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## Yearling vs: 2-year-old bulls

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no. 1.214

COLORADO STATE UNIVERSITY EXTENSION SERVICE

### Quick Facts

- Bulls may be more economical to sell as yearlings rather than as 2-year-olds.
- Yearling bull use can reduce the bull cost-per-calf.
- Yearling bull use can result in greater genetic improvement than using older bulls.
- A reproductive soundness exam is recommended regardless of bull age.

Producers often consider selling bulls as yearlings, especially if they receive less than expected for their 2-year-old bulls. Bull sellers are concerned about performance and appearance of bulls they sell. There is some hesitation about selling bulls as yearlings, because special management is required for bulls to reach maximum mature weight.

### Seller Advantages

The price differential between selling bulls as yearlings vs. 2-year-olds has not always been that great, especially for top performing bulls. Yearling bulls may, in fact, bring higher prices than 2-year-old bulls.

The feed cost for carrying bulls one more year may negate any increased return from selling bulls as 2-year-olds. For instance, if corn was selling for \$.08 per pound\* and a bull was fed five pounds of corn a day plus 23 pounds of hay at \$.03 per pound, a \$1.09 feed cost per day would result in a \$398 annual cost.

There also are interest costs incurred with the feed. Interest at 15 percent for six months results in a \$30 interest cost. Opportunity costs are involved with carrying a yearling for one more year. If one were to sell that bull for \$1,000 as a yearling and could reinvest that money for one year at the rate of 15 percent, then one could make \$150 on that money.

This adds up to \$578 for interest and feed costs. That cost should be recovered in additional price for a 2-year-old bull compared to a yearling bull. This does not include any labor or yardage expense or investment return. The owner also carries the risk of bull injury or unsoundness for an additional year.

### Buyer Advantages

There are two main advantages for yearling bull buyers. 1) Yearling bulls reduce the cost-per-calf. For example, if an average bull sires 100 calves over a four-year period, the use of a yearling bull can result in one additional year's production in the life of that bull.

An extra year's production can mean a 20 to 25 percent greater calf crop (25-30 extra calves) during the bull's life. This helps spread the cost of that bull over more calves.

2) The use of yearling bulls can result in greater genetic improvement. This can be seen in traits such as weaning weight.

Work in New Mexico has shown that two pounds more per calf per year can be obtained using yearling bulls. This assumes that the bulls used as yearlings have greater genetic merit than the bulls presently being used in the herd.

This genetic improvement, through the use of yearling bulls, is attributed to decreasing the generation interval. Generation interval is the average age of all parents when their progeny are born. Typically, herds not using yearling bulls have an average generation interval of 4.5 to 6.0 years.

**Table 1: Expected annual progress due to use of younger bulls.**

Age when mated (yrs)	Average age when calves are born		Generation interval (years)	Exp. annual progress in yearling weight
	bulls	cows		
2, 3, 4 & 5	4.5	6	5.25	6.1
All yearlings	2.0	6	4.00	8.0

Reducing the generation interval will increase the expected annual progress made per generation (see Table 1). Expected annual progress or progress made per generation is calculated using the following formula:

$$\frac{\text{heritability} \times \text{selection differential}}{\text{generation interval}} = \text{progress made per generation}$$

The selection differential is the superiority of the selected individuals above the population average from which they came. Heritability is that portion of the difference observed between animals that is transmitted to their progeny. For example, to calculate the rate of improvement per year in yearling weight, use a heritability of .40, a selection differential of 50 pounds\* and a generation interval of five years.

$$\frac{.40 \times 50 \text{ pounds}}{5 \text{ years}} = 4 \text{ pounds}$$

<sup>1/</sup>Tim Stanton, CSU assistant professor, animal sciences and extension feedlot specialist; Dennis Lamm, CSU assistant professor, animal sciences and extension beef specialist (4/1/82)

By reducing the generation interval to four years, there is a five pound-per-year rate of improvement in yearling weight.

$$\frac{.40 \times 50 \text{ pounds}}{4 \text{ years}} = 5 \text{ pounds}$$

## Bull Nutrition

Nutrition is critical for developing yearling bulls. A study evaluated the influence of nutrient intake on age and weight at first ejaculate (see Table 2). Energy was provided to a group of yearling bulls at the rate of 70, 100, 115 and 130 percent of the National Research Council (NRC) recommendation for total digestible nutrients (TDN).

**Table 2: Influence of nutrient intake on age and weight at first ejaculate.**

TDN level	At first ejaculate	
	Age, weeks	Weight, pounds
70	61	523
100	45	643
115	41	675
130	44	784

(J. Dairy Sci. 1961, 44:905.)

Feeding bulls at 70 percent of the NRC recommendation for TDN resulted in a 15- to 20-week delay in the time to first ejaculate. Energy level was also reflected in the weight of animals at first ejaculate. Those animals that were fed the higher energy levels were heavier at an earlier age than those animals fed at the 70 percent level. Nutritional recommendations for yearling bulls are listed in Table 3.

**Table 3: Daily nutrients recommended for young growing breeding bulls.**

Weight,	(lb)	1,000-1,200	1,200-1,400
Daily gain,	(lb)	2.00-2.25	1.75-2.00
Dry matter,	(lb)	26.00	26.00
Protein <sup>1</sup> , %	(lb)	13.00 (03.4)	12.50 (03.2)
TDN <sup>1</sup> , %	(lb)	62.00 (16.0)	60.00 (15.6)
Calcium, %	(grams)	.27 (32.0)	.27 (32.0)
Phosphorus, %	(grams)	.24 (28.0)	.24 (28.0)
Vitamin A,	(IU)	50,000	50,000

<sup>1</sup>Dry matter basis.

## Reproductive Soundness

If one chooses to use yearling bulls in a breeding program, a reproductive soundness exam is critical. Testicle size is an important criteria to determine sperm producing ability. Work at CSU's San Juan Basin Research Center, Hesperus, Colo., has determined a minimum of 30 centimeters at 13 months of age to be a good culling criteria for Hereford and Angus bulls. Other guidelines are presented in Table 4.

**Table 4: Recommended minimum scrotal circumference for beef bulls.**

Age (months)	Scrotal circumference (centimeters)
6-7	20.0
12	32.0
18	33.5
24	35.0

Also, an examination of the reproductive tract for any abnormalities is essential as is semen evaluation at least 60 to 90 days prior to the breeding season. Libido and serving capacity are being developed as evaluation tools to determine the reproductive potential of yearling bulls.

Sexual maturity or puberty is dependent primarily on age and weight. Minimum guidelines suggested for age and weight of bulls is 14 months and 900 pounds, respectively. However, there is some variability in these guidelines. A study was conducted evaluating the effect of breed on age and weight at puberty (table 5). Some breeds have the potential for maturing at an earlier age and also a lighter weight.

Sexual maturity not only refers to sperm production, which develops at 8 to 11 months-of-age, but also includes sex drive and mating ability. Sex drive usually develops between 12 and 15 months-of-age and is much more unpredictable than sperm production. Mating ability is a behavioral phenomena that needs consideration when using yearling bulls.

Lack of experience can have a depressing effect on a bull's sex drive. This can be overcome by exposing a yearling bull to one or two estrous females 30 days prior to the breeding season. Serving technique needs to be observed to identify any back, leg or feet problems or any other reproductive problems.

Bull dominance is a factor often overlooked in a multi-sire mating program. The most dominant bull in the herd usually is the oldest and heaviest, and has been there the longest. However, there is an age limit when dominance is lost.

Keeping young and old bulls in the same breeding pasture may contribute to reproductive problems. As bulls reach the age of four or five, their reproducing ability declines, but their dominance remains high. Since older bulls prevent younger, more potent bulls from mating with estrous females, a high percent calf crop may not be achieved.

\*To convert to metrics, use the following conversions: 1 inch = 2.54 centimeters; 1 pounds = .45 kilogram.

**Table 5: Effect of breed on age and weight at sexual maturity.**

Breed	No.	Age (weeks)	Weight (pounds)
Angus	12	44	681
Hereford	15	45	710

(J. Anim. Sci. 1965, 24:761.)