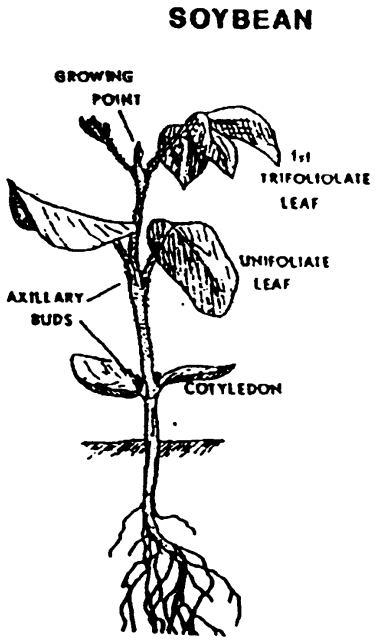
Hail Damage Assessment to Soybeans

Joel DeJong, ISU Extension Agronomist, 6/20/16
712-540-1085

Questions arise as to:

- What is and will be the final stand of the soybean field?
- How healthy is the soybean plant?
- Given the current stand and defoliation, how much yield impact will the reduced stand have?
- Should the crop be replanted?
- What are the replant options for soybeans



*Look for locations where regrowth is occurring – and can usually be seen by 3 - 6 days after the hail occurs. Remember, new growth can start from the axillary buds at the base of every leaf, and the base of the cotyledons.

*If the stem below regrowth area is OK, and there is a cotyledon or leaf to feed the plant, the plant will likely survive. If only partial leaf or cotyledon remains below regrowth, it might be a "maybe."

*If deep bruising (The bruising extends into the pith of the stem) occurs below where the new growth occurs, later risk of the plant lodging makes it a "maybe" or a "dead" plant, as counted in #2 below. If bruising is just in the outside skin of the stem, it is likely OK. However, it takes a few days to really assess the full amount of bruising from the hail.

EVALUATING HAIL DAMAGE ON SOYBEANS

1. Check the number of live plants per foot of row. Lay a tape in the row and dig up all plants in a 3-foot or more length. For drilled beans, two rows could be dug. Repeat several times over the field, keeping track of the live plants per foot of row.
2. Examine plants carefully and separate into three piles.

    a. live plants
    b. questionable plants
    c. dead plants

    Add the number of live plants and one-half the number of questionable plants and divide by the length of row to get the number of live plants per foot of row. Plants cut off below

the cotyledons (thick bottom seed leaves) will not re-grow. If plants are broken off above the cotyledons, there is a bud in the axil between the cotyledon and stem and between the unifoliate and trifoliate leaves and the stem which will produce new growth.

Table 1. Approximate number of plants per foot of row to give various populations per acre

	Populations				
Row Width	150,000	125,000	100,000	75,000	50,000
36 - 38	10.6	8.8	7.1	5.3	3.5
30	8.6	7.2	5.7	4.3	2.9
20	5.7	4.8	3.8	2.9	1.9
15	4.3	3.6	2.9	2.2	1.4
10	2.9	2.4	1.9	1.4	1.0
7	2.0	1.7	1.3	1.0	0.7

Beans tend to branch, so the number of plants per acre can vary greatly with moderate effect on yield. If the stand loss is fairly uniform, it generally takes a population of less than 75,000 plants per acre to pay to replant in mid-to-late May and less than 50,000 – 60,000 in mid-to-late June. However, if most of the remaining stand is made up of "questionable" plants, it may pay to replant with a higher population.

Table 2 shows the yields that may be expected when populations are thinned at various stages of development. Table 3 shows approximate yield loss due to late planting, beans start to lose yield potential when planted after mid-May in northern Iowa.

Table 2. Percent of soybean yield at various populations when thinned at various stages of development

	Thinned at		
Final Stand	**VC**	**V3**	**V6**
50,000	92	85	74
75,000	98	99	92
100,000	100	107	98
125,000	99	102	100
150,000	100	101	100
75,000 w/ 1 ft. gaps	97	97	89
75,000 w/ 2 ft. gaps	92	92	86
Source: University of Minnesota			

Table 3. Approximate percent of yield at various planting dates

Planting Date	**N. Iowa**
Late April	100
Early May	96
Mid-May	99
Early June	81
Mid-June	**61**
Early July	**33**
Source: Iowa State University	

Generally, full season adapted varieties can be planted in northern Iowa up until late-June. I would consider Mid Group II through the end of June and then a Late Group I in July.

A small amount of leaf area loss, especially at early stages of growth does not usually result in much yield loss. Hail loss estimates on beans are complicated by bruising, and the effect of lower stem bruises is hard to evaluate. Deep bruises can result in lodging of the soybeans later in the season.