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Plant coloring differences based on management and weather

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Abstract
This is the year of multi-colored corn. The impact of the wet spring is evident. There are noticeable differences dependent on management practices, such as the rotation used: corn following corn or corn following soybean. What impact will this have on growth and final yields? As of June 11, corn across Iowa ranged from V2 to V9 (two to nine leaves), with a rough average of V6. The large variation in growth stages and plant size is in part due to the tri-modal planting dates, which will be discussed in next week’s newsletter.

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**Plant coloring differences based on management and weather**

by Roger Elmore and Lori Abendroth, Department of Agronomy

This is the year of multi-colored corn. The impact of the wet spring is evident. There are noticeable differences dependent on management practices, such as the rotation used: corn following corn or corn following soybean. What impact will this have on growth and final yields?

As of June 11, corn across Iowa ranged from V2 to V9 (two to nine leaves), with a rough average of V6. The large variation in growth stages and plant size is in part due to the tri-modal planting dates, which will be discussed in next week's newsletter.

Most of Iowa was saturated with precipitation amounts that are from normal to two times the normal amount since mid-April. Although a good share of Iowa's corn appears green and healthy, reports of yellow and purple corn are coming from several parts of the state.

Differences in overall vigor and growth between corn following corn and corn following soybean are even more obvious than in prior years. In the long run, these could contribute to the yield penalty for corn following corn. Long-term data have shown that in good years, corn following corn can yield close to or the same as corn following soybean. In stressful years, though, corn following corn will not be able to compete with corn following soybean. See [Yield penalty when corn follows corn](#) for more information.

**Yellow corn**

Cool, wet weather is a major cause of the yellow corn seen already this growing season as it is a symptom of crop stress. Yellow corn does not necessarily point to a nitrogen deficiency. Corn grown in waterlogged soil turns yellow and may die if conditions are severe.

Nitrogen and potassium deficiencies, herbicide applications, and soil compaction may all contribute to leaf yellowing. Leaf yellowing, in most cases, is likely associated with a poorly developed root system.
Yellow corn is present in the lower area of this field due to earlier saturated conditions, June 11, 2007. (Tim Chwirka)

Once secondary roots develop and temperatures warm, plants are expected to recover. Some lasting results of yellow or stunted corn are uneven plant heights and/or stand reduction; these will both reduce yield potential if they occur. Once the soil dries, if the plants remain yellow, then nitrogen may be limited, which will also reduce yield.

**Purple corn**
Another symptom of cool air and soil temperatures, combined with wet conditions, is a purplish tint to corn seedlings. Purple corn was observed last year also. Purple leaf coloring is more pronounced in some hybrids' genetics than others. Most often though, the leaf purpling is related to stress experienced by the young seedling and/or restricted root development.

Phosphorus unavailability is often mentioned as a culprit for the purple leaves. Phosphorus deficiency will result in reddish purple leaves, yet it is not likely the primary cause. A reddish purple tint on leaves can be due to anything that disrupts sugars within the plant. Cool and/or compacted soils, as well as shallow planting, can each create the opportunity for purpling to be expressed in corn leaves. If root development is restricted (due to temperature or seedbed problems), then the observed symptoms are simply an expression of this since the plant is not developing normally.

Purple corn resulting from early-season stress in no till. Nebraska, 2005. (Roger Elmore)

Whenever we see purple corn seedlings we can assume one of two things: either the plant is not translocating sugars well or there is a phosphorus deficiency. Although the plants are purple, phosphorus is not likely deficient in the soil. The plants are simply responding to wet conditions in which root growth was stalled for a period of time. The plants should grow out of this condition with no significant long-term impact (except as noted above with yellow corn). For additional information on purple corn and cold-season stress, see Early season cold stress.

Summary

Root restrictions that cause purpling or yellowing are expected to be temporary and seedlings should regain a healthy green color as weather conditions improve. Overall, yield should not be affected. It is good practice to check a few plants after they 'green up' to ensure that root development resumes.

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