



# Your Link to



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## Is it genetics or management?

You're going to a lot of effort to gather carcass data. Your motive is twofold: informed genetic-selection decisions and supporting facts to use in merchandising your feeder cattle. Order buyer statements — such as “a black coat color is not enough” or “where's the feedlot and carcass data?” — add fuel to the fire of our need to know.

If it takes information to command top prices today, as we enter an era of reduced feeder-cattle supplies, just think of what's coming five to eight years from now. The projected abundance of cattle will help drive greater differentiation between “known quantities” and commodity production.

Today's reality is that many commercial Angus producers have collected carcass data, but they have spent little time evaluating it to make the appropriate genetic changes. Granted, this is not an exact science, but an elementary understanding of heritability and carcass-trait relationships can shed some light.

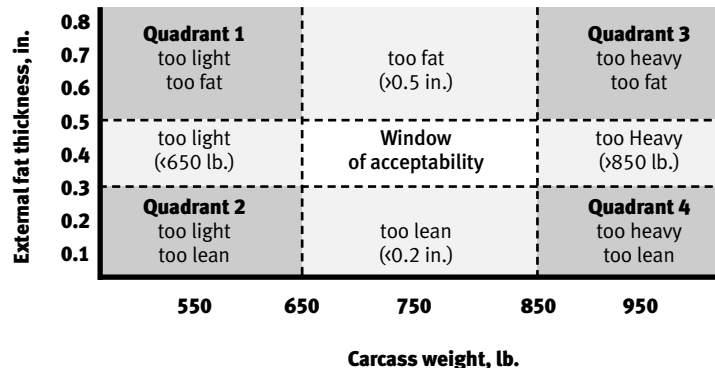
### Measure, control differences

Heritability has been defined as that portion of the differences among cattle, measured or observed, that is genetically transmitted to their offspring. It is expressed as a number that varies from zero to 1. The higher the heritability of a trait, the more accurately the individual performance predicts breeding value and the more rapid should be the response to selection for that trait.

Those beef cattle production traits that occur close to calving (such as fertility, conception, maintenance of pregnancy and calving ease) are lowly heritable and, therefore, do not respond rapidly to selection. However, low-heritability traits are enhanced through systematic crossbreeding. That's why the average crossbred commercial cow is more efficient reproductively and has greater lifetime productivity than a straightbred cow.

In contrast, production traits that occur close to harvest are more highly

**Fig. 1: Using fat thickness-carcass weight relationships to identify management strategies**



heritable. According to the spring 2001 *Angus Sire Evaluation Report*, heritability values for carcass weight, marbling score, ribeye area (REA), fat thickness and percent retail product are 0.30, 0.36, 0.27, 0.24 and 0.24, respectively. The report lists slightly higher body composition heritabilities, derived via ultrasonography, of 0.57, 0.37, 0.36, 0.37, 0.41 and 0.36 for scan weight, percent intramuscular fat, REA, fat thickness, rump fat and percent retail product.

These heritability values are considered moderately to highly heritable and, therefore, lend themselves to rapid genetic change through sire selection by expected progeny differences (EPDs). A herd of cattle that has never been selected for carcass merit will respond faster than a herd that has received intense selection pressure for some time.

### It's not all genetics

Even though we consider carcass and body-composition trait heritabilities “moderate to high,” they are not close to 1.0. That tells us the environment (such as suckling-calf nutrition, respiratory disease, feedyard nutrition, implant strategy, days on feed and weather) has a greater effect on carcass characteristics than genetics has.

Let's look at the interaction among carcass traits, using the relationship

between external fat thickness and carcass weight as an example. A carcass data summary often shows a high percentage of carcasses within a target range of 0.3 to 0.5 inch (in.) of external fat and a 650- to 850-pound (lb.) carcass weight (see Fig. 1). However, many of these summaries also show some individual carcasses falling within one of the following four outlier categories, identified as quadrants 1 through 4 in Fig. 1.

**Quadrant 1:** too light (<650 lb.) and too fat (>0.5 in.);

**Quadrant 2:** too light (<650 lb.) and too lean (<0.2 in.);

**Quadrant 3:** too heavy (>850 lb.) and too fat (>0.5 in.); and

**Quadrant 4:** too heavy (>850 lb.) and too lean (>0.5 in.).

The question becomes whether the outlier carcasses are due to inappropriate genetic selection, mismanagement or a mismatch of genetics to environment. Let's discuss each quadrant separately.

### Too light, too fat

This is mainly a genetics challenge wherein the cattle have insufficient frame and growth potential to be managed as calf feds, but such cattle were pushed too hard too early in life on high-concentrate rations.

Possible solutions would be to use larger-frame bulls or to grow the cattle

on “cooler” rations for a few months prior to finishing. Producers who seek lower-input, later-calving cow systems may have to consider backgrounding calves their first winter, grazing them as yearlings the first half of their second summer, then finishing them in the fall. However, multilocation research says you risk depression in quality grade by not activating adipocytes (fat cells) earlier in life.

### **Too light, too lean**

This is not a genetics challenge. The cattle simply were harvested too soon to express their genetic potential. Chances are that the cattle also did not have an opportunity to express their maximal marbling scores and lost opportunities to capture quality premiums. The outliers in this quadrant may be the youngest in the pen. Overall, from an economical standpoint, market conditions (high cost of gain, falling cattle prices) occasionally merit premature harvest.

### **Too heavy, too fat**

We have seen a few of these in recent years. This is not a genetics challenge

so much as it is an information challenge. These cattle simply were fed too long for what they are.

Iowa State University analyses of 100,000 Certified Angus Beef LLC (CAB) carcass records suggest it is counterproductive to feed the wrong kind of cattle for a high-quality end point.

Yes, market forces sometimes support overfeeding cattle. What’s the rush with cheap grain, wide Choice-Select price spreads, strong grid premiums for the *Certified Angus Beef*® (CAB®) brand and Prime, and high replacement feeder-cattle prices? However, carcass discounts resulting from Yield Grade (YG) 4s far exceed premiums. From an industry perspective, these cattle add more tonnage of the kind that makes us less competitive with alternative protein sources.

### **Too heavy, too lean**

This is a genetics challenge. The cattle simply have too much frame to finish with sufficient fat thickness and marbling to hit the window of acceptability. Yes, some of these

carcasses come from extended backgrounding programs wherein the wrong kind of cattle went through a stocker phase instead of being more appropriately handled as calf feds and harvested at a lighter weight and younger age.

### **Sort it out**

Sorting cattle prior to feedlot entry and sorting at reimplanting or at some other point while on feed can go a long way toward the elimination of outliers. Perhaps the most responsibility lies with the cow-calf producer, over time, to create a more uniform calf crop through the use of “like kind” genetics and a defined 60-day breeding season.

If carcass characteristics are part of your selection program, there are no better genetic selection tools than the carcass- and ultrasound-derived EPDs. However, it’s not all genetics. Cattle from intensive carcass-trait-selection programs must be managed properly to capture their full value.

