

BETWEEN THE ROWS

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KEYS FOR SUCCESSFUL CORN GERMINATION AND EMERGENCE

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Requirements for Germination and Emergence

Certain environmental conditions will influence how fast and uniformly corn germinates and emerges. The first step to a successful stand is planting when conditions are right.

1. **Sufficient soil moisture.** To trigger germination, a corn seed must imbibe over 30% of its weight in water. If the area around the seed is too dry, or dries too quickly, germination will be delayed until enough moisture is available. Some factors affecting soil moisture in the seed zone are soil type, tillage practices, uneven seeding depth, and unusual weather conditions. With the below average rainfall the last 18 months, there will be more reliance on normal periodic rainfall throughout the spring to provide necessary moisture.
2. **Adequate soil temperature.** Corn will emerge slowly and unevenly at soil temperatures below 50° F. Once soils warm into the mid-50's, or warmer, emergence will improve. It takes approximately 115-120 GDDs from the time of planting to emergence. If all requirements are met, emergence will often occur in seven days or less.
3. **Uneven soil temperature** in the seed zone can lead to uneven emergence and a poor stand. Factors causing this are soil type, soil drainage, residue coverage, and seeding depth. This will be most pronounced when soil temperature is right around the 50°F threshold.
4. **Optimum seed-to-soil contact.** For the seed to imbibe the required amount of water, it must have good seed-to-soil contact. Poor seed-to-soil contact is common when planting into residue, in soil that has a lot of clods or rocks, or when the seed is exposed to air due to sidewall compaction and the furrow not closing from planting into wet soils. In all of these situations there is a greater chance the seed will not be able to take in enough water to germinate, or could be weather dependent leading to uneven emergence.
5. **Unrestricted soil structure.** Anything restricting the coleoptile from breaking the surface, or the mesocotyl from elongating will restrict emergence. Crusting at the surface or sidewall compaction in the furrow can hinder emergence and cause leafing out underground or seedling death. Sidewall compaction can also limit root growth, limiting the young plant's ability to take in vital nutrients and water.

6. **Quality seed** with a high warm germination score printed on the tag. Planting seed into less than optimum conditions will amplify the disappointing germination that will result from planting seed that is below normal industry standards. In years when seed supply is challenged, it might pay to ensure that your seed supplier is keeping standards in check, and not substituting seed with lower germination scores.

Understanding Seed Germination Testing

Every seed company is required to test their seed before selling it to ensure seeds are viable. The standard method to evaluate emergence potential of a seed lot is exposing a representative sample of the lot to germination tests. The Federal Seed Act requires a standard warm germination test to be conducted on every lot of seed for sale. These tests are standardized across the industry and the results of these tests are required to be reflected on a seed label or tag.



Wyffels Hybrids seedling germination test

Some companies, including Wyffels, further test the quality of the seed using a cold germination test. Although not required by law, this step provides more confidence in the seeds' viability and ensures a certain level of quality. There are many different types of cold germination tests, and testing methods can vary from company to company. Wyffels uses a type of cold germination test that is rigorous and demanding and meant to imitate planting conditions that are not optimal, but may be reality.

Wyffels hybrids arriving on customer farms must pass certain specifications in both warm and cold germination tests. While planting into ideal conditions will improve the chances of the optimal stand, we test our hybrids in conditions that are less than ideal so that we can be confident we are providing a quality product.

Management Practices to Improve Germination and Emergence

1. Choose a seeding depth that will place the seed at a depth that will ensure not only the presence of moisture, but that it is uniform moisture so that seedlings don't emerge unevenly. It is widely popular to plant at 1½ to 2 inches, which is a great choice for many conditions. However, if you are planting into soil with inadequate or variable moisture at 2 inches, it may be good to move your seeding depth to 2½ or 3 inches. The negative effect of surface crusting on emergence will have more to do with the timing of the weather events that form the crust, and less to do with the depth the seed is planted at.
2. Consider row-cleaning attachments for the planter to remove residue from the seedbed to improve seed-to-soil contact, and also to expose the seedbed to sunlight to warm the soil. These attachments could also help clear a seedbed that contains clods or rocks.
3. Planter attachments that help press the kernels into the seed furrow can improve seed-to-soil contact and seeding depth uniformity, even in challenging conditions.
4. Try to avoid excessive tillage before planting, especially in cases where there is a chance of rainfall before the seed emerges. Excessive tillage could increase the chances of a surface crust forming.
5. Do not plant if conditions are too wet. This could cause the sides of the seed furrow to smear and leave sidewall compaction inhibiting both emergence and root development.
6. Avoid using excessive down pressure on the closing wheels. This could lead to compaction around the seed, as well as smearing of the sidewall. Optimum down pressure will differ depending on soil moisture. If too little down pressure is used it could lead to some seeds being planted shallower than others.

7. Monitor the upcoming forecast. Planting immediately ahead of conditions that are predicted to be cool and wet can affect uniformity of emergence. Imbibition of cold water will lower germination rates, and cool soil temperatures will delay emergence allowing more time for diseases to attack the seedling.
8. Planter speed. Planting too fast will influence seed depth and uniformity.



Conclusion

Maximizing the genetic potential of a hybrid starts at planting and germination. Many factors affecting good germination and emergence are environmental, but there are things that are under our control that can be monitored to improve the chances of a successful start. Take time to make sure your equipment is properly set before the season, and be mindful of how different conditions may change the practices you should use to ensure uniform germination and emergence of corn.