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Oklahoma Cooperative Extension Service • Division of Agricultural Sciences and Natural Resources

# Beef Breeding: Purebred Program

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A purebred breeding program is the basis of genetic improvement of beef cattle in the United States. Less than 10 percent of the total beef cattle population is purebred, but from this 10 percent comes many bulls that serve the needs of commercial beef producers in economic improvement. Thus, 4-Her's with purebred beef need to have their objectives clearly identified.

## Objectives

- To contribute to the economic improvement of a breed or breeds.
- To promote the breed with factual data.
- To produce breeding stock that will improve commercial beef production.
- To gain knowledge of beef production.

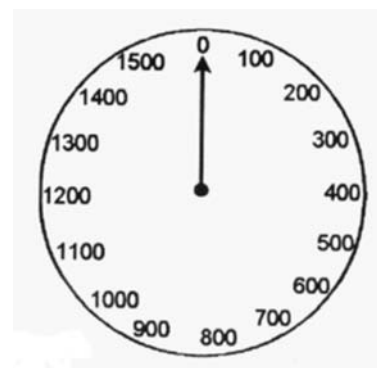


**Profit is an important goal.**

## Choice of Breed

The breed selected to become a 4-H project needs to be popular in your local area. Most purebred producers have to rely on commercial producers as an outlet for their purebred cattle. Only the very elite purebred producers sell a majority of their cattle to other purebred producers.

Before selecting a breed or even after a breed has been selected, visit with several key people in your area about possibilities of acquiring breeding stock and outlets for cattle once you have produced them. Some of these key people include the local Extension agent, agricultural education instructor, area representatives for different breeds, local breeders, and local 4-H leaders.



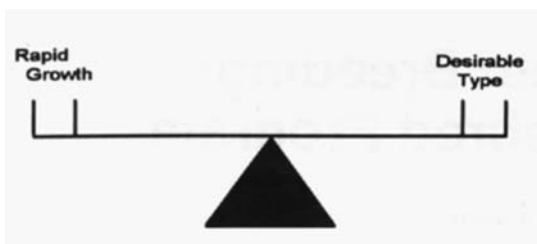
**Evaluate growth traits.**

All breeds have both good and bad animals in their registry. It becomes your individual responsibility to select and breed animals that will contribute to the improvement of a breed. Two very important items surface here. First, in selecting animals make sure that growth to weaning and yearling age is adequate and not a limiting factor. Ask to see performance records of the individual along with sire and dam progeny information. Pertinent information of performance testing to include adjustments and calculations is contained in Extension and breed association publications; please refer to these for information on specific traits of economic importance. Secondly, the correctness of body type and structure in breeding cattle is of utmost importance. Remember, it takes longer to breed good cattle from a bad start than it does when you start with an average animal or above average animal. Information on selection may also be found in other 4-H fact sheets; please refer to these for additional information on selection based on type and structural correctness.

Your family may already be involved with a breed of cattle. If this is true, your chances of breeding superior beef cattle would be further advanced, since you have a ready made source.

## Places to Select Breeding Stock

1. Breeders private treaty (direct sale from breeder to 4-Her): Most breeders will help young people get started in business.
2. Breeders-production sale: Many breeders offer a discount to young people selecting project animals.
3. Organized breed consignment sale: many have a show preceding the sale. Here you would have an opportunity to see different breeders' cattle compared in type and structure.



A balance between these traits is important in a purebred breeding program.

4. Family breeding herds: this is most likely the cheapest way to get started.
5. Test station consignment sales: to obtain cleanup bulls (bulls used for natural service after A.I. is used) or major herd sires.

## Expected Progeny Difference (EPD)

Most beef breed associations estimate breeding value as an Expected Progeny Difference (EPD). An EPD is equal to one-half the estimated breeding value. The word difference implies a comparison. Thus, EPDs let us compare or rank the superiority of individual animals. EPDs provide a prediction of future progeny performance of one individual compared to another individual within a breed for a specific trait. In most cases, the EPD is given as a positive or negative value in the units of measure for the particular traits, although there are exceptions. The EPD values are available for all animals, male and female. The EPD values may be used to directly compare only those animals within a breed. For example, the EPD values for a Hereford bull may not be compared against the EPDs for an Angus or Limousin bull. EPD values are most useful when two individuals are being compared directly. For example, consider the two sires in Figure 1.

Figure 1. Birth Weight EPD example

	Sire A	Sire B
EPD, lb	+5	-2

The Expected Difference in the Progeny of Sire A and Sire B is 7 pounds. Sire A has a Birth Weight EPD of +5 and Sire B has a Birth Weight EPD of -2. On the average, we should expect the calves by Sire A to be 7 pounds heavier at birth than calves of Sire B if all cows are managed in a uniform manner and are of similar genetic merit. Other comparisons for these sires could be made for weaning weight, yearling weight, and other traits.

EPDs cannot be compared between breeds. A bull with a low birth weight EPD from a large mature size breed may sire calves that are heavier than a bull with a high birth weight EPD from a moderate sized breed. A low birth weight EPD does not guarantee a minimum of calving difficulty if the choice of breeds is incorrect.

Preferential mating of certain individuals does not bias the results. Therefore, an expensive bull can be used only on genetically superior cows and his EPD will not be inflated. This is accomplished by adjusting for the EPDs of the cows to which he is mated. Also, appropriate adjustments are made for genetic change in the breed.

## Milk EPD

The milk EPD that results from the separation of weaning weight into growth and milk segments is, like any other EPD, fairly simple to use. The Milk EPD evaluates genetic merit for mothering ability. It is the expected difference in weaning weight of calves out of daughters of a particular sire as compared with calves out of daughters of another sire due to differences in mothering ability. As an example, consider two bulls in Figure 2.

Figure 2. Milk EPD example

	Sire A	Sire B
EPD, lb	+10	-5

The Expected Progeny Difference out of daughters of Sire A and Sire B is 15 pounds. Sire A has a Milk EPD of +10 and Sire B has a Milk EPD of -5. The expected weaning weight difference, due to mothering ability alone, in calves out of daughters sired by the two bulls is 15 pounds.

## Use of EPDs for Selection in Purebred Heads

Purebred producers need to consider EPDs in their breeding programs. Care needs to be exercised when making selection decisions. Type fads have caused some problems in the past when single traits are emphasized. Similar or worse problems may arise if a single performance trait is emphasized. For example, if the members of one breed association began to emphasize yearling weight and ignore all other characteristics several concerns may result. Birth weight would be expected to increase with the attendant calving difficulty. Mature size should also increase perhaps to the point where the functionality of the cow herd would diminish. This could lead to problems in reaching desirable quality grade at an acceptable weight. Each trait has a set of drawbacks if changes are carried an extreme. The availability of EPDs would make such extremes easier to reach if breeders chose to blindly emphasize a single trait.

Careful consideration of reproductive performance including conception rates, calf mortality, libido in bulls, and regularity of calving is still critically important. Carcass characteristics may have increased importance in the near future. Breeders are encouraged to obtain carcass data and use it in making selection decisions. There should be carcass EPDs available in several breeds soon when more complete databases are established.

When selecting breeding stock consider prevailing conditions such as production environment, feed resources, and level of management. Rougher conditions probably dictate avoidance of very high EPDs for growth or milk and the care to avoid high birth weights. Growth EPDs should be geared to the desires of the potential buyers. Again, traits for which there are no EPDs as yet can also be important. Traits associated with reproduction fall in this category.

## Planning Your Breeding Program

**Step 1.** Analyze the females for what they really are; consideration needs to be given to traits of economic importance.

- a. Birth weight EPD
- b. Calving ease information
- c. Weaning weight ratio
- d. Weaning weight EPD
- e. Post-weaning gain ratio
- f. Yearling weight ratio
- g. Yearling weight EPD
- h. Maternal milk EPD
- i. Performance information for above traits on sire and dam
- j. Body type
- k. Frame size
- l. Structural correctness
- m. Reproductive soundness

All these traits can not be given equal weight in making mating decisions. We simply need to be conscious of major problems within any of the traits and place the majority of emphasis on traits of economic importance (reproductive and growth traits).

**Step 2.** Select the bull or bulls to mate with your females. Based on information from the list of traits in Step 1, bulls can be selected and used. This is made possible through artificial insemination (A.I.) as a tool in the physical mating of animals. Most bulls with superior qualities in either growth performance or correctness are available through A.I. bull studs that specialize in merchandising A.I. bulls. Breed associations provide trait information on proven bulls through national sire summaries, performance pedigrees, breed journals, and breed representatives. Use the best bull you can afford for a cleanup bull following the A.I. season. Breed cattle according to what you need, what you can sell, and what the commercial producer will buy in your area. The possibilities of breeding a string of champions is unlikely but not impossible. The show ring is another step in assessing the completeness of animals in type and correctness.

**Note:** Study an animal's pedigree to guard against selecting animals that are possible carriers of genetic defects. A pedigree needs to be merchantable, but only close ancestors (parents) need consideration.

## Required Facilities

A purebred program requires more land and facilities than any other beef project. Some consideration needs to be given to the number of cattle that can be maintained as actual project cattle.

You may want to work out arrangements with your family or a neighbor in renting pasture or securing a winter feed supply. If existing corrals and working chutes are not available, plans to restrain your cattle for vaccinations and other procedures should be considered.

## Management

A 4-Her can have animals that are genetically superior, but only through proper and careful management can superior genetics be expressed. Poor management can limit genetic expression, proper nutrition, health, and overall good animal husbandry practices are necessary in a purebred beef program. Please refer to the 4-H Member's Guide, "Selecting and Managing the 4-H Beef Heifer," for detailed information on management practices.

## Things to Do (Activities):

1. Visit local breeders to become familiar with their programs. Study the management, performance testing, and promotion of these breeding firms. Ask for advice where your program may be weak.
2. Visit an A.I. collection facility; learn the technique in collecting bulls and inseminating cows.
3. Attend state breed association meetings and become a member of the state and national association. Many opportunities are available for junior members.
4. Visit local commercial producers; inquire about their wants and needs in selecting breeding stock.
5. Visit your Extension agent about locating sources of information on A.I. sires, shows for 4-Hers, and other ways to promote beef cattle in your area.
6. Become proficient in performance testing and procedures of your breed association and in adjustments and correction factors for the different traits.

## Other Resource Materials

1. Oklahoma Beef Cattle Manual
2. Bulletins, circulars, fact sheets in county Extension offices.
3. Literature provided by beef breed associations.
4. 4-H Project Manual, Beef Breeding; 4-H Members' Guides, "Beef Sire Selection" and "Selecting and Managing the 4-H Beef Heifer."



The show ring can compare animals in type and correctness.

## Questions

1. Purebred beef cattle make up less than \_\_\_\_\_ percent of the total beef cattle number.

2. Name five key people in obtaining information to assist with your breeding program.

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3. Name five places to select breeding stock.

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4. Name three growth traits in beef cattle.

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5. What tool or procedures allows the use of bulls we do not own?

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6. What is another step in assessing the completeness of animals in type and correctness?

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