



Corn & Soybean News

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Soybean Planting in Kentucky

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 @KYGrains

As of April 26, the USDA National Agricultural Statistical Service estimated that 18% of Kentucky's soybean crop for 2020 had been planted, with 3% that had emerged. This is considerably more than the 5-year average of 2% planted and last year's average of 3% planted for this same date.

There are a couple of reasons that may explain this surge in soybean planting this year. First, there are many growers that are interested in planting soybean early (in some cases as early as March) to capture some reports that soybean planted early will result in much greater yields. Secondly, this year was a fairly mild winter that resulted in soil temperatures reaching and maintaining 50°F earlier than in years past (Figure 2).

Average soil temperature across the entire state, rose above the 50°F minimum for soybean



Figure 1. Soybean seedlings at VE (emergence) growth stage.

planting at a 2" depth as early as the beginning of March. However, it was not until about late-March that soil temperatures maintained the critical 50°F for any length of time. From March 25 until April 15, the soil temperature maintained temperatures greater than or equal 50°F, except for about 4.5 hours on the morning and into early afternoon of April 2. These warm soil temperatures early in the season likely prompted much of the early soybean planting this year.

Unfortunately, a freeze occurred across the entire state April 15 and 16. This resulted in average soil temperatures across the state falling as low as 46°F for about four hours on April 15 and maintaining temperatures below 50°F for about 10.5 hours. On April 16, average soil temperatures across the state fell to 46°F for two hours and remained below 50°F for about 8.5 hours. For soybean seedlings that were still below ground, these freeze events likely had minimal impact on the developing soybean seedling, other than slowing down growth and development leading to the seedling remaining below ground for a longer period of time. For seedlings that were in the 'crook' stage or emerged, there may be damage, and in the case of seedlings in the 'crook' stage (Figure 3), likely complete death of the plants.

In general, to maximize the chances of successful soybean establishment and the best chances for maximum yield, conditions at planting and following should be:

- Soil temperatures to be and remain at 50°F or greater
- Low risk for killing freeze from the soybean 'crook' stage to VC (vegetative cotyledon) stage

Additional considerations when soybean are planted into soils that are less than about 60°F:

- Know the vigor of each seed lot
 - Several laboratories offer such testing including University of Kentucky's Regulatory Services (<http://www.rs.uky.edu/regulatory/seed/service/TestDescriptions.php>)
 - Seed planted into cool conditions MUST have a high vigor or there could be problems with stand establishment
- Use seed treatments
- Plant about 1.5 to 2" deep (but never more than 2")
- Increase seeding rate to off-set additional stand losses that can occur
 - Limited research has shown up to about 25% stand loss with early planting dates
- If the field has a history of Sudden Death Syndrome (caused by *Fusarium virguliforme*)
 - Select a resistant soybean variety
 - Utilize ILeVO seed treatment
 - But do not delay planting
- Inoculate seed with *Bradyrhizobium japonicum* if the field
 - was saturated for extended periods of time within the past year
 - has a history of poor nodulation
 - has not grown soybean within the last three to five years

Figure 2. Average soil temperature at 2" below the soil surface for various locations across KY from March 1 to April 27, 2020. Data provided by KY Mesonet.

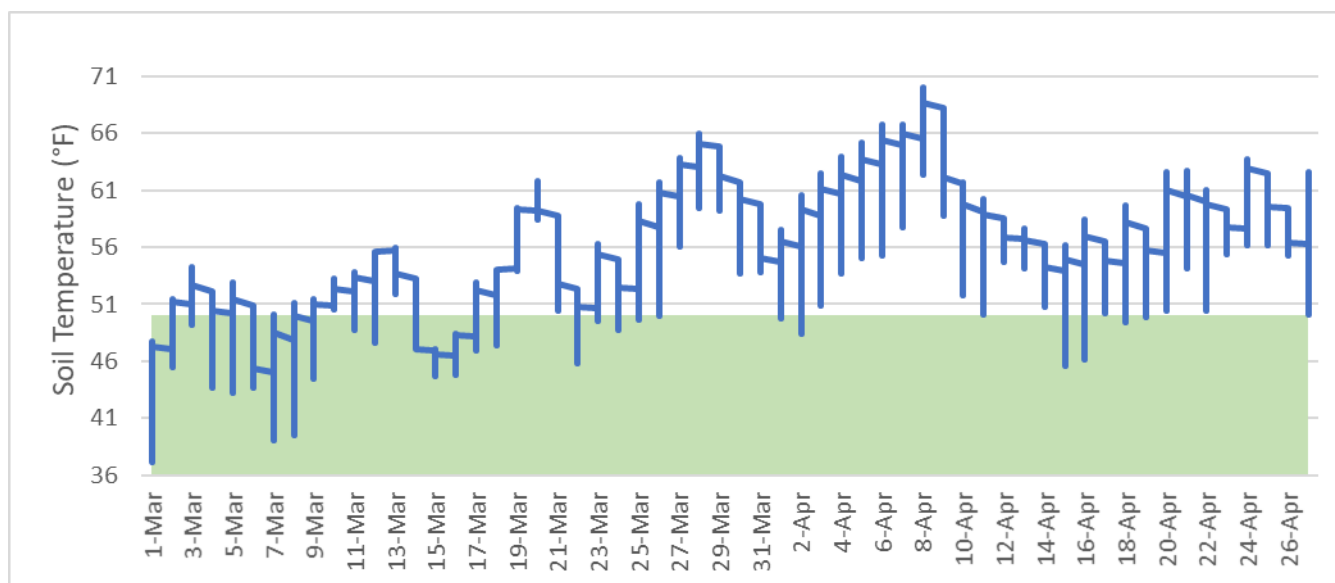
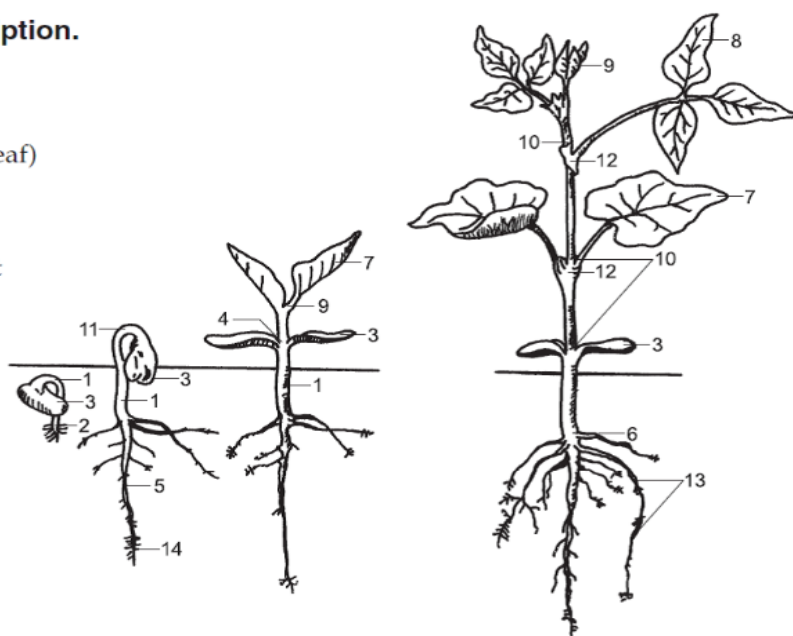


Figure 3. Image depicting the ‘crook’ growth stage (second from left). Source: <https://www.ag.ndsu.edu/crops/dry-bean-articles/stages-of-development>.

Figure 1. Plant description.

1. Hypocotyl
2. Radicle
3. Cotyledon (simple leaf)
4. Cotyledonary node
5. Tap root
6. Lateral (branch) root
7. First true leaf (unifoliolate)
8. Trifoliolate leaflet
9. Terminal bud
10. Axillary buds
11. Hypocotyl arch
12. Nodes (point of leaf attachment)
13. Nodules
14. Root hairs



Resources

Kentucky Mesonet. <http://www.kymesonet.org/soil.html>.

Knott, C. and C. Lee (eds). A Comprehensive Guide to Soybean Management in Kentucky. University of Kentucky Cooperative Extension Service ID-249. <http://www2.ca.uky.edu/agcomm/pubs/ID/ID249/ID249.pdf>.

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Stages of Development. North Dakota State University Cooperative Extension Service. <https://www.ag.ndsu.edu/crops/dry-bean-articles/stages-of-development>

USDA-NASS Crop Progress and Condition. Issue 6-20. Released April 27, 2020. https://www.nass.usda.gov/Statistics_by_State/Kentucky/Publications/Crop_Progress_&_Condition/cw20/CW042720.pdf.



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Also in this issue

- WHAT TO EXPECT IN YOUNG CORN IN 2020
- RECORDING OF STORED GRAIN HANDLING, MANAGEMENT WEBINAR IS AVAILABLE

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What to Expect in Young Corn in 2020

By Chad Lee

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Grain and Forage Center of Excellence
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As of April 27, 2020, Kentucky farmers were ahead of schedule on planting corn. Much of the corn across Kentucky is likely somewhere between germinating to about V3. In this article, we are going to discuss some things to expect with a young corn plant this spring.

Most farmers and crop consultants would agree that when corn emerges, it appears to almost just “sit still” for a week or two. Corn plants without a 2x2 or in-furrow nitrogen application often look yellow, even if other nitrogen was applied before planting. The young corn plants with the 2x2 or in-furrow nitrogen will look greener and may be a little taller. Eventually, a few more leaves are added to the plants and they look a little better. Then, in what seems sudden, the corn appears to “grow overnight”. Much of the corn in Kentucky is in the “sit still” stage and the recent weather may cause it to “sit still” a little longer.

Let’s get back to emergence and discuss some of what to expect. When temperatures are warm enough and once corn kernels imbibe water to push kernel moisture above about 35%, germination begins. First, a young root called the radicle will emerge. After that, the mesocotyl (shoot) emerges. The coleoptile protects the mesocotyl. Once the mesocotyl breaks through the soil surface, the green leaf will be visible, first as a

“spike” (VE growth stage) and then begins to extend and unroll until it is fully emerged (V1 growth stage).

The mesocotyl is very sensitive to temperature. Normally, it grows up. But, if the soil experiences alternating warm and cold periods, the mesocotyl can become “confused,” growing down to avoid the cold temperatures and back up. The mesocotyl sometimes will look like a corkscrew in these conditions. Other times during cold spells, emergence is simply delayed. Delays in emergence allow more time for pests like insects or certain fungi to attack the seedlings. Temperatures below 60 F will slow emergence. Alternating warm and cold temperatures (such as going from 60 to 35 back to 65 back to 40 F) are likely to cause the corkscrew effect in some mesocotyls.

When the corn emerges through the soil surface it is at the VE growth stage. The emerged plant is relying on a root system that emerged from the seed. This system is called the seminal root system and it has very limited range. The young plants rely on these seminal roots until about three leaves are fully emerged (V3 growth stage). At that point, roots emerge from the first grouping of nodes which are above the remnants of the seed but below the soil surface. If a corn seed was placed too shallow (less than one inch), that grouping of nodes will set close to the soil surface. These seedlings are more susceptible to being killed in cold weather and the surviving plants are much more susceptible to lodging after pollination.

Corn plants from VE to about V2 (two fully emerged leaves) are very susceptible to insect and slug damage. If the young plants are growing in warm and sunny weather, they will often

grow fast enough to avoid serious damage. Also, the sunny weather limits the duration at which those insects and slugs are actively feeding. If the weather is cooler and cloudy, the young seedlings will grow slowly. Insects and slugs love cooler, cloudy weather. Not only is the young corn plant growing slowly, the insects and slugs are spending more time above the soil surface and feeding on the plants much more. Farmers can expect stand loss in these kinds of conditions. Farmers and crop consultants should scout these fields to determine pest pressure and make management decisions accordingly.

Once the young corn gets to about V3, slug damage may occur, but such damage rarely hurts yields. Corn at these young stages can handle 100% defoliation with no damage to yield potential. Corn tissue that was frozen from recent events typically will sluff off the plant after about a week and new growth will be uninhibited... if slugs and insects are not present.

Corn from VE to V3 are relying on seminal roots which are not very extensive. Most of these roots are within or very near the seed furrow. Cold weather and saturated soils will limit nutrient uptake. Even for corn with a 2x2 or in-furrow fertilizer application, plants may show symptoms of nutrient deficiency that are caused by environmental factors, not by a lack of those nutrients in the root zone. For these plants, some sunshine and drier soils are the best remedy. Additional nutrients will provide little to no benefit, unless the field was truly deficient, already.

If young seedlings survive, much of the damage discussed in this article to a plant at or before the V3 growth stage will have little impact on potential yield. However, the cloudy weather and cooler temperatures require that field scouting on most fields and additional action where needed.

Other Sources:

Abendroth, L.J. Roger W. Elmore, Matthew J. Boyer, Stephanie K. Marlay, Corn Growth and Development, PMR 1009 Iowa State University, Ames. <https://store.extension.iastate.edu/product/Corn-Growth-and-Development>

Nielsen, R.L. 2004. Corkscrewed Corn Seedlings. Purdue Univ. <https://www.agry.purdue.edu/ext/corn/news/articles.04/Corkscrew-0501.html>

Roozeboom, K. and A. Sindelar. Corn Growth and Development. Kansas State University. <https://www.agronomy.k-state.edu/extension/crop-production/corn/corn-growth-and-development.html>

USDA NASS KY Crop and Weather Reports <https://www.nass.usda.gov/Statistics by State/Kentucky/Publications/Crop Progress & Condition/>



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Recording of Stored Grain Handling and Management Webinar is available

By Sam McNeill

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A webinar on stored grain handling, safety and management was held on April 22, 2020, to address specific concerns with the 2019 U.S. crop. A panel of seven experts from the grain industry and land-grant universities in the North Central and Southern regions that work on post-harvest topics responded to questions related to grain handling and storage on farms and elevators. Specific focus was given to problems relat-

ed to delayed drying, stored grain management, safety concerns, handling issues, and controlling insect pests and mold growth in storage. It was attended by 366 folks, but if you missed it here's a link to the webinar recording:

<https://attendee.gotowebinar.com/recording/1109044800007797249>

If you have questions please call or email Sam McNeill, who served as one of three moderators during the webinar (270-365-7541 x 21326; sam.mcneill@uky.edu).



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Useful Resources



<http://wheatscience.ca.uky.edu/home>



KyGRAINS.info

Useful Resources



Crops Marketing and Management Update

<http://www.uky.edu/Ag/AgEcon/extcmmu.php>



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Upcoming Events



Please note: The University of Kentucky Research and Education Center/Grain and Forage Center of Excellence is moving forward with its summer educational programming in a COVID-19 safe manner. We look forward to your participation in our educational programming. Please check <https://wheatscience.ca.uky.edu> and <https://www.kygrains.info> for updates.

<u>DATE</u>	<u>EVENT</u>	<u>LOCATION</u>
May 12	UK Wheat Field Day	Virtual
May 28	KATS—Crop Scouting Clinic	TBA
June 18	KATS—Mid-Season	TBA
June 30	Pest Management Field Day	TBA
July 16	KATS—Spray Clinic	TBA
July 28	UK Corn, Soybean & Tobacco Field Day	TBA
July 30	High School Crop Scouting Competition	TBA