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Practical Reproduction Strategies for Utah Beef Ranches

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Introduction

Fertility is the most important factor contributing to the profit of a beef cattle operation and is critical for sustainability. Simply, cows that do not wean a live calf do not generate any revenue to offset several months of accumulated expenses, care and management. Many years ago the common goal was to produce a live calf every year. Modern livestock marketing practices demand more than just a calf every 365 days. In fact, a uniform calf crop is the expectation and in turn requires a short breeding season, 45-60 days. One method of achieving a uniform calf crop and a short breeding season is by selecting highly fertile females which breed early and maintain their pregnancy until calving.

In common thought, selecting highly fertile replacement heifers should create a productive cow herd. However, there are no identifiable physical traits which indicate highly fertile females. Among reproduction traits, size and maturity factors have the greatest heritability (Table 1). Heritability is numerically calculated and indicates the probability of the traits being passed on to offspring. For instance, pregnancy rate has a low heritability, 0.07 or 7% (Table 1). Replacement heifers are usually picked from the biggest and oldest heifers. However, size and age do not guarantee fertility, but rather ensure that heifers reach puberty and will cycle. Additionally, ranchers who strictly cull all open cows never achieve 100% pregnancy rate and may never reach desirable herd fertility using size, maturity, production oriented or phenotypic selection traits.

Fertility is affected by numerous factors including age, body condition, size, soundness, growth, body type, ease of calving, and sire. Producers who fail at any one of the components of fertility will receive less than desirable productivity. A one percent increase in fertility equates to greater than one percent increase in production. Ultimately, gross income increases more than one percent. Likewise a one percent decrease in fertility equates to greater than one percent decrease in production and profitability. Fertility is critical to the sustainability of beef cattle operations.

Table 1. Heritability of reproductive traits in cattle (Cushman et al., 2012).

Trait	Heritability
Pregnancy Rate	0.07
Calving Day	0.07
Heifer Pregnancy Rate	0.11, 0.21, 0.28*
Age at Puberty	0.14, 0.24*
Stayability	0.15
Follicle Diameter	0.16
Yearling Uterine Horn Diameter	0.20
Age at First Calving	0.28
Reproductive Tract Score	0.30
Antral Follicle Count	0.44
*Studies with differing results	

Table 2. Relationship of increase percent calf crop to the percent pounds weaned.

Percent calf crop	Percent increased or decreased pounds weaned/one percent increase in calf crop.
75	1.3%
80	1.3%
85	1.2%
90	1.1%
95	1.1%

Genetic Testing

Genetic testing can evaluate individuals for selection prior to their performance. Several gene markers exist for production traits such as marbling, feed efficiency and growth. Due to the fact that reproduction is a polygenic trait, a trait influenced by many genes each with small effects, a good marker for fertility has not been discovered. Polygenetic traits create a challenge to identify specific markers. Unfortunately, a gene marker for fertility has yet to be found and it is still unclear if one will be found in the future (Cushman et al., 2012). Using genetic testing for single trait selection of production traits can have negative impacts on reproduction.

Selecting Replacement Heifers Calving Early in the Calving Season

Twenty-one years of data summarized from over 18,000 individual heifers identified heifers calving in the first 21 days of the calving season to have improved production and longevity. Heifers calving in the first 21 days of the breeding season stayed in the herd approximately 1 year longer and produced more than 290 lbs more of weaned calf (Mousel et al., 2012). Additionally, high antral follicle counts and high reproductive tract scores, indicators of fertility, are correlated to heifers that calve early in the first 21 days of the calving season. This data adds to the validity of selecting early calving heifers. Practical application of this strategy may require beef producers to retain all or significantly more heifers until after pregnancy determination and then cull the non-pregnant heifers. For example: a producer usually retains 15 replacement heifers for a 100 head mother cow operation and normally 64% of the exposed replacements conceive in the first 21 days of the breeding season. The producer would now need to retain 23 heifers until pregnancy is confirmed and hopefully 15 highly fertile heifers would have conceived in the first 21 days of the breeding season. The cull replacement

heifers would be ideal candidates for marketing to a feedlot.

Estrus Synchronization

Estrus synchronization is an underutilized technology in the beef industry. It can potentially shorten the calving season, increase calf uniformity and enhance the ability to utilize artificial insemination. Beef cattle cycle on average every 21 days. In a normal breeding season, 4.7% of the herd's females will cycle on any given day and the majority of females will only cycle once during the first 21 days of the breeding season. Estrus synchronization is used to bring all cows into estrus on the first day of the breeding season. This strategy creates two heat cycles and two opportunities to get pregnant in the first 21 days of the breeding season. Several estrus synchronization protocols exist, each with stringent protocols and procedures. Some protocols require detection of estrus with AI systems. Other synchronization systems use a timed-AI procedure. Natural service works well for all synchronization protocols and reduces labor substantially. For specific estrus synchronization protocols, contact the local Extension office, veterinary office or the local semen sales representative.

Best Management Practices for Utah Beef Producers

An estimated 75-85% of all beef cows calve annually (USDA-APHIS, 1994). The percent of cows calving could be increased through best management practices. The following are best management practices for Utah beef producers:

- Breeding females should be on a stable or increasing plane of nutrition with adequate mineral supplementation.
- Heifers should weigh 62-65% of their mature body weight prior to breeding and have a reproductive score of four or greater.
- Heifers should be bred to calve 2-3 weeks before the main cow herd so they have extra time to begin cycling again and prepare for the upcoming breeding season.
- Heifers becoming pregnant in the first 21 days of the breeding season show higher production and improved longevity in the cow herd.
- Cows should have a body condition score of five or higher during the breeding season.
- Cows failing to conceive in one or more breeding seasons can be considered to have an inherent fertility problem and should be culled.
- Selecting replacement heifers with appropriate breed characteristics, milking ability and frame size which match the ranch's feed resources,

location and topography will improve reproductive success.

Conclusion

Fertility and reproduction management are critically important for Utah beef producers. Beef producers will make the most improvement in fertility by selecting for highly fertile replacements rather than emphasizing sire selection. Genetic testing for fertility may never be successful, but genetic testing and selection for specific traits may result in lower reproduction efficiency. Selecting heifers which conceive in the first 21 days of the breeding season will mostly likely be the simplest method to select for highly fertile females and improve overall herd reproduction. Estrus synchronization will increase the likelihood of cows and heifer conceiving in the first 21 days of the breeding season. Beef producers who apply the best management practices of

reproduction will have above average reproduction efficiency, improved profitability and greater sustainability.

References

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