The effect of supplementation strategies on reproductive and productive performance of cows kept under different husbandry systems in Sudan

Ahmed Idris[1], Muna Ahmed[2], Elagib Farahain Mohamed[1] Claudia Kijora[3], Hessain Yousif[2]

[1] Peace University, Animal Production and Range, Sudan

[2]University of Khartoum, Institute of Environmental Studies, Sudan

[3]Humboldt-Universit¨at zu Berlin, Dept. of Animal Breeding in the Tropics and Subtropics, Germany

Introduction

Sudan has a livestock population of 103 million; approximately 33 million are cattle. The bulk of the cattle living under the pastoral system of management, that divided into three main categories of pastoralists can be recognized.

The migratory pastoralists are those that are on constant move with their animals in pursuance of forage and water. During the rainy season (July to August) they settle in camps near a city and graze their animals in the nearby fields. With the advancement of the season they move out in search of pasture and water, covering long distances. As the dry season approaches the herders settle around sorghum fields to make use of sorghum residues as the main diet of the animals (Photo1).

In the transhumance system, pastoralists with their animals move from a home-base located at the centre of the migratory route, between wet and dry season camping areas. It is an adaptive system whereby rangeland use is inseparable from the livelihood of the people(Photo1).

In the sedentary system of cattle management, there are two production systems, the traditional and the improved. The traditional system is subsistence-oriented and is characterized by low inputs with a resultant low productivity. The improved system consists of intensive crop-livestock smallholders, peri-urban production and semi-intensive management (Photo 2).

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.

Material and Methods

Study area

The present investigation focused around the cattle herders of El Obeid, which located in semi-arid rainfed 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. Five farmers MA, MB, MC, MD and ME, from the migratory system of production,

each having between 5–20 cows were selected. 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.

Poultry manure/molasses mixture was used to replace farmers concentrate diet of the sedentary system while in others the concentrate ration usually used by the farmer was partially substituted by molasses.

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 (BCS), body weight (BWT) and health disorders . 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 dew to poor fertility of these cows, as in migratory system (Table2). 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 calving to first P4 rise and conception 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±31.29^{c}	105.36±31.18^{b}
	TC	74.58±43.98^{c}	139.25±28.71^{b}

$^{a\,b\,c\,d}$ valves with same column bearing different superscript vary significantly at P≤ 0.05

Cows in migratory system were recorded best BCS in parturition, 30, and 90 days from parturition (Table2). Poultry/manure molasses used as a complete diet showed the highest increase in milk yield in the sedentary system. In the transhumance system molasses was used alone as substituted diet and showed significant increase in milk yield (Table2). Similarly, results reported by (Fitzpatrick, 1993).

The effect of season on days to ovulation for cows kept under different husbandry systems were shown in figure 2, Days to conception were longer and conception rates were significantly lower in the dry season compared to the wet season (Figure 3) . Similar findings were reported by other workers (Thatcher, 1986).

Photo 1: Transhumance system: dry season camping areas pastoralists with their animals move between wet and

Photo 2: Sedentary system of cattle management , improved system of intensive crop-livestock smallholders (Pri-urban areas)

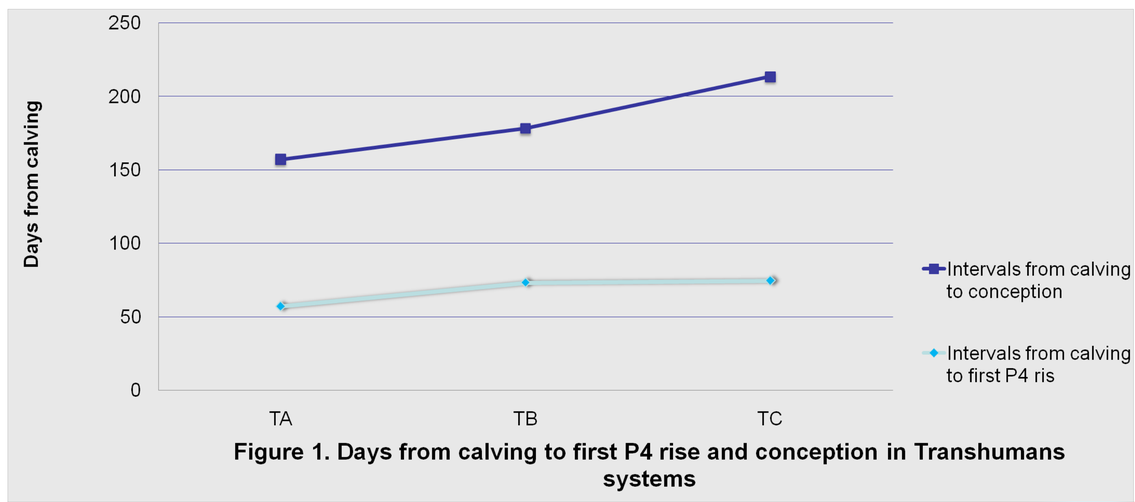

Figure 1. Days from calving to first P4 rise and conception in Transhumans systems

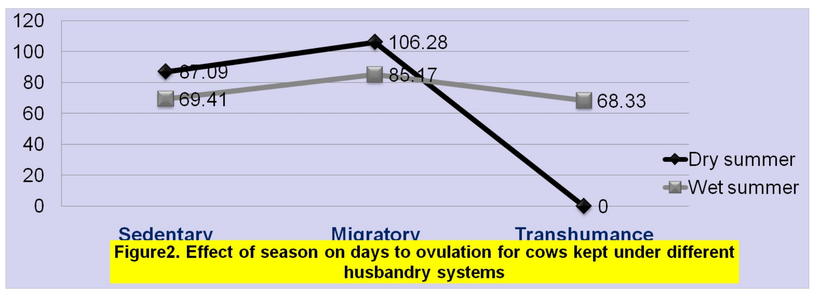

Figure2. Effect of season on days to ovulation for cows kept under different husbandry systems

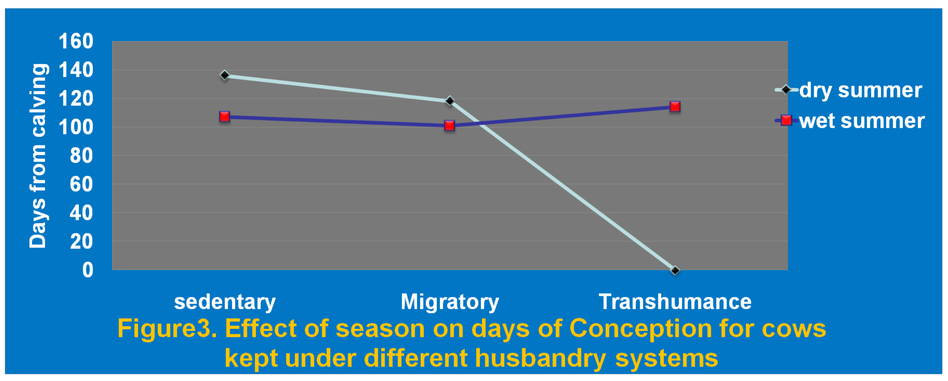

Figure3. Effect of season on days of Conception for cows kept under different husbandry systems

Table 2. Body Weight (Kg) Body condition score (1-9 scale) and milk yield (Kg) in all husbandry systems

Herd	Body weight (BWT) (Kg)				Body condition (BCS)				Milk yield (MY) (Kg)		
	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±0.8b	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}

$^{a\,b\,c}$ 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

Conclusion:

*Management of post-partum anoestrus under extensive tropical environments should BWT and BCS by strategic of supplementation during late pregnancy and early lactation.

*Restricted suckling would reduce stimulus of cow-calf interaction and hence reduce days to conception. *Nearly all farmers under extensive systems used sorghum grains, it better Using alternative diets.

* * There was no benefit of keeping crossbreds since neither milk yield nor conception rates were improved , Selection could be done among indigenous breeds where adaptation and milk yield were optimum and produce a calf every year.

Contact address: abuelgoni2002@hotmail.com