

CROSSBREEDING OF INDIGENOUS CATTLE FOR MILK PRODUCTION

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ABSTRACT

Milk and dairy products whilst nutritionally desirable, are often not available in rural areas. Increasing small holder production of milk would improve nutrition, diversify production and present the opportunity for cash generation to rural people. Crossbreeding of local cattle to improve the potential for milk production should be considered. A project has started at Matopos Research Station in which indigenous Nkone and Tuli cows are being crossed with Jersey bulls in order to assess the performance of both the resultant F1 male and female progeny. Three calf crops have now been born (October to December, 1991, 1992, 1993, a total of 44 males and 39 females). Males are either kept entire (for assessing the value of crossbred bulls) or castrated, to train for draught purposes or to be reared for slaughter and carcass assessment. The first pen finished animals will be slaughtered, at 20 months of age, in 1994 and the first range fed at 42 months in 1995. Females will be bred at 15 to 27 months (starting early 1994) and subjected to various management and nutritional regimes. A Jersey bull will be used initially but Nkone bulls will be used later in the programme to establish upper and lower limits of Jersey blood for acceptable levels of milk production. Growth rates of 1991 and 1992 born calves compared favourably with purebred Nkone and Tuli and Nkone crosses during the first 150 days.

Introduction

Commercial milk production in Zimbabwe is generally situated around the major urban areas. Total milk deliveries were 20 6335 tonnes in 1992-93 (CSO, 1993) and these were divided between liquid consumption and manufacture. With a population estimated at 10.5 million this gives an estimated per capita availability of milk of ± 20 kg annually. The sale of dairy products is greater in the urban compared to the rural areas. Milk is produced within the small holder sector, both for consumption within the homestead and for sale, but the quantities involved are small. Per capita consumption of animal protein, calculated from sales within the formal sector, would appear to be low (7.3g/day : FAO 1988).

To increase protein production from cattle requires an increased offtake rate for slaughter, which is currently estimated at 16-17 percent in the commercial sector and 2-3 per cent in the communal sector, or increased milk production. Within the communal areas or small holder sector, because of small herd size (less than five livestock units per household; GFA: 1986) and the demand for draught power, coupled with a low reproductive rate, a marked increase in offtake for slaughter is not likely. This leaves the option for increasing milk production.

Trials at Matopos have demonstrated the superiority of indigenous cattle in surviving and reproducing in a harsh environment (Siboniso Moyo, 1990). Work at Makoholi has demonstrated increased milk production when indigenous Mashona Cows were crossed with exotic dairy bulls of the Friesian or Jersey breed (Tawonezwi, Dube and Khombe, 1987). The objective of this study is to cross indigenous female cattle with Jersey bulls and to study the performance of the F1's under differing management systems. Both males and females will be assessed.

Experimental procedure

Initially the work will be carried out at Matopos Research Station. The station is in the South of Zimbabwe, at an altitude of 1340m, and has an annual rainfall between 250-1350mm (mean

¹Matopos Research Station, P/B K5137, Bulawayo

mm), which falls between November and April. However, both the amount and distribution of the rains are erratic (Ward *et al.* 1979).

ups of Nkone and Tuli cows, surplus to requirements of the herds maintained at Matopos have been run with a Jersey bull, purchased locally during January to March in 1991, 1992 and 1993. This practice will continue. Cows and calves are subjected to the same management regime as their contemporaries involved in the study of crossbreeding for beef production (Moyo, Ndlovu, and Magwenzi 1994).

These calves are considered to have three uses: as a source of crossbred bulls; as a source of draft power and as a source of slaughter stock. To meet these objectives a small number of calves from each calf crop are not castrated at eight months of age allowing the option of training them for breeding. Of those castrated, a small number (two to four) are selected for training for work and the rest are finished for slaughter, either off rangeland or after penning.

Some females will be bred at two ages (15 and 27 months) and subsequent performance monitored. Over time both Jersey and Nkone bulls will be used to establish the optimum amount of Jersey blood required for acceptable dairy performance. The heifers will be selected to differing management and nutritional regimes, both on and off station.

The first crop of animals which were born between October and December 1991, consisted of 19 males and 10 females. Of the ten males two have been trained to work and eight will be finished for slaughter off grass in May 1995. Of the ten females, one was subject to theft and the other was impregnated at \pm fifteen months of age. Birth weights and early growth rates of these calves are shown in Table 1. In January 1994 the average weight of the males was 312 kg and that of females was 308 kg.

TABLE 1. BIRTH WEIGHT AND GROWTH TO 150 DAYS OF JERSEY X NKONE AND TULI AND PUREBRED NKONE AND TULI CALVES (ALL 1991 BORN)

	Jersey x Nkone		Jersey x Tuli		Nkone		Tuli	
	Male	Female	Male	Female	Male	Female	Male	Female
No. of calves	5	2	5	8	50	41	58	55
Birth weight (kg)	25.6	22.5	26.0	24.9	26.1	24.3	26.8	25.6
SD	4.83	0.71	6.78	3.87	4.66	3.63	3.71	3.48
Daily gain (g)(0-90 d)	885	617	829	797	597	530	77	572
SD	84.6	7.8	96.9	86.5	198.4	173.5	167.6	139.1
Daily gain (g)(91-150 d)	843	625	750	712	838	832	875	817
SD	107.0	35.4	65.7	128.6	238.0	198.4	160.1	197.6
Live weight (kg)(150 d)	156	116	146	140	130	122	133	127
SD	13.6	2.1	6.3	10.0	22.4	21.4	18.0	15.1

The second calf crop consisted of 15 males and 15 females (again one lost from theft). Five have remained entire and will undergo further selection at 18 months of age. Of the remainder, four will be selected to train to work and the remainder will be intensively finished for slaughter in August 1994. The seven heaviest females are being bred at fifteen months of age and the lighter seven will be kept for a year before breeding (see Table 2 for growth rates).

TABLE 2. BIRTH WEIGHT AND GROWTH TO WEANING OF JERSEY X NKONE AND JERSEY X TULI CALVES BORN IN OCTOBER TO DECEMBER 1992

Dam breed Sex of calf	Nkone		Tuli	
	Male	Female	Male	Female
No. of calves	9	5	6	9
Birth weight (kg)	26.6	25.2	27.2	26.0
SD	3.9	2.17	4.36	7.02
Daily gain (g)(0-90 d)	860	749	841	743
SD	91.0	42.0	183.2	188.0
Daily gain (g)(91-150 d)	609	750	678	691
SD	240.1	97.2	225.0	298.1
Live weight (kg)(150 d)	141	138	144	134
SD	15.2	2.2	18.9	
Weaning weight (kg)(=)	176	163	167	
SD			17.0	

The third crop was born in late 1993 and consists of 19 males and 14 females (one stillborn)

Discussion

The calves produced in this project have been able to cope with the environment and to attain satisfactory growth rates (the growth rate in heifers may need restricting to avoid fatty udders leading to a restriction in milk production, (Foldager, Sejersen and Bbrolund Larsea, 1980). Calf survival has been high, with the stillbirth in 1993 being the only natural loss. Birth weights of calves of Nkone, Tuli and Jersey crosses were all similar and less than those recorded in crossbred calves from cows of traditional beef breeds crossed to Nkone bulls (Moyo *et al.* 1994) (Table 3). The live weight of a mature Jersey cow is generally between 360 and 420 kg (Smith, Siviter and Whitby, 1980).

TABLE 3. BIRTH AND WEANING WEIGHTS (KG) OF NKONE CROSSBRED PROGENY, BORN IN OCTOBER TO DECEMBER 1992, BY DAM BREED (MOYO *ET AL.* 1994).

Dam Breed	Birth weight		Weaning weight	
	Males	Females	Males	Females
Brahman	29.9	28.8	179.6	177.7
SD	5.9	6.2	5.9	6.3
Tuli	30.2	28.1	158.5	154.6
SD	6.6	6.7	6.4	6.6
Hereford	30.2	30.9	157.3	148.2
SD	5.5	5.8	4.9	5.7
Simmental	31.9	31.2	164.7	154.5
SD		2.8	3.2	4.6

The first two steers to be trained for work proved willing and capable. This initial response agrees with similar assessments made with crossbred Jersey steers in Nepal (Pearson, 1991). Whilst most dairy beef calves are produced from dairy cows crossed to a beef bull, the concept of dairy beef is well established (MLC, 1987).

By fifteen months of age all females were cycling and showing good udder development. The decision to put some animals to the bull at 15 months reflects what is likely to occur in practice. The success of calving at this age will depend on adequate growth rates until the first calving is achieved and will probably require supplementary feed (Roy and Smith, 1987). No supplementary feed has been used in this project.

It is predictable that the success of this project will depend on the levels of nutrition and management applied. As both these factors increase, so the 'dairy' content of the stock can be raised. Development of a composite breed is not envisaged.

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