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## Quality Issues Related to Hail Damaged Crops

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# Quality Issues Related to Hail Damaged Crops

## **Abstract**

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## **Keywords**

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## **Disciplines**

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## Quality Issues Related to Hail Damaged Crops

By Charles R. Hurburgh, Department of Ag and Biosystems Engineering; Alison Robertson and Gary Munkvold, Department of Plant Pathology

The August 23 hailstorm across north central Iowa, and to a lesser extent the earlier northeast Iowa storm, caught crops approaching maturity. The sheer size of the north central event, almost 200 miles long and 10 miles wide, assures that damaged grain will reach the market. Fortunately, weather since the storm has been very favorable for hastening maturity and minimizing mold toxin potential.

### Corn

Corn maturity in general was lagging across the state, anywhere from 200 to 500 heat units below normal. A relatively high moisture harvest seems inevitable, even without the hail concerns. However, the recent weather – mid 70s and low 80s during the day and 60s at night – has brought corn toward maturity faster than the late season conditions of 2008. This means that, even if the harvest starts out wetter, it may dry down faster because of more complete maturity. This will also increase test weights, storage stability and handling properties over the problem crop of 2008.

Corn in the intense central band of the hailstorm was killed by the hail; the hail stones were large enough to cause extensive bruising. The bruised kernels will shrivel; many will be moldy but many also will pass out the back of the combine. Corn that has had its development stopped with the milk line partway down the kernel will be soft, have free sugars and be very low test weight (below 50 pounds per bushel, some down to 40 pounds per bushel). This corn will not dry easily but the recent warm weather will start the drying process right away, without creating toxin problems. Cool wet weather would have increased the risk of vomitoxin and fumonisin; hot weather would have increased the risk of aflatoxin. Mold will be present, but with less likelihood of toxin production. Feed users should spot check initial harvest just to be sure. Your veterinarian can assist in making decisions; the Iowa State University [Veterinary Diagnostic Lab provides toxin testing](#).

Stalk strength will be poor in hail damaged fields. It may be worthwhile to harvest remaining crop, putting only a few feet of corn in bins and using advantage of the dry air. The key is to get the moisture down as quickly as possible to slow both cob and kernel molding. Do not expect the test weight of very light corn to increase after drying. Elevators will isolate, dry and move this corn rapidly. Expect discounts for moisture, damage, test weight and possibly foreign material.

Corn in the larger hail area outside the high intensity band had shredded leaves, with some bruised stalks and ears from larger stones – likely resulting in less than 10 percent damaged kernels by grading standards. Test weights will be reduced (50-54 pounds per bushel) and field drydown may be slower, but test weights should increase after drying. Again the present weather is a big help. This corn will present the most difficulty for the market because it will not be distinctly low quality, but may require the buyer to grade for both

damage and test weight. This is difficult at harvest; buyers may choose to accumulate composite samples by seller, and grade those, or they may visually grade and price each load. Test weight is measured automatically by the moisture meter.

Damage grading is sometimes controversial because visual evaluation is required; graders should use color copies of the official damage designation photos as a comparison reference. This year is particularly difficult for damage because of the problems still on hand from the 2008 crop. The grain market has little leeway to handle damage from 2009. Ethanol plants are negatively affected by damage; fermentation reactions are retarded. As always, test weight is a good way of making a rough division of corn quality and storability.



**Hail damaged ears with signs and symptoms of *Gibberella* ear rot, *Fusarium* ear rot, *Penicillium* ear rot and sooty mold.** (Robertson, 2009)

### **Soybeans**

Barring frost, the primary soybean quality issue for beans remaining attached to plants will be smaller seed size (down to chips in some cases).

Percentagewise, there were greater yield losses in soybeans than corn. The impact on composition (percentage protein and oil) is uncertain because the total yield and the quantities of individual nutrients were both reduced. The smaller beans and chips will be harder to process; many very small pieces will be removed by the combine. Small beans or chips will not be graded damaged unless discolored as well. They are not foreign material unless they pass through the 8/64 foreign material sieve. They are not splits even if they pass through the splits sieve because splits must be physically broken pieces. However, the bruised plants will create more FM in the tank, due to broken stems.

Beans in pods that were bruised but not removed may be discolored. As with corn, comparison to standard color photos is needed to identify damaged soybeans in the grades.

### **General Recommendations**

Iowa was headed for a wetter than normal 2009 crop before of the hailstorms. Late August and early September weather has been ideal for accelerating the lagging maturity and reducing the high moisture potential. Nonetheless, expect to dry corn again this fall. Even air and low temperature dryers, if only filled one-third or less depth will operate rapidly in present conditions. Take advantage of this if you have lodging; soybeans too will dry easily in 70-80F weather. Soybean moisture probably will fall rapidly in the field after leaves

have dropped, making drying less necessary.

There is carryover of 2008 crop on hand, primarily in elevators but some on farms. Do not mix 2008 and 2009 crops in the same storage. The old corn will have a high tendency to spoil; its storage life is probably expended or nearly so. Mixing with less moisture stable new crop creates an unpredictable situation.

Temperature control is critical. The same warm weather that is helping maturity will mean warm grain coming from the field. It must be cooled immediately, even if drying is not necessary. Leaving grain warm after harvest can remove months of storage life in the next spring and summer. Good aeration practice is to immediately cool harvested grain, then cyclically reduce temperatures into the 30s as the outside air temperature falls. Remember that once a cooling cycle is started, it should not be stopped until complete. The benefits of having a bin temperature monitoring system becomes very clear during aeration cycles, as it tracks cooling progress without over aerating.

Remove center cores of bins to take out fines and trash. Larger bins (over 50,000 bushel) may have to be cored twice. Level the grain after the last coring. A vac can be used to core piles or flat storages, although it has less effectiveness and removes more grain than bottom center draw off.

Expect ethanol plants and other users to become increasingly careful about grading inbound corn. Damage and test weight discount scales are going up. The steady increase in production (yield) has come with some cost in wetter corn, less high quality storage as a percent of total, and more management issues. Plan ahead very carefully which grain should go in which storage area, based on expected length of storage time. The better corn (higher test weights) should be the corn held for longer periods, in the better storages. Move lighter corn to market as soon as possible.

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