

## **Breeding Soundness Examination of Bulls: The Whys and Hows**

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### **INTRODUCTION AND ECONOMICS**

The cow-calf segment is a relatively dynamic and volatile part of the beef industry. Market prices are constantly fluctuating, consumer demands are changing, federal regulations impact historical production practices, and environmental issues (drought, etc) affect herd stability. Despite these changes, however, the ultimate goal of a cow-calf producer always remains the same: have every cow wean a calf every year. One of the primary determinants of whether or not this happens is reproductive efficiency. Unlike reproduction, which just evaluates whether or not a cow gets pregnant, reproductive efficiency evaluates the speed at which cows get pregnant during the course of a breeding season. The reason reproductive efficiency is so important is as follows: calf weaning weight is a function of both average daily gain (ADG) and age at weaning and, as a result, a calf that is born early in the calving season will, on average, weigh more than a calf that is born late in the calving season simply because the calf born earlier is older at the time of weaning. Therefore, the early born calf will be worth more at sale for no other reason that it was born sooner. Not only does reproductive efficiency drive cow herd profitability, it is also a driver of heifer performance and longevity. It is known that a heifer that calves in the 1<sup>st</sup> 21 days of her first calving season will spend significantly more time in the herd and wean more and heavier calves over the course of her lifetime. Furthermore, the offspring of these more efficient animals become more efficient and productive themselves. Indeed, heifer calves born to cows that calve in the first 21 days of a calving season reach puberty faster and are more productive through their first breeding seasons than heifer born at other times. In addition, steers born to cows calving in the first 21 days of the calving season weigh more at weaning and produce higher value carcasses at slaughter.

The question is, then, how does the performance of a breeding soundness examination (BSE) on bulls fit into this equation. A Brazilian study looking at the impact of implementing BSEs over a 4-year period found that, once infertile or subfertile bulls were removed, calf production increased by 32% and each cow weaned 54 lbs more calf per year due to an increased number and weight of calves sold. Overall, the implementation of BSEs represented a \$10:1 return on investment in this population. Research performed in the early 1980's on ranches in Colorado and Wyoming found that bulls that passed a BSE sired, on average, 6% more calves than bulls that never had a BSE performed (Table 1). Lastly, a study from the United Kingdom found that the implementation of BSEs on cattle operations had a dramatic impact on both the number of calves born and the timing of those births. All told, herds that used bulls that passed a BSE weaned 4500 more lbs of calf than herds that used subfertile bulls (Table 2). Thus, even with the costs of an exam included, the implementation of BSEs in beef cattle herds is a profitable venture and represents a > \$20:1 return on investment (Table 3).

**Table 1. Impact of Bull BSE on Herd Reproductive Performance**

	Year 1		Year 2	
	BSE	No BSE	BSE	No BSE
Cows exposed	675	655	808	1282
# Bulls Used	27	26	33	51
# Cows Pregnant	656	571	769	1179
% Pregnant	93%	87%	90%	85%
% Increase with BSE	6%		5%	

**Table 2. Impact of Bull BSE on Calving Distribution**

Bull Classification	Cows Pregnant 1 <sup>st</sup> cycle	Cows Pregnant 2 <sup>nd</sup> cycle	Cows Pregnant 3 <sup>rd</sup> cycle	Cows Pregnant 4 <sup>th</sup> cycle	Total Open Cows	Weaning Weight (lbs)
Fertile	15	12	5	2	1	17,580
Subfertile	8	8	6	4	9	13,020
Difference in lbs with BSE						4,560

**Table 3. Sensitivity Analysis of Return on Investment of BSE at Different Exam Costs**

BSE Cost	Value of BSE per Tested Bull (\$)				
	\$60	\$65	\$70	\$75	\$80
Cost/Female Exposed	\$2.40	\$2.60	\$2.80	\$3.00	\$3.20
Change in Income/Cow	\$57.12	\$57.12	\$57.12	\$57.12	\$57.12
Cost:Benefit	\$24:1	\$22:1	\$20:1	\$19:1	\$18:1

## THE BREEDING SOUNDNESS EXAM – WHAT, WHY, AND HOW

### *What*

A BSE is a through systematic examination meant to identify problems that could affect bull fertility. A good BSE focuses on 3 areas: physical soundness, the external and internal reproductive structures, and lastly, semen. BSEs are more than just a wiggle test and simply evaluating a drop of semen under a microscope to detect movement does not constitute a complete exam. *It must also be understood that a BSE is an evaluation of potential bull fertility and is not a guarantee of how a bull will perform on a given farm in a given year.*

### *Why*

Surveys of cattlemen across the United States have shown that a majority of producers (>90%) use bulls as the only breeding method on their operation. Unfortunately, fewer than 20% of these same producers say that any kind of assessment of bull fertility is performed prior to the beginning of breeding season. With the value of a BSE being approximately a \$20:1 return on investment, a lot of opportunity is being missed to increase the number and weight of calves sold

and enhance farm income. Furthermore, with times being tough due to the COVID-19 pandemic, skimping on a BSE can serve to worsen what might be an already tough year.

### ***How***

A BSE begins with a general assessment of physical soundness. The bull's attitude, overall appearance, and body condition are recorded. In addition, particular attention is paid to the eyes for evidence of scarring, cancer eye, or other defects. A bull that can't see is a bull that can't breed. Next, the feet and conformation are noted. Bulls must remain sound to do their job adequately. Bulls that are lame or have poor conformation will be less likely to cover the cows they are expected to cover. In addition, some conformational issues (screw claw, etc) are potentially heritable. Regardless of heritability, these things will shorten a bull's productive life and are something that should be paid attention to assist in making management decisions. Next, the bull's scrotum and testicles are assessed for size and shape. Bulls must have a minimum scrotal circumference to pass a BSE (> 34 cm at 2 yrs of age). Bulls with larger scrotal circumference are more fertile and have daughters that will be more fertile over the course of their lifetime. Third, the internal (seminal vesicles, prostate) and external (penis) reproductive structures are examined. Internal reproductive structures are examined via rectal palpation and are being evaluated for size, consistency, pain, and shape. The penis is examined to ensure it can fully extend and is free of abnormalities that might impair the ability of the bull to fully insert it into the cow at breeding time. Lastly comes examination of the semen. Semen is examined for density, motility (movement), and morphology (microscopic appearance).

### ***Outcome***

Once the exam is completed, all of the data collected is compiled and the bull will be classified in one of three ways: satisfactory potential breeder, unsatisfactory potential breeder, or classification deferred. Satisfactory bulls are ready to go and should be able to do the job they are intended to do. Unsatisfactory bulls are unlikely to perform and should be culled. Deferred bulls should be reexamined after a period of time to see if the problems encountered during the exam have improved.

### ***Other Comments***

BSEs should be performed on every bull prior to the beginning of each breeding season. Just because a bull passes his first BSE doesn't mean he will be fertile in future years. Ideally, a BSE should be performed at least 30-60 days before the breeding season starts. Doing them this far ahead of the breeding season allows for the purchase of a new bull should one fail or reexamination of a bull that is deferred for any reason. In addition, bull power should be considered. A useful rule of thumb is for there to be 1 bull per cow per bull month of age up to 50 months. So, with this in mind, a 3-year-old bull could cover 36 cows in a breeding season while a 4-year-old bull could be expected to successfully cover 48 cows.

## **SUMMARY**

The success of a cow-calf operation is predicated on the delivery and weaning of a live, healthy calf. Utilizing cattle health and management practices that improve herd efficiency will increase the value of the final product sold (calves) and, in most cases, reduce the overall cost of production. Breeding soundness exams are a proven tool that can improve herd productivity with minimal investment. On average, bulls that pass a BSE will sire 6% more calves than bulls that

do not have a BSE performed at all. It has been estimated that each 1% increase in calf crop is worth an additional 5 lbs/calf in weaning weight across the entire herd. As a result, the BSE is one of the most cost-effective management tools that can be implemented on a farm and represents a greater than \$250/hr value proposition. As always, when questions regarding animal health arise, contact your local herd health veterinarian.