Time to Prepare Calves For Cold Weather

Only a third of dairy producers change calf-feeding practices in cold weather, study shows.

It's hard to believe we're heading into winter months again. That means it's time to prepare your calves for cold weather.

As a rule of thumb, if you need to wear a sweatshirt to do chores, temperatures are cool enough to turn your focus on a winter calf management program. The thermal neutral zone (comfort zone) for newborn calves is 50 to 78 degrees F, while 1-month-old calves' thermal neutral zone is 32 to 78 degrees. Once the temperature reaches below the lower critical temperature of 32 degrees for 1-month-old calves or 50 degrees for newborn calves, the energy they consume is used for maintenance, making less available for growth and immune function.

Is it really that bad? See it from the calf's perceptive. If a 100-pound calf has only 1.5 pounds of fat reserve at birth, this fat reserve can easily be depleted within 18 hours under certain conditions. For every 1-degree drop below the lower critical temperature, maintenance requirements increase 1%. If energy increase is not provided, calves have the potential to become sick or die.

Based on a USDA National Animal Health Monitoring System study, only 33% of dairy producers change calf-feeding practices in cold weather. Failure to minimize the effects of cold stress results in depressed immune function, increased risk of sickness, poor response to treatment, decreased growth performance and possible death.

A calf can stand a good deal of cold weather if it is dry and protected from drafts. To minimize cold stress, one area of focus is the calf's environment. This includes the calf's resting space, feeding area and walking surface. As temperatures begin to drop in fall, the following are ways to minimize cold stress:

- **A dry, clean place to lie with plenty of bedding.** Based on University of Wisconsin research, calves tend to lie down nearly 50% of the time during the day and 100% of the time at night. Wet bedding causes the calf's hair coat to clump and lose insulation value. Ideal bedding provides a good base to soak up liquid, provide a buffer from the cold ground, provide insulation and allow the calf to nestle. Dairy Calf and Heifer Association Gold Standards recommend 6 to 12 inches or 20 to 25 pounds of bedding per calf to provide a good base. To maintain the base, 2 to 3 pounds of bedding per day should be added to the pen or hutch. The amount of bedding used is more important than the specific material used.
- **Plenty of fresh air with minimal draft.** UW School of Veterinary Medicine research shows that as temperatures fall, pneumonia incidences rise.

Pneumonia can be attributed to cold stress and calves not meeting their energy needs to support their immune systems. Also, pneumonia can be attributed to poor air quality as producers close up barns during the winter. DCHA Gold Standard II indicates indoor ventilation rate should be 50 cubic feet per minute during mild weather and 15 cfm during cold weather to provide good air quality while minimizing cold air drafts.

- **Blankets to help keep calves warm.** North Dakota State University research shows calves wearing calf blankets during cold weather had 1.4 pounds of daily gain from birth to 4 weeks of age as compared to 1.2 pounds of gain by calves with no blanket. Blankets should fit properly and allow room for growth. Blankets should be dry. Monitor blanket use to minimize sweating or overheating, which would affect the insulation value of the calf's hair coat.
- **Minimum frost or condensation.** During very cold weather, minimize frost or condensation to reduce bacterial growth in pens and the calving environment.

As you plan for this winter's calf management program, don't forget about the calves' environment. Focus on comfort and cleanliness to help your calves thrive this winter season.

Written by Tina Kohlman, Extension dairy and livestock agent in Fond du Lac County, Wis. This column is provided by the University of Wisconsin-Extension Dairy Team.

App Helps Farmers Make the Most of Their Corn Harvest

A new tool developed at the University of Wisconsin–Madison could save farmers time and money during the fall feed-corn harvest and make for more content, productive cows year-round.

The innovation isn't a physical farm implement, but a smartphone app. With just a handful of harvested corn, the app allows farmers to gauge — without leaving the field — the effectiveness of their harvesting machinery so that they can achieve the highest-quality cracked corn.

The app — named SilageSnap — is now available for free download on the Apple App Store and Google Play Store. More information is available at https://go.wisc.edu/silagesnap.

Cracking corn breaks up the tough outer kernel, exposing the nutritious starch inside. "Cracked corn makes the feed easier to digest, so cows can produce more milk," says Brian Luck, a UW–Madison assistant professor of biological systems engineering and extension machinery systems specialist, who helped develop the app.

Excellently cracked corn can boost milk production by up to two pounds (or, about a quart) per cow per day, according to studies conducted in UW–Madison's Department of Dairy Science.

Harvest machinery cracks corn by passing pieces of plant material between two grinding roller-wheels. Wear and tear on the machine can make it less effective, and some fields of corn resist cracking more than others.

Farmers can fine-tune their harvests to a certain extent by controlling the width of the gap between the wheels: Narrower spaces squeeze kernels more strongly, but also slow down the equipment — and thus, the harvest; wider gaps allow the machines to move faster, but risk leaving too many kernels intact.

"The problem is, when the harvester goes through the field, there's no way for farmers to tell how well they cracked the kernels," says Luck.

Even though farmers can easily recognize whole, uncracked corn kernels in their harvest, it's almost impossible for them to tell at a glance what percentage of the cracked corn is just right. After the harvest, farmers send samples of their corn to commercial labs that dry and pass the grain through nine shaking and rotating sieves of varying sizes in a large proprietary contraption that eventually returns a number for the overall corn silage processing score.

And that score determines the corn's value as animal feed.

If 70 percent of the cracked corn fits through a hole the width of a standard drinking straw, then the corn receives an excellent score—fit for a dairy cow's feast. Unfortunately for many farmers, the lab results yield merely adequate, or even poor, scores, meaning they must feed their cows much more grain every day to meet nutritional requirements.

The SilageSnap app is a convenient and accurate in-the-field alternative to after-the-fact processing scores. While farmers don't have access to lab equipment on their tractors, most do carry smartphones in their pockets—and those small devices pack more than enough computational muscle to measure corn kernels.

"We wanted to develop a product that would help the people of Wisconsin," says Rebecca Willett, who collaborated with Luck on the project while she was an associate professor of electrical and computer engineering at UW–Madison. She is now a professor of computer science and statistics at the University of Chicago. "The app is very efficient and fast; you get a response almost immediately. Producers can even use it throughout their fields to adapt to changing field conditions. Because it uses so little power, repeated use does not drain their batteries."

To use the app, farmers merely spread out a small sample of corn, set down a coin to calibrate for pixel size, and snap a photo with their phones. Image-processing algorithms then calculate kernel-processing scores right there in the field, instead of weeks after the harvest at an external lab.

Based on kernel processing scores and summary statistics from the app, farmers can fine-tune their machinery on the spot — rather than develop contingency plans after the harvest is well over. And initial results suggest that the scores returned from the app align very closely with official results from commercial corn silage processing score evaluations.

SilageSnap gives farmers information that frees them from the uncertain trade-off between creeping through the corn rows slowly to thoroughly pulverize every last piece of plant material or speeding up the process at the risk of harvesting an entire silo's worth of lower value feed corn. "It all comes down to data," says Luck. "How much data can people gather to assess their operations and maximize efficiency?"

The project was supported by grants from the Midwest Forage Association and the Ira and Ineva Reilly Baldwin Wisconsin Idea Endowment at UW–Madison.

Collaborators Brian Luck (right), a UW–Madison assistant professor of biological systems engineering and extension machinery systems specialist, and Rebecca Willett, a former UW–Madison associate professor of electrical and computer engineering who is now at the University of Chicago. Photo: UW-Madison

University of Wisconsin Extension, Aerica Bjurstrom, Agriculture Agent
920-388-7138 * aerica.bjurstrom@wisc.edu

Simplified Scoring System to Identify Respiratory Disease in Dairy Calves

Bovine respiratory disease (BRD), also known as shipping fever or pneumonia, is a significant problem for dairy replacement heifers. According to reports from the National Animal Health Monitoring System (NAHMS), 18.1% of pre-weaned dairy heifers experienced respiratory disease (USDA 2012), but respiratory problems accounted for 22.5% of deaths in unweaned heifers and 46.5% in weaned heifers (USDA 2010). That means respiratory disease is the single greatest cause of heifer deaths after weaning. Long term effects on performance include decreased probability of survival to first calving, decreased growth, delayed age at first calving, increased probability of having a difficult delivery at first calving, premature culling, and reduced lifetime profit (Heinrichs et al 2005, Guliksen et al 2009, Stanton et al 2012, Bach 2011).

Please visit https://dairy-cattle.extension.org/2019/08/please-check-this-link-first-if-you-are-interested-in-organic-or-specialty-dairy-production/ if you are interested in organic or specialty dairy production.

Early detection and treatment of sick animals is important regardless of cause. Often there are multiple causes such as a combination of viral and bacterial infections along with various management and environmental stressors. Among a group of animals, individuals may be observed with varying severity and stage of disease. Diagnostic tests can be expensive, so care takers should be trained to consistently assess an animal's health status. **BRD scoring systems present a way to standardize diagnosis across a large number of animals.**

Simple and Useful Tool to Assess Respiratory Disease
The usefulness of a disease scoring system for dairy farms is limited by the logistics and practicalities of on-site implementation. A new on-farm bovine respiratory disease (BRD) scoring system has recently been created in an effort to provide an easy and accurate way to diagnose BRD in pre-weaned dairy calves (Love et al. 2014).

Five's the Limit
This simplified scoring system assesses six clinical signs. When present, a specific number of points are assigned for each sign. **A total score of 5 or higher classifies an individual as a BRD case.**

Cough = 2 points
Eye discharge = 2 points
Fever ($\geq$ 39.2°C) = 2 points
Abnormal respiration = 2 points
Nasal discharge = 4 points
Ear droop or head tilt = 5 points

One of the advantages of this system is that a rectal temperature is not needed for every calf; it is only needed if the total score for the visible signs is 4. A temperature could then tip the score over the cutoff of 5.

Please see Figure 1 for a detailed outline of the scoring. A printable version of the scoring system (in English and Spanish) can be found at:http://www.vmtrc.ucdavis.edu/laboratories/epilab/scoringsystem.pdf.

Figure 1. Scoring matrix for the simplified scoring system. (http://www.vmtrc.ucdavis.edu/laboratories/epilab/scoringsystem.pdf)

Simple and Accurate
Validation of the simplified scoring system was performed by scoring 500 hutch-raised calves in parallel on both the new system and the Wisconsin system. The Wisconsin system uses five clinical signs scored by level of severity (http://www.vetmed.wisc.edu/dms/fapm/fapmtools/8calf/calf_respiratory_scoring_chart.pdf). In addition to scoring with both systems, the calves were evaluated for pneumonia using a stethoscope and ultrasound of the lungs. Sensitivity and specificity were determined for each system (Table 1) (Aly et al. 2014). Sensitivity is a measure of the proportion of true positives among all of the positive results (i.e., the number of actually diseased animals, as determined by clinical signs in combination with microbiological testing and abnormal lung sounds or abnormal ultrasound, which return a positive test result – the rest are false positives). Specificity measures the opposite, the proportion of true negatives among all of the negative results (i.e., the number of healthy animals that return a negative test result – the rest are false negatives).

Table 1. Sensitivity and specificity of each scoring system performed on the same 500 calves.

System	Sensitivity	Specificity
Simplified system	72.3%	89.9%
Wisconsin system	70.8%	93.1%

*The difference in sensitivity is not statistically significant (P=0.695). The difference in specificity is statistically significant (P=0.041), but the implications of this are currently unknown.

Table 1 shows that both systems result in comparable sensitivity and specificity.

Further research on the diagnostic performance of BRD scoring systems in entire populations, as well as the development of a customizable risk assessment tool, are underway.

Benefits of Respiratory Scoring
At the end of the day, the best scoring system for a particular farm is the one that will actually be used on a regular basis to determine which animals are sick. A simplified system that is easy to implement allows for the identification of sick animals more efficiently, thereby allowing them to be treated in a timelier manner. This has positive implications not only for the individual calf, but overall for animal welfare improvement.

To view a presentation about the simplified scoring system, please visit: https://www.youtube.com/watch?v=4r0CQOZ1s9Y.

To view a presentation about the Wisconsin system, please visit: https://www.youtube.com/watch?v=uGOCn2NcAOo.

Author Information
Amy Young
Staff Research Associate, UC Davis

Harvest of Hope Fund

What does a Wisconsin farm family do when they experience a financial crisis due to low commodity prices … escalating costs of fuel, fertilizer and other inputs … shifting global markets … a medical emergency … drought, flooding or other climatic conditions … or some combination of these factors? Many families have turned to the Harvest of Hope Fund. More than 1,650 gifts totaling over $1,070.000 have been granted to Wisconsin farm families since the fund was created in January 1986.

If you are a Wisconsin farm family needing financial help to meet emergency needs, please fill out and send the "Application Form" and "Financial Planning Statement" (both forms are needed to make a funding decision). Feel free to contact us for additional information at (608) 836-4633.