



# Beef Cattle Handbook



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## Feed Value of Hail Damaged Corn

Ivan G. Rush, Extension Beef Specialist, University of Nebraska

Research on hail damaged crops is limited. However, a severe hail storm at the West Central Research and Extension Center, North Platte, Nebraska on July 27, 1972, provided an opportunity to look at several aspects of the problem.

### The Situation

As a result of the storm, an experiment was designed to measure the feed value of the hail damaged corn. At the time of the storm, the tip of the tassel on most of the corn plants was just beginning to emerge and the ear shoots were just showing. One to two leaves were still emerging, so there was some leaf tissue development after the hail.

At the time of ensiling the crop, the percentage of grain was measured in the hailed and the non-hailed corn. As the corn was being chopped for the silo, the hail damaged and non-hailed corn green chop contained 27.2 and 38.0 percent dry matter, respectively. After the material was ensiled and thoroughly fermented, the hail damaged and non-hailed forage contained 27.7 and 39.0 percent dry matter, respectively, and 8.4 and 7.0 percent protein on a dry matter basis, respectively.

There was 10.6 percent grain in the dry matter of the green chop from hail damaged corn and 49.9 percent in the dry matter of the green chop from non-hailed corn. The corn was ensiled on September 26 in trench silos. The five rations used in the 99 day experiment were: (1) hailed corn silage; (2) non-hailed, good quality corn silage; (3) hailed corn silage with grain added to make 25 percent grain in the silage dry matter; (4) hailed corn silage plus grain to make 37.5 percent grain in the

silage dry matter; and (5) hailed corn silage plus grain to make 50 percent grain in the silage dry matter (Table 1).

All rations were calculated to be 13.3 percent protein on a dry matter basis until the calves averaged 400 pounds, at which time the protein content of the ration dry matter was decreased to 11.1 percent. The protein content of the rations was raised to the calculated level with a 42 percent natural protein supplement.

### Observations

Based upon the 1972 experiment, these observations can be made:

1. The silage from the hail damaged corn is inferior to silage made from non-hailed irrigated corn.
2. Adding corn grain to the hail damaged silage to equal the amount of corn grain in the non-hailed silage gives it comparable feed value.
3. Hail damaged corn can be used effectively as the basal ration for growing calves and the amount of grain to feed with it will depend upon the amount of grain in the silage and the level of performance desired.
4. Five or six pounds of grain per head per day is needed if only 10 percent of the silage dry matter is grain. This amount of grain will bring the grain portion of the ration dry matter to nearly 50 percent—similar to good quality corn silage.
5. The weight gains and the dry matter consumed per pound of gain of the calves fed the different rations was positively related to the amount of grain in the dry matter of the silage.

### **What About Nitrates?**

Questions often arise concerning nitrates in hail damaged corn. Although immature corn can be relatively high in nitrates, it is usually not a problem when the corn is harvested as silage. Most of the nitrates are found in the lower third of the plant. If high levels of nitrogen fertilizer were used it may be advisable to raise the cutter head and leave 8-12" stubble. If there is a great reason for concern then samples of the fresh corn plant could be submitted to laboratories for analysis. Even if the nitrates are relatively high it can still be fed without problems. Approximately half of the nitrates are broken down or destroyed during fermentation. Even if the silage is slightly high it can be blended with other low nitrate feed such as alfalfa hay and corn.

### **When Should Hail Damaged Corn be Harvested?**

Time of harvesting will vary depending on the stage of maturity and severity of hail. It is usually advisable to wait for at least a week before starting harvest. The main reason for waiting is to allow the corn plant to dry down. To allow for the best fermentation, the silage should have less than 67 percent moisture (33 percent dry matter). The immature corn plant will contain approximately 75-76 percent water (24-25 percent dry matter) and if harvested at this stage, severe drainage will occur from

the silo, yielding in poor fermentation and high dry matter fermentation loss. It is usually advisable to allow the plant to dry down unless the stalks are damaged to the point that logging will become a problem. Because the silage may have a relatively low level of fermentable carbohydrates, silage fermentation enhancements (additives) may be advisable.

### **What Kind of Yield Can We Expect?**

Yields will obviously depend on the severity of the hail damage. Data indicates that the leaves comprise approximately 15-20 percent of the dry matter if the ears are relatively well developed. Consequently, this may give some indication of yield if the leaves are stripped and the remainder of the plant maintained relatively intact. If the ears are not well developed, then the leaves may account for up to 40 percent of the dry weight.

### **What about Smut on the Ears if the Plant is Allowed to Develop in the Field?**

Smut will usually develop on the ears where the hail damaged the end of the ears and exposed some of the grain. Even though this looks undesirable and causes a dark irritating dust when harvesting, it is not toxic, nor does it lower consumption or feed value of the silage.

Table 1. Performance of Calves Fed Rations Containing Hail Damaged Corn Silage (1972-73)

	Hail damaged corn			Non-hailed corn		
Grain in dry matter, %	11	25	37.5	50	50	50
Number of animals	20	20	20	20	20	20
Initial wt, lb	354	355	346	351	348	348
Daily gain, lb	1.27	1.52	1.74	1.92	1.90	1.90
Daily feed, lb						
Silage	38.24	34.86	29.17	25.02	29.22	29.22
Corn		2.13	3.96	6.15		
Supplement	1.22	1.26	1.17	1.14	1.14	1.14
Total dry matter						
Consumption, lb/day	11.44	12.48	12.50	13.33	13.12	13.12
Dry matter/lb grain, lb	9.04	8.24	7.21	6.94	6.93	6.93

Author:

Ivan G. Rush, Extension Beef Specialist, University of Nebraska

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