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Update on 2014 Crop Quality

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Update on 2014 Crop Quality

Abstract
It seems like a broken record...weather changes have shifted expectations of new crop corn quality. Three weeks ago, somewhat wetter corn than normal but high quality was the forecast. It is clear that the wetter part will come true; early harvest moistures are generally coming in at 18 – 22 percent, which is above average but not high enough to cause severe complications in drying. Field drydown is probably nearly over so do not expect much change in moisture from here on.

Keywords
Agricultural and Biosystems Engineering, Plant Pathology and Microbiology

Disciplines
Agricultural Science | Agriculture | Bioresource and Agricultural Engineering | Plant Pathology

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Update on 2014 Crop Quality

October 15, 2014

By Charles Hurburgh, Department of Ag and Biosystems Engineering; Alison Robertson, Department of Plant Pathology; and Erin Bowers, Department of Agricultural and Biosystems Engineering.

It seems like a broken record...weather changes have shifted expectations of new crop corn quality. Three weeks ago, somewhat wetter corn than normal but high quality was the forecast. It is clear that the wetter part will come true; early harvest moisture is generally coming in at 18 – 22 percent, which is above average but not high enough to cause severe complications in drying. Field drydown is probably nearly over so do not expect much change in moisture from here on.

Overall quality has been put at risk however, in some areas. The mid-September frost in far northern Iowa caused more reduction in grain fill than was previously thought. This is showing up as lower test weight. This issue is more prevalent in Minnesota, Wisconsin
and northern Illinois. The rest of the state still is seeing test weights 57 lb/bu and up, after drying. If you have some frost related issues, see PM1635, *Frost Damage to Corn and Soybeans*.

However, the southern half of Iowa (see map below) has had extreme rains in late September into October. This will raise the chances of field molds, primarily Gibberella, but Fusarium may also be present. Both of these fungi produce toxins. The most likely will be deoxynivalenol (vomitoxin), others include zearalenone (often found with vomitoxin) and fumonisin.

![Accumulated Precipitation Map](image)

Examples of affected ears and recommended feeding limits are given below. None of these toxins are regulated by Food and Drug Administration, but guidance or advisory level recommendations have been issued as a result of the negative health impacts they can have on livestock that consume them.
Photo. Gibberella Ear Rot – produces deoxynivalenol (vomitoxin) and zearalenone

Advisory Levels for Deoxynivalenol (Vomitoxin) in Livestock Feed

<table>
<thead>
<tr>
<th>Class of Animals</th>
<th>Feed Ingredients &amp; portion of the diet</th>
<th>DON level in ingredients and (finished feed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruminating beef and feedlot cattle older than 4 months</td>
<td>Grain and grain by-products not to exceed 50% of the diet</td>
<td>10 ppm (10 ppm)</td>
</tr>
<tr>
<td>Ruminating dairy cattle older than 4 months</td>
<td>Grain and grain by-products not to exceed 50% of the diet</td>
<td>10 ppm (5 ppm)</td>
</tr>
<tr>
<td>Chickens</td>
<td>Grain and grain by-products not to exceed 50% of the diet</td>
<td>10 ppm (5 ppm)</td>
</tr>
<tr>
<td>Swine</td>
<td>Grain and grain by-products not to exceed 20% of the diet</td>
<td>5 ppm (1 ppm)</td>
</tr>
<tr>
<td>All other animals</td>
<td>Grain and grain by-products not to exceed 40% of the diet</td>
<td>5 ppm (2 ppm)</td>
</tr>
</tbody>
</table>

Zearalenone causes estrogenic activity in swine and dairy that manifests as reproductive effects.

Negative effects on cattle:
- Infertility
- Reduced milk production
- Hyper-estrogenism

Negative effects on swine:
- Enlarge mammae
• Swelling of uterus and vulva
• Atrophy of the ovaries
• Withered testes

There are no FDA action, advisory, or guidance levels for Zearalenone.

Photo: Fusarium Ear Rot- produces fumonisins

Guidance Levels for Total Fumonisins in Livestock Feed

<table>
<thead>
<tr>
<th>Class of Animal</th>
<th>Feed Ingredients &amp; portion of the diet</th>
<th>Fumonisin level in ingredients and (finished feed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equids and rabbits</td>
<td>Corn and corn by-products not to exceed 20% of the diet</td>
<td>5 ppm (1 ppm)</td>
</tr>
<tr>
<td>Swine and catfish</td>
<td>Corn and corn by-products not to exceed 50% of the diet</td>
<td>20 ppm (10 ppm)</td>
</tr>
<tr>
<td>Ruminants, Poultry, and mink (all breeding)</td>
<td>Corn and corn by-products not to exceed 50% of the diet</td>
<td>30 ppm (15 ppm)</td>
</tr>
<tr>
<td>Ruminants ≥3 months old being raised for slaughter and mink for pelt production</td>
<td>Corn and corn by-products not to exceed 50% of the diet</td>
<td>60 ppm (30 ppm)</td>
</tr>
<tr>
<td>Poultry being raised for slaughter</td>
<td>Corn and corn by-products not to exceed 50% of the diet</td>
<td>100 ppm (50 ppm)</td>
</tr>
<tr>
<td>All other species or classes of livestock and pet animals</td>
<td>Corn and corn by-products not to exceed 50% of the diet</td>
<td>10 ppm (5 ppm)</td>
</tr>
</tbody>
</table>

The best action is preharvest scouting of fields. Once harvested the presence of the fungi and subsequently the risk for toxin contamination is more difficult to assess. If ear rot is present on more than 10 percent of the ears in a field, that field should be scheduled for harvest sooner. Harvested grain should be dried to less than 15 percent moisture and cooled immediately to prevent further growth of the mold and production of toxins. Affected grain should be stored apart from non-affected grain.

Affected corn fed on farm should be tested; your veterinarian can access the Iowa State University Vet Diagnostic Lab. Official USDA-GIPSA grain inspection agencies can also test for these toxins. Provide at least 10 lbs of sample taken from multiple points in the grain lot.
Feed and processing markets are probably monitoring for toxins on a periodic composite sample basis. Testing every incoming load is not very practical except in extreme conditions. The tests for these toxins are generally immunoassay-based strips that take about 10-15 minutes to run and cost about $10-$15 per toxin.

In Iowa the highest risk areas for toxins will correspond to the areas with highest rainfall during harvest. This makes occurrence spotty with rainfall patterns.

Overall the risk of toxins in 2014 corn is not yet clear, but the wet conditions have increased the possibility of vomitoxin, zearalenone, and fumonisin. Aflatoxin is not a threat in Midwest corn this year. Grain buyers should monitor composite samples to identify potentially high risk areas. If mycotoxin levels in composite sample tests exceed about 40 percent of the limit for a specific toxin in composite samples, stored grain will likely have pockets of contamination above recommended feeding levels for certain livestock. Best practice would be to increase testing frequency in order to either reject or isolate highly contaminated lots at the point of delivery for use in feed for livestock that have a higher tolerance.

Visibly moldy grain, sufficient to create Damage discount, may not be present in all samples with toxins. Grain fed from fields showing the presence of fungi should be tested before use.

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**Category:** Crop Production, Plant Diseases

**Crop:** Corn

**Tags:** Corn, corn quality, mold, fungi, toxin, livestock feed

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