

HAEMONCHUS CONTORTUS INFECTIONS IN MERINO WEANERS -
THE GENETICS OF RESISTANCE AND RESILIENCE

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Anthelmintic resistance is a progressively increasing problem in the major ruminant nematode parasites. For the time being, a problem with resistance to one drug may be circumvented by using another compound. However, the number of basically different anthelmintic drugs available is very limited and not likely to increase significantly in the near future. This, together with the increased cost of drug-based control, has focussed attention on alternative methods for the control of helminth parasitism in grazing domestic animals.

In the case of gastro-intestinal nematodes, vaccination, one possible alternative, has not yet proven to be useful as such, despite a considerable research effort. The potential of a second alternative, exploiting inherited resistance of the host, is clearly indicated by a considerable number of reports on genetic variation in parasite resistance between and within breeds of cattle and sheep. In preliminary work, Le Jambre (1978) found the heritability of resistance to *H. contortus* in 18 month old Merino rams to be about 0.25.

Economic damage due to parasitism occurs mainly through reduced production in parasitised animals. It is possible that host resistance to the parasite itself (i.e. its establishment, development and multiplication) and the 'resilience' of the host towards the detrimental effects of the parasite are separate phenomena. It may well be that host resilience has a genetic basis and could be exploited as such (c.f. the development of tolerant plant varieties, which get normally diseased but stay relatively unaffected by the damaging effects of the disease).

The aim of our research is to quantify the feasibility of increasing sheep productivity in the presence of *H. contortus* infection by breeding for resistance and/or resilience. This will be done by estimating the heritabilities of resistance, resilience (i.e. the difference in production between the parasitised and unparasitised state) and production traits (liveweight gain, wool growth). Furthermore, genetic correlations between these characters will be determined.

Investigations are being done in random-bred half-sib groups of Merino weaners. In a three year period at least 60 sire groups of approximately 20 lambs each will be evaluated for the various characters. The experimental design is basically a cross-over design, involving two trial periods in which half of the lambs are kept 'worm-free' and half are experimentally infected with *H. contortus* larvae. Liveweight gain, wool growth, faecal parasite egg excretion, haematocrit, erythrocyte potassium content and serum iron concentration are being measured.

Preliminary results of the first year will be presented at the Conference.

REFERENCES

- LE JAMBRE, L.F. (1978). In: "The Epidemiology and Control of Gastro-intestinal Parasites of Sheep in Australia", *CSIRO Division of Animal Health*.