Wind Damaged Corn – Nutrient Content?

John E. Sawyer

Iowa State University, jsawyer@iastate.edu

Antonio Mallarino

 apmallar@iastate.edu

Follow this and additional works at: https://lib.dr.iastate.edu/cropnews

Part of the Agricultural Science Commons, and the Agriculture Commons

Recommended Citation


https://lib.dr.iastate.edu/cropnews/2649

The Iowa State University Digital Repository provides access to Integrated Crop Management News for historical purposes only. Users are hereby notified that the content may be inaccurate, out of date, incomplete and/or may not meet the needs and requirements of the user. Users should make their own assessment of the information and whether it is suitable for their intended purpose. For current information on integrated crop management from Iowa State University Extension and Outreach, please visit https://crops.extension.iastate.edu/.
Wind Damaged Corn – Nutrient Content?

Abstract
The August 10, 2020 high winds (derecho) caused lodged or flattened corn in many Iowa fields. The corn development ranged mainly from stages R3 (milk) to R5 (dent). Some fields may not be harvested, some chopped for silage, and some harvested for grain. Nutrients such as nitrogen (N), phosphorus (P), and potassium (K) remaining in the field may be different than with normal harvest due to partial plant removal, grain harvest, or grazing. Therefore, adjustments can be made for future fertilizer or manure applications.

Disciplines
Agricultural Science | Agriculture

This article is available at Iowa State University Digital Repository: https://lib.dr.iastate.edu/cropnews/2649
Wind Damaged Corn – Nutrient Content?

August 17, 2020

The August 10, 2020 high winds (derecho) caused lodged or flattened corn in many Iowa fields. The corn development ranged mainly from stages R3 (milk) to R5 (dent). Some fields may not be harvested, some chopped for silage, and some harvested for grain. Nutrients such as nitrogen (N), phosphorus (P), and potassium (K) remaining in the field may be different than with normal harvest due to partial plant removal, grain harvest, or grazing. Therefore, adjustments can be made for future fertilizer or manure applications.

Effect of corn development stage

Iowa State University and Outreach publication PM 1688 (A General Guide for Crop Nutrient and Limestone Recommendations in Iowa) provides P and K concentrations for corn normally harvested for grain and corn silage. Additional information on dry matter and nutrient content of various corn vegetative components at maturity can be found in ICM News article Dry Fall Conditions Can Lead to Field Fires.

The corn plant P and K concentrations, as well as the N and dry matter concentrations, may differ with earlier growth stages. A recent ISU research study conducted across two years looked at the dry matter and nutrient content of several era corn hybrids. The following information is taken from the most modern hybrids in that study. Plant dry matter and nutrient content increases as reproductive stage and grain fill progresses (Tables 1 and 2). These values can be used as estimates/adjustments for the corn stage in specific fields. There tends to be nutrient loss from vegetative tissues as corn reaches maturity (R6 stage), therefore the total plant relative values are based on the total at R5. Such nutrient loss does not occur for grain, therefore, the grain relative values are based on the total at R6.
Total corn plant dry matter and nutrient uptake varies by productivity (yield level) and specific growing conditions (weather, hybrid, etc.). Tables 3 and 4 list the dry matter and nutrient content for the hybrids’ grain yield of 224 bu/acre. Of course, estimated nutrient amounts should be based on each field yield or harvested plant component and yield.
Key points

- With normal corn silage or grain harvest, considerations for nutrient management and application rates for the next crop will not be different compared to a normal year.
- For plant harvest at corn stages not normal for silage or grazing, P and K concentration estimates can be adjusted based on the growth stage. However, estimating the amounts of P and K remaining or removed will be difficult and uncertain with partial plant harvest or grazing.
- If the corn plants are broken off and die, and plant parts are not removed or grazed, then dry matter yield and P and K concentrations can be approximated based on the growth stage when killed (see Tables 1-4); and the P and K amounts remaining in the field will be available for future crops.
- Nitrogen remaining in non-harvested plant material will cycle through the soil system. If fields are rotated to soybean next year, changes in N recycling will not affect the

Table 3. Total corn plant dry matter and macronutrient content (224 bu/acre grain yield).

<table>
<thead>
<tr>
<th>Corn Stage</th>
<th>Dry Matter</th>
<th>N</th>
<th>P₂O₅</th>
<th>K₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk – R3</td>
<td>13,460</td>
<td>166</td>
<td>55</td>
<td>145</td>
</tr>
<tr>
<td>Dough – R4</td>
<td>14,960</td>
<td>171</td>
<td>64</td>
<td>148</td>
</tr>
<tr>
<td>Dent – R5</td>
<td>20,300</td>
<td>201</td>
<td>78</td>
<td>164</td>
</tr>
<tr>
<td>Maturity – R6</td>
<td>19,910</td>
<td>190</td>
<td>80</td>
<td>131</td>
</tr>
</tbody>
</table>


Table 4. Corn grain dry matter and macronutrient content (224 bu/acre grain yield).

<table>
<thead>
<tr>
<th>Corn Stage</th>
<th>Dry Matter</th>
<th>N</th>
<th>P₂O₅</th>
<th>K₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk – R3</td>
<td>2,290</td>
<td>38</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>Dough – R4</td>
<td>4,620</td>
<td>62</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>Dent – R5</td>
<td>9,470</td>
<td>114</td>
<td>55</td>
<td>43</td>
</tr>
<tr>
<td>Maturity – R6</td>
<td>11,250</td>
<td>138</td>
<td>69</td>
<td>48</td>
</tr>
</tbody>
</table>

soybean crop. If there is no plant material harvested, then there is potential for more than normal amounts of N to be available to next-year’s corn crop. However, that estimation should not be taken into account until the spring of 2021 as there needs to be time for N mineralization and there can be rapid change in inorganic-N (specifically nitrate) from late summer to the next spring.

Category: Crop Production  Soils  Soil Fertility

Links to this article are strongly encouraged, and this article may be republished without further permission if published as written and if credit is given to the author, Integrated Crop Management News, and Iowa State University Extension and Outreach. If this article is to be used in any other manner, permission from the author is required. This article was originally published on August 17, 2020. The information contained within may not be the most current and accurate depending on when it is accessed.

Crop:

Corn

Tags: damaged corn  derecho  high winds  weather damage  crop nutrients  plant dry matter  corn development

Authors:

John Sawyer Professor
Dr. John Sawyer is a professor of agronomy and extension specialist in soil fertility and nutrient management at Iowa State University. His extension program involves soil fertility management, efficient crop nutrient utilization, and environmentally sound fertilizer and manure systems. Dr. Sawye...

Antonio Mallarino Professor of Soil Fertility and Nutrient Management, Extension Specialist
Dr. Antonio Mallarino is a professor of agronomy and nutrient management research and an extension specialist at Iowa State University. His programs focus on agronomic and environmental issues of nutrient management with emphasis on phosphorus, potassium, lime, and micronutrients. Issues addressse...