A Proven Path

Good things can happen when marbling leads trait selection.

by Steve Suther, Certified Angus Beef LLC

It's OK to try this at home — 23 years of focused selection for marbling in an Iowa State University (ISU) Angus herd turned up no ill effects. Just good, maternal cows, better replacements and steers that should work well in the value-based market.

Dan Loy shares insight on Iowa State University's Angus herd built on marbling.

ISU sells cattle on a grid, and premiums support profit as 95% of the finished cattle now have the marbling required for the *Certified Angus Beef*® brand, with nearly 60% Prime and yield grades of 3 to 3.5. That's after daily gains of 3.7 pounds (lb.) and feed conversion ratios better than 6 to 1 last year. Other traits hover around Angus breed average in McNay Farm's 400-cow herd near Chariton, Iowa.

That's according to veteran ISU animal scientist Dan Loy, whose team recently authored a white paper based on a literature review and case study of historic data from that herd, "The relationship between carcass merit and maternal traits in beef cattle," (see sidebar).

Well studied

Three years after the university bought its first Angus heifers from Nebraska and South Dakota herds in 1996, a series of literature reviews began to explore trait correlations to marbling. Their steady consensus was that marbling selection has virtually no link to other traits.

"We know that single-trait selection has gotten the industry and several breeds into trouble several times in history," Loy says. "But in this herd, cattle are still culled on functionality. For most of the traits other than marbling (nearly double the Angus average), we are pretty much average. That says we can stay with the breed and still make faster progress in this one trait."

In the late 20th century, cattlemen were skeptical of selection for marbling. And after the first National Beef Quality Audit in 1991, the industry literally declared "War on Fat," both the external and intramuscular kind.

"The industry was not sure we needed to increase marbling at all," Loy recalls. Depending on how producers market their calves, some of that skepticism remains; although the industry consensus now agrees on the need for marbling.

The right direction

Early data on the ISU herd showed "some challenges with cows falling out," he says. "We wanted to see if that was related to selection for marbling, but did not find that. We're working on that from the management side now, and making some progress."

Where Loy's group did find correlations to marbling, they would be considered good news, such as the 5% positive link to greater heifer pregnancy (HP).

"If anything, the maternal traits are aided by selecting for marbling," the researcher says. Calving intervals are slightly shorter as marbling increases. "All of the changes, however small, are in the right direction."

Table 1: ***Percentage of carcasses from the ISU McNay Breeding Project herd grading Prime, Choice and Other by birth year***

Year	Total harvested	Choice and higher, %	Premium Choice & higher, %	Prime, %	Select and Standard, %
2014	146	97.3	73.3	26.0	2.7
2015	169	98.2	87.6	44.4	1.8
2016	204	92.6	84.3	45.1	7.4
2017	238	98.3	91.6	56.3	1.7
2018*	100	99.0	93.0	57.0	1.0

*Includes only steers born in the Spring 2018

New research doors

The unique herd characteristics are opening more doors to research, starting with internally generated breeding bulls. Those allowed tracking scrotal circumference (SC) expected progeny differences (EPDs), just above breed average with a slight positive correlation to marbling. If anything, selection for marbling leads to more potent bulls, "but I'll call it neutral because the relationships aren't large," Loy says.

Studies show the old marbling paradigm on fat deposition, "last in, first out," may not be valid.

"I wish there was more data with cows," Loy says. "We are starting to look at it in different stages of nutrition and condition. When a cows goes from a body condition score (BCS) 5 to a 3, does that come from the marbling and other fat deposits equally? We know a lot more in the feedlot, and there marbling is not the last fat to be deposited. Maybe it just starts sooner for all cattle. Those are some things we're still learning."

Another new opportunity comes from joint projects with the Iowa Beef Checkoff to look at appropriate use of technology.

"How much tech can we use without messing up this grading potential, and how much profit might we give up by removing it? I'm concerned feeders may give up more than the premium pays, and we need to know where those boundaries are," Loy says.

Last year showed little difference in grade whether calves went directly on feed or started with 70 days in a backgrounding program with varied timing of growth implants.

Balanced technology

"There wasn't much difference between the groups, but they all averaged 65% Prime," Loy reports. A second year of exploring technology use with the cattle started in January, featuring groups with no implant, conservative and aggressive, and varying energy in the rations.

Yes, the McNay Farm Angus cows are in a research herd.

"Our job is to try things the average breeder wouldn't be comfortable with and see what happens," he says.

Built-in marbling

But look at what's happening. Are there any red or even yellow lights on the road to elite marbling?

"We don't know, but if you can go too far, I don't think we're there yet," Loy says. The herd average EPD for marbling last year was 1.065, compared to 0.58 for the Angus breed. "We're still maintaining the other traits, still performing in the feedlot. Conversion, cost of production — nothing is out of line, and you wouldn't notice anything unusual when you look at their phenotype."

Under the hide, Loy still looks on in wonder when serial harvest or ultrasound shows another calf that could grade Choice at weaning, another cow with Prime marbling at calving time. It's built in.

Can the development or purchase of such a herd support a business plan in the commercial cattle world?

"Yes, if you can capture the value, given the Prime premiums available today and where the industry seems to be going with higher value products sold," Loy says. "But if you sell calves at weaning and don't capture the value or even the information, the only person who will get the reward is the final owner of those cattle." AJ

Leading up to ISU herd data analysis

Genetic improvement in beef cattle means jumping hurdles or "antagonisms" among the traits.

When animal scientist Dan Loy signed on with Iowa State University (ISU) as a feedyard specialist 40 years ago, he brought along a commercial Angus background. Best practices for the herds supplying feedyards then were crossbreeding and balanced selection for maternal and growth traits.

Stockmen had to use single-trait "heifer bulls," because there weren't many bulls with calving ease along with growth. If anybody paid attention to marbling, they probably noticed some bulls above average there had little else to recommend them.

Science charted and measured the antagonisms for decades, and the *Certified Angus Beef*® brand sponsored a literature review at Kansas State University (K-State) in 1999, updated in 2007. That was revisited by researchers at Virginia Tech in 2013. The consensus has always found little or no correlation between marbling and other traits.

That lack of correlation says marbling, maternal function and growth should all fit together in the same cow.

Before those studies, in 1996, Loy and ISU began gathering data on calves from the University's two Angus herds, built on either marbling or ribeye emphasis. Early on, results were not much publicized and after six years, the ribeye herd was discontinued.

It took many years to build up enough volume to achieve significance in data from the McNay Farm herd near Chariton, Iowa. But that time has come with the white paper's publication, now available online at *www.cabcattle.com/about/research/relationship-between-carcass-merit-and-maternal-traits-in-beef-cattle.*