CRYSTAL CREEK NEWSLETTER

APRIL 2017

WHAT'S NEW FOR 2017

Building to Better Serve Our Customers

Crystal Creek© is excited to announce the completion of our 32,500 square foot warehouse addition. This project was started in April 2016 and was complete by September 2016, providing jobs for more than 100 skilled tradesman during the course of construction.

Crystal Creek© has been very fortunate to experience continual growth since beginning in 1997. Our goal has always been to provide quality products, services and resources to our loyal customers. We appreciate the opportunity to serve you.

New Technology in Calf Barn Ventilation

FLAP DUCT is the industry's most versatile calf barn ventilation system, providing calf raisers with an unmatched level of fresh air control. This technology builds on the innovation of FLIP DUCT, with internal membranes that can be airtight, perforated, segmented and layered.

This unique technology can be successfully implemented by any calf raiser regardless of calf barn style or farm size. Visit the "CALF BARN VENTILATION" page on our website to view a number of educational videos on FLAP DUCT and other ventilation solutions.

Products

Crystal Creek® has recently integrated a number of new chlorine dioxide disinfectants into our product line. These products are highly effective, safe to use, versatile in their application and economically priced. Contact us today to learn how using chlorine dioxide can reduce your livestock's exposure to common disease causing pathogens.

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Pre-Engineered Tube Ventilation Systems

By Ryan Leiterman, D.V.M.

What are the benefits of a pre-engineered positive pressure tube system?

Crystal Creek® is now handling pre-engineered tube systems. These duct systems have reduced set up and production time, lower material waste and use bulk shipments for lower freight costs; making the ducts less expensive when compared to a customized duct. Pre-engineered duct systems do not require a ventilation designer to engineer the system, further reducing costs.

How are these pre-engineered ducts designed?

Pre-engineered ducts are made of a durable, UV-resistant, rip-stop high density polyethylene material that contains a patented, lightweight internal membrane which can be moved to change airflow based on seasonal ventilation requirements. An array of numerous, small holes are located at the top of the tube (spanning the ten to two o'clock position) that discharge slow, non-drafty air during cold weather. An array of fewer, larger holes located at the bottom of the duct at the six o'clock position discharge fast, cooling air straight down during times of warm weather. The large six o'clock position summer holes that are spaced along the bottom of the tube (4 feet on center) are to be aligned with the center of each individual calf pen housing system. These ducts are designed to be centered over the calf pen area at a range of 7-10 feet off the ground.

What size pre-engineered ventilation system do I need?

Fan and duct sizing are dependent on the number of calves housed, their size and the dimensions of the barn. Pre-engineered ducts are designed to be specifically powered by the ACME FanJet series of fans. Using another fan with dissimilar air output could lead to improper function of the system. A Crystal Creek® ventilation specialist can work with you to determine what system is right for your operation.

What duct colors and lengths are available?

Pre-engineered ducts are only available in a dark green color and come in 50, 75, 100 and 125 foot lengths. Custom ducts have additional colors available.

Where can I buy these systems?

Crystal Creek® carries everything you will need for your pre-engineered ventilation system. Fans, ducts, mounting hardware, variable speed controllers and fan hoods can be purchased from Crystal Creek® and shipped quickly and conveniently to your farm.

Embracing Change

By Rob Adler

As a newcomer to the agricultural industry I am refreshed by the number of times I hear one of our nutritionists or livestock specialists say, "My producer is excited about the positive results from the changes we made."

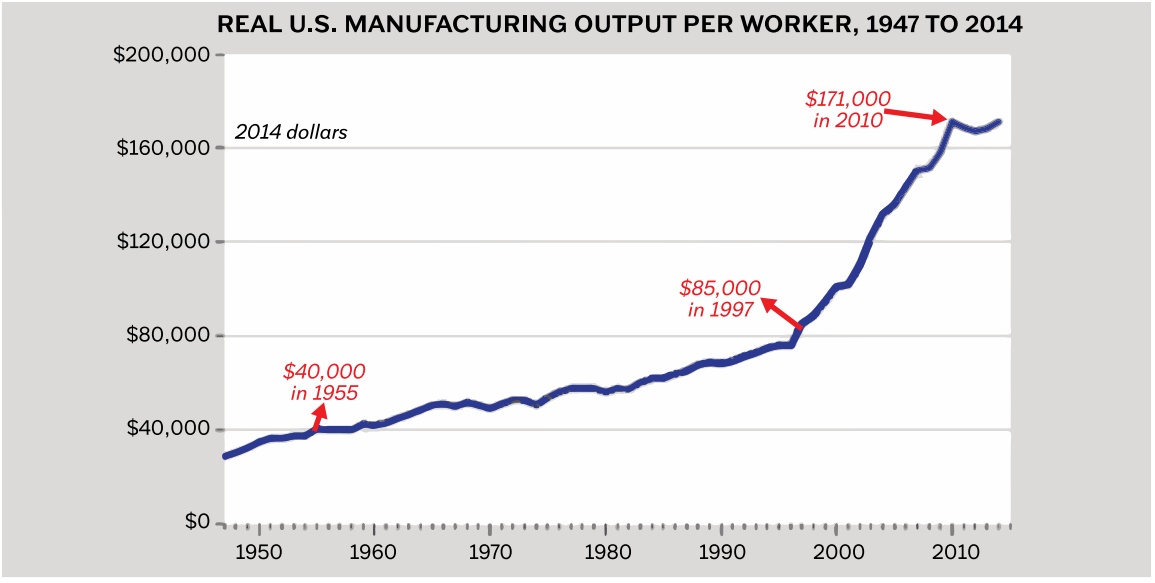
Before joining Crystal Creek, I spent 24 years in manufacturing. When I entered the manufacturing industry in the early 90's the business culture was, "if it worked in the past it will continue to work today." That mindset caused many of the processes, technologies, and building infrastructures to remain unchanged for a number of decades. When global competition heightened in the early 2000's, many manufacturers found themselves uncompetitive resulting in the loss of jobs, bankruptcy, or jobs moved overseas.

The businesses that did survive, and continue to compete today, are ones that embraced change in their operations and progressed by installing a culture that looked for continuous improvement. This continuous improvement came from embracing the latest technologies and equipment enhancements, eliminating waste in their operations, and a dedicated reinvestment of cross-training their workforce. As a result of this culture shift of change, not only did these companies survive global competition, most thrived.

See the graph below showing worker productivity gains over the past 60 years. Note the timeframe from 1997 to 2010. In just over 10 years worker productivity more than doubled. Or revenues of the business more than doubled, while the headcount stayed the same.

As you look at your operation where would you gauge yourself and your culture? Are you progressive about utilizing the latest research and technology to better improve your herd health and profitability? Are you open minded to objectively look at a process and ask "is there a better way?"...for measuring, cleaning, housing, storing, and maintaining or do you take the stance of the dinosaur and view what worked yesterday as the path going forward? Take the road that many in manufacturing did, embrace making positive changes and utilizing the professionals that can help you make changes. After all, how can we expect different results if we keep doing the same thing over and over? Change is good!

Rob Adler is the Warehouse Manager at Crystal Creek®. Prior to joining Crystal Creek® he held various mid and upper level management positions while working in the food and wood products industry. Rob has over 13 years of experience leading continuous improvement programs, has acquired his Lean Certification and has earned numerous Lean Sigma belts.



Dairy Goats Benefit From High Quality Nutrition

By Dan Leiterman

Goats are competent browsers, which leads to the misconception that goats can eat and thrive on almost anything. In reality, because goats have a shorter digestive system relative to their body size, food is not retained as long. This increases the need for both higher levels of nutrition and higher quality nutrients. This faster digestive pass through time, reduces nutrient absorption, but also allows goats the ability to increase their dry matter intake to offset the short access time to nutrition. The range of dry matter intake for goats is 3 to 5 % of their body weight which is typically higher than other ruminants.[1]

A goat's diet may consist of a wide variety of feedstuffs. Goats can browse on shrubs, graze on pasture and can accommodate supplemental grain feeding when necessary to meet nutritional requirements during times of higher production or winter months.

Advanced Nutrition In Crystal Creek® 37% Goat Pellets

Crystal Creek® 37% Goat Pellets contain high performance features that make an excellent foundation for meeting the higher nutritional needs of both milking and meat goats. For example:

1) High quality ingredients such as cleaned phosphorus reduces nutrition blocking contaminants in the diet and supports energy utilization.
2) 100% trace mineral fortification with polysaccharide chelates for improved support of immune function, lower somatic cell count, reproductive performance and mammary health.
3) Strong fortification levels of trace mineral (especially copper) and vitamins to support optimum health and production.
4) Crystal Creek® 37% Goat Pellets do not contain cheap fillers such as distillers grains.

Using Crystal Creek® 37% Goat Pellets to formulate a complete grain mix will not only meet the higher needs of producing goats, but will simplify formulation and enhance the palatability of the diet.

Example 16% Grain Mix Made With Crystal Creek® 37% Goat Pellet

The nutrient requirements for milking goats have a wide range. Variables such as, the number of kids, level of milk production, environmental conditions, and the size, breed and age of the doe are all examples that affect nutrient requirements. The following (**Figure 1**) is an example of a typical 16% grain mix made with the Crystal Creek® 37% Goat Pellet.

Figure 1. 16% Complete Grain Mix For Milking Goats And Growing Goats

Corn	860 lb.
Oats	500 lb.
CC, 37% Goat Pellets	540 lb.
Liquid Molasses	100 lb.
Total	2,000 lb.

Crude Protein	16.00 %
Net Energy Lactation	0.76 Mcal
Calcium	0.95 %
Phosphorus	0.52 %
Copper	35 ppm
Vitamin A	5,950 IU/lb.
Vitamin D	1,370 IU/lb.
Vitamin E	135 IU/lb.

Feeding Grain To Milk Goats

It is recommended you have a Crystal Creek® Nutritionist balance the diet for your goats. General guidelines for feeding grain to goats can be helpful. Because of the wide variation in feedstuffs it is best to feed a ration that has been balanced by a competent nutritionist.

1. Start a doe on grain one month before kidding, and target 1.5 pounds of grain/hd./day by kidding time.[1]
2. After kidding, increase grain slowly to about 3 pounds/hd./day. This is usually accomplished by 4th week post-kidding.[1]
3. After peak lactation, feed according to milk production. Feed approximately 0.33 lb. of grain per lb. of milk production. Split the daily grain feeding into two feedings.
4. Try not to feed a doe more than 4 pounds of grain per day.[2]

Crystal Creek® offers a wide range of nutritional and animal comfort products that are beneficial to supporting your goals in goat production. Check out our website at www.crystalcreeknatural.com and learn more about the innovative Crystal Creek® family of products and services. Our friendly technical staff is available to answer any questions you may have. Call today and plan a winning strategy for your operation.

Source:
1. Feeding Dairy Goats, University of Minnesota Dairy Extension, Laura Kieser.

2. Smith, 1994.

Understanding Biofilms In Agriculture

By Jessica Dercks, B.S.

In agriculture today, sanitation technique and protocol implementation have become more important than ever before. An increased awareness of health benefits gained from a clean environment has stimulated a higher standard of cleaning expectations. Many producers not only strive to remove organic matter from surfaces, but also microbial buildup; more accurately, biofilms.

What are biofilms?

Biofilms are simply defined as thin, slimy films of bacteria, protozoa and viruses adhered to a surface in a resistant matrix of cellular materials. Biofilm layers are found on many farm surfaces such as feeding equipment, animal housing and milking equipment. Roughly 90% of all bacteria on a farm are found in a biofilm layer. These biofilm layers are important because they are resistant to common cleaning and disinfection agents. To truly clean a surface, one must break down the biofilm layer to achieve not only a visually clean surface, but a surface that is also clean on a biological level.

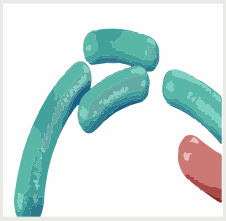
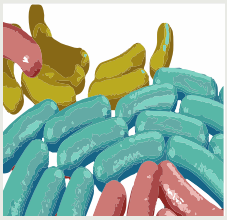
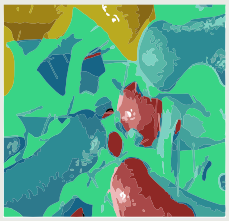
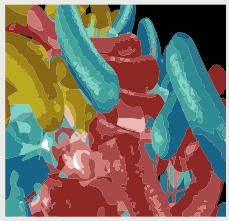
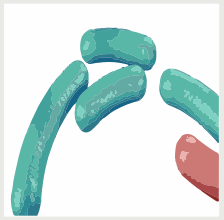
How do biofilms form?

In the past decade many researchers have investigated the process of biofilm formation. It has been well established that there are five major steps comprising the entire process: attachment, growth, maturation, detachment, and re-development. **Figure 1** illustrates the cycle of biofilm formation.

Why are biofilms important?

Biofilms have potential to be detrimental in the agriculture industry because of the opportunity for cross-contamination. Equipment and pens that are visually clean may not be biologically clean. Biofilms limit the rate of cleaning and disinfecting agents to the interior cells while providing conditions for those same cells to thrive[1]. These cells can be disease-causing bacteria that can spontaneously break free from the biofilm and spread sickness to an animal. One example would be placing a newborn calf in a hutch that previously housed a weaned calf. Any bacteria harbored by the older calf could be contained in a biofilm and may not have been removed during the hutch cleaning process. In this scenario, the bacteria could break free from the biofilm and pose a serious health challenge to the newborn calf.

Figure 1 **Bacterial Biofilm Formation - 5 Stages:**

ATTACHMENT	GROWTH	MATURATION	DETACHMENT	RE-DEVELOPMENT
				
Bacteria attach to a variety of surfaces, from metal, to plastic, to skin tissue, using specialized tail-like structures.	The cells grow and divide, forming a dense matrixed structure, many layers thick. At this stage the biofilm is too thin to be seen.	When there are enough bacteria in the developing biofilm the bacteria secrete a slimy extracellular matrix of proteins and polysaccarides.	The slime protects the bacteria from the harsh environments, shielding them from many chemicals, antibiotics and immune systems.	As the colonies mature, the structures created weaken and cast off bacteria that look for new places to grow and prosper.

Source: 1. Centre for Microbial Innovation, University of Auckland, New Zealand

Figure 2

COMPARISON COMPONENT	OZONE (O^2)	HYDROGEN PEROXIDE (H_2O_2)	PERACETIC ACID (POA)	HYPOCHLOROUS ACID (HOCl)	SODIUM HYPOCHLORITE (NaClO)	CHLORINE (Cl_2)	CHLORINE DIOXIDE (ClO_2)	QUARTERNARY AMMONIA	PHENOLS	IODOPHOR
E. COLI	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
GIARDIA	YES	NO	NO	NO	NO	NO	YES	NO	NO	NO
CRYPTOSPORIDIUM SPP	YES	NO	NO	NO	NO	NO	YES	NO	NO	NO
ROTAVIRUS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
CORONAVIRUS	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO
PEDv	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO
BIOFILM REMOVAL	YES	VARIES	VARIES	NO	NO	NO	YES	NO	NO	NO
AFFECTED BY pH	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES
CORROSIVE	YES	YES	YES	YES	YES	YES	NO	VARIES	YES	YES
INACTIVATED BY ORGANICS	NO	YES	YES	YES	YES	YES	NO	NO	NO	YES
WATER SANITIZER / DISINFECTANT	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO
EPA APPROVED WATER SANITIZER	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO
USED WITH DETERGENTS	NO	NO	YES	NO	YES	NO	YES	YES	YES	YES
PRODUCED ON-SITE	YES	RARELY	RARELY	RARELY	NO	NO	YES	NO	NO	NO

How are biofilms broken down?

There are very few products proven to be effective against the tough buildup of biofilms. **Figure 2** demonstrates the efficacy of various products on biofilms, while comparing microbial diversity and environmental considerations.

The clear standout agent is chlorine dioxide. Chlorine dioxide has superior ability to break down the toughest microorganisms and biofilms, without corrosive action or negative impacts on the environment. Its efficacy is not impacted by the condition of the environment, most notably in regards to pH levels and presence of organic matter. Chlorine dioxide is effective against bacteria, protozoa, viruses and fungi on inanimate objects and is considered more effective against microbes than other chlorine solutions[2]. Unlike other cleaning products, chlorine dioxide starves and kills microorganisms by disrupting the transport of nutrients across their cell walls[2].

Chlorine dioxide is even effective against Cryptosporidium, a tough protozoan responsible for causing diarrhea in many different livestock, most notably calves. According to the CDC, this organism has an outer shell that allows it to survive without a host for long periods of time and makes it very tolerant to bleach disinfection.

(Continued on Page 8)

(Continued from page 7)

Figure 3

DISINFECTANT EFFECTIVENESS ON CRYPTOSPORIDIUM PARVUM		
DISINFECTANT	**CONCENTRATION (PPM)**	**CONTACT TIME**
Ammonia	**50,000**	**18 hours**
Benzalkonium chloride (1%)	10,000	Not Effective
Chlorhexidine (2%)	20,000	Not Effective
Chlorine dioxide (ClO_2)	**100**	**< 1 minute**
Cresylic acid (5%)	50,000	Not Effective
Hydrogen Peroxide (6%)	60,000	4 minutes
Isoporpanol (70%)	700,000	Not Effective
Peracetic Acid	3,500	5 minutes
Sodium hydroxide	200	Not Effective
Sodium hypocholrite (6%)	60,000	Not Effective

As demonstrated by the chart above, chlorine dioxide is clearly the product of choice when dealing with cryptosporidium. With less than a minute of contact time, chlorine dioxide can incapacitate the microorganism at a much lower concentration compared to other products.

Why not use household bleach?

The efficacy of bleach is determined by the pH of the mixed solution. When mixed with water, bleach (sodium hypochlorite) breaks into two compounds: hypochlorous acid and hypochlorite ion. Hypochlorous acid has about 80 times the killing power of hypochlorite ion and is minimally present in solutions with a pH of 10 or greater. A 10% bleach solution has a pH of 10-11 and therefore has a greatly reduced ability to effectively perform as a sanitizing agent.[3]

How can biofilm awareness be raised?

One way to locate the unseen biofilms is to test for them. An ATP meter can be used to identify areas of high microbial activity and can also be used to monitor and evaluate the effectiveness of a cleaning protocol. Swabs are taken from materials that are cleaned, such as nipples, buckets, panels or equipment. The ATP meter then provides a numerical readout that will reveal the efficacy of the cleaning protocol in place. If the meter readings indicate unacceptable levels of microbial activity, it is advised that the cleaning protocol be reevaluated.

Regardless of the operation (e.g., dairy, swine, poultry) all livestock producers can benefit from biofilm reduction. Reducing livestock exposure to pathogens will decrease mortality and sickness rates, thereby decreasing treatment costs and increasing profitability. Biofilm buildup is a serious issue that should be heavily considered when selecting a sanitizing agent. For ways to prevent biofilm buildup and to improve your cleaning protocol, see Erik Brettingen's article on page 12 for effective chlorine dioxide treatment options and protocols.

Sources:
1. Donlan, Rodney M. "Biofilm Formation: A Clinically Relevant Microbiological Process." Clinical Infectious Diseases 33.8 (2001): 1387-392. Web.

2. Valderrama, W. B., E. W. Mills, and C. N. Cutter. "Efficacy of Chlorine Dioxide against Listeria monocytogenes in Brine Chilling Solutions." Journal of Food Protection 72.11 (2009): 2272-277. Web.

3. Socket, Donald C. "6 Easy Steps to Properly Clean and Sanitize Calf Feeding Equipment" (2012). Web.

"Ask the Vet/Ask the Nutritionist"

"My Layers Were Producing Well, But Are Not Producing Now - What Is The Problem?" - Eggless in Ohio

As you might expect there is a long list of reasons why this might happen. However, the most common theme that results in a decrease in egg production is stress. Stress is defined in medical terms as, "Any physical, physiological or psychological force that disturbs equilibrium.....includes agents that upset homeostasis, such as infection, injury, disease, internal organ pressures or ... strain."[1]

Heat Stress Challenges Bird Health And Production

As the temperature rises, so does the stress on the birds. Heat stress in poultry begins at approximately 74°F and affects different production parameters incrementally as the heat goes up. For example:

Egg Weight:
Egg weight drops by 0.4% for each 1.8°F from 74°F to 80°F

From 80.6°F on up egg weight drops by 0.8% for each 1.8°F over 80.6°F

Growth Rate:
Growth rate starts to drop at 75.2°F

Feed Conversion Rate:
Is minimal at 82.4°F

Rate of Lay:
Rate of lay starts to drop at 86°F

Physical Signs:
Birds begin to show physiological signs of heat stress starting at 82.4°F, i.e. wings hang loosely, peripheral blood flow increases

Feed Crystal Pellets™ To Stressed Birds

It is important to help birds stay on feed and support digestive function so the diet can be utilized well during stressful conditions. Add Crystal Pellets™ to the birds ration at an inclusion rate of 10 to 25 lb./ton. Some layer barns add Crystal Pellets™ at a 10 lb./ton rate all year because they find economic benefits in better bird health and production. Other flocks with higher challenges, such as early indications of respiratory issues will add Crystal Pellets™ at 15 lb./ton to help keep birds on feed. During times of severe stress challenges, some producers may even add 20 to 25 lb./ton temporarily and then cut back to 10 lb./ton as needed. Crystal Pellets™ are a great tool to have when birds are challenged and need to stay on feed, whether it is due to heat stress, moving, crowding, cold weather, or predators. If you have poultry, you will be glad you have Crystal Pellets™ in your tool kit.

1. Taber's Cyclopedic Medical Dictionary, 19th Edition.

By Dan Leiterman

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

Crystal Creek®
Ask the Vet/Nutritionist
1600 Roundhouse Road
Spooner, WI 54801
OR
askthevet@crystalcreeknatural.com

Swift Start® Calf Feeding Challenge

By Teresa Marker, B.S.

The ultimate goal for calf raisers is to raise a healthy, profitable replacement for their herd. Crystal Creek's Swift Start® Calf & Heifer Program consistently provides the jump start calves need to become a productive part of the herd. The Swift Start® program consists of a line of milk replacers, texturized calf feeds, calf pellets and calf and heifer minerals that are formulated with industry leading technology and manufactured with the highest quality ingredients available. Calf raisers on Crystal Creek's Swift Start® Calf & Heifer Program see less scours, better average daily gains and smooth transitions after weaning.

Crystal Creek's Swift Start® Texturized Calf Feeds start with quality calf feed formulation:

(Please refer to Dan Leiterman's article "Unlocking The Secret Potential of Calf Feed" in the April 2014 newsletter for more information about the formulation of Swift Start® texturized calf feeds.)

1. Texturization. Crystal Creek® texturized calf feeds consist of a combination of calf pellets, corn, oats and molasses. Compared to pelleted starter, texturized calf feeds provide better rumen stimulation and development, increased saliva production, and reduce the risk of ruminal acidosis.

2. Safe Starch Levels. Calf feeds that are over 40% starch pose a higher risk to calves of developing acidosis. Crystal Creek® texturized calf feeds are approximately 30% starch hence a much lower risk of acidosis.

3. Cleaned Phosphorus Source. Our cleaned phosphorus source has significantly lower levels of contaminates such as iron, fluoride and aluminum, all of which can tie up nutrients and interfere with calorie utilization/feed efficiency.

4. Natural Coccidiostat. Yucca Schidigera is an effective, natural coccidiostat comparable to an ionophore without the negative side effects ionophores have on fiber fermentation. Yucca has been proven to increase immune function and increase lower G.I. tract digestion/ nutrient absorption. Yucca also enhances protein utilization and maintains healthy rumen bacteria.

5. 100% Polysaccharide Chelated Trace Minerals. Crystal Creek® uses 100% polysaccharide chelated trace minerals because these types of trace minerals are 100% bioavailable to the animal. Using a more absorbable trace mineral source leads to improved average daily gain, feed efficiency and immune support.

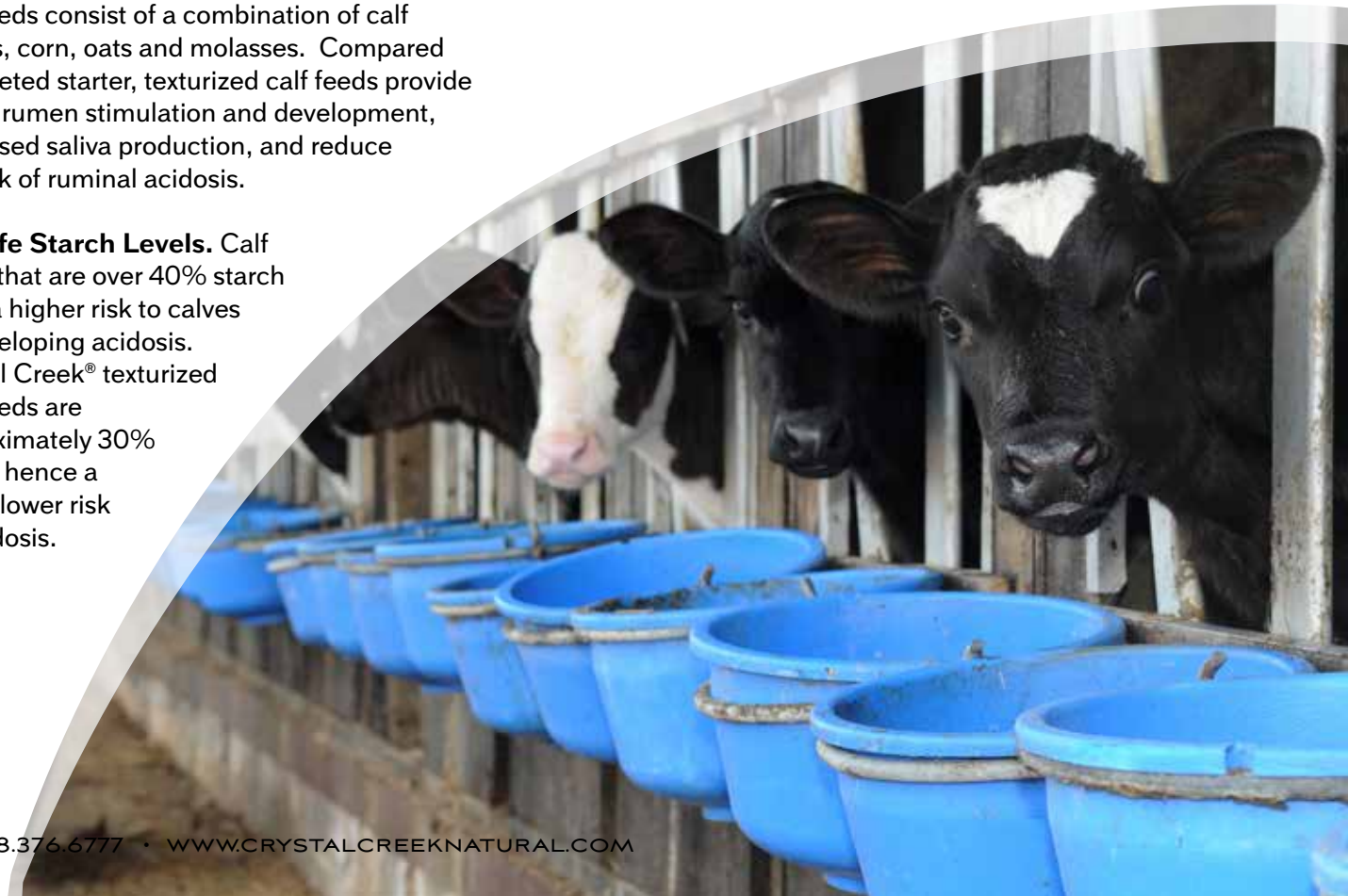


Figure 1

	Number of Calves	Average Birth Weight	Colostrum Brix %	Average Weaned Weight	Days on Feed	ADG	Average Weight Increase	Lb. of Calf Grain Eaten During Trial
Crystal Creek®	24	91.33 lb.	26.33	185.9 lb.	57.9	1.63 lb.	204%	890.5
Brand X	27	90.11 lb.	26.85	177.4 lb.	60.2	1.45 lb.	197%	1146

6. 100% Selenium Yeast. Crystal Creek® uses 100% Selenium Yeast as our selenium source because this option for selenium is nearly 100% bioavailable to the animal. Selenium is important for immune function, muscle growth, and prevention of white muscle disease.

7. Strong Vitamin Fortification. Crystal Creek® fortifies their calf feeds with strong levels of vitamins to support optimum immune function, growth performance and helps reduce potential issues such as ringworm, pinkeye and respiratory issues.

A calf raiser on Crystal Creek's Swift Start® Calf & Heifer Program was recently approached by their previous supplier of calf grain, urging them to switch back to their old program. This prompted the producer to run their own calf feeding trial to compare the two brands of calf feed. Calves were all weighed at birth and given at least 1 gallon of good quality colostrum (minimum of 23% Brix). All calves were fed Crystal Creek's Swift Start® 25/18 Calf Milk Replacer. Calf Shield® and Check™ calf products were added to the milk replacer, in accordance with the complete Swift Start® program recommendations.

Grain was introduced at three weeks of age. One half of the calves were fed Crystal Creek's 22% texturized calf feed and the other half were given Brand X's 22% texturized calf feed. The amount of calf feed fed and refused was weighed every day to determine the pounds of calf feed eaten by each group. All calves were weighed again at weaning. (**Figure 1**) This chart shows calves on the Crystal Creek® program weighed 8.5 lb. more at weaning. Calves were weaned 2.3 days earlier, gained 0.18 lb. more per day and ate 5.34 lb. (or 12.6%) less feed during that time.

The producer initially thought that Brand X was the best choice based on the information of cost per bag being less than Crystal Creek's. Fortunately, the calf raiser knew to not just look at cost per bag. When comparing feeds, it is important to evaluate other parameters such as amount of feed consumed, average daily gain and overall animal performance in order to determine the real value of a bag of feed. This calf feeding trial was beneficial to quantify and validate what other calf raisers using Crystal Creek's Swift Start® Calf & Heifer Program are seeing on their own farms.

Challenge your herd by using Crystal Creek's Swift Start® Calf & Heifer Program. Call our specialized staff to explore options and benefits for your farm, today.

Hygiene Protocols For Successful Calf Raising

By Erik Brettingen, B.S.

Every calf raiser knows that keeping calves healthy is neither simple nor easy. When a calf's exposure to pathogens "outweighs" its immune resources, the results are clinical illness. One of the keys to keeping calves healthy is reducing disease causing pathogens at their source using proper hygiene procedures.

The three primary pathogen exposure points for newborn and pre-weaned calves are maternity pens, calf housing, and calf feeding equipment/utensils. By systematically identifying the primary pathogens at each of these exposure points, a producer can select the most efficacious hygiene protocol to reduce harmful pathogens in the calf's environment.

Although monitoring and documenting the effectiveness of a sanitation protocol is important, the identification and isolation of sick animals may also need to be implemented to prevent the further spread of disease.

To help you carry out these hygiene practices effectively, Crystal Creek® now carries Acepsis Exact Tablets and Acepsis Calf Hygiene Activator and Base; which are chlorine dioxide based sanitizers. Chlorine dioxide is a versatile sanitizing agent that has been proven to be extremely effective against the most durable pathogens. These sanitizers, when added to water, make a concentrated solution of chlorine dioxide. Specific mixing instructions for creating a 500 ppm concentrate solution are found on the product label.

In an effort to better manage the calf development process, the following hygiene practices have been identified.

Maternity Pen Hygiene Procedures:

Provide Fresh/Clean Bedding: For optimal newborn health, calves must be delivered in a clean, dry area, maintaining minimal pathogen exposure. To meet this goal, Crystal Creek® recommends bedding with 25 pounds of long stem straw per 1,000 pounds of animal body weight per day. In general, coliform bacteria (from fecal matter) are the most dangerous pathogens present in every calving area. Maternity pens should be cleaned and disinfected after each calving.

Cleaning the Maternity Pen (Concrete Flooring):

1. Remove bedding from the calving area between each calving. If the calving pen floor is concrete, rinse floor area removing as much organic material as possible.

2. Apply a chlorinated alkaline foaming detergent (see Chlor-A-Foam in the Crystal Creek® catalog) with hot water (140°F/60°C) to all pen surfaces using a hand held foamer. Soak for approximately 10–15 minutes.

3. Rinse with water. Allow pens to dry.

4. Use *Acepsis Calf Hygiene Concentrate* as the final step in the calving pen cleaning process. The solution should be used at a concentration of 100 ppm and sprayed on all pen surfaces for maximum protection.

5. Allow to dry prior to re-bedding the pen.

6. Re-bed calving area with clean/fresh bedding.

Navel Dipping: Careful and consistent navel dipping is a hygiene step that not only kills pathogens at the navel opening but also helps close the umbilical cord.

Separation of Calf from Dam: Separating the calf from the dam shortly after birth is an important hygiene procedure. By controlling this aspect of the calf's environment, you are removing a huge source of fecal bacteria from the calf's environment.

Pre-Weaned Calf Housing Hygiene Procedures:

Keep calves away from wet conditions that support pathogen survival and growth. Providing ample drainage and a dry environment is an effective weapon against bacteria and parasites.

Cleaning Calf Hutches/Pens With Sand/Clay Flooring:

1. Remove the bedding and top layer of sand/clay between calves.

2. Spray top layer of sand/clay with 100 PPM of *Acepsis Calf Hygiene Concentrate*.

3. Let dry for approximately 1 hour prior to re-bedding calf hutch.

4. Clean calf hutches/pens as per previous washing instructions.

5. Rinse with water. Allow pens to dry.

6. Use *Acepsis Calf Hygiene Concentrate* as the final step in the calving pen cleaning process. A solution of 100 PPM of ClO_2, should be sprayed on all pen surfaces for maximum hygiene protection. Allow to dry prior to re-bedding the pen.

Calf Feeding Equipment/ Utensils Hygiene Procedures:

Because feeding equipment comes in direct contact with the calf's mouth, disinfection is crucial in preventing the spread of disease. Careful attention to cleaning protocols will decrease the pathogenic load on bottles, nipples, buckets and other feeding equipment resulting in healthier calves.

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Cleaning Calf Feeding Equipment and Utensils:

1. Rinse all equipment/utensils with warm water (110°F/45°C) removing organic material before washing.
2. Soak the equipment/utensils in hot water (140°F/60°C) with a chlorinated alkaline detergent (pH of 10-11) for approximately 5 minutes.
3. Wash vigorously with a brush for 1-2 minutes.
4. Remove alkaline solution and fill sink with cold rinse water.
5. Add Calf Hygiene Concentrate to the rinse water creating a 50 PPM ClO_2 solution.
6. Let sit and allow to air dry prior to use.

Implementing these sanitation protocols will reduce the load of pathogens calves are exposed to every day. An effective sanitation protocol gives the immune system the advantage it needs to keep calves healthy, saving you time and money by reducing treatments. It is important to note that while these products and procedures are very efficacious, they only work if protocols are carried out correctly, consistently and measured for effectiveness. To learn more about the importance of implementing effective sanitation protocols, see "Understanding Bio-Films in Agriculture" by Jessica Dercks on page 6 of this newsletter.

Monthly Promotions

April 2017

PIVOT FL™

1-3 boxes: **$10/box discount**

4-9 boxes: **$18/box discount** ($10/box discount + $8 per box existing volume discount)

10+ boxes: **$23/box discount** ($10/box discount + $13 per box existing volume discount)

Pail: **$2/pail discount**

HEIFER PRIDE™ **$10/bag discount** & **$2/pail discount**

May 2017

JAM PROMOTION

Receive a **FREE Jar of Jam** or **4 oz. Udder Fancy™** for every $100 of product purchased. Limit 5 per order.

June 2017

FLY REPELLENT

$5 per gallon discount
(4 gallons or more)
$2 per gallon discount
(2-3 gallons)
Normal discounts do not apply during promotion.

CRYSTAL ADVANTAGE®
EQUINE FLY REPELLENT

Concentrate: **$4 per bottle discount**
Ready-To-Use: **$2 per bottle discount**

July 2017

Save 10% When You Order Any Products in the Crystal Advantage® Product Line

CRYSTAL ADVANTAGE®

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PELLETED MINERAL **50 or 25 lb.**
DIGESTIVE SUPPORT **25 lb.**
EQUINE FLY REPELLENT (Ready-to-Use OR Concentrate) **32 oz.**
EQUINE SALVE **4 oz.**

August 2017

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