

# Hail damage to corn and soybeans in August

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 [blog-crop-news.extension.umn.edu/2023/08/hail-damage-to-corn-and-soybeans-in.html](https://blog-crop-news.extension.umn.edu/2023/08/hail-damage-to-corn-and-soybeans-in.html)

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We have heard it over and over this year. “It’s so dry, we are desperate for rain, but we don’t need any hail with it,” or something this effect. Statewide, Minnesota has been plagued by lack of rain from June through July. Just as the weather patterns seemed to change for the better, some heavy thunderstorms boiled up in south central Minnesota on Friday afternoon and evening. These storms affected parts of Renville, McLeod, Meeker, Wright and Carver counties and beyond. Hail was very intense in some areas where either large quantities or very large hail stones fell. There have been many reports of damaged property and crops.



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Hail damage in soybean, 2020. Photo: Dave Nicolai

August hailstorms are not uncommon, but they can be particularly disheartening for farmers. Hail in mid-August can be the most devastating for crop yields and they also occur after much energy has been spent making the crop. This year may be especially frustrating for those affected. Farmers were beginning to be optimistic about potential yields after recent rain events, only to get hit by hail on a Friday evening.

## Soybean

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Soybean is most sensitive to hail damage at the point in the growth cycle where leaves cease development and expansion. At this time the soybean plant begins to put all of its energy into filling seeds. Developmentally we call this stage R5.5 or midway between Beginning Seed (R5) and Full Seed (R6). The stage is easy to identify visually by noting a cluster of small leaves at the very top of the plant. Defoliation at the R5.5 stage is particularly damaging as the soybean has not accrued any yield in the form of seed and yet it does not have the capacity to make any new leaves to help fill those developing seeds. In addition, soybean stores about half of the seeds’ protein requirement in the leaves that is normally mobilized to the seed late in development. The loss of leaves late in the growth cycle removes stored resources that cannot be replaced.



In addition to leaf loss, storm damage to corn can also cause root lodging, stalk breakage, stalk bruising, and ear damage. This makes it difficult to accurately predict yield loss prior to harvest.

## **Root lodging**

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When soils are saturated, strong winds can cause corn plants to lean over due to pulling of shallow roots. Within a few days, root-lodged plants typically straighten, and stalks have a curved appearance. Yield loss due to root lodging is greater when the crop is more mature at the time of root lodging. Little information is available on the severity of root lodging after tasseling, but a study in Wisconsin found that root lodging to corn a few days before tasseling reduced grain yield by 30% (Carter and Hudelson, 1988, Journal of Production Agriculture). Corn that has experienced root lodging after tasseling can be very challenging to harvest, and it is important for combine operators to monitor harvest losses and adjust accordingly. Combine operators may need to slow the speed of travel, make adjustments to the header, harvest in a single direction, or mount specialized reels or sweepers onto the corn head in order to harvest down corn.

## **Stalk breakage and bruising**

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Stalk breakage from hail or wind reduces the amount of leaf area, and if it occurs below the ear it also reduces the number of harvestable ears per acre and has a greater impact on yield. Corn plants that are adjacent to stalk-broken plants can partially compensate for the damaged plants by producing slightly larger ears due to a greater amount of sunlight available, but the level of compensation will be relatively small. The younger the corn is at the time of damage, the greater the potential for undamaged plants to compensate for damaged plants that are adjacent to them. Bruising of stalks by hail limits the plant's ability to translocate water and nutrients, and it also reduces standability. Plants with stalk bruising should have their stalks split to determine the severity of the bruising. Plants with damage extending beyond the rind of the stalk and into the pith either will not recover or will have large reductions in yield. Fields with severe stalk bruising should be harvested early to avoid significant harvest losses from stalk lodging.

## **Damaged ears**

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Ears that are damaged by hail stones can lose kernels in the damaged areas. Damaged ears are also at elevated risk for developing ear rots and mycotoxins. Some growers may choose to harvest a damaged corn crop as silage rather than grain. One can expect reduced feed quality for corn silage that is damaged by hail, in part due to a reduction in grain. Hail-damaged silage may also have higher-than-expected harvest moisture which can affect storage, and it should be checked for mycotoxins and nitrate levels. High nitrate levels can occur in corn silage when the grain-to-stover ratio is reduced due to drought or ear/kernel loss. Raising the cutter bar to a height of 10 to 12 inches avoids harvesting the lowest part of

the stalk, which has the highest concentration of nitrates. Feed managers may choose to dilute hail-damaged silage with other feedstuffs of higher quality before feeding to livestock.

## **Links to other resources**

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Wind and hail damage to corn - <https://extension.umn.edu/corn/growing-corn#wind-and-hail-2203712>