

Understand trends to improve cow comfort

Editor's note: A previous issue of Progressive Dairyman, identified a new program – CowSigns – which evaluates several cow activity touch points based on real animal responses. The program helps monitor key parameters more accurately by compiling data on specific

management areas and comparing current data and trends to optimal values (input versus output metrics) in order to pinpoint bottlenecks and opportunities. The following article is a follow-up and update about the program and what it is proving about about cow comfort.

CowSigns completes the first step of a two-step process: it sets a trendline and benchmark that identify how cows are relating to their environment. The second critical step requires the operator to understand and rank opportunities that will make the most impact on cow health and profitability.

See **Figure 1**.

Cow health, reproductive performance and feed efficiency could be considered the most important factors that have an impact on productivity and profitability. But three areas – cow comfort, rumen function and milk quality – must be addressed before those critical factors can be optimized.

Technical Services Director. “A good point of measure is an hour after the morning milking, you should see around 80 percent of the cows which aren’t eating or drinking, lying down. Good things happen when cows lie down and chew their cud – this mimics what cows do in optimal conditions and reduces stress on feet and legs.”

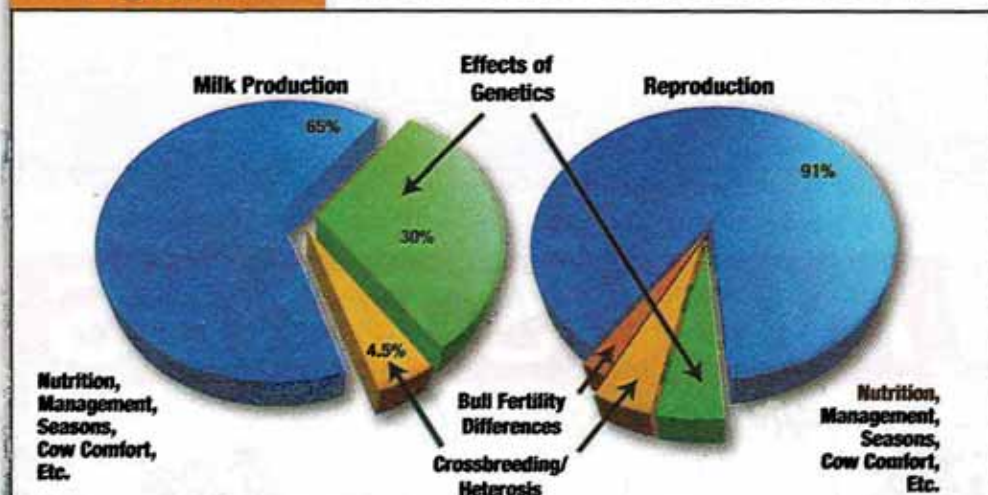
Michael points to changing dairy environments as contributing to the need to make sure cows spend adequate time off of their feet.

“In most freestall barns, cows spend a tremendous amount of time on concrete,” he says. “Rubber mats, strategically placed, can be key to preserving foot and leg health, in addition to extending the longevity of the cow. When we see how lameness and poor locomotion impacts heat expression and conception, investing in rubber mats for walking and standing surfaces can be very wise.”

Another fundamental way to save cows from the wear and tear of walking and standing on concrete is to provide a comfortable place to lie down. The two most common reasons why cows don’t use freestalls are inadequate lunge space and uncomfortable bedding surfaces.

Available lunge space is a

Figure 1 Production and reproduction influencers



Technical Services — Because Profitability Matters

Figure 1 Derived from: Miglior and co-workers, Journal of Dairy Science 78:1174 and Fuerst, Journal of Dairy Science 77:1114

Specific factors have a greater impact on milk production and reproductive performance than others. As shown in the graphic, management practices, cow comfort and nutrition play the largest part in reproductive performance and milk production, while genetics plays a much smaller role in a cow’s performance.

Cow comfort – why aren’t they lying down?

Comfortable cows are more likely to produce high volumes of milk and have fewer health problems, a great combination for improved profitability. Tracking animal activity and movements helps determine instances where there are opportunities for improvement in the area of cow comfort.

“Ideally, cows should spend at least 50 percent of their day lying down,” says Neil Michael, ABS Global

function of where the brisket board and neck rails are placed in the stall.

"If the brisket board is too close to the back of the stall (less than 66 inches), then cows won't have enough room to lunge forward when standing up," Michael says. "And if the neck rail is too close to the stall surface (less than 46 inches) or too close to the back of the stall (less than 60 inches) it won't provide a proper fulcrum to help her get up."

In addition to lunge space, the type and quality of bedding is equally important. While there are a variety of bedding sources available, dryness and quantity are crucial factors. Higher moisture levels promote bacterial growth which then has the opportunity to get on the udder and enter the teat canal. Inadequate bedding amounts will create an uncomfortable lying surface and lead to swollen or scarred hocks.

If activity monitoring shows that cows are spending less than half of their day lying down, examine whether the freestalls provide a comfortable environment. If you're not willing to lie in those stalls for an extended period of time, it's likely your cows won't want to either. If you find the stalls aren't the problem, check additional cow environment factors described below, as a combination of issues can affect cow comfort.

Rumen function

Comfort also impacts how well the rumen functions. When the rumen efficiently converts feed to amino acids, volatile fatty acids and other compounds that lead to milk synthesis, then productivity and cow health are optimized.

Dr. Pedro Melendez, assistant professor at the University of Florida College of Veterinary Medicine and a technical consultant for ABS Global, says three main factors determine how well the rumen is functioning and what impact the ration is having on cow health – cud chewing, manure score and body condition score. Each of these performance indicators is tracked through CowSigns, and Dr. Melendez explains each area in greater detail:

• **Cud chewing** – Cud chewing provides a good indication of how well fiber is being utilized in the ration.

"I look at the percent of cows chewing at any time and compare that with ration particle length as evaluated by the Penn State Forage Separator," Melendez says. "It's important to compare what cows eat and what they leave behind, so I compare the fresh total mixed ration (TMR) to the weighback portion. The coarse fraction of the weighback should be no more than 50 percent higher than the fresh TMR."

Melendez says that a low cud chewing score (less than 50 percent) can indicate lack of effective fiber (below 20 percent forage NDF),

low coarse fraction score (below 6 percent) or too much nonfiber carbohydrates. He notes that overmixing can reduce particle size. Monitoring TMR preparation and mixing procedures helps to ensure proper effective fiber levels.

• **Manure score** – Fresh, undisturbed piles of manure may provide valuable clues on the nutritional status of the cow.

"Consistently low manure scores (below 3.0) indicate a lack of effective fiber, which could also indicate a low ration dry matter content, especially when the diet contains fresh alfalfa hay," Melendez says. "This can lead

to subclinical acidosis and other disorders related to poor rumen function."

When cows have low manure scores, Melendez counsels producers to check the ration for nonfiber carbohydrate levels, especially starch content. Starch should not reach any higher than 27 percent of ration dry matter. Again, TMR preparation and mixing can have an impact on manure score as it relates to the breakdown of fiber before it is fed to the cow.

• **Body condition score** – Melendez monitors BCS several times throughout a lactation, including

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at dry-off, calving, 90 days in milk (DIM) and 200 DIM.

"I pay special attention to the scores at calving and at 200 DIM,"

Continued on page 28

Understand trends to improve cow comfort, cont'd from page 27

he says. "If a cow at 200 DIM scores higher than 3.25, I recommend that she gets switched to a low-energy diet so she isn't too fat at dry-off."

Any scores that are outside the normal range indicate inefficient energy nutrition and utilization. Cows with optimal BCS at calving but low at 90 DIM are not getting adequate nutrition during the fresh period. Conversely, a high BCS at 200 DIM indicates an overfeeding of energy during the last 100 DIM. Melendez recommends groups with BCS outside of the optimal trendlines to evaluate feeding management, especially energy and fiber levels.

Milk quality

Comfortable cows with well-functioning rumens have the ability to produce large volumes of milk. However, this milk won't be of any value if it's not harvested properly.

One of the most important parts of the cow is the one that takes the most abuse during milking – the teat end. CowSigns collects data on teat end score, teat skin and cow hygiene. It's important that each of these factors is analyzed since they affect the amount of bacteria on the teat surface, the opportunity for bacteria to adhere to skin folds and cracks, and the opportunity for bacteria to enter the teat canal.

Hyperkeratosis, or the hardening of the area around the teat end, is the biggest enemy of healthy teats. It creates milk quality problems because bacteria harbor in the cracks and folds and, since it's hard to get teats completely clean, they eventually migrate into the teat canal. Hyperkeratosis can't be cured overnight, but takes a concerted effort over time to make sure teat ends are healthy.

Managing teat ends is crucial, and Roger Thompson, Team Management Concepts, P.L.C. and a contracted veterinarian with ABS Technical Services, says that's where the real value of a program like CowSigns comes in.

When looking at the performance of your herd, it's easy to pick out the comfortable cows with healthy rumens and well-functioning mammary systems. They are the cows near the top of the production list and at the bottom of the high SCC cow list. They are also the cows with the greatest longevity and lowest incidence of health problems. In the end, they are also the ones with the greatest positive impact on your bottom line. Understanding how to have more of these cows in your herd takes good data, an understanding of what the data means and the ability to make the appropriate changes. **PD**

—Submitted by ABS Global



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Whether you are building a new barn or renovating existing facilities, the right stall, bedding and amount of ventilation all contribute to providing a quality environment for cows. But to really make cows comfortable and enhance performance, we need to step back and take a broader view of how cows move on a daily basis.

"What we're trying to do is maximize the time a cow spends in front of a feedbunk or lying down," says David Avila, who owns Western Dairy Design Associates Inc. in Oakdale, California. Avila, who consults with regards to building design and cow flow, says, "Cow comfort should be built into the entire barn design to prevent stress and provide a normal routine."

A normal routine pertains to the number of cycles a cow goes through during a day. Known as turn-time, a cycle includes the time from when the first cow leaves the pen or freestall area to when the last cow returns after milking. Avila designs barns and group sizes so that the last cows from the parlor spend no more than 45 minutes at a time away from their feedbunk or freestall group.

For instance, cow groups should be between 65 and 70 cows when a double-10 parallel parlor is used. For a larger parlor, like a double-50 parallel, group sizes can reach up to 325 cows.

Moving cows through the parlor in a timely fashion as well as getting them back to the freestall area has a big impact on time away from the feedbunk and cow comfort. Rubber mats in the return lanes are a standard part of buildings Avila designs. "We could put a 12-foot concrete return lane for cows to walk on, and they would all walk on the 3-foot rubber mat in the center of the alley. That's the most comfortable area for cows."

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