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Managing stress to improve calf performance

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The goal of the dairy replacement program is to economically raise heifers to be of adequate size and body condition to calve at a reasonable age to produce high levels of high-quality milk during the first lactation. Pre-weaned calf management practices, good or bad, establish the trajectory of the dairy replacement program and affect the program's outcomes. Many factors contribute to successfully rearing a calf from birth to weaning including care of the dam prior to calving, calving environment, calf housing, feeding management, and health care (prevention and treatment). Stress management is also key to achieving high heifer survival rates and calf performance and is the focus of this article.

The Miriam Webster Dictionary defines stress as a physical, chemical, or emotional factor that causes bodily or mental tension and may be a factor in disease causation. Physiologically, stress can decrease feed intake; compromise the gut making the calf more susceptible to disease; increase inflammation; and increase energy needs. Calf responses to stress may include poor performance as seen through reduced growth rates, increased morbidity (number of calves getting sick), and increased mortality (number of calves dying).

Common calf stressors include temperature extremes, diet/inconsistent feeding practices, disbudding, handling and transportation, poor housing conditions, pests, and weaning.

Change is often associated with stress. Although the pre-weaning period is typically only eight weeks long, the calf experiences many nutritional changes during this time. Soon after birth, the calf is separated from the dam and fed colostrum. The calf transitions to a different liquid diet (milk replacer, saleable milk, waste milk) over the next few days. Calf starter and ad lib water are introduced soon thereafter. One of the things that automatic calf feeders can do well when properly programmed is to step up total solids fed as the calf ages and then step down to encourage more starter intake as the calf nears weaning, which provides for a less stressful weaning for the calf. Similar approaches have been taken when bottle feeding and may include several days of once-a-day feeding prior to weaning.

Consistency can be very helpful in reducing stress as dairy animals are creatures of habit and respond best when consistent practices are maintained. One way to support consistency is to develop protocols, also known as standard operating procedures, for pre-weaned calves. Examples of protocols that could enhance pre-weaned calf management are calving, dystocia (calving difficulties), newborn calf care, feeding, disbudding, and disease treatment (specifically scours and pneumonia). The calf manager, other employees, and the herd

veterinarian should be involved in writing the protocols. Training should be provided to all employees involved in calf care. Protocols should be posted in a conspicuous place for quick reference and a constant reminder of the proper way of handling calf management tasks.

One of the best ways to mitigate stress for calves is to spread out when stressful management practices are performed. For example, it would be a recipe for disaster to wean, dehorn, and move a heifer from individual to group housing on the same day. Compounding stressors increases the odds for a bad outcome (illness or poor average daily gains). Disbudding should take place prior to weaning and should be done with pain mitigation. Weaning decisions should be based on grain intake but should be delayed if a calf is having a health issue such as scours or pneumonia. It's recommended to wait to move individually housed calves into group pens for a week after weaning to facilitate the transition to the solid diet without competition.

Many types of housing systems are used to raise pre-weaned calves. Regardless of the system, calf housing should be clean, dry, well-ventilated, and draft-free to reduce stress and prevent disease.

To effectively evaluate the management of pre-weaned calves, the calf manager needs detailed records. Calf managers should record calf ID; dates of birth, disbudding, and weaning; vaccinations; illness diagnoses along with dates, treatments, and outcomes; body weights at birth and weaning; and necropsy results for calves that die. Summarizing this information can provide a more objective analysis of the state of the program.

The Dairy Calf and Heifer Association's Gold Standards provides targets for pre-weaned calves. Comparing one's heifer program to the standards can indicate the level of performance being achieved. From a growth standpoint, calves should double their birth weight by 56 days of age (8 weeks). From a health perspective, the survival rate from 24 hours to 60 days of age should be greater than or equal to 97 percent. This equates to a mortality rate of less than or equal to three percent. The target morbidity rate due to pneumonia pre-weaning should be less than 10 percent. For scours, the target morbidity rate should be less than 15 percent.

The benefits of reducing stress for pre-weaned calves are numerous. Performance of calves will improve because of improved immune function and improved feed conversion. If good management persists throughout rearing, calves should go on to have an earlier age at first calving and produce more milk during the first lactation.

Prototheca mastitis: Prevention is your best treatment

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Over the past several months, our laboratory has identified an increase in milk samples that have cultured positive for ***Prototheca***, an environmental algae capable of causing chronic mastitis in dairy cattle. Although *Prototheca* mastitis has historically been considered relatively uncommon, many laboratories and veterinarians are reporting more frequent cases. Whether this reflects a true increase in prevalence or greater awareness and testing, it serves as an important reminder that prevention remains the best management strategy.

Unlike the bacteria that commonly cause mastitis, ***Prototheca* is a colorless algae** that thrives in wet, organic environments. It is commonly found in manure, standing water, mud, contaminated bedding, water troughs, parlor drop hoses and areas with poor drainage. Because it is an environmental organism, cows are exposed to it regularly. Disease develops when the organism gains access to the teat canal, often during milking or while cows are lying in contaminated environments.

What does *Prototheca* mastitis look like?

Prototheca infections can be difficult to recognize because they do not always resemble typical cases of clinical mastitis. Some cows develop mild changes in milk appearance, while others show

little to no visible abnormalities. In many cases, producers first notice:

- Persistently elevated somatic cell counts
- Recurrent mastitis in the same quarter
- Decreased milk production from the affected quarter
- A quarter that fails to respond to antibiotic therapy

Unfortunately, once a cow becomes infected, the organism often establishes a chronic infection within the mammary gland. Antibiotic treatment is ineffective because *Prototheca* is an algae, not a bacteria, and currently there are **no approved or consistently effective treatments** available. Many infected cows remain culture-positive for life.

Why early identification matters

Because infected cows continuously shed *Prototheca* organisms in their milk, they can become a source of environmental contamination. While cow-to-cow transmission during milking is considered less common than with contagious mastitis pathogens, contaminated milking equipment, liners, towels, or milkers' hands may contribute to spread if proper milking hygiene is not followed.

For this reason, identifying infected cows is critical. Repeated cases of mastitis that fail to respond to treatment should be cultured before additional therapy is attempted. Knowing the cause of the infection allows producers to make informed management decisions and avoid unnecessary antibiotic use.

Prevention is the best defense

Since treatment options are extremely limited, prevention focuses on minimizing cows' exposure to the organism.

Key management practices include:

- Keep housing, bedding, and loafing areas as clean and dry as possible
- Improve drainage around waterers, feed bunks, holding pens, and high-traffic areas
- Regularly clean and maintain water troughs to prevent algae growth and organic buildup
- Replace wet or heavily contaminated bedding promptly
- Follow consistent pre- and post-milking teat sanitation procedures with effective and approved germicides
- Wear clean gloves during milking and change or disinfect gloves when they become contaminated
- Limit water use in the parlor and consider treating drop hoses
- Ensure milking equipment is functioning properly and is thoroughly cleaned and sanitized after every milking
- If misters are used for heat abatement, ensure the water flow is such that cows are not soaked with water dripping down to their udders

Managing infected cows

Once *Prototheca* has been confirmed, producers should work closely with their veterinarian and herd management team to develop an appropriate plan. Depending on the severity of infection and the cow's production level, options may include:

- Permanently segregating infected cows
- Milking infected cows last
- Drying off the affected quarter when appropriate
- Culling chronically infected animals, particularly those with multiple infected quarters or repeated positive cultures

Although culling is never an easy decision, chronically infected cows often represent an ongoing source of environmental contamination and reduced herd profitability.

Take-Home Message

Prototheca mastitis remains an uncommon disease compared with traditional bacterial mastitis pathogens, but recent laboratory submissions suggest it deserves increased attention. Because effective treatment is not available, success depends on **early diagnosis, excellent environmental management, and strong milking hygiene**.

If your herd is experiencing mastitis cases that do not respond to therapy or cows with persistently elevated somatic cell counts, consider submitting

milk samples for culture. Identifying the causative organism is the first step toward making informed management decisions and protecting the health of the remainder of the herd.

Upcoming Events

September 12-16, 2026
All American Dairy Show

September 23, 2026
Southeast Dairy Business Innovation Initiative Grants Closing:

- Dairy Business Planning Grant
- Specialty Processing Equipment Grant

September 24 - October 4, 2026
Virginia State Fair

September 25, 2026
State Fair Junior Dairymen's Contest (Youth)

September 25, 2026
Temple Grandin at Virginia Tech (In-person talks; Livestream option available)
Tickets: https://go.vt.edu/usasF

- 1:00 PM – *Humane Livestock Handling*
- 5:00 PM – *Great Minds Are Not All the Same*

September 29-October 2, 2026
World Dairy Expo

November 5-19, 2026
North American International Livestock Expo

If you are a person with a disability and require any auxiliary aids, services, or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.

Additional notes:

▪ The dairy extension group is working with VDH to assist in distributing PPE to dairy farms. Request a kit online at https://shorturl.at/ethov or contact your local extension agent. Requests will be filled as supplies allow.

▪ Your input could guide future programming. Please complete the short survey at https://tinyurl.com/dairy-extension.

For more information on Dairy Extension or to learn more about our current programs, visit us at VTDairy—Home of the Dairy Extension Program online at www.sas.vt.edu/extension/vtdairy.html

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