

Hail Decision Guide (Corn)

Hailstorms on the Great Plains are a common occurrence yet making decisions on what to do with a damaged crop can be agonizing. The following guidelines can be utilized to assess losses.

Assess Your Stands

A convenient way to assess a crop stand after a storm is by counting the plants in 1/1,000 of an acre, then multiplying all counts by 1,000. Check several areas of a field, as hail damage can vary greatly throughout a field.

Table 1. Row lengths equal to 1/1000th of an acre.

Row Width	15 in	20 in	30 in	36 in
Length of row: (1/1000 acre)	34 ft 10 in	26 ft 2 in	17 ft 5 in	14 ft 6 in

Prior to the corn reaching a height of 8-inches, the growing point remains protected below the ground surface and stand losses are less likely. However, with severe hail, plants can be damaged to the point that death is a result. If time permits, observations should be made 7-10 days following the damage for accurate conclusions.

If the growing point is present above ground you should always check for damage. Healthy growing points are white and firm. Injured growing points are soft and in time, will begin to turn brown similar to frost damaged plants. If observations are made immediately following a hailstorm, damaged plants can be overlooked. Be conscious of bruises on the stalks of small plants.

Estimating yield reductions due to stand reduction through the 10th actual leaf stage can be calculated utilizing Table 2. When considering a replant situation it is also important to consider planting dates as they relate to potential yields. For example, it may be beneficial to leave a stand reduced to 18,000 plants per acre vs. replanting on May 31st to establish a stand of 30,000 plants per acre. Utilize Table 3 for percentage of expected yield. Other factors to consider when utilizing Table 2 and 3 include:

- Gaps and skips have a negative effect.
- Tables relate to stand reductions during the vegetative stages.
- Consider the hybrid's ability to flex ear size, or yield at low populations.
- Weed control can negatively affect final yields.

Table 2: Stand Reduction / Yield Loss Chart

Original Stand (x 1000)	Remaining Plants per Acre (x 1000)						
	27	25	23	21	19	17	15
30	3	5	7	11	14	20	25
29	2	4	6	10	13	18	23
28	1	3	6	9	12	16	21
27	*	3	5	7	10	14	18
26	*	1	4	6	9	12	16
25	*	*	2	4	7	10	14

Source: National Crop Insurance Association and the Crop Insurance Research Bureau, Inc.

For more information concerning replant dates and expected yields, refer to the *Crop Insights* publication, "Hybrid Maturity Switches Based on Long-term Research", available online at: <http://www.pioneer.com/web/site/portal/menuitem.683e661c8aed591aa9fbbff5d10093a0/>

Table 3. Plant population and planting date responses for corn. (Source: Emerson Nafziger, Eric Adey, and Lyle Paul, Univ. of Illinois.)

Planting Date	Plant Population (1000 plants/acre)						
	10	15	20	25	30	35	40
	----- % of maximum yield -----						
April 1	54	68	78	88	95	99	99
April 10	57	70	81	91	97	100	100
April 20	58	71	81	91	97	100	99
April 30	58	70	80	89	95	97	96
May 9	55	68	77	86	91	93	91
May 19	50	63	72	80	85	86	84
May 29	44	56	65	73	77	78	75
June 8	35	47	56	63	67	67	64

Estimating Leaf Loss

Visually estimating the percentage of leaf area loss takes practice and experience. The amount of leaf loss is usually over-estimated. In order to estimate losses accurately you can assess individual leaves of the corn plant and then compile an average leaf area loss for the plant. Another method is to visually estimate losses by observing whole plants individually. This method requires more practice to accurately estimate leaf loss. Smaller corn can handle significant leaf loss without much yield loss because it can quickly re-grow new leaves. Even at the 10-leaf stage, only about 25 percent of the plant's eventual leaf area has been unfurled.

It is important to determine the stage of growth the crop was at when the damage actually occurred. Once this has been determined, use Table 4 to calculate yield losses. Remember, corn will add a new leaf every two to three days with normal weather conditions.

Table 4: Estimated % yield reduction due to defoliation at various stages of growth.

Stage of Growth	Percent Leaf Area Destroyed								
	20	30	40	50	60	70	80	90	100
7 leaf	0	0	1	2	4	5	6	8	9
8 leaf	0	0	1	3	5	6	7	9	11
10 leaf	0	2	4	6	8	9	11	14	16
12 leaf	1	3	5	9	11	15	18	23	28
14 leaf	2	4	8	13	17	22	28	36	44
16 leaf	3	6	11	18	23	31	40	49	61
18 leaf	5	9	15	24	33	44	56	69	84
Tassel	7	13	21	31	42	55	68	83	100

Source: National Hail Insurance Association

Stalk Bruising and Breakage

Stalks are damaged most from the time corn is knee-high until it begins to tassel. After tasseling, corn stalks become more rigid and are less susceptible to bruising and breakage. If a plant survives stalk damage, it typically will produce near-normal yields, but it will be at greater risk for stalk lodging before harvest. Judging losses prior to harvest is difficult.

Ear and Kernel Damage

Ears are particularly susceptible to hail damage from the blister to dough stage. To assess, estimate the percent of damaged kernels.

Weeds Can Threaten Crop Recovery

With reduced stands and an open crop canopy, weed growth can be rapid. If cultivation is possible it may be the best option. If herbicide weed control programs are to be implemented, allow time for the crop to resume growth prior to making applications.

Corn Leaf Tie-Up

Leaf tie-up can be a common occurrence as emerging corn leaves get tied-up by the damaged older leaves. In most cases plants eventually break loose and survive; however, in severe cases death may be the result. If leaves do not break free easily, mechanical options have been attempted with limited success. Dry and windy weather usually is the best cure for this situation.

Replanting Options

If replanting becomes your only alternative consider your options carefully. It is extremely important to base your decisions upon economics rather than emotions at this stage. Consider the following issues:

- Alternative crops
- Rotation restrictions due to herbicide activity
- Insurance coverage
- Replanting costs and potential returns

Corn Decision Worksheet

Keep Existing Stand

Potential Yield (Table 3) _____ %
 Leaf Loss Adj. (Table 4) (_____)%
 Other Adj. (_____)%
 Yield Goal X _____ bu/A
 Commodity Price X _____ \$/bu
 Estimated Income = _____ \$/A

Replant

Potential Yield (Table 3) _____ %
 Yield Goal X _____ bu/A
 Commodity Price X _____ \$/bu
 Replant Costs (tillage, seed, etc.) (_____)\$/A
 Estimated Income = _____ \$/A