



**UNIVERSITY OF NAIROBI**

# **ANNUAL FACULTY OF VETERINARY MEDICINE SCIENTIFIC CONFERENCE AND COMMUNITY OUTREACH**



**THEME:**

**Harnessing Research in Veterinary Science for  
Resilience and Sustainability of Communities**

**25-27 OCTOBER 2023 | FVM GROUNDS**



**BROOKE**

**ACTION FOR WORKING  
HORSES AND DONKEYS**



Brooke East Africa works in 22 counties within Kenya, Somaliland, South Sudan, Tanzania and part of Northern Uganda, through a strategic partnership model engagement.

This pool of partners with varied expertise and experiences has enabled them achieve key milestones with significant reach across the region. In South Sudan, working through partners they have trained 189 frontline Local Service Providers (Community Animal Health Workers, government vets, livestock extension officers and farriers) on equine healthcare, and subsidised their group-managed clinics with veterinary supplies on a recovery basis, enabling them to offer healthcare extension services to 8,030 equines annually.

In Kenya, as well as their success in securing a country ban on donkey slaughter in Kenya, they are also closely monitoring cross-border activity between East and West Africa, trade routes in Asia and Central America, and supporting their sister organisation Brooke USA in their efforts to ban the import of ejiao products to the US. Their work in Tanzania focuses on tackling the cross border donkey skin trade and other donkeywelfare issues.

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# Contents

WELCOME REMARKS	1
GUEST SPEAKERS	2
PROGRAMME	3
GUEST SPEAKERS	6
ORAL ABSTRACTS	17
POSTER ABSTRACTS	31



# WELCOME REMARKS

UNIVERSITY OF NAIROBI FACULTY OF VETERINARY MEDICINE , OFFICE OF THE DEAN

## FIRST FACULTY OF VETERINARY MEDICINE INTERNATIONAL SCIENTIFIC CONFERENCE AND CORPORATE SOCIAL RESPONSIBILITY

The Faculty of Veterinary Medicine has its history when the first cohort of degree awarding Bachelor of Veterinary Science students joined the University of East Africa at Makerere in 1962. Thereafter, the Faculty continued to offer the Bachelor of Veterinary Medicine degree in the country following the establishment of the University of Nairobi in 1970. The delivery of academic, research, innovation and clinical services are organized around the following:

1. Department of Veterinary Anatomy and Physiology
2. Department of Animal Production
3. Department of Veterinary Pathology Microbiology and Parasitology
4. Department of Public Health Pharmacology and Toxicology
5. Department of Clinical Studies

The Faculty offers two undergraduate programmes, namely Bachelor of Veterinary Medicine and Bachelor of Science in Wildlife Management and Conservation. In addition, several Masters and Doctoral Degree programmes are on offer in the various departments. The Faculty is well endowed with a high concentration of highly qualified and experienced academic staff, with 74 % of its current establishment of 80 being holders of PhD degree. There are 26 professors, 20 Senior Lecturers, 28 Lecturers and 8 Tutorial Fellows. The Faculty student population currently stands at 855, majority of whom are pursuing the Bachelor of Veterinary Medicine degree programme.

The Faculty has produced a diverse number of prominent alumni and members of the convocation, that include the Vice Chancellors of several public and private universities, internationally renowned researchers and industry captains. Although the faculty has previously held scientific conferences through the Faculty Biennial Scientific Conference, these have not been held since 2014. The launch of the First Faculty of Veterinary Medicine International Scientific Conference marks a landmark turning point in our history. This event is aligned to the Constitution of Kenya, the Commission for University Education Standards amended in 2023, the Science, Technology and Innovation Strategy, the University of Nairobi Statutes and University of Nairobi Strategic direction on pursuing Research, Innovation and Commercialization Agenda. Specifically, the conference brings together a wide array of participants and presenters from diverse areas of specialization as outlined in the scientific programme. In addition, the event will be delivered in a blended mode and provides opportunities to network and socialize with alumni, industry, professional and corporate thought leaders. On behalf of the staff, students and stakeholders of the Faculty of Veterinary Medicine, as well as entire University of Nairobi community, I extend our warm regards and welcome you to participate in the history event. I wish you all the most fruitful deliberations, engagement and partnerships and opportunities to chart the strategic direction of the various facets of the profession with a view to transform society.

PROF. JOHN D. MANDE, PhD, FKNAS

DEAN, FACULTY OF VETERINARY MEDICINE





## GUEST SPEAKERS

Dr. Chrysantus Tanga - Senior Scientist and the Head of Insects for Food -ICIFE

Dr. Wachira Maina – Managing Director – HighChem East Africa

Dr. Victor Yamo – World Animal Protection (Africa)

Dr. Raphael Kinoti – Managing Director - Brooke East Africa

Dr. Sam Kariuki – Director Eastern Africa, Drugs for Neglected Diseases Initiative

Dr. Francis Gakuya – Kenya Wildlife Society

Dr. Sam Wanjohi-Country Manager AFROHUN Kenya

Cooperative Bank of Kenya

Prof. Brian Joseph - Director on the LifeStock Int'l

Prof. Patrick Kareru - JKUAT

Prof. Mathiu Mbaabu - GBFA

Prof. Janet Hellen Amuguni – Tufts University, USA



# PROGRAMME

<b>DAY 1 - W EDNESDAY 25 OCTOBER 2023</b>	
<b>Time</b>	<b>Activities</b>
7.30 AM -8.30 AM	Arrival and Registration
8.30 AM -9.00 AM	House keeping
9.00AM -11.00AM	Opening Ceremony
	Dean FVM - Prof JD Mande, BVM, MSc, PhD To welcome Guests.
	Guest - DVC (R.I.E) UON - Prof MC Hutchinson, BSc, MSc, PhD
11:00AM -11:30AM	Health break
<b>SESSION 1</b>	<b>CURRENT ADVANCES IN LIVESTOCK PRODUCTION AND HEALTH</b>
<b>SESSION CHAIR P</b>	<b>ROF. LILLY BEBORA</b>
11.30AM -12.00PM	Guest Speaker - Dr. Chrysantus Tanga - ICIPE
12.00PM -12.20PM	Novel quantitative Theileriaparvasporozoite sero-neutralization assay to evaluate vaccine Candidates for East Coast Fever. Chege, H., et. al.
12.20PM -12.40PM	Molecular detection and risk factor analysis of rotavirusinfections in piglets from Kiambu, Kenya. Bett, E. C., et. al
12.40PM - 1.00PM	Immune response to theileriaparva p67c sporozoite antigen bound to liposomes containing tlr 4 agonist and QS21. Oboge, H. et. al.
1.00PM -2.00PM	LUNCH
2.00PM -2.20PM	Co-Designing a disease surveillance system in pastoralist areas of northern Kenya. Sentamu1, D. et. al.
2.20PM -3.10PM	Guest Speaker - Dr. WachiraMaina – Managing Director – HighChem East Africa
3.10PM -3.30PM	A Novel CRISPR-Cas Based Pen-Side Diagnostic Test for the Diagnosis of East Coast Fever. Muriuki, R. et al.
3.30PM - 3.50PM	Performance and anti-diarrheal potential of insect meal on piglets in Kenya. Bosibori, E. et al.
3.50PM - 4.15PM	Q&A Plenary
4.15PM	Health break

<b>DAY 2: THURSDAY 26 OCTOBER 2023</b>	
<b>Time</b>	<b>Activities</b>
8.00AM -9.00AM	Arrival and Registration
<b>SESSION 2</b>	<b>ANTIMICROBIAL RESISTANCE AND ANIMAL WELFARE</b>
<b>SESSION CHAIR</b>	<b>DR. J. ONONO</b>
9.00AM -9.30AM	Guest speaker: Dr. Victor Yamo – World Animal Protection (Africa
9.30AM -10.00AM	Dr. Raphael Kinoti – Managing Director - Brooke East Africa
10.00AM -10.30AM	Q&A Plenary
10.30AM -11.00AM	Health break
11.00AM -11.30AM	Guest Speaker: Dr. Sam Kariuki – Director Eastern Africa, Drugs for Neglected Diseases Initiative

<b>DAY 2: THURSDAY 26 OCTOBER 2023</b>	
<b>Time</b>	<b>Activities</b>
11.30AM -11.50AM	Biological control of multi-drug resistant parasitic helminths in manure from dorper sheep using black soldier fly larvae. Kibegwa, F. M. & Bett, R, C.
11.50AM - 12.10PM	Biosecurity: A tool in reducing antibiotic use and spread of bacterial pathogens along the food value chain in a large-scale pig production and value addition company in Kenya. Lucy Gatitu et al.
12.10PM - 12.30PM	Microbial and chemical quality of slaughterhouse tap water in Kajjado County. Kimindu, V.A. et al.
12.30PM -1.00PM	Q&A plenary
1.00PM -2.00PM	LUNCH
<b>SESSION 3</b>	<b>WILDLIFE MANAGEMENT AND AQUACULTURE</b>
<b>SESSION CHAIR - DR. DN KARANJA /DR. SM MUCHAI</b>	
2.00PM -2.30PM	Guest speaker: Dr. Francis Gakuya – Kenya Wildlife Society
2.30PM -2.50PM	Comparative hatchery management practices and ectoparasitic infections Of Nile Tilapia In Homabay County, Kenya. Wainaina, El. Al.
2.50PM -3.10PM	Occurrence of bacterial infections in different sizes of Oreochromis jipe under different climatic and physio-chemical environments in Taita-Taveta County, Kenya. Hamisi, M., et al.
3.10PM -3.30P	Effects of manure type on heating and total bacterial count in fishponds in Kenya. Mwangi, J. M., et a
3.30PM - 3.50PM	Building Resilience and Sustainability in Aquaculture through Innovative Fish Feed Production. KemuntoAchoki, el. al.
3.50PM - 4.15PM	Q&A Plenary
4.15PM	Break

<b>DAY 3: FRIDAY 27 OCTOBER 2023</b>	
<b>Time</b>	<b>Activities</b>
8.00AM -9.00AM	Arrival and Registration
<b>SESSION 4</b>	<b>CLIMATE CHANGE AND ONE HEALTH</b>
<b>SESSION CHAIR PROF. S. GITHIGIA / PROF MAINGI</b>	
9.00AM -9.30AM	Guest Speaker - Dr. Sam Wanjohi- AFROHUN Kenya
9.30AM -9.50AM	Guest Speaker - Cooperative Bank
9.50AM -10.10AM	Occurrence of serum antibodies to Toxoplasma gondii and associated risk factors in donkeys from Kirinyaga and Meru Counties, Kenya. Dr. Fredrick Ojiambo Obonyo Ndichu Maingi, Samuel Maina Githigia <sup>1</sup> , Peter Kimeli <sup>3</sup> Evans Nyaega Nyaboga <sup>4</sup>
10.10AM -10.30AM	Potential climate change effects on the health of small ruminants in pastoral Laikipia. Ngotho-Esilaba, R.N., Ombui, J.N., Onono J.O. and Lindahl J.F
10.30AM -11.00AM	Health break
11.00AM -11.30AM	Guest Speaker - Prof. Brian Joseph - LifeStock Int'l
11.30AM -11.50AM	Prevalence of fascioliasis in bovine at Dagoretti slaughterhouses. Laban Nganyi et al



DAY 3: FRIDAY 27 OCTOBER 2023	
Time	Activities
11.50AM -12.10PM	Enhancing the productivity of Galla Goats ( <i>Capra hircus</i> ) using estrus synchronization and controlled mating in Kenyan's Southern Rangelands. Wambulwa, L. M. et. al.
12.10PM -12.45PM	Q&A Plenary
1.00PM -2.00PM	LUNCH
<b>SESSION 5:</b>	<b>ALTERNATIVE MEDICINE</b>
<b>SESSION CHAIR</b>	<b>PROF. C. GITAU</b>
2.00PM -2.20PM	Guest speaker; Prof. Patrick Kareru - JKUAT
2.20PM -2.40PM	Guest speaker: Prof. Mathiu Mbaabu - (GBFA)
2.40PM -3.00PM	Puff adder ( <i>Bitis arietans</i> ) snake venom-derived serine proteases attenuate myocardial ischemia-reperfusion injury in a global ischemic rabbit heart model. Mukabwa, H. E. et al.
<b>SESSION 6:</b>	<b>GENDER ROLES IN ANIMAL PRODUCTION</b>
<b>SESSION CHAIR</b>	<b>DR. R BETT</b>
3.10PM -3.30PM	Guest Speaker - Prof. Janet Hellen Amuguni – Tufts University, USA
3.30PM - 3.50PM	Supporting women smallholders involved in small-scale chicken production. Kaluwa, C. et al.
3.50PM - 4.15PM	Q & A plenary
4.15PM	Break

DAY 4: SATURDAY 28 OCTOBER 2023	
Time	Activities
9.00AM -4.00PM	Field day / community outreach



# GUEST SPEAKERS

## BIO AND ABSTRACT



### DR CHRYSANTUS M . TANGA, BSC, PHD

*Dr. Chrysantus Mbi Tanga is a Senior Scientist and the Head of Insects for Food, Feed and Other Uses (INSEFF) Programme at ICIPE.*

#### BIO

His dedication and innovation in Insects for Food and Feed has been largely successful at multiple levels, transforming and facilitating growth in the utilisation of insects for food and feed, development of standards for commercial insect products, resource mobilisation, up-scaling, dissemination of innovative technologies to smallholder farmers, improving food and nutrition security, empowering women and youths, and networking people to improve their well-being. The efforts of Tanga and his team leading the continent-wide initiative on Insects for Food and Feed won global recognition and was privileged to be awarded the prestigious Curt Bergfors Senior Scientist and the Head of Insects for Food, Feed and Other Uses (INSEFF) Programme at icipe.





## DR. WACHIRA MAINA (BVM 1979 MSC 1985)

*Managing Director – HighChem East Africa*

### BIO

Currently heading HighChem Group of Companies. A population of over 170 Employees. Involved in Manufacture and Distribution of Products for the East African Market. Product range;

1. Household Products in Hygiene Sector
2. Veterinary Products, Human Pharmaceutical and Agricultural Products

Dr Wachira Maina is experienced in many years as a fiffield veterinarian, work in research, taught at University before joining the Private sector in 1990 to date.

### ABSTRACT

The theme of this year's conference - "Current Advances in Livestock Production and Health" is a very broad theme as it encompasses Livestock Production and Livestock Health, in the many animals of interest and the several many production systems that are in practice. The topic in this paper is "Current Growth in Pharmaceutical Manufacturing and its impact on Livestock and Health in Kenya". To bring out the positive impact of manufacturing in livestock in Kenya, the various manufacturing inputs will be evaluated, including : 1] the dynamics of pricing 2] cost of labour 3] the basic general infrastructure packaging materials 4] infrastructure and ecosystems for logistical and 5] the effects and dictates of critical target area of interest like the disease, the production system.

As much as not every intervention in Kenya Livestock Production and Health has enough data for evaluating impact, or has been documented, the understanding that manufacturing is a commercial enterprise by the private sector, the growth of that enterprise alone is enough evidence that the livestock industry is growing and benefitting from positive economic input through manufacture. It goes without saying then, that a production system will not thrive where cost of production is not cost effective.

As for the quality of the manufactured goods, the fiffinal adjudicator is animal productivity, and not whether the product was manufactured locally or imported but whether the Egg , M eat or Milk being produced are affordable and available quantitatively and qualitatively. Manufacturing locally for local interventions has been an on-going enterprise in Kenya since the early 1960's. This is not to belittle any work done before the 60s but this being the period time that Kenya was changing from colonial era to an independent state thework done thereafter is good reference for development of the nation and the livestock industry. A gap exists in the manufacture of vaccines. A call is made to both the institutions of interest and the interested investors within the Kenyan Private players (Investors) to come together and birth a collaborative working formula for a revitalized vaccine production in Kenya.

The potential collaborate this thought. Started in 1999 as a result of major restructuring by the giant German Chemical and pharmaceutical company, Hoechst AG, (In Kenya Since 1958) HighChem Group is a conglomerate of companies operating within East Africa devoted to improve health and, productivity in crop science, veterinary, home-care, human pharmaceuticals and hospital consumables plus diagnostic technologies through the best practices possible. We are ISO 9001:2015 certified. HighChem Group is committed to providing top-quality life-enhancing Agrochemicals, Human and Veterinary Pharmaceu-ticals, Consumer and Hygiene products. We shall at all times remain customer-focused and aspiring to surpass their expectations while maximizing returns to our stakeholders.



## DR. VICTOR YAMO BVM , M BA, KIM

*The Humane & Sustainable Agriculture Campaign  
Manager at World Animal Protection Africa Office.*

### BIO

A Veterinary Surgeon who has worked in various capacities within the African poultry industry. For 25 years, He worked within production systems to improve the productivity of chicken leading to improved food security and livelihoods. Currently working with African governments, the poultry industry and the general public to develop animal welfare policies and strategies while updating outdated legislation. Analysis of antibiotic dispensing patterns in human and veterinary retailers in Kenya

### ABSTRACT

Analysis of antibiotic dispensing patterns in human and veterinary retailers in Kenya

### Background

Private human and veterinary drug stores are widely found in Kenya's landscape and are the primary level of health/veterinary care for most of the population. A significant portion of antibiotic consumption occurs within these establishments, through informal medical /veterinary consultations or self-administration. Here, we aimed to investigate the pattern of antibiotic dispensing through exit interviews with patients who visited to review their medication information.

### Methods

Cross-sectional data was collected from customers visiting 30 human and 30 veterinary drug stores between April-May 2022. Data recorded included customer demographics, types of medicines purchased, antibiotic purchase process and use practices.

### Findings

A total of 1187 (48.6%) and 1255 (51.4%) customers were interviewed in veterinary and human drug stores, respectively. About a third (28%, 331/1187) and 23% (292/1255) of the customers, respectively, purchased at least one antibiotic. A total of 1994 and 1906 purchases, respectively, were made, which represent 1.7 items on average per customer. 17% of purchases (veterinary: 352/1994, human: 330/1096) in both store types were at least one antibiotic. The most frequently purchased antibiotics in veterinary stores were oxytetracycline (27%), trimethoprim (11.7%), and tylosin (11%), and amoxicillin (16.4%), azithromycin (15.5%), and amoxicillin clavulanic acid (13.6%) in human stores. More than half (59.5%) and 94.5% of antibiotic purchases in human and veterinary stores were not accompanied by a prescription or a diagnosis, but were mostly based on the customer's clinical/animal symptoms to the pharmacist. In veterinary stores, customers purchasing antibiotics by describing symptom descriptions and those without veterinary backgrounds were significantly more likely to purchase more antibiotics.

### Conclusion

Our study found that private veterinary and human drug stores in LMICs contribute to community antibiotic use, with inappropriate prescribing practices common. These results will aid future investigations on how to promote sustainable antibiotic use practices.





**DR RAPHAEL KINOTI, BVM , MBA**

*The Regional Director at Brooke East Africa, an animal welfare NGO based in Kenya*

**BIO**

He has over 20 years of experience – working in the field of livestock production and veterinary medicine, animal welfare, biodiversity conservation, and environmental awareness, as well as peace building and conflict management, and community development with both national and international NGOs. He has focused on the development of strategies to protect biodiversity and natural resources, with a specific emphasis on climate change resilience. Additionally, He is an advocate for women's empowerment, sustainable farming, and youth empowerment, among other causes.

**Connecting Animal Welfare and Antimicrobial Resistance through Equine Welfare Initiatives**

In East Africa, working donkeys play an integral role in sustaining livelihoods of communities. Improving and sustaining equine welfare is not only important to the equids themselves but also communities that depend on them. An equid in good welfare is cheaper to keep, serves owner better, lives longer and enjoys high quality of life with optimal productivity. Antimicrobial resistance is a global threat and the nexus between animal welfare and antimicrobial use is quickly gaining some significant attention. Brooke East Africa's (BEA) theory of change focuses mainly on improved equine welfare that is heavily linked to thriving equine-owning communities, and strengthened system for animal health. BEA achieves this through four main programme goals namely; livelihood and resilience; compassion and behaviour, animal health and enabling environment. In this abstract, we will share some Brooke East Africa equine welfare initiatives that contribute to building supportive systems that address antimicrobial resistance as well as promote sustainable animal health and welfare practices. These initiatives collectively drive their efforts to support communities and working equids in East Africa.

Under the animal health goal, BEA engages in a number of initiatives namely; training of animal health practitioners, mentoring of 120 animal health professionals using animal health mentoring framework, training and mentoring of 30 community donkey farriers using the farriery mentoring framework, Training and mentoring of 150 current antimicrobial prescribers using agrovet mentoring framework. In the effort to training and mentor future antimicrobial prescribers, BEA is currently working with 15 animal health training institutions in 3 countries to help produce animal welfare conscious graduates who utilizes antimicrobials in an evidence based responsible manner. In Kenya BEA works closely with the Directorate of Veterinary Services and Kenya Veterinary Board on the veterinary internship programme by naturing, sensitizing and providing internship opportunities as well as promoting antimicrobial stewardship. In the field, BEA is actively engaged in trainings farmers on good animal welfare practices, preventive animal health, early disease recognition and linking them up with both animal health practitioners and agrovet operators and asking them to demand for quality animal health services like seeking explanation on each veterinary medicine provided to their animals.

These initiatives aim to promote the welfare of animals (equids inclusive) while producing animal health practitioners who are not only well-equipped but also conscientious in their use of antimicrobials. By promoting preventing animal health services and improving the welfare of working equids and other livestock species, BEA contributes to the reduction of conditions that would otherwise necessitate the excessive use of antimicrobials which globally is touted as the major driver for the antimicrobial resistance crisis.



BEA strongly believes that healthy and well-cared for animals are less susceptible to diseases hence our strong commitment to enhancing the wellbeing of all animals so as to decrease the demand for antibiotics in the first instance and contributing to the fight against antimicrobial resistance. BEA's animal health approaches not only address the immediate health and wellbeing of working donkeys but also address the root causes that lead to misuse of antimicrobials.

This is done by empowering livestock owning communities, hands-on training and continuous professional development activities for animal health practitioners and advocating for all aspects of improved equine welfare. BEA believes that a holistic animal welfare initiative in the broader context offers insights into sustainable practices for veterinarians and other stakeholders in the fight against antimicrobial resistance. In conclusion, BEA is presenting these initiatives to inspire all of us to embrace collaboration in implementing animal welfare initiatives as they ultimately lead to antimicrobial resistance mitigation benefiting both animals, environment and humans alike.

**Key words: Animal Welfare, Antimicrobial resistance, Brooke East Africa**



**PROF. SAMUEL KARIUKI BVM , M SC, PHD**

*Eastern Africa Director, DNDi*

#### **BIO**

Prof. Samuel Kariuki joined DNDi in 2023 as the Eastern Africa Director. He is supervising and leading DNDi's activities in the region. He is the former Acting Director General at the Kenya Medical Research Institute (KEMRI), which is one of DNDi's founding partners. Prof. Kariuki holds a Bachelor of Veterinary Medicine degree from the University of Nairobi, a Master of Science in Pharmacology & Toxicology from the same university, and a PhD in Tropical Medicine from the University of Liverpool, UK. In 2022, the Liverpool School of Tropical Medicine awarded him an Honorary Doctorate degree in recognition of his contribution to research in tropical medicine, especially infectious diseases and antimicrobial resistance. He is a Fellow of the African Academy of Sciences, an Honorary Faculty Member of the Wellcome Sanger Institute, a visiting Professor of Tropical Microbiology at Nuffield Department of Medicine, University of Oxford, UK, and a member of the American Society for Microbiology.

Prof. Kariuki also serves as a member of the World Health Organisation Strategic Advisory Group (STAG) on AMR. Over the last 20 years, he has researched and published on AMR and the epidemiology and genomics of key foodborne enteric pathogens endemic in Kenya and the region. He has published over 180 papers in peer-reviewed journals and 4 chapters in textbooks of Microbiology, majoring in infectious diseases and AMR. During his career, Prof. Kariuki has conducted numerous research projects including epidemiological, social, laboratory, and clinical research. His leadership positions at KEMRI have included serving as the Director of the Centre for Microbiology Research and leading KEMRI's Directorate of Research and Development.



**DR. FRANCIS GAKUYA, BVM , M SC, PHD**

**BIO**

He is formerly the Head of Veterinary Services at Kenya Wildlife Service (KWS) and currently a Principal Research Scientist and Head of Veterinary Science and Laboratories department at Wildlife Research and Training Institute (WRTI). He has worked as a wildlife veterinarian and research scientist for the last 22 years. He has been a member of Institute of Primate Research-Scientific and Ethics Committee (IPR-ISERC) since the year 2010 and the Chairman of the committee from the year 2019. He was a Director at Kenya Veterinary Board (KVB) from 2012 to 2021 representing the wildlife sector. He is the World Organisation for Animal Health (WOAH) wildlife focal point for Kenya and a member of the International Union for Conservation of Nature– Wildlife Health Specialist Group (IUCN-WHSG).

**ABSTRACT**

Group Wildlife especially in Africa is facing a myriad of conservation challenges including human population pressures, habitat loss and degradation, loss of connectivity, climate change, human wildlife conflicts, diseases and loss of genetic viability and poaching for trophies and bushmeat among others. These has resulted in the loss of biodiversity and near extinction of certain wildlife species. Due to these challenges, wildlife and ecosystems are increasingly having to be intensively managed in order to save and maintain biological diversity. This type of management calls for multi-disciplinary wildlife management team approach which is part of adaptive management and the veterinary profession is playing a crucial role in the maintenance of wildlife and ecosystem health as part of this team. The veterinary profession has contributed to this approach through increasing veterinary inputs into wildlife management and research, disease surveillance and prevention, training and education. In order to provide efficient and effective wildlife veterinary services, veterinarians have made great advances in the areas of development, testing and refining sedative, anaesthetic and tranquilization drugs, improved capture and relocation techniques, improved disease investigation and surveillance techniques, active applied research and wildlife veterinary training that enhances the field of wild animal capture and therefore improve wildlife health. This paper reviews the recent advances towards improved wildlife health management with particular focus to conservation of African wildlife.

**Keywords: Conservation challenges, veterinary profession, adaptive management, recent advances**





### DR SAM W ANJOHI

Country Manager, AFROHUN Kenya

#### BIO

Country Manager, AFROHUN Kenya Passionate about advancing the implementation of the One Health approach, which has seen him participate in training students and professionals including multidisciplinary staff from academia and government institutions, on various skills sets including Risk Analysis and One Health Leadership within the East and Central Africa Region and beyond. Contributed to the development of various strategic, and technical documents as well as training modules on One Health Leadership, Risk Analysis and Antimicrobial Resistance, among others.



### DR BRIAN JOSEPH DVM , M FAS, CERTAQV

Director on the LifeStock Int'l

#### BIO

Former Washington State Veterinarian Brian Joseph serves as a veterinary consultant for over a dozen aquaria and dolphin facilities in the United States and the Bahamas including Washington's own Seattle Aquarium. A 1984 University of California, Davis, School of Veterinary Medicine graduate, he completed his Master's in Fisheries and Aquatic Sciences at the University of Florida in December 2020. Dr. Joseph served as a Major in the United States Veterinary Corps deploying to Qatar, Djibouti, DRC, CAR, Somalia, South Sudan, and Afghanistan. Dr. Joseph's interests include the global effect of climate change on food security, transboundary disease, zoonotic disease, and the marine environment. He serves as a Director on the LifeStock Int'l, Protect Wild Dolphins Alliance, and Washington State Veterinary Medical Association Boards of Directors, and recently completed a project for LifeStock Int'l in Kurdistan and Iraq training farmers, laboratory diagnosticians, and veterinarians in the detection, reporting and control of transboundary diseases. Dr. Joseph frequently serves as an animal welfare auditor for the American Humane Association, has published in a number of professional journals, and is a frequent speaker at conferences and universities.

#### ABSTRACT

#### **The Impact of Climate Change on Agriculture in Africa Brian E. Joseph, DVM MFAS CertAqV LifeStock Int'l**

Global climate change is the Earth's greatest threat to peace and food security and could drive as many as 134.2 million into poverty by 2030. If unchecked, the African continent will experience a 2.6 – 3.0 degree C temperature increase by 2050 while the rest of the Earth will undergo a 2.0 degree C increase.



This will devastate African agriculture by increasing the volatility of crop and livestock yields, destabilization local markets, and curbing economic growth in Africa, resulting in increased food insecurity, increased emigration, and increased armed conflict. Africa, the continent that is least responsible for global climate change is the continent that is suffering the most. Responsibility for the correction of global climate change must be shared through funding from those most responsible, the Global North, and innovation by the Global South, most importantly Africa. Success is dependent upon the recognition that global climate change is a global challenge, not a country-to-country challenge.





**PROF. PATRICK KARERU BSC, M SC, PHD**

**BIO**

Has taught at Jomo Kenyatta University of Agriculture and Technology – Chemistry Department for 30 years where he has served as the Principal Investigator for projects dealing with natural products at the Sino-Africa Joint Research Centre, Sajorec (JKUAT). He is Research, Development and marketing of industrial, agro-based products and Herbal medicines. Current research areas are in search of antimicro-

bial Agents from medicinal plants and in particular search of anti-malarial agents from medicinal plants.



**PROF. M BAABU M ATHIU PHD**

CEO of Green Blue Foundation Africa (GBFA)

**BIO**

Prof. Mbaabu Mathiu is an Environmental Veterinarian with a PhD in Environmental Physiology with many years of service at the University of Nairobi. He is an avid promoter of health, which combines animal, human and ecosystem health for inclusive wellbeing. He is a Registered

Lead Expert in Environmental Impact Assessment (EIA) and Environmental Audit (EA) and a member of several professional bodies including the Environment Institute of Kenya (EIK) and the Kenya National Academy of Sciences (KNAS). He also serves in various academic and development organizations at local, national and international levels. His passion is environmental restoration. He is currently the CHIEF EXECUTIVE OFFICER of Green Blue Foundation Africa (GBFA).

**Harnessing Research in Veterinary Science for Resilience Sustainability of Communities: Alternative Veterinary Medicine.**

**ABSTRACT**

The key phrase here is research for resilience sustainability of communities. Bearing this in mind, the paper explores the status of research in "alternative" veterinary medicine. To put it in another way, the role of research in "alternative" veterinary medicine for resilient sustainable communities. A brief definition of key words and phrases is given for context and clarity, starting with "alternative medicine" and in particular "alternative veterinary medicine". The focus is then turned to traditional herbal veterinary medicine or ethnoveterinary medicine and the range of conditions and diseases that are managed and/or treated. These include examples of external/internal parasites and infectious diseases and some of the herbs used for their management and treatment. Finally, the key challenges facing traditional veterinary medicine or ethnoveterinary medicine are briefly highlighted and suggested way forward.

Prof Mbaabu Mathiu





**PROF. JANET HELLEN AMUGUNI, BVM , PHD**

#### **BIO**

She is an Assistant Professor in the Department of Infectious Disease and Global Health at the Cummings School of Veterinary Medicine, Tufts University. She has many years of experience working as a Veterinarian and Gender specialist among pastoralist communities in the Horn of Africa, developing gender programs, and conducting gender assessment studies among livestock projects in Kenya, Ethiopia, Southern Sudan and Somalia. She also facilitates the International

Veterinary Medicine forums and Problem-Based Learning courses and is the Co-Director of the Human Dimensions of Conservation Medicine course for graduate students in the Masters in Conservation Medicine program. She is the technical advisor for the USAID RESPOND project in Africa. She coordinates projects across six African countries including Kenya, Uganda, Tanzania, Rwanda, Ethiopia and the Democratic Republic of Congo working with 14 institutions of public health and veterinary medicine to build the capacity of partner African countries using a One Health approach to investigate, respond to, and counter existing and future emerging infectious disease outbreaks.

#### **ABSTRACT**

### **Integrating gender into One Health and Climate resilient livestock systems: A case study of SheVax+ - A Climate resilient Women Centered Livestock Vaccine Delivery System in East Africa**

Around 1.7 billion people depend on the livestock industry for their livelihoods. In sub-Saharan Africa, an estimated 85% of livestock keepers live in extreme poverty. Two-thirds of these livestock owners are women, who are the most vulnerable to immediate and long term impacts of climate change. These women preferentially rear small livestock species (e.g., poultry and small ruminants) due to their numerous benefits. Incidentally, goats and backyard chicken production systems are some of the best systems to mitigate the negative impacts of climate change on livestock production, while ensuring sustainability and productivity of livestock farming. In Rwanda, Kenya and Uganda, 75-90% of small-scale poultry farmers are women. Livestock deaths and diseases are exacerbated by these environmental changes thereby preventing these women from maximizing production earnings. Their flocks and herds are frequently decimated by preventable diseases, such as Newcastle disease (ND) in chickens and contagious caprine pleuropneumonia (CCPP) in goats, despite the availability of effective vaccines. Over the last four years, SheVax+ has tested a climate resilient women centered private sector livestock vaccine delivery model. Our research uncovered the major barriers that prevent Women small holder livestock farmers (WSLF) from accessing vaccines for use in their livestock.

Removing these barriers reduces livestock morbidity and mortality, improves livestock productivity, combats food insecurity, and helps vulnerable women smallholder farmers adapt today and build resilience for the future. Our solution, which centers on utilizing solar-powered refrigeration, a climate smart technology to increase access to vaccines and animal health services, and training animal health service providers within the rural communities, empowers women to become animal health service providers allowing them to expand into new roles within the livestock vaccine distribution and delivery chain, be empowered economically, develop new professional competencies and contribute to gender-equitable service delivery. This climate resilient livestock vaccine delivery system is crucial for ensuring food security, reducing greenhouse gas emission from the livestock sector and promoting the sustainability of livestock systems in the face of climate change.





# ***ORAL ABSTRACTS***



### DR. HANNAH WAMBUI

#### **Novel quantitative Theileria parva sporozoite seroneutralization assay to evaluate vaccine candidates for East Coast Fever;**

*Hannah Chege, Samuel Githigia, James Gathumbi, Naomi Chege, Rose Ojuok, Josiah Odaba, Stephen Mwalimu, Harriet Oboge, Tore Tollersrud, Steinaa Lucilla, Musa Mulongo, Vishvanath Nene, and Anna Lacasta*

#### **Animal and Human Health Program- International Livestock Research Institute (ILRI), P.O Box 30709, 00100 Nairobi, Kenya.**

Developing an in vivo assay to detect mechanistic immune correlates of protection are of great importance in vaccine research. Having an in vitro surrogate assay to predict protection allow to avoid the use of animals reducing animal suffering, time on getting results and cost. However, they are difficult to develop and validate. East Coast fever subunit vaccine research will benefit from the development of a robust high throughput seroneutralization assay. Traditionally, the assay was based on the use of fresh cells and infectious material, sporozoites, and a tedious timeconsuming read-out based on Giemsa staining of cell slides. Further improvement used frozen material to avoid batch to batch variations, but the assay became qualitative. By preserving the use of frozen material but using a strong read-out based on FACS analysis of infected cells, we overcome all these limitations and developed a robust, reliable, quantitative and high throughput assay. Moreover, the assay is not only able to detect individual neutralizing capacity, but it can also detect synergist effect of antibodies, even when they are targeting the same antigens/epitopes. The new neutralization assay will help the assessment of new Theileria parva vaccine candidates in vitro and to assess mechanistic immune correlates with protection.

**Keywords: East Coast fever, Theileria parva, sporozoites, seroneutralization assay, monoclonal antibodies, PIM, p67, vaccine**

### DR. EVALYNE C. BETT

#### **MOLECULAR DETECTION AND RISK FACTOR ANALYSIS OF ROTAVIRUS INFECTIONS IN PIGLETS FROM KIAMBU, KENYA.**

*Sub-theme for the conference: Current Advances in Diagnosis, Livestock Production and Health*

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Rotaviruses cause disease in pigs thereby hampering their productivity worldwide including Kenya. Previously, rotavirus groups circulating in pig farms in Kiambu, Kenya were unknown and this prompted this study. The objectives of this study were to identify rotaviruses and determine risk factors associated with infections in Kiambu County. Two hundred and fifty-five (255) fecal samples from 52 farms were collected from clinically healthy piglets aged 3 months and below. Molecular detection of rotavirus groups was done using reverse transcription polymerase chain reaction (RT-qPCR) and then compared with conventional reverse transcriptase Polymerase Chain Reaction (cPCR).

Questionnaires were administered to pig farmers and risk factors analyzed. The overall animal-level prevalence was 16.1%, with the highest prevalence observed for rotavirus C (10%), followed by rotavirus A (6%), and the lowest observed in co-infection of RVA+RVC (0.4%). Out of the 52 farms sampled, 38.5% had piglets infected with at least one rotavirus group. Rotavirus group C (RVC) were observed in 23.1% and group A (RVA) in 13.5% of the farms. Rotavirus group B (RVB) was not observed in any of the farms. Co-infection of piglets with RVA and RVC was observed in one farm.

The study showed that qRT-PCR and conventional PCR can be used interchangeably for rotavirus detection. However, qRT-PCR offered additional advantage of quantification of RNA and therefore help in determination of rotavirus viral loads. Gender of the pig farmer influenced the occurrence of rotavirus infections in farms; with farms managed by men having increased odds of infection. Pig houses made of concrete floor and wooden walls, feeding mixed feed and keeping other animals within the farm were shown to reduce the risk of diarrhea in pig farms. In conclusion, porcine rotavirus A and C are circulating in pig farms in Kiambu and both real time and conventional PCR can be utilized in early detection/diagnosis that will help reduce economic losses and improve pig productivity. Improved surveillance and biosecurity measures are crucial in mitigating the impact of rotaviruses in pig farms.

**Key words: Rotavirus. Piglets. RT qPCR. Detection. Risk Factors**

## **DR. HARRIET OBOGE**

### **IMMUNE RESPONSE TO THEILERIA PARVA P67C SPOROZOITE ANTIGEN BOUND TO LIPOSOMES CONTAINING TLR 4 AGONIST AND QS21**

#### **Current Advances in Diagnostics, Livestock Production and Health**

*Oboge Harriet, Oluga. A. Gabriel, Chege Hannah, Ojuok Rose, Chege Naomi, Githaka Naftali, Thumbi S.M, Jonathan Lovell, Wei-Chiao Huang, Vishvanath Nene, Lacasta Anna*

The development of effective sub-unit vaccines offers promising opportunities for a sustainable and scalable solution to East Coast fever, a major disease affecting cattle in Eastern, Central, and Southern Africa. Recent experimental trials have shown that a recombinant sporozoite candidate vaccine antigen, p67C, provides 50% protection against the LD70 sporozoite needle challenge. In this study, we aimed to assess the efficacy of Spontaneous Nanoliposome Antigen Particleization (SNAP) in stimulating a potent immune response using p67C as a model antigen. Four groups of cattle were immunized with recombinant his-tagged soluble p67C mixed with different SNAP ingredients: cobalt-porphyrin-phospholipid (CoPoP), CoPoP/PHAD, CoPoP/QS21, or CoPoP/PHAD/QS21. To validate the potency of the immunogen, mice were immunized with p67C mixed with CoPoP/PHAD/QS21 as well as p67C adjuvanted with Alum. The results showed that p67C antigen mixed with CoPoP/PHAD/QS21 and CoPoP/QS21 induced an IgG antibody response in cattle, while p67C mixed with CoPoP only and CoPoP/QS21 did not effectively elicit an IgG antibody response.

In mice, p67C mixed with CoPoP/PHAD/QS21 generated a stronger IgG antibody response compared to Alum, suggesting the potency of the immunogen used in cattle. Interestingly, the SNAP technology, in its current formulation, did not significantly increase p67C IgG titres in cattle, but it did demonstrate an enhanced immune response p67C in mice compared to Alum. This discrepancy in the immunological response in mice and cattle could be attributed to inherent physiological and pathological differences between cattle and mice, considering that East Coast fever primarily affects cattle. Overall, this study highlights the potential of SNAP technology for vaccine delivery of poorly immunogenic antigens like p67C, with the need for improvement of the SNAP formulation to optimize its application in large animals and with consideration of increasing the dosage of p67C antigen in cattle since higher antibody titres have been elicited in previous studies that administered two doses of 450ug of p67C per animal.



## **DR. DERRICK SENTAMU**

### **LIVESTOCK DISEASE SURVEILLANCE PRACTICES IN PASTORAL AREAS IN NORTHERN KENYA.**

*Derrick Sentamu, Raphael Lotira, Haron Akala, Lian F. Thomas, Oliver Vivianne Wasonga, Joshua Orungo Onono*

Livestock plays a very important role in the lives of pastoralists whose entire livelihood is designed around benefit from animals. One of the major constraints for pastoral production is livestock diseases. A major driver that maintains high disease burden is poor disease surveillance. Reporting of diseases and outbreaks from pastoral communities to animal health workers is one of the challenges that often affects effective and timely response. Therefore, this work aimed to understand animal disease surveillance practices in pastoral areas of Northern Kenya. Stakeholders, their roles and information flow amongst each other were identified. Methods used to transmit this information and their strengths and challenges were also identified. The study was carried out in Marsabit County in Laisamis constituency in 2 wards, Laisamis and Ngurunit. Villages were then chosen purposively based on livestock numbers and distances away from potential animal health services.

Mixed methods were used for this qualitative study comprising of Narrative and Key Informant Interviews with pastoralists and other already known stakeholders in livestock disease surveillance and response. A pretested tool was used to guide the interviews. Notes were taken and audios recorded during interviews. Transcripts were obtained for the recordings and analysis was done using ATLAS.ti. Findings showed evolution in methods used in reporting of livestock diseases from use of smoke, fire and walking on foot to currently using motor bikes and mobile phones. Evolution in livestock disease response pathways from solely relying on herbs to utilisation of animal health workers and modern synthetic drugs. Stakeholders in disease reporting and response have also increased over time with several new roles created and expansion of the network.

Mobile phone applications exist and are used in the county but mostly by the literate. In conclusion, there still exists an information transmission gap between pastoralists and animal health services and current disease surveillance methods have various challenges. An opportunity exists in bridging this gap with use of technology. Proper understanding of important stakeholders to include in a jointly designed disease surveillance system. Several gaps and challenges in current disease reporting and response methods have been identified and can inform in the development of this system.

**Keywords: Pastoralists, Livestock, Disease, Reporting, Response.**

## **DR. ESTHER BOSIBORI**

### **PERFORMANCE AND ANTIDIARRHEAL POTENTIAL OF INSECT MEAL ON PIGLETS IN KENYA.**

#### **SUB THEME: ANTIMICROBIAL RESISTANCE AND ANIMAL WELFARE.**

*Esther Bosibori, Timothy Wachira, Chrysantus Tanga and Lily Bebora*

Meat consumption has been increasing steadily over the past few decades, with pork being the most widely consumed globally. Pig production is a crucial aspect of the global food systems and has quadrupled globally in the past 50 years. Post weaning diarrhoea has been a major challenge in the pig production industry and has recorded a huge economic impact. A well-balanced diet that meets the nutritional needs of pigs can help to optimize their growth, reduce the risk of diseases and to improve the quality of meat. One of the most important nutrients for pigs is protein which is needed for tissue growth and repair.

Recently, the cost of common protein sources for pig feed production such as soybeans and fishmeal are increasingly becoming expensive hence, the prompted shift towards a more sustainable feed ingredient. Insect meal has emerged as a potential alternative protein source. The black soldier fly larvae (BSFL) are considered a promising high-quality feed component in animal feed since they contain a high protein and fat content. To manage diarrhoea effectively, and to reduce economic loss and minimize antibiotic use which is a public health concern, the search for alternatives to antibiotics is inevitable. Insect-based meals have been suggested as a possible solution for post weaning diarrhoea in piglets and there is no study showing the BSFL antidiarrheal property thus, the need to determine it. This study aims to establish the prevalence of diarrhoea in Kenya and to test for the effectiveness of black soldier fly larvae as treatment for post-weaning diarrhoea and as growth promoter when used as part of piglet meal, the minimal inclusion level of BSFL in premixed piglet feed and the specific bacteria targeted or inhibited by BSFL.

## **DR. ROBERT MURIUKI**

### **A Novel CRISPR-Cas Based Pen-Side Diagnostic Test for the Diagnosis of East Coast fever.**

*Robert Muriuki, Maingi Ndichu, Samuel Githigia, Nicholas Svitek*

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*Theileria parva* causes one of the most important and lethal tick-borne diseases of cattle in subSaharan Africa, known as East Coast fever (ECF). About one million cattle die every year, leading to more than US \$300 million in annual economic losses. From an estimated 170 million cattle in 12 sub-Saharan countries, at least 50 million are at risk. A sensitive point-of-care diagnostic tool is lacking for the detection of *T. parva*. Currently, *T. parva* diagnosis relies mainly on serology and microscopic identification of parasites in either blood or lymph fluid

samples. However, these tests might not indicate ongoing infection and lack the sensitivity for low-level infection detection. Molecular tests such as the nested and quantitative PCR assays are sensitive enough for *T. parva* detection. Yet, they remain highly complex technologies impractical for resource-limited settings where the economic loss due to the disease has the most significant impact. An ultrasensitive field-deployable test will help immensely in the treatment and control of ECF in endemic areas. For this purpose, we developed a CRISPRCas12a-based pen-side tool that can sensitively and specifically detect *T. parva* based on the p104 gene. We describe a streamlined,

field-applicable diagnostic tool comprising a 20-minute recombinase polymerase amplification (RPA) reaction followed by a 60-minute CRISPR-Cas12a reaction using a FAM/Biotin lateral flow strip readout. We tested two different RPA primer pairs and four different CRISPR- RNAs (crRNAs). The p104-based assay displayed high sensitivity, detecting up to 1000 infected cells per ml, and universality by detecting at least eight different *T. parva* strains, without detecting DNA from other *Theileria* species, such as *T. mutans* and *T. lestoquardi*. This work opens the way for a field-applicable diagnostic tool for the sensitive detection of carrier animals and point-of-care early diagnosis of infected cattle.

## DR. FM KIBEGWA AND DR. RC BETT

### **BIOLOGICAL CONTROL OF MULTI-DRUG RESISTANT PARASITIC HELMINTHS IN MANURE FROM DORPER SHEEP USING BLACK SOLDIER FLY LARVAE**

#### **SUB-THEME: ANTIMICROBIAL RESISTANCE AND ANIMAL WELFARE**

Most sheep diseases caused by worms are controlled mainly using anthelmintics. Continued use of these drugs is threatened by emerging cases of parasite resistance, because of indiscriminate use, poor quality products, under-dosing and high frequency of usage. Development of other alternative strategies to reduce these infections is desirable in order to reduce this resistance but also to reduce the cost of disease control. This study was undertaken to evaluate the performance of black soldier fly larvae (BSFL) as a biological control of multi-drug resistant parasitic gastrointestinal nematodes in Dorper sheep manure.

Faecal material was collected from 12 Dorper sheep reared at the KALRO Veterinary Research Institute, Muguga. These sheep have been shown to harbour multi-drug resistant parasitic gastrointestinal nematodes. The samples were divided into two portions. From the first portions, faecal egg counts (FEC) were determined using the Modified McMaster Techniques. Thereafter, the samples were incubated with BSF larvae at room temperature for 10 days. At the end of the incubation period, sub-samples were collected for determination of FEC. The second portions were cultured for 10 days after which the nematode larvae present were determined. Subsequently, they were inoculated with BSFL and incubated for 10 more days, after which the nematode larvae present were again determined. A comparison was then made between the- before and after BSFL for the egg count and nematode larvae using a t test. The results indicated that there was a statistically significant differences between various nematode genera. For example, the mean faecal egg counts reduced from 1,659 epg to 50 epg ( $P < 0.001$ ), and the mean number of larvae reduced from 44 to 28 ( $P = 0.006$ ). The findings indicate that BSFL are a viable biological helminth control strategy that can be easily adopted by farmers.

**Key words: Nematodes, Dorper sheep, black soldier fly larvae, biological control, manure**

## DR. LUCY GATITU

### **BIOSECURITY: A TOOL IN REDUCING ANTIBIOTIC USE AND SPREAD OF BACTERIAL PATHOGENS ALONG THE FOOD VALUE CHAIN IN A LARGE SCALE PIG PRODUCTION AND VALUE ADDITION COMPANY IN KENYA.**

#### **SUB-THEME: ANTIMICROBIAL RESISTANCE AND ANIMAL WELFARE**

*Lucy Gatitu, Esther Kamau, Kipyegon AN, Sharon Tshigadi*

The insatiable demand for pork and its products has led to increased use of antimicrobials in growth promotion and therapeutics. This is a major contributor to AMR. This study was carried out to determine measures undertaken by a vertically integrated pork enterprise to reduce antimicrobial use in the pork value chain and prevent the spread of AMR genes along the food chain. An observational study and in-depth discussions were carried out in a Kenyan large-scale commercial pig farm between May and June, 2022 to determine the biosecurity measures in the farm, slaughter house facility, food processing and sales units. Biosecurity measures in the farm included; treated footbath and wheel dips, restriction of entry and movement and practice of closed herd system. Routine vaccination, cleaning and disinfection of destocked pens were carried out.

In addition, raw materials for feed processing were subjected to organoleptic evaluation and laboratory analysis to determine the nutritive value, moisture content, and presence of mycotoxins. Feed formulation was then done considering optimal nutritional value to cater for different classes of pigs.

Water used on farm and in the slaughter facility was routinely tested for quality. Meat was stored in a cold chain overnight to lyophilize and butchering done in sections depending on the final product. In-coming and out-going air in the processing area was filtered to avoid contamination of meat. Personal hygiene, grooming and adorning of PPEs was mandatory to all personnel. Food handlers are tested every 6 months for communicable diseases and every 2 months for staff in high care units producing ready to eat products. Transport of meat and meat products was done in cleaned and disinfected dedicated refrigerated trucks. Reduced disease incidence on farm and negative results on microbial analysis of products confirm that appropriate biosecurity measures reduce use of antimicrobials. Further, use of vaccines prevents diseases reducing need for antimicrobial use whilst a closed herd system, and movement restrictions prevents disease spread. Formulating proper nutritional value elements boost immunity. Feed and feed product analysis enhance clean feeds free from pathogens. Sanitation control of water being used reduces contaminants passing to products. Key words: Pigs, Antimicrobial resistance (AMR), Biosecurity, Value chain, Kenya.

They produce Roll catches flies. Easy to use against flies in stables, garages, cages or places where animals are exposed. The adhesive substance does not dry out and maintains its effectiveness until the surface is occupied by insects.





## DR. VICTORIA KIMINDU

### MICROBIAL AND CHEMICAL QUALITY OF SLAUGHTERHOUSE TAP WATER IN KAJIADO COUNTY

This study determined the microbial and chemical quality of water intended for slaughterhouse hygiene and carcass washing across 5 slaughterhouses in Kajiado county. Microbial analyses determined total and faecal coliform, *Escherichia coli*, *Salmonella* and *Shigella* species. Chemical analyses determined included pH, temperature, electrical conductivity (EC), total dissolved solids (TDS), turbidity, Iron (Fe), aluminium (Al), fluoride, nitrate, nitrite ammoniacal nitrogen. *E. coli* and *Pseudomonas aeruginosa* were detected in 60 % of the samples while *Salmonella* species were detected in 20 %. All water samples had acceptable appearance, pH, turbidity, Al and nitrate but water temperatures exceeded the WHO maximum limit. Water samples exceeded in Fe, EC, TDS, ammoniacal nitrogen and fluoride beyond WHO guideline limit while nitrites were not detected.

Faecal contamination of slaughterhouse tap water rises public health concern for the presence of microbial risks including enteric pathogens and opportunistic infections. Sensitization of slaughterhouse management and local authority on the consequences of poor-quality potable water on meat safety, personnel health and slaughter operations should be prioritized. The study recommends the collaborative establishment of water safety plans and routine water quality monitoring between slaughter facilities and local government to verify quality and safety of water for use at the slaughterhouses.

**Key words: microbial water quality, potable water, Salmonella, slaughterhouse, water quality**

## DR. HENRY EMONJE

### PUFF-ADDER (*BITIS ARIETANS*) SNAKE VENOM-DERIVED SERINE PROTEASES ATTENUATE MYOCARDIAL ISCHEMIA-REPERFUSION INJURY IN A GLOBAL ISCHEMIA RABBIT HEART MODEL.

#### SUB-THEME: ALTERNATIVE MEDICINE

*Henry Emonje, Philemon K. Towett, Albert W. Nyongesa, Peter W. Mwangi, George Oluoch.*

**Introduction:** One of the major causes of death and disability in the modern world, including Africa, is coronary heart disease (CHD). The most serious manifestation of CHD is myocardial infarction, which is why attenuating it is so important. Despite the significant burden of ischemic heart disease, there is still no effective cure for Ischaemia Reperfusion Injury (IRI) brought by reperfusion of an ischemic heart. Objective: The present study was designed to investigate the potential of Puff-udder (*Bitis arietans*) snake venom serine proteases (SVSPs) to alleviate myocardial IRI in rabbit in-vitro model of global ischemia. Methodology: Crude venom from Puff-udder (*Bitis arietans*) was extracted and fractionated using a liquid chromatography system and then each fraction was analysed by SDS-Page. The study employed forty (40) mature mixed-sex New Zealand white rabbits weighing 2.5–3.5 kg. Heparin was administered intraperitoneally after the rabbits were anaesthetised with 6% sodium pentobarbitone (60 mg/kg) intraperitoneally, after which heparin (500 IU/kg) was administered via the same route. On the Langendorff system, all animal hearts were isolated and perfused with Krebs Henseleit Buffer (KHB). To study the cardioprotective effects of (SVSPs), five groups of animals (n=5) were used.

The hearts were re-perfused as follows: Control group KHB; positive control group-KHB containing glucosamine (1000 mg/kg); test groups 1,2 and 3, KHB containing SVSPs:1.0 mg /1000 ml (low-dose), 2.0mg/1000ml (medium-dose), and 3.0 mg/1000 ml (high-dose) of SVSPs, respectively. To study the possible mechanism(s) of action of cardioprotection of SVSPs, three groups of animals (n=5) were used.

Reperfusion was performed by co-administration with various cardioactive Substances to the animals' groups: Group A, [theophylline (1000  $\mu$ mol/L + 2.0mg/L SVSPs)]; Group B, [naloxone (2.2  $\mu$ mol/L + 2.0mg/L SVSPs)] and Group C (KHB+ 2.0mg/L SVSPs). Force and frequency of myocardial contraction were recorded as the indices of cardiac function by a force transducer attached to the apex of the heart. At the end of the experiments, heart tissues were processed for histological examination, and the extent of myocardial structure disruption was graded as follows: 0: no change, 1: mild, 2: moderate and 3: severe.

Data was analysed using one-way ANOVA and Tukey's post hoc test was done to check for comparisons of mean values among treatment groups and controls with statistical significance set at 5% level. Results and discussion: Nine fractions eluted under gel filtration chromatographic peaks showed clear bands on SDS-PAGE. Five fractions containing serine proteases (35-70KDa) from all chromatography runs were pooled, and protein concentration was determined using Biodrop Elite. Results showed no significant differences in the force and frequency of contractions ( $P = 0.7833$  and  $P = 0.6063$ ) respectively during the equilibration phase. There were significant differences in the force and frequency of myocardial contractions between the five test groups in both the early and late phases of recovery ( $P < 0.0001$ ).

There were no observable changes in myocardial structure in low dose, medium doses and naloxone groups compared to the positive control group. There were observable myocardial structure changes in the high dose, negative control and theophylline groups (severe oedema, infiltration and infarction). There were significant differences in structure disruption among all five test groups ( $P = 0.0037$ ). Pre-treatment with theophylline partially abolished the pharmacological post-conditioning cardioprotective effects afforded Bitis arietans SVSPs while naloxone did not abolish the cardioprotection. Conclusion: The current investigation provides proof that Bitis arietans SVSPs exhibit significant dose-dependent cardioprotective effects and are potential therapeutic agents against IRI. However, further advanced research involving the purification of Bitis arietans SVSPs should be done so that individual serine proteases can be studied.

**Key Words: Ischemia, Reperfusion Injury, Cardioprotection, adenosine and bradykinin Pathways, Puff-adder (Bitis arietans), Snake venom serine proteases (SVSPs).**

## DR. CATHERINE KALUWA

### SUPPORTING WOMEN SMALLHOLDERS INVOLVED IN SMALL-SCALE CHICKEN PRODUCTION SUB THEME: GENDER AND ANIMAL PRODUCTION

*Catherine Kaluwa, Jemimah Oduma, Tevin Konde, Angela Opondoh, Diana Muta, Brigitte Bagnol, Meghan Stanley, Marieke Rosenbaum, Hellen Amuguni and Robyn Alders*

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By the end of the 1990s research had clearly established that women had a good control over the benefit resulting from small-scale chicken use and sale. This paper analyses the differences between gender-blind and gender-aware approaches in dealing with small-scale chicken production.

Three case studies are analyzed. Two are gender aware and aimed at supporting women's chicken raising endeavour through the control of Newcastle disease in Africa: One is gender-accommodating and the other is gender transformative. The third case study is gender-blind and examines the impact of the 2003-6 Highly Pathogenic Avian Influenza outbreak in Asia. While promoting women's participation in animal health and livestock raising activities can contribute to gender awareness and improve gender dynamics in the sector, the gender-blind intervention during the HPAI outbreak negatively impacted female farmers raising small-scale chickens. The authors highlight the importance on using gender-transformative approaches in initiatives that target livestock production systems.

**Keywords: Women's empowerment, gender transformative, gender, backyard chicken, small-scale chicken, vaccine value chain, Newcastle disease control, HPAI**

## **DR. FREDRICK OJIAMBO OBONYO**

### **OCCURRENCE OF SERUM ANTIBODIES TO TOXOPLASMA GONDII AND ASSOCIATED RISK FACTORS IN DONKEYS FROM CENTRAL KENYA**

*Fredrick Ojiambo Obonyo, Ndichu Maingi, Samuel Maina Githigia, Peter Kimeli, Evans Nyaega Nyaboga*

*Toxoplasma gondii* is an intracellular parasite of zoonotic concern and economic importance in humans and animals, respectively. This study was conducted to determine the occurrence of *T. gondii* and associated risk factors in domestic donkeys from Kirinyaga and Meru counties in Kenya. Blood samples were collected from 363 randomly selected donkeys for detection of antibodies to *T. gondii* using a commercial kit ID Screen® Toxoplasmosis Multi-species indirect enzymelinked immunosorbent assay (ELISA). The data on risk factors were collected by interviewing donkey owners using epidemiological questionnaire. Serum antibodies to *T. gondii* were detected in 26.4% (95% CI: 22.2–31.3) of the donkeys. The analysis showed that age of donkeys (OR=2.484, 95% CI: 1.315–4.693;  $p=0.005$ ) was associated with increased risk for *T. gondii* seroprevalence while county of origin of donkeys (OR=0.182, 95% CI: 0.083–0.400;  $p=0.000$ ), residential place of donkeys (OR=0.301, 95% CI: 0.136–0.665;  $p=0.003$ ), rearing chicken (OR=0.203, 95% CI: 0.064–0.644;  $p=0.007$ ), and donkey production system (OR=0.644, 95% CI: 0.456–0.909;  $p=0.012$ ) were associated with reduced risk of *T. gondii* seroprevalence. This is the first report to provide epidemiological information on *T. gondii* infection among donkeys in Kenya.

The presence of antibodies to *T. gondii* in donkeys suggests the high potential of transmission to other animals and humans. Regular monitoring and control of *T. gondii* infection in donkeys were recommended in the study area.

**Keywords: Donkeys · Indirect ELISA · Occurrence · Risk factors · Toxoplasma gondii**

## DR. NGOTHO ESILABA

### POTENTIAL CLIMATE CHANGE EFFECTS ON THE HEALTH OF SMALL RUMINANTS IN PASTORAL LAIKIPIA

#### SUB-THEME: CLIMATE CHANGE AND ONE HEALTH

*Ngottho-Esilaba, R.N., Ombui, J.N, Onono J.O, and Lindahl J.F*

Globally, increasing variability of the climate and in the frequency of occurrence of extreme events will impact livestock productivity, household incomes, food and nutritional security. Pastoralists living in marginalized areas, faced with increasing biodiversity loss and other challenges are amongst the most vulnerable to climate change impacts in the world. Adverse climate effects on livestock, a pastoralist's prime source of livelihood will just enhance this vulnerability. In Kenya, in the last four decades there has been accelerated increases in pastoral small ruminant populations congruent to decreasing cattle populations, highlighting preference for the former due to their smaller carbon footprint amongst other reasons. We sought to evaluate livestock owners' awareness of climate change, its impacts and potential links to disease incidence in small ruminants and actual effects at household levels.

Pastoralists' perceptions on climate change had been teased out in formal focus group discussions (FGDs) held prior to formal household surveys. Two cross-sectional household surveys were carried out in the same sites as the FGDs using structured questionnaires bearing close-ended questions. Collected data was analyzed using Microsoft Excel. In this paper we present evidence of climate change effects in Laikipia north and plausible links to seasonal disease prevalence and mortality. Drought was identified as the leading effect of climate change in Laikipia at 27%, second was little rain at 14% and third was delayed rains at 13%. The leading period for these climate impacts was 2016-2020 at 59%, followed by 2011-2015 at 23% and 1995-2000 at 8%. Negligible adverse impacts were experienced in 2001-2005. The highest prevalence of shoaat diseases was in hot & dry seasons, followed by cold & wet seasons. Goat diseases are much more prevalent in hot and dry seasons than sheep diseases. A few diseases showed no seasonality. The leading cause of mortality for both sheep and goats is diseases. Pastoralists did not link any deaths to climate change impacts. The findings reported here forewarn of future climate linked disease risk and informs future mitigative strategies for small ruminant diseases in pastoral areas. We must prepare to mitigate climate change impacts using a one health approach.

**Key words:** Climate change, Small ruminant diseases, Pastoralism, Kenya.

## DR. LABAN O. NGANYI

### PREVALENCE OF FASCIOLIASIS IN SLAUGHTERED BOVINE AT DAGORETTI SLAUGHTER HOUSES.

*Laban O. Nganyj, Samuel M. Githigia*

A retrospective study covering a period of 5 years (2016-2020) was carried out using meat inspection records from Dagoretti slaughter houses complex to determine the prevalence of fascioliasis in slaughtered bovine in Dagoretti for the 5 years. The Dagoretti slaughterhouses complex consisted of Nyongara, Cooperative, Thiani and Mumu. Meat inspection records from the 4 slaughter houses in Dagoretti were examined for the 5 year period. Prevalence of fascioliasis was calculated as the number of cattle found to be infected with fasciola expressed as a percentage of total number of cattle slaughtered. Using the average weight and market price of a bovine liver, the monetary loss occasioned by condemnation of fasciola infected livers was calculated. A survey was also carried out to investigate annual trends of fascioliasis and what other regions other than within the country do cattle originate from.



During the 5 year period a total of 337,553 cattle were slaughtered out of which 225,825 were males. Out of the 111,728 females, 29,176 were pregnant. The highest prevalence was recorded in 2018 (53.58%) followed in descending order, by 2017 (45.76%), 2016 (35.79%), 2020 (34.07%) and 2019 (32.81%). In 2016, the highest prevalence was February (74.19%), in 2017 was October (61.1%), in 2018 was November (72.1%), in 2019 was April (37.6%) and in 2020 was September (46.34%). A total of 8,277 livers (amounting to 3.3 million loss) were condemned and out of this 3,375 livers (amounting to 1.3 million loss) were condemned due to fascioliasis. From this data, fascioliasis contributed to 39.39% loss of the total economic loss encountered due to liver condemnation in the 5 year period.

High percentage annual economic loss due to fascioliasis was recorded in 2018 (53.58%) followed in descending order, by 2017 (45.76%), then 2016 (35.79%), then 2020 (34.07%) and then 2019 (32.81%). Cattle slaughtered at Dagoretti slaughter house originate from all parts of the country and some came from Uganda and Tanzania. It is concluded that fascioliasis is prevalent in Kenya, it causes greater economic losses as a result of condemnation of infected livers. Local climatic factors, cattle trade, rustling and increased population number, and presence of snail intermediate hosts are probably the main risk factors influencing incidence of fascioliasis in various regions of the country.

## **DR. WAMBULWA LEVI M.**

### **ENHANCING THE PRODUCTIVITY OF GALLA GOATS (*CAPRA HIRCUS*) USING ESTRUS SYNCHRONIZATION AND CONTROLLED MATING IN KENYA'S SOUTHERN RANGELANDS SUB-THEME: CURRENT ADVANCES IN DIAGNOSIS; LIVESTOCK PRODUCTION, AND HEALTH**

*Wambulwa Levi M, Jung'a Joseph O, Bett Rawlynce C, and Mbuku Samuel M*

This study aimed to increase Galla goat (*Capra hircus*) productivity in the Southern rangelands of Kenya. This was achieved by synchronizing kidding with feed availability that boosts the survival of dams and kids, and reducing pro-longed kidding interval. The study site was at KALRO Kiboko research station in Makueni County. Out of the two hundred and two (202) Galla goats used in this study 195 were cycling does of between first and fourth parity and 7 were fertile breeding bucks. The objectives of the study were to assess the effectiveness of the use of hormone treatment and the buck effect on estrus response alongside its economic aspect. The study also assessed the mating ratio on Estrus synchronization (ES). Data collected on expression of estrus, conception rate, mating ratio and benefit - cost ratio was subjected to statistical analysis using Analysis of variance (ANOVA) and IBM SPSS version 22 software of 2013. The least significant difference method (LSD) at 5% was used for mean comparison. Estrus response and the conception data analyzed, showed that there was significant difference ( $P < 0.05$ ) between the hormone and the buck effect treatments. However, on estrus responses, statistically there was insignificant differences between the two treatments. The buck effect group and had higher estrus response of 90% than those administered with exogenous hormone 66.67%.

The buck effect response on conception recorded 76.67% than the hormone treatment 20.69% one. The performance of the three Mating ratios; 1:10, 1:15 and 1:20, showed that there were no significant differences ( $P > 0.05$ ) between them. The benefit-cost ratio analysis (BCR) showed estrus stimulation using the "buck effect" was more beneficial than the use of hormones on Galla Goat. The buck effect had a BCR of 1.38, while the hormone effect had a BCR of 0.25. Therefore, adopting of assisted reproductive techniques of using the "Buck effect" may improve productivity in Galla goats and enhance their resilience in an ever-changing environment.

**Keywords: Galla goats, Synchronization, Buck effect, Hormones**

## DR. NJUNG'E CORAZON

### CAUSES AND DISTRIBUTION OF PIG MORTALITY IN NAIROBI METROPOLITAN, KENYA

*Corazon N. Njung'e, Njagi, L.W, Mulei, I. R*

Pig mortalities are a major problem to pig farmers because they lead to financial losses. This study was aimed at documenting the common causes of pig mortalities in peri-urban areas of Nairobi. Data was obtained through a retrospective study of porcine diagnostic records in the Department of Veterinary pathology, microbiology and parasitology, University of Nairobi, from January 2012 to December 2021. Diagnosis relied on a combination of history, clinical signs, macroscopic, and microscopic and, microbiological findings. The major causes of mortalities in different age groups was then tabulated. The study showed that different age groups had similar diseases affecting them but some were more prevalent in one age group than in the others. The most common causes of mortalities in pigs were respiratory diseases (19%), gastroenteritis (19%), oedema disease (12.5%) and African swine fever (9.5%).

In terms of age-groups, the leading causes of mortalities in piglets and weaners was gastroenteritis followed by respiratory diseases, . in In growers it was oedema disease while in adults it was African swine fever. Based on annual distribution of mortalities, the year 2013 had the lowest number of mortalities while 2018 registered the highest. The number of cases in gastroenteritis cases increased over the ten year ten-year period. Respiratory diseases and Oedema disease had a fluctuating trend while African swine fever had a gradual increase then a drop during the study period. Overall, the study highlights the causes of mortality in pigs, emphasizing the need for urgent mitigation strategies to minimize further losses in this enterprise.

**Keywords: Mortality, African swine fever, oedema disease, respiratory diseases, age groups, trend**

## DR. Jacob M. Wainaina

### COMPARATIVE HATCHERY MANAGEMENT PRACTICES AND ECTOPARASITIC INFECTIONS OF NILE TILAPIA IN HOMABAY COUNTY, KENYA

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#### Abstract

Fish parasites have been known to have an effect on individual fish by causing skin lesions, loss of mucus, anemia, lack of appetite among others. Whether these effects on fish impact or influence aquaculture practices has not been well addressed. A study was conducted in hatcheries in Homabay County, Kenya to assess whether management practices influence occurrence of parasites, income losses and mortalities associated with these parasites. Eleven accredited hatcheries were included in the study where questionnaires were administered. Parasitology samples were collected from all age groups of Nile tilapia in two hatcheries and examined in-situ.

Seventy six percent of samples (738/965) were positive for parasites in hatchery A with super intensive systems relative to hatchery B with a moderately intensive system where 26% (227/965) of the samples had parasites. In hatchery A the management practices included, high stocking densities and constant handling of fish, in hatchery B, the stocking densities and handling was moderate. Most respondents (73%; 8/11) reported to have experienced mortalities in their hatcheries while 27% (3/11) reported no mortalities. The respondents affected by ectoparasites identified Gyrodactylus, Dactylogyrus and Trichodina species through microscopy, as they had in-house diagnostic facilities. Sixty four percent (7/11) did not identify any parasites due to lack of capacity. The rest (27 %; 3/11) had no idea of fish parasites or whether they are an issue to fish farming. Almost half (45%; 5/11) of the respondents admitted to have incurred extra costs due to parasites and biosecurity measures, including buying disinfectants and professional consultation. Two (18%) respondents also admitted to have closed down the hatchery for less than a week due to parasites, while the rest (9; 82%) said they had closed down their hatcheries due to a range of reasons including low production, lack of funds, markets and lack of enough and clean water. From this study, it is evident that parasites have potential to paralyze normal hatchery operations, increase cost of production and management practices influenced occurrence of ectoparasites. Thus, hatchery owners should invest in preventive measures such as investing in biosecurity measures and routine parasitology sampling to avoid major losses.

**Key words: Biosecurity, Control, Ectoparasites, Gyrodactylus, Hatchery, Trichodina**



# ***POSTER ABSTRACTS***



# POSTER ABSTRACTS

TITLE	SUB THEME	AUTHOR(S)/ PRESENTER(S)	ORGANISATION
Gastrointestinal parasites in captive lions and cheetahs at the Nairobi animal orphanage and safari walk	Wildlife Management and Aquaculture	ASUMTA NJUGUNA	
Comparative analysis of nutritional composition in different life stages of black soldier fly larvae ( <i>hermetia illucens</i> ) and their frass derived from poultry manure.	Current Advances in Livestock Production and Health	Bett, R.C. and Kibegwa, F.M,	Department of Animal Production, Faculty of Veterinary Medicine, University of Nairobi
Experimental infection and treatment of rodent malaria		Boaz P Kemoi	
Condition factor of fish in relation to physiochemical and microbial water quality in ponds in selected counties of Kenya	Antimicrobial Resistance and Animal Welfare	Khaseke N. Cidee <sup>1</sup> , Njagi L. <sup>1</sup> , Mbindyo M. Christine <sup>1</sup> , Nyaga P. <sup>1</sup> , Delamare-Deboutville J. <sup>2</sup> , Ali E. Shimaa <sup>2</sup> and Tarvonpanich S <sup>3</sup> .	<sup>1</sup> Department of Veterinary Pathology, Microbiology & Parasitology, Faculty of Veterinary Medicine, University of Nairobi; <sup>2</sup> World Fish; <sup>3</sup> Norwegian Veterinary Institute.
Gender roles in animal production		Colleta Chepkosgei	
Physiological and biochemical evaluation of <i>mucuna pruriens</i> seed extracts on fertility using male wistar rats		Muthungu W. Joyce <sup>1</sup> , Albert W. Nyongesa <sup>1</sup> , Evans Nyaboga <sup>2</sup> .	<sup>1</sup> University of Nairobi, Faculty of Veterinary Medicine, Department of Veterinary Anatomy and Physiology, <sup>2</sup> University of Nairobi, Faculty of Science and Technology, Department of Biochemistry
Gender equality in the veterinary profession in Kenya	Gender roles in Animal Production	Karani M.A. <sup>1</sup> Sirma A.J. <sup>1,2</sup> , Shepelo P.G. <sup>1,3</sup> , O'Brien M.K. <sup>4</sup> , Sol P. <sup>4</sup>	<sup>1</sup> Kenya Veterinary Association – Women Branch; Nairobi, Kenya <sup>2</sup> Directorate of Veterinary Services, State Department for Livestock; Nairobi, Kenya <sup>3</sup> Clinical Studies Department, Faculty of Veterinary Medicine, University of Nairobi, Kenya <sup>4</sup> Center for Animal Health and Food Safety, University of Minnesota, USA
A study to assess the quality and the factors that influence bacteriological contamination of raw milk in Uganda	Antimicrobial resistance and Animal Welfare	Dr. Kasiiku Mathew Mwebaze	
Windowed ostrich egg culture methods		Makanya AN, Maina JN, Sikiru JA, Mugweru J and Wanjohi M.	Department of Veterinary Anatomy and Physiology, The University of Nairobi, P.O. Box 30197-00100 Nairobi, Kenya.
Description of cattle production systems in different agro-ecological zones of Narok County, Kenya	Current Advances in Diagnosis, Livestock Production and Health	Presenting author: Dr. Wyckliff Ngetich (MVetMed, Ph.D fellow, CSD, UON), Co-authors: Prof. George K. Gitau, Dr. Abuom. T.O and Dr. Gabriel. O. Aboge	

TITLE	SUB THEME	AUTHOR(S)/ PRESENTER(S)	ORGANISATION
Effects of consumption of cassava ( <i>Manihot esculenta</i> Crantz) storage root meals on reproductive performance in female wistar rats	<i>Current Advances in Livestock Production and Health</i>	Presenter: Samwel Wafula, Department of Veterinary Anatomy and Physiology	
Seroprevalence of <i>Taenia saginata</i> cysts in cattle, human hospital cases and Risk Factors for human taeniasis in Kajiado County, Kenya.		Ruphline M. Anyango <sup>1</sup> , Timothy M. Wachira <sup>1</sup> , Gerald M. Muchemi <sup>1</sup>	Department of Public Health, Pharmacology and Toxicology, University of Nairobi, Kenya.
Sero-epidemiology of <i>Coxiella burnetii</i> and associated risk factors in livestock and humans in Isiolo County Kenya.		Wilfred Mutisya <sup>1</sup> , James Akoko <sup>2</sup> , Athman Mwatondo <sup>2,3,4</sup> , Mathew Muturi <sup>2,4,5</sup> , Daniel Nthiwa <sup>6</sup> , Hussein Abkallo <sup>2</sup> , Richard Nyamota <sup>2</sup> , Timothy Wachira <sup>1</sup> , Peter Gathura <sup>1</sup> , Bernard Bett <sup>2</sup>	1 Department of Public Health, Pharmacology and Toxicology, Faculty of Veterinary Medicine, University of Nairobi, Kenya; 2 International Livestock Research Institute, Nairobi, Kenya; 3 Zoonotic Disease Unit, Nairobi, Kenya; 4 Department of Medical Microbiology and Immunology, Faculty of Health, University of Nairobi, Kenya; 5 Faculty of Veterinary Medicine, Dahlem School of Biomedical Sciences, Freie Universität Berlin, Germany; 6 Department of Biological Sciences, University of Embu.
The Consequential AMR in the Environment due to Contamination with waste from Intensive pig farms in Kenya: Potential Public Health Threat		Patrick Muinde <sup>1</sup> , Victor Yamo <sup>1</sup> , Kelvin Momanyi <sup>1</sup> , Monica Maichomo <sup>2</sup> , Moses Olum <sup>2</sup> and Hezron Wesonga <sup>2</sup>	<sup>1</sup> World Animal Protection, Africa Office, Nairobi;  <sup>2</sup> National Veterinary Research Institute, Kenya Agricultural & Livestock Research Organization, Muguga
Analysis of antibiotic dispensing patterns in human and veterinary retailers in three counties of Kenya		Patrick Muinde <sup>1</sup> , Victor Yamo <sup>1</sup> , Beryl Okumu <sup>1</sup> and Dishon Muloi <sup>2</sup>	<sup>1</sup> World Animal Protection, Africa Office, P.O. Box 66580 – 00800 Nairobi <sup>2</sup> International Livestock Research Institute, Nairobi
Management and welfare of dogs kept by the nomadic pastoralists of Amboseli ecosystem		Nyokabi MM <sup>1*</sup> , Kipyegon AN <sup>1</sup> , Gatitu L <sup>1</sup> , King'ori EM <sup>2</sup> , Kibegwa FM <sup>3</sup>	<sup>1</sup> Department of Clinical Studies, Faculty of Veterinary Medicine, University of Nairobi, <sup>2</sup> Veterinary Department, Kenya Wildlife Service, Kenya Wildlife Service, <sup>3</sup> Department of Animal Production, Faculty of Veterinary Medicine, University of Nairobi.
Fish farm management practices and their effect on fish parasitism in Kericho and Bomet counties, Kenya		Finnan O. Ageng'o <sup>1,2*</sup> , Robert M. Waruiru <sup>1</sup> , Philip N. Nyaga <sup>1</sup> and Paul G. Mbutia <sup>1</sup>	<sup>1</sup> University of Nairobi, Faculty of Veterinary Medicine, Department of Veterinary Pathology, Microbiology and Parasitology, P.O. Box 29053-00625, Kangemi, Nairobi, Kenya  <sup>2</sup> Kenya Fisheries Service (KeFS) 13th Floor, NHIF Building, Ragati Road, P.O. BOX 48511, Nairobi 00100 Tel: +254 202 020 191 Email: kefs@kilimo.go.ke



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