EFFECT OF PLANE OF NUTRITION ON WOOL GROWTH IN LOHI SHEEP

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The effect of plane of nutrition on wool growth in *Lohi* sheep was investigated. Fifteen adult ewes selected at random were divided into three groups of high to low uniform, and low to high dietary regime groups. They were fed *ad libitum* chaffed berseem hay and cottonseed cake in the ratio of 60: 40, for five different periods of six weeks each. Analysis of wool growth of samples from 10 X 10 cm. mid-side area, taken after every 6-week interval indicated that the differences in planes of nutrition, periods of feeding and interaction plane x period were highly significant.

The mean weight of wool growth in high to low dietary regime group was not significantly higher than that in uniform dietary regime group, but both these groups produced higher wool growth than low to high dietary regime groups. The mean production of wool differed significantly in different feeding periods.

INTRODUCTION

Pakistan produces about 41 million pounds of wool annually and the bulk of it is exported to other countries. Wool ranks third in importance among the exportable commodities, earning a considerable amount of foreign exchange of which dollars form a substantial portion. Pakistan wool is classed as carpet wool in international market, but it includes also a fair proportion of fine wool which can be utilized for making apparel cloth. The future developments aim at the increased production of more improved wool.

Research on Pakistan wool has not received adequate attention. Quantitative and qualitative improvement of the wool depends on the basic information on intrinsic and extrinsic characteristics of wool fibre. *Lohi* sheep is regarded as a general purpose breed in Pakistan and is reared mainly for mutton and wool. It would be expected that the growth of the wool both in quantity as well as in quality is markedly influenced by fluctuations in the nutritional status. The present investigation was made to study the effect of plane of nutrition and wool growth in *Lohi* sheep.

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REVIEW OF LITERATURE

Marston (1948) reported that the rate of wool growth (weight of wool produced per unit time) increased 440—600 per cent from the lowest to the highest level of feeding and that change was reflected in both the mean length and in the mean diameter of the fibre. Schinckel (1960) found that on controlled feed intakes, differences between sheep and between groups were less than those under field grazing or *ad libitum* pen feeding. He concluded that a significant portion of the differences in wool production at grazing was referable to differences in feed intake.

Ferguson *et al.* (1949) reported that rate of growth was closely related to nutrient intake although individual animals differed greatly in the efficiency with which they convert feed into wool. Daly and Carter (1955) found significant and positive correlation between wool growth and feed intake in a number of studies on sheep fed at different levels of nutrition. Dunn (1958) indicated that a high level of nutrition produced a large increase in fibre cross-sectional area, fibre length and body weight in Merino sheep. More recently Wodzicka (1960) showed that rams of Columbia Southdale, Merino and Hampshire breeds produced insignificantly more wool in summer than in winter, the mean temperature ranging between 30 and 85°F. Similarly, Ferguson *et al.* (1949) showed a positive influence of the environmental temperature on wool growth rate in Corriedale and Camden Park Merino Sheep, fed at a uniform level, at a mean temperature ranging from 55 to 80°F.

MATERIAL AND METHODS

Fifteen adult ewes of *Lohi* breed, of uniform weight and size were selected at random from Livestock Farm, West Pakistan Agricultural University, Lyallpur. The ewes were divided into three groups, of five ewes each as follows : High to low dietary regime group, uniform dietary regime group, and low to high dietary regime group (Fig. 1).

The ewes were housed in pens and were fed for five periods of 6 weeks each. The ration composed of loose mixture of chaffed berseem hay and cotton seed cake in the ratio of 60 : 40 parts was prepared in a single batch for the whole of the experimental period to ensure uniformity. Samples of feed were analysed and the results of analyses are given in Table 1.

RESULTS AND DISCUSSION

The weight of mean wool growth for each period on the patches (10 × 10 cm.) located on the left-mid side area is given in Fig. 2. The data on wool production were subjected to analysis of variance (Table 2) and it was observed

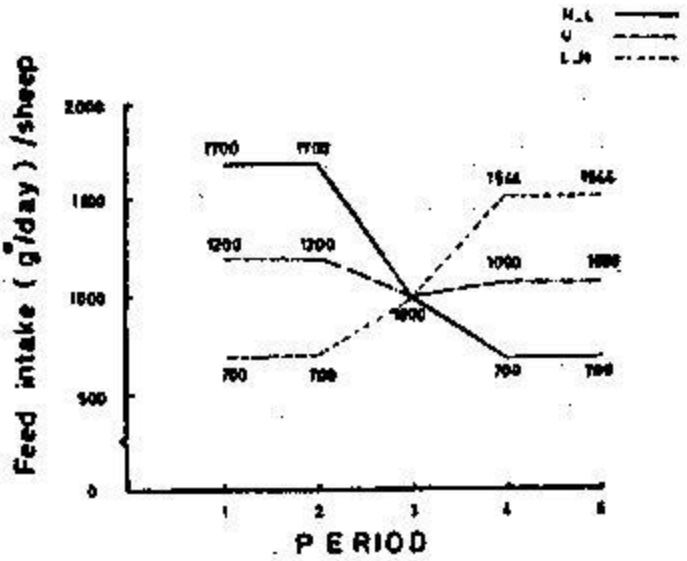

Fig. 1. Mean daily feed intake/sheep for six weekly periods.

TABLE I. *Composition of Feed.*

(Berseem hay chaff and Cottonseed cake 60 : 40)

Period		Dry Matter %	Protein %	Crude fat %	Crude fibre %	N-F.E %	Ash %
1	..	90.15	14.44	5.21	20.0	41.57	8.93
2	..	90.41	16.40	4.13	23.5	39.08	7.30
3	..	90.06	14.66	5.33	22.0	42.97	5.10
4	..	91.58	14.87	4.88	20.25	46.28	5.30
5	..	91.97	13.13	5.03	24.0	44.16	5.65
Mean	..	90.83	14.70	4.92	21.95	42.81	6.45

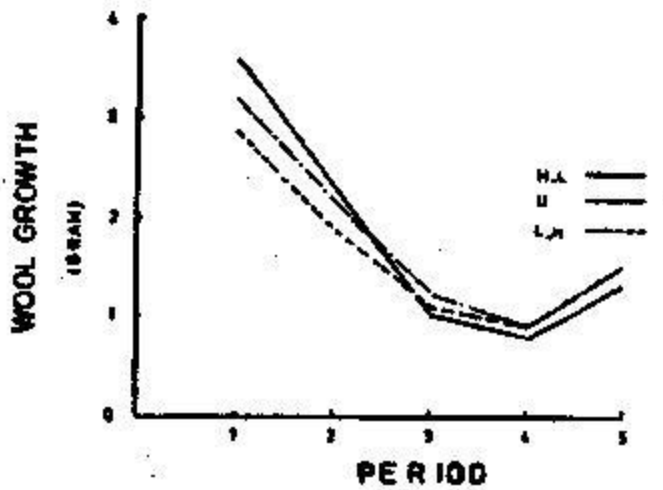

Fig. 2. Mean wool growth for each period measured on six, weekly mid-side samples.

TABLE 2. *Analysis of Variance of Wool Growth*

Variation due to	Degree of Freedom	S. S.	M.S.	F. Ratio
Plane ..	2	0.55	0.275	4.17**
Period ..	4	49.10	12.75	185.98**
Plane X Period ..	8	6.78	0.848	12.85**
Error ..	53	3.51	0.066	
Total ..	67	59.94		

that the differences among the planes of nutrition, differences among the periods, and those among the interaction plane x period were highly significant ($P<.01$).

The mean weight of wool growth in high to low dietary regime group (1.87 gm.) was not significantly higher than that in uniform dietary regime group (1.80 gm.), but the mean weight of wool growth in both of these groups was significantly higher than that in low to high dietary regime group (1.65 gm.). As regards different periods of feeding, the mean production differed significantly from one another. Successive periods resulted in regular decrease in production in the order period 1, 2, 5, 3 and 4, the average mean weight of growth being 3.21, 2.11, 1.44, 1.11 and 0.86 gm. These results are in close

agreement with the results of Ferguson *et al.* (1949), Marston (1948) and Daly and Carton (1955), who found close relationship between nutrient intake and wool production.

During the experiment, the highest mean maximum temperature (102°F.) was observed for period 4, and the lowest mean minimum (41°F.) for period I. The maximum temperature recorded during the observation was 116.2°F on June 29, 1964 and the minimum 31.2°F on January 28, 1964. The mean maximum and mean minimum temperature at the animal house during the experiment is given in Fig. 3 and the pattern of wool growth for each period is illustrated in Fig. 2. It is impossible to measure the influence of temperature, as the feed intake and temperature effects are confounded but it is evident that with increased temperature wool growth decreased. These results, however, differ from the findings of Ferguson (1949) and Wodzicka (1960), who found more growth of wool in summer than in winter when the food supply was optimum.

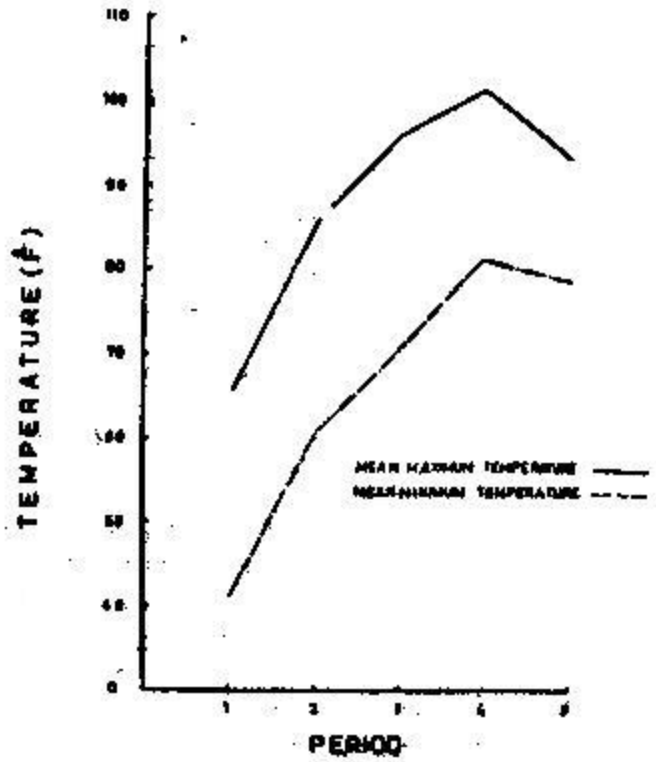

Fig. 3. Mean maximum and minimum temperature values for 6-weekly periods.

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