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Early Frost Damage in Corn

Matt Teply, CCA, Sales Agronomist – LG Seeds

Having lived in SW Nebraska most of my life, I have unfortunately been in more than my fair share of corn fields that have had a frost or a freeze after corn has emerged. Freeze damage in corn is often hard to evaluate the day after it happens. Especially in a crop that is maybe just at the V1 to V4 leaf stage.

Most of the time there are a couple ways to look at a colder temperature issue. The two big factors are how cold did the air temperature get and what duration of time did it stay that cold. As well as what stage of growth is the corn plant in. A frost is normally thought of as an air temperature that is between 36 to 30 degrees Fahrenheit for a short period of time and can cause severe damage to exposed leaf tissue. A freeze event is normally when the air temperature gets to 28 degrees Fahrenheit and can cause major issues in as little time as 10 minutes. In most cases, not all, if the growing point of the crop is still below the soil surface (V1 to V2 stage) there is little risk of plant death. When the plants are in the V3 to V4 stage and the growing point is at or just above the soil surface diagnosing crop damage becomes more difficult.

In regards to both frost and freeze events damaged tissue often turns a purple or black color initially and then will turn to brown or white. The damaged tissue will fall away. The hope is that new growth start's to develope out of the whorl. Often with a frost event you will be able to cut plants in half vertically and still see green or white living tissue that wasn't exposed. This tissue will soon begin to grow out of the whorl with good weather. In the case of a freeze event at the V3 to V4 stage things are a bit more difficult. Often, the day after the event, you may see white tissue but not much green. The hard thing in this case is that it's a waiting game. The full extent of the damage may not be able to be established for a few days depending on the weather. Cold, wet, cloudy weather is not conducive to promoting new plant growth and can inhibit and even worsen damage and extend evaluation time. Warm, sunny, dry weather can stimulate plant growth and evaluation can be made in a couple days. The hope is always that that the growing point of the plant is spared and that new growth quickly starts to appear out of the whorl. What you do not want to see when cutting the plants in half vertically is a white or brownish color, water soaked appearing center of the plant. This most likely means plant death. Established stands will then need to be evaluated to see if the crop population is at a level were the crop will not need to be replanted.

Often the hardest aspect of evaluating damage from a frost or freeze event is the patience required to wait 24 to 48 hours before actually even evaluating a field. In some cases when the weather is not cooperating, even days before evaluating. Mother Nature is in full control until conditions allow for the resurgence of plant growth.

References and additional information

1. http://cropwatch.unl.edu/frostfreeze-effects-corn-and-soybean
2. http://www.aganytime.com/Corn/Pages/Article.aspx?article=89