Dairy Research, Teaching, and Extension
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DELAWARE DAIRY NEWSLETTER

A Few Reminders for Corn Silage Season

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- ✓ Optimal harvest window: 35 ± 2% whole plant DM
- ✓ Sharpen knives on choppers
- ✓ Check chop length: optimal at ¾ inch theoretical chop for processed corn silage
  - chop a bit longer if storing in a bagger with teeth that reduces particle size
  - chop a bit finer if DM is above 40%
- ✓ Check processor rolls for excess wear, replace as needed
- ✓ Older bagging machines:
  - replace worn teeth on baggers as needed
  - add a tunnel extension for better packing
- ✓ Use a research proven inoculant:
  - No aerobic stability challenges? Use a good homolactic acid-based inoculant
  - Aerobic stability challenges? Use an inoculant containing *L. buchneri*
  - Do not allow temperature of water in the inoculant tank to be greater than 95-100F
- ✓ Pack fast/tightly: >15 lb of DM/cu ft or bulk porosity below 40% (bulk density > 44lb as fed/cu ft
  - As DM increases above 40%, porosity increases and requires more packing weight and time to achieve a good pack
- ✓ Seal quickly with sufficient weights to keep air out of the silage mass
- ✓ Bunkers and piles:
  - Consider 2 layers of plastic (thin first layer ok)
  - Consider research proven oxygen barrier plastic
  - Use ample overlap of plastic at seams
  - Use more weight at seams and edges of plastic

- Consider plastic on side walls

✓ Be cautious of silo gasses especially in tower silos
✓ If possible, allow silage to ferment at least 3-4 weeks before feeding
✓ If possible make gradual changes when introducing new silages into the ratio
- Be sure to adjust for DM and nutrient changes in the TMR

Best Milking Practices

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I recently listened to a webinar hosted by Penn State Extension titled "Tools for Evaluation Milk Quality" by Amber Yutzy. The webinar explained that mastitis could cost the average dairy producer roughly $121 per cow, per year due to sub-clinical milk loss, lost premiums, culling and milk loss to clinical mastitis. As a real life example, a 300 cow dairy farm she worked with had a high Somatic Cell Count and lost close to $100,000 for the year which broke down to $330 per cow, per year, which is well over the industry average. This sort of significant revenue loss can be avoided and the harvest of high quality milk can be achieved if we can develop BMPs – Best Milking Practices. Once the BMPs are developed, they must be implemented and monitored to ensure consistent results. The first step in development of BMPs is to review "The Seven Habits of Highly Successful Milking Routines" by Pamela Ruegg and her colleagues:

1. Make Sure Cows are Calm and Clean before Milking

   Dirty cows can slow down parlor output by doubling cow prep time and increasing the rate of intramammary infections. Make sure the cow bedding is clean, dry and comfortable to minimize pathogen growth and exposure. In addition, removal of udder hair can aid in cow cleanliness.

   Milk time efficiency can also be affected by cow handling. An adrenaline rush within 30 minutes of milking can interfer with milk letdown. Operator and parlor performance should be evaluated if cows refuse to enter the parlor or defecate frequently in the milking parlor.

2. Grouping Cows

   To minimize the exposure of mastitis pathogens you can divide the herd into groups: 1) Infected, 2) non-infected and 3) unknown. The non-infected cows should be milked first, followed by the unknown, and the infected cows milked last.

   The herd can also be grouped by length of milking. Parlor throughput can be increased by dividing the herd into slow milkers and fast milkers. A farm milking in a double 8 parallel parlor increased four cows per hour by instituting length of time grouping.

3. Use a Consistent Pre-Milking Cow Prep

   Cows are creatures of habit and therefore thrive in routine. It is imperative to develop a consistent pre-milking prep routine that is efficient and complete in order to stimulate proper milk let down. Optimal stimulation can increase milk yield, milk flow rate and decrease unit on time, therefore

improving parlor efficiency and teat end health.

Fore stripping can aid in stimulation and eliminate the most dangerous bacteria, which reside in the teat end. Only 2 to 3 streams of milk per quarter are adequate to check milk quality. Nonetheless, it is labor intensive. Pre-dipping is also used as an aid to increase stimulation and eliminate the bacteria on the teat. The dip should have a contact time of 20-30 seconds for proper disinfection. After pre-dipping, perform a "paper towel test"- wrap a paper towel around each teat to see if coverage is complete.

4. Make Sure Teats are Dry

When the teats are wet, the bacteria on the skin have an easier time gaining access to the mammary gland and decrease the effectiveness of the milking unit. Therefore, dry teat ends are very important in the disinfection process. Individual paper or cloth towels are acceptable for drying teats. Cloth towels need to be properly disinfected and dried at a high temperature in a dyer before reuse. In addition, gloves should be worn by milkers to cut down on pathogen transfer.

The teat end swab test can be used to determine the effectiveness of pre-milking cow prep. To perform the test all you need to do is swab all four teat ends with an alcohol swab. Complete the test on several cows to provide immediate feedback on teat end cleanliness. A clean swab indicates a properly prepared teat while a dirty swab indicates a poorly cleaned teat.

5. Attach Units Properly

The milking units should be attached with limited air admission and aligned so the weight of the cluster is evenly distributed. This will result in fewer liner slips. The number of cows prepared by the milker will be determined by prep-lag time.

Prep-lag time, which is the time from the beginning of cow prep until unit attachment, should be in a range of 60-90 seconds. A lag time shorter or longer than the acceptable range can decrease milking efficiency.

6. Remove Units Properly

To ensure healthy teat ends, a cow should not be over-milked. Cluster removal is done with the vacuum shut off and all four teat cups removed at the same time. You can perform a strip yield test by hand stripping each quarter to check the completeness of milk out. 2 to 4 ounces a quarter will indicate proper milk out.

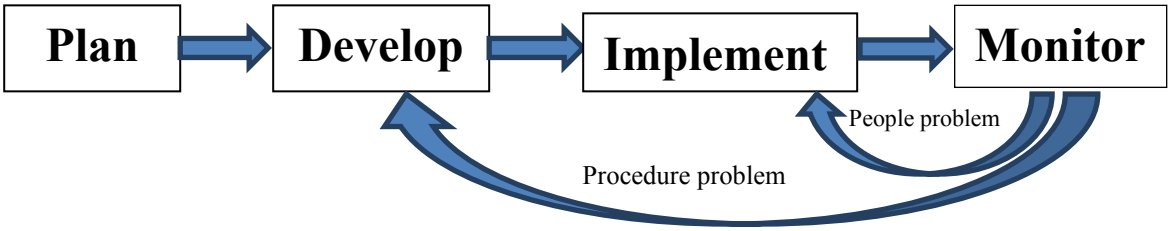
7. Manage Cows Post-Milking

Post-dipping the teats after milking can reduce mastitis transmission if the teats are adequately covered. Again, perform the paper towel test to see how well dipping has been executed – teat dip completely around the towel indicates a properly dipped teat. In severe cold weather, an alternative is to post-dip the teats, allowing contact for 30 seconds and then drying them off prior to releasing the cows.

Having fresh feed at the bunk following milking will encourage the cows to remain standing for 30 minutes thus allowing the teat sphincter to close.

Now that we have revisited the basics of a milking routine, it is time to develop a milking standard operating procedure (SOP) for your farm. SOPs are means to remove the variation in work performance caused by people completing the same work in different ways. A SOP describes the steps that people should use to complete a job. An SOP also includes planning for results, development, implementation, monitoring and performance feedback. The Following is adapted from "Managing the Human Variables " by Richard Stup at Penn State University.

Variation in processes can lead to reduced production and economic problems. But some variation is normal. The key is to control the variation by identifying the variables and controlling them, such as human performance.



Plan for results

- What business goals will the SOP help achieve?
- How will we monitor performance so that we know workers are following the SOP and that we have information to provide feedback to the workers?
- How will we monitor results to know if the SOP is properly designed to be effective?
- What type of procedure format should we use?

How can we get everyone to buy into this SOP?

Development

- Develop a rough draft
- Share the draft with others
- Make revisions as needed

Test the SOP

Implementation

- Give everyone a copy of the SOP
- Train everyone with the SOP

Share "why" the procedures are being done

Monitoring and Feedback

- Are all the workers consistently following the SOP?

Is the SOP designed correctly to achieve the desired results?

Now that you have successfully developed an SOP and reexamined basic milking principles, you can monitor milking by using checkpoints developed by Penn State Extension to ensure your Best Milking Practices (BMP) are being followed:

____ Observation of cow cleanliness. Is there manure on the udder and teats?
____ Observation of parlor and equipment cleanliness.
____ Are employees using gloves?
____ Proper use and coverage of pre-dip. Test proper coverage with paper towel test.
____ Length of time dip is on teat before drying. (Follow label on container.)
____ Is the employee stripping each teat vigorously and getting good milk flow?
____ Is a strip cup being used? (This can help to detect early cases of mastitis and decrease chance of pathogen spread.)
____ Is CMT test being performed on animals that are suspected to have an infection?
____ Is water being used to clean udders? (Water should NOT be used – it aids in bacteria growth.)
____ What is the milking preparation procedure? Dip-strip-dry-apply. Dry must be the last step before application of unit.
____ Are teats being thoroughly dried (including teat ends) before unit attachment? Use clean dry towels. Test teat end cleanliness with the alcohol swab test.
____ Are the teats farthest away from milking being dried first? (This reduces the risk of recontamination.)
____ What is the time from first contact with the teat until the unit is fully attached? (This is referred to as lag-time and should be between 60-90 seconds.)
____ Are units properly adjusted to squarely hang on the udder?
____ Are employees properly using the automatic take offs? (They should not be switching to manual.)
____ What is the length of time from unit attachment to unit removal? (This is referred to as unit on time and should be 3 ½ to 5 minutes in length with proper milking stimulation.)
____ Observe teat ends for damage or tops of teats for purple ring.
____ Are employees getting proper post-dip teat coverage? Use the paper towel test.
____ Are all employees following the same procedure? Consistency is very important.
____ Observe milk filter post milking for dirt or mastitis.

In conclusion, following the above milking practices and assuring that all employees are following a thorough standard operating procedure program can remove much of the variation in milk quality, output, and revenue. Less variation will also result in a more efficient and happier environment for both the cows and employees, which makes for a more all-around successful dairy. All it takes is a little planning.

References are available upon request.

Checklist for the Top 5 Priorities for Fall/Winter Dairy Feeding Programs

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1. Develop a Plan

Develop a plan for using homegrown forages and determine whether you need to purchase other forages.

To devise this plan, **sample all forages and submit representative samples to a forage testing laboratory** to determine their nutrient content. Forage samples taken at the beginning of the feeding season can serve as a starting place for balancing rations. Throughout the feeding season, take numerous samples (three to four samples) and combine their results to better describe the nutrient content of forages being fed. Single samples often do not accurately represent the nutrient content of feeds sampled.

Concurrently**, take an inventory of each forage and commodity in storage.** With this information, you can allocate forages stored separately to the various groups of animals and determine shortfalls so that forages can be purchased or other feedstuffs can be added to rations being fed. For example, if you have corn silage from three different hybrids but the hybrids are stored in a single bunker silo, you need to know you have 900 tons of corn silage instead of 300 tons of each hybrid. If each hybrid is stored in a separate bag, they can be considered separate feeds with 300 tons of each. Reserve the highest-quality forages (usually hay) for heifers less than 4 months of age and fresh, early-lactation, or high-production groups of cows. This information then can be used to balance rations for the milking herd, dry cows, and heifers raised on the dairy operation.

2. Balance Rations

Balance rations **for all groups of cattle** on the dairy operation using the inventory and forage analyses.

Dairy cattle need nutrients, not ingredients, to support body maintenance, milk production, and growth. Rations also are balanced to provide these nutrients at the least cost. Various combinations of forages and other commodities can meet nutrient needs and may result in a cost savings. In the current economic climate, small savings for not only the dairy milking herd but also dry cows and replacement heifers can definitely affect cash flow. For example, substituting other forages and/or commodities for dry cows and/or heifers may decrease feed costs.

Because of increased volatility in commodity prices, dairy farmers should follow ingredient prices and reevaluate feeding programs frequently. In addition, changes in the amount of starch and protein provided in rations have been reevaluated, and some nutritionists have revised their nutrient parameters when balancing rations. These changes, if incorporated correctly, may decrease feed costs with higher corn and soybean meal prices and could have a positive impact on the environment.

Diets for lactating dairy cows, heifers, and dry cows are balanced to provide a certain amount of each nutrient delivered through a certain amount of dry matter of each feedstuff. The dry matter (or moisture) content of each feed should be used to determine the amount of each ingredient to be added to the TMR mixer or fed to an individual cow. For wet feeds, such as silages and wet commodities, dry matter contents can vary tremendously within storage structures, loads, and storage time of various feeds. To account for this variation, dry matter contents of these feeds should be measured at least weekly, if not more often, and changes made when necessary (2% to 5% change in dry matter or 1 percentage unit) to the amount added to the TMR mixer.

3. Review Feeding Practices

Review feeding practices with the person feeding the dairy's lactating cows, heifers, and dry cows.

Practices to review for the lactating herd include but are not limited to:

- Lactating cows should have access to the feed bunk at least 20 hrs daily, but preferably 22 hrs daily (i.e., in holding pen for no more than 2 hrs daily). Minimizing the time away from feed allows cows to eat multiple meals for optimum intake. This is especially important for fresh, early-lactation, and high-producing dairy cows.
- Cows should be fed a consistent ration at a consistent time each day.
- Feed should not be heating in the feed bunk.
- Uneaten feed should be routinely removed (usually daily) from the feed bunk. Milking cows should be fed for 1% to 2% of their daily intake left after a 24-hr feeding period. If a farmer is feeding for a slick bunk at the time of feeding, the bunks have to be monitored throughout the day and feeding time adjusted rather than feeding at the same time every day.
- Feed should be provided within the entire feed bunk at each feeding for the lactating herd.
- Waterers should be cleaned out multiple times weekly and scrubbed once weekly with a brush and a weak chlorinated solution (1 cup of household bleach to 5 gallons of water). Rinse the chlorinated solution out after cleaning.
- Adequate bunk and freestall (or resting) space should be provided such that groups are not overcrowded. Ideally, 24 inches of bunk space should be provided to the milking herd (six-row barns may provide 18 inches per cow, less than ideal). For fresh and close-up dry cow groups, the recommendation is 36 inches per cow and one freestall or 100 square feet per cow.
- Fans should be turned on when temperatures are above 65° to 70°F depending on humidity. High-producing cows should be in an environment with a temperature-humidity index below 68.
- TMR mixers need to be serviced and adjusted for the feeds being added. Check to make sure the TMR mixer is not overfilled, TMR mixtures are not over- or under-mixed, and ingredients are being added at the correct amounts and order for the mixer. The mixing quality of the TMR should be evaluated occasionally. Does the mix look the same over the length of the feed bunk? Has the forage particle size decreased too much by the mixer wagon? The use of the Penn State Particle Size box can be a useful on-farm tool to evaluate mixes.
- Clean faces on bunkers and maintain other silage storage structures to prevent heating and ensure that a high-quality feed is being fed.

Dairy cows should be consuming a similar amount of feed as suggested in balanced rations. If not, discuss this observation with the nutritionist, who may wish to make adjustments in the diet, if large differences are detected. Daily or weekly refusals will need to be weighed to assess the consumption by the group of cows.

4. Work Closely with Consultants

Work closely with your nutritionist and other consultants to develop and modify the feeding and overall management program throughout the feeding season. Constantly work on developing an ongoing relationship that results in dialog among all parties. It can help to improve your bottom line to discuss different ways to group, feed, and/or manage your herd. Sometimes, producers incorrectly believe that they do not need to oversee and/or understand feeding and nutritional concepts. Understanding these concepts is critical for dialog and to understand when and how to make minor adjustments or temporary changes before they become disasters.

5. Start Making Plans

Start making plans for the next cropping season. Now is the time to evaluate whether to make changes to your cropping system or forage purchasing plans for next year. In the United States, various universities and agronomic companies conduct variety trials to see how new varieties of alfalfa, corn for silage, and other crops yield in different environments and growing conditions. These results can be used to help select varieties that incorporate new genetic material into crops that best fit your dairy operation.

Using your forage analyses, review whether your harvesting (or forage harvesters) techniques have resulted in the highest-quality forages needed to feed high-producing dairy cows and whether you need to make changes. Then, complete a plan to incorporate these changes into next year's cropping season.

Areas to evaluate include, but are not limited to:

- varieties planted,
- timeliness of harvest (i.e., whether the crop was harvested at the proper stage of maturity and at the proper moisture concentration),
- methods used to harvest (i.e., whether the tedder was used properly and at the proper time of day to retain leaves), and
- whether fertility was inappropriate for the planted crop.

Issues With Wet Silages

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There are several reasons why we should avoid ensiling forages at high moisture levels (> 70-75% moisture or < 25-30% DM).

First, high moisture silages can produce a significant amount of effluent. Silage effluent represents a loss of valuable nutrients. It also represents an environmental hazard because it is often very acidic and can cause erosion of steel and concrete as well kill vegetative life. Did you know that silage effluent is 200 times stronger than raw human sewage, 40 times stronger than dairy barn waste and 8 times stronger than flushed piggery waste. In fact, 1 gallon of corn silage effluent has the potential to contaminate 10,000 gallons of fresh water such that fish and other aquatic organisms would not survive.

Another reason to avoid wet silages is the higher probability of ending up with a clostridial fermentation that produces butyric acid. We all know what this smells like! Ugh! Note however that the key words in the previous sentence are "higher probability". All wet silages do not automatically become clostridial. If not all wet silages become clostridial, what factors increase that probability? For crops like alfalfa, prolonged wilting periods, high amounts of soil contamination (i.e. high ash), delayed filling, applications of slurry near harvest time, being rained on and poor packing densities will increase the probability that a high moisture crop will end up with a clostridial fermentation. This, is why we recommend wide swathing (this reduces wilting time and saves fermentable sugars); mowing after the dew is gone (takes advantage of better drying conditions), and **not** mowing late in evening (results in slow drying at night and high losses of fermentable sugars.)

Even if wet silage has not undergone clostridial fermentation, high moisture crops tend to produce excessive amounts of silage acids. When consumed at too high levels, such crops can lead to a reduced dry matter ntake. In addition, wet silages often have high proportions of their acids as “wild acetic”, which has been blamed for poor intakes.

If conditions dictate putting up a wet forage, use a research-proven microbial inoculant, pack it quickly, pack it tightly, cover it immediately and cover it well…and maybe throw a few extra pennies into that “wishing well”!

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