

Production of Worm-free Lambs at Pasture

RECENT research has shown that a considerable loss of productivity occurs in sheep carrying a sub-clinical infestation of nematodes parasitic in the alimentary tract^{1,2}. This work has depended upon comparisons of worm-free and lightly infected groups of animals and has therefore been carried out in indoor pens. It has been concluded that infected sheep gain weight at less than their optimum rate; but it is not clear how valid these results are for sheep at pasture, under normal conditions of continual reinfection by grazing. In order to measure the actual loss due to sub-clinical parasitism it is necessary to compare normally infected sheep with similar, worm-free animals under grazing conditions. An investigation was therefore carried out during March–July 1954 at the Grassland Research Station, Stratford-on-Avon, into the possibility of raising worm-free lambs at pasture.

As previously indicated³, two essential requirements are (a) a worm-free pasture and (b) a grazing management capable of preventing infection of the lambs from their infested ewes.

The pasture used was a newly sown ley following two successive corn crops. The land had not been grazed by either sheep or cattle for two years. The grazing management adopted was based on the fact that the majority of the nematode eggs passed in the faeces of the host do not reach an infective larval stage for at least three days.

Nine ewes and fifteen lambs were transferred to the pasture when the lambs were less than twenty-four hours old and folded over it, using movable fences. The animals were moved in such a way that they never remained on the same area for more than two days and were never pastured on a previously grazed area. Regular faecal egg-counts were carried out on both the ewes and lambs, 5–10 gm. samples being taken. The average egg-count for the ewes during this period was 300 eggs per gm. No anthelmintic was administered to either ewes or lambs during the time these were in the experiment.

The lambs were weaned at fifteen weeks and their egg-counts at this time were as follows: No eggs of *Nematodirus* spp. were found at any time; two lambs had counts of 2 and 1 *Trichuris ovis* eggs per gm., respectively; five lambs had negative counts for *Strongyloides papillosus*, and of the remainder 12 eggs per gm. was the highest count; the counts for 'other strongyles' were negative for twelve lambs and 1, 3 and 27 eggs per gm. respectively for the remaining three animals.

During the first thirteen weeks only an occasional *T. ovis* egg and low counts for *S. papillosus* were recorded. One lamb appeared to acquire a slight infection shortly before weaning. The complete absence of 'other strongyle' eggs in twelve of the lambs shows that it is possible to raise 'worm-free' lambs in the field. The negligible counts for other species compare favourably with 'worm-free' lambs raised in indoor pens. For comparison, an equivalent group of ewes and lambs were grazed on the re-growth of pasture following the first group and managed in a similar manner on such infected pasture.

It may be noted that at weaning time the average egg-count (excluding *S. papillosus*) of these lambs was 90 eggs per gm. Their peak of 400 eggs per gm. was reached in June, at which time they were dosed with phenothiazine. The worm-free lambs gained weight more rapidly than the sub-clinically infected animals.

The experiment has confirmed that a ley sown on land ungrazed for two years is worm-free. The possibility of retaining 'worm-free' ewe lambs and maintaining them as a 'worm-free' breeding unit, and the effect of age on the development of resistance to infection, are under investigation.

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¹ Gibson, T. E., *State Vet. J.*, **6**, 22 (1951).

² Spedding, C. R. W., *Empire J. Exp. Agric.*, **21**, (84), 255 (1953).

³ Spedding, C. R. W., *Agric.*, **61**, 51 (1954).

Normal Haematological Values in the Buffalo

IN view of the wide range in the characteristics of the blood constituents of various animals, an investigation has been carried out to determine the normal values for various blood constituents of the domestic buffalo (*Bos (Bubalus) bubalis*).

Twenty adult Egyptian buffalo-cows were available at the Animal Breeding Research Farm, Giza, Egypt. They ranged in age from three to ten years and were healthy and non-pregnant. Samples of oxalated blood were taken during the period January–April 1953. Red, white and differential counts were carried out and the diameter of the corpuscles was determined in dry stained smears. The following determinations were made: sedimentation-rate (using Westergren method), clotting time (Sabraz's capillary tubes), haemoglobin content (Halden haemoglobinometer), specific gravity (Weiss copper sulphate method), pH (Beckman pH meter) and the haematocrit (using the Winthrop technique). The following chemical constituents were also determined: blood sugar (Folin and Wu method), plasma proteins and non-protein nitrogen fraction using a semi-micro Kjeldahl method (Van Slyke technique), sodium (Weinback's method), calcium (Roe and Kohn technique) and phosphorus (Fisk and Subba Row's method).

The erythrocyte count was $6.8 \times 10^6/\text{mm}^3$, while the leucocyte count was $6.7 \times 10^3/\text{mm}^3$. In a differential leucocytic count, the percentages of lymphocytes, neutrophils, monocytes, eosinophils and basophils were 51, 36, 8, 5 and less than 1 respectively. The average diameter of erythrocytes was 5.5μ , while the diameters of lymphocytes, neutrophils, monocytes, eosinophils and basophils were 6.8, 11.3, 15.7, 11.8 and 11.8μ respectively.

The physiological and chemical characteristics of buffalo blood are shown in Table 1.

In the buffalo, the erythrocyte count is higher than in cattle and lower than in sheep and horse, whereas the leucocyte count is less than in cattle, horse and sheep. The percentage of lymphocytes, monocytes and eosinophils (in the differential count) in the buffalo is higher than in sheep and horse and lower than in cattle. The percentage of neutrophils in the buffalo is less than in sheep and horse and higher than in cattle. The basophils have almost the same frequency (less than 1 per cent) in all farm animals. The sedimentation-rate in the buffalo is higher than in cattle and lower than in horse, while the haemoglobin content is higher in the buffalo than in all other farm animals. The clotting time of buffalo blood is longer than in sheep, shorter than in horse and similar to that of cattle. In general, buffalo blood is characterized by a relatively (to other farm animals) high