PARASITISM AND PRODUCTION IN FLEECEWEIGHT-SELECTED AND CONTROL SHEEP

A thesis presented in partial fulfilment of the requirements for the degree of Master of Agricultural Science at Massey University

JOHN F WILLIAMSON

1994

Abstract

Internal parasitism in sheep selected for increased wool production for 37 years (FW) and in unselected controls (C) was studied. FW sheep were shown to consistently develop higher FECs than C sheep when grazing naturally infected pasture. Resistance to establishment of infective larvae of *Haemonchus contortus* and *Ostertagia circumcincta*, but not *Trichostrongylus colubriformis*, was lower in artificially infected adult FW sheep.

Several parasitological and immunological parameters were compared between lines. Antiparasite antibody levels in grazing lambs and artificially infected adult sheep did not differ between lines. There was a typical strong inverse relationship between numbers of mucosal mast cells and numbers of parasites in FW sheep, whereas no relationship was evident in C sheep. Packed cell volume was lower in FW sheep than C sheep and thymus weights were heavier in FW sheep. Blood gastrin levels tended to rise more in C sheep than FW sheep when infected.

Production loss associated with infection in each line was examined. Albendazole controlled release capsules (CRC) were used to prevent infection in some sheep from each line while the remainder were allowed to become subclinically infected. Despite FW sheep developing a larger burden than C sheep there was little evidence that this resulted in greater production loss in FW sheep. Production loss was not found to be associated with decreased feed intake.

Decreased resistance to internal parasites (of some species) following selection for increased wool production has been clearly demonstrated. This suggests that resistance traits and wool production are unfavourably genetically correlated, which will slow selection responses when all traits need to be simultaneously improved.

Despite the effectiveness of CRC treatment in preventing establishment of an adult parasite burden, production in treated sheep, particularly rams, was lower than

in subclinically infected sheep at some stages of the trial. The cause of this effect is unknown.

The effect of CRC treatment of young sheep (aged 6 months) was examined 10 months later when sheep were artificially infected. Resistance to establishment of *T. colubriformis* larvae was lower in previously treated sheep, as were thymus weights. It appears that CRC treatment of sheep may have a detrimental long term effect on resistance to parasites.

In an unrelated study the effect of kiwifruit vinegar (8.2g/100ml) on parasitological and production parameters in lambs and fertility in two-tooth ewes was investigated. There was a tendency (not significant) for FECs in vinegar treated lambs to be lower than in untreated lambs. Treatment had no effect on liveweight gain, wool growth, or wool colour, but caused a small reduction in wool yield. Pre-mating liveweight of two-tooth ewes and reproductive status 38 days after removal of the ram was not affected by vinegar treatment.

Acknowledgements

Several people deserve my thanks for their part in this study and for helping to make my time at Massey a highly enjoyable and interesting one.

My supervisors, Professors Hugh Blair and Dorian Garrick, for providing expert guidance while allowing a free hand to fully explore my thesis topic.

Bill Pomroy, Barbara Adlington and Shirley Caulder, for technical advice on things parasitological, and assistance with processing of samples.

Staff and post-graduate students of the Animal Science Department, who were always friendly and ready to lend a hand.

My friends, in particular the "Ferguson Street Crew" for the many good times spent together while taking time out from this Masterate.

Massey University Research Fund, C. Almer Baker Trust, and Nufarm for financial assistance.

Table of Contents

Table of Contents (Contd)

List of Tables

List of Figures