

Look to genetics for marbling indicators

By Jennifer K. Ryan

Some fat cattle may be just, well, fat.

New research shows that using the amount of external fat as an indicator for marbling isn't the most accurate sign of carcass quality.

By using genetic selection to emphasize marbling traits, producers can achieve minimum carcass fat with an immense amount of marbling, notes John Brethour, Professor at the Kansas State University Agricultural Research Center in Hays, Kan.

"Fat and marbling is an 'either/or' relationship," Brethour says. "Feeding more energy than you need for the maintenance generates fat, and the genetics of the animal indicates where the fat goes. Marbling is about 90% genetics."

While Brethour notes that a longer feeding period can enhance marbling, but it's a slow progression that must begin with a genetically capable animal.

"You can't make something out of nothing," Brethour says. "There are cattle that won't grade Choice no matter how many days you feed them."

In a recent study including 10 pens of cattle, with an average of 27 animals per pen, Brethour notes that there was no correlation between average backfat thickness and gain per kilogram of dry matter (DM) intake, i.e., feed efficiency. Correlations between average backfat thickness and ADG or DM intake were also nearly zero. Furthermore, carcass backfat thickness was a poor predictor of carcass marbling score even though backfat thickness was an important predictor of percent empty body fat.

According to the study's results, there is little relationship between body composition and marbling score, which is contrary to models that assume a USDA quality grade target at a specified percent fat endpoint. In addition, the results show a measure of backfat thickness on the live animal during the finishing phase is not an effective predictor of future feed efficiency.

Dan Faulkner, Professor of Animal Sciences at the University of Illinois at Urbana-Champaign, says his research confirms there is little correlation between backfat and marbling. However, his research has shown a relationship between days on feed and backfat.

Simply put, Faulkner says that while any cattleman can tell you that days on feed influences backfat, there is little evidence to show that backfat can be used as a good indicator of the amount of marbling present.

He notes that proper nutrition greatly influences an animal's marbling score.

"We can feed byproducts to cattle and achieve the same rate of gain as cattle on high-grain diets. We can get the backfat deposited, but not get the marbling deposited," Faulkner says. "The No. 1 determinant of quality, in our research, is the number of days the cattle are on a high-grain diet. An average animal gains about one marbling score every 100 days on a high-grain diet."

Faulkner notes that early weaning or creep feeding can get cattle on feed earlier and help achieve a higher rate of gain - without depositing excessive amount of fat. On the other hand, poor management can reduce an animal's marbling score.

"If you take cattle off a high-grain diet, you lose that marbling," Faulkner says. "If they get sick, there's usually a one quality grade difference. The cattle are off feed and not getting the rate of gain needed."

Different genetics will marble differently, Faulkner says, but all types of genetics will increase marbling if placed on a high-grain diet

"Every group of cattle may be different just because of their genetic ability," notes Kelly Bruns, Ph.D., Assistant Professor of Animal Science at South Dakota State University. "Our research would show that the longer you fed cattle, the fatter they became, but that didn't necessarily relate to their ability to obtain a higher marbling scores. Certain individual animals wouldn't necessarily get higher up on the marbling line than other steers in their contemporary group."

The most important determinants of beef carcass value are external fat content and marbling. External fat lowers value while marbling increases value. Dr. Bruns notes the cattle industry is beginning to realize there is a weak relationship between these variables.

Learning how and when marbling develops is a key component to commercial use of such research, Bruns says.

An old school of thought was that marbling is a late-developing trait tissue. Research conducted by Bruns and colleagues at South Dakota State University revealed that marbling develops at a fairly constant rate throughout an animal's life, contrary to what has been assumed for many years. The research was conducted over a two-year period and involved approximately 90 purebred Angus steers, slaughtered at carcass weights ranging from 460 to 838 lbs.

The key to producing a carcass with minimal external fat and maximum marbling is to match genetics to an optimal slaughter point, Bruns notes.

"Marbling is a continuous process and can be hindered due to improper management practices early in a calf's life," Bruns says. "We tested that theory by administering a high potency implant early in the finishing phase of production, which resulted in decreased marbling scores versus if we delayed administration of the same implant. How you manage cattle in the first 30 to 50 days in the feedlot is very critical relative to marbling

development. Any stresses that impede dry matter intake, growth or average daily gain within the first 30 days may have an adverse effect on marbling development. Our research would indicate that different groups of cattle maximize marbling development at different levels of carcass fatness.