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EFFECT OF THE FLUSHING AND LATE-GESTATION SUPPLEMENTARY FEEDING ON FERTILITY AND PRODUCTIVITY OF HARNAI EWES

by

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EFFECT OF THE FLUSHING AND LATE-GESTATION SUPPLEMENTARY FEEDING ON FERTILITY AND PRODUCTIVITY OF HARNAI EWES

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A B S T R A C T

Eighty-one Harnai ewes grazing native range were used in an experiment designed to examine the effect of flushing and late-gestation supplementary feeding on ewe fertility and productivity at Tomagh Range Livestock Research Station, in Loralai district, Baluchistan. The animals were divided into three groups of twenty-seven animals each. These three groups were assigned three flushing treatments at random: barley grain (300 g/head/d), cottonseed cake (100 g/head/d) and control (no supplementary feed) for six weeks. On the 110th day from the start of breeding each of the three main groups was divided into three sub-groups of nine animals each. Three sub-groups of each main group were randomly assigned to one of the three late-gestation supplementary feed treatments: barley grain (300 g/head/d) cottonseed cake (100 g/head/d) and no feed (control). The results indicate that flushing had a significant ($P<0.05$) effect on the maintenance of ewe body weights. Late-gestation supplementary feeding with barley grain also had a significant ($P<0.05$) effect on maintenance of ewe body weights. Results of the study also suggest a fertility rate response to flushing and a positive birth weight response to late-gestation supplementary feed with cottonseed cake.

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I N T R O D U C T I O N

The annual production cycle of sheep in the uplands of Baluchistan starts with the fall breeding season and ends with weaning of lambs in mid-summer. If timing of the breeding season is controlled by the stockowner, it usually takes place during the period of September through November. Thus, the late-gestation phase will generally occur from February to April, depending on when breeding started. Late-gestation in this context refers to approximately the last month of the typical 155-day gestation period for sheep.

Flushing is a supplemental feeding practice used during the pre-breeding and breeding periods to increase conception rates. This early phase in the production cycle and the late-gestation phase are considered to be the most critical periods in the nutritional management of sheep. It is during these periods when deficiencies in the nutritional status of ewes are most likely to affect lambing percentages and other production parameters. These nutritional deficits can be especially pronounced when ewes are obtaining essentially all of their nourishment from range forage which is low in protein, energy, and digestibility. Adding to the nutrient supply problem are the extremely low

air temperatures during late-gestation, which increase the ewe's need for feed energy to maintain body weight and to provide for the accelerating growth of the foetus.

The present study was designed to compare animal responses in terms of conception rate, birth weight, and lambing percentages to different kinds and levels of nutritional management during critical reproductive periods. The ultimate objective of this research is to develop economically sound feeding strategies which can increase the fertility and productivity of sheep raised principally under rangeland conditions.

MATERIALS AND METHODS

SITE: The study was conducted at Tomagh Range-Livestock Research Station, situated on the Tomagh State Forest, 15 Km west of Sanjawi in Loralai District at an elevation of 1,800 m. The average annual precipitation at Tomagh is estimated to be 300 mm, and is distributed approximately 60% and 40% between winter and summer periods, respectively.

ANIMALS: Eighty-one ewes of the Harnai breed were included in the study. The animals were two to three years of age at the start of the experiment.

GRAZING: All ewes were grazed together on the mixed grassland-woodland range. Each animal had essentially equal access to the available range forage, which consisted mainly of the two perennial grasses, Cymbopogon jawarancusa and Chrysopogon aucheri. The shrub and low tree component of the range vegetation included Prunus persica, Ebenus stellatus, Ephedra intermedia, and Olea cuspidata.

BREEDING: Three rams, two years of age, were placed with the ewes on September 15, 1987. The rams were in good physical condition throughout the breeding season, which ended on October 15.

SHEARING: The animals were shorn in April and September. Shearing twice per year is the common practice in this area.

HEALTH COVER: All the animals were given appropriate health care timely vaccination, drenching, etc.

NUTRITIONAL TREATMENTS:

FLUSHING: The 81 ewes were divided in to three groups of 27 animals each. Each of the three groups was randomly assigned to one of the following feed supplementation treatments:

1)	Barley grain	@ 300 g/head/day
2)	Cotton seed cake	@ 100 g/head/day
3)	Control	No flushing feed

The duration of the flushing was six weeks. Flushing started two weeks before breeding and continued for the four week breeding period. All the animals in each group were fed the experimental rations in the afternoon after grazing. Because the range feed availability was very poor due to the severe drought in this area during the experimental period (ICARDA, 1989; Kidd et al., 1988) all the animals were offered @50 g/head/day of lucerne hay from December 1st to February 1, 1988.

LATE PREGNANCY SUPPLEMENTARY FEED: On the 110th day from the start of breeding each of the three main groups was divided into three sub-groups of nine animals each. Three sub-groups of each main group were randomly assigned to one of the following three feed supplementation treatments:

1)	Barley grain	@ 300 g/h/day
2)	Cotton seed cake	@ 100 g/h/day
3)	Control	No supplementary feed

Late-gestation and early lactation supplementary feeding lasted for ten weeks, of which the first six weeks occurred prior to lambing.

OBSERVATIONS RECORDED

1) Live weights of ewes at the start of experiment and then at two week intervals until end of the study.

2) Number of services and conception rate.

3) Birth weights of lambs.

4) Ewe and lamb mortality.

RESULTS AND DISCUSSION

There was no significant difference ($P<0.10$) in the birth weights of lambs among the first seven treatments listed in Table 1. This set includes all of the flushing groups (with or without late-gestation supplementation) and the late-gestation cottonseed cake supplementation sub-group. However, of these seven groups, only the two sub-groups which received only cottonseed cake alone had significantly ($P<0.10$) higher birth weights than the control group or the late-gestation barley supplementation sub-group. The latter two treatments were not significantly different ($P>0.01$).

The trend in overall average liveweight of the ewes during the experiment is shown in Table 1. Flushing had a significant ($P<0.05$) effect on the maintenance of body weights of the ewes during the first 120 days of pregnancy (Figure 1). However, there was no significant difference in response in liveweight to supplementation with cottonseed cake and barley grain compared with the control group. Although the duration of the flushing was only six weeks, its effect seems to have been carried over to the 20th week of pregnancy.

Late-gestation supplementary feeding with barley grain had a significant ($P<0.05$) effect on maintenance of body weights of the ewes as compared to the control group. In

Table 1. CHANGES IN LIVEWEIGHT OF EWES WITH OR WITHOUT FLUSHING AND LATE GESTATION SUPPLEMENTATION

Reproductive stage / FEEDING REGIMES		AVERAGE LIVEWEIGHTS OF EWES				LAMBS	
		Initial weights (Kg)	At breeding (Kg)	At the end of flushing (Kg)	At the start of L.G.S. (Kg)	No. born	Av. birth wt. (Kg)
Flushing	L.G.S.						
BG	CSC (9)	31.89	32.50	33.72	26.96	9	2.88ab
BG	BG (9)	30.00	30.94	32.44	27.82	9	2.89ab
BG	X (9)	31.78	32.39	33.28	26.36	9	2.50ab
CSC	CSC (9)	29.89	30.56	31.89	26.67	9	3.16a
CSC	BG (9)	30.11	30.72	32.11	27.41	8	2.73ab
CSC	X (9)	29.11	30.06	31.39	25.66	9	2.77ab
X	CSC (9)	31.00	31.22	30.44	25.73	8	3.10a
X	BG (9)	30.11	30.33	29.94	26.08	7	2.33b
X	X (9)	31.22	31.28	30.28	24.57	8	2.33b

Note: Values with different letters in the same column are different (P<0.1)

Abbreviations used:

L.G.S. Late-gestation supplementation ; BG Barley grain;
CSC Cotton seed cake ; X Control;
(9) No. of ewes in feeding treatment groups

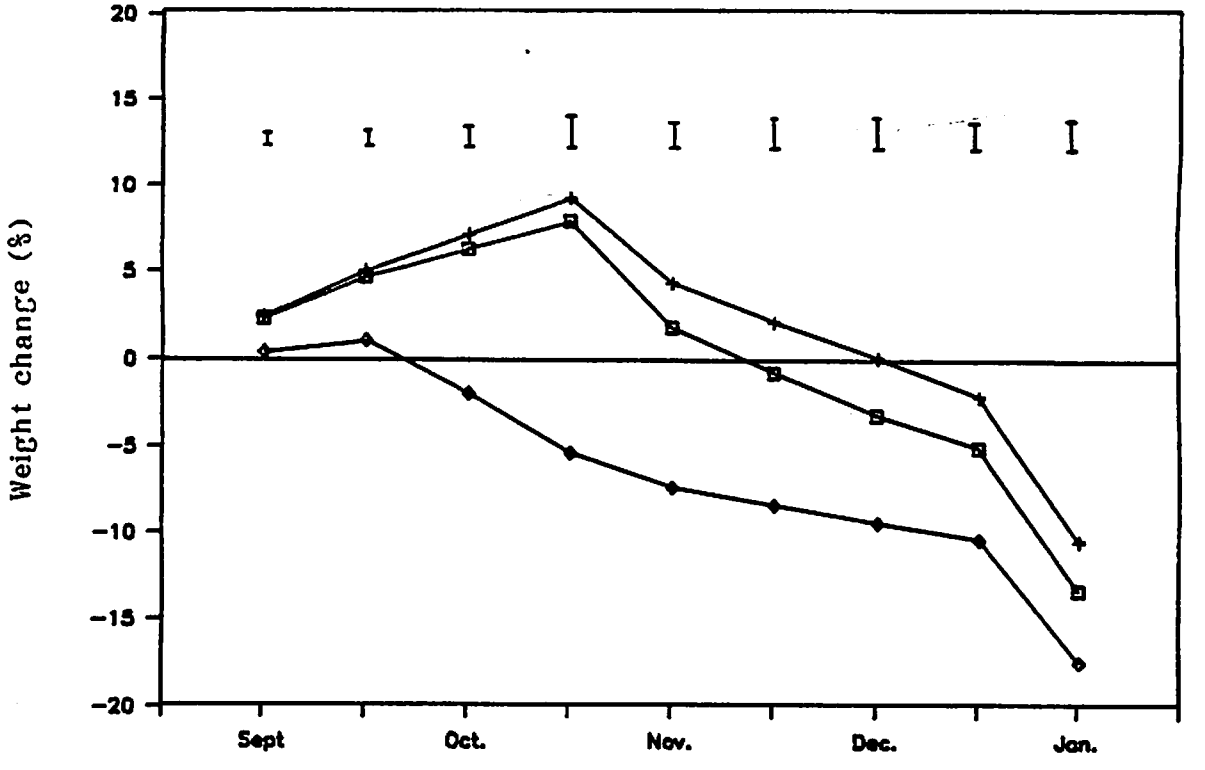

Figure 1. Effects of flushing on ewe liveweights, 1987/88.

Bars represent 2 standard errors of the mean.

□ barley grain; + cottonseed cake; ◇ control.

contrast, cottonseed cake supplementation had no significant effect on the maintenance of body weights of ewes during the late-gestation period, (Figure 2). The duration of the late-gestation supplementary feeding was ten weeks and the substantial effect of the barley grain supplementation was evident even during lactation. The Harnai ewes in this study had a 94% fertility rate and about a 99% weaning rate. The average gestation period was 155 days (Table 2).

During their annual production cycles, sheep experience a series of weight gains and losses corresponding mainly to seasonal fluctuations in range-forage availability. If no steps are taken to provide supplemental feed during the normal periods of forage deficit within annual production cycles, and for longer periods during drought, sheep under these conditions will not yield lambs at the level of their genetic potential. This shortfall results from the effect of inadequate nutrition on productivity rates, as well as the direct effect of malnutrition on the productivity and mortality rate of adult sheep.

It has been reported that nutritional status in early pregnancy has little effect on lambing percentages (Honmode and Patil, 1975), but extremely high or low levels of feeding can result in embryonic losses during early pregnancy (Doney, 1979; Huston, 1981). Flushing for only two weeks prior to breeding has been observed to increase

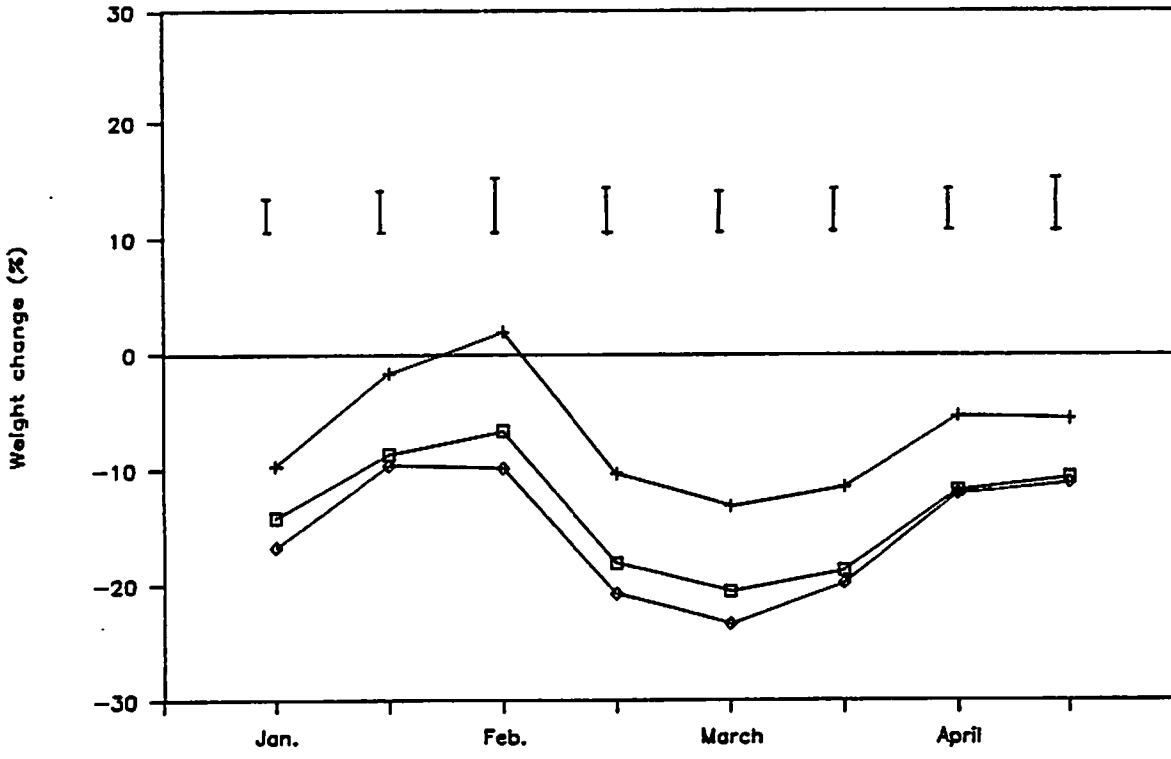

Figure 2. Effect of late-gestation supplementation on ewe liveweights, 1987-88.

Bars represent 2 standard errors of the mean.

□ Cottonseed cake + Barley grain ◇ Control

Table 2 **REPRODUCTIVE PERFORMANCE OF HARNAI EWES AT TOMAGH**

1.	Date of breeding	September 15, 1987
2.	Number of ewes at breeding	81
3.	Number of ewes at lambing	81
4.	Number of ewes having lambed	76
5.	Number of lambs aborted	0
6.	Number of lambs born	76
7.	Number of lambs dead (0 - 90 days)	1
8.	Number of lambs weaned (90 days)	75
9.	Fertility rate #4+#5/#3	94%
10.	Prolificacy #6/#4	100%
11.	Weaning rate #8/#6	99%
12.	Number of lambs weaned per ewe put at breeding	0.93
13.	Number of oestrous availed by the ewes to conceive	

One	75
Two	6
Three	0
Four	0

14.	Services/conception	1.14
15.	Average gestation period (days)	155
16.	Sex ratio (male : female)	1 : 1.2

ovulation and embryo survival rate when animals were kept on a low plane of nutrition (Self et al. 1955).

In the present study supplemental feeding with cottonseed cake particularly at late-gestation increased birth weights. This response is in concurrence with Edey (1969) who found that supplementary feeding during late pregnancy increased the birth weights of lambs and reduced their pre- and post-natal mortality. The live birth weight of lambs in the control group in the present study were somewhat higher than the 2.25 kg average reported by Hasnain (1985) for the Harnai breed. This difference might be due to the better than average health cover and management provided to all the animals in the present study. These results also suggest that a protein supplement, such as cottonseed cake, has a greater effect on increasing lamb birth weights than does an energy supplement such as barley grain. Only four treatment groups (Table 1) in this study had less than a one hundered percent lambing rate and three of them were non-flushing treatment groups. The 27 ewes from the three non-flushing groups produced 23 lambs, a lambing rate of 85%. This is in contrast to average farmer lambing rates of approximately 65% in the area surrounding Tomagh Range-livestock Research Station (Nagy, 1987). The nine ewes which received flushing with cottonseed cake and barley grain as a late gestation supplementation produced eight lambs, a lambing rate of 89%. The two groups with 18

ewes that received flushing, but no late-gestation supplementation had 18 lambs vs. only 15 from the 18 ewes that received no flushing but were supplemented with cottonseed cake and barley grain during late-gestation (a 20% difference).

The results of this study indicate, with even a small improvement in the nutritional status of ewes at critical periods, and with good prophylactic health care, that it is possible to achieve high levels of productivity with range sheep in upland Baluchistan.

A C K N O W L E D G E M E N T S

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