CRYSTAL CREEK

NEWSLETTER

APRIL 2024

Behind the Scenes

Dr. Ryan Leiterman speaks at the Fall Grazing Conference in Shell Lake, Wisconsin.

Drs. Ryan Leiterman, Nele Leiterman and Darren Zimmerman at the World Dairy Expo in Madison, Wisconsin.

Nutritionist Erik Brettingen and Casey O'Reilly.

Nutritionist Erik Brettingen making farm calls around Wisconsin and Minnesota.

IN THIS ISSUE:

Ventilating Repurposed Structures for Calf Housing

By Alex Austin, B.S.

Building a new calf raising facility is an expensive investment and not always an option. Converting an existing structure, whether it's a pole shed or old stanchion barn, to house and raise calves can be a great option when done correctly. When considering repurposing an existing structure, a lot of thought goes into the logistics of everyday calf care, such as feeding and bedding, but one area that can be overlooked is proper ventilation. A poorly ventilated calf barn will quickly lead to struggles with calf health and poor performance. To avoid these and achieve proper ventilation, a system that can deliver fresh air in different penning set ups and overcome potential structural challenges is key.

Penning and Ventilation

One of the first things to decide when repurposing a structure is the penning and pen layout. This has a big impact on the ventilation design of the calf barn. Pairing calves or raising them in small groups of six or less can be a great option, if these groups or pairs have solid dividers. Mesh dividers, such as hog panels, can allow contagious pathogens to easily spread throughout the barn, resulting in poor calf health that is difficult to overcome. There should also be a less than one week age gap between calves in these pairs or groups. Recent research has shown benefits such as social development and increased feed intake resulting in improved average daily gains when calves are paired together. There have also been studies that have determined there is no increased risk for pathogen spreading in paired calf housing. Whether calves are in individual pens or in groups, the Crystal Creek® FLAP DUCT® can be custom designed to deliver fresh air to the calf area, no matter the layout.

Overcoming Structural Challenges

Many repurposed structures can come with some challenges for installing a FLAP DUCT® ventilation system. Sliding doors, solid walls and beams are just a few examples of some challenges that an existing structure can have.

Intake Fan

When it comes to bringing fresh air into the barn, the intake fan must be connected directly to the FLAP DUCT®. The place where the fan draws fresh air from can be flexible. To get around structural challenges, such as sliding doors or solid walls, intake boxes can be built to bring fresh outside air to the intake fan and into the barn. (See ***Figure 1***)

Figure 1 **AN INTAKE BOX IS BUILT UP THROUGH A HAYMOW IN ORDER TO BRING AIR INTO THE BARN**

Tube Placement

Ideally, tubes are placed directly over the top of calf pens, eight feet off the ground. This will achieve the best air flow into pens. Since this is not always an option, FLAP DUCT® ventilation tubes can be designed to throw air to the left and right, directing air into the pens. Hole sizing can also be adjusted in order to achieve the correct air speed at the calf level.

Exhaust Fans

To assist with the removal of contaminated air from the calf space, exhaust fans are often used. The calf space is the immediate area where the calf lives, four feet off the ground in the calf pen. Exhaust fans that are mounted high off the ground do little to remove the low hanging contaminated air. To draw from the calf space, building an enclosed box down from the exhaust fan to the height of three feet off the ground (see ***Figure 2***) will help to achieve this. This will force stale air to be removed from the calf level more effectively.

Ventilation Goals

The goal of a properly designed ventilation system is to provide clean, fresh air to the calf. By doing so, a ventilation system will also remove air borne pathogens, accumulated heat and moisture, as well as noxious gases from the calf space. Year-round ventilation is required to achieve this.

When designing a FLAP DUCT® ventilation system, three basic goals are met to ensure the best air quality possible for calves:

1. Correct volume of fresh air delivered to the calf.
2. Appropriate speed of the air on the calf based on temperature.
3. Adequate distribution of fresh air in the calf space.

(Continued on page 4)

Figure 2 **ENCLOSED BOX TO FORCE STALE AIR AWAY FROM CALF**

(Continued from page 3)

Volume

The amount of air being drawn into a barn by a ventilation system is called the volume. According to the University of Wisconsin School of Veterinary Medicine, properly ventilated calf barns should experience a minimum of four air exchanges per hour in the winter. Practical experience by the ventilation team at Crystal Creek® has shown that ventilation rates can and should exceed four air exchanges per hour in the winter.

Speed

The air speed is measured at the calf level. This is the speed at approximately four feet off the ground. During cold weather, calves should not experience a draft, defined as air speeds greater than 60 feet per minute. Summertime air speeds should have a goal of 200 feet per minute or greater for heat abatement and fly pressure relief.

Distribution

The distribution of air describes where the fresh air is going in the barn. The goal of any ventilation system should be to distribute fresh air to the calf space. The calf space is the penning where the calf lives plus four feet off the ground. When it comes to proper air distribution, the distance and position of the tubes are very important. Ideally, tubes should be placed directly above the calf. If this is not an option, hole placement should be designed to throw air left

and/or right into the calf space. Preferably, tubes should be placed at eight feet from the bottom of the tube to the ground, but no higher than ten feet.

When it comes to housing calves, producers should not overlook old barns or pole sheds they already have. An existing structure can be successfully repurposed into a calf raising facility. A well-designed ventilation system, such as the FLAP DUCT®, is key to that success. The ventilation specialists at Crystal Creek® have the experience and knowledge to overcome structural challenges and design an effective ventilation system that delivers excellent air quality to calves. To learn more about the FLAP DUCT® calf barn ventilation system, visit www.crystalcreeknatural.com.

References available upon request.

2024 Crystal Creek® Product Catalog

AVAILABLE IN DIGITAL FORMAT

Crystal Creek® is excited to announce that our annual product catalog is available in digital format. In addition to our print version, for customers who prefer a hard copy, a convenient digital version can be found on our website. This digital version is easily shared with a longer life span than a physical copy that can be damaged or misplaced. Crystal Creek® takes great pride in producing an interactive catalog with high quality images and features that provide our customers with product and technical information. Visit our website at www.crystalcreeknatural.com to get your copy today.

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Ask the Vet

Get Your Spring Chicks Off to a Good Start

~ By Nele Leiterman, D.V.M.

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

The first thing to consider when planning to order chicks is the weather. The chicks Crystal Creek® offers hatch in Wisconsin hatcheries. They often get shipped out the same day they hatch, and usually arrive at our office the next morning. The chicks travel together with regular mail through the USPS system and there is always the possibility of the journey lasting an extra day. The hatchery, the post office staff, and the Crystal Creek® team try their best to get the chicks here safely, and temperatures above freezing help with a positive outcome. So, please don't order your chicks too early or when a cold spell is likely.

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***)

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. You can use heat lamps, hoover mats, or gas heaters to warm the brooder. It's important to ensure a stable temperature around the clock. Thermometers that lock the lowest and highest temperatures in the past 24 hours are very helpful to detect if your brooder keeps its temperature even.

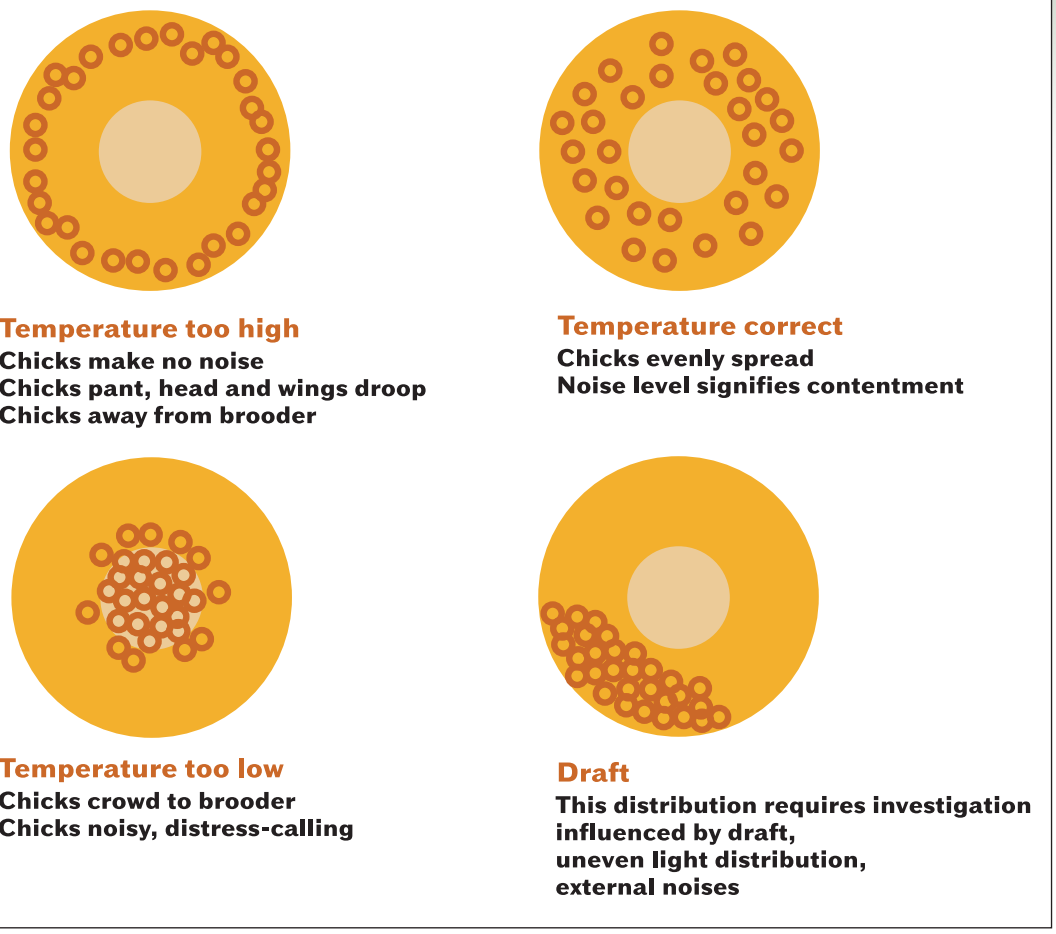
Monitoring chick movement is the best way to ensure the brooder is draft free and the correct temperature. The chicks should move around in small clusters. If the chicks are crowded to a certain edge, there is likely a draft they are trying to avoid. If the chicks surround

Figure 1 **HOMEMADE BROODERS**

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*)

After the first week, you should start to gradually reduce the brooder temperature to prepare the growing birds for lower temperatures. Reducing the temperature by 5° F every week, until you match the current outside temperature has proven to be a successful strategy.

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 three days. Two to three days can pass from the time a chick hatches, 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. 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® Whole Leaf Aloe Vera 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. After the chicks arrive show them where their new waterer is by dipping every chick's beak into the dish.

How to increase chick water consumption:

1. Provide adequate access to water (2.5 linear cm/ chick at the waterer)
2. Provide room temperature water (72° F)
3. Add Crystal Creek® Whole Leaf Aloe Vera Juice
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.

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(Continued from page 7)

How to prevent "starve out":

1. Ensure adequate water is always available. 100 chicks will consume between 5-6 quarts of water per day. (See ***"How to increase chick water consumption"*** on Page 7.) You should change the water out and clean and disinfect the waterer daily to prevent biofilms and pathogens from growing.
2. Provide a quality chick starter feed that is easily digested and absorbed. The chick starter should be easily accessible with 2 cm of trough space per bird for the first month. Family Flock® Chick Starter is formulated to provide the right amount of protein, energy, 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 and is easily digested without offering the chicks extra grit. 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 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 drank 24 hours after placement, is at higher risk of succumbing to starve out. (See ***Figure 3***)

Lighting

The most often used 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 plenty of lighting to encourage feed intake. After 2 -3 days the lighting should be regulated by a timer that allows for 3-4 hours of darkness at night to allow the chicks to rest and fast. Short periods of fasting are important for the development of their digestive system. They need their crop to run empty for short periods of time periodically. After one week, elongate the dark time by one hour per week until you reach the current daytime schedule. During the "dark time" any red-light heat lamps may stay on. The chicks will still need the supplemental heat from the lamp, and it will help with basic orientation, while still allowing the chicks to go to sleep.

Whether you are new to raising chickens or have raised birds in the past you will find that the Crystal Creek® 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 questions 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.

References available upon request.

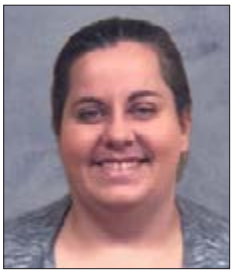
Figure 3 **PALPATING THE CROP OF CHICKS**

CRYSTAL CREEK® FLY REPELLENT
A SAFE, EFFECTIVE, NATURAL CHOICE

Flies are known to spread disease, cause stress and leave painful bites. Crystal Creek® Fly Repellent is a natural, economical tool that provides safe, effective relief from flies. In a recent efficacy trial, independent laboratory testing reported repellency rates as high as 96.7% and the lead PhD researcher concluded that the Crystal Creek® Fly Repellent "provided a high degree of repellency." The Crystal Creek® Fly Repellent showed exceptionally good performance repelling stable flies, who are known to be extremely aggressive.

Crystal Creek® Fly Repellent can be used as a spray, wiped on for more sensitive areas such as the face and ears, or used in an oiler at pasture. The versatile, oil or water based formulas can be diluted to various concentrations to best fit your operation's need. As with any good fly control program, it is important to use other fly control methods, in addition to an effective fly repellent, such as keeping facilities clean of manure and waste, dumping out stagnant water and disposing left over feed to discourage areas flies may be attracted to. If you want to provide your livestock with immediate, effective, safe relief from flies, try the Crystal Creek® Fly Repellent today!

The Impact of Fly Pressure and the Importance of Fly Control



By Cassy Golburg, B.A.
Livestock Specialist

When winter is over and warm weather arrives, it is goodbye to plowing snow and dealing with frozen water and hello to green pasture and sunshine. The warmth of spring and summer can present new challenges with the hatching fly population. Livestock owners know flies cause pain and discomfort to animals but they can also have a negative economic impact. It is important to enter the summer season with an effective fly control plan in place to maintain animal health and minimize fly pressure effects on producer profitability.

When fly pressure is high, livestock will be stressed, spending much of their time moving to avoid areas of high fly pressure and engaging in behaviors such as tail swishing, stomping and licking to remove flies from their bodies. These behaviors have a negative influence on animal health and performance by decreasing both feeding and resting time of the animal. ***Figure 1*** shows some of the most common fly species and their correlating significance in the livestock industry.

Studies evaluating the economic burden of flies on the United States' cattle industry show an estimated total loss of over $4 billion annually. The top two contributors to this economic loss were Stable flies and Horn flies. Stable flies had the largest negative impact, estimated at over $2.2 billion in annual loss. Horn flies were ranked as the second most detrimental fly species with over $1 billion in estimated economic annual loss. These evaluations were based on decreased animal production and performance, as well as consequences on animal health and cost of disease treatment. Other fly species that were determined to cause stress and decrease performance in livestock were the House, Face, Horse, Deer, and Heel fly.

Figure 1 **FLIES THAT AFFECT LIVESTOCK**

			
Stable Fly	Horn Fly	House Fly	Face Fly
Stable flies prefer to land on the lower legs of livestock and need a combination of moisture, organic matter and animal waste to reproduce.	Horn flies feed mostly on an animal's back, shoulders and sides. An individual fly can bite their host up to 40 times/day.	While house flies do not have sucking mouth parts like the stable or horn fly, they are a nuisance to livestock and known for spreading disease.	Face flies congregate around the eyes and noses of livestock and spread disease causing pathogens.
Economic threshold of 5 flies/leg.	Economic threshold of 200 flies/animal.	Adult House flies can live for 3-4 weeks and produce up to 1,000 eggs each.	Known for negative economic impact in spreading *Moraxella bovis.* (pinkeye).

Source: Michigan State University & U.S. Meat Animal Research Center, John Keele, *" Host Susceptibility of Cattle to Horn Flies."*

There are several management tools and strategies producers can use to provide animals with relief from fly pressure such as removing waste (manure, urine and dirty bedding), providing shade for livestock and using fly traps and predatory fly parasites. One of the most important tools to have available is a safe, effective fly repellent. There are many fly repellent options on the market, making it difficult to decipher which repellent is the best choice. Crystal Creek® Fly Repellent is a proven, effective choice that can be used in multiple types of applications.

The efficacy of Crystal Creek® Fly Repellent was tested in a trial by an independent laboratory that specializes in performing insect repellent efficacy trials. Both the Crystal Creek® Water and Oil base Fly Repellent formulas were tested. Stable flies were used in this trial as they are one of the most aggressive fly species and, as previously discussed, cause the most economic damage. ***Figure 2*** is a summary of the study and its results.

Crystal Creek® is proud to offer customers a safe, effective fly repellent option that does not rely on chemicals. Crystal Creek® Fly Repellent Oil and Water base formulas are convenient to use, easy to mix and can be used as a spray-on, wipe-on or in oilers. Both formulas are clean, non-sticky and pleasant smelling. Crystal Creek® Fly Repellent is a proven, must-have tool for your fly control plan.

References available upon request.

Figure 2 CRYSTAL CREEK® FLY REPELLENT EFFICACY TRIAL

TEST INSECTS: Stable flies, Stomoxys calcitrans, < 3-day old adults.

EXPERIMENTAL DESIGN: Approximately twenty to twenty-five (20-25) non-blood-fed adult Stable flies were used in each experiment iteration. An artificial blood agar host consisting of a 10 cm Petri dish bottom containing approximately five warm blood-soaked cotton balls, covered with fine nylon mesh stretched to cover the Petri dish were used. This is similar to the procedure used to rear Stable flies in the laboratory, so the use of blood-soaked cotton balls as a nutritional source is well documented. The nylon mesh of the artificial host was treated with the test substance and each host was treated with approximately 1-2 g of each of the test substances and dilution rates. The treated nylon mesh was allowed to dry for approximately 15 minutes before being placed on the host and introduced into the test cages. Untreated "hosts" or mineral oil treated hosts were used as control replicates. This laboratory testing method is considered industry standard and in accordance with best practice testing methods.

The blood agar hosts were immediately placed in individual test cages after being treated and filled with warmed blood as either a treated replicate or an untreated replicate, with a total of 5 replicates in each test group. The number of Stable fly landings with intent to bite (LIB's) and blood feeding (BF) for each host were recorded.

RESULTS AND DISCUSSION: The adult Stable flies in the untreated control group fed well on this artificial host bioassay system with an average of 24.2 flies feeding or attempting to feed. Both control groups demonstrated feeding rates well above what was observed in the Crystal Creek® Fly Repellent treated groups. Data for the 5 replicates were pooled for each test group and the percent repellency determined. A modification of Abbotts formula was used to determine percent repellency:

$A - B \div A \times 100 = \%$ Repellency

A = Average Control Value
B = Average Treatment Value

Results of the repellency efficacy from 5 separate testing iterations:

Crystal Creek® Oil Base Fly Repellent 3:1	= 96.7% Repellency
Crystal Creek® Water Base Fly Repellent 3:1	= 77.7 % Repellency

CONCLUSION: Both the water-based and the oil-based formulations of Crystal Creek® Fly Repellent provided a high degree of repellency against adult Stable flies.

How to Feed Calves? MilkBar™ Teats Can Improve Calf Gut Health

By Nele Leiterman, D.V.M.

What should I feed my replacement heifers? Whole milk or milk replacer? What fat and crude protein percentage is right for my operation? Are there additives that I should be using? These are typical questions a calf raiser will ask. Often the focus is on WHAT should be fed to the calf, but how often do people think about HOW to feed their calves?

MilkBar™ is a company founded by dairy farmers in New Zealand that looked deep into this HOW. Their innovation is a teat that mimics the natural physiology of how calves nurse from their dams. And the research shows the MilkBar™ controlled-flow teats hold many health benefits for calves and the heifers they will grow into.

This article lists some of the benefits of feeding calves with MilkBar™ teats.

The Physiology of Nursing

When people say calves are "drinking" milk, that is technically not correct. Drinking is the physiological process for the uptake of water. Milk is meant to be nursed from a cow's udder. While this may seem like a nuance, the distinction between drinking and nursing is quite large from a physiological perspective.

The process of nursing involves the calf's mouth creating both a positive (pushing down) and negative (sucking) pressure onto the teat. This leads to the calf only being able to achieve and swallow small sips of milk at a time. The calf can essentially nurse at a similar speed that a human can strip out a cow's teat. If you ever milked a cow by hand, you will have noticed that it takes quite a long time to accumulate one quart with this method. It's about the same time that a calf needs to nurse one quart from an udder. This is one of the keys to feeding calves. Calves are designed to drink their milk slowly, in a manner that mimics nursing from the dam.

The position of the calf's head and neck when nursing is also important. The downward flexed position of the calf's neck and the proteins in the milk both lead to the reflective contraction

Photo used with permission from MilkBar™.

of the esophageal groove. The esophageal groove is the body's version of a bypass valve, and it directs the nursed milk past the first three stomach compartments (rumen, reticulum, and omasum), directly into the abomasum, or what is referred to as the milk stomach. Calves can digest milk only in their abomasum because it contains the necessary digestive enzymes and acids.

When calves drink from a bucket there is a general lack of the physiological response to suckling, so the esophageal groove stays mostly open. Milk gets directed straight into the rumen and from there, overflows into the abomasum (milk stomach). When feeding calves from a bucket 10 – 15% of the milk directly enters the rumen. If the milk accidentally enters the rumen, it will not get digested, but instead, will start to ferment. This can lead to clostridial bloat or other health problems for the calves.

Saliva Production Is Important

While nursing milk from a teat the pressures in the mouth activate the salivary glands of the calf. This is evident by the saliva bubbles that start to form around the calf's mouth when nursing from a MilkBar™ teat or udder. Time is key when looking at the necessary amount of saliva that needs to be mixed with the portion of milk to digest it. A calf needs 3-4 minutes per quart of milk to produce adequate amounts of saliva. Saliva naturally contains digestive enzymes, antibacterial agents and it buffers the pH of the stomach. Calves create little to no saliva while drinking milk from a bucket. Without sufficient saliva production, none of the essential digestive processes can work properly. This leads to raw milk entering the intestines and studies have found this has an increased risk of diarrhea.

(Continued on page 14)

Figure 1 **CALF ANATOMY**

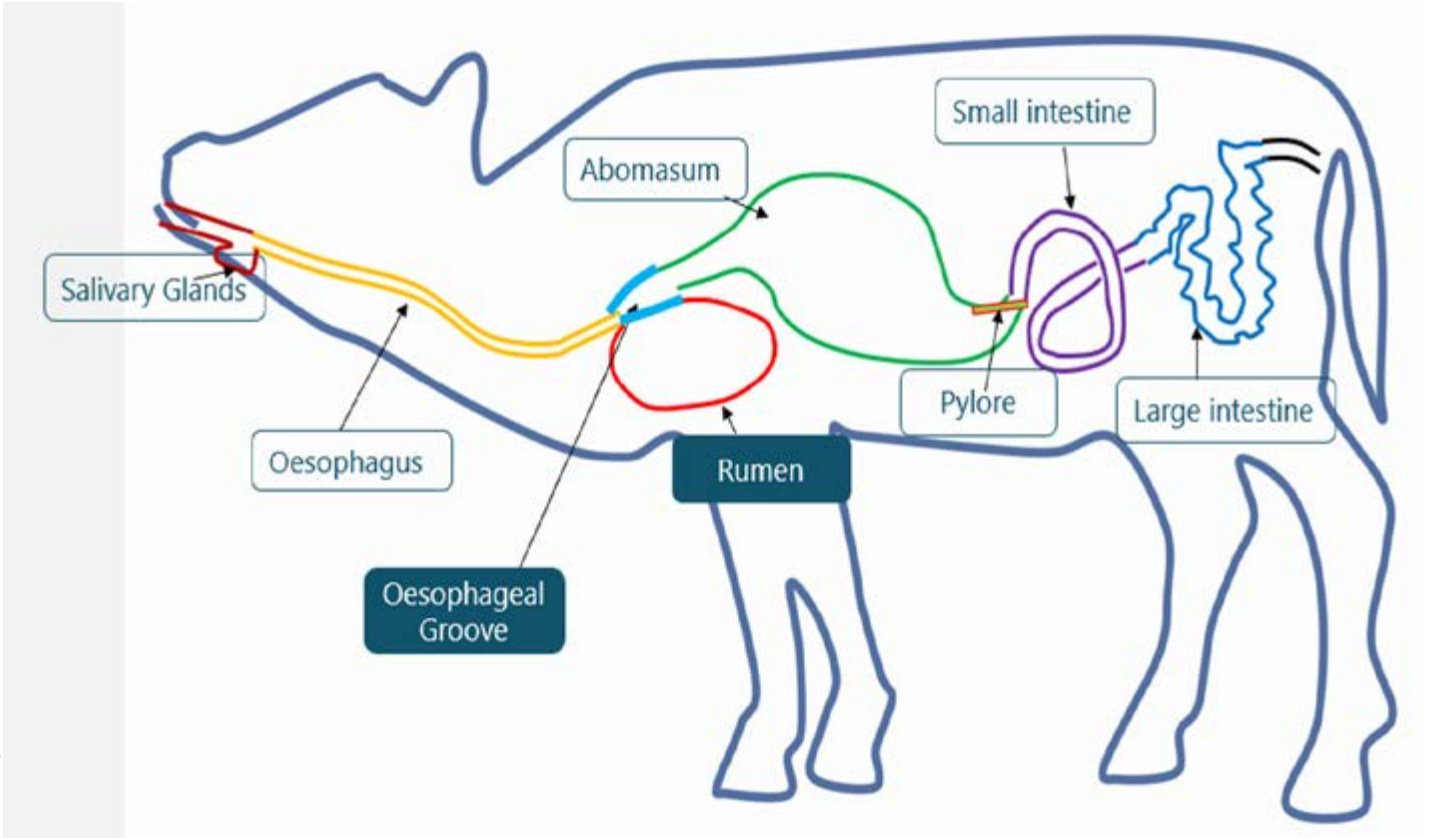


Image used with permission from MilkBar™.

(Continued from page 13)

Grow Your Calves to Their Full Potential

Choosing the right feeding system for your farm is not only about the immediate impact on calf health, but also has an impact on the long run for your future dairy cows. Calves that are fed with buckets or fast-feeding teats are often prone to show unnatural behaviours like cross-sucking on other calves in the group. This behavior results from a lack of saliva in their abomasum, which can lead to an upset stomach. Also, because the bucket or fast nursing teat delivered the milk to the calf quickly, there is a lack of neurological feedback to their brains, which is supposed to tell them when they are supposed to be done nursing. This can lead to cross-sucking with group housed calves.

The juvenile udder has natural keratin plugs in the teat canal, that shields the udder tissue from outside pathogens. During cross-sucking, this plug is sucked out, and the developing udder is now unprotected. Bacteria can now enter the udder and colonize the tissue, leading to increased mastitis rates and more heifers with blind quarters.

Often, cross-sucking is addressed by raising calves in individual pens. Calves that do not feel satisfied after drinking from a bucket or fast teat will still suck on objects in their surroundings. Another way to address cross-sucking is to feed calves with a controlled flow nipple like MilkBar™. Think of the effect nursing or a pacifier has on a human infant, the same neurological feedback is also at work in the calf's brain. Interestingly, cross-sucking is a virtually unknown behavior in beef herds, where calves are always kept together. This illustrates that cross-sucking can be controlled. Feeding calves in a more natural way, with teats that mimics the nursing behavior, seems to be a possible solution. Researchers in France have found that it is possible to keep groups of calves together without cross-sucking if fed with MilkBar™.

There are even more quantitative measurable benefits. One study looked at the daily weight gains of calves fed with different systems. For the trial, calves on one farm were divided into two groups. One group was fed with a controlled-flow teat, the other with a "normal" fast-flowing teat. On all other aspects the calves were treated the same; same volume and type of milk fed, same housing, same offering of water and grain. The

Photo used with permission from MilkBar™.

	Milk Bar	Fast Flowing Teat	Bucket
Esophageal Groove Closed	+	+/-	-
Diverting Milk into Abomasum	+	+/-	-
Promotes Saliva Production	+	-	-
Satisfies Calf While Drinking	+	-	-

calves that were fed with the controlled-flow teats had more than 10% higher average daily weight gains when compared to the other group at weaning.

Conclusion

Plenty of evidence supports that offering calves milk through a controlled-flow MilkBar™ teat has many benefits for calves. Due to the slower drinking speed, the calf produces more saliva, has less milk accidentally reach the rumen, and can better digest the milk. Additionally, negative effects of cross-sucking are negated.

If you want to learn more about calf nutrition and health, feel free to reach out to one of our Crystal Creek® team members at 888-376-6777 or info@crystalcreeknatural.com.

References available upon request.

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