Repro Tracks

by **Cliff Lamb,** *University of Florida*

Advantages of reproductive technologies

I was recently asked to give a talk discussing the advantages of current and future reproductive technologies for beef cattle production systems. While preparing the presentation, I began to realize the significant impact that reproductive management technologies have contributed to enhancing the efficiency and productivity of beef production in the United States.

Since 1973 our beef systems have increased beef production by 17% with 28% fewer cattle! While reproduction is not the only contributor to this increased efficiency, it certainly is one of the primary areas that has changed significantly.

Established technologies

In this column, I plan to visit about some of the more traditional or earlier developments in reproductive management that affect beef production. In future columns I will address more advanced technologies we are using and hopefully try to share some ideas that may come onto the market in future years.

What are "traditional" reproductive technologies?

Many producers use technologies and techniques today that they may not realize are reproductive technologies. I classify technologies such as castration of males, controlling the estrous cycling of females not destined for breeding, incorporating a defined breeding season, breeding soundness examinations and diagnosis of pregnancy "traditional" technologies. Let me address why we use some of these reproductive technologies in our beef management systems.

Why do we use castration?

Removal of testes from bull calves is likely the most frequently used reproductive technique in U.S. beef cattle production systems. A 2007 survey by the National Animal Health Monitoring System (NAHMS) indicated 59.2% of cattle operations castrated at least a portion of their bull calves. This represented 77.1% (95.0% in large operations) of the total calves owned by survey respondents (see Fig. 1).

Sale prices of steer calves are greater than those of bull calves, and 91.6% of feedlot operators reported that castration and dehorning at least four weeks prior to arrival at the feedlot were effective for reducing sickness and death loss. From a standpoint of weight gain, feed efficiency and final feedlot weight, intact males actually perform better than castrated males.

However, castration is usually implemented to foster selective breeding. Castration offers producers the opportunity to decide which animals may best be suited to sire future calf crops and those which are better suited to the commodity beef market.

Another major concern with maintaining bulls rather than steers is the aggressive tendencies of bulls. This aggressive behavior is both in response to sexual stimuli, as well as a desire to maintain social dominance. The sexual stimuli would be relevant if pens of bulls were in the same vicinity in a feedlot

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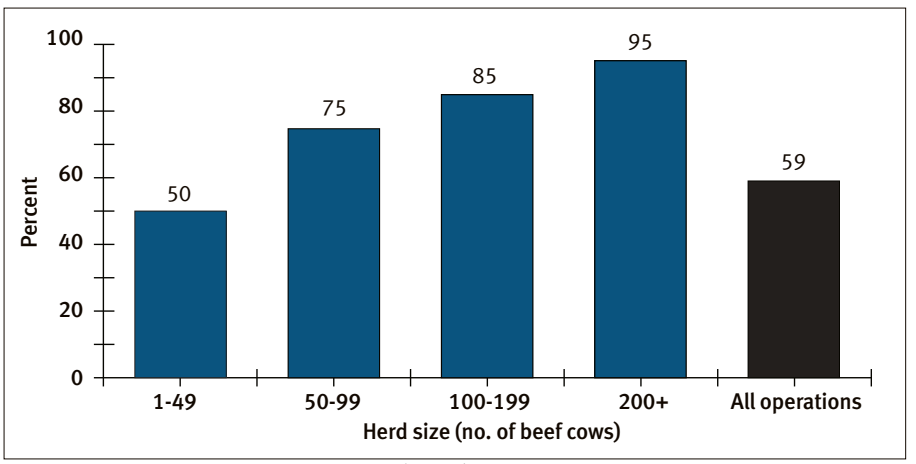
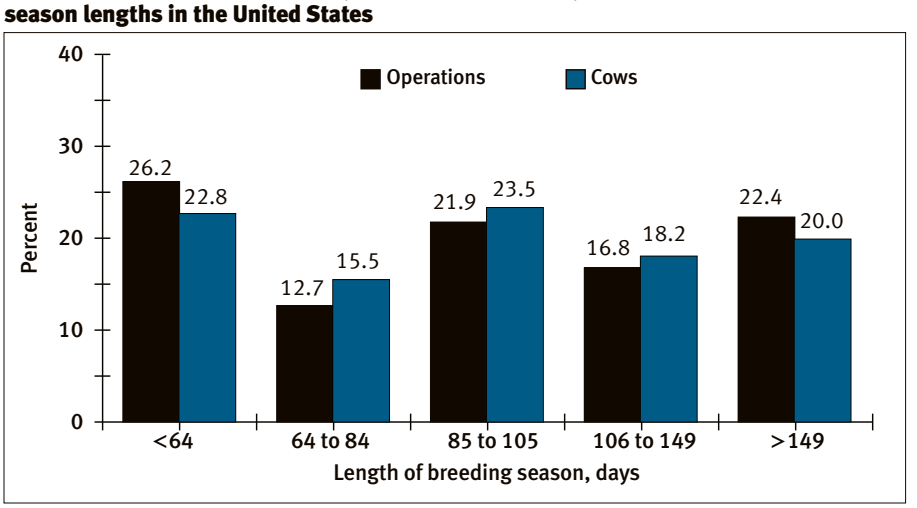
Fig. 1: Percentage of beef cattle operations that castrated bull calves



Source: National Animal Health Monitoring System (NAHMS), 2008.

Fig. 2: Percentage of beef cattle operations and cows exposed to various breeding season lengths in the United States



Source: NAHMS, 2009

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as pens of heifers not receiving an estrus suppressant such as melengestrol acetate (MGA). Behavioral characteristics of bulls cause concerns over safety of humans and of other cattle, as well as maintenance of fences and other equipment.

Castration is prevalent in U.S. beef production systems also as a result of consumer preference. Tenderness and consistency of products are important attributes for consumers choosing to purchase beef. Compared with that from bulls, meat from steers contains more fat, resulting in greater quality grades, as well as increased tenderness, juiciness and flavor ratings of the longissimus muscle along with a brighter color. This preference for meat from steer carcasses has been highlighted by prices received when selling finished cattle.

Why is controlling the estrous cycle of females not destined for breeding important?

The frequency of pregnant heifers entering feedlots has ranged from 4% to 17% of all heifers, depending on the management or the heifer source of origin. Some pens of heifers have been harvested where the pregnancy rate approaches 20%. While pregnant heifers gain weight similarly compared with open heifers, a portion of this weight is being partitioned toward the developing fetus, and the overall feed efficiency is reduced in those pregnant heifers. Producers have the option of continuing to feed heifers that are pregnant or administering an abortifactant to heifers found to be pregnant. Retaining pregnant heifers and adding excess body condition may result in major problems associated with calf survival and heifer health when they calve in feedlot pens.

Removal of ovaries (spaying) in heifers is a practice that is conducted on only a small proportion of females but, when successful, eliminates the opportunity for pregnancy in females. Spaying heifers offers feedlot operators the ability to maintain mixed-sex pens or to house pens of spayed heifers in the vicinity of a pen of cull bulls. In addition, spaying reduces the incidence of estrous activity. Estrous activity of intact heifers causes a temporary reduction in feed intake and associated performance, and estrous activity near the time of harvest may cause an increased incidence of dark-cutting beef in intact heifers compared with spayed heifers and steers.

The process of spaying removes the heifer's natural source of estrogen. Rather than spaying, feeding MGA is an approved method of controlling estrus in feedlot heifers. The label for MGA claims a suppression of estrus, an increase in weight gain, and an improvement in feed efficiency for feedlot heifers. According to a 1999 NAHMS survey of feedlot operators, 79% of feedlot heifers in the United States received MGA when in feedlots.

Why do producers use a defined breeding season?

In the United States, 55% of operations surveyed had no set breeding season, whereas 34% of operations had a single defined breeding season and 12% of operations had two defined breeding seasons (NAHMS, 2009). Even today, only 38.9% of operations expose their cattle to a breeding season of 84 days or less (see Fig. 2).

Implementation of defined breeding seasons significantly impacts profitability of beef operations by matching cattle to available resources, refining nutrient delivery to groups of cattle, concentrating labor resources and increasing the sales price of calves. Many traditional commercial breeding seasons are designed to place a

young, growing calf on forages at their peak of quality and availability. Matching growing calves to high-quality forages allows for maximal weight gains through forage intake and through milk produced via forage intake of the dam during lactation.

A defined breeding season also allows for delivery of proper nutrients to cows during key times of gestation. Having groups of cattle at similar stages of gestation allows producers to set precise targets for nutrient delivery and to manage feeding cattle according to their requirements rather than their appetite. Without a specific breeding season, producers would have difficulty implementing a precision-based nutrition system without continually overfeeding a portion of their herd and underfeeding another portion. The concept also pertains to allocation of pasture resources to optimize forage utilization.

Labor resources are also more concentrated and focused when a defined breeding season has been implemented. When no breeding season is established, a producer should monitor cows in a herd for calving every day of the year. By implementing a defined breeding season, calving activity is concentrated into a period of time slightly longer than the breeding season (given the natural variation in length of gestation).

This phenomenon of more calves being born over a shorter period of time also concentrates the need for labor to monitor and assist cows during calving. The concentrated labor may also increase attentiveness of producers as they monitor cows regularly during calving and ultimately lead to greater calf survival (and coincidentally profit potential) by offering prompt assistance to heifers or cows experiencing dystocia.

As the number of calves in an auction lot increases, the price received subsequently increases. This is true both in sale barns and video auction lots. Upon arrival at a sale barn, groups of calves are sorted into relatively similar cohort groups and presented in the sale accordingly, unless producers live in a region where calves are sold individually through the ring. A defined breeding season that concentrates calving increases the uniformity of calves, resulting in fewer groups of cohorts being sold at a single time. Fewer cohort lots result in a greater number of calves in each lot and a greater sales price.

Actual dates of the breeding season vary by region, and tradition (cited by 43% of survey respondents) plays a major role in deciding when a breeding season should be. Additional factors of feed cost, cow performance, calf performance and environmental conditions need to be considered when deciding which breeding season is appropriate for a particular herd.

I have addressed a few traditional reproductive technologies or management practices many producers have been using for years, sometimes without realizing the impacts of those technologies on their operations. These technologies have a major impact on our beef production systems and incorporating or refining these technologies in our operations will continue to improve the efficiency of beef production.

EMAIL: gclamb@ufl.edu

Editor's Note: *Cliff Lamb is a beef cattle specialist for the University of Florida and coordinator of the Florida Bull Test.*