



## Programme 4.2: Management of gastrointestinal helminth in domestic ruminants

Coordinator: [Dr Jan van Wyk](#)

Gastrointestinal nematodes were identified by the International Livestock Research Institute, Nairobi, Kenya, as having the most significant impact of all veterinary conditions, on sustainable production by resource-poor farmers, of especially small ruminants. However, liver fluke infection (fasciolosis) of cattle also features among the top 10 conditions limiting production, and bovine gastrointestinal helminthosis in the top 20. Furthermore, resistance of helminths to available anthelmintics is progressively posing a threat to continued sustainable production of sheep and goats, with cattle also becoming involved in some parts of the world. The research being done is aimed, through an understanding of the epidemiology of the parasites, at developing alternatives to exclusive dependence on anthelmintics for helminth management.

### Collaborating institutions:

- Department of Production Animal Studies, Faculty of Veterinary Science, [University of Pretoria](#)
- Department of Animal Health, [Institute of Tropical Medicine](#), Antwerp, Belgium
- Department of Virology, Parasitology and Immunology, Faculty of Veterinary Medicine, [University of Ghent](#), Belgium

### Donors:

- [Institute of Tropical Medicine](#), Antwerp, Belgium
- [European Union](#)
- [Cape Wools](#)

### Current projects:

#### 1. Adaptation of a susceptible *Haemonchus contortus* population to pasture

The few known populations of *H. contortus* in the world that have not become resistant to anthelmintics have been cycled in the laboratory so many times over the decades that some of our investigations in South Africa indicated reduced viability. It is hoped that a return to pasture will restore the ability of the population we are using to compete on “equal” terms with drug resistant populations in the field.

Jan van Wyk, Rhulani Nkuna

#### 2. Targeted Selective Treatment (TST) as a strategy in sustainable Integrated Parasite Management (SIPM)

TST, i.e. treatment of only overly susceptible animals while leaving the rest untreated, is a strategy for obtaining populations of worms in refugia (i.e. that part of a given worm population that is not exposed to drug selection when animals are treated). Development of the FAMACHA© system by this Faculty and others made TST practicable for the first time, and further work is being conducted, with the emphasis on gauging the effect of the system on the production of animals and the heritability of the results.

Jan van Wyk, Gareth Bath (Dept of Production Animal Studies), Joseph Vercruyse (University of Ghent)

#### 3. Software-based decision support for sustainable management of haemonchosis in small ruminants

Development of automated decision support systems at farm level for day-to-day decisions on measures to take for optimum worm management.

Dean Reynecke (PhD student), Joop Boomker (supervisor), Jan van Wyk (co-supervisor), Dirk Berkvens (co-supervisor; Institute of Tropical Medicine, Antwerp), Bruce Gummow (co-supervisor; Dept of Production Animal Studies), and Pierre Dorny (Institute of Tropical Medicine, Antwerp)

#### 4. Reversion of anthelmintic resistance

Once drug resistance has developed in a worm population, “natural” reversion on withdrawal of the compounds concerned is so slow as to be of little practical use. And the only system that holds any promise for engineering reversion is one of artificial introduction of susceptible worm populations genetically to dilute resistant genes in the resistant population. This system, developed by our team in South Africa, is being investigated further to improve its ease of application and the outcome of the

artificial manipulation.

Jan van Wyk

**Recent publications:**

RILEY DG, **VAN WYK JA**. 2009. Genetic parameters for FAMACHA© score and related traits for host resistance/resilience and production at differing severities of worm challenge in a Merino flock in South Africa. *Veterinary Parasitology* 164:44-52

KENYON F, GREER AW, COLES GC, CRINGOLI G, PAPADOPOULOS E, CABARET J, BERRAG B, VARADY M, **VAN WYK JA**, THOMAS E, VERCRUYSSSE J, JACKSON F. 2009. The role of targeted selective treatments in the development of refugia-based approaches to the control of gastrointestinal nematodes of small ruminants. *Veterinary Parasitology* 164:3-11

**VAN WYK JA**. 2008. Production trials involving use of the FAMACHA© system for haemonchosis in sheep: preliminary results. *Onderstepoort Journal of Veterinary Research* 75:331-345