

# Dairy cow stress is complicated

Contributed by Chris Gwyn

## AT A GLANCE

A variety of stressors can impact cow health and production. Identify the stressors within your control that are impacting your herd and direct your resources toward treating them.

When dairy farmers plan their days, they should lean on this David Allen quote: “You can do anything, but not everything.”

Trying to be a superhero can be daunting. When people try to overachieve and “do everything,” stress can build up inside them and

they may not recognize it until it has taken a physical and/or mental toll. Stress will impair your immune system, increase risk of heart issues, upset your reproductive and digestive systems, speed up the aging process and much more. The same can be true for your cows.

Stress is complicated. The dairy industry has identified many stress factors, but we often only focus on a small handful, and even then, the industry tends to address them



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individually. In reality, stressors can interact and, as farmers know, they can compound one another, negatively impacting cow health, performance, reproduction, longevity – and ultimately your revenue. We call it the Jenga effect. Stressors are like the wooden blocks in that board game. When you stack stressors on top of one another, and you’re missing solutions to overcome them, the risk of losses magnifies. Specifically, those losses are poor reproductive performance, immune dysfunction, increased cull rates and mortality, and reduced milk production and component yield.

More than 30 different stressors can affect the health and performance of dairy cows. We have grouped them into five major areas of concern and outlined keys to reducing their potential damage.

### 1 Weather

As summer temperatures climb, we hear a lot about heat stress. A dairy cow experiences stress when its heat load is greater than its capacity to dissipate heat. The cow often will adapt by modifying its metabolism to reduce heat expenditure. To help battle heat stress, we recommend a whole-farm approach, including management, feeding and precision nutrition strategies. The goal is to maintain good health, feed intake and production levels, even when the temperature-humidity index (THI) reaches 68 or higher.

Farmers rely on heat abatement strategies, including the use of fans, misters and shade. It is also important to increase clean water supplies and avoid overcrowding. In addition, farmers should deliver feed during the coolest time of the day, increase nutrient density of the ration, feed high-quality forages and increase feeding frequency to avoid heating of the ration. And the third principle to the whole-farm approach is a precision nutrition strategy. Research shows that a blend of rumen-protected B vitamins can help cows cope with heat stress. In short, supplying protected B vitamins improves the animal’s ability to make energy and protein more efficiently.

Research indicates it may be beneficial to increase the feeding rate of protected B vitamins (choline, riboflavin and folic acid) during hot weather. On a 1,200-cow commercial herd in Queretaro, Mexico, researchers evaluated the effect of

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30-60 Sec	8.17 Lbs./Min.	7.80 Lbs./Min.	✓
Peak Flow	8.84 Lbs./Min.	8.52 Lbs./Min.	✓
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feeding a higher rate (100 grams versus 50 grams) of the B vitamin blend on health, milk production and reproduction.

The owner was already feeding the blend with good success but wanted to determine if a higher feeding rate would benefit his transition cows during hot weather. Results showed the higher feeding rate reduced metritis by 33.1% and retained placentas by 41%. In addition, there was a 34.7% increase in the first-service conception rate, a 22.4% increase in percentage of cows pregnant after two services, and milk yield was increased by 0.9 kilogram at 10 days in milk (DIM) and 1.7 kilograms at 30 DIM.

During another heat stress study, researchers evaluated the effect of rumen-protected B vitamins and choline supplementation on subclinical ketosis by measuring blood levels of beta hydroxybutyric acid (BHB). Data was collected from 701 cows on 20 farms in Mexico. First, to establish the prevalence of the metabolic disorder, results showed there was a 50% increase of subclinical ketosis during the hot season (cows calving between April 1 to Sept. 30) versus the cool season (Oct. 1 to March 31). Next, researchers measured subclinical ketosis during the hot season and determined that when transition cows were supplemented with the blend of rumen-protected B vitamins and choline, the prevalence rate was reduced by 55.3%.

Stress also can occur during winter weather. Cows strive to maintain a constant core body temperature of about 38°C (101°F). When a cow's temperature drops too low, the cow must expend extra energy to stay warm. To remain productive, animals need protection from extreme cold and excessive snow, rain and dampness.

Other strategies to combat weather-related stressors include good year-round air quality and proper lighting, as a lack of light can slow down metabolism and reduce productivity.

## 2 Routine management procedures

Can management routines unknowingly cause stress? Routine procedures may seem low stress, but when they overlap, they can cause issues. Here's a short list of potential management-related stressors: stocking density, group changes, mixed parity groupings, bunk space, human-animal interactions, housing issues, herd health status and social stress.

During a recent episode of the *RumiNation* podcast titled "Impacts of Stressors on Physiology and Health of Dairy Cows," Dr. Trevor DeVries, professor at University of Guelph, discussed how social stress can have a negative impact and how it can come from a variety of places. "Cows are social animals, and they

like to be in social environments," DeVries explained, "but there are aspects of a social environment that may have a negative effect on cows and actually be stressful. For example, overcrowding at the feedbunk or in the parlour's holding pen."

DeVries also mentioned parity composition of groups and how mixing young animals in with older animals can cause stress, especially in the younger cows.

When it comes to reducing management-related stress, attention to cow comfort is critical. As the old saying goes: A comfortable cow is a cash cow.

While many factors can affect cow comfort, adequate feed and resting space, protection from the elements, access to high-quality feed and water, and training employees on proper animal interactions are all recommended. Human and animal interactions must be positive, calm and quiet. A fearful cow is a stressed, less productive cow.

DeVries said acute stressors, such as poor handling, can have a direct impact on cow physiology and her productivity. "A clear example of that is bad handling of cows in the milking parlour," DeVries said. "A stress like that can cause a cortisol spike in cows, which may lead to a block or reduction in oxytocin release, which may limit milk letdown."

## 3 Stage of production

Calving can be one of the most stressful and metabolically challenging times for a cow, yet there are other key periods of production where significant physiological stress also can occur, including dry-off, pre- and post-calving periods, early lactation through peak milk and breeding.

As Dr. Matt Lucy, professor at the University of Missouri, recently explained on another podcast episode, stress is a big factor in getting cows pregnant. "Traditionally, we always thought about the effects of stress on ovarian function, whether or not the cow had started cycling and come into heat. But more recently, we're trying to understand specifically how stress affects uterine function and the preparation of the uterus for that pregnancy."

According to Lucy, it's important for farmers to understand that reproduction starts in the dry cow pen. "Avoid the long-term drag on cows and take care of them in the transition pen."

Lucy added that it's important to know the difference between stress and strain. "Cows are stressed, but the strain is what matters – how the cow responds to that stress. For example, we have a lot of cows in a herd that make 45 kilograms of milk per day. The stress is the production. However, the strain is how she responds to that. We want our cows

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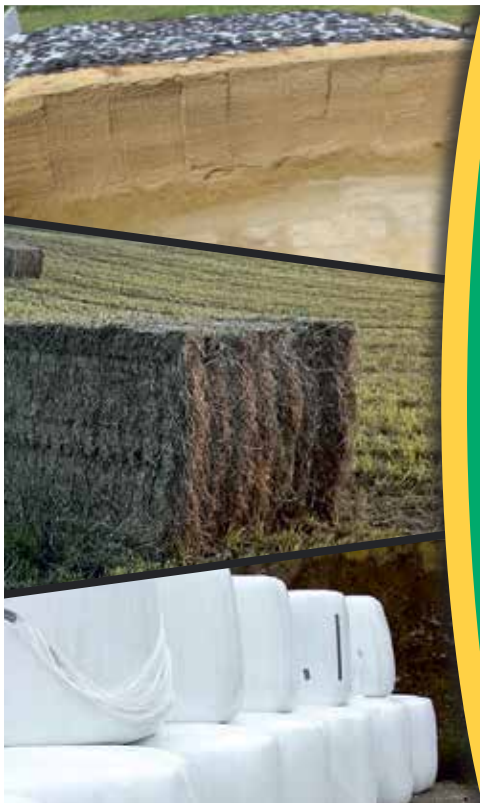
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to have very little strain.”

Genetics allows a farmer to select for a more resilient cow. “We want cows that can handle these stresses,” Lucy said. “Once we have the right kind of cows, then as a producer, you have to manage the remaining strain. You cannot fix everything with genetics – you have to be a top producer and manage the remaining strains like heat stroke, nutrition, bunk space and so forth.”

#### 4 Intake

DeVries said cows can suffer from nutritional stresses. These can be physiological, such as how a cow’s body literally reacts to a change in diet, how the rumen adjusts to it. Or it can be perceptual as the cow simply views a diet change as different and it may stop eating. Intake reduction has a trickle-down effect on energy balance, production and health of the cow. This snowball effect can then lead to even more problems.

Lucy concurred, stating there is no substitution for good management and nutrition. He recommended consistency. “Cows want consistency. In a perfect world, cows get the same TMR at the same time delivered by the same person using the same tractor.” He added that this type of balance acts like a suit of armor for cows and helps them manage the strain from many stressors.

#### 5 Herd health

Whether the problem is lameness, ketosis or mastitis, it’s worth managing, preventing and treating, says University of Manitoba animal science professor Dr. Meagan King. She said, “From subclinical ketosis to moderate lameness, it is definitely worth doing something about it.”

A lot of King’s research has been looking at the impact of stressors on production, whether it is from lameness, overcrowding or feed delivery. She recommends using precision technology, such as rumination or activity tracking information, to look at behaviour, help identify problems early and make better management and nutritional decisions to treat the problem.

While stress can be complicated, the key is to identify which stressors have the biggest impact on you, your cows and your team. Don’t stress out about things you can’t control or can’t change, and know there are people and resources available to help. ↗

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*Chris Gwyn is the sales director at Jefe and host of RumiNation podcast.*

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# Keep cows healthy to improve conception rate at first insemination

Progressive Dairy Editor Emma Ohirko

## AT A GLANCE

Hitting the trifecta of high milk yield, a clean bill of health and strong reproductive performance is attainable if producers monitor and devote resources to preventing common disease events.

Much like the focus elite athletes give to their workouts, training programs and diets, managers of high-producing dairy cows must dedicate a similar level of care and attention to fine-tuning the health and routine of their herd. At least, this is how Dr. Stephen LeBlanc, professor at the University of Guelph, sees it.

“High-producing dairy cows – who metabolically, at peak, are doing the equivalent of running about two marathons a day in terms of caloric output – their demands in terms of nutrition and management and how we look after and support that potential has to be at a very high level,” LeBlanc explained during his recent presentation for Semex titled, “The triple crown or Bermuda triangle?”

LeBlanc’s presentation pulled

from various datasets globally, along with some of the research he has overseen, to answer the question of whether high milk yield, a good health record and strong reproductive performance can coexist in dairy cows. He challenged the often-held idea that producers must accept sacrificing performance in one of these three areas to achieve success in the others.

### The parameters to gauge performance

To dive into the relationship between milk yield, health and reproduction, the parameters to determine animal and herd efficiency in these areas must be gauged. If we take a black-and-white approach to measuring milk yield, quantifying production to the simplified low, medium or high yield, and animals

are viewed as either healthy or unhealthy, producers and their teams can then get a snapshot of how animal performance in these areas may be impacting reproductive performance.

To reveal this snapshot, LeBlanc suggested pregnancy rate as the preferred metric. “For herd monitoring, the single-best measure of reproductive performance of a herd of cows, now and over time, is pregnancy rate, or 21-day pregnancy rate. This is literally the speed at which open cows are converted into pregnant cows,” he stated.

Consistently, disease events, particularly those occurring throughout the transition period such as metritis, retained placenta and cystic ovaries, are found to be associated with a longer time to pregnancy. However, LeBlanc noted, milk yield is not a determining factor. In fact, he explained, an increase in milk yield has been found to be associated with higher herd pregnancy rates.

Compared with healthy cows, cows that experience trouble at calving, metritis, endometritis, mastitis, lameness, ketosis or a

combination of these health events see lower fertility levels.

The repercussions of this can be hard to stomach, as nearly half of cows experience one or more health events during some stage of their productive life. However, this association appears to be unrelated to milk yield, as data on large, very high-producing herds shows cows that stay healthy do very well in terms of pregnancy rates at first insemination.

### The role of disease events on fertility

Now that it has been determined that high milk yield does not have a clear connection to lower reproductive performance, we can turn our attention to the importance of maintaining a healthy herd.

It is well established that any and every health problem is likely to be bad for fertility. However, LeBlanc argued, producers should look deeper into this issue to understand which events have the greatest impact on reproductive performance.

Looking at some common clinical

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