

www.agproud.com/articles/63271-no-off-season-managing-stress-in-dairys-metabolic-athletes



Image by Mike Dixon.

No offseason: Managing stress in dairy's metabolic athletes

Modern dairies treat their cows like elite athletes – pushing them to challenge what's physically possible. In doing so, pro-

ducers need to ensure they are limiting stress inhibitors and utilizing supporting tools.

Dan Shock (</authors/924-dan-shock>)

May 8, 2026

Our modern dairy cows are elite performers. Though our industry is constantly improving, we are at a massive inflection point in gains through the adoption of genomics, artificial intelligence, automated management and monitoring technologies, and precision nutrition. As Dr. Stephen LeBlanc has often said: The modern dairy cow is a metabolic athlete. On a per-kilogram bodyweight basis, her daily energy turnover rivals that of a National Hockey League (NHL) athlete on gameday. The difference is that she does this day-in, day-out, without recovery until dry-off.

Let's take the NHL analogy a step further. Roughly half of professional NHL players will miss time due to injury over the course of a season. This is not because they are poorly trained, but rather the system they operate within pushes them close to their physiological limits. Injury is not only about the single event, but more about the accumulation of stressors adding injury risk.

We see a similar pattern in transition dairy cows. Depending on definitions and monitoring, 30% or more of cows will experience at least one disease event in early lactation. These outcomes are rarely driven by a single cause. Instead, they often reflect stacked stressors: the onset of lactation, negative energy balance, increased calcium demand, social disruption, etc. Couple these challenges with the added demands of production and the margin for error narrows. Small deviations from optimal management start to matter for our 2026 metabolic athletes.

The paradigm has shifted as well. Producers, nutritionists and veterinarians focus not only on treating disease but also proactively managing the biological bottlenecks that precede it. In both athletes and cows, performance is limited not just by output but by resilience. Stress, and how well the cow can adapt to it, sits at the centre of that equation.

From stress to inflammation to disease

Stressors, the external stimuli that can disrupt the homeostatic (a consistent internal state) state of our cows, are everywhere. Stress is the physiological and behavioural response of the animal to that stressor and can be seen as the animal's attempt to bring their system back into homeostasis.

Stress begins as a normal adaptive response. The real issues happen when stressors are intense, repeated/chronic or poorly managed, they drive physiological changes that directly impact health and production. Activation of the hypothalamic-pituitary-adrenal axis leads to increased cortisol, altered glucose metabolism and activation of inflammatory pathways.

What's more, stress alone can trigger changes in the immune system that lead to a state of low-grade inflammation. In transition cows, this inflammation contributes to reduced dry matter intakes, altered metabolism, impaired liver function and immune suppression. In calves, it increases susceptibility to disease and results in poorer growth rates.

By the time the animal shows disease, the underlying biology has long since shifted. We can't look at managing stress and optimizing health and welfare as separate. They are intimately connected.

Stress and immunity

Stress does not simply suppress immunity; it disrupts it. Under repeated or chronic stress (as seen in transition cows or calves at weaning, for example):

- Nutrients are diverted away from immune function and growth
- Immune cells become less effective at responding to pathogens
- Barrier defenses (gut, lung) may be compromised

In young dairy calves, this is especially critical. Early-life stressors (separation, housing, diet changes) occur while the immune system is developing. Studies in preweaned calves show that reducing stress can improve growth and reduce disease incidence and treatment costs.

Physiological indicators support this link. Calves exposed to stress-mitigating strategies show reduced fight-or-flight-associated changes (e.g., lower and more stable heart rates). These changes are consistent with improved adaptive capacity.

What does stress look like on-farm?

Stress is often easier to see in behaviour than in bloodwork. On-farm, animals experiencing higher stress or poor adaptation may show:

- Increased agitation or competition
- Reduced lying time or delayed rest after feeding
- Inconsistent feed intake
- Social instability

Behavioural studies in calves demonstrate that how animals settle after feeding reflect underlying stress and welfare status. For producers, these are practical indicators. Subtle behavioural changes can often precede measurable losses in performance or health.

Practical strategies to reduce stress

Because stress is cumulative and multidimensional, reducing it requires a farm-level approach. It is impossible to abolish stress, so we must focus on reducing stressor intensity/duration, improve predictability and support adaptation.

Feed and intake consistency

Fluctuations in feed delivery or composition increase stress, particularly in transition cows. Consistent timing, minimizing sorting, and maintaining ration stability and ingredient quality are critical.

Manage social stress

Pen moves, regrouping and overcrowding disrupt social structure. Minimizing unnecessary moves and maintaining stable groups can reduce competition and improve intake.

Support the transition period

Close-up and fresh cows benefit from minimizing disruptions, ensuring adequate bunk space and consistent management.

Optimize calf-raising

Early-life management sets the foundation for our herd's future. Key areas include:

- Excellent colostrum management
- Gradual weaning strategies
- Opportunities for social interaction while minimizing disease transmission

Modern raising systems introduce unavoidable stressors, but their impact can be mitigated through thoughtful management.

Calm animal handling

Calm, consistent human interaction reduces fear and improves both welfare and productivity. Variability in handling is a common but often overlooked stressor.

Appeasing pheromones as a supportive tool

Up until this point, we've focused on reducing stressors, but there is increasing interest in tools that help animals better cope with stress. One area of research involves bovine appeasing pheromones (BAP), which are naturally occurring chemical signals produced by the dam that promote calm behaviour in calves.

Synthetic compounds of these pheromones have been extensively studied. Their mode of action involves activating receptors in the mouth that, in turn, signal the cow's brain, modulating their stress response.

In dairy calves and transition cows, research has shown:

- Reduced stress responses
- Improved growth performance during preweaning and postweaning periods
- Reduced disease incidence and lower need for medical treatments
- Improved milk production and reduced somatic cell counts

There is so much science that there has been a meta-analysis already. Across multiple cattle studies there are consistent reductions in circulating cortisol, supporting positive effects on stress physiology.

These tools are not replacements for good management. Their value lies in helping animals cope with unavoidable stressors such as weaning, regrouping or environmental change.

Bringing it together: Managing for resilience

Modern dairy systems are highly efficient, but they also place animals closer to their biological limits. In that context, resilience becomes the key driver of both welfare and performance.

Stress links directly to inflammation, immune function and disease risk. It accumulates across nutrition, environment and social factors. And importantly, it often shows up before disease is visible.

For producers, the opportunity is clear:

- Identify stress in your system.
- Reduce unnecessary variability and disruptions.
- Monitor behavioural indicators alongside production/health metrics.
- Consider supportive tools like BAP that help animals adapt.
- The goal is not just higher production – it is more consistent, more resilient performance.

In elite athletes, success depends on managing cumulative load as much as maximizing performance. The same principle applies to dairy cattle. As we continue to push performance, the systems that support adaptation will determine how far we can go.