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Imbibitional Chilling and Variable Emergence

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Abstract
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Integrated Crop Management NEWS

Imbibitional Chilling and Variable Emergence

By Roger Elmore, Department of Agronomy

Sixty-four percent of Iowa's corn lay in seedbeds as of May 6. This is 6 percent ahead of normal (see USDA report). Northeast and South Central cropping districts reported 50 percent planted while the Northwest and West Central cropping districts were around 75 percent planted. Indeed many farmers completed planting corn; 7 percent of our soybeans were planted – slightly behind the 11 percent five-year average.

So far we have experienced multiple corn planting 'windows' this year. As I write this article, farmers rapidly plant the remaining corn crop.

Walk fields to assess stands – and discover problems

In a May 1 ICM New article I discussed how to think about corn yet unplanted, in terms of yield potential. Planting between May 15 and May 25, on average, results in 87 percent yield potential. But please remember, we have had years where the best planting dates were the last ones of the season!

Also in that article I presented information and links on how to assess planted corn that may be a candidate for replanting. I don't intend to discuss those items more now. However, let's talk about some 2012 conditions and field reports.

Reports from emerging fields - 2012
Soil temperatures in late April backed off to 'normal' after an unusually warm March. We all know that cooler soil temperatures slow the germination process and predispose seedlings to fungal infection and other problems – corn is a warm season crop. My colleagues and I observed, and/or heard reports of seedling growth problems in some parts of Iowa already this year, related to Imbibitional chilling damage (see Figures 1 and 2) and some variable emergence. Soil crusting was not a problem in these situations.

Figure 1. Imbibitional chilling effect on corn, Story Co. IA. R. Elmore photo,

May 10, 2012.

Figure 2. Imbibitional chilling effect on corn planted April 11, 2012, Story Co. IA. R. Elmore photo, May 8, 2012.

Imbibitional chilling refers to the chilling effect seeds may experience when they imbibe, or absorb water especially when soil temperatures are less than 55 F for an extended time. Brittle shoot cell membranes rupture in cold soils. Seedlings may "corkscrew" and may not emerge when exposed to these cool soil temperatures. This may also happen when there are rapid swings in air temperatures. Fortunately, most fields we've seen or heard about exhibit less than 5 percent of the plants affected. If these plants do emerge, they will not likely be productive.

In addition, it is not hard to find fields this year with variable plant emergence in both reduced and minimum tillage, as well as maximum tillage – see Figure 3. Variable emergence and growth reduces yield if development stages vary by two leaves or more.

Figure 3. Four plants, three development stages, Story Co. IA. R. Elmore photo May 10, 2012.

What we like to see

We like to see uniform emergence and growth (Figure 4). Perfect plant spacing within a row – a picket-fence stand – is less important than uniformity of emergence and attaining optimum plant populations. Adjust planters, planter speed and seed depth properly. And of course, plant into good seedbed conditions: 'mudding in' corn results in mediocre results. Do what you can to end up with the right number of plants that all look and develop the same (Figure 5).

2012 promises many opportunities to learn more about growing corn.

Figure 4. Uniform emergence and development is more important than uniform plant spacing in the row. Corn following corn, Story Co. IA. R. Elmore photo. May 10, 2012.

Figure 5. Strive for uniformity in emergence and development. R Elmore photo. May 10 2012.

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