

ADDRESSING 2019 AGRICULTURAL CHALLENGES

Resources for Ohio's farmers to navigate the impacts of extreme weather conditions

Question: If a hay crop field was contaminated with manure or sewage during flooding is that a concern?

Answer: The main concerns would be worker and cow health. Fresh forage that has been contaminated with manure or sewage can contain human pathogens and standard safety practices should be followed (wash your hands after handling the fresh forage, limit exposure to the fresh forage, etc). However, silage made from a contaminated hay crop usually will be safe because good ensiling eliminates almost all pathogens. Several studies have inoculated fresh forage plants (corn, wheat, grass, alfalfa) with *E. coli* O157:H7 and in all studies when the forage fermented rapidly and well (pH < 4 for corn silage and less than 4.5 for legume silage), the pathogen did not survive. This was also mostly true for salmonella and some other pathogens. Silage making also greatly reduces the presence of the pathogen associated with Johne's disease.

The key to reducing human and cow risk from contaminated forage plants is to store them as silage and practice good silage making practices so that you get a rapid and complete fermentation. Good silage practices include wilting the crop to 35 to 40% DM, rapid filling, good compaction, and covering and sealing the silage mass quickly. Application of a good lactic acid bacteria inoculant can help but is not essential to eliminate pathogens from silage. When fermented corn silage was inoculated with *E. coli* O157:H7 after the silo was opened, the bacteria only survived if the exposed silage reached a pH > 4. Low pH can be maintained after silos are opened if feed out rate is 6 to 8 inches of silage per day. Silage inoculants containing *Lactobacillus buchneri* can help keep silage pH low during feedout.

Forage crops that have been contaminated with manure or sewage should not be green chopped. Data are lacking on the survival of many pathogens following hay making. Exposure to sunlight and the dry environment of hay should greatly reduce pathogen load but likely will not eliminate it. At this time, we recommend not making hay from forage that has been contaminated with manure or sewage. Contamination risk diminishes as the time between exposure and harvest increases. It likely is safe to make hay on later cuttings.

Soil can also contaminate forage plants during flooding events. A study evaluating the use of corn plants that were flooded following Hurricane Irene (Northeastern US), was

conducted in 2018. Flooding was severe and flooded plants had up to 25% ash (normal corn silage averages about 3% ash.) Iron concentrations were also very high in the flooded corn plants. The flooded plants usually fermented adequately with no evidence of clostridial fermentation, but the resulting silage had substantially less energy because ash has no energy and fiber digestibility was reduced. No pathogens were detected on the silage. Controlled feeding studies were not conducted, but surveyed farmers reported increased health problems with their cows. Because of very limited forage supplies in Ohio, forage fields that were flooded but have harvestable material, should be harvested. Rain will wash much of the soil off plants so soil contamination likely is not a major concern on forage crops.

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