

Strong parasitology focus at the Faculty of Veterinary Science

By Prof BL Penzhorn

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Parasitology featured strongly at graduation ceremonies of the Faculty of Veterinary Science, University of Pretoria, from November 2008 to April 2010.

Twenty-five theses and dissertations (six doctoral, 19 masters) were on parasitology-related topics. Most of the candidates were from the Department of Veterinary Tropical Diseases, but there were also three candidates from the Department of Paraclinical Sciences (Phytomedicine Programme) and two from the Department of Companion Animal Clinical Studies.

An interesting trend is that three PhD and seven MSc topics were on molecular characterisation of vector-borne blood protozoa.

The most prestigious degree, **Doctor of Veterinary Science**, which is based on examination of a submitted set of publications, was awarded to Prof **Joop Boomker** for his life-time work, **Parasites of some free-living wild animals and freshwater fish species in South Africa**. The examination panel consisted of Dr Pierre Dorny (Institute of Tropical Medicine, Antwerp, Belgium), Dr Odille Bain (Muséum National d'Histoire Naturelle, Paris, France) and Dr Lynda Gibbons (Royal Veterinary College, London, UK).

Five PhDs were awarded: to **Raksha Bhoora, Tshepo Matjila, Felix Nchu, Volker Schwan and Kgomotso Sibeko**.

In her thesis, **Molecular characterization of *Babesia caballi* and *Theileria equi*, the aetiological agents of equine piroplasmiasis, in South Africa**, Raksha Bhoora reported extensive sequence heterogeneity in the 18S ribosomal RNA genes of South African *T. equi* and *B. caballi* isolates. Using the sequence data obtained, quantitative real-time PCR (qPCR) tests for the detection of these organisms were designed and evaluated. It is envisaged that, once validated, these qPCR assays may enable more accurate identification of carrier animals and provide greater control over the spread of equine piroplasmiasis globally. Further work indicated that a previously developed *T. equi*-specific qPCR assay and a *B. caballi*-specific competitive inhibition enzyme-linked immunosorbent assay (cELISA) failed to detect the parasites in South Africa, due to significant genetic and antigenic heterogeneity amongst South African *T. equi* and *B. caballi* isolates.

(Supervisor: Dr Nicola Collins; co-supervisor: Prof Banie Penzhorn)

In his thesis, **Molecular detection and characterization of tick-borne pathogens of dogs**, Tshepo Matjila reported on the occurrence of various tick-borne parasites in dogs, of which *Babesia rossi*, the main causative organism of canine babesiosis in South Africa, is the most important. Using sophisticated molecular techniques to isolate, amplify and characterize genomic DNA, Tshepo identified, for the first time, the occurrence in South Africa of *Babesia vogeli*, a less virulent species, as well as a novel parasite, tentatively assigned to the genus *Theileria*. In an innovative approach, Tshepo demonstrated that there was possible correlation between *Babesia rossi* genotype and disease phenotype, thereby contributing to a better understanding of the intricate host-parasite interaction resulting in canine babesiosis, which remains an economically important yet enigmatic disease entity in southern Africa.

(Supervisor: Prof Banie Penzhorn; co-supervisors: Prof Andrew Leisewitz; Prof Frans Jongejan, Utrecht University, the Netherlands)

(Tshepo Matjila received 2009 Senior W O Neitz Medal from the Parasitological Society of Southern Africa for this thesis)

In his thesis, **Development of formulations and delivery systems to control economically important ticks with entomopathogenic fungi**, Felix Nchu focused on biological control of ticks using entomopathogenic fungi. All of his research was conducted in Kenya.

(Supervisor: Prof Kobus Eloff; co-supervisors: Drs H Ahmed and MN Kalemba, ICIPE, Nairobi)

In his thesis, **Filariasis of domestic carnivores in Gauteng, KwaZulu-Natal and Mpumalanga provinces, South Africa, and Maputo province, Mozambique**, Volker Schwan made a first attempt to map canine and feline filariasis in the mentioned provinces. This attempt was completed by diagnostic results of routine examinations for filarial

infections of dogs and cats from South Africa obtained between 1994 and 2008. Combined with a critical literature review on filariasis of domestic carnivores in Africa, which was updated by diagnostic results of routine examinations for filarial infections obtained from animals originating from other African countries between 1994 and 2008, the topic is comprehensively addressed for the first time from a continental perspective.

(Supervisor: Prof Joop Boomker)

In her thesis, **Improved molecular diagnostics and characterization of *Theileria parva* isolates from cattle and buffalo in South Africa**, Kgomotso Sibeko described developing a real-time PCR assay for detecting *T. parva*. The test required less time to perform and is more sensitive than other molecular assays used in *T. parva* diagnostics. In May 2006 the technology was transferred to the ARC-Onderstepoort Veterinary Institute, where it is now routinely used. East Coast fever (ECF), caused by *T. parva*, was eradicated from South Africa in the 1950s, but the parasite persists in buffalo, and it is feared that ECF may re-emerge. Molecular characterization of *T. parva* parasites indicated the presence of cattle-type p67, p104 and PIM alleles identical to those of *T. parva* Muguga (a cattle-derived parasite that causes ECF in Kenya) in specimens obtained from cattle from KwaZulu-Natal. Variants of cattle-type p67 and p104 alleles were identified in *T. parva*-positive specimens from buffalo. These results might indicate that *T. parva* parasites that could adapt to cattle may exist in the South African buffalo population.

(Supervisor: Dr Nicola Collins; co-supervisors: Dr Abdalla Latif; Marinda Oosthuizen; Dr Dirk Geysen, Institute of Tropical Medicine, Antwerp, Belgium).



At the graduation ceremony in April 2010: flanking Dr Tshepo Matjila (who graduated in November 2008) are Dr Raksha Bhoora (left) and Dr Kgomotso Sibeko (right)

The following MSc and MMedVet degrees were conferred:

Ms Suzanna Bell:

The influence of farm management on localized *Culicoides* species on a lowland farm in South-West England.
(Supervisor: Prof Estelle Venter; co-supervisor: Dr P Mellor, Institute for Animal Health, UK)

Dr Peter Brothers:

Occurrence of blood-borne tick-transmitted parasites in tsessebe (*Damaliscus lunatus lunatus*) antelope in Vaalbos National Park, Northern Cape Province
(Supervisor: Prof Banie Penzhorn; co-supervisor: Dr Nicola Collins)

Dr Ilana Conradie:

The prevalence of helminths in warthogs, bushpigs and some antelope species in Limpopo Province, South Africa
(Supervisor: Prof Joop Boomker)

Ms Chantel de Beer:

Assessment of blackfly (Diptera: Simuliidae) problem status and potential biological control agents along the Vaal and Orange Rivers in South Africa
(Supervisor: Dr Karen Kappmeier Green; co-supervisor: Prof Banie Penzhorn)

Dr Carlos de Matos:

Species composition and geographic distribution of ticks infesting cattle, goats and dogs in Maputo province, Mozambique
(Supervisor: Prof Ivan Horak; co-supervisors: Dr Nigel Bryson; Dr Luis Neves, Eduardo Mondlane University, Maputo)

Dr Danny Govender:

Detection of *Babesia* and *Theileria* parasites in white rhinoceroses (*Ceratotherium simum*) in the Kruger National Park, and their relation to anaemia
(Supervisor: Prof Banie Penzhorn; co-supervisor: Dr Marinda Oosthuizen)

Dr Clement Kandu-Lelo:

The potential use of the invasive species *Cereus jamacanu* (Cactaceae) to control nematode infections in sheep.
(Supervisor: Prof Kobus Eloff; co-supervisors: Dr Adriano Vatta, Ross University, St Kitts; Dr IA Ademole, University of Ibadan, Nigeria)

Dr Liza Köster:

C-reactive protein in canine babesiosis caused by *Babesia rossi* and its associated outcome
(Supervisor: Dr Mirinda van Schoor)

Ms Mpho Ledoka:

Molecular characterization of trypanosomes commonly found in cattle, wild animals and tsetse flies in KwaZulu-Natal, South Africa, 2005-2007
(Supervisor: Prof Phelix Majiwa; co-supervisor: Prof Abdalla Latif)

Mr Leonard Maposa:

The prevalence and economic importance of nematode infection in goats in Gweru District, Zimbabwe
(Supervisor: Prof Joop Boomker)

Ms Kedibone Mawela:

The toxicity and repellent properties of plant extracts used in ethnoveterinary medicine to control ticks
(Supervisor: Prof Kobus Eloff; co-supervisors: Dr D Luseba, Tshwane University of Technology; Dr S Magano, University of Limpopo)

Dr Daud Ndhlovu:

Tick infestation and udder and teat damage in selected cattle herds of Matabeleland South, Zimbabwe
(Supervisor: Prof Banie Penzhorn; co-supervisor: Dr Pious Makaya, Central Veterinary Laboratory, Harare)

Dr Zoleka Ntondini:

The extent of acaricide resistance in the eastern region of the Eastern Cape Province
(Supervisor: Prof Ivan Horak)

Ms Cassandra Olds:

The isolation and characterisation of a *Babesia bovis* stock from outbreaks on a farm in KwaZulu-Natal, South Africa
(Supervisor: Prof Abdalla Latif; co-supervisor: Dr Nicola Collins)

Dr Patrick Page:

Duration of repellence of selected agents against *Culicoides* species when applied to polyester mesh
(Supervisor: Prof Alan Guthrie; co-supervisor: Dr Gert Venter, ARC-OVI)

Dr Silke Pfitzer:

Occurrence of tick-borne haemoparasites in nyala (*Tragelaphus angasi*) in KwaZulu-Natal and Eastern Cape Province, South Africa
(Supervisor: Prof Banie Penzhorn; co-supervisor: Dr Marinda Oosthuizen)

Ms Andrea Spickett:

The anthelmintic effect of copper oxide wire particle (COWP) boluses against *Haemonchus contortus* in indigenous goats in South Africa

(Supervisor: Prof Joop Boomker; co-supervisor: Dr Adriano Vatta, Ross University, St Kitts)

Dr Saira Yusufmia:

The prevalence of *Theileria* species infections in cattle at the edge of the Hluhluwe-iMfolozi Park, KwaZulu-Natal, South Africa

(Supervisor: Prof Banie Penzhorn; co-supervisor: Dr Nicola Collins)

Dr Dave Zimmermann:

The occurrence of piroplasms in various South African black rhinoceros (*Diceros bicornis*) populations

(Supervisor: Prof Banie Penzhorn; co-supervisor: Dr Marinda Oosthuizen)

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