Soybean Pod Splitting and Seed Sprouting in 2018

Weather Conditions During 2018 Harvest

- Many soybean producing areas experienced prolonged extreme wet conditions during the 2018 harvest season.
- These conditions caused substantial delays in harvest in some areas and led to yield losses due to pod splitting and seed germination in the pods.
- Two conditions are necessary for soybeans to germinate in the pods following physiological maturity:
    - Seed moisture raised back above 50%
    - Temperatures greater than 50 ºF
- Weather conditions in September of 2018 met both of these requirements in many areas – temperatures were above average through most of the eastern and Midwestern U.S. (Figure 1), and precipitation was double or even triple the monthly average in many areas (Figure 2).

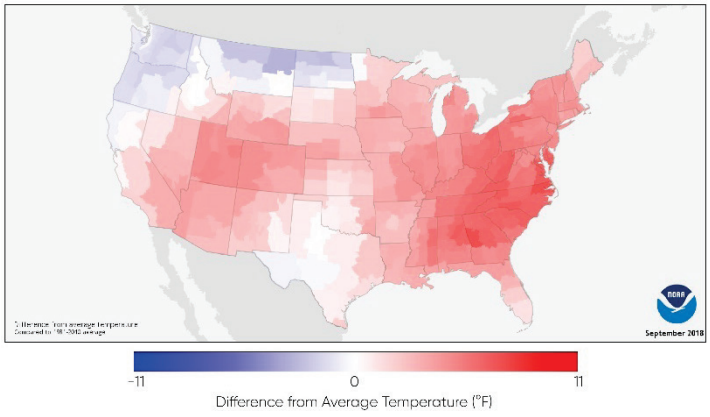

Figure 1. September 2018 temperature deviation from average (1981-2010). (NOAA)

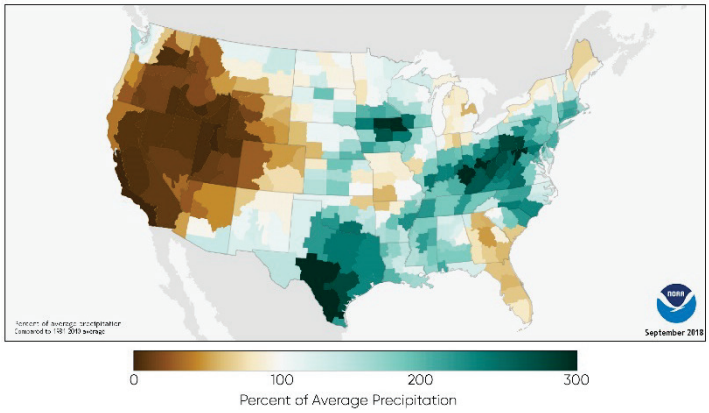

Figure 2. September 2018 precipitation percent of average (1981-2010). (NOAA)

Figure 3. Soybeans that have swollen and ruptured the pods due to persistent wet conditions in Iowa in 2018 (Photo: Chris Doud, Pioneer Field Agronomist)

Seed Swelling and Pod Splitting

- Soybean seed moisture is around 35% at physiological maturity and will decline quickly under dry conditions, drying down much more rapidly than corn.
- However, soybeans will readily re-absorb water and expand when exposed to moisture.
- Frequent rains and persistent wet conditions, such as those experienced in many areas in 2018 can allow water to soak through the pods and cause the seeds to swell inside the pods.
- If the seeds swell enough, they can cause the pod to rupture (Figure 3).
- Soybeans that experienced drought stress earlier in the season can have an elevated risk due to smaller and weaker pods.
- When pods are ruptured, seeds are prone to loss, particularly when they dry back down, either before or during harvest (Figure 4).

Germination in the Pods

- Once the pod has ruptured, the seeds are directly exposed to soaking rainfall. If the seeds swell to above 50% moisture and temperatures are above 50 ºF, they may begin to germinate (Figure 5).
- Germination will continue as long as moisture and temperatures remain favorable.

Figure 4. Soybeans that have fallen to the ground after the pods ruptured. (Photo: Chris Doud, Pioneer Field Agronomist)

Harvest

- Affected fields should be harvested as soon as feasible to prevent further loss of yield and quality.
- If soybean plants have retained green foliage due to wet conditions, a desiccant may be needed.

Combine Speed and Settings

- Slowing down harvest speed can help reduce gathering losses. Keep forward speed at about 3 miles per hour for most combines. Slow down for uneven soil surface or other abnormal conditions.
- Equipment must be properly adjusted and carefully operated to minimize losses. Soybeans that never get inside the combine can account for 80 to 85% of harvest losses.
    - Be sure knife sections and ledger plates are sharp, and that wear plates, hold-down clips, and guards are properly adjusted. Chains and bearings should be properly lubricated, and belts tight.
    - Proper reel speed in relation to ground speed will reduce gathering losses. Shatter increases if the reel turns too fast; stalks may be dropped if the reel turns too slow. Use a reel speed about 25% faster than ground speed.
    - The reel axle should be 6 to 12 inches ahead of the sickle in most cases. Operate a bat reel just low enough to tip cut stalks onto the platform. The tips of the fingers on a pickup reel should clear the cutterbar by about 2 inches.

Handling and Storage

- Swollen and/or germinated seed will negatively affect seed quality.
- Germinated seeds will die and break into pieces during harvest, most of which will likely go out the back of the combine.
- Pieces that remain in the harvested grain can promote spoilage due to the breakdown of carbohydrates, proteins and fats in the seed that is initiated during the germination process.

Figure 5. Soybeans germinating in the pods due to persistent wet conditions in Iowa in 2018. (Photos: Chris Doud, Pioneer Field Agronomist)

- Soybeans subjected to conditions capable of causing germination in the pods will also likely have pod and seed diseases present as well, which can also contribute to grain quality concerns (Figure 6).
- Soybeans should be dried down to 11% moisture to inhibit fungal growth, aerated, and delivered as soon as possible.
- Soybeans should be dried at temperatures between 100 and 130 ºF. Higher temperatures can cause damage to the seed.
- Damaged soybeans can be blended with good quality soybeans, if possible.
- Growers should open a claim with their crop insurance provider if there is a concern over soybean quality and yield.

Figure 6. Swollen seeds and ruptured pods with disease visible on both the pods and seeds. (Photo: Chris Doud, Pioneer Field Agronomist).

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