

NOVEL APPROACHES TO THE CONTROL OF GASTROINTESTINAL PARASITES IN SMALL RUMINANTS

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Introduction

Parasite control for the past 30 years was based firmly on anthelmintics. However, anthelmintic resistance has reached serious proportions in many parts of the world. To ensure that parasite control remains effective, it is necessary to develop an integrated approach in which anthelmintics play an important but not the only role. We are therefore focussing on control using anthelmintic strategies and grazing management. These provide solutions for control of gastrointestinal nematodes of small ruminants in the short term. The most effective long term solution to the problem of parasites would be to increase the genetic resistance of the animal to infection through a selective breeding programme. The objectives of the project are : (a) To implement and to study the benefit of control strategies which integrate anthelmintics; improved nutrition and gazing management; and (b) to breed sheep for resistance.

Materials and Methods

Integrated control using anthelmintic-supplementation-grazing (short term approach) Sheep grazing in three management systems (open pasture, under rubber and oil palm trees) were divided into two groups: one given the medicated urea-molasses blocks (MUMB) and the other the unmedicated block (UMB). In both groups half of the animals were on a pasture rotation of 3-4 days in each area and areas were 'spelled' for 25-35 days. The other half of the animals grazed on permanent pastures. Breeding for genetic control (long term approach) Young lambs were screened to detect those that are resistant to gastrointestinal nematode infection (high responders, HR) and those that are susceptible (low responders, LR) based on worm egg counts derived from field infections. These animals were challenged with *Haemonchus contortus* larvae to observe their responses to experimental infections. Based on their responses to both field and ex-

perimental infections, the animals were classified as HR or LR. Upon attaining sexual maturity, HR males were mated with HR females, LR males with LR females. The low resistant line was developed to serve as a comparison. The first generation lambs were challenged to confirm their responder status. The HR rams will be mated to females with good performance records to increase the proportion of resistant sheep in the population.

Results and Discussion

When open pastures were spelled for 30-35 days, the FEC were significantly reduced in sheep that grazed rotationally compared to set stocked animals. In the oil palm situation where the areas were spelled for only 25 days, FEC remained high despite frequent anthelmintic intervention. Earlier findings also showed that infective larvae survived for slightly longer periods under tree canopy compared to open pastures. The introduction of MUMB to sheep constantly grazing on permanent pastures coupled with conventional anthelmintic dosing failed to prevent worm establishment. In the group of sheep which rotationally graze the use of these blocks gave much lower FECs. Rotational grazing may not be applicable to certain types of management, for example communal grazing or limited land. However, in farming situations where it can be applied it is another control option. There appeared to be a strong association between field and experimental infections ($r=0.55$). This indicates that the less cumbersome field method can be used to select young lambs for worm resistance. *Haemonchus contortus* reached patency later in the HR lambs (four weeks) compared to earlier in the LR lambs (three weeks). This augurs well for extending the interval between anthelmintic dosing in resistant animals. It was observed that after one generation of selection there was significantly higher FEC and lower haematological parameters (PCV, PP) among the LR compared to the HR lambs. It is possible to breed lines of sheep resistant to gastrointestinal nematodes as the findings indicated the presence of an inherited factor operating against infection with *Haemonchus contortus* in the high responder lambs.

Conclusions

The FEC results showed the benefit of rotational grazing. The findings indicated that the benefits of treated supplementation blocks is enhanced by rotational grazing with the recommended spelling period of 30-35 days.

It was concluded that FEC, haematocrit and plasma protein values may be used as indicators to segregate lambs into high responders (resistant) and low responders (susceptible) to gastrointestinal strongyles.