Silo Gases

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Drought-stressed crops pose greater risks to animals and their caretakers. One of the additional risk factors of greater importance in a dry year is the possibility of poisonous silo gases forming during the fermentation process. The high nitrate accumulation in the plant causes increased risk to the animal and can be a deadly threat to humans.

Plants wilted by drought or crops ensiled after a drought-breaking rain often have high nitrate levels in the plant stalk. Heavily fertilized fields may have high levels of residual nitrogen that wasn't absorbed and utilized to grow the plant. Following a heavy rain, moisture starved plants rapidly absorb this nitrogen, and it takes time for plants to metabolize these nitrates into useful plant nutrients. Because this often happens late in the season when harvest will soon occur, producers can unknowingly harvest crops with high nitrates.

Two important recommendations are to avoid harvesting silage crops until several days of sunshine have followed a drought-breaking rain. This gives the plant time to convert the nitrates to useful plant nutrients and lowers the risk for both man and animal. Producers can reduce nitrates by cutting corn plants higher than normal because most of the nitrates concentrate in the lower portion of the stalk. When in doubt as to the risk of high nitrates, have plant samples analyzed for nitrates prior to harvest and adjust management practices appropriately.

Nitrogen dioxide gas is the major toxic material of concern to humans when ensiling crops. The plant respiration and bacterial fermentation that occurs may convert nitrates and nitrites into the yellowish brown gas sometimes observed around the base of silos. Inhaling these gases will burn the lungs and may cause death in only a few minutes. The greatest danger to humans occurs in the first few days after ensiling, but gases may be formed for two to three weeks or more after ensiling. Be alert for bleach-like odors and/or yellowish fumes around the silo. Avoid spending time around silos for at least three weeks after filling until fermentation is nearly completed and exercise caution when opening silos for the first time. Always work with someone else in clear view so if a rescue becomes necessary you can receive assistance.

Run the forage blower for 15 to 20 minutes before unloading silage to allow any accumulated gases to ventilate from inside the silo. Be especially careful around silo feed rooms. Since this is a heavy gas, fumes often accumulate near the bottom of the silo and unventilated silo rooms can be dangerous places that build up the toxic fumes. Open windows and use fans to ventilate these rooms especially during the initial three-week high-risk period. Tightly seal silo room doors to prevent contamination of the barn.

If circumstances require the producer to enter a silo within ten days after filling, then a self-contained breathing apparatus is essential. Under such conditions, working with a partner who can maintain visible contact at all times is a must.

Always remember the risk of fatal silo gas poisoning when silage harvest approaches. Keep alert for possible silo gas accumulation and take precautions to ventilate silo rooms, run the blower, and work in pairs when opening silos.

Silo gas poisoning is just one of the added challenges producers face when dealing with drought-stressed forages. For additional information on these and other topics, request a copy of DAS

99-5 “Drought related issues in dairy cattle nutrition” from the County Extension Office, or download a copy from the web at: http://www3.das.psu.edu/dcn/catforg/DAS/index.html

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