

Early Season Hail Damage

Spring thunderstorms can bring the threat of damaging hail to young corn plants. The potential for any yield loss depends on the plant's stage of growth, environmental conditions after the hail event, size of hail stones, and severity of damage. A general recommendation is to wait at least five days before evaluating hail damage to young corn plants because of these factors and the potential for recovery.

The survival of young corn plants is largely dependent on the location and health of the plant's growing point. The growing point generally remains protected below the soil surface until the collar of the sixth leaf (V6 growth stage) is visible (Figure 1). When the growth stage is greater than V6, the growing point becomes susceptible to direct damage from hail stone hits. The five-day wait is recommended to determine if the growing point is

pushing new tissue through damaged leaves. If the growing point is damaged, recovery is doubtful.¹ For more information regarding corn growth stages, please visit your brand's Agronomy Library.

It is important to understand that the National Crop Insurance Service counts leaves as fully developed when the leaf tip points or droops to the ground (Figure 1). This can happen prior to the collar becoming visible. Based on this method, a 9-leaf plant may lose 1% and 12% of its yield potential when 25% and 95% of the leaf area is destroyed, respectively.³

To assess potential growing point damage, select random plants throughout the field, dig up the plant, and cut the stalk vertically to expose the pyramid-shaped tissue near the base (Figure 2). The growing point should be healthy in appearance without any dark spots. Dark spots could

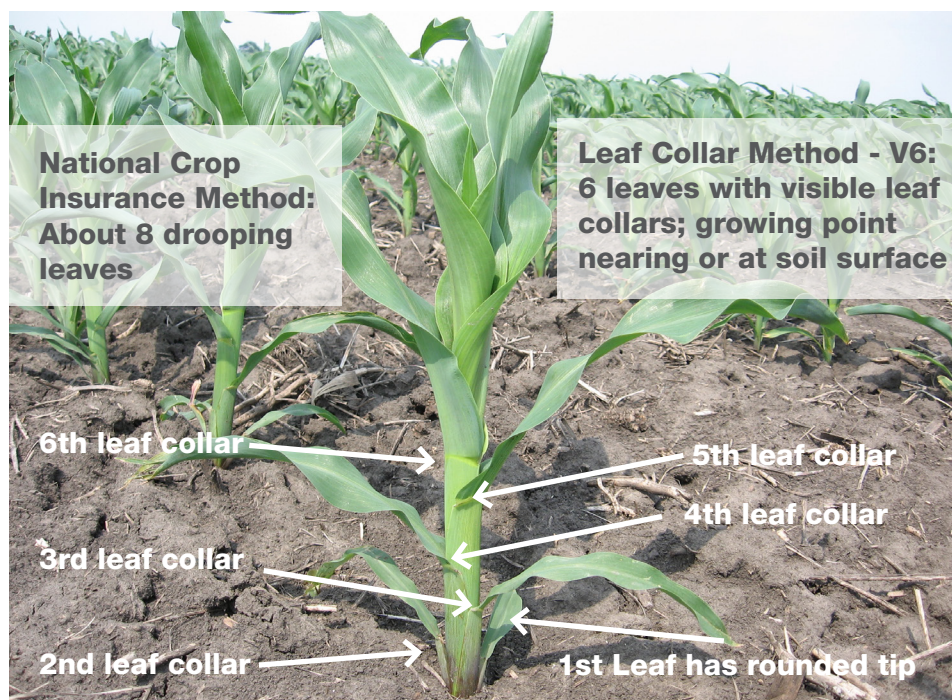


Figure 1. Leaf collar and National Crop Insurance Methods for identifying stage of growth.

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indicate that the tissue is beginning to mold or rot. The size of the hail stones is important because pea sized hail is unlikely to cause damage to a protected growing point. However, if soil is wet from heavy rain and large hail stones (around golf ball size) strike the soil and plant, the stones could penetrate deep enough to damage the growing point.

Leaf Damage

The shredded leaves of young corn plants can look worse than the actual damage (Figure 3). Shredded leaves that are attached to the plant can still contribute to plant growth and development because photosynthesis can occur.² If the leaves are twisted or matted together, they usually can separate within three to five days. New leaves should emerge intact; however, they may have some bruising or holes depending how deep hail stones penetrated the stalk.

Assessing Viable Population

After waiting at least five days, population counts can be taken to estimate viable plants. To make the counts, randomly select several areas within the field and measure 1/1000th of an acre based on row width (Table 1). Count the number of plants within the measured area that appear healthy (new growth should be pushing through

the damaged leaves (Figure 4) and multiply by 1,000 to get the plants per acre. When population is reduced early in the growing season, yield loss is not directly proportional to the number of plants lost.

Table 1. Row measurement for 1/1,000th acre based on row width.

Row width (inches)	Row length equal to 1/1,000th of an acre
20	26' 2"
30	17' 5"
36	14' 6"
38	13' 9"

Surviving plants may compensate for an absent plant by increased ear size, deeper kernels, or the potential development of a second ear.¹ Tables have been developed that compare the yield potential of existing populations to that of a replanted crop based on planting date, replanted seeding rate, and the cost associated with replanting (Table 2). A later planted crop with a full stand may produce less grain than an earlier planted crop with a reduced stand.³



Figure 2. Healthy growing point 9 to 10 days after hail event.



Figure 3. Shredded leaves can appear worse than actual damage. Photosynthesis can still occur, and new leaves can emerge from the whorl if the growing point is healthy.



Figure 4. New growth appearing from whorl 9 to 10 days after hail event.

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Table 2. Expected Yield (% of Maximum) Based on Planting Date Range and Plant Stand

Planting Date Range	Plant Stand (000/acre)						
	20	23	26	29	32	35	38
	Expected Yield, % of Maximum						
April 1 - 10	84	88	91	94	97	98	99
April 11 - 20	84	89	92	95	97	99	100
April 21 - 30	84	88	92	95	97	99	99
May 1 - 10	83	87	90	93	95	97	98
May 11 - 15	81	85	89	91	93	95	96
May 16 - 20	79	83	87	90	92	93	94
May 21 - 25	78	82	85	88	90	91	92
May 26 - 31	75	79	82	85	87	88	89
June 1 - 5	73	76	79	82	84	85	86

Source: Nafziger, E. 2020. Replanting corn and soybeans. The Bulletin. University of Illinois. Permission granted by Dr. Nafziger

Management Considerations

The five-day wait period is crucial to determine survivability. However, plant health should be checked because there are some corn diseases that are favored by wounding. With a hail event comes the inevitable question as to whether foliar fungicide sprays are warranted due to the fear that hail injury to tissue could increase the development of foliar diseases such as Anthracnose leaf blight from splashing rain or wind.

Torn and damaged leaves are more susceptible to disease and may benefit from an early-season fungicide application either shortly before the hail event or very soon after. A fungicide, such as Delaro® 325 SC, can increase the plant's stress tolerance after a hail event. Fungicides help fight fungal pathogens that may colonize hail-damaged plants. The strobilurin component of Delaro fungicide boosts the formation of callus tissue which helps heal wounded plants, creating a barrier which can reduce the potential for pathogens to enter damaged plant tissue and could enhance the recovery of the plant and preserve its productivity.

To learn more about Delaro fungicide, please visit <https://www.cropscience.bayer.us/products/fungicides/delaro>. As with any crop-protection product, always read and follow label directions, consider forecasted environmental conditions, corn growth stage, and disease presence before applying a fungicide.

Lost plants can expose soil to sunlight that encourages weed growth. However, before applying herbicides after a hail event, corn growing points should be examined to determine growth stage if leaves are missing. Should the herbicide label indicate application by a specified leaf stage, and examination of the growing point can provide the leaf stage when leaves are missing.

For information on mid- to late-season hail damage to corn, please refer to Mid-Season Hail Damaged Corn.

Sources (web sites verified 6/2/2020)

¹Nielson, R.L. 2015. Recovery from hail damage to young corn. Corny News Network Articles. Purdue University. <https://www.agry.purdue.edu/>.

²Thomison, P. Hail injury to corn varies depending on development stage. Agronomic Crops Network. The Ohio State University Extension Service. <https://agcrops.osu.edu/>.

³Vorst, J.V. (Purdue University). 2002. Assessing hail damage to corn. NCH 1. Climate & Weather. National Corn Handbook. Iowa State University Extension.

Nafziger, E. 2020. Nafziger, E. 2020. Replanting corn and soybeans. The Bulletin. University of Illinois. <http://bulletin.ipm.illinois.edu>.

Legal Statements

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

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