AGRONOMIC ALERT

Technology Development by MONSANTO

Recovery & Damage Assessment of Hail Damaged Corn in June and July

Recently, severe storms marched across the region bringing along hail that damaged corn in localized areas. After the initial shock of viewing a severely damaged corn field has diminished, the stages of determining the extent of the damage begin.

Yield loss in corn due to hail damage can result from:

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

The severity of each of these factors is important to accurately assess the extent of hail damage and how yield potential may 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. To accurately assess potential yield loss from hail, corn plants should be evaluated 7 to 10 days after the storm. At that time, it should be easier to more accurately distinguish between living plants and plants unable to withstand the hail damage itself or subsequent disease infection.

Leaf Defoliation and Bruising Effects

Plant defoliation results in the loss of photosynthetically active leaf area. The severity of the loss depends not only on the amount of leaf area removed, but also the corn growth stage when damage occurs. Keep in mind that leaf damage usually looks worse than it really is, especially in the first few days after a storm. Shredded leaves that remain green and attached to the plant will often continue often to produce photosynthates for the plant (Table 1).

Figure 2. Hail damaged corn at V3 stage.

Table 1. Estimated potential yield loss in corn from plant defoliation. Corn growth stage is based on 'indicator leaf' method, instead of the 'V stage' method from Iowa State University.

Source: J. V. Vorst. 1995. Assessing Hail Damage to Corn. NCH-1. National Corn Handbook.

Corn Growth Stage	Percent Leaf Area Destroyed				
	20	40	60	80	100
	% Potential Yield Loss				
10 Leaf	0	4	8	11	16
11 Leaf	1	5	9	14	22
12 Leaf	1	5	11	18	28
13 Leaf	1	6	13	22	34
14 Leaf	2	8	17	28	44
15 Leaf	2	9	20	34	51
16 Leaf	3	11	23	40	61
17 Leaf	4	13	28	48	72
18 Leaf	5	15	33	56	84
19-21 Leaf	6	18	38	64	96
Tassel	7	21	42	68	100
Silked	7	20	39	65	97
Brown Silk	6	18	36	60	90
Pre-Blister	5	16	32	54	81
Blister	5	16	30	50	73

Assessing the extent of stem and whorl bruising and how it affects the health and productivity of the plant is difficult. Bruising may allow an avenue for infection, which

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may increase the risk for stalk lodging later in the season. Most foliar fungicides are not labeled to control stalk rots, however they can help protect the health of the plant, reducing the susceptibility to stalk rots. Additionally, hail damage alone is not enough justification to spray a fungicide. However, if situations that favor disease development exist, such as a susceptible hybrid, wet and damp conditions through much of the year, drought conditions during grain set that favor cannibalization, and/or continuous corn fields that have a high level of inoculum, a fungicide application may be beneficial. Consult your local agronomist for additional information. Fields that contain severely bruised plants may need to be evaluated at the end of the season.

Stand Losses

After V10, potential yield loss and stand reductions are on nearly a one-to-one ratio (for example: 80% stand = 80% yield potential) and are in addition to losses shown in the defoliation table (Table 1). Stand loss at this stage will likely result in considerably greater loss of yield potential compared to leaf defoliation.

Estimating Total Yield Loss

Many factors are involved in estimating total loss of yield potential, including effects from defoliation, stand loss, plant bruising, possible disease infection of damaged plants, stalk lodging later in the season, and environmental conditions during the remainder of the growing season. Growers should scout for and monitor for stalk rot and lodging, increased nitrate levels in fields intended for animal feed, and late-season weed flushes due to increased light penetration in defoliated areas. Potential 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.

Figure 2. Corn with leaves damaged by hail.

Sources: J. Lauer. 1994. Assessing Hail Damage in Corn. Univ. of Wisconsin Coop Ext. http://corn.agronomy.wisc.edu

R. Nielsen. 2001. Hail Damage in Corn: Moving Beyond Grief to Damage Assessment. Purdue Univ. Coop. Ext. www.agry.purdue.edu

J. V. Vorst. 1995. Assessing Hail Damage to Corn. NCH-1. National Corn Handbook.