



WASHINGTON STATE  
UNIVERSITY  
EXTENSION



## BEEF TENDERNESS

### In Search of the Perfect Steak

#### BY THE NUMBERS

- 5 cooperating producers participated.
- Project included 350 cattle over 12 years of data collection.
- 66% of grass-finished beef is considered "tough."
- 25% of commercial beef is considered "tough."
- American Beef Council reports a guaranteed tender product is worth an additional \$352 per carcass. (2008)

### 2016

#### ISSUE

American beef is of high quality, but tenderness is a concern. In national studies "grass-fed" beef is considered tough 66% of the time by consumers. Additionally, consumers believe "normal" beef is less than desirable tenderness 23% of the time. Tenderness is ranked as one of the top concerns, if not the top concern, of the American Beef Industry.

#### RESPONSE

Using DNA marker technology, Frank Hendrix tested and then researched bull bloodlines to find several bulls with the highest tenderness ranking of T=10. These bulls are uncommon and it took three years to find the first one.

Hendrix developed a team of cooperating producers and bred (artificially inseminated) 350 of their cows to T=10 bulls. He retained heifers testing T=8, T=9, or T=10 for six years to produce animals to test. The normal cow (T=3 or 4) when bred to a T=10 bull would produce calves with higher "T" tenderness values, but it was necessary to produce several generations before T=8, 9, and 10s were consistently produced for testing. A group of high tenderness ranking steers were born and managed with their herd mates according to the best management practices of the American Beef Industry. This group of cattle was raised on irrigated pasture until they each weighed 900 pounds. They were transferred to a commercial feedlot, finished to harvest weights (1,300 pounds), and harvested at a commercial facility under USDA supervision.

Matching 12th rib steak samples were taken from all animals, identically cooked, and tested for tenderness using the Warner Bratzler shear force machine.

The results showed a significant difference ( $<0.01$ ) in tenderness between normal American beef (T=3, 4) and the selected tender (T=8, 9, and 10) beef. The project showed tenderness to be an inherited trait and that the ranking method was 99% accurate. The technology is specific, accurate, cost effective, and makes a significant difference in beef quality. DNA marker use enhanced beef quality and guaranteed tenderness independent of beef breed, method of finish, or fat levels in the carcass.



## QUOTES

"From our prospective, tenderness is the largest problem in the beef industry. [Frank Hendrix's] research has the potential to completely eliminate the tenderness problem." - *Washington Beef Inc. management*

"By using AI sires in this project we have ensured a high level of phenotypic quality in the selected cattle." - *Cooperating producer*

"After trying a T-8 locker beef, all future locker beef is going to be DNA tested." - *Cooperating producer*

"Since being involved in this study, I've been spoiled. I rarely buy restaurant beef anymore; it's a disappointment compared to my beef at home." - *Cooperating producer*

## IMPACTS

The project showed guaranteed tender beef is an inherited trait that is significantly different and superior in quality ( $<P0.01$ ), from normal American beef. Tenderness can be ranked accurately (99%) using DNA marker technology with a small sample from each animal. Producers can and should select breeding stock for superior beef tenderness.

Economic analysis indicates a guaranteed tender animal retains more than a \$300 market benefit over the average beef animal. Less feeding time is needed to finish the animal, less fat is needed to produce a quality product, and tenderness concerns are eliminated by using the DNA marker technology. The use of DNA markers as an aid to augment beef tenderness and beef quality is rapidly expanding. When fully adopted, Washington beef cow/calf producers will benefit approximately \$75 million annually as a direct result of these basic studies and findings. Guaranteed tender animals entering the feedlot to be finished will need 80 to 90 fewer days in confinement and on high-energy feed to produce a high-quality product. This will result in an estimated savings of \$320 per animal, or approximately \$900 million in Washington. Additionally, a significant amount of fat per animal will not be necessary to produce the same high-quality product. This is of significant financial importance (billions of dollars nationwide), but Hendrix has not been able to estimate the exact figure. The USDA grades will not be as important to quality. A lean beef steak will be as tender and as high of quality as a USDA prime-graded beef steak.

Funding for this fifteen-year study came from the Yakima County Cattlemen's Association, indirect cooperating producers, and out of pocket.