Dear Ranch Hand Subscribers,

Warmth, sunshine and green grass all came early to the northern Great Plains in 2012. Along with the early spring came early maturity of our grasses and legumes. The decision of when to harvest hay crops always is based on a balance of quality and quantity; generally, as quantity goes up, the quality goes down, and vice versa. An article talks about this year’s first hay cutting and why producers may want to have first-crop hay directly in their sights right now.

As the 2012 calf crop goes to grass and breeding time is either upon us or rapidly approaching, now is the time to think about what the future may bring. Whether turning bulls out with the herd or loading artificial insemination straws, we all wish for the same thing: cows and heifers that become pregnant very early in the breeding season. An article discusses the impact that early establishment of pregnancy has on several areas of the beef production system and an alternative way to manage breeding pastures that could have profound effects on the future of your herd.

North Dakota State University will be hosting an event called the Reciprocal Meats Conference (RMC) in mid-June. This event is a gathering of more than 600 of the world’s brightest meat scientists, students and industry professionals, and a significant effort is being made on the part of members of the Animal Sciences Department to prepare for this event.

These same members of the Animal Sciences Department work closely to put on the NDSU BBQ Boot Camp events. Because of these efforts to coordinate the RMC, the BBQ Boot Camp will have an abbreviated summer schedule, visiting four locations. Be sure to check out the locations and try to get to one of these great events that focus on telling the story of production agriculture to the people most important to our industry: the consumers.

This month’s Research Corner article describes a component of research conducted in the NDSU Animal Sciences Department that spans well beyond production agriculture and may have major impacts on your health. Be sure to read to find out what’s happening and how it may impact you.

For additional questions on the material covered in this newsletter or any other concerns on your operation, contact your county, area or state Extension personnel. We look forward to serving you.

Sincerely,

Carl Dahlen, Ph.D., Editor
NDSU Extension Beef Cattle Specialist
Carl Dahlen, NDSU Extension Beef Cattle Specialist

Several studies have quantified the different advantages that calves born during the first 21 days of the calving season have over those that are born later. Each day a calf is on the ground, it has the opportunity to gain weight, and the relationship between birth date and actual weaning weight is obvious: Older calves are typically heavier at weaning compared with younger calves. However, these effects extend well beyond the time of weaning.

In calves placed in feedlots, the greater feedlot entry weights (a function of greater weaning weights) are followed by heavier final carcass weights, improvements in carcass quality grade and the proportion of carcasses qualifying for premium beef programs for calves born during the first 21 days of the calving season compared with those born later. In addition, a greater proportion of replacement heifers born during the first 21 days of the calving season were cycling at the start of their first breeding season, and this subsequently led to greater overall pregnancy rates compared with heifers born later in the calving season.

We also begin to see impacts of early calving on the cows themselves. The pattern of late-calving cows becoming perpetually late calving and subsequently not becoming pregnant is familiar to all of us. Early calving cows are more likely to become pregnant early in the next breeding season and a recent report (Kill et al., 2012) began to quantify the impacts of replacement heifers calving within the first 21 days of the calving season on longevity in the cow herd.

The average time early calving heifers remained in the herd was 5.1 years compared with only 3.9 years for heifers that calves after the first 21 days of the calving season in a group of 2,195 South Dakota producer-owned cattle. In a group of 16,549 cattle managed at the U.S. Department of Agriculture’s Meat Animal Research Center, heifers calving in the first 21 days, second 21 days and later had an average longevity of 8.2, 7.6 and 7.2 years, respectively. In both cases, data were confined to cattle culled for nonpregnancy, and other types of culls (conformation, temperament, etc.) were removed for the analysis. Taken together, this work showed that early calving heifers had at least a one-calf lifetime advantage compared with late-calving heifers.

This one-calf lifetime advantage also was complemented by extra weaning weight at the end of the breeding season that accumulated to the weight of an additional calf during the lifetime of the cow. Thus heifers that calved during the first 21 days of the calving season had the equivalent of a two-calf lifetime advantage over those heifers that calved after the first 21 days of the calving season. The moral of this story should be to focus on keeping heifers that become pregnant during the first 21 days of the breeding season.

With this in mind, producers may want to consider their heifer development and management strategies and related costs a few different ways. We are all very cognizant of the costs associated with developing heifers through their first breeding season. Producers may not wish to retain any more heifers on breeding pastures than they wish to keep for themselves to control costs.

However, an alternative method of stocking replacement heifer breeding pastures would be to stock enough heifers...
The First 21 Days (continued from page 2)

so that the number of replacements needed would be met solely by those heifers becoming pregnant during the first 21 days of the breeding season. To achieve this stocking rate, the number of heifers on breeding pastures would need to increase according to the proportion we anticipate becoming pregnant early. Data from the North Dakota Beef Cattle Improvement Association’s Cow Herd Appraisal and Performance Software (CHAPS) revealed that the proportion of females becoming pregnant during the first 21 days of the breeding season ranged from 58 to 64 percent during the past 10 years. Therefore, we would conservatively estimate that 60 percent of the heifers would become pregnant during the first 21 days.

To calculate the stocking rates of breeding pastures in this scenario, we would divide the number of replacements we are targeting to retain by 60 percent (0.60). For example, if a producer wishes to retain and calve out 50 replacement heifers, 84 heifers would be stocked onto breeding pastures (50 ÷ 0.60 = 84 total heifers). The divisor used is herd-specific, and producers knowing the proportion of heifers becoming pregnant early in their herds should anticipate accordingly. Perhaps the benchmark of 65 percent of the cows becoming pregnant within the first 21 days is achieved regularly and only 77 heifers would need to be kept.

The number of heifers mentioned above is obviously a much larger number of heifers than normally would be run on many operations. Several items are critical to the success of developing a successful system of retaining only those females pregnant within the first 21 days of the breeding season:

- Enough high-quality heifers and bull power to stock breeding pastures at suggested rates - If sufficient numbers of high-quality replacements are not available but a second-tier group of heifers is available, then producers are faced with another question: What is better for the long-term profitability of the herd - a better-quality heifer that likely will not last in the herd, or a slightly lower-quality heifer that likely will last in the herd? This can be answered only by the herd manager.

- Enough winter feed supply and grazing pasture, or money to secure each, to develop extra heifers - Aside from that exception of producers who normally retain nonreplacement heifers as yearling stocker cattle, grazing plans and stored feed supplies would need to be adjusted to facilitate the greater number of breeding heifers maintained.

- A method of identifying heifers that are pregnant within the first 21 days of the breeding season - Accuracy and timing of pregnancy diagnosis are critical when building a system that relies on knowing when conception occurred. The earlier pregnancy determination can be conducted relative to breeding, the more accurate it will be. In addition, the timing of pregnancy determination is critical to ensure that...
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The First 21 Days (continued from page 3)

all pregnant heifers are detected and appropriately classified into groups according to estimated conception dates (for more details, see the August 2011 article in The Ranch Hand titled “Consider Early Pregnancy Checking”).

- A solid marketing plan for nonpregnant heifers and for heifers that became pregnant after the 21-day breeding target - Remember that we started with a high-quality group of replacements, and because of the diversity in the beef industry, the heifers that became pregnant outside of one producer’s target may be exactly what another producer is looking for. If natural-service bulls are used, then a market for a group of bred heifers needs to be secured. Additionally, a favorable market for nonpregnant heifers should be identified. Quite likely, the open-heifer markets will be complemented by the timing of pregnancy determination (see previous item) because nonpregnant heifers identified early could be sold as grass calves in the late-summer yearling markets.

An additional production system utilized by some beef operations is to breed each heifer a single time via artificial insemination and not run any cleanup bulls. Pregnant heifers are kept and open heifers are sold as stockers at the end of summer or retained through the feedlot phase. In either case, both systems identify the heifers that become pregnant early in the breeding season, and both systems take advantage of the additional longevity and accumulated weaning weight that accompany these early calving heifers.

Given the lifelong benefits of heifers calving early in the calving season, producers may want to implement a system that focuses on retaining only these heifers. Before making this decision, several items need to be considered and a thorough plan developed. In addition, producers should evaluate nutrition and management decisions that offer heifers the greatest likelihood of early pregnancy.

However a question remains: Is early calving per se what leads to the benefits highlighted in the above paragraphs or is it something inherent in heifers that naturally calve early that drives the observed advantages? Whether heifers that become pregnant early only as a result of additional management experience the same benefits of longevity and calf performance as those heifers that become pregnant early without intervention is unknown at this time. Either way, I hope that you have a high proportion of heifers calving within the first 21 days of the calving season that go on to wean large, healthy calves and continue to stay in the herd for many years to come!

NDSU BBQ Boot Camp Coming to a City Near You

David Newman, NDSU Extension Swine Specialist

North Dakota State University’s BBQ Boot Camp is back for the 2012 grilling season.

The camp:

- Introduces participants to basic grilling styles, including gas, charcoal and smokers
- Offers information about different rubs, marinades and seasonings to use on meat
- Explains why cooking temperatures are important and how the temperature affects the quality of the meat
- Teaches food safety tips and nutritional facts on meat
- Informs participants about current topics in the meat and food industry and the importance of understanding the world food supply
- Gives participants a chance to sample different types of barbecued meat and provides ideas for their next neighborhood barbecue

The NDSU Animal Sciences Department hosts the camp in conjunction with NDSU Extension Service faculty.

Four camps are scheduled throughout the state this summer. The camp dates, locations and people to contact for more information or to register are:

- June 20 – Fargo, Megan Kortie, (701) 231-7641
- June 28 – Williston, Mary Froelich, (701) 577-4595
- July 16 – Bismarck, Cathy Palczewski, (701) 221-6865
- July 18 – Minot, Paige Brummond, (701) 857-6444

Registration also is available online at www.ndsu.edu/bbqbootcamp.

This is the fourth year of the BBQ Boot Camp program. BBQ Boot Camp is a unique opportunity to combine great food, great people and the BBQ Boot Camp program message on the critical role agriculture plays in everyone’s life. Organizers plan to hold the camp in even more communities across the state next year.
Early Spring Means Cutting Hay Early

Karl Hoppe, NDSU Extension Area Livestock Specialist, Carrington; Kevin Sedivec, NDSU Extension Rangeland Management Specialist; and Ron Wiederholt, NDSU Extension Nutrient Management Specialist, Carrington

Now is the time to start cutting hay! Although hay usually isn’t harvested for the first time for another two weeks, weather conditions this spring have led to alfalfa and grasses maturing about 10 days earlier than normal.

The lack of snow during the winter allowed the soil to warm sooner and the grasses and alfalfa to start growing earlier.

However, the below-normal snowfall meant less water was available for the grasses and alfalfa, and spring rains didn’t fall at the right time to help the hay crop grow. Thus, while the warm temperatures were encouraging growth, the lack of water stalled the crops in some areas.

Harvesting alfalfa and the grasses now will result in hay of the same quality as it was in the first cutting last year. Cutting now also will set the stage for a good second cutting with adequate rains. If you don’t cut now, then the second cutting may not yield as well as expected. And if you cut now, you may be able to do third cut later in the season.

Another important note: Total tonnage from the first cut will be lower than last year, but this should be offset if producers take a second cutting of a hay crop such as alfalfa.

Ranchers are looking for the best combinations of quality and quantity in their forage, and sometimes more quantity for wintering cows. Some ranchers will tend to cut hay late to get quantity without sacrificing too much quality (protein and energy). For this year, cut by the plant’s maturity and not the calendar date or you will get poorer quality feed than expected. And then look for regrowth and a second cutting.

While winter kill always is possible in alfalfa, poorer stands of alfalfa this year probably aren’t from winter kill. More likely, they are the result of poor growth due to a lack of water and too much heat early in the growing season, followed by a cool May.

If fertility is an issue, one option is to spread manure on the alfalfa or grass hay field immediately after the first cutting is harvested and bales are removed. The key to success is to apply a thin layer of composted or broken-down manure that won’t leave any clumps.

Producers also are encouraged to test hay for forage quality after the hay is baled to help plan feed needs for wintering cows. Contact your local Extension agent for information on how to sample hay for testing and where to send the samples, as well as help in understanding what the results mean.

You can match the hay to the cows’ needs if you know what you have.
Domestic Animals in Agriculture and Biomedical Research

Joel Caton and Larry Reynolds, Professors, Center for Nutrition and Pregnancy, NDSU Animal Sciences Department

1 Portions of this article were published previously by Reynolds et al., (2009).

The use of domesticated or managed animals in research is important for improving the efficiency of animal production. The U.S. has a long tradition of excellence in research using domesticated and other managed species. Many of the breakthroughs in animal breeding/genetics, animal nutrition, animal reproduction, animal production methods, meat science and muscle biology, animal behavior, animal health and well-being, and other areas have resulted from research conducted at U.S. land-grant universities and/or private enterprises.

In addition to improved production efficiency and enhanced economic returns, research using domestic animals also contributes to the global effort to alleviate poverty and promote human health, which is particularly relevant in developing countries. Animal food sources are particularly appropriate for combating human malnutrition and nutritional deficiencies while offering the most efficient utilization of resources that would otherwise go underutilized. Clearly, research with domestic animals has and will continue to contribute to global health and socioeconomic well-being for the foreseeable future.

A significant but often overlooked fact is that research with domestic animals has been an important contributor to biomedical types of research during the last several centuries. This research has contributed to many of the major advances in human medicine and surgery. This historic “dual purpose” of research with livestock species usually is not recognized when focusing attention on either livestock or biomedical outcomes.

However, the importance of this dual impact is experiencing a minor renaissance which, we hope, will expand to a broader understanding and application of domestic animal research models for both agricultural and biomedical relevant purposes. Recent workshops held jointly by the National Institutes of Health (NIH) and the U.S. Department of Agriculture (USDA) focusing on the “Advantages of Agriculturally Important Domestic Species as Biomedical Models” have continued to elevate awareness of the significance of research efforts with livestock species for dual purposes of agricultural and biomedical outcomes.

Historical Perspective

From a historical perspective, research with domestic animal models has been critical to advances to human biomedical and surgical practices. For example, research in embryology, which has provided the basis for understanding developmental processes, including birth defects and related disorders, has relied heavily on animal models, including domestic species, from ancient times to the present. The use of appropriate animal models, including those with agricultural relevance, continues to be critical in nutritional and biomedical research.

Our current understanding and application of nutritional principles has been impacted tremendously by basic and applied research with livestock. The broad nutritional areas of energetics, proteins, carbohydrates, lipids, vitamins, minerals, growth, and body composition have been heavily underpinned with research in relevant livestock species.

Regarding the function and metabolism of known macro- and micronutrients, contributions of livestock animal models to our current understanding are extensive. The history of nutritional research is a story of complementary efforts in agriculturally relevant species, rodents and humans, with breakthroughs in each fostering the work in the others. Consequently, early work in the area of energetics and micronutrients was instrumental in spawning the fields of biochemistry and, subsequently, molecular biology.

Research Corner (continued on page 7)
The use of appropriate animal models, including those with agricultural relevance, continues to be critical in nutritional and biomedical research. Current examples include, but are not limited to, impacts of maternal nutrition on developmental programming, porcine models of obesity and metabolic syndrome, bovine models of fat synthesis and its regulation, and domestic animal models to optimize the techniques used for assisted reproductive therapies in humans.

**Current Efforts and Future Prospects in North Dakota**

Numerous research efforts in North Dakota are focused, in varying degrees, on the interface of agricultural and biomedical issues. A detailed description of these efforts is beyond the scope of this writing; however, activities are 1) multidisciplinary, spanning across departments, research centers and institutions, and 2) integrated, crossing borders of the research, teaching and Extension missions of the land-grant system. In particular, the Animal Sciences Department and the College of Agriculture, Food Systems, and Natural Resources are uniquely positioned to provide significant contributions to these integrated and multidisciplinary efforts currently and into the future.

Research efforts focusing on livestock production questions while simultaneously addressing current biomedical issues are highly relevant and likely will become even more important in the next couple of decades.

Primary drivers of these historic and re-emerging dual-purpose research efforts include the need to make efficient use of available research dollars; the need to make rapid and relevant advances in biomedical research areas; the importance of animal agriculture in meeting projected world food demands; and the expanding recognition that food production practices, environmental stewardship, and human health and well-being are interconnected on microscopic and macroscopic levels.

Editor’s Note: A version containing references to all work mentioned is available upon request.
Management strategies to consider in the coming month:

1. Check water sources to ensure adequate clean water
2. Review and apply fly control options (producers are reporting early fly hatches ahead of traditional fly season)
3. Prepare records and begin to explore whether opportunities exist for value-added calf marketing programs
4. Start forage harvest earlier than most years: early spring = early hay crop
5. Carefully monitor forage yields and compare with anticipated winter feed needs; some areas will have low yields
6. Control noxious weeds, seed cover crops for late-season grazing and finalize flooded pasture restorations
7. Watch for anthrax/sudden deaths, lightning strikes; keep records of all death losses
8. Evaluate cows for lameness and health concerns, provide adequate mineral and start thinking about creep feeding scenarios
9. Turn bulls into breeding pastures at time appropriate for your operation; monitor closely for breeding activity
10. Plan for early pregnancy diagnosis and develop marketing plan for nonpregnant females

More Information
NDSU Extension Service agents or specialists: www.ag.ndsu.nodak.edu/directory/extdir.htm
NDSU Department of Animal Sciences: www.ag.ndsu.edu/ansc/
CattleDocs: www.ag.ndsu.edu/cattledocs

For more information on this and other topics, see www.ag.ndsu.edu

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