

One Health Pathways for Sustainable Livestock and Food Security

SOUVENIR

16th NATIONAL VETERINARY CONFERENCE (VETCON '26)

Chitra 27-28, 2082 (10-11 April, 2026)

Manigram, Rupandehi, Nepal



NEPAL VETERINARY ASSOCIATION

Tripureshwor, Kathmandu

Tel. No. : +977-1-5357496

Email : nveta2024@gmail.com/editor@nva.org.np

Veterinarian's Oath



Being admitted to the profession of Veterinary medicine, I solemnly swear to use my scientific Knowledge and skills for the benefit of society through the protection of animal health, the relief of animal suffering, the conservation of livestock resources, the promotion of public health, and the advancement of medical knowledge.

I will practice my profession conscientiously, with dignity, and in keeping with the principles of Veterinary medical ethics.

I accept as lifelong obligation the continual improvement of my professional Knowledge and competence.

One Health Pathways for Sustainable Livestock and Food Security

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16th NATIONAL VETERINARY CONFERENCE (VETCON '26)

April 10-11, 2026

Venue : Dreamland Gold Resort and Hotel, Manigram, Rupandehi, Nepal

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Minister

Ministry of Agriculture and Livestock Development



Singha Durbar, Kathmandu
Email: gc.tharu07@gmail.com

Dear Nepal Veterinary Association Members,

I want to congratulate the Nepal Veterinary Association (NVA) for organizing the 16th National Veterinary Conference (VETCON'26), themed "One Health Pathways for Sustainable Livestock and Food Security."

This theme is highly relevant to Nepal's development priorities and is timely. The veterinary profession plays a crucial role in safeguarding animal health, public health, and environmental sustainability, especially amid emerging and reemerging diseases, antimicrobial resistance, and food safety concerns. Since its founding in 1967, NVA has been instrumental in fostering excellence in veterinary care, advancing scientific understanding, and fortifying professional unity. Veterinarians are now important leaders in ensuring food safety, animal welfare, and One Health in addition to being specialists in animal health.

Veterinarians play a crucial role in Nepal's rural economy, food and nutrition security, and agricultural development, as millions of farmers depend on livestock for their livelihoods. Their expertise is especially vital in tackling serious diseases such as African Swine Fever, Avian Influenza, Lumpy Skin Disease, and other zoonotic and transboundary diseases that directly affect trade, public health, and production.

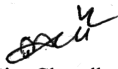
Strong veterinary services are vital for a healthy and competitive livestock sector, as recognized by the Nepali government. A capable and well-resourced veterinary workforce is key to effective disease monitoring, diagnostics, vaccination, biosecurity, food safety, and animal welfare. Thus, expanding veterinary capacity is essential to reduce financial losses, boost productivity, and ensure our population has access to safe and quality animal-derived foods.

I am confident that VETCON'26 provided a valuable platform for policy dialogue, knowledge exchange, and innovation. Such forums are essential in shaping a livestock and animal health system in Nepal that is well-coordinated, science-based, and future-oriented.

I want to thank all the organizers, specialists, and attendees for their valuable contributions. I hope the veterinary profession continues leading Nepal's path towards safer food, healthier animals, protected livelihoods, stronger One Health systems, and a more prosperous nation.

Once again, congratulations on successfully organizing VETCON'26 and best wishes for its grand success.

With best regards,


Hon. Gita Chaudhary
Minister,
Ministry of Agriculture and Livestock Development



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Office of the Vice Chancellor
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Date: April 5, 2026

Message

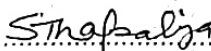
I am delighted to send my warm greetings and best wishes for the 16th National Veterinary Conference (VetCon 2026), organized by the Nepal Veterinary Association. I also want to congratulate the organizer, editorial board, and all contributing authors, for making this esteemed event possible under the theme "*One Health Pathways for Sustainable Livestock and Food Security*".

As we face global challenges from emerging and re-emerging zoonotic diseases, antimicrobial resistance, climate change, and environmental degradation that led to food system vulnerabilities, the conference will open the door to expanding the horizons of veterinary science beyond clinical aspects. In this regard, the conference theme is strategically aligned with both national and global priorities and commitments to health, sustainable animal agriculture, and ecosystem resilience.

The Agriculture and Forestry University (AFU) is committed in advancing education, research, and innovation in the field of agriculture, veterinary science, and natural resource management. As a leading academic institution in the country, AFU internalize the role of veterinary professionals in improving livestock productivity, protecting public health, and supporting economic development. Scientific events like VetCon 2026 will serve as crucial platforms for encouraging intellectual exchange, foster interdisciplinary collaboration, and turning scientific insights into practical solutions that benefit farmers, communities, and the entire nation.

Once again, I extend my heartfelt congratulations to NVA and all stakeholders involved in organizing this conference. I wish grand success of the conference and confident that it will bring meaningful impact on the advancement of veterinary science, one health, and sustainable livestock development.

Thank you


Prof. Sharada Thapaliya, PhD
Vice Chancellor

Vice-Chancellor



Government of Nepal
Ministry of Agriculture & Livestock Development
Department of Livestock Services
Harihar Bhawan, Lalitpur

5421610 5444725
5422056 5522059
5425733 5350717
5431007 5350719

Website: www.dls.gov.np

Email: dg@dls.gov.np (DG)

dlsplanningmonitoring@gmail.com

Ref:



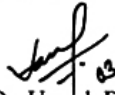
It is my great pleasure to present this compilation of proceedings from the National Veterinary Conference 2026 on the theme "*One Health Pathways for Sustainable Livestock and Food Security*." This theme is both timely and highly relevant to Nepal, where livestock farming is integral to rural livelihoods, nutrition, and national economic development.

Nepal has made notable progress in institutionalizing the One Health approach, as envisaged by the One Health Strategy, 2019, through strong multisectoral collaboration among the animal, human, and environmental health sectors. Priority zoonoses such as rabies, avian influenza, brucellosis etc continue to be addressed through coordinated national programs, avian influenza surveillance, and integrated disease control strategies. Likewise, combating antimicrobial resistance (AMR) remains a key national priority. Nepal's *National Action Plan on Antimicrobial Resistance (NAP-AMR, 2024-2028)* guides coordinated efforts across sectors to promote the prudent use of antimicrobials (AMU), strengthen surveillance, and improve awareness.

The Department of Livestock Services plays a critical role in advancing the One Health approach as a central pillar for sustainable livestock development and national food security. By fostering cross-sectoral collaboration, strengthening evidence-based policymaking, and investing in resilient animal health systems, and promoting farm-level biosecurity, the Department aims to ensure the availability of safe, nutritious, and sufficient animal-source foods for the population. Continued emphasis on disease prevention including zoonoses, responsible antimicrobial use, food safety, and environmental stewardship will be essential to achieving long-term sustainability and improving the livelihoods of farming communities across Nepal.

I would like to express my sincere appreciation to all authors, organizers, and participants for their dedicated efforts in making this conference and publication a success. I am confident that the insights and recommendations presented herein will further promote interdisciplinary collaboration and advance the One Health agenda in Nepal.

The Department of Livestock Services remains committed to promoting a holistic, science-based approach to livestock sector development in alignment with national priorities and global One Health principles. Together, let us continue to work towards safeguarding the health of animals, people, and ecosystems for present and future generations.


03 April 2026

Dr. Umesh Dahal
Director General
Department of Livestock Services, Nepal



नेपाल भेटेरिनरी एसोसिएसन NEPAL VETERINARY ASSOCIATION



It is a great privilege to announce that the Nepal Veterinary Association (NVA) will convene its Annual General Assembly alongside the 16th National Veterinary Conference (VETCON 2026). This year's conference is centered on the timely and globally significant theme: *"One Health Pathways for Sustainable Livestock and Food Security."* We warmly invite all participants to join us on 10–11 April 2026 (Chaitra 27–28, 2082) in Rupandehi.

As the leading professional organization representing veterinarians in Nepal, the NVA remains committed to advancing clinical excellence, fostering academic and scientific innovation, and strengthening professional solidarity. Our mission is to promote veterinary science and practice in ways that enhance animal health and welfare, inform evidence-based policy, and proactively address emerging and transboundary diseases. Through collective action, we not only safeguard the integrity of our profession but also contribute significantly to protecting public health from zoonotic threats.

VETCON 2026 is envisioned as a dynamic platform for meaningful dialogue, knowledge exchange, and interdisciplinary collaboration. It aims to bridge gaps across sectors and explore innovative tools and technologies that strengthen prevention, preparedness, and response systems. This gathering comes at a critical juncture, as Nepal intensifies its efforts toward global commitments such as the eradication of Peste des Petits Ruminants (PPR), control of Foot and Mouth Disease (FMD) and the elimination of dog-mediated rabies by 2030. The NVA reaffirms its full commitment to working in close partnership with the Government of Nepal and international stakeholders to ensure effective implementation of surveillance, vaccination, and control strategies.

Beyond disease control, we strongly advocate for the "One Health" approach, recognizing the interconnectedness of animal health, human health, and environmental sustainability. By embracing this holistic perspective, we aim to enhance food security, promote sustainable livestock production, and elevate the veterinary profession to meet global standards of excellence and competitiveness.

The success of VETCON 2026 is fundamentally rooted in the contributions of our scientific community. We extend our sincere appreciation to all researchers, authors, and presenters whose dedication to scientific inquiry and evidence generation continues to drive progress in livestock, poultry, and companion animal sectors.

We also express our heartfelt gratitude to NVA members, organizing committees, partners, and supporters whose unwavering efforts have made this event possible.

To all national and international delegates, we extend a warm welcome to Rupandehi. We trust that your participation will be both professionally enriching and personally rewarding, and that the collaborations fostered here will contribute to meaningful advancements in veterinary science and practice.

Dr. Kedar Subedi

President, Nepal Veterinary Association

Nepal Veterinary Association, Veterinary Complex, Tripureshwor, Kathmandu, Nepal
Tel/Fax: +977-1-5357496, Email : nveta2024@gmail.com, URL: www.nva.org.np

Editorial

It is our immense pleasure to present the abstract book of the 16th National Veterinary Conference (VetCon2026), organized by the Nepal Veterinary Association, with the theme “One Health Pathways for Sustainable Livestock and Food Security.” This conference envisaged a common platform to discuss policies, socioeconomics, and various disciplines of veterinary science through invited presentations by experienced scientists and faculty, as well as early-career scientists and students.

Veterinary science is at a critical intersection where animal health, human health, environmental sustainability, and food systems intertwine. The One Health paradigm and approach have been realized in academia as well as in field-level interventions. The abstracts, talks, and posters at this conference demonstrate that the Nepalese veterinary community is actively contributing to the implementation of the One Health concept and to food safety and security. The sector is contributing through multidisciplinary research & innovation to address issues in zoonotic diseases, food safety, eco-health, and sustainable livestock production. It also demonstrates the expansion of the veterinary sector into digital innovations, reproductive biotechnology, wildlife, and biobanking. The conference highlights the integration of emerging technologies such as artificial intelligence, digital pathology, mobile-based applications, and hybrid learning platforms.

Science will not move ahead without collaboration. The papers that will be presented at this conference reflect a strong collaboration and partnerships among academia, policy institutions, development partners, and international organizations. Such collaborative efforts are crucial for generating high-quality evidence, uplifting institutional capacity, and ensuring the research findings are translated into actionable policies and programs. The active participation and solidarity from multidisciplinary stakeholders from universities, research centers, regulatory bodies, entrepreneurs, and field practitioners demonstrate the strong commitment to advancing the profession within a One Health framework and a sustainable livestock production system.

We extend our sincere appreciation to all authors, reviewers, participants, and helping hands for their dedication and well wishes. We hope the outcome of the conference will catalyze meaningful dialogue, foster interdisciplinary collaboration, and drive transformative efforts for holistic professional development.

Thank you.
Himal Luitel, PhD
Editor-in-Chief
&
Editorial team

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Policy and Socioeconomic

Advancing Veterinary Regulation: Global Insights and Opportunities for Nepal

Prajwal Regmi^{1,*}

¹United States Food and Drug Administration

*Presenting Author Contact: prajwal.regmi@gmail.com

Veterinary regulatory systems are central to advancing the One Health agenda by ensuring the safety, quality, and efficacy of veterinary medical products, preventing zoonotic diseases, and supporting sustainable livestock production and food security. In an increasingly interconnected world, regulatory frameworks vary in structure and capacity, yet share a common mandate to protect animal, human, and environmental health.

Drawing on global regulatory models and experience from the United States, Canada, and Nepal, this presentation will provide a high-level overview of veterinary regulatory approaches worldwide. Key areas of focus include regulatory oversight of veterinary drugs, biologics, and medicated feeds, as well as alignment with international standards within a One Health framework.

The presentation will further examine opportunities for capacity building and resource sharing to strengthen Nepal's veterinary regulatory systems, supporting sustainable livestock development and resilient food systems. Strengthened regulatory systems can enhance food safety, improve animal health outcomes, and reinforce Nepal's contribution to global health security. This discussion will highlight practical, context-specific strategies to advance regulatory effectiveness while promoting sustainable livestock systems and long-term food security.

Keywords: *Veterinary Regulation, Drug, Safety, Effectiveness, Food Security*

Strengthening Foodborne AMR Surveillance, Raising Awareness, and Addressing AMR Regulatory Gaps: FAO's Strategic Support to Government Initiatives

Sakar Siwakoti^{1,*}

¹ Food and Agriculture Organizations of the United Nations, Nepal

*Presenting Author Contact: sakarvet@gmail.com, +977- 9841330281

AMR in the food value chain poses a growing threat to public health, food safety, and sustainable livestock production. In alignment with national priorities and the One Health approach, the FAO ACT project has played a catalytic role in strengthening foodborne AMR surveillance, enhancing awareness, and addressing regulatory gaps in AMR containment through strategic collaboration with the Government of Nepal. FAO has supported the initiation of joint foodborne AMR surveillance across the poultry food value chain, bridging the animal and food sectors. Continued surveillance efforts have generated critical evidence on AMR trends within the poultry value chain supporting government stakeholders in informed decision-making.

The FAO, along with youth organizations, implemented youth-led and youth-targeted foodborne AMR and food safety campaigns to promote food safety and raise awareness. Engaging young advocates as change agents has expanded outreach and fostered community level dialogue on responsible AMU, consumer awareness, and widespread messages across the nation. Complementing these efforts, a mixed-methods study combining quantitative surveys and qualitative insights was undertaken to assess the knowledge, attitudes, and practices (KAP) of poultry farmers. The study further explored the socio-economic and behavioral drivers that constrain the adoption of prudent AMU practices. Additionally, the study indicated that behavioral-based awareness and communication strategies need to be considered along with knowledge based to encourage farmers to adopt best practices. In parallel, the project conducted a comprehensive review with recommendations regarding Nepal's AMR regulatory framework in alignment with Codex standards, identifying key gaps and inconsistencies that limit effective implementation and cross-sectoral coordination.

In conclusion, sustaining and scaling integrated AMR surveillance across all major food value chains, ensuring continuous evidence generation, strengthening regulatory coherence and enforcement mechanisms, and expanding behavior change interventions are essential for the containment of AMR and ensuring food safety.

Keywords: *Codex, Foodborne AMR, Food Safety*

Digital Pathology and Artificial Intelligence for Veterinary Disease Diagnosis and Education in developing countries like Nepal

Dinesh Kumar Singh^{1,*}

¹Tribhuvan University

*Presenting Author Contact: dksnl@yahoo.com, +977- 9845023132

Computational pathology, driven by digital pathology and artificial intelligence (AI), offers a transformative potential to revolutionize clinical and veterinary diagnostics in developing countries like Nepal. In resource-limited settings, these technologies promise faster, more accurate diagnoses and enhanced treatment planning by enabling objective data analysis and telepathology. However, widespread adoption in Nepal faces significant translational barriers, including high upfront costs for scanning equipment, unstable internet and power infrastructure, and a critical scarcity of large, population-specific annotated datasets. Furthermore, a lack of computational expertise among pathologists and the ongoing challenge of “brain drain” hinder the sustainable integration of these tools into routine practice.

To overcome these obstacles, a strategic approach prioritizing cost-effective technologies is essential. Static telepathology, which utilizes cameras or smartphones mounted on traditional microscopes, and the adoption of open-source software platforms such as QuPath or ImageJ, provide accessible entry points for organizations with limited financial resources. Success further depends on forging international collaborations to facilitate knowledge transfer and the development of localized regulatory frameworks that address data privacy and ethical AI validation. Additionally, integrating digital competencies into academic curricula at institutions like Tribhuvan University, Agriculture and Forestry University, and Purbanchal University is vital to prepare the next generation of pathologists for this digital shift. Ultimately, implementing a structured roadmap focused on pilot projects and infrastructure enhancement can bridge the diagnostic gap between underserved regions and global expertise, significantly improving animal and human health outcomes in Nepal.

Keywords: *Artificial Intelligence, Digital Pathology, Nepal, Resource-limited Settings, Telepathology*

Milky Way: Transforming Dairy Sector of Nepal

Lekh Nath Adhikari^{1,*}

¹Livestock Technology and One Health, Heifer International Nepal

*Presenting Author Contact: lekhnath.adhikari@heifer.org, +977-9801182972

The Milky Way Program (MWP) is a 5-year (2023–2028) transformative initiative designed to strengthen Nepal's dairy sector through in collaboration with the government of Nepal including MoALD, DLS, NARC, NLBOs, provincial and local governments. The program responds to persistent structural challenges, including low productivity associated with poor genetics, inappropriate feeding management, poor access to appropriate technologies and spectrum of economic and zoonotic diseases and parasitic problems, weak market systems, and fragmented policy implementation. Approximately three million households are engaged in dairy farming, yet productivity and competitiveness remain constrained.

MWP aims to collaborate with 200,500 smallholder dairy farm families to achieve resilient and thriving livelihoods by integrating interventions across production, service delivery, markets, and governance. The program promotes model dairy villages as centers of excellence, focusing on improved genetics through community-managed nucleus herds and resource centers for dairy animals, climate-smart husbandry practices, and regenerative resource management to enhance productivity while minimizing environmental impact. It strengthens farmer institutions like Milk Producer Cooperatives and their district and central associations as key drivers of dairy system governance and service delivery, technology extension and adoption enabling collective action, improved access to inputs, and market participation.

Market competitiveness is strengthened through financial inclusion, quality assurance, value addition, and formal market integration, alongside opportunities for import substitution and export of dairy products and genetic materials. The program also supports evidence-based policy reform, institutional coordination, and multi-stakeholder platforms for sustainable dairy development.

Aligned with national priorities, MWP adopts a scalable, inclusive model integrating economic, social, and environmental dimensions. It enhances genetics, productivity, and quality; reduces costs and environmental impacts; improves food and nutrition security; strengthens smallholder resilience; and transforms Nepal's dairy sector.

Keywords: *Climate-Smart Agriculture, Dairy Transformation, Food Systems Approach, Smallholder Farmers, Nepal*

Hybrid Distance Digital Training (HDDT) and Distance Continuous and Mentoring Education (DCME) Platform for Enhancing the Technical Capacity of VAHWs in Nepal

Garima Khanal^{1*}, Gopal Bhusal¹, Matthew Brooks², Conner Mullally³, Bhola Shankar Shrestha¹

¹Heifer International Nepal

²University of California, Davis

³University of Florida

*Presenting Author Contact: garima.khanal@heifer.org, +977-9861498015

Livestock is a vital income source for rural Nepalese households, yet smallholder farmers face significant gaps in veterinary expertise and market access. While Village Animal Health Workers (VAHWs/CAVEs) provide essential community-level care, they often lack ongoing technical support and modern management skills. However, household responsibilities frequently prevent women from accessing traditional residential training.

To address these barriers, Heifer Project International, in collaboration with the University of Florida through the financial support of USAID/FtF/UF/LSIL, piloted a hybrid distance digital training module for VAHWs in 104 cooperatives (300 candidates). A randomized controlled trial (RCT) was employed, and the results indicated that women were more motivated to enroll in and complete hybrid distance learning to become VAHWs than in the traditional mode of training. Being assigned to distance learning raises the probability of becoming a VAHW by nearly 30 percentage points, or about 55% relative to women assigned to traditional training.

Recently, it was noted that grassroots-level technicians, such as VAHWs, have limited opportunities to upgrade their skills and knowledge. Therefore, the Hybrid Distance Digital Training Tool has been converted into a Distance Continuous and Mentoring Education (DCME) platform, and again, through employing an RCT, the impact of the platform is being evaluated. The program has been implemented in 71 co-operatives: the treatment arm (45) and the control (26). In the treatment arm, the VAHW digital platform (digital learning platform and GeoKrishi-Ext mobile application) has been introduced to 93 CAVEs. A capacity enhancement session is being implemented weekly for a period of 1.5 years. To date, the average participation rate in these has remained above 70%. This initiative aims to establish a scalable, equitable digital extension model to strengthen Nepal's agri-livestock development network and boost rural economic prosperity.

Keywords: *Agri-Livestock Technicians, Capacity Enhancement, Digital Mentoring, Hybrid Training, Women Empowerment*

Assessing the Efficiency of Mobile Applications Against Paper-Based Goat Performance Recording System

Aavash Aryal¹, Rupesh Kafle^{1,*}

*Presenting Author Contact: rupesh.kafle@heifer.org, +977-9801182959

This study compared a mobile application with paper registers for goat performance recording among smallholder farmers in Palpa, Nepal. In a four-month field experiment conducted from May to August 2025, 205 farmers used either a mobile app or a paper register. Outcomes included data-entry time, submission timeliness, completeness, accuracy, usability, workload, and future intention to use. Because most outcome variables were non-normally distributed and baseline age, education, and goat-rearing experience differed significantly between groups (all $p \leq .001$; gender $p = .683$), analyses used Mann-Whitney U tests, ANCOVA, ordinal regression, and chi-square tests. The mobile app was significantly slower than paper for goat registration (mean 3.27 vs 0.38 minutes), kidding (3.45 vs 0.34 minutes), and mating (2.82 vs 0.32 minutes). These differences remained significant after adjustment. Overall, the mobile application improved timeliness and showed potential to improve completeness but did not improve entry speed. Successful scale-up will require mobile literacy, simpler workflows, better connectivity, and sustained farmer training.

Keywords: *Goat Performance Recording; Mobile Application; Smallholder Farmers*

One Health in Nepal: Issues, Challenges, and a Way Forward

Banshi Sharma¹

*Presenting Author Contact: banshineupane@gmail.com, +977-9851067387

The One Health (OH) paradigm integrates human, animal, plant, and environmental health to address complex, multi-sectoral health threats. Nepal's unique socio-ecological system, characterized by high biodiversity, close human-animal contact in rural and peri-urban settings, and a fragile health infrastructure (human and livestock), presents considerable One Health challenges. Zoonotic diseases such as rabies, avian influenza, leptospirosis, brucellosis, Salmonellosis and Japanese encephalitis remain endemic, driving morbidity and mortality in both human and animal populations. Antimicrobial resistance (AMR) has emerged as a pressing public health threat due to inappropriate antimicrobial use across human and animal sectors by recommendation of unauthorized technicians, exacerbated by limited diagnostic infrastructure, weak regulatory enforcement, and socio-economic drivers of self-medication and unregulated dispensaries. Environmental degradation, climate change, and poor waste management further amplify disease transmission risks and ecosystem disruption. While Nepal has initiated several One Health-aligned policies and surveillance systems, persistent barriers impede operationalization, including fragmented governance, lack of legal and institutional frameworks, limited inter-sectoral data sharing, insufficient technical capacity, weak coordination among ministries, and constrained financial resources. Addressing these barriers requires a cohesive One Health strategy featuring robust policy integration, capacity building, interdisciplinary education, sustainable financing, integrated surveillance, and community engagement. Strengthening legal frameworks, enhancing multisectoral coordination, mainstreaming OH in curricula, and fostering research collaborations will facilitate Nepal's operationalization of One Health principles. The FAO supports Nepal endeavor of OH operationalization in the country with limited success. This review synthesizes existing literature on One Health in Nepal, identifies critical gaps, and proposes actionable recommendations to bolster national and community-level resilience against emerging and re-emerging health threats.

Keywords: *One Health, zoonotic disease, AMR*

Veterinary Antimicrobial Use in Nepal 2022-2024

Sujeeta Pokharel Dhakal^{1,*}, Nabin Paudel², Prawesh Khatiwada³, Nira Ramdam¹, Sujan Rana¹

¹Veterinary Standards and Drug Regulatory Laboratory, Kathmandu, Nepal

² Food and Agriculture Organisation (FAO) Emergency Centre for Transboundary Animal Diseases (ECTAD), Lalitpur, Nepal

³FHI 360, Kathmandu, Nepal

*Presenting author contact: pokharel.sujeeta.vet@gmail.com

Monitoring of antimicrobial use in veterinary sector is one of the strategic priorities under Nepal's National Action Plan on Antimicrobial Resistance (2024-2028). As the national focal point for veterinary antimicrobial use, the Veterinary Standards and Drug Regulatory Laboratory (VSDRL) reports antimicrobial use data annually to ANIMUSE, a global platform of World Organization of Animal Health (WOAH). Data related to the quantity of antimicrobials and their use were obtained from various sources: (i) Department of Drug Administration (DDA), (ii) Veterinary pharmaceuticals and (iii) veterinary drug importers. The data were verified and validated. A total of 48,610.90 kg, 40,589.25 kg, and 42,452.50 kg of antimicrobials were recorded for 2022, 2023, and 2024, respectively. Among them, the most used classes of antibiotics included sulfonamides, tetracyclines, aminoglycosides and fluoroquinolones. Domestic manufacturers accounted for an average of 85.48% of the total veterinary antibiotic volume, with the remaining 14.52% supplied through imports. Antibiotics were predominantly available as oral formulations (96.80 plus or minus 0.67%), while injectables represented only a smaller proportion (3.20 plus or minus 0.67%). These data are based on voluntary reporting by stakeholders and are estimated to capture approximately 90% of the total antibiotics circulating in the country. Three years of antimicrobial use data can provide a snapshot of which antibiotics are most common in the country; however, it would be difficult to establish a trend in antimicrobial use. To mitigate the risk of AMR, it is essential to develop a mandatory, integrated surveillance system that includes all actors in the antimicrobial supply chain and to improve antimicrobial stewardship in the animal health sector.

Keywords: ANIMUSE, Antimicrobial Use, NAP-AMR, Nepal, VSDRL.

Profitability of dairy cattle farms in selected districts of Nepal

Jyoti Dhungana^{1*}, Devendra Gauchan¹, Hari Krishna Panta¹, Krishna Prasad Timsina², Loknath Paudel³

¹Institute of Agriculture and Animal Science (IAAS), Tribhuvan University, Kirtipur, Kathmandu, Nepal

²Nepal Agricultural Research Council (NARC), Singha Durbar Plaza, Kathmandu, Nepal

³Food and Nutrition Enhancement Security Project (FANSEP) II Hariharbhawan, Lalitpur, Nepal

*Corresponding author contact: jyoti.hohen@gmail.com

The dairy sector is vital for generating income opportunities for Nepalese farmers. However, dairy farmers face high production costs, low efficiency, and, ultimately, lower profits. This study examined the profitability and resource-use efficiency of 407 dairy cattle farms across four selected districts: Ilam (86) and Morang (114) in eastern Nepal, and Kavre (91) and Chitwan (116) in central Nepal. The survey was conducted from February to October 2024 and validated through interviews with 30 key informants. The dairy farms were categorized into separate groups based on their production scale and intensity. The dairy farms were categorized as large, medium, and small, with 101 farms (24.8%), 149 farms (36.6%), and 157 farms (38.6%), respectively. Data were analyzed using descriptive statistics, one-way analysis of variance, Cobb-Douglas production function, and Benefit Cost Ratio (BCR). The findings revealed that feed cost accounted for 58% of total production cost, followed by labor 11%, while the cost for the remaining inputs was from 2% to 9%. The highest gross profit (\$395), net profit (\$322), and BCR (1.65) were found for medium-sized farms. Similarly, returns to scale indicated decreasing returns in large-sized farms (0.81) and small-sized farms (0.84), while medium-sized farms (1.20) showed increasing returns. The medium-sized dairy farms were relatively profitable due to their higher profits and increasing returns to scale. This study recommends enhancing dairy extension services to assist farmers in managing medium-sized farms by providing education and training in cost-reduction and input-efficiency strategies.

Keywords: *Cost, Cattle, Dairy, Profit, Return*

One Health and Zoonosis

Zoonoses in Nepal: A One-Health Approach

Dr. Sher Bahadur Pun

Clinical Research Unit

Sukraraj Tropical & Infectious Disease Hospital

Teku, Kathmandu, Nepal

The world has witnessed several pandemics over the past decade, the majority of which have been of zoonotic origin. These events have resulted in substantial mortality, partly due to limited early understanding of the diseases “nature and origin,” reflecting insufficient attention to zoonotic threats. Factors such as climate change and increasing human-animal interactions play a critical role in the emergence and re-emergence of infectious diseases, facilitating their spillover into human populations, as documented in previous pandemics. To address these challenges, the One-Health approach, integrating expertise from human, animal, and environmental health sectors, offers a comprehensive framework. Through a collaborative and integrative system, this approach enhances the capacity to effectively prevent, detect, and respond to emerging and re-emerging infectious diseases. In Nepal, infectious diseases of zoonotic origin have a significant impact on human health. Here, I discuss the potential threats posed by zoonoses and the benefits of implementing a One-Health approach in the country.

Keywords: *zoonoses, pandemic, one-health approach, human-animal interface*

Enhancing animal health system for enhanced food and health security: FAO's efforts at the global level and in Nepal

Surendra Karki^{1,*}

¹Livestock and One Health Advisor, Food and Agriculture Organization of the UN, Kathmandu, Nepal

*Corresponding author: surendra.karki@fao.org

The emerging and re-emerging animal diseases such as lumpy skin disease, African swine fever, foot-and-mouth disease, and highly pathogenic avian influenza have a significant impact on global food security through losses in animal production and productivity. Further, it poses a threat to public health as more than 60% of infectious diseases and 75% of emerging and re-emerging infectious diseases in humans are believed to originate in animals. Additionally, problems like antimicrobial resistance (AMR) that originate in the animal-human-environment are predicted to cause 10 million annual human deaths by 2050 and concurrently lead to losses in animal productivity, pushing smallholder livestock farmers into further poverty. To tackle these problems, the Food and Agriculture Organization of the UN (FAO), in collaboration with its member states, partners and stakeholders have been working together to strengthen the animal health system through one health approach. At the global level, FAO, along with partners, has put forward several strategies and frameworks, such as the Global Framework for the control of Transboundary Animal Diseases (GF-TADs), the One Health Joint Plan of Action, the Action plan on AMR, and the RENOFARM initiatives. Building upon these global initiatives, FAO is also working with the Government of Nepal and partners to strengthen the animal health system through the implementation of various programs and projects, such as the Pandemic Fund. Current focus includes strengthening the laboratory capacity through renovation of veterinary laboratories, supply of diagnostics and equipment and capacity building of laboratory personnel, surveillance system strengthening through field level surveillance, enhanced disease reporting, value chain studies and capacity building of the workforce, including the establishment of the field epidemiology training program for veterinarians in Nepal. In summary, FAO has been at the forefront of the fight to tackle emerging and re-emerging animal health threats and problems, such as AMR, by strengthening the animal health system through the One Health approach at national and global levels.

Keywords: *Antimicrobial resistance; global health security; one health; surveillance system*

Antibiogram of *Salmonella* Isolated from Retail Buffalo Meat in Bharatpur Metropolitan City

Shekhar Pokhrel^{1,*}, Mamata Kharel¹

¹Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University

*Presenting Author Contact: spokhrel@afu.edu.np, +977-9849433200

Salmonellosis remains a global public health challenge, frequently transmitted through contaminated meat. In Nepal, buffalo meat is a dietary staple, yet data on *Salmonella* prevalence and antimicrobial resistance (AMR) at the retail level remains scarce. This study investigated *Salmonella* contamination in buffalo meat within Bharatpur Metropolitan City, evaluating hygiene practices and antibiotic susceptibility profiles. A total of 53 meat samples were collected from registered and unregistered retailers from November to December 2025. Standard microbiological techniques were employed for the isolation and presumptive identification of *Salmonella*, followed by antimicrobial susceptibility testing performed via the Kirby–Bauer disk diffusion method in accordance with Clinical and Laboratory Standards Institute (CLSI) guidelines. Fisher’s exact test was done to analyze statistical associations between contamination status and selected risk factors. The results showed a 9.4% prevalence of *Salmonella* in buffalo meat, with contamination significantly higher in unregistered shops and those with poor visible cleanliness ($p < 0.05$). Concerningly, 100% of isolates were resistant to amoxicillin, and 40% exhibited multidrug resistance (MDR), showing resistance to three or more antibiotic classes. On a positive note, higher-generation drugs like ceftriaxone and cotrimoxazole remained effective. These findings highlight a clear link between inadequate hygiene and the presence of potentially dangerous and resistant *Salmonella* in the meat value chain. The emergence of MDR strains in local markets poses a direct treat risk to consumers’ health. Critical interventions to safeguard public health in Bharatpur include enforcing mandatory shop registration, implementing stricter hygiene protocols, and promoting the “judicious use” of antibiotics in livestock.

Keywords: *Salmonella*, Antimicrobial Resistance, Food Safety

Baseline Survey and Pre-KAP study in Chitwan, Rupandehi and Banke districts of Nepal for the One Health Asia Program (OHAP)

Naresh Kumar Shah^{1,*}

¹Department of Veterinary Public Health, Himalayan Institute of Agricultural Science and Technology, College of Veterinary Science, Kirtipur, Nepal.

*Presenting Author Contact: nareshmph@gmail.com, +977-9841307983

One Health (OH) is a collaborative effort to attain optimal health for animals, humans, and the environment. The real concept of OH is still in its infancy in Nepal but is increasingly growing. The Government of Nepal (GON) has taken some imitations to tackle burgeoning problems such as antimicrobial resistance, highly pathogenic avian influenza, some vector-borne zoonotic diseases, and rabies using an OH approach. The major bottlenecks in implementing OH in Nepal include a poor organizational structure to support OH, the absence of a legal framework to implement OH, poor coordination among government agencies, insufficient technical expertise, a poor data-sharing mechanism across sectors, a limited budget, and a poor understanding at the political level. I encourage GON to address these gaps and prioritize the health problems where the OH approach would give the best outcome. Institutional and legal frameworks need to be created to effectively implement an OH approach in Nepal. Increasing awareness among policymakers, including political leadership, and increasing government budget for all OH activities would be helpful to promote OH in Nepal. The KAP studies provide reliable baseline information which will be used as benchmarks against which changes and progress of achievements can be measured and evaluated using verifiable indicators presented in the logical framework during the project implementation. It determines the knowledge, Attitude, and practices (KAP) status on livestock health and husbandry, Zoonoses and their impact on public health among the targeted beneficiaries. The specific objective of this study is for documenting the existing qualitative and quantitative value of the project indicators which is based on the given logical framework. This study also helps to create better understanding of existing knowledge, attitudes and practices among the project beneficiaries and to describe vulnerabilities and gaps. It helps to generate baseline data on existing knowledge, attitudes and practices in the target districts as part of a framework for monitoring progress. It also helps to provide essential data for formulation of key messages and required areas of focus in awareness raising campaigns. The scope of this study is to assess the current condition of the physical infrastructure, e.g., veterinary Hospitals, vet service centres, veterinary colleges/ training institutes, medical colleges, Hospitals, Medical institutes and medical and veterinary laboratories or diagnostic facilities, at least on a sample basis and their response in the prevention of Zoonoses. It helps to assess the cold chain maintenance of vaccines and biological and the surveillance and reporting system of Zoonoses from the grassroots level to the central reporting system

Keywords: *Prevalence, One health, Zoonotic Diseases*

Antimicrobial Resistance in Riverine *Escherichia Coli* in The Kathmandu Valley: Evidence for One Health Intervention Needs

Manoj Kumar Shahi^{1,*}, Barun Kumar Sharma², Ajit Kumar Karna³, Saharuetai Jeamsripong¹

¹Department of Veterinary Public Health, Faculty of Veterinary Science, Chulalongkorn University, Bangkok, Thailand

²Central Veterinary Laboratory, Tripureshwar, Kathmandu Nepal

³Nepal One Health Institute, Kathmandu, Nepal

*Presenting Author Contact: avisan2006@gmail.com, +977-9851195821

The prevalence of extended-spectrum β -lactamase (ESBL)-producing *Escherichia coli* (ESBL-EC) in environmental waters is a growing global concern. This study aimed to assess the prevalence of ESBL-producing and multidrug-resistant (MDR) *E. coli*, as well as antimicrobial resistance (AMR) patterns across major rivers in the Kathmandu Valley, Nepal. A longitudinal study was conducted from November 2024 to October 2025. A total of 148 water samples were collected from 37 sampling points along the Bagmati, Manohara, and Nakkhu rivers. *E. coli* was isolated using standard culture-based methods and confirmed by MALDI-TOF. Antimicrobial susceptibility testing was performed using the VITEK Compact system. ESBL phenotypic detection and MDR classification were conducted according to CLSI guidelines.

The overall prevalence of *E. coli* in river water was high at 85.1% (126/148). Slightly higher levels were observed in the Nakkhu River (87.5%) compared with the Bagmati River (83.8%). The overall prevalence of ESBL-producing *E. coli* was 23.8%, with the highest prevalence detected in the Bagmati River (28.4%) and at downstream sites (30.2%). No ESBL-producing isolates were detected in midstream and upstream locations of the Nakkhu River. Resistance was highest to trimethoprim-sulfamethoxazole (18.3%), followed by ceftriaxone (17.5%), ciprofloxacin (14.3%), fosfomycin (8.7%), imipenem (8.7%), and cefepime (6.3%). Notably, no resistance was observed to ertapenem, meropenem, or cefoperazone/sulbactam. Resistance to last-resort antimicrobials remained minimal, including colistin (0.8%) and tigecycline (4.0%). The overall prevalence of MDR *E. coli* was 16.7%, with higher levels observed in the Bagmati River (22.4%) and during autumn (26.7%), and lower levels in summer (9.1%).

This study highlights a high burden of fecal contamination and a notable presence of AMR *E. coli* in river systems, including ESBL-producing and MDR strains. Although resistance to last-resort antimicrobials remains low, emerging resistance signals a potential future threat. These findings underscore the urgent need for integrated One Health interventions to reduce environmental contamination and mitigate the spread of AMR.

Keywords: Antimicrobial resistance, *E. coli*, ESBL, Kathmandu Valley, River

Assessment of Snail Host Species Linked to Helminth Parasites Using Morphometric Analysis in Chitwan

Chet Raj Pathak^{1,*}, Prashant Lamichhane¹

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: crpathak@afu.edu.np, +977-9848827681

Snails serve as intermediate hosts for numerous parasitic diseases of humans and animals. This study examined the morphometry-based identification for ten snail species from terrestrial and aquatic habitats in Chitwan, Nepal. In total 120 snails were identified based on regional taxonomic keys. Morphometric analysis showed interspecific variation in shell dimensions among the studied snails. *Lissachatina fulica* exhibited the largest size with an ovo-conical shell (61.33 ± 2.96 mm height; 31.58 ± 3.59 mm width), while *Indoplanorbis exustus* represented the smallest species (12.33 ± 1.93 mm height; 5.38 ± 0.68 mm width). Ovate *Lymnaea* showed moderate size (18.45 ± 1.48 mm height; 8.95 ± 2.99 mm width), whereas *Bellamya dissimilis* had a larger conical form (26.67 ± 1.69 mm $\times$ 20.25 ± 1.21 mm). Discoidal *Macrochlamys indica* and elongate-conical species (*Brotia costula*, *Thiara scabra*, *Melanoides tuberculata*) exhibited distinct height-to-width ratios reflecting habitat-specific adaptations. Globose taxa such as *Pila globosa* (29.50 ± 11.30 mm $\times$ 26.83 ± 9.97 mm) and *Cyclophorus* sp. (24.25 ± 1.64 mm $\times$ 30.17 ± 1.86 mm) showed broader shells relative to height. Aperture dimensions were widest in *L. fulica* (34.58 ± 2.93 mm $\times$ 20.42 ± 0.36 mm) and narrowest in *T. scabra* (4.92 ± 0.95 mm $\times$ 2.38 ± 0.36 mm). These morphometric variations not only reflect ecological adaptations but also highlight the epidemiological significance of snails as intermediate hosts of major parasitic diseases of major medical and veterinary concern.

Keywords: *Gastropods, Intermediate hosts, Morphometry, Parasitic Diseases*

Detection of Beta-Lactam Antibiotic Residues in Raw Milk Samples in Kathmandu Valley

Bibhuti Bam^{1,*}, Manita Subedi²

¹Himalayan College of Agricultural Sciences and Technology, Purbanchal University, Kathmandu, Nepal

²Department of Livestock Services, Government of Nepal, Kathmandu Nepal

*Presenting Author Contact: bibhuti.bam@gmail.com, +977-9867899471

Antibiotic residues in milk continue to pose a significant public health concern due to their role in the development and dissemination of antimicrobial resistance (AMR), leading to treatment failures and the emergence of resistant infections. This study aimed to detect Beta-lactam antibiotic residues in raw milk marketed in Kathmandu. A cross-sectional study was conducted in Kathmandu Valley from June to August 2025 to detect Beta-lactam antibiotic residues in raw cow milk. A total of 82 raw milk samples were collected from milk collection centers and cattle farm of Kathmandu (n=31), Bhaktapur (n=25), and Lalitpur (n=26). The competitive Enzyme-Linked Immunosorbent Assay (ELISA) was used for analysis. The findings were compared with Nepal's Standards Maximum Residue Limit (MRL) of 4 µg/kg. Beta-lactam antibiotic residues were detected at 12.2% (10/82) of sample. Highest level of residue was reported from Kathmandu (16.1%), followed by Lalitpur (12.0%) and Bhaktapur (7.7%). Among 10 positive samples, only one sample (10%, 1/10) contained residue level exceeding the MRL with the value of 4.02 µg/kg. The result highlights the need for enhanced monitoring and stronger regulatory measures to safeguard milk quality and consumer health, while also underscoring the importance of targeted educational and training interventions to minimize irrational antimicrobial use and reduce the risk of antimicrobial resistance. Furthermore, broader studies across multiple regions and production systems are recommended to better understand the risks associated with antibiotic use in dairy production.

Keywords: Antibiotic residue, Beta-lactam antibiotic, Cattle Milk, ELISA, Kathmandu Valley

Integration of One Health Strategy into Municipal Policy and Program: A Case Study from Badigad Rural Municipality

Rajendra Dhakal¹, Rupesh Kafle¹, Ayush Adhikari¹

¹Heifer International Nepal

*Presenting Author Contact: rdhakal56@gmail.com, +977-9845623442

Nepal adopted a national One Health Strategy in 2019 to address interconnected risks at the human-animal-environment interface, including zoonotic diseases, antimicrobial resistance, food safety threats, and environmental degradation. Despite this policy foundation, implementation has remained uneven, particularly at the local level, because of weak cross-sectoral coordination, limited technical capacity, fragmented financing, and low institutional ownership.

This study synthesizes a qualitative review of national policy and program experience with a municipal case study to examine how development partners can support the operationalization of One Health in Nepal. Nationally, progress is emerging through zoonotic disease prioritization and outbreak response, laboratory and surveillance strengthening, antimicrobial resistance, rabies control, and food safety; however, important gaps persist in joint response systems, data sharing, and translation of national strategy into local plans and budgets.

Heifer Nepal's experience in Badigad Rural Municipality demonstrates a practical pathway for municipal institutionalization. Through facilitation of the Project Monitoring and Coordination Committee, orientation of elected representatives and sectoral stakeholders, and support to contextualize national priorities to local realities, One Health was adopted as a guiding principle in the FY 2082/83 municipal policy and program, and a One Health Coordination Committee was established.

This institutional shift was linked to concrete actions, including zoonotic disease prevention, strengthened animal and public health services, integrated agriculture-veterinary service delivery, promotion of safe and sustainable food systems, community awareness and engagement, and environmental health measures such as waste management and climate resilience planning. The Badigad case offers a scalable model for embedding One Health in local governance and strengthening preparedness and resilience against complex, interlinked health threats.

Keywords: *Antimicrobial Resistance, Local Governance, Multisectoral Coordination, One Health, Nepal, Zoonotic Diseases,*

Prevalence and Antibigram of *Staphylococcus Aureus* isolated from Chevron in Bharatpur, Chitwan, Nepal

Roshan Babu Pandey^{1,*}, Parisha Thapa¹, Manoj Sherpali¹, Amrit Poudel¹, Sudip Sharma¹

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: roshanbabupandey@gmail.com, +977-9865505438

Background and Aim: *Staphylococcus aureus* is an important foodborne pathogen commonly associated with meat contamination due to poor hygiene during slaughtering and retail handling. This study aimed to determine the prevalence, antimicrobial susceptibility pattern, Multidrug resistance, multiple antibiotic resistance index and associated risk factors of *S. aureus* in chevon sold in Bharatpur, Nepal.

Materials and Methods: A total of 60 meat samples were collected and analysed using standard microbial procedures for isolation and identification. Antimicrobial susceptibility testing (AST) was performed by the Kirby-Bauer disc diffusion technique following CLSI guidelines. Multidrug resistance (MDR) and multiple antibiotic resistance index (MARI) were determined. A Survey was used to assess the association of *S. aureus* with house type, hygienic practice and butcher knowledge.

Results: Out of 60 samples, 23 (38%) were positive for *S. aureus*. The isolates showed variable susceptibility to gentamicin (91.3%), amikacin (87%), cotrimoxazole (87%), chloramphenicol (82.6%) and resistance to penicillin (91%), cefoxitin (52%) and erythromycin (39.1%), Fifty-seven percentage of isolates were identified as MDR and 57% had MARI >2 indication high-risk contamination source. Chi-square analysis showed a significant association between *S. aureus* contamination and factors such as house type, poor knowledge of contamination and poor cleanliness among meat handlers, while other factors were not significant.

Conclusion: The findings indicate high prevalence of *S. aureus* in chevon with high levels of resistance to commonly used antibiotics, and emphasize the need for improved hygiene practices, increased awareness among meat handlers, and prudent antimicrobial use to reduce foodborne risks and antimicrobial resistance.

Keywords: Antimicrobial Resistance (AMR), Chevron, Multidrug Resistance, Public Health, *Staphylococcus aureus*

Seroprevalence of Brucellosis in Cattle and Its Associated Risk Factor in Dairy Pocket Areas of Gorkha District

Anuj Khanal^{1,*}, Yagya Raj Pandeya¹

¹*Presenting Author Contact: anuj.khanal04@gmail.com, +977-9840505199

Background: Brucellosis is a neglected zoonotic disease caused by *Brucella* spp. that reduces reproductive performance and causes economic losses in livestock. There was no prior published study reporting bovine brucellosis prevalence in Gorkha District, Nepal, motivating this research to estimate seroprevalence and assess associated risk factors in local dairy pockets.

Objectives: To determine the seroprevalence of brucellosis in cattle in dairy-pocket areas of Gorkha District and to assess associated herd and animal level risk factors and farmers' awareness.

Methods: A cross-sectional study was conducted in the dairy pockets of Gorkha (Gorkha and Palungtar municipalities). A total of 180 blood samples were collected purposively from female cattle and sera tested using an indirect ELISA (iD.Vet multi-species iELISA) following the manufacturer's protocol. Epidemiological data were gathered via a structured questionnaire administered to 72 farmers.

Results: All 180 sera tested negative by iELISA; observed seroprevalence was 0%. Descriptive data showed the herd and animal characteristics (e.g., breed distribution, history of abortion, repeat breeding) but no seropositive animals were detected to allow analytical association testing.

Conclusion: No seropositive cattle were detected in the sampled dairy pockets area of Gorkha District; however, absence of positives in this sample does not prove the area is free of infection. The study recommends larger-scale surveillance covering wider geographic areas and increased farmer awareness of brucellosis and its public-health importance.

Keywords: *Brucellosis, Dairy, Gorkha, iELISA, Seroprevalence*

Animal Reproduction

Heat Detection Technique for Precise Timing of Insemination in Buffaloes

Aashirbad Pokharel¹, Gokarna Gautam¹, Shatrughan Shah¹, Kapil Dev Yadav¹, Padmakumar Varijakshapanicker², Bhuminand Devkota^{1*}

¹Department of Theriogenology, Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Chitwan 44209, Nepal

²Senior Research Coordinator and Country Director, International Livestock Research Institute (ILRI), Nepal

*Presenting Author Contact: bdevkota@afu.edu.np

Efficient heat detection and accurate timing of artificial insemination (AI) are critical determinants of reproductive efficiency in buffaloes (*Bubalus bubalis*), a species characterized by weak estrus expression, short estrus duration, and a high incidence of silent heat. These biological constraints often lead to inaccurate estrus detection and inappropriate insemination timing, resulting in reduced conception rates and prolonged calving intervals. Conventional estrus detection methods in buffaloes primarily rely on visual observation of behavioral signs, rectal palpation, and ultrasonographic monitoring of ovarian dynamics. Although these techniques remain integral to reproductive management, their sensitivity, labor requirements, and limited practicality under field conditions often restrict their effectiveness, particularly in smallholder production systems. Recent advances have focused on developing biomarker-based approaches to improve estrus detection accuracy. Automated activity monitoring systems enable continuous behavioral monitoring; however, their adoption in buffalo production systems is limited by high cost, technical complexity, and variable reliability. Consequently, increasing research attention has been directed toward identifying alternative physiological and biochemical indicators that are reliable, non-invasive, and applicable under field conditions. Promising approaches include vaginal electrical resistance, progesterone profiling, and salivary biomarkers. Among these, salivary crystallization (fern) patterns, resulting from estrogen-mediated alterations in electrolyte composition during the peri-ovulatory phase, have emerged as a simple indicator of the ovulatory window. Our recent investigations demonstrated a distinct progression of salivary fern morphology during the follicular phase, closely associated with declining progesterone and increasing estrogen concentrations. Importantly, when analyzed the insemination time matching with salivary fern pattern, AI performed approximately 15 hours after the first appearance of a fully developed (mature) fern pattern resulted in significantly higher conception rates compared with earlier or delayed inseminations. These findings indicate that salivary fern analysis can serve as a practical, low-cost, and non-invasive tool for improving ovulation prediction and optimizing precise AI timing in buffaloes. Future research should focus on standardizing sampling and interpretation protocols, integrating salivary indicators with behavioral signs monitoring, and validating this approach for the development of a cow-side heat detection kit.

Keywords: Buffalo Reproduction, Estrus Detection, Salivary Fern Pattern, Artificial Insemination Timing, Conception Rate

From Shell Gland to Eggshell: How Aging Disrupts Eggshell Biomineralization in Broiler Breeder hens

Birendra Mishra, DVM, PhD

Associate Professor and Graduate Chair of Animal Sciences

Department of Human Nutrition, Food, and Animal Sciences, University of Hawaii at Manoa, Honolulu, HI, USA

The egg production cycle of broiler breeder hens is shorter than that of laying hens, and maintaining eggshell quality with advancing age remains a major challenge in modern broiler production. Declining shell integrity directly affects hatchability, chick quality, and overall economic efficiency. Although this age-related deterioration is well recognized, the underlying biological mechanisms remain incompletely understood. The shell gland (uterus), the site of eggshell biomineralization, undergoes functional changes during the production cycle that may disrupt the tightly regulated processes of ion transport, mineral deposition, and matrix protein secretion required for optimal shell formation. Our study explored the emerging concept that reproductive aging in broiler breeder hens is closely associated with altered regulation of ion transport and calcium homeostasis within the shell gland. Using an integrative approach that combines uterine transcriptomics, eggshell ultrastructural analysis, and mineral profiling, we examine how age-related changes in gene expression and cellular function compromise biomineralization efficiency. Eggshells from younger breeders exhibit thicker palisade layers, narrower mammillary regions, and higher sulfur and potassium concentrations. At the molecular level, uterine RNA sequencing revealed downregulation of genes and pathways associated with (1) calcium mobilization and deposition, (2) mechanoreception and calcium secretion, (3) energy metabolism and transcriptional regulation, and (4) defense and antioxidant systems in aged hens. Collectively, these findings suggest that aging reduces the shell gland's capacity to regulate mineral transport and maintain cellular homeostasis, thereby impairing eggshell formation. This integrative study provides new insight into reproductive aging in broiler breeder hens and highlights potential targets for nutritional, genetic, and management strategies to sustain eggshell quality and improve production efficiency.

Keywords: *Egg, Broiler breeder, antioxidant, aging*

Prevalence and Associated Risk Factors of Reproductive Disorders in Dairy Bovines of Nepal

Rabin Bastakoti^{1,*}, Girhamani Nepal², Rajesh Kumar Chaudhari³

¹Government of Nepal, Bharatpur Metropolitan, Chitwan, Nepal, ²Institute of Agriculture and Animal Sciences, Paklihawa Campus, Tribhuvan University, Nepal, ³Government of Nepal, Ministry of Land Management and Cooperative.

*Presenting Author Contact: rabinbastakoti@gmail.com, +977-9845276729

Reproductive inefficiency remains one of the most significant constraints to sustainable dairy production in developing livestock production systems. This study aimed to determine the prevalence and major risk factors associated with reproductive disorders in dairy bovines presented at infertility redressal camps conducted in central Nepal. A cross-sectional study was carried out over a one-year period in six districts: Syangja, Lamjung, Gorkha, Tanahun, East Nawalpur, and Chitwan. Clinical reproductive examinations were performed using transrectal palpation and ultrasonography to diagnose uterine and ovarian pathologies.

A total of 390 bovines were examined, comprising 352 cattle (90.25%) and 38 buffaloes (9.74%). Overall, anoestrus was the most prevalent reproductive disorder, affecting 173 animals (44.36%; CI: 39.51–49.32). Other conditions identified included endometritis in 70 animals (17.95%; CI: 14.46–22.06), metritis or clinical grade III endometritis with visible discharge in 49 animals (12.56%; CI: 9.64–16.22), cervicitis in 42 animals (10.77%; CI: 8.07–14.24), repeat breeding syndrome in 24 animals (6.15%; CI: 4.17–8.99), cystic ovarian condition in 8 animals (2.56%; CI: 1.40–4.65), and other reproductive disorders in 22 animals (5.64%; CI: 3.75–8.49).

Statistical analysis revealed that body condition score (BCS) had a highly significant association with the occurrence of reproductive disorders ($p = 0.0010$). Parity also showed a significant influence ($p = 0.0062$), while animals older than five years exhibited a higher likelihood of reproductive disorders compared to those ≤ 5 years of age ($p = 0.042$). In contrast, deworming history (≤ 3 months vs. > 3 months) showed no significant association with disease occurrence ($p = 0.511$). Similarly, breeding system (artificial insemination, natural service, or both) ($p = 0.1225$) and breed type (Holstein cross, Jersey cross, Murrah cross) were not significantly associated with reproductive disorders. BCS demonstrated a strong association with ovarian cyclicity (OR = 6.0; $p < 0.0001$). Non-cyclic ovaries were significantly associated with the occurrence of non-cyclic endometritis (OR = 1.8; $p = 0.02$). In dairy bovine, anoestrus and uterine infections are the most common reproductive problems; BCS, parity, age, and ovarian cyclicity are important factors affecting reproductive health and management.

Keywords: Dairy Bovines, Reproductive Disorders, Anoestrus, Body Condition Score, Nepal

Standardization of Progesterone Impregnated Sponge Device for Intravaginal Use in Dairy Animals

Bimochan Poudel¹, Sandeep Bhattarai², Bhuminand Devkota³, Gokarna Gautam³, Shatrughan Shah³,
Yagya Raj Pandeya⁴, Bishal Pokharel⁵

¹Ichhakamana Rural Municipality

^{1*}Livestock Development Section, Ichchhakamana Rural Municipality Chitwan, Nepal

²Pioneers Animal Hospital and Research Centre Pvt. Ltd., Rupandehi, Nepal

³Department of Theriogenology, Agriculture and Forestry University, Chitwan, Nepal

⁴National Cattle Research Program, Nepal Agriculture Research Council, Chitwan, Nepal

⁵Nepal Veterinary Council, Kathmandu, Nepal

*Presenting Author Contact: bimochanpoudel99@gmail.com, +977-9845112490

Post-partum anestrus in dairy animals and seasonal infertility in buffaloes, particularly during low breeding seasons, are often linked to inactive, non-cyclic ovaries, necessitating the use of intravaginal progesterone (P4) depots to induce cyclicity and promote fertile ovulation. However, the use of P4-based reproductive techniques in Nepal is limited by high cost and the lack of registration of devices like CIDR. This study aimed to develop a smaller, easy-to-apply, P4-impregnated intravaginal sponge device locally and validate its efficacy in dairy cows and buffaloes by assessing its P4 release efficiency. In the Theriogenology Laboratory at the Agriculture and Forestry University, Chitwan, two sizes of polyurethane sponges were prepared: a larger proven sized sponge (height: 6.0 cm, diameter: 10.0 cm) and a smaller sponge (height: 2.8 cm, diameter: 7.5 cm). These sponges were impregnated with Medroxyprogesterone acetate (MPA) in concentrations equivalent to the standard CIDR device (1.9 gm) and a lower amount (1.0 gm), then dried under air and laminar flow conditions. Both sponge sizes demonstrated similar P4 holding efficiencies, with air drying being more effective. The P4 release efficiency of the smaller sponges was validated by measuring serum P4 levels in corpus luteum non-bearing dairy cows (n=5) and buffaloes (n=6) on the day of application, prior to removal on day 7, and three days post-removal. The results showed that smaller sponges impregnated with 1.9 gm and 1.0 gm P4 released adequate amounts of P4 into circulation in both species, with similar patterns observed. Further validation in buffaloes indicated that the P4 levels on day 7 using the 1.0 gm sponge were comparable to those using 1.9 gm sponge and positive control pregnant buffaloes, confirming its effectiveness. In conclusion, the locally developed, smaller-sized 1.0 gm P4-impregnated polyurethane intravaginal sponge device is a simple, cost-effective, and efficient alternative for reproductive management in dairy cows and buffaloes.

Keywords: *Buffalo, Dairy Cows, Intravaginal Sponge Validation, Medroxyprogesterone Acetate*

Dynamics of Follicular and Corpus Luteum Size in Three Breeds of Cyclic Mares During Physiological Breeding Season

Nirvik Nyaupane^{1,2,#}, Gokarna Gautam¹ and Bhuminand Devkota^{1,*}

¹ Agriculture and Forestry University, Rampur, Chitwan, Nepal

²Equine Breeding Stud, Chitwan, Nepal

[#]Presenting Author Contact: nyaupanenirvik@gmail.com

^{*}Corresponding Author: bdevkota@afu.edu.np

Equine reproduction is characterized by a seasonal polyestrous cycle, largely governed by the photoperiod in the Northern Hemisphere. Despite the growing importance of equine production and management in Nepal, systematic information on reproductive physiology and breeding status of equines remains scarce. The present study aimed to characterize breed-wise follicular and corpus luteum (CL) dynamics in cyclic mares during the physiological breeding season, thereby generating baseline data to support evidence-based reproductive management under Nepalese conditions. A total of 40 clinically normal cyclic mares, comprising light breed thoroughbreds (n = 15), heavy draft breeds (n = 20), and pony breeds (n = 5), maintained at the Equine Breeding Centre, Bharatpur, Chitwan, were monitored using transrectal ultrasonography throughout the estrous cycle until ovulation and on day 8 post-ovulation. Retrospective analyses were performed to evaluate the diameter of the largest pre-ovulatory follicle at defined intervals (14, 7, 3, 2, and 1 days prior to ovulation), as well as CL diameter at 14 and 7 days before ovulation and on day 8 post-ovulation. The mean($\pm$ SE) pre-ovulatory follicular diameters did not differ significantly among breeds ($P > 0.05$), measuring 42.8 ± 1.0 mm, 43.4 ± 0.9 mm, and 41.9 ± 1.7 mm in light, heavy, and pony mares, respectively. Similarly, CL diameters on day 8 post-ovulation were comparable across breeds (26.9 ± 1.0 mm, 25.1 ± 0.8 mm, and 24.5 ± 1.2 mm, respectively; $P > 0.05$). However, a significantly larger CL diameter was observed in light-breed mares compared to pony mares one week prior to ovulation (21.0 ± 1.8 mm vs. 15.0 ± 0.9 mm; $P < 0.05$), suggesting subtle breed-related variation in luteal regression dynamics. In conclusion, this study establishes the first baseline dataset on follicular growth and luteal development patterns in major mare breeds in Nepal. The findings indicate broadly similar peri-ovulatory follicular dynamics across breeds, with minor differences in luteal regression, and provide a scientific foundation for optimizing reproductive management and assisted breeding strategies in equine populations under subtropical conditions.

Keywords: *Equine Reproduction, Follicular Dynamics, Corpus Luteum, Mare, Ultrasonography*

Comparative Evaluation of Progesterone Impregnated Intravaginal Sponge and CIDR Device on Reproductive Performance of Anestrus Buffaloes

Sandeep Bhattarai^{1,*}, and Bhuminand Devkota², Gokarna Gautam², Shatrughan Shah², Bimochan Poudel³

¹ Pioneers Animal Hospital and Research Center Pvt. Ltd.

² Agriculture and Forestry University, Rampur, Chitwan, Nepal

³ Livestock Development Section, Ichchhakamana Rural Municipality, Chitwan, Nepal

*Presenting Author Contact: sandeeptbhattarai39@gmail.com, +977-9849597535

Progesterone-impregnated intravaginal CIDR devices (CIDR) are commonly used to induce fertile cyclicity, particularly in anestrus animals with non-cyclic ovaries. However, their high cost and limited availability in Nepal pose significant challenges. To address this issue, a progesterone-impregnated sponge device (PISD), which is cheaper and easier to prepare, has recently been developed, although its clinical reproductive efficacy has not yet been fully evaluated. Therefore, the present study aimed to assess the reproductive performance of anestrus buffaloes using PISD compared to the standard CIDR device.

A total of 37 anestrus buffaloes from the Agriculture and Forestry University Livestock Farm and surrounding areas were included. Nineteen buffaloes were treated with intravaginal PISD from day 0 to 7 within an Ovsynch protocol, while 18 received CIDR during the same period. The study was conducted during both low and peak breeding seasons. Reproductive performance parameters, including estrus response, ovulation, conception rate, and conception following subsequent services, were evaluated. Additionally, vaginal health parameters such as vaginitis and vaginal wall integrity were assessed. The effects of body condition score (BCS), parity, days in milk (DIM), and season were also analyzed using Chi-Square and Fisher's Exact test.

Results indicated that reproductive parameters, except for conception rate, and vaginal health outcomes in PISD-treated animals were comparable to those treated with CIDR. However, first-service conception rates in the PISD group were lower in both seasons but improved with subsequent services, possibly due to the long-acting nature of medroxyprogesterone used in the device. No significant effects of BCS, parity, or DIM were observed on reproductive performance in the PISD group, although BCS significantly influenced outcomes in the CIDR group.

In conclusion, PISD effectively induced estrus and ovulation comparable to CIDR, with similar vaginal health effects, but lower initial conception rates. Further evaluation using short-acting progesterone is recommended to enhance its effectiveness as a cost-efficient alternative.

Keywords: *Anestrus buffaloes, CIDR, Progesterone Impregnated Sponge Device (PISD), Ovsynch protocol, Reproductive Performances*

Postpartum Endometritis in Dairy Cattle: Prevalence, Risk Factors, and Reproductive Implications

Sushil Neupane^{1,*}, Shambhu Shah¹, Narayan Neupane¹, Krishna Kaphle¹, Subash Chhetri¹, Bheshraj Poudel¹, Bishal Pathak², Anish Balchhaudi¹

¹Institute of Agriculture and Animal Science, Tribhuvan University, Nepal

²Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: sushilneupane8@gmail.com, +977-9845620743

Endometritis is a persistent uterine infection in cattle occurring ≥ 21 days postpartum and characterized by purulent vaginal discharge. It significantly impairs reproductive performance, leading to repeat breeding, infertility, and premature culling. A cross-sectional study was conducted from December 16, 2022, to January 20, 2023, in Bharatpur Metropolitan City–21, Chitwan District, Nepal, to estimate prevalence and associated risk factors. A total of 103 postpartum dairy cattle were selected using purposive sampling, and data were collected through a structured questionnaire. Clinical endometritis was diagnosed by vaginal mucus scoring following manual collection, while subclinical cases were detected using the Whiteside test with 10% NaOH solution. Data were analyzed using SPSS version 25.0, and associations were assessed using the Chi-square test at a 95% confidence level. The overall prevalence of endometritis was 20.4%, comprising 7.8% clinical and 12.6% subclinical cases. No significant association was found with parity, postpartum period, or milk fever ($p > 0.05$). However, retained placenta, dystocia, and mastitis showed significant associations ($p < 0.05$). These findings highlight the need for improved periparturient management, routine screening, and timely treatment to reduce the incidence of endometritis and enhance reproductive efficiency in dairy cattle.

Keywords: Dairy Cattle, Dystocia, Mastitis, Retained Placenta, Whiteside Test

Effect of Frequency of Canister Handling on Liquid Nitrogen Level and Post-Thaw Motility of Buffalo Bull Semen During Summer Season

Milan Poudel^{1,2,#}, Gokarna Gautam^{1,*}, Khagendra Sapkota³

¹Department of Theriogenology, Faculty of Animal Science, Veterinary Science & Fisheries, Agriculture and Forestry University, Rampur, Chitwan, Nepal

²Current affiliation: National Vaccine Production Laboratory, Tripureshwor, Kathmandu, Nepal

³National Farmer's Commission, Kathmandu, Nepal

[#]Presenting Author Contact: mpaudel345@gmail.com, +977-9847612260

^{*}Corresponding Author: ggautam@afu.edu.np

A study was conducted to evaluate the effect of frequency of canister handling on liquid nitrogen (LN₂) level and post-thaw motility of buffalo bull semen during peak summer season (March to June 2024) at National Livestock Breeding Office, Nepalgunj. A total of 99 cryo-preserved semen straws from a breeding Murrah buffalo bull were deposited into the 5 cryogenic referees- consisting of one control group (no handling of canister until 15 days) and four treatment groups (T1, T2, T3 and T4) with varying canister handling frequencies (once, thrice, five times and seven times daily, respectively). Post-thaw motility and liquid nitrogen depletion patterns were assessed for 15 days. In control referee, the LN₂ remained 70 ml on the 15th day, whereas in T1, T2, T3 and T4, the LN₂ completely depleted on day 12, 9, 8 and 7, respectively. A two-way ANOVA revealed a significant decline ($p < 0.05$) in post-thaw motility with increased canister handling frequencies. Likewise, post-thaw motility deteriorated below the acceptable level on day 11, 7, 5 and 3 in T1, T2, T3 and T4 groups, respectively suggesting that the LN₂ should be replenished within these time periods to maintain the proper LN₂ level and optimum semen post-thaw motility during extreme summer season in Terai region of Nepal. Furthermore, with the same level of LN₂, the semen post-thaw motility was diminished with higher handling frequencies. This study guides the appropriate timing of refilling LN₂ in the referee with different canister handling frequencies during summer season. Adopting improved storage protocols, including controlled handling and efficient nitrogen management, can enhance the success of artificial insemination programs in buffalo breeding.

Keywords: *Buffalo semen, Liquid Nitrogen, Post-thaw motility*

Studies on Reproductive Parameters and Treatment of Infertility in Dairy Animals of Baitadi District, Nepal

Bishal Pathak^{1,*}, Bhuminand Devkota¹, Shatrugan Shah¹, Sushil Neupane²

¹ Faculty of Animal Science, Veterinary Science & Fisheries, Agriculture and Forestry University, Nepal

²Institute of Agriculture and Animal Science, Tribhuvan University, Nepal

*Presenting Author Contact: bpathak9999@gmail.com

Infertility is a major constraint to dairy productivity in Nepal, particularly under field conditions where management practices and veterinary services are variable. This study was conducted in Patan and Dasharathchand Municipalities of Baitadi district, Nepal, from August 2024 to February 2025 to establish baseline reproductive parameters, identify major reproductive disorders, and evaluate treatment responses in dairy cows and buffaloes. A cross-sectional survey using a semi-structured questionnaire was performed on 400 dairy animals, including local Pahadi cows (n=211), Jersey cross (n=50), Holstein cross (n=27), local Gaddi buffaloes (n=62), and Murrah buffaloes (n=50). Reproductive and productive parameters, management practices, and reproductive disorders were recorded. Additionally, 56 infertile animals were selected for clinical reproductive examination using transrectal palpation and ultrasonography and categorized as repeat breeders (n=27), silent estrus (n=14), and true anestrus (n=15). Following deworming and mineral-vitamin pretreatment, repeat breeders were treated with either GnRH after heat rest (n=15) or split GnRH (n=12), silent estrus animals were treated with Ovsynch (n=9) or double PGF₂ α (n=5) depending on ovarian status and true anestrus animals received Prajana capsules (n=15). Pregnancy was confirmed 90 days after breeding. Exotic breeds showed significantly superior reproductive and productive performance compared with indigenous breeds. Overall, 25% of animals had a history of reproductive problems, with anestrus and repeat breeding being the most prevalent. Regular deworming significantly improved ($P<0.05$) reproductive performance, particularly in cattle, while concentrate feeding showed a moderate improvement trend. Pregnancy rates were 73.33% for GnRH after heat rest, 41.67% for split GnRH, 77.78% for Ovsynch, 60.00% for double PGF₂ α , and 46.7% for Prajana-treated true anestrus animals, with no statistically significant differences among hormonal protocols. Multivariable analysis identified exotic breed and concentrate feeding >1 kg/day as significant predictors ($P<0.05$) of pregnancy success. In conclusion, improved management practices, particularly deworming and nutritional supplementation, combined with targeted hormonal treatments, can significantly enhance reproductive performance of dairy animals under field conditions in the Baitadi district.

Keywords: *Anestrus, GnRH, Infertility, Repeat Breeding, Ovsynch*

Clinical Management of Endotoxemic Metritis with Hypothermia in a Non-Descript Murrah Buffalo

Rabin Bastakoti^{1,*}, Teknath Bhattarai², Gunraj Lamichhane³

¹Bharatpur Metropolitan, Government of Nepal

²CDMPCU, Chitwan

³Nepal Polytechnic Institute, Purwanchal University, Chitwan, Nepal

*Presenting Author Contact: rpncarc@gmail.com, +977-9849365866

Buffalo farming plays a pivotal role in the rural economy of Nepal, significantly contributing to dairy production, buffalo meat production and farmer livelihoods. Postpartum metritis is a common but frequently underreported condition, which may progress to systemic endotoxemia. Severe cases can present with atypical signs such as hypothermia, often leading to misdiagnosis. This report describes a case of endotoxemic metritis in a non-descript Murrah buffalo, presented with complete anorexia, depression, reduced activity, recumbency, swelling of legs and hypothermia (rectal temperature 97°F) following recent parturition. In Nepal, field technicians commonly administer calcium therapy in any case of postpartum hypothermia without prior laboratory confirmation, which can result in inappropriate management. IN this as as mentioned in above statement, initially treated as milk fever, the animal showed no response to calcium therapy. Clinical examination revealed uterine discharge, limb swelling, and persistent anorexia. Hematology revealed severe leukocytosis (WBC: 652,890/ μ L) and mild anemia (PCV: 25.5%), while biochemistry showed elevated total protein (8.2 g/dL) and bilirubin (3.65 mg/dL), indicating systemic infection, endotoxemia, and hepatic involvement. Based on clinical and laboratory findings, a final diagnosis of endotoxemic metritis with systemic toxemia and hypothermia was established. Treatment included aggressive intravenous fluid therapy, (DNS + Ringer's Lactate: 6/6 bottle of 500 ml bottle once), enrofloxacin (4 mg/kg BID, IM, 3 days), meloxicam (0.5 mg/kg, I/M for 3 days), chlorpheniramine maleate (15 ml IM daily for 3 days), and vitamin B-complex (20 ml IM on alternate days, two doses). Rapid clinical improvement, including restoration of appetite and mobility, was observed within 3 days. This case underscores the importance of differentiating endotoxemic metritis from milk fever in postpartum buffalo and highlights the risks of indiscriminate calcium therapy without laboratory confirmation. Accurate diagnosis supported by laboratory data, combined with timely fluid therapy, antibiotics, anti-inflammatory drugs, and supportive care, is essential for successful management and favorable clinical outcomes.

Keywords: *Buffalo, Calcium therapy, Endotoxemic metritis, Hypothermia, Postpartum infection*

Reproduction and Fertility of Captive Asian Female Elephants (*Elephas maximus*) in Nepal

Grihamani Nepal¹, Bhuminand Devkota¹, Gokarna Gautam¹, Himal Luitel², Amir Sadaula³, Bijaya Kumar Shrestha⁴, and Kiran Raj Rijal³

¹Department of Theriogenology, Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Chitwan 44209, Nepal

²Center for Biotechnology, Agriculture and Forestry University, Chitwan 44209, Nepal

³National Trust for Nature Conservation, Sauraha, Chitwan 44200, Nepal

⁴Chitwan National Park, Sauraha, Chitwan 44200, Nepal

Reproductive inefficiency in captive Asian elephants (*Elephas maximus*) threatens long-term population sustainability and conservation success. This study was conducted to evaluate the reproductive and fertility status of captive female Asian elephants in Nepal, identifying physiological and microbial factors. A comprehensive retrospective study (1984- 2024) and standardized surveys were performed from May to October 2024 across five key protected areas- Koshi Tappu Wildlife Reserve, Parsa National Park, Chitwan National Park, Bardiya National Park and Shuklaphanta National Park. Data were collected from 76 sexually mature females ranging from 10 to 82 years of age. Findings revealed that only 50% (38/76) of the females had a history of successful conception and calving, producing a total of 100 calves, which indicates suboptimal reproductive performance and warrants further investigation. Based on reproductive records, elephants were categorized as fertile (calved within the last four years) or infertile (no calving within the last four years). To investigate physiological correlates, blood samples from 29 adult females (fertile, n=16; infertile, n=13) were analyzed for hematological and biochemical parameters. In parallel, vestibular swabs from 25 females (fertile, n=12; infertile, n=13) were analyzed for microbiota using 16S rRNA sequencing of the V3-V4 region. While hematological variables showed no significant differences between groups, however fertile elephants exhibited significantly higher levels of calcium (8.71 ± 1.26 mg/dL), total cholesterol (42.06 ± 8.43 mg/dL) and total protein (7.0 ± 0.98 g/dL). Microbiome analysis through alpha and beta diversity metrics showed no significant association with fertility status, age and parity but varied significantly by geographic location ($p=0.0060$). The core vestibular microbiota was dominated by Incertae (30.9%), Jonquetella (14.7%), Fermentimonas (13.9%). This findings suggest that captive female elephants in Nepal are more strongly associated with biochemical homeostasis than hematological. The novel methodology for microbial analysis supports evidence-based reproductive monitoring and conservation breeding strategies.

Keywords: Asian elephant, Conservation, Fertility, Hemato-biochemistry, Microbiome

Poultry Production and Management

Host Range Expansion of Highly Pathogenic Avian Influenza A Virus and Novel Vaccination Approaches

Santosh Dhakal^{1,*}

¹College of Veterinary Medicine, Kansas State University, Manhattan, KS, USA

*Presenting Author Contact: sdhakal3@vet.k-state.edu

Highly pathogenic avian influenza viruses (HPAIVs) cause severe and often fatal diseases in domestic poultry. Most major outbreaks are associated with H5 or H7 subtypes. Since the first isolation in 1990s, H5N1 IAVs have been circulating in wild birds and domestic poultry across multiple continents with occasional human infections with high fatality rates. However, since 2020, novel H5N1 strains emerged and spread quickly. Spillover of the clade 2.3.4.4b occurred in multiple mammalian species which were previously unprecedented. In 2024, H5N1 virus infection was detected in dairy cattle in the U.S., with retrospective studies indicating that this virus was being circulated in wild birds at least a year ago. H5N1 showed strong affinity for bovine mammary gland, and infectious virus was detected in milk, indicating a new route of influenza virus transmission. Infected cattle showed mild respiratory signs but severe mammary gland infection with mastitis-like lesions. H5N1 clade 2.3.4.4b was also detected in goat kids and alpacas. More than 70 human cases of H5N1 were reported in the U.S., mostly associated with contact with dairy cows, and commercial and backyard poultry. Most people only had mild symptoms, but occasionally serious infection and even fatality were possible. The continuous mutations in HPAIVs driving expansion of host range, and spill over to different animal species and in humans demonstrates its significant zoonotic and one health concern. It also highlights the necessity of developing highly efficacious vaccines against HPAIVs for birds and other animals. Novel approaches of HPAIV vaccine development are ongoing, including recombinant subunit vaccines, viral vector-based vaccines, and mRNA vaccines. Different delivery approaches, to enable mass vaccinations in poultry, are considered such as in ovo vaccination, aerosolization, and delivery in feed or water. Likewise, to enable efficient surveillance and trade, vaccines with ability to Differentiating Infected from Vaccinated Animals (DIVA) are necessary.

Keywords: *High Path Avian Influenza, H5N1, Influenza Vaccine, One Health*

Evolving Dynamics of Poultry Diseases: Challenges and Opportunities

Surya Paudel^{1,*}

¹ Department of Infectious Diseases and Public Health, City University of Hongkong, Hongkong

*Presenting Author Contact: spaudel@cityu.edu.hk

Global poultry production, especially across Asia, has experienced rapid growth in recent years, driven by rising demand for affordable animal protein. This expansion has prompted significant advancements in husbandry practices, including a notable shift from traditional housing systems to alternative husbandry practices, and even beyond to the organic models designed to improve animal welfare. Concurrently, regulatory frameworks governing drug use—particularly antimicrobials—have been strengthened to safeguard public health and optimize production efficiency. Despite these improvements, the transition has introduced new complexities. The diversity of poultry pathogen genetics and the need for localized adaptation to varying climates, disease pressures, and management systems pose ongoing challenges. Strain diversity, while beneficial for resilience, can lead to inconsistent performance and variable disease susceptibility across regions. Additionally, evolving production systems require continuous refinement of biosecurity, nutrition, and health management strategies to balance welfare standards with economic sustainability. Addressing these multifaceted challenges is essential to support the long-term sustainability of the sector. This presentation will discuss current opportunities and challenges in poultry from a global perspective.

Keywords: Poultry, Diseases, Control Measures

Assessing the Potential of Genetic Transformation of Chicken Gut Commensal Bacterium Through Conjugal Transfer Using Random Transposon Mutagenesis: Exvivo and In vivo Model

Arjun Chapagain, Dr. Young Min Kwon, Asim Abbasi

*Department of Poultry Science, University of Arkansas, Arkansas, United States

*Presenting Author Contact: arjunc@uark.edu,

Most gut microbes remain untapped ex vivo by culturomics, and these are about 70 percent. Besides this, the majority of the microbes are not amenable to genetic modifications, which can be due to competitive commensalism at the microbe level in the native state. Genetic modification of several gut microbes has been related to diagnosing and treating dysbiosis that has been linked to several cancers, metabolic, autoimmune, and infectious diseases. Transposon junction sequencing (Tn-seq) is a powerful tool for establishing a relationship between genotype and function in complex microbial communities, but we are due to lack insight into how well it works across biological replicates and taxonomic levels. Chicken cecal microbiota was used as a recipient cell to transfer the Himar1/Mariner transposon using EcGT2 as donor cells, and the transconjugant cells were further processed with Tn-junction amplification before next-generation sequencing. Insertion counts were computed at the metagenome-assembled genome (MAG) and genus levels. Then they were normalized and analyzed using pairwise Spearman correlation. At the genus level, insertion profiles were very similar across different samples ($\rho = 0.797\text{--}0.838$, $p < 0.001$), which shows that the dominating taxa were always represented the same way. On the other hand, MAG-level correlations were more variable ($\rho = 0.158\text{--}0.775$), which means that they were more sensitive to random changes and genomes that are not very common at higher resolution. Filtering rare MAGs did not significantly enhance correlation, indicating that variability is inherent to fine-scale insertion patterns. Taxonomic mapping was checked by adding full genus annotations to make sure that the aggregation was strong. Trait-based analysis showed that Gram-negative (81.2%) and facultative anaerobic taxa were consistently dominant across replicates. This supports the idea that the microbial community is stable in the environment. Overall, this study shows that there is a basic trade-off between resolution and reproducibility in metagenomic Tn-seq analysis. It also shows how important it is to use multi-level validation to ensure that functional microbiome data is interpreted correctly.

Keywords: *Transposon Sequencing, Chicken Gut Microbiome, Metagenome-Assembled Genomes (Mags), Reproducibility, Genus-Level Analysis, Functional Metagenomics.*

Avian Metapneumovirus in Commercial Poultry Population of Nepal

Shriti Jha^{1,*}, Aashirbad Pokhrel², Indira Basnet³, Rabin Chaudhary², Narayan Paudyal²

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

² National Animal Health Research Centre, NARC, Khumaltar, Lalitpur, nepal

³ Himalayan Veterinary Diagnostics and Research Centre Pvt Ltd, Kathmandu, Nepal

*Presenting Author Contact: shritijha57@gmail.com, +977-9863790867

Avian metapneumovirus (AMPV) is an economically significant and frequently underdiagnosed viral pathogen that plays a central role in the respiratory disease complex of poultry. In Nepal, the occurrence or epidemiological status of AMPV has not been reported yet, although unrecognised infection leading to uncontrolled secondary infections and elevated morbidity and mortality are suspected. This study aimed to investigate the seroprevalence of AMPV in the commercial poultry population of Nepal and to generate baseline data to support improved diagnostic and control strategies. A cross-sectional serological survey was conducted using 188 serum samples collected from unvaccinated commercial poultry flocks, including broiler breeders, commercial layers, and broilers across major poultry-producing districts of the country. All serum samples were tested for AMPV-specific antibodies using an indirect enzyme-linked immunosorbent assay (ELISA), and descriptive statistics were applied to evaluate seroprevalence patterns across poultry types and geographic locations. Overall, 109 of 188 samples (57.98%) were seropositive for AMPV antibodies, indicating widespread natural exposure within the studied population. Seroprevalence was highest in commercial layers (80%), followed by broiler breeders (60.39%), and lowest in commercial broilers (33.34%). Antibody titres demonstrated substantial inter-individual variability, characterised by a strongly right-skewed distribution, a high coefficient of variation, and the presence of a small number of extremely high responders. This pattern suggests endemic viral circulation with episodic or clustered high-intensity exposure events, rather than uniform flock-wide infection. These findings provide the first serological evidence of AMPV circulation in commercial poultry in Nepal and indicate that the virus is likely an under-recognised contributor to respiratory disease complexes in the country. Routine inclusion of AMPV in respiratory disease diagnostics, use of paired serum samples, strengthening of molecular diagnostic capacity, and establishment of systematic surveillance programmes are recommended to improve disease control and reduce economic losses in the Nepalese poultry industry.

Keywords: *Avian metapneumovirus, Seroprevalence, Commercial poultry, Endemic exposure, Nepal*

Growth Performance, Carcass Characteristics, and Immune Response of Sakini Chickens Under Different Rearing Systems

Suman Karki^{1,*}, Shanker Raj Barshila¹, Nabaraj Devkota, Masaaki Toyomizu

¹Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: sumankarki@afu.edu.np, +977-9814200110

This study evaluated the effects of different rearing systems on growth performance, carcass traits, meat quality, and immunity of indigenous Sakini chickens. A total of 180 birds were assigned to three treatments under a Completely Randomized Design for eight weeks: intensive (100% feed allowance), semi-intensive (50% allowance with free-range access), and free-range (25% allowance), all fed 18% CP diet supplemented with 0.1% synbiotics. The semi-intensive system showed significantly higher final body weight gain ($p<0.05$) compared to other systems. Birds under semi-intensive and free-range systems exhibited a lower heterophil/lymphocyte ratio ($p<0.001$), indicating reduced stress. Meat from these systems had significantly higher crude protein content ($p<0.05$), although intensive rearing resulted in lower drip and cooking losses ($p<0.01$). Immune response, assessed by hemagglutination inhibition titre, was superior in semi-intensive birds, reaching protective levels earlier. Overall, the semi-intensive system with 50% feed allowance and synbiotic supplementation provided the balance between productivity, meat quality, and immunity in Sakini chickens.

Keywords: *Sakini Chicken, Rearing System, Semi-Intensive, Synbiotic, Growth Performance*

Quantification and Analysis of Mycotoxins in Poultry Feed of Commercial Poultry Farm in Bharatpur Metropolitan City, Chitwan

Krishna Prasad Chaudhary^{1,*}

¹Agriculture and Forestry University, Rampur Chitwan, Nepal

*Presenting Author Contact: chaudharykrishnaprasad@gmail.com, +977-9817498574

Background and Aim: A serious and often invisible threat to feed safety; mycotoxins toxic secondary metabolites produced by different filamentous fungi, chiefly of the genera *Aspergillus*, *Fusarium*, and *Penicillium*. These mycotoxins exhibit serious hepatotoxic, immunosuppressant, nephrotoxic, gastrointestinal impairment effect to health of poultry reducing reproductive health and eggs and meat production. This study aimed to detect and quantify mycotoxins namely Aflatoxin, Zearalenone, Fumonisin, Deoxynivalenol, Ochratoxin and T2-HT2 toxin and to evaluate the occurrence of the mycotoxins in poultry feed in commercial poultry farm in Bharatpur Metropolitan City, Chitwan.

Materials and Methods: A total of 26 feed samples were collected from different poultry farm in December 2025, including 11 broiler feed samples and 15-layer feed samples. Quantification of mycotoxins was performed by Mycomaster quantitative test; an immunoreceptor assay utilizing lateral flow technology and water extraction technology. The samples were ground, extracted, diluted in buffer, loaded in mycotoxin strips and read in Mycomaster reader.

Results: All 26 samples were detected with AFLA with an average concentration of 19.73 ± 2.02 ppb, where 50% samples contain toxin above the Maximum Permissible Limit (20 ppb). Similarly, among 6 samples tested for ZEA, FUM, Ochratoxin and T2-HT2 toxin had average concentration of 232.16 ± 9.72 , 3260 ± 274.95 , 5.1 ± 1.01 and 21 ± 3.87 ppb, respectively; all had toxin levels above MPL. However, Deoxynivalenol was not detected in 2 samples tested.

Conclusion: The feed of commercial poultry farms in Bharatpur Metropolitan City is detected to contain mycotoxins above the MPL set by the Government of Nepal and the European Union. These study findings underscore the need for prompt action in storage conditions and practices of feed ingredients by farmers and feed manufacturers to prevent silent and invisible toxins.

Keywords: *Maximum Permissible Limit, Molds, Mycotoxin, Poultry Feed*

Animal Science

Use Of Dietary Exogenous Enzymes to Optimize Nutrient Utilization and Modulate Gut Health in Monogastric Animals

Rajesh Jha¹

¹Department of Human Nutrition, Food, and Animal Sciences,
University of Hawaii at Manoa, Honolulu, HI, USA
Presenting Author Email Address: rjha@hawaii.edu

The intensification of animal production and the global shift toward antibiotic-free systems have necessitated advanced nutritional strategies to optimize nutrient utilization and modulate gut health. Additionally, alternative feed ingredients are increasingly used in feeding programs to maintain industry competitiveness. However, their use is limited by high levels of non-starch polysaccharides (NSPs), which often act as anti-nutritional factors. Dietary exogenous enzymes, primarily carbohydrases, proteases, and phytases, have emerged as pivotal tools in this paradigm, acting as functional modulators of the gastrointestinal tract. Studies show that these enzymes effectively break down the complex fibre-starch-protein matrix in alternative feedstuffs, thereby reducing digesta viscosity and alleviating the “cage effect” that traps essential nutrients.

Beyond improving digestibility, enzymatic hydrolysis of NSPs helps release functional prebiotics, such as xylo-oligosaccharides and mannan-oligosaccharides. These oligomers selectively promote the growth of beneficial bacteria, including *Lactobacillus* and *Bifidobacterium*, while suppressing the growth of pathogens. This microbial change increases the production of short-chain fatty acids (SCFAs), which provide energy for intestinal epithelial cells and are vital for maintaining gut health and regulating immune responses. Additionally, supplemental enzymes can significantly enhance gut morphology, as indicated by increased villus height and a higher villus-to-crypt ratio, both of which are signs of improved nutrient absorption. Furthermore, the combination of exogenous enzymes and alternative feedstuffs has been shown to improve growth performance and immune function, effectively mimicking the advantages of traditional antibiotic growth promoters.

Overall, the strategic use of exogenous enzymes offers a sustainable way to enhance the nutritional and functional qualities of various feed ingredients, supporting animal health and resource efficiency in the modern livestock industry. However, despite these benefits, enzyme effectiveness can vary with factors such as dosage, diet composition, and the animal’s age. Therefore, more research is needed to refine enzyme supplementation strategies and fully understand the mechanisms behind their positive effects.

Keywords: *Alternative feedstuffs, enzymes, prebiotics, intestinal health, immune response*

Synchronizing Life History Traits: Biological Rhythms in Yak and Their Role in Nutrition, Reproduction, and Production

Shanker Raj Barsila^{1,*}

¹Agriculture and Forestry University, Chitwan, Nepal

*Presenting Author Contact: srbarsila@afu.edu.np, +977-9851166703

The yak (*Bos grunniens*) is endemic in high-altitude Asia, an environment characterized by extreme seasonal variation in daylight, temperature, and feed conditions. Its survival and productivity depend on a strong biological rhythm that aligns its physiology with seasonal changes. At the circadian level, the yaks exhibit a polyphasic pattern of activity, grazing at dawn and dusk to optimize their nutrient intake while avoiding heat stress. The molecular clocks in peripheral tissues regulate nutrient metabolism in conjunction with the hypoxia associated with high altitude. Melatonin secretion, regulated by the photoperiod, is a key hormonal signal for seasonal adjustment. Seasonal rhythms are central to nutrition, reproduction, and production. During summer, long-day photoperiods stimulate hyperphagia, enabling rapid fat accumulation that fuels winter survival. In winter, yaks enter a programmed state of negative energy balance, characterised by a reduced metabolic rate and the mobilisation of adipose tissue. This metabolic flexibility is regulated by seasonal expression of genes involved in lipid metabolism (FABP4, PPAR γ) and thermogenesis (UCP1). Reproduction is strictly seasonal; the spring photoperiod triggers the hypothalamic-pituitary-gonadal axis, synchronizing estrus and parturition with optimal forage availability to maximize calf survival. Consequently, production traits such as milk yield, growth rate, and fibre quality exhibit pronounced seasonality, directly reflecting the integration of nutritional intake and reproductive timing. In conclusion, yak biological rhythms represent an integrated adaptive system, ranging from molecular clocks to whole-animal physiology, that governs nutrition, reproduction, and production. It is crucial to understand biological rhythms to maintain productivity in a changing climate and to improve husbandry practices.

Keywords: *Biological Rhythms, Seasonal Adaptation, High-Altitude, Energy Balance, Photoperiod*

Insects as a Novel Nutrient Source for Feed and Food Applications

Prabhat Khanal^{1,*}

¹Nord University, Norway

*Presenting Author Contact: prabhat.khanal@nord.no

The increasing global demand for high-quality protein, coupled with environmental and resource constraints, has intensified interest in insects as a sustainable alternative nutrient source for future food and feed systems. Insects such as black soldier fly larvae and mealworms are characterized by high protein content, balanced amino acid profiles, favorable lipid profiles, and the presence of bioactive compounds, including antimicrobial peptides and chitin. Their efficient feed conversion, ability to valorize organic side streams, and lower environmental footprint compared to conventional protein sources such as soybean meal and fishmeal position them as key contributors to circular and resilient food systems. Nutritional studies in livestock indicate that insect-derived ingredients can support comparable or improved growth performance, nutrient digestibility, and product quality, while potentially enhancing gut health and immune responses. However, challenges remain in large-scale production, standardization of processing, safety, and consumer acceptance. Overall, insects represent a promising ingredient with the potential to contribute significantly to sustainable food systems and animal agriculture.

Keywords: *Circular Economy, Nutrition, Sustainability*

Whole-Genome Investigation of Genetic Architecture of Wild Buffalo in Nepal and its Implication on Conservation

Aashish Dhakal^{1,*}, Jingfang Si², Saroj Sapkota³, Amir Sadaula⁴, Alfredo Pauciullo⁵, Jianlin Han⁶, Neena Amatya Gorkhali⁷, Xingbo Zhao², Yi Zhang²

¹ Institute of Agriculture and Animal Science, Tribhuvan University, Nepal

² College of Animal Science and Technology, China Agricultural University, Beijing, China

³ National Animal Breeding and Genetics Research Centre, Lalitpur, Nepal

⁴ National Trust for Nature Conservation, Chitwan, Nepal

⁵ University of Torino, Turin, Piedmont, Italy

⁶ Yazhouwan National Laboratory, Sanya, Hainan, China

⁷ National Animal Science Research Institute, Lalitpur, Nepal

*Presenting Author Contact: aashish.dhakal@pakc.tu.edu.np, +977-9845278291

Understanding the current status of the diversity of the country's animal genetics resources is essential for their efficient and sustainable conservation. The small remnant population of wild Asian water buffalo (*Bubalus arnee*), found in southeastern Nepal likely represents the ancestral population from which the domestic buffalo originated. Importantly, the geographical distribution of wild buffaloes in Nepal overlaps with that of domestic buffaloes making hybridization probable due to wildlife-livestock interaction. There is a severe threat to the pure population of *B. arnee* and thus warrants the study of genetic structure of the wild buffaloes in Nepal. In this study, we collected the blood samples from 13 Nepalese wild buffalo individuals for DNA extraction and genotyping using paired-end sequencing. For comparison, we took 66 sequences of Nepalese domestic buffaloes (from our previous work), and 147 publicly available sequences of other river-type and swamp-type breeds. We utilized whole-genome sequencing (WGS) to investigate the genetic diversity and phylogenetic relationship of wild buffaloes with other groups of domestic buffaloes and explored the patterns of gene flow among these species. The population structure analysis using Principal Component Analysis (PCA), admixture, and neighbor joining (NJ) tree suggested close genetic associations between the wild buffalo and domestic breeds, especially with the Nepalese domestic breeds. Additionally, the analysis displayed population differentiation within the wild breed: one likely being the pure wild type and other group being the hybrid type. In the gene flow study using the D-statistics, we found strong evidence of gene flow events between the wild and domestic breeds of buffaloes. The treemix plot indicated a presence of ancestral wild populations from which the gene flow occurred into the Nepalese domestic breeds. These findings underscore the urgent need for genomic information mediated conservation to preserve the genetic integrity of both the domestic and wild buffaloes in Nepal.

Keywords: *Bubalus arnee*, Conservation, Diversity, Nepal, Whole-Genome Sequencing,

Effects of Dietary Treatments on Enteric Methane Emissions and Productivity of Dairy Animals

Shiva Hari Ghimire^{1,*}, Shanker Raj Barsila¹, Bhuminand Devkota¹ and Narayan Paudyal¹

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: drshivahari@gmail.com, +977-9851166703

Two dairy animal studies of cattle and buffaloes were carried out to know the effect of feeding on milk productivity and environmental footprint (enteric methane emission) of small holder dairy animals' production systems in Nepal by improving feeding and nutritional management throughout physical and biological treatment of rice straw, the most important locally available feed resource. The cattle experiment was conducted at the metabolic crate of the National Cattle Research Program, and the buffalo experiment was conducted at the National Buffalo Research Program. Both studies involved three feeding and nutritional treatments (CTR-C, TRT1 and TRT2 in cattle and CTR-B, IMP1 and IMP2 in buffalo). The control (CTR-C) diet was composed of 7.0 kg unchopped and untreated rice straw, 5.0 kg unchopped fresh cut forage (Napier grass) and 3.7 kg concentrate meal, where feed items were fed separately at different times, mimicking smallholder feeding management. The TRT1 and TRT2 diets included similar amounts of rice straw, green forage and meal as for the CTR-C diet, where the rice straw was previously bio-fermented (TRT1) or shredded (TRT2), and feed items were offered as total mixed rations fed twice a day after morning and afternoon milking. In the Buffalo experiment, the CTR-B diet was composed of 7.0 kg chopped and untreated rice straw, 13.0 kg fresh cut oats forage and 5.0 kg concentrate meal. The IMP1 diet was similar to the CTR-B diet with a 1.0 kg extra concentrate meal. In the IMP2 diet, untreated straw of CTR-B was replaced by 12 kg of bio-fermented rice straw. Feed items in the Buffalo Study were manually mixed in the feed troughs at the time of feed offering (after morning and afternoon milking). Animals in both studies were fed at 1.1 times their voluntary feed intake. In cattle, methane emissions (MJ/d and g/d) were not significantly influenced by treatments; however, CH₄ yield per unit of fibre intake (NDFI and DNDFI) was significantly reduced ($P < 0.01$) in TRT1 compared to CTR-C and TRT2, indicating improved efficiency of fibre utilization. Milk yield in cattle remained unaffected by treatments. In buffalo, methane emissions were significantly affected by treatments ($P < 0.001$), with IMP2 generally showing lower emissions per unit of fibre intake (NDFI and DNDFI). Milk yield in buffalo also remained unaffected by treatments. Overall, IMP2 demonstrated a consistent potential to reduce methane emissions, particularly per unit of fibre intake, without adversely affecting milk production or composition. These findings suggest that bio-fermented straw feeding can improve environmental sustainability while maintaining animal productivity in dairy systems.

Keywords: *Feed Treatment, Enteric Methane, Rice Straw, Bio-Fermentation, Shredding*

Evaluation of a Locally Formulated Concentrated Feed Premix on Productive Performance, Milk Quality, and Economic Returns in Holstein Cross Dairy Cows in Melung, Nepal

Rupesh Kafle¹, Rajendra Dhakal¹, Ayush Adhikari¹

¹Heifer International Nepal

*Presenting Author Contact: rupesh.kafle@heifer.org, +977- 9801182959

Inadequate and imbalanced nutrition remains a major constraint to dairy productivity in rural Nepal, largely due to limited access to protein-rich feed resources and overreliance on low-quality basal feeds. This study, implemented under Heifer International Nepal, evaluated the effects of a locally formulated concentrated feed premix on productive performance, milk quality, and economic returns in 100 Holstein-Friesian crossbred dairy cows in Melung, Nepal. During the study period, green forage availability remained constant.

A nutrient-dense concentrate was formulated using locally available agro-industrial byproducts, including soybean meal, mustard cake, pulse husk and distillers dried grains soluble, supplemented with essential minerals, sodium bicarbonate, vitamins, and feed additives. Farmers were trained to incorporate the premix with maize and rice bran at mixing ratios of 1:2 for high-producing cows and 1:3 for low-producing cows. A cooperative-based production and distribution model was adopted, along with continuous field monitoring.

The intervention resulted in a reduction in feed cost by approximately 24% (from NPR 65/kg to NPR 49.36/kg). Mean daily milk yield increased from 9.06 to 9.40 liters (3.7% improvement). Milk compositional quality also improved, with fat content increasing from 3.60% to 3.91% (8.6% increase) and solid-not-fat (SNF) from 7.60% to 7.78% (2.36% increase). Economic analysis indicated an increase in monthly profit of approximately NPR 2,465.6 per animal, equivalent to an annual gain of about NPR 29,587 per cow.

Despite these positive outcomes, the study was limited by the absence of controlled experimental design, lack of randomized control groups, and potential variability in management practices across households, which may influence the observed results.

The findings demonstrate that the use of locally formulated concentrated feed premix significantly enhances feed efficiency, improves milk yield and quality, and reduces production costs. This approach represents a scalable and sustainable feeding strategy that leverages locally available resources to improve dairy productivity and farmer livelihoods in resource-constrained settings.

Keywords: *Concentrated Feed Premix, Cooperative-Based Production, Dairy Productivity, Feed Cost Reduction, Local Feed Resources*

Copy Number Variation Landscapes Underlying Breed-Specific Genome Structure in Nepalese buffaloes

Uddhav Paneru^{1,*}, Gopal Ramdas Gowane², Rani Alex² and Vikas Vohra²

¹NARC-National Cattle Research Program, Rampur, Chitwan, Nepal

²ICAR-National Dairy Research Institute (NDRI), Karnal, Haryana, India

*Presenting Author Contact: pnrুদ্ধav.npl@gmail.com, +977-9857012030

Copy number variations (CNVs) are a presence of different copies of large structural variation in the genome of an individual compared to the reference genome that determine the variation in the trait of interest relative to population. The present study aimed to identify the common and breed-specific copy number variation (CNVs) in 5 breeds of Nepalese buffaloes using 64 whole genome sequence data. Read depth approach in CNVnator software with a bin size of 500 was used to call CNVs. CNVs that were overlapped among each other were concatenated into CNVR to compare among each other. High frequency CNVR region were created by filtering CNVR that were occurring in 80% of the samples. These regions were the genomic hotspot of structural variation and represent the latest changes in copy number variation resulting from resistance against diseases, heat stress and adaptation to the changing environment. Further these genes were annotated using Cluster Profiler and DAVID and literature was mined to associate genes with functional pathways. The maximum number of CNVs was identified in Lime (5,978) and the minimum number of CNVs was identified in Parkote (5,978) breed, with deletions outnumbering duplications in all breeds. While annotating these CNVR, genes related to mastitis resistance was observed in Lime buffalo and resistance to tuberculosis and paratuberculosis were observed in Gaddi buffalo. This study helps us in selection of future buffalo population resistance for major economic diseases based on the large structural variants.

Keywords: *Annotation, Bin Size, CNVR, Copy Number Variation, Read Depth*

Mitigating Summer Production Slump: An Assessment of the Efficacy of Phytogetic Electrolytes and Antioxidant Adaptogens (Vam-C) on Egg Quality and Hen-Day Production in Commercial Layers

Ram Krishna Yadav^{1,*}, Niraj Bastakoti²

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

²Nepal Agriculture Research Council

*Presenting Author Contact: ramkyadav@afu.edu.np, +977- 9845333986

In the increasingly unstable climate of the tropical region of Chitwan, seasonal heat stress is a major physiological challenge for the birds, which manifests as the ubiquitous “summer production slump” for the commercial layers, thereby threatening the viability of the farming industry. As the ambient temperature increases above the thermoneutral zone, i.e., above 32°C, the birds experience respiratory alkalosis as the high rate of panting results in a reduction of blood (CO₂) and bicarbonate levels. This physiological change directly impacts the calcium-binding proteins, thereby causing “thin shell syndrome” and reducing the overall Hen-Day Production (HDP), which is further reflected in the mortality rate of the birds. The heat stress also affects the reproductive system of the birds, thereby reducing the internal egg quality.

In this study, a 42-day field trial was conducted in Chitwan among commercial Hyline Browns at 52 weeks of age. The birds were allocated into four different homogenous treatment groups: (1) Control, (2) Betaine HCl, (3) Vam-C, and (4) Combination. Parameters monitored were HDP, eggshell thickness, and Haugh Units to evaluate albumen integrity. One-way ANOVA was used to analyze all data collected, and results were considered statistically significant at p-values less than 0.05.

The results showed that birds in the Vam-C and Combination treatment groups maintained significantly higher HDP levels at +3.8% and +4.1%, respectively, compared to the control during peak thermal stress levels (>33°C). Interestingly, eggshell thickness in birds treated with Vam-C was significantly higher than those in the control and Betaine HCl treatment groups. Although Betaine HCl improved water intake in birds, Vam-C showed better results in maintaining Haugh Units, thus reducing internal protein denaturation. The study established that the combined effect of phytogetic adaptogens offers birds a powerful defense mechanism against adverse effects of heat stress on egg production. By maintaining a stable electrolyte balance and countering oxidative stress, Vam-C ensures egg quality and flock persistence.

Keywords: Heat Stress, Phytogetics, Eggshell Quality, Vam-C, Hen-Day Production

Udder Morphology, Milk Quality and Milk Composition of Saanen Goat

Sagun Malla¹, Raju Kadel, Shanker Raj Barsila², Pratik Hamal, and Ayush Adhikari

¹Nepal Agriculture Research Council, Khumaltar, Lalitpur, Nepal

*Presenting Author Contact: sagun_malla44@yahoo.com, +977-9851166703

Goat farming plays a vital role in meeting the increasing demand for meat and dairy products globally. In Nepal, goat is primarily used for meat purposes and significantly contribute to agricultural GDP, although there are potential milking breeds of goats with their economic importance. The introduction of Saanen goats, renowned for their high milk yield, holds the potential to transform the goat farming industry in the country. The main objective of this research was to evaluate the udder morphology, milk composition, and milk quality of Saanen goats to provide insights for improving productivity and herd management practices in Nepal. The study was conducted at the NGRP, Bandipur, Tanahun, over 28 days, involving 10 Saanen goats in late lactation, with data collection in a weekly interval. Morphological measurements were taken for udder symmetry, teat shape, and teat-to-ground distance. Milk composition and somatic cell count (SCC) were analysed for quality assessment. Saanen goats exhibited symmetrical, globular udders with funnel-shaped teats. SCC values remained within the normal range, with higher counts in the right teat (1,137,242 cells/ml) compared to the left teat (352,676 cells/ml). Teat-to-ground distance influenced SCC in the left teat. Milk composition was stable with minor variations. Variations in udder circumference and width were noted, correlating with milk yield. Results of this research highlighted the potential of Saanen goats for sustainable, high-quality milk production in Nepal. Key findings on udder morphology, milk composition, and SCC offers insights into optimizing milk yield and early health detection. The results also suggest that monitoring udder traits can enhance herd management and improve goat milk productivity. Goat farming plays a vital role in meeting the increasing demand for meat and dairy products globally. In Nepal, goat is primarily used for meat purposes and significantly contribute to agricultural GDP, although there are potential milking breeds of goats with their economic importance. The introduction of Saanen goats, renowned for their high milk yield, holds the potential to transform the goat farming industry in the country. The main objective of this research was to evaluate the udder morphology, milk composition, and milk quality of Saanen goats to provide insights for improving productivity and herd management practices in Nepal. The study was conducted at the NGRP, Bandipur, Tanahun, over 28 days, involving 10 Saanen goats in late lactation, with data collection in a weekly interval. Morphological measurements were taken for udder symmetry, teat shape, and teat-to-ground distance. Milk composition and somatic cell count (SCC) were analysed for quality assessment. Saanen goats exhibited symmetrical, globular udders with funnel-shaped teats. SCC values remained within the normal range, with higher counts in the right teat (1,137,242 cells/ml) compared to the left teat (352,676 cells/ml). Teat-to-ground distance influenced SCC in the left teat. Milk composition was stable with minor variations. Variations in udder circumference and width were noted, correlating with milk yield. Results of this research highlighted the potential of Saanen goats for sustainable, high-quality milk production in Nepal. Key findings on udder morphology, milk composition, and SCC offers insights into optimizing milk yield and early health detection. The results also suggest that monitoring udder traits can enhance herd management and improve goat milk productivity.

Keywords: Milk Composition, Somatic Cell Count, Udder Morphology

Microbiology and Parasitology

Avian Influenza in Asia: Surveillance in Nepal as a Strategic Platform for One Health Collaboration

Manabu Onuma*

*Biodiversity Division, National Institute of Environmental Studies, Japan

*Presenting Author Contact: monuma@nies.go.jp,

Highly pathogenic avian influenza (HPAI) continues to exert significant impacts on biodiversity, livestock production, and public health across Asia. Nepal, located along major migratory bird flyways and characterized by diverse ecosystems, represents a critical interface where viruses can be transmitted among wildlife, domestic animals, and humans. This presentation provides an overview of HPAI occurrence in wildlife across Asia and positions avian influenza surveillance in Nepal as a strategic platform for advancing international One Health collaboration.

Surveillance activities in Nepal offer unique opportunities to monitor virus circulation in regions where migratory and resident bird populations overlap. These efforts contribute to the early detection of emerging strains, evaluation of viral pathogenicity, and improved understanding of transmission dynamics across ecological boundaries. Furthermore, Nepal's geographical position linking South Asia, Central Asia, and East Asia highlights its importance as a regional hub for integrated surveillance.

In addition, this presentation introduces a novel approach for assessing viral pathogenicity that does not require virus isolation using embryonated eggs. This method has the potential to provide rapid and practical evaluation of pathogenicity and will be discussed in the context of its applicability and potential implementation in Nepal.

The surveillance framework in Nepal is also presented as a practical model for One Health integration, combining expertise from wildlife health, veterinary science, and public health. This platform facilitates data sharing, capacity building, and coordinated transboundary responses to emerging infectious diseases.

Ultimately, avian influenza surveillance in Nepal not only strengthens national preparedness but also serves as a foundation for international collaboration, contributing to a more resilient and interconnected One Health framework in Asia.

Keywords: *Avian Influenza, Surveillance, Nepal, One Health, Pathogenicity Assessment*

Infectivity Titration and Characterization of an Archived Newcastle Disease Virus in Embryonated Eggs at Second Passage

Suman Khadka^{1,*}

¹Agriculture and Forestry University, Chitwan, Nepal

*Presenting Author Contact: suman.khadka@favf.edu.np, +977-9864401178

Background and Aim: Newcastle disease virus (NDV) is a significant avian pathogen with economic impact, and precise quantification of infectivity and confirmation of its pathotype are crucial before using archived virus stocks in further experimental work. This study aimed to titrate and characterise an archived NDV genotype VII.2 isolate at the second passage by confirming viral presence, evaluating antigenic integrity, determining the 50% egg infectious dose (EID₅₀), and estimating the mean death time (MDT) in embryonated chicken eggs.

Materials and Methods: An archived NDV genotype VII.2 isolate stored at -80°C in the Virology Department of Nepal Animal Health Research Center (NAHRC), Lalitpur, with a history of repeated freeze-thaw cycles, was used for characterization. Viral RNA was confirmed by one-step RT-PCR targeting the fusion (F) gene, and antigenic integrity was assessed by hemagglutination (HA) testing. The virus was amplified by second-passage propagation in NDV-unvaccinated embryonated chicken eggs via allantoic inoculation, and infectivity was titrated using ten-fold serial dilutions (10⁻² to 10⁻⁸) with endpoint detection by rapid hemagglutination, followed by EID₅₀ calculation using the Reed-Muench method. MDT was calculated from embryo mortality timing at the minimum lethal dose dilution to phenotypically classify the pathotype.

Results: RT-PCR successfully amplified the NDV F-gene target in one sample, confirming the presence of viral RNA in the archived allantoic fluid. The initial HA titres for the three tested samples were 1:8, <1:2, and <1:2, and the RT-PCR positive sample (1:8) was selected for amplification due to its low initial HA titre relative to expectations for velogenic strains. Following amplification, HA titres of pooled allantoic fluid from dead and live embryos were 1:128 and 1:16, respectively, indicating successful virus amplification. Based on Reed-Muench calculation, the infectious titre of the amplified stock was 10^{6.75} EID₅₀/mL (with 0.1 mL inoculated per egg). MDT was 54 hours at the minimum lethal dose (10⁻⁴) and thus classified as velogenic.

Keywords: Newcastle disease virus, Genotype VII.2, Virus titration, EID₅₀

Efficacy of Anthelmintic Drugs Against Gastrointestinal Nematodes of Sheep in Jumla

Ramesh Prasad Sah^{1*}, Bhim P Timsina²

¹Nepal Agricultural Research Council

²Institute of Agriculture and Animal Science, Tribhuvan University, Nepal

*Presenting Author Contact: rpsnarc@gmail.com, +977-9849365866

Gastrointestinal nematodes are major constraints to health and productivity of small ruminants. Methods of their control relies mainly on anthelmintic drugs; however, the indiscriminate use of these drugs could lead to the development of anthelmintic resistance. This study aimed to investigate the evaluation of anthelmintic efficacy in sheep. A farm-based field study design was employed for the evaluation of anthelmintic efficacy. Sheep were not drenched from 12 weeks. The McMaster egg counting results showed that the mean EPG of infected sheep before treatment was 834.4. Altogether 30 sheep were kept for the experiment and were grouped into three- 10 for albendazole, 10 for ivermectin and 10 for control. Albendazole @7.5 mg/kg bw orally showed slightly lower efficacy (percentage reductions= 91%) than ivermectin @ 0.5 ml/25kg bw s/c 92% after 15 days of treatment. Factors such as age, body condition, and past deworming history of sheep were found to have a statistically significant ($p < 0.05$) influence on the occurrence and burden of the worms. The study results revealed that nematode infections were among sheep health constraints that could hurt their productivity while efficacy of two drugs Albendazole and Ivermectin were detected. Therefore, the appropriate management techniques of Gastrointestinal nematodes infections should be designed and implemented.

Keywords: *Anthelmintic Drug Efficacy, Gastrointestinal Nematodes, Sheep, Jumla*

Isolation and Antibigram of *Salmonella* spp. Present in Poultry Meat from Retailer Meat Shops of Nawalparasi (Bardaghat-Susta West), Nepal

Harikrishna Pokharel^{1,*}, Bharat Kafle, Bishal Khatri, Madan Bhandari¹, Arun Chaudhary

¹ Institute of Agriculture and Animal Science (IAAS), Paklihawa Campus, Bhairahawa, Nepal

*Presenting Author Contact: hpokharel2@gmail.com, +977-9857010860

The research entitled “Isolation and Antibigram of *Salmonella* spp. Present in Poultry Meat from Retailer Meat Shops of Nawalparasi (Bardaghat-Susta West), Nepal” aimed to assess microbial safety of poultry meat by determining the prevalence and antibiotic resistance patterns of *Salmonella* isolated from retail meat shops. A total of 196 poultry meat samples were collected from various retail shops and analyzed using standard microbiological, biochemical, and antibiotic sensitivity testing methods.

Based on FDA Bacteriological Analytical Manual, out of the total samples, 55 (28.06%) were found positive for *Salmonella*. Antibiotic susceptibility testing showed the highest resistance to Ciprofloxacin and Amikacin (40%), followed by Cefpodoxime (25.45%) and Doxycycline (9.09%), while Chloramphenicol and Gentamicin were found to be the most sensitive antibiotics. Furthermore, 72.44% of the *Salmonella* isolates were identified as multidrug-resistant (MDR), showing resistance to three or more classes of antibiotics.

The high prevalence of MDR *Salmonella* isolates indicates extensive and inappropriate use of antimicrobials in poultry farming. These findings emphasize the importance of implementing proper biosecurity measures, regulating antibiotic use, and promoting awareness among poultry producers, retailers, and consumers to minimize the risk of transmission of resistant bacteria and safeguard public health.

Keywords: *Salmonella Spp., Poultry Meat, Antibiotic Resistance, Antibigram, Multidrug Resistance*

Identification of Ticks and Tick-Borne Pathogens in Goats of Buffer Zones Around Chitwan National Park

Bishal Kandel¹, Chet Raj Pathak, Rabin Bastakoti

*Presenting Author Contact: kandelbishal265@gmail.com, +977-9844700139

Tick and tick-borne pathogens are the major constraints for the health and productivity of small ruminants in the tropical and sub-tropical regions. This study investigated the diversity of tick fauna, morphometry of identified tick species, prevalence of haemoparasitic disease, and its alteration on haematological parameters in goats.

Goats in the buffer zone of Chitwan National Park were screened for tick infestation, and collected ticks (n= 327) were identified using morphological and morphometric keys. Collected blood sample (n= 163) was screened for haemoparasites by microscopic examination of Giemsa-stained blood smears, and haematological parameters were analyzed by performing Complete Blood Count. Data management and Statistical analysis were done using MS Excel version 2021 and RStudio version 4.4.2.

Four different tick species: *Haemaphysalis punctata*, *Haemaphysalis bispinosa*, *Haemaphysalis sulcata*, and *Amblyomma* species were identified with highest prevalence of *H. punctata* (52.30%) followed by *H. bispinosa* (45.70 %). Significant differences in morphometric parameters were found between different species of *Haemaphysalis* ticks. Examination of Blood smears revealed *Anaplasma* (7.97%), *Babesia* (5.52%), and mixed infection (1.81%). Haematological data revealed hypochromic, microcytic anemia along with inflammatory leucocytosis in goats infected with Haemoparasites. Mixed infection showed more severe haematological changes than a single infection of *Anaplasma* or *Babesia*.

The study demonstrates a high diversity and prevalence of ticks and tick-borne haemoparasites in goats from the buffer zone of Chitwan National Park. Haemoparasitic infections significantly alter haematological parameters, with mixed infections causing more pronounced pathological changes. These findings highlight the need for effective tick control strategies and regular screening of goats to improve animal health and productivity in the study area.

Keywords: *Haemoparasites, Haematology, Morphometry, Ticks*

Seroprevalence of *Neospora Caninum* in Dairy Herds of Rautahat District

Manoj Dahal¹, Parisha Thapa^{2*}, Amar Nath Chaudhary³

¹ Veterinary Instructor, Janata Madhyamik Bidhyalaya, Mahalaxmi Municipality, Dhankuta, Nepal

²Department of Livestock Production and Management, Agriculture and Forestry University, Rampur, Chitwan, Nepal

³Department of Anatomy, Physiology and Biochemistry, Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author and corresponding Author Contact: parishathapa@afu.edu.np, +977-9841410078

Neospora caninum is a protozoan parasite implicated in reproductive disorders in cattle and buffaloes, causing abortions and infertility. This study aimed to determine the seroprevalence of *Neospora caninum* in cattle and buffaloes from Rautahat district, using the ImmunoComb dot- ELISA for in vitro detection of specific antibodies. A total of 100 serum samples were collected from farmer-level dairy herds, and the animals were selected based on their history of reproductive complications, including abortions, repeat breeding, and anestrus. The results revealed that 4% (4/100) of the samples tested positive for *Neospora caninum*, while the remaining 96% (96/100) were negative. The study included six breeds of cattle and buffalo. Among these, 3 out of 43 Jersey samples tested positive, and 1 out of 13 local cattle samples was positive. No positive cases were found in other breeds. Reproductive complications in the positive cases were predominantly repeat breeding (50%), followed by anestrus (25%) and late abortion during the third trimester (25%). These findings suggest a moderate prevalence of *Neospora caninum* in the dairy herds of Rautahat District and its potential association with reproductive disorders. Further studies are needed to explore the impact of *Neospora caninum* on dairy production and implement effective control measures.

Keywords: *Neospora caninum*, Seroprevalence, Immunocomb ELISA

Antibiotic Sensitivity Patterns in Bovine Subclinical Mastitis: A Nine-Year Retrospective Analysis from the Central Veterinary Laboratory, Kathmandu, Nepal

Shiva Khanal¹

¹Institute of Agriculture and Animal Science

*Presenting Author Contact: shiva.khanal@pake.tu.edu.np, +977-9847421441

Bovine subclinical mastitis (SCM) is a major economic burden on dairy production, and its effective management is increasingly challenged by antimicrobial resistance. The objectives were to evaluate long-term antimicrobial susceptibility patterns of major mastitis-associated bacterial groups and to generate evidence-based recommendations for rational antimicrobial use in Nepalese dairy systems. A nine-year (2009/10–2017/18) retrospective analysis was conducted using officially published annual technical reports from the Central Veterinary Laboratory, Kathmandu, Nepal. Of 3,445 bovine milk samples from cattle and buffalo screened using the California Mastitis Test, 2,948 (85.6%) tested positive for SCM and were advanced to bacteriological culture. Isolates were classified into four groups (*Staphylococcus* spp., *Escherichia coli*, *Streptococcus* spp., and *Bacillus* spp.) and tested against five antibiotics (gentamicin, tetracycline, ciprofloxacin, enrofloxacin, and ampicillin) using the Kirby-Bauer disk diffusion method. Arcsine-transformed percentage sensitivity data were analyzed by two-way ANOVA, and mean comparisons among antibiotics were performed using Tukey's post-hoc test. Antibiotic type had a highly significant effect on susceptibility ($p < 0.001$), whereas pathogen group showed no significant effect ($p = 0.29$). Fluoroquinolones (ciprofloxacin: 90.0%; enrofloxacin: 90.06%) and gentamicin (88.0%) exhibited consistently high and stable sensitivity over the study period. Tetracycline showed moderate but variable efficacy (64.78%), while ampicillin recorded the lowest sensitivity (42.81%). These findings confirmed that antibiotic class, rather than pathogen identity, is the primary determinant of antimicrobial efficacy in bovine SCM in Nepal. Empirical treatment should prioritize fluoroquinolones and gentamicin, while ampicillin should be avoided. Tetracycline use should be restricted to cases confirmed susceptible by laboratory testing. These results highlight the need for sustained antimicrobial susceptibility surveillance and evidence-based stewardship in Nepalese dairy systems.

Keywords: *Antimicrobial Stewardship, Antimicrobial Susceptibility, Bovine Subclinical Mastitis, Dairy Systems, β -Lactam resistance*

Biotechnology

Camelid single-domain antibodies: from discovery to biotherapeutic application

Toya Nath Baral

*Presenting Author Contact: tnbaral@gmail.com, +1-650-804-1331

Immunoglobulins (Igs), also known as antibodies (Abs), are the major factors of adaptive immune system, particularly the humoral immune response. The IgG subclass of mammals is composed of two chains, called heavy chain and light chains and are thus heterodimer. In early 90s a group in Vrije University of Brussels led by Prof Hamers when analyzing the sera from camels, identified unique type of IgGs without light chains and they named them Heavy-Chain-only-antibody (HcAb). Few years later the same group were able to show elegantly that the binding components of HcAbs are single domain. This discovery opened up a new class of molecules for therapeutics and diagnosis of diverse spectrum of indication. Ablynx (a spinoff from VUB, now acquired by Sanofi in 2018 at USD \$4.8 billion) was the first company to get approval of VHH based drug for human disease (caplacizumab; bivalent anti-vWF nanobody for treating rare blood clotting disorders). Currently there are multiple biotech and biopharma bring these molecules to clinic. There are batteries of multi-specific molecules under development for their biotherapeutic usage, some of which are discussed here.

Keywords: Single-domain antibody, Biotherapeutic, Discovery

Genomic Pathways to One Health: Climate Adaptation and Livestock Resilience in the Himalayan Region

Prashant Ghimire, Nan Wang, Pritam Chhetri, Nishma Dahal, Cheng Yi, Tong Zhang, Suonan Zhuoga, Zhaxi Jiangyong, and Sangeet Lamichhane*

*Department of Biological Sciences, Kent State University

*Presenting Author Contact: slamichh@kent.edu, +1-330-593-9801

Mountain systems of Nepal sustain millions of people whose livelihoods depend on climate-sensitive livestock production across steep elevational gradients. In these environments, animal health, biodiversity, ecosystem stability, and food security are tightly interconnected. Yet national livestock and conservation policies rarely integrate genomic data, landscape connectivity, and climate projections to assess long-term adaptive capacity. Developing such an integrated framework is essential for advancing One Health pathways in the Himalaya.

Here, we use the Tibetan Partridge (*Perdix hodgsoniae*), a high-altitude endemic of the Sino-Himalayan region, as a model to examine how geography and climate jointly shape genetic diversity, local adaptation, and vulnerability to environmental change. By integrating whole-genome sequencing with ecological, climatic, landscape, and morphological data, we reveal strong population divergence driven by mountain barriers and contrasting climatic regimes. Populations in arid western landscapes show genomic signatures of temperature adaptation but reduced gene flow and lower genetic diversity, increasing sensitivity to future climate stress. In contrast, populations in more humid and connected regions maintain larger effective population sizes and adaptive signatures linked to precipitation, supporting greater resilience.

These findings provide a transferable framework for Nepal's livestock systems, including yak, sheep, goat, and indigenous poultry breeds that are increasingly exposed to rising temperatures, shifting monsoon patterns, emerging pathogens, and rangeland fragmentation. We argue that Nepal's national breeding programs should incorporate genomic monitoring of adaptive variation, while community-based breed conservation initiatives can safeguard locally adapted genetic resources. Given the transboundary nature of Himalayan ecosystems, cross-border genomic and disease surveillance collaboration is also critical for maintaining connectivity and adaptive potential.

Integrating genomics, landscape ecology, and climate forecasting into livestock policy will strengthen climate-adaptive breeding strategies, reduce vulnerability at wildlife–livestock interfaces, and support sustainable livestock production and food security under accelerating environmental change.

Keywords: *Climate Adaptation, Genomics, Himalayas, One Health*

Microbiome Engineering in Poultry Gut: Assembly, Function, and Dynamics

Maria Whitton¹, Dragana Stanley¹, Yadav Sharma Bajagai¹

¹Institute for Future Farming Systems, School of Health, Medical and Applied Sciences, Central Queensland University, Rockhampton, Australia

The gastrointestinal microbiome of chickens is a complex and dynamic ecosystem comprising trillions of microorganisms that plays significant roles in nutrient metabolism, immune development, pathogen exclusion, and overall flock productivity. Understanding how this microbial community assembles, functions, and shifts across the production cycle is central to developing strategies that promote gut health while reducing reliance on antimicrobial growth promoters.

Microbial colonisation of the avian gut begins at hatch, or potentially even earlier, and is shaped by host genetics, environmental exposures, feed and feed substrates, and early-life microbial seeding. These founding communities establish metabolic and immunological trajectories that influence bird performance throughout life, making the early-life window a critical period for microbiome programming. As the bird matures, the gut microbiome undergoes successive compositional and functional shifts driven by age, diet transitions, and environmental pressures. Disruptions in these microbiomes at any stage, whether through dysbiosis, pathogen challenge, or management stressors, can compromise intestinal barrier integrity and predispose flocks to enteric disease.

Advances in high-throughput sequencing, metagenomics, and multi-omics integration have transformed our capacity to understand gut microbial ecology and host-microbiome interaction at unprecedented resolution. These tools are now enabling a shift from descriptive profiling to rational microbiome engineering, the deliberate design of microbial interventions, such as probiotics, prebiotics, and precision biotics, that steer community composition and function toward desired health and production outcomes. The study of the gut microbiome is also relevant to the One Health framework, given the shared microbiota among chickens, humans, and other livestock species and its implications for the dissemination of antimicrobial resistance.

Keywords: *poultry, microbiome engineering, gut health, multi-omics*

A Comparative Study of Intestinal Microbiota in Sakini versus Hyline Brown Chicken Breeds

Wang Tshiring Pakhrin¹, Rumakanta Sapkota, Chet Raj Pathak¹, Himal Luitel¹, Prabhat Khanal

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: wangpakhrin7@gmail.com, +977- 9845812767

While host genotype significantly influences animal gut microbiomes, the microbial profiles of local breeds such as Nepal's Sakini and Hyline Brown have remained largely unexplored. This study addressed this gap by comparing gut microbial diversity and composition between these two breeds under both fed and 12-hour-fasted conditions. Researchers sequenced the V3-V4 region of the 16S rRNA gene from 67 samples across the duodenum, ileum, and cecum. Results indicated that while a 12-hour fast did not significantly alter microbial alpha diversity or community structure, both breed and gastrointestinal location were primary drivers of microbial composition. Specifically, significant differences in bacterial genera were identified in the ileum and cecum, including potentially zoonotic genera such as *Paeniclostridium*, *Synergistes*, and *Helicobacter* in Sakini chickens, and *Arcobacter* in Hyline Browns. Ultimately, the study concludes that breed-specific traits are more influential than short-term fasting, highlighting the need to consider breed characteristics in future research on poultry health, nutrition, and microbiology.

Keywords: *Gut Microbiome, Fasting, Hyline Brown, Sakini*

Sero-Surveillance of Blue Tongue Virus Antibody and Their Associated Risk Factors Among Domesticated Ruminants of Chitwan District of Nepal

Sachin Shrestha^{1,*}, Chiran Krishna Tiwari², Durga Dhungana², Nisha Poudel², Krishna Raj Pandey²

¹Paklihawa Campus, IAAS, Tribhuvan University

²FMD and TADs Investigation Laboratory

*Presenting Author Contact: sachinshrestha430@gmail.com, +977-9869536958

Bluetongue virus (BTV) affects domestic ruminants. Although no recent clinical outbreaks have been reported in Nepal, previous serosurveys have indicated a high seroprevalence of BTV antibodies. This study aimed to determine the seroprevalence of BTV antibodies in livestock of the Chitwan District, Nepal, and to identify associated risk factors.

Methods: Serum samples were collected from 382 domestic ruminants (121 cattle, 132 goats, 103 sheep, and 26 buffalo) across the Chitwan district. The samples were tested for BTV antibodies using a commercial competitive ELISA kit. Data on animal species, age, sex, breed, and housing practice were recorded. Associations between these variables and seropositivity were assessed using chi-square tests and multivariate logistic regression, with $p < 0.05$ considered statistically significant.

The overall seroprevalence of BTV antibodies was 59.69%. Cattle exhibited the highest seroprevalence (95.87%), followed by goats (49.24%), buffalo (46.15%), and sheep (33.98%). Seroprevalence among older animals (> 24 months) was significantly higher (78.1%) than in younger animals (≤ 24 months; $p < 0.001$). Females had higher seroprevalence (67.01%) than males ($p < 0.001$). Crossbred animals had higher seroprevalence (71.77%) than indigenous breeds ($p < 0.001$). Animals kept in intensive housing systems had higher seroprevalence (62.24%) than those in semi-intensive systems, although this difference was marginal ($p \approx 0.07$). In multivariate analysis, cattle had markedly higher odds of seropositivity than sheep (adjusted odds ratio=42.73; $p < 0.001$). Additionally, female goats and goats raised under intensive systems had significantly higher odds of seropositivity.

The high seroprevalence indicates widespread, likely enzootic, circulation of BTV in the livestock of Chitwan, despite no reported clinical outbreaks. Cattle appear to be key hosts in maintaining the virus. These findings underscore the need for improved surveillance, vector control, and further investigation of circulating BTV serotypes in Nepal.

Keywords: *Livestock, BTV Antibody, Nepal, ELISA, Transboundary Animal Disease*

Wildlife

Establishing a Viable Cell Culture Banking Network for Endangered Species Conservation in Asia

Manabu Onuma*

*Biodiversity Division, National Institute of Environmental Studies, Japan

*Presenting Author Contact: monuma@nies.go.jp,

The rapid loss of biodiversity across Asia highlights the urgent need for innovative conservation strategies that complement traditional in situ and ex-situ approaches. Among these, the establishment of viable cell culture banking has emerged as a powerful tool to preserve the genetic resources of endangered species. This presentation outlines the concept, current progress, and future prospects of developing a regional network for viable cell culture banking in Asia.

Viable cell culture banking enables the long-term cryopreservation of living cells, including somatic cells and germline-derived materials, which can support a wide range of applications such as genetic studies, reproductive technologies, and disease research. These resources provide a foundation for what may be considered a “cryo-population,” complementing wild and captive populations within an integrated conservation framework.

In Asia, several institutions have independently developed cell banking initiatives; however, coordination and standardization across countries remain limited. Establishing a regional network would enhance data sharing, harmonize protocols, and facilitate collaborative research, thereby increasing the overall effectiveness of conservation efforts. Such a network could also strengthen capacity building, promote technology transfer, and support rapid responses to emerging threats, including infectious diseases and environmental changes.

This presentation introduces ongoing efforts to build such a network, including case studies from Japan and collaborative activities with partner countries including Nepal. Ultimately, the development of a viable cell culture banking network in Asia represents a critical step toward implementing a One Plan Approach to conservation, integrating multiple population management strategies to ensure the long-term survival of endangered species.

Keywords: *Cell Culture Banking, Cryopreservation, Endangered Species, Asia, One Plan Approach*

One Health Approach in Successful Control of Avian Influenza among Large Felids in Gorakhpur Zoological Park

Yogesh Pratap Singh¹, Ravi Yadav², Vikas Yadav³, Gaurav Verma⁴, Shyam Bihari Singh⁴, Rakesh Kumar Singh⁵

¹Dy Director/Veterinary Officer, Shaheed Ashfaq Ullah Khan Prani Udyan Gorakhpur, UP, India

²Wildlife Veterinarian, Shaheed Ashfaq Ullah Khan Prani Udyan Gorakhpur, UP, India

³Director, Shaheed Ashfaq Ullah Khan Prani Udyan Gorakhpur, UP, India

⁴Range Forest Officer, Shaheed Ashfaq Ullah Khan Prani Udyan Gorakhpur, UP, India

⁵Joint Director (Gynaecology), Dept of AH, Ayodhya, UP, India

dryogeshpratap@gmail.com

Avian influenza H5N1 (AI) was diagnosed in eight zoo animals, including big cats and birds, at the Shaheed Ashfaq Ullah Khan Zoological Park in Gorakhpur, India, along with a few feral crows. The zoo is home to approximately 400 wild animals representing more than 53 species. Various agencies provide important guidelines for controlling infectious diseases and epidemics. However, implementing these guidelines practically often presents challenges. Consequently, a one health approach was adopted to prevent pandemics and diseases, drawing on past experiences in biosecurity, government directives, and most importantly, a practical health strategy.

Thanks to a collective One Health approach and interdepartmental coordination, this was the first time that Avian influenza was successfully controlled in a zoological park. The affected animals, treated by zoo veterinarians, tested negative for H5N1 after one month.

A multidisciplinary approach was devised, involving Animal health/Veterinary professionals, Human health/Medical professionals, and Environmental health/Forest/Local body professionals.

The 'One Health' approach has also proven essential in preventing antimicrobial resistance (AMR), even after extended antibiotic use in ex-situ conditions during pandemics. Pandemics and emerging diseases pose significant challenges in zoo animal health management, and implementing the 'One Health' strategy is crucial for successful ex-situ conservation efforts.

Successfully managing AI at the Gorakhpur Zoo is an excellent example of the One Health approach.

Keywords: *Influenza, zoo, One-Health, antimicrobial resistance*

Prospective of integrated biobanking of endangered wildlife and indigenous livestock genetic resources in Nepal

Himal Luitel, PhD

hluitel@afu.edu.np

Center for Biotechnology, Agriculture and Forestry University

The geographical diversity of Nepal supports a wide range of biodiversity, including both wildlife and indigenous livestock genetic resources. Traditional conservation efforts for endangered wildlife species rely on in situ conservation, but due to unavoidable circumstances. Indigenous livestock breeds are being replaced by high-yielding exotic breeds, and the gene pool of ecological adaptability, disease resistance and resilience to harsh environments has been neglected. In this context, integrated biobanking of IUCN red list wildlife species and indigenous livestock species will be the strategic approach to conserving genetic resources for future applications and supporting de-extinction efforts. Genetic materials preserved through biobanking can be utilized for advanced reproductive technologies, selective breeding programs, and restoration of genetic diversity.

Integrating wildlife and indigenous livestock biobanking will help to tackle biodiversity loss and promote sustainable animal agriculture in Nepal. Developing a policy framework, building technical expertise, and establishing multidisciplinary and cross-sectoral collaboration are crucial to successfully implementing the strategy. This initiative will be a milestone in conserving Nepal's genetic resources and will support further advancement in conservation.

Keywords: *Biobanking, conservation, genetic resources, legal framework*

Factors influencing the foot health of captive Asian Elephants (*Elephas maximus*) in Chitwan National Park (CNP), Nepal

Rupak Khatri-Chhetri^{1,*}, Prasiddha Paudel¹, Anisha Subedi¹, Amir Sadaula², Shekhar Pokhrel¹, Subir Singh¹, Manoj Shah¹

¹Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Rampur, Chitwan, Nepal

²National Trust for Nature Conservation, Biodiversity Conservation Center, Sauraha, Chitwan, Nepal

*Presenting Author Contact: rupakkc@afu.edu.np, +977-9840244324

Foot problems are commonly encountered ailments affecting captive elephants. The present study was conducted to identify the influencing factors associated with the foot health of captive Asian Elephants in Chitwan National Park (CNP), Nepal, during October – December 2023. A comprehensive field examination of the foot was conducted, accompanied by a questionnaire survey of elephant owners and mahouts. The foot ailments were meticulously categorized into three severity levels, ranging from 0 to 3. The structures of interest during the physical examination were nails, interdigital space, cuticle, and foot pad. A total of 10-foot lesions were recorded, where 82.90% of the elephants had one or more-foot ailments. Overgrown nails were seen in 63.15% of elephants, being the highest among other foot ailments. Among the four limbs, the right forelimb was found to be the most affected. Category-3-foot lesions were further subjected to microbiological culture for the identification of bacteria and their antibiotic susceptibility against select antibiotics. The organisms isolated included *Staphylococcus aureus*, Coagulase-negative *Staphylococcus*, *E. coli*, and *Klebsiella* spp. To identify the influencing factors affecting foot health, various 11 independent variables covering distinct topics were investigated, where stereotypical behaviour, floor substrate, chaining, nail trimming frequency, and advancing age were found to be significant. With advancing age, elephants showing stereotypical behaviour were found more often. The regular trimming of nails, cuticles, and soles markedly reduced the foot problems and subsequently prevented the cracked and split nails, abscesses of nails, interdigital space, and sole abscess. It acknowledges that there is still much to learn and discover about the specific factors influencing captive Asian elephants' foot health. This research urges the scientific community, conservationists, and practitioners to collaborate in addressing the complexities associated with captive Asian elephants.

Keywords: Asian elephants, captivity, management, stereotypical behaviour, floor

Seroprevalence of Canine Distemper in Free-Roaming Dogs in Buffer Zone of Bardiya National Park, Nepal

Madan Bhandari^{1,*}

¹ Institute of Agriculture and Animal Science (IAAS), Paklihawa Campus, Bhairahawa, Nepal

*Presenting Author Contact: madanbhandari24@gmail.com, +977-9862420530

Canine distemper (CD), caused by *Morbilivirus canis* of Paramyxoviridae family, is a contagious and potentially fatal viral disease affecting a wide range of domestic and wild canid species. This study aimed to determine the seroprevalence of Canine Distemper Virus (CDV) and associated risk factors among free-roaming dogs in the buffer zone of Bardiya National Park (BNP), Nepal. A total of 91 serum samples were collected from free-roaming dogs and tested for CDV-specific IgG antibodies using an iELISA kit. The apparent seroprevalence was found to be 52.75% (95% CI: 42.5–63.0%), while the Rogan–Gladen adjusted true prevalence was 53.28% (95% CI: 42.92–63.64%). Among seropositive samples, 29.17% had high, 31.25% medium, and 39.58% low antibody titers, indicating mixed stages of exposure. Although older dogs (>72 months) showed higher seropositivity (80%), no statistically significant association was observed between CDV seropositivity and age, sex, body condition score, and location ($p > 0.05$). The findings suggest that CDV is enzootic in the free-roaming dog population around BNP, representing a potential reservoir for viral spillover to vulnerable wildlife species such as leopards and tigers

Keywords: *Bardiya, Buffer Zone, Canine Distemper, Wildlife*

Foundations of Snake Biology and Medicine: Implications for Handling, Diagnostics, and Therapeutics

Rupak Khatri-Chhetri¹

¹Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: rupakkc@afu.edu.np, +977-9840244324

Snakes are integral components of healthy ecosystems and have held significant cultural importance worldwide for centuries. They exhibit unique anatomical, physiological, and behavioral characteristics distinct from mammals and birds, presenting specific challenges in clinical management and research. Despite increased encounters with snakes in wildlife rescue, conservation, and veterinary settings, many practitioners and researchers lack familiarity with snake biology and medicine. This presentation describes practical methods for sample collection, encompassing blood sampling, fecal analysis, and fundamental diagnostic procedures, while emphasizing anatomical landmarks and species-specific limitations. Snakes can be restrained manually or with anesthetics if necessary. Safe and effective handling techniques are discussed, considering stress physiology, behavior, operator safety, and the complexities of rescuing free-ranging snakes. Morphometric data and vital physiological variables such as heart rate, respiratory rate, cloacal temperature, and skin temperature are essential for assessing snake health. Hematology and plasma chemistry are also crucial for routine health evaluations and comprehending various biological processes in snakes. Practical guidelines for collecting morphometry, physiological data, and venipuncture, including associated challenges, are outlined. Common snake diseases (respiratory infections, skin infections, and parasitic infestations), along with current diagnostic and treatment strategies, are reviewed. Additionally, key considerations for rehabilitation, medication routes, husbandry practices, and nutrition management are addressed. The field of snake medicine is an emerging area within veterinary science that necessitates further research to provide evidence-based approaches for the diagnosis, treatment, and conservation of reptilian species. This presentation aims to stimulate increased research interest in reptilian health, particularly in regions where human-snake interactions and wildlife rescue efforts are becoming more prevalent.

Keywords: *Disease, Physiology, Reptile, Rescue, Research*

Intestinal Obstruction from Enterolith and Coexisting Pituitary Adenoma in a Trakenen Horse: A Pathomorphological Case Report

Shashi Sharma^{1*}, Shibuya Hishahi²

¹Institute of Agriculture and Animal Science, Tribhuvan University, Paklihawa, Bhairahawa, Nepal

²Nihon University, College of Bioresource Sciences, Kanagawa, Japan

*Presenting Author Contact: timilsinashashi@gmail.com, +977-9841159515

Enterolithiasis is a well-known cause of colic due to partial or complete obstruction of the large intestine. Horses with enteroliths in the large colon usually display recurrent mild-to-moderate signs of colic, whereas horses with enteroliths in the transverse or small colon have more acute and unrelenting pain, due to complete obstruction of the segment of the intestine where the enterolith lodge. Necropsy was performed on a 32-year-old, male Trakehner horse. Owner stated that before death, the horse showed signs of anorexia, colic, and pyrexia. The clinical signs of hirsutism were observed in horse. In the small colon approximately 50 cm distal to the large colon, a green, spherical enterolith measuring 9×8×6.5 cm and weighing 500 gm was present. Gastrointestinal tract was ruptured resulting in peritonitis. Histopathologically, lymphoplasmacytic enteritis was observed on duodenum, jejunum, caecum and rectum. Pituitary gland was enlarged to approximately 2.7×2.0×1.0 cm and was dark red in color. Histopathological structure of the pituitary adenoma in a horse, involves the pars intermedia. Pars intermedia have densely cellular neoplastic lesions. The tumor was composed of round, oval, spindle shaped cells and moderate collagen fiber proliferation. Tumor cells have both distinct and indistinct cell border and contain eosinophilic cytoplasm. The nuclei are small, oval to spindle shaped with coarse chromatin and have distinct and indistinct nucleoli. Cellular atypia was moderate. Mitotic figure was less. Pars distalis and pars nervosa are small as tumor cells of pars intermedia compress these parts. Death in this horse resulted from severe peritonitis following rupture of the gastrointestinal tract due to an enterolith lodged in the small colon, with a concurrent pituitary adenoma present in the pars intermedia.

Keywords: *Colic, Cushing's disease, Hirsutism*

Behavioral and Health Aspects of Dry Cows Reared in a Compost-Bedded Pack System

Hem Raj Dhakal^{1,*}

¹National Cattle Research Program (NCRP), Rampur, Chitwan, Nepal

*Presenting author contact: dhakalhemraj44@gmail.com

The compost bedded pack (CBP) barn is a loose housing system designed to improve comfort in the resting areas of dairy cows. A trial was conducted at the Department of Animal Science, Bangladesh Agricultural University, from 18 March 2020 to 17 March 2021. This study aimed to evaluate the behavioral patterns and health status of dry cows housed in a CBP system using rice husk bedding compared to a conventional concrete floor (CF) system. An on-farm welfare assessment based on Welfare Quality® protocols was conducted at 30-day intervals over a period of ten months using 48 dry cows. Behavioral observations were recorded through video monitoring conducted twice over four consecutive days to assess activities in resting areas. In the CBP system, 200 kg of rice husk bedding was applied and regularly mixed at two-day intervals to maintain bedding quality. The experiment followed a randomized complete block design, and all data were analyzed using ANOVA in R and SPSS software. The results showed that dry cows housed in the CBP system experienced greater comfort during the winter season, as indicated by significantly higher bedding temperatures ($p < 0.05$) compared to the CF system. No significant differences were observed between the two systems in terms of health parameters, including hoof condition, foot lesions, as well as mastitis and FMD incidence ($p > 0.05$). However, behavioral parameters such as standing time with rumination, frequency of sitting, duration of lying, and movement frequency were significantly improved in the CBP system ($p < 0.05$), suggesting enhanced comfort. Other behavioral traits remained unaffected ($p > 0.05$). In conclusion, well-managed CBP systems provide substantial welfare benefits by improving comfort, mobility, and reducing integument and locomotion problems. These findings support CBP housing as a sustainable management strategy, although further studies under diverse climatic conditions are needed.

Keywords: *Animal Behavior, Compost Bedded Pack, Dry Cows, Foot Health*

Detection of Shiga Toxin-Producing (*stx1* and *stx2*) Genes in Isolated From Raw Goat Meat in Bharatpur, Nepal

Ambika Adhikari^{1,*}, Himal Luitel^{1,#}, Chet Raj Pathak¹

¹Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: vet.ambika02@gmail.com, +977-9869202710

²Corresponding Author: hluitel@afu.edu.np

Escherichia coli strains that produce Shiga toxin (Stx) are major pathogens that cause gastroenteritis (GE) and hemolytic uremic syndrome (HUS) in humans. These *E. coli*-associated infections, often linked to contaminated meat, are a significant health concern in developing countries such as Nepal. This study aimed primarily to detect *E. coli* in raw goat meat, with a focus on identifying the *stx1* and *stx2* genes, from biochemically confirmed *E. coli*. From September-November 2023, 156 tissue samples (large intestine, liver, skin; 3 per animal) were aseptically collected from 52 slaughtered goats in Bharatpur Metropolitan City, Chitwan, Nepal. *E. coli* was isolated via pre-enrichment, MacConkey/EMB agar culture, Gram staining and IMViC confirmation. Out of a total of 156 samples, *E. coli* was detected in 17.94% (28/156) of the samples. Conventional polymerase chain reaction (PCR) was carried out to detect the *stx1* and *stx2* genes in biochemically confirmed *E. coli* isolates. Among positives, *stx1* prevalence was 89.3% (25/28), highest in liver (100%) > large intestine (92.3%) > skin (71.4%); *stx2* occurred in 25% (7/28), highest in large intestine (38.5%)> Liver (25%) and absent from skin.

This study revealed a high prevalence of Shiga toxin-producing *E. coli* in raw goat meat, which poses a significant public health risk for STEC-associated GE and HUS. These results highlight the importance of formulations and the implementation of strict hygienic practices in slaughterhouses to prevent contamination. For a better understanding of the distribution and prevalence of pathogenic *E. coli* strains in Nepal, future research should be expanded to broader areas, varieties of sources, and larger sample sizes, including whole genomic sequencing.

Keywords: Chevon, *E. coli*, Health risk, STEC, *stx* genes

Isolation, Identification and Antimicrobial Resistance Profiling of Bacterial Pathogens in Otitis Externa in free-roaming dogs of Rupandehi District

Minu Kumar Gupta^{1,*}, Sirjan Bastola²

¹Institute of Agriculture and Animal Sciences, Paklihawa Campus, TU

*Presenting Author Contact: gptminu42@gmail.com, +977-9826463582

Canine otitis externa is a common inflammatory condition of the external ear canal, particularly prevalent in tropical regions, characterized by erythema, pain, malodor, head shaking, and swelling. It is primarily associated with predisposing factors such as allergies, parasitic infestations, autoimmune and endocrine disorders, and is frequently complicated by secondary infections involving *Staphylococcus pseudintermedius*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, and *Malassezia pachydermatis*. The increasing emergence of antimicrobial resistance (AMR), including multidrug-resistant (MDR) strains, poses a major challenge to effective clinical management.

This study aims to determine the prevalence of otitis externa in free-roaming dogs in Rupandehi District, Nepal, and to characterize the antimicrobial resistance and MDR profiles of *Staphylococcus* and *Pseudomonas* isolates. A total of 186 dogs will be sampled based on a 95% confidence level and 14% expected prevalence. Ear swab samples will be aseptically collected, cultured on selective media, and identified using standard biochemical methods. Antimicrobial susceptibility testing will be performed using the Kirby–Bauer disk diffusion method and interpreted according to CLSI guidelines.

The study is expected to reveal significant resistance patterns, including MDR isolates, thereby providing baseline data to guide evidence-based therapy, limit antimicrobial misuse, and strengthen veterinary AMR surveillance under the One Health framework.

Keywords: Ear, *Pseudomonas*, Multidrug-resistant (MDR)

Evaluation of Rabies Virus-Neutralising Antibody Titers and Associated Factors in The Vaccinated Household Dogs of Kathmandu, Nepal

Prachanda Pandey¹, Rabin Acharya¹, Arjun Aryal²

¹Institute of Agriculture and Animal Science (IAAS), Paklihawa Campus, Bhairahawa, Rupandehi

²Central Veterinary Laboratory (CVL), Tripureshwor

*Presenting Author Contact: prachandapandey.vet@gmail.com, +977-9864405355

Rabies is a neglected tropical disease which can infect all the animals of group Mammalia, but dogs have been considered as the major sources of human infection. Rabies remains a fatal yet preventable zoonotic disease, posing a persistent public health concern in Nepal despite ongoing dog vaccination programs. Evaluating the immune response to vaccination is essential to ensure effective rabies control. This study assessed rabies virus-neutralizing antibody (RVNA) levels and associated factors in vaccinated household dogs of Kathmandu district, Nepal. A cross-sectional study was conducted from June to September 2025 involving 96 apparently healthy, vaccinated dogs aged over four months. Serum samples were analyzed using the BioPro Rabies ELISA kit, with antibody titers ≥ 0.5 IU/mL considered protective. Demographic, vaccination related and dog management data were collected through owner questionnaires. Overall, 74% of dogs exhibited protective antibody levels, while 26% failed to achieve the protective threshold, including 11 with undetectable titers. Age showed a significant association with antibody response (p-value=0.00381), with puppies having the lowest (26.7%) and senior dogs the highest (94.1%) seroprotection. Although no significant association was observed for sex, breed, or neutering status, dogs that received additional core vaccines (DHPPiL, Corona) and those housed indoors had higher antibody levels. The findings suggest that while vaccination coverage among household dogs is generally effective, a substantial proportion remain unprotected. Regular booster vaccinations, improved vaccination practices, better management, and post-vaccination seromonitoring are recommended to ensure sustained immunity and support Nepal's goal of eliminating dog-mediated rabies.

Keywords: *ELISA, Protective Antibody, Seroprotection, Vaccine*

Diagnostic Identification and One Health Risk Assessment of the Fish Tapeworm *Diphyllbothrium latum* in the Siyari Aquaculture Hub, Rupandehi district, Nepal

Anish Khanal¹, Shailesh Gurung¹

¹Institute of Agriculture and Animal Science (IAAS), Tribhuvan University, Paklihawa Campus, Nepal

Presenting Author Contact: anishkhanal1379@gmail.com

The zoonotic “broad fish tapeworm” *Diphyllbothrium latum* is a neglected food-borne parasite that poses a significant threat to consumer safety and aquaculture sustainability in Nepal. This report details the diagnostic identification and environmental risk factors associated with *D. latum* observed during laboratory exercises and field surveillance in Siyari Rural Municipality, Rupandehi. Through systematic necropsy and the application of the candling technique at the IAAS Paklihawa laboratory, plerocercoid larvae were successfully isolated and morphologically characterized from commercially farmed cyprinids. Beyond laboratory identification, a field assessment of 83 farm sites identified critical ecological drivers for the parasite’s lifecycle, with 54.2% of farms reporting frequent activity of piscivorous birds, the primary definitive hosts. These findings confirm the endemic presence of *D. latum* in a major production region and highlight a critical “One Health” gap between farm management and public health. This technical report serves as a baseline for developing biosecurity deterrents against avian hosts and emphasizes the necessity of integrating routine parasitic screening into veterinary diagnostic services to safeguard Nepal’s aquaculture value chain.

Keywords: *Diphyllbothrium latum*, Zoonosis, One Health, Aquaculture, Rupandehi, Nepal

Age Related Gross Anatomical and Histo-morphological Studies of Testes on Non-Descript Dogs (*Canis familiaris*) of Nepal

Arjun Paudel^{1,*}, Sanjay Paudel¹

¹ Paklihawa Campus, Institute of Agriculture and Animal Science, Tribhuvan University, Rupandehi, Nepal

*Presenting Author Contact: orjun.pdl.2855@gmail.com, +977-9869014458

The aim of the present study was to evaluate age related changes in gross and histological structure of testes of dog. Total of 48 dogs, ranging from 4 to 72 months of age, were categorized into four age groups: prepubertal, pubertal, relatively younger, and sexually mature. Both right and left testes were collected aseptically from dogs presented for routine neutering, and examined for gross, biometric, histological, and micrometric parameters. Grossly, the testes were elongated and pale in prepubertal dogs, becoming oval, firm, and creamy white with advancing age. The mean testicular weight significantly ($p < 0.05$) increased from 1.48 ± 0.13 g in the prepubertal group to 10.19 ± 0.58 g in sexually mature dogs, while the testicular volume increased significantly ($p < 0.05$) from 1.57 ± 0.19 ml to 9.76 ± 0.64 ml, showing a distinct sigmoid growth pattern. The gonado-somatic index was significantly ($p < 0.05$) higher (0.10 ± 0.03) in sexually mature dogs and lower (0.03 ± 0.01) in prepubertal dogs. There was non-significantly ($p > 0.05$) increase in the thickness of tunica albuginea across the different age groups. The tubular diameter increased significantly ($p < 0.05$) from 57.94 ± 12.08 μ m in prepubertal to 218.70 ± 41.25 μ m in sexually mature dogs, accompanied by a rise in epithelial height and seminiferous tubular area. It is concluded that the age of the dog plays a major role in influencing the gross and histological variations of the testes. These findings provide important baseline reference data for future studies, which should further clarify the association between structural modifications, reproductive performance, and hormonal function.

Keywords: Canine testes, Gonadosomatic index, Gross Morphometry, Histomorphometry

Effect of Probiotic in Weight Gain in Fish

Amrit Subedi¹, Shailesh Gurung¹, Sirjan Bastola¹

¹ Institute of Agriculture and Animal Science (IAAS), Paklihawa Campus, Bhairahawa, Nepal

*Presenting Author Contact: subediamrit43@gmail.com, +977-9864474461

Nile tilapia (*Oreochromis niloticus*) is a key species in global aquaculture, where probiotics are increasingly employed to improve gut health, growth and feed efficiency. However, optimal supplementation levels remain unclear, some studies reporting benefits while others note dose-dependent effects or negligible impacts. A commercially available multi-strain probiotic of brand name Hypro aqua probiotic was used, and this study investigated the influence of varying probiotic concentrations on tilapia growth over 60 days (23 June- 23 August 2025). Juvenile tilapia of initial mean weight 11.91–19.36g was stocked at 40 fish/0.4m³ tank in a completely randomized design (CRD) with five treatments with two replications: control (T1-0% probiotics of feed) and T2–T5 (1–4 % of feed, respectively). Fish were fed a 25% crude protein diet at 3% body weight daily. There were no significant differences in initial weights, final weights and water quality parameters among the treatment groups. Final mean weight was highest in T1(24.73g) followed by T2 (22.34g), T5 (21.57g), T4 (19.96g), and T3 (18.18 g). The results showed no statistically significant difference ($p = 0.17 > 0.05$) in mean weight gain among different treatment groups.

Keywords: Fish, Probiotics, Weight gain

Availability, Usage, and Practices of Antibiotics Among Veterinary Services of Kathmandu Valley, Nepal

Kavya Ghimire^{1*}, Dr. Birendra Timilsina²

¹Institute of Agriculture and Animal Sciences, Tribhuvan University, Nepal

²Agriculture and Forestry University, Chitwan, Nepal

*Presenting Author Contact: kavyaghimire956@gmail.com, +977-9707021383

Antimicrobial resistance (AMR) is a serious global threat to human and animal health. However, there is a lack of comprehensive situational analysis regarding the current availability, usage, and practice of antibiotics in companion animals, poultry, and livestock within the Kathmandu Valley. The primary objective of this study was to evaluate the current situation of antibiotic practice and KAP regarding antimicrobial resistance (AMR) among practicing veterinarians. A total of 35 veterinary clinics and hospitals in the Kathmandu Valley were surveyed and analyzed using descriptive statistics, a chi-square test, and standard deviation. A chi-square test of association was done to understand the relationship between animal species and antibiotic usage pattern. The test shows an association between the two variables, χ^2 (df = 120, N = 246) = 260.803, $p < 0.001$. This shows that the choice of antibiotic prescription differs among different species of animals. Penicillin, cephalosporin, tetracyclines, quinolones, and aminoglycosides were the most commonly used antibiotics. Of these, 86% rely on locally available antibiotics, while the remaining use both imported and locally manufactured ones. Additionally, 80% of them preferred the coadministration of antibiotics along with liver tonics, vitamin B complex, iron, omega-3 fatty acid, calcium, and probiotics for diseases such as diarrhea, fever, wounds, and respiratory illnesses. The most preferred routes were IV, PO, I/M, and IMM. Almost all of them had knowledge regarding species-specific usage of antibiotics, which were sold not only for therapeutic or preventive measures but also for growth production, mainly in poultry. Of the respondents, 94% were aware of AMR, but only 65% had good KAP about AMR. This shows that AMR awareness among veterinary professionals is still limited. Voluntary-based participation was done anonymously.

Keywords: *Antimicrobial Resistance, Veterinary Antibiotics, Antibiotic Usage, Knowledge Attitude Practice, Nepal*

SSR-Based Analysis of Genetic Diversity and Population Structure in Cattle Breeds of Nepal

Saroj Khadka^{1,*}

¹Agriculture and Forestry University

*Presenting Author Contact: s.khadka0713@gmail.com, +977-9846929713

Nepal has a cattle population of about 7.4 million. Seven breeds from Nepal are recognized officially as the indigenous breeds which makes Nepal, a country rich in cattle genetic resources. However, the molecular characterization of the cattle population remains unexplored. This study aimed to assess the genetic diversity and population structure of seven cattle breeds in Nepal using microsatellite (SSR) markers.

Blood samples were collected from 25 animals representing seven cattle breeds: Lulu, Pahadi, Terai, Siri, Jersey, Holstein, and Hariana. Genomic DNA was extracted, amplified by PCR and gel electrophoresis. Allelic bands were scored using Gel analyzer v.23.1.1, and diversity indices were computed using GenAlex v.6.5. Polymorphism Information content (PIC) was estimated using Excel 2016, and population structure was evaluated using Nei's genetic distance, AMOVA and Neighbor-Joining clustering.

A total of six alleles were detected at the BM1500 locus, with the 150 bp allele being the most frequent. The marker showed high informativeness (PIC = 0.74). However, genetic diversity indices were low to moderate (mean $N_a = 0.85$, $N_e = 1.22$, $H_e = 0.14$, $uH_e = 0.17$, Shannon's $I = 0.21$), indicating limited allelic richness and heterozygosity across populations. AMOVA revealed that 85% of the genetic variation was within populations, while 15% occurred among populations ($\Phi_{PT} = 0.147$, $p = 0.274$). Pairwise genetic distance and phylogenetic analysis grouped the cattle into two major clusters, broadly separating indigenous and crossbred populations with substantial admixture.

The low diversity indices suggest the presence of inbreeding, genetic bottlenecks, or population substructure, likely resulting from unmanaged breeding, selection based on productive traits, Artificial Insemination (AI), and Embryo Transfer (ET) programs. Despite the limitation of using a single microsatellite locus, the study provides valuable baseline data on the genetic diversity of Nepalese cattle. The findings highlight the need for multi-locus or genome-wide studies to support effective conservation, breeding strategies, and sustainable management of indigenous cattle resources in Nepal.

Keywords: AMOVA, Genetic diversity, Microsatellite Marker, Population, Structure

Prevalence and Antibiotic Resistance of *Salmonella* Spp. in Freshwater Fish Sold in Bharatpur, Nepal

Sudha Barakoti^{1,*}, Rupak KC¹

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: sudhabarakoti8@gmail.com, +977-9844208932

Fish act as a potential source of *Salmonella* infection in humans, which is the leading cause of foodborne gastroenteritis worldwide. There is limited data on the presence of *Salmonella* in local fish. This cross-sectional study aimed to isolate *Salmonella* and determined the antimicrobial susceptibility pattern in freshwater fish sold in Bharatpur Metropolitan City. A total of 75 intestinal samples from commonly consumed freshwater fish species, *Pangasianodon hypophthalmus* (Pangas), *Labeo rohita* (Rohu), and *Cyprinus carpio* (Common Carp), were collected from live fish retail shops in Bharatpur, with 25 samples from each species. Samples were processed using standard bacteriological culture and biochemical identification techniques for the isolation of *Salmonella* spp. The Kirby–Bauer disc diffusion method was used for antimicrobial susceptibility testing in accordance with Clinical and Laboratory Standards Institute (CLSI) guidelines. *Salmonella* spp. was detected in 18.7% of the fish samples. The slight differences in *Salmonella* prevalence among Pangas, Rohu, and Common Carp were not statistically significant (Fisher's exact test, $p = 0.80$). All isolates showed 100% resistance to ampicillin, while resistance to tetracycline and ciprofloxacin was 35.7% and 21.4%, respectively. Multidrug resistance was identified in 21.4% of the isolates. The detection of antimicrobial-resistant *Salmonella* in freshwater fish indicates a potential public health risk, highlighting the need for continuous monitoring of foodborne pathogens and the use of antimicrobials in aquaculture.

Keywords: *Salmonella* Spp., Freshwater Fish, Antibiotic Resistance, Multidrug Resistance

Cold Chain Assessment of Vaccines in Small Animal Clinics and Its Potential Implications for it's Effectiveness in Bhairahawa city, Rupandehi district, Nepal

Sujina Shakya^{1,*}, Subash Rimal¹

¹Institute of Agriculture and Animal Sciences (IAAS), Paklihawa Campus, Tribhuvan University, Nepal

*Presenting Author Contact: sujinaashakya23@gmail.com, +977-9840171542

Effective vaccination in small animals relies on a continuous cold chain to maintain vaccine potency. In low-resource settings such as Bhairahawa, Rupandehi district, Nepal, gaps in cold chain management may compromise vaccine effectiveness, contributing to persistent cases of canine parvovirus (CPV) and distemper (CDV).

A cross-sectional study assessed cold chain infrastructure, monitoring practices, and staff knowledge across small animal veterinary clinics in Bhairahawa. Data were collected on refrigeration availability, thermometers, temperature logs, backup power systems, and clinic type (private vs. government). Cold chain compliance was evaluated using a 12-parameter scoring system and categorized into low, medium, or high risk. Retrospective data on vaccine-preventable diseases over a two-year period were also analyzed. No statistical analysis was performed.

Dedicated refrigeration was available in 83.33% of clinics, but none had thermometers or maintained temperature logs, and only 50% had backup power systems. Most clinics were privately operated (75%). FEFO practices were widely followed, but cold chain risk scoring showed that one clinic was low risk and five were medium risk, reflecting partial compliance and gaps in monitoring, documentation, and contingency systems. Veterinary personnel showed moderate knowledge, with gaps in transport, freeze-damage prevention, and corrective actions for temperatures above 8 °C, indicating a need for targeted cold chain training. Persistent CPV and CDV cases over two years suggest potential vaccine potency loss due to temperature excursions, inadequate monitoring, and environmental challenges such as high ambient temperatures and intermittent electricity.

Despite high refrigeration coverage, deficiencies in monitoring, documentation, backup systems, and staff knowledge compromise vaccine effectiveness in small animal clinics in Bhairahawa. Strengthening cold chain management through targeted training, routine monitoring, improved supervision, and regulatory oversight is essential to reduce vaccine failure, enhance herd immunity, and control persistent disease outbreaks in resource-limited veterinary settings.

Keywords: *Cold Chain Management, Veterinary Vaccines, Small Animals, Canine Parvovirus, Canine Distemper, Nepal, Vaccine Efficacy*

Correlation of Vaginal Cytology with Ovarian Ultrasonography for Defining Estrus in Buffalo

Sudip Sharma^{1,*}, Bhuminand Devkota¹, Roshan Babu Pandey¹, Prasiddha Sapkota¹, Bishal Kandel¹

¹ Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: sharmasudip340@gmail.com, +977-9867826659

Silent estrus is one of the most concerning reproductive problems in water buffalo (*Bubalus bubalis*) due to weak or absent behavioral signs, demanding objective diagnostic approaches. Although ultrasonography accurately assesses ovarian status, its field use is limited. Exfoliative vaginal cytology offers a simple alternative but lacks quantitative validation in buffalo. Therefore, this study aimed to correlate vaginal cytology with ovarian ultrasonography for precise estrous cycle staging and to establish a Cornification Index threshold for estrus detection.

This prospective longitudinal study aimed to correlate exfoliative vaginal cytology with ovarian ultrasonography for accurate phase-wise staging of the estrous cycle in synchronized buffaloes. Two cyclic animals were synchronized using the Ovsynch protocol. Ovarian structures were monitored to record key events using ultrasonography and vaginal samples were collected repeatedly at eleven points corresponding to key ovarian events. Vaginal epithelial cells were classified as parabasal, intermediate, superficial, and cornified cells, and estrogenic activity was quantified using the cornification index.

Phase-specific ovarian dynamics were confirmed by ultrasonography, characterized by a dominant follicle during estrus, followed by post-ovulatory corpus luteum formation and functional corpus luteum during diestrus. Vaginal cytology demonstrated a marked shift from parabasal and intermediate cell predominance in diestrus to dominance of superficial and cornified cells during estrus. A significant difference was observed in cornification index among estrus phases ($p=0.0023$), where estrus showed a significantly higher Cornification index than diestrus ($p = 0.0014$). Proestrus and metestrus exhibited intermediate values.

These finding shows exfoliative vaginal cytology as a reliable indicator of ovarian endocrine status and establish a Cornification index as a practical threshold for estrus detection in buffalo, offering a simple, low-cost tool for managing silent estrus under farm conditions.

Keywords: *Buffalo, Cornification Index, Estrus Detection, Silent Estrus, Vaginal Epithelial Cell*

Assessment of Antimicrobial Residue in Broiler Meat Sampled from The Retail Meat Shops of Godawari Municipality, Kailali, Nepal

Pushpa Raj Joshi^{1,*}

¹Institute of Agriculture and Animal Science, Tribhuvan University, Nepal

*Presenting Author Contact: oshjar71@gmail.com, +977- 9848240560

Indiscriminate use of antibiotics in poultry production for therapeutic, prophylactic, and growth-promoting purposes has raised significant concerns regarding residue contamination in meat and its potential impact on public health, particularly the emergence of antimicrobial resistance. This study aimed to assess the prevalence of antibiotic residues in broiler meat sold in retail shops in Godawari Municipality, Kailali, Nepal.

A total of 84 broiler samples (42 liver and 42 muscle) were purposively collected and analyzed for residues of six commonly used antibiotics: doxycycline, tylosin, enrofloxacin, sulfonamide, gentamicin, and colistin, using the Enzyme-Linked Immunosorbent Assay (ELISA).

Out of 504 tests performed across 84 samples, 270 (53.57%) were positive for antibiotic residues, with a significantly higher prevalence in liver samples (150; 59.52%) compared to muscle samples (120; 47.62%) ($\chi^2 = 7.179$, $df = 1$, $p = 0.007$). Among the positive tests, 32 exceeded the Maximum Residue Limits (MRLs), with liver samples (25; 16.67%) showing a significantly greater proportion than muscle samples (7; 5.83%) ($\chi^2 = 10.811$, $df = 1$, $p = 0.001$). Residue distribution revealed that doxycycline (97.62%), tylosin (95.24%), and enrofloxacin (80.85%) were the most prevalent antibiotics in liver samples, while tylosin (95.24%), enrofloxacin (66.67%), and doxycycline (64.29%) predominated in muscle samples. Many samples contained multiple antibiotic residues, indicating widespread and indiscriminate antibiotic use in poultry production.

These findings highlight a substantial risk of antibiotic residue exposure to consumers and underscore the urgent need for stricter regulatory enforcement, routine surveillance, and increased awareness among poultry producers regarding the prudent use of antibiotics to safeguard food safety and public health.

Keywords: Antibiotic Residues, Antimicrobial Resistance, Broiler Meat, Food Safety, Maximum Residue Limits.

Dose-Response Efficacy of Albendazole in Khari-Cross Goat in Chandragiri Municipality Kathmandu

Pallabi Kunwar*

*Presenting Author Contact: pallabikunwar999@gmail.com, +977-9841468953

In Nepal, goat husbandry is a vital economic pillar, yet gastrointestinal nematode (GIN) infections remain a primary constraint to productivity. While Albendazole is the most widely used anthelmintic due to its low cost, its efficacy is increasingly questioned due to the rapid metabolic rate of goats and potential anthelmintic resistance. This study evaluated the dose-response relationship of Albendazole to determine an evidence-based dosing strategy for local Khari-cross goats.

A comparative efficacy trial was conducted in Chandragiri, Kathmandu, using 45 naturally infected Khari-cross goats. To ensure physiological and metabolic uniformity, goats were purposively selected at approximately nine months of age. Animals were randomly allocated into three treatment cohorts (n=15) receiving oral Albendazole at 5 mg/kg, 10 mg/kg, or 15 mg/kg. Fecal samples were collected per rectum on Day 0 and Day 14 post-treatment. Egg per gram (EPG) counts were determined using the McMaster technique, and drug efficacy was assessed via the Fecal Egg Count Reduction Test (FECRT).

Post-treatment analysis demonstrated a distinct dose-dependent reduction in egg shedding. The FECR values were 79.38% for the 5 mg/kg group, 91.73% for the 10 mg/kg group, and 98.03% for the 15 mg/kg group. Notably, both the conventional 5 mg/kg dose and the 10 mg/kg dose failed to meet the World Association for the Advancement of Veterinary Parasitology (WAAVP) efficacy threshold of >95%. Only the 15 mg/kg dosage (98.03%) achieved a reduction level indicative of high anthelmintic sensitivity.

The findings suggest that the standard 5 mg/kg dose is insufficient under Nepalese field conditions, likely due to rapid drug clearance or emerging resistance. This study advocates for updating national guidelines to recommend higher dosages (up to 15 mg/kg) and implementing integrated parasite management to preserve anthelmintic efficacy in Nepal's smallholder goat sector

Keywords: *Albendazole, Anthelmintic resistance, Gastrointestinal nematodes, Goat, Nepal*

Assessment of Water Quality in Livestock Production System of Bharatpur, Chitwan

Prashant Pandey^{1,*}, Anil Kumar Tiwary¹

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: pandeyprashant155@gmail.com, +977-9867504845

Water in farm is indispensable for all the physiological and daily farm activities. Poor or contaminated water can lead to systemic diseases and a reduction in overall performance. This study aimed to assess the water quality of livestock farms of Bharatpur, Chitwan. A total of thirty samples (21 source and 9 trough) were collected from different farms (cattle, buffalo, sheep/goat, poultry, pig, mix) of different wards of Bharatpur during Nov. and Dec. 2025. Biological parameter (Fecal E. coli), physical parameters (Temp., pH, EC, and Turbidity) and Chemical parameters (TH, NH₃, NO₂⁻, Fe, Mn, As and F) were examined to assess the quality of water of farms. Survey was taken among the farmers to analyze the situation. Water Quality Index (WQI) and number of samples above or below NDWQS, 2022 and WHO WQG, 2019 references for chemical parameters were calculated. Out of thirty samples, only one source sample was found positive for Fecal Coliform. Only 53.3% (n=16/30) of sources and 13.3% of trough samples (n=4/30) were found excellent and only one source sample was unsuitable WQI. Post pH change was found in 22.2% (n=2/9) of trough sample. Turbidity in 36.6% and iron in 46.6% samples were found to exceed the permissible limits. Bore wells (hand-pump) were found to have higher parameters among source types. Likewise, turbidity and iron from dissimilar sources for human and animal use were found higher and were associated with diseases and nearer manure storage. The study suggests the need for improvement in farm management with the adequate separation between water sources and manure storage, regular trough cleaning and source protection emphasizing that water unsuitable for human consumption should not be assumed safe for animals too.

Keywords: Chitwan, Farm Water, Water Quality, WQI

Comparative Evaluation of Growth Performance of Common Carp (*Cyprinus carpio*) and Water Quality Dynamics in an In-Pond Raceway System (IPRS) and Conventional Earthen Pond Under Nepalese Conditions

Rabin Bastakoti^{1,*}, Bhim Datta Bhatta²

¹Government of Nepal, Bharatpur Metropolitan, Chitwan, Nepal ²Nepal Polytechnic Institute, Chitwan, Nepal

*Presenting Author Contact: rabinbastakoti@gmail.com, +977-9845276729

To maximize the efficiency of resource usage and satisfy the growing demand for fish worldwide, aquaculture production techniques must be intensified. In this field study conducted in southeast Nepal, the growth performance of common carp (*Cyprinus carpio*) and related water quality metrics in an In-Pond Raceway System (IPRS) was compared to a traditional earthen pond. With an initial mean weight of 75 g, fingerlings were used in a 90-day culture study. Average daily gain (ADG), net weight gain, and ultimate body weight were among the growth metrics that were evaluated at 15-day intervals. Temperature and dissolved oxygen (DO) were two important water quality metrics that were tracked concurrently. Common carp reared in the IPRS exhibited significantly higher final body weight ($1,175.0 \pm 15.5$ g) compared to those in the earthen pond (275.0 ± 8.2 g) ($p < 0.001$). Net weight gain and ADG were also markedly higher in the IPRS (1,100 g; 12.2 ± 0.8 g/day) than in the earthen pond (200 g; 2.2 ± 0.3 g/day). Mean dissolved oxygen levels remained significantly higher in the IPRS (6.8 ± 0.3 mg/L) than in the earthen pond (4.9 ± 0.4 mg/L) ($p < 0.001$), whereas water temperature did not differ significantly between systems ($p > 0.05$). Bighead carp (*Hypophthalmichthys nobilis*) cultured in the connected pond of the IPRS system also demonstrated exceptional growth (final weight 2,100 g). The results show that better water circulation and oxygen availability in the IPRS significantly improved fish development performance. Under Nepalese aquaculture conditions, IPRS technology adoption might greatly boost output, maximize water use, and boost farm profitability.

Keywords: *In-Pond Raceway System, Common carp, Dissolved oxygen, Aquaculture intensification, Growth performance*

Clinical, Hematological, and Diagnostic Evaluation of Canine Trypanosomiasis in a Rescued Dog from a High-Risk Environment

Anil Yadav^{1,*}, Sushil Kumar Paudel¹, Chiran Krishna Tiwari¹, Hrikath Shrestha¹, Sudip Lohani¹

¹Animal Medical Centre Pvt. Ltd., Kathmandu, Nepal

*Presenting Author Contact: anilvet7@gmail.com, +977- 9860622329

Canine trypanosomiasis is a clinically significant hemoprotozoan disease in endemic regions, often characterized by non-specific clinical signs and hematological disturbances. Dogs from high-exposure environments may be at increased risk, necessitating comprehensive diagnostic evaluation. A rescued dog from an area near a butcher shop was presented with lethargy, anorexia, and intermittent fever. Screening for canine distemper virus, canine parvovirus, and canine coronavirus using ELISA yielded negative results. Hematological examination, performed manually, revealed marked anemia (hemoglobin: 6.0 g/dL; packed cell volume: 17%; RBC count: $2.8 \times 10^6/\mu\text{L}$), severe thrombocytopenia, and leukocytosis. Definitive diagnosis was established by microscopic identification of motile *Trypanosoma* spp. in a peripheral blood smear, although species-level identification was not determined. Echocardiographic evaluation showed no significant structural or functional cardiac abnormalities. The dog was treated with diminazene aceturate at 3.5 mg/kg body weight on 12th, 17th, and 22nd March 2026 at five-day intervals, along with dexamethasone at 0.4 mg/kg body weight as an anti-inflammatory agent. The treatment resulted in progressive clinical improvement, with resolution of clinical signs and subsequent hematological recovery, including improvement in erythrocyte parameters and platelet count. This case highlights the importance of blood smear diagnosis and a multimodal approach in endemic areas, with relevance to both companion animal and public health.

Keywords: *Blood Smear, Dog, Diagnosis, Trypanosoma*

Splenic Fibrosarcoma in a Dog: A Case Report

Dilip Paudel^{1,*}, Sushil Kumar Paudel¹, Sudip Lohani¹

¹ Animal Medical Center Pvt. Ltd.

*Presenting Author Contact: dilippaudel10@gmail.com, +977-9868904719

Intrinsic splenic components, such as smooth muscle, fibrous, neural, vascular, and lymphoid tissues, can give rise to splenic neoplasms. Splenic lesions can be malignant or benign. Based on the embryological origin, tumors originating from splenic stroma are categorized as Splenic Stromal Sarcomas (SSS), which contain several histological subgroups, including fibrosarcoma, liposarcoma, and so on. Hemangiosarcoma is the most common splenic tumor in dogs; fibrosarcomas are also reported, but less commonly. Splenic fibrosarcoma is a malignant soft tissue tumor arising from connective tissue in the spleen.

This report describes a case of splenic fibrosarcoma in a dog presented with vomiting, anorexia, decreased activity, and tenesmus. Diagnostic imaging, including radiography and abdominal ultrasonography, revealed a well-defined solid mass in the mid-abdomen associated with the spleen. Hematological evaluation and Serum biochemistry showed marked leukocytosis and elevated liver enzyme, respectively. Exploratory laparotomy confirmed the presence of a splenic mass, and complete splenectomy was performed. Histopathological examination of the tissue demonstrated spindle-shaped neoplastic cells arranged in interlacing fascicles and whorls, consistent with fibrosarcoma. This case highlights the importance of integrating clinical signs, diagnostic imaging, and histopathology for accurate diagnosis of splenic neoplasms. Early surgical intervention remains a critical therapeutic approach, and histopathological evaluation is essential for definitive diagnosis of splenic stromal sarcomas in dogs.

Keywords: Dog, Tumor, Splenic fibrosarcoma, Splenectomy, Histopathology

In Vitro Study of Antimicrobial Effect of Selected Homeopathic Mother Tinctures Against *Escherichia Coli* Isolated from Poultry

Saket Kumar Tiwari^{1,*}, Tara Bahadur Pun¹

¹Agriculture and Forestry University, Rampur, Chitwan, Nepal

*Presenting Author Contact: saketi.tiwari@favf.edu.np, +977-9806855891

Poultry production has a significant role in food security; however bacterial infections have been a major challenge specially those caused by *Escherichia coli*. The increasing problem of antimicrobial resistance has necessitated the exploration of alternative antimicrobial agents. The present study was conducted to evaluate the in vitro antibacterial activity of selected homeopathic mother tinctures against *E. coli* isolates of poultry origin.

A total of 18 *E. coli* isolates obtained from poultry sources were tested using the Kirby-Bauer disk diffusion method. The antibacterial activity of *Calendula officinalis* Q and *Berberis vulgaris* Q in which 45% ethanol was used as vehicle, was compared with Neomycin as positive control, while ethanol (45%) and plain discs were used as controls. The zone of inhibition was measured, and data were analyzed using mean $\pm$ standard deviation and one-way analysis of variance (ANOVA).

Calendula officinalis Q exhibited the highest antibacterial activity with a mean zone of inhibition of 21.12 ± 4.32 mm, followed by Neomycin (11.58 ± 1.80 mm), while *Berberis vulgaris* Q showed lower activity (8.35 ± 4.84 mm). The differences among the tested agents were statistically significant ($p < 0.001$). Qualitative susceptibility testing revealed that 77.8% of isolates were resistant to Neomycin, 22.2% were intermediate, and none were sensitive. Ethanol and plain disc controls showed negligible or no inhibition.

The finding indicates that *Calendula officinalis* possesses significant in vitro antibacterial activity against poultry-origin *E. coli*. However, further studies with a larger sample size and an in vivo study are required to determine its efficacy and to elucidate its mechanism of action.

Keywords: Antimicrobial Resistance, *Escherichia coli*, Homoeopathy, Poultry

Seroprevalence and Associated Risk Factors of Caprine Toxoplasmosis in Rupandehi, Nepal

Arun Tharu^{1,*}

¹ Institute of Agriculture and Animal Science (IAAS), Paklihawa Campus, Bhairahawa, Nepal

*Presenting Author Contact: aruntharu1718@gmail.com, +977-9844822877

A cross-sectional study was conducted to determine the seroprevalence and associated risk factors of *Toxoplasma gondii* infection in goats of Rupandehi District of Nepal. A total of 265 serum samples were collected from goats of various municipalities and rural municipalities and tested using a commercial ELISA kit (ID Screen® Toxoplasmosis Indirect Multi-species, IDVet, France). Out of these, 112 samples (42.26%) were seropositive for *T. gondii* antibodies, indicating a moderate level of exposure among goats in the study area. Risk factor analysis using chi-square tests revealed that pregnancy status and presence of cats were significantly associated with seropositivity ($p \leq 0.05$). Pregnant goats showed a prevalence of 47.10% compared to 36.06% in non-pregnant goats while farms with cats had a prevalence of 44.91% compared to 20.68% in those without cats. Other factors such as age, sex, breed, herd size, and housing system were not statistically significant. The findings highlight that toxoplasmosis is an endemic among goats in Rupandehi district. This shows that the disease is circulating in the area and may affect goat health and productivity. This study provides valuable baseline data for future surveillance and control programs and emphasizes the need for improved farm hygiene, restriction of cat access, farmer education, and a One Health approach to reduce the impact of toxoplasmosis on both animal productivity and human health in Nepal.

Keywords: *ELISA, Risk Factors, Seroprevalence, Toxoplasma Gondii, Zoonosis*

Isolation, Identification, and Antibigram of Mastitis Pathogens from Milk Samples of Dairy Bovine in Kathmandu Valley, Nepal

Susan Aryal^{1,*}, Bikash Shrestha², Upendra Chauhan¹

¹Faculty of Animal Science, Veterinary Science & Fisheries, Agriculture and Forestry University, Rampur, Chitwan, Nepal

²Current affiliation: National Vaccine Production Laboratory, Tripureshwor, Kathmandu, Nepal

*Presenting Author Contact: sushanaryal616@gmail.com, +977-9866144340

Bovine mastitis remains one of the most economically significant infectious diseases affecting dairy production worldwide and is increasingly associated with antimicrobial resistance (AMR). Continuous monitoring of pathogen distribution and cumulative antimicrobial resistance patterns (antibiogram) is essential for effective disease management and rational antibiotic use.

A total of 422 bovine milk samples suspected of mastitis were screened using the California Mastitis Test (CMT) and processed for bacterial culture and identification. Antimicrobial susceptibility testing (AST) was performed using the Kirby–Bauer agar disc diffusion method following standard guidelines, and cumulative susceptibility data were compiled to generate an antibiogram. Associations between microbial growth and risk factors, including age, parity, species, and breed, were analysed using appropriate statistical tests.

Out of 422 samples, 324 (76.8%) yielded microbial growth, comprising 320 bacterial and 4 fungal (*Candida* spp.) isolates. *Staphylococcus* spp. (36.7%) predominated, followed by *Klebsiella* spp. (27.5%), *Escherichia coli* (8.6%), *Pseudomonas* spp. (8.6%), and *Streptococcus* spp. (7.4%), with Enterobacteriaceae (38.8%) and *Staphylococcaceae* (37.2%) being the leading families. Microbial growth was significantly associated with age ($p = 0.016$) and parity ($p < 0.001$). The cumulative antibiogram indicated high susceptibility to trimethoprim–sulfamethoxazole, marked ampicillin resistance among Enterobacteriaceae, and emerging β -lactam resistance in *Staphylococcus* spp. Multidrug resistance was observed in major isolates, including *Staphylococcus* spp. (17.6%), *Escherichia coli* (20.7%), and *Klebsiella* spp. (15.7%). Mastitis in dairy bovines of the Kathmandu Valley was mainly bacterial, with age and parity as significant risk factors.

Keywords: Antimicrobial resistance (AMR), Bovine Mastitis, Central Veterinary Laboratory, Enterobacteriaceae, *Staphylococcus* spp.

Detection of *Coxiella Burnetii* (Q Fever) Antibodies in Goat Entering Kathmandu Valley Through the Nagdhunga Checkpost

Rita Thapa*

*Presenting Author Contact: rockstar.rabina25@gmail.com, +977-9866822090

Q-fever, caused by *Coxiella burnetii*, remains an underrecognized yet significant zoonotic threat with serious implications for livestock productivity and human health. In Nepal, where large-scale, unregulated livestock movement is common, the epidemiological status of this pathogen remains poorly defined. This study uniquely focuses on the Nagdhunga checkpost—a main livestock entry corridor—highlighting the hidden risk of disease introduction through animal trade.

A cross-sectional study was conducted between July and September 2025, analyzing 92 goat serum samples collected from major source districts: Dhading (n=25), Bardiya (n=22), Gorkha (n=18), Kailali (n=11), Surkhet (n=9), and Kapilvastu (n=6). Using a highly sensitive and specific indirect ELISA, an overall seroprevalence of 9.77% (9/92) was detected. Notably, 7.60% (7/92) of samples exhibited strong seropositivity—predominantly from Dhading (n=5) and Kapilvastu (n=2)—while 2.16% (2/92) were moderately positive (Bardiya and Kailali, n=1 each). The majority, 90.22% (83/92), tested negative.

The detection of *C. burnetii* antibodies among incoming goats confirms active circulation of the pathogen within livestock populations entering urban peripheries. This finding highlights a critical epidemiological gap: the absence of routine screening at animal transit points. Notably, variability in seroprevalence across source regions suggests uneven implementation of herd health management and biosecurity practices, further amplifying transmission risks.

This study delivers a compelling call to action: strategic surveillance at livestock entry points, strengthened quarantine biosecurity, and integration of a One Health framework are urgently needed. Proactive monitoring at transit hubs like Nagdhunga could serve as a frontline defense against zoonotic spillover, safeguarding both animal industries and public health.

Keywords: *Coxiella Burnetii*, Q Fever, Goats, Seroprevalence, Zoonosis

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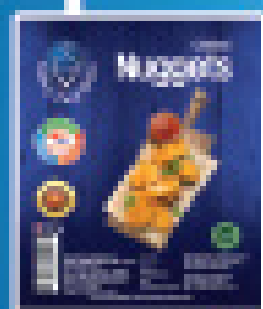
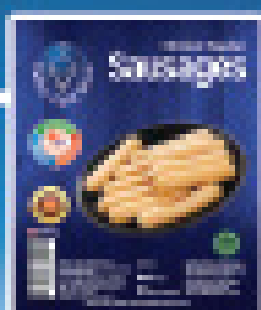
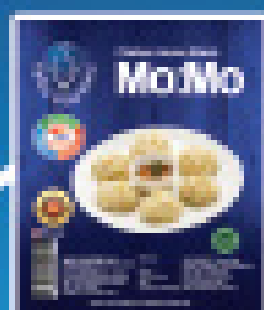
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