

Column Name- The Heartland Minute

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“Diagnosing Early-Season Growth Problems in Corn”

My dad is an old car guy. From a young age I’ve been dragged to car shows all across the country. The amount of old cars I can identify (make, model, year, etc.) would astound you. My dad is a great mechanic, and knows his stuff when it comes to old cars. When dad is judging cars, he has a saying. After looking over a car, he would say “Well, that’s a 30/30 car”. Now, if you’ve never judged cars with dad you may not know what he is saying. But I know exactly what a “30/30” car is. It’s a car that looks good at 30 yards away, when you’re driving 30 mph by. Although as you come closer and take a harder look, it’s deceiving. Whether it has rust under the wheel wells, poor paint job, or whatever the issue may be.

Checking your crop fields accurately and timely is very similar. Many fields look good from 30 yards out, while driving 30 mph. down the road. Once you actually get out in the field, you may see a different story.

Getting a good stand of corn, with vigorous early-season growth, is the first step in getting desirable yields. When adverse conditions, such as hard rain or unusually cool weather, occur after planting and emergence. Producers should get out in their fields and take a close look at how their corn is truly doing.

K-State Research and Extension Agronomists give us the following pointers when looking to diagnose early-season growth problems in corn. If the plants emerged in good fashion, but the seedlings then have problems maintaining adequate growth and development or leaf color, there may be several possible reasons. A few of the most likely causes include:

- **Freeze damage.** In most cases, much of the corn that is emerged at the time of a freeze will recover with minimal damage. However, some of the new growth may have a hard time emerging from the dead tissue. New growth may become trapped and start to split from the side of the leaf sheath. Generally, warmer temperatures will increase growth rates and new leaves will eventually split the dead tissue, emerge, and continue to grow normally.
- **Unusually cool temperatures, compacted soil, or waterlogging.** Wet soils and unusually cool temperatures can inhibit root growth, slowing plant development. This can cause yellowed, wilting plants due to poor root growth, drowning, or a seedling blight infection. Seedling blight is often characterized by stem tissue near ground level that is discolored or water-soaked in appearance. Also, planting in wet soil can compact the

seed furrow, inhibiting root growth. A shallow compaction layer can slow early root growth, resulting in stunted, nutrient deficient plants.

- **Early-season lodging (“floppy corn syndrome”).** This is usually associated with hot, dry weather during V1 to V6, which prevents adequate development and penetration of nodal roots. Plants can survive for a time on just the seminal root system, but they will have little mechanical support. Reasons for poor nodal root development and an elevated crown include sidewall compaction, erosion after emergence but before nodal root development, and sinking of the seedbed due to pounding rains. Often a good soaking rain is enough to allow nodal roots to establish and plants to recover. Inter-row cultivation can be used to push soil against plants with exposed crowns.
- **White grubs or wireworms*.** These soil insects may be eating the roots, which will cause the plants to wilt.
- **Black cutworms.** These insects, which can be found in the soil or on the surface, cause “windowpaning” of the leaves on young plants. Cutworms may also cut off seedling plants at the soil surface.
- **Flea beetles*.** These tiny leaf-chewing insects can cause “scratches” on leaves. Eventually, the leaves may shrivel, turn gray, and die. Plants are more susceptible to flea beetle injury when temperatures are cold and seedling growth is slow. Seedling plants are often able to recover from flea beetle injury because the growing point remains below ground level until the fifth leaf emerges.
- **Nematodes.** Poor growth that occurs as circular to oval patches in the field could be an indicator of nematode problems. Approximately 35 days after emergence is an ideal time to sample for nematodes, particularly the root lesion nematode that inhabits about 80 percent of Kansas corn fields. Take 20 cores at a depth of 12 inches from directly in or alongside the row from the outer edges of affected areas. Additionally, 2 to 3 root balls of affected plants should be submitted at the same time. Bag the root samples separately from the soil cores. Samples can be submitted through local Extension offices or sent directly to the Plant Disease Diagnostic Lab in Throckmorton Hall.
- **Fertilizer injury:**
 - Free ammonia from an anhydrous ammonia application. This can injure roots and kill germinating seed if the ammonia was applied too shallowly (especially in coarser soils), too close to the time of planting, or if dry soil conditions slowed the conversion of ammonia to ammonium. One way to minimize damage is to apply the ammonia at a 10- to 15-degree angle from the direction of planting. If injury occurs then it is more randomly distributed, reducing the multi-plant skips, and allowing the unaffected plants to compensate.
 - Ammonia injury can also occur when side-dressing anhydrous ammonia under dry soil conditions. Root injury can occur if the plants get too big or the knives run too close to the row. Ammonia injury resulting from poor soil sealing can cause leaves to appear water-soaked or have dead margins. Roots may appear

sheared off, or burned off. Plants will normally recover from this injury, but yields can be reduced.

- Putting a urea-based N fertilizer in contact with the seed. Urea will hydrolyze into ammonia and injure the seedling.
- **Nitrogen (N) deficiency.** This does not usually occur until a later stage of growth in conventional tillage systems. But in no-till corn, especially in high residue situations, N deficiency is common where producers haven't applied nitrogen as a starter, or broadcast a significant amount of N prior to or at planting. In early planting into very cold soils where no N was applied close to the seed as a starter, seedlings may be N deficient in conventional-till also. Nitrogen deficient corn seedlings will be spindly, with pale yellow-green foliage. As the plants grow, the lower leaves will "fire," with yellowing starting from the tip of the leaf and progressing back toward the stalk.
- **Phosphorus deficiency.** This can result in stunted growth and purple leaves early in the growing season. Phosphorus deficiency is often enhanced by cool, wet growing conditions.
- **Iron deficiency.** This can cause upper leaves to be pale green between the veins. Iron deficiency is more common on high pH and calcareous soils.
- **Sulfur deficiency.** This can result in stunted plants having pale green leaves, with no distinct pattern on the leaves.

We know that our world continues to change throughout this time dealing with the COVID-19 pandemic, but one thing that will remain the same is K-State Research and Extension's mission to serve and educate our local Kansas communities. As our Greenwood County Courthouse is currently still restricting in-person access, this also limits our in-person office availability during this time. But the Extension office is still here to serve our community! Our office remains open and is available via phone (office number is 620-583-7455) or by email at lindsayshorter@ksu.edu. We are still available in-person through appointments and can be arranged by calling the Extension office. Be sure to follow K-State Research and Extension-Greenwood County on Facebook for the most up-to-date information on Extension education and our Greenwood County 4-H program.