



Heterosis effects on beef sensory and leather quality traits

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Characterization Of Breed-Specific Additive And Heterosis Effects On Beef Sensory And Leather Quality Traits

Industry Sector: Cattle And Small Stock

Research Focus Area: Research Animal Products, Quality And Value-Adding

Research Institute: ARC-Animal Production Institute Northern Cape Department Of Agriculture, Land Reform And Rural Development And University Of The Free State

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The Research Team

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Year Of Completion : **2017**

Aims Of The Project

- To characterize the maternal and paternal heterosis effects on sensory beef traits
- To characterize the maternal and paternal heterosis effect on leather traits

Executive Summary

The project had two objectives, namely to estimate direct and maternal breed effects and heterosis contributions for Afrikaner (A), Simmentaler (S), Brahman (B), Charolais (C) and Hereford (H) on sensory carcass traits and leather traits.

Sensory carcass traits

Five sensory traits (tenderness, juiciness, aroma and flavor and residual connective tissue) and two physical meat traits viz shear force (N/2.5cm²) and cooking loss (%) were investigated. Data (N=375) arising from 5 straightbred and 24 crossbred combinations were modeled by multiple regression of the phenotypes on expected breed proportions and heterozygosity.

Only direct effects seem important for shear force, tenderness, and residual connective tissue. However, for juiciness and cooking loss maternal effects also seem relevant. This may indicate that effects manifested during the pre-weaning period on components of meat quality were retained through the time of harvest or a predisposition for creating differences in the sensory properties of the meat were established. The indigenous Afrikaner had generally the most favourable sensory profile relative to the imported breeds. This was particularly true for shear force and tenderness.

Sanga cattle, like the Afrikaner, are early maturing breeds. There is clear evidence that the use of exotic germplasm on Sanga breeds can increase feedlot performance and meat yield of cattle reared under South African conditions. Different crossbred genotypes also provide opportunity for more rapid conformation to the changes in market requirements and may offer opportunity for more revenue. However, it appeared based on the sensory data summarized, that crossbreeding with exotic germplasm has little to offer in terms of consumer satisfaction relative to the use of Afrikaner.

Leather quality

It is important to note that hides are normally purchased by weight, but leather is sold by surface area. It is therefore common practice to mechanically stretch the hides during tanning and manufacture. The standard practice is to stretch leather to 20% extension. There is however concern that this stretching may affect important aspects of leather quality and strength.

Hide yield (%) and 8 leather characteristics (leather yield (dm²/kg), force 20% extension (Mpa), extension grain crack (%), extension break (%), force break (Mpa), slit tear force (N/mm), distension grain crack (%), and force grain crack (N/mm)) were evaluated. The results indicate breed direct effects and individual heterosis, but not maternal effects, may be important for most of these traits. For all of the exotic breeds, direct effects reduced hide yield and increased leather yield relative to the indigenous Afrikaner. For both of these traits, individual heterosis effects arose primarily from indicus x taurus crossing with the Hereford x Brahman effect being most pronounced. Leather from the exotic breeds appeared to be stronger, as evidenced by greater direct effects for force required to achieve 20% extension and break, than leather from the indigenous Afrikaner. Direct effects on the extension required to crack the grain attributable to Hereford and Simmentaler were less than for the indigenous Afrikaner, Brahman, and Charolais. These results indicate opportunities to improve leather yield and quality through crossbreeding relative to straight bred Afrikaner.

Popular Article

There are 2 scientific articles, please contact the researcher for more information on this.

Please contact the Primary Researcher if you need a copy of the comprehensive report of this project – Michiel Scholtz on GScholtz@arc.agric.za.

- Animal Products, Cattle and Small Stock, Quality and Value-adding
- ◆ 2017, ARC, ARC-API, Paper, Scholtz
 - < Genomics for the South African Beef industry
 - > Brine injection of beef

DEADLINES for RESEARCHERS 2021

Proposals for 2021: TBC

Progress reports: 28 Jan 21

Final reports: 29 Jan 21 Final includes comprehensive report and popular article

COMMITTEE MEETINGS for 2021

RMRDSA CSS Planning - TBC
 Project Committee - TBC
 Pork Planning - TBC



Calendar

< > Apr 2021						
Sun	Mon	Tue	Wed	Tur	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

PORK Priority Areas

Cattle & Small Stock Programmes

1 Sustainable natural resource utilisation

2 Improvement of Livestock production and forage

3 Management of agricultural risk to create a resilient Red Meat sector

4 Sustainable health and welfare for the Red Meat sector

5 Enhancement of production and processing of Animal Products

6 Consumer and market development of the Red Meat sector

7 Commercialisation of the emerging sector

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