

Recovery and Assessment of Hail Damaged Soybean

- Hail damage to soybean can occur as reduced leaf area, bruising, or plant death.
- Proper assessment of soybean damage is critical to help determine yield potential after a hail event.
- Soybean plants have the ability to compensate for defoliation and reduced stand counts; therefore, leaf damage and stand loss can often look worse than they are.

Assessment

Potential yield loss in soybean due to hail damage can result from:

- Leaf area reduction caused by hail-damaged leaves and plant bruising.
- Stand loss caused by plant death.

Table 1. Estimated soybean yield loss from plant defoliation.

Soybean Growth Stage	Plant Defoliation (%)								
	20	30	40	50	60	70	80	90	100
	Estimated % Yield Loss								
V2—V6	Removal of main stem nodes, stem breakage, and stand loss contribute to seed yield loss in vegetative stages. Yield loss can occur when 60 to 80 percent of node removal occurs at the V2 stage and when 40 percent of node removal occurs at the V6 stage.								
R1-R2	2	3	5	6	7	9	12	16	23
R3	3	4	6	8	11	14	18	24	33
R4	5	7	9	12	16	22	30	39	56
R5	7	10	13	17	23	31	43	58	75
R6	6	9	11	14	18	23	31	41	53

Sources: University of Nebraska NebGuide G85-762; Conley, S. et al. 2009. Main-stem node removal effect on soybean seed yield and composition. *Agronomy Journal*. Vol. 101(1):120-123.

The severity of each of these factors is important to accurately assess the extent of hail damage and how yield potential will likely be affected. Evaluating the health of the growing point can be done soon after the storm, but making a decision regarding the yield potential of the field is premature because the plants have not been given enough time to recover. It takes about 4 to 7 days to see regrowth on soybeans after hail. To more accurately assess potential yield loss from hail, soybean plants should be evaluated 7 to 10 days after the storm. At that time, it should be possible to more accurately distinguish between living plants and plants unable to withstand the hail damage itself or subsequent disease infection.

Leaf Defoliation and Bruising



Figure 1. Soybean at growth stage VC with growing point still intact.



Figure 2. Soybean with leaves damaged by hail.

Because the soybean was damaged before flowering, plants may not be significantly affected by loss of leaf area (Table 1). At this stage, the soybean plant has the ability to branch out after leaf defoliation or with reduced plant stands caused by

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hail. If either the stem apex (growing point at the top) or axillary buds remain intact after the hail event, new branches and leaves can be produced even though the hail may have destroyed nearly all the above-ground foliage (Figure 1).

Leaf damage usually looks worse than it really is, especially in the first few days after the storm passes. Shredded leaves that remain green and attached to the plant will often continue to produce photosynthates for the plant (Figure 2). Additionally, soybean loss estimates can be complicated because potential effects of lower stem bruising (which may lead to lodging later in the growing season) can be difficult to evaluate. Bruising may also allow an avenue for infection, which can affect plant health and productivity.

Stand Losses

Because soybean plants have the ability to recover by branching out after a hail event, potential yield loss from stand reduction during early growth stages is not of major concern. If severe stand losses occur, replanting may be a viable option. Fields with a uniform stand of 90,000 plants per acre may realize full yield potential.

Estimating Potential Yield Loss

Defoliation, stand loss, plant bruising, possible disease infection of damaged plants, lodging later in the season, and environmental conditions during the remainder of the growing season are factors involved in estimating potential yield loss. Growers should scout for stem rot, lodging, and late-season weed flushes due to increased light penetration in defoliated areas. Expected yield loss figures due to damaged or missing plants are only estimates. True yield loss from a hail storm cannot be fully determined until harvest.

Sources

Pedersen, P. 2004. Soybean growth and development. Iowa State University Extension. PM 1945.