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WATER INTAKE, FEED CONSUMPTION AND MILK PRODUCTION OF INTENSIVELY MANAGED SAVANNA BROWN DOE DURING THE EARLY AND LATE RAINY SEASON

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SUMMARY

A study was designed to investigate the level of water intake, feed consumption and milk production of intensively managed Savanna Brown does during the early and Late rainy season. Season was found to have significant effect ($P<0.05$) on the pattern of water intake and milk parameters measured. However, feed consumption was not significantly ($P>0.05$) affected by season.

KEY WORDS: Water, Feed, Milk, Savanna Does.

INTRODUCTION

Water makes up two-thirds of the body mass and serves as a medium in which all biochemical activities within the body take place (Campbell and Lasley, 1985). As a result of this, life may be impossible without water. Aganga *et al.* (1988) reported that water is a prerequisite for animals' maintenance of life. They can survive for several days without feed but for less time if deprived of water.

The provision of adequate clean water to farm animals is considered a sound management practice since thirsty animals do not eat as much food as those animals that have access to water *ad libitum.* This results in poor growth, reproduction and lactation (Book and Carpenter, 1990).

Consumption of water is a key point in animal feeding particularly in the arid regions where seasonal variation has been observed to have a detrimental effect on water intake in animals (Ezekwe *et al.*, 1999). Therefore, an investigation to determine water consumption and Milk production in goat will be of great value for water supply management, administration of drugs and other additives used on animals in confinement.

MATERIALS AND METHOD

Location

This study was conducted at Federal University of Technology, Minna, Niger State. Minna is located in the southern guinea savanna ecological zone of Nigeria. It lies within Latitude 9°37' North and Longitude 8°33' East. The maximum and minimum temperature throughout the year are 37.1°C in March and 19.5°C in November while the mean annual rainfall yield range between 1247.3 mm and 1250.0 mm with a duration of between 195-275 days.

Animals

Twelve Savanna Brown breed of does whose characteristic have been described by

Fasanya (1986) were used for this study. The does were between 130 to 146 days pregnant at the onset of the experiment and had a mean body weight of 18 kg. They were allowed a pre treatment period of 14 days. The entire study lasted for sixteen weeks.

The first phase was classified as early rainy season and it lasted 8 weeks (May – June) while the remaining eight weeks represented the late rainy season.

Management

The does were assigned into four groups of 3 does namely, A, B, C and D each group serving as a replicate and kept in confinement during the study period in a randomized complete block design. Seven and half litres of water were supplied to each group daily during both phases of the experiments. Also, the same type and quantity of feed (1.0 kg of cereal bran per group) and 1.5 kg of fresh mango leaves per group were made available on daily basis during both phases of the experiment (Table I). Salt lick was also provided. All does were routinely dewormed and sprayed for the control of endo and ecto parasites, respectively. All animals were identified with numbered neck tags.

TABLE I: Chemical composition of mango leaves and maize bran used in feeding the does

Parameters (%)	Mango leaves	Maize bran
Dry matter	48.42	84.07
Moisture	51.58	5.93
Crude protein	10.00	9.93
Crude fibre	21.30	26.00
Ether Extract	6.29	5.00
Ash	13.37	7.50
NFE	50.04	61.57

Measurements

Daily temperature, concentrate and forage intake, water intake and milk parameters like total solid, fat, protein, sodium, potassium, chloride, nitrate, ash and daily milk yield were measured as shown below:

Temperature

Environmental temperature was measured twice a day (7.00 am and 2.00 pm) using a thermometer. The average between these two served as the mean daily temperature.

Concentrate and Forage Intake

The amount of concentrate and forage provided each day was noted. Left over concentrate and forage were also weighed very early in the morning on the next day. The difference between the amount supplied and the left over represented the intake.

Water intake

Seven and a half litres of water was supplied to each group daily and the left over was recorded the next morning. The difference between the amount of water supplied and the left over represented the water intake.

Milk yield

This was achieved by hand-milking dam every morning and measuring the quantity of milk obtained from each dam in a measuring cylinder. Prior to milk collection, the pen and equipment were thoroughly cleaned. The udder and surrounding areas were also cleaned with disinfected water.

Milk composition

Milk samples obtained in each of the four groups were pooled together such that there were four samples per season, each serving as a replicate and the proximate analysis was conducted using AOAC (1994) procedure.

Values obtained in all the groups were compared.

Statistical Analysis

Data on environmental temperature, water intake, concentrate and forage intake, milk yield and composition were subjected to t-test using a computer package "Minitab for Window release 9.2".

RESULTS

Mean temperature during the early rainy season was 30.32 ± 0.45°C with a range of 27.90-31.90°C while the mean temperature during rainy season was 27.79 ± 0.26°C with a range of 26.80-29.00°C (Table II). This was found to differ significantly ($P<0.05$) with the mean temperature at early rainy season higher than late rainy season.

Water intake also deferred significantly ($P<0.05$). Higher value (0.93±0.04 litre) was recorded during the early rainy season while the least value (0.63±0.03) was recorded during the late rainy season. There was no significant difference ($P>0.05$) in forage and concentrate intake as well as body weight (Table II) during both seasons.

The results on milk parameters are given in Table III. Milk yield was significantly ($P<0.05$) higher during the early rainy season than late rainy season. However, milk composition improved during the late rainy season. Total solid, fat, sodium and potassium differed significantly ($P<0.05$) with season while protein, ash, non fat solids, chloride and nitrate did not differ significantly ($P>0.05$).

TABLE II: Mean weekly water, forage and concentrate intakes, temperature and body weight of does during early and late rainy season

	Temperature (°C)		Water intake (l)		Concentrate intake (kg)		Mango leave intake (kg)		Body weight (K	
Week	*ERS*	*LRS*	*ERS*	*LRS*	*ERS*	*LRS*	*ERS*	*LRS*	*ERS*	*LRS*
0	31.6	28.40	0.66	0.81	1.43	1.54	0.57	0.48	18.67	15.04
1	31.90	26.80	1.09	0.65	1.78	1.68	0.61	0.56	19.84	16.34
2	30.50	26.90	0.95	0.62	1.70	1.69	0.60	0.67	16.75	16.16
3	31.30	27.60	0.95	0.72	1.73	1.77	0.78	0.65	16.96	16.79
4	30.80	28.20	1.01	0.58	1.80	1.75	0.95	0.71	17.25	18.13
5	30.60	27.20	1.04	0.63	1.73	1.75	0.75	0.68	15.67	17.96
6	28.70	27.50	0.91	0.59	1.70	1.79	0.75	0.83	16.00	18.08
7	29.60	29.00	0.88	0.56	1.78	1.76	0.72	0.84	16.00	18.17
8	27.90	28.50	0.87	0.52	1.67	1.70	0.70	0.78	15.08	19.17
Means	30.32	27.79	0.93	0.63	1.70	1.71	0.71	0.69	16.89	17.32
	±0.45[b]	±0.26[a]	±0.04[b]	±0.03[a]	±0.02[a]	±0.02[a]	±0.03[a]	±0.03[a]	±0.01[a]	±0.01[a]

a,b = Values with different alphabets in the same row are significantly different ($P<0.05$)
ERS = Early raining season
LRS = Late raining season

TABLE III: Parameters of milk obtained from the Savanna Brown doe during the early and late rainy seasons.

Parameters	Season	
	Early rainy season	Late rainy season
Milk total solid(%)	15.90 ± 0.05^{a}	16.83 ± 0.07^{b}
Milk fat (%)	2.63 ± 0.02^{a}	3.84 ± 0.02^{b}
Milk protein(%)	4.98 ± 0.11^{a}	5.19 ± 0.13^{a}
Non fat solids (%)	13.28 ± 0.18^{a}	12.98 ± 0.09^{a}
Ash (%)	0.87 ± 0.04^{a}	0.84 ± 0.03^{a}
Chloride (%)	0.15 ± 0.03^{a}	0.15 ± 0.04^{a}
Nitrate (%)	0.17 ± 0.02^{a}	0.18 ± 0.02^{a}
Sodium (PPM)	391.88 ± 4.25^{a}	569.45 ± 7.83^{b}
Potassium (PPM)	1477.41 ± 4.49^{b}	1418.00 ± 5.38^{a}
Mean daily Milk yield (mHs)	145.52 ± 1.04^{b}	92.12 ± 0.80^{a}

a,b: values with different alphabet in the same row are significantly different ($P<0.05$)

DISCUSSION

Significantly more water ($P<0.05$) was consumed during the early rainy season than the late rainy season (Table II). This observed increase could be attributed partly to the high environmental temperature recorded during this period. High environmental temperature is known to encourage animals to drink more water in order to maintain the water balance of the body (Ezekwe *et al.*, 1999). In addition, since the does were all lactating, they would require a lot of water for milk synthesis particularly during the early rainy season which coincides with the period of peak lactation and high environmental temperature. This was in agreement with earlier report by Giger (1987) who showed that high lactating animals would require more water to produce efficiently since metabolism increases in lactating animals.

The pattern of forage and concentrate consumption as well as the body weight of does which were not significantly ($P>0.05$) affected by season could be due to the fact that the does were all at similar stage of maturity and physiological state which made their nutritional requirements to be similar.

Milk total solid, fat and sodium were significantly ($P<0.05$) higher during the late rainy season while the mean daily milk yield and potassium content of milk were significantly ($P<0.05$) higher during the early rainy season (Table III). These variations could be largely attributed to the stage of lactation of the does. According to Campbell and Lasley (1985), milk yield and milk mineral are usually high in early lactation which coincides with early rainy season in this study while milk protein and non-fat solids shows less seasonal fluctuation than fat. This could be responsible for the non-significant ($P>0.05$) difference observed for milk protein. Nitrate, ash and chloride observed in this study as well as the significantly ($P<0.05$) high values of total solid and fat recorded during the late rainy season in this study. Castle and Watkins (1979) also reported that voluntary intake is generally low in early lactation and body reserves are used to support high milk production whereas in late lactation, voluntary feed intake is relatively high while milk yield is low and unresponsive to extra feeding.

Conclusion and recommendation

Results obtained from this study showed that season as well as stage of lactation had a remarkable effect on the pattern of water intake, milk yield and composition. However, forage and concentrate intake

were not significantly (P>0.05) affected by the season or stage of lactation.

Therefore, it is recommended that lactation activities should be planned to coincide with the early rainy season when animals are less stressed and higher milk yields are guaranteed.

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