SUMMARY

An experiment was conducted for 32 weeks to study the performance of native and crossbred weaner lambs under two levels of energy and two levels of protein and to assess the requirement of energy and protein for growth purposes. The digestibility of nutrients, nutrient balance were measured and also the levels of certain blood parameters were studied under these varied planes of feeding of the lambs. The effect of energy and protein level in the diet on the production and quality of wool was also studied.

One hundred and twenty weaner lambs of Chokla (C), Rambouillet x Chokla (R x C), Russian Merino x Chokla (M x C), Nali (N), Rambouillet x Nali (R x N) and Russian Merino x Nali (M x N) breeds, 20 from each breed, were allotted to four nutrition treatment groups, comprising 30 animals in each group (5 lambs representing each breed in each treatment). The treatments consisted of (1) Low energy - Low protein (LL), (2) Low energy - High protein (LH), (3) High energy - Low protein (HL) and (4) High energy - High protein (HH), the TDN and DCP consumption in low and high planes being approximately equivalent to 1½ and 2 times the maintenance requirement. The concentrate mixture comprised of barley, ground nut cake, mineral mixture and vitablend. Cenchrus ciliaris hay was fed as basal fodder ad lib.
Individual feeding was practiced throughout the experimental period of 246 days including a preliminary feeding period of 20 days. The period from the start of the experiment up to first shearing is referred as the first period which was approximately of two months duration. The post shearing period was divided into two periods, referred as the second and third periods representing 6-9 and 9-12 months of age of the lambs respectively. Two metabolism trials were conducted, one at the age of about 6 months and the other at about 12 months of age. Blood samples were drawn by jugular venepuncture at approximately 6, 9 and 12 months of age of lambs and wool samples were taken at 6 and 12 months of age. The weight gain of lambs during the first, second, third and the overall experimental periods were calculated. Blood samples were analysed for Haemoglobin (Hb) Packed Cell Volume (PCV), total protein, plasma urea nitrogen (PUN) and glucose concentrations. Wool samples were analysed for the quality attributes. The data were subjected to analysis of variance test for comparison of the means.

Total body weight gains were found to be 16.48, 17.60, 16.56 and 18.60 kg in treatments LL, LH, HL and HH respectively and 15.77, 18.84, 17.93, 14.97, 17.29 and 18.87 kg for C, M x C, R x C, N, M x N and R x N breeds respectively. The average daily gain (ADG) of HH group was significantly higher (83 g per day) than LL, LH and HL groups. In general, HH treatment was the best followed by LH treatment indicating that high protein
regime was superior than the low protein regime. R x N lambs gained the highest 84 g per day followed by M x C, R x C and M x N lambs. The crossbred lambs gained higher than the native lambs in each level of nutrition. The nutrition x breed interaction was not significant.

During the entire period the average DM consumption per day varied from 705 g to 779 g for different nutritional treatments. The dry matter consumption per 100 kg body weight during first, second and third period were 4.00, 3.40 and 3.40 kg respectively.

The requirement of different nutrients by a weaner lamb at the age of about 4-6 months, having a body weight of approximately 12 kg were for DM 455 g, DCP 36 g and TDN 311 g per day for an average daily gain of about 35 g. A growing weaner lamb of 6-9 months of age and weighing about 20 kg required DM 617 g, DCP 48 g and TDN 422 g per day for an average daily gain of about 70 g. Similarly a growing weaner lamb of 9-12 months of age and having a body weight approximately 30 kg required DM 939 g, DCP 62 g and TDN 631 g per day for an average daily gain of about 95 g.

The overall feed consumption per kg gain was 9.87 kg and 6.68 kg for DM and TDN respectively. The Low energy – high protein and High energy – high protein treatments were more efficient in feed conversion. The Rambouillet x Nali and
Merino x Chokla breeds were found to be the most efficient feed converters than the other breeds studied with a feed conversion ratio of 8 and 9 during the second and total period respectively. The TDN consumption of about 6.10 kg per kg gain was the maximum efficiency obtained in this experiment by Rambouillet x Nali and Merino x Chokla lambs.

The high energy feeding regimes in general, increased the digestibility of DM, EE and NFE and decreased the digestibility of CF as compared with those of the low energy feeding regimes. The high protein diets increased the digestibility of CP and CF in the first trial whereas these differences were not significant in the second trial. The Nali lambs showed significantly higher digestibility for CP and NFE than its crosses, whereas the differences between the Chokla and its crosses were not significant, although Chokla lambs also had higher digestibility values for CP and NFE than its crosses. These differences were not apparent during the second trial.

Nitrogen retention was significantly higher in high protein groups than in low protein groups, irrespective of the energy level. Calcium retention was more in LL and HH groups than in the other two nutrition treatments. Breed differences were nonsignificant for nitrogen and calcium retention. The high energy level showed significantly higher amounts of phosphorus and within each energy level high protein groups showed significantly higher phosphorus balance.
Low energy groups had higher Hb and lower PCV value. Low protein groups had low plasma protein and PUN levels than high protein group. Blood glucose concentration was significantly higher (39.83 mg) in third period as compared to the first and the second periods. Blood glucose, Hb and plasma protein levels were found to be increased with advancing age upto 12 months, whereas PCV and PUN values first increased and then decreased slightly. Hb and PCV was more in Chokla (10.00 and 35.66% respectively) than in Nali (9.56 and 32.83% respectively) and crossbreds, in general, had intermediate values.

The HH group yielded significantly higher grease fleece weight (1545 g), staple length (7.03 cm), fibre diameter (37.35 μ) and medullation percentage (32.46%) than the other treatment groups. Crossbreds performed better than the natives and did not differ among themselves in the quality of the wool fibres.