

Workers Compensation Update

by Peggy Murray, FBM Extension Educator, Lewis County

The Worker's Compensation Law requires that you post a Notice of Compliance at your place of business. The Workers Compensation Board is sending out reminders to all employees regarding the requirement to post a copy of the prescribed notice at their place of business as well as in vehicles such as trucks as well as doing on-site inspections.

You can get a copy of your notice of compliance:

- online at nysif.com by registering for online services and downloading 8 ½ x 11 notice.
- E-mailing your request for an 8 ½ x 11 or 6 x 4 notice (this size may be more convenient for posting in vehicles) to C105requests@nysif.com.
- Calling in your request to 1-866-303-7737.

Source: New York State Insurance Fund

12th Annual Buckwheat Field Day

August 28

1 - 3:30 pm

NYS Ag Experimental Station, Geneva

- Demonstrations will show the effect of varying seeding rate. Duration of flowering and plant size have been seed in the past,
- No-till field preparation will be demonstrated,
- Timing of incorporation of crop residue and sowing buckwheat.



An online Buckwheat Production Guide and newsletters are available at

www.nysaes.cornell.edu/hort/buckwheat/.

We are pleased to provide you with this information as part of the Cooperative Extension Dairy and Field Crops Program serving Broome, Cortland, Tioga and Tompkins Counties. Anytime we may be of assistance to you, please do not hesitate to call or visit our office.

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(Continued from the cover)

STRESS DURING VARIOUS CORN GROWTH STAGES

Planting to Emergence - Stress in the period from planting to seedling emergence is usually related to either soil temperature, soil moisture, soil aeration conditions or the interaction among them. The most common stress imposed at this time is that of cold soil temperatures. Cooler temperatures alone are not likely to impose a stress on the seedling, but only delay its emergence.

Emergence to Flower Differentiation (Early Vegetative Growth) - Shortly after emergence, the corn plant shifts from dependence on food stored in the seed to that available in the soil. At this stage, stress due to moisture shortage seldom occurs, because spring rainfall is usually adequate and the plant's moisture requirement is very low basically only enough to get the permanent roots growing.

If the top few inches of soil become very dry when the plant is small, early growth problems will likely occur. However, some feel that moderate moisture stress during this period is actually advantageous, since such stress may encourage early-season root growth, which would prove beneficial later if moisture supplies become short. Further, a dry surface soil utilizes more of the solar energy to heat the soil.

The effect of early-season stress on the final corn yield is difficult to access. Although moisture stress reduces plant size, it has little effect on final yield *if* good crop production conditions prevail during the pollination and grain-filling periods.

Rapid Stem Elongation to Tasseling (Late Vegetative Growth) - Relationships between weather and yield are more significant in the late vegetative growth stages--i.e., the 3- to 4-week period up to silking. Average air temperatures during the late vegetative stages are frequently above 72-75 F, which is considered optimum for corn growth. If too much above, moisture stress may also occur. Under this dual moisture-temperature stress condition, vegetative growth will be reduced. Smaller plants in the population are further stunted; larger plants will also be affected but to a lesser degree. **Overall, a final grain yield reduction of 2-3 percent per day of stress will result.**

Tasseling, Silking and Pollination - This is the most critical stage in corn development for any type of stress to occur. **Combined moisture -temperature stress during the reproductive period can substantially reduce final grain yield.**

Although separating the effects of these two stresses is difficult, most temperature stress conditions occur on high atmospheric-moisture-demand days--i.e., days when the daily mean temperature is above 77 F and the daily maximum is above 95 F, *regardless of soil moisture conditions*. However, the greatest potential yield reduction probably occurs from moisture stress during the silking process. Such stress delays silking and increases the time required for pollination. The result is that sometimes all the pollen may be shed before the silks emerge.



Either nutrient, pest or disease stress at the corn reproductive stages can also affect yield drastically. For instance, when moisture stress is combined with plant nutrient and temperature stress, final grain yield can be cut by up to 13 percent per day. Nutrient stress often happens during a drought, because the upper part of the soil where the fertilizer has been placed is dry and out of the active root extraction zone.

Grain Filling - Grain filling and maturation occur in the last 50-60 days of the corn plant's growth cycle. Early in this period, any kind of severe crop stress can reduce final yield as much as 3-4 percent per day, with the reduction becoming less as the plants approach complete "black-layer" (physiological) maturity.

The greatest single threat to yields during grain-filling is frost or freezing temperatures before black-layer maturity.

SUMMARY

During germination, emergence and the early growth stages, soil moisture and soil temperature levels are critical factors. During the late vegetative growth period, crop moisture stress can reduce final grain yield up to 3 percent per day.

?? During the tasseling and silking, corn is very sensitive to stress. At that time, high seasonal temperatures combined with low soil moisture availability may reduce yields an average of 5 percent per day; under more severe temperature-moisture conditions, reductions can run over 10 percent per day; and under extreme stress, corn fertilization might not even occur, resulting in total crop failure.

?? After pollination and during the grain-filling period, corn becomes increasingly less sensitive to stress. In the early weeks of grain-filling, stress can cut final yield up to 5 percent per day; about 6 weeks after pollination, its effects decline rapidly. 🍷

Source: National Corn Handbook -18. <http://www.ces.purdue.edu/extmedia/NCH/NCH-18.html>

Agronomic Considerations for Molds and Mycotoxins in Corn Silage and High Moisture Corn

Mike Rankin¹ and Craig Grau², ¹Crops and Soils Agent, UW Extension – Fond du Lac County
²Plant Pathologist, Dept. of Plant Pathology, UW-Madison

"Some problems are so complex that you have to be highly intelligent and well informed just to be undecided about them." -----Laurence J. Peter

Introduction

Mycotoxins have long been a concern to livestock producers when environmental conditions during the growing season were conducive to mold growth on the field crop. In recent memory, the drought year of 1988 brought on a concern about aflatoxin. During 1992 and 1993, wet and cool weather delayed planting and/or crop development to the point where kernel moisture late into the fall was still extremely high and corn ear molds were very common.

Mycotoxins are now more frequently being associated with crops like corn silage that include not just grain but a high percentage of stalks and stover. Recently, mycotoxins in corn silage have been associated with dairy herd health problems during years with near ideal growing conditions and record corn yields. These reports were widespread and came from excellent dairy producers. A sensory inspection of the silage indicated no visible mold, a good smell, and from all indications top management from field to storage (i.e. proper moisture, well packed, etc.). These situations were frustrating for both the producer and those in the industry who were trying to find some answers. Unfortunately, there are still more questions than answers and a need for more research that is both time consuming and costly.

This presentation will address agronomic factors associated with the growth and prevention of field molds in corn caused by *Fusarium*, the most common species associated with mycotoxin problems in livestock.

Molds and Mycotoxins 101

Molds, depending on type, can grow under a wide range of environments. The general conditions needed for *Fusarium* field molds to proliferate are high humidity (>70%), oxygen, and temperatures that fluctuate between hot days and cool nights (Seglar, 2001). *Fusarium* molds are responsible for a wide range of diseases in grass and cereal crops. In wheat and other

small grains, *Fusarium* causes head scab, an economically devastating disease for growers in the wheat belt and one that is receiving a large amount of research attention. In corn,

Fusarium causes Gibberella and Fusarium stalk rot, Fusarium crown rot, Fusarium kernel rot, and Gibberella ear rot.

Fusarium molds are everywhere in a field environment. They overwinter in the soil, on plant debris, and on or in the seed (Vincelli and Parker, 1995). Hence, a goal of eliminating *Fusarium* is unrealistic. Environment and plant stress determine the extent of plant infection by the mold. It is

these factors that need to be managed to every extent possible. This is not an easy task when we consider that molds and mold spores may enter the plant through the roots, via pollen transfer down the silks, through the seed kernel pericarp (where damage exists), and through plant

wounds caused by wind, hail, mechanical damage, or insect feeding. Although not confirmed by research, it's highly possible that certain soil types and cropping systems may be more conducive to supporting high mold levels than others (for example, a no-till cropping system on a clay-based soil).



So how do mycotoxins fit into the picture? Molds are no different than any other living organism - - - -

they need nutrients to grow. Competition for plant nutrients comes from both the host plant and other microorganisms. In an effort to help gain a competitive advantage, the mold produces a toxin. Mycotoxin production is likely going to be greatest when plant demand for nutrients is highest or when nutrient availability is limited. Once produced, most of these toxic compounds are not destroyed by heat, time, or fermentation.

There are 400 to 500 known mycotoxins. However, only in the case of a few is there a wide body of knowledge relating to their production and effect on humans and

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animals that consume them. The most commonly produced mycotoxins from the *Fusarium* molds are:

Name	Produced by:
DON (vomitoxin)	<i>F. moniliforme</i> and <i>F. graminearum</i>
T-2	<i>F. sporotrichioides</i>
Zearalenone	<i>F. graminearum</i>
Fumonisin	<i>F. moniliforme</i>

Numerous feeding studies and surveys with dairy cattle have not been able to conclusively show a cause-effect relationship based on elevated pure DON levels (Seglar, 1997). Rather, most researchers agree that it is probably just a marker for some "yet to be determined" anti-quality compound (Seglar, 2001; Whitlow and Hagler, 1997). Fumonisin, a recently discovered mycotoxin, has been identified as a potential human carcinogen and the causative agent for a fatal brain disease in horses (Munkvold and Desjardins, 1997). Similar to zearalenone, cattle do not appear to be extremely sensitive to fumonisin.

The visible mold/mycotoxin relationship is not clear-cut. In other words, it is possible to have visible mold and not have any mycotoxins. Conversely, it is also possible to NOT see any visible mold and have relatively high levels of mycotoxins. This is what makes management and the potential identification of mycotoxin feeding problems so difficult.

What are the agronomic factors involved in the formation of molds and mycotoxins

Soil Fertility

In general, a balanced soil fertility program reduces plant stress and the likelihood for subsequent disease development. More specifically, two major nutrients, nitrogen (N) and potassium (K), have been directly associated with increased stalk rot in field corn (Smith and White, 1988). Either excess or low amounts of N can increase stalk rot incidence. Excess N is especially a problem where low soil K levels exist. Low soil K levels independent of N availability can also increase the risk for stalk rot and perhaps ultimately the production of mycotoxins.

Hybrid selection

Although it's no secret that some hybrids are more susceptible to plant disease than others, the natural selection of the highest yielding hybrids for marketing indirectly helps in avoiding those hybrids with extreme susceptibility and stalk strength problems. This said, many seed companies offer additional hybrid ratings against specific corn stalk, ear, and leaf diseases. At least some seed corn companies are beginning to score

and screen hybrids for mycotoxin levels but these efforts are just beginning and not enough data is available to be made public.

Many producers are "pushing the limit" on hybrid maturity in an effort to capture maximum yields. This strategy pays dividends when planting is done early, normal heat units are accrued, and there isn't an early fall frost. However, when all or some of the previously mentioned don't happen, it sets the corn up for a longer dry down period under environmental conditions that are potentially more conducive to stalk and ear mold development.

Kernel texture is a hybrid trait that is currently being debated as either good or bad from the standpoint of feed quality and mold invasion (or potential mycotoxin production). Some seed industry experts argue that a soft kernel texture is desirable for better feed digestion of corn harvested as silage or high moisture grain. Others argue that it doesn't make any difference and soft kernels are more susceptible to ear molds and mycotoxins. At this point, neither side has a wealth of research to back any of the claims, although it is safe to say that a soft kernel is more susceptible to damage than a hard kernel. Kernel texture is probably a non-factor if corn is harvested for silage between 65-70 percent whole plant moisture (but, of course, that doesn't always happen).

Finally, there is the issue of European corn borer (ECB) resistant Bt corn. At least some seed companies are promoting the purchase of Bt as a method of reducing or eliminating ear molds and mycotoxins. The underlying theory is that corn resistant to ECB will maintain stalk, cob, and kernel integrity and prevent a pathway for detrimental mold spores to enter or be carried into the plant tissue (Munkvold and Hellmich, 1999). At Iowa State University, Munkvold et al. (1998) showed higher levels of ear rot and fumonisins in non-Bt lines compared to their Bt counterparts (Figure 1). Differences were noted between different Bt events based on gene expression in plant parts and duration of the Bt effectiveness. Corn was harvested at about 20% kernel moisture (later than would be normal for high moisture grain or silage).

Although Bt corn hybrids offer another tool against potentially reducing mold and mycotoxin occurrence, producers who plant these hybrids are by no means immune to the problem. Recall that molds can enter the plant through the roots, silks, and other avenues independent of insect damage. If environmental conditions are favorable, stalk and ear molds can still develop in the presence of the Bt gene. Farmer experience from recent years confirms this fact.

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From a plant genetics standpoint, perhaps our greatest hope to drastically reduce or eliminate mycotoxin formation lies in the development of transgenic crops with the ability to resist mold formation or detoxify the mycotoxin. Research work specifically along these lines is already being done with corn and wheat (Harris, 1999).

Tillage and Crop Rotation: It's no secret that high crop residue farming systems increase the risk for a number of different plant diseases. Corn residue that remains on the soil surface offers an overwintering host that can produce numerous ground level mold spores for the subsequent crop (Stuckey et al., 1992). For this reason, crop rotation to a non-susceptible crop becomes important in conservation tillage systems. In today's farming environment, reverting back to a clean tillage/moldboard plow system to reduce the risk of plant disease is not an option most producers can employ because of economic, social, and environmental implications.

Controlling Leaf Diseases: Fungi that cause leaf diseases in corn are not mycotoxin producers but their control may indirectly impact the potential for mold and mycotoxin development in other plant parts. If leaf diseases are kept in check either through hybrid selection or the use of a foliar fungicide, leaf photosynthesis is maximized and prolonged. This, in turn, delays the cannibalization of stalk nutrients and makes the stalk less predisposed to the development of disease (Smith and White, 1988).

Optimum Harvest Timing: A timely harvest insures that the crop will not stand in the field any longer than necessary. It is during the fall that conditions are optimum for *Fusarium* ear mold and mycotoxin development (alternating hot-cold temperatures between 45 and 75 degrees Fahrenheit). Corn silage that is too dry is also more difficult to pack in the silo. Although field fungi and mycotoxin levels are usually reported not to increase after the crop has been ensiled and gone through fermentation, levels will continue to increase as long as oxygen is present and the pH is sufficiently high (Gotlieb, 1997).

In the case of corn being harvested as high moisture grain, it is recommended not to harvest any cob if moldy corn is noted in the field prior to harvest. Leaving the cob in the field will reduce mold and possible mycotoxin contamination significantly. Applying propionic acid at the time of ensiling will help to eliminate any further mycotoxin production (but will not decrease the amount of mycotoxin already in the crop).

Wisconsin Corn Silage Mycotoxin Field Survey

As a response to producer and industry concerns about mycotoxins in corn silage, UW-Extension Team Forage initiated a field survey in the fall of 2000 to quantify mycotoxin levels of plants in standing corn that was targeted for silage harvest. Fields and farms were selected based on either perceived or documented past mycotoxin problems. Ten samples of four corn stalks each were collected from six different fields at R5 (early dent) and immediately before harvest (1/2- 3/4 milk line). Stalks were chopped and sub-sampled, then sent to the Marshfield Soil and Forage Testing Lab to be ground and dried. These samples were sent to the North Dakota State Vet Diagnostic Lab for mycotoxin (trichothecenes) screening using gas chromatography. Samples for two of the fields were also sent to the University of Wisconsin Department of Plant Pathology for *Fusarium* screening.

All of the tested samples were positive for *Fusarium*. Of the 17 mycotoxins screened, only DON vomitoxin) was found at significant levels (>5ppm) for any one sample. Only one sample (n=70) of the R5 samples submitted was greater than 5ppm for DON but it was the highest level of any submitted in the survey (41.6 ppm). Twenty-four percent of the R5 samples were between 0.1-4.9 ppm DON. The number of samples over 5 ppm DON increased to four with the harvest time sampling date (n=83). However, about 63% of the samples had between 0.1-4.9 ppm DON.

This survey confirmed that mycotoxins are predominantly a field rather than storage problem. Additionally, mycotoxin levels can vary significantly from field to field, area of field to area, and plant-to-plant. Testing several plants prior to harvest to check for potential mycotoxin problems is not feasible. In most cases, there is simply too much variation. Positive DON levels, although sometimes small, appear to be commonplace. This is in agreement with other survey efforts that have tested harvested silage (Gotlieb, 1997; Shaver, 2000). In three of the fields, samples were submitted as those with or without an application of Tilt® fungicide (i.e. fields were split with half receiving the application). The fungicide possibly had some effect in reducing the number of high positives for DON but more controlled testing is needed to reach any decisive conclusions.

Summary

- ?? Visible mold does not always translate into measurable mycotoxin levels.
- ?? There is still a whole lot more to learn about mycotoxins (plant parts, fungicides, time of infection, hybrid differences, etc.).

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Can “Holding One’s Horses” Make More and Better Corn Silage for Cows?

By: John Conway, Dairy Specialist
Ev Thomas, William H. Miner Agricultural Research Institute

This newsletter will reach everyone in advance of even aggressive corn silage harvest. Everyone has had the positive experience of feeding really high quality corn silage and most have been forced by circumstance to feed not quite fully mature and wetter than you’d like it corn silage. There’s more milk per ton and more tons in the former situation.

Current weather, impending weather, machinery capacity, available labor, standing crop tonnage and other factors enter into making the decision when to drop the green flag on harvest. When factors combine allowing you to hold off until all or most of the corn silage crop comes in at 32% to 35% dry matter, you will be rewarded. Below is a recounting of a hasty scenario from early September 2006 when choppers were ready to be fired up right after Labor Day, but the corn was clearly no where near 31% DM. Fortunately weather forecast factors were forgiving, farms waited, corn went in pretty close to the “light gray bars” below and more dollars were hung onto during the winter months of discouragingly low milk prices. “Hanging back” in 2007 will pay the same dividends!

I had sampled 5 corn silage bunkers and piles to serve as the farm's control. Even the farms that did a super job with 2006 Haylage were disappointed with the numbers. All were contemplating strategies to improve the situation for 2006 harvest. In one case, we were able to come up with a conservative estimate of the value lost in the top half of the silo. 90' wide, 16' side walls, 22' settled center height. A modest gain in density and diminution of DM loss on the top half of the silo is worth \$4500 in corn silage saved and value of standing corn diverted to HMSC. They’ve used the figure to find and employ a second trusted tractor operator to pack and stay out of the way of the 25 ton behemoth.

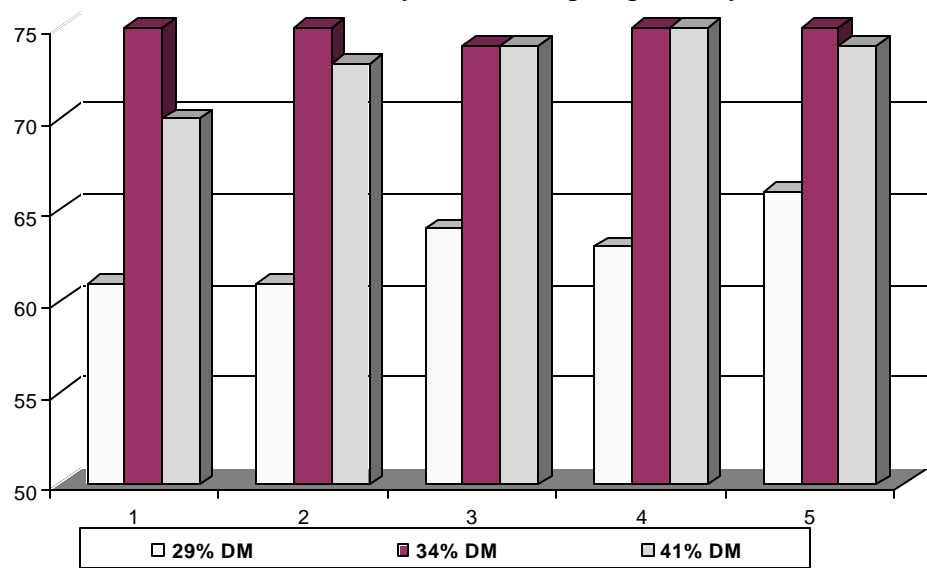
What really struck me was the number of samples testing in the 27 - 29% DM range. Based on the Pioneer data that Ev Thomas presented at WDM '06:

We appear to be missing the light gray bar. (It also could be that it went in right and my DM testing is related effects on the current face... but with the corer and face preparation, I doubt it).

Is there more of a tendency to a.) jump the gun and b.) slam it in by reducing days of harvest to less than the variation in standing corn maturity?

I don't know the answer. Those with both gravel valley corn and hill side and top corn have to spread things out differently. A working strategy to tighten up maturity in one summer's weather can do the opposite in dissimilar weather.

Effect of Maturity on Corn Silage Digestibility



Source: Pioneer Hi-Bred Int'l, 2001

Besides the mantra of small blade layer, lots of weight and continuous packing, **I wonder if getting a really good sample of standing corn with machete or corn knife, running it through a chipper or catching it with a contractor bag through the chopper and running DM analysis might help people get closer to the gray line above.**

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I consulted with Ev Thomas for his input.

Ev's response...

John predicted input, don't want to disappoint him. I really think that missing corn silage maturity is one of the bigger problems on dairy farms, even many of the larger, best-managed ones. Part of the reason may be the difference between "observed" and true whole plant DM, **also the rather consistent 2% or so difference between the DM we get when taking a sample from a field vs. actual DM. Try as we might, it seems that if the sample tests 30% DM, when we start chopping that same day the DM is closer to 28%.**

I take serious issue with all references that state the proper DM for CS as 28-35% DM. That is simply terrible advice! Even 30% isn't right, especially now that most CS is processed. **We should be recommending 32-35% DM.** Even so, we'll wind up with lots of corn silage that's barely 30%: **32% from a 10-20 plant sample is really 30% whole field DM, then after losing about 1% DM through normal fermentation we wind up with 29% DM CS, which is what Pioneer's data showed to be decidedly inferior stuff.**

Look at the difference in digestibility between 29% and 34% DM: 12 units is about the difference between normal and BMR CS, and blows away the quality difference between 6"

and 18" chop height. If we aim for 33-34% DM and miss by a couple of points up or down we're still OK. However, if we aim for 30% and it's 28%...well.

Then there's the problem of effluent production with sum-30% DM CS. Pioneer cited data that found 2.3 gallons/ton at 1/3 milk compared to 5.6 gallons/ton in the dough stage.

I spent 90 minutes yesterday checking our corn fields, and many had kernels that were "hard dent". However, when splitting kernels they were at almost 0 milk line. But just looking at the ear, I think that many farmers would deem the crop ready for harvest. The ear is an indicator, not a reliable predictor.

Finally, there's staygreen, a bit of a controversial subject and perhaps less important for farmers that process CS. I was in Idaho last week doing some consulting, farmers there had just started chopping corn, and was interested to learn that at least one corn breeder and some farmers were avoiding hybrids top-rated for staygreen—similar to what I've been recommending for years based on personal experience but precious little data.

These farmers have 2500-5000 dairy cows, high production (85-90+ lbs/cow) and obviously were processing. I'd sure recommend hybrids with moderate staygreen (5 to 7 on a 1-9 scale) for those countless farmers who insist on timing corn harvest by how the ear looks instead of running whole plant DMs. —Ev Thomas, William H. Miner Agricultural Research Institute

Maturity and Moisture Guidelines for Silage Harvest and Storage

Stage of Maturity	Alfalfa	Grass	Corn Silage
	32" (mid-bud) in 1 st cut	Boot	1/2 to 2/3 milk line
Theoretical cut length (inch)	3/8 to 1/2		Unprocessed 3/8 Processed 3/4
Moisture (DM) by storage structure			
Bunker Silo	58 – 66% (34 – 42%)	58 – 66% (34 – 42%)	65 – 68% (32 – 35%)
Conventional upright	60 – 65% (35 – 40%)	60 – 65% (35 – 40%)	63 – 68% (32 – 37%)
Oxygen-limiting upright	40 – 55% (45 – 60%)	40 – 55% (45 – 60%)	55 – 60% (40 – 45%)
Bag	58 – 66% (34 – 42%)	58 – 66% (34 – 42%)	60 – 68% (32 – 40%)
Baleage	50 – 60% (40 – 50%)	50 – 60% (40 – 50%)	----
Pile or Stack	58 – 66% (34 – 42%)	58 – 66% (34 – 42%)	65 – 68% (32 – 35%)

(Continued from page 6)..... Considerations for Molds and Mycotoxins in Corn Silage and High Moisture Corn

?? *Fusarium* happens: soil to seed to plant tissue. There's little any of us can do about that. Environment usually humbles genetics in the realm of plant diseases. We can, however, employ management practices to help keep mold spores inactive.

Management practices that can help to minimize the effects of molds and mycotoxins include:

1. *Soil fertility* – a balanced program is key.
2. *Hybrid selection* – disease resistance, relative maturity, insect resistance, kernel texture, etc.
3. *Tillage and crop rotation* – often little can be done about tillage, but certainly crop rotation to non-susceptible crops will be a benefit.

4. *Control leaf diseases* – genetically for sure, but the book is still out on fungicides.

5. *Optimum harvest timing* – extremely important. The longer the crop stands in the field, the more opportunity for mold and mycotoxin development. Harvest at the optimum moisture.

?? Transgenic hybrids may be our greatest hope toward seeing real progress in reducing the risk of molds and mycotoxins.

?? Is DON (vomitoxin) really the problem??? Probably not! 🍌

References available at <http://www.uwex.edu/ces/crops/MoldsMycotoxins.htm>

Source: *University of Wisconsin Extension-Team Forage-Focus on Forage Fact Sheet Series, Vol.4 No.1.*

(We have access to a chipper if you want help checking moisture to gauge harvest. Call Janice at 607-753-5215.)

Determining a Value for Silage Crops

Kern S. Hendrix, Department of Animal Sciences,
Purdue University

ALFALFA AND OTHER HAY-CROP SILAGES

For pricing, these types of silages, I usually attempt to arrive at a fair price based upon what the forage might sell for as hay and then adjust according to dry matter content. Hay prices can usually be obtained in the local area.

Let's assume for example, that hay is valued at \$60.00 per ton. What value is fair for similar quality material as silage or haylage? Hay will generally contain around 13% moisture. Thus, a ton of hay contains: $2000 \times .87 = 1740$ lbs. of dry matter. At \$60.00 per ton, each 100 lb. of dry matter is worth, $\$60.00 \div 17.40 = \3.45 .

Assuming that each 100 lb. of dry matter from silage or haylage has the same value, we simply need to again determine the amount of dry matter per ton. At 60% moisture, there would be 800 lb. of dry matter ($2000 \times .40 = 800$) per ton. Thus, the value of a ton of this particular silage would be $8 \times \$3.45 = \27.84 .

The above method assumes similar costs of harvesting, storing and feeding of hay and silage which may or may not be correct depending upon the situation.

SMALL GRAIN SILAGE

I know of no easy straight forward method for pricing these silages. A suggestion is to compare them with either hay-crop silages or corn silage depending upon the stage of maturity when the small grain silage was harvested. If harvested in the boot stage, feed value in terms of crude protein and energy will be similar to that of high quality hay-crop silage. Thus, a value can be based upon hay as discussed earlier. If, however, the small grain is in the dough stage when harvested, crude protein will be similar to that of whole plant corn silage, but energy value 80-85% that of corn silage. Thus, in this situation, the value of corn silage can serve as the base with an adjustment made for the lower energy value. Again, taking moisture into account will be important and can greatly influence value per ton. 🌾 🌾 🌾

Source: <http://www.ansc.purdue.edu/dairy/forage/silgcrop.htm>

1st Annual Summer Crop Tour



Hosted by:
Ron and Nancy Robbins and
North Harbor Dairy LLC

Co-sponsored by:

The New York Corn Growers Assoc.
& Cornell Crop and Soil Program Work Team

Location: 14471 Co Route 145
Sackets Harbor, NY 13685

Agenda:

- | | |
|-------------|---|
| 9:30-10:00 | Welcome and Coffee |
| 10:00-11:00 | Presentation by: Stephen
Norris-Perdue Farms
(Selling Corn to Northeast Bio-Fuels) |
| 11:00-12:30 | Tour Research Plots
Funded by the Northern
NY Ag Development
Program and The NY
Farm Viability Institute. |
| 12:30-1:30 | Lunch and Tours of North
Harbor Dairy LLC |
| 1:30-2:30 | Combine Clinic
(Red and Green Combines Invited) |

Directions:

From the North:
• Rt. 81 south to
exit 43(Kellog Hill)
• Turn left at end
of ramp
• Farm is 4 miles
to the right

From the South:
• Rt. 81 North to
exit 43(Kellog Hill)
• Turn left at top of
ramp
• Farm is 4 miles on
the right



Shelf Life of Stored Colostrum

Sam Leadley, Attica Veterinary Associates

Shelf life is that length of time that a perishable item is given before it is considered unsuitable for use. In the case of maternal colostrum bacterial contamination is the measure determining suitability. The criteria using laboratory incubation methods are: [cfu/ml = colony forming units per milliliter]

1. Total or standard plate count of less than 100,000 cfu/ml all bacteria, and
2. Coliform count of less than 10,000 cfu/ml.

LEAST EFFECTIVE METHOD

Storing colostrum at barn or milk house temperature – shelf life of less than 24 hours.

If you sit a pail of colostrum in the milk house at 70° (21°C) coliform bacteria will double hourly. Other bacteria species will grow, too, but at a slower rate. It is common at 12 hours to find bacteria counts of over one million in colostrum stored this way if parlor and equipment sanitation are compromised. In the name of good calf health, if you cannot feed the colostrum within one-half hour after collection discard it.

OKAY TO FEED FOR TWO DAYS

If a bacterial growth inhibitor or preservative is added at the time colostrum is collected then the generation time [length of time needed to double the population] is ten times as long. If you start with reasonably clean colostrum and add potassium sorbate liquid preservative, then at milk house temperature the colostrum may be under 100,000 cfu/ml about two days later. However, if as harvested the colostrum is already at 10,000 cfu/ml your colostrum is not likely to be suitable for feeding.

Or, if you chill your colostrum to 60° (16°C) within thirty minutes from collection and keep it in a refrigerator at 40° (4°C) the bacteria count may be acceptably low for up to two days. To be on the safe side, it is a best management practice to regularly sample colostrum handled like this. Have it tested for bacteria in a laboratory.

OKAY TO FEED UP TO SIX TO SEVEN DAYS

Chilling colostrum rapidly immediately after it is harvested is one key to extended shelf life. The standard is down to 60° within thirty minutes. At this temperature the generation time is extended out to 150 minutes. If you start with good cow preparation in the parlor and clean, sanitized milker cans this can mean a really low bacteria count initially.

Then, add a preservative at collection time. One preservative with which we have considerable experience is potassium sorbate. A 50 percent solution added at the rate of 10 ml/2 quarts and mixed in thoroughly extends the generation time ten times. At 60° this means extending the time for coliform bacteria to double from 150 to 1500 minutes. See www.atticacows.com in the Calf Facts section for directions

for using this preservative. Other preservatives probably will work to achieve acceptably low bacteria counts; I just do not have data in hand in order to describe their use. The routine here is: clean teats, clean collection bucket, add preservative immediately, chill to 60° within 30 minutes, store in refrigerator at 40° or below.

OKAY TO FEED UP TO EIGHT TO TEN DAYS

If you plan to push the shelf life of colostrum out to eight to ten days accept that you will have to heat treat it. Heat

treating or pasteurizing drastically reduces the pathogens in colostrum. Guidelines for pasteurizing colostrum are posted at www.atticacows.com in the Calf Facts section as “Colostrum Pasteurization.”

The keys to making pasteurization of colostrum work are:

- ? Start with clean colostrum
- ? Keep the pasteurizer clean and in good operating condition
- ? 60 minutes at 140° with constant agitation
- ? Chill rapidly to 60°
- ? Store in clean sanitized containers
- ? Store at 40° or less

OKAY TO FEED AT LEAST EIGHT TO TEN DAYS

Start with pasteurized colostrum that is processed according to the keys listed above. Then, add the preservative as it comes out of the pasteurizer mixing it in thoroughly. These bacteria counts can be as low as 100 cfu/ml even at the end of a week.

SERIOUS, BIG TIME SHELF LIFE – FREEZE IT!

The keys to effectively freeze colostrum and have a low bacteria count when thawed and fed are:

- ? Start with clean colostrum
- ? Store in clean, sanitized containers
- ? Chill to 60° within one-half hour – may require chilling before going into the freezer!
- ? Store at 0° for up to one year

Thanks to Dr. Sandra Godden, “Colostrum Management for Dairy Calves,” presentation at Cornell Summer Dairy Institute, July 3, 2007 for the background information on colostrum bacteria counts under selected storage conditions. 📖

Source: *Calving Ease*, July 2007



Loopholes that Make Calves Sick

Sam Leadley, Attica Veterinary Associates

Everyone knows the legalistic definition of a loophole. It is “an ambiguity (especially one in the text of a law or contract) that makes it possible to evade a difficulty or obligation.” In a calf care program a loophole is an ambiguity in a calf care protocol that makes it possible for bad things to happen.

Let’s look at a few of these that have surfaced in my travels this past spring.

Number One: A dairy had a high rate of scours among calves less than ten days of age. When cultured for bacterial contamination the colostrum checked out clean. But, when we cultured the milk replacer being fed from nursing bottles (calves were not started on pails until they were about one week old) most of the samples contained over 10,000 cfu/ml of coliforms. The milk replacer powder was clean, the five-gallon mixing pails were clean, the mixing whip was clean and so were the bottles and nipples. Where were the coliform bacteria coming from? I took time to watch a person bottle feed the youngest calves. All went well until a calf gave the feeder a hard time. What happened? Sit down the bottle, push the calf into a corner, pick up the bottle and coax the calf to nurse. Then, (this is the important part) the bottle was refilled by dunking it into the five-gallon pail! Of course, now it is evident that the manure on the bottom of the bottle was contaminating the milk replacer. Solution: carry a five-quart pail along with the bottle, sit the bottle in the bucket when working with the calf. **The protocol did not anticipate the need to sit down bottles when handling calves.** The other solution of pouring milk replacer into the bottle was not used but clearly would have solved the problem equally well.

Number Two: A dairy had a high rate of scours treatment among calves between seven and fourteen days of age. Fecal testing showed moderate to heavy concentrations of heavily encapsulated E. coli among these calves. Colostrum replacer was being fed. Feeding equipment checked out clean. When cultured for bacteria the milk replacer had very low bacteria counts. All the hutches were pressure cleaned between calves. The hutch sites had manure scraped away and fresh stone was added. Where were the coliform bacteria coming from? No definitive answer has yet been found to account for all contamination. However, we did observe one “loophole.” After the front-end loader finished removing the manure and loading it out into a spreader, the same loader promptly went to a pile of stone.

Stone was scooped up in the bucket – what else was in the bucket? Manure. Then the stone was dumped as a base for the hutches – what got dumped in addition to the stone? Manure. Solution: when handling stone, either use a different loader (such as one used for handling feed) or clean up the bucket on this one. **The procedure did not anticipate residual contamination of the bucket.**

Number three: A dairy had an inconsistent rate of scours among calves less than fourteen days of age. Some calves were quite sick while others had no scours symptoms at all. Sanitation procedures for all the equipment used to collect, store and feed colostrum were being followed without exception. The same was

true for milk replacer mixing and feeding equipment. After collection the colostrum was being chilled using bottles of ice before being placed in a household-type refrigerator. The outsides of the ice bottles were clean. Hutches were being high temperature high pressure washed between calves.

Hutches were moved to a vacant area between calves with a fresh stone base. We cultured both colostrum and pasteurized milk for bacteria. The milk came back just fine. The Colostrum samples were a mixed bag. Some had very low coliform counts. Others had very high coliform counts. What would account for the variation? On close observation it turned out that the amount of ice remained the same regardless of the amount of colostrum harvested. Two 16-ounce bottles went into the stainless steel bucket. That is the proper amount to chill one gallon of colostrum to 60° within one-half hour [that is the desired goal].

What happened when the cow gave three or more gallons? Two ice bottles were still used. The result?

Sometimes colostrum went into the refrigerator at or below 60°. However, other times the colostrums was quite warm when it was bottled and put into the refrigerator. Our colostrum chilling work showed that as small amount as one gallon of colostrum put into a refrigerator at 90° may take over two hours to reach even 60°. In this case at times putting 4, 6, 8 or even 10 bottles of 90° into the refrigerator at one time allowing even small numbers of coliform bacteria to multiply into 10,000’s before the chilling slowed things down.

Solution: add ice in proportion to the amount of Colostrum collected. That is, add one quart of ice per gallon of just-harvested colostrum to get it down to 60° within a half-hour. At 60° the coliform generation time becomes 150 minutes rather than 20 minutes at collection temperature. The protocol did not recognize the variability in the volume of colostrum collected.

Number four: A dairy had a persistent problem with scours among all seven to twenty-one day old calves. We sampled and checked “as-fed” colostrum for bacterial contamination. Clean. Calves were being removed from the calving pens promptly. Good quality colostrum was being fed in adequate volume within four hours of birth. Navels were being dipped with tincture of iodine before fed. The wash water never got up to 110°. Equipment used to feed in the morning was consistently contaminated. Solution: the household hot water heater was replaced with a rapid recovery unit. **The protocol did not anticipate the difference between AM and PM routines.**

Moral of the story: almost all of our on-farm protocols have little “loopholes” that allow errors to creep into our calf care procedures. Want to have fun? Ask a non-farm friend from a village or city to watch you perform a task and ask questions.

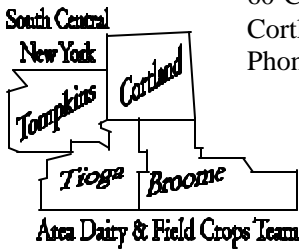
Source: *Calving Ease*, June 2007

You will be amazed at what they see!



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CALENDAR 2007

- AUG 7, 8 & 9** **NYS Empire Farm Days:** Rodman Lott Farms, Seneca Falls. Visit www.empirefarmdays.com for events.

- AUG 15** **Soil Health Workshop:** Musgrave Farm, Aurora. 3 to 6 pm. A hands-on workshop on soil health, featuring the Organic Cropping systems project’s long-term grain crop experiment, includes treatments using compost plus cultivation and tillage options (including ridge-tillage). You’ll gain insights into soil management and learn how to monitor physical and biological soil indicators on your farm. No Charge. Call Elizabeth @ 607-895-6913 with questions.

- AUG 20** **1st Annual Crops Tour.** Topics: Selling corn to Northeast Bio-Fuels, Tour research plots, Combine Clinic. 9:30am—2:30pm Ron and Nancy Robbins Farm in Jefferson County, 14471 County Rt 145, Sackets Harbor. Modest charge for lunch. Co-sponsored by: NY Corn Growers Association & Cornell University Crop & Soils Program Work Team. Call Janice with questions at 607-753-5215.

- AUG 21** **Pasture Walk - Grass Identification:** 6:00pm—8:30pm. Marvin Moyer’s Farm. 304 Lainhart Road, Owego NY. More information to follow. Contact Sharon VanDeuson at 753-5078 or shv7@cornell.edu for registration.

- AUG 28** **The Twelfth Annual Northeast Buckwheat Field Day:** Geneva, NY. 1:00 to 3:30 pm. Details at: www.nysaes.cornell.edu/hort/buckwheat/. Contact Thomas Bjorkman @315-787-2218 or tnb1@cornell.edu.

- SEPT 22** **Horse Fencing & Pasture Field Day:** **note date change** - 10 am to 4 pm - Stoltzfus Farm, Nichols, NY (Tioga County) - The day will focus on several aspects related to horse pasture and grazing management, including: fencing (options and installation), pasture management, watering systems, grass and weed ID, hay information, and more. For more information, contact Dan Vredenburgh at Broome County SWCD at 607-724-9268 or broomesoil@juno.com. 10am—4 pm. Stoltzfus Farm, Nichols NY.