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Characteristics of Corn Left Standing Through Winter 2009-2010 in Iowa

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Characteristics of Corn Left Standing Through Winter 2009-2010 in Iowa

Abstract
Very wet conditions in October 2009 and early snowfalls in November resulted in several thousand acres of corn left standing through the winter in Iowa. Considering the grain quality issues that ended the growing season, concerns were raised regarding the quality of corn left standing over the winter.

Keywords
Plant Pathology, Agricultural and Biosystems Engineering

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Plant Pathology

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Characteristics of Corn Left Standing Through Winter 2009-2010 in Iowa

Alison Robertson and Gary Munkvold, Department of Plant Pathology; Charles Hurburgh, Department of Agricultural and Biosystems Engineering

Very wet conditions in October 2009 and early snowfalls in November resulted in several thousand acres of corn left standing through the winter in Iowa. Considering the grain quality issues that ended the growing season, concerns were raised regarding the quality of corn left standing over the winter.

To address these concerns, samples of ears were collected from 72 fields throughout Iowa in March 2010. Ears were visually assessed for ear rot severity. After shelling, test weight, moisture, protein, oil, starch and density were determined before grain was ground and tested for deoxynivalenol (DON), zearalenone (ZEA) and fumonisins (FUM) using GIPSA-approved commercially available antibody-based lateral flow strip tests.

Ear rot severity (percentage of ear covered with mold), physical characteristics and mycotoxin contamination were compared with ear samples collected in October 2009 from 27 arbitrarily selected Iowa fields. These fields were part of the 2009 Iowa Hail Damage Grain Quality Survey and were considered representative of undamaged corn grain at the end of the 2009 growing season.

Mean ear rot severity among standing corn fields ranged from 0.2 to 83.8 percent (Table 1). Ear rot severity in standing corn (24.0 percent) was statistically greater than ear rot severity in October 2009 (3.3 percent). The predominant ear rot in standing corn was Cladosporium, followed by Fusarium and Gibberella at low levels, which is similar to ear rots present on corn in October 2009.

Not surprisingly, range in test weight of the standing corn was similar to that of corn in October 2009, and grain moisture was significantly lower in standing corn (18.4 percent) compared with grain moisture in October 2009 (24.4 percent) (Table 1).

Low levels of fumonisin (0.1 ppm), DON (0.9 ppm) and zearalenone (0.72 ppm) were detected in grain from standing corn and these levels of mycotoxins were not statistically different from those detected in grain sampled in October 2009 (Tables 1).

Grain that remained in the field actually fared better than grain stored in bins over the winter. Although severity of Cladosporium ear rot was high, most growers reported that “the mold blew off in the combine” and grain quality was good. These findings may create viable alternatives to ground piles for wet corn volumes beyond dryer capacity at elevators.

We thank ISU Extension field agronomists for collecting ear samples, and growers who allowed us to sample their fields. We also thank Agribusiness Association of Iowa, ISU College of Agriculture and Life Sciences, and Iowa
State University Extension who provided funding to cover costs associated with this survey.

Table 1. Ear rot severity, test weight, moisture and mycotoxin levels of grain from 99 ear samples collected from 72 overwinter standing corn fields and grain from 27 ear samples collected from fields in October 2009.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Standing corn (n = 72) Mean (range)</th>
<th>October 2009 (n = 27) Mean (range)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ear rot severity (%)</td>
<td>24.0 (0.2 - 83.8)</td>
<td>3.3 (0 - 16.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Test weightb</td>
<td>52.5 (31.8 - 59.1)</td>
<td>53.1 (49.3 - 58.6)</td>
<td>0.768</td>
</tr>
<tr>
<td>Moisture (%)</td>
<td>18.4 (13.9 - 23.3)</td>
<td>24.4 (18.2 - 38.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fumonisin (ppm)</td>
<td>0.10 (nd - 2.2)</td>
<td>0.27 (nd - 3.2)</td>
<td>0.347</td>
</tr>
<tr>
<td>DON (ppm)</td>
<td>0.90 (nd - 1.6)</td>
<td>0.69 (nd - 3.6)</td>
<td>0.646</td>
</tr>
<tr>
<td>Zearalenone (ppm)</td>
<td>0.72 (nd - 1.3)</td>
<td>0.04 (nd - 0.5)</td>
<td>0.898</td>
</tr>
</tbody>
</table>

*P value for a two tailed t test comparing the means of samples of maize ears collected in March 2010 from overwinter standing corn fields and from maize ears collected in October 2009.

b of clean grain sample

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