

To Plant or Not to Plant

There are three factors to consider in the analysis of when to initiate planting: calendar date, soil temperature, and soil conditions. In my personal experience, soil temperature is over-emphasized and soil conditions are not given enough importance. Modern seed treatments and our advanced understanding of hybrid stress emergence have re-written the book on what is acceptable for soil temperatures and calendar dates. I am not advocating these first two factors be thrown out, rather they should be balanced equally with the importance of soil conditions. With poor soil conditions (e.g. excessively wet) it is very difficult to set a planter to close the seed slice without season long impacts from side-wall compaction. If we error by planting “too early” into soils that are “too cool” resulting in a loss of stand, corn and beans both have a tremendous capacity to flex and respond to somewhat thinner stands. If, however, we plant into soils that are too wet we create sidewall compaction which impacts root development season long – a problem which greatly hinders the crops’ ability to achieve high yield as well as adopt to stress conditions.

Boiling this all down, waiting for the perfect soil temperature or calendar date often results in greater problems for producers when rainfall results in soil conditions that are too wet. So far this season we are dealing with excessively dry conditions across the region. The positive aspect of this is that we are seeing an excellent job of no-till planting into high levels of residue— ***quite possibly the best I have ever seen no-till planting work.*** If you are debating what move to make – e.g. plant corn or plant beans first, wait for warmer soils, etc., - I would advocate for planting no-till fields with high residue levels because, you won’t see planting conditions in these field work this well for a long time. If you are concerned about planting beans into current soil temperatures, I encourage you to review this UNL Crop Watch article discussing soybeans ability to imbibe water & germinate with soil temperatures in the mid-40’s:

<https://cropwatch.unl.edu/2021/demonstrating-critical-imbibitional-time-soybean>)

Recommendations for planting in exceptionally dry conditions.

The first recommendation is to remember what the good book says: “Rain falls on the just and the unjust” (Mt 5:45). The point here is that a lot of faith and a little humor in the face of challenges makes them much easier to endure 😊. We are seeing some unique challenges adjusting planters to deal with exceptionally dry conditions and we offer these suggestions when starting out:

Problem: loose dry soil falling into the seed slice before closing wheels can seal the trench.

- First advice is to not sweat this too much. Some very small amount of dry soil falling into the bottom of the seed trench is seen every year. Keep perspective on how much is too much.
- Second, check your disc openers and gauge wheels. If double disc openers are not touching the proper amount you will not be cutting a “Tru-V” but rather a “Capital W” as dry loose soil is left

in the bottom of the slice. Also check to see that gauge wheels are gently rubbing against the opening disc blades. If gauge wheel tires are not gently rubbing on the opening discs but a large gap exists instead, loose soil will be able to fall into the seed slice before closing.

- Third, add more down pressure to the row units. **When planting into wet conditions always error on the side of not enough down pressure and when planting into dry conditions always error on the side of too much down pressure.** Down pressure on the gauge wheels helps to firm the sides of the seed trench helping prevent dry soil from collapsing into the bottom of the seed trench. Be careful with this adjustment as too much pressure will create sidewall compaction.
- Fourth, consider the configuration of spiked closing wheels. I have long been an advocate for setting planters up with one spiked closing wheel and one standard tire (rubber or cast). The benefit of this configuration improving seed slice closure under wet or high clay content soils is clearly proven. There are a couple reasons I generally prefer just one spiked closing wheel vs two. First, two spiked wheels can be overly aggressive at times in wet conditions, and we can achieve 80-90% of the seed slice closure benefit with just one spiked wheel. Second, while spiked closing wheels do an excellent job of closing a wet seed trench they often do not provide seed to soil contact as *uniform* as solid tires. Firm seed to soil contact is absolutely necessary for seed germination and it can be difficult to achieve with dry conditions. Running one spiked and one solid tire helps improve uniformity of seed to soil contact over two spiked wheels. This may be very subtle but with dryer conditions every advantage helps.
- Seed firmers. We have already made adjustments to plant deeper this spring in order to into moisture. In conventional tilled and even ridged ground that has been stumped I am seeing a firm moist layer laying below several inches of dry soil. It is critical to lay the seed just into the top edge of that moisture layer to prevent the seed from drying out. With pivot irrigation it is possible to place seed into the dry layer and water it up. However, the frequency of high wind this spring creates concern about this strategy since this top 1-3" of dry soil is also loose - one pass of a pivot may not be sufficient to ensure uniform germination. Placing the seed in contact with the firm moist layer guarantees that any light irrigation or rainfall will not result in seed germinating and then dying as this layer dries out. Seed firmers help to ensure seed achieves good seed to soil contact at the bottom of the seed slice, hopefully into a zone of moisture.

Insects on the radar

We are seeing some early observations of seed corn maggot adults (flies). Producers are reminded that when you see hordes of small black adult flies congregating on vehicles, tractors, etc, that these are looking for a place to lay eggs which become seed corn maggots. While these are called "seed corn" maggots they will attack soybeans with the same voracity they attack seed corn. These adults strongly prefer fields that have heavy levels of decaying fresh cover crop residue.

An exclusive offering this year from your local Pioneer seed representative is Lumiderm soybean seed treatment. This new offering has proven itself to be the best seed treatment in the industry for protecting your crop from seed corn maggots. If you are planting into heavy levels of decaying cover crop residue, we strongly advocate using Lumiderm soybean seed treatment from Pioneer.

Running Pivots to improve planting conditions, pre-watering, etc.

The decision to water ahead of planting to improve soil conditions vs. waiting and irrigating after planting is not as clear cut as one might think. The right action in any scenario depends on the situation.

Water prior to planting		Water after planting
Pros	Ensure uniform soil conditions for setting a planter.	Incorporation of herbicide and germination of seed are accomplished with one irrigation pass.
	Helps to firm up soil thereby preventing collapse of seed trench during planting.	No risk of pre-water combining with potential rainfall to create surplus moisture situations.
	Sunlight / heat is absorbed and retained better in moist soil than dry soil.	Maximizes the opportunity to receive natural rainfall.
	Potential crusting issues from irrigating over planted seed are eliminated.	Ensures uniformity of moisture on planted crop.
Cons	Watering a second time will be necessary to incorporate herbicide.	Dual workload of planting and irrigation.
	Eliminates the opportunity of allowing rainfall to provide needed moisture.	Creates the risk of crusting soil surface.
	Opens risk of needlessly watering should subsequent rainfall be received.	

In situations where we know multiple irrigation passes will be necessary it would probably be wise to run an irrigation pass ahead of planting and one after planting. Such situations include:

- Where soil conditions are extremely rough, cloddy, and dry.
- When planting seed corn which has very low stress emergence and weak vigor.
- Where planting on a strip directly above a high amount (180+ lbs) of ammonia – and very little moisture (>2" total precipitation) has been received since fertilizer was applied.

Absent these type of situations, I generally am not an advocate of pre-watering to create better planting conditions unless it is absolutely necessary, but these situations certainly exist this year. The preferred strategy is to plant first and apply herbicides prior to watering.

Ammonia burn potential exists with strip till.

Strip tillers are cautioned to be aware of potential ammonia burn when planting on top of an ammonia fertilizer band. With the exceptionally dry conditions it really does not matter when the ammonia was applied (fall vs spring) or even the rate applied – the potential for burning seedling roots this spring is high. ***Conditions where this is most likely to occur exist where the fertilizer slice did not close properly BELOW GROUND at the point of injection.*** When this happens an open void or cavity allows ammonia to move upwards into shallower regions where it can impact germinating corn seedlings. Ammonia burn can happen very quickly (when the first radicle root emerges from the kernel, or it can occur weeks later when seedling roots grow 4-6" downward into an ammonia band. I am advising all strip till producers to have pivots ready to apply at least $\frac{3}{4}$ " of moisture to help alleviate the potential of ammonia injury. Again, my preferred strategy is to plant first, apply herbicide, then water the herbicide in. Preferably the water is applied within 5 days of planting. Pre-watering ahead of planting will also help mitigate risk of ammonia burn.

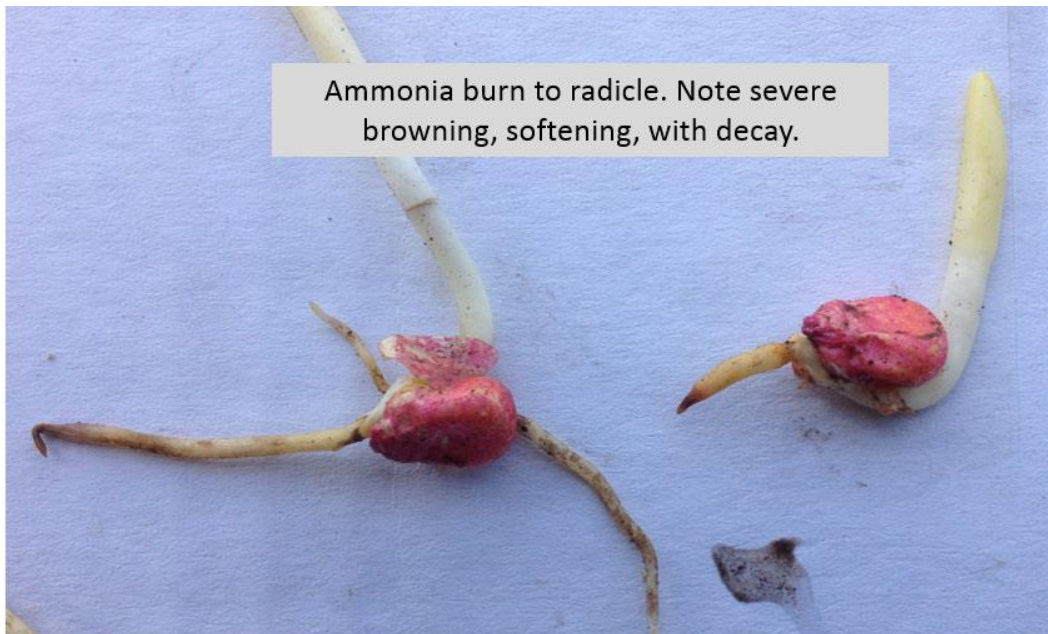


Severe Ammonia burn to emerging seedling roots.



Ammonia burn to emerging radicle.

I often encounter growers with concerns about applying cold irrigation water to fields with germinating seeds and the impact of this reducing soil temperature. In the southern half of Nebraska groundwater temperature averages around 50-53 degrees, with slightly cooler temperatures in the northern half of the state. Bottom line these temperatures are not a problem to be concerned with – the benefits of watering for stand establishment far exceed any potential negative temperature effects. Irrigation water can lower soil temperatures slightly, but it is not cold enough to cause any type of chilling injury.



Ammonia burn to radicle. Note severe browning, softening, with decay.

Avoiding PPO herbicide injury on soybeans.

Soybean herbicides in the Group 14 class, also referred to as “PPO inhibitors” are some of the most effective products available today for managing tough weed species. Unfortunately, these also carry potential to cause significant stress to emerging soybeans. There are two distinct ways PPO products can injure soybeans: first, if they are taken in through the radicle (first root to emerge from the seed) during germination and second, if they physically contact any plant tissue emerging from the soil. **Both potential injury scenarios can be significant under the right conditions.** The combination of early soybean planting intentions, herbicide incorporation via irrigation due to continuing dry conditions, and delayed herbicide application due to wind is setting the stage for potential PPO injury problems. We offer the following suggestions to mitigate risk potential.

1. Plant soybeans at least 1.5 to 1.75” deep putting the radicle root below the zone of herbicide incorporation. Generally, PPO herbicides activated by ½” to ¾” of moisture will not move deep enough to be taken up by the radicle of a seedling planted 1.5” to 1.75” deep. Research from the University of Nebraska indicates the optimum planting depth for soybeans to be 1.75” deep. (<https://cropwatch.unl.edu/soybean-planting-depth-consider-planting-deeper>) It is common to plant soybeans shallower (0.5” to 1” range) but this is not advised due to potential impacts on root development and subsequent yield. Planting soybeans in the 1.5” range has long been advocated as a way to ensure proper root development, which leads to higher yield potential.
2. Apply PPO’s 10-14 days ahead of planting creating time for them to be incorporated / diluted into the soil volume thus reducing opportunity for both types of injury. The worst possible scenario for PPO injury is to plant shallow then apply a PPO herbicide at planting and immediately water it into the seed zone. This creates very high potential for seedling uptake – causing significantly delayed emergence and stand establishment issues. If the herbicide must be applied at planting, plant 1.5-1.75” deep and wait at least 3-5 days after planting before incorporating with irrigation so the seed has an opportunity to imbibe water that does not contain herbicide. We should note this recommendation to delay irrigating for 3-5 days assumes early planting dates where it will take beans at least a week to emerge. When planting later with warmer conditions beans can emerge within 7 days of planting and **you do not want to be irrigating to incorporate PPO herbicide as beans are emerging (see next point).**
3. Do not irrigate when seeds are “necking” or cracking through the soil surface. If a PPO herbicide has been applied, but no moisture is received to incorporate it, applying water as the beans are emerging will float the herbicide into contact with emerging seedlings causing significant tissue damage. ***It is essential to incorporate with irrigation BEFORE you see any emerging seedlings.***
4. Ensure seed slice closure. An open seed slice increases risk of PPO chemistries being washed into the seed slice causing significant burn to all plant tissue parts.
5. Consult the Pioneer Herbicide by Variety guide. Soybean variety genetics respond to PPO herbicide uptake differently. We conduct replicated trials to better understand which varieties & herbicide combinations have potential for more issues. The full results can be found here: https://drive.google.com/file/d/1pxb7IHYPPLF6Dvn8bdZt-Ira46g_Kv1p/view?usp=sharing