CLEMSON EXTENSION

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Selecting the Herd Bull

The cow herd needs careful evaluation before a final decision is made about the next herd sire. What are the herd weaknesses? In what areas are improvements needed most-size, preweaning gains, postweaning gains, reproductive efficiency, early/late maturity, quality (muscling), or soundness of feet and legs? When you select your next bull, establish goals that emphasize those areas where greatest improvement is needed.

To make reliable decisions, consider the following performance facts:

- 205-day weight and ratio
- 140-day feed test gain and ratio
- 365-day weight and ratio
- Number of contemporaries
- 205- and 365-day hip height
- Thickness or muscling (average, above average, below average)
- Birth weight
- Back fat thickness
- Performance data on sire and dam and estimated breeding values on that bull, if available.

Background

Unfortunately, because of inadequate management, nutrition, and selection, true genetic improvement occurs in only a few herds. Often commercial producers are too concerned with the price of a bull and purebred breeders about the pedigree of the bull. There is nothing wrong with these concerns as long as the bull under consideration has performed above the average of his contemporaries. If so, we would expect the bull to contribute genetically in a positive manner since his superior performance should be due to desirable growth genes. Thus, purchasing within a price range and a particular pedigree is good, but positive performance must be a prerequisite.

Producers of row crops like corn and soybeans would not think of planting seed of unknown variety and germinating quality. Also, they insist on planting their crops early and demand excellent stands so that maximum yields will be possible the following fall. Yet these same producers use unidentified cows and bulls without performance records. Why follow recommendations so closely in one area of production and not in another?

Beef production costs today are too great not to be concerned about improvement. Poor management will force more producers out of business each year. Those who survive must be good managers, feeders, and breeders-the future belongs to the efficient. Cow identification, high reproductive efficiency, breeding and calving within 60 to 90 days, maintaining legumes in pastures, weaning 500- to 700-lb calves, and using bulls that have performed above the average of their contemporaries are keys to maximizing production yields and benefiting from positive returns on investment.

This leaflet describes one of the keys to maximizing production-selecting the herd bull. Let's look at a record and discuss its meaning and how to evaluate the contribution of a bull used in your herd.

What The Facts Tell You

205-Day Weight, 140-Day Feed Test Gains, and 365-Day Adjusted Weights and Ratios

With this information you can calculate the average gain your selected bull can contribute genetically to his offspring in your herd. We recommend that you select a bull that is above the herd average on his 205-day record.

Why should you select from those animals above the herd average? You make your selection from above

the herd average for the same reasons you select seed corn from the larger ears (in the old varieties, not the new hybrid varieties) and tobacco seeds from the larger plants in the field.

''Like begets like. This is genetics, the passing on of genes from generation to generation. All corn and tobacco plants in a particular field received the same treatment (environment was the same). The corn with larger ears and the bigger tobacco plants are simply showing their genetic superiority. The same is true in beef cattle: Those animals above the herd average are expressing their genetic superiority. Selecting a bull from below the herd average in any herd is like selecting your seed corn from the nubbins or inferior plants.

A sample of genes comes from the sire and dam to form the new individual. There is a segregation and recombination of genes, so no two offspring from the same parents are genetically the same. An animal that gains superior to others in the herd just happened to receive more of the favorable growth genes. An animal that grows slower received fewer favorable growth genes. To make genetic progress, we select from the best plants or animals within the same field or pasture, or those that have expressed genetic superiority.

The following chart gives the type of information you need to select a bull:

To determine the genetic superiority of the bull in this example, use the following mathematical calculations:

1. First, figure the herd average since it does not appear in the information given. It is easy to compute when you know the bull's 205-day adjusted weight and his 205-day weight ratio. 691 lb (the bull's 205-day adjusted weight) is to 132 (the bull's ratio) as X is to 100 (100 is always the herd average ratio) and the herd average or X is the weight you are seeking. Example:

   691 = X
   132 100

   132 X = 69,100
   X = 523 lb (herd average)

2. Knowing the herd average you can now determine the selection differential or the genetic superiority of the bull.

   691 lb (selected bull)
   -523 lb (herd average)
   +168 lb (This is a positive selection differential as the selected bull is above the herd average.)

3. 205-day weights are 30 percent heritable, so

   168 lb (selection differential)
   x .30 (heritability)
   50.4 lb heritable

Performance Record

Preweaning			140-Day Feed Test or Postweaning			Yearling				
Mgt. Code	205-Day Adj. Weight	Wt. Ratio	ADG	Final Weight	ADG Ratio	Adj. W/D Age	Adj. 365 D/Wt.	365 Day Ratio	365 Hip Height	Fat
Creep	691	132	3.25	1,105	126	3.32	1,211	120	51"	.30

Birth Date - 1/4/84
Birth Weight - 85 pounds
Final Weight Taken - 12/26/84
Breed - Angus

4. However, the bull contributes only 1/2 the genes to his offspring, so

   50.4 lb
   2 = 25.2 lb

   Thus, 25.2 lb is the amount you would expect this bull to add to each of his offspring if he was bred back to the cows in this herd. The new herd average expected when selected bull's offspring arrive are: 523 lb + 25.2 or new herd average of 548.2 lb.

5. Postweaning gains, 140-day feed test, are 45 to 60 percent heritable. You can really make genetic progress here. Calculate this the same as 205-day calculations. First find the average daily gains of all bulls on feed test.

   3.25 = X
   126 100
   126 X = 325
   X = 2.58 lb/day (This is the average daily gain of the other bulls on test, the contemporaries.)

6. So, 3.25 lb/day (selected bull's average daily gain on test)
   - 2.58 lb/day (contemporaries' average daily gain on test)
   + .67 lb/day (selection differential)

7. Postweaning gains are approximately 45 percent heritable, so

   .67 lb/day
   X .45 (heritability)
   .30 lb/day

   Remember, the bull contributes only 1/2 the genes (that is, .30 ÷ 2 = .15 lb/day). You would expect this bull to increase postweaning gains of his offspring by .15 lb per day. In this case, 2.58 (average of contemporaries) + .15 (genetic increase) = 2.73 lb/day as the new postweaning gain average for next year's calves when fed, if all are sired by this selected bull and out of the same cows.

This information is a summary of what you can expect the bull to contribute genetically to his offspring when selecting him from your herd and breeding him back to the cows within your herd. Use these same calculations to evaluate any bull with a performance record.

The most difficult part of this to accept is that the major difference between herds is environment, not genetics. Our major concern should be to select above the herd average. The higher above the herd average, the better. This says, "There is more genetic difference within herds than between herds."

205-Day and 365-Day Hip Heights

If 205-day hip heights are not available, you should demand 365-day hip heights. When cattle are standing side by side, you can easily judge which has the larger skeletal frame. But this is difficult to do when you look at them individually. This is when height measurements are so important.

The average 205-day hip height of Herefords and Angus is approximately 42 inches, and the average 365-day hip height is 47 inches. Today, we have entirely too many cattle that mature too early; that is, they just never get big enough.

A cow-calf producer is docked approximately $50 per head for short (early maturing) calves. The feedlot operator doesn't want them mixed with larger frame animals because they must be pulled out of the lot and sold at 800 to 850 lb. Feeding these animals to heavier weights is not efficient. The packer doesn't want these animals because processing an 850-lb animal costs as much as processing the 1,100-lb animal. Also, the industry is geared to the boxed beef trade, and 700-lb carcasses are necessary.

To increase the mature size in your cattle, select bulls that are larger (taller at the hips) than the breed average. You will want to select bulls that measure above the breed average (47 inches) at the hips at 365 days of age (British breeds). The larger breeds would be approximately 4 inches more, or 51 inches. With some of the larger breeds, height should not be a major selection criteria.

In our example, the bull is 51 inches at 1 year of age and will definitely contribute added frame size to his offspring. Yearling hip heights range from 43 to 55 inches within British breeds. One word of caution:

Make sure you ask when wither height measurements were taken-at 1 year of age or at the end of the feed test. This can make a big difference. Some data indicate that the heritability of frame size is 40 to 50 percent.

Muscling (Thin, Average, Heavy)

United States Department of Agriculture grades are determined by a composite evaluation of the following factors: maturity, marbling, texture of lean, firmness, and color of lean. Quantity of carcass, the amount of salable meat the carcass will yield, is important because it determines yield grade. USDA yield grades are based on four factors:

1. Hot carcass weight
2. Ribeye area at 12th rib
3. Fat thickness at 12th rib
4. Estimated percent kidney, pelvic, and heart fat

Thickness of muscling is important if we are to maintain quality as we increase frame. Depth of body should be considered in cattle evaluation as well.

Bull's Birth Weight

Birth weights are influenced by many things: the dam's age, size, breed, the nutritional level of the herd, sex of calf, and others. The sire contributes also.

Example:

Breed - Angus
Average Birth Weights - 75 lb
Selected Bull's Birth Weight - 85 lb
Heritability of Birth Weight - 40 percent
85 lb (selected bull's birth weight)
- 75 lb (average birth weight of breed)
+ 10 lb (selection differential)
X .40 (heritability)
4 lb = 2 lb
(bull's contribution is 1/2)

We would then expect this bull to sire calves that on the average were 2 lb heavier than the breed average (75 + 2 = 77 lb).

Back Fat Measurement

This very meaningful measurement is often overlooked. It can vary greatly within and between breeds. Early maturing breeds (Angus) get fat early. Later maturing breeds (Exotic) do not put on fat cover as early. Crossbreeding can work well in this case if you cross early maturing breeds with late maturing breeds. Breeds can complement one another, with the strong points of one breed strengthening the weaknesses of the other.

At 1 year of age, we would like fat thicknesses of 0.20 to 0.60 inches. Bulls with more than 0.60 inches of fat are probably maturing too early. However, fat thickness ranges are difficult to establish. An Angus bull gaining 4 lb per day on feed may be acceptable with 0.60 inches of fat covering, but one gaining only 2.25 pounds per day would be wasty With this same fat cover.

A Charolais with 0.10 inches of fat covering may lack enough fat covering for some breeders but could be used satisfactorily on some early maturing cows (British breeds). Depending on their cow herds, breeders can vary somewhat in the amount of fat covering they want their selected bulls to have.

Using the approach we have discussed should help you improve your herd genetically through sire selection. Every breeder can use the selection tools mentioned. Visual appraisal, grade, color, and pedigree should take a back seat to these more objective methods.

Most producers have not given genetics a chance to work for them. Genetics will work only if you make it work. Make your selections from above the herd average. Remember that ratios, or the percentage an animal is above (or below) the herd average (always 100), are the expression of genetic superiority. Please do not overlook ratios in a record. You must select bulls above the herd average if genetic progress is to be made.

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