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Cloudy July may have led to “tipping back”

Some Nebraska corn fields may have had increased occurrences of “tipping back” this year due to a reduced number of sunny days during the critical period after pollination.

“Tipping back” or barren-tipped ears of corn results from the abortion of fertilized kernels. The phenomena is most likely to occur because of crop stresses during a brief period after young kernels are fertilized. Newly fertilized corn kernels are likely to be aborted if they aren’t provided with enough energy to survive. This energy is in the form of sugars and carbohydrates produced during photosynthesis. When photosynthesis falters, tip kernels are the most vulnerable because they are the youngest and farthest from the incoming energy supply.

The three- or four-day period immediately after kernel fertilization is thought to be most critical time for tipping-back. During this period, the plant commits itself to filling as many kernels as it can. The rest are aborted. The control mechanism is not well understood, but the process of grain filling is known to have two stages, cell multiplication and cell elongation. The first is when cells in the developing kernel increase in number or multiply, serving as potential sites for starch deposit. The second is when kernel cells enlarge as starch is deposited. Kernel abortion is thought to occur when reduced energy supplies (stress-induced) inhibit cell multiplication and enlargement stages.

Conditions that result in enough stress to cause tipping-back are usually short-term. Plant stresses that develop over time, such as nitrogen deficiency, usually result in visible signs of reduced crop vigor. This is not the case with tipping-back in that plants are generally able to buffer themselves against short-term stresses. Plants go through many short-term stresses that producers and consultants may never see. Not until these stresses occur over prolonged periods does their damage become visible.

It is relatively rare for corn to exhibit the tipping-back phenomena to any great extent without other visual signs of crop stress such as those caused by too little or too...
Gary Hall, Extension educator in Phelps and Gosper counties: We have had reports of average to above average yields. One farmer reported dryland corn at 153 bu/A with a top on irrigated corn of 200 bu/A. Most of the yields for irrigated corn will probably be in the range of 180 bu/A. Soybeans on dryland have been reported at 40 bu/A. Some irrigated yields were in the 50-60 bu/A range.

By Monday harvest was about 45% complete in Phelps County. Gosper County was about 30% complete. The weather and crop conditions are very good for harvest.

Richard Ronnenkamp, Extension Educator in Boone and Nance counties: Harvest is going well. September has been dry, but a few showers have helped keep moisture levels in the desired range. Dryland corn is above average. Irrigated corn is average. Soybean yields are average. Bean size and condition are a concern and a limit on yield.

Paul Hay, Extension Educator in Gage County: Yields of dryland soybeans in southeast Nebraska were probably hurt 8-10 bushels per acre by dry August and September weather. Yields in the 30s and low 40s have been reported.

Farmers continue to fill home storage first which may make commercial storage even tighter later in the harvest season.

Moisture for fall seeding of wheat and alfalfa have been sparing, but adequate.

Ray Weed, Extension educator in Kimball and Banner counties:

Maize harvest really has not begun here yet. We have had very mild weather so far, but need moisture for our developing and emerging winter wheat. Sunflower harvest will begin after a hard freeze.

Some winter wheat was crusted over from last week’s rains.

Jim Schild, Extension Educator in Scottsbluff and Morrill counties: Scottsbluff County and the North Platte Valley have harvested about 65% of the dry bean crop. Yields have ranged from 25 bu/A to 45 bu/A with an average of 32 bu/A—a little below normal. Early sugarbeet harvest has started with reports of good tonnage and sugar; regular harvest should begin next week. No corn has been harvested for grain, but the crop is looking good.

Estimating losses

When setting a combine, producers often dig through the tailings and residue behind the combine to see how much grain is being thrown over. With straw spreaders, straw choppers, and chaff spreaders, however, not all the grain thrown over is directly behind the combine. Producers need to check across the full width of the header behind the combine to evaluate harvest losses. They also need to check in front of the combine to estimate preharvest field losses and under the combine for header losses.

Count the grain in a foot wide strip across the width of the header. About two kernels of corn per square foot equals a bushel per acre. Likewise, four to five soybeans per square foot or 17 to 22 grain sorghum berries equals one bushel per acre. Losses of 3-5% of the total yield are usually considered acceptable. The combine or operating procedure should be adjusted if measured losses are higher.

Paul Jasa
Extension Engineer
Control weeds early in shelterbelts

The acres in shelterbelts have increased dramatically across the state in the last few years. No doubt producers and homeowners have realized both aesthetic and economic benefits. This is because, when managed correctly, shelterbelts will provide a lifetime of rewards.

Weed control in shelterbelts, however, often can be a problem. This is especially the case this year when weather conditions favored weed growth. In the early to mid-summer there was above average moisture, followed by high temperatures and rapid plant growth. Weeds compete with desired vegetation for necessary soil moisture and nutrients as well as available sunlight. Weeds also harbor harmful insects, diseases and rodents which can severely damage shelterbelts.

There is no arguing the many benefits provided by shelterbelts. When placed around homes, heating costs may decrease because shelterbelts are blocking cold winter winds. Shelterbelts also decrease wind erosion and wind damage to crops, catch snow, provide wildlife habitat, and provide a favorable environment for crop growth.

Within and around shelterbelts, tall perennial grasses such as smooth brome proliferate. These grasses provide excellent nesting cover for upland birds and mammals including pheasant and rabbits while providing security for larger mammals such as whitetail deer. They act as travel corridors for many species of wildlife, allowing them to move freely throughout the landscape, decreasing predation and increasing breeding success. The key to weed control in shelterbelts begins when it’s planted. When developing shelterbelts, the best weed control method is to allow the newly planted seedlings to begin free of weed competition. This is critical for the first two to three years. A fall application would be best for control of perennial weeds within the chosen site. In spring, till the soil to remove much of the annual (Continued on page 211)

Proper calibration is the key to accurate yield monitor results

A yield monitor can be a valuable tool to gather information about crop production. The monitor provides an on-the-go estimate of yield and records the total weight of grain harvested per load, a high tech replacement for a weigh wagon. A yield monitor used in conjunction with a global positioning system (GPS) can estimate the yield at every location in the field. This georeferenced data can be used to develop a yield map showing the yield variability across the field rather than just by loads.

A yield monitor consists of several sensors and a small computer to integrate, display, and save the information. On most yield monitors, the grain flow through the combine is estimated by measuring the force the grain exerts on an impact plate or "fork" at the top of the clean grain elevator. The greater the grain flow, the greater the force or displacement measured. Travel speed is measured, allowing the grain flow to be related to an area since the width of cut is known. Grain moisture content is also measured so that the grain yield can be corrected to a standard moisture content.

In reality, the output from the sensors on the combine are not grain yield and moisture content but only millivolts. Proper calibration involves weighing the grain in a load using a scale and measuring the moisture content with a standard moisture tester. These numbers are entered into the yield monitor's computer, allowing the computer to assign a mass flow rate, based on travel speed, and a moisture content to the millivolt readings sensed. This calibration must be performed for each crop so that the readings recorded can be turned into useful numbers and can be done any time during the harvest season.

Unfortunately, many producers think that calibration consists of harvesting a tank or two of grain, calling that a load on the yield monitor, and weighing that load on a scale to get the bushels harvested, using that as input to the yield monitor. Later they may harvest several grain tank fulls, weighing them all as one load, and inputting that number into the monitor as another calibration point. This procedure actually only provides one calibration number — the average mass flow through the (Continued on page 211)
much nutrients or water. The 1998 growing season is one such case in parts of Nebraska, Kansas and Iowa. Daily weather records at the Nebraska Management System Evaluation Area (MSEA) project near Shelton offered some early clues as to the cause of tipping-back. These records showed an extended period of low light intensity during the first two weeks in July. The situation repeated itself during the last week of July and the first week of August. The most extensive problem with tipping-back at the research site occurred with corn that tasseled beginning about July 4. The problem was much more pronounced for inner-row plants that had to compete for sunlight compared to those in field borders.

Comparing solar radiation in 1998 with that in 1994, a year that produced excellent yields, clearly identifies the periods of low radiation in 1998. The tipping-back problem was not apparent until the second or third week in August. Plots placed under shade material on July 26 helped determine the timing and cause of the tipping-back. This material reduced solar radiation reaching the canopy by 50%. In mid-August, after three weeks of shading, ears did not show any more tipping-back than plants with full exposure to the sun, indicating that the plants outside the shade were already light-stressed. Shaded plants had somewhat smaller kernels and showed more of a gradient in kernel size from the base to the ear (largest) to the tip (smallest). Additional signs of reduced radiation early in the growing were evident by taller plants away from the edge of the field. Plants in the third row of one field examined were 18 inches taller than the outside row. Tipping-back increased from nearly none in the outside row to about 20% beyond the second row.

The extent to which tipping-back will reduce yield remains a question, although preliminary yield reports are providing a clue to the impact. Producers harvesting early-planted corn in the affected area have found that plants often compensated for the reduced sunlight during the critical grain fill period. Some of those with late-planted fields with tipping back are disappointed, however. Corn plants can compensate to some extent for reduced kernel numbers by increasing kernel length. The impact of tipping-back on corn production in Nebraska is largely speculation. Comparing solar radiation during the first two weeks of July with the long-term average shows tipping-back might be expected for a large portion of southern and eastern Nebraska, Northern Kansas, and Western Iowa.

Early-planted fields were less affected by the low radiation than late-planted fields; however, some hybrids were better able than others to tolerate light-stressed conditions.

Jim Schepers
Agronomy Professor
John Shanahan
Agronomy Professor

**Crop report**

Crop conditions this week, according to the Nebraska Agricultural Statistics, are: Corn condition rated 1% very poor, 2% poor, 16% fair, 57% good, and 24% excellent. Dryland corn rated 79% in good or excellent condition and irrigated corn rated 83% in those categories.

Soybean condition rated 2% poor, 22% fair, 53% good, and 23% excellent.

Sorghum condition rated 1% poor, 13% fair, 67% good, and 19% excellent.
Shelterbelts  (Continued from page 209)

weed clutter. Allow annual and perennial weeds to regrow to acceptable heights before applying Roundup or Touchdown, which should eliminate most if not all the weeds present before planting. It is also a good idea to apply a preemergence herbicide such as Princep to control annual grasses and broadleaf weeds. Princep will provide residual weed control for several weeks after planting. Once the seedlings are planted, weed control must be maintained. In smaller shelterbelts, mechanical control can be very effective. In larger areas, Paraquat can be sprayed to control many annual weeds throughout the growing season. Do not allow Paraquat to contact desirable foliage to avoid injury. A mixture of Paraquat and Karmex will provide good control of emerged weed seedlings with some residual control. Spot treatments of Roundup will control perennial weeds although contact with desirable plants will cause severe injury or death.

Many producers and homeowners have expressed concern over the amount of burcucumber this year. This species is an aggressive annual vine that quickly climbs over trees and shrubs. Although this will probably not cause long-term injury to trees, it can canopy over them, reducing sunlight to the tree. This can weaken trees and shrubs as they enter winter dormancy, rendering them vulnerable to diseases and pathogens. Mechanical removal of burcucumber provides the best control. Because this species is an annual, burcucumber is easily pulled out of the ground. Postemergence herbicides that would control burcucumber would also injure desirable trees and shrubs making this a bad option. The best plan for a chemical attack of burcucumber may be a preemergence herbicide application in early summer. Provided trees are at least two years old, Princep can be applied around the drip line at the base of the tree. Princep will provide four to six weeks of residual control.

Planning is essential to good weed control in shelterbelts. Weed control is critical during the first two to three years when weed competition can weaken stands and weed invasions can quickly crowd out newly planted seedlings if not protected. As we have seen this year, invasions from weeds such as burcucumber can damage stands if not planned for. Paying attention to weather conditions, applying preemergence herbicides when needed and removing young weeds in early summer can go a long way in protecting your shelterbelt investment.

Jeff Rawlinson
Extension Assistant Weed Science
Alex Martin
Extension Weed Specialist

Yield monitors  (Continued from page 209)

combine at “normal” operating conditions, usually full load.

The proper calibration procedure usually consists of harvesting several loads, under various mass flow rates, to calibrate the mass flow sensor across the variety of flow rates that occur during harvest. The first load may be at normal operating conditions like the producer above. However, the next loads should be at reduced mass flow rates, like 1/2 speed (or 1/2 width of cut) and 3/4 speed (or 3/4 width of cut) and 1/4 speed (or 1/4 width of cut), and so on to get a variety of flow rates. This calibrates the mass flow sensor for the high and low flow rates that occur when harvesting high and low yielding areas in the field. Consult the yield monitor owner’s manual for the proper procedure recommended for a particular monitor. Follow the directions and don’t skip the low flow rate calibration loads thinking it is waste of time to operate the combine at such reduced capacity.

When comparing the scale weight of a load to that recorded by the yield monitor, producers should resist the temptation to input an “extra” number or two at full load conditions, trying to improve the calibration. For each number entered at full load conditions, the corresponding numbers should be entered for all the reduced flow rates to keep the sensor calibrated across the full range of operation. Extra data points at full load conditions can skew the calibration curve so that values recorded at anything other than full load may not be accurate.

Most yield monitors store the load data internally and can be calibrated any time during the harvest season, making the calibration retroactive to the first data stored. Any data downloaded before calibration will not be valid. Likewise, inputting an extra calibration number or two will change the calibration curve so that any data downloaded after that time will be different than the data downloaded before.

Even with the best calibration procedures, the yield monitor will still have some errors. They should not be used to determine the exact yield of a field or portion of a field. Rather, they are a valuable tool for exploring relative yield differences from various areas of the field, one of many starting points for site specific crop management.

Paul Jasa
Extension Engineer
Evaluating corn nitrogen status:  
Was it too much, too little, or just right?

At harvest as producers assess their corn production strategies, the question arises, "Was my fertilizer program adequate?" One way to test this is with the "end of season" cornstalk test. This test has been calibrated in Iowa and is explained fully in the Iowa State University Extension Publication PM-1584, August 1994, Agronomy 7-4 called Cornstalk testing to evaluate nitrogen management, by A. M. Blackmer and A. P. Mallarino.

What does the test show?

The results of this test indicate whether the corn was overfertilized during the season. Blackmer and Mallarino have calibrated the test to show low, optimal and excess stalk nitrate values. Low values indicate nitrogen may have been deficient. Excess values indicate that there was more nitrogen in the plant than it could have used to produce grain. The scientific basis for this test is the fact that corn will continue to accumulate nitrogen past the level at which rain yield is increased. Corn does not show visible symptoms of excess nitrogen. The stalk analysis helps determine when this occurs. This test is probably best used for finding excess nitrogen since nitrogen deficiencies can be spotted visually by leaf yellowing.

When should the test be used?

Since the test gives an indication of how well nitrogen supply matched corn nitrogen needs, this test can be used to compare alternative practices. While the test can not be used to fine-tune nitrogen management in the season of use it can help give confidence to the producer for giving credit for various nitrogen sources. If nitrogen credit from irrigation water is being tested, the stalk test will confirm if there was optimal nitrogen. If nitrogen credit for legumes is being increased or initiated, the stalk nitrate value will indicate if adequate nitrogen was available. This test also could be used to test manure credits, soil test recommendations and different nitrogen timings.

How to take the test?

Stalk samples should be taken any time between one and three weeks after black layer formation in 80% of the kernels. Take an 8-inch segment from 6 inches to 14 inches above the ground.

Remove leaf 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.

If any of the results are in either the low or excess category, conduct a thorough review of the nitrogen fertilization program to determine where improvements can be made. Several NebGuides are available from your local Cooperative Extension to help fine-tune a nitrogen management program. Every year is different and some weather conditions can affect even the best program. It is important to determine if nitrogen problems were due to management or to unique weather conditions.

This procedure has not been extensively tested in Nebraska, but there is no theoretical reason why it should not be valid here.

Charles Shapiro, Extension Soils Specialist, Haskell Agricultural Laboratory, Concord

Congratulations!

Randy Klein, director of market development for the Nebraska Corn Board, won the drawing at this year’s Husker Harvest Days for a free subscription to Crop Watch for 1999.

Congratulations to Randy and thanks to all who took a few moments to stop by the University of Nebraska Institute of Agriculture and Natural Resources building to talk with specialists and view displays of some of the latest information in agricultural research and education.
October’s optimum for perennial weed control

Throughout the growing season, perennial weeds have caused problems for many weed management programs. October is the best time for good control of many perennial weeds that have evaded weed control tactics throughout the growing season.

Perennials are plants whose life cycle lasts more than two years. Because these plants are long lived and reproduce vegetatively as well as from seed, they are usually much more difficult to control chemically. Usually they have a much larger root mass compared to annuals. This large root mass provides more of a reserve to fall back on when plants are stressed. In order to control these weeds, chemicals must move to the root and kill this part of the plant.

In the fall, perennials begin to transport carbohydrate back to their roots. This provides a supply of nutrients for next year’s growth. With colder temperatures and shorter day lengths, this activity begins to increase rapidly. If there is adequate soil moisture to support active growth, fall is the optimum time for chemical control of many perennial plants. Herbicides contacting and entering the plant will be transported to the root along with the mass flow of other nutrients. Once the herbicide is in the root in sufficient quantity, the plant will die.

Leafy spurge

Leafy spurge, a noxious weed in Nebraska, has quickly become one of the most problematic weeds in the state. Its extensive root system, ability to quickly spread and survive considerable vegetative damage, along with its extended flowering season, make it one of the most difficult weeds to control. This deep-rooted perennial requires a well-planned management strategy.

Fall herbicide applications have shown the best results with respect to controlling leafy spurge. In pastures, effective control can be achieved with Tordon at 2-4 qt/A, 2,4-D at 1 qt/A + Tordon at 1 pt/A, 2,4-D at 4 qt/A or Roundup + 2,4-D at 1 qt/A each. Keep in mind that control will require multiple applications of all but high rates of Tordon. In non-grazed sites, Plateau at 8-12 oz has been very effective in controlling leafy spurge when applied in the fall. Chemical applications should be based on the infestation. Small isolated patches are best controlled with either Plateau or Tordon. Larger infestations make several applications of 2,4-D more feasible.

Canada Thistle

Canada thistle is an aggressive perennial and has been classified as a noxious weed in Nebraska since 1873. It is estimated to infest well over 800,000 acres in northern and western Nebraska. Its extensive root system and ability to produce over 5000 seeds per plant make it difficult to control. Much like leafy spurge, nearly all parts of the root system can produce buds that can eventually form new vegetative shoots.

Several herbicides are available for control of Canada thistle. Banvel at 1 qt/A in the fall will provide 85-90% control. Better control is available with either Roundup at 2 qt/A, Stinger at 1.3 pt/A, or Tordon at 1-2 pt/A. Fall is the best time for herbicide applications to Canada thistle. Herbicide applications in the spring when Canada thistle is about 10-20 inches tall also provide good control. One application will not provide sufficient control; new seedlings will need to be treated for several years. A good Canada thistle control program will call for spring and fall applications for two or three years.

Field bindweed

Field bindweed is another perennial with an extensive root system, reproducing by root buds and seed. This capability along with an extended flowering period make this plant difficult to control, especially in row crops.

In corn, most growth regulator herbicides including 2,4-D and Banvel will provide good control. In soybeans, Roundup at 1 qt/A, will provide some control when applied to young actively growing plants. In non-crop areas, Roundup and 2,4-D or Banvel at .5 pt/A, 2,4-D at 1 qt/A + Banvel at .5 pt/A or Tordon at .5 pt/A + 2,4-D at 1-2 pt/A will also provide good control. Apply herbicides during vigorous fall growth.

Musk thistle

Musk thistle, another noxious weed in Nebraska, is a biennial or occasionally an annual. It reproduces by seed in the fall or spring, forming a rosette of leaves. It can be identified by its alternate clasping leaf blades with serrate margins that lack hair. The large purple heads are prolific seed producers with mature plants producing 5,000-10,000 seeds.

Herbicides applied at the rosette stage in spring or fall provide the best control. Excellent control is available with Tordon at 8 oz/A and Stinger at 5.5 oz/A. Good control can be achieved with 2,4-D at 1 qt/A + Banvel at .5 pt/A and Ally at .2-.3 oz/A. Under favorable conditions, 2,4-D amine is effective.

Alex Martin
Extension Weed Specialist
Jeff Rawlinson
Extension Assistant, Weed Science
As agricultural biotechnology expands, conference addresses the important issues

Advances in biotechnology are greatly extending the range of management choices available in today’s agriculture as well as the information necessary to make those decisions. To better make those choices, producers need information on how biotechnology will affect profits and overall production strategies as well as the long-term effects on crop production, agribusiness, and the economy. A two-day November conference planned by Nebraska producers, agricultural groups and the University of Nebraska will address these issues.

The conference, “Biotechnology in Agriculture: The Bottom Line,” will be Nov. 19-20 at the Clifford Hardin Nebraska Center for Continuing Education on the University of Nebraska’s East Campus in Lincoln at 33rd and Holdrege streets. Experts on biotechnology issues will address scientific, economic, social and environmental issues.

The conference offers producers an opportunity to get the latest information on this fast-changing and complex field, said Rod Gangwish, a Shelton farmer who chairs the conference planning committee.

“For producers, the bottom line is ‘What’s going on in biotechnology and how does it affect me and my operation?’ We’ll cover topics producers need and want to know about,” Gangwish said.

“Biotechnology is affecting you today whether you know it or not,” he said. “It will affect you tomorrow at an increasing rate. If you don’t know what’s happening, you’re driving down the road with your eyes closed.”

The conference is designed for anyone from production agriculture to agribusiness who wants to know more about how biotechnology affects agriculture, said Anne Vidaver, director of NU’s Center for Biotechnology and a conference organizer.

The evening of Nov. 19, keynote speaker Ron Phillips, a University of Minnesota agronomist, will discuss “Public Sector Biotechnology: Its Role and Importance.” Phillips, a member of the prestigious National Academy of Sciences, is former chief scientist for the U.S. Department of Agriculture’s National Research Initiative competitive grants program and was instrumental in the National Plant Genome Initiative. His was among the early research programs in modern agricultural plant biotechnology.

At noon Nov. 20, keynote speaker Paul Raeburn, senior editor for Business Week magazine, will explore “Biotechnology, Business and the Agricultural Landscape.” Raeburn is a former Associated Press science editor, a regular guest on National Public Radio’s “Talk of the Nation: Science Friday” and author of “The Last Harvest: The Genetic Gamble that Threatens to Destroy Agriculture.”

Topics include: plant and animal biotechnology developments; expectations for the future; processing and distribution of biotechnology products; economic implications; labeling, marketing and international trade; issues for small farmers, consumers and rural communities; the need for and potential of biotechnology; and the potential and possible consequences of genetic engineering.

Conference co-sponsors are: Agricultural Builders of Nebraska, the Nebraska AgRelations Council, Nebraska Farm Bureau, Nebraska Beef Council, Nebraska Corn Board, Nebraska Soybean Board, and NU’s Center for Biotechnology, Institute of Agriculture and Natural Resources and the Department of Agricultural Economics.

Conference cost is $80 and includes meals. Registration deadline is Nov. 10. To register or for more information, call the University’s Center for Biotechnology at (402) 472-2635.

Crop diseases diagnosed

Corn diseases diagnosed in the clinic during the last two weeks included maize chlorotic mottle virus, Physoderma brown spot, Goss’s bacterial blight, common rust, Southern corn rust, Helminthosporium leaf spot, northern leaf blight, gray leaf spot, yellow leaf blight, Diplodia ear and stalk rot, Fusarium stalk rot, charcoal stalk rot, and anthracnose stalk rot.

Soybean diseases identified in the clinic were charcoal rot, Rhizoctonia root rot, brown spot, bacterial blight, and bean pod mottle virus.

Sorghum diseases identified included anthracnose stalk rot, gray leaf spot, sooty stripe, bacterial stripe, and bacterial leaf spot.

Loren J. Giesler
Plant and Pest Diagnostic Clinic Coordinator