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Stalk rots common in damaged corn; harvest affected fields first

Several stalk rot diseases in corn are widespread this year and may seriously impact harvest. During a recent survey of central and northern counties, many fields already had stalk breakage with plants and/or ears laying on the ground.

Stalk rot is a family of corn diseases caused by several species of bacteria and fungi. Early symptoms are general in nature (leaves and diseased stalks turn dull and grayish green) and are easily confused with those caused by early drydown and drought stress. This is particularly the case this year. In advanced stages of deterioration the stalks become spongy and soft and the disease may ultimately destroy a major portion of the pith tissue. Depending on which stalk rot pathogen is present, pink, red, or black discoloration of internal stalk tissue may be evident. At this stage of disease development, a wind velocity of less than 20 mph may cause the stalk to break or lodge. However, stalk rot diseases cause damage long before plants collapse and can significantly reduce yield even if plants remain standing.

As in past years, Fusarium and Gibberella stalk rots are very common in most counties. Although less widespread, anthracnose and Diplodia stalk rots are also common this year. In one drought-stressed county, Macrophomina stalk rot was present in several fields. Images of some stalk rot symptoms commonly seen in Nebraska can be found in the NebGuide (G99-1385), Common Stalk Rot Diseases in Nebraska. It is available from your local Cooperative Extension office and on the web at: http://www.ianr.unl.edu/pubs/plantdisease/g1385.htm.

Fusarium and Gibberella stalk rots. Over 75% of field corn plants can be infected with Fusarium stalk rot, although damage often may be late enough in the season that it (Continued on page 191)

Molds pose particular threat in drought-stressed grains

Although grain molds occur in Nebraska every year to varying degrees, they are not usually considered a major constraint to production or marketing of Nebraska corn. However, due to the widespread occurrence of drought stress in Nebraska this year, the potential exists for serious pre-harvest and storage grain mold problems. The potential also exists for mycotoxin contamination of corn at some locations.

The most striking external symptom of grain mold is the presence of the mold itself. The (Continued on page 192)
Ralph Kulm, Extension Educator in Holt County: Dryland corn harvest is underway in Holt and Boyd counties with grain moisture and yield varying greatly due to drought conditions. Stalk rot is already causing a lot of the drought-stricken corn to break over. Many irrigation systems are being shut down with corn at or near black layer. Producers are concerned about blowing soil on soybean fields that were cut for hay.

Gary Hall, Extension Educator in Phelps County: A lot of corn and some soybeans have been harvested. With the corn harvest we are seeing many weed escapes because herbicides weren’t activated due to lack of rain. Corn crop has been average for the most part. Alfalfa is barely holding on with no moisture. Wheat acres will probably decrease for next year unless some moisture falls soon.

September yield forecast

Corn production in Nebraska, based on September 1 conditions, is forecast at 1.03 billion bushels, down 6% from the August 1 forecast, according to the Nebraska Agricultural Statistics Service. Production, if realized, would be the smallest since 1995 when wet weather and abnormally cool temperatures reduced crop yields. Acreage for grain harvest, at 8.05 million acres, is unchanged from last month but 3% below last year. Average yield is forecast at 128 bushels per acre, down 8 bushels from last month, 11 bushels below last year, and the lowest yield since the 111 bushels per acre recorded in 1995. Dryland yields suffered the most, down 34 bushels from the record high set in 1998.

Irrigated corn production is forecast at 749.5 million bushels, down 2% from last month and last year. Yield of 157.9 bushels, is over 3 bushels below last month’s forecast and 1.5 bushels below 1999. Acreage for harvest remained unchanged from the August estimate, at 4.75 million, 1% below 1999.
Stalk rot (Continued from page 189)

doesn’t cause significant yield loss. *Fusarium* can be distinguished by a reddish-pink discoloration of the stalk pith tissue while *Gibberella* can be distinguished by a deep reddish discoloration of the stalk pith tissue (Figure 1).

**Diplodia stalk rot.** *Diplodia*, which is distinguished by brown stalk discoloration and dry rot in the lower two internodes, is less common than *Fusarium* in Nebraska. With this disease, the pith tissue is usually shredded and black spore-forming structures (pycnidia) can be found embedded in the lower stalk surface.

**Anthracnose stalk rot.** In central Nebraska, several fields are severely damaged by anthracnose stalk rot. Anthracnose affects the stalk, leaves and ears and can be distinguished by black discoloration on the stalk surface.

**Charcoal stalk rot.** Charcoal stalk rot (Figure 2) is less common in Nebraska and is usually associated with drought-stressed fields. Internal stalk tissues are gray-black. It is caused by the fungus *Macrophomina phaseolina*, a pathogen with a very large host range including soybean and sorghum. The pathogen survives in the soil as microsclerotia that are produced within the stalk pith tissue of affected plants (Figure 3).

Scouting and management. Scout fields now to assess the degree of stalk rot present. Randomly select 50-100 plants in each field and squeeze the lower two to four internodes. If the stalk is crushable, examine the plant more carefully to try to determine the extent of damage and the type of stalk rot. A hollow shell of a stalk that collapses easily indicates advanced stalk rot. If 25% of the plants have stalk rot, consider harvesting the field as soon as possible after maturity. Stalk rot will continue developing throughout the field until harvest so it’s important to harvest before lodging occurs. While there are no measures to completely prevent stalk rot, the impact of the disease can be lessened next year by selecting hybrids that are tolerant to stalk rot and have good stalk standability and by minimizing moisture, nutrient, and disease stresses during the growing season.

Jim Stack, Extension Plant Pathologist, South Central REC

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Ag risk focus of Monday Market Journal

This Monday’s Market Journal broadcast will feature a discussion of commodity loans and LDPs and the Ag Risk Protection Act. Each month Doug Jose, NU Extension Ag Economist, hosts the show, bringing together experts from across the state to address pertinent topics of risk management and ag marketing.

The Sept. 18 Market Journal will be from 8 to 9:30 p.m. CDT and available as a live webcast on ruralroutes.unl.edu and also down-linked at 18 sites across the state. Contact your local Extension office for the nearest downlink site. The broadcast will be archived on Rural Routes after Sept. 20 at http://deal.unl.edu/ruralroutes/Market/index.htm

Scheduled speakers include:
- Roger Selley and Roy Smith, UNL Extension Agricultural Economists, on “The ABCs of Commodity Loans and LDPs.”
- Don McCabe, Ontario Farmer and Director of the Ontario Corn Growers Association, on “The Financial Situation With Ontario Corn Growers.”

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Molds and mycotoxins  (Continued from page 191)

degree of growth on the kernels and the appearance of the mold (e.g., color and density) varies with the mold species and the environmental conditions in the field and in storage; specifically, temperature and relative humidity. Most grain mold pathogens become associated with the kernel in the field but can grow within the colonized kernel and even spread to adjacent kernels during storage. Consequently, it is imperative to dry down the grain as soon as possible. The decision for some producers may be whether to let the grain dry in the field or harvest higher moisture corn and artificially dry the grain.

Some grain mold pathogens produce compounds (called mycotoxins) that can be toxic to farm animals, wildlife, or humans; however, the presence of mold does not indicate contamination of the grain with mycotoxins. Only certain strains of certain species produce these potentially harmful compounds. The most serious mycotoxin occurring in corn is aflatoxin. It is produced by the fungus Aspergillus flavus. Aflatoxin contamination is common in Texas and the southeast United States but is rare in Nebraska. Fusarium mycotoxins can occur wherever corn is grown but is more common in the Northern Great Plains.

Some grain elevators use the black light test as a preliminary indication of potential toxin contamination. This black light test is very unreliable. Many things will fluoresce under the light, including non-toxin producing fungi and insect parts. Consequently, many false positives can result. Only certain laboratory analyses can establish the occurrence and concentration of mycotoxins. So far this year, all corn samples in Nebraska analyzed for aflatoxin have been negative for aflatoxin or well below the FDA tolerance.

To ensure the quality of Nebraska corn, the Nebraska State Department of Agriculture in collaboration with scientists at the University of Nebraska are monitoring corn from around the state; samples are being analyzed for grain mold pathogens and for aflatoxin and fusarium mycotoxin contamination.

For more general information see NebGuide GOO-1408, Grain Molds and Mycotoxins in Corn, which is available from your local Extension office and at http://www.ianr.unl.edu/pubs/plantdisease/g1408.htm.

Jim Stack
Extension Plant Pathologist
South Central REC

Fall management affects wheat disease risk

Although wheat planting has been underway in western Nebraska since early September, growers in central and eastern Nebraska should wait to plant until the end of September or early October. Early planting is risky because it increases the threat of loss from wheat streak mosaic, barley yellow dwarf, soilborne wheat mosaic, common root rot, take-all, strawbreaker, Hessian fly and Russian wheat aphid. The planting date window for central Nebraska is the third and fourth week of September; for eastern Nebraska it is the fourth week of September and the first week of October. Our two most serious diseases brought on by early planting are common root rot and wheat streak mosaic virus.

Planting date becomes especially important in a dry fall because moisture stressed seedlings are highly susceptible to attack by crown- and root-infecting fungi. Continued moisture stress through late fall and early winter often leads to stand loss from the common root rot-winter injury complex. Affected stands either fail to initiate spring growth or green up unevenly in March and then plants decline and eventually die due to infected crowns and roots. Early planting in September contributes to this moisture stress because it uses up valuable soil moisture in the fall.

In eastern Nebraska winter wheat often follows soybeans. When conditions are dry, it is difficult to plant into a firm seedbed when planting into soybean residue. A firm mellow seedbed provides the necessary seed to soil contact for stand establishment. This helps reduce fall moisture stress, lowering the risk factor for winter injury and crown and root rot. Developing a firm, mellow seedbed is important in any seedbed preparation, but it is even more critical when wheat is planted late following soybeans.

John E. Watkins
Extension Plant Pathologist

Also see page 197, Consider seedbed . . .

Market Journal  (Continued from page 191)

• Al Dutcher, State Climatologist, UNL Department of Agricultural Meteorology, "Climate Update."
• Ron Maas, executive director, Nebraska Wheat Board, "Wheat Market Analysis and the Potential for White Wheat."
• Roy Smith, Nebraska Farmer, "Analysis of Corn and Soybean Market."

The broadcast receives support from the Nebraska Feed and Grain Association; Nebraska Soybean Board; Nebraska Corn Board; and USDA Risk Management Agency.
**Under drought conditions**

**Assessing the need for a fall irrigation**

With most of Nebraska experiencing a moderate to severe drought and the expectation that dry conditions may continue into the 2001 production season, growers are asking whether they should irrigate this fall to refill or partially refill the soil profile.

Keep in mind, the recommended best management practice is to stop irrigation in the fall so that the growing crop depletes most of the available water in the soil profile. Depleting available soil water in the fall means adequate room is available for storing precipitation that occurs in the fall, winter or spring. Applying water through irrigation in the fall coupled with significant precipitation before planting the following season results in higher pumping costs and the potential for deep percolation of water and nutrients below the root zone.

To examine whether a fall irrigation is needed during a drought, consider the following factors.

### Soil type

Coarse or light textured soils hold a relatively small amount of water. In most of Nebraska, off-season precipitation should be adequate to refill the soil profile. For example, in fine sands, a growing crop can use about 0.5 inch of water per foot of soil. Therefore in a 4-foot soil profile, 2.0 inches of precipitation is needed to refill the profile. Loam soils, however, can store over 1.0 inch of available water. In a 4-foot loam soil profile, 1.0-1.25 inches of water used from each foot means that the total water needed at the end of the growing season to refill the soil profile is 4.0-5.0 inches. These values are based on the assumption that the crop was not stressed due to lack of water at the end of the growing season.

### Crop

Corn and soybeans actively use water from a depth of approximately 4.0 feet. Dry beans have about a 3.0 foot profile while alfalfa will actively root to 6.0 feet and beyond. If you have a gravel or hard pan layer, the crop’s active root zone can be decreased dramatically. Knowing your particular field, and the depth of the active root zone for your crops is extremely important when determining soil water storage capacity.

Alfalfa continues to grow until frost. Even after top growth has stopped, soil water is needed to insure good growing conditions during winter dormancy when plant reserves are built for a vigorous spring regrowth. For alfalfa, irrigation may be necessary in the fall to avoid causing water stress in winter. Because the soil profile is large, even though irrigation occurs in the fall, there should still be room for winter and spring precipitation.

### Irrigation system

**Furrow irrigation** tends to refill the soil profile and leaves little room for additional water without causing deep percolation. Although it’s not recommended, a late irrigation this fall would require little labor compared to trying to irrigate next spring before, or soon after, the crop is up. Labor is a key consideration for surface irrigators.

**Center pivot or sprinkler irrigation** allows the irrigator to refill only a portion of the soil profile leaving room for later precipitation. With center pivot systems adding water later in the spring, when the amount of water needed is known, can be much more cost effective.

With the current fluctuation in energy prices, also consider energy costs this fall and projected energy costs for next spring. Remember, applying water in the spring allows you to take advantage of all off season precipitation.

### Water availability

Ground water irrigators generally have water available throughout the year so water can be applied in the fall or spring; however, for surface water irrigators, water may not be available in the canals until late spring. For the surface irrigator who relies on canal water, a fall irrigation may be justified if other factors indicate irrigation is needed.

If irrigation is used this fall prior to harvest, consider the impact of harvesting on potentially wet soils. Compaction this fall will result in more runoff of off-season precipitation as well as problems for crop growth next year.

### Average precipitation

Precipitation varies significantly in Nebraska, ranging from less than 15 inches in the west to over 35 inches in the southeast. Refilling the soil profile by next spring will depend on the amount of off-season precipitation. Based on available forecasts, precipitation for Nebraska during the fall of 2000 through the spring of 2001 is expected to be at or slightly above normal.

Over the last 110 years, average precipitation in Nebraska has occurred seasonally as indicated below:

<table>
<thead>
<tr>
<th>Season</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter (Dec-Feb)</td>
<td>8%</td>
</tr>
<tr>
<td>Spring (Mar-May)</td>
<td>31%</td>
</tr>
<tr>
<td>Summer (Jun-Aug)</td>
<td>41%</td>
</tr>
<tr>
<td>Fall (Sept-Nov)</td>
<td>20%</td>
</tr>
</tbody>
</table>

*(Continued on page 194)*
Fall irrigation  (Continued from page 193)

Recommendations

Based on the average seasonal precipitation amounts, we can expect to receive, from now through May 2001, nearly 60% of our average annual precipitation. This means we can receive nearly 9 inches of precipitation in the west and over 20 inches in the extreme southeast. Not all of the precipitation that occurs will be effective in refilling the soil profile. Some precipitation may run off as a result of intense rainstorms while snow may evaporate directly into the atmosphere. Even at a 50% level of effectiveness, we can expect over 4.0 inches of precipitation in the west and 10.0 inches in the southeast. With an estimated 3.0-4.0 inch depletion in most irrigated fields, refilling the soil to near field capacity by next spring should be possible.

Predicting whether precipitation during the off season will be sufficient requires additional information of temperature and wind variations. If drier than normal field conditions exist in your area, refilling a portion of the soil profile by irrigating this fall will reduce the amount of water needed from precipitation. Remember, a fall irrigation increases the risk of water and nutrient loss by deep percolation. In general, “a wait and see approach” is recommended because there is a good potential of refilling the profile with natural precipitation.

C. Dean Yonts, Extension Irrigation Specialist
Panhandle REC
Q. Steven Hu
Assistant Professor
School of Natural Resources

How much nitrogen are you leaving behind?

With grain prices dropping and fuel prices climbing, cutting costs is a primary means of farming profitably. The 1999 Nebraska Farm/Ranch Business Management Report showed that farmers in the high profit one-third (irrigated corn, owned land) had total fertilizer costs of $29.43/ac, while the low profit one-third spent $43.41/ac.

Nitrogen rate is one production input many farmers should re-evaluate. One evaluation tool recommended by UNL Extension agronomists is the end-of-season corn stalk nitrate test. This test shows producers whether there was too little, enough, or excess nitrogen available to the crop late in the growing season. Excess nitrogen applied to the field and absorbed by the corn plants but not used to make grain will accumulate in the lower stalk.

The cornstalk nitrate test gives farmers 20-20 hindsight on their nitrogen program for the year. If the nitrates are high, then less nitrogen could have been applied. Excess nitrogen costs money and is wasted if it leaches or if a legume is planted next year. If nitrate leaches below the root zone it eventually contaminates the groundwater. Growers should use this test now to fine tune next year’s nitrogen rates, especially where manure was applied. Fields of dryland, drought-stressed corn would be expected to have a higher stalk nitrate level this year and should not be included in the sample.

For the corn stalk nitrate test, sample one to three weeks after the black layer forms in most kernels, but before harvest. Use a small bypass pruning shears or knife to cut an 8-inch long segment of stalk between 6 and 14 inches above the soil. Remove any leaf sheaths and discard all segments that have stalk rot or insect tunneling. Collect 15 segments from a uniform area (same soil type and history). Consultants and fertilizer dealers may be willing to take samples for a fee.

Keep samples cool and send immediately to a lab. The cost of laboratory analysis may be $6 to $10 per sample. Nitrates less than 250 ppm are Low, 250 to 700 ppm are Marginal, 700 to 2000 ppm are Optimal, and more than 2000 ppm are Excess.

Charles Shapiro, Extension soil fertility specialist at the NU Haskell Ag Lab, wrote about this test in the Agronomy Department’s “Soil Science News” (18:7). It is available from your County Extension office or at www.iianr.unl.edu/iianr/agronomy/ssnL7.htm. Iowa State University also has a publication on corn stalk testing (Pm-1584). It’s on the Web at www.extension.iastate.edu/Pages/pubs/so.htm.

Richard DeLoughery, Water Quality Education Coordinator, Northeast REC

Crop condition report

The Nebraska Agricultural Statistics Services provided the following report on crop conditions across the state, as of Monday:

**Corn** condition rated 18% very poor, 15% poor, 35% fair, 23% good, and 9% excellent. About 53% had matured, well ahead of last year at 18% and the average at 12%. Harvest is about two weeks ahead of normal.

**Soybeans** remained in mostly fair condition. By week’s end, 83% of the crop had turned color, compared to 43% last year and 39% average.

**Sorghum** remained in mostly fair condition. The crop was 87% colored by week’s end, ahead of last year at 63% and average at 64%. About 50% was mature, compared to 2% last year and 5% average. Harvest had begun in the East Central and Southeast Districts.
Clean bins, treat grain to avoid insect losses during long-term storage

To keep stored grain in good condition for at least a year, it’s important to properly prepare bins for storage, provide good temperature and air flow management, and monitor the grain throughout the period.

While no grain bin can be protected indefinitely from insect infestation, economic losses can be prevented with:

1. clean harvesting equipment;
2. proper bin preparation,
3. management of the grain environment, and
4. insect monitoring throughout the storage period.

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. Adjust combines according to the manufacturer’s specifications to minimize grain damage and to maximize removal of fines and other foreign material. Many common grain insects are secondary feeders, feeding only on broken or cracked kernels and other material, not sound grain.

Check the bin site and remove any items or debris that would interfere with safe, unobstructed movement around the bin. Remove any spilled grain and mow the site to reduce the chances of insect or rodent infestation. If necessary, re-grade the site so that water readily drains away from bin foundations. Inspect bins and foundations for structural problems. Uneven settlement of foundations can cause gaps between the foundation and bottom edge of the bin. This can result in grain spills and provide entry points for water, insects, and rodents. If perforated floors are used, a gap between the foundation and bin will allow air that would normally be forced through the grain to escape from the bin. Small gaps in bins can be filled with a high quality caulking compound. If deterioration is extensive, the mastic seal may need to be replaced. Be sure that all anchor bolts are tight and not damaged. Repair or replace any other deteriorated bin components.

Remove old grain with brooms and vacuum cleaners. Avoid placing new grain on top of old grain. Also, clean bins not being used for storage this year to keep insects from developing in them and then migrating to nearby bins.

If long-term storage (over 10 months) is planned, consider treating the cleaned bin with protective insecticides two to three weeks before new grain is added. Apply the spray to the point of runoff to as many surfaces as possible, especially joints, seams, cracks, ledges, and corners, including outside the bin at the foundation and near doors, ducts, and fans.

Malathion, methoxychlor, Tempo, and Reldan (sorghum only) can be used for treating bin surfaces. Tempo and methoxychlor should not be applied directly to the grain. Reldan can only be used if sorghum is to be stored. As with all pesticides, read and follow label directions during handling, mixing, and application.

To reduce the incidence of insects and molds, cool and dry the grain immediately after combining. Deterioration of grain quality occurs rapidly at higher moisture and temperatures. For example, grain held continuously at 75°F and 25% moisture content will deteriorate more in four days than 15% moisture grain held at 60°F would in 250 days. Warm, moist grain is more prone to insect and mold problems.

As grain is being augured into storage, apply a liquid or dust grain protectant if the grain is to be stored for 10 months or more. Use either premium grade malathion (corn and sorghum), Actellic (corn and sorghum), or Reldan (sorghum only). Soybean experiences few insect problems and need not be treated as it enters the bin. Power spray applicators are preferred over gravity drip applicators because they provide more uniform coverage, giving better insect control.

Treating when grain temperature is above 90°F and grain moisture is above the recommended level for long-term storage will increase the breakdown rate and limit insecticide effectiveness. If grain must be treated when it is warm, it should be cooled with an aeration system as soon as possible. Operation of the aeration system will not remove the protectant from the grain.

After the grain has been leveled in the bin, an insecticide should be applied to the surface to form a barrier to prevent infestations. A surface treatment (topdress) should be applied to all grain. Insecticides labeled for surface applications are:

- **malathion** on corn, wheat, oats, rye, barley, sorghum, and sunflowers;
- **chlorpyrifos-methyl** (Reldan) on wheat, oats, barley, rye, sorghum, and sunflowers;
- **pyrethrins plus piperonyl butoxide** on corn, wheat, oats, barley, rye, sorghum, and sunflowers;
- **Bacillus thuringiensis** (Dipel, Top-Sideside and others) a biological control compound, on corn, soybeans, wheat, oats, barley, rye, sorghum, and sunflowers;
- **Pirimiphos-methyl** (Actellic 5E) on corn and sorghum;

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Aerate stored grain to control temperature

Corn is a perishable commodity with a limited shelf life that depends on the moisture content and temperature of the grain. With the warm temperatures this harvest season, special attention needs to be paid to the grain temperature in storage, especially with higher moisture contents, drought damaged grain, or low test weights. The harvested corn needs to be cooled as quickly as possible to reduce biological activity within the grain mass. In addition, insect activity is greatly reduced when grain temperatures are below 50°F.

Aeration is required for temperature management in all stored grains, regardless of moisture content. The average temperature of the grain mass should be kept within 10 degrees of the average ambient air temperature. This minimizes moisture migration within the grain mass, reducing the chances of condensation and spoilage.

When holding corn above 16% moisture content, continuous aeration is required, especially when the temperature is above 50°F. The temperature of the corn mass will not remain constant because biological activity of the corn releases heat that increases corn temperature. The higher corn temperature, in turn, increases biological activity, which can rapidly lead to corn deterioration. Aeration systems are needed to offset this temperature rise and to adjust the corn temperature to ambient temperatures. Without aeration, wet corn cannot be held.

Estimated shelf life

Successfully holding wet corn requires an understanding of aeration systems and the effects of corn moisture, temperature, and damage levels on shelf life of the corn. Use the table to estimate the shelf life of aerated corn based on the moisture content and temperature of the corn. The shelf life data are not valid for corn held without aeration. Unaerated corn may deteriorate three times faster than indicated in the table.

<table>
<thead>
<tr>
<th>Corn Temp, °F</th>
<th>Corn Moisture Contents (Wet Basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16%</td>
</tr>
<tr>
<td>30</td>
<td>939*</td>
</tr>
<tr>
<td>35</td>
<td>626*</td>
</tr>
<tr>
<td>40</td>
<td>418*</td>
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<td>45</td>
<td>279*</td>
</tr>
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<td>50</td>
<td>186*</td>
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<td>55</td>
<td>123*</td>
</tr>
<tr>
<td>60</td>
<td>81</td>
</tr>
<tr>
<td>65</td>
<td>61</td>
</tr>
<tr>
<td>70</td>
<td>45</td>
</tr>
<tr>
<td>75</td>
<td>33</td>
</tr>
</tbody>
</table>

Shaded bold numbers: Corn held at these temperatures and moisture contents requires frequent inspection and continuous aeration.

* Under Nebraska weather conditions, corn temperatures cannot be maintained at these levels for the indicated length of time.

The shelf lives given in this table represent the lengths of time that good quality, aerated shelled corn can be stored before losing one-half percent of dry matter at various temperatures and moisture contents. With this amount of dry matter decomposition, it is assumed that the corn loses some quality, but maintains its market grade. Deterioration rates also depend on kernel damage from harvest and previous mold or insect damage. These storage times may be optimistic if excessive damage exists.

Aeration systems

A well-designed aeration system is necessary to safely hold wet corn for even short periods of time. Adequate air-flow within the corn mass is essential to carry away heat generated by mold and corn respiration. This is particularly important when holding corn with shelf lives of less than one month.

Research has shown that corn in this condition needs to be cooled within one or two days after being placed in the bin to avoid significant mold damage. This rapid cooling rate can be achieved only in bins with fully perforated floors and fans capable of delivering airflow rates of at least 0.33 to 0.5 cfm/bu. Airflow rates of 0.1 to 0.2 cfm/bu normally used for aerating dry corn (corn with less than 16% moisture content) are not adequate to safely hold corn with less than one month of shelf life. Airflows higher than aerator rates (about 1.5 to 2 cfm/bu) can be used for natural air drying to reduce the moisture content of the stored grain.

Additional details of aeration system design and management are in NebGuides G84-692, Aeration of Stored Grain; G94-1199, Management to Maintain Stored Grain Quality and the Midwest Planning Service publication, MWPS-22, Aeration System Design.

Dry corn aeration systems can be used to hold lower moisture corn for extended periods of time. Generally, longer term wet corn storage is possible only if corn temperatures are maintained below 50°F. In Nebraska, these temperature levels can typically be maintained from

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Consider seedbed, equipment when planting wheat into dry soils

It’s been dry, but how dry? Since officials first started keeping weather records at the University Dryland Farm south of North Platte in 1907, 1940 was the only year, besides this year, with less rainfall from September 1 to August 31. With such dry conditions, many are asking whether they should plant wheat now into dry soil or wait for rainfall to improve soil moisture.

That decision depends on several factors, including the planting equipment to be used, the seed selected, and the condition of the seedbed.

Examine field equipment to ensure that openers and disks are not worn. For hoe drills, good quality spear point or eagle-back openers usually improve performance.

For seedbeds that have been tilled (usually fallow) and where the seed can be placed in firm soil at the correct seeding depth for the winter wheat variety, the producer’s best option is probably to go ahead and seed even if the soil is dry and the wheat seed will not germinate. Wheat requires 41% seed moisture for germination which is 9% more than corn (32%) but 10% less than soybean (51%).

The maximum depth a winter wheat variety can be planted with a short length coleoptile is 2 inches in a silt loam soil. These planting depths need to be reduced by up to 1/2-inch in extremely fine-textured soil with a lot of clay content and increased by up to 1/2-inch in coarse-textured soils with lots of sand. For winter wheat varieties with medium-length coleoptiles, these seeding depths can be increased by 1/2-inch. For long length coleoptile varieties, the seeding depth can be increased to 3 inches with the adjustment for the soil texture. Warmer soil tends to shorten the coleoptile length. The coleoptile penetrates the soil and results in seedling emergence. If the seed is planted too deep, beyond the elongation of the coleoptile, seedlings cannot emerge and a poor stand will result.

If the seedbed is loose and the seed would be placed in loose soil, consider delaying seeding until there is enough moisture to firm the seedbed. Seed placed in a loose seedbed usually results in increased winter injury -- root and crown rot. Remember to increase seeding rates if the seeding date is delayed beyond the optimum time. This will help compensate for a loss of tiller development resulting from the later planting.

Hoe drills, especially those with wider row spacing, can plant seed deeper because they can build a ridge and plant in the furrow. The seeding depth then becomes the soil cover over the seed. If the seedbed was not tilled too deep, it usually is possible, with the hoe drill, to place the seed in firm, moist soil. Deep tillage or applying anhydrous ammonia with knives can dry out the soil, so it could be impossible to place the seed in firm moist soil, even with a hoe drill.

As with everything, there are drawbacks to the hoe drill. The biggest is that if a hard rain occurs, the ridges will be destroyed and the seed, or developing plant, will end up under too much soil cover.

Seeding with a disc drill in a loose seedbed almost guarantees disaster. Wait until there is sufficient moisture and decrease ground speed so adjacent rows are not covered with soil.

For continuous cropping do not till. If you do till, the seedbed will dry out to the depth of tillage. The soil should be firm after soybeans are harvested. If planting winter wheat this year, make sure the drill is running lower in back than normal. Transfer more weight to the back of the drill and add extra weight to the drill. This will allow for penetration into dry, hard soil, forcing the seed into the soil and insuring seed-to-soil contact. Also, don’t plant wheat too shallow. When using disc drills, plant to a depth of 2 inches.

Do not seed winter wheat a lot earlier than the suggested seeding date for your area. (See dates in Sept. 1 Crop Watch.) Early seeding leads to problems with diseases such as wheat streak mosaic and insects such as hessian fly.

As with all these rules, there are exceptions. The biggest rule is to make sure you seed by the required date for crop insurance in your area. (See Table, page 198.)

Robert N. Klein, Extension Dryland Crops Specialist, West Central REC
Paul J. Jasa, Extension Engineer
Stephen P. Baenziger, Professor
Department of Agronomy

NU Diagnostic Clinic report

The following diseases were diagnosed Aug 15 - 29 in the NU Plant and Pest Diagnostic Clinic:

Alfalfa -- rust (Platte County);
Corn -- gray leaf spot (Kearney, Madison, Washington, and Wayne counties), and Stewart’s bacterial wilt (Kearney, Madison, Pierce, and Wayne counties);
Soybean -- charcoal rot (Burt, Jefferson, Johnson, and Pierce counties) and Rhizoctonia (Buffalo County).

Jennifer Chaky, Coordinator
NU Plant and Pest Diagnostic Clinic
Wheat planting  
(Continued from page 197)

Final planting dates for winter wheat.

October 5

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October 10

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October 15

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Aeration  (Continued from page 196)

Oct. 15 through April 15. While continuous fan operation is preferred, it is not always required to maintain cool corn temperatures and control mold activity. Once corn is cooled below 35°F, respiration of corn and molds is slowed and the fan needs to be operated only enough to ensure that temperatures remain at that level.

Do not expect to dry corn in a system designed to temporarily hold wet corn, or even in a normal aeration system. Continuous aeration will dry corn very little during the fall and winter. With 0.1 or 0.2 cfm/bu, there is not enough airflow to change the moisture content more than 1 percentage point. With these low airflow rates, drying times are so extended that some of the corn usually goes out of condition before drying is complete. The best chances for success are with systems designed for airflow rates of at least 1.0 cfm/bu and filled with corn no wetter than 18% moisture content. For this situation, drying can be successfully completed if the fan is run continuously until the corn is dried.

(Adapted from NebGuide G87-862-A, Holding Wet Corn With Aeration) 

Paul Jasa  
Extension Engineer

Treating grain bins  (Continued from page 195)

- Diatomaceous Earth - Recommended application of Diatomaceous Earth products include treating the first loads of grain in the bottom of the bin and the last loads at a rate of 1-2 lbs./1000 bu. In 1991, diatomaceous earth was approved for insect control in bulk grain. Diatomaceous earth kills insects with its abrasive qualities and does not leave unacceptable pesticide residues as do some contact insecticides. Diatomaceous earth is now acceptable as an additive to grain as long as its presence is written on the label of the submitted sample. If diatomaceous earth is identified as an unknown foreign substance in an inspection, the grain can be labeled as sample grade, the lowest designation. Consequently, it is advisable to identify the diatomaceous earth when the grain is submitted for grading.

The Indian meal moth is a common problem in Nebraska stored grain, including soybeans. The moth itself does not feed on the grain, but the larva is a surface feeding insect that will infest the top foot or so of the grain mass. It also may be found in perforated floor or door areas. It is resistant to control with malathion. If this insect is a problem, other surface treatments will have to be used. The biological control compound Bacillus thuringiensis (Bt) is labeled for control of the larvae of this insect; however it will not control other insects that may infest stored grain. Bacillus thuringiensis (Bt) could be used with other materials. In some areas, Indian meal moth resistance to Bt is being reported, so inspections are critical in maintaining stored grain quality.

Dichlorvos strips (Vapona) are labeled to be used in the space above all stored grains for the control of flying insects, including adult Indian meal moths. Use one strip per 1,000 cubic feet of air space above the grain and change every six to eight weeks. Actellic and Diatomaceous Earth may be used for all insect problems including Indian meal moth.

Inspect grain at least once a month in winter and every two weeks in the summer. If problems are detected, they need to be evaluated and corrected as soon as possible. This may include cooling with aeration, further drying, or fumigation for insect control.

Keith Jarvi  
Integrated Pest Management  
Northeast REC