

ENTOMOLOGICAL INVESTIGATIONS

Mr. L. MORRISON

Sheep-dipping Experiments.—An experiment to test the effect of derris dip on lice-infested sheep was commenced on 18th September, 1942. A group of eleven sheep infested with body lice (*Bovicola ovis*) was employed in the trial. One large and two small double-fenced pens were erected to receive the animals. The seven undipped sheep, to serve as controls, were confined in the large pen. The remaining four animals, which were fairly heavily infested with lice, were dipped and placed in pairs in the two small pens. The dipping-bath was a tank with a capacity of 40 gallons. The fluid was prepared from artesian water and derris-root powder (5 per cent. rotenone content) and made up to a strength of $\frac{1}{2}$ lb. powder to 100 gallons water. The period of immersion for each animal was half a minute. About five weeks after the experiment was laid down, two of the dipped animals gave birth each to one lamb. The two lambs were allowed to run with their mothers until the experiment was finished.

A thorough examination of the dipped animals was carried out on 10th November, 1942. No live lice were found. Dead and shrivelled lice and numerous dead keds were found. A few unhatched ked pupæ were seen, but they were all dried up and apparently dead.

A second examination of the seven controls was carried out on 16th November, 1942. Lice were present and readily found on some of the animals, but the numbers had diminished considerably. On some of the controls no lice were found at this examination.

A second examination of all the experimental sheep was carried out on 29th March, 1943. The four dipped sheep and the two lambs were completely free from lice. Some of the undipped controls revealed a light infestation with lice, while on others no lice could be found.

The final examination was carried out on 9th October, 1943, on all the experimental animals. One of the dipped animals which had broken out of the pen was discarded from the experiment. The three remaining dipped sheep plus the two lambs of 1942 were entirely free from lice. With the exception of one, all the undipped controls were lice-infested. Some were very heavily infested, but others were still lightly infested.

The trial demonstrated that, under the conditions of the experiment, derris dip at the normal strength for ked control—viz., $\frac{1}{2}$ lb. per 100 gallons water—and with an immersion period of half a minute was effective in controlling lice. It also demonstrated that the lice population on untreated animals may vary to a considerable degree from season to season, and that lice may entirely disappear from certain sheep even when left undipped.

Another set of trials was commenced on 8th November, 1943. Four double-fenced pens, each approximately $\frac{1}{4}$ acre in area, were erected. A group of twelve lice-infested animals was procured—viz., six Border Leicester and six English Leicester hoggets. The dipping-bath was the same as employed in the previous experiments, and the time of immersion was again half a minute per animal. The derris fluid was prepared in the same manner as previously, and the strength was $\frac{1}{2}$ lb. powder (5 per cent. rotenone content) per 100 gallons water:—

- (a) Three Border Leicester controls were placed in pen No. 2 and shorn on 18th November, 1943;
- (b) Three Border Leicesters were shorn and dipped the same day and placed in pen No. 1;
- (c) Three English Leicesters were dipped "in the wool" and placed in pen No. 3;
- (d) Three English Leicester controls, undipped and unshorn, were placed in pen No. 4. These animals were shorn in February.

A preliminary examination of the dipped groups carried out one month after dipping failed to locate any live lice on any of the animals.

An examination of the sheep on 8th February, 1944, showed that the unshorn and dipped English Leicesters were perfectly clean, but that the shorn and dipped Border Leicesters were fairly heavily infested with lice. The reason for this breakdown is not clear, but it is possible that those attending the sheep may have failed to take the necessary precautions to prevent carrying lice from infested to non-infested pens.

In order to repeat the experiment, the lousy English Leicester controls were shorn and dipped in the third week in February, and the reinfested Border Leicesters were again dipped, but now carrying three months' wool.

An inspection of the 9th March showed that all the dipped sheep were apparently free from lice at this date; further inspections at monthly intervals require to be made for some considerable time to ensure that no reinfestation occurs.

Insect Pests of Wheat Crops.—To test the varietal resistance of wheat to Hessian-fly and stem-weevil attack, experimental plots were laid down on the Wheat Research Institute area at Lincoln and as on the farm of Mr. J. D. Hall, Hororata. Ten varieties of wheat were sown, one variety per plot, and each plot was 16 ft. long and contained four rows. Each group of ten plots was replicated three times. In addition, six varieties were sown in beds at Lincoln only. The beds were replicated twice. The Lincoln beds were sampled on 18th November, 1943, and the plots on 6th December, 1943. The Hororata plots were sampled on 13th December, 1943. Data collected from these samples will be used to show the degree of attack and the resultant mortality of tillers during the active growing phase of the plants. The Hororata plots were examined again on 26th January, 1944, and the Lincoln plots and beds on 27th January, 1944. The data collected on these latter dates will be examined to determine the breakage which occurs in the different varieties prior to harvest, due to attack by Hessian fly and stem weevil.

To ascertain the actual mortality caused by Hessian fly and stem weevil, closely-controlled pot experiments were laid down in the insectary. The varieties Hunters, Cross 7, Tuscan, Dreadnought, and Fife Tuscan were employed. Wheats were sown in twenty-five pots, five grains per pot, and one variety in each of five pots. The wheats were allowed to grow throughout the winter in an insect-proof house. In spring, prior to removal to the field, two pots of each variety were covered with scrim, proof against insects, and three