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Influence of Calf Parity Number, Season of Calving and Period of Calving on Birth and Weaning Weights of Friesian-Bunaji Calves

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ABSTRACT [ENGLISH/ANGLAIS]

Data collected over a period of 30 years (1981 – 2010) from 618 Friesian-Bunaji calves were analyzed to determine the effect of calf parity number (1, 2, 3 and 4), season, namely: Early Dry (October, November and December), late dry (January, February and March), early wet (April, May and June) and late wet (July, August and September); and period of calving as follows: 1981 – 1985, 1986 -1990, 1991-1995, 1996-2000, 2001-2005 and 2006-2010 on birth and weaning weights. Birth weight was significantly ($p<0.01$; $p<0.05$) affected by Calf parity number, period of calving and season of calving while weaning weights were not influenced by the factors. It is concluded that calving should be aimed to occur in late wet/early dry season and calves from the 3rd parity number should be selected for optimum performance subsequently in life.

Keywords: Calf parity number, season of calving, period of calving, birth weight, weaning weight

RÉSUMÉ [FRANÇAIS/FRENCH]

Les données recueillies sur une période de 30 ans (1981 - 2010) de 618 Friesian-Bunaji veaux ont été analysés pour déterminer l'effet de veau parité nombre (1, 2, 3 et 4), saison, à savoir : Début à sec (octobre, novembre et décembre), tardive à sec (janvier, février et mars), début humide (avril, mai et juin) et fin humide (juillet, août et septembre); et la période de vêlage comme suit : 1981 - 1985, 1986 -1990, 1991-1995, 1996-2000, 2001-2005 et 2006-2010 sur la naissance et le sevrage des poids. Poids à la naissance était significativement ($p<0.01$; $p<0.05$) touchés par veau parité numéro, période de vêlage et de la saison de vêlage tandis que le sevrage des poids n'étaient pas influencés par les facteurs. Il est conclu que la période du vêlage devrait viser à se produire à la fin humide/début saison sèche et les veaux dans la parité 3ème numéro devrait être sélectionné pour des performances optimales, ultérieurement, dans la vie.

Mots-clés: Veau numéro parité, la saison de vêlage, période de vêlage, poids à la naissance, le sevrage poids

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INTRODUCTION

The body weight of an animal at birth has been known to affect its performance later in life [1] since birth weight is considered as an initial reference point with regard to subsequent development of individuals as well as other characteristics, this trait is of critical importance to the cattle industry [2]. Differences in size between calves at birth are sometimes used as an indication of differences between them in vigor, potential growth rate, and mature size. It is demonstrated that calves having too small live weight at birth may lack vigor and tolerance to external conditions [1]. In a study conducted by Kaygisiz et al. [2], on Brown Swiss in Pakistan, birth weights ranging from 37.53 – 45.68 kg were observed with parity, season, year of birth and sex of calf significantly ($p<0.05$; $p<0.001$) affecting calf birth weights. Malau-Aduli et al. [3] reported mean birth weights ranging from 17.50 – 32.90 kg from their studies on Friesian × Bunaji calves. This

study is aimed to determine how calf parity number, season of calving and period of calving affect birth and weaning weights of Friesian-Bunaji over a 30-year period (1981 – 2010).

MATERIALS AND METHODS

Data collected over a period of 30 years (1981 – 2010) from 618 Friesian-Bunaji calves were subjected to analysis using the General Linear Model (GLM) procedure of Statistical Analysis System [4]. The calves which were ½ Friesian crosses born to either Friesian × Bunaji or pure Bunaji dams were raised either by bucket feeding or suckling method. In the bucket feeding system, the calves remain with their dams for 4 to 5 days post-partum to obtain colostrum. Thereafter, they were separated from their dams and fed fresh whole milk from an open bucket at the rate of 2.0kg/head/day. In addition, the calves received concentrate diets and legume hay *ad libitum*. The

concentrate consisted of 57% maize, 40% cotton seed cake, 1.5% bone meal, 1% salt and 0.5 vitamin premix. The milk allowance was given twice daily at 9am and 4pm until the calves reached 3 months of age when they are weaned.

Birth weight was considered as the weight (in Kilograms) of the calf (few hours) after delivery. Period of Calving was taken as the period the young is delivered, grouped into six namely: 1981 – 1985, 1986 -1990, 1991-1995, 1996-2000, 2001-2005 and 2006-2010. Calf Parity Number this was considered as the calf from either the 1st, 2nd, 3rd or 4th calving of the dam. Season of Calving was considered as the time of the year the calf was delivered. Based on the prevailing climatic conditions, the calving season adopted was as follows: Early Dry (October, November and December), late dry (January, February and March), early wet (April, May and June) and late wet (July, August and September) as reported by [5].

The linear model used was,

$$Y_{ijkl} = \mu + P_i + S_j + C_k + e_{ijkl}$$

Y_{ijkl} = the l^{th} observation in the k^{th} period of calving, j^{th} season of calving, i^{th} calf parity number

μ = overall mean

P_i = effect of the i^{th} calf parity number

S_j = effect of the j^{th} season of calving

C_k = effect of the k^{th} period of calving (year)

RESULTS

Birth weight was significantly ($p < 0.01$; $p < 0.05$) affected by Calf parity number, period of calving and season of calving (Table 1). Calves from parity number 4 had higher body weights ($32.27 \pm 3.18 \text{kg}$) while those from parity number 1 weighed low ($18.90 \pm 0.16 \text{kg}$). When grouped by season, calves cropped at the early dry season weighed higher than calves from other seasons of the year. Crossbreds calved in period 2005 – 2010 weighed higher compared to calves from other periods, with the lowest observed in period 1991 – 1995. Weaning weight was not influenced by calf parity number, season and period of calving. An increase in birth weight of crossbreds was observed over the period studied except for the decline observed between 1991 and 2000 (Figure 1). A similar trend was observed in weaning weights of Friesian × Bunaji calves when grouped on calf parity number and season of calving (Figure 2 and Figure 3).

Table 1: Effect of calf parity number, season of calving and period of calving on Birth and weaning weights of Friesian-Bunaji calves

	N	Birth weight ± S.E	Weaning weight ± S.E
Overall mean	618	20.12±0.17	70.30±0.76
Calf parity number		**	NS
1	126	18.90±0.16 ^d	68.32±1.08
2	137	23.80±0.34 ^c	66.72±2.21
3	162	27.84±0.68 ^b	64.28±4.49
4	193	32.27±3.18 ^a	65.41±3.14
Season of calving		*	NS
Early dry	122	26.25±0.87 ^a	67.34±2.80
Late dry	151	25.18±0.84 ^b	68.10±2.28
Early wet	168	25.59±0.86 ^b	66.10±2.44
Late wet	177	25.79±0.85 ^b	67.22±2.21
Period of calving		**	NS
1981 – 1985	34	25.69±0.89 ^c	65.28±2.25
1986 – 1990	83	26.26±0.89 ^b	64.81±2.10
1991 – 1995	82	24.00±0.84 ^d	64.44±2.17
1996 – 2000	146	24.16±0.91 ^d	70.36±3.49
2001 – 2005	132	26.76±0.87 ^b	66.24±2.24
2006 – 2010	141	27.38±0.89 ^a	65.72±2.24

^{a,b,c,d} Means with different superscripts differ significantly ($p < 0.05 = *$; $p < 0.01 = **$); NS= Not Significant; S.E= Standard Error; L.O.S= Level of Significance.

Figure 1: Effect of calf parity number on birth weight of Friesian × Bunaji calves over a period of 30 years (Standard Error for Calf parity number 1=0.92, Calf parity number 2=0.79 and Calf parity number 3=0.96)

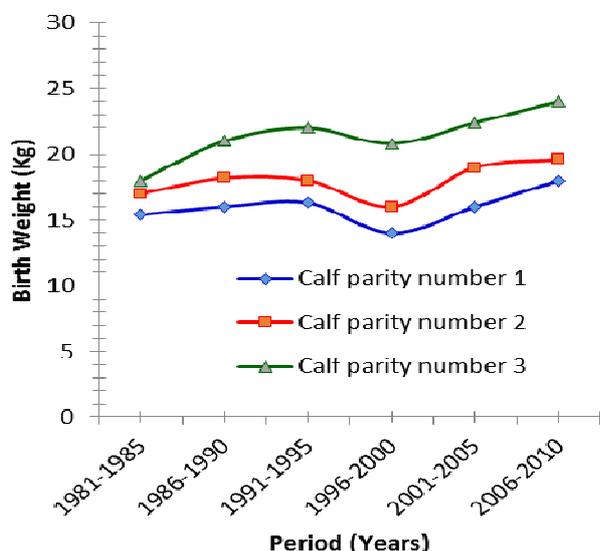
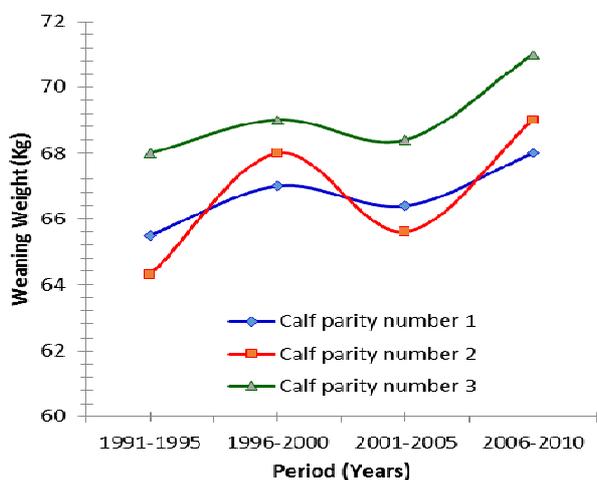


Figure 2: Effect of calf parity number on weaning weight (kg) of Friesian × Bunaji calves over a period (standard error for calf parity number 1=0.83, calf parity number 2=0.95, calf parity number 3=1.02)

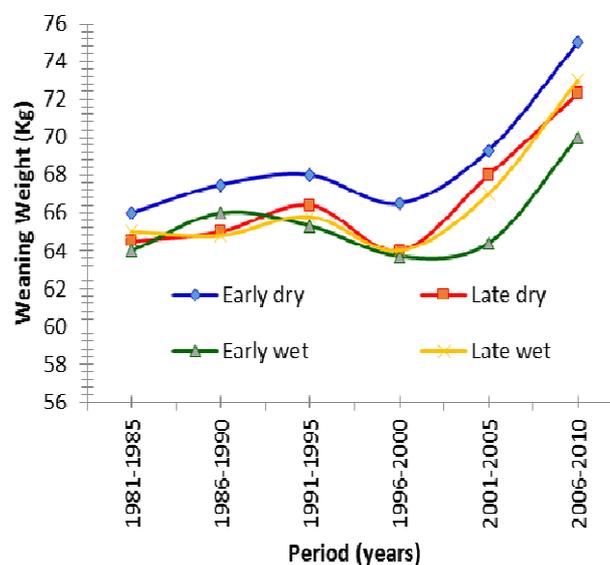


DISCUSSION

Birth weights for crossbreds fell within the range of 17.50 – 32.90 kg reported by Malau-Aduli et al [3]. Over the period studied, birth weight of calves increased up till 1991 – 1995 then declined till 2000 when it began to increase for all calf parities and continued till 2010. The period of decline corresponds with the time cows were replaced with heifers which had not attained full

physiological maturity, which agrees with a similar report by Rafique et al [6]. Friesian-Bunaji crossbred calves from calf parity 1 had a 10% (1.5kg) improvement in birth weight while calf parity 2 improved by 12% (2kg) and calf parity 3 by 29% (5kg). Weaning weights of calves from calf parity 2 improved by 4kg (6%) followed by calf parity 3 with 3kg (4%) and 2kg (3%) increase in calves from calf parity 1. Weaning weight fluctuated over the period which attests to the fact that calves were allowed to graze along with cows before 2000. From 2000 till date, calves were kept indoors till 6 months of age when they were released to flock with the matured herd subsequently. Higher birth weights for calves observed in early dry season (26.25kg) compared to calves in late dry (25.18kg), early wet (25.59kg) and late wet (25.79kg) seasons could be attributed to availability of good quality forage during the last trimester of pregnant dam when the fetus grows rapidly [7].

Figure 3: Effect of season of calving on weaning weight of Friesian × Bunaji calves over 30 years (Standard error for Early dry season=1.73, Late dry season=1.03, Early wet season=0.97, Late wet season=1.82)



Weaning weights of calves in the early dry season improved by 9kg (14%) followed by calves in the late dry season 8kg (12%), late wet 7kg (11%) and 6kg (9%) for calves in the early wet season. Few literature exist on weaning weights, however, [8] observed that variation in body weights few months after birth could be due to available succulent forage for dams during early lactation hence good milk yield which calves utilizes.

CONCLUSION

It is concluded that calving should be aimed to occur in late wet/early dry season and calves from the 3rd parity number should be selected for optimum performance subsequently in life.

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CONFLICT OF INTEREST

No conflicts of interests were declared by authors.

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