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The Effect of Supplementation Strategies on Productive Performance of Cows Kept under Different Husbandry Systems in Sudan

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Abstract

Three extensive systems of husbandry practices were chosen in the semi-arid rain fed area of western Sudan. Cattle production in sedentary, transhumance and migratory systems were closely monitored through a period of 365 days. Cattle herders were randomly selected to supplement with poultry manure/molasses or molasses alone. Different groups of cattle herders were selected from sedentary, transhumance and migratory system. In each system the recently calved cows were monitored for post-partum ovarian activity using milk progesterone radioimmunoassay. Days to conception were taken as non-return to estrus. Milk yield (MY), body weight (BW) and body condition score (BCS) at calving, 30, 60, and 90 days from calving were recorded. The results revealed that there was a wide variation in both days to first ovulation and days to conception in all systems of production. Cows in both sedentary and migratory systems showed gradual increase in BW and MY, while those of transhumance showed a steady decrease in both these parameters. BCS was found to decrease from calving to 60 days in all systems.

Introduction

Sudan has a livestock population of 134.1 million (AOAD.2005); approximately 33 million are cattle. The bulk of the cattle living under the pastoral system of management, which divided into three main categories of pastoralists, can be recognized, migratory, transhumance and sedentary system. Grazing cattle in pastoral system are apt to suffer from nutritional deficiency, loss of body weight and body condition during the dry season, when the pasture is scarce, fibrous and low of a low nutritive value, this generally reflected in slower growth rate, reduced maturity and low productive and reproductive performance. The present study was undertaken to investigate the influence of various supplementation strategies on production and reproductive performance of cattle under the three management systems.

Materials and Methods

Study area

The present investigation focused around the cattle herders of El Obeid city, in the semi-arid rain fed area in western Sudan (Latitude11o 15' and 16o 30'N, Longitude 27o and 32oE). ***Husbandry practices***

Seven cattle owners were randomly selected from different geographical sites around El Obeid city for studies on the sedentary system of production. They were designated as *farms SA, SB, SC, SD, SE, SF,* and *SG.* Each farm had an area of 10–15 ha, which was being cultivated with sorghum for local consumption. During the rainy season farmers settle in drier areas avoiding the flooded areas, which are usually uninhabitable because of unpleasant smell and biting flies.

Five farmers *MA, MB, MC, MD* and *ME,* from the migratory system of production,

each having between 5–20 cows were selected. In these system cattle owners were on constant move with their animals in pursuance of forage and water. They have homelands in which they settle during certain times of the year. During the rainy season, cattle herders settle in camps and during the dry season the herders return to the villages and animals are depends mainly on stored pasture and sorghum stover. Concentrates are given only to milking cows at a rate of 2 kg/cow/day.

The transhumance cattle herders move from north to south and backwards along rain-fed rangelands located in western Sudan. During the rainy season they settle in the north and in the dry season they move to south. The transhumance system was represented by three cattle herders who were willing to participate in molasses supplementation. They were designated as *TA, TB,* and *TC* herds. Due to controlled breeding, all cows calved during the rainy season. Recently calved cows in each herd were of the same number and parity. Concentrate feed (2 kg/animal/day) was given to milking cows during the dry season.

In all systems, weaning was done gradually and mating was natural with bulls running with the herd. Body weight, body condition score and milk yield were also recorded at calving and at 30, 60 and 90 days after calving.

Results and Discussion

Fertility of cows kept under traditional extensive systems was shown to be low as indicated by long post-partum anoestrus period and long days to conception in the majority of cows investigated (Table. 1 and figure. 1). This was largely correlated with nutritional and other environmental stress. Similarly, other studies revealed by (Fitzpatrick, 1993). Other factors, which might have influenced fertility, included, body condition score (BC S), body weight (BWT) and

health disorders (Vale *et al.* 1996 and Mukasa-Mugerwa, 1989) . In the sedentary system, farm *SC* showed the shortest days to ovulation and conception as this farm used controlled suckling (Table. 1). Similarly, it has been shown that calf creep feeding strategies improved conception through reduced suckling (Schlink, 1998).

In the migratory system cows in herd *MB* showed better fertility parameters and were in a better nutritional status since they were frequently supplemented with guar meal. The effect of BWT on fertility was clearly demonstrated by farm *SG* and cows in herds *TB* and *TC* of the transhumance system as these had low BWT., which was reflected on extended post-partum anoestrus and long days to conception. Similarly, the studies of Singh (Singh, 1990). Low BWT at birth and slow growth rate during pre-pubertal period may be due to poor fertility of these cows, as in migratory system (Table.2). Also it has been shown that cows, which calve in poor body condition, have only a small pool and few follicles that prolonged period post-partum (Fitzpatrick, 1993).

Table. 1 Days from calvin[g] to first P4 rise and conce[p]tion in all husbandry systems

	Farms	Intervals from calving to first P4 rise (Mean + SD)	Intervals from calving to conception (Mean + SD)
Sedentary	SA	71.32 ± 45.12^{c}	126.07 ± 46.06^{b}
	SB	92.23 ± 54.3^{b}	226.07 ± 52.63^{a}
	SC	61.78 ± 14.99^{d}	102.67 ± 48.93^{b}
	SD	85.5 ± 39.17^{b}	174.17 ± 81.6^{b}
	SE	72.2 ± 35.87^{c}	103.2 ± 16.21^{b}
	SF	74.5 ± 48.74^{c}	112.2 ± 21.83^{b}
	SG	167 ± 59.68^{a}	165.75 ± 57.16^{b}
Migratory	MA	87.58 ± 31.62^{b}	108.25 ± 20.07^{b}
	MB	91.25 ± 14.75^{b}	99.13 ± 14.26^{c}
	MC	105.64 ± 29.44^{a}	123.46 ± 21.35^{b}
	MD	93.74 ± 21.27^{b}	102.11 ± 13.69^{b}
	ME	94.29 ± 25.7^{b}	120.43 ± 28.71^{b}
Transhumance	TA	57.17 ± 38.2^{d}	100.09 ± 35.64^{b}
	TB	$73.3\pm31\ .29^{c}$	105.36 ± 31.18^{b}
	TC	74.58 ± 43.98^{c}	139.25 ± 28.71^{b}

^{abcd} valves with same column bearing different superscript vary significantly at P~ 0.05

Table.2 Body Wei[g]ht (K^{g}) Body condition score (1-9 scale) and milk yield (K^{g}) in all husbandry systems

	Body weight (BWT) (Kg)				Body condition (BCS)				Milk yield (MY) (Kg)		
Herd	1	2	3	4	1	2	3	4	1	2	3
S	291 ± 44.2^{a}	280 ± 45.7^{a}	279 ± 42.5^{a}	286 ± 45.5^{a}	5.2 ± 1.0^{a}	4.7 ± 0.6^{b}	4.3 ± 0.8^{b}	5.1 ± 0.7^{a}	3.1 ± 0.5^{b}	3.7 ± 0.6^{b}	4.7 ± 0.8^{NS}
M	249 ± 30.8^{b}	254 ± 33.6^{b}	256 ± 34.0^{b}	263 ± 35.6^{b}	6.7 ± 0.4^{a}	6.2 ± 0.5^{a}	4.0 ± 0.9^{b}	5.4 ± 0.6^{a}	3.5 ± 0.8^{b}	4.5 ± 0.6^{a}	4.7 ± 0.6^{NS}
T	298 ± 14.7^{a}	287 ± 14.4^{a}	283 ± 13.6^{a}	288 ± 11.3^{a}	4.6 ± 0.3^{b}	3.9 ± 0.3^{c}	5.2 ± 1.0^{a}	$3.90.4^{b}$	5.1 ± 0.4^{a}	5.1 ± 0.3^{b}	4.0 ± 0.2^{NS}

^{ab} Values within the column bearing different superscript vary significant at P~0.05 1,2,3,4, representing parturition, 30, 60, and 90 days from parturition

^{NS} Not significant different at P~0.05

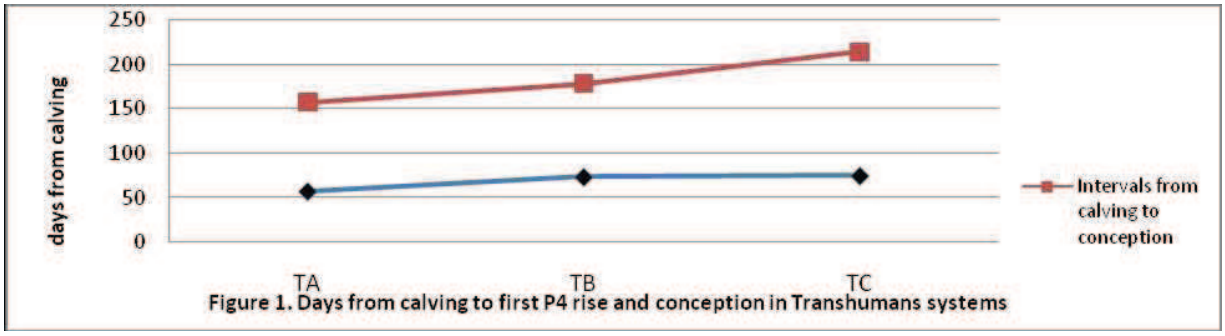

Figure 1. Days from calving to first P4 rise and conception in Transhumans systems

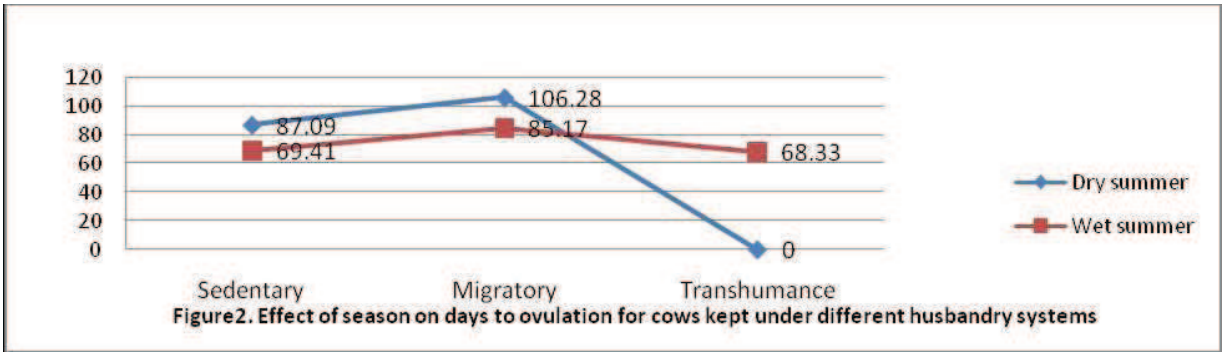

Figure2. Effect of season on days to ovulation for cows kept under different husbandry systems

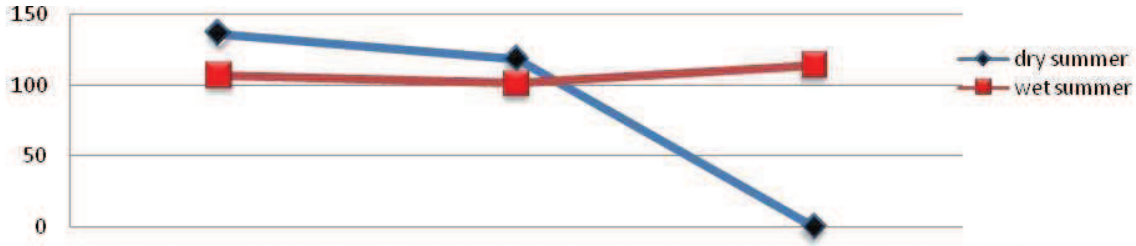

Figure3. Effect of season on days of Conception for cows kept under different husbandry systems

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