

Gastrointestinal Nematodes Of Sheep And Cattle Biology

Gastro-intestinal nematodes have been identified as the primary parasites of small ruminants in tropical and sub-tropical areas. Their control has depended upon chemical compounds, but this does not seem to work due to nematode resistance. However, the book has shown that botanical plants and biological control agents could be effective replacements for chemicals when supplemented with the diet of small ruminants.

A unique resource for all those interested in the impact of worms on livestock, the anthelmintics used to get rid of them and the emerging problem of anthelmintic resistance. This book provides an over-arching view of past, present and suggested future strategies for control of gastrointestinal nematode parasites in sheep and cattle. The book begins with descriptions of the biology of gastrointestinal nematodes, the harm they cause to the host and their economic impact. The main body of the book deals with the control of worms, focusing on the use of anthelmintic drenches. The relationship between drenching practices and the development of drug resistance is discussed, as well as resistance

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management. The authors also break new ground by discussing alternative options for worm control, including: nutritional interventions, biological control, breeding for desirable genetics and artificially improving immunity to infection. They also offer useful recommendations for program development.

Pathogenesis of the loss of production in gastrointestinal parasitism; Epidemiology and control of nematode infections; Grazing management and control of parasites in sheep; Epidemiology and control of liver fluke in sheep; Sheep anthelmintics; Anthelmintic resistance in gastrointestinal nematodes of sheep; The nature and role of immunological control in gastrointestinal helminthiasis; Host genetic factors in helminth control; Assessment of the economic impact of gastrointestinal parasitism in sheep.

The objectives of the present study were to determine the prevalence of gastrointestinal nematodes (GIN) in naturally infected lambs of five sheep breeds based on individual faecal egg counts (FEC) in Germany, and to evaluate the predictable influence of birth type, age, sex and breed of lambs on the excretion of nematode eggs in the faeces. Furthermore, the use of potential infection indicator traits such as the dag score (DS), the faecal consistency (FCS), the body condition (BCS) and the FAMACHA©, either separately or combined, to detect individually lambs in need for drenching when exposed to natural nematode infections was investigated. Additionally, the possibility of

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breeding for resistance against GIN in German sheep breeds directly based on faecal egg counts (FEC) or indirectly by using DS, FCS, BCS and FAMACHA© was also evaluated. Moreover, the relationships between the nematode infection with *Haemonchus contortus* and body and organ measurements of lambs were estimated. The field trials under natural conditions of nematode infections (Chapters II, III and IV) were carried out on 3,924 lambs of different breeds aged from 3 to 15 months. The breeds used were Merinoland (ML), German Blackhead Mutton (GBM), Texel (TX), Rhoen (RH), and Merino long-wool (MLW). Data collection took place on various farms. The samples were collected once during the grazing seasons in 2006, 2007 and 2008. At the time of faecal sample collection, the FAMACHA© score, the BCS, the DS and FCS were additionally determined and served as potential infection indicator traits. The lambs were not dewormed at least 45 days before the sampling time. Sixty-three percent of the lambs were infected with GIN. The infections were mostly low to moderate and involved different species. *Trichostrongylus* spp. were the predominant species based on the percentage of larvae in the faecal cultures. Only 11.4% of faecal samples were *Eimeria* oocysts free. Tapeworm eggs were encountered in 13.2% of all samples. The farms affected the prevalence of GIN infections significantly ($P < 0.001$). Significantly higher FECs ($P < 0.001$) were found in lambs infected with *Haemonchus contortus*. Infections with gastrointestinal nematodes (GIN) represent a major constraint in sheep husbandry. The present thesis investigates the control of these parasites by means of

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tanniferous fodder plants. Such alternative control strategies are urgently needed because of the emergence of nematode populations resistant to chemical synthetic anthelmintic drugs. Non-chemical control of GIN is also of crucial importance in organic agriculture, where the use of synthetic compounds is restricted.

Bovino; Nematode; Gastrointestinal; Epidemiologia; Ovino; Estados Unidos; California; Sanidade; Doença; Parasitologia; Manejo.

The presence of nematodes in the gut did not induce detectable production of new compounds, rather, the abundance of the above mentioned compounds was altered as parasitic infection developed. Infection with *T. circumcincta* induced significant changes to the relative abundance of 4-methyl phenol as early as 7 days post infection (dpi) and continuing through to 28 dpi. This compound was also altered during infection with *H. contortus* at 14 dpi. The relationship between 4-methyl-phenol and pepsinogen synthesis is explored as is the diagnostic potential of this observation. The abundance of VFAs, particularly acetic acid, was altered on occasion during both mono-specific and concurrent GI infections, however, few changes were constantly observed between the sheep tested. This was typical for the majority of compounds identified, with individual variation occurring at high levels throughout study. Seasonal prevalence -- FAMACHA© -- Anthelmintic resistance -- Visual appraisal -- ITS2 gene -- Genetic diversity -- Gene flow -- Haplotype -- Limpopo province -- South Africa.

Gastrointestinal Nematodes of Sheep and Cattle Biology and Control John Wiley & Sons

The rapid increase in the magnitude of anthelmintic resistance towards commercial chemical anthelmintics, calls for alternative methods to complement treatment or

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replace anthelmintics. During the last two decades more and more calls have been made for a holistic management solution. Recent studies on breeding for resistant animals and bioactive forages highlight the potential of these to contribute towards parasite control. For this study, gastrointestinal infection in a merino flock was investigated by means of faecal egg counts (FEC). The level of parasite infection in weaned merino lambs in their first summer could be linked to weather conditions. Anthelmintic resistance in the flock was quantified and compared to the resistance level some years earlier. Within the flock, 18% of the ewes appeared to be resistant with consistently (P

The efficacy of a new broad-spectrum anthelmintic, Netobimin_R (coded SCH 32481-Schering Corporation) was evaluated in two trials conducted during either the spring or fall grazing seasons of 1984 in Western Oregon using 20 cross-bred yearling beef heifers and 30 cross-bred spring lambs, respectively. Percent efficacies were determined in both bovine and ovine hosts harboring naturally acquired gastrointestinal nematode infections and were reported with respect to genera and species of nematode and morphological stage of life cycle when recovered. Fasciolicidal efficacy was concurrently evaluated in the sheep with experimentally induced mature *Fasciola hepatica* infections. An oral formulation of netobimin was administered in both studies via a modified oral drenching gun to animals randomly divided into groups based on body weight and egg per gram (EPG) counts. Ten heifers received a dose level of 7.5

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mg/kg (concentration 150 mg/ml) and 10 remained untreated as controls. Sheep were divided into three groups of ten and received either 7.5 mg/kg or 20 mg/kg of netobimin (concentration 50 mg/ml) or a tap water drench placebo which was given to the control group. All heifers were necropsied two weeks post-treatment and sheep were necropsied either one or two weeks post-treatment. Parasitic gastrointestinal helminths were recovered using standard techniques. Fecal samples were taken throughout the trial and EPG counts monitored. Fecal samples taken on trial termination dates revealed EPG counts (excluding *F. hepatica* eggs) were reduced in treated heifers by 98% and in treated sheep groups by 62% (7.5 mg/kg) or 100% (20 mg/kg). The overall efficacy against all species of adult nematode found (excluding *Trichuris* spp.) in the bovine study was 67% ($p > 0.05$). The overall efficacy in the ovine study against all nematode species including all life stages present was 88% ($p > 0.0002$) at 7.5 mg/kg and 99% ($p > 0.0002$) at 20 mg/kg; the respective efficacies against *F. hepatica* were 62% ($p > 0.05$) and 91% ($p > 0.01$). No adverse reactions or signs of toxicosis were observed in either trial.

Includes papers about Argentina, Fiji, India, Indonesia, Kenya, Malaysia, Mexico, Paraguay & Uruguay

This thesis investigates host genetic resistance to gastrointestinal nematode infection in angora and cashmere goats, in order to ascertain if there is sufficient genetic variation to justify setting up selection programs for the Australian industry. It also looks at the realised response

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for resistance to *Haemonchus contortus* in a divergently selected Merino sheep flock to ascertain if the predicted response in selection for resistance matches actual results.

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