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Evaluating Corn Stands

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Evaluating Corn Stands

Abstract
As of May 6 2019, 36 percent of Iowa's corn is planted according to the USDA-NASS. Under cool conditions (50 to 55°F soils), it may take more than three weeks for corn to emerge whereas corn in 70°F soils can emerge in less than a week (Licht et al., 2001). Cool and wet conditions at or around planting delay emergence and provide seedling disease pathogens, like Pythium, a favorable environment and longer time to infect corn seeds or seedlings (Munkvold and White, 2016; Robertson and Munkvold, 2007). The cool and wet conditions could also result in herbicide injury due to the slow growth and prolonged exposure to herbicides. Additionally, for corn planted shortly before (24 to 36 hours) the cold spell over the weekend of April 27 and 28, imbibitional chilling may be a concern. Corn planted ahead of the cold spell could still experience cold injury, which causes abnormal shoot growth like twisting or problems with root system development.

Disciplines
Agricultural Science | Agriculture
As of May 6, 2019, 36 percent of Iowa’s corn is planted according to the USDA-NASS. Under cool conditions (50 to 55°F soils), it may take more than three weeks for corn to emerge whereas corn in 70°F soils can emerge in less than a week (Licht et al., 2001). Cool and wet conditions at or around planting delay emergence and provide seedling disease pathogens, like Pythium, a favorable environment and longer time to infect corn seeds or seedlings (Munkvold and White, 2016; Robertson and Munkvold, 2007). The cool and wet conditions could also result in herbicide injury due to the slow growth and prolonged exposure to herbicides. Additionally, for corn planted shortly before (24 to 36 hours) the cold spell over the weekend of April 27 and 28, imbibitional chilling may be a concern. Corn planted ahead of the cold spell could still experience cold injury, which causes abnormal shoot growth like twisting or problems with root system development.

According to USDA-NASS, just one percent of the corn is emerged. As the crop emerges, it is a good time to assess stands, which involves taking stand counts and assessing seedling health. While scouting, determine whether seedling growth appears normal or whether actions are warranted to remediate any issues.
As corn starts to emerge, take time to assess stands and do stand counts. Photo by: Meaghan Anderson.

Taking Stand Counts

1. Measure out 1/1000 of an acre base on your row width. Table 1 provides the length of row needed based on row spacing. For example, with 30-inch row corn, measure out a length of 17 feet, 5 inches.

<table>
<thead>
<tr>
<th>Row Spacing</th>
<th>Row Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>15”</td>
<td>34’ 10”</td>
</tr>
<tr>
<td>20”</td>
<td>26’ 2”</td>
</tr>
<tr>
<td>30”</td>
<td>17’ 5”</td>
</tr>
<tr>
<td>36”</td>
<td>14’ 6”</td>
</tr>
<tr>
<td>38”</td>
<td>13’ 9”</td>
</tr>
</tbody>
</table>

Table 1. Feet of row representing 1/1,000 of an acre at different row widths. Source: Corn and Soybean Field Guide, IPM 1.
2. Count the number of plants in the measured area and repeat this in six representative locations across the field to get a more accurate picture of how things look. Randomly select these locations. Do not intentionally avoid areas that have missing plants or gaps.

While taking stand counts, pay attention to variability in plant spacing and uniformity in emergence. If one count doesn’t seem to fit the other counts, keep that count separate and make note of where that area is at in the field.

If an area has a lower count, variable plant spacing (skips, doubles, gaps in rows) or uneven emergence (differences in crop stages), try to determine what may be causing that to occur and how wide spread it appears to be in the field.

3. Dig up seedlings and check the plants for symptoms of the following:
   - **Seed rots and seedling blights** (rotting seed and brown discoloration of mesocotyl and seminal roots or missing plants)
   - **Anhydrous ammonia burn** (uneven emergence, plant wilting and discoloration, brown roots that appear burnt, missing plants)
   - **Herbicide injury**
   - **Insect issues** (*seedcorn maggot*, *wireworms*, *cutworms*, *armyworms*)
   - **Planter issues** (seed depth or skips and doubles)
   - If plants are missing entirely, check to see if you can even find any seed(s) where plants should be.

4. Finally, average the counts and multiply the average number of plants by 1,000 to obtain the plant population per acre.

**Steps in determining if replanting is warranted**

1. Determine the yield potential of the existing stand using the estimates in Table 2 below. For example, if the original planting date occurred on April 21, a population of 35,000 plants/acre is expected to provide a maximum yield (100%). If the population is only 25,000 plants/acre, the yield potential is still 95% of the maximum yield potential. Also, consider stand uniformity in regard to evenness in emergence and the presence of large gaps. To estimate potential yield losses from unevenness in stand uniformity, check out these tools. A few comments regarding stand uniformity impact on crop yield:
   - If gaps are present in rows, yield potential can also be reduced. The size of the gap impacts how much yield potential could be lost. Yields can be reduced by an additional 5% if larger gaps (4 to 6 foot) within the row are present and by 2% if
smaller gaps (16 to 33 inches) are present.

- More information on uneven emergence in corn can also be found in the publication NCR 344 “Dealing with Uneven Emergence in Corn”
- If half or more of the plants in the stand emerge three weeks later than the first emerged plants, replanting could increase yields by about 10%.
- If the delay in emergence is less than two weeks between the early and late emerging plants, replanting may increase yield by 5% or less. Replanting would likely not be economical in this situation.
- If uneven emergence varies from row to row (i.e. most rows are emerged but some are not), replanting will likely not increase yield.

2. Estimate the replant yield with Table 2 using the expected replant planting date and target plant population. Note that there is no guarantee of getting a good stand with replanting. For instance, replanting on May 20 at 35,000 plants/acre is expected to have a yield potential of 87% of maximum yield.

<table>
<thead>
<tr>
<th>Population (plants/acre)</th>
<th>Percent Maximum Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>45,000</td>
<td>97</td>
</tr>
<tr>
<td>40,000</td>
<td>99</td>
</tr>
<tr>
<td>35,000</td>
<td>100</td>
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<tr>
<td>30,000</td>
<td>99</td>
</tr>
<tr>
<td>25,000</td>
<td>95</td>
</tr>
<tr>
<td>20,000</td>
<td>89</td>
</tr>
<tr>
<td>15,000</td>
<td>81</td>
</tr>
<tr>
<td>10,000</td>
<td>71</td>
</tr>
</tbody>
</table>

Table 2. Relative yield potential of corn by planting date and population. Note: Values based on preliminary Iowa research and modeling; 100% yield potential is estimated to occur with 35,000 plant population and early planting. **Source: Corn and Soybean Field Guide, IPM 1.**

3. Compare the yield potential of the replanted crop with the yield potential of the existing crop. If the yield potential of the existing stand is less than that of the replanted crop, replanting may be warranted. In our example above, the yield potential of the original crop planted on April 21 with an existing stand of 25,000 plants/acre is 95% of the maximum. Replanting on May 20 with a targeted plant population of 35,000 plants/acre would give a yield potential of 87% of the maximum
yield. The yield potential of the original stand is greater than the yield potential of the expected replanted stand.

4. In addition to comparing yield potentials, also consider the cost of replanting. These costs include any tillage, seed, fuel (for tillage and planting), additional pesticides, labor, etc.

5. Other factors to consider when debating to replant or not:
   - It is important to remember that if corn requires replanting, the original stand needs to be destroyed as seeding into the original stand will further complicate management. Check herbicide labels to be sure replant of corn is allowable.
   - The chance of fall frost occurring prior to the physiological maturity of replanted corn. The **Useful 2 Usable corn growing degree day (GDD) tool** allows for users to input planting dates and hybrid relative maturity to graph estimated black layer (physiological maturity) date given projected GDD accumulation for the season. This tool shows the average first freeze date as well.
   - In regard to hybrid maturity, research has shown that later-planted corn can adapt to being planted later by requiring fewer growing degree days (GDDs) to reach maturity (Nielson et al., 2002). Therefore, even with a later planting date, it is recommended to plant a well-adapted hybrid for your specific area. An exception to that may be if it is late-May and the chosen maturity is already pushing the late side of what is well-adapted for the area. In that case, it is recommended to switch to a hybrid that falls more within the middle of suggested hybrid maturity’s for a given area. For more information on hybrid maturity considerations with delayed or late planting, check out this article from Purdue University “**Hybrid Maturity Decisions for Delayed Planting.**”

Replanting is not an easy decision, and numerous factors determine a crop’s yield potential. Note that actual yield losses could be greater or less than what is shown in Table 2 because weather conditions are the major driver of corn yield potential.

As more of the corn crop emerges, taking stand counts and scouting for potential issues like insects, diseases, and herbicide injury will all be very important. If necessary, the resources above will help to aid decision-making in identification of possible issues and determining whether replanting is necessary. Also, feel free to reach out to your local extension field agronomist if you have any questions.

**Sources:**


Category:  Crop Production

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Crop:  Corn

Tags:  stand counts  corn stand

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