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ASPECTS OF ANTHELMINTIC

RESISTANCE IN

NEMATODES OF SHEEP

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ABSTRACT

The increasing prevalence of anthelmintic resistance in nematodes of sheep is causing concern among animal scientists and farmers. In Australia anthelmintic resistance has become widespread since the first case was reported in 1968, and in some districts up to 68% of farms are affected. Benzimidazole resistance is most common, but levamisole and morantel resistance also occurs, and some farms have nematodes resistant to both major anthelmintic groups. Strains of the following species have shown resistance: Haemonchus contortus, Ostertagia circumcincta, Trichostrongylus spp. and, least commonly, Nematodirus spp.

In New Zealand, anthelmintic resistance was first reported in 1980, and subsequent surveys found that its prevalence was generally low except on farms with above average anthelmintic usage. The same anthelmintics and nematodes as in Australia were implicated, although resistant Nematodirus spp. were reported more frequently in New Zealand.

The most common test used to identify anthelmintic resistance - the faecal egg count reduction (or depression) test - was used in the survey of 15 Manawatu sheep farms which is the subject of this report. On each farm the anthelmintics oxfendazole, ivermectin and levamisole were given by mouth to groups of 12 young sheep, at dose rates of 5.0, 0.2 and 8.0 mg/kg, respectively. Twelve additional sheep were designated as untreated controls. Faecal samples for egg counting were taken from all sheep on the day of treatment and 7 days later. Composite faecal samples from each farm were cultured for identification of larvae present before treatment and, when anthelmintic treatments were deemed unsatisfactory, post-treatment faeces were also cultured for larval identification.

Using the simplest method of calculation of faecal egg count reduction, and a cut-off point of 90% or below, there were (respectively) 4, 2 and 0 farms with oxfendazole, ivermectin and levamisole resistant strongylate nematodes (excluding Nematodirus spp.). However, supporting evidence for the existence of ivermectin resistant nematodes was weak, and no claim is made that true ivermectin resistance has been detected. On the 4 farms with oxfendazole resistant nematodes, resistant Trichostrongylus spp. were the most common (4 farms), followed by H. contortus (3 farms), O. circumcincta (2 farms) and Oesophagostomum spp. (2 farms).

Oxfendazole resistant Nematodirus spp. were very common, but it was not possible to reach any conclusion about the susceptibility of the Nematodirus spp. present on each farm because of the low numbers of sheep passing Nematodirus spp. eggs and the small numbers of those eggs. Resistant Nematodirus spp. have probably been overlooked in the past and methods to reduce the likelihood of this are suggested.

The faecal egg count reduction test is a useful field screening test, but it is difficult to interpret when only a slight degree of anthelmintic resistance is encountered. This is partly due to uncertainty in where the cut-off point should be, and partly to variation in calculation methods. The acceptance of recently formulated standard test protocols for Australia and New Zealand should reduce this problem, but supplementary tests will still be needed in many cases of anthelmintic resistance testing.

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PREFACE

The increasing prevalence of anthelmintic resistant nematodes in sheep has aroused considerable interest and concern, particularly in Australia and New Zealand. An almost total reliance on anthelmintics for the control of internal parasites means that a decline in the efficacy of these normally highly effective compounds could have serious consequences for the profitability of a sheep enterprise. Such a decline in efficacy can occur when nematodes become resistant to the effects of anthelmintics.

The work described in the following report was undertaken primarily to determine the extent and degree of anthelmintic resistance on sheep farms in a limited area of New Zealand (the Manawatu), and to identify the nematode genera and anthelmintics involved. A secondary aim was to develop a practical, inexpensive and uncomplicated method for veterinary clinicians to test flocks for the presence of anthelmintic resistant nematodes. There is an obvious need for greater uniformity in the conduct of these tests so that results can be compared and changes in prevalence and degree of anthelmintic resistance noted.