K-STATE Kansas State University Research and Extension

Beef Tips

November 2008 | Department of Animal Sciences & Industry | www.asi.ksu.edu/beeftips

Upcoming Events

Livestock Manure Management Conference
Nov. 18, 2008
Garden City, KS
see details on page 2
http://www.asi.ksu.edu/manure

Applied Reproductive Strategies in Beef Cattle
Dec. 2-3, 2008
Fort Collins, CO
see details on page 4
www.appliedreprostrategies.com

Tri-State Cow/Calf Symposium
Jan. 3, 2008
Wray, CO
970-332-4151

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Manure value at historic levels

Joel DeRouchey, environmental management specialist

Manure from livestock producers, both large and small, has historically been viewed as a liability because of time needed to scrape, load, haul and spread. However, this is no longer the case. In fact, with the dramatic shift in fertilizer prices for nitrogen and phosphorus, the value of manure has never been higher and more economical to use as fertilizer. With overall input costs soaring, livestock producers will be ahead to utilize their manure effectively in their cropping operations and/or merchandise the manure as a potential revenue stream.

Feedlot manure will generally contain between 10 to 20 pounds per ton of both nitrogen and phosphate ($\mathbf{P_2O_5}$). The nutrient profile can be influenced by many factors, including dietary nutrient levels, frequency of manure scraping, and length of stockpiling before spreading. As the diet fed increases in nutrient content above the animal's requirement, the excess is simply excreted. There are circumstances where it is more economical to feed excessive levels of nutrients. One instance is the use of by-products, where increasing their use lowers cost per pound of gain, this also leads to overfeeding nutrients and increasing the levels of nutrient excretion.

When lots are cleaned frequently, the nitrogen on the pen surface is captured at a higher rate. Since some nitrogen is volatile in manure, the longer it stays on the pen surface, the larger losses of nitrogen one can expect. Typically 50 percent of the nitrogen excreted is lost to volatilization before it is scraped and land applied. Also, for operations that scrape and stockpile manure for spreading at a later time, the nitrogen in the stockpiles will begin to breakdown over several months of storage. This is due to a compost type effect where microbes use the nitrogen as an energy source. However, since P_2O_5 is not volatile or reduced by composting, its levels are generally unchanged compared to the amount that is actually excreted.

To obtain maximum fertilizer value of manure, proper nutrient crediting and timing of application and incorporation is needed. While all of this may seem complicated to those thinking about utilizing manure, in fact they are all very manageable. When relating to these issues, once again the nitrogen portion of manure is the most sensitive. Nitrogen in manure is in two forms, inorganic and organic. In the case of scraped beef feed lot manure, about 35 percent is in inorganic form while 65 percent is in an organic form.

The inorganic portion, otherwise known as ammonium nitrogen, is readily available for crop use. This is also the type of nitrogen that is volatile and lost from the pen or field surface. Secondly, manure contains organic nitrogen, which needs to undergo mineralization to be available for crop use. Typically, 25 percent of the organic nitrogen will mineralize for the next crop utilization, with 12 percent mineralized for year two and 6 percent for year three. Thus, producers need to be aware of the nitrogen crediting that they can do to reduce cost on future years to fully utilize the nitrogen in manure that is applied.

Finally, when solid manure is field applied, the impact of crop available nitrogen is directly related to the timing of incorporation into the soil. If manure is incorporated within 1 day of spreading, approximately 90 percent of the inorganic nitrogen will be retained. However, if incorporation does not occur for 7 days or longer, or in the case of no-till is solely surface applied, only about 5 percent will remain for crop use. In the case

see Manure on page 2

Manure...*continued from page 1*

of phosphate, all will be retained for use regardless of application timing and incorporation. Also, it is generally viewed that 100 percent of the phosphate in manure is available for crop use.

Producers need to properly distribute nutrients to avoid a build up of an excessive amount of phosphate. Historically, most producers have spread solid manure to meet the nitrogen requirement for the upcoming crop, but this also spreads enough phosphate for multiple years. With many operations now implementing nutrient management plans, the basis of application is on a phosphate removal rate based on crops planted. While hauling manure longer distances was not previously economically justifiable in many cases, producers need to reevaluate their nutrient distribution based on current fertilizer prices.

Given current fertilizer costs of $0.90 per pound of nitrogen and $1.25 per pound of phosphate, the value of manure is at historic levels. With an estimated 15 pounds of nitrogen per ton in feedlot manure, the value would be estimated to be $13.50 per ton.

However, each producer must evaluate the true value of nitrogen based on potential nitrogen losses as described earlier. For phosphate considering an average amount of 15 pounds per ton of feedlot manure, the value would be $18.75 per ton. Thus, in a 15 ton box spreader of manure, the phosphate contribution would be about $280, without considering the nitrogen value. Only three years ago this same amount of phosphate was worth $60 to $70 per 15 ton load. Not only can livestock producers save on fertilizer input costs, selling manure to neighboring crop producers can be a revenue stream. The price that can be negotiated is situation specific and needs to be workable for both parties.

Kansas State University publication MF-2562 "Estimating Manure Nutrient Availability" describes in further detail nutrient availability, crediting, and general guidelines for using manure.

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Livestock Manure Management Conference Slated Nov. 18 by K-State in Garden City

MANHATTAN, Kan. – Among the myriad challenges livestock producers face on a day-to-day basis, there is at least one constant – the issue of manure management, including capturing its full value. To help livestock producers of all operation sizes address this challenge, Kansas State University and K-State's Beef Cattle Institute will host a Livestock Manure Management Conference Nov. 18 in Garden City.

The event starts with registration at 10 a.m. in the K-State Research and Extension Southwest Area Office at 4500 E. Mary St. The program will begin at 10:30 a.m.

Presentations and presenters will include:

- Feed ingredients influence diet nutrient level – Justin Waggoner, K-State southwest area beef systems specialist;
- Diet impacts nutrient excretion and land needs – Joel DeRouchey, K-State Extension livestock specialist;
- Determining the economic value of manure – Mandy Fox, Kansas Livestock Association Environmental Services, Inc.;
- Composting and changes in value – Joe Harner, K-State Extension specialist in biological and agricultural engineering;
- Legality of manure and crop nutrient removal – Terry Medley, Kansas Department of Health and Environment Livestock Waste Management chief; and
- Agronomics of manure and crop nutrient removal – Dorivar Ruiz-Diaz, K-State soil fertility and nutrient management specialist.

A live Webcast will be available for those who are not able to travel to Garden City. (Contact Chris Reinhardt for additional Webcast information at 785-532-1672 or cdr3@ksu.edu.)

The advance registration fee of $15 includes lunch and is due by Nov. 11. The fee to participate in the Webcast is $20 and to register at the door is $25.

More information about registration and the event itself is available on the Web at http://www.asi.ksu.edu/manure or by calling Justin Waggoner in the K-State Research and Extension Southwest Area office at 620-275-9164.

Protein supplementation of gestating cows impacts calf performance

Sandy Johnson, livestock specialist

High feed costs have everyone examining ways to reduce costs in one way or another. Whenever costs are cut or management practices change, the challenge can be to fully understand the impacts. Cows do an excellent job of utilizing low quality forages and generally it is believed that if cows are in adequate body condition at the time of calving it is not too critical how they get there.

Increasing evidence indicates a potential problem with that theory. An area receiving more and more research attention both in the human and animal side is that of fetal programming. This concept refers to either positive or negative impacts on the mother at critical points in fetal development that can have long term impacts on the offspring. A study of birth records in the UK and Europe by Baker and coworkers found that under nutrition of the mother in the first half of gestation and adequate nutrition subsequently produced normal birth weight children that were proportionally longer and thinner. As adults, these individuals had increased health problems that included diabetes, obesity, and cardiovascular disease. This developmental programming has now been explored and substantiated in several animal models including cattle and sheep.

Traditional cow management would increase nutrition during the last third of gestation when most of fetal growth occurs. However, early in gestation is when most placental growth and blood vessel development takes places. Growth of fetal organs is initiated in this early phase as well. In beef cows fed to either gain or lose weight from days 30 to 125 of gestation, fetuses from cows in the restricted group were lighter at 125 days than from cows that gained weight. After re-feeding and allowing fetuses to develop to near term, fetal weights were similar in both groups. In rats, lifelong increases in blood pressure result in offspring from pregnant rats fed low -protein diets. One consequence of the high blood pressure seems to be altered lung vascular development. In cattle, researchers speculate if this might relate to the incidence of bovine respiratory disease.

Precalving nutrition has been shown to influence calf survival in a variety of studies. Cows with low protein and/or energy precalving can have increased calving difficulty and produce less colostrum. More recently several studies conducted at the Gudmundsen Sandhills Lab in Nebraska have examined the impact of wintering systems beyond weaning to harvest or as replacement females. One study supported earlier work when it found protein supplementation during the last one third of gestation increased the proportion of calves weaned compared to calves from non-supplemented dams. A study by Martin and coworkers, replicated over three years, followed heifer offspring through the second pregnancy from dams that did or did not receive protein supplementation during the last one third of gestation. Despite a similar age at puberty and proportion cycling prior to breeding, a greater proportion of first calf heifers whose dams had received protein supplementation calved during the first three weeks of the first calving season and had a higher final pregnancy rate. Heifers from protein supplemented dams had heavier body weights at weaning, prebreeding and at pregnancy diagnosis as yearlings and as 2-year olds.

Improvements in pregnancy rate and average calving date were also observed in replacement heifers from dams that had received winter protein supplementation on either range or crop residue compared to heifers from non-supplemented dams. As weaned calves, these heifers and their steer mates had greater weaning weights and adjusted 205 day weights if they were born to dams that received protein supplementation. The protein supplementation also increased the proportion of steers reaching the choice grade.

Much is yet to be learned from this area of research particularly with the wide range of management systems used in the industry. These data should not be interpreted as a need to overfeed as both overfeeding and underfeeding have shown detrimental impacts on fertility. Application will also be confounded in herds with long breeding seasons and thus ranges in gestation lengths.

One implication certainly is that this is another instance were knowledge of the management and nutrition of animals prior to purchase can be valuable. This type of effect could explain variations in fertility in groups of replacement heifers originating from different herds and reared together since weaning. Additionally for those that are continually trying to optimize production to achieve greater profitability, knowing the nutrient content of the diet and supplementing accordingly may have broader pay offs than expected.

For further reading on this topic see the 2007 Range Beef Cow Symposium proceedings paper by Vonnahme on Nutrition during Gestation and Fetal Programming and recent UNL Beef Reports of Funston and coworkers at http://beef.unl.edu/reports.shtml.

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Experience should not replace caution when it comes to safety

"It is important to not be so focused on a task that you forget the potential dangers around you."

Recently an experienced veterinarian died as a result of injuries from a bull attack in Kansas. The bull hit him from behind and he sustained significant injuries before observers could remove the bull from the pen. We can all find sympathy for this type of tragedy but we may think "it would never happen to me". In a brief internet search it was not hard to find other recent reports of similar deaths. In Iowa, the victims were two brothers ages 84 and 79 who were found by a third brother that was returning home from the hospital from injuries he suffered from the same bull five days earlier.

For the most part the industry is good about sending animals with behavior problems to slaughter. More efforts are being made to select for calm animals including EPD for docility. Researchers are finding ways to measure excitable behavior in a manner safe for the animal and handler. However not all problem animals display obvious signs before a bad incidence. It is for this reason that we need to be reminded to not take the docility of our animals for granted. Even if we spend lots of time with them, something could happen in our absence that causes agitation (predators in pasture or pen) that totally changes the animal's normally calm behavior. Or we could forget about a stressor because it is right under our nose.

An example is the producer that got rolled by the cow that just calved. He forgot that his young dog might have added curiosity about the new calf even though the cows had been content to have the dog around prior to calving. His old dog had probably given the freshening cows much more space than he had realized. The potential problem just wasn't on the producer's mind.

Good judgement says to never take your eye off a bull (or cow) especially in tight quarters no matter how well you think you know the animal. Too few of our working facilities contain escape routes and more often our focus is on building facilities from which the animals can not escape. Be familiar with animal behavior and recognize the signs of nervous or agitated animals. It is important to not be so focused on a task that you forget the potential dangers around you.

The following link to an article written for Hoards Dairyman several years ago on how and why to read a bull or cow is appropriate for review. http://www.cnr.berkeley.edu/ucce50/ag-labor/7article/article29.htm

Register Now for Reproductive Strategies Symposium

Want to get the most out of your herd's reproductive potential? Register now for the Robert Taylor Memorial Symposium: Applied Reproductive Strategies in Beef Cattle. The symposium will be Dec. 2-3, 2008, at the Hilton in Fort Collins, Colo. Speakers and trade show participants will focus on new methods and technologies to control and improve reproductive success in beef cattle.

Visit www.AppliedReproStrategies.com for an overview of the conference and speakers and a link to online registration. Available through Nov. 17, pre-registration is $75 for students and $150 for other attendees. After Nov. 17, registration increases to $200 for everyone.

"This meeting is for anyone interested in beef cattle reproduction, including producers, veterinarians, AI technicians and Extension specialists," says Sandy Johnson, animal science specialist with Kansas State University Research and Extension and one of the conference coordinators. Continuing education credit will be available for veterinarians.

The symposium is co-sponsored by Colorado State University (CSU) and the Beef Reproduction Task Force, which is comprised of Extension animal scientists from Kansas State University, the University of Nebraska, South Dakota State University, Iowa State University, the University of Idaho, the University of Illinois, the University of Florida and the University of Missouri with support from several industry sponsors.

Angus Productions Inc. will provide online coverage of the event at www.AppliedReproStrategies.com. Visit the site now for a program schedule, hotel and travel information, and links to online registration. After the meeting, visit the site for summaries and supporting materials for each presentation.

More information is available at www.AppliedReproStrategies.com or by contacting CSU's Jack Whittier at 970-491-6233; or Nancy Weiss at 970-491-7640.