

UF-Gainesville Beef Cattle News Corner

Using genomics to beef up meat quality in Brahman influenced cattle

Raluca Mateescu, Department of Animal Sciences, University of Florida

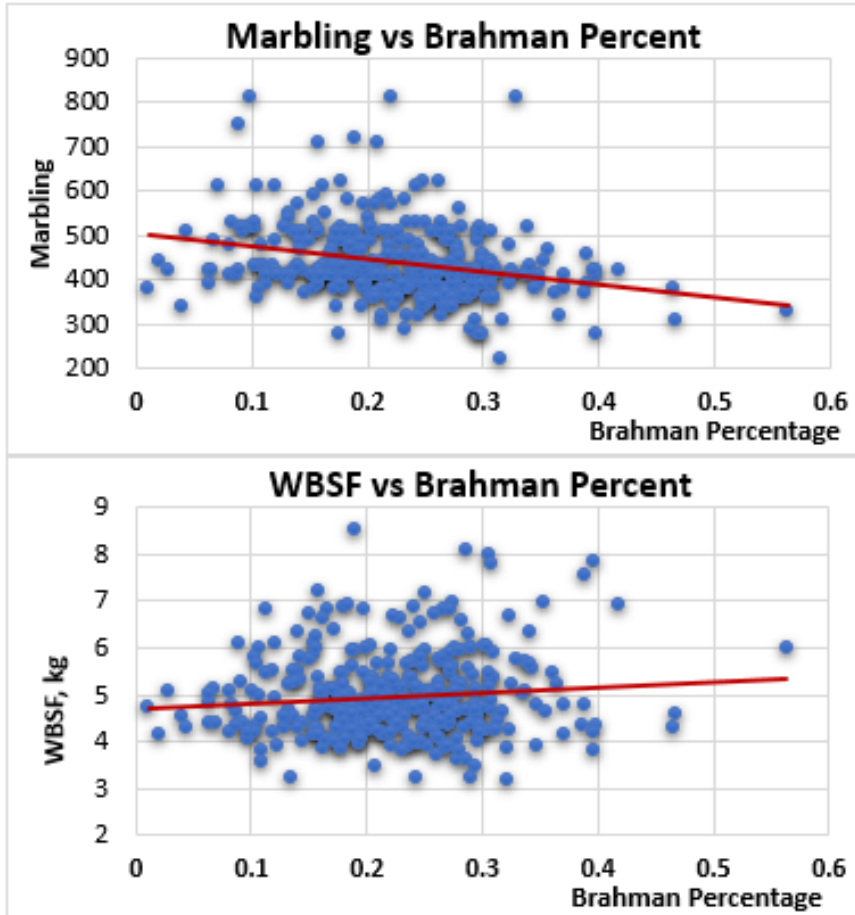
Beef product quality is a top priority for beef industry - because it has a great power to influence demand and also because the beef industry has the ability to improve it. Great effort was dedicated to understanding how consumers perceive beef quality and all studies point out that the strongest quality attributes are tenderness, juiciness, and flavor, followed by healthiness and nutritional value. These issues are of particular importance for Brahman and Brahman crosses as they are routinely penalized for inadequate tenderness and relatively low marbling score.

A couple of year ago a proposal entitled “Using genomics to beef up meat quality in Brahman influenced cattle” was funded through the Florida Cattlemen Enhancement Fund. The funding allowed for tenderness (Warner-Bratzler shear force, WBSF) analysis and genotyping (250K SNP chip – assay analyzing 250,000 genetic markers) of 340 steaks. The animals were part of a large resource population developed at University of Florida which consists of more than 1,500 Brahman-influenced steers with carcass quality, healthfulness and nutritional value measurements already recorded.

The genotypic information allowed us to estimate genetic parameters (heritability) which is not otherwise possible in the absence of pedigree information. Heritabilities measure the magnitude of the genetic component contributing to these traits and are important parameters in understanding the effectiveness of future genomic evaluation and selection programs – traits with high heritability could be improved dramatically through selection. Heritability of carcass and meat quality traits were very high (e.g. 0.58 for marbling, 0.45 for ribeye area, 0.49 for yield grade), moderate for tenderness 0.29. These preliminary results indicate a large portion of the phenotypic variation due to the additive genetic variation which would translate in high accuracy genomic selection programs for these traits.

The genotypic information also allowed us to estimate the exact breed composition. This was estimated based on statistical procedures developed in our research group. The relationship between breed composition and marbling and tenderness (WBSF) was investigated in the 340 steer group (**Figure 1**). There is a significant decrease in marbling score with the increased Brahman percentage, and a similar trend but of lower magnitude is observed for tenderness.

Figure 1. Breed composition effect on marbling score and tenderness (WBSF, kg) in a group of 340 Brahman-influenced steers. Breed composition was estimated based on 250K genotypes. There is a significant decrease in marbling score with the increased Brahman percentage. While a similar trend but of lower magnitude is observed for tenderness, there is also a lot of variation in the degree of tenderness across the entire range of breed composition.



As previously shown in other smaller populations, there is substantial variation in tenderness across all quality grades. Because the beef industry is currently using the USDA grading system to determine premium and discounts, *Bos Indicus* influenced cattle are routinely penalized for relatively low marbling score. About 30% to 40% of the variation in tenderness is due to genetics (based on the heritability estimated in this small group of 340 animals, about 29% of the variation in tenderness is due to genetics). Recent developments in genomics paves the way for making significant improvement in tenderness via genomic selection and offer opportunities for marketing of cattle on the basis of tenderness. Genetic markers discovered in other populations (Angus) are not informative in *Bos indicus* influenced populations. To adopt this technology, producers need population/breed specific information on the value of genetic testing and our project will provide this information for Brahman influenced cattle.

For more information, please contact Raluca Mateescu directly by email/phone or visit the website: <https://www.ralucamateescu.com/>