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NEWS

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Photos at: <http://www.cabpartners.com/news/photos/tatum005.jpg>
<http://www.cabpartners.com/news/photos/BradJohnson.jpg>

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Symposium covers marbling from all angles

Marbling can be fickle. Everything, from genetics to growth technologies and production systems, affects the way and how much intramuscular fat cattle will express.

This summer an American Society of Animal Science (ASAS) symposium focused on getting the most meat quality with maximum efficiency.

Daryl Tatum, Colorado State University (CSU), began by citing advantages and disadvantages of implants and beta-agonists.

“Growth technologies are among the most effective management tools available to beef producers for adding value to cattle,” he said. According to Iowa State University, implanting feedlot cattle can add \$71 per head; ionophores, beta-agonists and animal health products can increase that figure another \$84.

“That boost in value doesn’t always come without a cost,” Tatum said, noting beef quality often slips with the misuse of many such products.

Tatum shared a meta-analysis of 25 steer implant studies (see Table 1) that showed a single mild dose increased hot carcass weight (HCW) 23.6 pounds (lb.), but dropped marbling score 28 points. Moderate implants added an additional 18.7 lb., while decreasing marbling just another 4 points to a total reduction of 32 points. For another pound of gain, aggressive implants knock marbling scores back 35 points.

“It appears moderate implants are the best choice for balancing growth and carcass quality grade,” he said.

In heifers, giving TBA alone seems to make the most sense. A recent CSU study showed that, compared with estrogen + TBA, use of single-ingredient TBA implants in heifers fed MGA resulted in similar carcass weights, but significantly higher percentages of heifers grading Choice and Prime (62% vs. 50%) and qualifying for the Certified Angus Beef® (CAB®) brand (29% vs. 13%).

Quality compromises associated with misuse of growth technologies should be of concern to the industry, Tatum explained: “Great taste remains the primary reason consumers often make beef their

food of choice for a pleasurable dining experience. The goal is to take advantage of the benefits of growth enhancement without detriment to beef demand.”

The flavor driver, marbling, interacts with growth at the cellular level, according to Bradley Johnson, Texas Tech University.

Implants alter the expression of adipogenic genes, the precursors to marbling. Research looked at the relative abundance of genetic markers when cattle were given estradiol (E2), TBA or TBA-plus-E2 implants.

“A combined TBA/E2 implant significantly reduced expression of key genes important in marbling development the first 28 days following implantation,” Johnson said.

Stepping outside the animal, Ivan Rush, University of Nebraska, discussed a system that could produce higher quality and greater efficiencies without a change in technologies.

“Input costs like corn, time and labor, along with the Choice/Select spread, determine which is the best route,” he said, “but early weaning seems to increase quality, especially in the Premium Choice arena.”

Rush evaluated several studies comparing early-weaned to conventional calves and yearling systems. In general, early weaning:

- Improves reproduction rates
- Increases profit per calf (more than \$100/calf in an Oklahoma study)
- Consistently improves quality grade
- Improves feed efficiency when compared to yearling systems
- Has little effect on carcass weight
- Improves cow body condition significantly

Mark Enns, CSU, talked about selection for marbling. Since it is highly heritable, at .4, producers can make significant progress.

“How much do you have to change your average marbling score in cattle to go from producing 60% to 80% Choice and higher? he asked.

A 20-point increase in marbling score raised grading percentage by 10% or more. He shared a chart showing the changes from 50% to 90% Choice and higher (see Table 2). The amount of genetic change (measured in genetic standard deviations) required to jump from 50% to 60% is much smaller (.38) than going from 50% to 90% (1.91). Their model shows a change of 1.91 genetic standard deviations moves the mean marbling score one full USDA quality grade.

Making that improvement means more dollars on the bottom line.

“There is value in increased marbling,” Enns said. “The calculations show that as you turn the herd over, you’re making about \$218 more per replacement back into your herd.”

Even though it’s demanding—the right conditions, nutrition and genetics are required to boost marbling—it builds demand for beef. The scientists agreed marbling is worth the focus for individual economics and greater sustainability for the industry.

TABLE 1

Effects of a Single Finishing Implant on Steer Carcass Traits

Potency	HCW, lb.	Marbling Score, pt	Ribeye area, cm ²	Fat thickness, cm
<i>Difference from NI Control</i>				
Mild	23.6	-28	2.8	0.02
Moderate*	42.33	-32	3.8	0.04
Aggressive	43.65	-35	4.6	0.05
Mean effect	38.8	-32	3.9	0.04
SEM	2.13	4.1	0.36	0.017
Mean effect > 0	<i>P</i> < 0.001	<i>P</i> < 0.001	<i>P</i> < 0.001	<i>P</i> = 0.032
Potency effect	<i>P</i> = 0.094	<i>P</i> = 0.801	<i>P</i> = 0.080	<i>P</i> = 0.552

TABLE 2

Changes in Net Merit (\$)

% Choice and Higher	Increase in Marbling Level	Change in Net Merit API 2006	Change in Net Merit API 2007
50	0.000	\$ -	\$ -
60	0.196	\$ 5.02	\$ 44.03
70	0.406	\$ 10.28	\$ 90.26
80	0.652	\$ 16.30	\$ 143.10
90	0.992	\$ 24.83	\$ 217.95
Net 50-90	0.992	\$ 24.83	\$ 217.95