

ZOOLOGY



Maud Bonato

Stellenbosch University

Mentor: S Cloete

Broad research area: Animal production

Specific research field: Artificial insemination in ostriches

Purpose of study:

I am currently involved in postdoctoral studies at the Department of Animal Sciences, University of Stellenbosch, in collaboration with Professor Schalk Cloete and Professor Irek Malecki (University of Western Australia). My postdoctoral study focuses on developing an artificial insemination (AI) program in ostriches. In ostrich breeding there is growing interest in developing AI technology as a method of assisting natural reproduction, which the industry is currently based upon. The development of such a technology would assist the South African ostrich industry in its further development and expansion. Questions pertaining to semen that needs to be addressed include how frequently semen can be collected from ostriches, what should semen be diluted with, what temperatures should be used for the short-term storage of sperm, and what protocol is needed for the cryopreservation of sperm. In females, we need to establish a fertile period after insemination, leading to the optimisation of the dose of sperm supplied as well as the frequency of insemination to ensure optimal fertility. In combination, these studies will not only allow us to develop a viable protocol for the application of the AI technology in the industry, but also to gain a comprehensive understanding on the physiology and fertility of both male and female ostriches.

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Götz Froeschke

Stellenbosch University

Mentor: Dr S Matthee

Broad research area: Biology

Specific research field: The effect of anthropogenic habitat change on the parasite diversity and assemblages of small mammals with emphasis on possible emerging infectious diseases.

Purpose of study:

Parasites are omnipresent in the lives of wild animals and represent a major component of biological diversity. More than 50% of the known species on this planet are parasites or pathogens of some form. In southern Africa there is a paucity of information on small

mammal parasite ecology and how the parasite assemblage is affected by habitat transformation. During the process of landscape transformation and urbanisation new environments are created, where both animals and humans are exposed to new parasites and the opportunity exists for parasite exchange. As a consequence it is hypothesised that host-switching events and the possibility of emerging infectious diseases will be higher in transformed habitats. Using the four-striped mouse *Rhabdomys pumilio* as a model entity, the objective of the project is to investigate the effect of habitat change on the macroparasite (with focus on helminths and ticks) diversity and species assemblage of an agriculturally adapted small mammal species with emphasis on possible emerging infectious diseases. Sampling is currently taking place at five localities within each of four well characterised habitat types, namely pristine natural, agricultural (crops and vineyards), agricultural (life stock) and urban areas. Thirty adult *Rhabdomys pumilio* individuals will be trapped per locality during September to January. Ecto- and endoparasites will be removed and parasites will be identified to species level in collaboration with expert taxonomists. We are working together in close cooperation with local veterinarians and do an extensive literature research to compare available parasite data of life stock, domestic animals and humans. Preliminary data suggest that conditions associated with agricultural activities (crops and vineyards) facilitate a higher mean abundance of individual helminth and pathogenic tick species compared to pristine natural conditions. The study forms an integral part of a novel research programme that focuses on the environmental and anthropogenic factors that shape natural macroparasite (helminths, ticks, fleas, lice and mites) and microparasite (viruses and blood protozoa) assemblage of small mammals. The information will facilitate predictions on future parasite assemblages and host-switching events in the light of climate change and agricultural and urban development.

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Alfred Sichilima University of Pretoria

Mentor: Prof NC Bennett

Broad research area: Ecology, physiology and reproductive biology of vertebrates

Specific research field: The burrow structure, colony composition and reproductive biology of the *Fukomys anselli* from the Lusaka province of Zambia.

Purpose of study:

African mole-rats (*Bathyergidae*) provide an excellent model system with which to test theories relating to the evolution and maintenance of sociality in underground mammals. The range of habitats they occupy is variable and mainly dependent on the availability of the food resource in the form of geophytes. The Aridity Food Distribution Hypothesis has been put forward in attempt to explain why some mole-rats are strictly solitary and others

exhibiting extreme sociality. In this scenario, sociality is adaptive as cooperative foraging spreads the energetic costs of burrowing and increases the chance of finding food items, which because of the clumped nature of the resource is sufficient once found to support larger groups of mole-rats. To quantify the burrow metrics in relation to seasonal energetic cost of foraging, cooperative foraging, colony size formation and the seasonal variation of quantities of food in burrows, fractal dimension analysis is undertaken on excavated burrow systems. However, to date, the above detailed studies have only been carried out on giant mole-rat *Fukomys mechowii*. My current research focuses upon the burrow structure, colony composition and the reproductive biology of Ansell's mole-rat *Fukomys anselli* (*Bathyergidae*) from the Lusaka Province of Zambia.

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