

Chapter 2 – Genetic Selection

Selecting for any one trait while ignoring others does not lead to commercially successful livestock production. The key is balance in selecting for all traits that affect profit, both short- and long-term. However, balance need not mean “equal.” Strong selection pressure can be put on a few traits that greatly improve CAB acceptance rates without compromising other areas.

The trait most related to hitting the CAB target is **marbling**, but **ribeye area** and **fat thickness** also have some effect. Done correctly, improvement can be made for these carcass traits with no negative impact on reproductive, maternal or growth traits. In fact, improvement can be made in all of these areas at the same time with the proper use of expected progeny differences (EPDs).

While this manual focuses on recommendations for herd bulls, remember that “stacking” generations of daughters from such bulls will result in more rapid and predictable improvements in carcass merit. As heifers are retained or purchased, superior marbling genetics should be a key consideration. Research shows higher marbling genetics are correlated with lower annual feed costs. As you obtain carcass data on calves, it should be added to the criteria that determine culling. From the older or less productive cows considered cull candidates, first sell those producing calves with low-value carcasses.

Below are general recommendations for selecting a herd bull or AI sire in the three areas of marbling, ribeye area and fat thickness. For more accurate selection in all traits, let carcass data from your calves establish a baseline. Such data can identify areas of strength and weakness, pointing out needs for genetic selection.

A note on the accuracy (ACC) of EPDs or the reliability that can be placed on the EPD: When this number is close to 1.0, you can be more confident of the results in the next generation. The number of progeny and ancestral records in the database largely determine accuracy. Consider utilizing bulls with high-accuracy carcass EPDs when selecting an AI sire.

Marbling

Research at the Meat Animal Research Center (MARC) has proven over the years that the Angus breed is superior in marbling to all other mainstream beef breeds.

The CAB brand requires Modest or higher degrees of marbling (“Upper 2/3 of Choice” or “Premium Choice”). In more than 90% of the Angus-influenced (black-hided) cattle that fail to meet CAB specifications, inadequate marbling is to blame. Keep in mind that the percentage of Angus genetics varies greatly in black-hided cattle.

- The EPD for Angus cattle that predicts marbling is Marb. Both carcass data and yearling ultrasound data are used to calculate Marb.
- The amount of marbling needed in a herd sire depends on the cowherd he will service and your goals. If the cowherd is of Continental or highly crossbred genetics, selection for higher marbling is recommended. If the cowherd is Angus or English-based and known to produce calves that can marble, moderate to high levels may suffice.
- Recommendations are **absolute minimums. Higher marbling levels should be selected for when all other important traits can be obtained in an animal.**
- Recommendations are given as percentiles or rankings of current sires in the Angus breed. Actual EPD minimums are in the table footnotes, based on percentiles from the Spring 2010 Angus Sire Summary.

Ribeye Area

CAB specifications call for a ribeye area (REA) from 10 to 16 square inches (in^2). A ribeye smaller than 10 in^2 results in a poor yielding carcass while greater than 16 in^2 presents challenges in portion size.

REA is dependent on carcass weight and increases as weight increases. Typically, a 10 in^2 REA comes from a thinly muscled finished animal, and a 16 in^2 REA comes from a fairly thick and heavily muscled animal. An ideal target on finished cattle is 12 to 14 in^2 .

- The EPD that predicts ribeye area in Angus cattle is RE. RE is generated from both carcass data and yearling ultrasound data.
- Recommendations are given as percentiles or rankings of current sires in the Angus breed. Actual EPDs are in the table footnotes, based on percentiles from the Spring 2010 Angus Sire Summary.

Backfat

The CAB brand allows a maximum fat thickness of 0.99 inch, but an ideal target is 0.40 to 0.60 inch on finished cattle. While extremes can be minimized with genetic selection, fat thickness is often a function of sorting and marketing in the feedlot.

- Selection for extremely low backfat can have a negative impact on fleshing ability of daughters retained in the herd. However, it is a viable strategy when many progeny from a herd finish with more than 0.80 in.
- The EPD to predict backfat in Angus cattle is Fat. The Fat EPD is calculated from both carcass data and yearling ultrasound data.
- Recommendations are given as percentiles or rankings of current sires in the Angus breed. Actual EPDs are in the table footnotes, based on percentiles from the Spring 2010 Angus Sire Summary.

Selection Indexes for Combining Traits

The American Angus Association has developed index tools that combine EPDs, traits and economics for ease of selection. The indices are called \$ Values.

- \$ Grid (\$G) combines the three genetic traits that influence CAB acceptance rates. Its value is calculated using a 3-year average of grid premiums and discounts.
- Since marbling is the most limiting factor in CAB acceptance, you should follow the aforementioned marbling criteria in addition to using \$ Values.

Genetic Recommendations

COWHERD GENETICS: ANGUS OR OTHER ENGLISH BASE

	EPD	PERCENTILE	EPD VALUE
Marbling	Marb	Top 40%	+0.32 or higher
Ribeye	RE	Top 50%	+0.13 or higher
Backfat	Fat	Mid 80%	+0.040 to -0.018
Carcass Index	\$ Grid (\$G)	Top 50%	+19.92 or higher

**Based on percentiles from the Spring 2010 Angus Sire Summary - Current Sires*

COWHERD GENETICS: CONTINENTAL/HIGHLY CROSSBRED, MEDIUM FRAMED

	EPD	PERCENTILE	EPD VALUE
Marbling	Marb	Top 25%	+0.43
Ribeye	RE	Top 50%	+0.13
Backfat	Fat	Mid 80%	+0.040 to -0.018
Carcass Index	\$ Grid (\$G)	Top 35%	+23.68

**Based on percentiles from the Spring 2010 Angus Sire Summary - Current Sires*

COWHERD GENETICS: CONTINENTAL/HIGHLY CROSSBRED, LARGE FRAMED

	EPD	PERCENTILE	EPD VALUE
Marbling	Marb	Top 25%	+0.43
Ribeye	RE	Mid 80%	-0.12 to +0.39
Backfat	Fat	No recommendation	
Carcass Index	\$ Grid (\$G)	Top 35%	+23.68

**Based on percentiles from the Spring 2010 Angus Sire Summary - Current Sires*