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## Hail Damage Across a Large Part of Iowa

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## **Abstract**

Last week was certainly an eventful week in terms of weather across the state. Unfortunately, in several of those heavy rainfall areas hail also occurred, adding a whole new dimension to our stressful crop conditions this year. Along with the flooded fields that will reduce plant stands, the damage caused to the plant by hail will also have to be considered when making replant decisions. It is essential to make good estimation of plant health and accurate stand counts in order to determine the need for replanting.

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## Hail Damage Across a Large Part of Iowa

By **Palle Pedersen, Department of Agronomy**

Last week was certainly an eventful week in terms of weather across the state. Unfortunately, in several of those heavy rainfall areas hail also occurred, adding a whole new dimension to our stressful crop conditions this year. Along with the flooded fields that will reduce plant stands, the damage caused to the plant by hail will also have to be considered when making replant decisions. It is essential to make good estimation of plant health and accurate stand counts in order to determine the need for replanting.

Soybean is sensitive to hail damage because as soon as the plant emerges the growing point is above ground and extremely sensitive to adverse weather events such as hail. In the case of hail, the plant is considered dead if it is in the cotyledon stage and it is cut off below the cotyledons, or if it is damaged by hail to such a degree that they have no green leaf tissue or regrowth.

The reason is that nutrients and food reserves in the cotyledons supply the needs of the young plant during emergence and for about seven to 10 days after emergence, or until about the V1 stage. Cotyledons are the first photosynthetic organs of the soybean seedling and are also major contributors for seedling growth. Unlike corn, whose growing point is below ground until it reaches V5-V6, the growing point for soybeans is between the cotyledons and moves above the soil surface at emergence.

This makes soybean particularly susceptible to damage from hail, frost, insects like bean leaf beetles, or anything that cuts the plant off below the cotyledons early in its life. Stand reductions are therefore likely to follow hailstorms. Overall, we do not see hail damage to be as critical early during the vegetative growth stages. However, plant injury tends to be much greater during reproductive growth stages.

Some of the hail storms last week had 60 mph wind and hail with the size of baseballs leaving plants with broken stems and completely defoliated. I started a project with Purdue University in 2003 to assess the effect of node removals at different growth stages. This project was funded by the National Crop Insurance Service and we are still doing the research today. Last year we summarized the first three years of the study and here is a short summary of the Iowa data.

We had six treatments of node removal (0, 20, 40, 60, 80, and 100%) and three node removal timings (V2, V6, and R3). Averaged over node removal treatments, yield was 24.9 and 46.1% greater at the V2 than the V6 and R3 node removal timings, respectively. Seed mass was 3.2% greater when comparing the V2 to the V6 or R3 node removal. Soybean oil content response was variable, but generally decreased as percent node removal increased. Protein content was largely unaffected. Our results suggest that node removal timing was a significant factor to consider when estimating soybean grain yield loss and oil content adjustments may need to be

considered to properly compensate growers.

More information about replant decisions can be found at [www.soybeanmanagement.info](http://www.soybeanmanagement.info)

**Table 1. Effect of node removal on soybean grain yield at three different growth stages (V2, V6, R3) in Iowa (2003-2005).**

Percent node removal	V2	V6	R3
		Bu/acre	
0	51.1	52.4	51.2
20	48.6	48.9	43.8
40	45.4	45.3	39.1
60	45.2	40.7	32.3
80	42.4	31.5	21.2
100	41.4	0.6	0.0
LSD (0.05)		6.3	

*Palle Pedersen is an assistant professor of agronomy with research and extension responsibilities in soybean production.*

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