

CROP NOTES for May 7, 2020 – Frost Warning

Iowa State University Extension Information for Northeast Iowa

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FROST WARNING FRIDAY NIGHT

For northeast Iowa, Friday night low temperatures (about 4-5 AM Saturday morning) are predicted to be about 28°F along Hwy 9, and 29 to 30°F from Hwy 18 to Hwy 20. Apparently dew point temperatures are predicted to be even a few degrees colder, so low lying areas with no wind and clear skies could experience even colder temperatures. On the positive side, these are air temperatures predicted at 4-feet above ground. The soil is warmer and gives off radiant warmth close to the soil surface. For above ground plant tissue, heavy residue cover will block some of the soil radiant warming, so expect more above ground frost injury to plant tissue in no-till vs. tilled fields.

Corn and Soybeans

For plant tissue above ground, 28°F or less could be lethal. Corn's growing point is below the surface, so a hard freeze is required for plant death. Frost damage to exposed leaves has little impact on potential corn yields, especially at very early dates. "Lethally cold" temperatures for emerged young corn plants are those that dip to 28°F or lower for 1 to 2 hours. Emerged soybeans are more easily impacted since their growing points are above ground. Although their thick high-moisture cotyledons are highly resistant to frost damage. As development continues and the cotyledons open, they expose the developing unifoliolate leaves. This tissue is more fragile and exposes the main growing point. Fortunately, it is common for soybeans to produce new growing points from the axils of the cotyledons if the unifoliolate is damaged. Damage would first look "water-soaked" dark greenish in color, changing to a tan color as tissue dries out. You may be able to assess stands in 3 to 5 days after the event, although waiting a week may be necessary since the following days will continue to be on the cool side. Even though we assume corn's growing point is safe below ground, when assessing stands it would still be good to dig some plants and check for a viable growing point. Healthy growing points will be firm and white to yellow in color. If the growing point or plant tissue within 0.5 inches above the growing point is damaged, it will be watery and a brownish color, and the plant will not likely recover. For 29°F to 32°F, frost injury should be minimal. However, the continued cool weather is still contributing to reduced vigor and growth, and greater risk for infection from pathogens.



Photo 1. Photo is May 19, 2016, 4 days after a frost.



Photo 2. Photo is May 19, 2016, 4 days after a frost.

Alfalfa

Spring Planted Alfalfa

New seedlings this spring that have emerged are quite tolerant of frost up to about the 2nd trifoliolate stage. At that point a few hours of around 26°F could kill them. If a young seedling is frost damaged, it will first appear to wilt, and then die over the next 3 to 5 days. As long as at least one set of leaves escapes damage, the plant should recovery. Unless mortality is absolutely obvious, wait a week after the frost and count living plants per square foot. If more than 20 plants per square foot remain, the stand will survive in good shape. If there are less than 15 plants per square foot, consider interseeding more alfalfa into the stand.

Old Alfalfa Stands

The general rule of thumb is if stand height in the field is less than 10 inches, no matter how hard it is hit by frost just leave it alone. Regrowth will come from below the frost-killed part of the shoots. For light frost damage, expect to see white leaf edges, and then leaves will later turn somewhat tan in color (Photos 3a & 4b). New shoots in close proximity to the crown are quite cold tolerant. As the shoots lengthen, they are more susceptible to cold injury. Taller frosted shoots may wilt (goose-neck) as in Photo 4. Photo 5 shows more significant frost damage, but with recovery of new shoot growth from 10 days later. Again, the stands will recover, but those with more significant frost damage will set back the first crop harvest date by a week or more. There will also be some variability in damage across fields due to slope position and valleys.



Photos 3a & 3b. Light frost damage.



Photo 4. Taller shoots hit by frost may wilt with the tops of the shoots killed. New growth will start below the killed area.

Photo 5. Significant frost injury killed much of the above ground shoots, but new growth is coming from the base of the plant.



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Oats, Wheat, Rye and Triticale

Effects on spring oats, winter rye and triticale would be similar to winter wheat. Page 3 in the following University of Nebraska publication on winter wheat details stage of growth and temperature concerns <http://extensionpublications.unl.edu/assets/pdf/ec132.pdf> Cold tolerance is very good through tillering stage. Once plants reach jointing stage, they are quite susceptible to mid-20's temperatures. These cereals have to be closer to boot stage for 28°F temperatures to be a concern. Lighter frost damage will just frost back leaf tips.

To help define jointing stage, here are a couple of photos from Kansas State University. Jointing is when the growing point has moved above ground. Feel along the stem. The growing point has a bit of a swelling to it. Or dig some plants and slice them open as in the photos below to determine stage of development in your field.



Photo 6. Growing point is still below ground.



Photo 7. Growing point has moved above ground. Jointing stage.

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