EXTENSION

AGRICULTURE

Managing Flooded Corn Silage at Harvest

Heather Darby, Agronomic and Soils Specialist, University of Vermont Extension
heather.darby@uvm.edu

In July, corn fields throughout the state were flooded and their fate was unclear. Some fields were pushed completely flat by the current of the raging water and died weeks later. Other fields were pushed near the ground and slowly, over time, they began to push themselves back up with clear determination to survive. Fewer fields were flooded but did not get pushed down by the water. Regardless, all the corn was damaged, impaired, and slow to recover as the soil remained saturated and wet weather continued until harvest. We all wondered if the silt left from the flood water would wash off the plants, if the plants would tassel, and if ears would form? Would there be anything to harvest and would it be safe for our livestock? Now the time has come, and farmers are starting to prepare for harvest. To assist with harvest management decisions, our team sampled corn from fields that had been flooded along the Lamoille, Winooski, and Missisquoi rivers. From a set of fields, numerous corn plants were harvested at ground level and brought back to the research farm. At the farm, the corn from each field was divided into 3 piles. One pile would represent corn harvested 6 inches from the ground, one 18 inches from the ground, and one harvested just below the ear (snaplage). Each sample was run through a chipper/shredder and a subsample collected for ash, mineral, and mycotoxin analysis. The chipper/shredder was cleaned between each farm and each sample to avoid contamination.

The sample analysis revealed that a good portion of the silt that had contaminated the corn had been washed away over time (one benefit of the excessive rain). The highest ash content was 6.21% and from a field that had been nearly flat to the ground after the flood waters receded. This same corn field had 15.5% ash content one-month after the flood. So more than half of the ash had been washed off these plants. High-chop corn further reduced that ash, as would be expected since more of the stalk is left in the field (Figure 1). Most of the fields reached ash levels that are considered in the normal range for corn silage (3.0% to 4.0% ash on a dry matter basis).

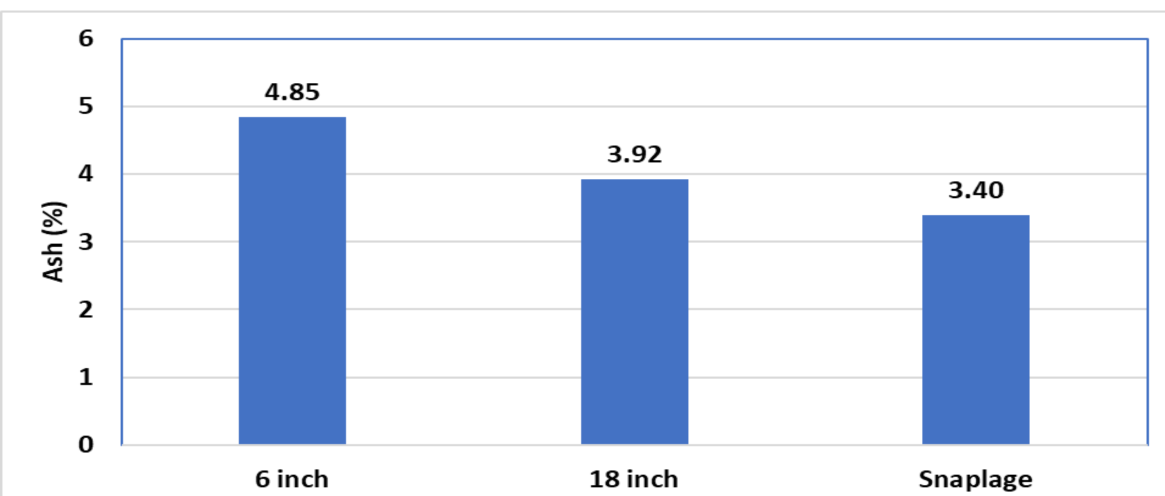

Figure 1. Ash content of flooded corn silage harvested at 6 inches above the ground, 18 inches, and just below the ear (snaplage).

THE UNIVERSITY OF VERMONT EXTENSION

NORTHWEST CROPS & SOILS PROGRAM

A Publication of the University of Vermont Extension
Northwest Crops and Soils Program

The other concern was the possible growth of fungi on the plants that can produce harmful mycotoxins. Only corn sampled along the Winooski contained the mycotoxin DON produced by the Fusarium fungus. The levels ranged from 0.50 ppm to 4.8 ppm. Depending on the livestock type, when DON concentrations reach 2 ppm it can negatively impact animal health (Table 1).

Table 1. FDA advisory levels for total vomitoxin (DON) in animal feeds.

Class of animal	Levels in grain	Levels in finished feeds
	ppm	**ppm**
Beef and dairy cattle	10	5
Chickens	10	5
Swine	5	1
All other livestock	5	2

Mycotoxins are complex organic compounds that are produced by some fungi to increase its impact on the plant. Once produced, these toxins cannot be destroyed by heat, time, or fermentation. The primary toxin producing fungi we are concerned with in our area is Fusarium. Several toxins of great concern are produced by Fusarium and include vomitoxin (DON), fumonisin, zearalenone, and T-2. A common scenario for high levels of Fusarium toxin infection in corn starts with wet conditions accompanied by damage to the plant. The longer corn is allowed to stand in the field after maturity, the greater the likelihood of significant toxin development. Levels of Fusarium toxins can be the result of a continuous accumulation of toxin over time during the growth period and continuing after maturity and into storage until oxygen becomes limiting or, in the case of grain, moisture is reduced to less than 20%. *Limiting oxygen is the key to successfully limiting toxin production during ensilement.* Oxygen is like a light switch. It can turn toxin production on and off during storage. Therefore, one of the best management strategies to mitigate further production of toxins is to create optimum fermentation conditions. It is wise to sample for mycotoxins once the feed is fully fermented and periodically as feeding begins. Please refer to Mitigating Silt and Microbe Risks in Flooded Forages article for more information at https://www.uvm.edu/sites/default/files/Northwest-Crops-and-Soils-Program/Articles_and_Factsheets/Mitigating_Silt_and_Microbe_Risks.pdf.

EXTENSION

AGRICULTURE

Managing Flooded Corn Silage at Harvest

Remember, best harvest practices will allow the feed to ferment quickly and keep harmful microorganisms from growing and reducing feed quality and producing harmful toxins. Below are some reminders for a successful harvest.

1. Harvest living plant tissue. Leave the dead and decaying material in the field. Decaying material is at high risk for yeast and molds, if not toxins. This will contaminate the better forage if comingled at harvest.
2. Proper moisture/DM to insure packability and proper fermentation.
3. Adjust height of harvest to avoid soil and silt contamination. Aim for <4% ash. Soil/silt is inert material, can hamper proper fermentation and also carry yeasts/molds, and possibly toxins.
4. Capture sugar. There may not be much starch in ear development, but the plant sugars that remain are critical for a decent fermentation. Dead and decaying material has little sugar to fuel proper fermentation.
5. Consider increasing the rate of inoculant to 1.5-2.0x recommended rates. Also consider a homolactic inoculant to maximize lactic acid development and proper pH reduction.
6. PACK! Above all, pack as tight as possible.

If you have any questions, please feel free to contact Heather Darby, UVM Extension, at email heather.darby@uvm.edu or call 802-782-6054.

September 2023

Published by the University of Vermont Extension Northwest Crops and Soils Program. Learn more about the program at: https://www.uvm.edu/extension/nwcrops

THE UNIVERSITY OF VERMONT EXTENSION

NORTHWEST CROPS & SOILS PROGRAM

A Publication of the University of Vermont Extension
Northwest Crops and Soils Program