

Using Hail or Green Snap Injured Corn for Silage

Corn injured by hail or green snap (brittle snap) can be harvested for silage; however, there are some factors that should be considered. The first step in dealing with a hail or green snapped damage corn crop is to contact your insurance agent. It is important to know what is required to meet the contract obligations for hail or revenue insurance.

When is the best time to harvest a damaged corn crop for silage?

Time of harvesting will vary depending on the stage of maturity at the time of damage and the severity of hail or green snap.

When a corn crop is injured by hail and is in the reproductive growth stages, it is usually advisable to delay harvest for at least a week or more after the injury. This allows the corn plant to dry down to a more favorable moisture level. Silage should have less than 67% moisture content (33% dry matter) for optimal fermentation and storage in an upright silo. If being placed in a bag, bunker, or ground pile the moisture content should be no more than 70% (30% dry matter). It is usually advisable to allow the plant to dry down unless the stalks are damaged to the point that lodging becomes a problem. Corn with hail damage (Figure 1) usually reaches physiological maturity earlier but takes longer to dry down.

The harvest date for V12 through R2 corn damaged by green snap can vary depending on the percentage of snapped plants compared to the percentage of undamaged plants in the population. If the green snap damage is catastrophic (over 50%) the best option is to harvest for silage as soon as possible.

Dead or heavily damaged plants can rot in the field and should be harvested as soon as possible. In this situation the producer is forced to manage a silage crop with a higher than ideal moisture content. Harvesting as soon as possible will result in a higher quality silage than if harvesting is delayed, as dead and rotting plants will degrade the silage quality. If 50% of the plants or less are green snap damaged, then wait to harvest the crop for silage at the typical harvest time. The surviving plants can compensate, to some extent, for the missing plants. The benefit for waiting to harvest

the crop at the correct time (around 65% whole plant moisture) can be higher quality feed, with higher starch content, than feed harvested at the late vegetative growth stage.



Figure 1. Corn stalk damaged by hail.

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What is the expected yield potential from a hail damaged or green snap injured crop?

Yield potential depends on the severity of the hail damage or green snap.

If the ears are relatively well developed, then the leaves can comprise approximately 15 to 20% of the total dry matter of a corn plant. Consequently, a hail event at this time may give some indication of yield potential if the leaves are stripped and the remainder of the plant is relatively intact (Figure 2). If the ears are not well developed, then the leaves may account for up to 40% of the dry weight. Data from Pennsylvania State University indicates when 25% defoliation occurs at the early dough stage, a reduction in yield of about 15% is possible with an overall dry matter content higher than non-injured corn. At 100% defoliation, a reduction in yield is about 41% and dry matter content is like non-injured corn.

Yield potential is substantially different after a green snap event compared to a hail damaged crop. Green snap in corn usually occurs at two different times during development. Green snap can occur as early as at V5 to V8 and would usually not be considered for harvest. However, the second common green snap timing occurs during the most rapid stages of growth, from the V12 to R2 growth stages. If green snap occurs during these growth stages, then there is a potential to salvage the crop by harvesting for silage. Green snap injury is usually observed at or around the primary ear node.

Only after a catastrophic green snap event with a high percentage of the plants are broken off, should a producer consider harvesting a silage crop soon after the green snap event. At this stage of growth, the ear has just started to develop, and assuming the top of the plant is still attached to the stalk the yield potential of a crop harvested soon after the green snap event would only be about 35 to 40% of the normal expected yield.¹ If 50% of the plants or less are green snap damaged, then wait to harvest the crop for silage at the typical harvest time. The surviving plants can compensate, to some extent, for the missing plants. The benefit for waiting to harvest the crop at the correct time (around 65% whole plant moisture) can be higher production along with a higher feed quality, with higher starch content, than feed harvested at the late vegetative growth stage. The yield potential of a non-catastrophic green snap event depends on the percentage of the plants green snapped in the population, the consistency of that damage across the field, and the ability of the non-green snapped plant to compensate (ear flex). There is often a lot of variability, within the field, of the level of damage so predicting yield potential can be difficult.



Figure 2. Corn damaged by hail.

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What key factors impact the probability of green snap?

- **Corn product characteristics.** Most corn products are evaluated for green snap potential and there can be large range of ratings for different products. However, any product can green snap under certain conditions.
- **Environmental conditions.** Wind velocity, direction and temperature fluctuations are all key factors affecting green snap occurrence during a severe wind event. When temperatures are hot, corn plants are more pliable and capable of bending which makes the plant less brittle and susceptible to wind damage. However, when cool temperatures occur during a wind event, this makes the corn plants increasingly brittle and subject to green snap.
- **Management practices.** High corn plant populations favor green snap because competition for nutrients, water and sunlight can increase plant height and decrease stalk girth. High nitrogen levels can also favor green snap. Corn that is fertilized for optimum yield potential can have an increased growth rate, leading to plants that may be brittle and subject to breakage.



Figure 3. Corn stalk damaged by green snap.

How is feed quality impacted by hail or green snap?

One of the most important quality concerns is how hail or green snap impacts the amount of starch in the silage. Any loss of leaf area, which is the factory that produces grain, during the reproductive growth stages can affect the starch content of the silage. A catastrophic hail that destroys 100% of the leaf area at pollination or a green snap event that breaks a high percentage of plants can reduce the starch content of the silage to near zero.¹ A quality corn silage should have 25 to 35% starch content.

Note: Any corn plant that is green snapped damaged at or below the ear node will most likely produce very little grain or starch. Hail events can lead to plant lodging. Lodging can increase yeast and mold contamination and affect nutritive value. Corn plants that are in contact with the ground can be infected by undesirable bacterial and fungal growth, deterioration, and ear rots which can increase mycotoxin contamination. Additionally, contact with the ground can increase ash content in the forage. Damage to the stalk or ears can cause ear droppage, rapid plant drying and ear and or stalk rot.⁵

It is important to store a hail or green snapped injured silage crop separately from a correctly ensiled high-quality silage crop because of the potential for high moisture silage to be poorly ensiled. After the ensiling process is complete (approximately three weeks after harvest) samples should be analyzed for nutritional value and for mycotoxin risk. The nutritionist can evaluate the nutritional value of the affected silage and formulate rations to incorporate this feed.

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How does an early harvest after a hail or green snap event affect moisture levels and feed quality?

Moisture content is one of the most important factors that determines feed quality. An immature corn plant contains about 75% water (25% dry matter) and if harvested at this stage, severe seepage can occur, resulting in poor fermentation and high dry matter fermentation loss. If the crop is harvested before the ear has fully developed, then the moisture content of the silage can be high, and the level of fermentable carbohydrates can be relatively low. Including silage fermentation enhancements (additives) may be advisable.

Knowing the moisture content of the feed coming into the silage structure is important for managing the ensiling process. There are many moisture testers on the market today, and the type of moisture tester is not important but monitoring the moisture content of the crop at harvested is critical. Crop moisture changes can happen very rapidly in a hail or green snap injured corn silage crop so constant moisture monitoring is needed. Managing the crop variability (blending wetter and drier loads), if possible, coming into the silo can help to keep the moisture within the correct range. Blending loads is an effective management technique for most silage structures except silage bags, which is usually not an option. Excessively wet silage often results in inadequate fermentation and unstable products which can drastically affect silage quality.

Sources

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- 2 Roth, G. and Antle, M. 2012. Effects of hail damage on corn silage Yield and quality. Pennsylvania State University Extension. <https://extension.psu.edu/effects-of-hail-damage-on-corn-silage-yield-and-quality>.
- 3 Licht, M. 2021. Green snap Integrated crop management. Iowa state University. <https://crops.extension.iastate.edu/encyclopedia/greensnap>.
- 4 Corn Agronomy, Silage quality and feeding. University of Wisconsin. <http://corn.agronomy.wisc.edu/Silage/S006.aspx#:~:text=Corn%20silage%20contains%20up%20to,to%20this%20high%20starch%20content>.

Can nitrates be a problem for corn harvested for silage after hail or green snap injury?

Although immature corn can be relatively high in nitrates, it is usually not a problem when the corn is harvested as silage. Cutting the silage crop at 8 to 12 inches above the soil line should help minimize nitrate issues because the highest concentration of nitrates in a corn plant are in the lower stalk. Even with relatively high nitrates, it can still be used as feed as 30 to 50% of the nitrates are broken down or destroyed during fermentation. However, if there is a concern, a sample should be submitted to a testing laboratory for analysis. Silage that is slightly high in nitrates can be fed by blending with other low nitrate feeds such as alfalfa hay and corn.

Can common smut on the ears be a problem after a hail event damaged the corn?

Delayed harvest and exposed grain after a hail event can lead to the development of common smut (Figure 4) on ears. However, it is not toxic and will have no impact on consumption.



Figure 4. Common smut on corn ear.

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Web sources verified 05/27/2021.

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