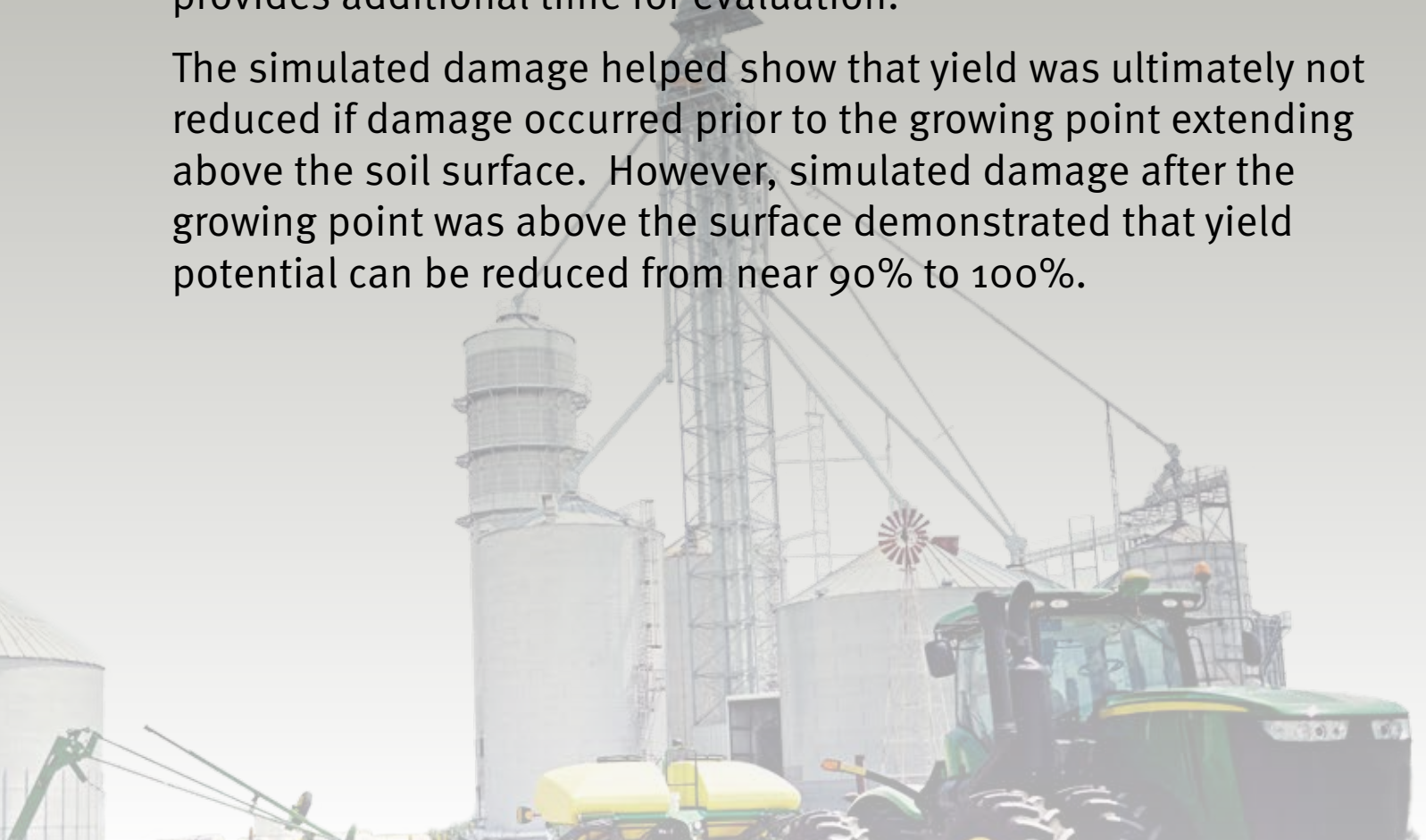




## RESPONSE OF THREE CORN PRODUCTS TO EARLY SEASON DAMAGE

The Monsanto Learning Center near Scott, MS has conducted several simulated demonstrations over the years to help determine the ability of young corn plants to recover from hail and possible frost damage. The ability to recover helps determine if a damaged crop can be left or needs to be destroyed and replanted to have a near normal yield potential. Generally, it is recommended to wait 7 to 10 days before evaluating the plant's health after damage to see if the plant has healthy re-growth. The longer growing season in the southern states provides additional time for evaluation.

The simulated damage helped show that yield was ultimately not reduced if damage occurred prior to the growing point extending above the soil surface. However, simulated damage after the growing point was above the surface demonstrated that yield potential can be reduced from near 90% to 100%.



## Background



Weather events in 2015 across the Mid South resulted in significant amounts of severely damaged early vegetative corn. The damage resulted in a desire to determine:

- How corn plants respond to damage in a southern environment?
- If damaged corn fields should be kept or destroyed and replanted?

Response of Three Corn Products to Early Season Plant Damage

## Background



- Generally, if the growing point (Figure 1) is below the soil surface when damage occurs, young corn plants can recover from severe frost or hail damage. However, withered or blackened leaves may occur (Figure 2).
- Frost damage can occur at temperatures greater than 28° F, but air temperatures can become lethal when they fall below 28° F for more than a few hours.<sup>1</sup>



**Figure 1. The Growing Point Contains Miniature Tassel and Potential Ears.**



**Figure 2. Frost Damage to an Early Vegetative Corn Plant in a Northern Location.**

Response of Three Corn Products to Early Season Plant Damage

## Results and Discussion



- Hail damage (Figure 3) is more common than frost damage in the Mid South. Though hail damaged fields can appear ugly, it is best to be patient and wait a few days to see if plants begin to have new growth.
- Hail damaged plants can be subject to rotting because of the injured tissue.
- Disease pathogens may use plant wounds as entry points.



Figure 3. Hail Damage to Corn Plant at a Northern Location

Response of Three Corn Products to Early Season Plant Damage

## Study Guidelines



- A corn demonstration trial was conducted at the Monsanto Learning Center near Scott, MS to address questions being asked by Southern farmers:
  - How do corn plants respond to early-season vegetative damage that occurs at three different stages of crop growth?
  - Do early damaged fields have acceptable yield potential?

Response of Three Corn Products to Early Season Plant Damage



## Background



- Three corn products were planted on April 23, 2015 at 38,000 seeds/acre:
  - DEKALB® DKC62-08 Brand (112 RM)
  - DEKALB® DKC66-87 Brand (116 RM)
  - DEKALB® DKC67-72 Brand (117 RM)
- Two replications and four rows of each product were planted.
- Three simulated crop damage treatments were performed:
  - 10 days before 6 collared leaves were visible
  - At 6 collared leaves (growing point emergence)
  - 10 days after 6 collared leaves were visible

Response of Three Corn Products to Early Season Plant Damage

## Background



- Simulated plant damage was achieved by damaging or cutting plants off with a string trimmer.



Figure 5. Simulated Plant Damage 10 Days after 6 Collared Leaves.



Figure 4. Simulated Plant Damage Prior to 6 Collared Leaves.

Response of Three Corn Products to Early Season Plant Damage

## Results and Discussion



- Simulated damage to plants before the growing point emerges from the ground (6 collared leaves) appears to have little or no effect on corn yield. Results are similar to a 2010 Monsanto Learning Center Demonstration at Scott, MS.<sup>2</sup>
- Significant yield reduction occurred when simulated damage occurred at or after 6 collared leaves; most plants died.
- The latest simulated damage (10 days after 6 collared leaves) resulted in a yield of zero to near zero in several of the replications.

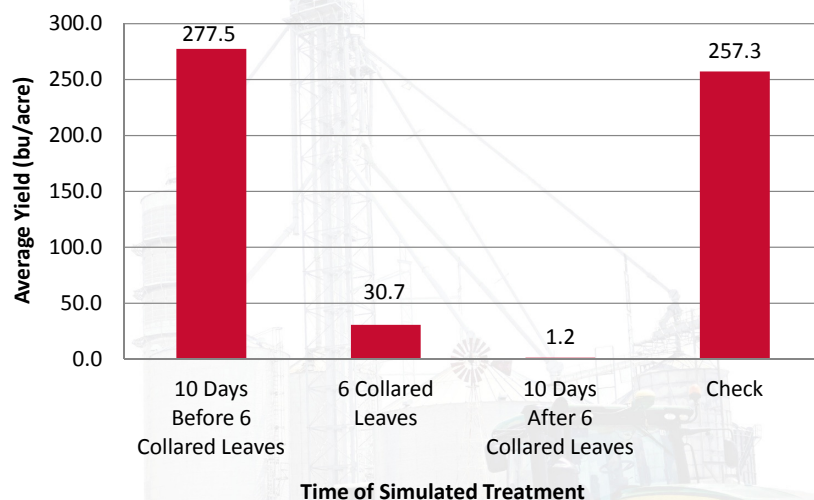
Response of Three Corn Products to Early Season Plant Damage

## Results and Discussion



Average yield for the three products in the 10 days before 6 collared leaves treatment was higher than the average yield of the untreated checks and the other two treatments.

Figure 6. Average Yield Comparison of the Three Corn Products for Each Simulated Treatment.



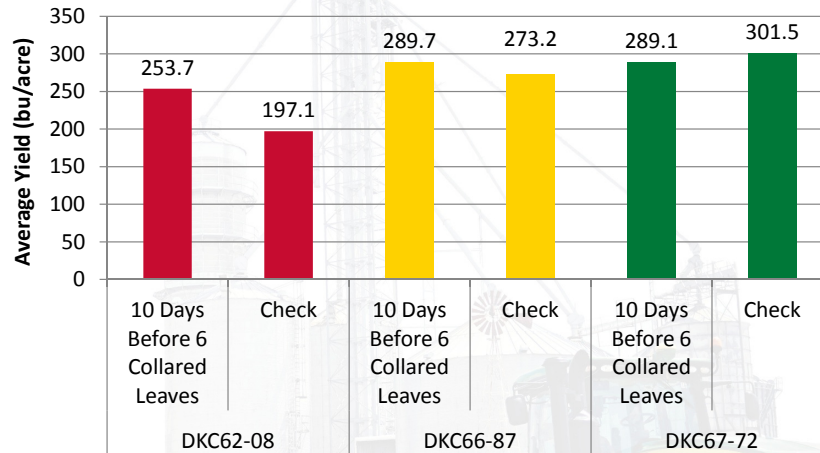
Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion



The average yields of DEKALB® DKC62-08 Brand and DEKALB® DKC66-87 Brand were higher than their respective checks by 56.6 and 16.5 bu/acre respectively, while DEKALB® DKC67-72 Brand was 12.4 bu/acre less than its check.

Figure 7. Average Yield Comparison for Treatment and Check When Simulated Damage Occurred 10 Days Before 6 Collared Leaves.



DEKALB® Brand Product and Simulated Treatment

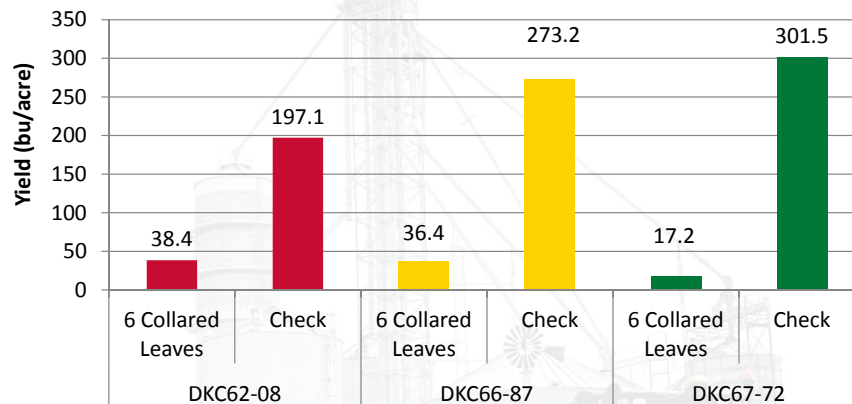
Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion



The average yields of DEKALB® DKC62-08 Brand, DEKALB® DKC66-87 Brand, and DEKALB® DKC67-72 Brand were significantly lower than their respective untreated checks by 158.7, 236.8, and 284.3 bu/acre respectively.

Figure 8. Average Yield Comparison for Treatment and Check When Simulated Damage Occurred At 6 Collared Leaves.



DEKALB® Brand Product and Simulated Treatment

Response of Three Corn Products to Early Season Plant Damage

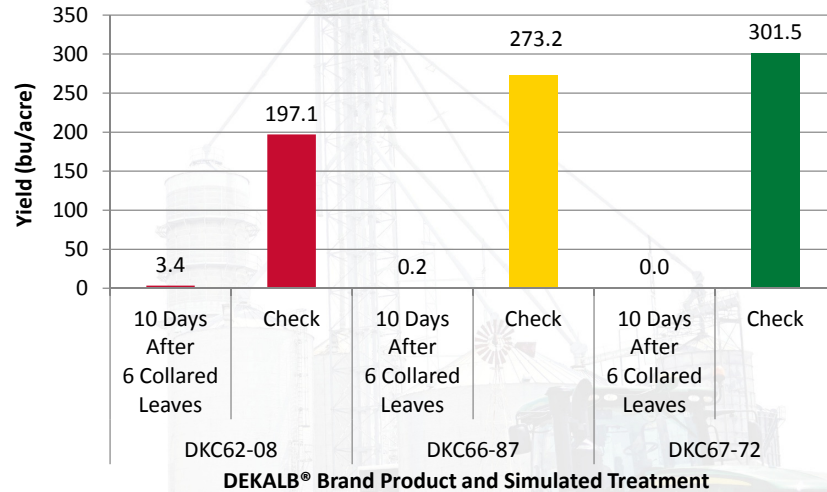


## Results and Discussion



The average yields of DEKALB® DKC62-08 Brand, DEKALB® DKC66-87 Brand, and DEKALB® DKC67-72 Brand were significantly lower than their respective checks by 193.7, 273.0, and 301.5 bu/acre respectively.

Figure 9. Average Yield Comparison for Treatment and Check When Simulated Damage Occurred 10 Days After 6 Collared Leaves.



Response of Three Corn Products to Early Season Plant Damage

## Results and Discussion



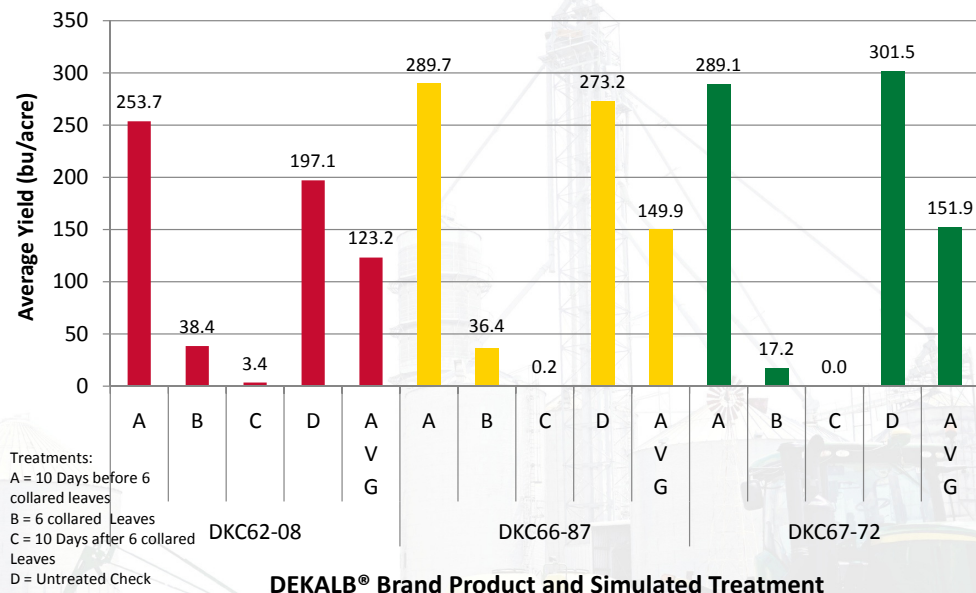
The significantly lower yields for the simulated damage at 6 collared leaves and 10 days after 6 collared leaves would indicate that the growing point in most or all of the plants was killed, resulting in plant death or the inability to produce an ear.

Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion



Figure 10. Average Yield of Each Product for Each Simulated Treatment



Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion



- Some corn products tend to yield more in response to the damage. Reason is not well understood, but may be related to shifts in timing of pollination.

Response of Three Corn Products to Early Season Plant Damage

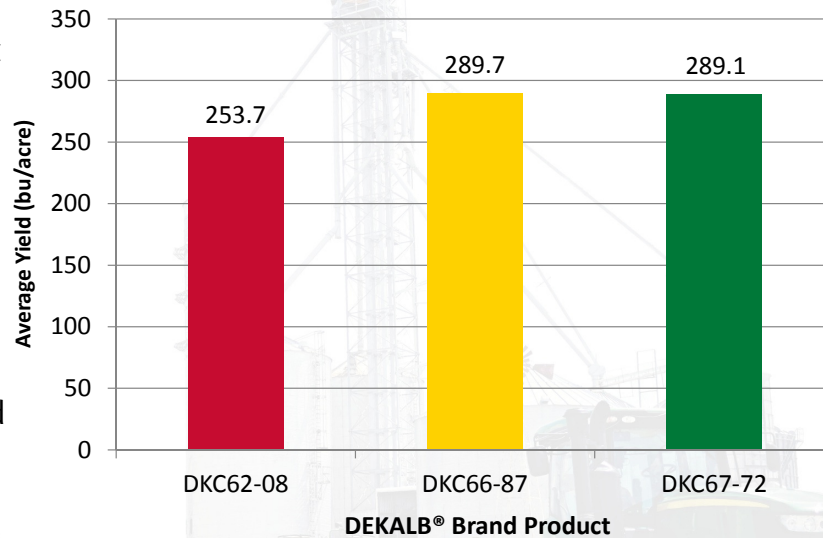


# Results and Discussion



DEKALB® DKC66-87 Brand was the highest yielding product with an average yield at 289.7 bu/acre followed by DEKALB Brand® DKC67-72 at 289.1 bu/acre and DEKALB® DKC62-08 Brand at 253.7 bu/acre.

Figure 11. Average Yield of Each Product When Simulated Damage Occurred Before 6 Collared Leaves.



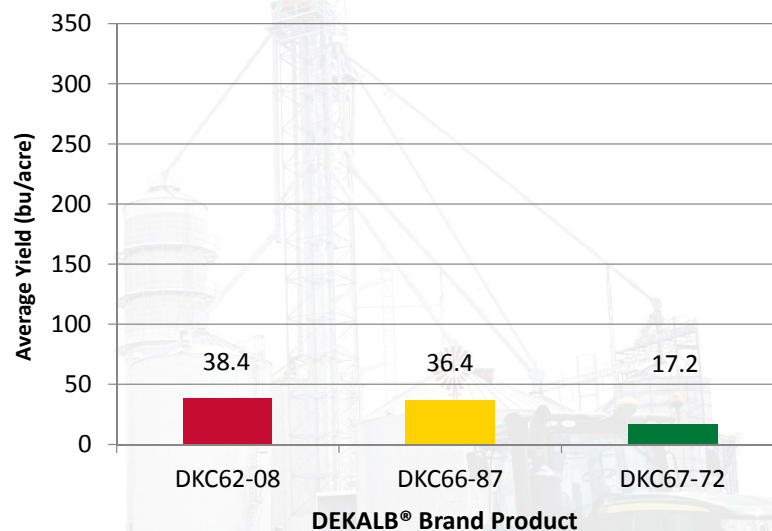
Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion



DEKALB® DKC62-08 Brand was the highest yielding product with an average yield at 38.4 bu/acre followed by DEKALB® DKC66-87 Brand at 36.4 bu/acre and DEKALB® DKC67-72 Brand at 17.2 bu/acre.

Figure 12. Average Yield of Each Product When Simulated Damage Occurred At 6 Collared Leaves.



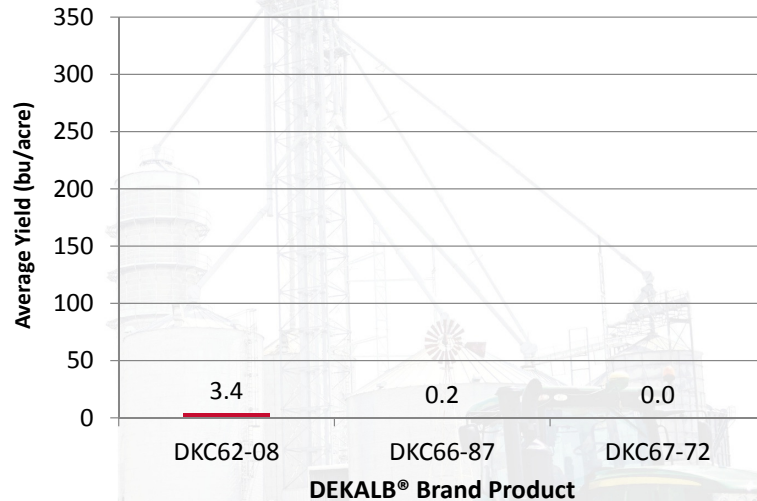
Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion



DEKALB® DKC62-08 Brand was the highest yielding product with an average yield at 3.4 bu/acre followed by DEKALB® DKC66-87 Brand at 0.2 bu/acre and DEKALB® DKC67-72 Brand at 0.0 bu/acre.

Figure 13. Average Yield of Each Product When Simulated Damage Occurred 10 Days After 6 Collared Leaves.



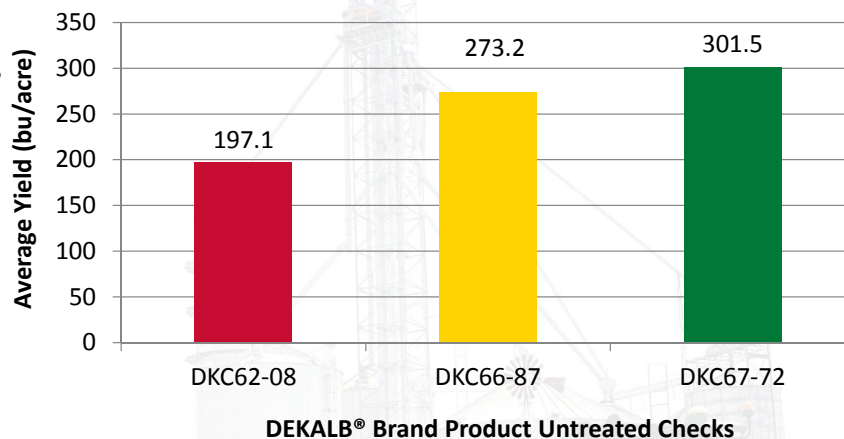
Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion



The average check yield of DEKALB® DKC67-72 Brand (117 RM, fullest season product), was the highest of the three products. However, it showed the lowest yield of each product when subjected to simulated damage.

Figure 14. Average Yield of Each Product As An Untreated Check



Response of Three Corn Products to Early Season Plant Damage

# Results and Discussion

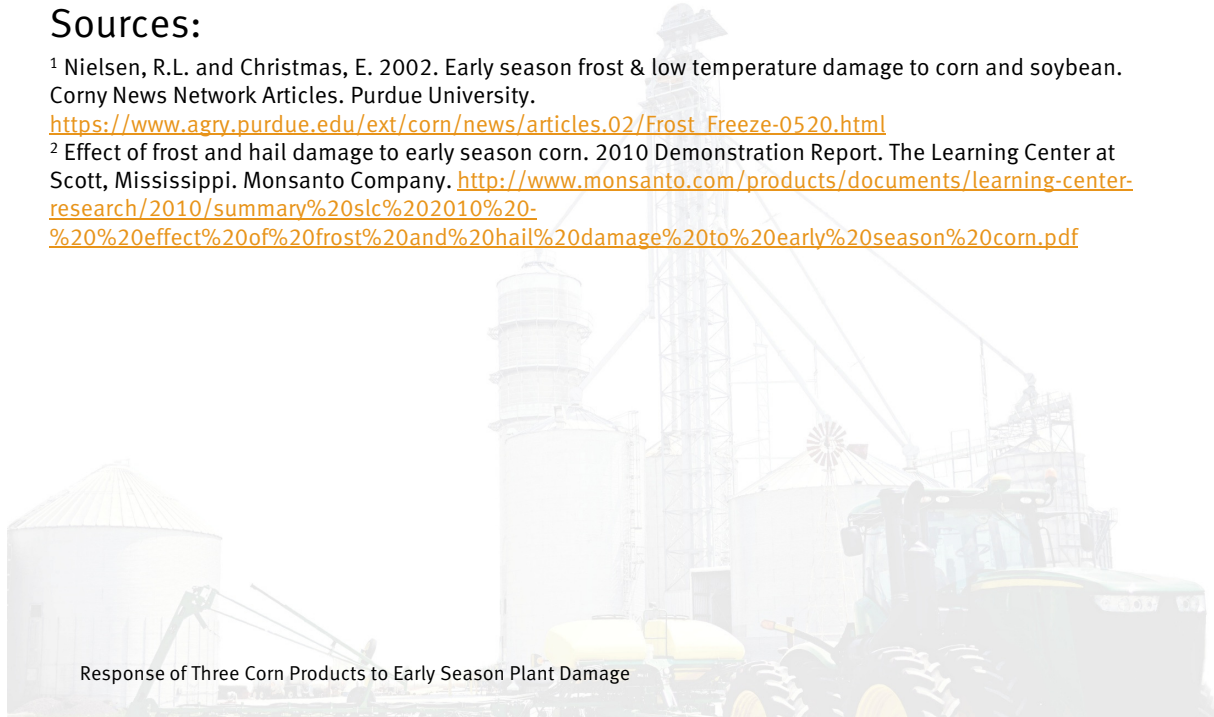


## Sources:

<sup>1</sup> Nielsen, R.L. and Christmas, E. 2002. Early season frost & low temperature damage to corn and soybean. Corny News Network Articles. Purdue University.

[https://www.agry.purdue.edu/ext/corn/news/articles.02/Frost\\_Freeze-0520.html](https://www.agry.purdue.edu/ext/corn/news/articles.02/Frost_Freeze-0520.html)

<sup>2</sup> Effect of frost and hail damage to early season corn. 2010 Demonstration Report. The Learning Center at Scott, Mississippi. Monsanto Company. <http://www.monsanto.com/products/documents/learning-center-research/2010/summary%20slc%202010%20-%20%20effect%20of%20frost%20and%20hail%20damage%20to%20early%20season%20corn.pdf>



Response of Three Corn Products to Early Season Plant Damage

# Legal Statements



*The information discussed in this report is from a single site, replicated demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.*

**Individual results may vary**, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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