Second International Avian Influenza and One Health Emerging Issues Summit

The University of Arkansas

Fayetteville, Arkansas, USA
September 30 to October 3, 2024

UNIVERSITY OF ARKANSAS

American College of Poultry Veterinarians
23 CE

American Veterinary Medical Association
26 CE

Professional Animal Auditor Certification Orgianization
12 CE

GMPC-Thesis and Opinions Platform

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Proceedings of the international avian influenza and One Health emerging issues summit: Introduction

Guillermo Tellez-Isaias

International Avian Influenza and One Health Emerging Issues Summit 2024, Fayetteville, Arkansas, USA

UNIVERSITY OF ARKANSAS

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Dear esteemed guests, distinguished speakers, honorable delegates, and all participants worldwide

Welcome to the International Avian Influenza and One Health Emerging Issues Summit, a premier event that brings together leading minds from across the globe to address some of the most pressing challenges in animal and human health. This year's Summit, held as a hybrid event in Fayetteville, Arkansas, USA, from September 30 to October 3, 2024, is dedicated to deepening our understanding of the intricate relationships between avian influenza and the broader One Health framework.

As we gather in a time of unprecedented change and global interconnectedness, the Summit offers a unique platform for experts, researchers, policymakers, and stakeholders to explore the emerging issues that define the landscape of avian influenza. Our discussions will span the latest scientific research, innovative strategies for disease control, and the broader implications for public health, agriculture, and wildlife.

Through a combination of in-person and virtual sessions, we aim to foster collaboration, share cutting-edge insights, and develop actionable solutions that can address the complex challenges at the intersection of animal, human, and environmental health. This Summit is not just a forum for knowledge exchange but a catalyst for forging the partnerships and policies necessary to protect global health in an increasingly interconnected world.

We are excited to embark on this journey with you and look forward to the ground breaking discussions and discoveries that will emerge over the next few days.

Sincerely,
Guillermo Tellez-Isaias
Chairman

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Acknowledgment to the German Multidisciplinary Publishing Center (GMPC)

Guillermo Tellez-Isaias

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On behalf of the organizing committee of the International Avian Influenza and One Health Emerging Issues Summit, we would like to express our deepest gratitude to the German Multidisciplinary Publishing Center (GMPC) for their invaluable support in publishing the proceedings of this important event.

The Summit, held in a hybrid format in Fayetteville, Arkansas, USA, from September 30 to October 3, 2024, brought together leading experts from around the world to address critical issues at the intersection of avian influenza and One Health. The proceedings capture the wealth of knowledge shared during this event, contributing significantly to the global understanding of these complex challenges.

We are confident that publishing these proceedings through GMPC will enhance the visibility and impact of the research presented, fostering collaboration and innovation across disciplines. Your partnership in this endeavor is greatly appreciated.

Thank you for your continued commitment to advancing scientific knowledge and facilitating the dissemination of research findings in such a meaningful way.

Guillermo Tellez-Isaias
Chairman

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Acknowledgment to Jessica Wesson (Communications Manager)

Guillermo Tellez-Isaias

Center of Excellence for Poultry Science, Division of Agriculture, University of Arkansas

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I would like to express my sincere gratitude to Jessica Wesson, Communications Manager of the International Avian Influenza and One Health Emerging Issues Summit, for her invaluable support and dedication. The upcoming hybrid event in Fayetteville, Arkansas, USA, from September 30 to October 3, 2024, promises to be a significant gathering, and your efforts in ensuring its success are deeply appreciated. Your commitment to fostering communication and collaboration within this crucial field does not go unnoticed, and I am grateful for all the work you've put in.

Thank you once again for your unwavering commitment and professionalism.

Guillermo Tellez-Isaias
Chairman

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Acknowledgment to Dr. Awad A. Shehata

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We extend our deepest gratitude to Dr. Awad A. Shehata for his exceptional work in editing the proceedings of the International Avian Influenza and One Health Emerging Issues Summit. His meticulous attention to detail and dedication have ensured that the content reflects the highest standards of scholarly excellence.

The Summit, held in a hybrid format in Fayetteville, Arkansas, USA, from September 30 to October 3, 2024, brought together leading experts from around the world to address pressing challenges in avian influenza and emerging One Health issues. Dr. Shehata's efforts in organizing and refining these proceedings have greatly contributed to the dissemination of critical knowledge and insights shared during this pivotal event.

We are immensely grateful for his contributions, which have significantly enhanced the quality and impact of this publication.

Guillermo Tellez-Isaias

Chairma

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Acknowledgment to Dr. Alberto Torres

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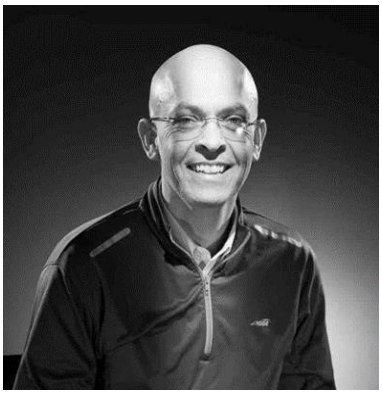

We would like to extend our heartfelt gratitude to Dr. Alberto Torres for his outstanding leadership and dedication as the Program Manager of the International Avian Influenza and One Health Emerging Issues Summit. His commitment to excellence played a pivotal role in the success of the Summit, held in a hybrid format in Fayetteville, Arkansas, USA, from September 30 to October 3, 2024.

Dr. Torres's meticulous planning and insightful guidance ensured a seamless experience for all participants, both in-person and virtual. His expertise and passion for advancing knowledge in avian influenza and One Health have significantly contributed to the impact and reach of this important event. We are deeply appreciative of his hard work and the professional excellence he brought to this Summit.

Thank you, Dr. Torres, for your invaluable contribution.

Guillermo Tellez-Isaias
Chairman

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Acknowledgment to sponsors

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Dear Valued Sponsors,

On behalf of the organizing committee of the International Avian Influenza and One Health Emerging Issues Summit, we would like to express our deepest gratitude to our sponsors for their invaluable support. This hybrid event, held in Fayetteville, Arkansas, USA, from September 30 to October 3, 2024, would not have been possible without your generous contributions.

Your commitment to advancing research and collaboration in the fields of avian influenza and One Health has been instrumental in bringing together experts, policymakers, and stakeholders from around the world. Your sponsorship has enabled us to create a platform for meaningful dialogue, knowledge exchange, and the development of innovative solutions to address the emerging challenges in these critical areas.

Thank you for your unwavering dedication to this cause and for helping to make this Summit a success. We look forward to continuing our partnership in the future as we work together to safeguard global health.

Guillermo Tellez-Isaias
Chairman

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Learning Objectives for the Session that will be presented at the International Avian Influenza and One Health Emerging Issues Summit organized by the University of Arkansas on September 30-October 3, 2024.

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A) Learning Objectives for the Session on Highly Pathogenic Avian Influenza (HPAI) Viruses in Commercial Poultry

At the end of this session, participants will be able to:

1. Understand the Epidemiology of HPAI Viruses: i) Describe the global distribution and transmission dynamics of HPAI viruses in commercial poultry. ii) Identify the key factors contributing to the emergence and spread of HPAI viruses in poultry operations.
2. Recognize the Impact of HPAI on Poultry Health and Production: i) Assess the clinical signs, morbidity, and mortality rates associated with HPAI infections in different poultry species. ii) Evaluate the economic impact of HPAI outbreaks on commercial poultry production, including market disruptions and trade restrictions.
3. Analyze Current Diagnostic Approaches and Challenges: i) Review the latest diagnostic techniques for detecting HPAI viruses in commercial poultry, including molecular and serological methods. ii) Discuss the challenges associated with timely and accurate diagnosis in the context of large-scale poultry operations.
4. Examine Preventive and Control Measures: i) Identify biosecurity practices critical for preventing HPAI introduction and spread in commercial poultry farms. ii) Explore the role of vaccination, culling, and other control strategies in managing HPAI outbreaks.
5. Understand the One Health Implications of HPAI: i) Discuss the zoonotic potential of HPAI viruses and the risks posed to human health. ii) Evaluate the importance of a One Health approach in mitigating the spread of HPAI viruses, considering the interconnectedness of animal, human, and environmental health.
6. Develop Strategies for Outbreak Preparedness and Response: i) Formulate effective contingency plans for responding to HPAI outbreaks in commercial poultry, including communication, coordination, and resource allocation. ii) Analyze case studies of past HPAI outbreaks to identify lessons learned and best practices for future outbreak management.

B) Learning objectives for the session on Highly Pathogenic Avian Influenza (HPAI) viruses in wild birds and mammals:

1. Understanding HPAI Ecology: Gain a comprehensive understanding of the ecological dynamics of HPAI viruses in wild bird and mammal populations, including transmission pathways, reservoirs, and species susceptibility.
2. Identifying High-Risk Species: Identify key wild bird and mammal species that play a significant role in the spread of HPAI viruses, with a focus on migratory patterns, habitat use, and interspecies interactions.
3. Evaluating Surveillance Strategies: Evaluate current surveillance and monitoring strategies for HPAI viruses in wild birds and mammals and explore innovative approaches for early detection and risk assessment.
4. Analyzing One Health Implications: Analyze the implications of HPAI viruses in wild birds and mammals from a One Health perspective, considering the interconnectedness of animal, human, and environmental health.
5. Exploring Control and Mitigation Measures: Explore effective control and mitigation measures to manage HPAI outbreaks in wild populations, including biosecurity practices, vaccination, and policy frameworks.
6. Assessing the Impact on Public Health and Agriculture: Assess the potential impact of HPAI viruses in wild birds and mammals on public health, agriculture, and global trade, with a focus on preventing zoonotic spillover and minimizing economic losses.
7. Fostering Collaborative Research and Response: Foster collaborative research and coordinated response efforts across disciplines, including wildlife management, veterinary science, epidemiology, and public health, to address emerging challenges posed by HPAI viruses.

These objectives will guide participants in understanding the complex interactions between HPAI viruses and wildlife, the broader implications for global health, and the strategies needed to mitigate risks.

C) Learning Objectives for the Session on HPAI Viruses in Dairy Cattle

1. Understand the Epidemiology of HPAI Viruses in Dairy Cattle: Explain the occurrence and transmission dynamics of Highly Pathogenic Avian Influenza (HPAI) viruses in dairy cattle. Identify the potential sources of HPAI virus exposure in dairy cattle operations and their significance in the broader context of animal and public health.
2. Assess the Clinical and Subclinical Manifestations of HPAI in Dairy Cattle: Recognize the clinical signs and potential subclinical impacts of HPAI infections in dairy cattle. Evaluate the diagnostic methods and challenges associated with detecting HPAI in the dairy cattle population
3. Analyze the One Health Implications of HPAI in Dairy Cattle: Discuss the role of dairy cattle as potential reservoirs or amplifiers of HPAI viruses and the implications for interspecies transmission. Explore the impact of HPAI infections in dairy cattle on food safety, animal welfare, and zoonotic risk, considering a One Health approach.
4. Develop Strategies for the Prevention and Control of HPAI in Dairy Cattle: Design biosecurity measures tailored to prevent the introduction and spread of HPAI viruses in dairy cattle herds. Formulate response plans for managing outbreaks of HPAI in dairy cattle, including collaboration with public health and veterinary authorities.
5. Evaluate the Economic and Operational Impact of HPAI on Dairy Farms: Assess the potential economic consequences of HPAI outbreaks on dairy farms, including production losses and trade implications. Consider the operational adjustments needed to maintain herd health and productivity during an HPAI event.

This session will equip participants with the knowledge and tools needed to address the emerging challenges of HPAI in dairy cattle within the framework of One Health, emphasizing the interconnectedness of animal, human, and environmental health.

D) Learning Objectives for the Session on Alternatives to Antibiotics to Reduce the Risk of Superbugs

1. Understand the Mechanisms of Antibiotic Resistance: Explain the biological and environmental factors contributing to the emergence of antibiotic-resistant bacteria, particularly in avian species. Identify the pathways through which antibiotic resistance genes spread in both agricultural and natural ecosystem
2. Explore Non-Antibiotic Interventions: Assess various alternative strategies to antibiotics, such as probiotics, prebiotics, vaccines, and plant-derived compounds, and their effectiveness in preventing bacterial infections in poultry. Compare the benefits and limitations of these alternatives in reducing reliance on antibiotics without compromising animal health and productivity.
3. Evaluate the Impact on Public Health and One Health: Analyze how reducing antibiotic use in poultry production can mitigate the risk of superbugs and protect human health. Discuss the implications of alternative strategies for global One Health initiatives, focusing on the interconnectedness of animal, human, and environmental health.
4. Implementing Alternatives in Poultry Production: Identify best practices for integrating alternative approaches to antibiotics within commercial poultry production systems. Develop a framework for monitoring and evaluating the success of these alternatives in reducing antibiotic use and the incidence of antibiotic-resistant bacteria.
5. Policy and Regulatory Considerations: Discuss the role of policy, regulation, and industry standards in promoting the adoption of alternatives to antibiotics. Explore international case studies where alternative strategies have been successfully implemented and the lessons learned from these examples.

These objectives will help attendees gain a comprehensive understanding of the current landscape of antibiotic alternatives, their practical applications in poultry production, and their broader implications for public health.

E) Learning Objectives for the Session on One Health in Aquaculture:

1. Understand the One Health Concept in Aquaculture: Define the One Health approach and its relevance to aquaculture, emphasizing the interconnectedness of human, animal, and environmental health.
2. Explore the Impacts of Aquaculture Practices on Public Health: Analyze the potential public health risks associated with aquaculture, including zoonotic disease transmission, antimicrobial resistance, and food safety concerns.
3. Examine Environmental and Ecosystem Health in Aquaculture: Investigate the environmental impacts of aquaculture practices, such as pollution, habitat destruction, and biodiversity loss, and discuss strategies to mitigate these effects within a One Health framework.
4. Evaluate Disease Management and Biosecurity in Aquaculture: Assess current approaches to disease prevention, control, and biosecurity in aquaculture and identify opportunities for integrating One Health principles to enhance disease management and reduce the risk of emerging infectious diseases.
5. Discuss Policy and Regulatory Implications for One Health in Aquaculture: Review existing policies and regulations related to aquaculture and One Health and explore potential improvements to ensure the sustainability and safety of aquaculture systems.
6. Promote Collaborative Research and Interdisciplinary Approaches: Encourage the development of interdisciplinary collaborations between veterinarians, ecologists, public health professionals, and policymakers to address One Health challenges in aquaculture.

F) Learning objectives for the session on African swine fever (ASF) at the upcoming International Avian Influenza and One Health Emerging Issues Summit:

1. Understand the Global Impact of ASF: Assess the current status of African swine fever outbreaks worldwide and their socio-economic impact on the global pork industry.
2. Explore ASF Transmission Dynamics: Analyze the transmission pathways of ASF in domestic and wild pig populations, with a focus on environmental and biological factors that contribute to the spread of the virus.
3. Evaluate ASF Detection and Control Strategies: Examine the latest advancements in ASF detection methods, including molecular diagnostics, and evaluate the effectiveness of current control measures, including biosecurity protocols and vaccination research.
4. Discuss One Health Implications: Explore the intersection of ASF with the One Health framework, highlighting the role of environmental, animal, and human health in managing and mitigating the risks associated with ASF outbreaks.
5. Identify Future Research and Policy Needs: Identify gaps in current ASF research and policy and discuss the future direction of ASF management, including the need for international collaboration and the development of new tools for prevention and control.

These objectives will guide the session, ensuring that attendees gain a comprehensive understanding of African swine fever and its implications within the broader context of global health.

G) **Learning objectives for the session on "The One Health approach as a successful strategy in research on emerging zoonotic diseases":**

1. Understand the One Health Concept: Participants will gain a comprehensive understanding of the One Health approach, including its interdisciplinary nature and how it integrates human, animal, and environmental health to address emerging zoonotic diseases.
2. Analyze Case Studies: Attendees will explore successful research case studies where the One Health approach has been applied to emerging zoonotic diseases, identifying key factors that contributed to positive outcomes.
3. Evaluate Research Methodologies: Participants will evaluate different research methodologies used within the One Health framework, emphasizing the importance of collaboration across sectors and disciplines in tackling zoonotic disease outbreaks.
4. Identify Challenges and Solutions: The session will highlight common challenges faced when implementing the One Health approach in research, and participants will discuss practical solutions and strategies to overcome these barriers.

5. Promote Interdisciplinary Collaboration: Attendees will learn about the importance of fostering interdisciplinary collaboration and will be encouraged to consider how they can apply the One Health approach in their own research and professional practices.
6. Impact on Policy and Public Health: Participants will understand how the findings from One Health research can inform public health policies and practices, leading to better prevention, detection, and response to zoonotic diseases on a global scale.

H) Learning objectives for the session on Histomonosis:
1. Understand the Etiology and Epidemiology of Histomonosis: Gain a comprehensive understanding of Histomonosis, including its causative agent, *Histomonas meleagridis*, transmission pathways, and the role of the cecal worm (*Heterakis gallinarum*) in its life cycle.
2. Identify Clinical Signs and Pathological Lesions: Learn to recognize the clinical signs of Histomonosis in poultry, including turkeys and chickens, and identify characteristic pathological lesions associated with the disease.
3. Explore Current Diagnostic Techniques: Review and evaluate the latest diagnostic methods for detecting Histomonosis, including molecular techniques, histopathology, and clinical examination.
4. Examine Treatment and Control Strategies: Analyze current treatment options for Histomonosis and discuss preventative measures, including biosecurity practices, the use of anti-protozoal drugs, and the role of vaccination in controlling outbreaks.
5. Discuss the Impact of Histomonosis on Poultry Health and Production: Understand the economic and health impacts of Histomonosis on poultry production, including its influence on flock morbidity and mortality, and explore strategies to mitigate these effects.
6. Assess Future Research Directions: Explore ongoing research and emerging technologies aimed at improving the prevention, diagnosis, and treatment of Histomonosis and discuss potential areas for future investigation.
These objectives will ensure that participants leave the session with a thorough understanding of Histomonosis and are equipped with the knowledge to manage this disease effectively in poultry populations.

I) Learning objectives for the session on Circular Bioeconomy and Green Chemistry:
1. Understand the Principles of Circular Bioeconomy: Participants will explore the core principles of the circular bioeconomy, focusing on how biological resources can be sustainably managed and recycled to reduce waste and environmental impact.
2. Evaluate the Role of Green Chemistry in One Health: Attendees will analyze how green chemistry principles can be applied to reduce harmful chemicals and processes in the development of sustainable products, contributing to improved public health, environmental protection, and economic viability.
3. Examine Case Studies on Bio-Based Innovations: Participants will review real-world examples of bio-based innovations in agriculture and industry, learning how these innovations contribute to a circular bioeconomy and support global sustainability goals.
4. Identify Opportunities for Implementation in the Poultry Industry: The session will cover strategies for integrating circular bioeconomy and green chemistry practices within the poultry industry, highlighting potential benefits for disease prevention, waste management, and resource efficiency.
5. Discuss Policy and Regulatory Frameworks: Participants will engage in discussions on current and emerging policies and regulations that support the circular bioeconomy and green chemistry, understanding their implications for industry practices and One Health initiatives.

J) Learning objectives for the session on Emerging *Salmonella* Infantis:
1. Understand the Epidemiology of Emerging *Salmonella* Infantis: Participants will explore the global and regional epidemiology of Salmonella Infantis, including trends in incidence, geographic distribution, and the impact on both poultry production and public health.
2. Identify the Genetic and Phenotypic Characteristics of Salmonella Infantis: Attendees will learn about the unique genetic markers and phenotypic traits that distinguish Salmonella Infantis from other Salmonella serotypes, with a focus on antimicrobial resistance and virulence factors.

3. Assess the Public Health Risks Associated with Salmonella Infantis: This objective will focus on understanding the implications of Salmonella Infantis for food safety and public health, particularly its potential to cause human illness and its role in antimicrobial resistance.
4. Evaluate Control and Prevention Strategies for Salmonella Infantis in Poultry Production: Participants will review current and emerging strategies for controlling Salmonella Infantis in poultry production, including biosecurity measures, vaccination, and other interventions aimed at reducing transmission and contamination.
5. Explore the One Health Approach to Managing Salmonella Infantis: Attendees will be introduced to the One Health approach, which emphasizes the interconnectedness of human, animal, and environmental health in managing Salmonella Infantis and preventing its spread across different sectors.
These objectives aim to provide a comprehensive understanding of the challenges and opportunities in addressing Salmonella Infantis as an emerging pathogen.

K) Learning objectives for the session on "Poultry Production Sustainability: Heat Stress Challenges and Potential Mechanism-Based Strategies":
1. Understand the Impact of Heat Stress on Poultry Production: Identify the key physiological and behavioral effects of heat stress on poultry, including its impact on growth, feed intake, egg production, and overall health. Discuss the economic and productivity losses associated with heat stress in commercial poultry operations.
2. Explore Mechanisms of Heat Stress in Poultry: Describe the underlying biological mechanisms through which heat stress affects poultry health and performance. Analyze how heat stress influences metabolic processes and immune responses in poultry.
3. Evaluate Current Strategies for Managing Heat Stress: Review existing management practices and technologies used to mitigate heat stress in poultry farms, including environmental modifications, nutritional interventions, and management practices. Assess the effectiveness and limitations of these strategies in different production systems.
4. Identify Potential Mechanism-Based Strategies for Enhancing Heat Resilience: Examine emerging research on novel mechanism-based approaches to improving heat resilience in poultry, such as genetic selection, dietary supplements, and innovative cooling systems. Discuss the potential benefits and challenges associated with implementing these strategies in commercial settings.
5. Implement Sustainable Solutions for Heat Stress Management: Develop actionable recommendations for integrating heat stress management strategies into poultry production practices to enhance sustainability. Explore case studies and real-world examples of successful heat stress management and their impact on poultry production sustainability.
6. Engage in Interactive Discussions and Problem-Solving: Participate in discussions on recent advancements and future directions in heat stress research and management. Collaborate with peers to identify practical solutions and innovative approaches to address heat stress challenges in poultry production.

L) Learning objectives for your session on Microbiology, Induction, and Management Practices to Mitigate Bacterial Chondronecrosis with Osteomyelitis and Lameness in Broiler Chickens:
1. Understand the Pathogenesis: Describe the microbiological agents responsible for Bacterial Chondronecrosis with Osteomyelitis (BCO) and their role in the development of lameness in broiler chickens. Explain the disease progression and the impact of BCO on broiler chicken health and performance.
2. Identify Diagnostic Techniques: Identify key diagnostic methods used to detect BCO in broiler chickens, including microbiological, histopathological, and imaging techniques. Discuss how to interpret diagnostic results to accurately diagnose BCO.
3. Implement Induction Strategies: Examine the factors contributing to the induction of BCO, including environmental, genetic, and management aspects. Evaluate strategies for early detection and prevention to reduce the incidence of BCO.
4. Apply Management Practices: Outline effective management practices to mitigate the risk of BCO in broiler flocks, focusing on husbandry, nutrition, and biosecurity measures. Review case studies or examples where management interventions successfully reduced the prevalence of BCO.

5. Evaluate Treatment and Control Measures: Assess current treatment options for BCO, including antimicrobial and non-antimicrobial therapies, and their efficacy. Discuss integrated approaches combining management practices, environmental control, and treatment strategies to manage and prevent BCO.
6. Promote Best Practices: Develop a plan for implementing best practices in broiler production to prevent BCO, considering both proactive and reactive approaches. Encourage the adoption of evidence-based practices to improve flock health and reduce the incidence of lameness related to BCO.

M) Learning objectives for the session on "Microbiota Management for Healthy and Successful Poultry Production"

1. Understand the Role of Microbiota: Explain the significance of microbiota in poultry health and its impact on immune function, nutrient absorption, and overall well-being.
2. Identify Key Microbial Communities: Describe the different microbial communities present in the poultry gut and their roles in maintaining a balanced microbiota.
3. Implement Management Strategies: Discuss effective strategies for managing poultry microbiota, including dietary adjustments, prebiotics, probiotics, and environmental controls.
4. Evaluate the Impact of Microbiota Disruption: Analyze how disruptions in microbiota balance can lead to health issues and reduced production efficiency in poultry.
5. Integrate Microbiota Management into Production Practices: Develop practical approaches to integrate microbiota management into routine poultry production practices to enhance flock health and performance.
6. Assess Emerging Research and Technologies: Review recent advancements in microbiota research and technologies that can be applied to improve poultry production outcomes.
7. Address Common Challenges: Identify and address common challenges and misconceptions related to microbiota management in poultry production.

These objectives aim to provide participants with a comprehensive understanding of microbiota management and its practical application in poultry production.

N) Learning objectives for the session on "Bee Pollination and Its Economic Value for Food Production":

1. Understand the Role of Bees in Pollination: Explain the fundamental role of bees in the pollination process and their impact on the reproduction of flowering plants and crop production.
2. Identify Key Crops Dependent on Bee Pollination: Recognize which major food crops and agricultural products are heavily reliant on bee pollination and the implications of their dependency on bee populations.
3. Assess the Economic Impact of Bee Pollination: Analyze the economic value of bee pollination to global and local food production systems, including the estimated monetary benefits and contributions to food security.
4. Explore Threats to Bee Populations: Discuss the various threats to bee populations, such as habitat loss, pesticide use, climate change, and diseases, and their potential impact on agricultural productivity.
5. Evaluate Conservation Strategies: Review current strategies and practices aimed at protecting and supporting bee populations, including habitat restoration, sustainable agricultural practices, and policy initiatives.
6. Promote Awareness and Action: Develop strategies for raising awareness about the importance of bees in food production and advocate for actionable measures that stakeholders can implement to support bee conservation.

These objectives aim to provide a comprehensive understanding of the significance of bee pollination in agriculture and its economic implications.

O) Learning objectives for the session on Inclusion Body Hepatitis (IBH) in broilers:

1. Understand the Pathogenesis: Explain the pathogenesis of Inclusion Body Hepatitis, including the role of the causative virus and its effects on broiler liver tissue.
2. Identify Clinical Signs and Diagnosis: Recognize the clinical signs and diagnostic methods for IBH in broilers, including laboratory tests, histopathology, and differential diagnoses.

3. Discuss Epidemiology and Risk Factors: Analyze the epidemiology of IBH, including factors contributing to outbreaks, such as management practices, environmental conditions, and interactions with other pathogens.
4. Evaluate Prevention and Control Strategies: Assess effective prevention and control strategies for IBH, including vaccination, biosecurity measures, and management practices to reduce the risk of infection.
5. Review Case Studies: Examine case studies of IBH outbreaks to illustrate practical challenges and successful management strategies in commercial poultry operations.
6. Explore Research and Future Directions: Explore current research and potential future developments in the understanding and management of IBH, including advancements in vaccine development and therapeutic options.

P) Learning objectives for the session on "Exploring the Potential of Artificial Intelligence in Feed Formulation to Advance Poultry Health and One Health":
1. Understand the Fundamentals of AI in Feed Formulation: Define key concepts and technologies related to artificial intelligence (AI) and machine learning (ML) as they apply to feed formulation. Describe how AI and ML can be integrated into the feed formulation process to enhance nutritional accuracy and efficiency.
2. Evaluate AI Applications in Poultry Health: Identify specific AI-driven tools and systems that are currently being used or developed for improving poultry health through optimized feed formulation. Assess the benefits and limitations of these AI applications in the context of poultry health management.
3. Analyze the Impact of AI-Optimized Feed on One Health: Explore how AI-enhanced feed formulation contributes to broader One Health objectives by improving animal health, reducing disease transmission, and promoting environmental sustainability. Examine case studies or examples where AI in feed formulation has had measurable impacts on One Health outcomes.
4. Discuss Future Trends and Innovations: Identify emerging trends and potential future advancements in AI technology that could further revolutionize feed formulation and poultry health. Consider the implications of these advancements for the poultry industry and One Health initiatives.
5. Develop Strategies for Implementing AI in Feed Formulation: Formulate actionable strategies for incorporating AI technologies into feed formulation practices within poultry operations. Discuss challenges and solutions related to the implementation of AI tools in feed formulation and how to overcome them.
These objectives aim to provide attendees with a comprehensive understanding of AI's role in feed formulation and its potential to advance both poultry health and One Health initiatives.

Q) Learning objectives for the session on the "Impact of Coccidiosis and Enteritis on Poultry Energetics and Feed Energy Value":
1. Understand the Pathophysiology: Describe the pathophysiological mechanisms by which coccidiosis and enteritis affect poultry health, including their impact on intestinal integrity and nutrient absorption.
2. Assess the Impact on Feed Utilization: Evaluate how coccidiosis and enteritis alter feed consumption, digestion, and nutrient utilization in poultry and how these conditions influence overall feed efficiency and energy metabolism.
3. Analyze Economic Implications: Analyze the economic implications of reduced feed efficiency and energy utilization caused by these conditions, including the potential for increased feed costs and reduced poultry production profitability.
4. Identify Diagnostic and Monitoring Techniques: Identify current diagnostic and monitoring techniques for detecting coccidiosis and enteritis in poultry and discuss their effectiveness in assessing the impact on feed energy value.
5. Explore Management and Intervention Strategies: Explore effective management and intervention strategies to mitigate the impact of coccidiosis and enteritis on poultry energetics and feed energy value, including dietary adjustments and therapeutic options.
6. Evaluate Case Studies and Current Research: Review case studies and recent research findings related to coccidiosis and enteritis, focusing on their impact on feed energy value and poultry performance, and discuss their implications for future management practices.

7. Apply Knowledge to Practical Scenarios: Apply the knowledge gained to practical scenarios in poultry production, including strategies for optimizing feed formulations and management practices to minimize the impact of coccidiosis and enteritis on poultry energetics.

R) Learning objectives for the session on the deep analysis of the immunopathology of Salmonella Gallinarum and its implications in the One Health approach:

1. Understand the Immunopathology of *Salmonella* Gallinarum: Explain the mechanisms by which Salmonella Gallinarum interacts with host immune systems. Identify the key immune responses and pathophysiological changes induced by *Salmonella* Gallinarum infections in poultry.
2. Analyze the Impact of Salmonella Gallinarum on Poultry Health: Assess the clinical manifestations and disease progression associated with *Salmonella* Gallinarum infections in avian species. Discuss the effects of *Salmonella* Gallinarum on poultry production and welfare.
3. Explore the One Health Implications: Evaluate how *Salmonella* Gallinarum infections in poultry can affect human health through zoonotic transmission and environmental contamination. Illustrate the connections between avian health, human health, and environmental factors in the context of *Salmonella* Gallinarum.
4. Discuss Integrated Management Strategies: Review current strategies for managing Salmonella Gallinarum infections in poultry and their effectiveness. Propose integrated One Health approaches to mitigate the risks and impacts of Salmonella Gallinarum on animal and human health.
5. Identify Research Gaps and Future Directions: Highlight key areas where further research is needed to better understand the immunopathology of Salmonella Gallinarum and its broader implications. Recommend potential research avenues to enhance One Health strategies for addressing Salmonella Gallinarum infections.

S) Learning objectives for the session on "Contributions of Veterinary Pathology to the Development of Medicine":

1. Understand the Historical Context: Describe the historical contributions of veterinary pathology to the development of human medicine, including landmark discoveries and pivotal studies that have shaped modern medical practices.
2. Identify Key Innovations: Recognize specific innovations and techniques in veterinary pathology that have been adopted or adapted in human medicine and discuss how these advancements have improved diagnostic and therapeutic approaches.
3. Explore Cross-Disciplinary Impact: Analyze how veterinary pathology has influenced research and treatment in various fields of human medicine, including oncology, infectious diseases, and immunology.
4. Examine Case Studies: Review case studies where veterinary pathology has directly contributed to breakthroughs in medical research or clinical practice, highlighting the practical applications of these contributions.
5. Discuss Future Directions: Explore emerging trends and potential future contributions of veterinary pathology to human medicine, focusing on how interdisciplinary collaboration can drive innovation and address current medical challenges.
6. Promote Interdisciplinary Collaboration: Emphasize the importance of ongoing collaboration between veterinary pathologists and human medical researchers to enhance both fields and address complex health issues from a One Health perspective.

T) Learning objectives for the session on "New Research in Mass Mortality Compost and Depopulation":

1. Understand Recent Advances: Participants will gain insight into the latest research and technological advancements in mass mortality composting and depopulation methods for avian species.
2. Evaluate Effectiveness: Attendees will learn how to assess the effectiveness and efficiency of new composting techniques and depopulation strategies in reducing environmental and health risks.
3. Implement Best Practices: The session will provide practical guidelines for implementing best practices in mass mortality composting and depopulation, including considerations for biosecurity and waste management.

4. Address Challenges: Participants will explore common challenges and limitations associated with current methods and learn about innovative solutions to address these issues.
5. Integrate New Research: Attendees will be equipped to integrate findings from new research into their own operations and management practices to enhance overall outcomes in handling mass poultry mortality.
6. Collaborate and Share Knowledge: The session will encourage collaboration and knowledge sharing among professionals in the field, fostering a community of practice focused on improving mass mortality management.

Speaker Information

Dr. Adnan Alrubaye

Department of Poultry Science, Center of Excellence for Poultry Science, Dale Bumpers College of Agricultural, Food, and Life Sciences University of Arkansas, U of A System Division of Agriculture

"Microbiology, Induction, and management practices to mitigate Bacterial Chondronecrosis with Osteomyelitis and lameness in broiler chickens."

Dr. Alrubaye is an Assistant Professor of poultry microbiology and the Associate Director of the Cell and Molecular Biology graduate program at the University of Arkansas. Dr. Alrubaye's main area of research interest is identifying the bacterial causes and mitigation measures for Bacterial Chondronecrosis with Osteomyelitis BCO lameness in broiler chickens. BCO lameness is one of the highest-priority animal welfare issues affecting the broiler industry.

Alberto Torres

Export Manager, Cobb-Vantress, Inc.

"Circular Bioeconomy and Green Chemistry: The Need for Radically Innovative Approaches in the Design of New Products"

Alberto Torres is a Veterinarian from UNAM (Mexico), has a Master's Degree in Animal Science from Massey University (New Zealand), and a PhD in Poultry Sciences (poultry health) from the University of Arkansas (United States). Since 2006, he has managed the compliance and logistics of exports of breeding stock from the US to the rest of the world. He is a member of multiple committees and organizations that address issues related to poultry health and international trade.

Alejandro E. Macias Hernández

Professor, University of Guanajuato

Specialist in Internal Medicine and Infectology. Master of Science from Univ of London. He is currently a Professor at the University of Guanajuato. National investigator level three, the highest level in Mexico. Member of the National Academy of Medicine. Former Influenza Commissioner during the A(H1H1) 2009 pandemic in Mexico

Bill Hewat

Tyson Foods

"Industry Veterinarian's perspective on managing a case of HPAI"

Bill is a veterinarian with Tyson Foods who works with both domestic and international poultry operations. He is a native of North Carolina and attended North Carolina State University (BS in Poultry Science, DVM) and the University of Georgia (Master of Avian Medicine). He is a member of the American Veterinary Medical Association and American Association of Avian Pathologists and is board-certified by the American College of Poultry Veterinarians. He was appointed to the Arkansas Livestock and Poultry Commission by the Governor of Arkansas. He has held positions in a variety of poultry industry-related NGOs and local government. He has spoken at multiple domestic and international conferences, seminars, and conventions. In addition to commercial poultry production and medicine, he is interested in the science of vaccinology and is focused on optimal methods of vaccine delivery. Bill is a Founding Member of the American Speckle Park Board of Directors. Bill and his wife Angie are first-generation farmers in Goshen, Arkansas. They started Blue Ridge Farms in 2013 with a small herd of commercial cows that included several British White cows. Sheep were later added, and Angie currently has a flock of registered Babydoll Southdowns. To differentiate themselves in the competitive seed stock industry, the Hewats were determined to find a new and progressive beef breed. After much research, they decidedly selected a new breed, the Speckle Park. Their sizeable group of foundation females and bulls were purchased from Prestwould Parke and several breeders in Canada via both auction and private treaty in late 2020 and early 2021. Currently, Blue Ridge Farms has one of the largest Speckle Park Herds in the US. Aside from Bill's passion for poultry and Speckle Park cattle, he enjoys attending St. Gabriel's Anglican Church, fishing, and reading.

Dr. Bill Potter

Technical Advisor, Poultry Food Safety, Elanco Animal Health

"One Health Strategies to Optimize Poultry Intestinal Integrity and Preharvest Food Safety "

Dr. Bill Potter has a B.S. in Animal Science, and MBA from Texas A and M, and a M.S. and Ph.D. in Poultry Science from the University of Arkansas. Three decades of experience leading and developing food safety and quality systems in both technical and senior leadership roles. Currently Technical Advisor for Elanco Animal Health, focusing on optimization of poultry food safety programs. Previously also held strategic roles in food safety, QA, R and D, and technical services at George's Inc., ConAgra Poultry, and Advance Food Co. Active participant in pilot programs and initiatives with members of NCC, IAFP, and AAAP

Dr. Claudia Hess

Clinic for Poultry Medicine Department for Farm Animals and Veterinary Public Health University of Veterinary Medicine Vienna, Austria

"Emerging Salmonella Infantis"

Graduated at the University of Veterinary Medicine Vienna (Austria) Diplomate of the European College of Poultry Veterinary Science. Senior Lecturer in Poultry Diseases. Strongly involved in undergraduate and post-graduate Teaching activities (residency candidates of the ECPVS, doctorate and PhD candidates). Diagnostic activities involve clinical practices, necropsies of different poultry species, and diagnostics (parasitology, bacteriology, serology, histology, molecular biology, virology). Providing reports and offering consultancy to colleagues, farmers, and owners of backyard poultry is also part of this working area. The diagnostic laboratory of the Clinic is accredited according to ISO 17025. Research activities focus mainly on bacterial infections in poultry.

David Sarfati-Mizrahi

Avimex® Animal Health/Veterinary Clinical Diagnostics
"Worldwide overview on Inclusion Body Hepatitis"
DVM and Poultry Specialist, co-founder of Avimex and DCV, currently has the position of Commercial Director and CMO in Avimex, responsible for the Marketing and Sales Teams, design, and implementation of the commercial strategies and customer technical services. Dr. Sarfati has acted as President of the National Association of Poultry Specialists in Mexico, ANECA, and part of its Scientific Committee. Currently, he is a member of the board of a nonprofit organization in Mexico called "Sociedad de beneficencia privada La Fraternidad IAP".

Dr. Diego Martinez

Center of Excellence for Poultry Science, University of Arkansas
"Exploring the Potential of Artificial Intelligence in Feed Formulation to Advance Poultry Health and One Health"
Dr. Martinez is a poultry nutritionist and researcher at the Center of Excellence for Poultry Science at the University of Arkansas. He holds a B.S. in animal science, an engineering degree in animal husbandry, an M.S. in animal nutrition, and a Ph.D. in poultry nutrition from UNALM (Peru), specializing in advanced data methodologies such as meta-analysis and predictive modeling. With over 20 years of experience in the poultry and allied industries, Dr. Martinez has developed innovative data analysis techniques, including meta-regression predictive modeling. His post-doctoral research with Dr. Craig Coon focuses on energy metabolism and amino acid utilization and their application to poultry feed formulation. Dr. Martinez's research interests center on understanding the nexus of nutrition and health in feed formulation and developing tools to enhance field production management.

Dr. Dilip Bhandari

Senior Director of Program, Livestock Technology and One Health. Heifer International Little Rock, Arkansas, USA
"Integration of One Health into Community Development Programs"
As the Senior Director of Programs-Livestock Technology and One Health, Dr. Bhandari is serving as a thought leader providing strategic, technical, and programmatic direction related to Livestock Technology and One Health and is responsible for managing a portfolio of Signature Programs in Asia. With 25 years of experience gained from diverse assignments in over 15 countries spanning Asia, Africa, and Central America, Mr. Bhandari is a seasoned veteran of livestock production management and community development. He has published several books, manuals, guidelines, and academic papers on smallholder sustainable livestock development and reproductive biotechnology. He co-authored "Sustainable Livestock Development for Poverty Alleviation and Food security" for CABI, the UK in 2012 and "Scaling-up successful practices on sustainable pro-poor small ruminant development" for International Goat Association (IGA) and International Fund for Agriculture Development (IFAD), Community Animal Health Worker Manual and contributed to "Raising Goats for Milk and Meat", and co-authored "Farmer Field School Manual of Goat Production". He holds a DVM from Tribhuvan University Nepal and a master's degree in reproductive biotechnology from Seoul National University, South Korea.

Dr. Elizabeth Bobeck

Associate Professor of Animal Science, Iowa State University
"Environmental Enrichment and Welfare in Broilers"
Dr. Elizabeth Bobeck, PhD., is currently an Associate Professor of Animal Science at Iowa State University. Her research and teaching efforts focus on the poultry industry from different angles with the same intent: to use nutrition to improve poultry health, productivity, and welfare. She has extended her nutritional immunology expertise to answer questions in other species, including canine models. Her lab employs cell culture, ex vivo cells and tissues, and whole animal models to answer questions related to bioactive components of feedstuffs, growth, performance, disease resistance, vaccination, microbiome, and the immune system. Her work also extends into welfare and meat quality to address forward thinking concerns in the poultry industry. Dr. Bobeck has authored over 45 peer-reviewed publications, 40 technical and extension publications, 68 abstracts, and has 4 awarded patents. She has mentored 3 PhD, 6 MS, 2 post-docs, and >80 undergraduate students in her lab.

Erica Spackman

Acting Research Leader, Exotic and Emerging Avian Viral Diseases Unit US National Poultry Research Center, USDA-Agricultural Research Service
"The ecology of the AIV. Reservoirs, host species, and spillover risk"
Dr. Spackman is a research microbiologist in the Exotic and Emerging Avian Viral Diseases unit at the US National Poultry Research Center, USDA-Agricultural Research Service in Athens, GA. She received both her MS and PhD in Animal Science from the University of Delaware. She joined USDA-ARS in 2001 where her research has focused on high consequence and emerging viral diseases of poultry. Her current research is centered on highly pathogenic avian influenza.

F. Dustan Clark DVM, PhD, DACPV

Extension Veterinarian and Assoc. Center Director of Extension, Center of Excellence for Poultry Science
"Bird Flu: More Than Just Birds."
Dr. Clark is the Extension Poultry Health Veterinarian and Associate Center Director for Poultry Extension in the Center of Excellence for Poultry Science at the University of Arkansas in Fayetteville, Arkansas. He has DVM (1980), MS (1982) and PhD (1991) degrees from Texas A&M University and is a diplomate of the American College of Poultry veterinarians. Dr Clark has tribal membership in the Choctaw tribe of Oklahoma. His Extension programs focus on Biosecurity.

and Disease Recognition and Disease Diagnosis and Treatment in commercial and small poultry flocks. He has diplomate status with the American College of Poultry Veterinarians and, in 2017, was awarded the Poultry Science Association Phibro Extension award. Dr. Clark has served on national and state Avian Influenza task forces, coordinating educational outreach. He conducts workshops, seminars, short courses, and farm visits for poultry integrators, growers, county agents, 4H youth, USDA/APHIS/VS veterinarians, animal health technicians, and small flock owners.

George Girgis

Founder, Nevysta LLC
"HPAI in layers: A field perspective"
George Girgis is a DVM, MSc in Poultry Medicine, PhD in gut immunotoxicology (University of Guelph, Canada), and a diplomate of the American College of Poultry Veterinarians since 2008. He worked as a veterinary services manager and director of animal health with major poultry meat and egg producers in Canada and the USA. He served on several industry committees, including the food safety committee of the United Egg Producers, and as an adjunct assistant professor in the College of Veterinary Medicine the Ohio State University. In 2019, he founded NEVYSTA, which focuses is poultry diagnostics and research.

Hesham R. El-Seedi

Uppsala University, Sweden
"Bee Pollination and Its Economic Value for Food Production"
Hesham R. El-Seedi is working in isolation and structure elucidation of biologically active natural products from medicinal plants, marine, and bee products, synthesis and biosynthesis. Hesham is a fellow of JSPS, Keio University, Japan. Throughout his career, he worked in internationally recognized laboratories, including Geneva University, Switzerland; KTH; Stockholm University, Sweden; and the Department of Pharmaceutical Biosynthesis, Uppsala Biomedical Center, Uppsala University, Sweden. He has published more than 400 peer-reviewed international research articles and scientific papers, reviews, and chapters in peer-reviewed international journals, including the Lancet (Current IF around 168.7). He has presented his research at over 200 international scientific conferences worldwide and received awards, including a 2019 Appreciation Certificate from Keio University, Japan, for his lectures and collaboration and a 2015 award from the STEFELSEN Foundation for Pharmacognosy for many years of scientific contributions to pharmacognosy research and thereby increasing the knowledge about bioactive natural products and building contributions with developing countries, Nordic International Conference, Visby, Sweden.

Irene Iglesias

Centro de Investigación en Sanidad Animal, Animal Health Research Centre, CISA-INIA/CSIC
"DiFLUsion: A new spatiotemporal early warning system for HPAI."
She received her PhD in Veterinary Epidemiology from Complutense University of Madrid (UCM), specializing in conventional and spatial epidemiology applied to animal health. Serving as a scientific researcher at INIA-CISA since August 2018, her 18-year tenure in veterinary epidemiology focuses on infectious diseases at the livestock-pets-wildlife-human interface under the One Health approach. Her expertise includes epidemiological studies of diseases crucial to animal and public health, such as highly pathogenic avian influenza (HPAI), African swine fever (ASF), and SARS-CoV-2. She has contributed significantly to national and international disease surveillance and control plans. She has a strong research portfolio that covers risk analysis, economic modelling, epidemic simulation, and the identification of risk factors. She has authored many publications and is involved in teaching and supervising doctoral students.

Iulia-Delia Cohen

Legislative Veterinary Officer, Animal Health Unit, European Commission Directorate - General for Health and Food Safety
"EU legislation on AI vaccination"
Iulia Cohen is licensed as a DVM and graduated from the University of Agricultural Sciences in Cluj Napoca, Romania, in 1995. Back in her natal Maramureş after graduation, she enjoyed her first five years as a veterinarian managing animal health activities in a company with integrated poultry production. Changing place of living, she took responsibility for developing national animal health legislation and disease

Romanian central veterinary services and invested time in postgraduate studies of veterinary epidemiology and animal health economics. From 2013 – 2019, she took her role as the Romanian veterinary representative to the EU, in Brussels, with an active contribution to the legislative process for the adoption of important EU animal health regulations. At the end of 2019 she joined the Animal Health Unit of DG SANTE, where she is the desk officer for poultry diseases and contributes to the development of tertiary legislation for Regulation (EU) 2016/429 on transmissible animal diseases.

Dr. Jada Thompson

Assistant Professor, Department of Agricultural Economics and Agribusiness and Center of Excellence for Poultry Science, University of Arkansas
"Economic Impacts of Highly Pathogenic Avian Influenza"
Dr. Jada Thompson is an associate professor in the Department of Agricultural Economics and Agribusiness at the University of Arkansas and is affiliated with the Center of Excellence for Poultry Science. Her research primarily focuses on animal health and livestock economics with emphasis on poultry. Dr. Thompson received a Ph.D. from Colorado State University in 2016, MS in agricultural economics from the University of Arkansas and MS in rural development from European Consortium in 2010, and a BS in poultry science and agricultural business in 2008. Her research focuses on animal health, markets, production, and their impact on producers and consumers domestically and internationally.

Jaime A. Angel Isaza

Nutritionist, Promitec Santander
"Comprehensiveness in the Action of Essential Oil as a Determining Factor in 'One Health'"
Veterinary Zootechnician from the University of Caldas, with a Master's degree in Veterinary Sciences, specialized in monogastric nutrition and feeding at the same university. Doctorate candidate in Biotechnology at the National University of Colombia. Currently, working as a nutritionist at the Research, Development, and Innovation Unit of Promitec Santander (Colombia), where research studies and field trials are coordinated related to the application of natural additives for improving the productive health of poultry and pigs.

Jean-Luc Guerin

Professor of Avian Pathology, National Veterinary College of Toulouse, France
"Vaccination against high pathogenicity avian influenza: first lessons from the French duck vaccination plan."
Jean-Luc Guérin, DVM, PhD, Dipl. ECPVS is full professor in poultry medicine at the National Veterinary College of Toulouse, France, and Director of the "host-pathogens interactions" joint research unit (INRAE-ENVT), covering virology, prions, bacteriology, immunology, and epidemiology of infectious diseases in animals, in a One Health perspective. His research is focused on viruses of poultry and for some years, pathobiology of highly pathogenic avian influenza. A priority is the development of innovative approaches to viral detection, including from environmental samples and at the wild birds/poultry interface. Since 2016, his research has been very much directed toward the emergence of H5 HPAI and, recently, to the scientific support of the National vaccination plan implemented in France. Jean-Luc Guérin authored >90 original international papers, >200 communications, and chapters of textbooks in the field of poultry virology and medicine.

José Luís Capelo Martínez

Bio-analytics and Proteomics Laboratory Chemistry Department. NOVA-FCT
"Exploring the Presence of Staphylococcus: Insights into Water Contamination and Animal Reservoirs"
Professor J.L. Capelo's scientific journey is marked by a relentless pursuit of understanding complex biological systems and improving diagnostic methodologies through cutting-edge research.

Throughout his career, he has been a fervent advocate for interdisciplinary collaboration, working at the intersection of chemistry, biology, and medicine. This collaborative approach has not only enriched his research but has also led to the development of practical solutions for pressing health challenges, particularly in the areas of cancer diagnostics and antibiotic resistance.

Dr. Jovita Fernández-Pinero

Centro de Investigación en Sanidad Animal, Animal Health Research Centre, CISA-INIA/CSIC
"Genomic surveillance of emerging pathogens: trapping and tracking of avian viruses in Spain."
Dr. Jovita Fernández-Pinero, PhD in Sciences, is a virologist and senior researcher at the Animal Health Research Centre (CISA) of INIA-CSIC, Valdeolmos, Spain. As a member of the Emerging and Transboundary Diseases Group, she coordinates the R+D+i studies about viral genomics, molecular diagnostics, and molecular epidemiology of animal and zoonotic viruses of great impact on animal health. Milestones in her research career include the development of numerous PCR methods applicable to diagnosis in animal health, many of them transferred and used in national and international diagnostic laboratories as part of the surveillance and control plans for animal diseases. Her dedication to scientific-technical assistance and international cooperation is notable, and she aims to transfer knowledge and technology in her field of expertise.

Dr. Juan D. Latorre

Department of Poultry Science, University of Arkansas Division of Agriculture - JKS Poultry Health Laboratory
"Histomonosis – An old disease requiring new candidate strategies"
Dr. Latorre is a research scientist at the Center of Excellence of Poultry Science at the University of Arkansas, Fayetteville, USA. Latorre earned his DVM in Colombia (UCC), MSc in animal nutrition in Mexico (UADY), and PhD in poultry science in the USA (UARK). During his post-doctoral fellowship, he worked on multidisciplinary intestinal health and nutrition projects. Then, he joined the allied industry as a senior research scientist, developing alternative feed additives to reduce intestinal inflammation and improve nutrient utilization. Currently, at the University of Arkansas, his research is focused on evaluating intestinal biomarkers, developing enteric disease models, evaluating strategies to control histomonosis, and studying the relationship between intestinal microbiota balance and physiology.

Juan Pascual

Veterinarian and animal science communicator
"Reasons to be Omnivorous. For Your Health and the Planet's"
Juan Pascual is a Doctor in Veterinary Medicine and has an MBA from Instituto de Empresa. He has spent most of his career in the animal health industry, and today he is VP – France, Iberia, and Italy for Elanco. Juan is very active in social media communication about the essential and often unknown role that animals play in our society and why livestock is key for the planet and for our health. Juan is the author of the book Reasons to be Omnivorous. For Your Health and the Planet's.

Dr. Juan Piñeiro

Assistant Professor and Extension Dairy Specialist, Texas A&M AgriLife Extension Service, Texas A&M University
"Outbreak in Texas Dairy Cattle – Lessons Learned"
Dr. Juan Piñeiro's research and extension program focuses on cattle preventive medicine and production of drought tolerant crops for dairy cows. He has been involved in a dairy cattle outbreak where avian influenza is a suspected contributing agent.

Julianna B. Lenoch

USDA-APHIS Center on Epidemiology and Animal Health
"The epidemiology of AIV in wild waterfowl. Does immunity play a role in the spread of AIV amongst wild bird populations?"
Dr. Julianna Lenoch is a veterinary epidemiologist for USDA APHIS. Dr. Lenoch is the National Coordinator for Wildlife Services National Wildlife Disease Program. She completed her Doctorate of Veterinary Medicine from Colorado State and earned a Master of Public Health Epidemiology from the Colorado School of Public Health.

Dr. Lenoch is a boarded diplomat of the American College of Veterinary Preventive Medicine. She has been with USDA since 2016, serving multiple roles at the Wildlife-Livestock interface and working in disease control and investigation programs. Dr. Lenoch is the United States designated Focal Point for Wildlife for the World Organisation for Animal Health (WOAH).

Kay Russo

Technical Services Manager North America, Animal and Plant Biosolutions
"From Farm to Table: The Crucial Role of Food Safety in the One Health Framework"
Dr. Kay Russo completed her veterinary training at Cornell University's College of Veterinary Medicine. After graduation, she served as a private dairy practitioner for several years before entering the industry, where she has held different roles in research and technical services for pharmaceutical and feed additive companies. She completed her Master of Health and Avian Medicine degree at the University of Georgia and is a Diplomat of the American College of Poultry Veterinarians. Kay joined Novonesis in 2023.

Leni Corrand

ANIBIO France
"One year of HPAI vaccination in ducks in France; feedback from a poultry veterinary practitioner."
Léni Corrand is a Doctor of Vetinerary Medicine, MSc Avian Virology Toulouse University (France) 2009, and Dipl. ECPVS (European College of Poultry Vet Sciences) and poultry medicine (field practitioner). He is a business partner at ANIBIO Veterinary Group (Vet Group in SW France) with a main focus of activity on poultry practitioner full-time broilers, layers, breeders, and ducks production and regular missions (field poultry expertise or education) in France or abroad.

Leopoldo Paasch Martinez

Resident of Veterinary Pathology, Armed Forces Institute of Pathology
"Contributions of Veterinary Pathology to the Development of Medicine."
Leopoldo Henri Paasch Martínez is a DVM with a residency in Veterinary Pathology Armed Forces Institute of Pathology, Washington, D.C., USA, and a Doctor of Philosophy in the area of Comparative Pathology, George Washington University, Washington, D.C., USA. He is a professor in Animal Pathology, Faculty of Veterinary Medicine and Zootechnics of the National Autonomous University of Mexico since January 1980, and a National Researcher, of the National System of Researchers, National Council of Science and Technology. He was Dean of the Faculty of Veterinary Medicine and Zootechnics of the National Autonomous University of Mexico, 1989 – 1996, and Founding President of the Pan American Federation of Schools and Faculties of Veterinary Medicine and Zootechnics, Santiago de Chile, 1992 – 1994. He is an Expert Consultant to the Food and Agriculture Organization of the United Nations, FAO, UN, World Dairy Industry, Rome, Italy, July 1991, Founding President of the National Technical Advisory Council for Animal Health (CONASA), 1992-1996, and Member of the Purkinje Institute for the Artificial Heart, Brno, Czech Republic, since 1996. He was the recipient of the Leon Bialik Award for Technological Innovation, National Autonomous University of Mexico, October 7, 1996. Dr. Paasch was General Administrative Secretary of the National Autonomous University of Mexico, 1997-1999 and Advisor to the Commissioner for Social and Human Development of the Executive Office of the Presidency of the Republic, 2001 – 2002.

Liliana Monroy

Natural Animals Health CEO and Founder
"Impact of Bacillus in the gut integrity and poultry production"
Liliana Monroy is a veterinarian and MBA in marketing and sales with 25 years of global expertise in pharmaceutical sales and marketing of animal health products, technical assistance, and distribution networks. Passionate team player who introduces adopts, and supports a variety of products and can motivate and mentor varied professional teams. Passionate about solving animal protein production issues. Entrepreneur, strategist. Builds great teams and relationships in high-strategy, big-picture contexts. Proven managerial and organizational ability to lead varied cross-functional teams and external cross-discipline resources. A successful CEO and founder who provides education and supports natural protein manufacturing solutions to deliver natural meat at every table.

Marisa Arias

Centro de Investigación en Sanidad Animal, Animal Health Research Centre
"African swine fever: What you need to know."
PhD in Science. Director of the European Union (EU) and FAO Reference Laboratories for African Swine Fever (ASF). She was actively involved in the ASF eradication programme in SPAIN (1986-1995). Her work has been carried out in 75 R&D&I projects and agreements with companies and institutions. She has participated in twenty-seven national and international committees as an expert in animal infectious diseases and biosafety issues. She has received three national scientific awards and two merits for outstanding research. A key priority for her is technology transfer, as demonstrated by her role as coordinator and/or director of more than fifty-seven international courses on animal health organized in Europe, Central, and South America, particularly on ASF and on the prevention, diagnosis, and control of emerging and transboundary animal viral diseases.

Michelle Kromm

Staff Veterinarian, Jennie-O Turkey Store
"African swine fever: What you need to know."
With over 15 years of experience developing partnerships within the business and research community, regulatory agencies, and civil society organizations to drive improvements in the food system, Dr. Kromm is an expert on risk management and mitigation. She specializes in the areas of food safety, emergency management of disease outbreaks, and antimicrobial stewardship. Dr. Kromm's consulting practice, Food Forward LLC, focuses on improving the resiliency of our food system — driving advancement and improvement in the areas of food safety, animal health, and sustainability. She believes by engaging with diverse stakeholders to identify and strategically mitigate risk, we can improve outcomes for animals, producers, and consumers. Dr. Kromm is a board-certified poultry veterinarian who received a concurrent Doctor of Veterinary Medicine from Iowa State University and a Master of Public Health from the University of Iowa in 2006. In 2007, she completed her master's degree specializing in poultry medicine at the University of Georgia. After completion of graduate school, Dr. Kromm joined Jennie-O Turkey Store as a staff veterinarian. There, she served in various leadership roles, including being named Vice President of Animal Health and Welfare in 2019. In this role, Dr. Kromm was responsible for managing the company's animal health, welfare, and preharvest food safety programs.

Dr. Miguel Angel Jimenez-Clavero

Centro de Investigación en Sanidad Animal, Animal Health Research Centre
"The One Health approach is a successful strategy in research on emerging zoonotic diseases: the case of Spain."
PhD in Biochemistry and Molecular Biology, Dr. Jiménez-Clavero is a virologist and Research Professor at the Animal Health Research Center (CISA), High Biological Security Facility in Spain, belonging to the INIA-CSIC. He is currently the Head of the Department of Infectious Diseases and Global Health at CISA, where he leads the Arbovirus Section within the Emerging and Transboundary Diseases Group. His current areas of interest focus on emerging diseases and zoonoses caused by viruses with high dispersal capacity and/or special virulence, particularly those transmitted by vectors (arboviruses). His work involves both national and international projects in this field, always inspired by the "One health" concept.

Dr. Mohammad Khairul Azhar Abdul Razab

Medical Radiation Programme School of Health Sciences Universiti Sains Malaysia Health Campus
"Effectiveness of Ultraviolet Radiation C in Disinfecting Influenza Viruses: A Promising Non-invasive Technique for Future One Health Emerging Approach"
Dr. Mohammad Khairul Azhar obtained his PhD in Radiation Physics, MSc in Medical Physics, and Bachelor of Health Sc. (Medical Radiation). He started his academic career as a senior lecturer at Universiti Malaysia Kelantan in 2010 and moved to Universiti Sains Malaysia, Health Campus (School of Health Sciences) in 2017. He is now the Chairman of the Medical Radiation Programme and is actively involved in applying ionizing radiation such as X/gamma rays and UV-C radiation for medical and health purposes.

In 2020, he was appointed as a consultant in disinfecting COVID-19 at Hospital USM (Teaching hospital for USM) using a UV-C robot. He has vast experience in writing and publishing high-impact journals indexed in Scopus/WOS. Until now, he has published more than 100 articles in Radiation Physic/Materials Science fields correlated with health and medical purposes.

Montserrat Arroyo Kuribrena

Deputy Director General International Standards and Science World Organisation for Animal Health
"Global Situation of HPAI (poultry and wild birds) and global activities for its control"
Doctor in Veterinary Medicine and Animal Husbandry UNAM (Mexico), Master´s Degree in Preventive Veterinary Medicine (MPVM) UCDavis, (USA). The majority of her career has been in public service, focusing mainly on the areas of prevention and control of foreign animal diseases and programs dedicated to the prevention and control of animal diseases at a national level. International negotiations for the establishment of trade in animal products, as well as sanitary measures and cooperation. She was head of the National Producer for Veterinary Biologics in Mexico. She has served as Subregional Representative of the World Organization for Animal Health (WOAH) for the Central American and Caribbean Region, also as Head of the World Animal Health Information Department, Head of the Regional Activities Department and since 2021, she is the WOAH Deputy Director General for International Standards and Science.

Dr. Morgan Farnell

Professor and Associate Department Head for Extension, Department of Poultry Science, Texas A&M University
"A Cleaning and Disinfection Primer: Evaluation of Liquid and Dry Foot Baths"
Dr. Morgan Farnell's research focuses on antimicrobial resistance, cleaning and disinfection, and antibiotic alternatives to improve food safety and gut health. He currently teaches graduate Immunology, undergraduate Advanced Food Bacteriology, and International Poultry Production (a study-abroad class to central Mexico).

Mussaret Zaidi

Senior Scientist, Epidemiological and Emerging Risks Research Program - National Autonomous University of Mexico
Dr. Mussaret Zaidi is an infectious disease pediatrician and microbiologist who has conducted extensive research on antimicrobial-resistant foodborne pathogens and their public health impact in Mexico. Dr. Zaidi has served as a member of the World Health Organization Advisory Group on Integrated Surveillance of Antimicrobial Resistance and as a One Health consultant for the Panamerican Health Organization and the European Union. Recognizing the need to bridge the gap between science and policy, she recently completed graduate studies in Global Infectious Disease Policy at Georgetown University in Washington, D.C. She is now a senior scientist for the Epidemiological and Emerging Risks Research Program at the National Autonomous University of Mexico. Her primary research interests include emerging infectious diseases, antimicrobial resistance, pandemic preparedness, and the impact of climate change on global health.

Olivia Faulkner

Vectored Vaccine Laboratory of the Research and Development Department at Ceva Animal Health, LLC
Dr. Olivia Faulkner received her PhD while investigating immunology and physiology of poultry, studying pulmonary hypertension in chickens under the advisors Dr. Gisela Erf and Dr. Bob Wideman at the University of Arkansas in Fayetteville, AR. Olivia continued poultry research studying avian influenza vaccines as a postdoctoral fellow at Southeast Poultry Research Laboratory, United States Department of Agriculture-Agricultural Research Service. She moved back to Fayetteville, AR, where she was a Research Scientist in the Poultry Health Laboratory at the University of Arkansas, creating subunit yeast or bacterial vectored vaccines for poultry. Currently, Olivia leads the Vectored Vaccine Laboratory of the Research and Development Department at Ceva Animal Health, LLC in Lenexa, KS, where she develops vectored Marek's disease vaccines and vectored fowl pox vaccines. She has worked at Ceva for the past nine years. She continues to follow avian influenza vaccine research and outbreak status.

Pablo Catalá Gregori

CECAV Spain
"Avian Influenza in Spain. What the poultry sector learned in the last waves."
Pablo Catalá Gregori (DVM, PhD, ECPVS) holds a degree in Veterinary Medicine from Cardenal Herrera-CEU University (2001), a Doctorate in Veterinary Medicine with European Mention from the University of Murcia (2007), and a European Diploma in Poultry from the European College of Poultry Veterinary Sciences – ECPVS – (2013). Throughout his career, he has specialized in poultry, initially as a field veterinarian, then as a doctoral student in nutrition, and subsequently took on the management of a producer association. Currently, he serves as the Managing Director of one of Spain's leading centers for Poultry Health and Animal Feeding. He has developed training programs for the poultry sector focusing on Animal Health, Animal Welfare, Diagnosis, Epidemiology, and Official and Sectoral Control Programs. He has championed the implementation and development of an Epidemiological Surveillance Network in the Valencian Community. With 35 JCR publications, one book chapter, and three books, along with numerous popular articles, he has participated in over 70 national and international conferences and symposiums. He has presented numerous papers at sectoral events and has been involved in 11 research projects, six of which he led as principal investigator and two within the framework of the H2020 program.
Additionally, he has co-supervised five doctoral theses, with two currently in progress. His current research focuses on epidemiological surveillance, antibioresistance, and phage therapy. Since 2008, he has been the Managing Director of the Center for Poultry Quality and Animal Feeding of the Valencian Community (CECAV). He has been an associate professor of Farm Management, Health and Production of Poultry and Rabbits, and Introduction to Veterinary Clinic in the French line at Cardenal Herrera-CEU University since 2014. He became a member of the PVSGEU in 2019, President of the Institute of Egg Studies since 2021, and a member of the executive committee of AECA-WPSA since 2023.

Patrícia Alexandra Curado Quintas Diniz Poeta

Veterinary Science Department, University of Tras-Os-Montes and Alto Duouro
"Fortifying the One Health imperative: a holistic exploration of antibiotic resistance."
Patricia Alexandra Curado Quintas Dinis Poeta, Full Professor at UTAD, is an EBVS® European Specialist in Veterinary Microbiology. CECAV-UTAD member and LAVQ-REQUIMTE collaborator, Chemistry Department, Faculty of Science and

Technology, University NOVA of Lisbon. Head of Medical Microbiology Laboratory and Coordinator of Research Group MicroArt- Microbiology and Antibiotic Resistance Team. PhD in Veterinary Medicine from UTAD. Scientific Committee President of the School of Agrarian and Veterinary Sciences. Her research focuses on antibiotic resistance mechanisms in bacteria from humans, animals, food, water, and the environment, as well as molecular epidemiology studies of antibiotic-resistant bacteria's genetic lineages.

Sami Dridi

Department of Poultry Science University of Arkansas
"Poultry production sustainability: heat stress challenges and potential mechanism-based strategies."
Dr. Dridi, Professor of Avian Endocrinology and Molecular Genetics in the Center of Excellence for Poultry Science at the University of Arkansas, Fayetteville, is one of the pioneer researchers who investigates the molecular mechanisms of heat stress responses and metabolic disorders in poultry for subsequent development of mechanism-based strategies to improve poultry production sustainability. He earned his M.S. (1998) and Ph.D. (2001) in Molecular Biology and Poultry Science from the National Polytechnic Institute of Lorraine (INPL) and The National Institute of Agricultural Research (INRA), France. He received his Accreditation to Supervise Research (HDR, 2012) in Cell Signaling and Structural Biology from the University of Paris XI, France. He served as a quality inspector in the poultry industry, and he joined several national and international labs such as UNC-Chapel Hill, UK, WVU, KUL Belgium, ENITAB, and ENVN France.

Sandra Sevilla Navarro

CECAV Spain
"Beyond Antibiotics: Focusing on Phage Therapy in the Fight Against Multidrug-Resistant Bacteria"
Sandra Sevilla-Navarro (PhD, ECPVS Dipl) is a Doctor in Veterinary Medicine and European Specialist in Poultry Veterinary Science by EBVS. She serves as the project manager at CECAV and leads the research department. Her primary research focus revolves around the investigation of bacteriophages and alternative methods for controlling superbugs in both poultry and swine production, leading National and Regional Research Projects in this field. Additionally, an Associate Professor of Poultry Infectious Disease at the Veterinary Faculty of Health at UCH-CEU University and collaborates as a lecturer in the Master's Degree of Ganadería de Precisión at the Polytechnic University of Valencia and Master's Degree of Virology at the University of Valencia.

Santiago Uribe-Diaz

PhD student at University of Arkansas
"Deep analysis of the immunopathology of Salmonella Gallinarum and its implications in the one health approach"
Santiago Uribe-Diaz is a Doctor in Veterinary Medicine and Animal Sciences with a Master of molecular and Macromolecular Sciences at the University of Prince Edward Island, Canada. Currently pursuing Doctoral studies at the University of Arkansas. Santiago has more than 5 years of field experience in the Poultry industry, and its research has been focus in Nutritional Immunology and Immunology.

Sergio R. Fernandez

SRF Poultry Nutrition Solutions LLC
"Microbiome management for healthy and successful poultry production"
PhD in Poultry Nutrition from the University of Illinois. A poultry nutritionist in several companies in charge of designing nutritional strategies with a focus on sustainability and high profitability. Expert in poultry research conducted both at university research centers as well as field operations. Former member of the Poultry Science Association Board of Directors, Ex-President of the Mexican Society of Animal Nutrition Specialists (AMENA).

Shaden Khalifa

Jiangsu University, China
"Applications of bee products as functional food"
She holds a PhD degree in the area of neuroscience and tissue engineering from Karolinska Institute. She published over 100 international peer reviewed scientific papers. She has many years of practical experience working in research at high-ranking universities such as Keio University, Japan, Uppsala University, Sweden. Riken Brain Research Institute, Japan; University of Malaya, Malaysia; and Karolinska Institute in Sweden.

Shanna Siegel

National Director of Live Animal Imports and Exports United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS)
"Regionalization, Zoning, and Compartmentalization from a Trade Perspective"
Dr. Shanna Siegel is the National Director of Live Animal Imports and Exports with the United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), and Veterinary Services (VS). She received her Bachelor of Science degree, Master of Public Health degree, and Doctor of Veterinary Medicine degree with a Certificate in International Veterinary Medicine, all from the University of Georgia. Dr. Siegel has a diverse background with more than 20 years of experience in the veterinary and agricultural fields spanning public, private, and research sectors, including areas of animal health, public health, emergency management, public policy, and international trade.

Tomi Obe

Assistant Professor, University of Arkansas Division of Agriculture
"Pre- and post-harvest strategies for Salmonella control in poultry production continuum"
Dr. Obe is an Assistant Professor of poultry food safety and microbiology at the Department of Poultry Science at the University of Arkansas Division of Agriculture. She has a background in pre- and post-harvest poultry food safety and microbiology coupled with the experience of working in the poultry industry and currently uses her research to answer questions/concerns facing the industry on strategies to mitigate food borne pathogens. Dr. Obe's research focuses on applied poultry food safety aimed at evaluating ways to understand and control Salmonella and Campylobacter throughout the poultry production continuum.

Vasilios Tsiouris

Unit of Avian Medicine, Clinic of Farm Animals, School of Veterinary Medicine, Aristotle University of Thessaloniki
"The use of backyard flocks as an avian influenza and Newcastle disease early warning system"
Vasileios Tsiouris is an associate professor in Avian Medicine and manager of the Unit of Avian Medicine, School of Veterinary Medicine of Aristotle University of Thessaloniki, Greece. He is an EBVS® European Specialist in Poultry Veterinary Science and consultant of Poultry Veterinary Services regarding poultry health and welfare management. He has a Master's Degree in Food Science and Technology, while in his PhD thesis investigated the effect of management factors on the pathogenesis of necrotic enteritis in broiler chicks. His research focuses on gut health pathophysiology, biomarkers, immunosuppressive diseases, zoonoses, and One Health issues. He is the principal investigator in several poultry research projects and the author of more than 30 scientific papers and book chapters.

Walter Harrington

Postdoctoral fellow, St. Jude Children's Research Hospital
"Active influenza surveillance in wild and domestic birds reveals sex- and host-specific patterns in Bangladeshi avian populations."
Dr. Harrington is a postdoctoral fellow in the lab of Richard Webby at St. Jude Children's Research Hospital. He received his PhD from the University of Arkansas for Medical Sciences in Little Rock, AR, and his MPH from the University of Memphis. He is currently working on both low-path and high-path avian influenza evolution, surveillance, and zoonotic infection and transmission in wild birds.

Yuhua Farnell

Instructional Assistant Professor, Department of Poultry Science, Texas A&M University
"Culture of Avian Stem Cells from the Trachea and Gastrointestinal Tract for the Development of a Sustainable Organoid Model to Study Avian Influenza in Vitro"
Dr. Yuhua Farnell comes from a biomedical background with expertise in molecular biology and tissue culture. Her research experience ranges from traditional Chinese medicine to fetal alcohol syndrome to wooden breasts in poultry. She is currently providing a vital tool for future researchers by creating organoid tissue culture models to study avian pathogens, as viable epithelial cell lines are not available.

Zac Williams

Assistant Professor and Poultry Extension Specialist, Center of Excellence for Poultry Science, University of Arkansas System Division of Agriculture
"New research in mass mortality compost and depopulation"
Dr. Williams is an assistant professor of poultry extension with an emphasis on live production. He received his B.S. and M.S. in poultry science from Mississippi State University and his Ph.D. in poultry science from Auburn University. Dr. Williams' most recent research efforts include mass mortality composting and mass depopulation. He teachings poultry production courses at the University of Arkansas. His extension efforts include developing short courses, farm visits, creation of online educational content, including podcasts, newsletters, and video content.

Zong Liu

Associate Professor and Extension Specialist, Department of Biological and Agricultural Engineering, Texas A&M University
"Process Demonstrations and Experiences of Mortality Management Responding to Disease Outbreaks"
Dr. Liu's research and extension programs focus on manure and mortality management, renewable energy production, greenhouse gas reduction, remote sensing/monitoring, value-added material production from waste, and virtual reality extension. Dr. Liu drew upon his broad academic and applied research background to develop novel and practical solutions to these problems.

Dr. Zulhisyam Abdul Kari

Department of Agricultural Sciences, Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus
"One Health in Aquaculture by Biofloc technology to support Sustainable Development Goals (SDGs)"
Dr. Zulhisyam Abdul Kari is a senior lecturer at the Faculty of Agro-Based Industry, Universiti Malaysia Kelantan. At the moment, he is the head of the Advanced Livestock and Aquaculture Research Group – ALAReG under the Faculty of Agro-Based Industry. His research interest is in animal nutrition and molecular study. He has extensive experience in writing and publishing in high-impact journals. He has published over 100 high impact journals indexing in Scopus/WOS. As a senior lecturer, he has more than 5 innovation products that have been patented. He also won and got recognition for the 40 products that he innovated during the national and international exhibition. His work has become a point of interest for the community as well as a reference for other researchers.

Monday, September 30, 2024 (All times are in CDT)

TIME	SPEAKERS	TOPICS
8:00 AM-8:05 AM	**Dr. Gail C. Golab**	Welcome
8:05 AM-8:10 AM	**Dr. Mark J. Cochran**	Inauguration
8:10-8:40 AM	**Pablo Catalá-Gregori**	Avian Influenza in Spain. What the poultry sector learned in the last waves.
8:40-9:10 AM	**Iulia-Delia Cohen**	"EU legislation on AI vaccination", and participation in a Panel discussion on Zoning and Compartmentalization
9:10-9:40 AM	**Shanna Siegel**	Regionalization, Zoning, and Compartmentalization from a Trade Perspective
9:40-9:55 AM	**Break**	
9:55-10:25 AM	**Bill Hewat**	Industry Veterinarian's perspective on managing a case of HPAI
10:25-10:55 AM	**Dr. Mohammad Khairul Azhar Abdul Razab**	Effectiveness of Ultraviolet Radiation C in Disinfecting Influenza Viruses: A Promising Non-invasive Technique for Future One Health Emerging Approach
10:55-11:25 AM	**Jean-Luc Guerin**	Vaccination against high pathogenicity avian influenza: first lessons from the French duck vaccination plan
11:25-11:55 AM	**Dr. Erica Spackman**	The ecology of the AIV. Reservoirs, host species and spillover risk
11:55 AM-1:20 PM	**Lunch**	
1:20-1:50 PM	**Leni Corrand**	One year of HPAI vaccination in ducks in France; feedback from a poultry veterinary practitioner
1:50-2:20 PM	**Irene Iglesias**	DiFLUsion: A new spatiotemporal early warning system for HPAI
2:20-2:50 PM	**George Girgis**	HPAI in layers: A field perspective
2:50-3:20 PM	**Walter Harrington**	Active influenza surveillance in wild and domestic birds reveals sex- and host-specific patterns in Bangladeshi avian populations.

TIME	SPEAKERS	TOPICS
3:20-3:35 PM	**Break**	
3:35-4:05 PM	**Vasilios Tsiouris**	The use of backyard flocks as an avian influenza and Newcastle disease early warning system
4:05-4:35 PM	**Montserrat Arroyo Kuribrena**	Global Situation of HPAI (poultry and wild birds) and global activities for its control
4:35-5:05 PM	**Zac Williams**	New research in mass mortality compost and depopulation
5:05-5:20 PM	**Guillermo Tellez-Isaias**	Closing Remarks

Tuesday, October 1, 2024

TIME	SPEAKERS	TOPICS
8:00-8:05 AM	**Guillermo Tellez-Isaias**	Opening Remarks
8:05-8:35 AM	**Julianna B. Lenoch**	The epidemiology of AIV in wild waterfowl. Does immunity play a role in the spread of AIV amongst wild bird populations?
8:35-9:05 AM	**Dr. Morgan Farnell**	A Cleaning and Disinfection Primer: Evaluation of Liquid and Dry Foot Baths
9:05-9:30 AM	**Dr. Yuhua Farnell**	Culture of Avian Stem Cells from the Trachea and Gastrointestinal Tract for the Development of a Sustainable Organoid Model to Study Avian Influenza in vitro
9:30-9:55 AM	**Dr. Zong Liu**	Process Demonstrations and Experiences of Mortality Management Responding to Disease Outbreaks
9:55-10:05 AM	**Break**	
10:05-10:25 AM	**Dr. Claudia Hess**	Emerging Salmonella Infantis
10:25-10:55 AM	**Sami Dridi**	Poultry production sustainability: heat stress challenges and potential mechanism-based strategies.
10:55-11:15 AM	**Juan Pascual**	Reasons to be Omnivorous. For Your Health and the Planet's

TIME	SPEAKERS	TOPICS
11:15-11:35 AM	**Dr. Sergio R. Fernandez**	Microbiome management for healthy and successful poultry production.
11:35 AM-12:55 PM	**Lunch**	
12:55-1:25 PM	**Dr. Diego Martinez**	Exploring the Potential of Artificial Intelligence in Feed Formulation to Advance Poultry Health and One Health
1:25-1:55 PM	**Michelle M. Kromm**	Turkey Industry Experience with HPAI in the Upper Midwest of the US
1:55-2:25 PM	**Dr. Tomi Obe**	Pre- and post-harvest strategies for Salmonella control in poultry production continuum
2:25-2:55 PM	**Dr. Diego Martinez**	Impact of coccidiosis and enteritis on poultry energetics and feed energy value
2:55-3:10 PM	**Break**	
3:10-3:40 PM	**Kay Russo**	Diagnosing the First Case of H5N1 in Dairy Cattle in the United States
3:40-4:10 PM	**Patrícia Alexandra Curado Quintas Diniz Poeta**	Fortifying the One Health imperative: a holistic exploration of antibiotic resistance
4:10-4:40 PM	**F. Dustan Clark**	Bird Flu: More Than Just Birds.
4:40-5:10 PM	**Dr. Jada Thompson**	Economic Impacts of Highly Pathogenic Avian Influenza
5:10-5:25 PM	**Guillermo Tellez-Isaias**	Closing Remarks

Wednesday, October 2, 2024

TIME	SPEAKERS	TOPICS
8:00-8:10 AM	**Guillermo Tellez-Isaias**	Opening Remarks
8:10-8:30 AM	**Shaden Khalifa**	Applications of bee products as functional food
8:30-8:55 AM	**Dr. Zulhisyam Abdul Kari**	One Health in Aquaculture by Biofloc technology to support Sustainable Development Goals (SDGs)
8:55-9:20 AM	**Marisa Arias**	African swine fever: What you need to know
9:20-9:35 AM	**Break**	
9:35-10:00 AM	**Dr. Miguel Angel Jimenez-Clavero**	The One Health approach is a successful strategy in research on emerging zoonotic diseases: the case of Spain.
10:00-10:25 AM	**Dr. Jovita Fernández-Pinero**	Genomic surveillance of emerging pathogens: trapping and tracking of avian viruses in Spain.
10:25-10:50 AM	**Dr. Adnan Alrubaye**	Microbiology, Induction, and Management Practices to Mitigate Lameness Caused by Bacterial Chondronecrosis with Osteomyelitis in Broiler Chickens
10:50-11:15 AM	**Sandra Sevilla Navarro**	Beyond Antibiotics: Focusing on Phage Therapy in the Fight Against Multidrug-Resistant Bacteria
11:15-11:45 AM	**Dr. Juan D Latorre**	Histomonosis – An old disease requiring new candidate strategies
11:45 AM-1:05 PM	**Lunch**	
1:10-1:40 PM	**Dr. Dilip Bhandari**	*Integration of One Health into Community Development Programs*
1:40-2:05 PM		
2:05-2:30 PM	**Hesham R. El-Seedi**	Bee Pollination And Its Economic Value For Food Production
2:30-2:45 PM	**Break**	
2:50-3:10 PM	**David Sarfati-Mizrahi**	Worldwide overview on Inclusion Body Hepatitis in Broilers

TIME	SPEAKERS	TOPICS
3:10-3:40 PM	**Mussaret B. Zaidi**	Antimicrobial resistance in the food chain: opportunities for medical-veterinary-agrifood collaboration
3:40-4:05 PM	**Alejandro Macias**	The looming threat of a new influenza pandemic: a perspective from the Mexican 2009 experience.
4:05-4:40 PM	**Olivia Faulkner, Mussaret Zaidi, Guillermo Tellez, and Alejandro Macias**	Panel discussion: Policy solutions for a complex problem
4:40-4:45 PM	**Alberto Torres**	Closing Remarks

Thursday, October 3, 2024

TIME	SPEAKERS	TOPICS
8:00-8:10 AM	**Guillermo Tellez-Iaias**	Opening Remarks
8:10-8:40 AM	**Dr. Juan Piñeiro**	Outbreak in Texas Dairy Cattle – Lessons Learned
8:40-9:10 AM	**Santiago Uribe-Diaz**	Deep analysis of the immunopathology of Salmonella Gallinarum and its implications in the one health approach
9:10-9:40 AM	**Dr. Bill Potter**	One Health Strategies to Optimize Poultry Intestinal Integrity and Preharvest Food Safety
9:40-9:55 AM	**Break**	
9:55-10:25 AM	**Jaime A. Angel Isaza**	Comprehensiveness in the Action of Essential Oil as a Determining Factor in 'One Health'
10:25-10:55 AM	**Leopoldo Paasch Martinez**	Contributions of Veterinary Pathology to the Development of Medicine.
10:55-11:25 AM	**Liliana Monroy**	Impact of Bacillus in the gut integrity and poultry production
11:25-11:55 AM	**Iratxe Pérez Cobo**	Bee diseases. Challenges and opportunities.
11:55 AM-1:15 PM	**Lunch**	
1:15-1:45 PM	**Dr. Elizabeth**	Environmental Enrichment and Welfare

TIME	SPEAKERS	TOPICS
	Bobeck	In Broilers
1:45-2:15 PM	**Alberto Torres**	Circular Bioeconomy and Green Chemistry: The Need for Radically Innovative Approaches in the Design of New Products
2:15-2:30 PM	**Break**	
2:30-3:15 PM	**Working Group Session**	Working groups (WG) session will consist of 6 different groups from the in-person audience. The main themes for these 6 WGs are listed below. The facilitator's job is to allow for a fluid brainstorming of ideas, to capture, and then to report on those main points to the large group upon return from the individual WG session: HPAI – Facilitator Dr. Inkar Castellanos Trade – Facilitator Dr. Alberto Torres One Health – Facilitator Dr. Liliana Monroy Public Health – Facilitator Dr. Mussaret Zaidi Sustainability – Facilitator Dr. Lisa Bielke Emerging Issues – Facilitator Dr. Brian Umberson The mechanics of the WG session will be for each group to brainstorm to identify areas of priority within each WG topic, and to suggest action points from a research and regulatory framework of development. The goal for each report from the six WGs will be to address an expression of such priorities to incumbent national and international organizations (e.g. FAO, WOAH, WHO), and to publish the reports as Opinion / Report notes on research outlets in order to extend the impact of this exercise where the event expects to gather people from around the world.
3:15-4:00 PM	**Guillermo Tellez-Isaias**	Working Groups: Reporting
4:00-4:15 PM	**Guillermo Tellez-Isaias**	Closing Remarks

GMPC-Thesis and Opinions Platform

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The ecology of highly pathogenic avian influenza virus

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Abstract

The natural reservoirs of avian influenza virus (AIV) are dabbling ducks of the Subfamily *Anatinae*, which typically carry low pathogenic (LP) AIV. However, over the past decade, the goose/Guangdong/1996 clade 2.3.4.4 lineage of H5 highly pathogenic (HP) AIV has become endemic in ducks nearly globally. Ducks are efficient carriers of the virus because they are highly susceptible to infection, the disease is mild or absent, and they can shed the virus for weeks. Also, the virus has been shown to survive in some habitats over six months, allowing for environmental transmission. As ducks migrate, they spread the clade 2.3.4.4 viruses to resident birds and other species, including mammals. Reported mammalian infections in wildlife with clade 2.3.4.4, H5 HPAIV have generally been fatal and "dead end" and don't transmit further among the new species. Many reported mammalian infections have occurred in predatory and scavenger species that were likely infected through ingestion of infected prey or carcasses. Notably, the virus was discovered in dairy cows in the US in March 2024 and appears to have become endemic in dairy herds in the US. Based on genetic analysis, the virus in cows appears to be a wild bird in origin and is a very rare event where sustained transmission in a new host has occurred. Finally, poultry, especially chickens and turkeys, generally do not serve as long-term reservoirs because the virus is fatal and frequently controlled by stamping out.

Keywords: HPAI, Ecology, Clade 2.3.4.4, Mammals

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One year of HPAI vaccination in ducks in France: Feedback from a poultry veterinary practitioner

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Abstract

The emergence of Highly Pathogenic Avian Influenza (HPAI) poses a significant threat to poultry industries worldwide. In response to recurrent outbreaks, France implemented a targeted HPAI vaccination program on commercial ducks starting in October 2023. This abstract presents a comprehensive review of the first year of this vaccination initiative, drawing on the practical experiences and observations of a veterinary practitioner deeply involved in the program. This synthesis begins first with the history of successive avian influenza crises and the scientific, technical, and financial reasons that led to the start of vaccination on commercial duck populations. Secondly, the presentation will set out the technical and financial choices of this new vaccination strategy, from the choice of vaccines, the selection of populations to be vaccinated, the practical challenges, and the modalities of mandatory post-vaccination monitoring and surveillance. The paper then summarizes the strategy after one year, always from the point of view of a field veterinarian: financing of the program, impact on commercial restrictions, volumes of animals vaccinated, hurdles encountered, and above all, the effectiveness of the vaccination. The practitioner's insights offer a nuanced perspective on the integration of vaccination into existing HPAI control strategies and underscore the importance of continued surveillance and adaptive management. This feedback provides critical lessons for policymakers, veterinarians, and the poultry industry, aiming to enhance the resilience of poultry production systems against HPAI. The abstract concludes with recommendations for future research and policy adjustments to optimize the effectiveness of HPAI vaccination programs in France and beyond.

Keywords: HPAI, Vaccination, Ducks, France

Citation. Corrand, L. 2024. One year of HPAI vaccination in ducks in France; Feedback from a poultry veterinary practitioner. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.36. https://doi.org/10.51585/gtop.2024.2.0037

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Vaccination against high pathogenicity avian influenza: First lessons from the French duck vaccination plan

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Abstract

Avian influenza, particularly high pathogenicity avian influenza (HPAI), poses significant threats to poultry industries globally. In response to recurring outbreaks, France has implemented a comprehensive vaccination strategy targeting ducks, a key species in the country's poultry sector. This abstract presents preliminary findings and insights from the French duck vaccination plan, focusing on its efficacy, challenges, and impact on disease management. The vaccination initiative was designed to enhance biosecurity, reduce the incidence of HPAI, and limit the economic impact on the poultry industry. Initial data indicates a substantial decrease in HPAI cases among vaccinated flocks and a notable reduction in virus transmission. However, challenges such as vaccine strain selection, coverage consistency, implementation of surveillance, and integration with existing biosecurity measures have been encountered. Key lessons from this experience include the importance of selecting appropriate vaccine strains, ensuring high vaccination coverage, and the need for continuous monitoring and adaptation of the vaccination strategy. This presentation will discuss these findings in detail, providing valuable insights for other regions considering similar vaccination programs and contributing to the broader understanding of effective avian influenza control measures. This work underscores the critical role of vaccination in managing HPAI and highlights the ongoing need for collaboration and research to refine and optimize vaccination strategies in poultry.

Keywords: Influenza, HPAI, French duck, Vaccination, Biosecurity

Citation. Guerin, J-L. 2024. Vaccination against high pathogenicity avian influenza: First lessons from the French duck vaccination plan. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.37. https://doi.org/10.51585/gtop.2024.2.0037

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EU legislation on HPAI vaccination

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Abstract

The EU has faced in the last years an increase in the length of the risk period and in the level of risk for the HPAI viruses to be passed from wild birds to poultry. Biosecurity continues to be a cornerstone preventive measure to protect poultry from infection with viruses from the environment, but vaccination could be a complementary preventive or control tool to be used if effective vaccines become available. The new legal framework for animal health in the EU has changed the paradigm in respect of using vaccination. Now, Member States have the possibility to use vaccination to ensure the most effective prevention or control of HPAI. The EU is prepared to adapt its actions in accordance with the new epidemiological situation and increasing level of risk, embracing solutions that could strengthen the prevention and control of HPAI in poultry. For this, the European Commission adopted specific rules on vaccination against HPAI to ensure harmonization of the surveillance and risk mitigation measures to be implemented in the vaccinated flocks to ensure the safe continuation of the trade from those establishments. The rules are in line with the WOAH standards. In addition, as there is not much experience with vaccination of poultry against HPAI in the EU, the European Food Safety Authority has been mandated by the Commission to issue a Scientific opinion on this topic. The EU characteristics of the poultry sector in each of the EU Member States are not uniform (e.g., infrastructure, type of main production, contribution to the national economy, export-oriented); therefore, a “fit for all” vaccination strategy will not be feasible. Therefore, the EU rules leave the possibility for each Member State to decide on the use of vaccination as a preventive or control measure for HPAI.

Keywords: Influenza, Vaccination, EU legislation

Citation. Cohen, L. 2024. EU legislation on HPAI vaccination. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.38. https://doi.org/10.51585/gtop.2024.2.0037

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DiFLUsion: A new spatiotemporal early warning system for HPAI

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Abstract

The emergence and spread of highly pathogenic avian influenza (HPAI) pose significant threats to global poultry industries, wildlife, and public health. Migratory waterfowl play a critical role in its propagation. The current epidemic of HPAI since late 2020 is unprecedented due to a severe increase in incidence, a constant presence without seasonality, greater susceptibility in wild birds, more frequent jumps to wild and domestic mammals (including cats, cows, and mink), and spread to new regions, presenting new challenges in disease control. These changes in the dynamics of the disease have resulted in numerous outbreaks and the death of millions of domestic and wild birds, directly impacting poultry product costs and representing a persistent threat to the poultry industry and public health. In response to this challenge, we present DiFLUsion, an innovative early warning system for HPAI that has been operational in Spain since 2021. DiFLUsion enables early detection in disease-free zones connected by wild bird movements to HPAI-affected areas. This system integrates multiple data sources and analytical tools using Python and ArcGIS, allowing for the modulation of alerts based on the location of HPAI outbreaks in Europe, the seasonality of wild bird movements, and virus survival temperatures. DiFLUsion operates in real-time, updating weekly, sending alerts to the Spanish Ministry of Agriculture, and providing an interactive map viewer. DiFLUsion has effectively identified high-risk areas for HPAI introduction in Spain, aligning with recent outbreak patterns. Over a three-year period, the system generated 77,872 alerts, demonstrating a sensitivity of 85.43% for high-risk categories and a specificity of 74.48% for the highest alert level. These alerts have facilitated preemptive measures, enhancing response times and mitigation strategies. DiFLUsion enhances the decision-making capacity of livestock health managers in Spain, enabling them to prepare for and respond proactively to avian influenza epidemics.

Keywords: HPAI, Public health, DiFLUsion, Early warning system

Citation. Martin, I. I. 2024. DiFLUsion: A new spatiotemporal early warning system for HPAI. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.39. https://doi.org/10.51585/gtop.2024.2.0037

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Turkey industry experience with HPAI in the upper Midwest of the United States

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Abstract

The turkey industry in the Upper Midwest of the United States has faced significant challenges due to outbreaks of highly pathogenic avian influenza (HPAI). These outbreaks have had profound impacts on both production and economic stability within the region. This abstract aims to provide a comprehensive overview of the industry's experience with HPAI with a primary focus on outbreak response and impact. Objectives i) Provide an overview of the spread of HPAI in the Upper Midwest turkey industry. ii) Discuss the effectiveness of various control and mitigation measures implemented during the outbreaks. Iii) Review the economic impact of HPAI on turkey producers. Iv) Provide recommendations for future preparedness and response strategies. Methods: Data were collected by direct observation and experience as well as from industry reports, government records, and interviews with key stakeholders, including turkey producers, veterinarians, and industry experts. Economic analysis was performed by the University of Minnesota to quantify the financial impact on the local industry. Results: HPAI outbreaks led to significant losses in turkey populations primarily due to prescribed depopulation requirements. Controlling the spread of the disease requires science-based, farm-level interventions such as biosecurity measures, including enhanced farm sanitation, restricted farm access, and intensive disease surveillance. Despite these efforts, the outbreaks resulted in substantial economic impacts. The evolving nature of H5Nx outbreaks highlights the need for rapid and flexible diagnostic tools, effective vaccination strategies, and coordinated response plans. Conclusion: The experience of the turkey industry in the Upper Midwest with HPAI underscores the critical importance of a collaborative response effort and the need for ongoing research into effective prevention and control strategies. The lessons learned from these outbreaks provide valuable insights for enhancing preparedness and resilience against future HPAI occurrences.

Keywords: Highly Pathogenic Avian Influenza, Turkey Industry, Biosecurity, Economic Impact, Outbreak Management, Upper Midwest, Poultry Health

Citation. Kromm, M. 2024. Turkey industry experience with HPAI in the upper Midwest of the United States. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.40. https://doi.org/10.51585/gtop.2024.2.0037

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Effectiveness of ultraviolet radiation C in disinfecting influenza viruses: A promising non-invasive technique for future One Health emerging approach

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Abstract

The ongoing threat of influenza viruses, particularly in the context of the One Health approach, necessitates the exploration of innovative and effective disinfection methods. This study investigates the effectiveness of Ultraviolet Radiation C (UV-C) in deactivating influenza viruses, highlighting its potential as a promising non-invasive technique for future One Health strategies. UV-C radiation, known for its germicidal properties, offers a rapid, chemical-free solution for virus deactivation. Laboratory experiments demonstrated that UV-C exposure effectively inactivated various strains of influenza viruses, reducing viral loads significantly within a short period. This method's efficacy was tested on surfaces commonly found in avian and human health settings, ensuring its practical applicability. Additionally, UV-C's non-invasive nature minimizes the risk of chemical residues and environmental contamination, aligning with the principles of the One Health approach. The integration of UV-C disinfection could revolutionize influenza virus management, offering a scalable, efficient, and eco-friendly solution. Future research should focus on optimizing UV-C application protocols and evaluating long-term impacts on virus transmission in diverse environments. This study underscores UV-C's potential to enhance biosecurity measures and contribute to global health resilience against influenza outbreaks.

Keywords: Ultraviolet radiation C, Influenza viruses, Disinfection, One Health, Biosecurity, Non-invasive technique, Emerging approach

Citation. Abdu Razab, M. K. A. 2024. Effectiveness of ultraviolet radiation C in disinfecting influenza viruses: A promising non-invasive technique for future One Health emerging approach. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.41. https://doi.org/10.51585/gtop.2024.2.0037

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HPAI in layers: A field perspective

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Abstract

High Pathogenic Avian Influenza (HPAI) has significantly impacted layer poultry industries globally, presenting unique challenges and management considerations. This presentation will offer a comprehensive field perspective on the recent outbreaks of HPAI in layer flocks, emphasizing both the direct and indirect effects on commercial egg production. By analyzing recent case studies and field data, we will explore the epidemiology of HPAI in layer systems, focusing on transmission pathways, biosecurity breaches, and the effectiveness of response measures. Key topics will include the impact of HPAI on production parameters, the economic ramifications for producers, and the implementation of control strategies. Additionally, we will discuss the role of One Health approaches in addressing the complexities of HPAI outbreaks and propose recommendations for enhancing surveillance, prevention, and response efforts. This presentation aims to provide actionable insights and foster collaborative strategies for mitigating the impact of HPAI in layer poultry systems.

Keywords: High pathogenic avian influenza, One Health, Recommendations

Citation. Girgis, G. 2024. HPAI in layers: A field perspective. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.42. https://doi.org/10.51585/gtop.2024.2.0037

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Active influenza surveillance in wild and domestic birds reveals sex- and host-specific patterns in Bangladeshi avian populations

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Abstract

Influenza, a virus causing up to 650,000 deaths worldwide each year, is a significant health concern. Influenza A viruses (IAV) in wild birds can reassort, increasing genetic diversity and the risk of pandemic strains. Monitoring IAV strains in bird populations is crucial for pandemic preparedness. Bangladesh, with major migratory bird flyways, a large bird farming industry, and a high human population density, is a key location for influenza reassortment and surveillance. We collected IAV and Highly Pathogenic Avian Influenza (HPAI) H5 samples from wild and domestic birds in Bangladesh from 2017-2022. The samples were processed at St. Jude for RNA extraction and virus isolation, and data was analyzed using Python. Our study found that male birds were more likely to test positive for IAV and HPAI H5 than female birds, even after accounting for selection bias and confounding variables. This pattern was particularly evident in ducks. We also explored the correlation between IAV positivity and bird age and found differences in viral load distributions across host, sex, and age categories. Chickens, male birds, and young birds typically exhibited higher viral loads. These findings, if corroborated, could enhance pandemic prediction and risk assessment models by providing more variables to reflect actual influenza infection and transmission dynamics better.

Keywords: Influenza, Bangladesh, Risk assessment

Citation. Harrington, W., Turner, J., Barman, S., and Webby, R. 2024. Active influenza surveillance in wild and domestic birds reveals sex- and host-specific patterns in Bangladeshi avian populations. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.43. https://doi.org/10.51585/gtop.2024.2.0037

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Avian influenza in Spain: Lessons from recent outbreaks

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Abstract

Avian influenza (AI) has posed significant challenges to the poultry sector in Spain, particularly during the recent waves of outbreaks. This presentation aims to synthesize the key lessons learned from these experiences and their implications for future preparedness and response strategies. Spain has faced recurrent AI outbreaks that have underscored the need for enhanced biosecurity measures, rapid detection systems, and effective containment protocols. Through a detailed analysis of the recent waves of AI, this study highlights the evolution of Spain's approach to managing AI risks, including improvements in surveillance and inter-sectoral collaboration. The findings emphasize the importance of a proactive and integrated approach to AI management, incorporating lessons learned from past incidents to mitigate the impact on the poultry industry. By sharing these insights, this presentation seeks to contribute to the global discourse on avian influenza management and foster stronger international cooperation in combating this persistent threat.

Keywords: Influenza, Spain, Evolution, Combating

Citation. Gregori, P. C. 2024. Avian influenza in Spain: Lessons from recent outbreaks. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.44. https://doi.org/10.51585/gtop.2024.2.0037

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Global situation of HPAI (poultry and wild birds) and global activities for its control

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Abstract

The world has been affected by avian influenza (AI) outbreaks for several decades now; the intensity and spread of outbreaks in both domestic and wildlife avian populations have increased in recent years, leading to unprecedented deaths in wildlife, global detections in non-avian including wild and domestic (both companion and farmed) terrestrial and marine mammals. It's important to understand the current global situation of AI, the characterization of circulating viruses, the situation of zoonotic transmission and risks of virus spread among animal populations. The World Organization for Animal Health (WOAH) honoring its mandate and, together with its quadripartite partners, provides tools and recommendations under a One Health approach so that we are better empowered to tackle AI effectively. Unfortunately, there are still challenges in the implementation of global recommendations, and surveillance systems need to enable early detection and rapid response to outbreaks. Biosecurity protocols have to be implemented based on the evaluation of risks of virus introduction and spread in poultry farms. Vaccination strategies need to be evaluated and implemented in high-risk areas to mitigate the impact of the disease. Communication and public awareness initiatives to educate stakeholders about the importance of all these different measures play and essential role in their implementation. Everyone recognizes the need for a One Health approach to addressing HPAI. Moving from recognition to implementation requires collaborative efforts between governments, international bodies, researchers, and the private sector. This synthesis of the global situation of HPAI and activities undertaken for its control aims at informing and engaging stakeholders at the International Avian Influenza and One Health Emerging Issues Summit, fostering a collective response to this ongoing global challenge.

Keywords: Influenza, HPAI, WOAH, One Health, Biosecurity

Citation. Arroyo, M. 2024. Global situation of HPAI (poultry and wild birds) and global activities for its control. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.45. https://doi.org/10.51585/gtop.2024.2.0037

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Bird flu: More than just birds

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Abstract

Avian influenza, commonly known as bird flu, has traditionally been viewed through the lens of its impact on avian species. However, its implications extend far beyond the avian world, influencing global economies, ecological balances, and human health. This presentation will explore some of the multifaceted natures of the disease in avian and other species. The economic ramifications of outbreaks will also be examined, emphasizing the impact on the poultry industry, trade, and food security. Additionally, the ecological consequences of the disease, including its effect on wild bird populations and ecosystems, will be discussed. The One Health perspective, which integrates human, animal, and environmental health, can be used to provide a comprehensive overview of the broader significance of the disease and the need for coordinated global efforts to address the complex issue of avian influenza outbreaks.

Keywords: Economic ramifications, Ecological consequences, One Health

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Citation. Clark, F. D. 2024. Bird flu: More than just birds. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.46. https://doi.org/10.51585/gtop.2024.2.0037

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Impact of coccidiosis and enteritis on poultry energetics and feed energy value

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Abstract

Diet energy density is a major factor in broiler production costs, but metabolizable energy system has limitations in accurately predicting broiler performance due to its low sensitivity to actual metabolism. The productive energy (i.e., Arkansas Net Energy) system, which measures productive energy, provides a more accurate assessment of energy utilization, particularly under conditions affected by gut health, like enteritis and coccidiosis. This article highlights opportunities for assessing the effects of enteritis and coccidiosis on poultry energetics, evaluating dietary interventions on gut health, improving precision nutrition, and supporting One Health strategies in antibiotic-free production systems. This presentation explores the effects of coccidiosis and enteritis on digestion, absorption, poultry energetics, and the energy value of feed. Our study utilizes recent data to quantify the energetic losses associated with these diseases, emphasizing the decreased energy available to the birds. Additionally, we analyze how these conditions alter the productive energy value of feed and discuss strategies for mitigating their impact. By understanding these dynamics, poultry producers can better address the challenges posed by coccidiosis and enteritis, optimizing feed utilization and enhancing overall flock performance.

Keywords: Enteritis, Coccidiosis, Productive energy, Feed additives, Precision nutrition

Citation. Martinez, D. A., Ponce-de-Leon, C. L., and Coon, C. N. 2024. Impact of coccidiosis and enteritis on poultry energetics and feed energy value. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.47. https://doi.org/10.51585/gtop.2024.2.0037

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Exploring the potential of artificial intelligence in feed formulation to advance poultry health and One Health

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Abstract

Integrating Artificial Intelligence (AI) into feed formulation represents a transformative opportunity for advancing poultry health and aligning with One Health principles. Feed accounts for over 60% of broiler production costs, with energy being the most significant factor. Traditional feed formulation methods focus on balancing nutrients to meet average flock needs but often fail to address the dynamic requirements of modern poultry production. Variability in growth rates, health, and environmental conditions can lead to feed utilization and performance inefficiencies. AI offers a transformative opportunity in poultry nutrition, enabling more precise and adaptable feed formulations. This presentation explores the innovative application of AI technologies to optimize feed composition, aiming to enhance poultry health, improve productivity, and mitigate disease risks, including Avian Influenza. By leveraging large datasets and advanced algorithms, AI can accurately predict nutrient requirements and optimize feed in real time, allowing continuous adjustments based on environmental changes and flock health. Essential support systems, including precision feed manufacturing tools, advanced sensors, and new energy systems like Productive Energy, are crucial to realizing the full potential of AI. The presentation will highlight case studies and emerging research demonstrating the potential for AI-driven feed formulation to address current and future challenges in poultry health and biosecurity, emphasizing its role in advancing integrated health strategies across humans, animals, and ecosystems.

Keywords: Artificial intelligence, Feed formulation, Precision nutrition, Precision farming, Health

Citation. Martinez, D. A., Ponce-de-Leon, C. L., and Coon, C. N. 2024. Exploring the potential of artificial intelligence in feed formulation to advance poultry health and One Health. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.48. https://doi.org/10.51585/gtop.2024.2.0037

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Outbreak in Texas dairy cattle – Lessons learned

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Abstract

The recent Avian Influenza outbreak in dairy cows in the U.S. that started in Texas has provided insights into the management and mitigation of zoonotic diseases. This presentation will cover the chronological development of the outbreak, highlighting the epidemiological patterns, response strategies, and challenges encountered. Biosecurity measures and inter-agency coordination efforts will be discussed. We also examine the impact of the outbreak on local dairy farms and their personnel. Lessons learned from this experience underscore the importance of integrated disease management efforts, continuous monitoring, and preparedness planning.

Keywords: Influenza, Mammals, Cattle, Epidemiology

Citation. Piñeiro, J.M. 2024. Outbreak in Texas dairy cattle – Lessons learned. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.49. https://doi.org/10.51585/gtop.2024.2.0037

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Economic impacts of highly pathogenic avian influenza

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Abstract

Highly Pathogenic Avian Influenza (HPAI) has emerged as a critical challenge to global poultry industries, leading to profound economic consequences. This abstract examines the multifaceted economic impacts of HPAI outbreaks, focusing on direct and indirect costs across different sectors. Direct costs include expenses related to disease control measures such as culling, vaccination, and biosecurity enhancements. Indirect costs encompass market disruptions, trade restrictions, and long-term impacts on consumer confidence and poultry prices. Additionally, the study explores the economic ripple effects on associated industries, including feed production, transportation, and retail. Through a comprehensive analysis of recent outbreaks and economic data, this presentation aims to highlight the importance of robust surveillance and rapid response strategies to mitigate financial losses and support sustainable poultry production. Insights gained will inform stakeholders on effective policies and practices to manage and reduce the economic burden of HPAI.

Keywords: HPAI, Biosecurity, Vaccination, Economic impacts

Citation. Thompson, J. 2024. Economic impacts of highly pathogenic avian influenza. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.50. https://doi.org/10.51585/gtop.2024.2.0037

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Process demonstrations and experiences of mortality management responding to disease outbreaks

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Abstract

Effective mortality management is crucial in responding to avian influenza outbreaks and mitigating their impact on both poultry industries and public health. This presentation provides a comprehensive overview of process demonstrations and practical experiences in mortality management during avian influenza outbreaks. We will explore key strategies employed in various case studies via field tours, highlighting both successful and challenging aspects of implementation. This talk highlights carcass disposal options and biosecurity measures. By examining real-world scenarios, we aim to provide actionable insights and best practices for stakeholders involved in avian influenza management, ultimately contributing to improved preparedness and response efforts in future outbreaks.

Keywords: Influenza, public health, biosecurity, outbreak

Citation. Liu, Z. 2024. Process demonstrations and experiences of mortality management responding to disease outbreaks. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.51. https://doi.org/10.51585/gtop.2024.2.0037

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The One Health approach is a successful strategy in research on emerging zoonotic diseases. The case of Spain

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Abstract

The One Health approach, which integrates human, animal, and environmental health disciplines, has proven to be an effective strategy in addressing emerging infectious diseases, most of which have a zoonotic origin. Here, we will review the successful implementation of the One Health framework in Spain, particularly focusing on its application to prevent, monitor, and control arthropod-borne viral zoonoses. We set the beginning of a strong interdisciplinary collaboration between scientists in the fields of animal health, public health, and environmental sciences in Spain in 2003, when a genuine One Health-inspired network of scientists and specialists in a number of relevant disciplines, including human and veterinary clinicians, laboratory diagnosticians, virologists, entomologists, ecologists, etc, joined around the EVITAR project. This project was funded by the National Health Research Fund (FIS, Fondo de Investigación Sanitaria) and initiated an enduring collaboration of more than 20 years, involving the core groups of the initiative through successive projects, which have been ongoing without interruption until today. The knowledge acquired through this strategy paved the way for official collaborations between veterinary and public health authorities and environmental agencies, which in turn translated into effective disease surveillance and control plans for emerging infectious diseases, some of which are currently ongoing. This case underscores the critical role of the One Health approach in enhancing global health security, providing a model for its implementation through research activities, which may be useful for other nations grappling with similar public health challenges.

Keywords: One Health, Zoonoses, Global health security

Citation. Clavero, M. Á. J. Fernández-Pinero, J., Llorente, F., Aguilera-Sepúlveda, P., and Pérez-Ramírez, E. 2024. The One Health approach is a successful strategy in research on emerging zoonotic diseases: The case of Spain. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.52. https://doi.org/10.51585/gtop.2024.2.0037

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Establishment of avian trachea organoids for studying host-pathogen interactions with avian influenza virus

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Abstract

Understanding the dynamics of host-pathogen interactions is crucial for combating avian influenza virus (AIV) infections. Here, a novel approach to studying virus-epithelial interactions using 3D trachea organoids derived from 90-week-old layers is presented. Tracheal epithelial layers were isolated and embedded in Matrigel supplemented with trachea organoid medium. The growth of trachea organoids was monitored over 6 days. Remarkably, the organoids exhibited progressive growth, with increased orbital size and diameter observed daily. The propagation of cryopreserved trachea organoids over a long period was confirmed. Our results demonstrate the successful establishment of trachea organoids derived from the avian trachea, providing a valuable model for investigating host-pathogen interactions with AIV. This model holds promise for elucidating the molecular mechanisms underlying AIV infection and may facilitate the development of novel therapeutic strategies to combat avian influenza.

Keywords: Avian influenza, Host-pathogen interactions, Trachea organoids

Citation. Farnell, Y. Z., Khan, M., Reeves, G., Liu, Z., Sun, Y., and Farnell, M. 2024. Establishment of avian trachea organoids for studying host-pathogen interactions with avian influenza virus. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.53. https://doi.org/10.51585/gtop.2024.2.0037

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Poultry production sustainability: Heat stress challenges and potential mechanism-based strategies

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Abstract

Poultry meat is highly regarded globally as one of the most affordable, wholesome, and efficient food sources. Although poultry production supports the livelihoods and food security of billions of people worldwide, it is facing substantial challenges from a steep projected increase in global demand for high-quality animal proteins that need to increase by 73% (FAO, 2018) and the need to adapt to planetary boundaries, including climate changes, heat stress, increasing pressure on natural resource (water, energy, land), and the upsurge of zoonoses and metabolic disorder incidences. Understanding the motivational factors driving water and energy homeostasis and their underlying molecular mechanisms under challenged conditions (heat stress, for example), as well as defining the etiology of poultry metabolic disorders, are important to addressing current challenges to poultry production sustainability. Here, I offer a review of the current understanding of heat stress response, water homeostasis, leaky gut syndrome, meat quality, and some potential effective strategies. We hope that this presentation will provide a new fundamental framework for future investigations and facilitate further progress by asking new questions, which may help in developing mechanisms-based strategies to improve both feed/water efficiency, reducing the incidence of metabolic disorders, and enhancing resilience to hot environmental temperatures in commercially important poultry as well as other avian species and livestock.

Keywords: Poultry, Heat stress, Gut integrity, Water homeostasis, Meat quality, Molecular mechanisms

Citation. Dridi, S. 2024. Poultry production sustainability: Heat stress challenges and potential mechanism-based strategies. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.54. https://doi.org/10.51585/gtop.2024.2.0037

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Microbiology, induction, and management practices to mitigate lameness caused by bacterial chondronecrosis with osteomyelitis in broiler chicken

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Abstract

Lameness affecting animals' stance and gait ability due to structural or functional abnormalities of the locomotor system has become a challenging disease across livestock, cattle, and poult. Lameness characterized by femoral head necrosis, joint cysts, arthritis, skeletal muscle weakness, and bone deformation impacts animal viability, growth, reproductivity, and productivity, leading to economic losses and animal welfare issues. Bacterial Chondronecrosis with osteomyelitis (BCO) lameness is the most prevalent skeletal disorder in poultry implicated by the inherent risk of high growth rate of modern broilers. The disproportion of massive body mass accretion vs. maturation of the structural bone induces the broiler's stressful condition and vulnerability to bone microfracture followed by pathogen ambush in the skeletal and thoracic vertebral bones. BCO lameness causes inflammation, necrotic bone, and leg paralysis and leads to eventual death. A study in 20 broiler farms in Australia recorded 28% BCO lesions of the necropsied birds, while a study in commercial flocks in Europe reported 19% moderate-to-severe lameness symptoms. The latest unpublished data of the Tyson Foods industry in the U.S. reported a 6% regular lameness rate in their broiler production. Managing BCO lameness in broiler poultry is more challenging than that of other species because the peak lameness rate emerges at the marketing age, and curative treatment of the affected broilers is arduous due to their larger populations but shorter production cycles. Nevertheless, the involvement of opportunistic bacteria in BCO lameness exhibits the risk of rapid transmission of highly contagious BCO throughout the broiler populations. Currently, culling clinically lame birds is a common practice in broiler farms to prevent a widespread BCO outbreak. This practice decreases the production value and increases the economic forfeits. Therefore, presenting intervention measures for managing and controlling BCO in broiler poultry is necessary. Knowledge of etiological agents, pathogenesis, detection, and experimental lameness models to evaluate the efficacy of the intervention measures is highly important in presenting approaches to mitigate BCO lameness. Thus, this review focuses on microbiology studies of BCO, models of creating experimental BCO lameness, and intervention measures mitigating BCO lameness in broilers.

Keywords: Chondronecrosis, Osteomyelitis, Lameness, Broilers, Mitigation

Citation. Asnayanti, A., and Alrubaye, A 2024. Microbiology, induction, and management practices to mitigate lameness caused by bacterial chondronecrosis with osteomyelitis in broiler chicken. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.55. https://doi.org/10.51585/gtop.2024.2.0037

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Emerging *Salmonella* Infantis

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Abstract

In recent years, the emergence of *Salmonella* Infantis has become a significant concern in poultry production and food safety. This serotype has shown an alarming rise in prevalence, impacting both commercial poultry industries and public health globally. This abstract presents a comprehensive review of the current trends, epidemiology, and challenges associated with *Salmonella* Infantis. We will discuss recent outbreaks and their implications for poultry production, highlighting the phenotypic heterogeneity and increased resistance of this serotype to multiple antibiotics, which complicates control measures and treatment of outbreaks in humans. The presentation will also explore potential environmental and management factors contributing to the rise of *Salmonella* Infantis, including biosecurity lapses, changes in poultry husbandry practices, and the role of international trade. By integrating findings from recent studies and surveillance data, we aim to provide insights into effective control strategies and emphasize the need for a coordinated approach to monitoring and mitigating the impact of this emerging pathogen. The session will conclude with recommendations for future research and policy interventions to address the growing threat posed by *Salmonella* Infantis in poultry and its implications for One Health.

Keywords: *Salmonella* Infantis, Epidemiology, Diagnosis, Surveillance

Citation. Hess, C. 2024. Emerging *Salmonella* Infantis. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.56. https://doi.org/10.51585/gtop.2024.2.0037

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Deep analysis of the immunopathology of *Salmonella* Gallinarum and its implications in the One Health approach

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Abstract

Salmonella Gallinarum, a facultative intracellular avian pathogen, poses a significant threat to the avian health and poultry industry finances by causing avian typhoid fever. This presentation serves as a comprehensive examination of the immunopathology of *Salmonella Gallinarum,* differentiating it from the paratyphoid *Salmonella* serotypes, and with a focus on its broader implications within the One Health framework. The analysis performed for this presentation examines the intricate molecular and cellular machinery underlying *Salmonella Gallinarum* pathogenesis. It compiles available information on the pathogen's strategies for immune evasion and disease persistence, shedding light on its ability to adapt and thrive within host environments. Moreover, the talk explores the interconnection of animal, human, and environmental health, emphasizing the importance of a holistic approach to disease control. It highlights the dynamic interactions between pathogens, hosts, and their surroundings, underscoring the need for collaborative efforts across disciplines to mitigate the spread of infectious diseases. By examining the immunopathology of *Salmonella Gallinarum* from a One Health perspective, this analysis not only expands our understanding of poultry diseases but also informs strategies for disease prevention and control that promote the health and well-being of both animals and humans. We can work towards a safer and more resilient ecosystem through interdisciplinary collaboration and a unified approach.

Keywords: *Salmonella* Gallinarum, Immune response, Immune evasion, Poultry

Citation. Uribe-Diaz, S. 2024. Deep analysis of the immunopathology of *Salmonella* Gallinarum and its implications in the One Health approach. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.57. https://doi.org/10.51585/gtop.2024.2.0037

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Pre- and post-harvest strategies for *Salmonella* control in the poultry production continuum

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Abstract

Salmonella contamination in poultry remains a significant public health concern globally, impacting both the poultry industry and consumers. Effective control measures must span the entire poultry production continuum, from farm to table, to mitigate the risk of contamination and outbreaks. This presentation reviews comprehensive strategies for controlling Salmonella in poultry, addressing both pre-harvest and post-harvest interventions. The goal is to highlight integrated approaches that enhance overall food safety and sustainability within the poultry industry. A systematic review of current pre-harvest and post-harvest strategies was conducted, including data from recent studies, industry practices, and regulatory frameworks. Emphasis was placed on the efficacy of biosecurity measures, vaccination, feed management, and environmental controls in pre-harvest settings, as well as processing plant interventions such as carcass decontamination, sanitation, and quality control measures. Pre-harvest strategies that have shown promise include enhanced biosecurity protocols, selective breeding for Salmonella-resistant strains, and advanced feed formulations. Post-harvest interventions, such as chemical decontamination, improved sanitation practices, and pathogen reduction technologies, are also critical in reducing Salmonella prevalence. Case studies and industry examples will be presented to illustrate the effectiveness of these strategies in real-world settings. An integrated approach that combines both pre-harvest and post-harvest measures is essential for a comprehensive Salmonella control program. Challenges and gaps in current practices will be discussed, along with recommendations for future research and policy development. Implementing a continuum of control strategies for Salmonella in poultry production is vital for ensuring food safety and protecting public health. Collaborative efforts between researchers, industry stakeholders, and policymakers are necessary to address emerging issues and enhance overall effectiveness.

Keywords: Salmonella, Poultry production, Pre-harvest strategies, Post-harvest interventions, Food Safety, Biosecurity

Citation. Obe, T. 2024. Pre- and post-harvest strategies for Salmonella control in the poultry production continuum. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.58. https://doi.org/10.51585/gtop.2024.2.0037

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Fortifying the One Health imperative: A holistic exploration of antibiotic resistance

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Abstract

The escalating threat of antibiotic resistance poses a formidable challenge to global health, demanding an integrated and comprehensive approach to mitigate its impact. Antibiotic resistance, driven by the overuse and misuse of antibiotics in human medicine, veterinary practices, and agriculture, has led to the emergence of multidrug-resistant pathogens that compromise the effectiveness of standard treatments. This phenomenon not only threatens individual patient outcomes but also undermines public health systems worldwide. The "One Health" concept provides a crucial framework for addressing antibiotic resistance, recognizing the intrinsic linkages between human, animal, and environmental health. By adopting a holistic perspective, this exploration delves into the complex interactions and pathways through which antibiotic resistance propagates across these interconnected domains. The agricultural sector's role, particularly the use of antibiotics in livestock for growth promotion and disease prevention, contributes significantly to the spread of resistance genes. Similarly, the environmental dimension, encompassing water, soil, and waste management, acts as a reservoir and conduit for resistant bacteria and genetic elements. This presentation will delve into various aspects of the One Health approach, emphasizing the need for interdisciplinary collaboration and coordinated efforts among healthcare professionals, veterinarians, environmental scientists, and policymakers. It will discuss the current state of antibiotic resistance, highlighting key factors driving its spread and persistence. Moreover, it will explore innovative strategies to curb resistance, including the development of new antimicrobial agents, alternative therapeutic options such as phage therapy and probiotics, and the implementation of robust antibiotic stewardship programs.

Keywords: One-Health, Antimicrobial resistance, New antimicrobial agents, Phage therapy, Probiotics

Citation. Silva, V., Igrejas, G., Capelo, J. L., and Poeta, P. 2024. Fortifying the One Health imperative: A holistic exploration of antibiotic resistance. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.59. https://doi.org/10.51585/gtop.2024.2.0037

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Phage therapy against superbugs. Promising strategies and insights

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Abstract

The global rise of multidrug-resistant (MDR) bacteria poses a critical threat to public health, necessitating innovative strategies beyond conventional antibiotics. This paper explores the potential of phage therapy as a viable alternative in combating MDR bacterial infections, particularly within the context of avian influenza and One Health. Phage therapy employs bacteriophages—viruses that specifically target and lyse bacteria—as a precision tool against pathogenic bacterial strains, reducing the risk of collateral damage to beneficial microbiota and minimizing the likelihood of resistance development. By leveraging the unique properties of bacteriophages, including their specificity, adaptability, and ability to disrupt biofilms, phage therapy offers a promising complement or substitute to traditional antibiotic treatments. This abstract presents an overview of recent advancements in phage therapy research, case studies of successful applications in veterinary medicine, and discusses the regulatory, safety, and implementation challenges. Emphasizing the interconnected health of humans, animals, and ecosystems, the integration of phage therapy within a One Health framework highlights its potential in managing bacterial co-infections in avian influenza outbreaks and curbing the spread of MDR bacteria. Through interdisciplinary collaboration and innovative therapeutic approaches, phage therapy can significantly enhance our arsenal in the fight against MDR bacteria, ultimately safeguarding both animal and public health.

Keywords: Multidrug-resistant, One Health, Bacteriophages

Citation. Sevilla-Navarro, S. 2024. Phage therapy against superbugs. Promising strategies and insights. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.60. https://doi.org/10.51585/gtop.2024.2.0037

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Comprehensiveness in the action of essential oil as a determining factor in One Health

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Abstract

For the last 60 years, the poultry industry has relied on the use of antibiotic growth promoters to improve production parameters and maintain the health of poultry flocks. However, in recent years, concern about this practice has been growing due to the possibility of inducing microbial resistance, and consumers are increasingly demanding higher-quality animal products. Modern poultry farming challenges producers to be profitable while aligning with breeding practices consistent with the "One Health" program vision, which takes into account environmental impact and the health of animal protein consumers. The objectives are to compile productive, health, and environmental results from experimental trials and implementation experiences in commercial broiler chicken and commercial egg-laying hen farms of antibiotic growth promoter withdrawal programs, with replacement by natural alternatives based on biotechnological developments in Colombia between 2019 and 2024. At the in-vitro level, the essential oil of Lippia organoids, as the basis of natural strategies for replacing AGPs, shows bactericidal capacity against microorganisms of importance for the intestinal health of birds, such as *E. coli* and Salmonella spp. This has been accompanied by improvements in intestinal microbial balance in in-vitro digestion simulation tests and evaluations of in-vivo intestinal microbiota modulation with an increase in bacteria associated with improvements in health and productivity. At the productive level, the use of these compounds has shown results comparable to the use of antimicrobials as growth promoters, both in research tests and in commercial farms, where positive results have been recorded in commercial breeding for five consecutive years (2019-2024) without the use of AGPs. This, in turn, has allowed a reduction in antimicrobial excretion of around 150 mg per kg of chicken produced. These results have led to the conclusion that the use of natural strategies allows for commercial breeding programs without the use of AGPs that are economically profitable over time and have a positive environmental impact, contributing comprehensively to the ONE HEALTH program.

Keywords: Intestine, Phytobiotics, Poultry, Public health

Citation. Serrano, Á. U., Morales, B. C. M., and Ángel-Isaza, J. A. 2024. Comprehensiveness in the action of essential oil as a determining factor in One Health. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.61. https://doi.org/10.51585/gtop.2024.2.0037

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Bee pollination and its economic value for food production

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Abstract

Bees, as an insect play a crucial role in crop pollination alongside other animal pollinators. Bees contribute to the global food supply by pollinating a wide range of crops, including fruits, vegetables, oilseeds, legumes, etc. Bee pollination improves the quality and quantity of fruits, nuts, and oils. Currently, 5–8% of all global crop production would be lost without the pollination services provided by bees, necessitating changes in the human diet and the expansion of agricultural lands to resolve shortfalls in crop production. One-third of a person's diet comes from insect-pollinated plants, and honeybees are responsible for the pollination of over 80% of flowering plants. Without honeybee pollination, crop yields will decrease by >90%]. Bee colonies are faced with many challenges that influence their growth, reproduction, and sustainability will be discussed.

Keywords: Bee pollination, Crop production, Bee visitation Challenges, Economic value

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The mystery cow disease, by the "Crazy Bird Lady"

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Abstract

Early February 2024, a mystery cow disease was ripping through the panhandle of Texas. The veterinarians fighting the disease on the front lines described cows with an abrupt cessation of rumination, drops in feed consumption, high temperatures, labored respiration, dry manure, and a high incidence of mastitis (amongst other sequelae). Cultures of abnormal milk were inconsistent, and testing for the usual suspects, such as Coronavirus, Bovine Respiratory Syncytial Virus, *Salmonella* spp., *Pasteurella* spp, *Mannheimia* spp, etc. came up largely negative. This is the story of how a group of a few late 30-early 40-year-old, 90's rap-listening cow vets (and one crazy cow-bird veterinarian) cracked the mystery behind the "mystery cow disease", quickly mobilized and generated some of the initial data to help define the first ever documented H5N1 outbreak in cattle in the world. This outbreak is proving to be one of the most important and most heavily politicized zoonotic animal disease outbreaks in our lifetimes. This is why it is important to half-listen in veterinary school, to rely on your veterinary (and PhD friends), always to question the status quo, and not to let politics get in the way of science. We laughed, we cried, we got fired for our involvement, we all went a bit manic, but we stuck together. The answer to the "mystery cow disease" enigma was in the birds.

Keywords: H5N1, Influenza, Bird flu, HPAI

Citation. Russo, K., Petersen, B., and Schneider, N. 2024. The mystery cow disease, by the "Crazy Bird Lady". Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.63. https://doi.org/10.51585/gtop.2024.2.0037

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One Health strategies to optimize poultry intestinal integrity and preharvest food safety

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Abstract

The integration of One Health strategies that support poultry health, intestinal integrity, and reduce pathogens have a collective impact on minimizing zoonotic diseases and enhancing preharvest food safety. This holistic framework advocates for collaboration across disciplines to achieve sustainable and effective solutions in poultry management and preharvest food safety. Veterinarians, nutritionists, food safety managers, and operations leaders all play important roles in reducing pathogens prior to processing. By utilizing a 360-degree multi-hurdle combination of intervention strategies such as vaccines, pre/pro-biotics, and pest elimination, bird health and pathogen reduction can be optimized to achieve a safer poultry food supply. Periodic preharvest monitoring and testing is necessary to detect and reduce pathogens and zoonotic risks that could impact food safety and human health.

Keywords: One Health, Pathogen, Risks, Collaboration

Citation. Potter, B. 2024. One Health strategies to optimize poultry intestinal integrity and preharvest food safety. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.64. https://doi.org/10.51585/gtop.2024.2.0037

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Reasons to be omnivorous. For your health and the planet's

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Abstract

In a world increasingly concerned with dietary choices and their environmental impact, the debate over omnivorous versus vegetarian or vegan diets has gained significant attention. Livestock and the concept of One health cannot be fully understood without each other. Contrary to the narrative that dominates the media, livestock plays a key role in many ecological processes: Livestock upcycle vast amounts of pastures and vegetable by-products from many industries, making a great contribution to feeding the world. The products that we obtain from farm animals are key to our health, as stated by many medical associations and studies. We will delve into the nutritional advantages that a balanced omnivorous diet can offer, addressing key nutrients that are more readily available from animal sources. This presentation explores the multifaceted reasons why being omnivorous can be beneficial, both for individual health and the health of the planet. Through a nuanced exploration of scientific research and practical examples, this presentation aims to provide a comprehensive understanding of why a thoughtfully managed omnivorous diet can be a sensible choice for promoting personal health and supporting environmental conservation efforts on a global scale.

Keywords: Livestock, Upcyclers, One Health

Citation. Beitia, J. P. 2024. Reasons to be omnivorous. For your health and the planet's. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.65. https://doi.org/10.51585/gtop.2024.2.0037

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Overview of inclusion body hepatitis in broilers

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Abstract

Since Inclusion Body Hepatitis (IBH) was first detected in two broiler chicken flocks in the USA in 1963, outbreaks of the disease have been reported. Historically, IBH was known to occur as a secondary pathogen, particularly in the presence of immunosuppressive agents, but this is no longer the case. During the late 1980s and recently, IBH and Hydropericardium Syndrome (HHS) have been widely distributed in broiler flocks in several countries and regions, such as Mexico, North America, Latin America, the Middle East, and Asia, where the significant mortality and growth retardation associated with the disease result in economic losses. IBH/HHS outbreaks in broilers caused by various FAdV serotypes have been reported globally in recent years, with serotypes 2, 8a, 8b, 11, and 4 being the most frequently involved. These viruses can be transmitted vertically, horizontally, or by contaminated vectors. Mortality peaks during IBH outbreaks, when vertically transmitted to susceptible chicks, occur at 3–5 days of age and can reach up to 10%, and on occasions more than that, especially when concomitant infections are present, and the second curve of mortality traditionally occurs at 3 – 5 weeks of age and in some cases can reach 10% to 30%, depending on the flock susceptibility and concurring factors, such as IBD, CIA, etc. On rare occasions, IBH has also been reported in layers and broiler breeders. Recently, in Mexico, we performed a retrospective genetic analysis of IBH outbreaks in broiler flocks during the period 2016-2024 and found that FAdV serotype 8b counted approximately for 86% of the cases, serotype 11 for 9%, serotype 4 for 3% and serotype 8a for 2%. Vaccination strategies have been put in place with variable results. When heavy breeders are properly vaccinated during the rearing period, mainly with inactivated vaccines, the vertical transmission to the progeny is limited, depending on the FAdV serotype(s) that is infecting the flocks, the viral strains included in the vaccines, vaccines´ formulation and vaccination programs. When vaccine strains match the wild viruses, the vaccination program is correct and the vaccine administration is properly performed, it has resulted in a very effective preventive measure.

Keywords: IBH, HHS, FAdV, Serotype, Vaccination

Citation. Sarfati, D.,Vigueras, R., Comonfort, S., Camacho E., Cortés, R., Contreras, M., and Lozano, B. 2024. Overview on inclusion body hepatitis in broilers. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.66. https://doi.org/10.51585/gtop.2024.2.0037

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Genomic surveillance of emerging pathogens: Trapping and tracking of avian viruses in Spain

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Abstract

West Nile Virus (WNV, *Orthoflavivirus* genus) is a zoonotic arbovirus worldwide spread. Under natural conditions, WNV circulates in an enzootic cycle between mosquitoes and birds, while mammals (particularly humans and horses) are considered incidental, dead-end hosts. In Spain, WNV was isolated from dead golden eagles for the first time in 2007, although there was evidence of circulation in Southern Spain years before. That first isolate was phylogenetically classified within lineage 1a, related to other Mediterranean isolates. Since 2010, outbreaks of WNV in horses have occurred annually, with the first cases coinciding with a striking increase in mortality among game birds in the same geographical area. Surprisingly, Bagaza virus (BAGV, *Orthoflavivirus* genus) was identified as responsible for this mortality event, a novel emerging pathogen never described before in Europe or a vertebrate species. Both BAGV and WNV are transmitted by the same mosquito species and can produce similar encephalitis disease in infected birds. A comprehensive genomic surveillance strategy was established, in collaboration with the Spanish reference laboratory, for tracking emerging viruses' appearance, spread, and evolution. Molecular analyses indicate that at least six and three incursions of WNV lineage 1a and BAGV, respectively, have occurred in Spain, all of them in the southernmost region of the Iberian Peninsula and specifically in one single province (Cádiz). BAGV seems to produce sporadic, time-limited outbreaks when it reaches Southern Spain. Conversely, some invasive WNV strains succeed in getting established and spread, while others become extinct from the territory shortly afterward. All gathered evidence confirms that Cádiz province constitutes a hotspot for the emergence of exotic pathogens of African origin. Remarkably, a European network for active genomic surveillance of avian influenza virus (AIV) in wild birds has been recently granted by EFSA. Cádiz province is the target area for monitoring in Spain. This network will work jointly for the next three years, tracking the AIV strains circulating in seven identified hotspots across Europe. Knowledge emanated from this project will be added to the national surveillance plan, which monitors AIV circulation in the whole country. Besides, the recent finding of a novel avian orthobornavirus (Barn owl bornavirus 1, BoBV-1) as responsible for the death of a barn owl or a poxvirus in an injured red kite illustrates the power of metagenomics in emerging pathogens discovery and diagnostic resolution. In this regard, the refinement and harmonization of wet-lab and dry-lab methodologies will expand the accessibility of this approach to virology laboratories dedicated to genomic surveillance.

Keywords: Genomic surveillance, Emerging pathogens, West Nile virus, Bagaza virus, Virus discovery

Citation. Fernández-Pinero, J., Aguilera-Sepúlveda, P., Aldea, I., Villalba, A., Villalba, R., Agüero, M., Llorente, F., and Jiménez-Clavero, M. Á. 2024. Genomic surveillance of emerging pathogens: Trapping and tracking of avian viruses in Spain. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.67. https://doi.org/10.51585/gtop.2024.2.0037

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New research in mass mortality compost and depopulation

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Abstract

The management of avian influenza outbreaks in poultry often necessitates the rapid and effective disposal of infected flocks to mitigate disease spread and environmental contamination. This presentation reviews recent advancements in mass mortality composting and depopulation techniques, focusing on their efficacy, environmental impact, and integration into biosecurity strategies. Emerging research highlights innovations in composting methods that enhance pathogen inactivation, reduce greenhouse gas emissions, and accelerate decomposition. Advances in depopulation techniques, including humane methods and improved logistics, are also discussed. The integration of these practices into comprehensive disease management plans is essential for improving response times and minimizing ecological and economic consequences. This session aims to provide insights into the latest developments and their practical applications, offering valuable knowledge for enhancing avian influenza control and biosecurity measures globally.

Keywords: Avian influenza, Biosecurity, Control

Citation. Williams, Z. 2024. New research in mass mortality compost and depopulation. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp.68. https://doi.org/10.51585/gtop.2024.2.0037

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Impact of *Bacillus* on gut integrity and poultry production

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Abstract

The health and productivity of poultry are intrinsically linked to the integrity of their gastrointestinal tract. Bacillus species, known for their probiotic properties, play a significant role in enhancing gut health and overall poultry performance. This study investigates the impact of Bacillus supplementation on gut integrity and poultry production parameters. We conducted a series of trials using commercial broilers, administering Bacillus subtilis and *Bacillus licheniformis* in their feed. Parameters evaluated included growth performance (body weight, feed conversion ratio), gut morphology (villus height, crypt depth), and gut microbiota composition. Additionally, we assessed the expression of tight junction proteins and inflammatory cytokines to understand the mechanisms behind Bacillus-induced improvements in gut integrity. Our findings indicate that Bacillus supplementation significantly improves growth performance, as evidenced by increased body weight and improved feed conversion ratios. Histological examination revealed enhanced gut morphology, with increased villus height and reduced crypt depth, suggesting better nutrient absorption and gut health. Furthermore, Bacillus-treated birds exhibited a more balanced gut microbiota, with higher populations of beneficial bacteria such as Lactobacillus and Bifidobacterium. Molecular analysis showed upregulated expression of tight junction proteins and downregulated inflammatory cytokines, indicating a fortified gut barrier and reduced gut inflammation. In the field, uniformity in poultry production can sometimes be difficult to achieve. However, a good start in maintaining gut integrity can lead to a good finish, ensuring consistent growth and performance across the flock. The results underscore the potential of Bacillus probiotics as a sustainable strategy to enhance poultry production and health. By improving gut integrity, Bacillus not only promotes better nutrient absorption and growth but also enhances resistance to gut pathogens, contributing to the overall well-being of poultry flocks. These findings are particularly relevant in the context of emerging avian health issues and the ongoing efforts to reduce antibiotic usage in poultry production. The integration of Bacillus probiotics into poultry diets represents a promising approach to meet these challenges, aligning with the principles of One Health by promoting animal health, food safety, and environmental sustainability.

Keywords: Bacillus species, Poultry production, Gut health, One Health

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Applications of bee products as functional food

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Abstract

Food manufacturers are also responding to the health trend of "you are what you eat", especially in the areas of functional and health-beneficial products for both prevention and treatment. The honeybee (*Apis mellifera* L.) produces several beneficial entities, including honey, propolis, royal jelly (RJ), bee venom, bee pollen, beehive air, and beebread. These products have been used in traditional medicine for thousands of years, and there is increasing interest in their application in modern medicine. Bee pollen is in line with this trend and has great potential to contribute to research and development. The involvement of bee pollen in various formulations, i.e., pills, tablets, capsules, and powders, helped to cover many customers' needs. Bee pollen has served to prevent and treat many chronic diseases, especially metabolic disorders. It has a preventive role in various ailments such as diabetes, obesity, hyper-dyslipidemia, and heart complications. In addition to the nutritional value of bee pollen, it also has a physicochemical composition (water, protein, and lipid content) and techno-functional properties (protein solubility, carbohydrate solubility, and emulsifying ability) that facilitate its food application. Finally, the discussion will handle the utilization of RJ, which is considered a curative product with high biological and nutritional effects. It alleviates menopausal symptoms by readjusting. The hormonal concentration promotes the reproductive performance in polycystic ovarian syndrome in rats, ameliorating pregnancy rates, counteracting infertility, and reducing oxidative stress. The synergistic interaction of RJ with commonly used cancer chemotherapy was discussed, either through its inhibitory effect against the adverse effects of the drugs or through its enhancement of the anticancer potential of the drug. These unique properties of RJ, besides its minimal toxicity, make it the best choice to be combined with anticancer drugs. The significant protection properties of RJ against different types of cancer, which was attributed to its active compounds.

Keywords: Bee products, *Apis mellifera* L, Functional food

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Regionalization, zoning, and compartmentalization from a trade perspective

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Abstract

Key Concepts:

(1) If/ when there is an outbreak of a disease, regionalization, and zoning, along with compartmentalization, are used to define free from affected areas to support animal/ animal product movement. They are also used to mitigate the spread of disease from affected to free areas via those movements. (2) Regionalization establishes the "status quo" of a country from an animal disease perspective (i.e., free versus affected). If/ when there is an outbreak of a disease, zoning will be used to define free-from affected areas of the region, as well as to ensure that disease does not spread from a free to affected area via animal movement by implementing control measures (e.g., biosecurity, testing/ surveillance, movement restrictions). Regionalization/ zoning, therefore, supports trade by allowing shipments to proceed from "free areas." (3) Compartmentalization relies on management and biosecurity measures specific for disease(s) that create a functional separation of subpopulations. Compartmentalization, therefore, supports trade by allowing shipments to proceed from a compartment, even when in an affected area/ zone. (4) The trade concept of compartmentalization is distinct from zoning, but the two complement each other. As trade negotiators, the goal is to supplement regionalization evaluations/ zoning agreements with acceptance of compartments. (5) The United States has established policies in alignment with World Organisation for Animal Health recommendations for the regionalization evaluations for disease status or commodity-based trade and recognition of zones and compartments; approval of a foreign compartment is based on the evaluation of 8 established factors required for a Competent Authority to administer a compartmentalization program, review of the technical criteria an individual company's compartment, and a site visit by APHIS.

Success of the U.S. Primary Breeder Highly Pathogenic Avian Influenza (HPAI) Compartment:

(1) In 2016, the U.S. implemented the U.S. HPAI Compartmentalization Program for primary breeders under our National Poultry Improvement Program (NPIP); the first compartment was established in 2017. (2) To date, U.S. compartmentalization participants have maintained freedom of Avian Influenza, proving the program is an effective strategy/ model to protect compartments from HPAI domestically and to maintain trade markets internationally.

Keywords: Regionalization, Zoning, Compartmentalization, Trade, Highly pathogenic avian influenza (HPAI)

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The use of backyard flocks as an avian influenza and Newcastle disease early warning system

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Abstract

Poultry production is characterized by a wide diversity of farming systems, with different scales of production, bird species, measures of biosecurity, and production inputs and outputs. Both intensive commercial poultry farms and backyard flocks coexist with very different characteristics. However, both farming systems use animals that are susceptible to the same diseases. This might represent a high risk for the transmission of infectious agents between them. Furthermore, the importance of biosecurity measures for large-scale poultry production is well understood. Such measures are highly significant for backyard flocks also, and they should not be underestimated since these flocks may be a source of infection for commercial farms. Highly pathogenic avian influenza (HPAI) and Newcastle disease (ND) are the most important threats to intensive poultry farming, as well as a significant risk to public health. A dynamic cycle of infection occurs within aquatic and wild avian species, many of which are migratory, as well as between these birds and commercial poultry and other animals. Contact with infected wild and aquatic birds is their gateway to countries and backyard poultry flocks with a direct risk of transmission to commercial farms. The risk of ND and especially HPAI outbreaks is continuous and uninterrupted, making the surveillance of backyard poultry flocks an essential tool for the early and timely diagnosis of diseases. The EPIRORNIS is a research project program for the early diagnosis of HPAI and ND and can significantly contribute to their prevention. In particular, the program includes the sampling of sentinel birds in high-risk areas (near reservoirs, breeding hens, and egg-producing hens) as well as in areas where vital production units of the project cooperating companies/partners are located. Sentinel birds come from the existing backyard poultry flocks located in specific areas after recording them and banding (or ringing) the birds. A clinical examination of the birds is carried out daily, while in case of mortality, a necropsy is carried out. Sampling is performed monthly, while its frequency is doubled during the high-risk period (October-April). Sampling includes both serological and rapid molecular tests to detect antibodies and viruses, respectively. Similar tests are also carried out in flocks of intensive and organic rearing of meat-producing and egg-producing hens. The use of EPIRORNIS, a prototype network of backyard flocks for the early detection of HPAI and ND viruses, will significantly contribute to the early diagnosis of the above diseases and will give the necessary time to the veterinary service and the poultry farms of the continent region to take the necessary measures to contain and preventing their spread in systematic poultry farms, as well as in humans. Especially in the case of HPAI, the systematic observance of biosecurity measures is crucial, given the speed of transmission of the virus, the peculiarities of its epidemiology, and the magnitude of the economic impact caused by its possible uncontrolled spread.

Keywords: Backyard poultry flocks, Avian influenza, Newcastle disease, Early warning system

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Histomonosis: An old disease requiring new candidate strategies

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Abstract

Histomonosis, also known as blackhead disease, is a parasitic disease caused by the protozoan *Histomonas meleagridis*. This disease primarily affects turkeys, leading to 70-100% mortality. Nevertheless, it also causes problems for broiler breeders, layers, and game birds. Despite being a long-recognized condition, histomonosis is a significant challenge to poultry health worldwide. Traditional control measures, including prophylactic and therapeutic drugs, are not available for the poultry industry due to food safety concerns. Therefore, the absence of available treatments requires immediate attention from academic, industrial, and governmental research institutions. This abstract aims to highlight the urgent need for innovative strategies to manage and control histomonosis in commercial turkey/poultry production. Increasing our understanding of disease development and progression, exploring alternative prophylactics/therapeutics strategies, and considering diagnostic and management practices as an integrated approach is crucial to help mitigate the negative impact of this enduring disease. A combined effort has been made between academic, industry, and governmental institutions to reduce the detrimental effect of histomonosis in the poultry industry. Multiple approaches, considering *in vitro* and *in vivo* methodologies to study the life cycle of the protozoa (cell stage), the transmission of the disease, as well as immune, nutritional, and microbiological aspects that could influence disease progression, have been taken into consideration to develop intervention strategies. The development of *in vitro* models and direct and horizontal transmission *in vivo* models have provided an opportunity for the evaluation of alternative strategies to control this disease. It has been frequently observed that *in vitro* results do not reflect the same outcome *in vivo*. Therefore, it is important to consider factors such as diet, stress, immune status, candidate compound bioavailability, and microbiota composition in the presentation of the disease. Advancements in disease progression and the histomonas life cycle have been presented or published by different researchers recently. Histomonosis remains a persistent threat to poultry health, necessitating a multifaceted approach for control and/or prevention by integrating information about the pathogen life cycle, transmission, pathogenicity, and diagnostics. Management practices and innovative alternative interventions can become effective strategies to combat this disease. Continued research and collaboration within the poultry industry and scientific community are essential to addressing this challenge and ensuring the sustainability of poultry production.

Keywords: Histomonosis, Blackhead disease, *Histomonas meleagridis*, Turkeys, Poultry health, Transmission, Alternative treatments

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Industry veterinarian's perspective on managing a case of HPAI

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Abstract

High Pathogenic Avian Influenza (HPAI) presents significant challenges to poultry industries worldwide, demanding effective management strategies to mitigate its impact. This presentation explores the practical experiences and insights of an industry veterinarian in managing an HPAI outbreak within a commercial poultry operation. Key aspects covered include the implementation of biosecurity measures, rapid diagnostic approaches, and response strategies tailored to industry needs. Emphasis is placed on the integration of veterinary expertise with operational protocols to enhance outbreak containment and minimize economic losses. The presentation also highlights lessons learned from case studies, including the importance of proactive surveillance and the role of industry collaboration in managing avian influenza effectively. By sharing practical experiences, this session aims to provide valuable perspectives and strategies for addressing HPAI challenges within the poultry industry.

Keywords: Industry, Influenza, HPAI, Poultry

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Highly pathogenic avian influenza: Policy solutions for a complex problem

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Abstract

Highly Pathogenic Avian Influenza (HPAI) poses a significant threat to both animal and human health, with implications for global food security and economic stability. The virus's ability to spread rapidly across borders, mutate, and infect various species makes it a complex problem requiring multifaceted policy solutions. This abstract discusses the necessity of a comprehensive, interdisciplinary approach to address the challenges posed by HPAI, emphasizing the integration of One Health principles. One Health, which recognizes the interconnectedness of human, animal, and environmental health, provides a robust framework for tackling HPAI. Policy solutions must incorporate surveillance, early detection, and rapid response mechanisms facilitated by international cooperation and data sharing. Strengthening biosecurity measures in susceptible farmed species, markets, and wildlife habitats is crucial to prevent the introduction and spread of the virus. Moreover, vaccination strategies should be refined to include broadened routes of application, target specific strains, rapid and safe manufacturing process, deployment across international borders, and natural reservoirs of the virus in prevention strategies while addressing potential impacts on the international trade of live animals and their products. The role of public awareness and community engagement cannot be understated. Educating stakeholders, including farmers, traders, consumers and the public in general, about the risks and preventive measures associated with HPAI is vital for the successful implementation of policies. Governments should also consider economic support mechanisms for affected industries, ensuring that the burden of HPAI does not disproportionately impact vulnerable populations. Furthermore, research and innovation must be prioritized to develop new diagnostics, treatments, and vaccines. International collaboration in research efforts can lead to a better understanding of the virus's evolution and transmission dynamics, aiding in the formulation of more effective policies. The emergence of HPAI as a global health threat underscores the need for a proactive, coordinated response that transcends national boundaries. The complexity of HPAI requires policy solutions that are not only scientifically sound but also socially and economically viable. By embracing a One Health approach, the global community can better mitigate the risks associated with HPAI and protect both animal and human populations from its potentially devastating impacts.

Keywords: HPAI, Food security, Global health

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Antimicrobial resistance in the food chain: Opportunities for medical, veterinary, and agrifood collaboration

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Abstract

Antimicrobial resistance (AMR) represents a critical challenge to global health, agriculture, and food security. AMR in the food chain is primarily driven by intensive animal production systems where antimicrobials are routinely used for disease control and productivity. Unsustainable agricultural intensification is a main driver of emerging zoonotic diseases, including antimicrobial-resistant and pandemic pathogens. Intensive animal production has been driven by a steadily increased demand for animal protein over the last two decades. Total food animal production and global meat imports are projected to continue an upward trajectory through 2031. Global poultry production increased from 94 million tons in 2009 to 131 million tons in 2019, with a 3% to 5% annual growth rate expected over the next decade. This rise in demand and production will drive increased antibiotic usage. Global antimicrobial usage (AMU) for food production is projected to increase 8% from 99,502 tons in 2020 to 107,472 tons in 2030, with China, Brazil, India, the USA, and Australia as top consumers, likely exacerbating the current AMR crisis. A case study from an integrated food chain surveillance system in Mexico illustrates how findings at the hospital level can inform decision-making in food-production systems and offer insights into areas for research and development. Starting in 2002, over 50 pediatric cases of severe diarrhea and sepsis were presented to the Hospital General O'Horan in Merida, Mexico. The culprit was a previously unknown strain of multidrug-resistant *Salmonella* Typhimurium harboring the cmy-2 gene emerging from swine. Its prevalence had rapidly increased from 0% in 2001 to more than 90% by 2003, illustrating how quickly a virulent and multidrug pathogen can spread once introduced into the food chain. The major factor contributing to its emergence is believed to be inappropriate antibiotic use, including ceftiofur in swine production. Assessing the impact of mitigation strategies such as reducing AMU, developing vaccines and rapid diagnostics for emerging pathogens, and modifying production systems requires dialogue and collaboration among stakeholders. A One Health approach, utilizing fresh perspectives, is crucial for addressing the escalating risk of AMR and pandemics.

Keywords: AMR, *Salmonella* Typhimurium, food chain, Mexico

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Integration of One Health into community development programs

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Abstract

The One Health approach recognizes the interconnectedness of human, animal, and environmental health, advocating for a holistic strategy to address complex health challenges. This presentation explores the integration of One Health principles into community development programs, with a focus on enhancing resilience and reducing disease risks in vulnerable populations. By embedding One Health strategies into local development initiatives, communities can achieve better health outcomes through coordinated efforts that address zoonotic diseases, improve environmental conditions, and foster sustainable practices. The integration process involves creating cross-sectoral partnerships, developing multi-disciplinary training programs, and implementing community-based surveillance systems. Case studies from various regions illustrate the effectiveness of these integrated programs in mitigating the impact of avian influenza and other emerging diseases. This presentation will highlight key successes, challenges encountered, and best practices for scaling up One Health initiatives within the community development frameworks of Heifer International. By showcasing these examples, we aim to provide actionable insights for policymakers, practitioners, and stakeholders committed to advancing One Health and enhancing community health globally.

Keywords: One Health, Global Health

Citation. Bhandari, D. 2024. Integration of One Health into community development programs. Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp. 77. https://doi.org/10.51585/gtop.2024.2.0037

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The epidemiology of AIV in wild waterfowl. Does immunity play a role in the spread of AIV amongst wild bird populations?

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Abstract

Avian influenza virus (AIV) poses a significant threat to both wildlife and domestic poultry, with wild waterfowl serving as the primary reservoirs. This presentation will summarize the detections of Highly Pathogenic Avian Influenza and trends in wild birds and wild mammals in the United States. Additionally, we will explore the epidemiology of AIV in wild waterfowl, what is understood about immunity to the virus, and the use of phylogenetics to help understand the changing course of the global outbreak. Recent trends in mammalian detections and spillover events are analyzed. This analysis is intended to inform future research directions and need for ongoing surveillance, and enhance our approach to mitigating the impact of AIV on both wildlife, poultry and human health.

Keywords: One Health, HPAI, Surveillance

Citation. Lenoch, J. 2024. The epidemiology of AIV in wild waterfowl. Does immunity play a role in the spread of AIV amongst wild bird populations?". Second International Avian Influenza and One Health Emerging Issues Summit 30th Sep – 3rd Oct 2024, The University of Arkansas, Fayetteville, Arkansas, USA. GMPC TOP. 4 (2). pp. 78. https://doi.org/10.51585/gtop.2024.2.0037

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One Health in Aquaculture by Biofloc technology to support Sustainable Development Goals

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Abstract

The intersection of human, animal, and environmental health epitomized by the One Health approach is critical in addressing contemporary global challenges. The escalating global demand for fish and seafood products necessitates innovative approaches in aquaculture to meet future production targets sustainably. Biofloc technology (BFT) emerges as a promising approach addressing this need by optimizing resource utilization while minimizing environmental hazards. The application of BFT in fish and shrimp farming offers multifaceted benefits, notably augmenting farm output through improved growth, survival, overall health of aquatic species and support the United Nations Sustainable Development Goals (SDGs). This abstract explores how Biofloc technology contributes to One Health principles by promoting efficient resource utilization, reducing environmental impact, and improving fish health and productivity. Biofloc technology, a sustainable aquaculture practice, leverages microbial communities to convert waste into consumable biomass, thereby improving water quality and reducing the need for external feed inputs. This closed-loop system not only enhances the efficiency and sustainability of aquaculture operations but also mitigates environmental pollution, a significant concern in traditional aquaculture practices. By optimizing the nitrogen cycle and reducing the release of harmful substances into water bodies, Biofloc technology aligns with SDG 14 (Life Below Water) by promoting the sustainable use of marine resources and SDG 6 (Clean Water and Sanitation) by improving water quality. Furthermore, the improved water quality and reduced reliance on antibiotics and chemical treatments enhance fish health and productivity, aligning with SDG 3 (Good Health and Well-being). The reduced environmental footprint and improved resource efficiency contribute to SDG 12 (Responsible Consumption and Production), while the potential for increased yields and economic benefits supports SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth). This presentation will delve into the scientific principles underpinning Biofloc technology, its implementation in aquaculture, and its multifaceted benefits through the lens of the One Health approach. By highlighting case studies and empirical data, we will demonstrate how Biofloc technology not only advances aquaculture sustainability but also contributes to the broader SDGs, ultimately fostering a more resilient and health-centric global food system.

Keywords: Biofloc, SDG, One-Health

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African swine fever: What you need to know

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Abstract

African swine fever (ASF) is a very complex, devastating hemorrhagic disease of swine (both wild and domestic) with a major negative impact on affected countries. Montgomery first described the disease in Kenya in 1921. The pathogen is a large complex dsDNA virus with 24 genotypes described to date in sub-Saharan Africa, where the disease is endemic. Virulent viruses cause acute forms of the disease with nearly 100% mortality, while moderately virulent and attenuated viruses, with lower mortality, emerge in endemic areas, and circulate with the virulent strains. Today, important gaps remain in the understanding of the virus, the epidemiology of ASF, and the immune mechanisms involved in protection against infection. Laboratory tests are essential for epidemiological investigations and for a correct diagnosis. Historically, the ASF virus has escaped from the African continent on three occasions. The first and second incursions, in 1957 and 1960 (genotype I) were into Portugal, spreading into Europe and the Americas, affecting up to 9 countries (France, Italy, Malta, Belgium, the Netherlands, Cuba, Brazil, the Dominican Republic, and Haiti). Eradication was successful in all countries except the Italian island of Sardinia. In 2007, the genotype II virus arrived on the European continent, affecting the whole of the Caucasus, Russia, Ukraine, Belarus and, finally, in 2014, several EU countries and the Balkans. In 2018, its presence was confirmed in China, beginning the largest expansion in its history. Today, the ASF is present in up to 77 countries and territories on all continents. Recently, recombinant live virus vaccines have been marketed for the first time in Asia (Vietnam), but these vaccines do not discriminate between vaccinated and infected animals, they do not have serologic DIVA characteristics. These vaccines create uncertainty if problems arise in their use and the available data do not ensure compliance with the high quality ASF vaccine recommendations of the World Organisation for Animal Health (WOAH). The evolution of ASF in most scenarios, particularly in Asia, is towards endemicity.

Keywords: African swine fever, Epidemiology, Gaps, control.

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Letter to the editor

The amazing contributions of avian pathology to the development of medical science

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Abstract

In the medical curriculum, the pathology course is the link between the basic and the clinical courses. In the pathology course, the medical student learns how to use the methods employed in the study of morphology and physiology to detect altered biology and understand its causes. Veterinary pathology plays the same linkage role in the veterinary medical curriculum; however, it covers a wider field because it also sets the base for comparative pathology that includes the study of several species of vertebrates and invertebrates. In my own experience as a veterinary pathologist, I have been confronted with the diagnosis of diseases of fish, crustaceans, and even insects, considering that shrimps and honeybees produce economic goods for human consumption and, therefore, belong to the scope of veterinary medicine. During the second half of the XX century, poultry farming changed rapidly from a rural family business to high technology, large-scale enterprises with enormous impact on the world food market, and at present, the criteria for control of infectious diseases of poultry, are set by international agencies and have a global significance because all the poultry producing regions of the world face the same sanitary challenges. Therefore, in the context of veterinary pathology, avian pathology has a very distinctive character because the avian pathologist must be aware of all the advancements in poultry science, nutrition, and genetics and, at the same time, must be permanently adopting the evolving technologies for the accurate and rapid detection and characterization of pathogenic agents frequently subject to mutation favored by the huge populations of modern flocks. In this regard, great importance has been given to the publication of the innovations in culture, isolation, identification, and characterization methods for avian pathogens and the extensive use of procedures based on molecular genetics; however, another relevant contribution of avian pathology, namely its influence in the advancement of medical science, has not been equally emphasized. Therefore, the present review aims to present some relevant examples of such important contributions.

Keywords: Poultry, Pathology, Glick's bursectomy, Lymphoid cells, Genetic control of the cell

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Glick's bursectomy

In 1956, Bruce Glick and Timothy Chang proved that antibody production is suppressed in bursectomized chickens, and this study became a cornerstone of modern immunology (Cheville, 1983a). The role of the bursa of Fabricius in the transformation of B lymphocytes with the consequent progeny of plasma cells in tissues and antibody production was demonstrated by the bursectomy performed in one-day-old chickens followed by irradiation. This procedure left the chickens devoid of plasma cells in tissues and incapable of antibody production; however, cellular immunity remained functional as long as the thymus was preserved intact. The maximal activity of the bursa occurs the first day after hatching when most stem cells from the liver, spleen, and bone marrow migrate to the bursa, where they are genetically induced for their transformation into B lymphocytes. The genetic induction consists of activating the sequences for the synthesis of IgM that gets fixed to the cell membrane and becomes the B cell antigen binding component (Cooper, 1972).

After several cycles of cell replication in the bursa, B cells migrate to other tissues, where they tend to aggregate in the form of lymphoid follicles. On antigenic stimulation, B cells form plasma cells that secrete immunoglobulins, which in turn are the mediators of humoral immunity. In mammals, the Peyer´s patches of the submucosa of the terminal ileum are considered the equivalent of the bursa of Fabricius in birds. Complete surgical removal of the lymphoid tissue of Peyer´s patches is not feasible even if followed by irradiation, and this explains the enormous relevance of the avian model. The findings of Glick and Chang unleashed the interest to identify the central lymphoid organs of lymphocyte differentiation, and these studies arrived at the inference of the existence of a system of humoral immunity based on B lymphocytes and a system of cellular immunity based on T lymphocytes. The avian models became the unquestionable precursors of these notions because they offer a unique, precise anatomic situation of the central lymphoid organs. To date, Glick's bursectomy model is used to study the avian immune response (Heidari et al., 2021; Schat, 2022),

Lymphoid cells in the thymus of the chicken embryo

In 1975, Le Douarin and Jotereau conducted a follow-up of lymphoid cells in the thymus of the chicken embryo and found that the thymus became functional on the seventh day of incubation (Le Douarin). The cell population of the thymus at day six of incubation was mainly composed of epithelial cells, but from the seventh day on, the prevailing cells were lymphoblasts. Thymectomy at birth did not suppress the presence of plasma cells in tissues and or antibody production; however, cellular immunity responses were jeopardized.

Glick and Chang and Le Douarin and Jotereau achieved unambiguous and explicit models that offered the definitive demonstration that the thymus is the central organ for differentiation of T lymphocytes responsible for cellular immunity, and the bursa of Fabricius is the organ of differentiation of B lymphocytes, precursors of the plasma cells that produce immunoglobulins.

Genetic control of the cell

In 1953, one of the most relevant discoveries of the biological sciences, namely the molecular structure of nucleic acids, was published by James Watson and Francis Crick, and since then, nucleic acids have been recognized as the genetic material of all living organisms and viruses.
Molecular biology developed with less celerity at the beginning, and it took eight years to establish a model of genetic control for the cell. Jacob and Monod from the Pasteur Institute published in 1961 the control model named *operon*, based on the fact that in bacteria, the enzymes needed for processing a nutrient are only synthesized when the specific nutrient is present in the culture medium (Jacob, 1961). When a nutrient such as lactose is added to a culture of *Escherichia coli*, there is a rapid increase in the rate of synthesis of galactosidase, the enzyme that hydrolyzes lactose to glucose and galactose. The genes controlling the synthesis of galactosidase is linked together on the *E. coli* chromosome. The repressor gene codes for a protein that blocks the operator gene. The operator gene is responsible for the site of RNA polymerase activation. Since lactose has a chemical affinity for the repressor protein, when present, the operator gene is liberated, initiating the transcription of mRNA by the promoter gene. Translation of the specific mRNA with the sequence for galactosidase is accomplished by the bacterial ribosomes. Lactose is hydrolyzed, the repressor gene is liberated, and the operator gene is blocked, and in this way, the cycle of induction–repression is established. This elegant model of genetic control induced multiple trials to find an equivalent model in multi-cellular organisms, and again, the chicken became the most suitable one.

Synthesis of the albumin of the egg

This synthesis occurs by linking intermediary peptides during the transit of the egg along the oviduct. Transcription of the genes involved only takes place in the presence of estrogen, and the specific hormonal response of the epithelial cells of the tubular glands of the oviduct makes this system an ideal model of genetic cell control in vertebrates (Cheville, 1983b). Egg albumin was one of the first proteins to be isolated in purity, unmixed with any other substance, and due to its abundance in avian reproductive organs and the egg, it has frequently been used as a standard for comparative studies of structure, synthesis, and secretion of proteins.
An oviduct that estrogens have not yet influenced is considered a virgin oviduct. If a virgin oviduct is macerated and processed for RNA extraction by gradient centrifugation, not a single copy of mRNA with the specific sequence for albumin translation will be found. On the other hand, if the donor hen is previously treated with estrogens, and her oviduct is processed with the same protocol for RNA extraction, hundreds of copies of mRNA with the specific sequence for albumin translation will be found.
Estrogens induce the synthesis of albumin by the tubular glands of the oviduct. It is known that estrogens cross the cell membrane and link in the cytoplasm with a specific estrogen receptor. The estrogen–receptor complex enters the nucleus and acts as an inducer of the albumin genes for the transcription of the specific mRNA. Once in the cytoplasm, mRNA is translated by the ribosome for albumin synthesis.

The avian model described was the foundation for further studies to decipher the mechanisms of cell control for all steroid hormones, namely progesterone, androgenic steroids, glucocorticoid hormones, and mineral corticoid hormones.

Avian model of lymphocytic proliferative herpes viruses

In 1968, at the International Conference on Leukemia, Burkitt gave an account of a peculiar lymphoma affecting facial bones, often with neoplastic deformation of the jaw in children in the African continent (Burkitt, 1968). Burkitt´s lymphoma has been proven to be caused by a herpes virus known as the Epstein-Barr virus. This agent, in temperate countries of Europe and North America, is the etiology of infectious mononucleosis (Purtillo et al., 1992). Clinically, this infection is characterized by pharyngitis and enlarged lymph nodes and spleen. In this presentation, the Epstein-Barr virus infects the epithelial cells of the oral cavity, pharyngeal mucosa, and salivary glands, where infective virions are produced. The subjacent lymphoid tissue is also infected because the marker CD21 of B lymphocytes acts as a receptor for the virus, and these lymphocytes proliferate but do not produce infective virions. Transmission of mononucleosis is horizontal, mainly by kissing, because infectious particles are concentrated in the saliva.

In veterinary medicine, the first description of a lymphocytic proliferative disease caused by a herpes virus was described by Marek in 1907. This author found an exuberant infiltration of peripheral nerves by pleomorphic lymphocytes in chickens suffering unilateral paralysis of limbs and wings and named the disease lymphocytic polyneuritis because he considered the lymphocytic infiltration to be inflammatory. The etiology of the disease has been determined as a herpes virus known as Marek´s Disease virus, and it has been established that the nerve infiltration is neoplastic.

The following decades after Marek´s description, the disease became more aggressive, producing multiple tumors in the ovary, liver, spleen, and kidneys, and was the leading cause of mortality in poultry until the turkey herpes virus vaccine was implemented in 1970 (Witter et al., 1970). The comparative pathology of infectious mononucleosis in humans and Marek disease in chickens reveals many similarities in the virus-host relationships. In both cases, the infection that produces infective virions occurs in epithelial cells, in the pharyngeal mucosa and salivary glands in infectious mononucleosis and in the epithelium of the feather follicles in Marek disease and therefore, in both cases, transmission is horizontal, by saliva in the former and by scales and feather debris and dust in the latter. In both cases, the lymphocyte infection is proliferative, causing lymph node enlargement and splenomegaly in infectious mononucleosis, neoplastic nerve lymphocytic infiltration, and multiple lymphocytic tumors in various organs in Marek disease.

Rous Sarcoma

In 1966, the Nobel Prize for Physiology and Medicine was awarded to Francis Peyton Rous for achieving the transmission of fibrosarcoma in chickens with cell-free filtrates demonstrating viral oncogenesis.

(Rous, 1910). The Rous sarcoma virus is a retrovirus that has four genes; three of them code for the formation of virions, and the fourth gene, the oncogene responsible for neoplastic transformation, is named gene src that is inserted in the cell genome and codes for an enzyme that promotes protein phosphorylation which unlaces malignant transformation of fibroblasts. All known retroviruses that possess oncogenes produce neoplastic growths and are also capable of genetic transformation of cells in cell cultures.

Congenital infection of avian leucosis

In 1967 Dougherty and Di Stefano found the replication sites of leucosis virus in chickens congenitally infected. Avian leucosis virus represents an alternative model of oncogenesis because it does not possess oncogenes and instead holds RNA segment that transcribes a DNA sequence using the enzyme reverse transcriptase (Cooper, 1972). The DNA sequence is called provirus and is capable of getting inserted into the genome of the host cell. Leucosis virions can be isolated from the ovary and the oviduct. In the epithelial cells of the albumin-producing tubular glands of the oviduct, replication of virions is abundant, and therefore, the ovum gets infected when it descends along the magnum of the oviduct.

This form of infection is referred to as vertical transmission, and at birth, virions can be isolated from the liver and kidneys; however, microscopical evidence of malignant transformation is only observable between the sixth and eighth week of age when giant lymphoid follicles can be detected in the bursa of Fabricius that foretell the malignant transformation of B lymphocytes.

The models mentioned above are only a few examples of the richness of the possible contributions of avian pathology to the advancement of comparative pathology. The interest in this phase of avian pathology must always be maintained as an important source of animal models of human disease for the progress of medical science.

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Working Group Report on Priority Areas for Action

Introduction

The Don Tyson Center for Agricultural Sciences in Fayetteville, Arkansas, hosted the 2nd International Avian Influenza and One Health Emerging Issues Summit from September 30 to October 3, 2024. This hybrid event recorded 1250 participants from 55 countries. It concluded with a working group of thirteen individuals with varied backgrounds of expertise, from public health to animal health and regulatory entities, that reviewed the scientific evidence and analyzed gaps in research and policy highlighted throughout the summit.

This report summarizes the working group's conclusions and recommendations, which we hope will provide a valuable tool for the scientific community and policymakers as key priority areas within the One Health framework. Emphasis has been placed on the pandemic potential of the current Highly Pathogenic Avian Influenza (HPAI) outbreak, its international trade impacts, and aspects related to public health and sustainability. It also suggests action points derived from the research and regulatory framework discussed during the Summit.

Highlights on One Health

The outbreak of HPAI related to H5N1 virus has impacted multiple regions of the world since January 2022 and has impacted poultry, many other avian species, and many mammals. From poultry depopulations to deaths of wild birds and terrestrial and marine mammals, this strain has spread across Africa, Asia, the Americas, Australia, Europe, and even Antarctica.

It is paramount to promote timely reporting and sharing of data for experts, scientists, and policy-makers to prepare for potential pandemics and health emergencies. Planning must include collaborative efforts between official and non-governmental organizations to ensure and restore animal health and to sustain a safe and uninterrupted food supply. Policies must facilitate expedited and smooth operations of animal and animal product transport, including trade of breeding stock of food animal species. The challenges that exist within the areas of regulatory authority, interagency communication and coordination, and disease response are complex and multifactorial. Efforts to enhance communication and cooperation between the multiple entities involved in ensuring a safe and uninterrupted food supply and maintaining animal health will facilitate more expedited and smooth decision-making and orchestrated operations.

The advancement of science and academia is significantly enhanced when federal and global agencies participate and collaborate with one another. Breaking down the silos of information can lead to a more integrated and efficient approach to research, fostering cross-communication and interdisciplinary partnerships. This can ensure that research is directed toward the most pressing and relevant subjects, maximizing the impact of scientific discoveries and innovations. Encouraging such an open exchange of knowledge not only accelerates progress but also democratizes information, allowing for a more inclusive scientific community that can tackle global challenges more effectively.

Government strategies must focus on securing the food supply against potential diseases that could collapse the production and distribution networks, especially given the interconnected nature of our global food systems and the role humans play in disease transmission. It is important to explore scenarios for controlling diseases within animal populations. This can be a crucial strategy for securing food supply and mitigating risks to human health. Examples include early detection and rapid response, potential vaccination programs, biosecurity measures, integrating the One Health Approach, public awareness and education, and transparent collaboration between government agencies, academia, and pharmaceutical companies.

Priority Areas

- Incorporating the One Health Approach: integrating human, animal, and environmental health can lead to a greater understanding of disease mechanisms and comprehensive and effective detection and control strategies. This involves collaboration between professionals from multiple fields, including veterinarians, medical professionals, and environmental scientists.
- Wildlife-Human Interface: Recognizing the role of wildlife as potential reservoirs for known and emerging zoonotic diseases and developing strategies for monitoring these interfaces.
- Sustainable Farming Practices: Reducing the environmental impact of agriculture (animal and plant operations) through innovative technologies.
- Circular Bioeconomy: Integrating sustainable practices into agricultural practices, such as waste reduction and switching and developing technologies with the right-to-fix, reusing, and recycling waste into valuable by-products.

Action Points

- Interdisciplinary Research: Strengthen interdisciplinary research that unites veterinary, medical, and environmental experts to develop holistic disease prevention strategies.
- Policy Development for One Health: Encourage the formulation of policies that integrate One Health concepts into national and international regulatory frameworks to address emerging zoonotic diseases effectively.
- One Health Task Forces: Create specialized task forces within advisory and regulatory entities to oversee the implementation of One Health strategies at local, regional, and international levels.
- Research into Green Technologies: Invest in research to develop green technologies that reduce or eliminate waste, conserve and recycle water, and minimize greenhouse gases (the ideal being a net zero balance or even a carbon drawdown effect).
- Regulatory Incentives for Sustainability: Create regulatory incentives for farms adopting sustainable practices, such as reduced energy consumption or lower carbon footprints.
- Circular Bioeconomy Frameworks: Develop regulatory frameworks that stimulate the adoption of circular bioeconomy principles across agricultural sectors.

- The use of chicken manure as a nutritional supplement to ruminants and as a fertilizer is a common practice in Mexico and other countries, and its prevalence is increasing due to the rising costs of nitrogen fertilizers.
- Appropriate measures to mitigate the risk of spreading disease, including avian influenza and antimicrobial-resistant pathogens, must be practiced before land application. All animal manure land applications must follow nutrient management guidelines.
- Vaccination against HPAI for susceptible animals must be considered under specific circumstances such as panzootic risk (high rates of lateral transmission between susceptible populations), overwhelmed disease response capacity of the local authorities, high risk of disruption to the food supply, and zoonotic risk with pandemic potential. The vaccination program must include a robust surveillance system capable of detecting silent infections to ensure timely official response and reduce opportunities for viral shift and drift.

Emerging Issues

It is imperative for government and international organizations to immediately prioritize response plans and research on diseases that threaten significant crops and livestock and to ensure food security.

Diversifying our food sources is crucial for enhancing food security and sustainability. Orphan crops, often neglected in mainstream agriculture, hold significant potential due to their adaptability to local conditions and nutritional benefits. These include crops like pulses, yams, and edible cacti.

Additionally, exploring alternative food sources such as insects and apiculture with native bees can provide sustainable, resilient, and nutritious options. Insects, for example, are rich in protein, vitamins, and minerals and have a lower environmental footprint than traditional livestock.

Investing in research and development for these alternatives can help build a more resilient food system, reduce dependency on a few major crops, and support local economies. This approach addresses food security while promoting biodiversity and environmental sustainability. In recent decades, research funded has dropped or remained flat at best. It is time to reverse that trend, as it has been demonstrated that investing in research provides a positive return on investment over time.

Antimicrobial resistance is threatening public health. It is imperative to further judicial use of antimicrobials everywhere, from public health to agriculture (plants and animals).

Priority Areas

- Research in areas of public, animal, and plant health; planning response plans and preparedness for scenarios of pandemic/panzootic with the potential to disrupt food supply; and research and development of food production and supply chains, including international trade policy, within the context of the concepts of Circular Economy and Green Chemistry.
- Antimicrobial Resistance (AMR): Address the growing threat of antimicrobial resistance by promoting antibiotic stewardship in food-animal production and veterinary and human medicine.
- Emerging Pathogens: Surveillance and management of emerging pathogens in domestic and wildlife populations.

Action Points

- Policies for research and development of food production and distribution in alignment with the United Nations (UN) Sustainable Development Goals.
- Alternatives to Antibiotics: Prioritize research into antibiotic alternatives in poultry farming, including probiotics, prebiotics, and vaccination strategies.
- Global Surveillance of Emerging Pathogens: Strengthen global surveillance systems to detect and track the spread of emerging pathogens in real time.
- Regulatory Guidelines for AMR: Create robust regulatory guidelines for using antibiotics in poultry farming, including restrictions on their use in healthy animals and incentives for using alternative treatments.

Conclusion

The International Avian Influenza and One Health Emerging Issues Summit highlighted several critical areas that require focused attention from both researchers and regulators. The advancement of science in HPAI, trade, public health, One Health, sustainability, and emerging issues must be coupled with effective regulatory frameworks that can quickly adapt to new challenges. This coordinated approach will help mitigate the impact of these issues on global health, trade, and the environment.

By fostering international collaboration, promoting research, and pursuing a One Health approach, policymakers and stakeholders can create resilient systems capable of addressing current and future challenges in the food-animal industries and their potential impact on human health and the continuity of its social institutions in balance with the environment.

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