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National Strategies to Help Cope with Heat Stress

As summer's heat and humidity grow, so too do the resulting production losses and health risks for dairy cattle - challenges that often persist beyond the return of cooler weather in the fall. Today's dairy cows begin to experience heat stress at lower temperatures than many people realize. Recently updated guidelines indicate that, for cows making 35+ kg of milk, production and reproductive losses begin at an average daily Temperature Humidity Index (THI) of 68 (23°C at 40% RH, or 20°C at 85% RH). Even in herds averaging less than 30 kg of milk, remember that the high producing cows will be negatively affected, and so in turn will the bulk tank average.

Focus on Facilities First: Heat stress, like most challenges faced by today's dairy producer, is one that is most effectively addressed with a multi-pronged approach. The largest and most cost-effective opportunities to reduce heat stress are facility-based. Ensuring that cows have adequate shade and abundant water provision are attainable goals for all dairies. Beyond those considerations, dairies in humid climates (typical of the northeast and mid-Atlantic regions) can most effectively cool cows by repeatedly wetting cows down and blowing air over them on a cycle that increases in frequency with a higher THI. Blowing hot, humid air over hot cows is ineffective.

Ration Formulation Considerations: First and foremost, ensure that the dairy ration fed during hot weather is rumen-friendly. Heat-stressed cows are more likely to experience rumen health problems. Daily eating patterns may be altered by hot weather, increasing the risk of slug feeding. Hot cows stand more, and will often pant as a means of trying to cool off. The more they pant, the less they chew their cud, and these two behavioral changes combine to reduce the amount of saliva that is produced and swallowed. This in turn means less bicarbonate enters the rumen to function as a buffer, and a greater risk of sub-acute rumen acidosis results. Heat-stressed cows also eat less. In an attempt to compensate for this, past nutritional approaches often included increasing ration energy density, commonly achieved (at least in part) by feeding more grain. Given the rumen health risks already present, feeding more grain (starch) is generally ill-advised. Instead, ration changes should focus on feeding less total and/or rapidly fermentable starch, more fermentable fiber, and potentially more fat, as diets so formulated should not add to the risk of acidosis. Brown mid-rib (BMR) forages and high-fiber (or low starch) byproduct feeds like soy hulls fit well with this nutritional approach. Feeding lower starch rations may reduce feed efficiency, but this measure tends to be poorer for heat-stressed cows to begin with. Furthermore, this approach should help minimize the risk of a significant nutritional contribution to the increase in lameness cases many herds experience in late summer or early fall. Strive to feed appropriate protein levels. Overfeeding protein (or feeding excess protein relative to the amount of fermentable carbohydrates in the ration) can increase MUN (milk urea nitrogen) levels. If MUNs are significantly elevated, they may further contribute to the reduced conception rates typical of heat-stressed cows. Excess ration protein may also unnecessarily increase ration costs, depending on the source(s) used.

Ration Additives: A variety of research-proven feed additives are available that may help with milk production and/or cow health during hot weather. However, nothing works everywhere (except good management!) Several studies have shown benefits to increasing ration DCAD (dietary cation-anion difference) levels through the inclusion of sodium bicarbonate and/or potassium carbonate, particularly in early lactation cows. Feeding additional sodium bicarbonate helps offset the reduced saliva production and rumen buffering experienced by heat-stressed cows. Cows lose more potassium as they sweat more during hot weather. Feeding potassium carbonate can help offset this loss and increase the cows' blood buffering capacity, and often contributes to higher milk production or improved butterfat percentage in the process.

Rumensin® is a feed additive labeled to improve milk production efficiency in dairy cows that typically generates a strongly positive economic return when it is fed. Research-to-date shows that this improvement in milk production efficiency is maintained in heat-stressed cows.

It is important to consider the use of any of these additives with input from a knowledgeable nutritionist. The additive(s) that are most likely to be appropriate and/or cost-effective may vary somewhat from herd to herd, and over time, depending upon feeding strategies, ration composition, desired response from the cows, milk component concentrations, and milk price.*(Article by Dr. Tom Bass, Renaissance Nutrition, Inc.)*

CELEBRATE DAIRY

June is Dairy Month. We all need to support and encourage our dairy industry! That's what we do every day, working with you to feed your cows efficiently and effectively. Join us in supporting the dairy industry locally and nationally… encouraging people everywhere to take advantage of the many available dairy products, which are among the safest and most nutritious foods you can eat. Our dairy industry is helping to feed Canada… and the world! We are proud to serve dairy producers with quality nutrition, products and services, management insights and information, agronomic support… all the tools needed for maintaining the health, productivity and profitability of dairy animals .

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LAMENESS AND FERTILITY

It's a well-known fact that lame cattle can experience reduced milk production and increased disease incidence, but the effects of lameness can also negatively affect fertility and reproduction. Jeff DeFrain, research nutritionist at Zinpro, says the link between lameness and fertility is what he considers to be a *"hidden transaction"* in the profitability equation. *"Cheques are either written or cashed when it comes to milk income, hoof trimming and culling,"* he says. *"However, the true cost of poor fertility, especially as it relates to lameness, becomes difficult to assess in most cases."* When compared to healthy, non-lame herd mates, research indicates that lame cows have decreased conception rates, more services per conception, increased presence of ovarian cysts and an overall decrease in pregnancy rate.

Physiological effects: *"Lameness is a chronic stressor. Once a stress is detected by the animal, chemical signals are sent to the brain in the form of pro-inflammatory mediators,"* DeFrain says. The brain is constantly interpreting these signals and directing metabolic processes such as the release of reproductive hormones. In essence, the animal goes into *"conservation mode"* and puts strict limits on nutrient use until the problem is eliminated. *"Therefore, until the stressor is removed, levels of hormones such as progesterone will not return to normal,"* DeFrain says. Because of this, poor reproductive performance should be expected if one chooses to inseminate lame cows. Research shows that severely lame cows have lower maximum progesterone concentrations (responsible for maintenance of pregnancy) compared to non-lame cows. Research has also found:

• Cows with abscesses/sole ulcers or with two or more claw disorders had more days open than cows without claw disorders.
• Cows that were clinically lame due to a claw disorder in the first 30 days postpartum had a 58.9% decrease in first service conception rates, a 125% increase in ovarian cysts, and an 8.2% decrease in pregnancy rate at 480 days postpartum.
• Low pregnancy rates in lame cows appear to be associated with failure of ovulation.

Investigating lameness
Just managing lame cows isn't enough. Getting to the root of the problem is critical to reducing lameness. DeFrain says investigating lameness involves these three steps:

1. Locomotion scoring: Everyone on the dairy should be trained in locomotion scoring dairy cattle. This scoring system forms the foundation for visual identification and recruitment of lame cows to be assessed by a qualified hoof trimmer. Hoof-trimming records, which include proper claw lesion diagnosis and recording, should be reviewed routinely during management meetings. *"It should be noted that measurable success in reducing lameness and improving reproductive performance has been realized on dairies approaching lameness as a team of people including management/owner, veterinarian, nutritionist, hoof trimmer and breeding team,"* DeFrain says. Locomotion scoring and hoof-trimming records should be used together to formulate a plan to address the trigger factors causing lameness. Incorporating this approach on a routine basis will provide for greater levels of reproductive performance.

2. Analysis of claw lesions present in the herd: Proper diagnosis of claw lesions at the trim chute forms the foundation for a solid investigation into lameness and reproductive performance. The veterinarian and/or hoof trimmer should work to establish a baseline of current levels of claw lesions present within your herd and make changes to address the lesions expressed in greatest quantity. Lastly, with the veterinarian and nutritionist's help, monitor your herd's reproductive performance.

3. Assess management practices on the dairy: Historically, mistakes in nutritional formulations may have played a significant role in lameness on dairies, DeFrain says. *"Today, it seems the majority of claw lesions present are not directly related to nutrition. Most of the nutritionally-related factors become manifested through how we group and manage cows and how feed deliveries are managed."* The majority of diets fed today are well-balanced; however, the eating and resting/ rumination behavior of the cows becomes affected by how the feed is mixed, delivered and pushed up and how pen stocking densities are managed — all of which significantly affects how the cow consumes the diet and ultimately contributes to compromised rumen function. Lame cows should be addressed immediately. This includes proper functional and corrective trimming technique and isolating these cows to a pen which has a soft, forgiving walking/resting surface, is not overstocked, has ample water supply and a pen which is close to the milking center, DeFrain recommends. "*Typically, the diet for this pen is formulated for a reduced level of intake and is fortified with key nutrients known to affect the growth, healing and repair of the claw such as highly bioavailable forms of trace minerals."* *(Edited from an article by Geni Wren, Dairy Herd Management)*

Water Analysis: Get a good sample first

Water, both availability and quality, are critical for your cows. It is important to obtain an accurate water-quality analysis on a regular basis, which begins with proper water sampling. When you're assessing the quality of your herd's water supply, take two samples, advises Dave Beede, professor of dairy nutrition at Michigan State University. Take one sample as close to the well or primary source of the water supply as possible. Then, take a second sample after the storage compartment of the reserve tank/pressure tank or as close to the cows as you can. Avoid sampling from tanks and other water sources that cows come into contact with, since this can contaminate the sample.

Submit the sample for a standard lab analysis for livestock water. Then, for instance, if the lab report shows iron concentrations greater than 0.3 parts/ million (ppm), or either sulfate or chloride concentrations greater than 250 to 500 ppm, take two more samples and send each to a different certified lab for another analysis and to obtain a comparison. "This may seem like over-kill at the time, but water treatment systems can be a major investment, so it is important to know absolutely for sure that concentrations of a particular analyte are in excess," Beede says. Water quality is important to your livestock! Also, when collecting water for analysis, label and seal two additional samples in screw-top bottles to serve as back-ups and as a historical record.
(Edited from an article by Kim Schoonmaker, Dairy Herd Management)