

The Latest Across the Plains

Welcome, Dr. Reid McDaniel!

Great Plains Livestock Consulting, Inc. would like to announce the addition of Reid McDaniel, Ph.D. as our newest consultant. Reid grew up on a diversified family farm in Georgia, where his interests in agriculture began. His education includes a bachelor's degree in both animal science and dairy science from the University of Georgia; a master's degree in animal science from Kansas State University; and a doctorate in animal science from New Mexico State University. His research programs predominantly focused on feedlot nutrition and management. He brings a broad range of professional experience in industry and academia including feedlot consulting in Australia and the United States; serving as the Extension Beef Feedlot Specialist at South Dakota State University; and providing nutrition and management services for a feed company. Reid focuses on providing sound science-based nutritional and management advice. His goals include increasing productivity, increasing beef quality, enhancing animal well-being, improving customer livelihood, and decreasing environmental impact. Reid and his wife Becky live in Lake Preston, SD and are blessed with three children (Cooper, Charli, and Maggie). Reid is an avid outdoorsman and loves hunting, fishing, and camping.



Timely Reminders

- ◆ Prepare adequate wind shelter and protection from winter elements. A dry, clean hair coat reduces maintenance energy requirements.
- ◆ Analyze winter feed supplies.
- ◆ Keep pens scraped and get manure hauled to fields.
- ◆ Make sure waterers are clean and in good working order.
- ◆ Keep an eye on breakeven projections for cattle placed on feed.
- ◆ Monitor BCS of cows monthly.
- ◆ Contact your nutritionist about running projections on growing or finishing cattle, beef or Holstein, to help plan feedstuff needs.
- ◆ Remember to provide bedding for mature bulls. Frozen testicles are a major reason for BSE failure.
- ◆ Use an internal parasite control product (white de-wormer) in both cows and calves after freeze up/dormancy occurs.

Calendar of Events

- **Dec 5 - 7** Nebraska Power Farming Show, Lincoln, NE
- **Dec 5 - 14** National Finals Rodeo, Las Vegas, NV
- **Dec 9 - 12** ASTA's CSS & Seed Expo, Chicago, IL
- **Dec 12 - 14** Tulsa Farm Show, Tulsa, OK
- **Dec 17 - 19** Indiana Farm Equipment & Technology Expo, Indianapolis, IN
- **Dec 24** Christmas Eve
- **Dec 25** Christmas Day
- **Dec 31** New Year's Eve
- **Jan 1** New Year's Day
- **Jan 3 - 5** Dakota Farm Show, Vermillion, SD
- **Jan 8 - 9** Northern Illinois Farm Show, DeKalb, IL
- **Jan 10 - 12** Missouri Cattle Industry Convention & Trade Show, Columbia, MO
- **Jan 11 - 26** National Western Stock Show & Rodeo, Denver, CO
- **Jan 28 - Jan 30** Iowa Power Farming Show, Des Moines, IA
- **Feb 5 - 7** NCBA Cattle Industry Convention & Trade Show, San Antonio, TX
- **Feb 6 - 23** San Antonio Stock Show & Rodeo, San Antonio, TX
- **Feb 15-23** Nebraska Cattlemen's Classic Kearney, NE
- **Feb 21 - 23** Western Farm Show, Kansas City, MO
- **Mar 3 - 5** Hawkeye Farm Show, Cedar Falls, IA
- **Mar 8 - 9** Big Red Beef Show, Grand Island, NE

Keep Your Boys In The Game: Offseason Herd Bull

Nutrition And Management

By Jason Warner, Ph.D.

We often refer to our herd bulls as the necessary evil for cow-calf production systems. They are necessary for obvious reasons. Their sole job is to breed females and transmit genetics to progeny within your herd, and the importance of this job simply cannot be overstated when you consider that our sire selection decisions will impact over 70% of the resulting genetics in a cowherd after accounting for both calves and replacement females. However, not only do bulls cost a lot of money in today's market, but they are excellent at destroying pastures and corrals, finding creative ways to injure themselves, and transmitting genetics to progeny in your neighbor's cowherd. Time and labor are the two most common reasons that A.I. is not utilized beyond approximately 5% across the national cowherd, and I don't foresee a significant change in that percentage anytime soon. So, if herd bulls represent both a significant cost to an annual cowherd budget (\$50-60/cow/year) and equally an investment in future genetics, then we should be well served to make efforts regarding nutrition and management after the breeding season to ensure their longevity. Just like females, bulls are a depreciable asset so if we can add 2-3 more years of service to a bull's life then we reduce our bull costs per cow unit.

Bulls are often out of sight and out of mind after the end of the breeding season, and it is easy to neglect them this time of year. The time period between breeding seasons is very important though because it represents the opportunity to regain body condition and weight. For those that use their bulls in more than one breeding season per year, this time period is shorter and bulls should be evaluated more closely to ensure they are prepared for the next season. If bulls need to regain weight, then they must gain at a higher rate depending on the degree of weight and condition loss. Most bulls, and young bulls in particular, lose weight and body condition through the breeding season. It is not uncommon for bulls to lose 100 to 200 lb, and this is ok if it means they have been working hard to breed cows. However, we don't want bulls to lose condition to the extent they lose muscle tissue and we should be prepared to supplement thin bulls after breeding to ensure they continue to regain condition prior to the next breeding season. Just as with cows, use body condition to assess the nutritional status of bulls to determine if and how much we need to supplement. Young bulls will grow until they are 3-4 years of age, and giving attention to these young bulls is key to preventing them from falling out after 1 or 2 seasons. At breeding, target young and mature bulls to be in a BCS 6 and 5, respectively. Over-conditioning of virgin bulls prior to breeding is an issue for seedstock producers and discussions about over-fed bulls "melting" upon turn out happen every year. Likewise, issues with semen quality, libido, and fatigue can be seen in over-fed mature bulls so we want to avoid over-conditioning established herd bulls same as we do for developing yearling bulls.

As with other classes of cattle, nutrient requirements for bulls will be dependent on weight and ADG. Table 1. shows the amount of energy (Mcal of NEg) required daily for a 1765 lb bull at different levels of daily gain. The take-home point here is that energy requirements beyond maintenance increase as the level of gain increases and we can design a nutrition program for bulls to provide sufficient energy depending on what our goal is for gain. For example, 2.8 lb/hd/day of corn (in addition to their daily intake) would supply the 1.9 Mcal/day of NEg (2.8 lb/day × 0.68 Mcal/lb of NEg = 1.9 Mcal/day) needed for a bull to gain 0.9 lb/day. If we wanted this bull to gain 90 lb, we should start supplementing 100 days prior to breeding. Bulls can consume 2.0% of BW DM basis and intake and forage quality will determine the supplementation program. Bulls in a BCS 5 or greater can do well on forage that is 8-10% CP without much additional supplement. Mineral and vitamin nutrition influences

Table 1. NEg Required For Gain For A 1765 lb Bull (NASEM, 2016)

ADG, lb	Mcal/day
0.9	1.9
1.76	4.1
2.65	6.4

sperm quality, so provide a well-fortified product that supplies at least 65,000 IU/day of vitamin A during the dormant season. Organic trace minerals have also been shown to promote sperm quality, so they would be best utilized prior to the start of and during the breeding season which also coincides with the recommended time for feeding them to breeding females.

Many "common sense" things regarding bull nutrition and management routinely get overlooked during fall and winter. While this is certainly not our intention, it is typical to forget about bulls with everything else one must get done on a daily basis. Devoting some time and forethought into our management plan can help us make sure bulls are ready to breed the following season. If comingling young and mature bulls together and they are not turned out on pasture, then they need to be in a bigger pen or trap pasture large enough so they can get away from each other to avoid injury. The more space we can give bulls also allows them more exercise which helps keep bulls sound and athletic. If possible, I prefer to feed or supplement bulls in an area such that they are forced to travel some distance to water so they exercise daily. A buller cage or anything similar to help prevent bulls from riding is always a plus to keep hip, leg, and foot injuries to a minimum. If supplementing in a bunk, provide at least 2 to 3 ft of linear space per bull. Your water source cannot be overlooked, and clean water in the liquid form is absolutely necessary. Once cold or snowy weather sets in, we need to make sure bulls not only have protection but that we are also providing bedding to avoid frozen testicles, particularly if bulls are in a drylot or on pasture with limited standing dormant forage. This is also an ideal time to treat for internal and external parasites or develop a plan to do so if you don't already have one in place. Conducting a breeding soundness exam with your veterinarian prior to the start of the breeding season is always recommended. This is cheap insurance relative to the cost of the bull, and allows us to identify any problems with sperm cell motility or morphology as well as a bull's physical ability to breed. Keep in mind that sperm production is a continuous life-long process, and a breeding soundness exam conducted at one point in time evaluates the ability of a bull to breed at that point in time. Bulls can fail an initial breeding soundness exam and then pass a second exam, and the opposite can also happen. The results of one breeding soundness exam are not necessarily true throughout life which is why we recommend having bulls checked annually, and at least several weeks prior to the start of the breeding season to give yourself time to find a replacement bull if needed.

The market for bulls fluctuates some from year to year, but the general trend has been higher over time. Bulls simply represent no small investment for cow-calf producers, and the ones with more proven or sought-after genetics often bring \$5,000-6,000+. Yes, some producers lease or turn over their entire bull lineup annually for other reasons. However, for most cow-calf operators a bull represents a mid-term investment, and our goal is for him to be siring progeny with our chosen genetics for several years into the future. With good nutrition and management during the offseason, we can achieve that goal and increase a bull's productive life. If you have questions or would like to discuss and review your current bull wintering program for this year, please feel free to contact us today. [📞](#)

Probiotics/Prebiotics in Beef Cattle Production

By Reid McDaniel, Ph.D.

Even in a world of "impossible", the beef industry continues diligently to provide a high-quality source of protein in a manner that promotes judicious use of antibiotics, improves animal health and performance, advocates increased wellbeing, and reduces our footprint on the environment. Challenging conditions are persistent, but alternative management approaches are increasing. Pre- and probiotics are among the options being explored to mitigate challenges.

Benefits of pro- and prebiotics have been demonstrated clearly in non-ruminants. These feed additives reduce pathogen issues by increasing the number of beneficial bacteria, improving mucus production and function, inhibiting proinflammatory cytokines, enhancing innate immunity, binding pathogenic toxins, and interfering with sites of colonization. Recent research gives promising results in ruminants along these same lines. The preponderance of rumi-

nant research with these feed additives exists in the dairy industry. Recent developments reveal that these products may have an important role across the beef industry. Before discussing details, defining these products and their differences will develop a good background upon which we can expand.

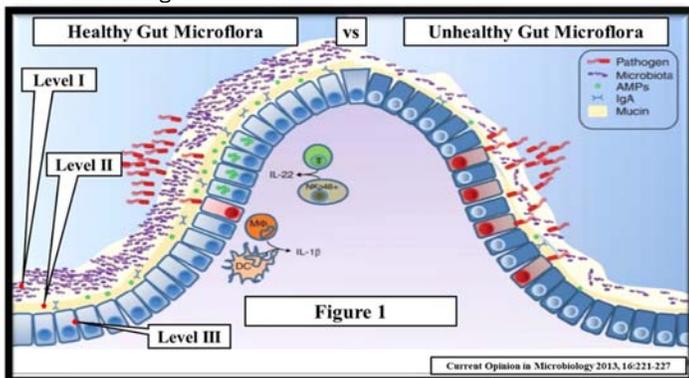
Probiotics are innocuous living organisms that when administered in adequate amounts can have a positive benefit to the host. Probiotics promote development of a healthy population of beneficial bacteria in the gastrointestinal tract. The major benefits include preventing colonization of the intestines by pathogenic bacteria, increasing capacity for digestion, rumen pH modulation, and improving immunity. Commercially available probiotics may be sold as one strain or a combination of strains or species of microorganisms. Except for specific yeast or fungal organisms, most probiotics are bacteria.

Prebiotics are not living organisms, but they promote growth and activity of beneficial microbes inhabiting the gastrointestinal tract. Feed additives that support beneficial bacteria increase digestion and absorption, reduce pathogenic bacterial colonization, improve barrier health and may prevent toxin absorption. Of the prebiotics available, refined functional carbohydrates (RFC) such as mannan oligosaccharides (MOS), beta glucans and D-Mannose are the most commonly found as feed additives for cattle.

Some products are designed to modulate rumen fermentation. Probiotics intended for this purpose may be in the form of a paste, an oral drench or fed in a ration. Depending on the product, responses might differ, but mode of action is often similar – an increased population of microbes fermenting feedstuffs into volatile fatty acids (VFAs) which are an important source of energy in ruminants. Increasing production of VFAs can make cattle more efficient if it does not exceed buffering and absorptive capacity of the rumen. Other probiotics might be useful when introducing cattle to diets high in fermentable carbohydrates. Starch fermentation increases lactic acid production in the rumen, leading to subsequent reduction in ruminal pH and development of acidosis. Increasing ruminal population of a lactate-utilizing bacteria could mitigate acidosis and decrease diet adaptation time.

The role of the gut in livestock production is critical. Balancing the gut microflora in a way such that a beneficial population exists has recently become a point of interest in animal agriculture. With increasing pressure from consumers to reduce the use of antibiotics, it is likely that research will persist. Perhaps, we have merely just scratched the surface into an area that is the future of beef production?

Figure 1 below compares healthy vs unhealthy gut microflora (Khosravi and Mazmanian, *Current Opinion in Microbiology*: 2013, 16: 221-227). Three levels of protection that are offered by a healthy intestinal microbial population are shown. In level I, colonization sites are saturated with beneficial microbes competing with pathogenic species for nutrients and limiting pathogen association with host tissue. In level II, commensal microbes bolster barrier immunity by increasing expression of mucin and other innate defense mechanisms; further reducing pathogen association with host mucosa and tissue. In level III, the presence of beneficial microbes is conducive to enhancing immune response to pathogens. In the case of an unhealthy gut microflora, immune responses are limited and pathogens are prone to increasing the risk of infection.



Now that we've explored the basics, you may be left wondering if, how or where these products fit your operation? It is imperative that basic needs of cattle must first be met. Proper nutrition must never be overlooked because it has a direct impact on performance and health across all sectors of beef production. Feeding these products is not a replacement for best management practices. An environment with a heavy exposure to vectors of disease

such as sale barns will remain a risk. Calves not getting significant colostrum or other forms of maternal nutrition will not benefit from using these additives.

Including a pro- or prebiotic may be a viable consideration for cow-calf producers given it is cost effective and the results are desirable. Current understanding of implications maternal nutrition has on calf health, growth performance, and carcass quality are compelling. University of Kentucky research using BIO-MOS (Alltech) showed higher levels of immunoglobulins G and M in colostrum from treated cows and in their calf serum. These results are indicative of increased colostrum quality. Data from the University of Florida tells us calves receiving RFCs are 50% less likely to become infected with *Cryptosporidium parvum* compared to unsupplemented calves. Success of using such additives might be assessed through tracking mortality, morbidity, or pounds of calves weaned. Either of these have important economic implications and are measurable means of determining outcome of management programs.

In the feedlot, studies have shown the benefits of probiotics and prebiotics on growth, performance and health. Some of the most beneficial responses in fed cattle have been reducing incidence and severity of acidosis and increasing immune response in stressed calves. Data from a heifer receiving experiment at Texas Tech University using the prebiotic Celmanax (Arm & Hammer Animal Nutrition) reported improvements in dry matter intake, average daily gain, and a 61% improvement in morbidity related to bovine respiratory disease. Management decisions to use these products must consider the economic outcome of doing so. Reducing of stress, increasing feed intake, reducing pull rates and death loss, and increased performance are all related to the bottom line in feeding cattle.

Other points of interest in fed cattle include evidence for implications on food safety. The Beef Industry Food Safety Council recognizes well-researched probiotics in pre-harvest Production Best Practice. Feedlot research data from North Dakota State University provides evidence that the probiotic Micro-Cell FS (Lallemand Animal Nutrition) reduces fecal shedding of *E. coli* O157:H7 and re-infection of *Salmonella*. Experimental results out of the Lethbridge Research Center in Canada suggests that Celmanax prevented binding of *E. Coli* O157:H7 to jejunal cells of the small intestine. This could have important implications on consumers since these pathogens are major contributors to food-borne illness in humans.

Consumer preference and regulatory constraints have created a fostering environment for the alternative feed additive industry. These products are not subject to the same regulatory discretion as important medicated feed additives commonly employed in our industry. New items are developed and determined to be Generally Recognized As Safe (GRAS) prior to entry into the market. Sound supportive research and source reputation should be a driving factor when considering use of any product. Variation between available strains and species of probiotics and type of prebiotics must be considered. Simply put, they are not all the same and results may be influenced heavily by choice. In all cases, choosing to use these products is an important decision because return on investment is crucial.

Angel Aguilar of Lallemand Animal Nutrition offered advice in a recent *Feedlot Magazine* article titled "4 Keys for Effective Probiotic Use". His recommendations included: 1. Probiotics must be alive and viable in the environment to which they will be exposed 2. Product(s) must come from a reputable source that maintains high quality control standards 3. Product(s) must be specific for your needs – not all pre- or probiotics have the same labeled use or specifications 4. Most product(s) must be fed daily and according to label in order to maintain efficacy.

Aguilar added, "storage must be according to label from the manufacturer. For probiotics and prebiotics to be effective in pathogen control, these products must escape rumen fermentation and abomasal digestion prior to reaching targeted sites in the small intestine

Claims from some manufacturers may be vague. When considering using these feed additives, look for products with specific claims and well-structured supportive data. Make sure specific claims are transparent about what to expect and why. Your Great Plains Livestock Consulting nutritionist will be glad to help you look beyond marketing claims for data that will help you make the proper decision.



GREAT PLAINS Livestock Consulting, Inc.

500 S. 4th St.
P.O. Box 377
Eagle, NE 68347

The Great Plains News Feed

Staff

Ruminant Consultants

Ki Fanning, Ph.D., PAS

Cell: (402) 890-5505
Ki.Fanning@GPLC-Inc.com

Jeremy Martin, Ph.D.

Cell: (402) 890-5507
Jeremy.Martin@GPLC-Inc.com

Dan Larson, Ph.D.

Cell: (402) 560-4052
Dan.Larson@GPLC-Inc.com

Luke Miller, M.S.

Cell: (660) 299-0798
Luke.Miller@GPLC-Inc.com

Jason Warner, Ph.D.

Cell: (402) 890-8533
Jason.Warner@GPLC-inc.com

Chris Muegge, M.S.

Cell: (317) 526-8204
Chris.Muegge@GPLC-Inc.com

Adam Schroeder, M.S., MBA, PAS

Cell: (815) 592-5491
Adam.Schroeder@GPLC-Inc.com

Karl Harborth, Ph.D.

Cell: (830) 310-0848
Karl.Harborth@GPLC-Inc.com

Matt Luebbe, Ph.D., PAS

Cell: (563) 213-9603
Matt.Luebbe@GPLC-Inc.com

Robert Jones, M.S.

Cell: (417) 737-9146
Robert.Jones@GPLC-Inc.com

Reid McDaniel, Ph.D.

Cell: (402) 803-8058
Reid.McDaniel@GPLC-Inc.com

Field Representatives

Brent Nelms

Cell: (308) 340-4235
Brent.Nelms@GPLC-Inc.com

Braden Forker

Cell: (402) 862-7001
Braden.Forker@GPLC-Inc.com

Taryn Chapman

Cell: (660) 953-0004
Taryn.Chapman@GPLC-Inc.com



Phone: (402) 781-9378

Fax: (402) 781-9379

www.GPLC-Inc.com

Winter
2019