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Soil crusting and its impact on soybean emergence

Palle Pedersen

Iowa State University, palle@iastate.edu

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Soil crusting and its impact on soybean emergence

Abstract

Soybean planting is currently 10 days behind normal, based on USDA statistics. However, field activity resumed on May 17 to 18, even though it was still very wet in many parts of Iowa. On May 19, Iowa State University field specialists in crops reported that soybean planting was close to 40 percent completed. Soybean planted in the last week of April has now emerged across most of Iowa. The sunny and windy conditions last weekend created stressful conditions for soybean seedlings. Fields that were planted just before the last rain now show a tendency toward soil crusting, which can delay or prevent seedling emergence.

Keywords

Agronomy

Disciplines

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INTEGRATED CROP MANAGEMENT

Soil crusting and its impact on soybean emergence

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Soybean planted in the last week of April has now emerged across most of Iowa. The sunny and windy conditions last weekend created stressful conditions for soybean seedlings. Fields that were planted just before the last rain now show a tendency toward soil crusting, which can delay or prevent seedling emergence. Crusting is usually most noticeable in fields with high silt content, low organic matter, and little surface residue, especially where excessive tillage occurred. Soil crusting can prevent emergence, reduce oxygen flow to the roots, and set up a barrier to efficient water infiltration. Soybean emergence can be problematic in dense surface crusts because the soybean seedling may not only be completely depleted of carbohydrate reserves before emergence but also the hypocotyl may be easily broken when pushing against a solid crust. It is therefore recommended to monitor high-risk fields for soil crusting where soybean emergence has not yet occurred.

Combating soil crusts quickly is a real challenge but one way to prevent a poor stand. The cooler the weather, the longer the seedling can survive, unless a seedling disease pathogen infects it. The warmer the weather, the faster the seedling grows and the sooner it runs out of energy. It is therefore important to deal with crusts soon after they form. Using a rotary hoe is one of the best ways to break the soil crust and enhance soybean emergence. If done right, rotary hoeing causes very little damage to the young soybean plant, does not damage the cotyledons, and causes little disturbance of crop residue, thereby enhancing infiltration and preventing erosion. However, the light rain on May 19 would hopefully soften up the crust. If not, rotary hoeing may be an option. For more information on the use of rotary hoe, see articles in the [May 7, 2001](#) [1], and [May 6, 2002](#) [2], ICM newsletters.

The stress of emerging through crusted soil also increases the risk of soybean seedlings being infected by plant pathogenic fungi. Poor-quality seed is always at great risk for seedling diseases, but even high-quality seed is at risk under severe stress. Although seedlings have emerged, the wet weather and cool temperatures have inhibited their growth. Several species of fungi that cause seedling health problems thrive in wet soils. The combination of stress on seedlings created by saturated soils and soil crusting and the greater activity of fungi in these wet soils means that seedling diseases may show up in many fields. For more information on soybean seedling diseases, see the [May 19, 2003](#) [3], *Integrated Crop Management* newsletter.

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<http://www.ipm.iastate.edu/ipm/icm//ipm/icm/2003/5-26-2003/soilcrust.html>

Links:

[1] <http://www.ipm.iastate.edu/ipm/icm/2001/5-7-2001/hoecrust.html>

[2] <http://www.ipm.iastate.edu/ipm/icm/2002/5-6-2002/postplanttillage.html>

[3] <http://www.ipm.iastate.edu/ipm/icm/2003/5-19-2003/>

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