult, but if it were sold for \$50-\$60 per ton, corn growers would make a little money and still have stalks remaining in the unbaled rows to protect soil and replace organic matter. Livestock producers will get a good quality winter feed for less cost than the \$80 to more than \$100 per ton being asked for hay in many places. Before feeding, sample and test bales or stacks for protein, energy (TDN), and nitrate levels to formulate least cost rations that will be safe to feed.

Bruce Anderson
Extension Forage Specialist

Test cornstalks for nitrogen; assess program

Corn fields can be sampled now to determine whether adequate nitrogen was available to plants this year. The best time to sample the lower stalks is within two or three weeks of physiological maturity. The NebFact, The Corn Stalk Nitrate Test (NF01-491), details how to take the sample from the lower portion of the stalk. (It is available from your local Cooperative Extension Office or on the Web at <http://www.ianr.unl.edu/pubs/fieldcrops/nf491.htm>)

When interpreting the results, if more than 2000 ppm nitrogen remains, it's excessive; if the level is below 700 ppm, it's marginal, and if it's under 250 ppm, it's deficient.

We have been working with livestock producers to match manure application rates with corn needs. In some cases, we're taking stalk samples this fall. Our experience has been that where we have a history of manure, the stalk nitrates can be significantly higher than the optimum level.

Exercise care this year when sampling dryland corn since drought will override the nitrogen efficiency interpretations.

Charles Shapiro
Extension Soils Specialist

Hot off the press

UNL Cooperative Extension recently released:

G 01-1441 Residential On-site Wastewater Treatment: Lagoon Design and Construction

G 02-1451 Climate Change and Winter Wheat: What Can We expect in the Future?

G 02-1468 Residential On-site Wastewater Treatment: The Role of Soil

NF 02-545 A Guide to Soy Foods

NF 02-546 Soy Health Claims

Soil moisture improves; long-term outlook causes concern

During the last six weeks, precipitation activity has increased significantly across much of the state. The large ridge that dominated much of the western third of the United States has retrograded to the southwest. This has allowed storm systems to move into the north central Rocky Mountains and central High Plains, providing rain to many areas of Nebraska.

Drought conditions have eased significantly across northeastern Nebraska, as well as areas adjacent to the Missouri River. The "exceptional drought" classification has been reduced to "extreme" across the Panhandle and southwestern corner of the state. Only a small pocket of exceptional drought exists in the southwestern Sandhills. Central and south central Nebraska are classified as either in severe or extreme drought, depending on location.

Top soil moisture reserves have rebounded at every site within the High Plains Regional Climate Center soil moisture monitoring project. Preliminary data indicates two to three inches of available moisture has been added since the lows set in early August.

Even if the wet, cool trend continues through this fall, it is highly unlikely that the western third of the state will be downgraded any lower than moderate drought conditions. The significant declines in reservoirs and the low streamflows are indicative of the deficiencies.

Long lead models continue to indicate that a weak to moderate El Nino will occur this fall through next spring, although I am not assured of this forecast. Warmer than normal conditions are expected across the northern United States, including Nebraska, from October through

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Sharing the road at harvest — take steps to stay safe

Farm Safety and Health Week is "Not just for farmers anymore," according to the National Safety Council. This year's theme, which targets rural roadway safety, is especially appropriate for Nebraska, where farmers, acreage owners, and townspeople often share the same busy roads.

For the last thirty years in Nebraska, the harvest months of September and October have ranked second and fifth in the number of fatal incidents. Harvest can become tragic within seconds.

An unknown number of non-agricultural people have died or been injured from incidents involving agricultural equipment on public roads. (In Nebraska, about 75% of traffic fatalities occur on rural, non-interstate roads.)

According to the National Safety Council, three types of users are found on rural public roads: producers, the driving public and those who jog or use the road for exercise. Farmers know the limits and characteristics of their equipment, but other road users do not. Farm equipment is slower, less maneuverable and larger than other vehicles. Combine this with later sunrises and earlier sunsets and collisions are likely to happen.

Reducing this likelihood is everyone's responsibility. Motorists should slow down when overtaking or meeting farm equipment. Swerving to avoid a combine header that extends into the opposite traffic lane can be disastrous at high speeds on a gravel road.

Farmers should only move equipment on public roads during daylight hours. Slow-moving vehicle signs should be clean, bright and unobstructed. Large equipment should have perimeter reflectors, reflective tape and warning lights. Mirrors should be adjusted to eliminate blind spots and a pilot vehicle should be used behind

Increasingly, many of those traveling rural roads may not be involved in farming and may not be watching for heavy harvest traffic. Stay alert to potential problems.

tractors and other equipment. Extremely wide equipment may require a second pilot vehicle in front with headlights and warning flashers. Never use work lights on equipment as a substitute or in addition to headlights and warning lights.

The most dangerous maneuver for farm equipment is making a left turn at an intersection or into a field drive or driveway. Speed must be reduced and large machines or those with long trailed equipment may have to move right to clear intersection or driveway obstructions. Following motorists may assume they are being given room to pass. It is vital that the machine operator use mirrors and turn signals to prevent a collision.

Rural non-farmer residents walk, jog or ride on rural roads for exercise or relaxation. Hiking and biking trails that cross public roads may not be well marked. Operators of larger tractors and combines may be concentrating on vehicular traffic and not notice pedestrians or cyclists on the shoulder and may need to pay special attention. Don't assume that they are familiar with farm equipment and will react accordingly.

Dave Morgan
Extension Safety Engineer

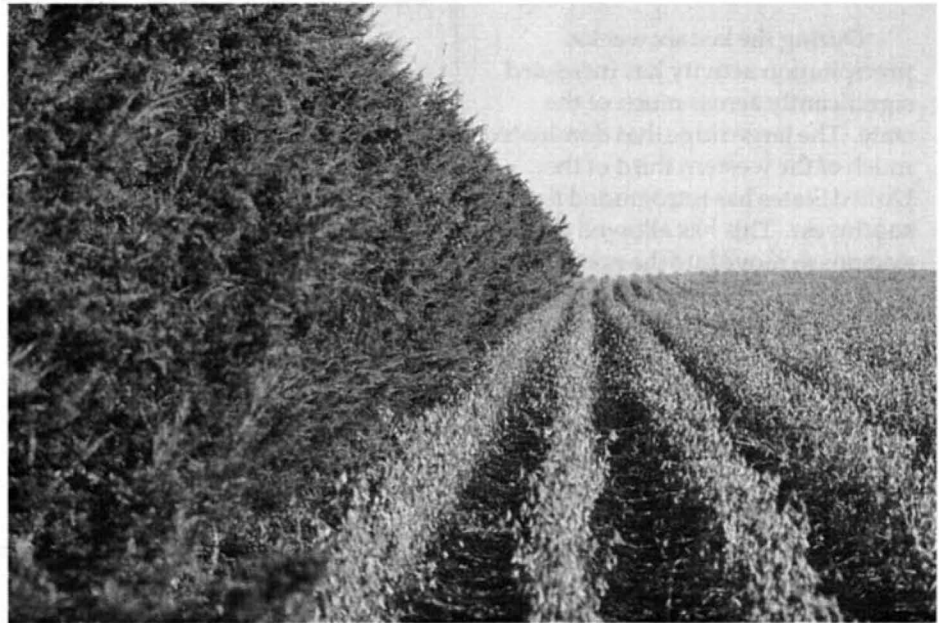
Check the economics for your operation

Planting windbreaks pays long-term dividends

This summer has seen the continuation of drought conditions for much of Nebraska. For many of us this is the worst we've seen it, but when you talk to the *old-timers* this years continuing drought just doesn't measure up to the "big ones" of the Dust Bowl days. Back then, our response was a massive tree planting program known as the Prairie States Forestry Project. As a result of that effort, just under 18,000 miles of windbreaks were planted throughout the Great Plains.

Today many of these older windbreaks have been removed and not replaced. Crop fields have increased in size and while changes in tillage practices have reduced the wind erosion potential, this year saw a significant increase in wind erosion incidents, an increase in highway accidents due to blowing dust and unfortunately the loss of several lives due to fatal traffic accidents directly attributed to blowing dust.

So how does this relate to field windbreaks? Field windbreaks are widely recognized as one of the best ways to control wind erosion. Once established, they provide a barrier



Field windbreaks can reduce erosion while helping increase crop yields.

to wind flow resulting in a reduction of wind speed and long-term protection for soil.

But field windbreaks do so much more. Research at the University of Nebraska's Agricultural Research and Development Center located near Mead has repeatedly demonstrated crop yield benefits of field windbreaks. Yields for winter wheat have averaged a 15% increase over the last 20 years. Similar studies for corn and soybean have indicated yield increases of 12% and 15% respectively.

In 1986 a researcher from the Shelterbelt Centre in Indian Head, Saskatchewan summarized how windbreaks affected crop yields on a world wide basis (Table 1). Without a doubt, yields are increased; the real question is do these yield increases result in economic gains to producers. And more importantly, how can a Nebraska Producer take

advantage of these windbreak benefits?

Over the past 10 years we have developed a Windows based computer model, *WBECON*, to estimate economic returns from investing in a field windbreak. The model is flexible, allowing the producer to enter details based on his/her operating conditions and expenses as well as the individual's view of future commodity prices. For a windbreak system to be profitable, the financial return from the long-term average yield increase from the protected areas of the field must be large enough to compensate: for the land occupied by the windbreak, for the crop losses associated with tree competition, and for the costs associated with planting and maintaining the windbreak.

Using a local example, if a corn/soybean farmer from Nebraska with a 160-acre field established four single-row, parallel field windbreaks equally spaced across the field, the cost of establishment and the costs associated with land planted to the

Table 1. Average crop yield increases in fields protected by field windbreaks.

Crop	Yield Increase (%)
Spring Wheat	6 to 10
Winter Wheat	20 to 25
Barley (grain)	23 to 25
Oats	5 to 7
Rye	18 to 20
Millet	40 to 45
Corn	10 to 15
Soybean	12 to 17

Source: Kort, J. 1988. Benefits of windbreaks to field and forage crops. *Agricultural Ecosystems Environment* 22/23:165-190.

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Planting (Continued from page 206)

windbreak would be recovered in 10 years. By year 15, the net return on the windbreak investment would be several thousand dollars. By year 30, the return on the original windbreak investment would be over \$30,000. The windbreaks would be expected to live an additional 20 years or more, providing additional income to the producer.

These returns are based on the reduced production costs and the increased yield from sheltered acres. In many cases, cost share programs and other conservation programs are available to help offset the establishment costs and may provide annual payments for acres planted to windbreaks (*see below*). These programs would further enhance the economic benefits from the windbreak investment.

Windbreaks also provide valuable wildlife habitat for various game and non-game species. Research also indicates that many of these plantings provide valuable habitat for insect predators, helping keep pest populations in check and reducing the need for pesticide applications.

Finally, UNL field trials are testing the concept of "productive conservation" -- producing commercially valuable products from woody plants included in conservation plantings. Production of one class of product, woody decorative florals, is particularly adapted to field windbreak plantings. The accompanying article describes in more detail the potential economic returns from these plantings. For more information, interested readers may request a

copy of the new publication series on agroforestry practices.

To take advantage of field windbreaks in your farm operation requires careful planning. NRCS District Conservationists, your local NRD or foresters with the Nebraska Forest Service will provide assistance in windbreak design. You also may want to read the Extension Circular EC-00-1778 *Field Windbreaks*. This publication and other windbreak publications are available from local Cooperative Extension offices or online at <http://www.ianr.unl.edu/pubs/forestry>.

Tree sales typically begin in the late fall so now is the time to make that initial contact. Fall site preparation is another key element in establishing a good windbreak.

Jim Brandle
Shelterbelt Ecologist

NRCS cost share options for windbreaks

Field windbreaks provide a number of economic and environmental benefits. Consequently, several USDA conservation programs encourage and financially support this practice. Following is information on those USDA programs that provide cost-share assistance.

The Conservation Reserve Program (CRP), administered by the Farm Service Agency (FSA), provides 50% cost-share assistance for establishing field windbreaks and an annual rental payment for the cropland that is taken out of production and planted to field windbreaks. The CRP annual payment is for 10 years and is based upon the rental rates for the land enrolled. For a field to qualify for CRP it must be determined to be "highly erodible land" (HEL). The USDA Natural Resources Conservation Service (NRCS) helps landowners determine land eligibility and designs field windbreaks. Landowners can enroll their land in

CRP only during specified enrollment periods. The enrollment process is competitively based on environmental benefits of the conservation practices that each landowner offers to establish on the field to be enrolled.

A variation of the CRP — the Continuous Conservation Reserve Program (CCRP) — differs from CRP in several important ways. Whereas CRP is intended to take entire fields out of crop production, the CCRP encourages landowners to install certain conservation practices on small land areas to provide significant environmental benefits. The eligible practices under CCRP include field windbreaks, shelterbelts, living snow fences, riparian buffers, shallow water areas for wildlife, salt tolerant vegetation, contour grass strips, grass waterways and filter strips. Another difference with CCRP is that there is no specified enrollment period and landowners can enroll at any time.

CCRP provides 50% cost-share for field windbreak establishment, along with a practice incentive payment of 40% of the cost of establishment. An additional sign-up incentive payment of \$10 per acre per year is provided with the entire amount paid at the beginning of the contract period. Also, a 20% incentive is added to the annual soil rental rate for field windbreaks, grass waterways, filter strips and riparian buffers. The contract period can range from 10 to 15 years. A maintenance payment of \$5 to \$7 per acre is also available for field windbreaks. The local FSA staff determines eligible land, and the NRCS helps the landowner with the field windbreak design.

A third USDA program may provide cost-share assistance is the Environmental Quality Incentives Program (EQIP), administered by NRCS. This program provides

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Barring the door to mosquitoes; using DEET repellent safely

With harvest, night ball games and hunting seasons close or already underway and the recent rainfall bringing a flush of mosquitoes, it's even more important to protect you and your family from West Nile virus.

West Nile virus is a mosquito-borne virus that can cause encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). First introduced in the United States in 1999, it has spread rapidly and has now been found from coast to coast. Wayne Kramer, state medical entomologist with the Nebraska Health and Human Services System, said as of Wednesday, the West Nile virus has been identified in 27 humans (two of whom died), 318 birds, and 825 horses.

While most of your backyard mosquitoes are probably nuisance mosquitoes of the *Aedes* genus, some may be of the *Culex* genus which can carry and transmit the West Nile virus from now until frost.

While this virus continues to be a threat, take the following steps to avoid problems:

1. Drain any standing water on your property;
2. Use mosquito "dunks" (*Bacillus thuringiensis* "donuts") in backyard ponds and birdbaths;
3. Stay inside during the evening when possible;
4. If you need to be outside during evening, nighttime and dawn hours when mosquitoes are most likely to bite, wear protective clothing such as long pants, long-sleeved shirts, and socks. During these periods, consider using an insect repellent containing 10% or less DEET (N, N-diethyl-methyl-metoluamide) for children and 30% DEET for adults.

Federal and state agencies provide the following cautions for using products with DEET:

People who work outdoors and use DEET regularly should be aware of the possibility of a reaction if DEET products are overused. Apply DEET lightly and treat clothing rather than skin.

◆ Do not use it on infants or pregnant women and do not allow young children to apply it themselves. Apply to your hands and put it on the child.

◆ Use sparingly to cover exposed skin and clothing and don't apply under clothing.

◆ DEET is effective for approximately four hours. Avoid prolonged or excessive use and do not reapply or saturate skin.

◆ Wash all treated skin and clothing after returning indoors.

How does DEET work?

The material apparently works by interfering with mosquitoes' ability to detect convection currents caused by a warm body after they have been alerted by their carbon dioxide receptors. Hairs on the antennae are temperature and moisture sensitive. Mosquitoes apparently do not avoid people because of the odor of DEET, rather it is thought that DEET molecules somehow interfere with the entry pores of the female mosquitoes sensory receptors, thereby interfering with their ability to locate their hosts.

Hazards of DEET

Several years ago, the Environmental Protection Agency issued some precautions regarding the use of DEET repellents, due to some reported adverse effects on young children. In a consumer bulletin entitled, "Using Insect Repellents Safely," the agency stated, "While doctors have not confirmed DEET as

the cause of reactions such as headache, mood changes (crying, irritability), confusion, nausea and, in severe cases, muscle spasms, convulsions or unconsciousness, EPA is concerned that a small segment of the population may be sensitive to DEET."

They indicated that overuses of DEET repellents may have resulted due to public concern over tick-related diseases, such as Lyme Disease. Also, many of the adverse reactions reported appeared to have involved accidental exposure, such as swallowing or spraying into the eye.

People who work outdoors and use DEET regularly should be aware of the possibility of reaction if DEET products are overused. Remember to treat clothing rather than skin. Apply the product lightly, particularly if it is concentrated. Be especially careful with small children, anyone who has a history of sensitivity to chemicals and the elderly as these groups are more likely to have a reaction.

The EPA estimates 50-100 million people use DEET repellents each year, with 10 or fewer resulting cases of neurological intoxication reported. EPA did not suggest that people stop using DEET due to its overall benefits of insect and tick repellency. We must balance the risk against those of irritation, secondary infection of bites and the possibility of transmission of insect-borne diseases.

David Keith
Extension Entomologist

Report tracks nitrogen, water management

Following University of Nebraska nitrogen fertilizer recommendations produced economic returns similar to or better than higher or lower application rates, according to a recent NU report.

This assessment from northern Holt County is based on the profitability of nitrogen applied relative to yields produced at an average price for corn of \$2.31 a bushel over the last decade, according to Charles Shapiro, Extension soils specialist at the Northeast REC and report co-writer. The report, "Agricultural Management Practices and the Groundwater System of Northern Holt County, Nebraska," focuses on the Holt County Groundwater Education Project. This inter-agency effort began in 1994 to alert area farmers about the movement of nitrates from fertilizer applications into groundwater, primarily through irrigation.

The project included demonstration plots with high groundwater-nitrate levels to show the value of following NU's best management practices for nitrogen application.

The project found that groundwater nitrates that are pumped and applied to corn via irrigation are as effective as nitrates applied through fertilization. Recognizing this can save farmers' fertilizer bills and help clean up contamination.

Other project leaders were Susan Olafsen Lackey, associate geoscientist with UNL's

Conservation and Survey Division and senior author of the report, and William Kranz, irrigation specialist at the Northeast Research and Extension Center.

Soil moisture

(Continued from page 205)

December. For January-March, temperatures are still forecasted to remain above normal. Above normal precipitation is projected to occur across south central and southeast Nebraska.

The models indicate two regions of the country -- the Ohio Valley and the northern Rockies -- will experience below normal precipitation from January through March. We are especially concerned about the northern Rocky Mountain forecast since it feeds snowmelt to the northern branch of the Platte River. If this were to occur, it would be crucial that these areas receive significant rain this fall to refill water resources and soil profiles.

Right now the northern jet is very strong and looks like the dominant storm track. I would not be surprised to see two- to four-week periods, where one jet stream dominates, giving way to the other jetstream, providing for a highly variable weather regime with alternating periods of warm and fairly benign weather, followed by cold and stormy weather.

Al Dutcher
State Climatologist

The publication recaps recommended best management practices for nitrogen applied to corn and for irrigation water application. It is available free from the Conservation and Survey Division, 113 Nebraska Hall, University of Nebraska-Lincoln; by phone: (402)472-7523; or e-mail csdsales@unl.edu. It is also distributed free from NU Cooperative Extension Publications, Box 830918, University of Nebraska, Lincoln, NE 68583-0918; or by calling (402)472-9713. Orders can be placed at local extension offices.

Cost-share

(Continued from page 207)

support for conservation plans that include structural, vegetative and land management practices on eligible land. Cost-share payments up to 75% are available to implement one or more eligible structural or vegetative practices, including windbreaks.

A new program beginning in fiscal year 2003 is the Forest Land Enhancement Program (FLEP). This program will be administered by the Nebraska Forest Service (NFS) and provides up to 75% cost-share for a number of practices, including field windbreaks.

In Nebraska, many local Natural Resources Districts (NRD) also provide cost-share assistance for establishing field windbreaks. The NRDs administer state funded cost-share assistance for many conservation practices. The cost-share rate varies, but is commonly 50%. NRDs coordinate very closely with the NRCS and Nebraska Forest Service to provide help with designing field windbreaks and determining appropriate cost-share programs for each landowner.

Rich Straight
National Agroforestry Center

CCA numbers required for credit

Beginning Sept. 1 all Certified Crop Advisers are required to use their assigned CCA Certification number when signing in at continuing education courses.

This requirement is being implemented by the International CCA Board to add continuity to the process and privacy for CCAs. Your CCA certification number appears on your wallet ID card and also on your original CCA certificate.

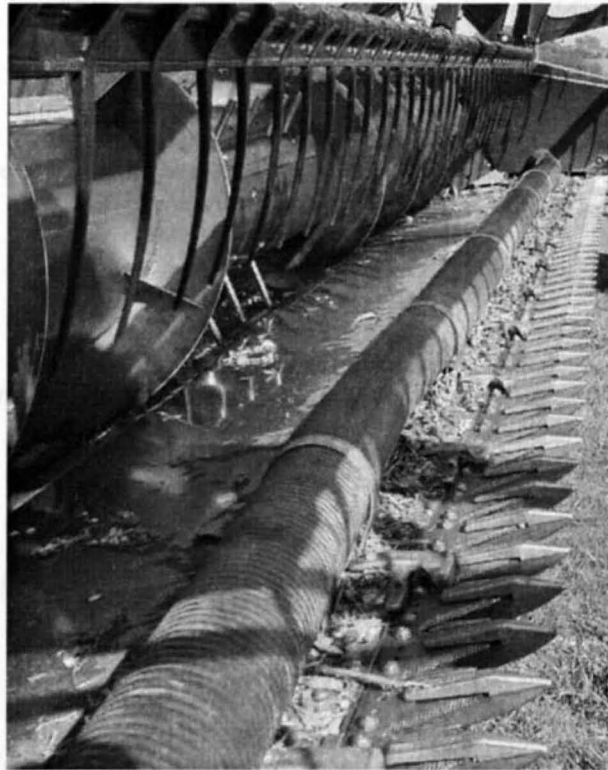
Combine adjustments for harvesting short beans

Because of the drought and heat this year, many producers are harvesting short soybeans. Not only are the plants shorter, the lower pods are closer to the ground than usual. The short plants may not be tall enough to fall into the auger when cut off by the cutterbar. The plants accumulate on the platform until there is enough of a pile to be caught by the auger. This results in "bunch feeding" which makes threshing and separation less efficient and results in a loud "whump" sound under the seat of the operator. Producers can do several things to help get every bean into the combine and to make sure that the short plants feed into the combine evenly.

Operate combine headers as close to the ground as possible to harvest the lowest pods. A flex header with automatic height control provides the closest cut. In rough or uneven fields, the operating speed may need to be slower to allow the header time to react to the surface, keeping it close to the ground without gouging.

By tipping the header slightly forward, the effective cutting height can be lowered to help catch the lowest pods. However, the cutterbar may gouge the ground or push residue more easily, especially if the residue is damp. Also, the soybeans must then move up a slanted platform to the auger which may increase bunch feeding.

To reduce bunch feeding, make sure that the beans get into the auger as soon as possible after cutting -- don't let them accumulate on the platform between the cutterbar and the auger. In normal soybeans, the reel should be set to lay the soybean plants over from the cutterbar onto the auger. The reel is run fairly high to reduce shatter losses and wrapping. In short beans, the reel may have to be moved lower and closer to the auger to keep the crop feeding into the auger properly. Reel sweeps, rubber or plastic flaps about a foot long, can be attached to the reel to



A rigid, 3-inch hose fastened by conduit clamps to the guard bolts on the platform directly behind the cutterbar can be helpful when harvesting short soybeans.

help sweep short plants and loose beans into the auger.

Producers should check the edge of the auger flighting. If it has been used for several years, the leading edge is probably worn and rounded. Use a hand grinder to square it off or to taper it slightly to the back edge. This allows the auger to effectively grasp the plants better for more uniform feeding. Also, the clearances from the auger to the header floor and to the back should be checked and adjusted, if needed, to help the auger grip the plants.

Some producers add an "air reel" to the combine header, either with or instead of the conventional reel, to move the crop across the cutterbar and into the header. The crop is constantly blown back to the auger and slugging is reduced because there is a uniform flow of material. Also, loose beans in the header are less likely to roll off the platform because of the airflow into

the header. In a year such as this with short beans, an air reel may pay for itself in reduced shattering, threshing, and out-the-back bunching losses.

A low-cost, effective addition to the header for harvesting short soybeans is a full-width piece of rigid, 3-inch suction hose, fastened to the platform directly behind the cutterbar (see photo). The short soybean plants briefly lean up against the hose after being cut. As the reel comes around, it "flips" the plants over the hose and into the auger rather than laying them on the platform. The hose reduces slug feeding by effectively shortening the platform in front of

the auger and by getting the plants directly into the auger. This hose, however, may increase shattering by the reel in taller soybeans as it doesn't allow the plants to fall directly onto the platform away from the reel immediately after being cut.

As in any year, the combine should be properly set to gather, thresh, and separate all the beans from the plants to minimize losses and damage. Any beans shattered out in front of the header or tossed out the back of the combine are lost yield potential. In addition, any damaged beans may be docked, reducing profit potential. For tips on setting the combine for a better soybean harvest, check the combine owner's manual and an article in the September 1, 2000 issue of *Crop Watch*, available on the Web at http://cropwatch.unl.edu/archives/2000/crop00-21.htm#sb_combine.

Paul Jasa
Extension Engineer