

PROGRESS REPORT ON THE ANGUS X NGUNI PROJECT AT THE VAALHARTS RESEARCH STATION

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Introduction

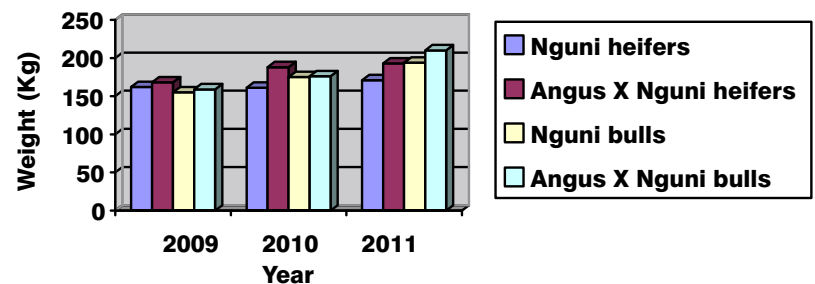
A system of terminal crossbreeding using the Nguni may be valuable for commercialization of the emerging sector and for commercial farmers. The interim results reported here are based on research that is being conducted at Vaalharts Research Station of the Northern Cape Department of Agriculture, Land Reform and Rural Development using 98 Nguni females that were procured from sales that were held under the auspice of the Nguni Cattle Breeders' Society.

Interim Results

Table 1: Weaning weights of Nguni and Angus x Nguni calves

Genotype / sex	Average	Minimum	Maximum	S. Dev.
Nguni heifers: 2009	162	136	181	13.44
:2010	161	102	189	20.49
:2011	171	125	222	24.49
Nguni heifers average: 165				
Angus x Nguni heifers: 2009	165	131	196	20.88
:2010	188	169	213	15.93
:2011	193	153	242	28.68
Angus X Nguni heifers average: 182				
Nguni bulls: 2009	155	120	199	19.84
: 2010	175	130	197	17.08
:2011	194	138	230	26.58
Nguni males average: 175				
Angus x Nguni oxen:2009	159	126	174	18.33
Angus x Nguni bulls: 2010	176	130	219	29.72
Angus x Nguni bulls: 2011	210	176	249	26.66
Angus X Nguni males average: 182				

Graph 1: The averages of the weaning weights for Nguni and Angus X Nguni calves.



Melville Ferreira (ARC in Vryburg) attended the 30th SA Society of Agricultural Technologist Congress where he submitted the poster on the left page. This conference took place in Salt Rock at the north coast of KZN during September 2012.

Table 2: Cow weights of Nguni cows that had Nguni and Angus x Nguni calves

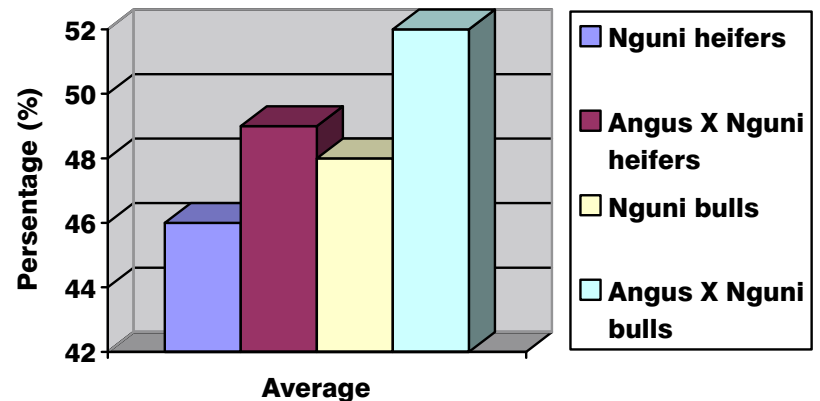
Genotype / sex of calve	Average	Minimum	Maximum	S. Dev.
Nguni heifers: 2009	348	250	496	55.04
:2010	344	222	431	60.19
:2011	354	294	434	34.45
Average cow weight: 349				
Angus x Nguni heifers: 2009	344	286	425	44.67
:2010	345	309	432	50.70
:2011	379	319	452	56.29
Average cow weight: 356				
Nguni bulls: 2009	349	222	516	65.94
:2010	360	312	508	46.96
:2011	372	300	566	57.15
Average cow weight: 360				
Angus x Nguni oxen:2009	306	250	350	36.63
Angus x Nguni bulls: 2010	347	302	470	62.92
Angus x Nguni bulls: 2011	373	310	471	43.64
Average cow weight: 342				

Over a three year period the average weaning weight of pure Nguni heifers was 165kg and that of Angus x Nguni heifers 175kg. In the case of male calves the average weaning weight of pure Ngunis was 175kg and that of Angus x Nguni 182kg.

Table 3: Cow efficiency (calf/cow weight ratio) of Nguni cows that had Nguni and Angus x Nguni calves

Genotype / sex of calve	Average efficiency
Nguni heifers: 2009	46
:2010	45
:2011	48
Average cow efficiency: 46	
Angus x Nguni heifers: 2009	48
:2010	47
:2011	51
Average cow efficiency: 49	
Nguni bulls: 2009	45
:2010	48
:2011	52
Average cow efficiency: 48	
Angus x Nguni oxen:2009	50
Angus x Nguni bulls: 2010	50
Angus x Nguni bulls: 2011	56
Average cow efficiency: 52	

Graph 2: Cow efficiency



Over a three year period the cow efficiency (calf/cow weight ratio) in the case of female calves was 6.5% higher in the crosses (46% versus 49%). In the case of male calves the cow efficiency was 8.3% higher in the crosses (48% versus 52%).

Table 4: Estimated breeding values (EBV's) of the Nguni cows at the start of the trial

EBV	Breed	Herd	Highest	Lowest
Wean Direct	-0.3	-0.4	+7.6	-6.6
Wean maternal	+0.2	+0.3	+6.7	-6.6
18 month weight	+1.1	+1.3	+25.4	-28.4
Mature cow weight	+3	+3	+28	-30

The feedlot performance of the Angus x Nguni bulls born in 2010 were compared to that of pure Nguni, Angus, a tropical adapted breed, a composite breed and a European breed. No growth stimulants were used.

Table 5: Preliminary feedlot performance of different genotypes

Trait	Genotype					
	Nguni	Angus	An x Ngu	Composite	Tropical	European
ADG	1.29	1.76	1.76	1.72	1.45	2.09
FCR	5.74	5.67	4.85	5.47	5.13	4.78
Final weight	308	368	335	380	338	420

Discussion

There were very big differences between the heaviest and lightest calves at weaning in both the pure (difference 120 kg) and crossbred calves (difference 129 kg). Possible reasons may be:

1. Differences in milk production between cows as reflected in a difference of 13.3 kg in the estimated breeding value for maternal weaning weight between the top and bottom cow.
2. Differences in the cow weight – a difference of 344kg between the heaviest and lightest cow that weaned a calf.

The data suggests that crossbreeding can increase the weaning weights of crossbred calves from Nguni cows and that the feedlot performance is at an acceptable level. However, the reason(s) for the large variation in calf weaning weights still needs to be investigated, since this also has an effect on the feedlot performance of the calves.

Hypothesis on Epigenetics

All alterations in DNA function without alterations in DNA sequence are referred to as epigenetics. It is associated with gene expression and the expression of different phenotypes (appearance). These modifications are influenced by environmental factors and can be transferred to the progeny in cell lines and complex organisms, including livestock. The first evidence of epigenetic inheritance in humans results from the Dutch famine in 1944. Children of pregnant women exposed to the famine intrauterine during late pregnancy were smaller than average and more susceptible to health problems. Surprisingly, some of these effects remained in the children of these children.

It is postulated that environmentally induced epigenetic information transmitted via the egg and sperm fundamentally acts as a form of pre-programming. If the survival of the parents was influenced or restricted by environmental factors, the offspring are pre-programmed with the information required to enable it to survive in a similar unfavourable environment. However, if the environment is different from the predicted one, the mismatch may result in maladaptation.

The question of interest is if the differences in the performance of the calves in the Vaalharts Nguni herd can be linked to the herd of origin of their dams? If this is the case a further question will be if this is due to differences in genetic potential or as a result of epigenetics?

