Safe, productive and engaged from day one

By Richard Stup

“Hello...er...what was your name again? Yeah, Pete, that’s right. We’re sure glad to have you starting today, two guys left last week and I did most of the milking over the weekend. Put your stuff down over there, here’s a pair of gloves, let’s get in the parlor. Juan’s been on since 8 p.m. last night, and he’s gotta be exhausted. I’ll introduce you around some other time, and we’ll do your paperwork up at the house this afternoon. Right now we need to get some work done!”

– or –

“Good Morning Jasmine, welcome to Lakewater Dairy. We are glad to have you starting today, and I know you’re eager to work with the cows, but the fact is that you and this job are really important. We need to go over a number of different things before you start work because we want you to be safe and ready to do a great job. We have a really good team of people here, and we all want you to be successful. We call our program for new team members ‘Lakewater Onboarding,’ let’s go into the office and I’ll tell you about it.”

WHAT IS AN ONBOARDING PROGRAM?

The first moments an employee experiences at a new job set the tone. Pete got pushed right into the parlor as soon as he got out of his car. His welcome clearly wasn’t important but getting the job done today surely was. Jasmine got a very different welcome. The spotlight was on her and the importance of helping her get started right. Which experience would you want your daughter to have at her first job? Which experience do your employees have when they start with you?

Employees are critical to the survival and success of every business, and they’ve never been harder to find. It’s critical for dairies to bring new employees onboard so that they will be safe, productive and engaged from day one. Starting out right increases the chance that your new employee will perform well, connect with the team, and enjoy a long employment relationship.

A team of industry professionals and dairy farm managers from New York's Agricultural Workforce Development Council is developing a model onboarding program that farms can adapt. The program has four clear goals:

1 Safety. Identify safety hazards on the farm that the new employee will encounter and how to work safely.

2 Productivity. Increase new employee confidence and performance to achieve standard productivity levels within two weeks of the hire date.

3 Professionalism. Demonstrate to the new employee that this farm is a professional workplace.

4 Engagement and Retention. Retain average- or excellent-performing employees for at least two years.
PLANNED STAGES OF ONBOARDING

It’s easy to overwhelm a new employee just with the paperwork that must be completed right away. Add to that safety and job training, orientation to a new place, and socialization with co-workers, and the first day at work can feel like being caught in an information avalanche. An onboarding program takes into account a person’s limited ability to absorb information. Human minds can only learn or absorb so much information each day. Rest and sleep are required to file away information in the brain and prepare for a new day of learning. Onboarding activities are staged out over three important time periods for the new employee: Day One, Week One and Month One.

Day One is already cluttered by regulations. Paperwork such as work agreements, disclosures, work authorization, benefit and tax documents are mandated to be completed. The onboarding program acknowledges these legal necessities and provides guidance to help ensure they are completed accurately. Safety is another key factor in Day One. Many safety issues must be covered right away because employees will immediately encounter hazards when any work begins. Basic work procedure training begins on Day One and, for some employees, an orientation to farm-provided housing is also on the agenda.

Week One continues many themes, but the emphasis shifts to procedure training and safety. Your farm needs to have a plan for highly effective training during days two through seven of that critical first week.

Month One represents the end of onboarding for most farm positions. By the time an employee has worked for a month, he should be performing up to standard in the procedures that form the main part of his job. Effective training is followed by performance feedback and common-sense evaluation to ensure that the employee has learned and mastered the basics.

EFFECTIVE TRAINING

People learn in different ways and at different rates. People who perform as trainers need to master some basic training techniques. The Tell-Show-Do-Review method works for most learners because it addresses learning styles such as seeing, hearing and practicing. The trainer begins by telling the employee how to do each step in the task. The next step is to physically show the learner how to do the task while the learner watches. After that, the learner gets a chance to do the task herself. Finally, the trainer reviews the learner’s work and gives feedback on her performance. Steps done well are reinforced with praise. Steps that should be improved require the trainer to tell and show again. Thus we have: Tell, Show, Do, Review. Effective trainers cycle smoothly through this pattern during the training process as the learner comes up to speed.

PROFESSIONAL IMPRESSION

The image of agricultural employment among the general public is unflattering. People hear farm work and they think long hours, low pay, and dirty work. Even worse, they think of farm work as jobs of last resort. In reality, farm jobs offer...
The Manager

PRODUCTION

Safe, productive and engaged from day one, cont’d from page 3

competitive pay, room for growth, and an opportunity to do real, meaningful work. New employee onboarding gives farms a chance to demonstrate professionalism and to focus employees on the importance and meaning of their new job. Professional employers will also complete required paperwork timely and deliver needed safety training to prevent injuries, all practices that lead to long-term workforce and business success.

WHO DOES THE ONBOARDING?

Making that professional impression on new employees can’t be done by just anyone. Three roles should be represented in the onboarding process. First, the ownership role should make an appearance to welcome each new employee on their first day. Only ownership can really emphasize the point that the new employee is highly valued. Second, the new employee’s supervisor should be present on Day One. The supervisor will be critical to the new employee, so he or she must greet the new person and offer a warm welcome. Third, a specially designated trainer needs to take part in new employee onboarding. Don’t delegate training to whoever is working the current shift. Instead, identify a specific individual with the skills and patience to effectively teach the new person how to be successful. In some farms, one person might fill all three roles and that’s just fine. The point is to welcome the new employee with the authority and importance of ownership, connect them with their future supervisor, and entrust them to someone who can effectively teach how to succeed at their job.

Onboarding is an important part of employee-focused human resource management. Successful farms recognize the pivotal role that employees play in business success. Onboarding is the way to focus on new employees and ensure they are safe, productive and engaged from day one.

Dr. Richard Stup (res396@cornell.edu) is the agricultural workforce specialist with Cornell University’s College of Agriculture and Life Sciences and Cornell Cooperative Extension.

Investment decision making in an economic downturn

By Anna Richards

During times of tight margins and economic uncertainty, investing into your business can seem risky, if not impossible. With lenders and consultants telling you to cut expenditures, it’s tempting to put all capital investments on the back burner. Before completely closing the checkbook, however, it’s important to remember that there are certain investments that, when analyzed carefully and structured correctly, can actually improve short term cash flow, and provide an immediate benefit to the business.

Let’s look at the following example:

A 620-cow farm is considering putting up grain bins. They’re currently using bays, and between birds and other wildlife, and their windy location, they suspect that they could save significantly on shrink with bins. Unfortunately, the $100,000 price tag for the setup they’re looking at seems like too much to take on right now. Let’s break it down:

INVESTMENT COSTS

The first step is to determine whether the investment will increase overall profitability. Assuming we’re talking about a purchase that affects only one area of the business, we can do this with a simple partial budget. In this phase, we need to take into account the changes in operating income or expense that will result, as well as the associated depreciation and opportunity cost.

Depreciation. We know that the total cost of the project will be $100,000. The bins have a useful life of 20 years, and will have a 10 percent salvage value. We calculate depreciation for management purposes as purchase price less salvage value, divided by useful life. In this case:

\[
\text{Annual Depreciation} = \frac{(\text{Purchase Price} - \text{Salvage Value})}{\text{Useful Life}}
\]

\[
\begin{array}{|c|c|c|}
\hline
\text{Annual Depreciation} & \text{Purchase Price} & \text{Salvage Value} \\
\hline
$4,500.00 & ($100,000.00 - $10,000.00) & 20 \\
\hline
\end{array}
\]

Opportunity cost. Our current opportunity cost, or what rate of return we could make by investing the money somewhere else, is 5 percent. Annual opportunity cost is calculated as total investment plus salvage value divided by 2, times the estimated rate of return available.

\[
\text{Annual Opportunity Cost} = \frac{(\text{Total Investment} + \text{Salvage Value})}{2} \times \text{Rate of Return}
\]

\[
\begin{array}{|c|c|c|c|}
\hline
\text{Annual Opportunity Cost} & \text{Total Investment} & \text{Salvage Value} & \text{Rate of Return} \\
\hline
$2,750.00 & ($100,000.00 + $10,000.00) & 5\% \\
\hline
\end{array}
\]

Operating costs. Operating the bins will incur some additional costs, including supplies, repairs and utilities. The annual estimated cost for the structure they are considering is $7,100.00 or $591.67 per month.
COST SAVINGS

Next, we need to determine cost savings. We know that switching to bins will reduce shrink, reduce some feeding labor time, as well as equipment use time, but to analyze the investment, we need to put some numbers to those savings.

**Reduced shrink cost:** Let’s say the farm has an annual throughput of grain of 3,600 tons, at an average cost of $315 per ton. Using the bins they currently have, they estimate their shrink is 8 percent. By switching to bins, their shrink will be reduced to 2 percent. Now, they can determine their annual and monthly cost savings as follows:

<table>
<thead>
<tr>
<th>Average Cost/Ton</th>
<th>Tons Purchased/Yr</th>
<th>Annual Grain Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>$315.00</td>
<td>3600</td>
<td>$1,134,000.00</td>
</tr>
</tbody>
</table>

**Reduced labor cost:** Switching to bins will reduce average daily feeding time by 30 minutes. If the average feeder costs a farm $16.50 per hour, including all benefits, annual labor savings would be $3,011.25, or on average $250.94 per month.

**Reduced equipment usage:** Moving to bins is predicted to cut loader usage time in half. Currently, their loader runs an average of 1.2 hours per day, costing them an average of $28.31 per day in fuel, repairs and maintenance as calculated in a 2016 PRO-DAIRY Feed Center Activity Analysis Project by Jason Karszes, Ashley Howlett and Anna Richards. Cutting this cost in half would lead to an annual savings of $5,166.58, and a monthly savings of $430.55.

We can summarize our total cost savings as follows:

- **Shrink:** $69,300.00
- **Labor:** $3,011.25
- **Equipment:** $5166.58
- **Total:** $77,477.83

For this example, we’ll assume that this is a hard number, i.e. that you can predict the change in operating expense with relative certainty. Our annual partial budget would look something like this:

<table>
<thead>
<tr>
<th>Increase Cost Flow</th>
<th>Decrease Cost Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased expense</td>
<td>$77,477.83</td>
</tr>
<tr>
<td>Operating cost</td>
<td>$7,100.00</td>
</tr>
<tr>
<td>Total (A)</td>
<td>$77,477.83</td>
</tr>
</tbody>
</table>

Here we can see that even though we may need to borrow for the initial investment, the immediate cash flow savings will more than cover the payment. Annual cash flow would increase by $35,474.25 for the first three years, and by $78,809.33 per year after that if grain, labor and fuel costs remained the same. If costs increase over time, the investment looks even better from both a profitability and cash flow standpoint, as the cost savings increase, and our investment and payment remain the same.

Since the cash flow savings is higher than the payment, we could even use the increased cash flow to pay the loan off faster, saving interest cost, if there were not a higher value use of cash within the business at the time. On the other hand, if freeing up more immediate cash flow in the business is the highest priority, we could extend the financing term to five years rather than three, decreasing our monthly payment and changing our cash flow budgets as follows:

**Annually (first five years):**

<table>
<thead>
<tr>
<th>Increase Cash Flow</th>
<th>Decrease Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased expense</td>
<td>$78,809.33</td>
</tr>
<tr>
<td>Operating cost</td>
<td>$7,100.00</td>
</tr>
<tr>
<td>Total (A)</td>
<td>$78,809.33</td>
</tr>
</tbody>
</table>

**Monthly:**

<table>
<thead>
<tr>
<th>Increase Cash Flow</th>
<th>Decrease Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased expense</td>
<td>$6,567.44</td>
</tr>
<tr>
<td>Operating cost</td>
<td>$591.67</td>
</tr>
<tr>
<td>Total (A)</td>
<td>$6,567.44</td>
</tr>
</tbody>
</table>

Continued on page 6
**PRODUCTION**

**Investment decision making, cont’d from page 5**

A key to this example, however, is that while we increased the loan term beyond the payback period, it is not longer than the asset’s useful life. After five years, when the loan is paid off, our cash flow increases significantly, and there will still be 15 years of useful life left.

**SENSITIVITY ANALYSIS**

The last piece of the process is to determine how much room for error we have in our assumptions. In other words, what if we’re wrong about how much shrink we would save? We do a sensitivity analysis to determine just how wrong we can be before it’s no longer a good decision.

For example, what if the cost of the project overran by 25 percent, increasing our investment to $125,000 rather than $100,000. In terms of profitability, our partial budget now looks like this:

<table>
<thead>
<tr>
<th>Increase Net Profit:</th>
<th>Decrease Net Profit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased Cost</td>
<td>$77,477.83</td>
</tr>
<tr>
<td>Opportunity Cost</td>
<td>$3,437.50</td>
</tr>
<tr>
<td>Operating Cost</td>
<td>$7,100.00</td>
</tr>
<tr>
<td><strong>Total (A):</strong> $77,477.83</td>
<td><strong>Total (B):</strong> $16,162.50</td>
</tr>
</tbody>
</table>

**NET CHANGE (A-B):** $61,315.33

Our projected cash flow partial budget on a three-year loan term would change as follows:

<table>
<thead>
<tr>
<th>Increase Cash Flow</th>
<th>Decrease Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased expense</td>
<td>$77,477.83</td>
</tr>
<tr>
<td>Operating Cost</td>
<td>$7,100.00</td>
</tr>
<tr>
<td><strong>Total (A):</strong> $77,477.83</td>
<td><strong>Total (B):</strong> $52,393.85</td>
</tr>
</tbody>
</table>

**NET CHANGE (A-B):** $25,083.98

While the cash flow increase is obviously lower, it’s still positive, and so we’d still most likely go ahead with the investment, all other things being equal.

Let’s say, however, that our shrink savings is lower than we originally estimated. We can go back and adjust our savings numbers as follows:

<table>
<thead>
<tr>
<th>Average Cost/Ton</th>
<th>Tons Purchased/Yr</th>
<th>Annual Grain Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>$315.00</td>
<td>X</td>
<td>3600</td>
</tr>
<tr>
<td>Tons Purchased</td>
<td>8% Shrink</td>
<td>Total Tons Fed</td>
</tr>
<tr>
<td>3600</td>
<td>-</td>
<td>288</td>
</tr>
<tr>
<td><strong>Total Tons Fed</strong></td>
<td><strong>Allowance for</strong></td>
<td><strong>Total Tons Needed</strong> @ 2% Shrink</td>
</tr>
<tr>
<td>3312</td>
<td>÷</td>
<td>.97</td>
</tr>
<tr>
<td><strong>Tons Needed @ 8% Shrink</strong></td>
<td><strong>Tons Needed @ 2% Shrink</strong></td>
<td><strong>Annual Tons Saved</strong></td>
</tr>
<tr>
<td>3600</td>
<td>-</td>
<td>3414</td>
</tr>
<tr>
<td><strong>Annual Tons Saved</strong></td>
<td><strong>Average Cost/Ton</strong></td>
<td><strong>Annual Savings</strong></td>
</tr>
<tr>
<td>186</td>
<td>X</td>
<td>$315.00</td>
</tr>
</tbody>
</table>

We would then plug the reduced savings number into our budgets as we did above, to determine that both our profitability and cash flow calculated above would be reduced by $10,710 per year, still leaving us with a positive increase in both budgets, albeit a smaller one. We can then do the same exercise testing each of the variables we’ve included (labor savings, equipment use, etc.), and in various combinations, to determine what our level of risk is in making the investment. While these steps may seem tedious, using an excel worksheet can allow you to easily adjust variables and test different scenarios without having to start from scratch.

Running a purchase decision through these exercises does not, however, absolve us of considering the other factors in economic decision making. We must still look at whether it fits into the long-term strategic vision for where the business is headed in the future. We also need to evaluate whether it’s the best use of limited resources. While we have determined that it will increase both profitability and cash flow, credit is not an unlimited resource, and if there are more potential investments to consider that are competing for available credit, we need to run them all through the above exercises and compare the benefits of each. Remember that if you only compare one option, that will always be the most attractive one!

Periods of financial stress do not necessarily mean you should stop investing in your business altogether. They do, however, require you to evaluate investment decisions carefully, from both a profitability and cash flow standpoint, to ensure you’re making the best use of limited resources, and that they fit into your strategic plan and long-term vision for your business.

Anna Richards (ar746@cornell.edu) is a dairy business management specialist with PRO-DAIRY.

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**Dairy Profit Monitor quarterly report tracks financial performance**

By Ashley Howlett

The Dairy Profit Monitor (DPM) is a monthly tool designed to help dairy producers watch their income over feed costs (IOFC) along with other key operating and financial measures. Producers input information from their milk checks, feed and herd management programs, as well as costs and labor hours of the dairy. Producers are able to look at their monthly trends, a rolling average and can also compare to other farms for each month. 33 farms entered data from July 2017.
to June 2018, with each farm entering at least nine months of data. When looking at these graphs, the same farm is not consistently at the top or bottom of for all the months, as each month is sorted independently. Farms that participate receive these same graphs with a black line for their individual data to see how they are trending compared to other farms.

Focusing on Northeast dairy production, a heavy emphasis is placed on pounds of components as it has a large influence on the milk price per hundredweight received. Over the last year, component production has stayed steady, with a dip in last fall due to poor haylage quality in 2017. Top producers are hitting well above 6.5 pounds per cow per day and close to reaching the 7-pound mark (see Graph 1). The average farms in DPM are hovering around 5.75 pounds per cow per day.

**GRAPH 1**

**Pounds of components per cow per day**

Aside from production, several other herd parameters are entered and calculated within DPM. Watching month-to-month changes in somatic cell values, pregnancy rate, culling statistics and fresh cow health incidences can help guide herd management meetings and steer the dairy in a direction of positive change. Producers look at their numbers for areas of improvement and DPM has them look through these parameters monthly.

A large determinant in IOFC for the lactating herd is feed conversion. Tracking the feed conversion on an energy-corrected basis allows producers to account for changes in component production. All the feed information is entered for the lactating herd and total dry matter intake and percent forage in the diet is calculated and compared over time.

**GRAPH 2**

**Feed conversion for DPM farms**

Graph 2 demonstrates the change in feed conversion seen by DPM farms. Over the last few months of 2017, feed conversion held steady, with some larger changes shown in 2018. The feed information in DPM does have each ingredient’s cost, so feed cost numbers can be calculated on a per pound of dry matter basis, cost per head per day and cost per hundredweight. These costs are then calculated into the four IOFC measures – each giving a different perspective of the farm’s operations.

IOFC can be viewed as purchased feed cost versus total feed cost and actual milk price versus fixed milk price. All numbers in DPM are calculated on a per-head, per-day basis as this has had the highest correlation of feed cost measures with Return on Assets (ROA) when analyzing annual financial performance within Cornell University’s Dairy Farm Business Summary and Analysis Project.

The first measure DPM calculates is the Net Milk Income over Purchased Feed Cost: Actual Milk Price. This measure is the one that feels the most real, as it uses the exact milk income numbers and accounts for feed that producers write a check for. Also using the exact milk income information, the value of grown feeds, forages and grain, are added to get the Net Milk Income over Total Feed Cost: Actual Milk Price. Producers are asked to provide an estimated value of grown feeds, which should represent the cost to grow the feed, not the market value to sell or purchase the forage. This enables producers to see what the real cost of feeding their lactating herd is, even though they aren’t paying for grown feeds in the same manner as they do with purchased feeds.

**GRAPHS 3 & 4**

**Net Milk Income Over Feed Costs: Actual Milk Price graphs for purchased versus total feed costs**

Using the fixed milk price numbers, more emphasis can be given to the operational performance of the business. Rather than fixing the milk price on a straight per hundredweight basis, component prices and a net marketing margin are fixed to account for changes in component production. Changes in forage quality, rations, and management can all play a role in affecting the change in the fixed milk price IOFC calculations through changes in feed conversion, cost of the ration and component production.

Comparing the two graphs above (Graphs 3 and 4) to the two below (Graphs 5 and 6) shows how much noise milk price variation causes in IOFC numbers. Operational performance can be seen as steady in the graph below with some changes that could be caused from diet changes, performance changes or feed cost changes.

**Continued on page 8**
As dairy producers have become increasingly aware of the significance of current labor issues, much discussion has revolved around labor costs and increasing minimum wages. Although cost has significant implications in the labor topic, understanding how and where employees spend time may be more important than the cost per hour and value of employees themselves. Labor efficiency can help track how much labor is utilized compared to output, but the scope of labor efficiency is extremely broad and different for many farms.

Over the years, the Dairy Farm Business Summary and Analysis Project has shown a wide variation in labor efficiency. In 2016, a labor allocation study conducted by Ashley Howlett and Jason Karszes, Cornell CALS PRO-DAIRY, collected labor data to determine where these differences were occurring. Twenty-eight dairy farms allocated their 2016 hours into 54 different tasks to see where time was being spent. The tasks were broken into different categories, including mature herd, pre-weaned heifers, post-weaned heifers, hay, corn, small grains/other crops, manure, shop, and management and office time.

Within each category, farms were asked to report hours for specific tasks within that area, along with other parameters. The total estimated hours were compared to their 2015 Dairy Farm Business Summary and were estimated within five percent of the annual hours recorded from the previous year, unless a significant change occurred. Twenty-eight dairy farms allocated their 2016 hours into 54 different tasks to see where time was being spent. The tasks were broken into different categories, including mature herd, pre-weaned heifers, post-weaned heifers, hay, corn, small grains/other crops, manure, shop, and management and office time.

Within each category, farms were asked to report hours for specific tasks within that area, along with other parameters. The total estimated hours were compared to their 2015 Dairy Farm Business Summary and were estimated within five percent of the annual hours recorded from the previous year, unless a significant change occurred.

Table 1 shows the average labor efficiencies seen in the Dairy Farm Business Summary and the range of those parameters. The study didn’t show as wide of a range in cows per worker and milk sold per worker, however, it was significant among the various production models observed in this study. Participating farms had a wide variety of heifer and crop outsourcing, which led to most of the overall variation seen.

The overall results showed most of the time on farms is spent with the mature herd. Across the data, this category also had the widest variation in how overall time was spent on the farm. Looking at the average, about 63 percent of time on dairies is spent with the mature herd, 11 percent collectively is spent with heifers, and shop tasks take 8 percent of total time. Manure, corn, hay, office time,
management, and small grain/other all follow behind, respectively (Chart 1). The average farm in this study raised 82 percent of heifers to cows and 53 percent of farms had some level of outsourcing in their young stock program.

When looking into the variation of the time breakdown, the table below displays the range, standard deviation and interquartile range for each category. Focusing on standard deviation, the greatest variation is in the mature herd category, with management and office time, shop, and pre-weaned heifers following behind. Various labor strategies with regard to outsourcing may be where some of these differences lie. Management and office time is different for every farm. As much as management time was defined, some of these hours may have been recorded differently among the farms and this is where differences in time spent on human resource management would appear. The shop category followed, which is an area that most had the hardest time tracking. Most shop employees spend their time mixed with other activities, and combined with a range of outsourcing repairs, this was an area that was expected to have a wide range.

The top eight time-consuming tasks were listed for each farm, with milking consistently using the most time of any task on the farm. Following milking, the second most time-consuming task was a toss-up between cleaning mature herd pens, and mature herd management tasks. Looking in the top eight categories, milking, cleaning, feeding and herd management in the mature herd were consistently among the top eight, with other tasks showing up in the top eight, including spreading, feeding pre-weaned heifers, office and financial work, equipment repairs, and crop work.

To think about this study in comparison to your own farm, a simple start is to track how employees are spending their time. Finding inefficiencies within tasks starts the process of finding new methods to accomplish the task. Knowing where a lot of time is spent can also help find areas where the biggest impact can be realized. Since most of the labor on farms is spent in the parlor, a simple tweak like placement of towels or dip could save a few seconds in your parlor routine, but in the long run have a big impact.

Although tracking time seems like a daunting task, encourage employees to think about their tasks completed within each day and how long those tasks take. We typically underestimate the amount of time we spend doing certain things because we omit the smaller details within a task. For example, feeding calves may take an hour; however, the entire task of feeding grain and water and cleaning up materials may actually put the task at two hours.

If time tracking seems completely infeasible, a much simpler question to ask is: What is one thing that would make this task easier? Although simple, small details and little things like keeping the tools you need next to where you use them, or changing a daily routine, can dramatically improve the efficiency of completing the task and could even make someone’s day run a little smoother.

As labor issues become increasingly important, improving efficiency will only be a solution if you can deliver the same or better results than you are currently achieving. Ensuring a job is completed efficiently and effectively is where the greatest gains are. Involve employees to find changes that get things done faster, and work together to figure out the best system. Beginning to record data on the tasks and activities within the farm is a step towards managing and observing performance of farm efficiency.

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**Ashley Howlett** was a dairy management specialist with PRO-DAIRY. She has returned to her farming roots to become a dairy herd manager. Contact Anna Richards (ar746@cornell.edu) or Jason Karszes (jk57@cornell.edu), PRO-DAIRY, with comments or questions.
UPCOMING PROGRAMS

DAIRY ONLINE MANAGEMENT PROGRAM

Cornell CALS PRO-DAIRY offers Dairy Webinar Series that includes a Thursday Dairy Update Series and a Spanish Dairy Series.

The Thursday Dairy Update series is offered one Thursday a month from January through April from 12:30 p.m. to 1 p.m. The series focuses on the latest in dairy research and industry issues.

The Spanish Dairy Series is presented entirely in Spanish. It is offered the last Wednesday of the month from January to May from 12:30 p.m. to 1:00 PM. It focuses on the “why behind the how” and best management practices for specific areas of the dairy.

The webinars are recorded and are available on the Cornell CALS website.

prodairy.cals.cornell.edu/webinars

Calf Management Online Course

The Calf Management Online Course will be offered Winter to Spring 2019 and is designed for people who work directly with calves. Those who work with calf managers will also find it useful. Topics start out basic and quickly build on the basics, and includes calf anatomy and physiology, nutrition, environment and health. The seven-week course will be offered entirely online. Register on the Cornell CALS PRO-DAIRY website.

prodairy.cals.cornell.edu/online-courses

Baby, it’s cold outside!

Winter calf care essentials

By Kathy Barrett and Jerry Bertoldo

The value of consistency, doing the little things right every day, these are always good ideas, but even more so in the current dairy climate. Cold weather calf care is a great example of how recommitting to the basics, and consistently doing things right, pays off in improved calf health and down-the-road cow productivity.

Cold weather presents its own set of challenges for calves. Calves are born lean with very little body fat. Consequently, they don’t have much energy reserves to maintain their body heat when it gets cold. This also results in less energy for the immune system, which then limits the ability to fight disease. To offset these heightened demands, a calf’s nutritional requirements change in the cold weather. As temperature decreases, maintenance requirements for the calf increase. Calves need more nutrients just to stay warm. Nutrients for growth and health requirements are met only after the maintenance requirements are met. The increase in nutrient requirements can sneak up on a farmer because young calves will feel the cold before we do. Calves less than three weeks of age need extra energy to keep warm below 59°F. Calves older than three weeks need extra energy to keep warm below 42°F. Add wind and wet conditions to the mix, and the calf has to work even harder to stay warm, further increasing the nutrient requirements.

Management can mitigate the impact a dropping thermometer has on calves. If you haven’t already done so talk to your nutritionist. Increasing milk volume at each feeding is a good start. As important is providing the optimal energy intake, which requires balancing both fat and carbohydrates. This is where your nutritionist comes in. They can recommend the appropriate feeding rate whether its milk or milk replacer based on your situation. More importantly they can adjust the milk replacer and starter feed composition to compensate for the cold weather as well. Feeding calves three times a day evens out the nutrient availability to the calf. This reduces the time the calf is both cold and hungry.

WATER, THE ESSENTIAL NUTRIENT

It’s obvious in the hot weather that calves need more water. It’s not so obvious that they need more water in the winter. Cold, dry air can cause dehydration. Depending on the age of the calf, they should drink one to two gallons of water a day. Feed warm, not cold, water. Cold water causes the calf to use energy to warm the water up to their body temperature. Feeding water at 101 to 102°F is ideal, but at 80°F as-fed. This can be tough in the cold weather especially if calves are in hutches. Water can be heated to a higher temperature to allow for some cooling off by the time it gets to the calves. Of course, frozen water doesn’t help anyone.

The two most common findings on a young stock necropsy are dehydration and undernutrition. Adjusting the nutritional program and feeding strategies in the cold weather helps keep calves healthy.

DRAFT FREE

Young calves are especially susceptible to drafts. It doesn’t take much either. Air movement over a dry calf, less than three weeks old, at a temperature under 50°F in excess of one mile per hour (MPH) is considered a draft. If you can feel the draft, your calves surely can too. The chilling effect of a draft is another draw on the calf’s energy. If calves are in hutches, keep them well bedded and open to the south. If calves are indoors, keep them draft-free, but appropriately ventilated. You should not be able to smell ammonia in the barn.
Making pathogen-based mastitis treatment protocols work for many dairies

By Amy Vasques

Mild or moderate clinical mastitis is defined as infection or inflammation of the mammary gland that results in abnormalities in milk consistency or color and/or swelling or redness of the affected gland. These cases differ from severe mastitis, which manifests as a systemically sick cow. Cows with severe signs most often need systemic and supportive treatment. The financial impact of all cases of mastitis on U.S. dairies amounts to over $2 billion annually, with losses attributed to treatment costs, milk loss, milk withholds and decreases in reproductive efficiency. Research indicates that these costs can be reduced without appreciable negative outcomes by selectively treating non-

Continued on page 12

<table>
<thead>
<tr>
<th>Herd</th>
<th>Treatment Protocol</th>
<th>Compliance</th>
<th>BTSCC Before</th>
<th>BTSCC After</th>
<th>ME305 Before</th>
<th>ME305 After</th>
</tr>
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<tr>
<td>1</td>
<td>Gram +</td>
<td>—</td>
<td>169,000</td>
<td>125,000</td>
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<td>2</td>
<td>Gram +</td>
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<td>146,000</td>
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<td>3</td>
<td>Gram +, Cull S. aureus</td>
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<td>89,000</td>
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<td>5</td>
<td>All but &quot;No-Growth&quot;</td>
<td>73%</td>
<td>109,000</td>
<td>116,000</td>
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<td><strong>Average</strong></td>
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<td><strong>147,500</strong></td>
<td><strong>30,953</strong></td>
<td><strong>29,670</strong></td>
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Making pathogen-based mastitis treatment protocols work for many dairies, cont’d from page 11

severe cases, rather than treating all cases with antibiotics.

Why does this work? Microbiological characterization of the behavior of mastitis pathogens as well as on-farm clinical trials indicate that groups of pathogens, namely Gram-negative bugs such as Pseudomonas, respond poorly to antibiotics. Alternatively, cows with pathogens such as E. coli experience high self-cure rates. Additionally, approximately 30 percent of cultures from mastitic cows return negative results.

With this knowledge, many dairies use an evidence-based approach to drive mastitis treatment strategies. For example, implementation of a pathogen-based protocol could involve use of on-farm culture (OFC) to treat only cows with Gram-positive results. There are several challenges to making on-farm culturing work. It requires a detail-oriented, dedicated individual(s) not only to retrieve samples, inoculate the culture plates, and to read the results, but also to maintain inventory of supplies, keep adequate records, and ensure proper function of the incubator. On-farm culturing may entail frequent training for proficiency, and some organisms, such as Mycoplasma species and Prototheca, will not grow using traditional methods or may be difficult to detect.

To explore an alternative to on-farm culturing, our group used culture results generated by a veterinary diagnostic laboratory to drive pathogen-based treatment decisions on six New York dairy herds. Mastitis samples were submitted five days per week with results reported 24 to 36 hours later. This simulated the weekday services offered by veterinary clinics that also have the capacity to culture during a typical workweek. Each enrolled herd milked 500 to 1,000 cows and four of the six dairies treated all clinical cases. The two remaining herds practiced pathogen-based therapy at the time of enrollment: one herd relied on once

---

### FIGURE 1
Distribution of mastitis pathogens from cows with non-severe mastitis on six New York dairy herds.

<table>
<thead>
<tr>
<th>Herd</th>
<th>n</th>
<th>Staph. aureus.</th>
<th>Staph. spp.</th>
<th>Streptococcus</th>
<th>Other Gram -</th>
<th>E.coli</th>
<th>Mixed Gram +</th>
<th>Klebsiella</th>
<th>Strep. uberis</th>
<th>Contamination</th>
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<tr>
<td>1</td>
<td>150</td>
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<td></td>
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<tr>
<td>3</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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### FIGURE 2
Percent of non-severe clinical mastitis cases treated with antimicrobials before and after implementation of a pathogen-based treatment protocol by herd. Herds used 24-hour sample pickup five days per week to drive treatment decisions.
Dietary management of subclinical hypocalcemia with zeolite A

By Allison Kerwin and Thomas Overton

Researchers at Cornell have identified another dietary tool that nutritionists and dairy producers can use to prevent hypocalcemia. Feeding zeolite A improved calcium status around the time of calving and may have improved reproductive performance, although further study with larger numbers of cows is required to evaluate effects on reproduction and health more fully.

Calcium requirements around calving increases at least two-fold, primarily due to colostrum production. To meet these demands, the dairy cow can mobilize calcium from bone, increase calcium absorption through the intestine and decrease calcium excretion through urine. Activation of this process can take days and is in response to a series of hormonal pathways, triggered by a drop in blood calcium concentration. If a cow fails to adapt to the calcium demands, she is at risk to develop hypocalcemia after parturition, which is subsequently associated with an increased risk of impaired health, decreased milk production and decreased reproductive performance. Cows that have subclinical hypocalcemia (SCH) continuously from calving through three days in milk (DIM) can be classified as having chronic SCH, including quarter, culture result and treatment.

Implementation of prompt reporting of culture results by nearby laboratories can effectively drive pathogen-based clinical mastitis treatment decisions on moderate sized dairies, resulting in decreased use of antimicrobials on all dairies involved. Cultures from all six farms provided data that was useful for decision making, whether for treatment or culling. No negative outcomes were noted when evaluating bulk tank somatic cell count or milk production. The use of a pathogen-based treatment protocol based on five-day per week results has the potential to decrease antimicrobial use, promote product sustainability and protect aspects of public health.

Amy Vasquez (akr25@cornell.edu) is a research associate with Quality Milk Production Services in the Department of Population Medicine and Diagnostic Sciences at Cornell University College of Veterinary Medicine.
Dietary management of subclinical hypocalcemia with zeolite A, cont’d from page 13

which increases disease frequency and time to pregnancy. Although clinical hypocalcemia affects less than five percent of cows, recent studies show that approximately half of cows suffer from SCH following parturition.

Prevention of hypocalcemia is dependent upon pre-calving nutritional management. Decreasing the dietary cation-anion difference (DCAD) through use of low potassium forage and dietary supplementation with sources of anions (Chloride and Sulfur) is a time-tested approach supported by research and field experience. The best results with anion supplementation occur in conjunction with routine monitoring of urine pH and use of commercial anionic supplements designed for improved palatability. The other approach is to feed a low calcium diet pre-calving. However, it is difficult to feed a ration low enough in calcium using typical feeds to trigger the calcium regulatory system. As an alternative, research conducted in Europe, beginning nearly 20 years ago, suggests that a low calcium dietary approach can be actualized by supplementing the prepartum diet with a synthetic zeolite A, which binds dietary calcium and decreases its absorption.

In a recent study at Cornell University, a synthetic zeolite A (X-Zelit, Protekta Inc., Lucknow, Ontario, CA/ Vilofoss, Graasten, DK) was fed to prepartum multiparous cows (n=26) for three weeks prior to expected calving and tested against a control group (n=29). Both treatments were fed the same prepartum diet (40 percent corn silage, 33 percent wheat straw, and 27 percent concentrate), with the addition of approximately 500 g/d zeolite A to the treatment diet. Postpartum, all cows were fed the same diet through four weeks of lactation.

Cows fed zeolite had significantly improved serum calcium concentrations during the week prior to calving through three days in milk (DIM), significantly lower serum phosphorus concentrations during the prepartum period through two DIM, and significantly lower serum magnesium concentrations the week prior to calving through the first DIM (Table 1). Decreased serum phosphorus and magnesium concentrations are likely due to the binding effect of zeolite, making these minerals less available for absorption. Having elevated blood phosphorus concentrations can inhibit the effectiveness of calcium absorption in the intestine and, therefore, it is plausible that the decrease in prepartum serum phosphorus, as seen in zeolite-fed cows, is a mechanism for decreased availability of calcium. TABLE 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment</th>
<th>Control</th>
<th>Zeolite A</th>
<th>SEM</th>
<th>P-value1</th>
<th>T</th>
<th>T × D</th>
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<tr>
<td>Prepartum</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ca (mmol/L)</td>
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<td>0.06</td>
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<tr>
<td>P (mmol/L)</td>
<td></td>
<td>2.03</td>
<td>1.03</td>
<td>0.04</td>
<td>&lt;0.001</td>
<td>0.04</td>
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<tr>
<td>Mg (mmol/L)</td>
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<td>0.92</td>
<td>0.85</td>
<td>0.02</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>DMI (kg/d)</td>
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<td>14.6</td>
<td>14.0</td>
<td>0.2</td>
<td>0.07</td>
<td>0.04</td>
<td></td>
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<tr>
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<tr>
<td>Ca (mmol/L)</td>
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<td>2.33</td>
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<td>P (mmol/L)</td>
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<td>1.39</td>
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<tr>
<td>Mg (mmol/L)</td>
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<td>0.91</td>
<td>0.01</td>
<td>0.51</td>
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<tr>
<td>DMI (kg/d)</td>
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<td>22.2</td>
<td>0.5</td>
<td>0.51</td>
<td>0.16</td>
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<tr>
<td>Milk yield (kg/d)</td>
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<td>48.0</td>
<td>47.5</td>
<td>0.8</td>
<td>0.58</td>
<td>0.99</td>
<td></td>
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<tr>
<td>ECM (kg/d)</td>
<td></td>
<td>53.0</td>
<td>53.8</td>
<td>0.9</td>
<td>0.50</td>
<td>0.57</td>
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</tr>
</tbody>
</table>

1 T = treatment; T × D = Treatment by day

FIGURE 1
The prevalence of subclinical hypocalcemia for control and zeolite-fed cows at different time points.

Percent of cows with serum Ca < 8.5 mg/dL

- Control
- Zeolite A

* P < 0.05

Percent of cows with serum Ca < 8.5 mg/dL

Day relative to calving

0 10 20 30 40 50 60 70 80 90 100

-17 -10 -5 -3 -1 0.25 0.75 2 3 4 6 7 10 15

ECM (kg/d)
to improve calcium status. Although magnesium concentration was reduced in zeolite-fed cows, it was still within the normal range of 0.75 to 1.0 mmol/L.

The prevalence of SCH between the two treatment groups is shown in Figure 1. Cows fed the control diet had a significantly higher SCH prevalence from three days prior to calving through three DIM, with approximately 90 percent of cows having SCH within the first DIM, compared to approximately 35 percent of zeolite-fed cows. Only one out of 29 control cows was not diagnosed with SCH (Ca < 8.5 mg/dL) from calving through three DIM, whereas 50 percent of the zeolite-fed cows were not diagnosed with SCH. Cows with serum calcium concentrations below 8.5 mg/dL from calving through three DIM were considered to have chronic SCH. Feeding zeolite to cows eliminated chronic SCH whereas 34 percent of the control cows were considered chronic.

We observed a tendency for zeolite-fed cows to become pregnant sooner than the control cows. Median time to pregnancy for zeolite-fed cows was 70 days versus 89 days for control cows. We observed no other treatment effects related to production outcomes or postpartum dry matter intake (DMI), however, cows fed zeolite tended to decrease DMI as parturition approached (Table 1).

Allison Kerwin (abl37@cornell.edu) is a Ph.D. candidate in the laboratory of Thomas Overton (tro2@cornell.edu), Professor, Department of Animal Science, Cornell University.

UPCOMING PROGRAMS

For more information: prodairy.cals.cornell.edu/events

SUCCESSION PLANNING KICKOFF SEMINAR FOR FARM BUSINESSES
When: December 14, 2018
Where: Syracuse, New York

This conference focuses on addressing the challenges surrounding succession planning for farm businesses, including tax, legal and estate implications, family communication, financial, and risk management issues. Speakers include Steve Walker, Esq., Erica Leubner, MSW, of NY FarmNet, and John Lehr of Farm Credit East. In addition, a diverse panel of producers will share their experiences around business transition. Following the program, producers can sign up for a three part followup workshop series, which will focus on helping the farm prepare to move forward with their transition planning process.

SPANISH REPRODUCTIVE MANAGEMENT ONLINE COURSE
When: January 2019

Taught online and in Spanish, this course will provide students with fundamental knowledge to understand and manage an effective dairy reproductive program. Topics include anatomy and physiology, synchronization protocols, breeding strategies, A.I. techniques, monitoring reproductive programs, and heifer reproduction management.

CDEP MANAGEMENT SYMPOSIUM
Lean Systems and Joint Ventures
When: February 26 - 27, 2019
Where: Syracuse, New York

As the industry continues to evolve, different management strategies, skills, and techniques can help dairy businesses thrive over time. Presentations on joint ventures and lean systems at this symposium can provide farmers with tools and information to improve operating efficiency.

OPERATIONS MANAGERS CONFERENCE
Building a Productive Culture – Cows, Crops and People
When: January 22 - 23, 2019
Where: Syracuse, New York

Operations management on dairy farms is integral to success of the business. This conference provides an opportunity for those who are responsible for day to day activities on dairy farms to increase their management and operations skills. Sessions will offer education and applicable strategies for management teams, whether their focus is cows, crops, or people.

HERD HEALTH AND NUTRITION CONFERENCE
When: April 8 – 9, 2019
Where: Syracuse, New York

This conference provides an opportunity for dairy producers, veterinarians, feed industry representatives and agriservice personnel to increase their knowledge of current herd health and nutrition management techniques while networking and interacting with other professionals. Sessions include feeding management, nutrition and reproduction, environmental footprint, current concepts in hypocalcemia and a risk management panel discussion.
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