

Will Your Corn Make High Moisture Corn?

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What are the chances that your corn will make high moisture grain corn? This sounds like a good question to be asking. The answer to this is not very easy, however, the corn's growth stage at the time of our first killing frost will help us make this decision. Our cool, wet spring delayed corn planting this year. There are still many growers hoping to harvest high moisture corn this fall.

What is a killing frost? According to Joe Lauer, Corn Agronomist, University of Wisconsin, corn will be killed when temperatures are near 32° F for a few hours, and when temperatures are near 28° F for a few minutes. Less damaging frost can occur when temperatures are around 32° F and conditions are optimum for rapid heat loss from the leaves to the atmosphere, i.e. clear skies, low humidity, no wind and low lying areas. Grain yield will continue to increase about 7 to 20% after a light frost that only kills the leaves as long as the stem is not killed (Table 1)¹.

Table 1. Potential impact of frost on grain yield.

Corn Development	Killing Frost (Leaves and stalk)	Light Frost (Leaves only)
Stage	% Yield Loss	% Yield Loss
R4 (Soft dough)	55	35
R5 (Dent)	40	25
R5.5 (50% kernel milk)	12	5
R6 (Black layer)	0	0

Derived from Afuakwa and Crookston, 1984

After a light frost, the corn plants will appear much drier than they really are. The frosted leaves make up only about 10 to 15% of the total plant weight. The stalks and ears will still be holding quite a bit of moisture. If any leaves, especially above the ear, or even the stalk and husk are still green after a frost, grain dry weight will continue to increase until the black layer forms at kernel tips².

If the corn was hit by a killer frost in the milk stage, yields have the potential to be very low and the grain will be very light and chaffy. It is also a nightmare to try to harvest this corn for grain. The cobs will likely be very spongy and it is difficult to get the kernels off of the cob. This corn should be made into corn silage only.

If the corn was in the dough stage, yields may be reduced by 50%. The test weight of the corn in this stage could also be low. It would not be surprising to harvest corn with test weights under 50 lbs/bu. This corn will need to stay in the field for an extended period of time. In the soft dough stage the kernel moisture is usually between 60-62% moisture. This long field drying will also make the corn susceptible to lodging due to European Corn Borer damage and rotted stalks.

Ev Thomas from the Miner Institute suggests that if the corn has any kernel milkline visible, even as little as 1/3 milkline, there will be a good chance the corn will make grain. Any corn with a kernel milkline is a good candidate for high moisture corn. If there is any milk in the kernel cap, consider chopping this corn and don't risk trying to harvest this corn for grain.

If the corn is in the late dent stage at the time of the frost, yields and test weights should be near normal. Chances are there may not be a lot of corn at this stage of growth when we receive our first killing frost. We can only hope that we get a later than normal frost this fall.

David Morris, former Soils and Crop Advisor, OMAFRA, wrote this about black layer. "Under normal conditions, black layer formation (end of grain filling), occurs when the grain contains about 32% moisture." Watch out for premature black layer formation. "A black layer will form whenever grain filling is stopped, even if the kernel is not completely filled. Thus, the presence of a black layer in grain that was frosted is not a sign that the corn is "mature" in the normal sense." Several days of cool temperatures (daily highs of 45 to 55° F) during grain fill may result in premature black layer formation, ending further grain yield increases even if another frost has not occurred².

Consider the corn hybrid when making your decision as to which fields will make grain corn. Ev Thomas mentioned that the new highly digestible hybrids should be harvested for silage only. These hybrids have a very soft endosperm. There is some concern that the soft endosperm can act as a sponge for mycotoxins. This was found to be true on a farm that Ev worked with four years ago. The companies that sell these hybrids encourage growers to plant them for silage only. It appears that this is very sound advice.

Mother Nature provided us with another growing season to remember. It is unfortunate that the delayed planting season will prevent some growers from harvesting any corn for grain. Soon it will be time to decide what corn should be chopped for silage and what corn could make grain. Right after our first frost you need to make a decision as to whether or not your corn is going to make grain. Delaying this decision may result in corn too dry for silage and too immature or wet for high moisture corn.

References:

¹*What is a killing frost in corn?, J. Lauer, Corn Agronomist, University of Wisconsin*

²*Handling corn damaged by autumn frost, publication NCH-57, National Corn Handbook*