

UF-Gainesville Beef Cattle News Corner

Hump height and tenderness – are they related?

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A month ago, I had the pleasure to host Rachael Cruwys for one day, a breeder of Brahman cattle in Queensland, Australia. Rachel was awarded a Winston Churchill Fellowship to pursue her interest of improving the genetics and domestic marketability of Brahman cattle in Australia. Rachel visited the United States starting in Houston for the Livestock Show, toured stockyards and feed yards in both Oklahoma and Texas, met with Ashley Hughes from American Brahman Breeders Association, and spend several days in Florida with George and Henry Kempfer, visited with Jimmy Chapman, Deseret Ranch, and Larry Barthle.

I spent one day with Rachel and her family showing them around the Department of Animal Sciences here at UF, our research and teaching beef units and talking about the research many of our faculty are conducting on Brahman and Brahman influenced cattle. Rachel was particularly interested in increasing awareness among seedstock and commercial producers about the availability of genetic information and how best to utilize it to increase the quality of the Australian Brahman herd holistically, enabling it to better meet the current consumer expectations of quality beef. This is also at the center of my research program because I strongly believe the ability to deliver a consistently superior quality product is important if beef industry is to maintain and expand its share of the market. These issues are of particular importance for Brahman and Brahman crosses as they are routinely penalized for relatively low marbling score and perceived inferior tenderness. A sustainable strategy to address these issues is via the development of effective selection and management genomic tools.

Rachel told me about a recent decision of Meat Standards Australia (MSA), which was developed by the Australian red meat industry to improve the eating quality consistency of beef and sheep meat. MSA decided to update their standards to include hump height as a “direct predictor” of tenderness, and therefore of quality. We discussed the extensive data Dr. Dwain Johnson and Dr. Mauricio Elzo collected over the years on the UF Brahman and Brahman crosses, data which includes hump height and tenderness. I decided to use our historical data to provide Rachel with arguments for the lack of a direct relationship between hump height and tenderness. I also think this is important for our Florida beef producers.

To analyze the relationship between the hump height and both marbling and degree of tenderness, I used 1,598 animals from the Angus-Brahman multibreed herd (cattle spanning the range from 100% Angus to 100% Brahman) developed at the University of Florida Beef Research Unit (BRU). All 1,598 had hump height and marbling measurements but only 1,230 had tenderness measured by Warner-Bratzler shear force. The WBSF is an objective measure of tenderness and it measures the force required to shear a cooked steak (in kg) – the lower the number, the less force is required to shear the steak indicating a more tender product. In this dataset, 286 animals were purebred Brahman.

Figure 1. Tenderness measured by Warner-Bratzler shear force (WBSF) across hump height (cm) in UF multibreed cattle (n = 1,230; from 100% Brahman to 100% Angus). Hump height had no effect on WBSF ($p = 0.7$; correlation = 0.04).

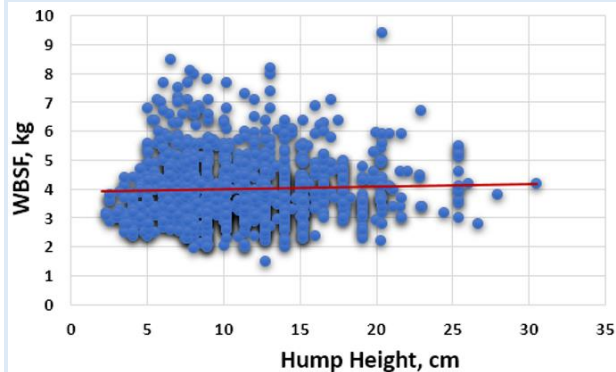
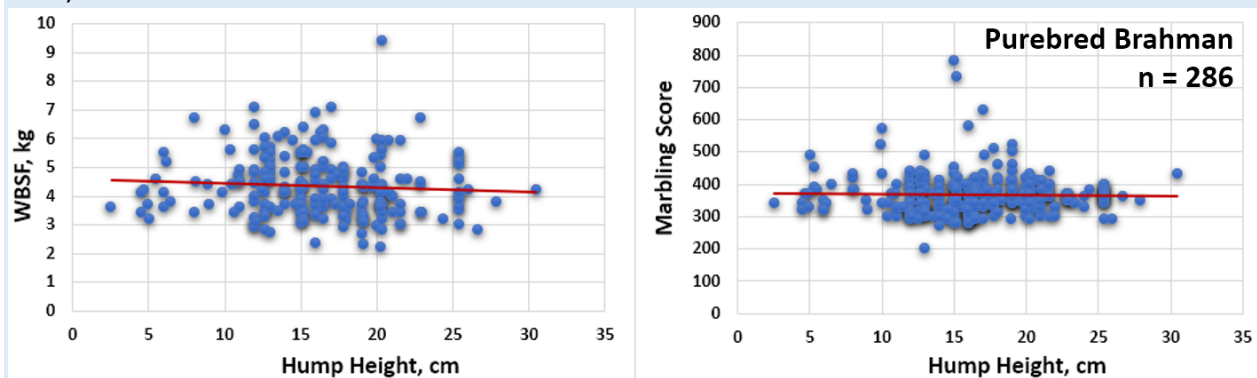
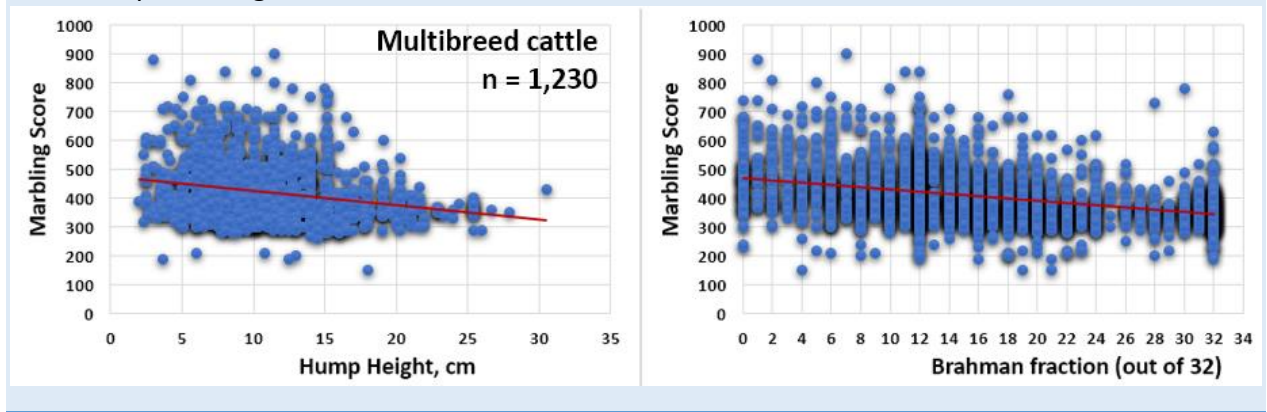


Figure 2. Tenderness measured by Warner-Bratzler shear force (WBSF) and marbling score across hump height (cm) in UF Brahman cattle (n = 286). Hump height had no effect on WBSF ($p = 0.9$; correlation = -0.07), and no significant effect on marbling score ($p = 0.07$; correlation = -0.02).



There are two main take-home messages in these data: 1) variation in tenderness (variation which is present in both the multibreed and pure-bred Brahman population) is not related to hump height; and 2) marbling score is not a good indicator of tenderness. There is a trend in the marbling score to decrease as the hump height increases in the multibreed population ([Figure 3](#)), but this trend is really related to the percent of Angus genetics not the actual hump height. This is not surprising as we know that Brahman animals will tend to have less marbling than Angus cattle.

Figure 3. Marbling score versus hump height (cm) in UF multibreed cattle (n = 1,230; from 100% Brahman to 100% Angus) and Brahman fraction (0/32 to 32/32). While there is a low negative correlation (-0.23) between marbling score and hump height this is completely due to the Brahman percentage.



Programs to improve eating experience when consuming beef and the ability to better predict the eating quality level for marketing purposes are critical to increase consumers' confidence that quality expectations are met. Collection of tenderness data on a routine basis is difficult and expensive because it requires collecting rib-steak samples, ageing, cooking, coring, and shearing steaks. This makes improving this trait through traditional selection more difficult and genomic selection appears the only practical route to make significant genetic improvement. Our research will generate genomic information, which can be used to develop effective selection and management genomic tools and will offer the opportunity to improve tenderness in Brahman influenced cattle. Improving eating experience will benefit the economic position of the beef industry through improved demand for beef products.