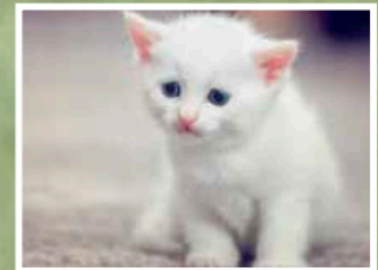


BOOK OF ABSTRACTS

34th TVA SCIENTIFIC CONFERENCE



Conference on Disease Control as the
Main Driver for Improving Productivity and
Livestock Market Access



34th TVA SCIENTIFIC CONFERENCE
Conference on Disease Control as the Main Driver for
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BOOK OF ABSTRACTS



Ministry of Agriculture,
Livestock and Fisheries





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PREFACE

Tanzania Veterinary Association (TVA) is proudly delighted, once again, to organise the 34th Annual Scientific Conference at the Arusha International Conference Centre (AICC) in Arusha-Tanzania. The main theme of the 34th Conference is “**Disease Control as the Main Driver for Improving Productivity and Livestock Market Access**”. Three sub-themes have been approved to guide matters that will be presented and discussed during the conference. These include: a) Challenges in Disease Control; b) Challenges and opportunities for livestock market access; and c) Trends in livestock market information system. Thanks to different contributors, this year we have been blessed by receiving enough and high quality abstracts relevant to the main theme and sub-themes of the 34th TVA conference. We can assure you that you will enjoy listening to the presentations to be delivered by research scientists and field-based veterinarians from within and outside Tanzania. In order to make this process smooth, TVA has compiled all abstracts in this **Book of Abstracts** that will help you to follow the presentations. We hope that you will find the compilation useful during the conference as well as a dependable reference material for your future endeavours. Your continued commitment to TVA scientific conference and sharing of information/knowledge is instrumental in upholding the vision, mission and core values of TVA. Enjoy your reading,

Prof Dominic Mukama Kambarage

Chairman, TVA

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PROGRAMME

34th TVA Scientific Programme

Day 1: Tuesday 6th December 2016

CONFERENCE OPENING SESSION: MBAYUWAYU

CHAIR: Dr A. Hayghaimo

08:00-08:45	Registration	ALL
08:45-09:00	Participants and Invited Guests seated	ALL
09:00-09:10	Welcoming Remarks	TVA Chairman
09:10-09:15	Invitation of the Guest of Honour	TVA Chairman
09:15-09:45	Official Opening of the 34th TVA Conference	Guest of Honour
09:45-10:00	Launching the Tanzania Animal Health Surveillance Network (TANSNet)	FAO Country Representative/Guest of Honour
10:00-10:10	Vote of Thanks	TBI
10:10-10:30	Group Photo	ALL
10:30-10:50	Tour of Exhibition Pavilions	Guest of Honour/TVA Chairman
10:50-11:00	HEALTH BREAK	ALL

SESSION 1: MBAYUWAYU

CHAIR: Prof J. Malago

11:00-11:30	Key Note Paper 1: Trans-Boundary Animal Diseases in Tanzania: Current Status and Challenges Related to Their Control	A. Hayghaimo <i>et al.</i>
11:30-12:00	Key Note Paper 2: Trends in Livestock Information Market System in Tanzania	A. Njombe



Disease Control as the Main Driver for Improving Productivity and Livestock Market Access

12:00-12:30 **Key Note Paper 3:** An Evidence-based Livestock Policy Reforms: Evidence from Field Experiment in Dodoma, Iringa, Morogoro and Tanga regions- Tanzania M.P.L. Nsiima *et al.*

12:30-13:00 **Key Note Paper 4:** Control of Ticks and vector borne diseases G. Mbassa

13:00-14:00 LUNCH BREAK

SESSION 2: MBAYUWAYU

CHAIR: Prof SI Kimera

14:00-14:30 **African Swine Fever Domestic Cycle Dominance in Tanzania** G. Misinzo *et al.*

14:30-14:50 Anthrax Surveillance in Remote Endemic Settings: The Critical Role of Community Engagement T. Forde *et al.*

14:50 -15:10 Trends of human brucellosis in pastoralist communities based on hospital records during 2013–2016 in Ngorongoro District, Tanzania H.E. Nonga *et al.*

15:10-15:30 Enhancing One Health disease surveillance in pastoral communities of East Africa through techno-health and participatory community-based approaches: the SACIDS Experience Karimuribo *et al.*

15:30-15:50 Brucellosis: Tackling knowledge gaps and evaluating options for control in Tanzania R. Bodenham *et al.*

15:50-16:05 General Discussion Chair

16:05-16:20 HEALTH BREAK

SESSION 3: MBAYUWAYU

Chair: Dr C. Uronu

16:20- 16:40 Challenges in Disease Control: Case for Heat-Tolerant PPR Vaccine R.G. Ireri *et al.*

16:40-17:00

17:00-17:20 A Field Trial for a New Vaccine Strategy Against Wildebeest-associated Malignant Catarrhal Fever Evaluation of Efficacy of Lasota® Vaccine Against Circulating Newcastle Virus Strains from Morogoro, Tanzania F.J. Lankester *et al.*
E.M. Mkupasi *et al.*



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17:20-17:40	A Trial to Assess the Thermotolerance of an Inactivated Rabies Vaccine	F.J. Lankester <i>et al.</i>
17:40-18:30	General discussion	Chair
18:30	END OF DAY 1	

DAY 2: Wednesday 7th December 2016

08:30-12:30	TVA Annual General Meeting	TVA Members and Invited Guests only
12:30-14:00	LUNCH	ALL

SESSION 4: MBAYUWAYU

Chair: Dr M. Makungu

14:00-14:30	Of Meat and Men, Models and Microbes – Understanding <i>Salmonella</i> risks in Tanzania's meat supply chain	R.N. Zadoks <i>et al.</i>
14:30-14:50	Food Safety in Tanzania's Meat Pathways: Knowledge and Handling Practices of Butchers and Eateries	G. Prinsen <i>et al.</i>
14:50-15:10	Isolation of <i>Salmonella</i> in Commercial Chicken Feeds in Dar es Salaam, Tanzania	S. Mdemu <i>et al.</i>
15:10 -15:30	Risk Factors for Episodes of Enteric Disease Following Handling of Cattle Waste in Tanzania	B.P. Madoshi <i>et al.</i>
15:30-16:00	General Discussion	Chair
16:00-16:30	HEALTH BREAK	

SESSION 5: MBAYUWAYU

Chair: Dr Z.E. Makondo

16:30-17:00	Impact of Animal Welfare on Disease and Productivity	V. Yamo
17:00-17:20	Foetal Wastage and Incidence of Ovarian Disorders in Goats Slaughtered at the Dodoma Municipal Abattoir, Tanzania	I.P. Kashoma <i>et al.</i>



Disease Control as the Main Driver for Improving Productivity and Livestock Market Access

17:20-17:40	Assessment of Risk Factors for Porcine Cysticercosis Prevalence and Animal Welfare in Selected Villages in Nyasa, Tanzania	E.M. Mkupasi <i>et al.</i>
17:40-18:00	Thoracic Radiographic Anatomy in Sheep	M. Makungu
18:00-18:30	General discussion	Chair
18:30	END OF DAY 2	

DAY 3: Thursday 8th December 2016

SESSION 6: MBAYUWAYU

Chair: Dr H.E. Nonga

08:30-09:00	Regulating Antibiotic Use in Livestock – The Danish Experience	J.E. Olsen
09:00-09:20	Determination of Anthelmintic Resistance in Goats and Sheep on Bases of Fecal Egg Count Reduction Test at Luguruni Farm, Kibamba- Dar es Salaam, Tanzania	A.M. Sailen <i>et al.</i>
09:20-09:40	Prevalence of Trematode Infection in Cattle and Common Flukeicides Used Against Flukes in Kilosa District	R.S. Mlekwa <i>et al.</i>
09:40-10:00	Abattoir Survey of <i>Trichinella</i> Infections in Pigs of Tanzania	H. Magwisha <i>et al.</i>
10:00-10:30	General Discussion	Chair
10:30-11:00	HEALTH BREAK	

SESSION 7: MBAYUWAYU

Chair: Dr S. Nong'ona

11:00-11:30	Serological Investigation of Multifactorial Causal of Fatal Outbreak of Diseases With Respiratory Signs in Sheep And Goats in Loliondo, Tanzania.	T. Kgotleje <i>et al.</i>
11:30-11:50	Prevalence and Risk Factors for Ascariasis and Cryptosporidiosis in Smallholder Pig Production Systems in Ulanga District, Tanzania	E.G. Lyimo <i>et al.</i>
11:50-12:10	The 'Social, Economic and Environmental Drivers of Zoonoses' Study: Methods and Initial Outputs From an Interdisciplinary Project	T. Kibona <i>et al.</i>
12:10-12:30	Molecular Diversity of <i>Theileria parva</i> : A Case Study in Kilosa District, Morogoro, Tanzania	L. R. Mwaijibe <i>et al.</i>



Disease Control as the Main Driver for Improving Productivity and Livestock Market Access

12:45-13:00 General discussion Chair

13:00-14:00 LUNCH BREAK

SESSION 8: **MBAYUWAYU**

Chair: **Dr S. Mdemu**

14:00-14:20 Prevalence of Mastitis in Dairy Cattle at Magadu Farm, Morogoro-Tanzania S.K. Motto *et al.*

14:20-14:40 Evaluation of Saponin Concentration Microscopy for the Diagnosis of Borreliosis A-H. Lukambagire *et al.*

14:40-15:00 Cyanobacteria and Cyanobacterial Toxins in the Alkaline-Saline Lakes Natron and Momela, Tanzania H.E. Nonga *et al.*

15:00-15:20 Diagnosis of Human Fascioliasis in Arusha Region, Northern Tanzania by Microscopy and Clinical Manifestations A-H. Lukambagire *et al.*

15:20-15:45 General discussion Chair

15:45-16:00 HEALTH BREAK

CONFERENCE CLOSING SESSION: **MBAYUWAYU**

Chair: **Prof R.R. Kazwala**

16:00-16:10 Participants and Invited Guests Seated ALL

16:10-16:25 34th VA Conference Recommendations TVA Chairman

16:25-16:30 Invitation of the Guest of Honour TVA Chairman

16:30-17:00 Official Closing of 34th TVA Conference Guest of Honour

17:00 END OF 34TH TVA SCIENTIFIC CONFERENCE (*Bon Voyage*)

POSTER PRESENTATION

1 Antimicrobial Resistance in Food-borne Enteric Pathogens and Commensals L. Maganga *et al.*

2 Risk Factors Associated With Prevalence of *Salmonella* and *Campylobacter* in Chicken From Different Production Systems in Arusha District, Tanzania E. Sindiyo *et al.*



Disease Control as the Main Driver for Improving Productivity and Livestock Market Access

- | | | |
|---|--|---------------------------|
| 3 | Entry Points to Stimulation of Expansion in Hides and Skins Processing: A Case of Maswa District, Tanzania | G. Chasama <i>et al.</i> |
| 4 | SEEDZ Project Poster | T. Kibona <i>et al.</i> |
| 5 | HAZEL Project Poster | R. Zadoks <i>et al.</i> |
| 6 | Brucellosis Poster | R. Bodenham <i>et al.</i> |
| 7 | Leptospirosis poster | K. Allan <i>et al.</i> |
| 8 | Anthrax Poster | R. Aminu <i>et al.</i> |

RESERVE LIST

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|---|---|----------------------------|
| 1 | Factors Influencing Access and Use of Poultry Management Information in Rural Tanzania | G. Msoffe <i>et al.</i> |
| 2 | Protecting People and Animals from High-Impact Disease Threats – FAO's Component of the USAID's Emerging Pandemic Threats Phase – 2 Programme | A. Hayghaimo <i>et al.</i> |



ABSTRACTS



TRANS-BOUNDARY ANIMAL DISEASES IN TANZANIA: CURRENT STATUS AND CHALLENGES RELATED TO THEIR CONTROL

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Abstract

Tanzania's animal wealth at the end of 2014/2015 included 23.5 million cattle, 15.6 million goats, 7 million sheep, 2.1 million pigs, 36 million village poultry, 0.3 million donkeys and 43.2 million poultry. More than 99% of these livestock are kept in low input-low output system, owned and managed by cash-constrained mixed and pastoral producers who operate under traditional husbandry system, often with little or no access to good and reliable animal husbandry practices, market access and reliable veterinary services. Livestock contributes about 30% of agricultural Gross Domestic Product (GDP), derived from an estimated 23.5 million heads of cattle, owned by 1.27 million small-scale households and mostly comprised of indigenous East African short horn zebu. Despite its great leverage potential, the sector is seriously constrained by animal diseases (of which the majority are Transboundary in nature), poor quality veterinary inputs and service, inadequate and quality feeds due to seasonal fluctuation, poor production/husbandry technology innovations and inadequate investment to enhance its contribution to the development of the country. A strong livestock sector is therefore crucial for enhancing food security and for reducing poverty in the country. Control of animal diseases is therefore a critical component in the overall plan for livelihood improvement in Tanzania. Over the last couple of years, the upsurge and growing trends of TADs has been a subject of concern to veterinary authority and trade. Over the period Jan- Sept 2016, FMD was reported in 21 regions involving 54 Local Government Authorities. Similarly CBPP was reported in 20 regions involving 51 LGAs. Others included Trypanosomiasis in 20 regions and 66 LGA's; PPR 8 regions and 9 LGAs and ASF 5 regions and 6 LGA's. Therefore, TADs have a multi-causal origin; some factors associated with this process include: a) Trade and international travel, b) Changes agricultural practices, c) Climate change, d) Reduction of habitat and increased contact with wild vectors/reservoirs, e) shrinking government investments in drugs and vaccine, and h) Introduction of naïve wild and domestic animals to new geographic areas where the disease is endemic and immunologically unknown for them (increases zoonotic pool within a geographic region). It is concluded that control of animal diseases, particularly TADs, requires thorough knowledge of the disease, effective policies, good public/private relationships, building core capacities for surveillance, reporting, control, political will and appropriate allocation of human and material resources.

Key words: Animal diseases, TADs emergence, constraints, challenges.



AN EVIDENCE-BASED LIVESTOCK POLICY REFORMS: EVIDENCE FROM FIELD EXPERIMENT IN DODOMA, IRINGA, MOROGORO AND TANGA REGIONS-TANZANIA

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Abstract

A popular catchphrase in government's meetings is "evidence-based policy", that is the use of good quality data and statistics to formulate, implement, monitor and evaluate policies and investments. Good quality data and statistics on agriculture are of paramount importance in Tanzania, a country in which – according to the National Bureau of Statistics (NBS) –agriculture accounts for about 30% of the Gross Domestic Product. However, in many cases, government's decisions are constrained by lack of or insufficient data, which limit the effectiveness of policies and investments. The Ministry of Agriculture, Livestock and Fisheries (MALF) has developed a three-pronged approach for evidence-based policy reforms, including: (i) Analysis of nationally representative datasets to identify binding constraints for livestock development; (ii) Stakeholder consultations and *ad-hoc* data collection to appreciate the determinants or root causes of selected binding constraints; (iii) Experimentation on the ground to test, on a small scale, alternative policy reforms that remove or relax the determinants of the constraints, thereby supporting livestock development. All these interventions support the implementation of the sector wide approach programme, the Agriculture Sector Development Programme (ASDP II), currently being finalized and the livestock specific initiatives, including; the Livestock Sector Development Programme of 2011, Tanzania Livestock Modernization Initiatives (TLMI) of 2015 and Livestock Master Plan (being finalized as well), all of which are within the context of the National Five Year Development Plan (2016/2017 -2020/2021) and the Sustainable Development Goals - 2030. This paper presents good practices for generating evidenced-based policy recommendations to improve the system of livestock services in Tanzania originated from a multiple-step MALF-NBS joint process. The process includes analysis of data, experimentation on the ground to test the effectiveness of alternative policy instruments to remove or ease the identified developmental constraints.

Key words: evidence-based policy, data, statistics, system of livestock services.



AFRICAN SWINE FEVER DOMESTIC CYCLE DOMINANCE IN TANZANIA

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Abstract

African swine fever (ASF) is a highly fatal haemorrhagic disease of domestic pigs that can cause mortalities reaching up to 100%. African swine fever is caused by ASF virus (ASFV), a double-stranded DNA virus of the Asfarviridae family. ASFV is naturally maintained in a sylvatic cycle involving transmission between warthogs (*Phacochoerus africanus*) and soft argasid tick *Ornithodoros moubata*. Spill of ASFV from sylvatic cycle to domestic pigs occurs either through a tick bite, feeding contaminated warthog carcasses and/or contact with warthog faeces. After spilling into domestic pigs, virus is capable of persisting in a domestic cycle that involves transmission between domestic pigs alone, through contact with fomites or between infected and susceptible pigs or consumption of infected meat. Since the introduction of genotype II virus in Kyela during November 2010, several outbreaks involving the same genotype II ASFV have been reported in Mbeya, Rukwa, Iringa, Morogoro and Dar es Salaam between 2010 and 2016. There have been a number of outbreaks involving another ASFV belonging to the same genotype IX in northwestern regions of Mwanza, Kagera and Kigoma between 2014 and 2016. Similarly, several outbreaks caused by genotype X ASFV have occurred in northeastern and central regions of Arusha, Moshi, Tanga and Singida. Recurrent circulation of distinct ASFV within defined zones of Tanzania for a number of years indicate persistence of virus within domestic cycle rather than its emergence from sylvatic cycle. Several factors contribute to domestic cycle dominance including lack of a specific treatment or vaccine, stakeholders' attitudes, practices and behaviors along the pig production and marketing chain, uncontrolled movement of pigs, restocking, poor biosecurity measures and breach of quarantine measures.

Key words: African swine fever, ASFV, domestic cycle, dominance, pigs, Tanzania.



ANTHRAX SURVEILLANCE IN REMOTE ENDEMIC SETTINGS: THE CRITICAL ROLE OF COMMUNITY ENGAGEMENT

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Abstract

Anthrax is a zoonotic disease caused by the spore-forming bacterium *Bacillus anthracis*. It primarily affects herbivores, causing sudden deaths. The disease presentation can range from sporadic cases to large outbreaks with devastating impacts. In humans, anthrax can be fatal if not treated rapidly with antibiotics. Anthrax is consistently ranked amongst the major poverty-related neglected zoonoses, impacting both human health and livelihoods through livestock losses. Although anthrax remains endemic in many low- and middle-income countries, its burden is often underappreciated due to limited surveillance. Serological studies using carnivores as sentinels for exposure to *B. anthracis* suggested that anthrax was a major issue in the Ngorongoro Conservation Area (NCA) of northern Tanzania, despite limited cases being recorded by local authorities. As a first step towards understanding the epidemiology and estimating the incidence of anthrax in the NCA, our team has begun working with various stakeholders from the animal and human health sectors to improve local knowledge and awareness, and to empower individuals to contribute to community-level surveillance. Through a series of workshops and training sessions, we have trained around 25 livestock field officers and community animal health workers on safe sample collection from suspect cases. We are also working with a regional laboratory to establish molecular diagnostics. Preliminary results suggest that community awareness and engagement can help to improve case detection, demonstrating their critical role in understanding the burden of anthrax in remote settings such as the NCA. Enhanced surveillance is an essential step towards securing high-level support for disease control, thereby improving health, productivity and livelihoods.

Key Words: anthrax, *Bacillus anthracis*, community-based surveillance, livestock, stakeholder engagement



TRENDS OF HUMAN BRUCELLOSIS IN PASTORALIST COMMUNITIES BASED ON HOSPITAL RECORDS DURING 2013–2016 IN NGORONGORO DISTRICT, TANZANIA

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Abstract

Brucellosis is among the neglected zoonotic disease which mostly affects the pastoral and agro-pastoral communities because of many risk factors for infection. A four-year (2013–2016) retrospective study was carried out to determine the sero-prevalence of human brucellosis in patients at Wasso and Endulen hospitals in Ngorongoro district, Tanzania. Hospitalization records were reviewed and serological positive cases of brucellosis were classified according to: year recorded, hospital facility, areas of residence, age, sex and season of the year. A total of 794 (5.8%) brucellosis cases from 111 villages/areas were diagnosed out of 13642 patients admitted at Wasso and Endulen hospitals. Most of brucellosis cases (35.5%, n=282) and (34.8%, n=276) were recorded in 2014 and 2015 respectively. Wasso hospital had more cases (6.9%) compared to Endulen (3.5%) and the difference was statistically significant ($P=0.0000001$). More *Brucella* positive cases ($p=0.0006681$) were observed in females than males. Similarly, adult individuals suffered more ($p=0.0000001$) than young ones. Most of the cases ($p=0.0000001$) were observed during the rainy seasons. Brucellosis is prevalent in Ngorongoro district which affects mostly women and adults, and therefore, an important public health problem. These findings merit for more extensive epidemiological investigations of brucellosis in pastoral and agro-pastoral communities in Tanzania to better determine the prevalence, economic impact, risk factors for the transmission and educate the public about on prevention and control measures of brucellosis.

Key words: brucellosis, pastoralists, hospital-based seroprevalence, Ngorongoro, Tanzania



ENHANCING ONE HEALTH DISEASE SURVEILLANCE IN PASTORAL COMMUNITIES OF EAST AFRICA THROUGH TECHNO-HEALTH AND PARTICIPATORY COMMUNITY-BASED APPROACHES: THE SACIDS EXPERIENCE

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Abstract

We developed a Community Level One Health Security approach that empowers community-based human and animal health reporters with training and ICT-based solutions so that they can contribute to disease detection and response at community level and thence national, regional and global levels. An EpiHack™ Tanzania event was organized in 2014 and attended by human and animal health experts as well as ICT programmers who collaborated in identification of major challenges facing early detection, reporting and responding to disease events occurring in human and animal populations. In August 2015, A Skoll Global Threats Fund supported project organized an inception workshop that brought together key stakeholders to refine objectives and implementation plan of a project focusing on 'Enhancing community-based disease outbreak detection and response in East and Southern Africa (DODRES)'. The DODRES project, building on previous initiatives was implemented by a dedicated design and implementation team from the Southern African Centre for Infectious Disease Surveillance (SACIDS) consortium. The team developed three out of four prototypes designed during the EpiHack™ Tanzania event to functional versions. This was followed by conducting training of community health reporters (CHRs) and officials from animal and human health sectors in two districts of Morogoro Urban and Ngorongoro in Tanzania. A total number of 29 CHRS and 17 officials at the district level have been trained on early disease detection, reporting and response in Morogoro Urban and Ngorongoro districts in Tanzania. Within the first month (August 2016) of tool deployment in the field, a total number of 83 clinical cases have been reported in Morogoro Urban (18) and Ngorongoro (65) districts of Tanzania. The project has also planned to deploy *Afyadata* tools in Narok County in Kenya to strengthen local cross border collaboration against epidemics in a unique ecosystem with a high interaction between people, livestock and wild animals. Participatory approaches supported by mobile technologies should be promoted for enhanced contribution early disease detection and response at the community, national, regional and global levels.

Key words: TechnoHealth, *Afyadata* tools, participatory community-based disease surveillance, One Health



BRUCELLOSIS: TACKLING KNOWLEDGE GAPS AND EVALUATING OPTIONS FOR CONTROL IN TANZANIA

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Abstract

Brucellosis is one of the most widespread human diseases acquired from animals, and one of the highest priority animal diseases in Tanzania and across Africa. Brucellosis has wide-ranging health and productivity impacts that include animal losses due to abortion, lost milk production, slaughter of infected animals, and human illness. Brucellosis control programmes have been successfully implemented in many countries globally, and control tools and strategies including livestock vaccination exist. In Tanzania, and sub-Saharan Africa more generally, development of brucellosis control programmes is hampered by several factors, including some key knowledge gaps. Key research questions include 'Which *Brucella* species is/are the most important cause of human illness?', 'Which animal species constitute the reservoir and/or source populations for human infections?', 'Which livestock population(s) and pathogen(s) should control efforts be targeted at?', and 'Which vaccine would be best targeted at which host species?' Our ongoing study is working to answer these key questions and inform the development of brucellosis control strategies in Tanzania. Analysis of data gathered through previous projects in northern Tanzania indicates that sheep and goats are the more likely source of human and animal infection than cattle in that area. Ongoing surveillance of febrile patients in Endulen, Ngorongoro, is underway to identify the *Brucella* species causing human bloodstream infections in this population. These data will inform the evaluation of the epidemiological impacts and benefits of alternative control strategies to help guide the targeted development of cost-effective strategies for brucellosis control and achieve human health and livestock productivity benefits.

Keywords: Zoonoses, Brucellosis, Vaccine, Livestock Productivity, One Health



CHALLENGES IN DISEASE CONTROL: CASE FOR HEAT-TOLERANT PPR VACCINE

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Abstract

Cost and availability of cold chain in delivery of heat labile live vaccines is a big challenge in the ASAL where infrastructure and terrain is poor or non-existent. In Kenya, 70% of livestock are found in the ASAL. In order to deliver vaccines in these areas, there is need to deliver vaccines that are viable in the most efficient and practical way. We have produced a thermostable PPR vaccine which is currently undergoing potency testing in goats. This paper presents the road map we used to produce the vaccine together with the results we obtained. A thermo-labile PPR vaccine was stabilised using different stabilisers and tested by subjecting the vaccine batches to varying heat stress temperatures *in-vitro*. Results obtained show that the vaccine retains high titres for thirty days at 25°C and twenty one days at 37°C. The vaccine is currently undergoing validation in isolated facilities and also under controlled field trial in goats.

Key words: Thermostable PPR vaccine, stability, validation, Kenya.



A FIELD TRIAL FOR A NEW VACCINE STRATEGY AGAINST WILDEBEEST-ASSOCIATED MALIGNANT CATARRHAL FEVER

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Abstract

Malignant Catarrhal fever (MCF) is a fatal lymphoproliferative disease of cattle that, in East Africa, results from transmission of alcelaphine herpesvirus 1 (AIHV-1) from wildebeest calves. We present the results of a field trial of a novel vaccine which was performed over two wildebeest calving seasons on the Simanjiro Plain of northern Tanzania. Each of the two phases of the field trial consisted of groups of 50 vaccinated and unvaccinated cattle, which were subsequently exposed to AIHV-1 challenge by herding toward wildebeest. Vaccination resulted in the induction of virus-specific and virus neutralizing antibodies. Some cattle in the unvaccinated groups also developed virus-specific antibody responses but only after the start of the challenge phase of the trial. PCR assays on DNA from blood samples detected AIHV-1 infection in both groups of cattle but the frequency of infection was significantly lower in the vaccinated groups. Some infected animals showed clinical signs suggestive of MCF but few animals went on to develop fatal MCF, with similar numbers in vaccinated and unvaccinated groups. This study demonstrated a baseline level of MCF-seropositivity among cattle in northern Tanzania of 1% and showed that AIHV-1 virus-neutralizing antibodies could be induced in Tanzanian Shorthorn Zebu crossbred cattle by our attenuated vaccine, a correlate of protection in previous experimental trials. The vaccine was shown, through comparison of PCR results of vaccinated and unvaccinated cattle, to have reduced infection rates by 56% in cattle exposed to wildebeest. However protection from the fatal form of MCF could not be determined due to the low number of lethal cases. The partial protection that this vaccine provides is unlikely to be sufficient to support a change in the grazing management systems to allow cattle to graze alongside wildebeest during the calving season when pasture quality is highest, however it could benefit pastoralists who are unable to avoid wildebeest due to recent land-tenure changes that have affected traditional grazing and disease avoidance strategies.

Key words: MCF, novel vaccine trial, partial protection, Simanjiro.



EVALUATION OF EFFICACY OF LASOTA® VACCINE AGAINST CIRCULATING NEWCASTLE VIRUS STRAINS FROM MOROGORO, TANZANIA

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Abstract

Newcastle disease (ND) outbreaks in flocks vaccinated with LaSota® vaccine have been reported around Morogoro municipality. This study was conducted to evaluate the efficacy of the vaccine against virulent strains of ND virus obtained in Morogoro municipality. One hundred day-old chicks were randomly allocated into five groups of 20 chicks each. Group I and II were vaccinated at the age of 5 days through oral and ocular routes, respectively, and boosted at the age of 20 days. Groups III and IV were vaccinated once through oral and ocular routes, respectively, at the age of 10 days. Group V served as a negative control. The immune response against ND virus was measured by the level of antibodies using haemagglutination inhibition (HI) test and resistance to challenge with virulent strain of ND virus. All birds were challenged with virulent ND virus at 32 days of age and monitored for 21 days. Regardless of the route, there was no statistical significant difference ($p > 0.05$) between the mean HI titres in the four vaccinated groups. Significant differences, however, existed between regimes ($p < 0.05$). The morbidity and mortality in vaccinated birds were 20% and 10% respectively, while in un-vaccinated birds the corresponding values were 95% and 65%. In conclusion, the used LaSota® strain ND vaccine available in Morogoro, Tanzania produced enough protection against ND. Both oral and ocular routes provided the same level of protection.

Key words: Newcastle disease, oral and ocular routes, layer chicks, vaccination regime, antibodies.



A TRIAL TO ASSESS THE THERMOTOLERANCE OF AN INACTIVATED RABIES VACCINE

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Abstract

A controlled and randomized non-inferiority study was carried out to compare the serological response at four weeks post-vaccination in Tanzanian dogs inoculated with the Nobivac[®] vaccine which had been stored at elevated temperatures for different periods of time with the response in similar dogs vaccinated with the same product stored according to label recommendations (2 - 8 °C). Specifically, the effectiveness of the vaccine stored at elevated temperatures at stimulating rabies antibody was not inferior to cold-chain stored vaccine when it was stored for up to six months at 25°C or for three months at 30°C. Despite being unlikely to result in changes to the authorized storage conditions, these findings will give reassurance that this vaccine can be used following a period of non-cold-chain storage when circumstances make it necessary to do so. For example, in remote communities where electricity is scarce, vaccinators can be confident that vaccines stored below 30°C should retain their immunogenicity for up to 3 months. This will greatly increase the capacity of rabies vaccination campaigns to access hard to reach communities in Africa and Asia. Furthermore, delivery options will be increased. For example thermo-stable vaccines could be stored in remote communities for extended periods allowing dogs to be vaccinated throughout the year, rather than annually when campaigns pass through. In this way puppies, born after a campaign, and new dogs could be vaccinated in a timely manner, reducing the rate at which the inter-campaign coverage level decreases. This will be useful where the 70% vaccination coverage target has not been reached. Thermo-tolerant vaccines stored in remote areas will also provide a life-saving resource in emergency outbreak situations where rapid vaccination of the dog population is required to control the epidemic. We have not confirmed a 3-year duration of immunity for the high temperature stored vaccine, however annual re-vaccination is usually practiced for all dogs presented for vaccination in Africa and Asia. As such this should not be a cause for concern. These findings will give confidence to programs working with this vaccine to control rabies that more flexible delivery models can be developed, involving the storage of this vaccine outside of the cold-chain for limited periods of time.

Key words: Thermotolerance, Nobivac[®] vaccine, rabies, dogs.



OF MEAT AND MEN, MODELS AND MICROBES – UNDERSTANDING SALMONELLA RISKS IN TANZANIA'S MEAT SUPPLY CHAIN

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Abstract

Tanzania is a hotspot for foodborne zoonoses, with non-typhoidal *Salmonella* (NTS) a major culprit. NTS can be carried asymptotically in the gut of healthy ruminants, and contamination of meat during or after slaughter may result in transmission of the microbes to humans. Rapid urbanisation in Tanzania is accompanied by changes in the meat supply chain, whereby the distance between producer and consumer grows and intensification of meat production and processing may affect the risk of foodborne disease. In this interdisciplinary project, we aim to understand the changing redmeat supply and value chain and the policies that govern it; to measure the occurrence of microbes in animal faeces, at slaughter, and in meat; and to model risks of transmission along the food chain. The work is conducted in northern Tanzania and represents three levels of intensification: Arusha City, Moshi Urban and Moshi Rural Districts. Key informant interviews have been conducted at slaughter, in butchers' shops, and eateries. Samples have been collected from cattle, goats, and the environment to measure levels of NTS. NTS has been detected in 2.6%, 0.5%, 9.7% and 7.7% of faecal (n=303), carcass (n=217), meat (n=330) and environmental samples (n=91) respectively, suggesting a contribution of environmental sources to meat contamination. Qualitative and quantitative information is combined into a Modular Process Risk Model, which aids in understanding of factors that contribute to human exposure risks. A summary of major findings and results to date and the conceptual model of microbial transmission along the meat chain will be presented.

Key words: One Health, meat, modelling, non-typhoidal *Salmonella*, supply chain.



FOOD SAFETY IN TANZANIA'S MEAT PATHWAYS: KNOWLEDGE AND HANDLING PRACTICES OF BUTCHERS AND EATERIES

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Abstract

As the African population grows and urbanises, the meat value chain that provides people with dietary protein changes. The meat value chain scales up in volume, becomes longer, and grows in complexity. These changes offer not only economic opportunities for all actors involved, but they may also present new hazards for public health by increasing the risk of microbiological contamination as meat from a large number of origins is funnelled through a limited number of butchers and eateries to reach a growing number of consumers. Bacterial food-borne pathogens, including non-typhoidal *Salmonella* and *Campylobacter*, have been described as the 'forgotten zoonoses' of Africa and the on-going changes in the meat value chain may aggravate the problem. On the other hand, the changes may also carry the opportunities for improved or more controlled food handling or processing. To understand risks and opportunities, a multi-disciplinary research team from multiple universities, research institutes and the Tanzanian Ministry of Agriculture, Livestock and Fisheries is investigating cattle, goat and meat handling practices in Northern Tanzania using a series of semi-structured interviews, observation check lists and videography. In this presentation, we share some of the research findings, examining the meat handling practices of commercial actors who sell raw meat (rural and urban butchers) and of those who sell cooked meat in formal and informal eateries. We also share findings from interviews with these commercial actors talking about their knowledge and beliefs regarding food-borne diseases and their prevention.

Key words: Food safety, butchers, eateries, meat pathways, beliefs, prevention.



ISOLATION OF *SALMONELLA* IN COMMERCIAL CHICKEN FEEDS IN DAR ES SALAAM, TANZANIA

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Abstract

Salmonella is one of important hazardous pathogens causing salmonellosis in both humans and animals. In Tanzania, commercial chicken farming is a rapidly growing industry and salmonellosis is a serious problem. A study on *Salmonella* was conducted in commercially produced chicken feeds from feed mills in Dar es Salaam, Tanzania between May 2015 and June 2016 with the objective of estimating the prevalence of *Salmonella* contamination. Feed samples were collected from a total of 384 randomly selected feed bags of different types from six feed mills. Cultural and biochemical tests were performed for identification of *Salmonella* in the samples. Antibiotic sensitivity test was determined for all isolates. The overall prevalence of *Salmonella* in the study was 22.1%. Prevalence of *Salmonella* contamination was 22.2%, 39.1%, 14.7%, 0.0%, 25% and 42.9% of the samples from feed mills named A, B, C, D, E and F respectively. Significantly higher ($p = 0.001$) prevalence of *Salmonella* contamination was seen in feed mill B. The antibiogram pattern indicated that *Salmonella* isolates were highly sensitive to Ciprofloxacin (89.0%) with less sensitivity towards Amikacin (36.6%), Sulphamethoxazole/Trimethoprim (14.6%), Gentamicin (13.4%), Kanamycin (12.2%), Streptomycin (3.7%), Amoxicillin (1.2%) and Tetracycline (0.0%). The presence of *Salmonella* in commercial chicken feeds in Dar es Salaam presents a contamination hazard for both humans and *Salmonella*-free flocks, and therefore, calls for improvement of hygienic processing and handling of feeds for effective control measures. Concurrently, antibiotics sensitivity surveillance should be done frequently to monitor the development of resistance in the commonly used antibiotics.

Key words: Salmonellosis, *Salmonella*, poultry mash, feed mills, antibiotic sensitivity.



RISK FACTORS FOR EPISODES OF ENTERIC DISEASE FOLLOWING HANDLING OF CATTLE WASTE IN TANZANIA

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Abstract

This study explored risk factors associated with episodes of enteric disease in animal waste handlers in Tanzania as occupational hazards. A qualitative survey involving 124 animal waste handlers from Morogoro peri-urban and urban areas was carried out. Large number of respondents (84) had experienced enteric episodes, and among them, 56.0 % had reported this to a health facility while 44.0% had consulted a nearby pharmacy or drug shop. Heaping was the most practised method of storage or cattle waste (52.4%) and most farmers deposited waste within living plots (71.0 %). The percentage of handlers who were aware of risks for acquiring enteric pathogens from cattle after handling their waste was low (43.6 %). There was limited awareness of government guideline on handling such waste (3.2%) and washing hands without soap was found to be the most common health measures taken after handling animal waste (70.2 %). The handlers who had experienced enteric episodes were found to be those who had little knowledge on occupational hazards ($OR=20.5$, $p=0.000$), limited knowledge on enteric zoonotic pathogens ($OR = 8.62$, $p=0.019$) and experience on handling cattle waste was surprisingly statistically associated with enteric episodes ($OR = 13.5$, $p=0.000$). The study shows that animal waste handlers are frequently experiencing enteric diseases, most probably because they are exposed to enteropathogens. Training on proper measures to handle animal waste as well as on how to protect themselves and the environment is urgently needed.

Key words: occupational hazards, animal waste, peri-urban, Morogoro, Tanzania.



IMPACT OF ANIMAL WELFARE ON DISEASE AND PRODUCTIVITY

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Abstract

The World Organization for Animal Health (OIE) defines Animal welfare as how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if it is healthy, comfortable, well-nourished, safe, able to express innate behaviour and if it is not suffering from unpleasant states such as pain, fear and distress. Good animal welfare therefore requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling and humane slaughter/killing. Animal welfare significantly contributes to the animal's health and ultimately its productivity. This is mainly because research has determined that animals are generally more sensitive and vulnerable to stress and suffering which predisposes them to diseases. A farm animal is constantly challenged by an array of environmental factors that may evoke stress responses such as overcrowding, extreme temperatures, poor ventilation, social disruption, unfamiliar sounds, unfamiliar or uncaring handlers, feed and water restriction, immunization and disease. This paper explores the impact of animal welfare on disease and productivity by reviewing how management practices within the poultry and dairy industries have an animal welfare impact.

Key Words: Animal, Welfare, Productivity, Disease.



FOETAL WASTAGE AND INCIDENCE OF OVARIAN DISORDERS IN GOATS SLAUGHTERED AT THE DODOMA MUNICIPAL ABATTOIR, TANZANIA

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Abstract

Livestock husbandry and slaughter have become millenary traditions in every part of the world. In request for meat, numerous viable embryos and fetuses are wasted since effective pregnancy detection system are lacking and thus pregnant animals are not spared in the slaughtering process. In Tanzania, limited data are available on the level of foetal wastage in small ruminants daily slaughtered. Prompted by the lack of data, this study was carried out to establish the level of foetal wastage and prevalence of ovarian disorders in does slaughtered at Dodoma municipal abattoir during an active period of seven days September 14 – 20, 2015. Gestation stage was estimated from foetal Crown Rump Length (CRL) measurement. Gross ovarian lesions were observed and sampled for histopathology examination. The total number of goats slaughtered during the study period was 2869 representing 72.3% males and 27.7% females. 412 out of 795 (51.8%) of slaughtered does were pregnant including 34.7% carrying singletons and 17.1% having twins ($p < 0.05$). Of the recovered foetuses, 60% ($n=247$) were males whereas 40% ($n=165$) were females. Observed CRL measurements ranged from 5 to 35 cm. Gestation length estimated from later CRL ranged from 37 to 103 days. Majority (80%) of foetuses were in second trimester, 12.8% second trimester and minority (7.2%) being in third trimester. The net economic value (NEV) daily forgone as a result of loss of potential offspring at Dodoma abattoir was estimated between 11,000 and 18,400 US \$. The incidence of ovarian disorders was recorded in 9.6% (37/383) of non-pregnant does. Follicular and luteal cysts were seen in 7.8% ($n=30$) and 1.8% ($n=7$), respectively. Most of follicular cysts (65%) occurred as multiples, of which 52.9% ($n=16$) were on the right ovary and 47.1% ($n=14$) were on left ovary. Luteal cysts were observed singly in either of the ovaries. In conclusion; foetal wastage due to slaughtering of pregnant does is quite alarming at Dodoma municipal abattoir. Institution of an effective pregnancy screening system could help to avert serious economic and human nutrient wastage.

Key words: foetal wastage, ovarian disorders, goats, Dodoma municipal abattoir, Tanzania.



ASSESSMENT OF RISK FACTORS FOR PORCINE CYSTICERCOSIS PREVALENCE AND ANIMAL WELFARE IN SELECTED VILLAGES IN NYASA, TANZANIA

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Abstract

Porcine cysticercosis (PC) is still a serious agricultural and public health problem in most developing countries where pigs are traditionally kept and pork consumed. Information about PC and associated risk factors in Tanzania is limited. In addition pig welfare issues are not adequately addressed. This study was conducted to determine the prevalence, risk factors responsible for PC transmission and pig welfare in Nyasa District. To establish the prevalence of PC, a cross-sectional survey was conducted involving 698 pigs by tongue examination and 330 pigs by Ag-ELISA test. A questionnaire survey was administered to a member of the selected households to gather information on pig husbandry and other factors that could explain the prevalence of PC in the area and pig welfare issues complemented with direct observation. The results showed that 44 pigs were positive by lingual examination (6.3%) and 110 tested positive for Ag-ELISA (33.3%). Risk factors associated with PC transmission in the study area were sex of pig ($p=0.011$), free range of pigs ($p=0.0001$), source of pork ($p=0.0001$) and open air defecation ($p=0.0001$). Welfare of pigs was greatly neglected. In conclusion, the present findings indicate that PC is endemic in Nyasa district and that free-ranging of pigs together with limited use of latrines contributes to PC transmission and pig welfare were violated of free from pain. For effective control of PC in the study area, pig confinement and use of latrine/toilets should be observed and welfare of pigs should be considered.

Key words: *Taenia solium*, prevalence, risk factors, welfare, Nyasa.



THORACIC RADIOGRAPHIC ANATOMY IN SHEEP

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Abstract

The objective of this study was to describe the normal radiographic anatomy of the thorax in sheep and to provide reference ranges for clinical use. Right lateral (RL), left lateral (LL), dorsoventral (DV) and ventrodorsal (VD) radiographic views of the thorax were obtained under general anaesthesia at the end of inspiration. Normal radiographic anatomy of the thorax was described. Measurements of thoracic structures were performed and ratios were calculated such as the mean ratio of the caudal vena cava diameter to the height of the fourth thoracic vertebral body, trachea diameter to thoracic inlet distance and the mean vertebral heart score (VHS). Variations exist in the normal radiographic anatomy of the thorax of different species. Knowledge of the normal thoracic anatomy of the sheep should prove useful in the diagnosis of thoracic diseases.

Key words: sheep, thorax, radiography, anatomy.



REGULATING ANTIBIOTIC USE IN LIVESTOCK – THE DANISH EXPERIENCE

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Abstract

WHO and UN have nominated antibiotic resistance a critical threat to human health. Steps to prevent antibiotic resistant must include the animal sector, since it is a One Health issue. Denmark has prioritized the fight against antibiotic resistance, and this presentation will describe the Danish resistance monitoring and prevention program and discuss how this has affected the daily life of veterinarians. The assumption is that reduction in resistance must come from a reduction in the use of antibiotics, in particular drugs that are critically important in human medicine. A key instrument has been a monitoring system for drug use. This system registers the amount of antibiotics used in individual herds and also the amount prescribed by each veterinarian. In addition, surveillance of selected resistances has been put in place, and it has been prohibited for veterinarian to make profit from sales of antibiotics. One cannot be the owner of a pharmacy and at the same time practice veterinary medicine. Also, official guidelines for antibiotic use have been issued. On top of official systems, the livestock industry has voluntarily decided not to use 3rd and 4th generation cephalosporin. This system has dramatically changes the emphasis of veterinarians from curing disease to preventing disease. The authorities perform close follow up on drug use on herd and practice level, and in pig industry, farmers are warned and asked to produce plans for health improvements in collaboration with their veterinarian, if the use of antibiotics in their herd is above a fixed value.

Key words: antibiotic resistance, monitoring and prevention, Denmark



DETERMINATION OF ANTHELMINTIC RESISTANCE IN GOATS AND SHEEP ON BASES OF FECAL EGG COUNT REDUCTION TEST AT LUGURUNI FARM, KIBAMBA- DAR ES SALAAM, TANZANIA

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Abstract

Nematode parasites are known to pose the biggest challenge for small ruminant production in Tanzania due to their resistance to the commercial anthelmintics. Under dosage and the frequency of treatment are likely to influence effect on the parasites control. The objective of this study was to determine the resistance of anthelmintic drugs in small ruminants. The Sheep and Goats aged between 6-12 months at Luguruni farm, Dar es Salaam with EPG of 150 or above were included in the trial. Three groups of 10 animals each were treated with Albendazole, Levamisole and Placebo respectively and followed up. A Modified McMaster Counting Chamber was used to determine the EPG while Hematocrit reader was used to record PCV values. The results on percentage reduction of EPG for Goats treated with Albendazole and Levamisole were 80% and 88.2%, respectively while for the Sheep the reduction were 60% and 73.13%, respectively. These findings indicate resistance to anthelmintic because the percentage reduction in EPG was less than 95%. The PCV as recorded in Sheep and Goats before and after treatment with anthelmintic drugs shows slight changes in terms of their values so this is convincing that there was less burden of *Haemonchus contortus*. It is concluded that compliance with recommended dosage and frequency should be observed while administering anthelmintics.

Key words: Albendazole, Levamisole, Percentage reduction of EPG, Resistance to anthelmintic



PREVALENCE OF TREMATODE INFECTION IN CATTLE AND COMMON FLUKECIDES USED AGAINST FLUKES IN KILOSA DISTRICT

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Abstract

Trematode infection in ruminants causes severe economic losses by causing acute and chronic disease in cattle. The study was conducted to investigate the occurrence of trematode infection in cattle and in the snail intermediate hosts in Kilosa district. A total of 341 cattle were examined for the presence of trematode infections using the Flukefinder® method. Snail intermediate hosts were collected from selected water bodies using scooping method. Structured questionnaire was used to establish the availability of anthelmintics used for treatment of trematode infections. The overall prevalence of *Fasciola gigantica* and amphistomes was 8.5% and 49.3%, respectively. The differences in level of infections between sex groups were not statistically significant for both *Fasciola* and amphistomes. The differences in the level of infections between body score condition were statistically significant for *Fasciola* ($p < 0.05$) and for age group the level of infections were statistically significant for amphistomes ($p < 0.05$). The identified snail intermediate hosts included *Lymnaea natalensis* and *Bulinus* species. The snail population density was low in December and April and started to increase in June after the rainy season. Furthermore, the study has shown that Albendazole, combination of Levamisole and Oxyclozanide (Nilzan plus®) and Nitroxylin (Trodax®) were the main anthelmintics used for treatment and control of trematode infections in cattle in the district. The present study has clearly shown that trematode infection is prevalent in cattle in Kilosa district making it necessary for further longitudinal studies on seasonal variation of snail intermediate hosts population, infection rates and disease pattern in cattle so that an effective control programme can be devised.

Key words: trematode infection, cattle, anthelmintics, Kilosa district, Tanzania.



ABATTOIR SURVEY OF *TRICHINELLA* INFECTIONS IN PIGS OF TANZANIA

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Abstract

Trichinellosis is a human zoonotic disease caused by larval and adult stages of parasitic nematodes belonging to the genus *Trichinella*. The parasite has a wide range of host species, mostly mammals. Humans acquire the infection by eating raw or inadequately cooked meat infected by larvae present in the muscle cells. Worldwide, the most common sources of human infections are pig, wild boar and other game meat. In Tanzania, a human outbreak with several deaths occurred for the consumption of warthog meat in 1977. *Trichinella nelsoni* has been documented in carnivores and warthogs of Serengeti. An abattoir survey was conducted in five regions of Tanzania to determine the prevalence of the nematode in domestic pigs slaughtered for human consumption in the framework of an OIE Twinning project. At least five grams of diaphragm muscle was taken from each sampled carcass. A total of 1,078 adult pigs were randomly sampled in Arusha (163), Dar es Salaam (291), Dodoma (236), Iringa (297), and Kilimanjaro (91). Magnetic stirrer method was used to digest the muscles for 30 minutes at 44-46°C, and the digested liquid was left to sediment for another 30 minutes. The sediment was examined under a dissecting microscope at magnification of X10. No *Trichinella* larva was detected. This result suggests that the prevalence of *Trichinella* infection in domestic pigs of Tanzania if any, is lower than 1%. From these findings it can be concluded that the pork entering the food chain at the time of this study was safe from *Trichinella* infections.

Key words: Magnetic stirrer, meat-borne infection, *Trichinella* larvae, Zoonosis



SEROLOGICAL INVESTIGATION OF MULTIFACTORIAL CAUSAL OF FATAL OUTBREAK OF DISEASES WITH RESPIRATORY SIGNS IN SHEEP AND GOATS IN LOLIONDO, TANZANIA

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Abstract

Transboundary respiratory diseases of small ruminants cause significant economic losses in the livestock industry. A case study was conducted to establish the cause(s) of severe mortalities reported in goats and sheep reported in Loliondo. This involved flock examination in six randomly selected flocks where a total number of 1,216 sheep and 386 goats were examined. From the examined animals, blood samples were collected from 59 sheep and 181 goats that were clinically sick during physical examination. Competitive Enzyme Linked Immunosorbent Assay (cELISA) was conducted used to detect antibodies against Peste des Petits Ruminants (PPR) in serum samples collected from sheep and goats while an enzyme immunoassay IDEXX CCPP was used to detect antibodies against *Mycoplasma capricolum* subsp. *capripneumoniae* (Mccp) in the serum samples collected from goats only. It was found that 38.4% and 56.7% of the sheep and goats examined respectively showed different clinical signs. Major clinical signs observed in examined goats and sheep were nasal discharge and diarrhea that were presented in combination or as single sign. Other less common signs were nodular lesions, excessive salivation, emaciation, sub-mandibular oedema and corneal opacity. Laboratory results indicated that 71.2% of sheep samples and 75.7% of goat samples were positive for PPR while 48.6% of goat samples were positive CCPP. It is concluded that mixed infections of both PPR and CCPP were responsible for the fatal outbreak and mortalities reported in goats and sheep in Loliondo area. Investigation of other possible causes of mortalities in small ruminants need to be carried out so that a comprehensive plan to control and prevent infectious diseases of small ruminants in Ngorongoro district can be devised.

Key words: Causes of mortalities, PPR, CCPP, Loliondo, Tanzania.



PREVALENCE AND RISK FACTORS FOR ASCARIOSIS AND CRYPTOSPORIDIOSIS IN SMALLHOLDER PIG PRODUCTION SYSTEMS IN ULANGA DISTRICT, TANZANIA

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Abstract

Diseases in particular parasitic infection is among the drawback to profitable pig production since parasites compromise the production and reproduction performance of pigs. The objective of this cross-sectional study was to estimate the prevalence and identify risk factors for ascariasis and cryptosporidiosis in pigs reared under smallholder farming systems in Ulanga District, Tanzania. A total of 243 pigs of different ages and sexes were selected for faecal sample examination using floatation and Modified Ziehl-Neelsen techniques. Questionnaire survey was conducted to 48 pig smallholder farmers to assess knowledge, perceptions and practices (KPPs) in relation to ascariasis and cryptosporidiosis. The results showed that the prevalence of ascariasis was 11.5% and that of cryptosporidiosis was 11.9%. Factors such age, feeding system, housing and breeding type were statistically significant ($p < 0.05$) as risk factors for ascariasis and cryptosporidiosis. Gastrointestinal parasites infestation is a problem in intensively managed pigs in Ulanga district. Proper control measures of gastrointestinal parasites are recommended including good management system especially to young pigs, better feeding, housing and breeding systems and disposal of manure.

Key words: ascariasis, cryptosporidiosis, pigs, smallholder farmers, Ulanga district, Morogoro.



THE 'SOCIAL, ECONOMIC AND ENVIRONMENTAL DRIVERS OF ZONOSSES' STUDY: METHODS AND INITIAL OUTPUTS FROM AN INTERDISCIPLINARY PROJECT

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Abstract

Livestock-based livelihoods are undergoing rapid transition across Tanzania. Urbanisation is contributing to increasing demand for milk and meat, with associated intensification of livestock production and changes in the dynamics of livestock marketing. Changing patterns of livestock production are expected to contribute to changes in zoonotic disease risk. The 'Social, Economic and Environmental Drivers of Zoonoses' study is a collaborative research project using inter-disciplinary methodologies from social science, epidemiology and economics to identify and assess drivers of change in livestock systems and the implications for zoonotic threats in Tanzania. The study is conducting in-depth quantitative and qualitative data collection in 20 communities across northern Tanzania, including sampling of 7,000 ruminant livestock and testing for exposure to *Brucella* spp., *Coxiella burnetii* and Rift Valley fever virus. People from the same communities are also being tested for exposure to these pathogens. This paper describes the methodology used for this on-going study, with initial outputs from serological testing of samples and exploratory risk factor analysis. To date, the seroprevalence of brucellosis has been established to be 2.5% (95% CI 2.3-3.5), an estimate that is expected to increase as more pastoral systems are tested. The project represents a major advance in approaches to understand of zoonotic disease risks in the context of environmental, social, economic, demographic and governance changes affecting livestock production systems.

Key words: collaborative research, livestock production systems, drivers, zoonoses, Tanzania.



MOLECULAR DIVERSITY OF *THEILERIA PARVA*: A CASE STUDY IN KILOSA DISTRICT, MOROGORO, TANZANIA

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Abstract

Theileria parva (*T. parva*) is an apicomplexan protozoan parasite which causes East Coast fever (ECF) in the Eastern and Central Africa. A study was conducted to determine the diversity of *T. parva* strains circulating in cattle in Kilosa district, Morogoro region during the period of February to May 2012. Also ECF cases reported in Veterinary Investigation Centres (VICs) from 2008 to 2009 were analysed retrospectively. A total of 100 cattle and 95 ticks were investigated. Conventional polymerase chain reaction (PCR) was used to determine the diversity of *T. parva* by amplification of surface protein (p67). The study revealed the existence of two strains of *T. parva* with 800bp and 900 bp respectively. It indicated that *T. parva* allele in Kilosa was not from the imported ECF trivalent vaccine ("Muguga cocktail") currently in use. Also the retrospective analysis on ECF cases in the VICs showed lower prevalence of ECF compared to the prevalence reported by other workers in the respective VICs zones. These findings call for more study on genotype diversity and spatial distribution of *T. parva* in cattle and wild animals in the different grazing lands in Tanzania. Also VICs are required to improve their diagnostic facilities and database.

Key words: Indigenous cattle, pastoralists, ECF, Molecular epidemiology.



PREVALENCE OF MASTITIS IN DAIRY CATTLE AT MAGADU FARM, MOROGORO-TANZANIA

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Abstract

Mastitis is among the major factors contributing to reduced milk production in dairy cattle. This study was carried out to determine the prevalence of mastitis at the Magadu Dairy Farm, Sokoine University of Agriculture. A total of 19 milk samples were cultured on blood agar and MacConkey agar at 37°C for 48 hours to identify microorganisms present in the milk. Purified cultures were gram-stained for microscopic examination and were further subjected to biochemical tests for identification of isolates to the species level. To determine antibiotics suitable for treatment, antimicrobial susceptibility test were done. All samples collected showed the presence of microorganisms, with *Staphylococcus* spp. being the most common at 44.6% of the total isolates. Based on the zone of inhibition, Kanamycin and Norfloxacin showed to be the best drugs of choice for the treatment of mastitis pathogens. The economic losses due to reduction in milk yield, changes in milk composition and discarded milk are serious burden to the dairy industry. Mastitis can be subclinical, therefore, it is important to screen dairy animal frequent to determine the health and milk production. Assessment of antibiogram is also recommended to guide choice of antibiotics to use during treatment.

Key words: mastitis, microorganisms, milk, Magadu dairy farm.



EVALUATION OF SAPONIN CONCENTRATION MICROSCOPY FOR THE DIAGNOSIS OF BORRELIOSIS

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Abstract

Borreliosis is a multi-system zoonosis resulting from human infection with spirochetes of the genus *Borrelia*, and often transmitted by tick bite. In most low-resource clinical settings, borreliosis is diagnosed by microscopic examination of blood films. This study sought to evaluate the Saponin concentration technique for improvement of the microscopic diagnosis of borreliosis. A cross-sectional, hospital-based study enrolled 311 febrile children aged 2-59 months from Manyara region, northern Tanzania between October 2015 and January 2016. Venous blood was drawn into EDTA tubes from which blood films were made and stained with Giemsa for microscopic examination. Whole blood was then haemolysed, fixed in 1% Saponin-formalin solution, concentrated by centrifugation and used to prepare a blood film for microscopic examination. All samples were further subjected to a quantitative real-time *Borrelia* DNA PCR assay targeting the GlpQ gene and results compared. *Borrelia* infection was detected in 17 (5.5%) children by Giemsa and 72 (23.2%) by Saponin concentration microscopy. The *Borrelia* qPCR detected borreliosis in 37 (11.9%) children; 29 (9.7%) children were positive with both PCR and the Saponin concentration technique (K = 0.443). Saponin concentration showed a sensitivity of 78.4%, specificity 84.3%, PPV 40.3, NPV 96.3 and diagnostic odd ratio of 19.5 against qPCR. Using qPCR as a reference test, Saponin concentration microscopy provides a cheap and better performing diagnostic tool for borreliosis compared to Giemsa microscopy. The method, while comparable in performance to Giemsa, provides a robust substitute for diagnosing borreliosis in resource limited areas.

Key words: Diagnosis, borreliosis, microscopy, "saponin concentration"



CYANOBACTERIA AND CYANOBACTERIAL TOXINS IN THE ALKALINE-SALINE LAKES NATRON AND MOMELA, TANZANIA

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Abstract

Physicochemical parameters, phytoplankton communities, microcystin (MC) concentrations and potential MC-producing cyanobacteria were investigated in Lakes Natron and Momela, Tanzania. In Lake Big Momela, concentrations of soluble reactive phosphorus, nitrate and ammonia were 7.1, 2.6 and 0.9 µg/L respectively while dissolved oxygen, salinity, conductivity and pH were 9.4 mg/L, 19‰, 30 mS/cm and 9.7 respectively. The concentrations of soluble reactive phosphorus, nitrate and ammonia in Lake Natron were 129.4, 8.1 and 58 µg/L respectively while dissolved oxygen, conductivity and pH were 8 mg/L, 52 mS/cm and 9.5 respectively. The phytoplankton communities in both lakes were dominated by cyanobacteria, particularly *Arthrospira fusiformis*. *Navicula* and *Nitzschia* diatoms, and *Chlorella*, *Chlorococcum* and *Scenedesmus* green algae were common in Lakes Momela and Natron. Using liquid chromatography–mass spectrometry (LC-MS) analysis, MC-RR, -YR, -LR and -RY were detected in phytoplankton. The total MC concentrations in Lake Natron were 0.1–4.5 µg/mL of phytoplankton scum and in Lake Momela were below quantifiable levels. Polymerase chain reaction analysis of phytoplankton revealed presence of *Microcystis* and the *Microcystis mcyB* gene in some samples. Finding of potential MC-producing cyanobacteria and MCs in study lakes poses a health risk to Lesser Flamingo which feed on cyanobacteria.

Key words: Microcystin concentration, cyanobacteria, physicochemical parameters, Lake Natron, Momela



DIAGNOSIS OF HUMAN FASCIOLIASIS IN ARUSHA REGION, NORTHERN TANZANIA BY MICROSCOPY AND CLINICAL MANIFESTATIONS

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Abstract

Human fascioliasis is a zoonotic disease that has been identified in many countries worldwide. Fascioliasis is included among the WHO's Neglected Tropical Diseases as a food-borne zoonosis, acquired from infected livestock as the primary host. Human fascioliasis has not been described before in the East Africa region, including Tanzania. Patients presenting at a primary healthcare centre in Arusha region, northern Tanzania provided fresh stool samples for routine ova and parasite screening (saline and iodine preparations). Subsequent stool samples were preserved in 5 % formalin in saline and subjected to ether sedimentation for microscopic examination and identification. Out of 1460 patients screened, 305 (20.9%) were diagnosed positive for fascioliasis based on the demonstration of brownish, oval eggs with inconspicuous opercula, typical of *Fasciola* infection in their stools. Two distinct egg sizes were identified; large 170–212.5 by 115–150 μm (mean 194.5 by 130.5 μm) and smaller eggs 120–150 by 87.5–112.5 μm (mean 138.8 by 101 μm). Clinically, patients presented with fever (99%) and abdominal pain (90%). Some patients (6%) had pruritis around the mouth and their lips were swollen. Three patients were treated and cured with single dose Triclabendazole. The remaining 302 patients were treated with Nitazoxanide and 122 (40.4 %) were cleared of infection with a single course. Snails of the genus *Lymnaea* were found in the surroundings. This report serves to remind medical professionals in East Africa that human fascioliasis is a probable differential diagnosis in patients presenting with similar symptoms. It is possible to diagnose fascioliasis by light microscopy although specific antigen tests are required for confirmation. Human fascioliasis however, has not been described or reported in Tanzania before and this demands further investigation.

Key words: Human fascioliasis, diagnostic microscopy, treatment, northern Tanzania.



ANTIMICROBIAL RESISTANCE IN FOOD-BORNE ENTERIC PATHOGENS AND COMMENSALS

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Abstract

Antimicrobial resistance is a serious public health threat causing concern for both human and animal health. Uncoordinated poultry production, poor veterinary services, and ease of purchase of antibiotics may cause indiscriminate use of antibiotics among Tanzanian farmers, possibly imposing selective pressure on gastrointestinal commensals and pathogens like *E. coli* and *Salmonella*. This study will investigate whether chicken production in Northern Tanzania plays a role in the spread of antimicrobial resistant *Salmonella* and commensal-derived resistance determinants to humans through the food chain. We will compare the prevalence of antimicrobial resistant *Salmonella* and *E. coli* in chicken across different poultry production systems, and examine whether there is linkage between the prevalence of resistance in *Salmonella* and *E. coli* and poultry production systems. Focus will be drawn to four production systems comprising of extensive, semi-intensive, indigenous intensive and broiler intensive. Four hundred cloacal samples from chicken will be collected from Arusha urban and rural areas. In this cross-sectional study, ten wards will be randomly chosen, with random or purposive selection of one representative farm per production system in each ward. Per farm, 10 chickens will be sampled. Standard microbiological and polymerase chain reaction (PCR) methods will be used to detect and confirm the presence of *Salmonella* and *E. coli*. Antimicrobial susceptibility of the strains will be screened using Kirby-Bauer disk diffusion testing on Muller-Hinton agar. Preliminary results suggest that the prevalence of *Salmonella* in cloacal swabs is low. Results for the majority of farms will be available in December.

Key words: Antimicrobial, Resistance, Determinants, Antibiotics, Susceptibility.



RISK FACTORS ASSOCIATED WITH PREVALENCE OF *SALMONELLA* AND *CAMPYLOBACTER* IN CHICKEN FROM DIFFERENT PRODUCTION SYSTEMS IN ARUSHA DISTRICT, TANZANIA

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Abstract

Despite the important role in the economy and social life in Tanzania, the poultry industry has potential of posing consumers to public health risks associated with zoonotic infections and food-borne diseases. Non-typhoidal *Salmonella* and *Campylobacter* spp. are two of the most important food-borne zoonotic pathogens. Risk factors at the farm level that are associated with the occurrence of *Salmonella* spp. and *Campylobacter* spp. in chicken from different rearing system in Tanzania are not well documented. This study is designed to assess risk factors associated with prevalence of *Salmonella* and *Campylobacter* in chickens from different production systems in Arusha District. The study will involve collection of environmental samples and cloacal swabs for laboratory investigation. Collection of information on management practices in each production system will involve a cross-sectional survey and in-depth interviewing of poultry keepers using semi-structured questionnaires. The information will help in advising poultry farmers on better management practices to reduce the *Campylobacter* and *Salmonella* load in chicken and along the food chain. Ten of 25 wards will be randomly selected. In each ward, one household will be selected per production system (Intensive Broiler, Intensive Indigenous, Semi-intensive indigenous, and Extensive Indigenous). The total number of farmers to be interviewed is 40 and 400 chickens will be sampled for cloacal swabbing. For environmental samples, one pair of boot swabs will be collected from each farm. The samples will be analysed in the KCRI Zoonoses laboratory using standard bacteriology methods. Surveys will be completed in December and preliminary results will be presented.

Key words: chicken, *Salmonella*, *Campylobacter*, risk factors, questionnaire, survey.



ENTRY POINTS TO STIMULATION OF EXPANSION IN HIDES AND SKINS PROCESSING: A CASE OF MASWA DISTRICT, TANZANIA

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Abstract

A study was carried out in Maswa, Tanzania to explore potential avenues for stimulating expansion in hides and skins processing. One hundred and eighteen respondents were interviewed and the gathered information analysed using SPSS. It was observed that 89.8% of the respondents' households keep livestock with numbers averaging at 11.85 ± 1.1 , 7.34 ± 0.68 and 5.61 ± 0.88 for cattle, goats and sheep, respectively, but 75.4% of the respondents don't sell hide or skin. The mean number of hides and skins sold per household per year and their prices (in TZS) for the year 2015 were 0.36 ± 0.103 and 2173.7 ± 574.7 for cattle, 0.22 ± 0.064 and 342.3 ± 84.7 for goats and 0.07 ± 0.34 and 280 ± 73.5 for sheep, respectively. Over 65% of the respondents use hot iron branding for animal identification. Animal slaughter was reported by 50.8% of the respondents to be done at backyard using normal knives. Sun drying on the ground, which was used by 42.4% of the respondents was found to be the major drying method. Only 3.4% of respondents add value to hides and skins by processing. Low quality of the raw material and inadequate skills were the leading constraints to industrial hides and skins processing whereas tick biting was the most important disease affecting hides and skins. For this status of the chain, it was proposed that a workable intervention model has to encompass placement of tanneries and slaughter slabs in the chain as new actors, linking chain actors, improving services especially for livestock dipping, and reinforcing for compliance to stringent requirements regarding hides and skins production at all segments.

Key words: Livestock chains, value addition, leather industry, intervention options



PROTECTING PEOPLE AND ANIMALS FROM HIGH-IMPACT DISEASE THREATS – FAO’S COMPONENT OF THE USAID’S EMERGING PANDEMIC THREATS PHASE – 2 PROGRAMME

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Abstract

Effective prevention and control of emerging and re-emerging infectious diseases in animals entails good understanding about the drivers that underpin the emergence, spill-over, spread and persistence of pathogens. Risk factors as agro-ecological, anthropogenic, socio-economic and demographic factors influence the emergence, spill-over, spread and persistence of pathogens. To this effect, timely and good-quality information and data about such drivers of disease emergence are needed in order to support decision making for disease prevention and response. A multi-sectoral and interdisciplinary surveillance system is crucial to enhance understanding of disease epidemiology at animal-human interfaces where diseases are likely to emerge. Leveraging on its vast experience from the influenza surveillance and response in Africa, Asia and the Middle-East, FAO through the USAID’s Emerging Pandemic Threats Phase-2 Programme (EPT-2) has expanded its surveillance activities to include other zoonotic viruses with pandemic potential in high risk livestock populations. In recognition of the dynamics of disease drivers associated with zoonotic viruses of pandemic potential, FAO’s risk-based surveillance will focus on understanding the role of livestock in the epidemiology of filo-, flavi-, influenza-, corona- and paramyxoviruses targeting livestock populations at the wildlife-livestock interfaces. To achieve the goal of this surveillance program, a multi-disciplinary and multi-sectoral approach (One Health approach) is applied to ensure that joint surveillance of priority viral families in wildlife, livestock, and humans is carried out at key animal-human interfaces.

Key words: FAO, USAID, EPT-2, risk-based, surveillance, One Health, disease drivers, zoonoses



NOTES