

Feed Efficiency - Feed Conversion - Gaining Yield or Gaining Fat ?

In cattle, all nutrients (energy, protein, vitamins, minerals, and water) are used in a hierarchy that goes from maintenance to development to growth to lactation to reproduction to fattening.

This means that an animal must have sufficient nutrients to maintain its body before bone or muscle growth can occur, and these must occur before fattening can occur.

A young, rapidly growing animal that is building his frame will naturally put on more bone and muscle.

As an average beef animal ages, and its genetic potential for muscle growth begins to plateau, it will put on fat. The rate of fat accumulation is most rapid in the latter part of the feeding period, after lean deposition has begun to subside, which causes a decrease in the lean:fat ratio as the animals mature.

The idea has been generally accepted that marbling is the last fat that is put on, and occurs only after an animal has already put on most of its' muscle. However, recent research shows this is not necessarily the case. South Dakota State researchers (Robbi Pritchard and Kelly Bruns) have demonstrated that marbling development is an intrinsic component of growth (which external fat is not) and that marbling starts early and progresses steadily up to harvest time. Pritchard noted that compensatory growth and added days on feed *will not* increase marbling.

Research shows that Angus/Hereford cross steers reached their genetic potential for marbling at 112 days on feed. Animal growth after 112 days of a high-concentrate diet did not improve marbling or ribeye area between 112 and 168 days, *but backfat increased substantially*. [May, S. G., H. G. Dolezal, D. R. Gill, F. K. Ray, and D. S. Buchanan. Effects of days fed, carcass grade traits, and subcutaneous fat removal on postmortem muscle characteristics and beef palatability.]

It has been demonstrated that feed efficiency in feedlot cattle is moderately heritable, and thus should respond to selection. There are more than 28.5 million steers and heifers harvested from U.S. feedlots annually. Assuming averages for dry-matter conversion of 6.5, \$120/Ton feed costs, and 500 lbs of feedlot gain, a 2% reduction in feed consumption, holding all other traits constant, would provide an \$111 million improvement in net return to U.S. beef producers, each year.

Have your feed costs increased in recent years?

The trait of economic importance today is feed efficiency and feed conversion into lean meat yield.

Pound for pound of Yield - there is nothing to compare with the Piedmontese breed in the efficiency game!

Breed effects on post weaning growth and feed efficiency traits were compared on 785 F1 crossbred steers out of Angus or Hereford dams and sired by Angus, Charolais, Galloway, Hereford, Longhorn, Nellore, Piedmontese, Salers, and Shorthorn bulls at the USDA's Meat Animal Research Center in Nebraska. **Growth rate of Piedmontese-sired crosses was the fastest to the fat trim end point.**

[GERMPLASM EVALUATION IN BEEF CATTLE - CYCLE IV: POST WEANING GROWTH AND FEED EFFICIENCY: Snowden, Cundiff, Koch, Gregory - USDA]

It is a well accepted fact that it requires more energy (feed) to produce fat than to produce lean.

In Italy, the Piedmontese Bull Test collects data on young Fullblood Piedmontese bulls (all 2-copy for the Myostatin gene). The bulls are individually recorded for their own feed consumption with every pound of feed measured.

The over-all averages for feed conversion on test bulls in Italy is 5.1 lbs of total feed per 1 lb of gain, and 4.6 lbs of dry-matter feed per 1 lb of gain. [Editor's note: 2025 NAPA GrowSafe Bull Test data confirms that 22% of yearling test bulls were below 5 lbs of feed/1 lb of gain, and 56% were below 6 lbs of feed/1 lb of gain. The top individual for Feed-to-Gain posted at 4.02 which rivals F/G in pigs!]

In the US, average feed conversion is usually reported as 6.5 lbs of dry-matter feed per 1 lb of gain. Various research has found a spread of more than 9 lbs dry-matter feed/lb of gain to approx. 5 lbs dry-matter/lb of gain in US beef breeds.

Moving from 4.6 to 6.5 lbs represents a 29% difference in feed efficiency exhibited by Piedmontese.

So, it takes more feed to produce fat than lean... however, it takes more energy to *maintain* lean than to maintain fat.

The implications, then, are that the majority of commercial cattlemen in the US may be correct to select the fatter British-breed cows like Angus, Shorthorn or Herford for the sake of efficient maintenance of productive females. Feed costs can be saved with these kinds of mother cows.

The problem is that they expect these small rib-eye, high fat females to produce the feedlot animals that need to be efficient at gaining red meat yield.

Working to improve the red meat yield and reduce fat levels in British-breed bulls is being done, it is just incredibly slow because it goes against the genetic tendencies inherent in those breeds.

However, crossing these British-breed cows with the ultra-lean high yielding Piedmontese sires moves the resulting calves into "over-drive" in one cross-breeding season, as far as feedlot efficiency and yield goes !

Feed efficiency is moderately heritable, but we know that the Myostatin gene - with its profound effects on red meat yield and tenderness - is 100% heritable when using a 2-copy bull to crossbreed with non-Piedmontese cows. (A homozygous Piedmontese sire will *always* pass forward one of the genes.) The cattle researched by the USDA and reported as having the fastest gain to the fat trim endpoint, were all sired by 2-copy bulls out of non-Piedmontese cows. These crossbreds also produced the *highest yielding carcasses* of all sire groups tested in the USDA Germplasm Evaluations.

NAPA registered Piedmontese bulls are all homozygous for this remarkable Myostatin gene, and have the DNA test to prove it.

These bulls represent the best direct method of improving feed efficiency and yield in a single season, without having to change any management practices in your current cowherd.

For further information, or assistance in locating Piedmontese bulls for your commercial program, contact the North American Piedmontese Association (NAPA) at (701) 578-2547

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