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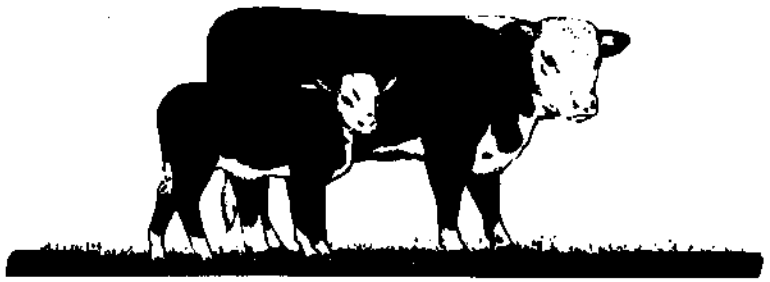

BEEF COW MANAGEMENT

COOPERATIVE EXTENSION SERVICE
MICHIGAN STATE UNIVERSITY
Michigan Counties and U.S. Dept. of Agriculture Cooperating

FACT SHEET 5600, October 1976

Improving the Beef Herd Through Selection and Developing A Breeding Plan

Too many times, beef cattle herd breeding plans do not receive proper emphasis. Genetic improvement is slow, and usually costs money either in the form of keeping the best animals within a herd, or purchasing a good herd sire. But genetic improvement is important, regardless of the objectives for a herd.

Naturally, a purebred breeder must become intimately involved with good recordkeeping programs. He should use these records to select male and female replacements from within his own herd or in purchasing these replacements from other herds. The genetic ability of replacement cattle in a strictly commercial herd has a tremendous effect on net profit and pride of ownership. The cattle business is just like any other business; there is a better chance of a person sticking with, enjoying, and continuing to improve a business if it involves highly productive units. Cattle are just like cars, each kind of cattle has different capabilities, and there are "lemons" and "performers" within each breed of cattle and each make of car. Also, there is no one breed of cattle, nor make of car, which performs every assigned task better than every other breed. There is no one breed of cattle which has the most desirable milk production, the most rapid growth rate, the highest quality carcasses, the highest bull and cow fertility level, and the easiest calving records.

WHY IMPROVE?

There are many examples of calves from one bull weighing 50 pounds or more than calves from another bull used within the same herd, bred to the same cows fed and managed alike. For most commercial breeders, the weaning weight of the calf determines the gross sale price of the calf crop; it is his "pay day." The purebred breeder must be vitally concerned about the performance (particularly weaning and 365-day weights), since it is from the purebred breeder that any further improvement in genetic ability comes for the rest of the industry.

WHAT CHARACTERISTICS TO IMPROVE?

Attention in any breeding program must be focused on the following traits:

1. *Reproductive ability* — whether or not a cow or bull has the ability to either become pregnant or to cause pregnancy in females within 45-90 days after last calving. This trait cannot usually be improved very much by selection within a breed, but is improved with crossbreeding.
2. *Calving ease* — means that the bull will not be too large for the cows, and will not have coarse muscling or coarse bone. It is tempting to breed virgin heifers to a large bull; but this is not to be recommended except in specialized, outstanding purebred herds.
3. *Structural soundness* — includes straightness and correctness of feet and legs, lack of extreme muscling (particularly important in some of the larger breeds), femininity in females, masculinity indicators in bulls, size and condition of the testicles, teat size and shape in producing females, and straightness and balance indicating an animal will have longevity of production. In

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the past, we have emphasized some unimportant components of appearance too much, but there are still some appearance items which reflect an animal's productivity.

4. *Calf weaning weight* — a reflection of the cow's ability to milk and to mother, and of the inherent growth rate of the calf. Specialized programs involving beef-dairy crossbred cows, will produce relatively large quantities of milk, and using large breeds of sire can bring about large increases in weaning weight.

5. *Yearling weight* — the ability to grow rapidly and efficiently before and after weaning. This trait is of high heritability, which means that selection of breeding stock on yearling weight will bring about relatively rapid progress.

6. *Carcass acceptability* — any product produced must be sold, although almost any type of beef produced in the past has had a market. Generally, carcasses of higher quality grades bring more money when sold. However, if too much fatness is required to reach a high grade, and this fat requires a large amount of feed, then it is debatable whether producing this type of carcass is economical for either the commercial cow-calf operator or the cattle feeder. Over recent years, the demand for moderate-quality carcasses (low choice) with lesser amounts of waste fat has increased.

USING PERFORMANCE RECORDS TO SELECT REPLACEMENTS

Many purebred breeders with large herds or small herds obtain accurate performance records on the cattle they produce. These records should be used to decide which animals within a herd are to be purchased or kept as replacement bulls or females. In the following table, weights at weaning time and about one year of age were adjusted for such things as age of the animal and age of the dam. These adjusted yearling and weaning weights are listed for six bulls born within the same herd during the same season, and fed the same ration from weaning until a year of age. The adjusted weaning and yearling weights of each of six bulls are given.

In addition, there is a ratio for weaning and yearling weights on each bull. These ratios compare each individual animal with the average of all six bulls. As an example, the weaning weight for bull number 4 was 92 percent of the average of all six bulls (538 pounds). The yearling weight on bull number 4 was only 93 percent of the average yearling weight for all six bulls. Therefore, he would not be a good bull to consider for a breeding program of any type.

On the other hand, bull number 5 had a weaning weight ratio of 112 percent and a yearling weight ratio of 112 percent. He was 12 percent above the average of all six bulls for both weaning and yearling weights. Heritability estimates of growth tell us that he should pass on ⅓ to ½ of this 12 percent superiority to the calves that he sires in a herd.

Performance ratios allow more accurate comparison of two or more animals raised in different herds. Actual or adjusted weaning or yearling weights should not be used to compare animals from different herds, because of the wide variety of feeding and management conditions between herds. However, an animal that has a high weight ratio in one herd will most likely have a high weight ratio if raised in a different herd.

Records on the cow herd become even more useful after several years of recordkeeping, since the lifetime production of cows and bulls in the herd can also be used to cull cows and compare bulls, and to provide additional information to decide which heifer calves should be kept for herd replacement. *Performance* records are information obtained when the animal is maturing (usually up to one year of age), but *production or progeny records are the "acid-test" of the animal's actual value based on the performance of his or her offspring.*

PUREBREEDING SYSTEMS

COMMERCIAL HERDS — Although the advantages of crossbreeding have been established, many commercial, relatively small herds will remain purebred. Some breeds are relatively acceptable in their performance

ADJUSTED WEANING AND YEARLING WEIGHTS AND RATIOS FOR SIX BULLS RAISED ON THE SAME FARM.

	ADJ. AT WEANING		ADJ. AT YEARLING	
Bull No.	Wt. (lbs.)	Ratio (%)	Wt. (lbs.)	Ratio (%)
1	535	99%	900	93%
2	585	109%	1035	107%
3	500	93%	960	99%
4	495	92%	900	93%
5	600	112%	1085	112%
6	515	96%	940	97%
HERD AVG.	538 lbs.	100%	970 lbs.	100%

for each of several different economically important traits. As an example, there will remain many straightbred Angus and Hereford cow herd. These two breeds and Shorthorn and some relatively recently imported breeds, have an acceptable level of fertility, a desirable milk production level, reach an acceptable carcass grade without a high level of grain finishing, and other traits which make them desirable as straightbred animals.

A commercial producer with straightbred cattle should not usually consider keeping bulls from his own herd. Neither should he follow line-breeding or inbreeding programs, because inbreeding, or mating of animals closely related, usually decreases performance. It is also usually best for commercial producers to continually use bulls from different blood lines, or from different breeders.

Straight breeding for the commercial herd is simple. As long as the commercial producer has a breed of cattle which are popular within his own area, it is an easy matter to obtain herd sires of that breed and even to purchase replacement heifers.

Particularly in a time of relatively low cattle prices, it may be advantageous for the commercial producer to purchase bred heifers or bred cows, rather than raising and maturing heifer replacements from his own herd. Naturally, any time cattle are purchased from outside the herd, careful attention must be paid to health standards of the herd supplying cattle.

PUREBRED BREEDERS — The purebred breeder has two options in carrying out his breeding program. These two general programs are discussed below.

1. *Out-crossing* — In this program, the breeder makes an effort to use bulls of different pedigrees or bloodlines in his herd. He may use a bull from one breeding line or pedigree for a few years, and then when he is ready to replace this bull, he might obtain a bull of a different pedigree; usually from a different purebred herd. Very few breeders have a whole herd of cows representing similar pedigrees or bloodlines. Therefore, almost any bull that a breeder selects will have some distant relationship to some cows in his herd.

Very little hybrid vigor (crossbreeding vigor) results from crossing animals of a different pedigree when the animals are from the same breed. Many breeders believe that there is some hybrid vigor resulting from crossing lines within a breed, but usually this amount of hybrid vigor is not important.

2. *Line-Breeding or Mild Inbreeding* — A true line-breeding program involves mating bulls and cows which are direct descendants of the same outstanding ancestor. Any kind of line-breeding, which is really a type of inbreeding, should only be done with truly outstanding, proven animals. Very few breeders have a herd which is sufficiently high in performance to use any kind of inbreeding or line-breeding.

Some of the most successful breeders have continually gone back to the same high-producing herds or bloodlines for their bulls or replacement heifers. Using outstanding high-performing bulls of the same breeding lines can increase uniformity and productivity of a purebred herd.

With artificial insemination (AI) almost any type of breeding program can be carried out. No longer is a breeder limited to only using natural service or having to purchase a breeding interest in a bull in order to use AI. In addition, almost every breed association has progeny test programs which more accurately evaluate the breeding ability of purebred bulls, and reports these to breeders for their use in selecting bulls.

UP-GRADING AND CROSSBREEDING

CROSSBREEDING FOR COMMERCIAL CALF PRODUCTION — A planned crossbreeding program can increase net productivity by 20 percent or more over purebreeding. It is important to choose breeds that will complement each other, and still produce a marketable calf. Crossbreeding can be used effectively in small commercial cow herds, paticularly with AI, although the maximum benefits from crossbreeding may not always be obtained in a small herd.

Almost every crossbreeding program starts with one breed of cows. Dairy breeds and some of the recently imported high-milk-producing breeds from Europe can also be used, but under specialized types of herd management. Before one can plan a crossbreeding program, breeds must be evaluated and selected. Each breed has strong points and weak points. These strengths and weaknesses must be considered when determining what breeds to use. It must be remembered that any evaluation of breeds is subjective, and the usefulness of any breed depends to some extent on the management level under which the herd is to be raised. See fact sheet 5000 for a discussion of selecting the best size and cattle type for various types of operations.

Use sire breeds and sires within a breed which do not cause a high frequency of calving difficulties. If the herd cannot be observed closely at calving time, then many times it is better to use only those breeds which do not have a history of calving problems.

Several types of crossbreeding programs are given below, with examples of the breeds which might be used:

1. *Two-breed criss-cross* — Only two breeds are used, with a sire of one breed being used for about two years, and then a sire of a different breed being used for two years. Usually heifer replacements are kept from within the herd. Breeds used should complement each other. A two-breed cross being used quite extensively is an Angus-Hereford cross. Cow size will not increase very much, and there is little concern about calving problems. Research has shown that percent of calves weaned

from crossbred Angus-Hereford cows is 4 to 8 percent greater than from a straightbred Angus or a straightbred Hereford herd. In addition, the calves will average 4 to 5 percent heavier.

Heavier weaning weights, faster post-weaning growth, and increased carcass meatiness could be obtained by using either of the two above cow bases and bulls of the larger, heavier-muscled breeds (Charolais, Simmental, Chianina, etc.). However, increased calving difficulties would be expected from using these larger breeds.

Other breeds might also be used, such as the Red Poll or Milking Shorthorn, which can add milk production, growth rate, and carcass leanness. However, any time that cow size or milk production is increased, then a better nutritional program is required, particularly during the time that the cows are being rebred.

2. *Three-Breed Rotational Crossing* — involves three breeds,each contributing something desirable to the maternal characteristics of the cow or to the growth rate and meatiness of the calf. An example of this might be alternating sire breeds each three years; such as Angus, Charolais, and Holstein bulls. Each breed of bull would be used for two or three years. A program using these three breeds would result in cattle that finish at slightly heavier slaughter weights, but which should wean heavier because of the increased growth rate of the Charolais and the increased milk production of the Holstein.

One problem with this is that not all the cows would contain the same percentage breeding from each sire breed. With AI, it would still be possible to use three breeds of sire in the same herd, but then the calf crop would not be as uniform as might be required to obtain top dollar at sale time. Usually heifers from the three-breed rotational crossing system are kept within the herd. Excess heifers, not required for replacements, should be in demand as replacement heifers for other commercial herds.

3. *Terminal Sire* — All heifers and steers from the cow herd are sold, and heifer replacements are obtained from outside the producer's own herd. One example of this is a beef-dairy crossbred cow, where all the cows in the herd are bred to a bull of a third breed. This cow could be an Angus-Holstein (or other beef-dairy crossbred) which would have a high rate of milk production. These cows are bred to bulls of a larger, heavier-muscled breed with sufficient growth to allow the calves to handle the extra milk available from the dam.

One problem with this type of program is obtaining the replacement heifers from outside the herd. There are few sources of commercial crossbred heifers for replacements, although this might be possible within certain areas.

But this is also an advantage since the producer does not have to mature replacement heifers on his own farm. Maturing these heifers to the time when they should go into the mature cow herd requires a separate feeding area, and a source of grain or silage which might not be home grown. Instead of having feeding areas available for these replacement heifers, a few additional cows may be carried, and labor requirements for the herd are reduced.

UP-GRADING — is where the producer may start with a crossbred herd, or a mixture of different breeds of cows. Continually, over a rather long period of time, bulls of only one breed would be used. As replacement heifers are kept from within the herd, the percentage of the breed that is being used increases in the herd, to the point where the cow herd will eventually carry a high percentage of that breed's blood. This is not as popular as it once was, except that there are quite a few herds being up-graded to newly available breeds (Simmental, Limousin, Chianina, Maine-Anjou, etc.). As in any breeding program, selection of sires to be used in a herd being up-graded is extremely important. This selection is probably even more important in up-grading programs than in the other commercial programs discussed above. Most of these breeds have extensive progeny test data available to assist breeders in selecting bulls. Most of them have specific requirements for reaching purebred status, and the respective breed associations should be contacted regarding these requirements.

ARTIFICIAL INSEMINATION — can be used in many of the above breeding programs, both by commercial and purebred breeders. In fact, in some purebred situations, it is almost a necessity in order to carry out these programs for maximum performance and profit. There are many advantages to using artificial insemination, but a successful AI program requires more time, labor and facilities than a natural service program. If these additional inputs cannot be made, an AI program will not be successful.

Purebred breeders have access to almost any kind of bull in AI service, so that they can carry out a line-breeding or well-controlled out-crossing program. There is little doubt that AI fits in and is an integral part of many successful purebred and commercial breeding programs.

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