

PRELIMINARY OBSERVATIONS ON GESTATION LENGTH, AGE AT FIRST CALVING AND BIRTH WEIGHT OF MUTURU CATTLE.

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ABSTRACT

The gestation length, age at first calving and birth weight of muturu cattle were studied in a small herd of Muturu heifers maintained at the University of Nigeria Teaching and Research Farm. The animals were grazed twice daily from 0830 hr to 1200 hr and 1430 hr to 1800 hr either in open natural grassland or in fenced paddocks containing a mixture of guinea grass (*Panicum maximum*) and giant star grass [*Cynodon dactylon*]. During the dry season, all animals received nutritional supplementation consisting of a mixture of brewer's spent grain and palm kernel cake in a ratio of 3:1. When the heifers were between the age of 16 and 18 months, a mature, fertile Muturu bull was introduced into the herd and the mating activity of the animals was closely monitored daily. No attempt was made to limit the number of services which a heifer on heat received from the bull. Results showed that gestation length average 280.0 ± 2.34 days, mean age at first calving was 29.39 ± 1.5 months and mean birth weight was 11.3 ± 0.68 kg. There were no significant differences ($P > 0.05$) in the gestation length and birth weight of male and female calves.

Key Words: Muturu heifers, age at first calving, gestation length, birth weight.

INTRODUCTION

Cattle breeds which are indigenous to the tropics have long been known to have

low reproductive efficiency when judged by temperate standards (Randel, 1984; Dobson and Kamonpatana, 1986). For example, tropical cattle breeds, attain puberty late (Rakha *et al.*, 1970; Ronningen *et al.*, 1972; Oyedipe *et al.*, 1982; Alberro, 1983), and have increased age at first calving (Sada, 1986; Reinhardt, 1978; Pullan, 1979; Mukasa-Mugerwa *et al.*, 1989). There is evidence also that tropical cattle breeds have prolonged periods of post partum anestrus, leading to long calving to service interval (Galina and Arthur, 1989). Much of the available information on female reproduction in tropical cattle have focused largely on zebu breeds (*Bos indicus*) while not much information on female reproduction is available on non-zebu (*Bos taurus*) cattle of tropical origin, such as the Muturu. This study was therefore initiated to obtain data on the age at first calving, gestation length and calf birth weight from a small herd of Muturu cattle maintained at the Teaching and Research Farm of the University of Nigeria, Nsukka, as a prelude to studies aimed at the conservation and multiplication of this breed in Nigeria.

MATERIALS AND METHODS

Animals:

Nineteen post-pubertal Muturu heifers aged between 16 and 18 months were used for this study. A mature, fertile Muturu bull of about 6 years was allowed to run with the heifers all the time. The herd was closely monitored both during the day and night by attendants and night guards, respectively. These workers documented

the date of service and the number of any heifer which the bull served successfully. All the heifer were numbered neck-tags and were grazed twice daily between 0830 hr and 1200 hr and between 1430 hr and 1800 hr. Supplementary feed consisting of dry brewer's spent grain and palm kernel cake mixed in a 3:1 ratio was provided to all animals during the dry season - from November and March in 1995, 1996 and 1997. Water was provided *ad libitum*. All animals were also sprayed routinely for the control of ectoparasites.

Age at first calving was calculated in months as interval between birth and first successful parturition. Gestation length was calculated in days as interval between date of fertile service and date of successful parturition. Data were obtained from 19 primiparous and seven pluriparous cows. Birth weight was recorded to the nearest kg within 24 hours of birth.

Means and their standard errors were calculated for the different parameters while t-test was used to compare gestation lengths and birth weights of male and female calves.

RESULTS AND DISCUSSION

Age at first calving:

The average age at first calving for Muturu cows is shown in Table 1. Age at first calving ranged from 24 months to 37 months with a mean of 29.39 ± 1.05 months. This mean value was low compared with the average age of 44 months which had been reported for most breeds of *Bos indicus* cattle (Mukasa-Mugerwa, 1989). It was also lower than the age of 34.8 months which Sada (1968) had reported for West African dwarf shorthorn (Muturu) cattle in Ghana. However, Roberts and Gray (1973) reported age at first calving of 22.68 months (635 days) for 6 cows maintained in Vom, Nigeria, with a range of 19.4 - 28.1 months (544 days - 788 days) in N'dama cattle which is another non-zebu breed of tropical origin. Zwandor and Akpokodje (1989) found age at first calving to be 44.3 months in a foundation herd of 11 N'dama cattle, whereas 4 N'dama heifers born on the farm had a mean age at first calving of 21.38 months. It has been reported by Ehiobu and Ngere

TABLE 1. REPRODUCTIVE PERFORMANCE INDICES OF MUTURU CATTLE

Performance indices	Number of observations	Sex	$\bar{X}$	SE	Range	Level of significance
Age at first calving (Mo)	19	-	29.39	1.05	24-37	
Gestation length (days)	26	Male (9)*	282.8	1.65	276-291	NS
		Female (17)	281.4	1.19	273-288	
		Overall	281.9	1.07	273-291	
Birth weight (kg)	26	Male (9)	12.4	1.04	9-17	NS
		Female (17)	10.6	0.85	7.15	
		Overall	11.3	0.68	7.17	

NS = Not significant ($p > 0.05$)

*Values in parenthesis indicate number of animals

(1986) that age at first calving is affected more by environmental factors such as climate, nutrition and management than by genetic factors. The present results therefore show that under good husbandry and improved management conditions, the reproductive performance of Muturu cattle could be quite satisfactory, and it is advantageous to breed Muturu heifers as soon as it is physiologically possible. Age at first calving is an important index of reproductive performance and is closely related to lifetime productivity of the animal.

Gestation length:

The average gestation lengths involving 9 male and 17 female Muturu calves are presented in Table 1. Gestation length ranged from 273 days to 288 days in the female calves and 276 days to 291 in male calves. There was no significant effect of sex of calf on gestation length even though male calves were carried about 2 days long than female calves. This is consistent with an earlier report on this breed of cattle by Sada (1968). The overall gestation length of 281.9 ± 1.07 days reported for *Bos taurus* cattle (Bazer and First, 1983). It is, however, lower than 285 days reported for most breeds of tropical cattle (Mukasa-Mugerwa, 1989). This discrepancy could be attributed to age differences between cows used in the two studies. It has been reported that heifers which conceived younger tended to have slightly shorter gestation length than those which conceived at older age (Hafez, 1980).

The slight within-breed variation in gestation length has also been attributed to seasonal or locational factors (Hafez, 1980).

Birth weight:

The average birth weights of male and female calves are also shown in Table 1. Male calves were not significantly heavier ($P > 0.05$) than female calves at birth. The overall mean birth weight of all calves was 11.25 ± 0.68 kg with a range of 7 to 17 kg. These values are quite low compared with birth weight of calves of most tropical cattle breeds. Nevertheless, low birth weights of Muturu calves are to be expected because of the small size of Muturu cattle generally since calf birth weight is known to be highly influenced by the breed of cattle (Wheat *et al.*, 1972; Egbunike and Togun, 1980; Taneja *et al.*, 1980). Moreover, Franke *et al.* (1965) showed that breed of dam was the most important factor affecting birth weight probably because of the overriding influence of maternal uterine environment on foetal development. There appears to be some conflicting reports in the literature concerning the birth weights of male and female calves. While some workers have reported significantly heavier birth weight for male than female calves (Wheat, 1975; Hans *et al.*, 1979; Fisher and Williams, 1979), others have found no significant differences in the birth weight of male and female calves (Groosman and De Oliveira, 1979; Koul *et al.*, 1980). The wide ranges in some of the parameters under study clearly demonstrate the great variability that exists in Muturu cattle and would suggest that with careful selection and breeding, Muturu cattle could respond well to breed improvement programmes.

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ABSTRACT

The accumulated and annual levels of inbreeding and their effects on growth traits of N'dama cattle were investigated using data collected over 11 years at the National Animal Production Research Institute, Zaria. Inbreeding level averaged 1.31% per year, amounting to 14.5% over the years. Average individual inbreeding coefficients of offspring from sires used for more than one breeding period were 0.101% across the inbred individuals and 0.004% over all inbred individuals. Regression coefficients of growth traits (average values per year) on inbreeding levels (average values per year) for birth weight, weaning weight, yearling weight, adult weight and weaning weight, respectively. All regressions were not significant ($P > 0.05$). The regression coefficients indicated that birth weight and weaning weight declined by 0.182 kg and 0.391 kg, respectively while yearling weight and adult weight increased by 1.830 kg and 0.391 kg, respectively. Significant effects of inbreeding level on growth traits were observed for birth weight, weaning weight, yearling weight and adult weight. Inbreeding level had no significant effect on growth traits.

INTRODUCTION

Inbreeding (mating of closely related animals) has been applied to some animal species (Wright, 1921; Mather and Jinks, 1971; Cavalli et al., 1979) in the development of breeding stock with high productivity to reveal and fix desirable genes and to eliminate of undesirable defects and to increase the frequency of desirable genes in the population. This process involves mainly inbreeding for whatever genes that are present, including the less desirable ones, with the result that many typically desirable in some traits. In such a case selection will be provided with an opportunity to set upon the inbreeding.