THE EFFECT OF FEEDING DIFFERENT ENERGY LEVELS ON THE REPRODUCTIVE PERFORMANC OF BUFFALO

BY

Salama, A.A , H.M. Ali , and M.M. Shokry

NATIONAL RESEARCH CENTER

DOKKI , CAIRO , EGYPT

INTRODUCTION

Most buffaloes are located in countries where land , cultivated forage crops , and pastures are limited . Usually feedstuffs are in such short supply that few animals have a balanced diet. In Egypt, summer feeding seems to be one of the most costly phases in buffalo production . Wallace, 1946 and Hafez, 1968 reported that nutrition level in rations of farm animals affected their reproductive performance . Limited nutrition of ewes during late pregnancy exerted marked effect upon birth weight of lambs (Hafez, 1968) .

The effect of energy level on ovarian activity , onset of puberty and post partum anoestrus was throughly investigated for different farm animals. (Clark,1934 ; McKenzie and Terril, 1937 ; El Sheikh et. al., 1955 ; Foot et. al., 1959 ; Crichton et. al., 1959 ; Reid, 1960 ; Wiltbank et. al., 1962 ; McGinity and Ray, 1975; Falk, 1974 ; Phillips et. al., 1978 and Phillips and Vavra, 1981)

Very little is known about the water buffalo concerning the effect of energy level on reproductive performance . Therefore , this study was designed to determine the effect of pre-calving energy level on pre-calving and post-calving weight changes , days to first post partum estrus , conception rate and birth weights and calf weaning weight at 120 days old.

MATERIALS AND METHODS

Shortly after weaning their calves , twelve mature pregnant buffaloes were used in two seasons study . Buffaloes were alloted in two group treatments with six buffaloes each. The treatments were high energy level (H) and low enrgy level (L) . The energy level was approximated by changing the roughage concentrate ratio of the ration based on the requirements given by the National Research Council (NRC) for dry prgnant cow. Buffaloes were fed individually and feed were

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offered twice daily.The design of the experiment include feeding HH energy level and HL level during pre-calving and post-calving period .The design was reversed during the second season to be LL and LH energy level.

Rations used consisted of clover (Trifolium alexandrinum) and wheat straw as roughages. The Co-op feed mixture was the concentrate . The Co-op feed Mixture consists of 63% cottonseed cake; 20% rice bran; 10% wheat bran; 3% molasses; 3% limestone and 1% sodium chloride. The chemical composition and ammount of meal offered for different treatments are given in table 1. The ammounts of roughages and concentrates were computed to allow the maintenance requirements as well as production requirements based on TDN values. The high energy treatment approximated 4 Kg of TDN/head/day , before calving. The ammount was raised to 7 Kg after calving . The low energy level approximated 2 Kg TDN/head/day before calvind and 4 Kg/head/day after calving . Protein allowances were held constant in the two group treatments .

Buffaloes of the HL and LL groups which did not show oestrus or stopped cycling within 4 months after calving were raised to the level of 7 Kg TDN . Buffaloes diagnosed as pregnant were directly removed from the experiment.Initial weight were taken as an average of three consecutive weights . Buffaloes were weighed monthly where additional weights were taken 3 weeks post-partum and when pregnancy was diagnosed . All weights were taken in the morning before feeding and when buffaloes were off water for 18 hours .

Rectal examination of the genital system started 2 weeks after calving and continued every other day until complete uterine involution and until buffaloes showed oestrus. After oestrus buffaloes were examined to determine ovulation and later on cel formation. 45 days after breeding buffaloes were polpated for pregnancy. A teaser bull helped to diagnose oestrus and oestrus buffaloes were bred at the first oestrus period. After calving buffaloes were weighed bimonthly up till the third month. Calves were weighed monthly up till weaning at 120 days old.

Data obtained were statistically analyzes to test significant differences among treatments according to Snedecor, 1955.

TABLE 1. THE NUTRITIVE VALUE OF INGREDIENTS USED AND AMOUNTS OFFERED DAILY

Ingredients	Nutritive value						Daily Offered Amounts	
	Ash	CP	EE	CF	DP	TDN	H	L
Clover	2.06	1.8	0.4	3.7	2.o	11.8	30.0	10.0
Wheat Straw	14.9	4.1	1.9	22.3	1.1	39.3	3.0	1.0
Co-op Feed Mix.	6.0	29.4	7.9	21.0	13.1	59.2	2.4	4.5

CP = Crude protein , EE= Ether extract , CF = Crude Fibre , DP = Digestible Protein and TDN = Total Digestible Nutrients

TABLE 2. EFFECT OF ENERGY LEVEL ON AVERAGE BODY WEIGHTS

Treatment	No. of animals	Intial weight	Weight before calving	Weight change	Weight after calving				
					15	30	45 days	60	90
HH	6	435.2	509.5	74.3	458	454	451.5	469.8	452.3
HL	6	522.3	596.0	73.7	511.2	492	475.2	465.5	464.0
LH	6	468.5	411.7	-56.8	386.2	378	379.7	381.2	403.0
LL	6	452.3	393.3	-59.0	338.8	322	317.8	313.7	308.5

TABLE 3. THE AVERAGE PERFORMANCE OF CALVES FROM BUFFALOES FED ON DIFFERENT ENERGY LEVELS PRIOR TO CALVING

Treatment	Average body weight of calves in kilograms					
	at birth	15 days	30 days	60 days	90 days	120 days
H	42.3	53.8	64.8	76.8	87.8	98.2
L	35.8	46.4	55.8	66.8	77.0	85.2

RESULTS AND DISCUSSION

Buffaloes weight and weight changes during the two seasons are shown in table 2. Despite the remarkable differences among individuals in their initial body weights but they are not statistically significant. During the last period , buffaloes in the high treatment group gained weight and looked more healthy. Buffaloes in the low treatment group lost weight and were negatively affected at calving time. The weight of buffaloes before calving showed a highly significant differences amongst the two groups. After calving, buffaloes weights showed no significant differences among the two groups . During the post-calving it was noticed that high energy level group was of higher body weights , however,the differences among the two treatment groups were highly significant ($P<0.01$) . The average values for calves birth weights differed by 7.58 Kg . The differenc reached 13 Kg by the weaning time at 120 days old.The results coming out from this particular experiment suggest that pre-calving energy level infeluence the subsequent calf performanse which is not the case in cows as reported by Falk et.Al., 1974 and Philips et.al., 1978. Over four years, Phillips and Vavra, 1981, reported no infeluence for the pre-calving energy intake on calf performance (table 3).

Involution time of the uterus was not signifcantly affected by the treatment (table 4) but it seems that utrine involution tends to be slow in the buffaloes receiving low energy level. Pos-partum oestrus was significantly infeluenced by the energy level prior to calving. Buffaloes receiving high energy level prior to calving exhibited sooner and higher percentage of buffaloes cycling before 80 days after calving . Buffaloes fed on the low energy level (LL) failed to exhibit normal cycling . The two seasons averages indicate that post calving energy level effect on oestrus is greatly conditioned by the pre calving energy level.(table 4). However the interval from calving to post partum oestrus in the (LL) and (LH) groups was longer than the other two groups . Thus it appears that low feeding levels before calving has an effect on the lenght of the interval from calving to post partum oestrus, which was not recovered by the the high energy level after post partum.

TABLE 4. OCCURANCE OF OESTRUS AFTER CAVING AND UTRINE INVOLUTION

Treat-ment	occurance of oest. after calving						1st post-partum oest.	anoest.	stopped cycling	sielent heat	Invol. time
	50 day	60	70	80	90	120					
H.H	50%	66.7%	83.3%	100%	100%	100%	54.83	0.0	0.0	33.3%	34.83
H.H	50%	66.7%	66.7%	83.3%	83.3%	33.3%	54.4	33.3%	50%	0.0	36.00
L.H	33.3%	33.3%	66.7%	83.3%	83.3%	100%	66.17	0.0	0.0	16.7%	37.00
L.L	0.0	0.0	16.7%	33.3%	50%	167%	75.25	33.3%	50%	0.0	37.00

TABLE 5 EFFECT OF ENERGY LEVEL ON CONCEPTION RATE

heat	conceptive oestrus			interval calving to cencepti	bred	bred not concieved	average serv./ concep.	preg. duration
	1 st	2 nd	3 rd	n				
H.H	50%	33.33%	1.67%	74.67	100%.	0.0	1.67	315.50
H.L	33.33%	33.33%.	33.33%	77.33	83.33 %.	33.33 %.	2.00	315.67
L.H	33.33 %.	50 %	1.67 %	111.17	100 %.	0.0	1.83	315.33
L.L	0.0	0.0	33.33 %	150	83.33 %.	50 %.	3.00	315.33

The conception rate in the different treatment groups are shown in table 5. Generaly speaking pre-calving energy level did not infeluence conception rate it seems that the post -calving energy level was more effective in this trait. Buffaloes fed on low energy level pre and post calving showed the lowest values for conception rate and moreover, feeding low energy levels resulted in stoped cycling in later stages. However, the interval from calving to conception was mostly infeluenced by the tincreased length of the period from calving to post-partum oestrus (table 4) . Buffaloes on low energy level during post-calving which refused to come into oestrus or stopped cycling 120 days post-partum , exhibited cycling, ovulation and conceived when the energy level was increased , but the conception rate was the same in both groups as regardes the number of cervicies / conception or the conception rate at first service. The average interval from changing the feeding level to first oestrus or cycling was 44 days. Similar results were obtained by Marsh et.al., 1959 ; Wagnon et.al., 1959; Wiltbank et.al., 1962; Falk et.al.,1974; Pillips et.al.,1978 and Phillips and Vavra,1981. as regardes cows. It is obvious from the data of this particular study that high energy intake in buffaloes rations will be rsulted in increasing calving percentage which is the same findings with cows (Knop and Watkins, 1958; Warnick, 1959; Wagnon et.al.,1959 and Wiltbank et.al., 1962).

Energy level after calving affects the conception rate in cows (Penney et.al., 1960; and Wiltbank et.al., 1962) . The findings of Marsh et.al.,1959 and Wiltbank et.al., 1962 indicated that lack of energy could be a limiting factor in the performance of cows . These findings are supported by the findings of this study concerning the buffaloes. The lack in the ovarian activity noticed in buffaloes fed low energy levels could be explained as a result of a failure to release gonadotrophins from the pituitary or a lack in production of these hormones , or even both mechanisms may be involved .

Further work is now underway to clarify the reproduction aspects of water buffalo as it is the most milk yielding animal in Egypt.

ABSTRACT

Twelve mature pregnant buffaloes , shortly after weaning their calves were alloted at random into two groups . Each group were fed one of two energy levels , high (H) or low (L) which were 100 % and 80 % of National Research Council (NRC) energy recommendations for maintenance of a dry pregnant cow. Protein allowances were kept constant in the two treatments. After post-calving the group fed on high energy level were fed on either high or low energy level, then the design was reversed . The experiment lasted two years.

The results showed that there was no significant differences between the two treatments in intial body weight . The calves weights differed significantly in the two groups . Before calving there was a highly significant difference among treatments in body weight . The weight of buffaloes after calving was not affected by the energy level offered .

Post partum estrus was significantly infeluenced by the energy level . The average for conception rate and date to first post-partum estrus were almost similar. The low energy level after calving lowered the pregnancy rate.

R E S U M E N

Doce búfalas adultas gestantes, poco después de haber destetado sus terneros, se distribuyeron al azar en dos grupos. Cada grupo se alimentó con dos niveles de energía diferentes, alto (H) o bajo (L), poseian el 100 % y el 80 % respectivamente de las recomendaciones para la energía publicadas por el National Research Council (RNC) para la conservación de las vacas secas en gestación. Las disponibilidades de proteinas se mantuvieron constantes en los dos tratamientos. Después del parto, el grupo alimentado con nivel de alta energía se alimentó bien en alta o bien en baja energía y el diseño fué invertido. Los experimentos duraron dos años. Los resultados demostraron que no existen diferencias significativas entre los dos tratamientos en el peso vivo al nacer. Los pesos de las terneras difirieron significativamente en los dos grupos. Antes del parto existió

una altamente significativa diferencia entre los tratamientos en el peso corporal. El peso de las búfalas después del parto no fué afectado por el nivel ofrecido de la energía. El estro post partum estuvo significativamente influenciado por el nivel de energía. La media por tipo de concepción y la fecha al primer estro post partum fueron casi análogas. El nivel de baja energía después del parto disminuyó el tipo de concepción.

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