

## Common Milk Quality Problems Identified on Vermont Goat Dairies



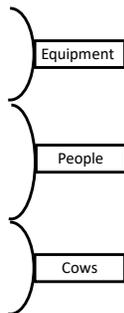
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## Learning Objectives

- Explore the findings of a UVM grant focused on milk quality deficiencies on Vermont goat dairies
- Understand the differences and similarities between dairy cow and goat physiology and systems
- Appreciate the avenues for correcting and preventing reoccurrence of these challenges

## Extension Survey Areas

- Average claw vacuum at peak flow
- Pulsation under load
- Milkline vacuum for 30 minutes
- Unit alignment scoring
- Milking routine timing
- Milk flow rate analysis
- Milking efficiency and throughput timing
- Strip yields
- Teat scoring
- Teat end cleanliness
- Udder cleanliness
- Environmental assessment



Perform full NMC evaluation if >6 months since previous

## Wash system analysis

- NMC troubleshooting cleaning problems in milking systems
  - Design of milking and wash system
  - Bulk tank milk quality analysis
  - Strategic Milk sampling
  - CIP procedures
  - Water quality and quantity
  - Water flow through unit
  - Slug analysis

### Troubleshooting Cleaning Problems in Milking Systems

From a Paper presented at the 1997 annual meeting of the National Mastitis Council by Douglas J. Reinemann, Ph.D. University of Wisconsin Milking Research and Instruction Lab

## Overview of Project

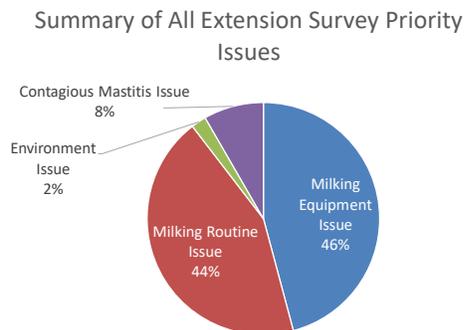
- University of Vermont obtained a grant funded by the Northeast Dairy Business Innovation Center (NE-DBIC) and hired QMPS to do extension surveys and wash-up analysis.
- 16 Vermont goat dairies enrolled in project
  - Mix of farmstead creameries and farms shipping fluid milk to a processor
  - Ranged in size from 14 to 950 milking does



## Overview of Findings

- Issues ranked by priority level for the farm in 2 areas:
  - Extension survey (all 16 farms)
  - Wash system analysis (11 farms)
- Top 3 priority issues for each area were then categorized and summarized

## Extension Survey Priority Issues



## Overview of Extension Survey Priority Issues

- 88% of farms had a milking equipment issue as 1 of the top 3 priority issues
- 81% of farms had a milking routine issue as 1 of the top 3 priority issues

### Commonly Observed Milking Equipment Opportunity Areas

- Inappropriate claw vacuum settings
- Unstable milkline vacuum
- Pulsation Failure
- Inappropriate Pulsation Rate/Ratio
- Liners worn out

### Inappropriate Claw Vacuum Settings

- Has the average claw vacuum at peak flow for a 5 to 20 second interval been accurately measured on at least 10 goats?
- Is it appropriate for this herd?
  - Goals of the dairy
  - Liners
  - Risk of over milking (milking routine, ATO settings, unit alignment, etc)



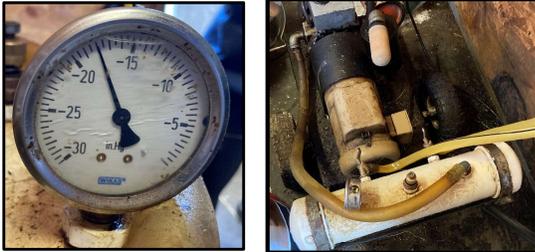
### Inappropriate Claw Vacuum Settings

- 14 goats milked in 2 stalls
- A few cases of mastitis
- Goats dancing during milking

### Inappropriate Claw Vacuum Settings



## Inappropriate Claw Vacuum Settings



Claw vacuum was at 13.7" Hg prior to adjusting the vacuum and 11.1" Hg after adjustment.

## Unstable Milkline Vacuum Levels

- Has the milkline vacuum level been recorded for at least three turns of a milking parlor or fifteen minutes in a tiestall?
- Does it meet NMC recommendations?
  - Greater than 95% of the time the vacuum level does not exceed 0.6" Hg (2 kPa) in a drop or a rise

## Unstable Milkline Vacuum Levels

- 100 goats milked in 24 stalls with 12 units
- SCC is 600,000 to 1 million
- Short term teat scores showed 39% of teats with hardness at teat end
- Strip yields were higher than expected as units removed with no milk flow

## Unstable Milkline Vacuum Levels

- Large fluctuations in milkline vacuum during milking. When units are attached, milkline went from 15.6" Hg to 16.6" Hg.
- Claw vacuum was at 14.5" Hg on 15 goats
- Sentinel regulator never adjusted. We adjusted it during milking and bottom graph shows stable vacuum when units attached and now claw vacuum in range of 12.5" Hg.



### Pulsation Failure

- 250 goat dairy milking in a single 12 lowline parlor
- Complaint is slow milking and long unit on time

### Pulsation Failure



### Pulsation Failure



### Pulsation Failure



## Inappropriate Pulsation Settings

- Have the pulsation parameters been accurately measured?
- 400 doe milking herd
- Double 16 parallel parlor with automatic take-offs
- 42% of goats scored had 1 or more bad teat ends



## Pulsation Parameter Adjustments

	Previous set-up	After adjustments
Claw vacuum (”Hg)	11.5	11.5
Pulsator rate	110	90
Pulsator ratio	61:39	60:40
b phase (ms)	263	307
d phase (ms)	147	201

- Data discussed with owner and equipment dealer called out to make adjustments
- Per owner a noticeable difference at milking time in milking speed and comfort

## Liners Worn Out

- 950 doe milking herd
- 60 stall rotary parlor
- Automatic take-offs
- Issues with liner slips and units staying on the goats

## Liners Worn Out

- Unit on time was highly variable with your goats and many goats had one inflation start to squawk and fall off. Also on some goats the unit came off early either due to kicking or falling off.



## Liners Worn Out

- As we discussed and calculated, you are at 39,000 milkings on your liners and GEA recommends changing after 2500 milkings.
- Owner reluctant to spend the money on the liners but calculated loss of milk due to fall-offs and quarters not milked out and payback was quite quick.

## Milking Routine Issues

- Teat end cleanliness poor
- Variable milking routine
- Lag time short
- Towels used on multiple goats
- Post-dip coverage poor

## Milking Routine Issues

### Teat Cleanliness Scorecard

1	2	3	4
Clean. No manure, dirt, or dip	Dip Present. No manure or dirt	Small amount of dirt and manure present	Larger amount of dirt and manure present
75 (66)		39 (34%)	

- No prep was occurring so this was really a reflection of teat hygiene from the pack.

## Cow Physiology vs Goat Physiology

Cow

Goat

- Milk is present in two primary areas in the udder just prior to milking
  - Cisternal fraction
    - ~20% of milk yield, removed by opening teat canal
  - Alveolar fraction
    - ~80% of milk yield, need oxytocin
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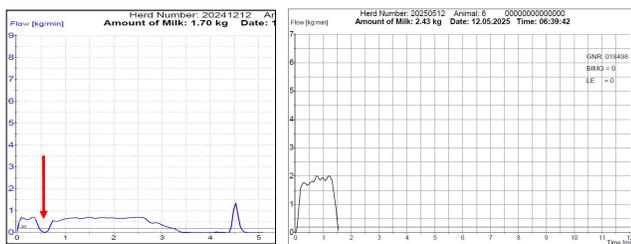
## Milking Routine Research

- Lag time from stimulation is critical to good letdown
  - Cows = Greater than 90 seconds
  - Goats = More research needed – Some studies suggest 30-60 seconds

## Milking Routine Issues

- Some herds that we observed had no consistency of prep routine
  - Each side or person milking was doing it different
- Based on what we know in cows, it is not optimal to have variability
  - A bad routine that is consistent may be comparable to a good routine that is inconsistent in terms of letdown

### LactoCorder® Analysis



- Only 5% of the goats we graphed showed a bimodal flow pattern like the graph on the left above. This is good overall but may not totally predict the situation. The graph on the right is what you would like to see with a rapid rise to peak flow and a rapid fall at the end.

## Milking Routine Issues

- Some herds did no prep and therefore the lag time from stimulation to attachment was 0 seconds
- Milking unit is doing the stimulation
- We observed very few bimodal graphs but twice a day milking and shorter unit on times may have influenced this compared to cows
- Are they missing 20% of the milk??

## Milking Routine Issues

- Towels used on more than 1 goat
- Did find *Staph aureus* on numerous goat herds and *Mycoplasma* on one herd.
- Advised that if going to use towels, they need to be fully laundered in hot water and soap and dried completely

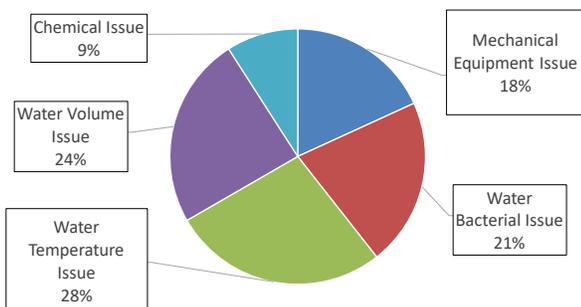
## Milking Routine Issues

- Post-dip coverage was variable on some farms
- Sprayers used on some farms with poor coverage
- Some farms not fully dipping the teat with dip cups as shown to the right.



## Wash System Analysis Priority Issues

Summary of All Wash System Analysis Issues



## Overview of Wash System Analysis Priority Issues

- 82% of farms had a water temperature issue as 1 of the top 3 priority issues
- 72% of farms had a water volume issue as 1 of the top 3 priority issues
- 64% of farms had a water bacterial issue as 1 of the top 3 priority issues

## Water Temperature Issues

- Water temperature issues
  - Water heater malfunction
  - Water heater not large enough
  - Circulating pump failure in hot water storage
  - Valve failure on cold water
  - Long runs of pipe led to more cooling of water

## Water Volume Issues

- Water volume issues
  - Shut-off switch not set right for volume needed
    - Initial set up not done correctly?
    - Someone changed level to use less soap?
  - Sink not level
  - Wash controller kicking on early

## Water Bacterial Issues

- Water bacterial issues
  - Pseudomonas found in water samples from 6 farms
    - Some had occasionally shocked well
    - Some were using some sort of water treatment system
    - Linked to LPC issues on these farms

## Mechanical Issues

- Mechanical issues
  - Drop pipe in tank too short and excessive splash
  - Air injector failure
  - Air injector not set correctly
  - Slope of line incorrect

## High Bulk Tank Bacteria Count (SPC or PI)

- **Step 1:** Brief phone investigation or visit
- **Step 2:** Duplicate Samples and LPC
- **Step 3:** Contact equipment dealer to perform an initial wash-up analysis
- **Step 4:** Team meeting
- **Step 5:** Sequential sampling in multiple sites throughout milking
- **Step 6:** Perform a detailed systematic analysis of the milking and washing systems
- **Step 7:** Second team meeting

## Summary

- Many routine problems observed on these goat dairies
- Attempted to better educate the goat dairies to help equipment dealers provide better service to goat dairies
- Wash system issues were correctable problems with good equipment dealer support
- Amount of dairies with *Pseudomonas* in water was not expected

## Questions?

