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Corn Quality Issues in 2008 – Storage Management

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Abstract
Grains have a shelf life just like any food product. Shelf life is primarily determined by moisture content and temperature. It is gradually used through the time before use, and each operation or storage regime consumes a portion of the life.

Keywords
Agricultural and Biosystems Engineering, Agronomy

Disciplines
Agricultural Science | Agriculture
Corn Quality Issues in 2008 – Storage Management

By Charles Hurburgh, Department of Agricultural and Biosystems Engineering; Roger Elmore, Department of Agronomy

Grains have a shelf life just like any food product. Shelf life is primarily determined by moisture content and temperature. It is gradually used through the time before use, and each operation or storage regime consumes a portion of the life.

Check combine settings between fields because fines and cracked kernels spoil much faster than whole, sound kernels. Grain that starts to heat or get moldy has essentially used its storage life. The goal of grain storage management is to reduce the rate at which the life is lost. Every action taken after harvest affects the ultimate length of time grain can be stored and the quality at the time of use. Always get grain cool quickly and minimize variations both from the dryer and from the field.

Holding wet grain, especially without aeration, shortens shelf life considerably. Fungi grow very fast in corn above 20 percent moisture. Overnight storage of wet corn in a wagon or truck can have a marked effect on future storability. Always get wet corn into an aerated storage immediately. Likewise the practice of holding medium moisture corn (16-20 percent) for future blending or feeding opportunities will cause problems for corn stored (even after drying) into the following summer.

Aeration Practice

Phase 1: Fall Cool Down
• Lower grain temperatures stepwise
  • October 40-45 F
  • November 35-40 F
  • December 28-35 F

Phase 2: Winter Maintenance
• Maintain temperatures with intermittent aeration
  • January, February 28-35 F

Phase 3: Spring Holding
• Keep cold grain cold
  • Seal fans
  • Ventilate headspace intermittently

This year there will be more wet corn held because of high field moistures and expensive drying. Wet corn should be checked weekly, and monitored for temperature increases. Wet corn should have 0.2 cfm/bu of aeration, double the normal rates for dry corn. Problems will start to show up in February and March as temperatures rise.

Options when large amounts of wet corn exceed drying capability
1) Dry to 17-18 percent moisture and cool in the storage bin. Corn will end up at about 16 percent moisture.

2) Dry to 20 percent moisture, cool in bin, hold wet corn for spring.
The less you dry, the more risk you are accepting. But spreading out the
drying into spring may be the only choice. Risk will require more constant
attention.

Be selective about what corn is placed in storage versus moved at harvest.
Deliberately decide which corn and bins are going to be kept into the
summer. This should be your best (highest test weight) corn, harvested below
20 percent moisture with careful combine settings to minimize trash and
placed in storages with good aeration rates/airflow distributions.

Low test weight corn should not be put in temporary storages or outdoor piles.
It is also not wise to mix corn of different crop years in the same storage bin;
the mix is generally much less stable than each year’s crop stored separately.
The 2008 corn will be more susceptible to mold and heating in storage than
average corn at the same moisture, which means that holding wetter corn
should only be done in cases where there is drying or other options to halt
spoilage if it starts.

Remove the center core and use a grain distributor if possible. Check your
grain at least every two weeks, with some way to take grain temperatures. If a
slow rise is noted, aerate. If a hot spot starts, make that the next corn to be
moved out; one storage problem always leads to another.

Understand your buyers’ needs, and match storage and drying practice to
intended marketing time. For example, corn sold for July or August 2009
delivery should be dried more fully right away.

The table below shows the maximum storage time for corn and soybean
based on temperature and moisture content. The data is from USDA research
at Iowa State University.

<table>
<thead>
<tr>
<th>Corn Temperature °F</th>
<th>Moisture Content (top %)</th>
<th>Soybean (bottom %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>13%, 14%, 15%, 29%</td>
<td>9.4, 6.1, 1.3</td>
</tr>
<tr>
<td>50</td>
<td>12%, 13%, 15%, 20%</td>
<td>5.3, 3.4, 0.6</td>
</tr>
<tr>
<td>60</td>
<td>11%, 12%, 14%, 16%</td>
<td>3.0, 1.9, 0.3</td>
</tr>
<tr>
<td>70</td>
<td>10%, 11%, 13%, 15%</td>
<td>1.7, 1.1, 0.3</td>
</tr>
<tr>
<td>80</td>
<td>9%, 10%, 12%, 14%</td>
<td>0.9, 0.9, 0.3</td>
</tr>
</tbody>
</table>

*Based on 0.5% maximum dry matter loss—calculated on the basis of USDA research at Iowa State University. Corresponds
to grade number loss; 2-3% points in damaged seeds.
Soybean approximated at 2% lower moisture than corn.

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responsibilities in corn production.

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