

Requirements for Uniform Germination and Emergence of Corn

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- Successful germination & emergence require adequate moisture, temperature and seed-to-soil contact.

Rapid, uniform germination and emergence of corn help set the stage for maximum grain yield at the end of the season. Without such a successful start to the season, the crop is behind the proverbial “eight-ball” right from the beginning. The good news is that there are only three simple requirements for uniform germination and emergence of corn. The bad news is that one or more of the requirements are sometimes absent from one field to another.

Adequate and uniform soil moisture at the seed zone. Adequate soil moisture is most simply defined as not too dry and not too wet. Most growers know what “adequate” looks and feels like. Uneven soil moisture in the seed zone can be caused by variable soil characteristics, tillage patterns, unusual weather conditions and uneven seeding depth. Uneven soil moisture in the seed zone is the primary cause of uneven emergence, the results of which can easily be yield losses of 8 to 10 percent.

Useful Tip: When seedbed conditions are dry, make sure that your choice of seeding depth ensures uniformly adequate soil moisture for the germination of the seed. Even though a 1.5 to 2 inch seeding depth is a good choice for many conditions, don't hesitate to increase seeding depth to 2.5 to 3 inches if that is where the uniform soil moisture is located. Planting shallower than 1.5 inches increases the risk of poor or uneven germination during subsequent drying of surface soils.

Adequate and uniform soil temperature at the seed zone. Adequate soil temperature is most simply defined as being greater than 50° F at the 2-inch depth. Corn will not germinate or emerge quickly or uniformly when soil temperatures are less than 50° F. When soils warm to the mid-50° F or greater, emergence will occur in seven days or less if soil moisture is adequate.

Uneven soil temperature can be caused by soil characteristics, uneven residue cover in reduced tillage systems and uneven seeding depth control. Temperature variability is most critical when average soil temperatures are barely within the desired minimum 48 to 50° F range for corn germination.

Useful Tip: Dark-colored soils will typically warm more quickly than light-colored soils. If soils dry differently across the field, the drier areas will typically warm faster than the wet areas. Uneven residue cover in reduced tillage systems causes significantly lower soil temperatures under the heavier cover than under barer spots in the field. Uneven seeding depth exposes deeper planted seeds to slightly cooler seed zones than seeds placed shallower.

Adequate and uniform seed-to-soil contact. In order for the kernel to absorb moisture quickly and uniformly, soil must be firmed completely around the kernel. Seed-to-trash contact results from “hair-pinning” of surface trash into the seed furrow during no-till planting when soil and/or trash are too wet for adequate coulter cutting action. Seed-to-clod contact results from planting into cloddy fields created by working soil too wet. Seed-to-rock contact is, needless to say, not good for proper germination either. Seed-to-air contact results from open planter furrows when no-till planting into excessively wet soils. Germination of kernels lying in open planter furrows is dependent on rainfall keeping the open furrow environment moist.

Useful Tip: Whippers, wipers, movers, fingers, and other similar trash management gadgets for the planter are most beneficial when you are challenged with rocky, cloddy, or trashy surface soil conditions. They help clear the way (literally) for the planter’s double-disc openers to more easily do their job of creating an optimum seed furrow. Other planter attachments that help press the kernels into the seed furrow can improve seed-to-soil contact and seeding depth uniformity when seedbed conditions are otherwise challenging.

Don’t forget, this and other timely information about corn can be viewed at the Chat ‘n Chew Café on the Web at <http://www.kingcorn.org/cafe>. For other information about corn, take a look at the Corn Growers’ Guidebook on the Web at <http://www.kingcorn.org>.

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