



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA

## Faculty of Veterinary Science

Fakulteit Veeartsenykunde  
Lefapha la Disaense tša Bongakadiruiwa

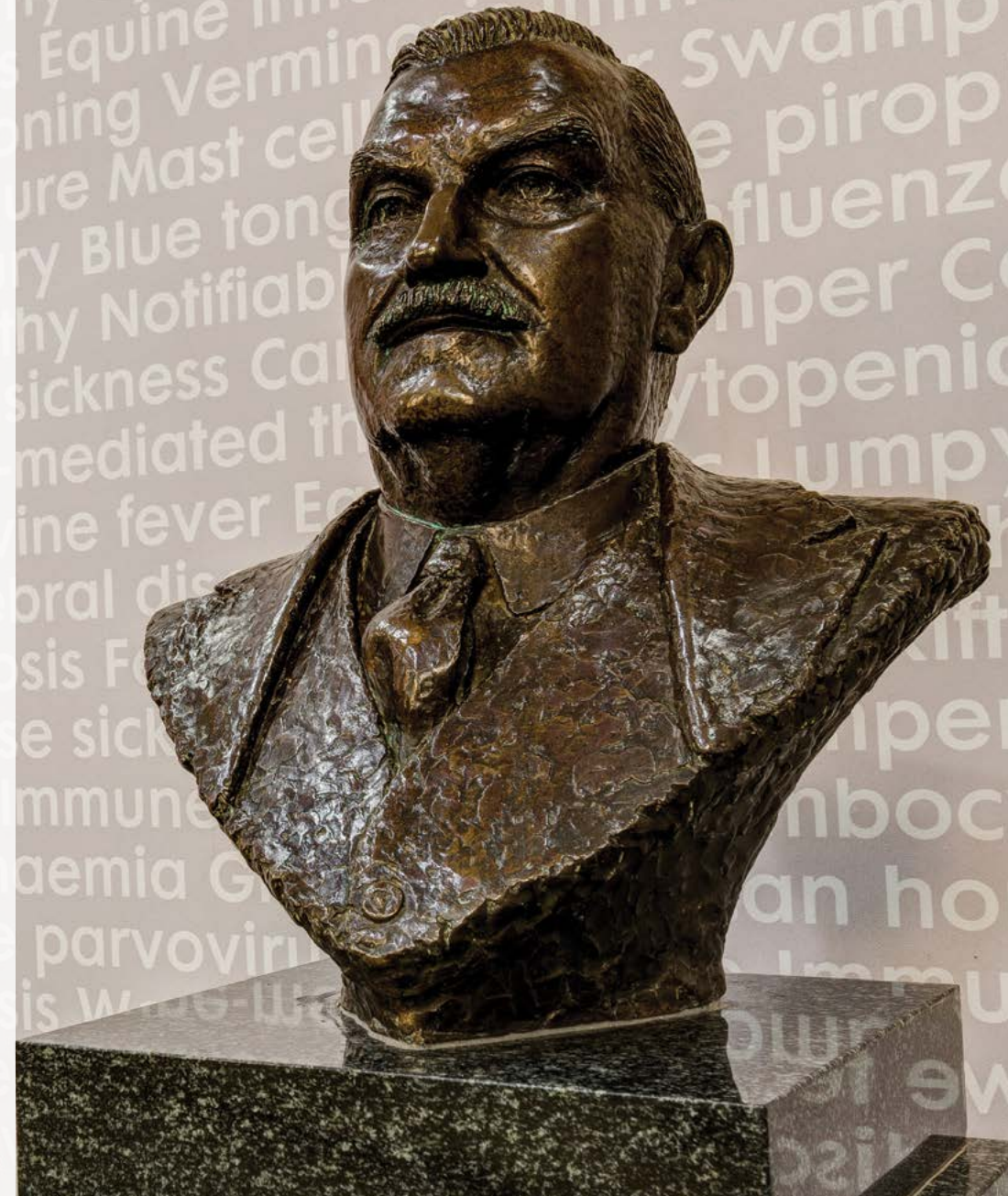
Make today matter



# 2023 Faculty Day

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## Brief history of Faculty Day

Faculty Day of the amalgamated Faculty of Veterinary Science reflects a proud tradition, which had been nurtured by the original faculties of Veterinary Science of both the Medical University of South Africa (Medunsa) and the University of Pretoria, of showcasing the research activities of staff and students on a special, dedicated occasion.

Since the inception of the Faculty of Veterinary Science at Medunsa in the early 1980s, the staff, and later students, were involved in the activities of the "Academic Day", which was aimed at highlighting the research activities of the University, as well as exposing young researchers to a conference environment.

The Faculty of Veterinary Science of the University of Pretoria at Onderstepoort followed this trend shortly thereafter and the first "Faculty Day", which focused on the research activities of the Faculty, was held on 5 September 1984, sponsored by the then Dean, Prof JMW le Roux. The combined research skills of the two original institutions are today reflected in the proceedings of the Faculty Day held each year at the Onderstepoort Campus.

A hallmark of the day is the Theiler Memorial Lecture and announcement of Faculty research awards. Prior to Faculty Day, the memorial lecture was presented as part of the SAVA congress, with the first lecture presented by Prof C Rimington in 1963.



# Faculty Day, Faculty of Veterinary Science, University of Pretoria

21 September 2023

Scan the QR code  
to access the  
online Booklet.



## Master of Ceremonies: Prof. Dietmar Holm

08:00-08:20	Registration and tea (Arnold Theiler Building) <a href="https://opvetfacultyday.co.za/">https://opvetfacultyday.co.za/</a>	
08:20-08:25	<b>Start of proceedings and housekeeping rules</b>	
08:25-08:40	<b>Welcoming address: Prof. Vinny Naidoo, Dean of the Faculty of Veterinary Science</b>	
08:45-09:50	<b>Session 1: Postgraduate research [10 min + 3 min questions]</b>	<b>Session chair: Dr Rungano Magadu</b>
	Risk factors for the 2011 and 2017 high pathogenicity avian influenza outbreaks on ostrich farms in the Western Cape – MC Marimwe	
	Sequencing of the southern white rhinoceros ( <i>Ceratotherium simum simum</i> ) cardiac troponin I gene and analytical validation of a point-of-care cardiac troponin I immunoassay – Y Rautenbach	
	Radiological description of the sesamoid bones and ossicles in the stifle joint of the lion ( <i>Panthera leo</i> ), black-footed cat ( <i>Felis nigripes</i> ) and Temminck's pangolin ( <i>Smutsia temminckii</i> ) – C Steyn	
	Comparison of the Bionote NSP Ab ELISA and PrioCheck FMDV NS ELISA – KC Moabelo	
	Antibacterial and anti-inflammatory activity and cytotoxicity of <i>Combretum elaeagnoides</i> Klotzsch methanol leaf extract and fractions against pathogens causing bovine mastitis – RC Erhabor	
09:55-10:25	<b>Session 2: Science communication – The skill of communicating complex scientific ideas to people who do not have subject expertise on the topic [3 min for PhD and 1 min for MSc students]</b>	<b>Session chair: Dr Miemie Grobler</b>
	The effects of nutritional stress and reproduction on stable isotope ratios of ruminants, monogastrics, and hind-gut fermenters in South Africa – GV Ringani [3 min]	
	Genetic diversity and geographic relationships between southern African <i>Amblyomma</i> ticks, <i>Rickettsia africae</i> and <i>Ehrlichia ruminantium</i> – A Smit [3 min]	
	Molecular epidemiology of infectious bronchitis coronavirus in southern African poultry flocks from 2011-2020 – C Strydom [3 min]	
	Potential of selected South African plants in the management of bovine mastitis caused by multi-drug resistant strains of <i>Streptococcus uberis</i> – AO Akinboye [3 min]	
	Radiographic subtrochlear notch sclerosis used for detection of early medial coronoid disease in Labrador retriever puppies and associated dynamic distal ulnar ostectomy to reduce disease progression – JD Pretorius [1 min]	
	Morphology of the digestive tract of Temminck's pangolin ( <i>Smutsia temminckii</i> ) – T] Saby [1 min]	
	Prognostic value of serial serum creatinine concentration at presentation, 24 and 48 hours post-surgery in cats with subcutaneous urethral bypass at a single referral hospital – R Elliott [1 min]	
	Evaluation of the spherical body protein 4 (SBP4)-encoding gene for molecular typing of <i>Babesia caballi</i> – A Venter [1 min]	
	Evaluation of the efficacy, safety and cardiopulmonary effects of thiafentanil-azaperone compared to etorphine-azaperone for the immobilisation of free-ranging black rhinoceros ( <i>Diceros bicornis</i> ) – BAT Gazendam [1 min]	
10:25-10:55	Tea/coffee break (Arnold Theiler Building)	

11:00-12:00	<b>Session 3: Sir Arnold Theiler Memorial Lecture</b> <b>Prof. Richard Kock: The future of animal-based-agriculture in the context of climate change and biodiversity loss</b>	<b>Session chair: Prof. Katja Koeppel</b>
12:05-12:40	<b>Session 4: Undergraduate research (Veterinary research report, VRE 600) [5 min + 2 min questions]</b>	<b>Session chair: Dr Takula Tshuma</b>
	Osteology of the thoracic limb of the South American tapir ( <i>Tapirus terrestris</i> ) – L Pillay	
	Comparison of different anaesthetic protocols in captive patas monkeys ( <i>Erythrocebus patas</i> ) in Uganda – L Marais	
	Tick vaccines: A viable option for tick and tick-borne disease control in cattle in sub-Saharan Africa? – RP Potgieter	
	A short review on the resting period of sheep, pigs, and cattle before slaughter: Is one hour too short or too long? – K Smith	
	Using data mining techniques to determine skills gaps in early-career veterinarians in South Africa – C Volschenk	
12:40-13:00	Poster viewing (Arnold Theiler Building and Cafeteria)	
13:00-13:55	Lunch (Arnold Theiler Building and Cafeteria)	
14:00-15:05	<b>Session 5: Postgraduate research [10 min + 3 min questions]</b>	<b>Session chair: Dr Joanne Karzis</b>
	Identification and gene expression profiling of subunit vaccine candidates in cattle- and buffalo-derived <i>Theileria parva</i> isolates – LL Borchers	
	Plant extracts as a possible solution for biofilm formation against <i>Salmonella</i> and <i>Enterococcus</i> crucial in the poultry industry – MM Lebeloane	
	A knowledge, attitude and practices assessment of control measures for bovine brucellosis and tuberculosis as a bottom-up approach towards a more effective national control programme in South Africa – AT Kgasi	
	Bovine tuberculosis heat inactivated vaccines reduce lesion severity and bacterial viability in an infection trial in African buffalo – J Hewlett	
	Effect of the degree of tibial plateau angle correction post tibial plateau levelling osteotomy on the patellar ligament strain in canine cranial cruciate ligament deficient stifles: an <i>ex vivo</i> experimental study – EG Bester	
15:10-15:40	<b>Session 6: UP Veterinary Science Open Innovation Challenge – Encouraging multi-disciplinary entrepreneurial thinking and stimulating innovation</b>	<b>Session chair: Prof. Vinny Naidoo</b>
	Overview of the UP Veterinary Science Open Innovation Challenge – Prof. Vinny Naidoo	
	Pitch 1: Sustainable tick removal service – Tamarin Powell	
	Pitch 2: KnoffelCo: veterinary apparel solutions – Daniel Archibald	
	Announcement of the winner – Adv. Lawrence Baloyi, Head: Innovation and Contracts Management, Department of Research and Innovation	
15:45-16:15	<b>Annual Faculty Research Prize Giving</b>	<b>Prof. Marinda Oosthuizen</b>
16:20	<b>Closing remarks</b>	<b>Prof. Vinny Naidoo</b>
	<b>Cocktail event</b>	

Scan the QR code  
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Poster Abstract  
Booklet.



<https://opvetfacultyday.co.za/>

## Poster presentations

1. *In silico* analysis of GPI-anchored hypothetical proteins from *Babesia bovis* as potential vaccine candidates – T Bambeni
2. Communal farmers' knowledge, perception and practice of foot-and-mouth disease (FMD) in the FMD control zone of South Africa – K Daddy
3. *In silico* prediction of CD4+ T cell and B cell epitopes targeting *Haemonchus contortus* vaccine antigens – SAC Gambu
4. Molecular characterisation of recent South African *Ephemerovirus febris* strains – M Grobler
5. Assessment of the tibial tuberosity osteotomy location on the postoperative complications in dogs surgically treated for medial patella luxation – P Guy
6. Cytotoxicity of imidacloprid and its possible activity in disrupting cytoskeletal proteins in a rat Leydig cell line (LC-540) – MIA Ibrahim
7. Evaluation of host metabolome in goats following infection with *Haemonchus contortus* – OB Kube
8. Genotyping five *Ehrlichia ruminantium* housekeeping genes – M Labuschagne
9. Biofilm expression and antimicrobial resistance patterns of *Streptococcus uberis* isolated from milk samples of dairy cows in South Africa – S Magagula
10. The blood microbiome of patients with acute febrile illness in the Mnisi community, South Africa, reveals the presence of a novel member of the family *Rickettsiaceae* – SM Makgabo
11. Cattle trade networks in the foot-and-mouth disease protection zone of Limpopo Province – K Malatji
12. Molecular characterisation of *Listeria monocytogenes* from beef and beef-based products purchased in Mpumalanga and North West Provinces – A Manqele
13. Evaluation of immune response and gut microbiome in *Haemonchus contortus* infected goats – BQ Maphangela
14. Computed tomographic evaluation of the distal limb in the standing sedated horse – N Mathee
15. Serological evidence and co-exposure of selected infections among livestock slaughtered at Eastern Cape abattoirs in South Africa – KD Mazwi
16. Detection of *Theileria haneyi* in South African equids using a newly developed quantitative real-time PCR assay – TV Mbaba
17. Serial ionized calcium and magnesium in puppies with parvoviral enteritis – A Mouton
18. Development and validation of a real-time PCR assay, and phylogenetic classification of *Anaplasma platys* – NF Nkosi
19. Anti-inflammatory activity of extracts of *Kalanchoe gunnii* and *Bryophyllum pinnatum* plant species with potential use against bovine mastitis – EC Ogbuadike
20. Retrospective analysis of clinical and clinicopathological findings in horses presenting with equine encephalosis – GB Piketh
21. A survey on the antimicrobial use against contagious bovine pleuropneumonia among farmers in Tanzania – EP Singano
22. *In silico* prediction of CD4 T cell and B cell epitopes of the peptidase and GTPase protein families of *Haemonchus contortus* – CB van der Byl



## Message from the Dean

**Prof Vinny Naidoo**  
Dean: Faculty of Veterinary Science

*"Following on the work of its founder, Prof Sir Arnold Theiler, veterinary education has been at the forefront of animal production, health and wellbeing in the country. From a very humble beginning with eight students, the Faculty is now recognised internationally for its quality of training, research, services and community engagement."*



Welcome to Faculty Day 2023. Today we are here to once again celebrate the achievements of our undergraduate and postgraduate students as they present their work. For our undergraduate students Faculty Day gives them an opportunity to showcase the research skills they've gained while completing their research module that teaches the importance of scientific publications in general veterinary practice, while for our postgraduate student today hopefully is the start of an academic career, all aimed at developing the veterinary profession. We are also privileged today to have Prof Richard Kock present the annual Theiler memorial lecture entitled "The future of animal-based-agriculture in the context of climate change and biodiversity loss."

With today's lecture being focused on climate change, I thought I'd share my perspective on climate change. A matter that is critical to how we need to continue to survive on our planet, which at the same time is made more complicated by our need to address the major evils faced by our society, further compounded by electricity supply constraints, poor performance of the South African economy, war on the other side of the world and an incapacity of the State to control critically important veterinary diseases. The way forward is for us to adapt our lifestyles to best optimize the use of our resources while minimizing greenhouse emission, which is a tall ask on a country highly dependent on coal-powered power stations. This in combination with our reliance, and maybe, over-reliance on technology and the need for power and batteries.

And being part of the veterinary profession, we can't dissociate ourselves from the current discussion on the role of

commercial agriculture on the release of greenhouse gases. While agriculture is not the greatest producer of emission, organized agriculture is estimated to produce 10 to 20% of emissions in a given year, depending in the country and region. Of this animal production contribute 31% while crop production about 27%. There has been a suggestion that moving the world towards a completely vegan diet could be an answer to the problem. But this needs to be taken into perspective, in that this would likely only slow down the current rate of temperature increase by 30 years. This would also be associated with a negative impact of needing more land for production, more synthetic fertilizers, the use of more plastics for clothing production and potential nutritional deficiencies.

To me this is not the only question that needs to be asked. What we need to look at is the old veterinary adage in food production being; cheap, good quality protein. So yes, the world may transition to protein alternates be it plant based protein or cultured meat, but at the moment animal protein is cheaper by up to 400% in comparison to just plant-based protein sources, and still remains more nutritious. The latter need to be considered also in the costs associated with taking additional supplements such as vitamin B12, thiamine, niacin and calcium. All in all, this has serious implication on our ability to feed poor communities affordably. Thus, the way forward is probably somewhere in between, with the veterinary profession playing a vital role in ensuring optimal animal production, ensuring that animal disease is properly mitigated and that effluent/sludge management is optimized.

It will no doubt be tough, but as Theiler showed us one needs to adapt to change. Coming from Switzerland to South Africa, he probably experienced his own version of climate change. Instead of being an



obstacle he took on the problems and found solutions, many of which were highly innovative for the time. With such strong historical roots, I'm sure we'll succeed. Some of this excellence is reflected in our 263 publications for the 2022 academic year, Prof Jurgen Richt being awarded his NRF A rating and a number of high value grants that were awarded to staff in the past 12 months. Finally, our efforts are also being recognised internationally, as evident by our position in the top 75 of the Shanghai ranking and top 60 of the QS rankings, with numerous staff featuring in the top 2% of top cited researchers in the world. With this, let me end, by wishing all our presenters all the best. Enjoy Faculty Day 2023.

**Prof Vinny Naidoo**

*Dean: Faculty of Veterinary Science*

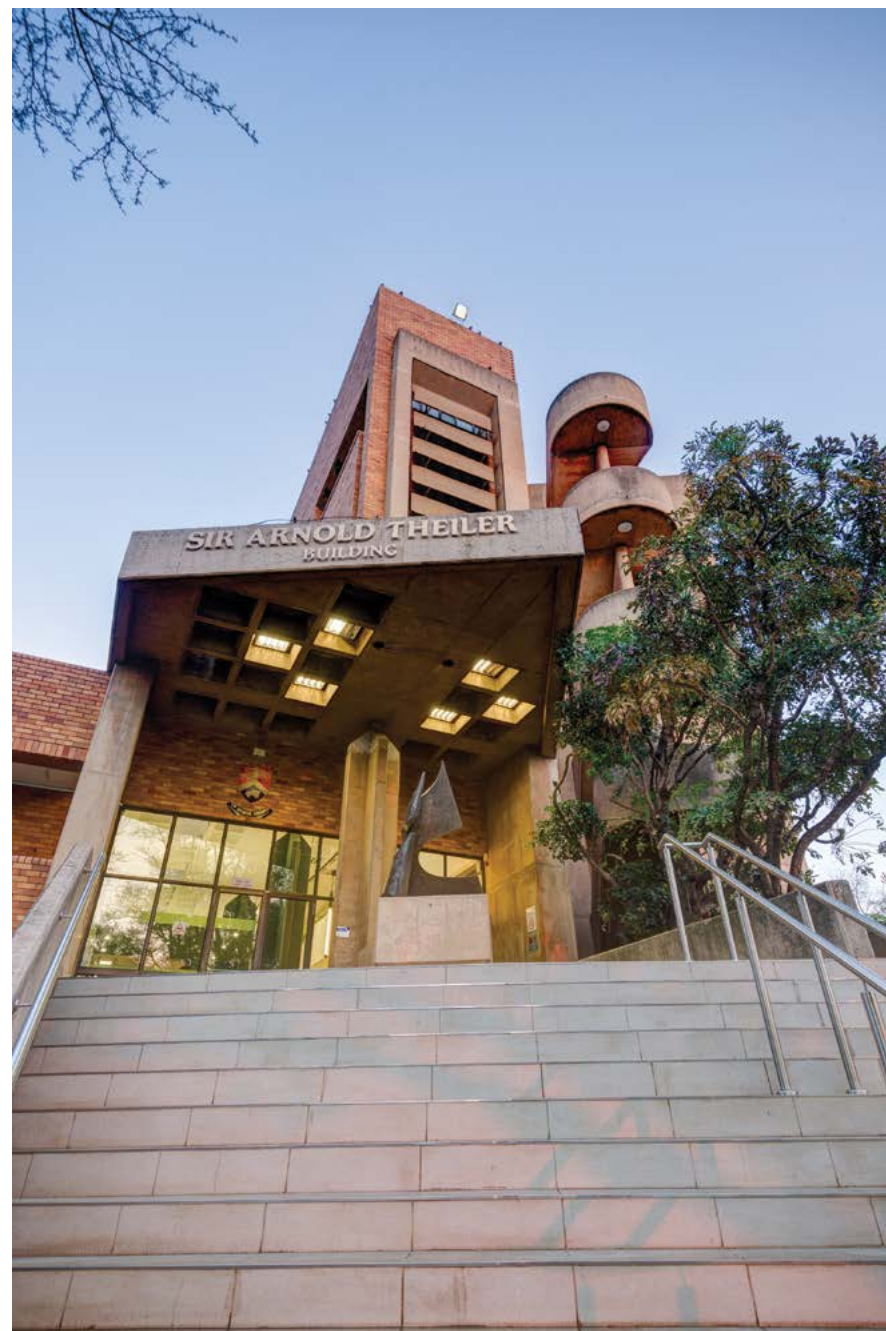
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## OUR VISION

To be an innovative global leader in veterinary science.

## OUR MISSION

- To provide an adaptive enquiry-led undergraduate and postgraduate educational system that meets national and international societal needs.
- To create and promote an enabling environment for excellence in research using a transdisciplinary approach.
- To be at the cutting edge of veterinary science and technology – building capability and creating new knowledge in the field.
- To influence and shape policy frameworks that are proactive and enabling.
- To leverage our expertise to protect and enhance animal and human health and well-being, and contribute to thriving communities and sustainable planetary ecosystems.



## Arnold Theiler Memorial Lecture



**Professor Richard A. Kock**  
(MA, Vet MB Vet MD MRCVS)

*Sketched by Estelle Mayhew*

### Biographical Summary

Richard Kock is a wildlife veterinary ecologist in the field of wildlife health focused on Africa and Asia. He also works in One Health at the interface between animals, humans and the environment, and on the role of food systems in disease emergence and environmental change. Of his 43 years as a professional, he was attached to the Zoological Society of London for 28 years, mostly based in Nairobi, seconded to the Kenya Wildlife Service and the African Union Inter-African Bureau for Animal Resources. He spent 11 years as Professor in Wildlife Health and Emerging Diseases at the Royal Veterinary College (RVC) London, and retired in 2022.

He was awarded the African Union Certificate of Appreciation in 2022 and an FAO Bronze Medal in 2010 in recognition of his work on morbilliviruses and eradication of the rinderpest virus as well as the Tom Thorne and Beth Williams Memorial Award of the international Wildlife Disease Association for exceptional contributions to understanding wildlife disease of policy relevance. He was co-chair of the International Union for Conservation of Nature's Wildlife Health Specialist Group for over a decade and is a dedicated conservationist. He continues to provide mentorship and consultancy on health and wildlife matters to international and national health agencies and institutions. He has published more than 360 peer reviewed publications and book chapters. He has an RG score of 40.12, an *h* index of 56, an *i10* index of 161 and 15192 citations. He jointly established a One Health MSc with RVC and the London School of Hygiene and Tropical Medicine and he lectures on One Health and Wildlife diseases.

Recently he retired as co-chair of the IUCN Species Survival Commission Wildlife Health Specialist Group. He is an Appointee in waiting as Vice President of the (International) Wildlife Disease Association. He is Chief Editor of the Cambridge University Press Research Directions One Health journal and a reviewer across the disciplines in wildlife health and One Health papers. In areas of policy, he is an associate Research Fellow of Chatham House (also known as the Royal Institute of International Affairs) and expert adviser to the FAO IAEA Zodiac Project on zoonosis, as well as the UK Government Bio-surveillance Strategy development to prevent epidemic disease in humans, plants and animals. He is also an Adjunct Professor at Tufts University (Grafton, USA) and at the Njala University in Njala and Bo, Sierra Leone.

## Abstract

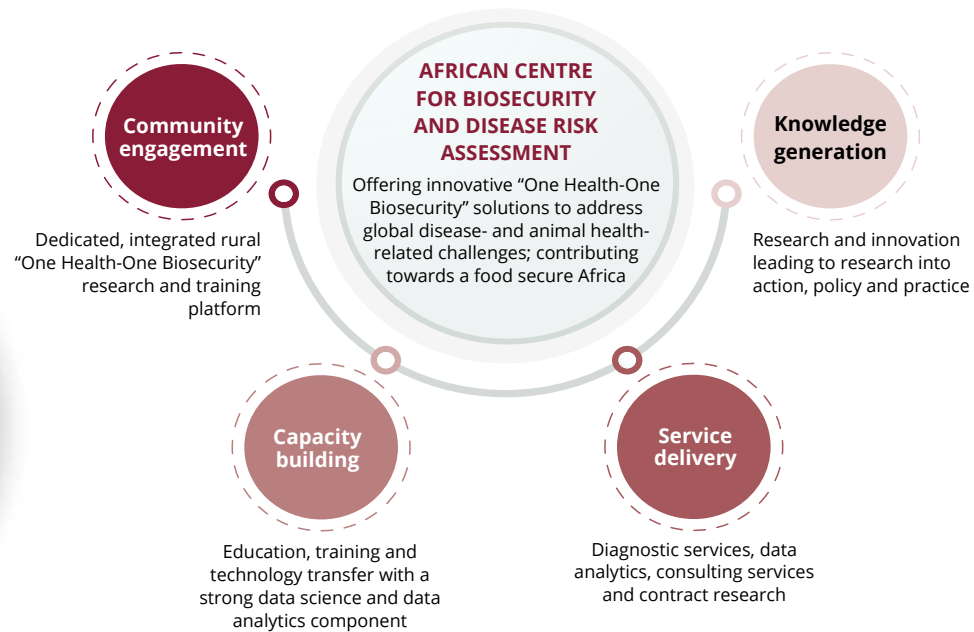
There is an urgent need to review the future of animal-based-agriculture in the context of climate change and biodiversity loss, which the World Economic Forum has described as two of the most important crises to resolve in order for the human economy to thrive. Another externality of food systems beyond economics is its impact on health. This presentation uses a One Health perspective to review food systems, inclusive of natural food webs, human food and food for livestock. Examining this fundamental with this lens enables consideration of core needs of biota, humans in particular and a view of all the externalities of the systems themselves. The key challenges of current food systems are to sustain the advances in food and nutrition security for humanity, whilst limiting biodiversity loss, soil and water degradation, climate change impacts, emerging zoonotic pathogens and malnutrition with a particular emphasis on overconsumption and obesity impacts on health. The human agricultural systems in existence are failing on a number of aspects and there is a need for a radical rethink on human food economy. These elements are also discussed.



# 2022 Research Highlights

## New Senate approved Faculty Centre

*"We aim to consolidate our strengths and to become known as the "one-stop, go-to" facility and preferred training hub for all disease risk solutions in Africa"*

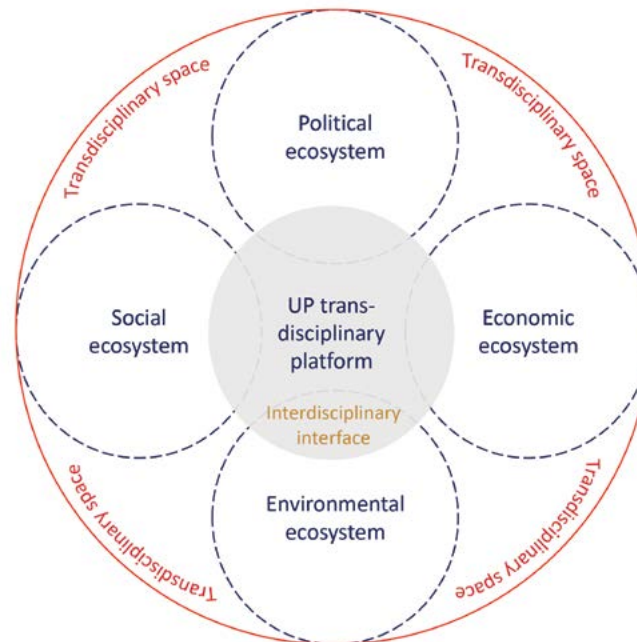


## African Centre for Biosecurity and Disease Risk Assessment

*"It is all about health: Healthy animals mean healthy people ... and healthier planet"*

## Mnisi Community Strategic Conversation: Establishing a UP-recognized Mnisi transdisciplinary platform

*"A platform in the field and immersed in the community where research, teaching and learning are undertaken across the spectrum of disciplinary-interdisciplinary-transdisciplinary dimensions"*



## Veterinary Science (51-60) GLOBAL RANK

2022 QS World University Rankings by Subject

**319**

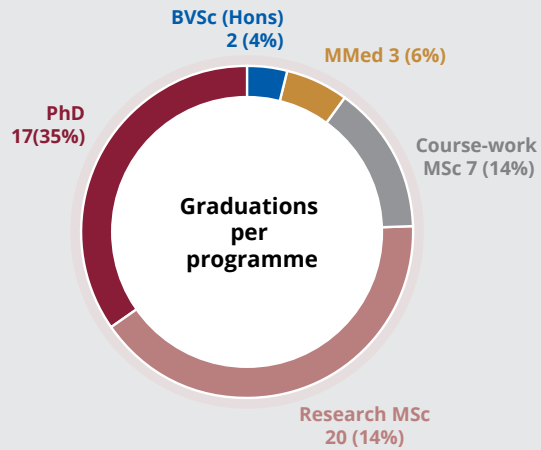
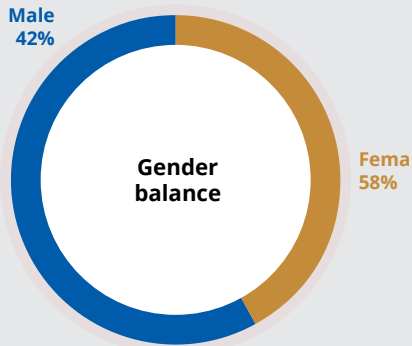
PG student cohort (2022)

**49**

PG graduates (2022)

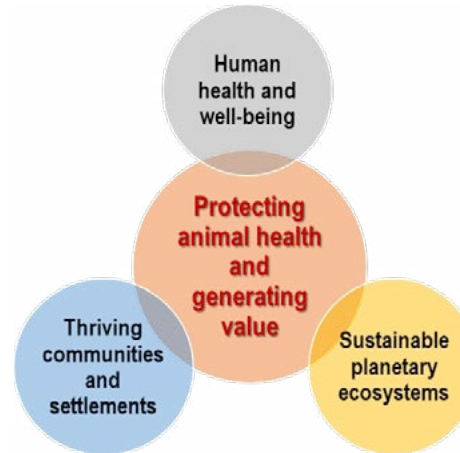
**112,93**

Publication units (2022)



### Faculty Research Framework

*“From basic sciences to advanced care – addressing the dimensions of sustainable development”*



## Launch of the National Biosecurity Hub at Innovation Africa @UP

*“A multi-stakeholder partnership initiative geared to address a multitude of current and potential future threats to biosecurity in South Africa”*



## Message from the Deputy Dean

*“To raise new questions, new possibilities, to regard old problems from a new angle, require creative imagination and marks real advance in science.”*

~ Albert Einstein

**Prof Marinda Oosthuizen**  
Deputy Dean: Research and Postgraduate Studies



From the 2022 highlights, it is clear that the Faculty performed well in all aspects of research; attracting postgraduate students nationally and internationally, increasing our research outputs, attaining significant research funding, strengthening national and international partnerships and collaborations, etc. This showcases the dedication and brilliance of our Faculty members, researchers and students. Several strategic conversations were also held during 2022 that I foresee to play a vital role in leading us towards a future of growth and progress, directing our efforts towards meaningful and impactful outcomes.

*“We have a proud tradition of training professionals to promote animal health that impacts directly on human health, thereby stimulating economic growth and food security”*

### Reflections 2022 – Postgraduate Students:

As for our postgraduate students, 2022 was once again a difficult year with many challenges and further delays mainly due to the “ripple-effect” of the COVID-19 pandemic. We struggled to meet our 2022 postgraduate enrolment targets (especially on MSc level), and our completion times are still not desirable. We are, however, very proud of our graduates and strive to, apart from their academic achievements, instill the skills, capabilities and attributes in them that will enable them to be successful in an ever-changing global environment. I would, therefore, like to thank our supervisors for their dedication and hard work to guide, support and mentor our students on their postgraduate journey.

For the 2022 registration year, postgraduate students contributed 25% of the total student body. Students from designated groups made up 53.6% of the total number of postgraduate students, with the group being 58% female.

*“We value our postgraduate students and strive to create an enabling environment that promotes success, well-being, and a positive learning experience”*

There are countless factors that influence the postgraduate student experience, beyond those issues which are purely academic, and which impact on both the quality of the experience and the probability of retention. These factors include a feeling of isolation especially in the initial year of study, emotional stress (feeling stressed, overwhelmed, anxious), financial stress, etc. We, therefore, have a responsibility to ensure that the best possible support is offered to our students. Through our Faculty Postgraduate Student Advisor, the Faculty provides and will continue to support our students with emotional (and other) difficulties, also creating several new initiatives to address the challenges our students face.

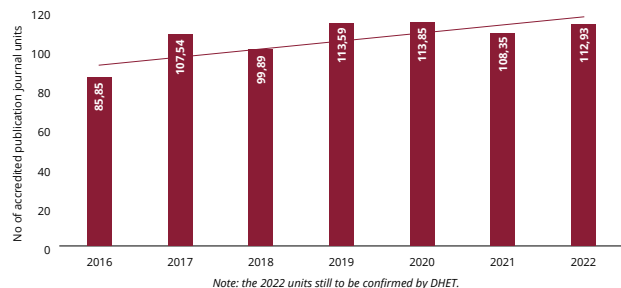
The Postgraduate Student Association (PGSA) is also playing a significant role in the lives of our postgraduate students. By engaging with our students and fostering a warm and inclusive environment, the PGSA created a dynamic and supportive community for all. Thank you for your enthusiasm and for always taking on, and organizing several academic and social initiatives. Your contributions are valued and I am proud to have you as an integral part of our Faculty.

## Reflections 2022 – Research:

We are very proud that the discipline “*veterinary science*” featured as one of the higher QS ranked subject fields at the University of Pretoria in 2022; ranked in the 51-60 global band. We ranked 51-75 in the global Shanghai rankings, and first in Africa. To continue improving the Faculty’s rankings and enhance its reputation as a leading veterinary school, we will continue delivering innovative and relevant research, generating high-impact publications, offering high-quality postgraduate training and growing the research status of the Faculty. The Faculty is committed to promoting transdisciplinary research, which can help to foster collaboration across different fields and disciplines. By doing so, the Faculty can tackle complex challenges and make a greater impact on society.

## Publication outputs:

After the drop in the number of publication units in 2021, we are excited to report that we are on an upward trend again with 112.93 accredited publication units in 2022 (274 papers in total), surpassing our target of 104. I would like to congratulate and thank each and every one for their contribution (no matter how big or small) to make this achievement possible.



**422 (27.1%)** Number of publications in the top 10% JOURNALS world wide.  
**187 (11.7%)** Number of publications in the top 10% most CITED publications world wide.

## New research initiatives and strategies:

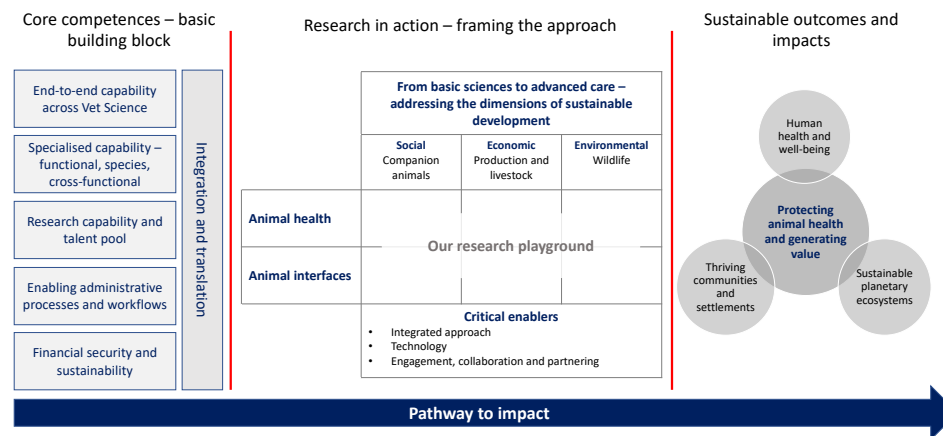
*“Our strategic conversations and outcomes will play a vital role in leading us towards a future of growth and progress, directing our efforts towards meaningful and impactful outcomes”*

### (1) Faculty Strategic Research Framework

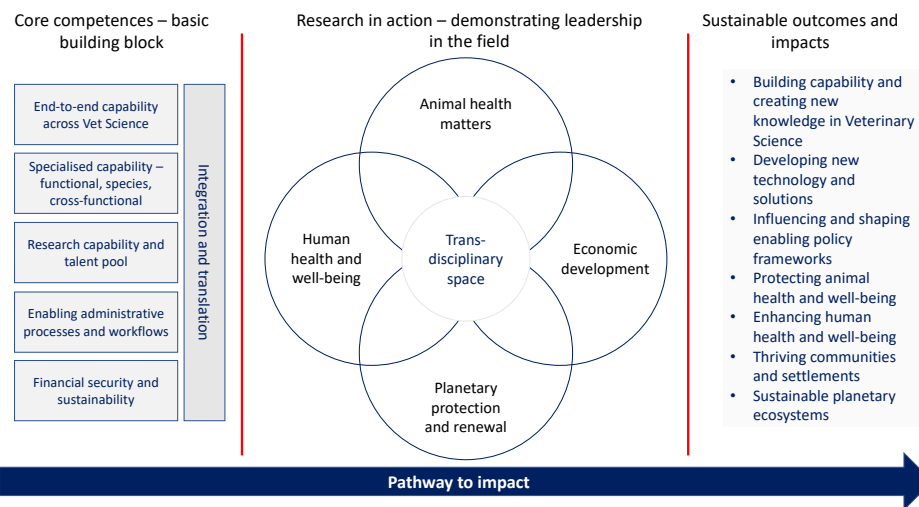
During 2022 and with the assistance of Dr Brian Chicksen (Executive Office) as facilitator, the Faculty has developed a new (and broad) Research Framework to ensure that

our research efforts are focused and aligned with our Faculty goals and objectives. We outlined the challenges our researchers are faced with, asked very pertinent questions and outlined our research philosophy. We recognized that we work at different levels of complexity with end-to-end capabilities, and we want to give all researchers, from any of the disciplines, a sense of belonging within the framework. The model we developed, “*From basic sciences to advanced care – addressing the dimensions of sustainable development*”, includes the different workstreams and varying levels of complexity to form the broad spaces where we conduct research (our research “playground” – the 2x3 matrix below).

### Framing the approach:



### Our research value proposition – sustainable outcomes and impact:



## (2) African Centre for Biosecurity and Disease Risk Assessment

During 2022, we got Senate approval for the establishment of an African Centre for Biosecurity and Disease Risk Assessment, a first in Africa. With the Faculty being very strong in these areas of study, we are consolidating and extending research and activities in this field by establishing a centre of scientific excellence for the study of animal health-related risks (including zoonoses, food-borne diseases, residues and antimicrobial resistance) that threaten Africa's wildlife and agriculture economy, food security, and public health. Also, we aim to consolidate our strengths and to become known as the "one-stop, go-to" facility and preferred training hub for all disease risk solutions in Africa.

### AFRICAN CENTRE FOR BIOSECURITY AND DISEASE RISK ASSESSMENT

*"It is all about health: Healthy animals mean healthy people ...and a healthier planet"*

#### OUR RESPONSIBILITY:

- As the only Veterinary Faculty in South Africa, offer quality education at the under- and postgraduate level; cutting-edge, innovative and locally relevant research with accredited specialists' diagnostic services; and support our communities through strategic outreach programmes.
- Being central to the economy and an important contributor to optimal health for people, animals and our environment lead in the One Health Concept.
- Support identified priorities of the National Development Plan thereby supporting Government in endeavours aimed at sustainable rural development, food security, job creation and nature conservation.

#### OUR RESPONSIBILITY

#### OUR WORK

- Grounded in four pillars, cutting across multiple transdisciplinary themes.

#### OUR GOAL

- Develop South Africa and Africa's capacity for research and innovation in the field of biosecurity and disease risk assessment through the use of expertise at the Faculty and with partners.
- Advance science, people, and policy; discovering novel approaches for disease intervention and delivery of preventive health care for animals and humans.
- Establish a BSL3 laboratory on the Onderstepoort campus for optimised disease research.
- Ultimately, improving the quality of life for animals and humans.

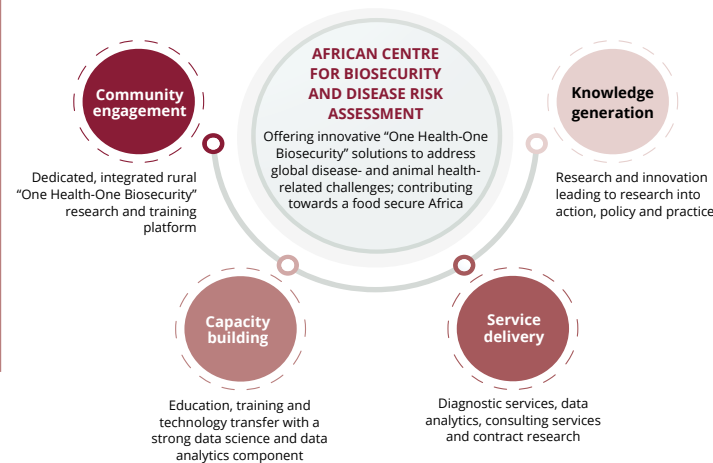
#### OUR VISION

- Establish and host a dedicated AFRICAN CENTRE FOR BIOSECURITY AND DISEASE RISK ASSESSMENT.
- Extend already established excellence in research, diagnostic services and related activities in biosecurity and disease risk assessment into a Centre of scientific excellence for the study of animal diseases and animal health-related risks (including zoonoses, food-borne diseases, residues and antimicrobial resistance) that threaten Africa's agricultural economy, food security, and public health.
- Offer innovative "One Health-One Biosecurity" solutions to address global disease- and animal health-related challenges; contributing towards a food secure Africa.
- To be the known "one-stop, go-to" facility and preferred training hub for all disease risk solutions.



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Faculty of Veterinary Science



Furthermore, the African Centre for Biosecurity and Disease Risk Assessment forms an integral part of the National Biosecurity Hub at Innovation Africa @ UP launched in October 2022, a platform established between Department of Agriculture, Land Reform and Rural Development (DALRRD), Department of Science and Innovation (DSI) and Innovation Africa @UP to support the prevention, reduction and management of crop and animal diseases.

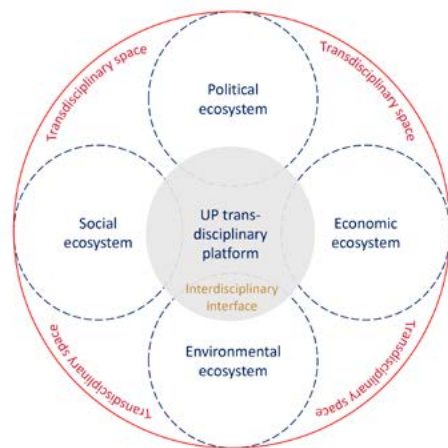




### (3) Mnisi Community Strategic Conversation - Establishing a Transdisciplinary Platform

Over the past 13 years, the Faculty has established a footprint in the Mnisi community in the Bushbuckridge municipality in Mpumalanga, bordering on the Kruger National Park. The infrastructure footprint includes the Hans Hoheisen Wildlife Research Station (HHWRS) and the Hluvukani Animal Clinic, although its influence extends far beyond, through deep community relations with a variety of stakeholders. The area has a wide array of complex developmental challenges. In response, the Faculty's approach seeks to leverage health and wellbeing of animals for positive impacts on humans and the social space; economic development and sustainable communities; and environmental protection and renewal. The Faculty also had a clear goal on enhancing the use of the HHWRS and involving other Faculties to not only offer a service to the Mnisi community but to also give the University the opportunity to truly find transdisciplinary solutions in the area via both teaching and learning and research activities.

In 2022, the Faculty invited representatives from the Faculties of Health Sciences, Natural and Agricultural Sciences, Humanities, and Economic and Management Sciences, along with research chairs from Future Africa and representatives from the Executive Office for a "walk-shop" in the Mnisi community to gain first-hand experience, through multiple lenses and perspectives, of the community and the impact that can be made, as well as what the HHWRS has to offer. A brainstorming session with various stakeholders in the area was also held to identify the needs and gaps to be addressed. This was followed up by conversations held at the Faculty (facilitated by Dr Brian Chicksen) to co-design an approach to recognize the Faculty's Mnisi Community Initiative and steps to establish it as an UP-recognized Mnisi transdisciplinary platform in the field, immersed in the Mnisi community.



- A platform in the field and immersed in the community
- Research, teaching and learning are undertaken across the spectrum of disciplinary-interdisciplinary-transdisciplinary dimensions.
- The mix of collaborators is determined by the nature of the issue at hand. Requisite voices and capabilities are drawn from the relevant domains – forming research clusters.
- Transdisciplinary work involves working across clusters, and with multi-sectoral partners and collaborators.
- Seamlessly connects societal relevance – teaching, learning and research – transformative solutions for wicked problems.

## Reflections – Faculty Day 2021 and Research Awards:

The annual Faculty Day on 20 October 2022 provided an opportunity for our researchers to showcase the research activities in the Faculty to colleagues and peers, and was well attended by staff members, visitors and sponsor companies alike. The Arnold Theiler memorial lecture entitled "IN THE FOOTSTEPS OF ARNOLD THEILER: Vaccines and Diagnostics - then, now and in the future" was delivered by Prof Juergen A. Richt, Regents Distinguished Professor at Kansas State University, Kansas Bioscience Eminent Scholar, extraordinary Professor in the Faculty's Department of Veterinary Tropical Diseases and an A2 NRF rated scientist. Excellence in research performance was recognized at the event with the announcement of the Faculty's Top 10 researchers:

### Researcher of the Year: Prof Geoffrey Fosgate

#### Rest of Top 10 Researchers in the Faculty:

- |                        |                               |
|------------------------|-------------------------------|
| 2. Prof Lyndy McGaw    | 7. Prof Henriette van Heerden |
| 3. Prof Leith Meyer    | 8. Prof Marinda Oosthuizen    |
| 4. Prof Vinny Naidoo   | 9. Prof Nenene Qekwana        |
| 5. Prof Anita Michel   | 10. Prof Amelia Goddard       |
| 6. Prof Peter Thompson |                               |

### To conclude:

I firmly believe that we will continue to make a substantial difference in attaining the goals of the Faculty and to make a significant contribution to the vision of the University. I personally would want to keep on supporting and inspiring our students and staff to be (and stay) excited about their research, their postgraduate journeys and; becoming (and being) the supervisor that they longed for during their own postgraduate journey. Passionate students and staff, and their enthusiasm, dedication, and commitment to excellence will drive innovation, creativity, and academic success, which ultimately benefit the Faculty, University and society as a whole. It is, therefore, our responsibility to inspire our students and staff to be passionate, and to reach for the stars. It's a beautiful thing when a career and a passion come together!

*"The most beautiful thing we can experience is the mysterious. It is the source of all true art and science - Albert Einstein"*

I am grateful for the continued progress we are making and the successes we are enjoying. It is thus quite appropriate to thank all of you – researchers, postgraduate students and support staff alike – who are making it possible for us to continue to operate and who are indeed contributing towards the Faculty and the University's goal of being a research-intensive entity.

With my sincere gratitude,

**Prof Marinda Oosthuizen**

*Deputy Dean: Research and Postgraduate Studies*

# Thank you to our sponsors

On behalf of the Faculty of Veterinary Science, University of Pretoria, a sincere thank you for your kind sponsorship of our Faculty Day.

Faculty Day is a proud tradition, showcasing the research activities of the Faculty as well as exposing young researchers, postgraduate and final year undergraduate students to a conference environment. The Faculty would, therefore, like to express our deepest appreciation for your continuing support and for being part of our special day.

We look forward to hosting you again in 2024!

## Prof. Vinny Naidoo

Dean of the Faculty of Veterinary Science

## Prof. Marinda Oosthuizen

Deputy Dean: Research and Postgraduate Studies

Special thank you to Estelle Mayhew for the beautiful sketch of Professor Richard A. Kock



If, by oversight, we omitted the logo of one of our sponsors, we sincerely apologize. It is important to acknowledge that the sponsors listed here had already secured their placements prior to the Faculty Day booklet being finalised.

# Session



**Postgraduate  
Orals**

## MC Marimwe



MC Marimwe<sup>1,2</sup>, GT Fosgate<sup>1</sup>, L Roberts<sup>2,3</sup>, S Tavornpanich<sup>4</sup>, C Abolnik<sup>1</sup>

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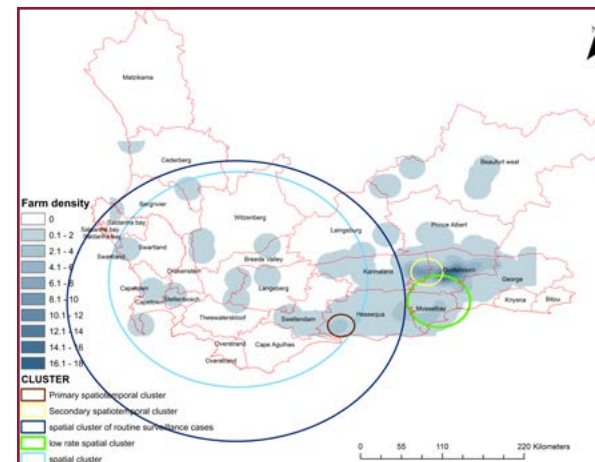
<sup>4</sup> Department of Aquatic Animal Health and Welfare, Norwegian Veterinary Institute, Oslo, Norway

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## Risk factors for the 2011 and 2017 high pathogenicity avian influenza outbreaks on ostrich farms in the Western Cape

High pathogenicity avian influenza (HPAI) outbreaks have been intermittently reported in the ostrich population of South Africa since 2004. Identifying risk factors for HPAI infection on ostrich farms is essential for planning and implementing disease surveillance and control. The objective of the study was to identify and compare risk factors associated with the 2011 H5N2 and 2017 H5N8 HPAI outbreaks on ostrich farms within the Western Cape Province of South Africa. A questionnaire on ostrich farming practices was used to collect epidemiological data from study farms. Additional secondary data collected included disease outbreak data from the Western Cape Department of Agriculture, historical weather records and spatially-explicit agro-ecological information. All ostrich farms registered at the end of December 2018 were eligible for participation. Multivariable logistic and conditional logistic regression models were fit to estimate associations. One hundred owner/manager questionnaires were completed including 30 farms affected in either or both outbreaks. Farm location (Oudtshoorn Municipality) (OR 11.8, 95% CI 1.69-82.0,  $P=0.013$ ) as well as multiple farm ownership (OR 1.51, 95% CI 1.20-1.91,  $P<0.001$ ) were positively associated with the 2011 HPAI occurrence. In 2017, high risk of occurrence was associated with farms sourcing ostriches from chick raiser farms

(OR 11.6, 95% CI 2.88-46.5,  $P<0.001$ ) as well as presence of increased wild birds seen at open water bodies during winter (OR 5.80, 95% CI 1.56-21.6,  $P=0.009$ ). Ownership/management of multiple farms in different municipalities, districts and provinces (OR 7.21, 95% CI 1.49-35.0,  $P=0.014$ ) and increased vegetation cover (Normalized Difference Vegetation Index) (OR 1.07, 95% CI 1.01-1.13,  $P=0.029$ ) increased risk of HPAI H5N8 for the 2017 HPAI outbreak period. Significant risk factors varied by outbreak suggesting that transmission pathways varied during the two outbreaks. This highlights the important role of both farming practices and environmental features as well as a need for tailored surveillance and control strategies.



## Y Rautenbach



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A Goddard<sup>1,2</sup>, LCR Meyer<sup>2,4</sup>, PE Buss<sup>2,5</sup>,  
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- <sup>5</sup> Veterinary Wildlife Services, South African National Parks, Kruger National Park, Skukuza, South Africa.

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## Sequencing of the southern white rhinoceros (*Ceratotherium simum simum*) cardiac troponin I gene and analytical validation of a point-of-care cardiac troponin I immunoassay

Conservation strategies for the critically endangered white rhinoceros (*Ceratotherium simum simum*) often involve chemical immobilisation and translocation. Dehydration, acid-base disturbances, hypoxaemia, negative energy balance, stress-induced immunomodulation and skeletal muscle injury are common adverse changes in translocated rhinoceros. Investigation into potential concurrent myocardial injury in transported rhinoceros is limited due to a lack of validated immunoassays. Firstly, to determine the mRNA transcript sequence of white rhinoceros' cardiac troponin I (cTnI) and evaluate sequence homology. Secondly, to validate a point-of-care cTnI immunoassay. RNA was extracted from ventricular myocardium of deceased adult white rhinoceros and complementary DNA was synthesised via rt-PCR and sequenced. Analytical method validation of the Siemens Stratus® CS 200 Acute Care™ Analyser included linearity, repeatability, reproducibility, recovery and detection limit experiments using homogenates of rhinoceros myocardium and serum. Results were assessed against prescribed total allowable error (TE<sub>a</sub>) of 70% for cTnI. Nucleotide sequence identity of the rhinoceros cTnI gene with human

and equine cTnI genes was high (97% and 96%, respectively). Predicted amino acid sequence matched assay antibody epitope-binding sites. The assay was linear within a range of 0.05-38.39 ng/mL. Imprecision ranged from 1.9%-8.0%. The proportional systematic error was -1.87% and was < TE<sub>a</sub>. Limit of the blank was below the detection limit of the assay (<0.03 ng/mL) and the limit of detection was 0.04 ng/mL. The Stratus CS 200 is suitable for measurement of cTnI in white rhinoceros and can be used to investigate potential myocardial injury in this species.



C Steyn



C Steyn<sup>1,2</sup>, K Koepfel<sup>2,3</sup>, MR Crole<sup>1,2</sup>

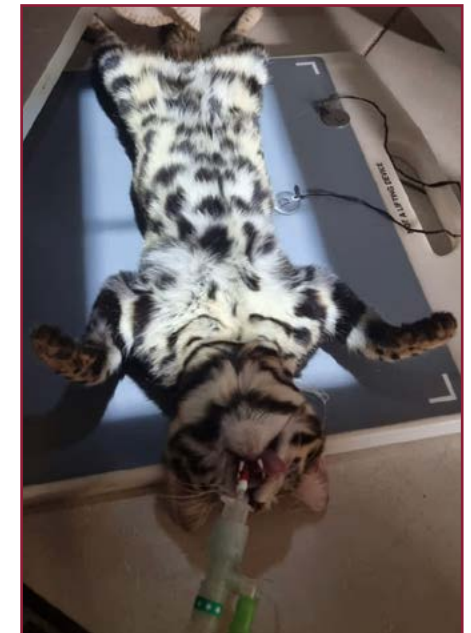
- <sup>1</sup> Department of Anatomy and Physiology, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa
- <sup>2</sup> Centre for Wildlife Research, Facchristine, steyn@up.ac.za, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa
- <sup>3</sup> Department of Production Animal Studies, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa

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## Radiological description of the sesamoid bones and ossicles in the stifle joint of the lion (*Panthera leo*), black-footed cat (*Felis nigripes*) and Temminck's pangolin (*Smutsia temminckii*)

The lion, black-footed cat (BFC) and Temminck's pangolin (TP) represent a range of sizes and locomotory functions of the stifle joint and a comparison of structures may elucidate the function. Sesamoid bones are radio-dense structures embedded in muscle tendons. The sesamoids of the stifle include the patella, lateral and medial fabellae and sesamoid of the popliteal muscle. Meniscal ossicles are occasionally observed although their functional significance is unknown. Nine BFC's were sedated and their left knees radiographed. Formalin-preserved hindlimbs of two lions and one TP (skin removed) were radiographed. Medio-lateral and either caudo-cranial or cranio-caudal views were obtained. The stifle joint of the lions (n=4) and BFC's (n=9), from largest to smallest, reveals the patella, lateral fabella and popliteal sesamoid bone, while the medial fabella is absent. A mineralised opacity (meniscal ossicle) is observed cranially in the medial joint space of the lion (n=3) and BFC (n=8). Only the patella is present in the pangolin (n=2). The articular and cranial surface of the patella are similar in length in the BFC and TP whereas in the lion the cranial surface is longer than the articular

surface. The variations in the patella of the three species may reflect the different functions of sesamoid bones which are to protect tendons as they pass over bony prominences, to increase areas for muscle attachment and to improve the mechanical advantage of tendons. A meniscal ossicle presumably mitigates excessive torsion of the meniscus. The presence of the fabella and popliteal sesamoid bone in quadrupedal felids supports the increased force on the stifle joint during hunting and running as opposed to the upright gait of the bipedal TP. The ossicle in the cranial joint space of the lion and BFC is comparable to the normal occurring meniscal ossicle described in domestic and other wild felids.



## KC Moabelo



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## Comparison of the Bionote NSP Ab ELISA and PrioCheck FMDV NS ELISA

Foot and mouth disease (FMD) is a highly contagious viral disease that causes devastating economic losses due to decreased productivity, trade restrictions and control measures. Accurate and timely diagnostics are crucial for effective disease management, including early detection, control and prevention. The detection of antibodies against non-structural proteins (NSP) of the FMD virus (FMDV) is one of the best tools to determine natural FMDV infection and can be used to differentiate infected from vaccinated animals. The purpose of the study was to evaluate the diagnostic agreement between the Bionote NSP Ab ELISA and PrioCheck FMDV NS ELISA. Four hundred and one serum samples were obtained from the Agricultural Research Council-Onderstepoort Veterinary Institute, Transboundary Animal Disease (ARC-OVR, TAD) Biobank. Results indicated that 284 (70.8%) samples were negative on both the Bionote and PrioCheck ELISAs, 62 (15.5%) serum samples tested positive on both ELISAs, and 11 (2.7%) and 44 (10.9%) samples tested positive on the Bionote and PrioCheck ELISAs, respectively. Cohen's Kappa coefficient for the two tests was calculated to be 0.61, depicting moderate to substantial agreement

between the two ELISAs. Based on these findings, it was concluded that both the Bionote and PrioCheck ELISAs demonstrate effectiveness in detecting FMDV NSPs. It also suggests a degree of confidence in their ability to identify positive samples. However, the disparity in the number of samples testing positive on each test suggests that there may be variations in sensitivity or specificity between the two ELISAs. Further investigations are warranted to identify the factors contributing to these differences and to determine the optimal circumstances in which each test should be used. Overall, the evaluation provides valuable insights into the performance of the Bionote NSP Ab ELISA and PrioCheck FMDV NS ELISA and highlights their potential applications in FMD diagnostics.



## RC Erhabor



RC Erhabor<sup>1</sup>, JP Dzoyem<sup>2</sup>, I-M Petzer<sup>3</sup>,  
LJ McGaw<sup>1</sup>

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<sup>2</sup> Department of Biochemistry, Faculty of Science, University of Dschang, Dschang, Cameroon  
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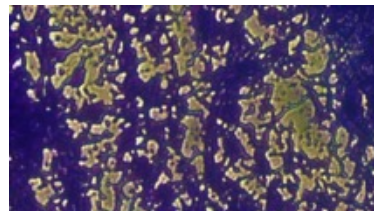
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## Antibacterial and anti-inflammatory activity and cytotoxicity of *Combretum elaeagnoides* Klotzsch methanol leaf extract and fractions against pathogens causing bovine mastitis

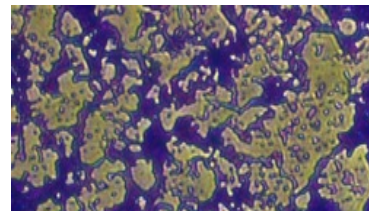
Bovine mastitis is an inflammation of the mammary parenchyma which is usually caused by an infection that could stem from microorganisms in an already infected udder, or from the environment. Mastitis-causing organisms cause tenacious infections, of which the *Staphylococcus* spp. and *Streptococcus* spp. are the most prominent. These bacteria are becoming increasingly resistant to common antibiotic therapy. Plants are rich in bioactive compounds, and with the alarming rate of antibiotic resistance resulting in the reoccurrence of infection, the in vitro bioactivity of the methanol extract of *Combretum elaeagnoides* and its fractions and isolated compound (quercetin-3-O-rhamnoside) against six clinical isolates of *Staphylococcus aureus* (SA1-6) and two ATCC strains (*S. aureus* ATCC 29213, *S. epidermidis* ATCC 35984) was investigated. The antibacterial potential of the extracts was determined via serial microdilution. Quorum quenching (QQ) activity was ascertained via inhibition of violacein production in *Chromobacterium violaceum*. The 15-lipoxygenase enzyme and nitric oxide (NO) inhibition assays were utilized to ascertain the anti-inflammatory activity of the extracts. A tetrazolium-based colorimetric reduction assay was used to determine the cytotoxicity of the extracts against bovine dermis cell lines. The ethyl acetate fraction had the best inhibition against all test bacteria (MIC = 0.07- 0.23 mg/mL). All fractions at different test times (T0, T24, T48) had varying biofilm biomass inhibition against the test strains with inhibition between 1.53- 100%. The extract and fractions had excellent QQ activity with IC<sub>50</sub> >1.25 mg/mL, and good lipoxygenase inhibition (IC<sub>50</sub> = 34.46 - 1000 µg/mL). The extract and fractions had moderate to good NO inhibition (IC<sub>50</sub> = 0.89 - 3.72 µg/mL). The methanol extract and fractions were non-toxic to the bovine dermis cells (LC<sub>50</sub> >1 mg/mL). Thus, *C. elaeagnoides* extract or fractions may be recommended for the development of herbal preparations for the prevention and treatment of bovine mastitis.

Images of biofilm formation of the different strains and isolates after staining with crystal violet following 24 hours incubation

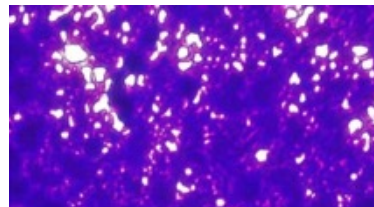
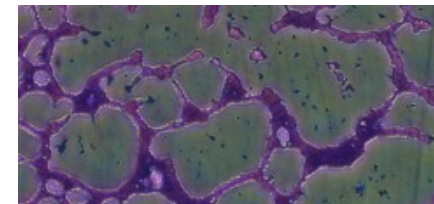
*Staphylococcus aureus* clinical isolate 2



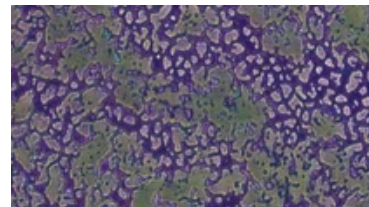
*Staphylococcus aureus* clinical isolate 3



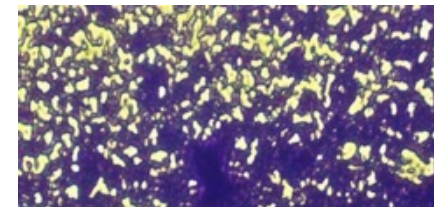
*Staphylococcus aureus* clinical isolate 4



*Staphylococcus aureus* clinical isolate 5



*Staphylococcus aureus* clinical isolate 6



*Staphylococcus epidermidis* ATCC 35984



# Session

# 2

**Science  
Communication**



GV Ringani



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## The effects of nutritional stress and reproduction on stable isotope ratios of ruminants, monogastrics, and hind-gut fermenters in South Africa

Gestation and lactation are metabolically demanding physiological states that female mammals undergo. The female's nutritional state during gestation and lactation has the potential to affect not just her health, but the growth trajectory of her offspring. Weaning is a nutritionally stressful transition period as young animals must adapt to a new diet. Stable isotope analysis is an analytical tool that can be used to elucidate the flow of nutrients through the food web. By quantifying the ratio of isotopes that are present within the organic and inorganic compounds that constitute the tissues of consumers, it is possible to reconstruct their diet and to assess how they utilise the nutrients that they have assimilated. Stable isotopes have been used to assess nutrient assimilation and usage in animals and as such they can be used as biomarkers to indicate changes in the nutritional state of individuals. The aim of this study was to determine the influence of gestation, lactation, and weaning (metabolically demanding periods) on stable isotope ratios in monogastrics, ruminants, and hind gut fermenters. The food consumed by pregnant animals as well as samples of

their hair will be collected. The collection of milk will commence following parturition and proceed in 14-day intervals until the offspring are weaned. Hair (wool) samples will be collected post-partum from the ewes, sows, does and offspring, and will be collected in 30-day intervals. All the samples will then be processed, and an isotope mass spectrometer will be used to quantify their isotopic content. The body condition and weight of all the animals will also be assessed. The body condition will serve as an additional indicator of their overall wellbeing and nutritional status.



A Smit



A Smit<sup>1</sup>, FC Mulandane<sup>2</sup>, M Labuschagne<sup>1</sup>, SH Wojcik<sup>1</sup>, C Malabwa<sup>3</sup>, G Sili<sup>4</sup>, S Mandara<sup>5</sup>, K Plaisir Pineau<sup>6,7</sup>, S Lecollinet<sup>6,7</sup>, DF Meyer<sup>6,7</sup>, A Galiana<sup>7</sup>, V Rodrigues<sup>6,7</sup>, H Rose Vineer<sup>8</sup>, Z Dlamkile<sup>1</sup>, K Huber<sup>9</sup>, H Stoltsz<sup>1</sup>, IG Horak<sup>1</sup>, BL Makepeace<sup>8</sup>, D Morar-Leather<sup>1</sup>, L Neves<sup>1,2</sup>

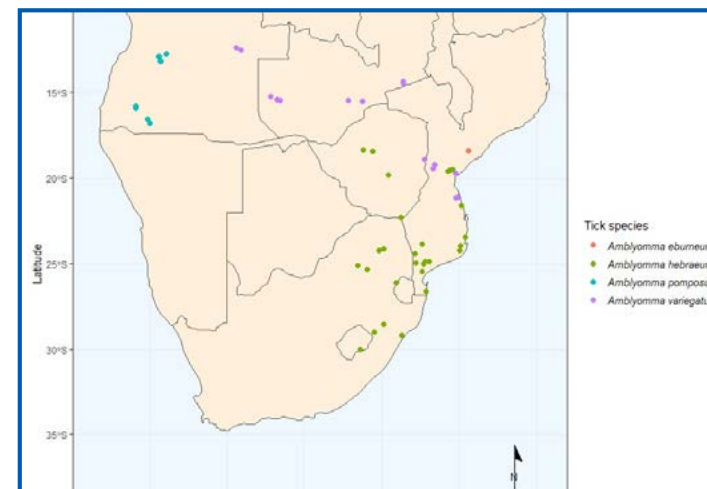
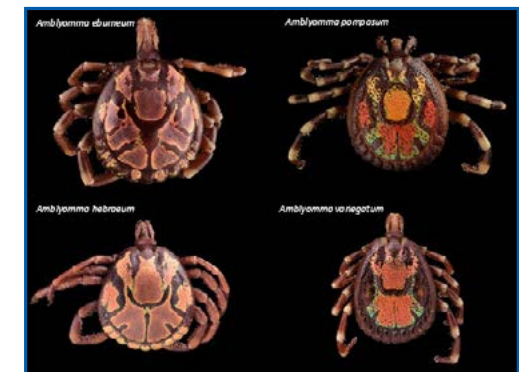
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- <sup>2</sup> Biotechnology Center, Eduardo Mondlane University, Mozambique.
- <sup>3</sup> Central Veterinary Research Institute, Lusaka, Zambia
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## Genetic diversity and geographic relationships between southern African *Amblyomma* ticks, *Rickettsia africae* and *Ehrlichia ruminantium*

*Amblyomma* are known for their decorative appearance and aggressive hunting behaviour. The genus is represented by 24 species on the African continent. Of these, *A. hebraeum* and *A. variegatum* have been well studied due to their status as competent vectors of pathogens including *Ehrlichia ruminantium*, the causative agent of heartwater, and *Rickettsia africae*, the causative agent of African tick bite fever (ATBF). Heartwater is a lethal disease in ruminants, estimated to cause an economic loss of 44,4 million US\$ annually in South Africa. ATBF is a non-lethal disease, mainly afflicting individuals travelling to southern Africa. In this study, *Amblyomma* ticks were collected from livestock in Angola, South Africa, Zambia and Zimbabwe and from both wildlife and livestock in Mozambique. Primary screening for *E. ruminantium* was conducted targeting the pCS20 genomic fragment and strain characterization was conducted with *Ampliseq* technology. A subsample of ticks were screened for *R. africae* using an *ompA* gene specific PCR, while characterization was conducted by sequencing of *ompA*, *ompB*, *gltA* and 17 KDa genes. Tick genetic diversity was evaluated using 12S, 16S, COI, *CytB* and *ITS2* genes. In total, 7,773 *Amblyomma*

ticks were collected and identified as: *A. hebraeum*, *A. pomposum* and *A. variegatum*. *E. ruminantium* tick infection rates per country ranged from 7.7% to 36.5%. Genotyping analysis indicated the clustering of the sequences with several strains, including Gardel, Grootvallei and Springbokfontein1. Infection rates of *R. africae* ranged from 11.4% to 35.6% per country while the phylogenetic analysis depicts little variation. The phylogenetic analysis of the *Amblyomma* species illustrated little intraspecies variation, where ticks of the same species from different countries cluster together indiscriminately. Interspecies variations were clear between the species forming distinct clusters. This study is one of the largest performed in this region of Africa, depicting the genetic variation of *E. ruminantium*, *R. africae* and the four collected *Amblyomma* species.



C Strydom



C Strydom<sup>1,2</sup>, Z Ismail<sup>1</sup>, C Abolnik<sup>2</sup>

<sup>1</sup> SMT Veterinary Laboratory, Irene, Pretoria 0178, South Africa

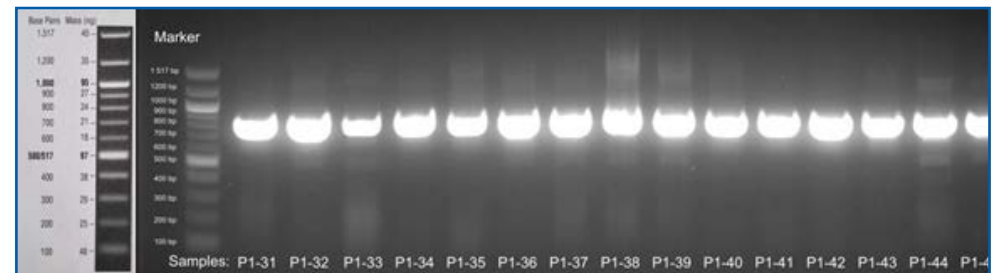
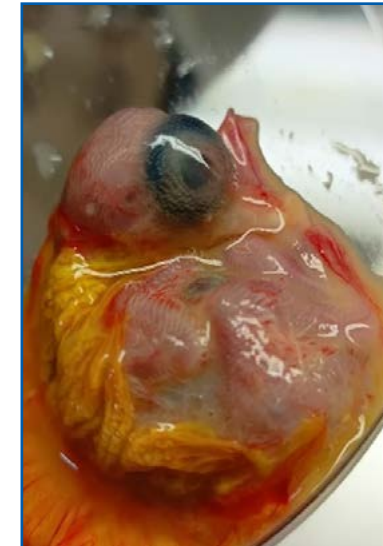
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## Molecular epidemiology of infectious bronchitis coronavirus in southern African poultry flocks from 2011-2020

Infectious bronchitis virus (IBV) (family *Gammacoronavirus*) causes major economic losses within the poultry industry worldwide. IBV is prone to an extremely high mutation rate, resulting in antigenic variations that evade vaccine induced immunity. Knowledge of the IBV variation in the region is imperative to selecting appropriate vaccines. IBVs collected from Botswana, Eswatini, Namibia and South Africa's Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, North West, and Western Cape provinces from 2011-2020 were isolated in SPF embryonated chicken eggs at Deltamune (Pty) Laboratory (n=385) and analysed in this study. A 745 bp region of the spike protein gene was amplified and sequenced, and phylogenetic analysis was performed. Twenty four (6.2%) samples contained mixed sequences from viral coinfections and were not evaluated further. In the remaining 361 isolates, 8 genetic lineages were identified. 181 (50.1%) viruses were identified as GI\_19 (QX) strains and 78 (21.6%) as the GI\_1 (Beaudette) strain. Both appear to be a mixture of field and vaccine strains. One isolate in GI\_1 appears to be a recombination. Other lineages detected

were GI\_13 (4/91) (10.5%) isolated from 2012-2019; GVI\_1 (TC07-2) (8.0%) isolated from 2010-2020; GI\_23 (Var II) (5.3%), isolated in 2010, 2015 and 2019-2020, and GI\_11 (UFMG/G) (3.6%), isolated mainly in 2013-2014 with single isolates in 2011, 2012, 2016, and 2020. Two unique viruses appeared more closely related to GIV\_1 (DE/072/92) lineages and lineage GI\_21 (Spain/97/314). Overall, this study reveals the circulation of diverse IBV field and vaccine-derived genotypes in southern African poultry flocks for the first time.



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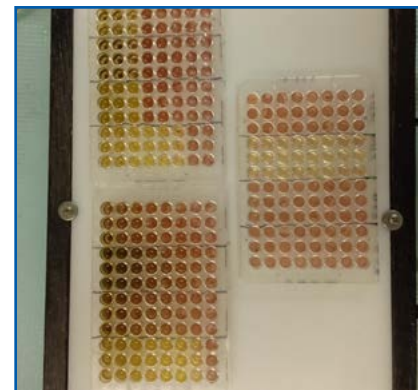
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## Potential of selected South African plants in the management of bovine mastitis caused by multi-drug resistant strains of *Streptococcus uberis*

*Streptococcus uberis* is a significant pathogen causing bovine mastitis. Strains of *S. uberis* have shown biofilm-forming ability and alarming levels of antibiotic resistance leading to treatment failures. This study aimed to investigate the antibacterial and anti-biofilm activities of selected South African plants against isolated strains of multidrug resistant (MDR) strains of *S. uberis*. Plant selection was based on reported minimum inhibitory concentration (MIC) of less than 0.1 mg/mL against staphylococcal bacteria of mastitis origin. The MIC values of acetone and ethanol extracts of four plants (*Searsia lancea*, *Indigofera frutescens*, *Erythrina caffra* and *Antidesma venosum*) were determined against seven clinical *S. uberis* isolates and *S. uberis* ATCC 700407 using a serial microdilution assay. Anti-biofilm activity and cytotoxicity in bovine dermis (BD) and Vero cells were determined using standard methods. MIC values ranged between 0.01 and 2.50 mg/mL, with the lowest MIC obtained with the acetone extract of *S. lancea* (0.01 – 0.09 mg/mL). Interestingly, the MDR isolates were more susceptible to the extracts than the ATCC strain. The ethanol extract of *S. lancea* had the highest mean selectivity index value of 25.70. The extracts were generally less toxic to BD cells than Vero cells. All the organisms demonstrated biofilm-forming ability. The acetone extract of *S. lancea* completely inhibited biofilm formation and disrupted preformed biofilm of *S. uberis* at three

sub-MIC concentrations. These findings demonstrate the potential of these plants as effective ethno-therapeutic options in bovine mastitis. They are recommended for further investigation towards developing novel complementary formulations for mastitis management.



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## Radiographic subtrochlear notch sclerosis used for detection of early medial coronoid disease in Labrador retriever puppies and associated dynamic distal ulna ostectomy to reduce disease progression

Elbow dysplasia (ED) is a potentially debilitating orthopedic disease affecting one or both elbows. Early diagnosis is essential in working dogs, particularly guide dogs, that are very expensive to train and need a long working life. The purpose of the study was to evaluate methods used in the early radiographic detection of subtrochlear ulna sclerosis (STS) which could successfully predict medial coronoid disease (MCD) and at the same time perform dynamic distal ulna ostectomy (DDUO) to prevent or reduce disease development. One hundred and fifty-two, 4-month-old, Labrador retrievers were used. Each ML radiograph was evaluated for STS by means of subjective (score 0-3) and a semi-quantitative and objective grading score given as a percentage of medullary STS of a region of interest compared to normal medulla. Evaluations were performed by a surgery resident, specialist veterinary radiologist (SVR) and a specialist veterinary surgeon. Lameness and pain were also evaluated and were combined with the STS scores to give a total joint involvement score. Elbows with >20% elbow involvement had DDUO surgery. At 1-year-old all dogs underwent elbow computed tomography to determine the development of MCD. The only method predictive of disease development was SVR's subjective evaluation of STS with a sensitivity of 46% and specificity of 81%. Twenty-two dogs not receiving surgery still developed MCD. One of 21 dogs receiving DDUO surgery developed MCD. The latter showed that DDUO had significant protective effects with these surgical candidates being 11 times less likely to develop MCD. It is advisable to start screening Labrador retrievers and other known at-risk breeds at 16-weeks for radiographic assessment by a veterinary radiologist for STS. If deemed at risk, DDUO surgery is advised to prevent or reduce MCD development.



Figure 1: Examples of subjective radiographic subtrochlear notch sclerosis in the 16-week-old radiographs with (A) #65 having a score of 0 with no STS present, (B) #57 having a score of 1 with mild STS present, (C) #87 having a score 2 with moderate STS present.

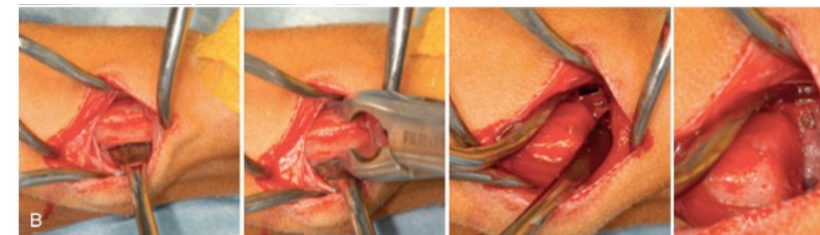


Figure 4: (A) DDUO for treatment of early MCPD that was suspected based on the presence of STS during routine radiographic juvenile ED screening. (B) The procedure is performed subperiosteally by removing 4 to 5 mm of ulna with a rongeur approximately 2 to 3 cm proximal to the distal epiphysis of the ulna. Care should be taken to preserve the periosteal envelope, especially medially, to avoid the development of synostosis as well as to allow for undisturbed healing of the ostectomy within a few weeks as described by Vezzoni.<sup>3</sup> (Reproduced by Vezzoni et al).

TJ Saby



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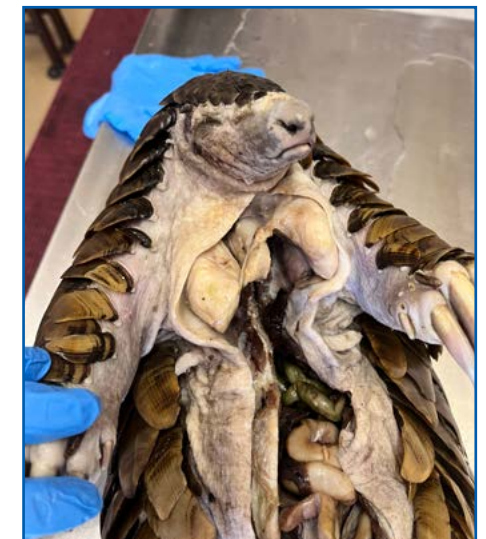
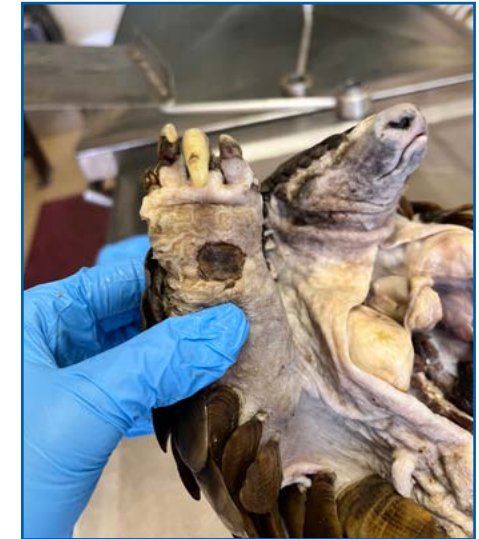
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## Morphology of the digestive tract of Temminck's pangolin (*Smutsia temminckii*)

Pangolins are scaly anteaters present throughout Africa and Asia. They roll into defensive balls when threatened. Temminck's pangolin is the only species present in southern Africa. Pangolins are regarded as the most trafficked species globally with their numbers drastically decreasing due to various anthropogenic threats. This study aims to provide a gross morphological description of the digestive tract and associated organs in this species. Two pangolins which succumbed to injuries were used. One immersion-fixed cadaver was used to describe the abdominal topography as well as the digestive tract organs in situ. The second pangolin underwent necropsy, after which the digestive tract was removed and immersion-fixed prior to transport and description. The salivary glands at the base of the neck are well-developed. The tongue is protrusible and forms a sigmoid flexure where it is housed in a sheath at the base of the neck. The base of the tongue displays muscular attachments to the dorsal surface of the elongated, spatula-shaped xiphisternum which extends into the right dorsal abdominal cavity. The stomach is mostly non-glandular. The caecum is absent and the transverse colon is attached to the stomach and spleen. The liver is well-lobated. The pangolin tongue is reported to extend into the abdominal cavity. However, this study demonstrated that the tongue remains in the oropharyngeal cavity and that the tongue muscles are greatly

modified to extend into the abdomen. The large salivary glands, together with the specialised sheath of the tongue, would allow for the trapped ingesta to slide off the tongue, be collected into a bolus and swallowed. Highly lobated livers are an adaptation which allows rearrangement of lobes with maximal spinal flexion. The unusual connection of the intestinal tract, as well as the modified tongue muscles and xiphisternum are important considerations in abdominal surgery and for interpreting diagnostic imaging.



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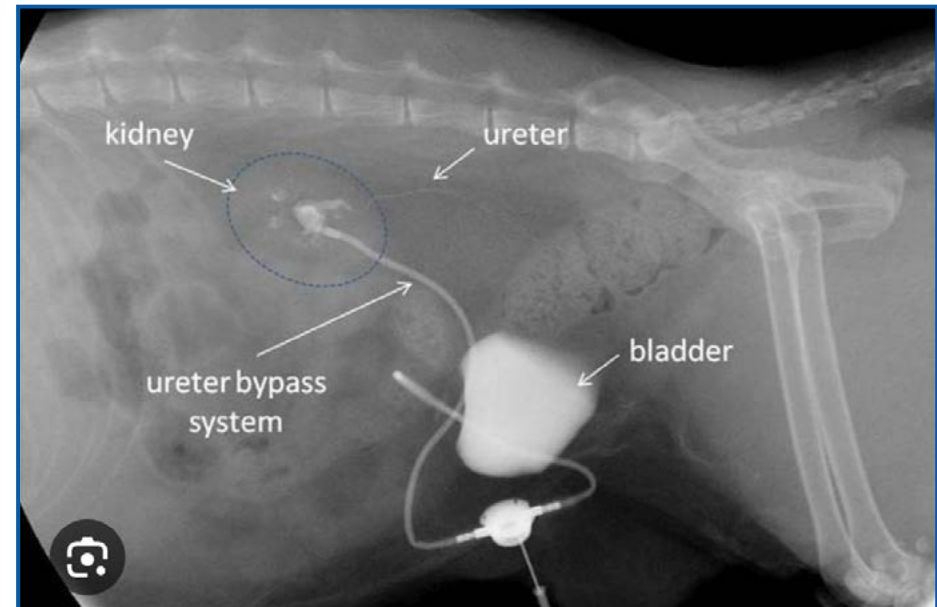
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## Prognostic value of serial serum creatinine concentration at presentation, 24 and 48 hours post-surgery in cats with subcutaneous urethral bypass at a single referral hospital

Ureteral obstructions are common in cats, with calcium oxalate ureteroliths being most prevalent. Previous studies have reported an association between serum creatinine levels and long-term survival in cats following the placement of a subcutaneous ureteral bypass (SUB). There has been a relationship between the initial drop in the azotaemia and prognosis, however this remains to be proven. Data were extracted retrospectively from the clinical records of Bryanston Veterinary Hospital corresponding to the years 2015 - 2020.. In total 28 cats met the inclusion criteria. Serum creatinine (umol/L) at presentation, 24 and 48 hours post-surgery, time to surgery, age, date and cause of death were recorded. In cases where date of death was unknown telephonic follow up was performed. Thirty cats presented for SUB placement and surgery was performed on 28 cats. The study population included 20 female and 8 male cats with a median age of 8 years (range, 4 - 19 years). The median survival time post-procedure was 373 days (95% confidence interval (CI), 161 - 585 days). Eleven cats did not have a decrease in serum creatinine during the first 48 hours post-surgery and their median survival time was 225 days (95% CI, 85 - 365). Cats that had <50% decrease in serum creatinine had a median survival time of

719 days (95% CI, 0 -2203) and those with  $\geq$  50% decrease had a median survival time of 989 days (95% CI could not be calculated). Survival time was significantly different among groups ( $P = 0.015$ ). Median survival times in this study were directly associated with decreases in serum creatinine over the first 48 hours post-surgery in cats undergoing SUB placement. Increased percentage drop in creatinine leads to a significantly increased mean survival time.





## A Venter



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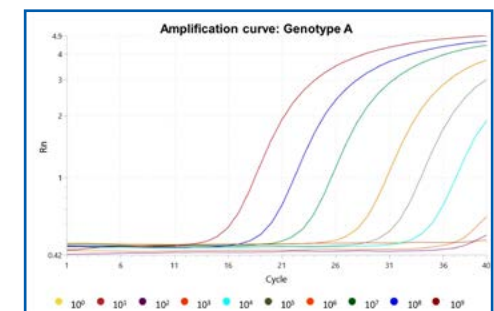
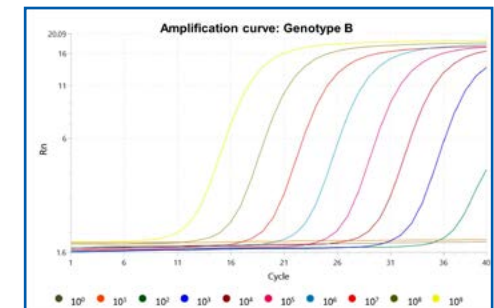
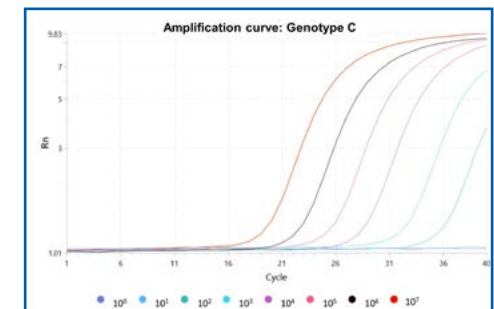
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## Evaluation of the spherical body protein 4 (SBP4)-encoding gene for molecular typing of *Babesia caballi*

*Babesia caballi* is an intra-erythrocytic protozoan parasite causing equine piroplasmiasis. Three *B. caballi* genotypes (A, B, and C) have been identified based on the heterogeneity in the 18S rRNA and rhoptry-associated protein-1 (rap-1) gene sequences. These variant parasite genotypes compromise the diagnostic utility of the OIE-recommended serological assays used in declaring horses free of the disease. The spherical body protein 4 (SBP4) was recently identified as a potential antigen for serological detection of *B. caballi*; however, it remains uncertain whether it can effectively detect the various geographical strains of this parasite. The molecular distinction between variant *B. caballi* parasite genotypes is limited; therefore, the aim of this study was to develop sbp4 gene-based quantitative real-time polymerase chain reaction (qPCR) assays for the rapid detection and differentiation between *B. caballi* parasite genotypes. Retrospective DNA samples from horses and zebras

were screened for the presence of *B. caballi* using an established 18S rRNA-based multiplex equine piroplasmiasis qPCR assay. Phylogenetic analysis of sbp4 and 18S rRNA gene sequences confirmed the groupings of the South African isolates into either *B. caballi* genotypes B or C. The sbp4 gene sequences obtained in this study were also aligned with published reference sequences representing *B. caballi* genotype A. This alignment allowed the identification of conserved regions within the gene, which were used to design three primer pairs and three genotype-specific TaqMan minor-groove binder (MGB™) probes. The qPCR assays were specific and efficient in the detection of and differentiation between *B. caballi* genotypes A, B and C. Therefore, these assays can be considered for improved diagnosis of *B. caballi* genotypes, to prevent the unintentional spread of equine piroplasmiasis globally.

	10	20	30	40	50	60	70	80	90	100	110	120
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Genotype_A_F						TTCTGC	TTCGGAGTCA	C				
Genotype_A_R									CT	TCTACCACTC	CAAAGGAGAG	
Genotype_A_P												
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Genotype_B_F												
Genotype_B_R												
Genotype_B_P												
BP3_C_sbp4	CGGCGGACAC	GGTTTGGAGC	ACGGGAGACA	GAAGGTGCTT	GCCTCTGTTC	TTCGGAGTCA	CTCCGAGGTC	AAGGAGTCTT	TCTACCACTC	CAAAGGAGAG	TGTATTACAG	AGATCAATTC
Genotype_C_F												
Genotype_C_R												
Genotype_C_P												



## BAT Gazendam



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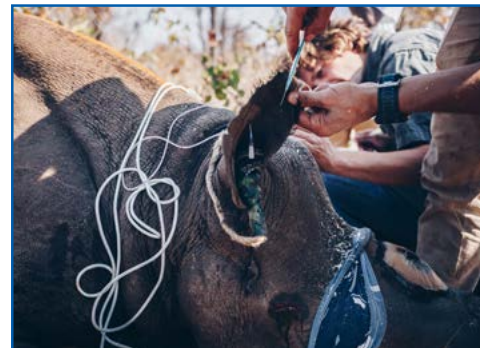
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## Evaluation of the efficacy, safety and cardiopulmonary effects of thiafentanil-azaperone compared to etorphine-azaperone for the immobilisation of free-ranging black rhinoceros (*Diceros bicornis*)

The objective of this study was to determine the efficacy, safety and cardiorespiratory effects of etorphine and thiafentanil, for immobilization of free ranging black rhinoceros (BR). Twenty-four BR, 12 males and 12 females, were included. Animals were either immobilized with etorphine (n = 12) or thiafentanil (n = 12). Dosage depended on age group and sex. Drugs were administered intramuscularly by dart. Induction, immobilization and recovery times and scores were recorded and compared between treatments. Arterial blood gases, arterial blood pressure and physical parameters including respiratory rate (RR), heart rate (HR), rectal temperature (RT) and oxygen saturation (SpO<sub>2</sub>) were measured.

Results showed that when thiafentanil was used, it resulted in a significantly quicker recumbency than when etorphine was used [2.88 + 0.75 minutes for thiafentanil and 3.95 + 0.77 minutes for etorphine (mean + SD)]. The HR decreased significantly in both treatments over time. HR measured throughout all time points was higher on average with thiafentanil than with etorphine, although not significant. No significant differences were observed in the PaO<sub>2</sub> and PCO<sub>2</sub> between treatments or within treatments over time. To conclude, both combinations provide a

safe induction, immobilisation and recovery for black rhinos, however, hypoxemia is observed with both combinations. The HR shows tendency to be higher with thiafentanil, despite a shorter induction time. The sample size is limited and therefore further research is needed.



# Session

# 2

**Arnold Theiler  
Memorial  
Lecture**



# Arnold Theiler Memorial Lecture

Professor Richard A. Kock  
(MA, Vet MB Vet MD MRCVS)



Sketched by Estelle Mayhew

Scan the QR code to meet  
Professor Richard Kock



<https://bit.ly/richardkock>



Editorial

## Prevention and Control of Diseases at the Interface of Livestock, Wildlife and Humans

Richard Kock\* and Cord Heuer

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## Roadmap to a One Health Agenda 2030

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## REVIEW

## Wildlife health outcomes and opportunities in conservation translocations

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### Abstract

1. It is intuitive that the health status of wildlife might influence conservation translocation outcomes, however, health as a topic has received limited attention in the conservation translocation literature. We determined the forms and frequency of disease and other biological problems reported in translocated animals and plants, and in populations linked to translocation, and associations between their mention and translocation 'success'. From these problems we deduced the forms of ill-health potentially associated with conservation translocation and developed contextual frameworks to inform health management.

2. Using described selection criteria, a subset of case studies of animal and plant conservation translocation from the IUCN's 'Global Reintroduction Perspectives' series (2008–2018) was reviewed. Self-reported information describing or implying mortality, ill-health or reproductive compromise was extracted and categorized as a 'disease' or other biological problem. Problems explicitly described as a 'major difficulty', 'major lesson' or 'reason for failure' were termed 'notable'. We specified the conditions representing ill-health and created diagrams illustrating their relationships to other biological problems and processes, and management measures.

3. Notable 'disease' problems such as infection, (as in stress-related) and husbandry-related disorders were reported in 30% of 295 reviewed case studies and were more likely to be mentioned in less 'successful' projects ( $P < 0.05$ ,  $\chi^2$  test). Other biological problems, in particular predation, adverse climate or weather, and anthropogenic trauma, were commonly reported (66% of 295 studies), especially post-release.

4. When present, disease may be an important obstacle to translocation success. The negative health impacts of other, apparently common post-release problems also merit acknowledgement. A broad spectrum of disease and other health-related problems can potentially occur in conservation translocations and impact

## What's food and nutrition security got to do with wildlife conservation?

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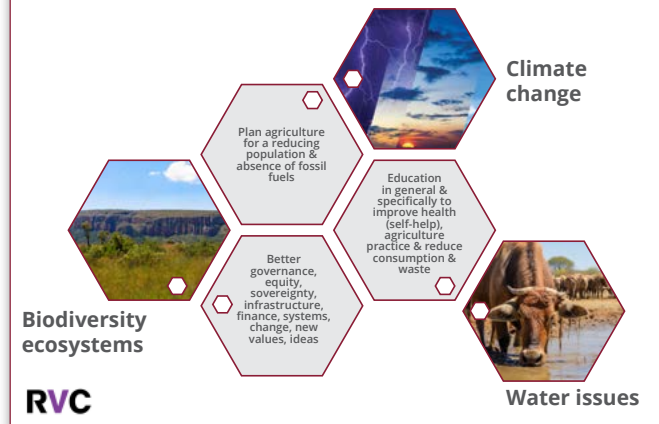
## ABSTRACT

We review the linkages between food security, nutrition and wildlife conservation in the early 21st century. Declines in wildlife populations and habitats have occurred in parallel with increasing human population and the global emergence of the double burden of under- and over-nutrition. Nutrition-sensitive landscapes and nutrition- and gender-sensitive value chains are key to delivering optimal food and nutrition security and environmental outcomes. Neglected or underutilized crops and sustainable harvest of wild food have the potential to play a number of roles in the improvement of food security that include being: (a) a way to reduce the risk of over-reliance on very limited numbers of major crops and animals; (b) a way to increase sustainability of agriculture through a reduction in the carbon footprint of agriculture and maintenance of biodiversity; (c) a contribution to food quality; and (d) a way to preserve and celebrate cultural and dietary diversity. Dietary diversity and reduced greenhouse gas emissions per kilogram of animal-source food produced can be promoted through the consumption of all edible parts of the carcass, including highly nutritious offal. We argue that adopting a nutrition-sensitive landscape approach would improve consumer understanding of food systems, nutrient cycles, ecosystems services and potentially linkages between dietary diversity and biodiversity.

**Key words:** Food security, natural resources, sustainable agriculture, conservation, wildlife, wild food, animal-source food, maternal and child nutrition, human population, biodiversity

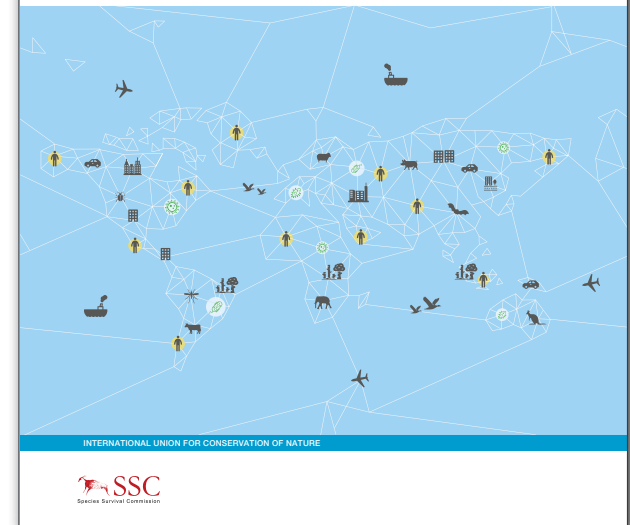
DOI: <https://doi.org/10.7882/AZ.2016.040>

## Key changes needed in health, agricultural and food systems thinking



## Situation analysis on the roles and risks of wildlife in the emergence of human infectious diseases

Richard Kock and Hernan Caceres-Escobar



INTERNATIONAL UNION FOR CONSERVATION OF NATURE



# Lectori Salutem

## Prof Juergen A Richt

Must still be updated

the  
 Memorial Lecture  
 in Honour of  
 Prof Juergen A Richt  
 2022  
 Faculty of Veterinary Science,  
 Onderstepoort

We honour an esteemed colleague, scientist and researcher for his outstanding contribution to the promotion of science

*20 October 2022*

Date

Dean



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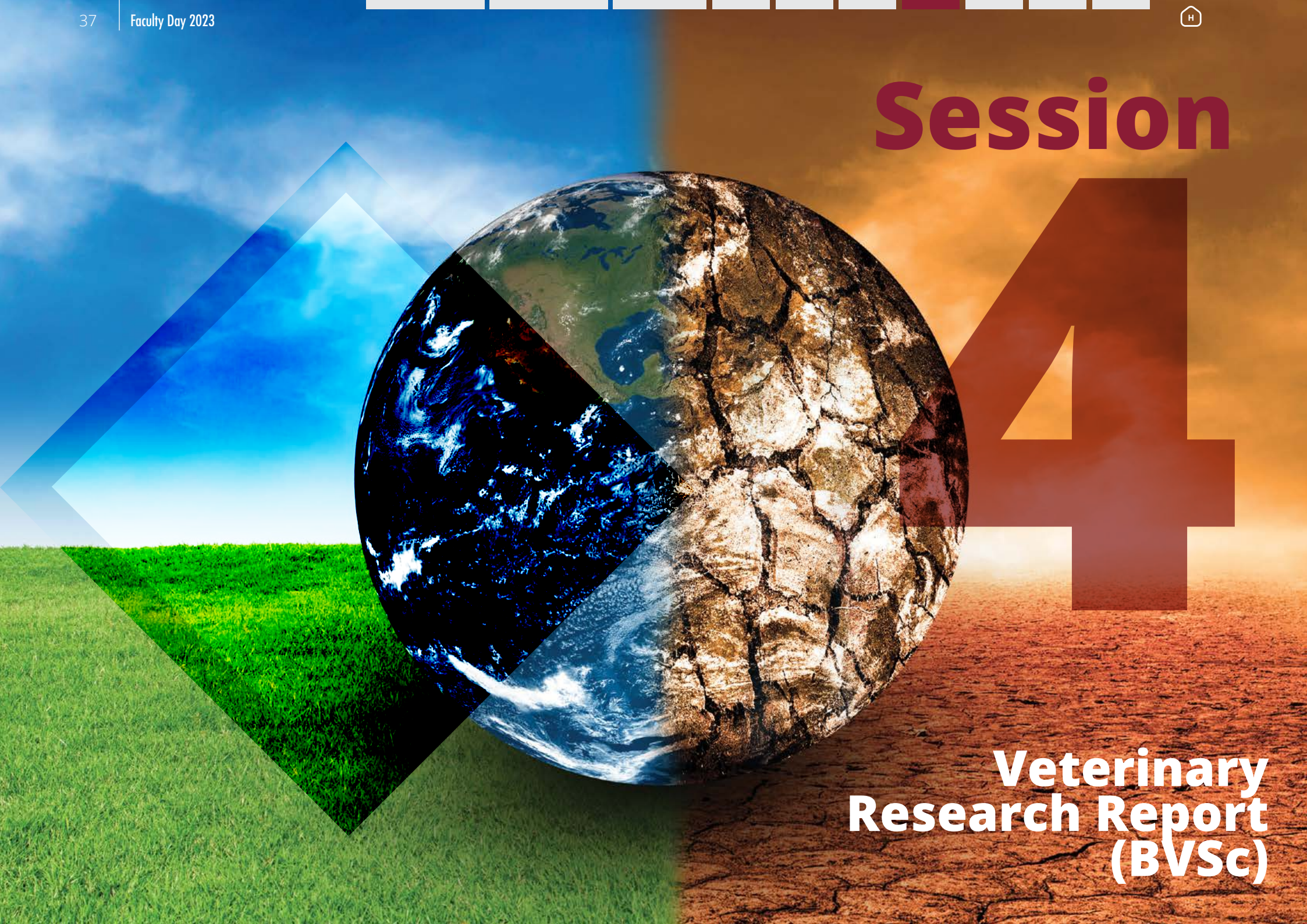
**100**  
**YEARS**  
 OF VETERINARY EDUCATION



# Session

# 44

**Veterinary  
Research Report  
(BVSc)**



L. Pillay



L. Pillay<sup>1</sup>, C. Steyn<sup>1,2</sup>

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## Osteology of the thoracic limb of the South American tapir (*Tapirus terrestris*)

The South American tapir (*Tapirus terrestris*), also known as the Brazilian or lowland tapir is an odd-toed ungulate which falls under the order Perissodactyla, alongside the horse and rhinoceros species. The South American tapir is a terrestrial mammal which is adapted to swimming and travelling long distances and plays an important role in aiding in seed dispersal in the South American rain forests. Literature on the thoracic limb morphology of the South American tapir is sparse. The right forelimb bones of a single South American tapir that died of unrelated disease, were described and compared with the osteology of other Perissodactyla species. The scapula is triangular and lacks an acromion. The humerus has a twisted appearance, both minor and major tubercles have cranial and caudal parts, and the bicipital groove is shallow. In addition, the medial epicondyle is larger than its lateral counterpart. The radius and ulna are similar in thickness, fused distally and displays a significant interosseous space. The carpus contains four bones in the proximal row and three bones in the distal row. The metacarpus consists of four metacarpal bones with metacarpal III the largest. Each metacarpal bone is accompanied by its proximal, middle and distal phalangeal bones with digit III the largest. The South American tapir osteology of the thoracic limb

indicates that the species has managed to retain certain features of their ancestral perissodactyl osteology which show characteristics such as increased elbow extension, carpal and digital flexion, and rotation of the forelimb. South American tapirs, unlike horses and rhinoceros, spend much of their time in swamps and water while foraging instead of browsing or grazing and thus the anatomy of their front limbs differ to accommodate this. Knowledge on the osteology of the front limb may aid veterinary workers when assisting an injured tapir.





L Marais



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## Comparison of different anaesthetic protocols in captive patas monkeys (*Erythrocebus patas*) in Uganda

Captive patas monkeys (*Erythrocebus patas*) in Uganda frequently undergo immobilization for veterinary interventions, disease screenings and enclosure transfers. Concerns over safety, efficacy, and reversibility resulted in the use of various immobilization protocols. This study aimed to compare immobilization and physiological effects of seven drug protocols commonly used at Uganda Wildlife Conservation Education Centre (UWEC), Uganda. Focus was placed on four protocols, since over the past 20 years, the majority of patas were immobilized using these combinations. A combination of medetomidine ( $0.05 \pm 0.03$  mg) + ketamine ( $4.92 \pm 2.06$  mg) [Protocol 1], medetomidine ( $0.05 \pm 0.007$  mg) + xylazine ( $3.47 \pm 1.03$  mg) [Protocol 2], ketamine ( $5.97 \pm 2.25$  mg) + diazepam ( $0.22 \pm 0.13$  mg) [Protocol 3] and ketamine ( $5.03 \pm 0.87$  mg) + xylazine ( $4.25 \pm 1.58$  mg) [Protocol 4], were administered via a dart to the monkeys. In total, 93 monkeys were immobilized. Times for immobilization and recovery, induction quality, oxygen-haemoglobin saturation, rectal temperatures, and cardio-respiratory variables were noted. Protocol 3 had higher induction scores and longer immobilization compared to the other protocols. Mean heart rates for protocols 1, 2, and 4 were lower than for Protocol 3. Respiratory rates were similar and constant across protocols. Initial low oxygen-haemoglobin saturation (SpO<sub>2</sub>) readings in Protocols 1 and 2 indicated

moderate hypoxaemia despite adequate respiration. While all four protocols induced mild anaesthesia, three monkeys did not reach complete immobilization within 20 minutes. Patas immobilized with Protocols 3 and 4 recovered on their own, while monkeys in protocols 1 and 2 received intramuscular atipamezole for more complete recoveries, but not necessarily shorter recovery times. All four protocols were effective and safe, although the ketamine combinations provided a longer anaesthetic period. Supplemental oxygen is advised due to hypoxia seen in the first two protocols.



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## Tick vaccines: A viable option for tick and tick-borne disease control in cattle in sub-Saharan Africa?

Cattle in sub-Saharan Africa are parasitised by numerous tick species, with a resultant loss in productivity due to direct damage and the transmission of tick-borne diseases (TBD's). Tick control in this region has largely relied on the use of acaricides, despite the many disadvantages associated with the use of such chemicals. Widespread acaricide resistance is also of concern in attempts to adequately control tick populations. Tick vaccines based on the Bm86 antigen of *Rhipicephalus microplus* (previously *Boophilus microplus*) were developed in the 1990s in Australia (TickGARD® and TickGARD®PLUS) and South America (Gavac®). These vaccines were produced in an effort to control *Rhipicephalus microplus* (an important vector of a number of TBD's) by providing a more economical and environmentally safer alternative to chemical control. Field trials have, however, shown variable levels of efficacy. The commercialisation of these vaccines has also faced numerous challenges and has ultimately limited their use. There is limited data on the use of these vaccines in sub-Saharan Africa and when considering the number of different tick species in this region, the impact that these vaccines may have is questionable. A lack of resources, including financial, physical infrastructure, and education may pose additional potential challenges to the

implementation of tick vaccines in Africa. The benefits of using tick vaccines in certain situations, or as an adjunct to more holistic integrated control programmes, cannot be disregarded though. Continued research is required to identify potential antigens with efficacy against a wider range of tick species, before tick vaccines can be considered a viable alternative for the control of the variety of economically important tick species in sub-Saharan Africa.



K Smith



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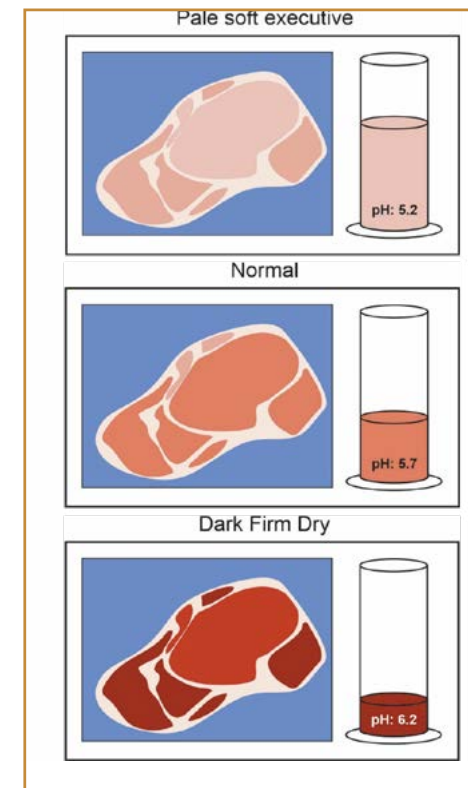
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## A short review on the resting period of sheep, pigs, and cattle before slaughter: Is one hour too short or too long?

The pre-slaughter rest period of an animal at an abattoir, also known as the lairage period, is a critical factor that not only affects animal welfare but also the carcass quality of slaughtered animals. The duration of rest periods in a lairage can vary depending on several factors, including the species of the animal, transport conditions, herding practices, and local regulations. However, the main purpose of a resting period is to provide animals with an opportunity to rest and recover from any stressors associated with transport as well as herding before the slaughter process. During this rest period, the animals are typically provided with access to water and, if necessary, suitable feed to ensure their well-being. This period allows animals to calm down, reduce their stress levels, and adjust to the new environment. Resting also helps to restore muscle glycogen levels and minimize any potential negative impacts on carcass quality that may arise from stress, such as the production of stress-induced hormones. Therefore, promoting animal welfare before slaughter, which includes loading on the farm of origin all the way through to the moments following stunning, is crucial for ethical reasons and to ensure the production of high-quality

meat products. However, determining the optimal rest period for a specific species under specific field conditions can prove difficult, since there are many factors that need to be taken into consideration. Several conflicting studies have been conducted to determine the optimal rest period in each species based on research and the current regulation in South Africa. Transport duration, pre-slaughter handling, the animals' temperament and breed predisposition, blood parameters indicative of stress and the degree of rigor mortis development is examined in this article. Additionally, the propensity for certain species to develop dark firm dry meat, pale soft exudative meat and wet carcass syndrome is discussed.



C Volschenk



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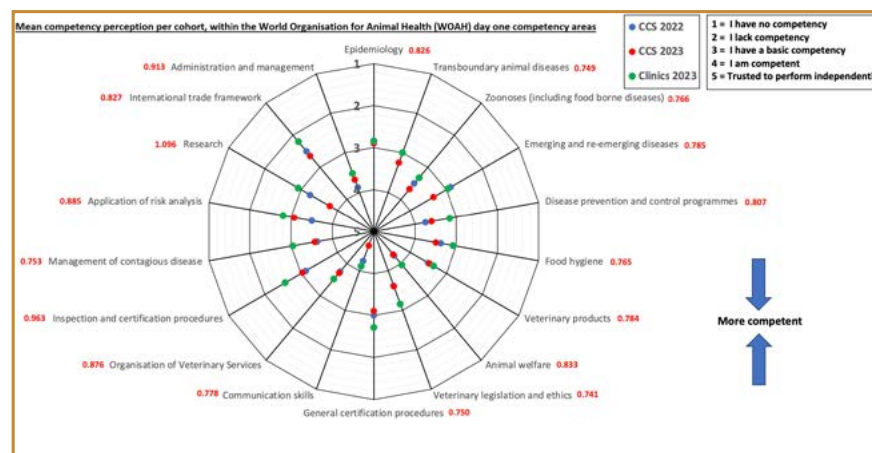
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## Using data mining techniques to determine skills gaps in early-career veterinarians in South Africa

This study investigated skills gaps in early-career veterinarians in South Africa using data mining techniques to determine perceived day one competency levels according to two international frameworks. Participant survey data were analysed using RapidMiner, a data mining analytics tool, and further interpreted using ChatGPT v3.5, an artificial intelligence tool that allows for a novel approach to survey feedback interpretation. Responses (n=61) were submitted multiple times to ChatGPT, to identify valid, constant, and reliable findings amongst participant responses. The study aimed to identify key patterns in the data, providing insight on perceived day one veterinary competency according to early-career veterinarians. Early-career veterinarians generally perceived competence in most areas considered by the World Organisation for Animal Health (WOAH) (partial alignment), and the Association of American Veterinary Medical Colleges' (good alignment) competency frameworks, improving their competency as they progress through their early careers. However, respondents perceived a lack of competence in certain areas of the WOAH framework, such as epidemiology, certification procedures, risk management, and international trade. The study also highlighted areas in the BVSc curriculum that respondents perceive to require improvements. Participants showed a preference for working with domestic animals, large production animals and equines, also having higher

perceived competence levels in these species compared to other non-preferred species. The perceived lack of day one competency and exposure in exotic animal species was noted by ChatGPT. Feedback from participants emphasised the need for curriculum improvements in veterinary practice management, technological integration, psychology, and the inclusion of an African language module. Although graduates perceived to meet international standards in most competency areas, improvements are recommended. By improving the curriculum, South African graduates can attain competencies aligned with global standards, particularly those related to international trade in animals and animal products, thereby impacting on the veterinary and agricultural industries, nationally and internationally.



# Session

# 5

**Postgraduate  
Orals**



## LL Borchers



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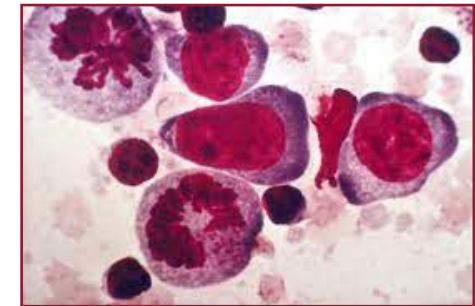
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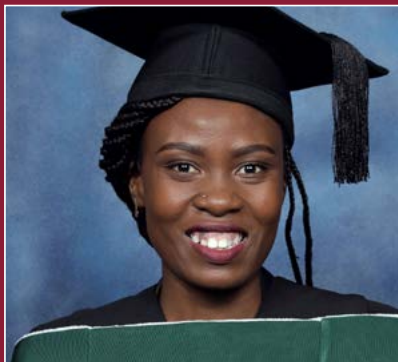
## Identification and gene expression profiling of subunit vaccine candidates in cattle- and buffalo-derived *Theileria parva* isolates

Bovine theileriosis caused by *Theileria parva* kills more than one million cattle annually in affected African countries, largely affecting smallholder farmers. The disease is currently managed by tick control with expensive acaricides often ineffective in altering disease progression, and immunization using the infection and treatment method which is associated with a range of limitations including limited protection against field strains. Therefore, the search is ongoing for antigens that can provide broad protection against field strains, especially buffalo-derived *T. parva* infections, for consideration in the development of a subunit vaccine. Thus, in this study, reverse vaccinology and transcriptome analyses were respectively employed to identify *T. parva* schizont antigens and profile their expression in cattle- and buffalo-derived *T. parva* isolates. The *T. parva* proteome was screened using a combination of bioinformatics tools for secreted proteins with predicted glycosylphosphatidylinositol anchors and  $\leq 1$  transmembrane domain, which were further evaluated for solubility and antigenicity properties prior to T-cell and B-cell epitope prediction analysis. Eighteen proteins had good binding affinity to MHC class-I BoLA alleles. Comparative transcriptome analysis between three cattle- and three buffalo-derived *T. parva* isolates showed that 12 predicted antigens

were expressed in both parasite groups during the schizont stage. Eight of these were expressed at similar levels in both groups and had no homologs or orthologs to the host (*Bos taurus*) proteome. The eight predicted antigens include four previously reported antigens, namely p104, p32, p67 and a hypothetical protein, and four novel antigens that are hypothetical proteins. Seven of these have been reported to be expressed in the host infective stage, the sporozoite. Thus, these antigens can be considered for the development of a subunit vaccine that will target both the inoculation and the pathogenic phases of infection; moreover, they will provide protection against both cattle- and buffalo-derived *T. parva* isolates.



## MM Lebeloane



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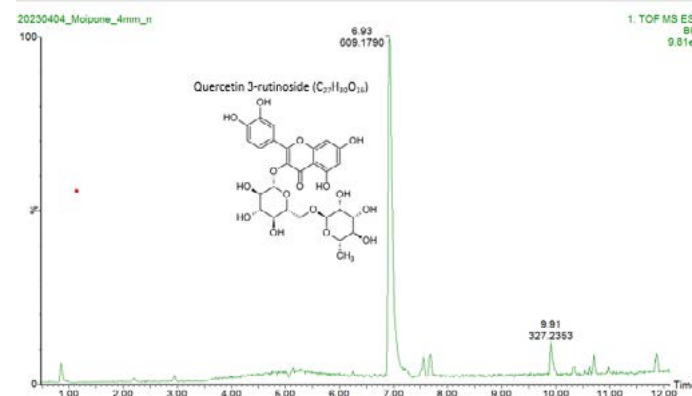
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## Plant extracts as a possible solution for biofilm formation against *Salmonella* and *Enterococcus* crucial in the poultry industry

*Salmonella* and *Enterococcus* are among the economic pathogens that contaminate poultry products and meat processing environments. Their persistent biofilm-forming property is responsible for multidrug resistance and presents a high risk of zoonotic infections to human health. Thus, in this study, we examined the antimicrobial and antibiofilm formation potential of 32 plant extracts against *Salmonella enterica* subsp. *enterica* serovar Typhimurium (ATCC 700720) and *Enterococcus faecalis* (ATCC 29212). Sixteen plants belonging to the families Anacardiaceae, Boraginaceae, Fabaceae, Euphorbiaceae, Moraceae, Malvaceae, Salicaceae, and Rhamnaceae were exposed to organic solvents, acetone, and methanol to extract phytochemicals. Thereafter, the minimum inhibitory concentration (MIC) against *S. Typhimurium* and *E. faecalis* was determined by serial microdilution assay and their *in vitro* cytotoxicity against Vero mammalian cells using a colorimetric tetrazolium assay. The ability of the plant extracts at sub-MIC of 0.16 mg/mL to prevent biofilm formation using the crystal violet quantification method was evaluated. Lastly, the anti-quorum sensing effect of the plant extracts against the biosensor strain *Chromobacterium violaceum* ATCC 12472 was investigated. The results demonstrated that crude extracts had MIC ranging from 0.31 to 2.50

mg/mL. Relatively low cytotoxicity (LC50 > 0.020 mg/mL) with the highest selectivity index of 2.21 and 1.39 against the selected foodborne pathogens. There was no significant difference between the inhibition of biofilm by the methanol extract of *S. galpinii* (85.20% against *S. Typhimurium*, and 97.27% against *E. faecalis*) when compared to the positive control, ciprofloxacin (93.01% inhibition). There was a significant difference in the minimum quorum sensing inhibitory concentration (MQSIC) of plant extracts against *C. violaceum*. The concentration of extracts that inhibited 50% of violacein production (IC<sub>50</sub>) and thus inhibited quorum sensing, ranged from 0.01 to 0.02 mg/mL. Plant extracts have the potential to be developed into antimicrobial and antibiofilm natural products used in the poultry industry as feed additives or sanitizing agents.



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## A knowledge, attitude and practices assessment of control measures for bovine brucellosis and tuberculosis as a bottom-up national control programme in South Africa

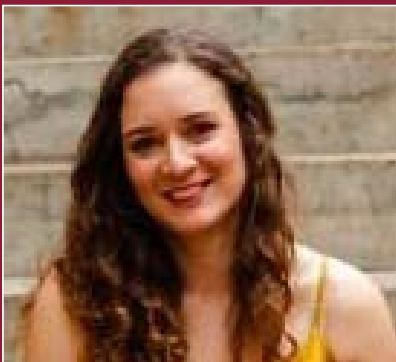
Bovine brucellosis (BR) and bovine tuberculosis (bTB) are zoonotic diseases with economic and public health importance across the world, especially in developing countries where the diseases are endemic. The diseases are classified as neglected diseases in developing nations with poor resources despite good control measures in some developed countries. The purpose of this study was to assess the knowledge, attitudes and perceptions (KAP) of stakeholders towards control measures for BR and bTB at a livestock-wildlife interface in KwaZulu-Natal, South Africa. A mixed method was used, involving a qualitative and quantitative approach. Stakeholders selected were small-scale farmers and veterinary officials affected by disease control measures in the area. In the quantitative method, small-scale livestock farmers and veterinary officials completed a structured questionnaire; whereas the qualitative method involved focus group discussions. The majority of small-scale farmers and veterinary officials did not believe that the current methods for control of BR and bTB were effective. Reasons provided were the lack of sufficient resources (people and funding) by the

Government. Poor communal farming infrastructure, lack of disease knowledge and unrestricted animal movement had a negative effect on disease control. Factors such as difficulty in implementation of biosecurity measures in communal areas, provincialization of disease control strategies, lack of enforcement, and lack of compensation for farmers, were raised by stakeholders. It is recommended that the current structure of the South African veterinary services' delivery model be revised to enable coherent disease control co-ordination between National Department and Provinces. Resource allocation and enforcement by veterinary officials are necessary to ensure effective disease control. Compulsory vaccination of cattle against BR is strongly recommended. Rural infrastructure should be improved, particularly fences, to ensure separation of livestock from wildlife. A comprehensive compensation system, effective movement control and education of farmers are critical for BR and bTB control. The outcome of the study should serve as guide for policy development and implementation for BR and bTB control measures in South Africa.





## EG Bester



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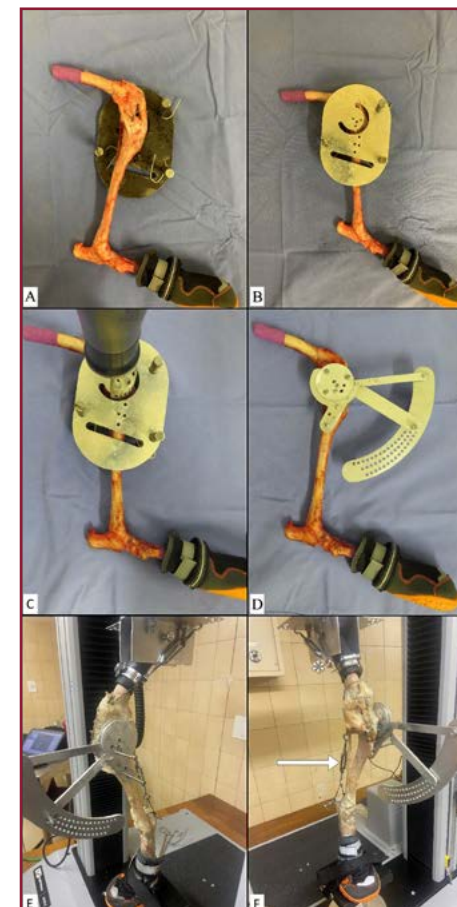
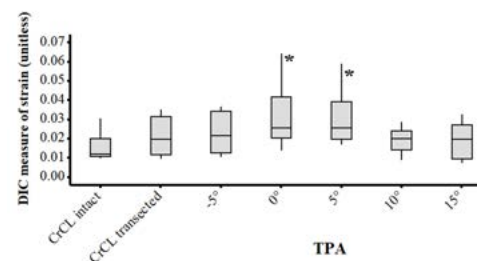
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## Effect of the degree of tibial plateau angle correction post tibial plateau levelling osteotomy on the patellar ligament strain in canine cranial cruciate ligament deficient stifles: an *ex vivo* experimental study

Cranial cruciate ligament (CrCL) disease is a common cause of pelvic limb lameness in dogs. Surgical treatment via tibial plateau leveling osteotomy (TPLO) can lead to patella desmitis postoperatively. The aetiopathogenesis of this condition is poorly understood but it is believed to be due to increase patella ligament strain, vascular damage, intra-operative trauma or altered biomechanics of the stifle. The objective of this study was to measure the strain of the patellar ligament strain post-TPLO in CrCL deficient stifles, *ex vivo*. We hypothesised that there is no difference in the preoperative patella ligament strain compared to postoperative strain at different tibial plateau angles, under conditions that mimic weight bearing. The strain of the patella ligament was evaluated in twelve canine cadaver limbs with the use of two orthogonally placed digital image correlation (DIC) cameras and focused on the dissected out patellar tendon. For each limb, DIC images were recorded during the axial loading of the stifle (at 135° of stifle extension for an intact CrCL stifle; a CrCL deficient stifle post TPLO (at tibial plateau angle (TPA) of -5°, 0°, 5°, 10° and 15°). The patellar tendon strain was measured in triplicate

and the mean measurement was used for statistical analysis. DIC data at each post-TPLO TPA was compared to the pre-TPLO state using a general linear mixed model (random factor: limb; fixed factor: degree rotation) and applying Dunnett's method of multiple comparisons. Cohen *d* was calculated for all significant ( $P < 0.05$ ) differences to estimate effect size. The mean ( $\pm$ SD) TPA for the pre-TPLO was  $25 \pm 2.2^\circ$ . The patellar ligament strain was significantly higher in post-TPLO TPA of  $0^\circ$  ( $P = 0.019$ ;  $d = 1.2$ ) and  $5^\circ$  ( $P = 0.031$ ;  $d = 1.2$ ) but no different for the remaining post-TPLO TPAs. An increase in strain was visualised predominantly at the distal attachment of the patellar ligament. A significant increase in this strain of patellar ligament is seen at a post-operative TPA of  $0^\circ$  and  $5^\circ$ . The highest strains were recorded at the insertion of the tibial



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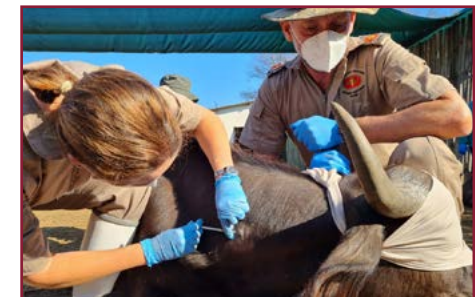
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## Bovine tuberculosis heat inactivated vaccines reduce lesion severity and bacterial viability in an infection trial in African buffalo

African buffalo (*Syncerus caffer*) are the primary wildlife reservoir host for bovine tuberculosis (BTB) in Africa. Infected buffalo populations spread this disease to numerous coexisting species in conservation areas as well as to cattle at park boundaries, resulting in increased mortalities in many threatened wildlife species and quarantine requirements which complicate metapopulation management. The test and slaughter method of controlling BTB is not viable in extensive conservation areas with complex species composition. In recent years considerable interest has arisen in the vaccination of cattle and indigenous wildlife species against BTB as an additional control strategy. In this vaccination trial, 21 sub-adult African buffalo (6-14 months) were divided into four treatment groups, and received BCG ( $10^6$  CFU), a heat inactivated *M. bovis* vaccine either intramuscularly (HIM) ( $10^7$  CFUs) or orally (HIO) ( $10^7$ - $10^8$  CFU), and a control group received 1ml phosphate buffered saline. After 7 months all animals were challenged with *M. bovis* ( $10^6$  CFU) via the intra-tracheal route and the study was terminated 5 months later. HIM vaccine produced the greatest reduction in granuloma severity and number, as well as the lowest number of *M. bovis* culture positive samples across lung and lymph node tissues, seen as 63.6% and 68,1% reduction in mean lymph node and lung

macroscopic scores, and a 67,5% reduction in mean lung lesions number from the control group. When granulomatous lesions from lymph node and lung tissues were enumerated (CFU/G), HIO resulted in the greatest reduction in bacterial burden, 78.9% and 72,5% respectively, compared to control group ( $p = 0.0505$ ). BCG vaccine resulted in 28.8% and 20.0% reduction in mean lymph node and lung macroscopic score, and large reduction (75.5%) of bacterial burden in lymph nodes tissues relative to controls, but large elevation in lung lesions (49.5%) and lung lesion bacterial burden (100%) relative to the control group.





# Session

# 6

**TuksNovation**

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## Faculty Day 2023: Committees

### Organising committee

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 Prof. Katja Koepfel  
 Prof. Peter Thompson  
 Ms Diepe Kgabo  
 Ms Fransie Lottering  
 Ms Metse Mlongwa  
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 Prof. Lyndy McGaw  
 Prof. Ned Snelling  
 Dr Abdur Kadwa

### Online platform liaison and editors

Prof. Marinda Oosthuizen  
 Mr Chris van Blerk

### Online platform management

Vetlink Media Solutions (Madaleen Schultheiss and her team)

### Sketch of the Theiler Memorial Lecturer

Ms Estelle Mayhew (*pro bono art*)

### Layout and design

Ms Monica Roos (*pro bono design*)



