AGRICULTURAL
GUIDE
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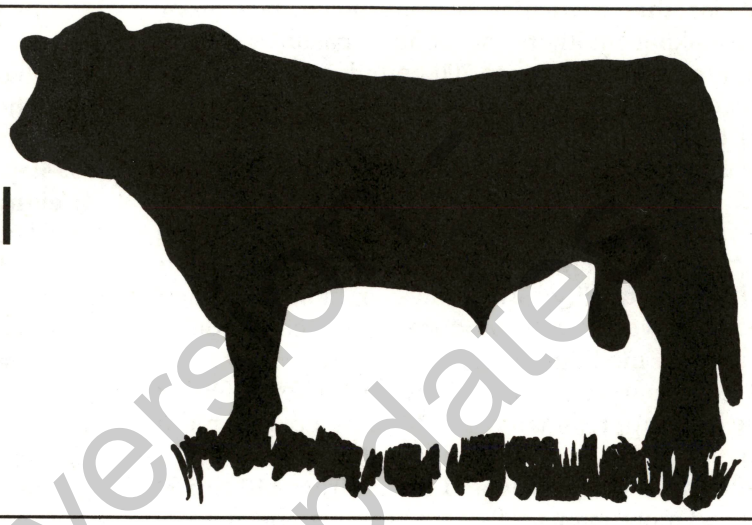
Selection of the herd bull



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Two major breeding programs in beef cattle improvement are: (1) purebred, in which the objective is to improve the genetic worth of the herd, and (2) commercial production, in which the objective is to take advantage of genetic material to achieve the greatest possible production.

The two breeding programs are different. Selection for either system requires excellent judgment and timely decisions.

Herd sire selection

For purebred or commercial breeder:

- Decide what kind of cattle is most nearly ideal for local conditions. Until this decision is made, a breeder cannot make progress—he can neither select the best nor discard the worst. Make use of the National Sire Summaries when selecting potential herd sires.
- Find animals that have the genes needed to produce the ideal animal: (1) by evaluating the performance of each animal; (2) by paying attention to merits of close relatives; and (3) by studying progeny.
- Secure at reasonable prices replacement sires that come nearest to the ideal and allow them to reproduce in numbers proportional to the quality of calves they sire.

For purebred breeders:

Through herd sire selection, keep the herd closely related to the best present and past animals in the herd.

Select outcross sires only to prevent serious defects from being fixed in the herd or to get genetic variation for a needed economic trait. The higher the average individual merit in a linebreeding program, the milder the outcross should be.

For commercial breeders:

Select outcross sires, when practical, unless you would have to use bulls of lower genetic merit. Using sires that are related to each other on females that aren't related to the sires will give maximum uniformity and vigor. Cross breeding should be practiced to increase total production with given set of resources.

Standards for selection

The objective of a beef cattle improvement program is higher rate and efficiency of production with a desirable retail product. Six major characteristics of cattle contribute to this aim:

- fertility,
- nursing ability (milking ability of dam and preweaning gains of calf),

- postweaning gains,
- feed efficiency,
- live animal merit (structural soundness and frame), and
- freedom from inherited defects.

The herd bull should meet the minimum standards outlined by the Missouri Beef Cattle Improvement and Testing Station Committee. These standards are:

1. The adjusted weaning weight of the bull must be above the average adjusted weaning weight of the herd for that particular season. Bull calves from good-milking mothers on ample pasture should weigh from 475 pounds to 700 pounds when weaned at seven months, if they are being considered for herd bulls. Use bulls with expected progeny difference of plus 20 pounds or better for weaning weight.

2. The bull should grade choice or above at weaning. On the average, bulls that grade choice will sire a higher percentage of choice feeder calves when bred to good quality cows. However, bulls that grade select or lower tend to produce calves that grade in the good to medium range.

Cattle market reports show that choice feeder cattle bring approximately 2 to 10 cents a pound more than select grade feeder calves. On this basis, a 500-pound choice calf would return from $10 to $50 per head more than a 500-pound select grade animal.

3. The bull should have a minimum post-weaning daily gain of 2.8 pounds during a 140-day feeding period on a standard ration. He should grow normally after weaning and show inherited characteristics without becoming excessively fat. Frame or mature size is important in producing uniform, high-yielding carcasses.

Certain inherited characteristics have a significant bearing on economy of beef production. How much of the superior breeding ability of a sire is transmitted to the offspring? Heritability estimates help answer this question.

A heritability estimate indicates the percentage of variation in a trait (weaning weight is 30 percent for example) due to heredity. This difference is transmitted from parents to their offspring. If the heritability estimate percentage is subtracted from 100, the remaining percent of variation is due to environment (feed, climate, disease). (See UMC Guides 2909 and 2005.)

Heritability estimates may be used to estimate the progress and setbacks in different traits that can be expected from different matings.

Example: Assume a breeder has fed 10 bulls of approximately the same age for 140 days. They all had a B conformation grade and had a combined average daily gain of 2.25 pounds. One bull in the group gained three pounds a day, and another gained only 1.8 pounds a day. Since rate of gain in the feedlot is 50 percent heritable, what rates of gain can be expected from calves from the two bulls if they are bred to equal quality cows?

The difference in rate of gain between the bulls is 1.2 pounds. Therefore, 1.2 pounds multiplied by 50 percent (heritability of rate of gain) equals 0.6 pounds. Since half of the inheritance comes from the dam and half from the bull, divide 0.6 by 2, which gives 0.3 pounds. Thus, you would expect calves sired by the bull that gained three pounds a day to gain .3 pound more daily than calves sired by the bull that gained only 1.8 pounds a day.

The gain of an extra .3 pound daily means that 30 calves sired by the better bull would, during one month on feed, gain a total of about 270 pounds more than the calves sired by the other bull.

4. The bull should have a minimum adjusted 365-day weight ratio of 100 in a contemporary group of eight or more bulls. Desirable weights for British breed bulls at various ages are: 7 months, 500 pounds; 12 months, 1,000 pounds; 18 months, 1,400 pounds; 24 months, 1,600 pounds; and 6 years, 1,800 to 2,000 pounds. Add 200 pounds for Continental breeds.

This weight standard can serve as a guide when purchasing sires of various ages. A good policy is to select those that gain rapidly between the ages of 7 to 12 months following rapid pre-weaning gains. Rate of gain is highly heritable in beef cattle. Select bulls with positive EPD for growth and milk traits based on National Sire Summary.

5. Breeding grades used by state extension specialists at 365 days are A, B, and C. These grades are further divided with plus or minus (example, B+ or B−). The recommended guides for selecting bulls under the respective grades are as follows:

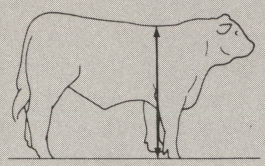
- Outstanding bulls are in the A grade and are excellent animals from the standpoint of type, conformation, quality, and beef characteristics. They are animals with no major defects and with numerical scores* 90 to 100.
- Bulls in the B grade are good enough to use in many registered herds and in any commercial herd. Animals in this grade are distinctly beef type. They must have sound feet and legs and numerical scores of 80 to 89.
- Bulls in the C+ grade, and particularly those in the top range of this grade, have sufficient type and quality to improve the average commercial herd. Bulls in the lower end of the grade cannot be expected to improve any herd, except possibly a herd of the lowest grade commercial cows. Numerical scores of 70 to 79 are C grades. The lower two thirds of this grade should be steered.

6. Frame is highly heritable (50 percent) and should be considered in selecting herd bulls because

*These are subjective scores awarded by judges on the basis of frame, muscle, bone, structural soundness, composition, and breed characteristics.

Missouri Frame Score

Height Measurement Is Taken Over the Shoulder at the Fifth Rib or Elbow



Potential Slaughter Weight	FRAME	AGE IN MONTHS																				
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		Height in Inches																				
750 - 850	1	32	33	34	35	36	37	38	39	39.75	40.5	41	41.5	41.75	42	42.25	42.5	42.75	43	43.25	43.5
851 - 950	2	34	35	36	37	38	39	40	41	41.75	42.5	43	43.5	43.75	44	44.25	44.5	44.75	45	45.25	45.5
951 - 1050	*3	36	37	38	39	40	41	42	43	43.75	44.5	45	45.5	45.75	46	46.25	46.5	46.75	47	47.25	47.5
1051 - 1150	4	38	39	40	41	42	43	44	45	45.75	46.5	47	47.5	47.75	48	48.25	48.5	48.75	49	49.25	49.5
1151 - 1250	**5	40	41	42	43	44	45	46	47	47.75	48.5	49	49.5	49.75	50	50.25	50.5	50.75	51	51.25	51.5
1251 - 1350	6	42	43	44	45	46	47	48	49	49.75	50.5	51	51.5	51.75	52	52.25	52.5	52.75	53	53.25	53.5
1351 & Above	7	44	45	46	47	48	49	50	51	51.75	52.5	53	53.5	53.75	54	54.25	54.5	54.75	55	55.25	55.5

*Frame 3 is average for British breeds.
**Frame 5 is average for Continental breeds.

it is a measure of mature size. Weights in the carcass are broken down into three parts—lean, fat, and bone. Bone is fairly constant, 12 to 14 percent. Fat can vary from 15 to 40 percent and lean can vary from 50 to 75 percent in choice cattle.

The USDA Feeder Grades, adopted in September, 1979, uses three frame scores—large, medium, and small. Under the Missouri frame score system, the USDA large frame is 5.5 above, with slaughter weight of 1,200 and up; medium frame is 3.5 to 5.5 with slaughter weight of 1,000 to 1,200 pounds; and small frame is 3.5 down with slaughter weights less than 1,000 pounds. The present demand is for 4 to 6 frame fat cattle, so design your program to produce slaughter steers in this range.

7. Prospective herd sires should pass a semen test for fertility within 90 days before breeding or purchase.

8. Bulls should be free of obvious physical and genetic defects in conformation. When selecting herd sires, keep in mind the numerous defects that may be found. Inspect the feet and legs carefully and avoid those that have extreme sickle hocks and crooked ankles. Also avoid those with feet that turn in (pigeon-toed) or turn out (splay-footed). Too much width between the toes is undesirable, since feet of this kind are more subject to injuries and are susceptible to corns and other foot trouble.

Disposition of bulls is important. Wild, high-headed, skittish animals tend to produce nervous, undesirable offspring. Nervous animals fail to gain rapidly in the feedlot, are inefficient producers, and tend to disturb animals with quiet dispositions.

General information

Bulls in good condition (not excessively fat) and gaining weight at the beginning of the breeding season are most valuable. Overconditioned animals usually require time to become acclimated to your range or pasture conditions before they can be used satisfactorily. But distinguishing between thickness of muscle and fat is not easy.

The breeder of the future will succeed by producing thick, trim, muscular, well-balanced cattle of attractive type and with a high degree of natural fleshing. These animals should gain rapidly, grade high, and not be overconditioned. They must stand on straight, strong legs and desirable feet. They must also be tough, rugged, and aggressive breeders.

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