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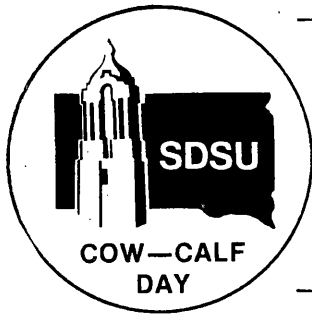
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BULL BEHAVIOR AND PREGNANCY RATES

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Introduction

Successful reproductive management of the beef cow herd includes having a high percentage of cows calving during the first 21 days of the calving season as well as a high percentage of cows calving. Nutrition, herd health, crossbreeding systems and evaluation of bulls for reproduction potential are all management areas that need attention in attaining these goals. Current guidelines for evaluating the reproductive potential of bulls include a physical exam, measuring scrotal circumference and evaluating semen (Breeding Soundness Exam, Society for Theriogenology). When conducted by an experienced person, these are relatively simple procedures that should be considered when culling bulls of low reproductive potential. Research during the last 10 years has demonstrated that there is tremendous variability among beef bulls for their ability and desire to mate (libido or sex drive). Bulls that are rated "satisfactory" in a Breeding Soundness Exam may achieve unacceptable pregnancy rates due to lack of libido. Libido is much more difficult to evaluate than the other factors that affect the reproductive performance of bulls. Social dominance or "peck order" also affects the breeding performance of bulls used in multi-sire breeding groups.

Variation in Bull Performance

It is commonly recommended that a mature bull is capable of serving 25 to 30 females during a breeding season. Although terrain and pasture size need to be considered, this is a conservative estimate for some beef bulls. Research conducted in northeastern Colorado demonstrated that fertility, libido and mating ability of individual bulls were more important in achieving high pregnancy rates than the number of females per bull (range 25 to 60) or the use of single versus multi-sire breeding groups (Rupp et al., 1977).

In trials conducted in Kansas, 23 bulls were mated to heifers during a 2 to 2½ day estrus synchronization period. The number of ejaculations for an individual bull averaged 22.6, but the range of 2 to 62 ejaculations during that period indicates that there is tremendous variation in libido and mating ability among beef bulls. Results of that study indicate that the number of heifers pregnant per bull was more limited by libido than semen production (Pruitt et al., 1982).

There are tremendous differences among beef bulls in their libido and mating ability. The challenge is to measure those differences prior to the breeding season.

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Methods of Measuring Libido and Mating Ability

Research in Australia led to the development of a "serving capacity test" where bulls to be tested are penned with females that are restrained to prevent movement. The number of matings during a 40-minute period was recorded. Table 1 shows that bulls performing more services during a 40-minute serving capacity test achieved higher first service conception rates and overall pregnancy rates (Blockey, 1978) during a 10-week breeding season. Those bulls achieving less than three services during the serving capacity test achieved unacceptable pregnancy rates.

Table 1. Relationship of Performance During the Breeding Season to a 40-minute Serving Capacity Test

Services during a 40-min. serving capacity test	First estrus conception, %	Pregnant during 10-week breeding season, %
0-2	21.0	32.5
3-5	60.3	91.3
6-8	68.2	94.5
9-11	73.3	95.5

Evaluating serving capacity is routinely used by some producers in Australia. In some cases bull prices are determined by serving capacity and scrotal circumference along with performance information. In the United States similar serving capacity evaluation has been used for research purposes with promising results. Although interest has been expressed by some producers, use of libido evaluation has been limited by the large amount of labor involved.

Table 2 shows the results of a study conducted in Nebraska with yearling bulls. Bulls classified as low libido during six 30-minute tests achieved unacceptable pregnancy rates during a 20-day breeding season (Lunstra, 1982). Four (9%) of 45 bulls showed no sexual interest during libido tests and 8 (19%) were classified as low libido bulls. Eliminating these bulls before the breeding season has the potential to increase pregnancy rates and the percentage of calves born early in the calving season.

Researchers at Colorado State developed a 1 to 10 libido scoring system to measure sex drive in yearling bulls using a shorter testing period. Since less than 50% of the yearling bulls in that study mated during a 30-minute test, they concluded that more information on those bulls could be obtained by using the following system (Chenoweth et al., 1977):

0 = bull showed no sexual interest

1 = sexual interest shown only once

2 = positive sexual interest in female on more than one occasion

- 3 = active pursuit of female with persistent sexual interest
- 4 = one mount or mounting attempt. No service.
- 5 = two mounts or mounting attempts. No service.
- 6 = more than two mounts or mounting attempts. No service.
- 7 = one service followed by no further sexual interest.
- 8 = one service followed by sexual interest, including mounts or mounting attempts.
- 9 = two services followed by no further sexual interest.
- 10 = two services followed by sexual interest, including mounts, mounting attempts or further services.

An accepted method for assessing the sex drive of yearling bulls would be to use the best score (1 to 10) of two 10-minute tests where four bulls are penned with three restrained females.

Table 2. Mating and Conception Rate for Individual Bulls Exposed to 50 Cyclic Heifers for 20 Days

Bull libido group ^a	Number of bulls	Number of heifers exposed	Estrous heifers mated, %	Conception rate/estrous heifer, %
High	4	198	87	51 ^b
Medium	4	200	95	50 ^b
Low	4	202	71	33 ^c

^a Determined during 30-minute test.

^{b,c} Percentage values without a common superscript differ (P<.01).

Relationship of Serving Capacity to Other Traits

Serving capacity is not related to scrotal circumference, semen quality, body weight or disposition. The heritability of serving capacity has been reported to be 59% (Blockey et al., 1978), indicating that serving capacity could be improved by selection.

Social Dominance

The distribution of calves sired by four bulls in a multi-sire breeding group in table 3 shows that a high percentage of calves can be sired by a single bull when more than one bull is used on a group of cows. We might explain some of this by differences in libido, but social dominance or rank in the "peck order" also plays a part. In general, young bulls are lower in rank or less dominant than mature bulls. When yearling bulls are used in multi-sire breeding groups with older bulls, the more dominant older bulls may prevent young bulls from servicing females. Since social dominance is not related to libido or fertility, a dominant sire in a multi-sire breeding group may decrease pregnancy rates. Table 4 shows the results of a study where four groups of bulls were used in multi-sire breeding groups (Blockey,

1979). Two mixed age groups included one 5-year-old and two 2-year-old bulls per group. Two young groups consisted of three 2-year-old bulls per group. Bulls were then divided according to high or medium serving capacity determined by a serving capacity test.

Table 3. Pattern of Calf Production in a Group Mating Situation

Bull	Age in 1964	Percentage of calves sired by each bull				
		1964	1965	1996	1967	1968
A	10	70.4	76.0	12.2	a	a
B	4	16.7	18.0	63.4	72.5	25.1
C	3	7.4	6.0	12.2	12.5	62.5
D	2	5.5	a	12.2	15.0	12.4

^a Bull absent from herd.

Table 4. Reproductive Performance of Bulls in Mixed Age or Young Bull Mating Groups

Age Serving capacity	Mixed		Young	
	High	Medium	High	Medium
First estrus detection, %	96.2	96.2	100.0	100.0
First estrus conception, %	73.6	56.7	81.0	60.7
Second estrus detection, %	75.0	82.2	90.0	97.6
Second estrus conception, %	61.9	64.9	83.3	78.9
Pregnancy rate, %	85.9	83.6	95.2	92.5

In each age group, higher serving capacity bulls achieved higher first service conception rates. It is interesting that, when younger bulls were grouped with an older bull, first service conception rates and overall pregnancy rates were lower. In this study, bulls that were higher in social rank spent more time close to those females in estrus. When bulls are more nearly equal in size and age, the social rank is less well established and lower ranking bulls have more access to females in estrus. Avoiding large differences in bull size and age may increase the percentage of calves born early in the calving season and overall pregnancy rates.

Conclusion

There is tremendous variation in the libido of beef bulls. The fertility, libido and mating ability of individual bulls are more important than the number of females per bull or the use of single versus multi-sire breeding groups. Measuring differences in bull libido prior to the breeding season may help eliminate poor performing bulls that cannot be eliminated by a semen evaluation or scrotal circumference.

Social rank of bulls used in multi-sire breeding groups can affect not only the percentage of calves sired by an individual bull but also total pregnancy rates. Groups of bulls of similar size and age may achieve higher pregnancy rates than groups varying widely in size and age.

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