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Soil crust-busters

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Abstract

Almost all Iowa producers would welcome rain, but if there is an intense downpour, some degree of soil crusting can be expected. Soil crusting most often occurs when rain separates the soil into very small aggregates and individual particles that cement into hard layers at the soil surface when drying occurs rapidly. And with the heat and wind so far this spring, rapid drying is a possibility.

Keywords

Agricultural and Biosystems Engineering, Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering
| Soil Science

INTEGRATED CROP MANAGEMENT

A photograph of a person in a field, possibly a farmer or researcher, with large, stylized text overlaid. The text reads 'INTEGRATED CROP MANAGEMENT'. The background shows a field with tall grasses and a person in the distance.

Soil crust-busters

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What damage can soil crusting cause?

Most producers have been advised to plant a little deeper this year to achieve good seed-to-soil contact and access to adequate soil moisture. But if a crust forms above the seed, it requires the combined pressure of several plants to crack through a crust, reducing emergence. Seedling crops trapped under a crust grow and elongate below the crust until the seed runs out of stored energy. Deep planting also presents risks because the plants leaf out underground, inhibiting growth and vigor and promoting an uneven stand.

Strategies to avoid soil crusting

Typically, mulch-tillage or no-till systems leave larger amounts of surface residues on and near the soil surface. The resulting benefit of reduced tillage systems is that the soils probably don't crust as much. With increased residue, surface pores are more likely to stay open and intense rainfalls result in less soil splash. Reduced soil splash limits soil movement, making it harder for soil to seal pores and cause crusting.

Can a rotary hoe be used to break up soil crusting?

If fields exhibit soil crusting, consider a crust-busting operation. With any crust-breaking method, some crop loss is possible. Soil crusting can be broken by working a rotary hoe at a very shallow depth, no deeper than the depth of the crust. Don't worry about damaging the seedlings--crop damage from the hoe can occur and should be checked when operating the hoe, but plant damage is often less than 2 percent. Compared with the damage of soil crusting, breaking crust is usually much less damaging than the crust itself.

Rotary hoes should be operated at 7 to 10 miles per hour. A side benefit of running the rotary hoe just prior to weed emergence is weed control. Although using a hoe to break a crust or incorporate moisture for a herbicide can be beneficial, hoeing is unnecessary if weeds or crust are not present.

Avoid detaching both cotyledons from young soybean plants with the hoe before the first true leaves develop. In fields with high levels of surface residue cover, rotary hoe wheels should be self-cleaning to avoid dragging residue. As crop height increases, a row-crop cultivator (with shields if the crop is small) is the implement of choice to break a crust.

Many areas of Iowa have sufficient surface soil moisture to germinate the crop. However, because the National Weather Service's 60-day forecast is for drier-than-normal conditions, many producers would welcome a rain. If rain comes hard and fast, being ready to combat soil crusting may be one way to prevent a disappointing stand.

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