

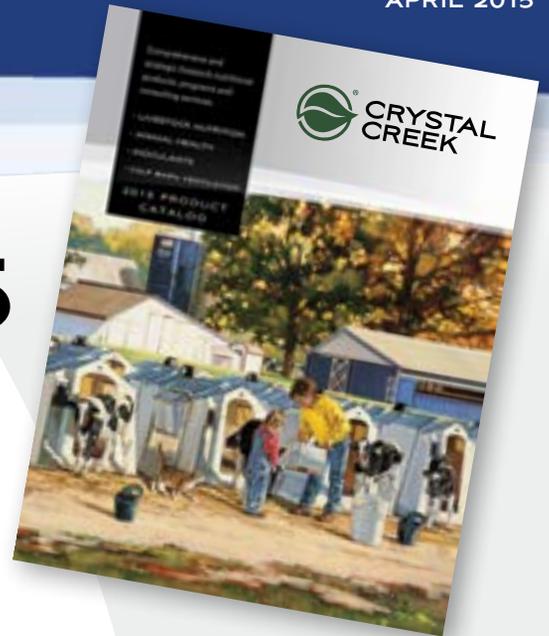
## WHAT'S NEW FOR 2015

### Inoc-U-Lock™ Buchneri HIGH PERFORMANCE INOCULANT



*Offers two primary benefits for corn silage and high moisture grain storage:*

- 1) A powerful inoculant for enhanced fermentation performance to reduce dry matter loss and preserve feed quality.
- 2) Stabilizes storage face quality and extends bunk life for improved dry matter intake and better livestock performance.



## Family Flock® PREMIUM POULTRY FEED

Crystal Creek® takes great pride in providing families with a high quality nutrition program that can be tailored to meet the needs of any size flock. The Family Flock® products provide many innovative benefits such as:

- Improved bird health and performance for egg and meat production
- Superior nutrient density in eggs and meat
- Exceptional value



### Available In Certified Organic And Non-Organic Options

Call today to ask about which **Family Flock®** option is right for you.

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# Introducing Crystal Creek®'s Inoc-U-Lock™ Buchneri:

*An Inoculant Specifically Designed For Corn Silage  
And High Moisture Grains*



By Dan Leiterman

The very foundation of profitable livestock production relies on feeding high quality feedstuffs. Also, the need to feed high quality forages which are critical to a healthy bottom line for any dairy or beef producer, is a well understood principle in

the industry. Over the years research has shown that applying a good inoculant to feedstuffs at the time of ensiling can provide a significant return on investment for the producer. A well designed inoculant program will help speed fermentation to reduce dry matter loss, reduce protein degradation, reduce lost energy (sugars), stabilize the face quality and improve bunk shelf life. Additional benefits include enhanced dry matter intake, improved feedstuff digestibility, improved milk and meat production and ultimately improved profits for the producer. Using a good inoculant like Inoc-U-Lock™ is a smart business decision. The focus of this article is to explain the Inoc-U-Lock™ controlled fermentation process and to describe where the *L. buchneri* bacteria may fit into your program.

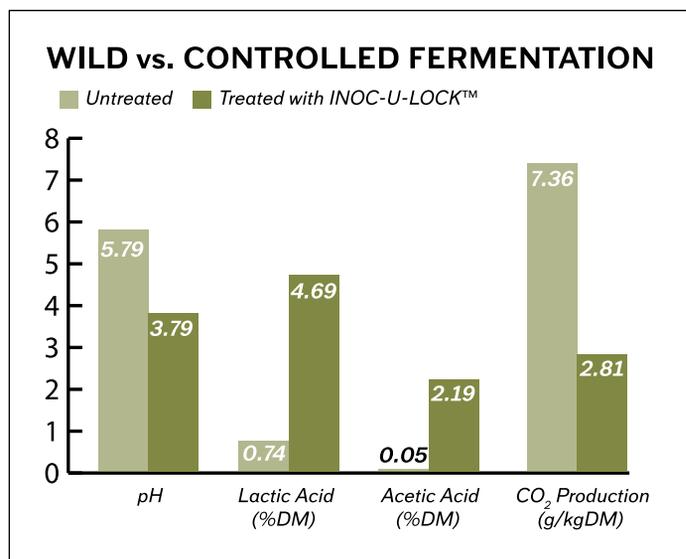
## 1) Wild vs. Controlled Fermentation:

Wild fermentation relies solely on the bacteria normally found on the feedstuff, which in many cases is inadequate for optimum fermentation (See *Figure 1*). Inoc-U-Lock™ contributes 5 different strains of bacteria to the fermentation process. Each strain of bacteria produces acids (lactic, propionic or acetic) to lower the pH to a range where the next strain of bacteria can take over. The next bacteria strain then produces more acids to continue lowering the pH, until another specific bacteria strain takes over in its optimum pH range. Much like a relay race, each bacteria strain is doing its job and then handing off to the next bacteria team in a controlled step-by-step process, which quickly drives the feedstuff pH to < 4.0. Inoculants containing only one or two bacteria strains, or having bacteria that are weak performers, may not provide the level of control needed to drive optimum



fermentation. Relying on wild fermentation to fill in the pH gaps is just too risky. Inoc-U-Lock™ with its strategic team of bacteria, provides a more driven and controlled fermentation process. Inoc-U-Lock™ also provides 4 categories of enzymes to help make critical nutrients available to the bacteria, allowing the bacteria to produce the acids necessary to lower the pH. A well built enzyme program will add strength and control to the fermentation process, further reducing the risk of lost revenue.

**Figure 1** Research trial showing the difference between wild and controlled fermentation



## All Inoc-U-Lock™ Products Contain:

(5) Strains Of Bacteria	pH Range	Purpose	(4) Enzymes
Lactobacillus acidophilus	8.5 to 3.5	Fermentation w/Lactic Acid	Cellulase
Pediococcus pentosaceus	7.5 to 4.2	Fermentation w/Lactic Acid	Hemicellulase
Pediococcus acidilactici	7.5 to 4.2	Fermentation w/Lactic Acid	Xylanase
Lactobacillus plantarum	7.8 to 2.0	Fermentation w/Lactic Acid	Amylase
Propionibacterium freudenreichii	6.5 to 4.0	Aerobic Stability w/Propionic & Acetic Acid	

## Inoc-U-Lock™ Buchneri Contains:

Inoc-U-Lock™ Buchneri Contains:	Purpose	Enzymes
All the above bacteria plus Lactobacillus buchneri	Aerobic Stability w/Acetic Acid	All of the Above

## 2) Inoc-U-Lock™ Provides Significant Aerobic Stability

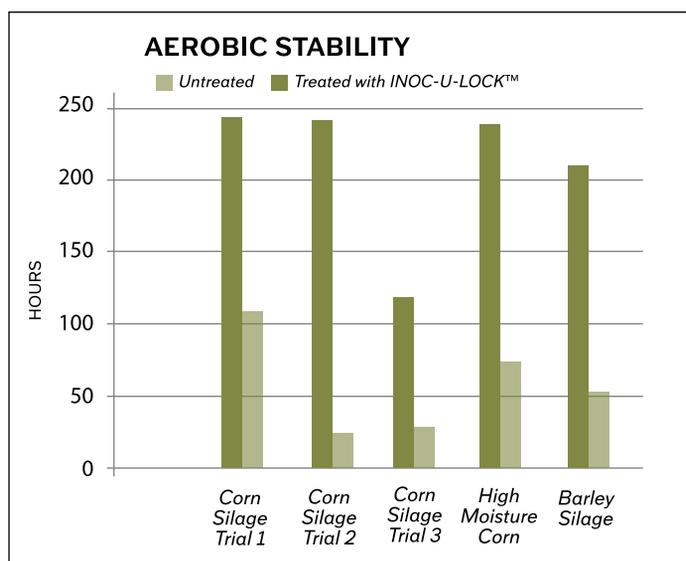
Having aerobic stability on a feedstuff means that when exposed to air, microbes like yeast have difficulty growing, which results in less heating and spoilage of the feedstuff. Research shows that the Inoc-U-Lock™ formula is effective at improving aerobic stability in different types of feeds and their associated storage methods (See Figure 2). Inoc-U-Lock™ reduces the risk of molding and heating on the storage face (piles, bunkers, silos) and in the feed bunk, which means less wasted feed, improved dry matter intakes, better production and improved profitability.

## 3) The Role Of Lactobacillus buchneri Bacteria In Livestock Feed Inoculants:

Lactobacillus buchneri (L. buchneri) bacteria has become popular in recent years because of its ability to provide additional aerobic stability, thereby supporting even better storage face quality and longer bunk-life to feedstuffs.

It is important to know however, that L. buchneri does not contribute to the fermentation of the feedstuff. It generally takes several weeks before L. buchneri starts to function in the feedstuff, well after the pH has been lowered to 4.0. When L. buchneri does start to function, it eats lactic acid (which has been produced by the fermenting bacteria to drive the pH to < 4.0) and produces both acetic acid and carbon dioxide. Having L. buchneri in an inoculant will help to control yeast growth once the feedstuff is already fermented. By reducing yeast growth, L. buchneri can provide

Figure 2 Research showing aerobic stability.



additional aerobic stability, further reducing storage face spoilage and heating in the feed bunk.

Because L. buchneri contributes nothing to the necessary fermentation process, it should not be the only bacteria in an inoculant. Using only L. buchneri is essentially the same as having a wild, uncontrolled fermentation which is very risky. A fully formulated inoculant like Inoc-U-Lock™ should be applied to the feedstuff to drive a controlled fermentation. Inoc-U-Lock™ Buchneri is a fully formulated fermentation inoculant that contains both P. freudenreichii bacteria and L. buchneri bacteria to help stabilize the face of ensiled/fermented feeds as well as feed in the bunk. These two bacteria work together to protect feed that has been exposed to the air and reduces the risk of heating and spoilage.

(CONTINUED ON PAGE 4)

#### 4) Where To Use A L. buchneri Bacteria:

The preferred feedstuffs for application of an Inoc-U-Lock™ Buchneri is grain silages like corn silage or high moisture grains like high moisture corn. It is not recommended to put L. buchneri on haylage or balage type feedstuffs due to their lower carbohydrate levels and lower risk of yeast growth. Research indicates that the proper application rate of a L. buchneri bacteria would be 100,000 CFU/gram of corn silage and 200,000 CFU/gram of high moisture corn. Adding higher levels (over 100,000 and 200,00 CFU/gram respectively) of L. buchneri to feedstuffs is not necessary for good performance (in most cases) and only adds unnecessary cost per ton to the producer.

#### 5) Application Rates For Inoc-U-Lock™ Buchneri:

##### Corn Silage:

The recommended application rates for Inoc-U-Lock™ Buchneri on corn silage provides 100,000 CFU/gram of the fully formulated Inoc-U-Lock™ inoculant, plus an additional 100,000 CFU/gram of the L. Buchneri.

##### High Moisture Corn:

The application rate of Inoc-U-Lock™ Buchneri for high moisture corn is doubled, which provides 200,000 CFU/gram of the fully formulated Inoc-U-Lock™ inoculant, plus an additional 200,000 CFU/gram of the L. Buchneri bacteria. In extreme need situations, Inoc-U-Lock™ Buchneri could be applied at an even higher level to provide 300,000 CFU/gram of the fully formulated Inoc-U-Lock™ fermentation inoculant, plus the 300,000 CFU/gram of the L. Buchneri bacteria.

##### Storage:

Inoc-U-Lock™ Buchneri is only available in a water soluble form, for liquid application. Inoc-U-Lock™ Buchneri needs to be kept in the freezer (freezer - not the refrigerator) for proper storage prior to use. Appropriate shipping techniques and timing of order shipment (to avoid weekend transit) will help to ensure that you receive a viable product. When ordering any of the Inoc-U-Lock™ inoculants, be sure to do so well in advance, so you have your Inoc-U-Lock™ when you need it.



v.schlichting / Shutterstock.com

#### 6) Inoc-U-Lock™ Buchneri Meets NOP Standards:

Inoc-U-Lock™ Buchneri is formulated to be allowed for organic use. Check with your organic certifier to verify its ability to be used for organic production before applying.

**Crystal Creek® Offers A Full Line Of High Performance Inoculants For All Of Your Ensiling Needs, (See Figure 3, 4, 5 and 6).**

The Inoc-U-Lock™ line of inoculants are excellent, high performance products, and offer great value. You will find that using Inoc-U-Lock™ in your operation is a smart business decision!

##### \*Freeze Inoc-U-Lock™ Buchneri Until Use

*DISCLAIMER: Because the manufacturer cannot control the condition of application, storage and handling practices, no expressed warranty is made. Normal expected results from using this inoculant can only be expected when the application, storage and hauling is followed as instructed.*

**Figure 3**

<b>INOC-U-LOCK™ DRY</b>			
<b>Crop</b>	Corn & Sorghum Silage	Grass or Legume Haylage & Small Grain Silage	High Moisture Corn
<b>25 lb. Bag</b>	Treats 100 tons	Treats 50 tons	Treats 33.3 tons
<b>Bacteria CFUs Per Gram Of Crop</b>	100,000 CFUs/gram	200,000 CFUs/gram	300,000 CFUs/gram
<b>Treatment Cost/Ton</b>	\$0.65	\$1.30	\$1.95

**Figure 4**

<b>INOC-U-LOCK™ BH (For Baled Hay)</b>			
<b>Tons Per Jar</b>	<b>20 tons</b>	<b>13 tons</b>	<b>10 tons</b>
<b>Grams Per Ton of Baled Hay</b>	20 gm	30 gm	40 gm
<b>% Moisture of Baled Hay</b>	<18%	18-20%	20-22%
<b>Bacteria CFUs Per Gram Of Baled Hay</b>	210,000 CFUs/gram	315,000 CFUs/gram	420,000 CFUs/gram
<b>Treatment Cost/Ton</b>	\$4.10	\$6.30	\$8.20

**Figure 5**

<b>INOC-U-LOCK™ WS (Water Soluble)</b>			
<b>Crop</b>	Corn & Sorghum Silage	Grass or Legume Haylage & Small Grain Silage	High Moisture Corn
<b>350 gram Jar</b>	Treats 200 tons	Treats 100 tons	Treats 66 tons
<b>Bacteria CFUs Per Gram Of Crop</b>	100,000 CFUs/gram	200,000 CFUs/gram	300,000 CFUs/gram
<b>Treatment Cost/Ton</b>	\$0.65	\$1.30	\$1.95

**Figure 6**

<b>INOC-U-LOCK™ BUCHNERI</b>		
<b>Crop</b>	Corn & Sorghum Silage	High Moisture Corn
<b>350 gram Foil Packet</b>	Treats 200 tons	Treats 100 tons
<b>INOC-U-LOCK™ Bacteria CFUs Per Gram Of Crop</b>	100,000 CFUs/gram	200,000 CFUs/gram
<b>PLUS L. Buchneri Bacteria</b>	PLUS 100,000 CFUs/gram	PLUS 200,000 CFUs/gram
<b>Treatment Cost/Ton</b>	\$1.40/ton	\$2.80/ton

## “Ask the Vet and Ask the Nutritionist”

Please submit your animal health or nutrition questions in writing to:

**Crystal Creek® - “Ask the Vet/Nutritionist”**  
1600 Roundhouse Road, Spooner, WI 54801



OR

askthetvet@crystalcreeknatural.com

# Get Your Spring Chicks Off To A Good Start



By Julie Wadzinski, B.S.

Across the country, more and more people are discovering the joys of maintaining their own backyard chicken flock. For many backyard flock owners, knowing where their meat and eggs come from, coupled with the security and self reliance of having

control of their food source is important. Even in many urban settings, city residents find that local ordinances allow for a small flock of chickens. It is not uncommon, for new people being introduced to chickens, to begin their flock by purchasing peeping chicks. When it comes to chick rearing, there are four key management areas to focus on: Temperature, Water, Feed and Lighting.

## Temperature:

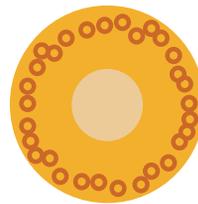
Chicks cannot regulate their own body temperature until they lose their down. They will rely on the supplemental heat within a brooder to keep warm and draft free for the first few days of their life. Brooders do not need to be expensive; in fact they can be made from a modified stock tank, kiddie pool, or even a cardboard box within a coop. A successful brooder just needs to keep chicks warm, dry and draft free. (See Figure 1)



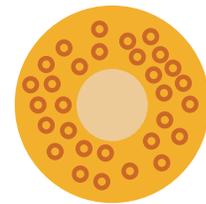
**Figure 1** *Homemade Brooders*

Brooders should be set up and warmed to 95-97°F prior to chick placement; continue to monitor brooder temperature for the next three days. When monitoring the brooder temperature, take the temperature 3" from the side of the brooder and 3" from the floor. Successful flock managers also take the rectal temperature of a handful of chicks for the first three days; the normal rectal temperature for chicks ranges between 104-106°F.

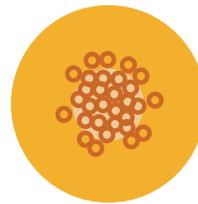
Monitoring chick movement is the best way to ensure the brooder is draft free and the correct temperature. The chicks should move around in small clusters. If the chicks are crowded to a certain edge, there is likely a draft they are trying to avoid. If the chicks surround the outer edge of the brooder with their wings outspread, they are too hot. The chicks will crowd under the heat lamps if they are too cold. (See Figure 2)



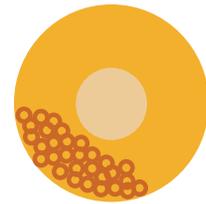
**Temperature too high**  
Chicks make no noise  
Chicks pant, head and wings droop  
Chicks away from brooder



**Temperature correct**  
Chicks evenly spread  
Noise level signifies contentment



**Temperature too low**  
Chicks crowd to brooder  
Chicks noisy, distress-calling



**Draft**  
This distribution requires investigation influenced by draft, uneven light distribution, external noises

**Figure 2** *Chick movement within a spot brooder*

## Water:

Water is the most important nutrient to a chick. Prior to hatching, a chick will ingest the remainder of the yolk. The yolk alone can provide the chick with enough water and nutrients to survive up to 3 days. Two to three days can pass from the time the chick starts hatching, gets processed and is shipped to your home. Much of the nutrients from the yolk absorption will be depleted by the time the chick arrives at your home; highlighting the importance of getting the chicks hydrated and on feed as soon as possible.

Some hatcheries will ship an electrolyte packet with the chicks, to add to their water, which aids in rehydrating and getting the chicks on feed. The shipping process puts the chicks under stress, increasing the stress hormone cortisol. Cortisol will suppress their immune function and reduce their appetite; slowing their ability to get on feed

upon arrival. Adding Crystal Creek®'s Aloe Juice to the water at a rate of 1 oz per gallon of water will minimize the negative effects of cortisol and bolster their immune system. For the first three to five days it is important to provide the chicks with 2.5 cm of linear water space per bird to ensure each chick has adequate access to the water source.

#### How to increase chick water consumption:

1. Provide adequate access to water (2.5 linear cm/chick)
2. Provide room temperature water (72° F)
3. Add Crystal Creek®'s Aloe Juice and provided electrolytes to the water
4. Ensure proper brooder temperature so chicks move about the space to find the water source

### **Feed:**

Early chick loss not caused by an infectious disease is commonly termed “starve out” and is the result of inadequate feed/caloric intake during the first 7-10 days of life.

#### How to prevent “starve out”:

1. Ensure adequate water is available at all times. 100 chicks will consume between 5-6 quarts of water per day (see tips for increasing water intake in new chicks above).
2. Provide a quality chick starter feed that is easily digested and absorbed. The chick starter should be easily accessible with 50 chicks to a starting pan (9”x13”) or 2 cm of trough space/bird for the first month.

Family Flock® Chick Starter is formulated to provide the right amount of protein, trace minerals, vitamins and macro minerals to support the rapid growth rate of young chicks. Family Flock® Chick Starter is a crumble that encourages consumption via the right particle size. Family Flock® is formulated with improved trace mineral quality which supports better immune function for healthier, more productive birds. In addition to being formulated with chelated trace minerals, the Family Flock® line of poultry feed contains 100% selenium yeast and increased levels of vitamin E. All of the Family Flock® feeds provide protection to the bird's digestive tract against common pathogens such as *Salmonella* and *E. Coli*. Quality formulation, such as this, results in more nutrient dense meat and eggs.

3. Monitor the birds by palpating the crop of several chicks to make sure that the chicks have found the feed source.

To ensure that the chicks have started eating, you can palpate the crop 24 hours after the chicks have been placed in the brooder. A chick that has eaten will have a firm, rounded crop with the texture of the feed. If the crop is round and soft the chick drank water but has not ingested any feed. A chick with an empty crop, that has not eaten or drunk 24 hours after placement, is at higher risk of succumbing to starve out. (See Figure 3)



**Figure 3** The chick on the left has a full, rounded crop, while the chick on the right has an empty crop

### **Lighting:**

Traditionally there are two types of lighting programs that can be used for starting chicks. One program is called an intermittent lighting program. This program alternates 2 hours of darkness with 4 hours of light for 7-10 days. The theory behind the intermittent program is that the stronger chicks will motivate the weaker chicks when the lights come on. This synchronizes chick activity and makes it easier for managers to identify sick chicks that may need special care.

The other more traditional lighting program revolves around a period of 24 hour lighting for the first 2-3 days. The theory behind 24 hour lighting is that it provides the chicks with more lighting to encourage feed intake.

There are numerous benefits to each lighting program. Ultimately, the decision should be based on which program can be most easily managed and may vary between farms.

Whether you are new to raising chickens or have raised birds in the past you will find that Crystal Creek®'s Family Flock® program has a feed for all stages of your bird's production. Our knowledgeable staff is here to help you with any poultry question you may have. For the healthiest clutch of chicks call Crystal Creek® today and talk to our knowledgeable staff for recommendations on everything from feed to supportive nutrition.

# Are You and Your Cows Ready for Summer?



By Teresa Marker, B.S.

It is hard to believe summer is just around the corner. Spring is a great time to prepare your animals for the challenges of summer. Below are some tips and strategies that will help your herd maintain its production and keep components up in the heat of the summer.



## Heat Stress

**Problem:** Heat stress can decrease milk production, dry matter intake, conception rates and milk components while increasing somatic cell count and laminitis. Dairy cattle begin to show symptoms of heat stress at 68° F. Higher producing animals can exhibit signs of heat stress at even lower temperatures. When animals are heat stressed, the pancreas shuts down and the animals become less sensitive to insulin. As a result, these animals struggle to maintain energy levels and milk production suffers.

**Solution:** Proper nutrition is a significant tool that can help reduce the effects of heat stress. Work with your nutritionist to have proper sugars levels in the ration to help maximize rumen function. Focus on bunk management (push up feed several times a day and feed during cooler parts of the day). Add Crystal Pellets™ to the diet at 2 to 4 oz./head/day to maintain feed intake. Provide adequate shade and have plenty of fresh, clean water readily available to all animals. Keep the barn properly ventilated and utilize misters, sprayers and fans while avoiding overcrowding.

each week using the Precision Xtra meter for up to four weeks post-fresh. If a cow tests positive for ketosis, there are Crystal Creek® products that can be utilized to help treat cows (i.e. Super Boost™ and Cow Quench™). Utilizing Crystal Creek®'s Transition Cow Protocol at time of freshening will help to prevent problems during the transition.

## Summer Ration Feeding

**Problem:** Summer heat can increase the amount of spoiled feed in the bunk and decrease feed intake. Reduction in feed intake can lead to ketosis and subsequent production loss.

**Solution:** Feed animals during the cooler part of the day. Push feed up more often to help prevent spoilage at the bunk. Using a quality inoculant on your forages can also help improve bunk life (see Feed Preservation heading in this article for information on Crystal Creek®'s Inoc-U-Lock™). Add Crystal Pellets™ to the diet at 2 to 4 oz./head/day to help maintain feed intake levels. Work with your nutritionist to keep the ration balanced and maintain proper sugar levels in the diet.

## Transition Cow Strategies

**Problem:** Cows that freshen during or after periods of hot weather are more susceptible to ketosis (a buildup of ketones in a cow's bloodstream as a result of either a carbohydrate deficiency or an inadequate carbohydrate metabolism) and other transition problems. Ketosis, compounded with heat stress, can greatly reduce milk production and profitability for that cow's lactation.

**Solution:** Feed a balanced ration. Work with your nutritionist to make sure you have a balanced ration for your far-off dry cows, close-up dry cows, fresh cows and the rest of the lactating herd. Keep a watchful eye on cows close to freshening as well as the cows that have freshened within the last four weeks. Many producers test fresh cows for ketosis

## Fly Control

**Problem:** Flies spread disease and decrease production. Two diseases that can be detrimental to livestock are pinkeye and staph aureus mastitis. One way pinkeye is spread from one animal to

another is by flies feeding on the secretions from the eyes of cattle with the disease. Fly bites on the udder from an insect carrying the staph aureus bacteria can infect heifers at a young age. Heavy fly pressure will also cause animals to become stressed and results in decreased production.

**Solution:** One of the best ways to control flies is to use a fly repellent such as Crystal Creek® No-Fly™. No-Fly™ comes in two formulas. One is a water-based formula that mixes with water. The other formula is oil-based and should be mixed with mineral oil. The water-based formula can be mixed at a ratio of 1 part No-Fly™ to 3 parts water and used in a hand sprayer. The oil-based formula has more flexibility in use. No-Fly™ oil-based can be used in hand sprayers, oilers, and wickers. Use the same 1:3 ratio for the hand sprayer but the oilers/wickers can be mixed 1:9. Other fly control methods include: Daily removal of old feed, proper manure management, fly tapes, fly traps and good ventilation. Using a combination of methods can give the best results to help reduce flies on your farm.

## Feed Preservation

**Problem:** Improper fermentation of ensiled feeds can lead to high amounts of dry matter loss, protein degradation, reduced feed quality, and lowered bunk life.

**Solution:** Use a high performance inoculant, such as Crystal Creek® Inoc-U-Lock™. Inoc-u-Lock™ contains 5 bacteria and 4 enzymes to help control each step in the fermentation process. Controlling the fermentation process in this manner, from start to finish, helps to preserve feed quality, retain dry matter, reduce protein degradation, improve bunk face and bunk life and ultimately improves your profitability. Inoc-U-Lock™ comes in both dry and water soluble forms that you can use on corn silage, haylage, balage and high moisture shell corn. Independent research shows a strong economic return on investment.

Don't let these summer challenges reduce your production and profitability. Call Crystal Creek® to consult with our knowledgeable staff to keep your herd on track during this summer season.

## “Ask the Vet and Ask the Nutritionist”

**“Sometimes our calves break out with scours for what appears to be no reason. Our Vet has ruled out pathogens and viruses. What could be causing this?”  
~A concerned calf raiser in Minnesota~**

While pathogens are some of the most common causes of calf scours, there are other factors that are often overlooked. Simple changes in management can many times correct these types of scours once the source of stress is found. Two common causes of digestive stress are feeding milk at an incorrect temperature or concentration.

**To Reduce the Risk of Nutritional Related Scours:**  
Provide consistency and good monitoring of milk quality to decrease scour occurrence.

- A) Prevent variance in milk temperature:** Milk or milk replacer that is delivered at a temperature below 101 degrees Fahrenheit will cause a decrease in the calves' ability to digest the milk's fats and proteins; leading to poor absorption which can in turn cause scours. Feeding temperature should be kept between 101-105 degrees Fahrenheit. **\*\*Take the temperature of the milk fed to the first and last calf to ensure all milk fed is between 101-105 degrees Fahrenheit.\*\***

- B) Prevent variance in milk total solids concentration:**  
Milk or milk replacer that is too rich, or too dilute, will not be absorbed properly either. Ideally, milk should have a total solids range between 12-14%. It is important when mixing milk replacer to accurately follow the mixing instructions. Never add additional water to whole milk. A digital brix refractometer can be used to monitor your milk's total solids concentration by taking the percent brix reading and adding 2 to get the percent total solids.

Example:  
 $18.9 \text{ Brix} + 2 = 20.9 \text{ Total Solids}$  ▶ Too high

By following the recommendations above you can greatly reduce the incidence of nutritional scours on your farm.

-Lorrie Meister, CVT  
Livestock Specialist



# Managing Dairy Cow Foot Health With Nutrition



By Dr. John Popp, PhD.

A cow with poor foot health eats less, produces less milk and is less profitable. Throughout the course of the year, as many as half of the cows on a farm can experience some form of lameness, be it mild or severe. While not all forms of lameness can be prevented, it is important to realize that causes can be multiple and sometimes cumulative. What starts as a simple 'ouch' on a foot...perhaps even a slight aggravation, which could take little recovery, may be exacerbated by stress, low immune function, poor cow comfort, lack of proper supportive management or nutrition. Regular foot care and good footing are also important to the formula for good foot health. The intent of this article is to discuss how specific nutrients and ration strategies can best support good foot health.

Growing up, I always heard stories of the cows that got into grain somewhere and never did the story have a good ending. Initially the cows got acidosis, generally followed by significant foot problems. The old practical message was always to make sure the cows got hay before grain and never over-feed grain.

Proper nutrition management can significantly lower the number of foot problems in a dairy herd. Laminitis can arise from many contributing factors. However, a well-designed and properly managed feeding program can go a long way to supporting good foot health. Even if a herd has a well designed diet on paper, it may not matter if the cow sorts her feed, if the feed is not mixed

well, if the feed heats in the bunk reducing dry matter intake, or if the feed is not pushed up in the bunk regularly; the cow's foot health will suffer, along with production and profitability.

Many typical modern diets for dairy cows attempt to deliver a significant amount of energy with low forage, concentrated diets in order to secure high milk yields. This type of increased energy delivery to a cow is generally through increased grain/starch and secondly by adding bypass fat. An over-supply of highly digestible carbohydrate (starch) results in the production of excess lactic acid, which in turn becomes a driving force toward causing laminitis



and reduced liver function. In order to secure good foot health, it is critical to optimize rumen fermentation in such a way as to reduce the risk of excessive lactic acid production. The first band-aid commonly applied to this type of problem is to free choice, or directly feed, sodium bicarbonate to the milk cows.

Rather than increasing energy intake through concentrating the diet, a better option is to stimulate higher dry matter intake of the total diet, especially the forage portion. Stimulation of higher dry matter intake is the focus when using the Crystal Creek® Dairy Nutrition Model (CCDNM) strategy for ration balancing. Some of the key points in the CCDNM are the utilization of good quality forages, high quality Crystal Creek® minerals and restructuring the protein profile of the ration to match carbohydrate profiles to better support forage digestion. Forage, by nature, is what cows are meant to eat, and supports better foot health when it is utilized in the ration properly.

## Supporting Good Foot Health:

- 1. Avoid abrupt changes** in energy supplied in the milking cow rations - generally by no more than 10% at a time. Keep starch levels in the milk cow's diet well below 30% and work closely with your nutritionist to target appropriate starch levels based on digestibility factors and total carbohydrate balance of the diet.
- 2. Provide ample bunk space** at all times (24" per lactating cow and 30" per dry cow) to insure proper dry matter intake (DMI). Along with that comes the need for good bunk management... making sure that feed is always available, fresh and pushed up frequently. This helps to guarantee optimum access and prevent heating.
- 3. Prevent transition period acidosis by managing the intake of dry matter.** Acidosis, a major trigger to poor foot health, can be prevented by feeding a diet to the close-up dry cow that targets 0.67 Mcal/lb. of dry matter, with a typical daily intake of 14 to 15 Mcal of energy per day for Holstein sized close-up dry cows. Start-up/early fresh cow diets should be at approximately 0.72 Mcal/lb. of dry matter in their diet and supplemental fat feeding should be avoided.
- 4. Minimize stress.** Stress can be a significant contributing factor in derailing hoof health and cow comfort is crucial to help reduce stress levels. Again, the most important period of high stress exposure is during the transition period for cows. Make daily fresh cow checks a priority on your operation to ensure a good appetite and health status for fresh cows. Getting cows off to a good start in the first 21 days of lactation is pivotal to a good lactation performance. Use strategic nutritional support products at freshening to help ensure a smooth transition process and get cows on feed quickly. Crystal Creek® offers a comprehensive line of quality products for fresh cow support. They have calcium supplements such as, Opti-Peak™ powder, Fresh-N-Drink™ powder, Fresh-N-Easy™ boluses and Saf-Cal™ liquid. Also, there are appetite support supplements like Super Boost™ boluses and Cow Quench™ liquid (a better alternative than propylene glycol). These excellent products allow for a reduction in the stress associated with the transition period. Lower stress levels will support good immune function and reduce the incidence

of heel warts. When stress is unavoidable, utilize Crystal Pellets™ in the diet to minimize the negative effects of stress hormones on the cow.

**5. Maximize amino acid levels from microbial protein** produced in the rumen, such as cysteine, histidine and methionine. These key amino acids play important roles in hoof/horn production. Optimum levels of microbial protein produced in the rumen, can be supported by a sound forage based diet as recommended by your Crystal Creek® nutritionist.

**6. Feed a well constructed mineral.** Both macro and micro minerals are important to foot health. Macro minerals such as calcium in the epidermis is essential for activation of the enzyme process for the creation of horn/hoof cells. High quality sources of phosphorus and the fortification of Vitamin D will also support calcium usage and good hoof health.

Along with proper Macro mineral supplementation, it is important to feed a properly formulated, highly bioavailable trace mineral that will directly support sound hoof health. Zinc and iodine are just two examples of trace elements that are needed for good foot health. Crystal Creek® livestock minerals are formulated with polysaccharide trace minerals, that are over 90% bioavailable (able to be utilized by the cow). Many typical livestock minerals are formulated with lower-grade trace minerals in oxide and/or sulfate form, which are generally less than 10 and 50% bioavailable respectively. The advantage to improved profitability for the producer with this approach can be significant.

There is more to good foot health than meets the eye, or can be determined fully by just looking at a feed label. The combination of a good nutrition strategy, a balanced ration utilizing a forage based strategy, the availability of high quality feedstuffs and highly bioavailable macro and trace minerals are all important to good foot health. Along with a proper nutrition strategy, it takes good feeding and bunk management practices to properly deliver the desired ration. When all of the pieces are implemented correctly, the results are a strong support program for good herd foot health.

Give Crystal Creek® a call today and develop a foot health program specifically designed for your herd!

# Are You Building a New Calf Barn? Design and Build for Excellent Air Quality



By Ryan Leiterman, D.V.M.

Spring is an excellent time to plan your upcoming construction projects. Across the United States, more and more farms are investing in new calf raising facilities.

Some of the more common calf barn designs incorporate naturally ventilated, curtain sidewall barns. Whether looking at a new barn for an automated calf feeder or individual pens, there are many aspects that need to be considered when designing the layout. Stocking density and animal flow, bedding and manure cleanout, feed delivery considerations, electrical and plumbing needs all should be evaluated.

When thinking about the design of the barn, consider factors that will improve the quality of the air the calves will breathe. As a calf barn ventilation engineer and veterinarian, I have been inside over 100 calf barns across the U.S. Seeing different operations has given me the opportunity to learn construction techniques that can improve air quality and reduce construction costs. Below are some points to consider that will improve air quality in a newly constructed calf barn.

## Build with lower concrete knee walls

Historically, barn construction blueprints called for 2-4 foot tall concrete knee walls, upon which fabric curtains were installed. Tall knee walls significantly interfere with natural ventilation when the curtains are open because the air flows over the top of the calf and out of the barn. (See *Picture 1*)

Lower concrete knee walls (1-2 feet) save concrete cost and provide better air flow **at the level of the calf** when the curtains are open during warm weather. Bedding type and frequency of clean out need to be considered when determining concrete knee wall height. (See *Picture 2*)

## Install split curtain sidewalls

Many manufacturers produce curtain configurations that can be adjusted from the top and bottom, increasing the flexibility of natural ventilation regulation for various weather conditions. (See *Picture 2* and *Picture 3* for superior curtain options.)



**Picture 1:** 4 foot tall concrete walls reduce ventilation at the level of the calf.

**Picture 2:** Notice the 18 inch height of the knee wall. Lower walls create better air flow at the level of the calves. Curtains are split 2/3 on bottom and 1/3 on top. They roll from the top down and bottom up, meeting in the middle.





**Picture 3:** Bottom and top curtains both roll up from the bottom and are operated independently

## Install an open ridge vent ventilation

Conventional wisdom has thought that calves produce too little heat to create practical natural ventilation through thermal buoyancy. Thermal buoyancy ventilation is the process in which warmer air rises up and out through the ridge vent and colder air flows in from the curtains and sinks to the floor. After fogging over 75 barns, I consistently notice fresh air from the positive pressure duct being directed to the calf level, only to be warmed and rise back up to the top of the barn. When fogging a barn, I time how long it takes after smoke is introduced into the barn before the air is clear again. Barns designed with open ridge vents that allow the warm air to escape consistently clear the smoke faster than barns with closed ridge vents. To clarify, ridge vents can and should be covered, but the covering needs to be elevated to provide space for warm air to escape.

Exhaust fans are useful when located in the gable end of a barn and aid in exhausting the warmer, more buoyant air. Typical exhaust fan set ups match the cubic feet per minute (CFM) output of the positive pressure duct fans.

## Plan ahead for a customized positive pressure ventilation duct system for cold weather ventilation

A well designed, customized barn ventilation plan is not complete without a professionally designed positive pressure duct system. These systems are designed to deliver relatively small amounts of fresh air in precise locations throughout the barn. Great care is given to the design of the positive pressure system so that the speed of the air as it reaches the calf is not drafty. Because these systems deliver relatively small amounts of fresh air, slowly and directly to the calf, they are ideally suited for cold weather applications. Before building the barn think about:

1. Where are the positive pressure ventilation ducts going to be placed? Can they be placed in a manner that will not interfere with:
  - a. overhead garage doors
  - b. lighting and electrical needs
  - c. bedding and pen cleanout with the skidloader boom raised up
2. Where are the intake fans for the ducts going to be located? Will they interfere with sliding doors? Where is the best place to put them to get fresh air? (Avoid mounting them over the end of the barn with a manure pit).
3. Where will the exhaust or additional warm weather fans be mounted?

## Recognize the need for increased fan power during periods of hot weather (above 75 degrees F)

The most common calf barns built today are naturally ventilated, curtain sidewall barns with supplemental positive pressure ducts used to provide winter ventilation. The positive pressure ducts are designed to provide winter ventilation only and will not provide enough CFM to address the ventilation requirements of warmer weather. Additional fan power, commonly in the form of high velocity basket fans, high volume floor fans or high volume, low speed ceiling fans are required for adequate summer ventilation.

(CONTINUED ON PAGE 14)

## ARE YOU BUILDING A NEW CALF BARN?

(CONTINUED FROM PAGE 13)

The number of complete barn air exchanges that should occur every hour is dependent on the outside temperature.

### **Winter Ventilation Requirements:**

Change barn air 4 times per hour

### **Spring and Fall Ventilation Requirements:**

Change barn air 10-20 times per hour

### **Summer Ventilation Requirements:**

Change barn air 40+ times per hour

## Additional Considerations

*Positive pressure ducts* can easily ventilate a width of 20-25 feet per duct. Larger widths can be accommodated but may require advanced design considerations.

*Sidewall height of barns* commonly range from 10-14 feet. As a ventilation designer, I prefer to have the bottom of the positive pressure duct mounted 10 feet above the floor of the calf barn. 12 foot side walls with Starwood or standard trusses will allow for this.

*Starwood trusses* offer the following advantages over conventional trusses:

- Cleaner, sleek look
- Less room for birds to nest/perch on
- Easier duct installation

*If using automatic feeders*, be sure to place the feeding station in an area that has easy and abundant access on both sides of the station. Placing the feeding station tight to a wall or gate, with entry access from only one side, reduces the use by subordinate/younger calves, as a larger or more dominant calf can stand near the entrance and discourage entry. (See *Picture 4* for a poor design, with limited entry access to the feeding station. *Picture 5* displays a better design with entry access to the feeding station on both sides.)

**Picture 4:** Notice limited access, as gate allows for entry from only one side.



**Picture 5:** Notice easy access to feeding station from both sides.



Crystal Creek® offers a professional calf barn ventilation design service with Dr. Leiterman. He has over 65 of his designs installed and functioning in calf barns across the U.S. and can provide ventilation plans that include: the duct layout and design, specific fan models and controllers needed, installation instructions and a proposed project budget.

If you are considering building a new calf barn, do not hesitate to call Crystal Creek® to discuss your construction plans with Dr. Leiterman. He will review ways that your barn can be designed to improve the air quality and respiratory health of your calves and may be able to offer cost saving tips as well.

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