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THE KENYA VETERINARY ASSOCIATION 58TH ANNUAL SCIENTIFIC CONFERENCE AND WORLD VETERINARY DAY CELEBRATIONS

24TH - 27TH APRIL, 2024

BOOK OF ABSTRACTS

THEME: "PROMOTING THE ROLE OF VETERINARIANS AS ESSENTIAL HEALTH WORKERS IN A GROWING ECONOMY"

ELBORAN HOTEL- ISIOLO COUNTY, KENYA

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58TH KENYA VETERINARY ASSOCIATION ANNUAL SCIENTIFIC CONFERENCE AND WORLD VETERINARY DAY CELEBRATION: (24TH - 27TH APRIL 2024: EL-BORAN HOTEL)
THEME: "THE ROLE OF VETERINARIANS AS ESSENTIAL HEALTH WORKERS IN A GROWING ECONOMY''

Wednesday 24th April 2024

7.30-8.00 am	Arrival and Registration
8.00-8.30 am	House keeping
SESSION 1: Veterinarians and disease surveillance	
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9:20-9:40am	Livestock disease reporting and response in pastoral areas in northern Kenya - **Derrick Sentamu**
9: 40-10:00am	Sero-prevalence and risk factors associated with Theileria parva infection among calves in Narok County, Kenya - **Wyckliff Ngetich**
10:00-10:20am	**Q&A**
10:20-10:40am	KVB
10:40-11:20am	**Health break**
11:20-1.00pm	OPENING CEREMONY -
1.00-2.00pm	**LUNCH**
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SESSION MODERATOR	
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2:20-2:40pm	Drivers of Antimicrobial use and Resistance in Kenya: Are there innovations for risk mitigation in the Veterinary Practice? - **Joshua Onono**
2:40-3:00pm	Post-market surveillance of selected veterinary medicines in Kenya - **Emily Muema**
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3:20-3:40pm	**Sponsor**
	Break Out session One: Moderator: Dr. Joseph Nginyi
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4:00-4:20pm	Kenya, experiences in use of digital platform on gathering data on antimicrobial use in animals – **Rose Owada**
4:20-4:40pm	Mapping the flow of veterinary antibiotics in Kenya – **Alexina Moranga**
4:40-5:00pm	**Q&A**
	Break Out session One: Moderator: Dr. Joshua Onono
3:40-4:00pm	Fish Parasites of Economic and Zoonotic Potential in Cultured and Wild Fresh Water Systems in Kenya - **Robert Waruiru**
4:00-4:20pm	Potential opportunistic zoonotic bacteria in Kenyan intensive pig farming environments- **Inguyesi Nerea**

4:20-4:40pm	ZoNoH - Preventing zoonoses in Kenya by fostering collaboration in the food system- **Kevin Momanyi**
4:40-5:00pm	**Q&A**
	Health break
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9: 40-10:00am	Role of the Government and Animal Health Professionals in providing and ensuring a sustainable utilization of the donkey economy - **Jane Njuguna**
10:00-10:20am	Increased occurrence of dystocia among free-ranging giraffes (Giraffa camelopardalis) in Kenya - **Francis Gakuya**
10:20-10:40am	**Q&A**
10:40-11:20am	Health break
	Break Out session Two: Moderator: Dr. Nick Langat
9:20 – 9:40am	Differences in Pathogenicity of three Nairobi Sheep Disease virus isolates in mice- **Ithinji G.D**
9: 40-10:00am	Evaluating Resistance of Trypanosoma species isolated from cattle populations in Lambwe Valley, Kenya, to diminazene aceturate (DA) - **Boscoh Kimathi**
10:00-10:20am	Evaluation of molasses-urea feed blocks supplementation on beef cattle steers fed on climate-smart basal diet of Cenchrus ciliaris (Buffel grass) – **Joseph Nginyi**
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1:00 – 2:00pm	Health break
2:00-5:00pm	**AGM**
5:00pm	Health break
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2:40-3:00pm	Changes in redox balance of periparturient goats during the hot-dry season in tropical savannah - **Yahaya, A.A**
3:00-3:20pm	Assessment of performamce of indigenous chicken value chain smallholder farmers under a South Korean Kopia project in Meru County, Kenya: 2020-2022 - **Missi Mutungi**
3:20-3:40pm	**Q&A**
3:40-4:00pm	Prevalence of *Babesia bigemina* and *Anaplasma marginale* infections and their associated risk factors among calves aged 3-12 months in Narok County, Kenya: **Naomi Kibet**
4:00-4:20pm	Determinants of daily milk yield in lactating dairy cows in Kiambu county, Kenya - **Christine A. Were**
4:20-4:40pm	Knowledge, attitudes, practices and effectiveness of aseptic protocols in veterinary surgery in Kenya - **Esther Macharia**
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WORLD VETERINARY DAY THEME VENUE	
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	Registration and assembly Procession Speeches, vaccinations, farmer training

Prevalence of *Babesia bigemina* and *Anaplasma marginale* infections and their associated risk factors among calves aged 3-12 months in Narok County, Kenya

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Introduction: Babesiosis and anaplasmosis are major constraints to livestock production in many developing countries including Kenya. Therefore, their epidemiological data needs to be constantly updated. The current study was aimed at estimating the seroprevalence of *Babesia bigemina* and *Anaplasma marginale* and determine their associated risk factors among calves aged 3–12 months in Narok County, Kenya.

Methodology: A cross-sectional study was undertaken in Narok County, Kenya, between February and May 2023. A total of 402 calves from 76 farms were randomly selected from 8 villages in Sub-Counties of Naroosura Majimoto and Ololulunga. Data on individual calf and individual farm factors was collected via closed-ended questionnaires administered to someone who was involved the calves' management. Blood was collected from the calves and processed for microscopy (smears) and serology (indirect ELISA using monoclonal antibodies), respectively. Descriptive analysis was performed for both categorical and continuous variables. Mixed effect logistic regression analysis was used to determine the association between seropositivity of the various risk factors with the random effect being the farm.

Results: The overall estimation seropositivity of *B. bigemina*, *A. marginale* and mixed infections of *B. bigemina* and *A. marginale* was 60%, 60% and 38.1% respectively. The overall prevalence on microscopy for *B. bigemina, A. marginale* and mixed infections of *B. bigemina* and *A. marginale* was 22.9%, 32.6% and 11.4%, respectively. Factors significantly associated with the seropositivity of the infections were increase in age (OR=2.736 for *A. marginale*, 3.030 for *B. bigemina* and 2.073 for *A. marginale/B. bigemina*), calves that receive acaricide treatment (OR=0.445 for *A. marginale* and 0.536 for *A. marginale/B. bigemina*) and infection history on the farm (OR=3.803 for *A. marginale/B. bigemina*).

Conclusion: The seroprevalence of *B. bigemina* and *A. marginale* was relatively high. Control and prevention efforts should be enforced to reduce the risk of clinical diseases from the hemoparasites.

Key words: *Babesia bigemina*; *Anaplasma marginale*; seroprevalence; calves; risk factors, Narok

Mapping the flow of veterinary antibiotics in Kenya

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Introduction: To effectively regulate and ultimately reduce antibiotic use in the animal sector, a good understanding of the flow of veterinary antibiotics in the country helps to identify strategic nodes in the chain for targeted interventions. The study aimed to map the flow of veterinary antibiotics from import to end-user and identify the relevant governance mechanisms.

Methodology: A mixed methods approach was used to collect data in three Kenyan counties (Nairobi, Kiambu, and Kajiado). Focus group discussions (n=23), individual interviews (n=148), and key informant interviews (n=10) were conducted.

Results: The key actors identified include the Veterinary Medicines Directorate (VMD), primary wholesalers, secondary wholesalers, retailers, animal health service providers (AHSPs), and farmers. Kenya imports 100% of its antibiotics: primary wholesalers import antibiotics as either finished pharmaceutical products or active pharmaceutical ingredients after approval by the VMD. Secondary wholesalers play a major role in the distribution of antibiotics from importers to farmers, AHSPs, and retailers. Despite the presence of various laws and regulations governing the veterinary pharmaceutical business, implementation has been challenging due to financial and human resource constraints.

Conclusion: Together with challenges in accessing veterinary services, this contributes to over-the-counter sale of antibiotics without prescription, unlicensed businesses selling antibiotics, illegal importation, and the presence of counterfeit drugs.

Keywords: antimicrobial, Africa, distribution, governance, LMIC, policy, supply

The Wild Meat Trade in the Nairobi Metropolitan Area

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Introduction: In the tropics, rural and peri-urban communities harvest wild meat for subsistence, but also supply it to distant urban centers. Interactions with wild meat during supply, however, put value chain actors, and the urban centers at the risk8 of infectious pathogen spillover from wild animals, or their meat. A better understanding of the value chain's operations and its actors could help mitigate the risk of pathogen spillover along the chain.

Method: A cross-sectional qualitative survey approach with key informant interviews was used to map the wild meat value chain of the Nairobi Metropolitan Area (NMA), a rapidly urbanizing city region in sub-Saharan Africa. We aimed to understand the structure, governance, actors involved and their motivations, wild animal species targeted, and the value chain's temporal and spatial dynamics.

Results: Wild meat was harvested from peri-urban areas of the NMA, consumed or sold locally, or supplied to distant urban centers including Nairobi City. The value chain had three main nodes: a harvester, trader, and consumer nodes. Lack of food, wild animal availability, and anticipated profits, among others, incentivized actors to participate in the value chain. Value chain activities increased during the dry season, and sometimes during Christmas period The value chain operated informally, creating a 'rules in use' framework.

Conclusion: This pioneering study provides insights into the operations of an illegal urban wild meat supply chain in the tropics. Our data can be leveraged when designing urban public health policies towards mitigating the risk of pathogen spillover through the value chain actors. The actors demonstrated here are a risk group for pathogen spillover based on their roles along the value chain. We recommend more

research efforts towards understanding their practices, beliefs, and perceptions regarding potential health risks from wild meat.

Keywords: *Bush meat, poaching, governance, zoonotic pathogens, foodborne pathogens*

Determinants of daily milk yield in lactating dairy cows in Kiambu county, Kenya

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Introduction: Small scale farming is pivotal to the Kenyan economy with a substantial percentage of these farmers engaging in dairy farming as the main livelihood. Dairy cattle productivity is critical in ensuring profitability of small holder dairy enterprises. However, milk production is hindered by many factors, including inappropriate breed selection, poor nutrition, endemic infectious diseases and conditions such as gastro-intestinal parasitism. This study was carried out to identify the factors associated with daily milk yield in smallholder dairy cows in Kiambu County, Kenya.

Methodology: On-farm questionnaires were administered to farmers in 62 randomly selected farms to capture farm and animal-level demographic data. 196 lactating dairy cows within the 62 farms were assessed. Descriptive statistics and multilevel mixed-effects linear regression model was considered at analyses.

Results: The mean daily milk yield per cow was 10.8 ±4.8 Liters. (range of 1-24 Liters) In the final multilevel mixed-effects linear regression model, feeding the cows yeast products increased daily milk yield by 7.56 L/d compared to those not supplemented (β=7.56, 95% CI 3.66- 11.45); Cows feeding Napier grass, hay and dairy meal had 3.68 L/d, (β=3.68, 95% CI 0.89- 6.46); 2.73 L/d, (β=2.73, 95% CI 1.32-4.12), and 2.16 L/d, (β=2.16, 95% CI 0.88- 3.44), respectively, increase in daily milk yield. In an interaction term, for cows with a body condition score ≥3, daily milk yield increased when fed wheat bran, with no significant difference when the score was less than 3. There was an increase in the daily milk yield of 0.25 L/d for every additional unit in herd size. Factors negatively associated with milk yield included: Cow Breed (β= -2.66, 95% CI -4.59 to -0.08); positive California Mastitis Test score (β= -1.23, 95% CI -1.81 to -0.64); and

Days in milk (β= -0.01, 95% CI -0.008 to -0.004). Ayrshires were associated with a 2.66 L/d decrease in daily milk yield compared to the Friesian.

Conclusion: The most significant management variable that affects milk production was feeding, breed of the animal, number of days in milk and the presence of mastitis on one or more quarters.

Keywords: Smallholder dairy, daily milk yield, lactating dairy cows, productivity, feeding

Enhanced Surveillance of Avian Influenza Viruses (AIVs) among domestic and wild birds in Kenya, 2021-2023

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Introduction: Highly pathogenic avian influenza virus (HPAI) has never been reported in Kenya. In 2017, H5N8, a form of HPAI, was first reported in Uganda among domestic and wild birds along the shores of Lake Victoria. Due to the imminent risk, Kenya needed to scale up surveillance activities. In 2021, the Directorate of Veterinary Services started conducting active surveillance in Live Bird Markets (LBMs) and among migratory birds to complement passive syndromic surveillance and assess introduction and circulation of AIVs.

Methodology: Oropharyngeal and cloacal swabs from poultry in Live Bird Markets (LBMs) in selected counties were collected monthly. Feacal samples from wild birds along selected lakes were collected. All specimens were tested for Influenza A virus by real-time reverse transcriptase polymerase chain reaction (rRT-PCR). Viral subtyping for H5, H7 and H9 was performed on influenza A positive samples using rRT-PCR.

Results: For the period, 7,603 samples were collected from LBMs and tested. 1,247/7603 (16.4%) were positive for Influenza A. From wild birds, 4,601 feacal swabs were collected. 20 were positive for Influenza A- 0.43%. None of the specimens were positive for H5 and H7 subtypes. Subtyping for H9 is ongoing. However, preliminary reports indicate that most of the positive samples are H9 subtypes.

Conclusion: The augmentation of active surveillance of Avian Influenza viruses to passive syndromic surveillance has contributed to situational awareness of the AIVs strains in circulation. The detection of Influenza A viruses and H9 subtypes poses a threat to both poultry and human health.

Key Words: Kenya, Avian Influenza Virus, Surveillance, Live Bird Markets, Migratory birds, H9 Subtypes.

Role of the Government and Animal Health Professionals in providing and ensuring a sustainable utilization of the donkey economy.

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Introduction: Following the ban on donkey slaughter in 2020, mainstream media has reported cries from donkey owners due to theft of donkeys. This has reached the policy makers, researchers, civil societies and law enforcement officers. The social economic importance of donkeys has always been underestimated and its only in the last ten years that the growth of donkey skin trade more so to China has been recorded. Gelatin a byproduct from donkey skin has been on high demand for the manufacture of Ejiao which is an anti-aging product. Donkeys are the mode of transport in the rural areas especially during the rains when the roads are impassable. Donkey is of great importance to women in transporting farm produce to the markets and fetching water for domestic uses. This has led to a high demand for donkeys thus increasing the price of donkeys.

Methodology: A systematic review of case reports of stolen and/ rescued donkeys, government and other stakeholder reports on donkey population, reproduction and contribution to livelihoods was conducted.

Results: The population of donkeys as per the 2019 population census was roughly 1.8 million but after the operation of the donkey slaughter houses that had been licensed by the Government, the population dwindled to 1.1 million. This is due to the low fertility of the donkeys and lack of measures to exploit the resource sustainably. Also there has been an increase of donkey thefts and bush slaughter with the meat ending up in our markets thus exposing the population to meat-borne diseases. During this slaughter, the donkeys are subjected to inhumane practices as stunning doesn't take place.

Conclusion: Various stakeholders in the donkey industry play different crucial roles to ensure the sustainability of donkey economy and measures taken to ensure the welfare of donkeys is guaranteed. Look after your donkey and the donkey will look after you.

Keywords: donkey, donkey skin, bush slaughter, theft, ban, Donkey economy, livelihoods

Post-Market Surveillance of Selected Veterinary Medicines in Kenya

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Background: Veterinary medicines are used in the treatment, control, and prevention of animal diseases, therefore mitigating the spread of infectious zoonotic diseases among animal and human populations. Sadly, substandard, and falsified medicines affect the efficacy of medicines and can lead to antimicrobial resistance (AMR). The quality of medicines can be compromised in manufacturing and distribution processes. This study evaluated the quality of selected veterinary medicines at various levels of the distribution chain in the market in six counties to assess their quality status for appropriate interventions.

Methodology: A cross-sectional study design and purposive sampling method were used to select the study areas, collection sites, and the studied veterinary medicines. Retail veterinary pharmacies (agrovet) were used as collection sites. A total of 96 samples were collected from Busia, Kajiado, Kiambu, Narok, Taita Taveta, and Garissa between November and December 2022. All samples were reviewed for product information and tested for quality using USP 44-39NF 2021 and USP 81 2021 methods at the Department of Public Health, Pharmacology, and Toxicology (PHPT), University of Nairobi. Oxytetracycline powder, Oxytetracycline solution, Albendazole, Procaine Penicillin, and Dihydrostreptomycin combinations were antibiotics analyzed.

Findings: The identified quality issues of the medicines included missing literature inserts and critical information such as withdrawal periods, storage instructions, name and address of the manufacturer, manufacturing and expiry dates, and batch/lot number. The laboratory results indicated that 36% of the samples failed compliance specifications of USP 44-39NF 2021 and USP 81 2021.

Conclusion: Insufficiency of the active ingredient was a major finding in this survey coupled with a lack of adherence to labeling guidelines as provided by VMD. More post-market surveys should be conducted to ensure the quality, safety, and efficacy of veterinary medicinal products in the market.

Keywords: Post-Market Surveillance, Product Information Review, Post market authorization, Veterinary Medicines.

Changes in Redox Balance of Periparturient Goats During the Hot-Dry Season in Tropical Savannah

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Introduction: The study underscores the impact of redox balance of malondialdehyde (MDA), catalase (CAT), glutathione (GPx), and superoxide dismutase in periparturient Red Sokoto (RSG), Sahel (SHG), and West African Dwarf (WAD) goats during the hot-dry season in tropical Savannah.

Methodology: Thirty multiparous cycling does that comprised ten (n = 10) each of RSG, SHG, and WAD were used for the study. They were bred during the last week of December such that the periparturient period coincided with the peak of the hot-dry season (March and April) following an appropriate synchronization protocol. Blood samples were taken from the does during pre-gestation and then once per week during the periparturient period for analysis of oxidative stress biomarkers.

Results: Meteorological parameters were above the critical limit established for tropical goats. In general, the mean serum MDA concentration (µmol/L) was significantly ($P < 0.05$) higher in RSG during the parturition week (13.01 ± 2.28) compared to values obtained during the prepartum week 3 (9.87 ± 1.05) and postpartum week 3 (11.24 ± 2.15). However, the CAT (µmol/L) activity was significantly ($P < 0.05$) lower during the parturition week in RSG (5.94 ± 1.09) compared to the SHG (7.85 ± 1.27) and (9.17 ± 1.48). Similarly, the SOD activity (µmol/L) was significantly ($P < 0.05$) higher in RSG (5.02 ± 0.23) during parturition compared to the WAD (2.71 ± 0.44) and SHG (3.40 ± 0.48)y. The SOD was lower during pre-gestation in RSG compared to prepartum and parturition weeks. At prepartum week 1, WAD had significantly ($P < 0.05$) higher serum GPx (µmol/L) activity (12.32 ± 1.36) compared to the RSG (8.69 ± 0.71) and SHG (11.38 ± 1.15).

Conclusion: The breed of goat and parturition period significantly influenced the oxidative status of Nigerian goats during the hot dry season.

Keywords: Periparturient; redox balance; breed of goats; heat stress

Assessing the Health and Wellness of Rescued Donkeys: A Case Study from the KSPCA Shelter n Naivasha, Kenya

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Introduction: Export donkey slaughter houses were closed in 2020 however, the trade of donkey skins continues. It is suspected that the skin and meat of donkeys slaughtered in the bush is destined for lucrative black markets in Nairobi due to rising cost of beef. Ndeiya in Limuru Sub County, Kiambu County has been the epicentre where over 4,000 donkeys have been slaughtered. Between April – June 2023 KSPCA and Brooke EA rescued approximately 300 donkeys form the bush slaughter and sheltered them at KSPCA grounds in Naivasha. 170 deaths have been reported dead since the rescue. This necessitated a health and welfare assessment of the rescued donkeys to understand the deaths and take programmatic decision.

Methodology: Non-probability sampling of 10 donkeys was undertaken based on their duration of stay at KSPCA and level of weakness. From each of the identified donkeys, a blood smear, whole blood, and faecal samples were submitted for analysis. The smear and whole blood samples were processed to assess blood cell morphology, presence of blood parasites, full blood count, while faecal samples were analysed for faecal egg count, flukes, lungworms, and bacteria presence.

Results: Donkeys of varied ages had poor body condition (score 1.5 - 2). The feeding regime included dry fodder, wheat bran, pollard and horse meal and access to water ad libitum. Anisocytosis was observed in 60% of the blood smears indicating the donkeys were anaemic. Neutrophilia was observed in 80% of the blood samples indicating possible bacterial infection. No blood or intestinal parasites were seen in any of the smears or faecal samples respectively.

Conclusion: The poor body condition score and prevalence of anaemia highlights the need for feed analysis and provision of quality feeds to address possible nutritional deficiencies. Furthermore, the possible bacterial infection highlights the importance of thorough veterinary care and biosecurity measures to prevent incidence and spread of bacteria. Laboratory confirmation of specific bacteria is

advised for targeted antimicrobial use. Allowing smaller groups to feed at a time could benefit weaker animals not feeding adequately.

Key words: Donkey, Rescue, slaughter, transportation, wellness.

Differences in Pathogenicity of three Nairobi Sheep Disease virus isolates in mice

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Introduction: Nairobi sheep disease (NSD) is a tick borne viral disease of sheep and goats that causes high morbidity and mortality in sheep and goats with a fatality rate up to 90% in naive herds. The disease is characterized by severe gastroenteritis in sheep and goats resulting in significant morbidity and mortality in naïve small ruminant populations. Vaccine platform to develop efficacious vaccine against the Nairobi sheep disease virus have not been successful.

Methodology: This research was a comparative study on infection, immunogenicity, and protection of three different Nairobi sheep virus isolates in mice. The three isolates are marked with differences in their ability to cause disease in suckling mice model.

Results: Fatality rates ranged from 0-50% from the seemingly less virulent isolate to the most virulent isolate and this was also demonstrated by relative time to death. Determining the immune responses elicited by different Nairobi sheep disease virus isolates in mice will facilitate development of vaccine candidates for NSDV.

Conclusion: This study demonstrates that NSDV isolates do present varying virulence in suckling mice. Further studies will determine whether this observation is true in the virus definitive hosts and if virulence is related to immunogenicity.

Key words: Nairobi sheep disease virus, virus isolates, virulence, immunogenicity

Assessment of Performamce of Indigenous Chicken Value Chain Among Smallholder Farmers Under a South Korean Kopia Project in Meru County, Kenya: 2020-2022

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Introduction: Adequate, nutritious and safe food is a basic human need. A food security project was implemented in Meru County with support from the Republic of South Korea between January 2020 and December 2022. Its objective was to improve the performance of indigenous chicken value chain among smallholder producers. Despite the existence of high demand for Indigenous chicken, market supply remained low.

Methodology: The study was conducted in September/October 2022 in all the 4 project villages; Ng'onyi, Mbaria, Ntalami and Kangeta. 150 households were sampled out of a target population of 800 households (200 per village). Households were randomly selected from amongst those who were still actively involved in project activities. Detailed information was collected from the respondents using semi-structured questionnaires. A focused group discussion consisting of 9 farmers from Mbaria model village was carried out using semi-structured protocols. Since the available baseline data were inadequate, recall method was used to collect supplementary data for the period before the project.

Results: The farmers identified inadequate knowledge, poor genetic material, high disease incidences and poorly developed market infrastructure as the main challenges facing the Indigenous chicken value chain. The average household total annual revenue from eggs (tray) rose from Ksh15583.3 before, to Ksh133588.7 after intervention. The quantity of eggs sold in trays increased from 54.4 to 193.7, while those sold in pieces increased from 482 to 969. The number of hens sold increased from 17 to 29, and, that of cocks sold doubled from 15 to 30. However, all the variable cost components increased during the intervention period. Broilers Mash witnessed the biggest increase in cost by 217.6% from Ksh 1358.9

before intervention to Ksh 2956.5. Despite a rise in the total variable cost by 213%, the average annual gross margin rose from Ksh.7092 to Ksh 91523.

Conclusion: Based on the obtained results, it was concluded that implementation of the Indigenous chicken project (mainly increased training, supply of high quality chicks and vaccines) helped to improve both production and household incomes of the targeted farmers.

Key words: Indigenous Chicken, Assessment, performance, KOPIA project, implementation

Phytochemical, Elemental, and Proximate Analysis of *Fadogia Andersonii* Robyn Root Extract

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Introduction: The presence of numerous bioactive phytoconstituents in plants is widely accepted for its therapeutic relevance in curing several diseases. *Fadogia andersonii* (*F. andersonii*) is an ethnomedicinal plant used to manage many diseases in Africa with limited information on its bioactive constituents. This study was designed to determine the phytochemical constituents, elemental, and proximate analysis of *F. andersonii root*.

Methodology: This study was carried out using standard procedures of Gas chromatography-mass spectrophotometer (GC-MS), Fourier transform infrared (FTIR), Atomic absorption spectrophotometer (AAS), and proximate analysis for phytochemical constituents, functional groups, elemental, and proximate analysis respectively.

Results: The GC-MS analysis reveals the presence of 40 different phytochemical constituents each with proven pharmacological activity. The FTIR analysis indicates the presence of hydroxyl, alkyl, alkene, carboxyl, and carbonyl functional groups. The AAS analysis for Fe, K, Mn, Zn, Ca, Na, and Cu in part per million (ppm) were 4.336, 38.00, 12.151, 17.388, 3.860, 18.00, and 0.020. Proximate analysis of *F. andersonii* root indicated the presence of Moisture (5.65 %), ash (4.33 %), lipid (6.19 %), Fibre (35.23 %), and carbohydrate (45.10 %).

Conclusion: This part of the plant is proven to contain essential nutrients, and has potential health benefits.

Keywords: *Fadogia andersonnii*, phytochemical analysis, elemental analysis, Proximate analysis,

Molecular Detection and Risk Factor Analysis of Rotavirus Infections in Piglets From Kiambu, Kenya.

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Introduction: 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 determined risk factors associated with infections in Kiambu County.

Methods: Two hundred and fifty-five fecal samples from 52 farms were collected from clinically healthy piglets aged three months and below. Molecular detection of rotavirus groups was done using reverse transcription polymerase chain reaction (RT-qPCR). Questionnaires were administered to pig farmers and risk factors analyzed.

Results: 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. RT-qPCR offered the 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.

Conclusion: porcine rotavirus A and C are circulating in pig farms in Kiambu and early detection 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, Molecular detection, Porcine.

Livestock Disease Reporting and Response in Pastoral Areas in Northern Kenya.

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Introduction: Livestock plays an important role in the lives of pastoralists, whose entire livelihoods are structured around benefit from animals. One of the major constraints for pastoral production is livestock diseases, and the available disease surveillance systems are often difficult to implement under range conditions where pastoralists live. Furthermore, delays in disease outbreak reporting by pastoral communities to animal health workers is also a challenge that affects effective and timely response. This study aimed to investigate animal disease surveillance practices in pastoral areas of Northern Kenya.

Methods: The study was carried out in Laisamis and Ngurunit Wards in Marsabit County. Data was collected on stakeholders within the pastoralists' production systems, their roles and animal health information flow between and amongst them; and methods used to transmit the information and their strengths and challenges.

Findings: The results revealed an evolution from past methods used in disease outbreak reporting by communities from use of smoke, fire and walking on foot to report disease outbreak, to the present-day methods including riding on motor bikes, vehicles and use of mobile phones in passing the information on outbreaks. Furthermore, it describes evolution in livestock disease response pathways from solely relying on herbs to utilisation of animal health workers and modern synthetic drugs to respond to disease outbreaks in communities. The stakeholders involved in disease reporting and response have changed over time and new roles have been created with the expansion of the network for disease reporting and response.

The major needs expressed by the pastoralists included: information on prevention, control and management of livestock diseases, bringing agrovets closer to communities and faster response to reports of disease outbreaks.

Conclusion: an effective disease reporting and response system, requires utilisation of the roles and links among various stakeholders involved in this network.

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

Prevalence of cattle mastitis and antimicrobial susceptibility of its bacterial causes in Kiambu County, Kenya

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Introduction: Cattle mastitis refers to inflammation of mammary gland occurring in clinical or subclinical form. Prevalence, risk factors of mastitis and antimicrobial susceptibility of its causative bacteria among cows in Kiambu County were determined in this cross-sectional survey. Clinical mastitis (CM) was determined by carrying out physical examination of cow udder and milk, while sub-clinical mastitis (SCM) was diagnosed using California Mastitis Test (CMT).

Methodology: Risk factors were identified through the administration of a semi-structured questionnaire to 34 farmers and assessment of 91 milking cows. Bacteria were identified by culturing 362 udder quarter milk samples (either CMT positive or negative) and susceptibility of 13 *Staphylococcus*, 8 *Streptococcus* and 4 E. *coli* isolates to 7 antimicrobials determined using Kirby-Bauer disc diffusion test.

Results: Two forms of mastitis namely clinical and subclinical were identified among cattle in Kiambu County. Prevalence of CM was 4.4% (4/91) and that of SCM was 62.6% (57/91) giving an overall prevalence of 67% (61/91). With regard to management related risk factors of mastitis all the cows with clinical mastitis were being reared under complete zero grazing system and were subjected to poor milking hygiene. Prevalence of SCM was affected by management and cow specific risk factors where it was highest among cows under zero grazing system, Friesians, at late stage of lactation, those pregnant and subjected to poor milking hygiene. Out of 131 bacterial isolates majority 73/131 (55.7%) were staphylococci, followed by streptococci (33.6%) and E. coli (10.7%). All three bacterial isolates had 100%

susceptibility to gentamycin. E. coli was 100% susceptible to the six antimicrobials tested except cotrimoxazole with 50% susceptibility. Cotrimoxazole had highest resistant.

Conclusion: Gentamycin is the drug of choice for the study site. In order to reduce prevalence of mastitis in Kiambu there is need for application of an appropriate control strategy.

Key words: Breeds, Risk factors, Staphylococcus, Streptococcus, Sub-clinical mastitis

Improving livelihood of Kenyans!

Evaluation of molasses-urea feed blocks supplementation on beef cattle steers fed on climate-smart basal diet of *Cenchrus ciliaris* (Buffel grass)

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Introduction: A study was carried out on beef steers to investigate the effects of supplementation of molasses-urea mineral block (MUMB) on their weight gain, feed intake, feed conversion efficiency, and manure quality between September and December 2022.

Methodology: Twenty-four steers with an average age of 1.5 years and a live body weight of 250 kg were randomly selected and divided into four treatment groups with six animals each. The animals in Treatment 1 were fed a basal diet of buffel grass only, Treatment 2 a diet of 210g of + buffel grass, Treatment 3 fed 420g + buffel grass, and Treatment 4 consumed 630 grams of with buffel grass hay. The feeding trial was conducted for 98 days, during which daily feed intake and weekly body weight gain were monitored.

Results: Treatment 4 had the highest average daily weight gain of 259 grams, while Treatment 1 had the lowest average daily gain of 145 grams. Similarly, Treatment 4 had the highest total dry matter intake per day of 6.44kg, while Treatment 1 had the lowest dry matter intake of 5.97kg. Lastly, the manure quality of animals in Treatment 4 had the highest mineral composition making it the best for improving soil quality.

Conclusion: MUMB supplementation to beef steers provided them with an affordable source of Non-Protein Nitrogen (NPN), minerals, energy, and vitamins, that improved feed conversion efficiency and manure quality.

Key words: Molasses-urea feed blocks, ***Cenchrus ciliaris*****,** beef cattle, supplementation

Increased occurrence of dystocia among free-ranging giraffes (*Giraffa camelopardalis*) in Kenya

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Introduction: Free ranging giraffes are faced with a myriad of challenges, which include shrinking browsing range, recurrent and prolonged droughts. Reproductive problems have been rare because of their natural selection against maternal and fetal predisposing factors. Before 2012, only one case of dystocia in free-ranging giraffe was reported in Kenya. Since then, an increased occurrence has been noticed. This study investigated the spatial and temporal occurrence of dystocia in giraffes in Kenya through review of recorded cases between 2012 and 2023. Further, it investigated the most common types of dystocia and the outcomes of intervention through obstetrical manipulation.

Methodology: A total of 17 cases were reported during the study period. The cases were recorded in Masai Mara, Lake Nakuru N.P. Naivasha, Meru N.P., Mpala Ranch, Nairobi N.P., Ol Pejeta Conservancy, Solio Ranch, Soysambu Conservancy and Game Ranch, Machakos. All the 3 giraffe sub-species found in Kenya (Masai, Reticulated and Rothschild) were affected.

Results: The study revealed that cases of dystocia were mainly due to fetal factors. Success of relieving dystocia with positive outcomes for the dam was 75% but none of the calves survived. Prompt detection, reporting and veterinary interventions were observed to increase the survival rates of dams during obstetrical manipulation. The study established that there is a temporal and spatial increase in dystocia cases, possibly due to nutritional-associated diseases.

Conclusion: There is an increased likelihood of occurrence of other reproductive conditions including irregular estrus cycles, low conception rates, abortions, and still births which can have significant impacts on the giraffe population. With free-ranging giraffe population on the decline with reports of up to 80% decline in some populations, these findings can play a significant role in informing mitigation measures towards reversing this trend.

Key words: giraffes, dystocia, reproductive problems, fetal factors, obstetrical manipulation

Potential opportunistic zoonotic bacteria in Kenyan intensive pig farming environments

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Introduction: Pig farming environments, with their diverse microbial communities, harbor commensal bacteria that, beyond their benign existence, are recognized as potential zoonotic pathogens and carriers of antimicrobial resistance which pose a grave threat to global public health. In intensive pig farms, the combination of high bacterial load and strong antimicrobial pressure promotes the emergence of resistant bacteria. This coupled with the close proximity of humans to animals and utilization of wastewater and raw manure on farms has led to the transfer of antibiotic resistant bacteria either to other animals, farmers and residents of the surrounding area or the environment including air, soil and water. The One Health concept stresses the ecological relationships between human, animal, and environmental health. Applying this approach allows for consideration of both pathogenic and non-pathogenic microbial transfer between humans, animals, and the environment. This cross-sectional study aimed to detect potentially opportunistic bacteria in the environment of selected intensive pig farms around Kenya.

Method: Soil, water and boot sock samples were collected from the environment of 16 purposively selected intensive pig farms. Bacterial culture and identification by MALDITOF-MS identified 24 genera of potentially emerging zoonotic pathogens and commensals of which *Citrobacter* spp and *Proteus* spp were the most frequently isolated.

Results: Sediment and bootsock samples yielded the majority of these bacteria. From this study, pig farm environments are shown to be potential reservoirs of opportunistic bacteria, particularly those that can complicate the landscape of infectious disease management as well as hospital infections and recovery.

Key words: Commensals, environment, microbiome, pigs and zoonotic

ZoNoH - Preventing zoonoses in Kenya by fostering collaboration in the food system

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Introduction: Globally, the risk of zoonotic pandemics is increasing, with Kenya experiencing high prevalence of zoonoses, impacting human and animal health and posing a significant socio-economic burden. Despite the critical role of One Health, operationalizing it at local levels and integrating it within local governance remains a challenge, with limited efforts in bridging food system approaches to health beyond food and nutrition security. Moreover, social sciences remain underrepresented in One Health literature.

Objective: The ZoNoH project aims to bridge these gaps, aligning with Kenya's national One Health strategy to enhance local One Health governance through support to County One Health Units (COHU), which are local platforms bringing together One Health key stakeholders from one county.

Approach: ZoNoH is designing a hands-on service equipping COHUs to better manage zoonoses within their food systems, aiming to prevent future pandemics. Service objectives: to foster One Health and Food Systems operationalization; make existing data on impacts of zoonoses accessible to COHU members; and support the co-creation of contextualised zoonoses management strategies. An interdisciplinary team outlines the service through iterative process comprising: prioritizing a zoonotic challenge by COHU members; analyzing its food system impact, identifying leverage points, exploring scenarios for a desirable future, prioritizing pathways of change, and developing an action plan. This involves workshops and desk research across multiple disciplines.

Conclusion: The service will undergo peer review and testing with two COHUs, aiming to enhance One Health governance and support Kenya's leadership in operationalizing One Health in food systems, benefiting humans, animals, and our environmental.

Key words: County One Health Units, zoonoses, One Health governance

Fish Parasites of Economic and Zoonotic Potential in Cultured and Wild Fresh Water Systems in Kenya

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Introduction: Fish are aquatic animals with high economic and nutritive value. They have high quality protein and poly-unsaturated fatty acids which are good for human health. In Kenya, fish provide food and income to many communities through trade and employment. Fish production in the country was highest in 2015 where at 163,824 metric tonnes but has declined over the years with the lowest of 146,543 metric tonnes recorded in 2019. The decreased production is mainly attributed to high cost and unavailability of quality fish feeds and inadequate supply of certified quality seed and diseases caused by bacteria, viruses, fungi and parasites. This review documents parasites in freshwater fish in Bomet, Homa Bay, Kericho, Kiambu, Kirinyaga, Kisumu, Nakuru, Nyeri and Taita Taveta counties between 2006 to 2023.

Methodology: Over 2,000 cultured and wild tilapia and catfish were purchased from grow-out farms, cages and fishermen from lakes Jibe and Victoria, and River Tana. These fish were euthanized, necropsied and examined for parasitic infestations by gross and light microscopy.

Results: Ectoparasites of economic importance from the skin were protozoan genera *Trichodina*, *Ichthyophthirius* and *Ichthyobodo*; Leeches (*Pisciola* spp.), fish lice (*Argulus* spp.). Monogeneans were, *Gyrodactylus*) (skin) and *Dactylogyrus*) (gills). Endoparasites included trematodes in the eyes (*Diplostomum* spp.) and skin/muscle (C*linostomum* spp*., Neascus* spp.) and blood protozoa (*Trypanosoma* spp.). Parasites with zoonotic potential were the nematode, *Contracaecum* spp., trematode (*Euclinostomum* spp.) and acanthocephalan (*Acanthocephalus* spp.).

Conclusion: Fish parasites are an important limiting factor in fisheries and aquaculture productivity as they cause massive mortalities, reduced growth rates and fish condemnation at inspection.

Key words: *Contracaecum*, earthen pond, *Euclinostomum*, Jipe tilapia, Nile tilapia, *Trichodina*

Experiences in use of digital platform on gathering data on antimicrobial use in animals

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Introduction: In Kenya and many other parts of the world, intensive animal production has been associated with increased use (AMU) and misuse of antimicrobials in animals, leading to the development of antimicrobial resistance (AMR). Currently AMR crisis is a global health threat due to diminished effectiveness of antimicrobials.

Methodology: World Organization for Animal Health (WOAH/OIE) gathers AMU data from 157 countries. This data is digitalized in online platform known as ANIMUSE (ANImal antiMicrobial USE) with features for reporting, checking, calculation of quantities, visualization, analysis, and communication. This presentation focuses on experiences and challenges on AMU data collection in Kenya.

Results: Kenya submits data on AMU annually since 2016. According to WOAH ranking, AMU in Kenya was steady from 2017 to 2019 but increased significantly in 2020 then reduced in 2022. During the period 2017 to 2019, total AMU was about 65,000, 74,000 and 66,000 kg respectively but in 2020 it increased to 417,000 kg. The antimicrobials imported to Kenya include tetracyclines, cyclic polypeptides, penicillins, aminoglycosides, cephalosporins, macrolides and sulphonamides. Kenya uses Option 3 of AMU data reporting, which assumes that all the antibiotics that come into the country through importation are utilized within Kenyan borders. Kenya has no capacity to use option 1 or 2 which are more advanced in terms of tracing AMU, at species level and accounting for entry of antimicrobials through illegal entry, disposal, and export of antimicrobials.

Conclusion: Digital reporting of AMU is critical in the fight against AMR. Kenya should improve her efforts in AMU data collection to advance our reporting options.

Key words: ANIMUSE, AMU, AMR

Sero-prevalence and risk factors associated with *Theileria parva* infection among calves in Narok County, Kenya

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Introduction: East Coast fever, caused by *Theileria parva,* is a devastating disease that causes significant economic losses to cattle production in sub-Saharan Africa. Prevention and control has remained a big challenge in pastoral settings due several reasons such as inadequate epidemiological information. The main objective of this study was to estimate the seroprevalence and the risk factors associated with *T. parva* infection among calves in different production systems.

Methods: A cross-sectional study was conducted on 318 calves. Blood was collected and sera prepared for indirect Enzyme enzyme-linked immunosorbent Assay targeting antibodies against Polymorphic Immunodominant Molecule found on the surface of *Theileria parva*. In addition, data on calf characteristics and management practices were collected during the visit. Descriptive statistics and logistic regression were used to analyze for the potential calf and farm level risk factors such as age, acaricide application among others with a p-value of less than 0.05 being considered significant.

Results: Out of the 318 calves sampled, 12.9% (41/318) were positive for *T. parva*, with a higher proportion in pastoral (36.6%) compared to 34.1% and 29.3% in mixed farming and agropastoral systems, respectively. The calf age (p=0.002), body weight (p<0.001), suckling status (p=0.026), rectal temperature (p=0.06), calves on pasture (p=0.022), other feeds (p=0.004), feed grown within the farm (p=0.004), acaricide application (p=<0.001) and acaricide application frequency (p=<0.001) were significantly associated with seropositivity from univariate analysis. However, from the multivariable mixed logistic model, calf age (OR 0.96, P=0.04), other feeds (OR 8.82, P=0.009), and suckling status (OR 0.38, P=0.05) were found to be significantly associated with *T. parva* infection.

Conclusion and recommendation: We found out that *T. parva* is circulating in cattle herds in the study area. There is a need for molecular surveillance to determine the presence of *T. parva* infection and the burden of the disease.

Key words: *Theileria parva,* Enzyme enzyme-linked immunosorbent Assay

Knowledge, Attitudes, Practices and Effectiveness of Aseptic Protocols in Veterinary Surgery in Kenya

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Introduction: Aseptic techniques are aimed at preventing or reducing microbial contamination in surgery to minimize the risk of post-surgery infection thereby promoting optimal wound healing. Therefore, knowledge and compliance to the recommended surgical preparation procedures is paramount for successful surgical outcomes.

Objective: To determine the knowledge, attitudes and practices of using antiseptics, disinfectants and aseptic procedures and their effectiveness in veterinary surgical practices in Kenya.

Method: Cross-sectional study involving open ended questionnaires and prospective experimental trial to determine the effectiveness of selected disinfectants on common contaminants and bacteria isolated from surgical sites.

Results: (59.2%) respondents found aseptic protocols essential. Protocols included: disinfection (98%,) shaving (93.9%), scrubbing (91.8%) draping surgical field (79.6%), wearing sterile surgical gloves (87.8%), surgical team scrubbing (85.7%). Common antiseptics; povidone iodine (85.7%), 70% ethyl alcohol (85.7%), chlorohexidine 79.6% (n=39). Respondents (75.5%) experienced surgical site infection postoperatively with (91.8%) routinely administering antibiotics postoperatively to prevent surgical site infections. 77.6% experienced poor response to antibiotics therapy with only (16.8%) submitting samples for culture and sensitivity. Postoperative antibiotic resistance (OR=11.419; p= 0.009), and past death following post-operative infection (OR=7.386; p=0.025) were significantly associated with surgical site infections in veterinary patients. 5 out of 145 swab samples collected preoperatively after disinfection were positive for bacterial growth. Comparative antibacterial effectiveness of antiseptics against common surgical site contaminants *Staphylococcus aureus* and *Escherichia coli.* revealed gentamicin more effective than chlorhexidine gluconate (p=0.0005); povidone iodine and chlorhexidine more effective than

laboratory 70% ethyl alcohol (p=0.0312) and (p=0.0552) respectively. Concentrated forms of antiseptics were more effective than diluted forms (P=0.0274). Interestingly, commercial 70% ethyl alcohol was not effective against both bacteria.

Conclusion: There is sufficient knowledge of aseptic protocols whose application is found to be effective in surgical practice if done appropriately.

Key words: post-surgery, infection, Postoperative, antibiotic resistance

Potential resistance of Trypanosoma species in cattle populations of Lambwe Valley, Kenya, to Diminazene aceturate (DA)

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Introduction: Trypanosomiasis is a parasitic disease of humans and animals that occurs mainly in sub-Saharan Africa where it negatively affects livelihoods. The control of trypanosomiasis in animals has for decades relied on the use of trypanocidal drugs that have increasingly reported resistance.

Methodology: A cross-sectional study was conducted in three villages of Lambwe Valley to evaluate resistance to DA. 385 cattle were screened for trypanosomiasis using the buffy coat technique (BCT) and monitored on day 7 and 28 post treatment through the BCT and ITS1-PCR. Cattle that tested positive for one or more species of trypanosomes, were recruited into a block treatment experimental design, with DA at 3.5mg/Kg body weight. They were monitored on days 7 and 28 through BCT and ITS1-PCR.

Results: 4.94% (19/395) of the cattle tested positive for one or more species of trypanosomes. On day 7, no animal tested positive on both BCT and ITS1-PCR. On day 28, 3 cattle tested positive by BCT while on PCR, 4 tested positive.

The relapses encountered on day 28 were either a result of new infections or probable resistant parasites that were not detected in the initial days or appearance of parasite's previously sequestered parts of the body that are not easily accessible by DA.

Conclusion: There is a likelihood resistance to DA, further molecular analysis or drug efficacy experimental trials is recommended for confirmation. Community sensitization on appropriate use of veterinary medicines to avert the development of resistance against veterinary drugs is also recommended.

Key words: Trypanosomiasis, Trypanocides, Drug resistance, Diminazene Aceturate, Block Treatment.

A study of the Companion animal pharmaceuticals purchased across different retail Agrovets in Kenya.

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Introduction: Companion animals play a vital role in the lives of Kenyan households, contributing to social, emotional, and economic well-being. This abstract presents a scientific exploration of the market dynamics surrounding companion animal products sold at the agrovet level in Kenya.

Despite traditionally being overshadowed by agricultural in-puts, this segment has seen surprising growth in recent years with farmers increasing the purchase of companion animal products.

Methodology: Through a comprehensive retail audit done in 1200 agrovets in Kenya between Jan 2021-December 2022. The data was cleaned and analyzed, and reporting was done on PowerBI. This study assesses the types of companion animal products available, market trends, and consumer preferences influencing sales within the retail agrovet in the Kenyan context.

Results: Data evaluation revealed that about 5% of all brand names sold at the agrovet were companion animal specific medicines, making up about 2% of total SKUs. The main drivers of Companion animal health Pharmaceuticals are Ectoparasiticides with a market share exceeding 50%. A notable trend within this niche market is the remarkable growth of companion animal vaccines.

Conclusion: Agrovets, serving as crucial intermediaries, have reported a surge in farmers seeking companion animal pharmaceuticals. This surge is not only indicative of changing consumer behaviors but also aligns with the rising number of breeders, dog and cat demands especially in urban and peri-urban areas.

Key Words: AgriTrack™, Companion Animals, Retail Agrovet, Consumer Preferences

The Need for Veterinarians in Animal Assisted Interventions in Human Health Care Systems.

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Improving livelihood of Kenyans!

Animal Assisted Interventions are increasingly used in health care facilities to alleviate symptoms of many diseases and conditions affecting people and their use has been found to reduce medical care costs. (Beck & Katcher, 1984)

In particular, and of importance is the use of Animal Assisted Interventions in alleviating symptoms of mental illness, in aged peoples' homes, palliative care centres for terminal diseases, in children with autism and in homes for people with Disability. (Creagan, 2002; Fine,2010; Fine &Eisen, 2016)

In many parts of the world the proportion of aged populations is increasing, many of whom do not want to end up in aged peoples' homes. These people often living on their own require companion animals to give them a sense of responsibility as well as to keep them company ((myers, 2006). As the need for companion animals increases, so will there be a need for veterinarians to take care of the health and welfare of these animals. The limited research that has been done has revealed that people who have companion animals are often in better physical and mental health and live longer (Friedman et al,1980)

Animals in Animal Assisted Interventions and companion animals require comprehensive animal health and animal welfare programs inclusive of disease control strategies, regular veterinarians visit to monitor their health and other veterinary related services. The five animal welfare freedoms/five animal welfare domains. (Voogt et al 2023) can only be protected by veterinarians. Further veterinary forensic experts are needed to check animal abuse behavior.

Animals used in Animal Assisted Interventions are often chosen based on certain behaviors and temperaments. It takes the skilled eye of veterinary ethologists to monitor the behavior of these animals over time.

In conclusion, veterinarians remain a key component of essential health care systems.

Key words: Animals; Animal Assisted Interventions; Health care systems, Veterinarians.

Leveraging on Progressvet program to address Veterinary workforce capacity gaps in Kenya as identified in the PVS Gap analysis.

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Launched in April 2019, ProgRESSVet-Kenya is a 12-month educational program addressing continuing education for Kenyan veterinarians, aiming to empower professionals for sustainable economic development. With over 47 participants successfully trained across three cohorts (2019-2022), the program bridges gaps in veterinary service capacity. In Kenya, there is a legal requirement of continuous professional capacity development/ education for Veterinarians so as to enhance Veterinary Service's performance with the ultimate goal of influencing animal health, food safety, and international trade. The program's objectives encompass enhancing local, national, and regional practices related to animal health and food safety, facilitating access to global trade markets, and promoting sustainable socio-economic development. The comprehensive curriculum integrates theoretical and practical learning through a technical Curriculum and a Proposal Development eBook, requiring 120 hours of participant's effort. Since its inception,47 veterinarians across the country have successfully completed the program, reporting significant positive impact to their veterinary practice. ProgRESSVet-Kenya is in the process of recruiting cohort four veterinarians to undertake the training in the coming year and will continue to do so for the next 7 years. This will ensure a continuous buildup of a pool of veterinarians capable of meeting ever increasing demand of veterinary services. Future collaborations with local and international stakeholders will expand, and iterative feedback mechanisms will prioritize local expertise, enhancing the curriculum's impact on Kenya's Veterinary Service Capacity.

Key words: ProgRESSVet, Continuing, Education, Animal health, Food safety

Drivers of Antimicrobial Use and Resistance in Kenya: Are There Innovations for Risk Mitigation in The Veterinary Practice?

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According to the Veterinary Surgeon and Para-Professionals Act, CHAPTER 366, "veterinary medicine**"** includes insecticides, vaccines, hormones, alternative medicines, antiseptics, disinfectants, surgical, nutrients and biological products. These substances are to be handled either by a registered "veterinary surgeon", "veterinary para-professional" or "veterinary specialist" within a veterinary clinic. The Veterinary Medicines Directorate is mandated to regulate manufacture, importation, exportation, handling, advertisement, labelling, sale and disposal of veterinary medicines, and maintain a register of all veterinary medicines manufactured or imported for use in the country or exported from the country. Despite these rules, the country is faced with rampart misuse of veterinary medicines across different livestock production systems; which could act as a driver for development of antimicrobial resistance. A survey among poultry farmers and key informant interviews with "agrovet" operators (veterinary pharmacist) and other players in the veterinary drug value chain in Kenya has revealed that antibiotics constitute a high proportion of veterinary drugs used in farms. These drugs are mostly administered by livestock farmers through water, and leftover drugs can be stored for later use for other sick animals, while some are disposed through incineration. From the same study, there was an increased likelihood for poultry farmers administering self-treatment to sick birds in farms that reported lack of improvements on health outcome for sick birds while on antimicrobial treatment; farms that continued with antimicrobial treatment even when sick birds didn't show signs of improvement from current treatment, and farms that often consulted human pharmacist on diagnosis for sick birds. This review highlights gaps in policy and practice of veterinary medicine, which have implications for antimicrobial resistance.

Is Genome Editing the Solution to The Livestock Sector Challenges

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In low- and middle-income countries, such as Kenya, meat and dairy from goats are critically important sources of protein for the human diet. Gametes (sperm and eggs) are the conduit by which genetic information is transmitted across generations and therefore serve as the source for shaping of genomes with potential for trait improvements.

Because males produce millions of sperm per day, strategies that expand breeding capacity of sires with desirable phenotypes can have major impact on production and resiliency traits of livestock populations on a large scale. This principle has been the rationale for development of artificial insemination approaches and while efficacious in confined operations such as dairy cattle production, adoption in small ruminant production settings has been limited. With innovation in breeding technologies, rapid and tenable progress in production and resilience traits via genetic intervention can be realized.

The Surrogate Sires breeding project involves generation of males that are ablated of endogenous germ cells thereby rendering them incapable of producing their own sperm. This is achieved via CRISPR-Cas9 editing of the evolutionarily conserved gene *NANOS2* that is normally expressed in male germ cells only and inactivation (i.e. knockout) results in male specific sterility. Yet, *NANOS2* knockout males possess testes with proper support cell function to harbor production of sperm from transplanted sperm stem cells that are isolated from testicular tissue of a donor male. Because stem cell transplanted into *NANOS2* knockouts can breed by natural mating, the Surrogate Sires are conducive with pastoral livestock production.

Beyond operationalization of a novel breeding technology in Kenyan goat production, technical capacity for generating CRISPR-Cas9 gene editing livestock is/ will be established at ILRI. This advancement will have future utility in devising genetic solutions to significant problems in Kenyan livestock including disease resistance.

Review of Basic Poultry Farm Biosecurity Practices

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Veterinarians are indispensable champions in ensuring the resilience of the poultry industry, which continues to be one of the most economically significant sectors in Kenya's livestock industry. With the projected population growth and increase in the middle class, poultry consumption and production are expected to rise. However, a myriad of challenges plagues the industry, including disease. Diseases have a huge economic impact due to losses experienced from morbidity, mortality, and trade bans imposed on affected regions, among others. Poor husbandry practices, inadequate extension services, and advancement of antimicrobial resistance further aggravate the disease burden. Due to the impact of diseases, farmers must establish infection prevention measures. Biosecurity practices help prevent the introduction, establishment, or spread of infection or disease. Critical control points in farms, such as source of products and inputs, entry to sites and sheds as well as movement within the site, must be closely monitored to prevent introduction and spread of diseases. Other important biosecurity practices include the presence of fences, lockable gates and doors, footbaths with disinfectants and proper cleaning and disinfection. Veterinarians play a pivotal role in disseminating biosecurity practices and promoting a culture of proactive disease management among poultry farmers and industry stakeholders. Therefore, empowering veterinarians with the knowledge and tools to foster the implementation of biosecurity protocols will hasten the shift toward sustainable, resilient poultry production systems.

Keywords: Biosecurity, Animal health, Disease resilience, Veterinarians, Capacity building

Learning from Emergency Livestock Projects: How to Gather Better Evidence of Impact: Video Presentation

Julius Kajume & Kisa Ngeiywa.

This is a Livestock Emergency, Guidelines and Standards (LEGS) video which highlights that best practices such as the **LEGS APPROACH** must be based on evidence. Emergency livestock projects for instance need to be assessed in terms of impact to show how people benefit from such projects.

The key learning points from the video include:

- Need for well-designed emergency livestock projects with provision for impact assessment to show benefits to both animals and people's livelihoods.
- Gathering credible evidence of impact for emergency livestock projects entails:
    - Embracing clear project livelihoods objectives,
    - Setting meaningful indicators that link to SMART Objectives, and
    - Using participatory methodology (P.E) where baseline data is unavailable or is unreliable.
- Evidence of impact is a reflection of the quality and accountability of the projects as outlined in the LEGS Approach.

Comment

Based on the theme of the conference, it is a fact that Veterinarians are at the center of saving and protecting lives and livelihoods of people. What is more essential that this?

Acknowledgement

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For more details:– www.livestock-emergency.net

Leveraging computational biology to accelerate development of livestock vaccines

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Livestock play an integral role in a country's economic growth. With the twin challenges of climate change and escalation of antimicrobial resistance, management of livestock diseases using antimicrobials has become arduous. Moreover, additional infectious diseases may emerge or re-emerge. Despite being the most efficient means of disease prevention and a sustainable approach to combat antimicrobial resistance, optimal adoption of animal vaccination faces hurdles due to ineffective vaccines and counterfeit products, ultimately impeding livestock productivity. Availability of effective vaccines for mitigating livestock diseases is critical. Advances in computational genomics have enabled the acceleration of the lengthy and costly traditional vaccine development process.

We have sequenced and assembled the genomes of *Streptococcus agalactiae* and *Staphylococcus aureus* bacteria isolated from camel milk samples obtained from ASALs regions of Kenya. Genome sequencing was done using Oxford MinION Nanopore kit for *Streptococcus agalactiae* and Illumina platform for *Staphylococcus aureus*. Genome assembly was done using UNICYCLER v0.5.0 for *Streptococcus agalactiae* and SPADES v3.14 for *Staphylococcus aureus.* Quality of the sequences was assessed using QUAST v5.2.0 and annotation done using PGAP v6.1 & v6.4 respectively. Computational analyses was done using Vaxijen, IgPred, AllerTOP v.2.0 softwares. DeepLoc and DeepTMHMM were used to predict sub cellular localization and transmembrane helices respectively. Potential antigenic proteins were identified in *Streptococcus agalactiae* (n=18) and *Staphylococcus aureus* (n=11). These have been cloned into appropriate vectors in readiness for expression, purification and characterization using *in vivo* models to assess immune responses.

Key words: Veterinary vaccines, computational genomics, camel mastitis

Poster presentation

Integration of Environment and Ecosystem Health Stakeholders to One Health Activities in Kenya

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Capacitating One Health in Eastern and Southern Africa project (COHESA) aims to enhance national and sub-regional cross-sectoral collaboration between government entities with One Health (OH) mandate and OH stakeholders across society.

Kenya's Zoonotic Disease Unit (ZDU) stands at the forefront of addressing the interplay between human, animal, and environmental health through the OH approach since its establishment in 2012. Despite its crucial mandate, the involvement of the environmental sector in the ZDU framework is limited, potentially hindering the effective implementation of OH activities.

In Kenya, COHESA has prioritized activities to enhance environmental sector participation within the ZDU to strengthen OH in Kenya. Representatives from academia, wildlife services and other stakeholders were purposively selected and convened to address this challenge. Action points were formulated to map and integrate the environmental sector players into OH activities in Kenya.

Leveraging on existing networks and partnerships, key OH actors from various sectors were identified and engaged in net mapping to identify those who have influence and interest in OH activities. Targeted sensitization sessions to emphasize the importance of environmental involvement in ZDU activities and OH initiatives, outlining their roles in disease surveillance, risk assessment, and mitigation and their integration in the technical working groups (TWG) of ZDU. The TWGs facilitates collaboration, expertise exchange, and joint action planning for ZDU. Some of the mapped environment and ecosystem health (EEH) stakeholders who have been identified to work on OH issues include state government departments, regulatory bodies, non-state actors, and international organizations. Employing net mapping techniques will help outline stakeholders' interests and influence in OH.

Integrating EEH into OH activities in Kenya requires collaborative efforts from diverse stakeholders to foster collaboration, and formalizing partnerships through the development of critical soft skills, this approach will address health challenges comprehensively at the human-animal-environment interface.