



Managing Flood Damaged Crops and Forage from Tropical Storm Irene

Tropical storm Irene has caused some of the most massive flood damage to crops in over fifty years. Many crop fields were completely destroyed, while others were left with varying degrees of damage. Before making any decisions about your fields, you should document and report any crop damage to your local U.S. Department of Agriculture Farm Service Agency (USDA FSA) office, your crop insurance agent and the Vermont Agency of Agriculture, Food and Markets. You are strongly encouraged to take ‘time-dated’ photos of any damage. Such information may be critical in federal emergency determinations and your eligibility for these programs.

Below are best management guidelines for harvesting, storing, and feeding flooded field and forage crops including corn, hay crops and pasture.

- Protect yourself from the harmful effects of silt dust on your health. If you do harvest your flooded crop, use a dust mask (N-95 or higher) or filtered cab to avoid breathing in dust.
- Flooded crops should be stored separately from the rest of your feed. In cases of production problems, this allows for feeding or disposal options without affecting your good feed.
- Flood water from streams and silt can be a source of pathogens. Farmers are strongly encouraged to work closely with their veterinarian and animal nutritionist when determining which vaccination and feeding protocol to use to further protect the herd from possible health issues associated with feeding flooded crop material.

Considerations for Harvesting Corn for Silage

- No matter how bad the field looks take the time to properly assess the damage in each field and determine harvestability. Because each field and/or farm is affected differently, no one prescription fits all situations.
- If possible it is best to avoid chopping corn with large amounts of dirt or silt on it. Soil contamination is the primary source of *Clostridium* bacteria which increases the risk of poor fermented silage. Clostridial fermentation can also increase the risk of botulism toxins.
- It is generally recommended to not harvest corn with significant moldy ears. Mold lowers feed value and increases the risk of mycotoxins. However, do not assume that all flooded corn will have moldy ears. We have observed that ears with tight husks show no or few signs of mold. It is important to monitor the corn regularly to assess mold growth and development. You may consider an early harvest if the mold worsens.
- Silt is abrasive, so it will be very hard on machinery. Operators will need to take extra care to ensure knives are sharp. Be prepared for extra repairs.
- Try to cut the corn above the silt line or at least above any heavy silt line. In areas where plants are heavily silted it may be more advantageous to harvest the corn as high moisture ear

or snaplage. This process requires only the ear to be removed and leaves the remainder of the plant in the field.

- Good silage fermentation kills or inhibits the growth of many pathogens; therefore, follow all best management practices to promote good fermentation by harvesting at the correct moisture content (62 - 68% Moisture content, 32 - 38% DM), proper chop length, high filling rate, extra packing, and a tight seal to exclude oxygen. In addition, silage inoculants properly applied can help promote good fermentation by assuring adequate populations of lactic acid bacteria (LAB) and silage preservatives such as buffered acids can help prevent mold and yeast growth.
- If possible the field should be left to reach the proper harvest moisture for silage. Do not chop immature corn unless necessary. Chopping immature corn can lead to other fermentation issues. If fungal growth seems imminent or increasing on the ears or in the stalk and you still intend to harvest, harvesting slightly earlier than you typically would can reduce the chances of an unacceptable mycotoxin load.
- Crop dry down rate may be faster than normal, so monitor plant maturity and whole plant moisture content routinely and be prepared to harvest when ready.
- Because of relationship between packing density and oxygen exclusion, it may be better to err on the side of harvesting at slightly higher moisture levels than usual. Chopping corn at excessively high dry matter content will reduce lactic acid bacterial growth and likely inhibit proper fermentation allowing more spoilage.
- It is advisable to inoculate with lactic acid bacteria from a reputable company. It may cost a little more for a good inoculant, but do not skimp on rate or quality. If harvested at the proper moisture content, it is generally recommended to inoculate with a combination of homolactic LAB (to lower and stabilize the pH of the silage) and *L. buchneri* (to increase acetic acid formation which extends bunk life and reduces feed out losses). Growth of molds and fungi are inhibited by acetic acid. Including *L. buchneri* in the inoculant can cause excessive production of acetic acid if the corn is harvested below 32% DM. However, for specific products, talk to your inoculant dealer about any modifications in inoculant rate and type. Distribution of inoculants within the forage is also critical so talk to your dealer about applicators. For more information, refer to www.extension.org/pages/11767.
- Acetic acid and buffered propionic acid products are also effective to limit mold and yeast growth, but should not be mixed with bacterial inoculants in the same applicator tank. Follow specific product recommendations.
- Remember to store flood damaged corn separately from undamaged corn. If production problems are detected from this forage then there are options to either feed it to other livestock or plan to spread it on your fields as you would manure.
- Avoid feeding for 4 to 6 weeks to allow adequate time for good fermentation. Some mycotoxin levels can actually decline over time in the silo.
- Before feeding, collect a representative sample and have it tested for mycotoxins.

Considerations for Harvesting Hay Crops

- Avoid harvesting heavily silted haycrops for the same reasons as corn.
- If you do harvest, keep all flood damaged hay and haylage separated from uncontaminated forage.

- There is a very high risk of poor fermentation from flood damaged haylage, therefore, making dry hay may be a better option than haycrop silage.
- If you do harvest as haylage, follow all best management practices to promote good fermentation.
- Monitor your moisture content and harvest at a moisture content of 60 to 65% moisture for bunks and uprights. If you are making baleage, harvest at 50 to 60% moisture.
- Fine chopping, quick fill rate, extra packing and quick sealing with a tight cover are all critical.
- Silage inoculants can help improve fermentation by providing adequate populations of lactic acid bacteria. Inoculate silage with a reputable brand appropriate for haycrop silage. For information about appropriate inoculation rates consult with product representatives.
- Avoid feeding for 4 to 6 weeks to allow adequate time for good fermentation.
- Before feeding, collect a representative sample and have it tested for mycotoxins.
- Monitor your animals closely and consult with your veterinarian if there is a problem.

Considerations for Pasture

- Be cautious. Soil disrupted by the flood along with decaying organic matter can expose your animals to clostridia organisms and other pathogens that may cause diseases, abortion, or even death. Handle any dead or aborted animals with care. Listeriosis which can be fatal to humans. Call your veterinarian immediately.
- Depending on the silt load, the safest approach may be to clip the contaminated pastures and then wait until next spring to graze the pasture.
- If you do graze regrowth this fall, don't graze it too closely. Avoid letting your livestock get down into the old dead material.
- Watch your livestock closely. If any animals appear sick, stop grazing and call your veterinarian immediately.

Considerations for Flooded Stored Forages

- Before feeding the flooded crop, collect a representative sample and have it tested for mycotoxins.
- For stored silage, haylage or wrapped round bales that were exposed to flood waters, it is important to dig into the silage (or open up a few bales) and assess the damage. Check the smell and color. If it looks and smells good, then it may be fine. Watch for mold growth.
- Discard forage that is visibly contaminated with silt or mold. In some cases, silt will even be found inside wrapped bales with the plastic still intact.
- For round bale silage, re-wrap or patch torn bales to avoid heating and spoilage and plan to feed these out soon. Flooded wrapped bales are apt to spoil; even if your bales look fine right after the flood, check a few in about a month to look for changes.
- Limit the amount of this feed in the ration mixing it with other good feeds. Monitor your animals closely.

Considerations When Feeding Flooded Forage

- Flooded forage should be analyzed for nutritional value and mycotoxins. With added silt, you may find a higher dry matter and ash content and a lower protein and energy concentration.
- Frequency of testing will be determined by field risk assessment as well as by evaluation of the feed's visual appearance and smell.
- Blending or diluting flooded feed with uncontaminated forage may be one means to reducing impact on herd health. However, check with your nutritionist and veterinarian to interpret mycotoxin test results before mixing feeds.
- Once you start feeding any flooded material, watch your animals closely. Mycotoxins and other potential pathogens may cause health problems immediately or over time.

Sampling and Testing for Mycotoxins

The risk of mycotoxin development may increase in crops that have been flooded and covered in silt. Mycotoxins are poisons that are produced by fungi. These toxins can be detrimental to both animal and human health. Mycotoxins can cause problems in production, reproduction and intake problems, as well as possible irreversible damage to cows' organs, including the liver and kidneys.

Fungi in the '*Fusarium*' family produce many of the mycotoxins common in the Northeast. The fungi itself is ubiquitous and found in the soil, plant residue and even blown around through air currents. Mycotoxins associated with '*Fusarium*' are zearalenone, T-2 toxin, fumonisin, and deoxynivalenol, also called DON or vomitoxin.

The following are mycotoxin risk levels for dairy cattle, expressed on a total ration, dry-matter basis.

- DON (vomitoxin); less than 5 to 6 parts per million
- Fumonisin; less than 25 parts per million
- T-2 toxin; less than 100 to 200 parts per billion
- Zearfalenone; less than 300 parts per billion

Aflatoxin produced by the fungi *Aspergillus*, the most serious carcinogen, has been found in high levels in peanuts, corn, cotton seed, and grain and can contaminate milk. This toxin is a serious problem for human and animal health and can contaminate corn in warmer growing regions. Aflatoxin requires warm (85° F) and moist conditions. Where fall conditions are cool, aflatoxin is rarely found. For example, in Vermont, our fall conditions are often wet but temperatures normally average between 50 and 60 degrees.

All flooded forages should be tested for mycotoxin after complete fermentation but soon enough so you have time to obtain feed if it has unacceptable levels. Samples should be taken from the storage facility and the TMR if available. The sampling strategy and frequency will depend on herd health monitoring. Mycotoxin analysis can be completed at UVM Grain Quality Testing Laboratory as well as other commercial labs.

Forage Inventory and Farm Decisions

Take an accurate inventory of your volume and quality of stored forage. Estimate how much feed you will need this winter and whether it is possible to avoid using the flooded forage. Talk to

your feed consultant about cost-effective options for replacing lost feed. Right now is the time to make the calculations. If you find you will have to borrow money to buy feed, talk to a banker early. It will show that you are planning ahead.

Contacts/Resources

References and links for other flood related sites can be found at <http://pss.uvm.edu/vtcrops/>.

If you have additional questions or help, please contact your local University of Vermont Extension office or one of the specialists below.

Name	Specialty	Location	Phone
Sid Bosworth	Agronomy/Forages	UVM Burlington	(802) 656-0478
Jeff Carter	Agronomy/Forages	Middlebury	(802) 388-4969 / 1-800-956-1125
Heather Darby	Agronomy/Forages	St Albans	(802) 524-6501 / 1-800-639-2130
Dan Hudson	Agronomy/Forages	St. Johnsbury	(802) 751-8307 / 1-800-545-8920
Dennis Kauppila	Farm Management	St. Johnsbury	(802) 751-8307 / 1-800-545-8920
Mark Cannella	Farm Management	Berlin	(802) 223-2389 / 1-866-860-1382

Other Contacts/Resources

UVM Extension State Office	1-866-622-2990	www.uvm.edu/extension/
Vermont Agency of Agriculture	1-802-828-1619	www.vermontagriculture.com
USDA-Farm Service Agency	1-802-658-2803	www.fsa.usda.gov/vt
USDA-NRCS	1-802-951-6327	www.vt.nrcs.usda.gov/
NOFA-VT	1-802-434-4122 or 802-535-9067 (Willie Gibson)	http://nofavt.org/flood

The information in this document reflects our best effort to interpret federal food safety guidance and related scientific research, and to translate this into practical management options. However, growers are fully responsible for their own management decisions, for the quality of the food they sell, and for compliance with all applicable laws and regulations.

Written by UVM Extension Specialists Sid Bosworth, Jeff Carter, Heather Darby, Dan Hudson, and Dennis Kauppila with contributions by Al Gotlieb (UVM retired)

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