

Selecting *Bos indicus* and Crossbred Beef Cattle for Meat Tenderness

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Tenderness influences meat price and consumption and impacts on the cattle industry. *Bos indicus* animals often produce less tender meat (Pringle *et al* 1997), yet they are prominent in Australia and Brazil for adaptability to tropical conditions. Selection of *Bos indicus* and their crosses for meat tenderness is feasible, as shear force value lower than 5kg has been reported for the Nellore (*Bos indicus*) genotype. Today, gene markers can assist cattle selection. Genes encoding calpain (CAPN1) and calpastatin (CAST) were chosen for marker development in light of their importance for postmortem tenderization (Delgado *et al* 2001). The predictive value of available markers within *Bos indicus* and their crosses has been challenged, and additional markers will benefit the beef industry (Casas *et al* 2005).

The effects of 2 markers for tenderness and rib eye area were tested. The genotype of markers *CAPN1/PsyI*, also known as *CAPN530* (Rincon and Mendrano, 2006) and *CAST/XmnI* (Chung *et al* 2001) were determined in 102 males. The genetic sub-groups were Nellore 1 (15 month), Nellore 2 (19 month), Nellore 3 (17 month), Charolais x Nellore (15 month), Rubia Gallega x Nellore (15 month), Brangus Three-way cross (15 month) and Braunvieh Three-way cross (15 month). All animal groups were slaughtered in the same abattoir; meat processing was the same for all. Shear force 7 days aging, myofibrillar fragmentation index and rib eye area were fitted using the GLM procedure (SAS) and the least square means were compared.

Table 1. Means and Standard Error Deviation of the meat traits within genetic sub-groups and genotypes

Genetic sub-group	SF (kg)	MFI	REA (cm ²)
Nellore 1 (n=11)	4.55±1.28 ^B	62.00±13.25 ^{AB}	64.90±4.99 ^C
Nellore 2 (n=11)	5.59±1.03 ^A	52.04±10.79 ^A	70.64±8.29 ^{BC}
Nellore 3 (n=24)	3.77±0.62 ^{BC}	76.68±20.69 ^B	65.33±7.18 ^C
Charolais x Nellore (n=23)	3.68±0.65 ^{BC}	65.13±13.75 ^{AB}	79.98±9.46 ^{AB}
Rubia Gallega x Nellore (n=10)	3.83±1.27 ^{BC}	67.14±18.99 ^{AB}	62.90±7.56 ^C
Brangus Three-way (n=18)	2.98±0.40 ^C	76.07±19.60 ^B	75.45±7.29 ^{AB}
Braunvieh Three-way (n=15)	3.21±0.46 ^C	62.41±13.66 ^{AB}	74.65±3.16 ^{AB}
Markers' Genotypes	SF (Kgf)	MFI	REA (cm ²)
<i>CAPN530</i> AG	3.78±1.01	67.72±17.22	69.77±11.50
<i>CAPN530</i> GG	3.77±0.96	69.63±18.16	68.08±91.96
<i>CAST/XmnI</i> AA	3.81±1.00	70.66±17.65 ^a	68.34±94.77
<i>CAST/XmnI</i> AB	3.93±1.04	63.44±15.49 ^b	68.93±10.57
<i>CAST/XmnI</i> BB	4.02±0.84	68.41±19.28 ^{a,b}	69.51±10.20

SF = shear force after 7 days aging; MFI = myofibrillar fragmentation index; REA = rib eye area; n= number of animals ^{A, B, C} Differences between genetic sub-groups within each meat trait (P< 0.05). ^{a, b} Differences between genotypes within each meat trait (P< 0.05).

CAPN530 and *CAST/XmnI* segregated equally in all genetic sub-groups. For *CAST/XmnI*, allele frequencies were: B (31%) and A (69%). For *CAPN530*, allele frequencies were: G (75%) and A (25%). Genotype *CAPN530* AA had low frequency (10%) in the total sample and very low (2%) in Nellore animals, so it was not included in the analysis in order to avoid unreliable results. The results showed no associations between meat traits and the *CAPN530*. But, the AA genotype of *CAST/XmnI* was superior to AB when comparing MFI, indicating possible value for beef tenderness selection. Further research is need to validate results before using this novel marker for selection of *Bos indicus* and crosses.

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