

ANIMAL SCIENCE E-NEWS

July 2008

Vol. 1, No. 3

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Reproductive Diseases Can Cost You

Dr. Jeremy Powell, Assistant Professor and Veterinarian

Sometimes we don't realize the danger that is lurking around the next corner. Just when you get through the breeding season and you've got all the cows settled, it hits. A major abortion storm sweeps through that wipes out next year's calf crop, and you're left with all the puzzling questions: What could have caused this? How can you get a diagnosis? More importantly, what can you do to prevent this from occurring next year? There are many potential causes that lead to abortion or embryonic death in cattle, but the majority of the problems are typically due to a handful of pathogens – Leptospirosis, Infectious Bovine Rhinotracheitis (IBR), Bovine Viral Diarrhea (BVD), Trichomoniasis and Vibriosis.

Leptospirosis

Leptospirosis is a disease that can affect several species, including cattle, sheep, pigs, dogs, horses, wildlife and man. This disease is caused by bacteria that are well suited for wet, moist environments. Cattle can be exposed from consuming contaminated stock ponds or by wildlife, rodents or infected domestic animals. Transmission can occur when the bacteria penetrate a mucous membrane (mouth, nose, conjunctiva, genital tract) or enter an open wound.

Once an animal is infected, the organism circulates throughout the body and localizes in the kidneys, mammary glands and genital tract. Once the urogenital tract becomes infected, the bacteria can be shed in urine, uterine discharge, semen and aborted fetuses/placentas. This shedding allows other herd mates to become exposed and infected.

Abortions due to Leptospirosis typically occur in the second or third trimester of gestation. Cows do not abort the fetus when they first contract the disease, and infected cows frequently exhibit no other signs of illness. If cows are affected very late in gestation, they may give birth to weak or poorly developed calves.

Infectious Bovine Rhinotracheitis

IBR can lead to several forms of clinical disease. The IBR virus can cause symptoms that range from respiratory tract infections, ocular infections, abortions, genital infections and neurological infections to a generalized infection of newborn calves.

Abortion from IBR typically occurs from four months of gestation up to term. Cows aborting due to an IBR infection may experience

temporary infertility from vaginitis after the abortion has occurred. Unvaccinated herds are at the highest risk for IBR abortion problems.

Bovine Viral Diarrhea

BVD virus can cause a wide variety of clinical syndromes in cattle, including infertility, respiratory disease (pneumonia), congenital abnormalities (eye defects, brain defects), abortion and stillbirths in calves. If a pregnant cow acquires a BVD infection, there are several possible outcomes depending on the stage of pregnancy when she is infected.

A normal calf could be born to a cow that becomes infected during late gestation (> 180 days). However, an infection during early pregnancy (< 125 days) can result in more detrimental outcomes. During this time period, possible outcomes of an infection include early embryonic death, abortion, fetal mummification or a persistently infected calf. Fetuses exposed to BVD that are at 150 days or more of gestation could be born with congenital defects. These defects may lead to poor brain development, eye abnormalities, structural malformations and stunted growth. Calves born with congenital defects usually have

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difficulty standing and walking and may exhibit an early death due to a poor ability to nurse the dam.

Vibriosis

Vibriosis is caused by bacteria called *Campylobacter*. It typically causes infertility during the breeding season due to loss of early pregnancies. Characteristic clinical signs of this disease would include a high percentage of cows in the herd returning to heat during the breeding season. They may also show prolonged or irregular estrus periods. Then, when calving season occurs, many cows will be calving later in the season due to the repeated breeding caused by infection. Infrequently, cows may abort between four and eight months of a *Campylobacter* infection.

Trichomoniasis

Trichomoniasis is a venereal disease of cattle caused by a protozoa organism, *Trichomonas foetus*. This disease causes very few outward signs of illness. Therefore, it can often be present in a herd for a considerable time before it is suspected and diagnosed. Infected cows will experience infertility and early embryonic death, causing the cow to return to heat and subsequently extending the breeding season. This, in turn, causes devastating losses due to poor calf crops and prolonged calving seasons.

Trichomoniasis has few adverse effects in the bull, but the bull acts as the main source of transmission for the herd. In bulls, the organism lives on the tissue lining of the penis and prepuce sheath. Younger bulls less than 4 years of age tend to clear themselves of the infection, while those 4 years and older are often infected for life.

Length of Gestation	Description of Fetus
Two months	Size of mouse
Three months	Size of rat
Four months	Size of small cat
Five months	Size of large cat
Six months	Size of small dog (hair around eyes, tail, muzzle)
Seven months	Fine hair on body and legs
Eight months	Hair coat complete, incisor teeth slightly erupted
Nine months	Incisor teeth erupted

Table modified from New Mexico State University Cooperative Extension Service publication B-215

Other Reproductive Diseases

There are many other potential causes of abortion in cattle other than the diseases covered in this article. One that is worth mentioning is Brucellosis, also known as Bang's disease. For some time, the U.S. had been classified free of Brucellosis. However, in light of the recent outbreak in Montana, the importance of preventing this disease has been re-established. Producers should strongly consider a preventative vaccine for their replacement heifers. Replacement heifers must be vaccinated by a veterinarian or state technician for Brucellosis between 4 and 12 months of age.

Diagnosing the Problem

Diagnosing the cause of abortion is somewhat trying, and results can be inconclusive greater than 50 percent of the time. When submitting tissues to a diagnostic laboratory, careful handling of the sample submission is essential. Always refrigerate samples as soon as possible to prevent further breakdown of tissue. When submitting samples, you should include the fetus, the placenta and

a maternal blood sample. Some diseases that cause abortion in cattle can also infect humans, so always be cautious when handling aborted fetuses and tissue. If you do not plan to use the tissues for diagnostic purposes, always remember to dispose of them so that other animals in the herd do not become exposed from these contaminants.

The chart above provides an estimate of age for an aborted fetus.

Preventing the Problem

Although herd health needs may vary between operations, there are a few standard vaccines that should be included to prevent problems with reproductive diseases in your herd. Among these are a 5-way viral vaccine (IBR, BVD, PI-3, BRSV), a 5-way Leptospirosis vaccine and a Vibriosis vaccine. Since vaccination needs may vary, it is important to get your veterinarian's input when selecting vaccines for your operation.

For more information on reproductive diseases and other cattle diseases, contact your county Extension office.

Forage Testing Up 51 Percent in Arkansas

Dr. Shane Gadberry, Assistant Professor

A survey at two Arkansas Beef Improvement Program workshops this past winter revealed 92 percent of the participants fed hay at least one-third of the year. The survey also revealed that two-thirds of the participants in the two workshops never had their hay lots analyzed for nutrient content. Although having forages analyzed for nutrient composition isn't a common practice for livestock producers, the number of samples submitted to the University of

Arkansas Diagnostics Laboratory was up during the 2007-08 hay production and feeding seasons.

Higher feed prices may be the driving force behind the 51 percent growth, compared to 2006-07, in the number of hay samples submitted to the Diagnostics Laboratory between May 2007 and April 2008. Hay analyses reached almost 1,000 samples, up from the previous nine-year average of 554

samples. Bermudagrass and mixed grass accounted for 37 percent and 35 percent of the samples, with the remaining representing fescue, johnsongrass, forage sorghums and alfalfa.

Twenty-four percent of the samples submitted requested nitrate analysis. Within this group, 34 percent contained 700 ppm (beginning level for cautionary measures) or greater nitrate-nitrogen. While higher nitrogen costs have

producers talking about reducing fertilization, concerns over nitrate accumulation do not diminish, especially with certain forages (johnsongrass, sudangrass and sorghum-sudan hybrids). Fortunately, many of the county Extension offices are now equipped with qualitative nitrate test kits that can be used to screen hay samples or standing crops prior to harvest.

The protein and energy content of the hays tested in 2007-08 remained the same compared to past years. Crude protein averaged 12 percent, with 68 percent of the samples within the range of 8.2 to 15.8 percent CP. Energy content, expressed as TDN (total digestible nutrients), averaged 56.5 percent with 68 percent of the samples within the range of 51.2 to 61.8 percent TDN.

Very few of the hay samples analyzed did not have enough combined protein and energy to meet gestating cow requirements. Overall, 95 percent contained a sufficient amount of protein for late-gestation and 84 percent contained an adequate amount of TDN.

Due to the additional protein requirement associated with milk production, there were fewer samples that met the protein requirement for lactation; however, 79 percent still contained enough protein for cows with moderate milking ability. Total digestible nutrients, unfortunately, were almost opposite of what was observed with protein.

Sixty-two percent of the hays WERE NOT adequate in TDN for lactation.

High feed prices and other input costs are causing livestock producers to re-think forage production and supplemental feed practices. Hopefully, the value of forage testing is being realized. At the writing of this article, winter corn futures were trading for \$6/bu. This could keep the byproduct feed energy market in the \$150 to \$170/ton range or greater and supplemental energy feed costs during lactation over \$0.15 per head daily, not including hauling or local feed mill markups.

Not only does forage testing help identify where nutrient shortfalls occur and the type of supplemental feed needed to compensate for deficiencies, but forage testing is also a valuable tool to help determine if pre-harvest forage management practices need adjusting so the reliance on purchased concentrate feeds can be minimized. Grass hay protein content can be correlated with the amount of nitrogen fertilization. Reducing or eliminating nitrogen fertilization rates will not only reduce hay yields but will also result in lower hay protein content, increasing the odds for needing protein supplementation. On the other hand, TDN is highly correlated with plant fiber content – the higher the fiber, the lower the digestible energy. Fiber increases as the plant matures over time. If a forage analysis returns with an

undesirably low TDN content, it can be interpreted as harvest was delayed too long. To improve TDN, the forage will have to be harvested at an earlier stage of maturity.

Rainfall patterns kept many producers in Arkansas from getting in the hay fields soon enough this spring, and a lot of fescue and ryegrass were being harvested at a mature stage. Ideally, cool-season grasses are harvested at a late boot, early head stage, which means the seed heads are just beginning to emerge from the stem. Harvesting at this stage will generally result in a TDN content that is sufficient for a lactating beef cow. Because of the delayed harvest, many of the hays cut this spring will be inadequate in energy for lactation.

The additional fuel and fertilizer costs along with short hay supplies have kept hay markets 54 percent above the five-year average reported by USDA. High feed prices and the lack of storage and handling facilities will limit the adoption of replacing hay with alternative feedstuffs in a wintering diet. Until reliance on hay for wintering beef cattle is minimized by stockpiling forages in fall and establishing complimentary forage systems, forage testing will continue to be a valuable tool for making cost-effective winter feeding and harvested forage management decisions.

Comparison of Nitrogen Sources for Forage Yield

Kenny Simon, Program Associate - Forages

Declining supply and increasing cost of ammonium nitrate have put pressure on fertilizer dealers and producers to switch to urea even though it may be less efficient for topdressing pastures. Nitrogen loss inhibitors, such as Agrotain, are being used in rice fields in eastern Arkansas to reduce urea volatilization. This product may improve efficiency of urea in pastures which could reduce fertilizer costs for producers managing for optimum forage production. The University of Arkansas Cooperative Extension Service is conducting farm demonstrations comparing nitrogen sources for effect on forage production.

In February 2008, a field experiment was established in a tall fescue pasture in Fulton County to determine spring response of tall fescue to four sources of

nitrogen fertilizer – ammonium nitrate, urea, urea treated with Agrotain and calcium nitrate. Each fertilizer treatment was applied at the rate of 75 lb N per acre. Application date was February 29. Recent soil test indicated P and K levels were optimum. Fertilizer treatments were compared to a non-treated check and were replicated four times. The forage was allowed to grow until May 29 when all plots were harvested. A sickle mower was used to harvest a three-foot wide strip from the center of each plot. Subsamples were dried to a constant weight for moisture correction.

Results indicate that nitrogen should be applied to maximize growth response. Mean yields from nitrogen application in late February were more than one and one-half times the yield of the untreated

check 5,571 lb/acre vs. 3,249 lb/acre, respectively (Table 1). Yield was not different among nitrogen sources. Urea with Agrotain tended to have a numerically higher yield; however, the difference between it and other N sources was not statistically significant.

With record high fertilizer cost, it is important to get the maximum return on your investment. Fertilizer sources should be compared according to the cost per pound of nutrient. Comparing sources based on price per ton will not give an accurate assessment of the true cost per acre (Table 2). For example, of the N sources listed on page 4, there are considerable differences in the price cost per ton; however, the price/lb of nutrient is similar.

Now the big question, is it cost effective to apply N fertilizer? In order to determine if fertilizing with N is cost effective, we must work through the following. If producing 4' x 5' bales weighing 750 lb each, 3.1 additional bales would be produced per acre with N fertilizer. The average cost to apply 75 lb of N/acre is \$57.38. Therefore, the N fertilizer cost per additional bale was \$18.51.

In conclusion, ammonium nitrate was the most cost effective, yielding over one and half times the yield of the check for \$0.73/lb N.

Table 1. Effect of nitrogen source on dry matter yield of tall fescue

N Source ^a	Dry matter yield per acre (lb) ^b	Tons per acre
Ammonium Nitrate	5,481 ^c	2.74 ^c
Urea	5,418 ^c	2.71 ^c
Urea + Agrotain	6,264 ^c	3.13 ^c
Calcium Nitrate	5,122 ^c	2.56 ^c
Check	3,249 ^d	1.62 ^d

^a All N sources applied at rates of 75 lb/acre N.

^b Yields are means of four replications.

^{c,d} Uncommon superscripts within the same column are significantly different.

Table 2. Comparing the nitrogen prices (June 2008 retail prices) of common fertilizers

Fertilizer Source	N	Nitrogen/ton (lb)	Price/ton (lb)	Price/lb of nitrogen	Cost to apply 75 lb nutrient/acre
Ammonium Nitrate	34-0-0	680 lb	\$497	\$0.73/lb	\$54.75
Urea	45-0-0	900 lb	\$680	\$0.76/lb	\$57.00
Urea + Agrotain	45-0-0	900 lb	\$680 + \$55	\$0.76/lb + \$0.06/lb	\$61.50
Calcium Nitrate	26-0-0	520 lb	\$390	\$0.75/lb	\$56.25

Activities of the Arkansas Milk Stabilization Board

Jodie A. Pennington, Professor

Act 754 by the 2007 Arkansas legislature established the Arkansas Milk Stabilization Board, which is to assure the viability of dairy farming in the state by encouraging increased milk production and to assure consumers of an adequate supply of milk. The board is composed of two dairy farmers, one consumer, one processor and one retailer. The goals of the Board are to stabilize and/or grow the dairy industry in the state to ensure adequate milk for consumers and to promote economic development, especially in rural areas.

In Arkansas, dairy producers produce approximately 200 million pounds of milk per year while dairy plants process over 900 million pounds of milk per year. Arkansas residents consume over 500 million pounds of fluid milk products yearly and consume over 1600 million pounds of milk-equivalents in dairy products each year, based on per capita consumption of dairy products. In contrast to many food products, fluid milk is needed on an almost daily basis and is not easily stored for long periods of time, compared to cheese, meat products and other hard products such as

cereal grains that are harvested yearly and can be stored for many weeks or longer.

More and more states provide financial incentives for dairy producers to ensure an adequate supply of milk in the states for economic reasons related to dairy production and/or to ensure an adequate supply of milk in the event of a natural or man-induced disaster that might prevent milk from getting to the state. Since milk production in the state continues to decline, the Stabilization Board has decided that financial incentives for dairy producers in the state are required to ensure that milk will be available to the population of Arkansas when needed.

The financial incentives for dairy producers to increase milk production and funding for the incentives are still being discussed. Tentatively, the incentives include (1) a 10 percent investment tax credit on money spent to construct, improve or acquire buildings or equipment for dairy animal housing, feeding, milk production or waste management; (2) production and quality incentives based on increased milk production

above the previous two years with quality incentives for milk below somatic cell count levels of 500,000; and (3) a monthly stabilization payment payable to registered Arkansas milk producers when the monthly average price for milk purchased from Arkansas producers by the Arkansas Dairy Cooperative Association and Dairy Farmers of America falls below a specific percentage of the average cost of milk production as determined by USDA/NASS in the surrounding states of Missouri and Tennessee. There will be dollar limits per dairy per year in each of the three categories.

To fund the incentives for stabilized and increased milk production, the Board has discussed several options and plans to finalize recommendations in the next few meetings

It is important to note that these proposals are still evolving, and the eventual act with the proposals must pass the legislature and be signed by the governor before the proposals become law. The Arkansas Milk Stabilization Board continues to meet monthly, normally the second Thursday of the month.

Tour of New Zealand-Type Dairy in Missouri

A tour of the New Zealand-type dairies in southern Missouri is scheduled for Thursday, July 17, 2008. The dairy is a 500-cow dairy near Wentworth, MO, Grasslands Wentworth 2, which is shared-milked by Jeff Hayes. Contact your county agent by July 12 if you are interested in visiting the dairy and/or want to ride in the van that will leave Conway at 7 am.

Central Arkansas Goat Conference

The Central Arkansas Goat Conference will be conducted at the 4-H Center at Ferndale on Saturday, July 26, 2008. The conference will begin at 9:30 a.m. and finish at 3:15 p.m.

Topics will include an overview of the goat industry, basic goat management practices, characteristics of the Kiko goat breed for use in the southeastern United States, goat diseases, an autopsy on a goat and showing and fitting of both dairy and meat goats as well as how to get a goat ready to show. Youth are encouraged to bring their own goat for showmanship. This is an excellent opportunity for youth with dairy and meat goat projects to practice showmanship before their county and district fairs. As many youth are fairly new to the goat project, the group will be divided in the afternoon into two sessions for 1) topics on showing and fitting for youth and parents and 2) talks on Kiko breed and management of goats for goat producers.

Speakers will include Terry Hankins, editor of the *Goat Rancher*, Sarah, MS;

Dr. James Britt, veterinarian with the Livestock and Poultry Diagnostic Laboratory in Little Rock; Dr. Jodie Pennington, University of Arkansas Cooperative Extension Service, Little Rock; and top youth with goat projects.

Registration is \$10 for preregistration by July 19 and \$15 at the door. Please use the material in the 4-H packet to register. Lunch is provided in the registration fee.

North Central Arkansas Beef Cattle Conference

The North Central Arkansas Beef Cattle Conference, one of the top beef cattle meetings in the United States, is scheduled for Aug. 4 at the North Arkansas Livestock Auction in Green Forest. The North Central Arkansas Beef Cattle Conference is a joint educational effort by the Division of Agriculture and Farm Credit Services of western Arkansas. It is designed to provide beef cattle producers with the latest information on beef cattle management.

The program will focus on producing quality calves and beef cattle markets and what the future might bring. It'll address beef cattle supply and demand, sire selection to produce quality calves and the factors that affect the value of a calf. The beef cattle conference will feature many experts that are nationally recognized in their respective areas.

The first speaker is Dr. Tom Troxel, U of A extension animal science professor. Troxel will discuss the factors that affect the selling price of calves sold through Arkansas Livestock Markets. In 2005, more than 100,000 calves sold

through Arkansas livestock auctions were evaluated to determine what factors affecting selling price.

Sammy Cline, livestock market reporter and a cattle buyer, will conduct a live animal evaluation to discuss the value of calves. Muscle, frame score, etc., will be evaluated on each calf and a selling price determined. The speakers will discuss the selling value differences of each calf.

After the break, cows will be brought into the ring, and Dr. Twig Marston, University of Nebraska, and Dr. Brett Barham, U of A extension genetics and breeding expert, will discuss what type of bull would be needed to produce a quality calf. Marston and Barham will break down each cow and discuss types and breeds of bulls that would complement each cow. In today's market, it's going to be very important that producers produce a quality calf in order to optimize their income.

James Robb, an agricultural economist with the Livestock Marketing Information Center in Denver, will address beef cattle supply and demand plus a market outlook. He has written several hundred articles and newsletters on livestock marketing topics and is a widely traveled speaker.

A registration fee of \$20 will be collected at the door. Conference registration begins at 2:30 p.m., and the program starts at 3 p.m. The program is scheduled to conclude about 7:30 p.m. For more information, contact your local county Extension office.

Byproduct Feeds: Getting the Most Out of Your Feeding Program

Paul Beck, Associate Professor

Increasing fuel expenses have led to increasing use of feed grains for bio-ethanol production. Corn production increased from 7.7 billion bushels in 1983 to around 14 billion bushels in 2007. From 1983 to 2006, approximately 50 percent of the corn was used as feed, while industrial uses equaled an average of 17 percent. In 2007 and 2008, the projected feed use of corn production is about 40 percent and industrial uses are projected to be about 35 percent of production. It is projected that about 33 percent of the corn crop will be used for

ethanol production alone by 2012, putting more pressure on corn's use as a feed grain.

Last fall, with over 85 million acres of corn harvested, corn prices have risen to stratospheric levels. A load of corn delivered to the University of Arkansas Southwest Research and Extension Center at Hope in early July costs right at \$7.70/bushel – nearly \$270/ton. Costs of byproduct feeds have increased along with the price of corn. Corn gluten feed has increased to over \$180/ ton, soybean

hulls to over \$150/ton and rice bran to over \$110/ton. These prices are substantially greater than historical price levels for these products.

In a recent market report, the price slide between 500-pound steers and 850-pound steers is around \$1.43/hundred pounds. This indicates that the high feed costs have pushed the feedlot sector to purchase heavier cattle decreasing the total amount of feed required to finish the cattle. This indicates that the economic incentive is still present to grow

calves to heavier weights prior to marketing them, but the increased feed costs of gain makes it more important than ever to consider the importance of feed efficiency and cost of gain when designing your feeding program.

Recent research conducted at the Noble Foundation and Oklahoma State University can be used as examples. At the Noble Foundation, steers were placed on cereal rye pasture in the fall without supplementation at a stocking rate of one calf for every two acres or were provided soybean hulls in bulk feeders free-choice and stocked at 2, 2.5 or 3 calves per acre. The calves fed soybean hulls gained similarly to the non-supplemented calves, and total gain per acre was increased by 88 to 170 percent (because of the increased stocking rates); but for every pound of added gain, the supplemented calves required 9 pounds of feed. At Oklahoma State, a similar study was conducted with calves fed hay and free-choice soybean hulls. Once again, it required 9 pounds of feed for every pound of added gain.

Free-choice supplementation of byproduct feeds is a program that may be cost effective when feed prices are cheap, but it will not be cost effective

with high feed prices. Improvements in efficiency can be gained through good feeding and husbandry practices. Accuracy and consistency of mixing and delivery of rations is the key to efficient production.

Two studies conducted at the Southwest Research and Extension Center at Hope help illustrate the effect of feeding program on efficiency. In one study, calves were limit-fed at a rate equal to 2.3 pounds (dry matter basis) per 100 pounds of body weight, and in the second study, feeding was managed so that feed intake was not limited. Average daily gain of the limit-fed calves in the first study was 1.76 pounds per day, while calves on full feed in the second study gained 2.67 pounds per day. Limit-fed calves required 7.4 pounds of feed per pound of gain with a feed only cost of gain equaling \$0.49/pound, while calves on full feed required 6.6 pounds of feed per pound of gain with a cost of gain of \$0.38/pound.

Because of the increased price of feeds, producers are increasingly looking to return to using byproduct feeds as a supplement to forages produced on the farm. At Oklahoma State, dried distillers grains were fed at rates of 0.3, 0.75, 1.2

and 1.65 pounds per 100 pounds of body weight to calves consuming low-quality hay. As supplementation rate increased, weight gains also increased from 1.2 pounds per day up to 2.8 pounds per day. Efficiency of feed utilization (hay plus distillers grains) improved from 9.1 to 5.4 pounds of feed and hay per pound of gain as supplementation rates increased. At the University of Arkansas Livestock and Forestry Branch Station near Batesville, calves were fed cottonseed cake (extruder processed whole cottonseed, very similar to distillers grains in nutrient composition) at 0.3, 0.6 and 1.2 pounds of supplement per 100 pounds of body weight to calves consuming good quality tall fescue hay (14 percent crude protein and 65 percent TDN). The calves gained from 2.9 to 3.6 pounds per day with feed efficiency of around 6 pounds of feed and hay per pound of gain.

Byproduct feed utilization workshops will again be offered at the SWREC in Hope (August 12) and the Livestock and Forestry Branch Station at Batesville (September 16). If interested, please contact your county Extension agent or the SWREC for more information.