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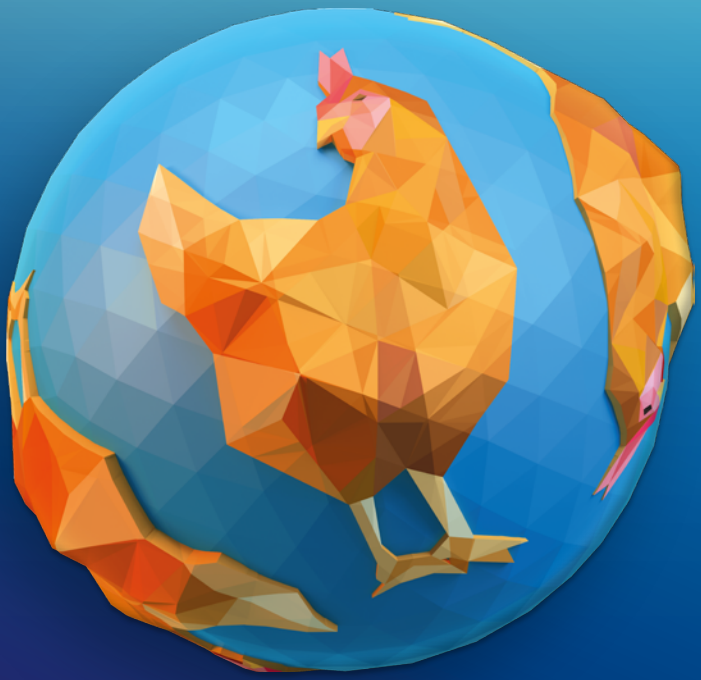

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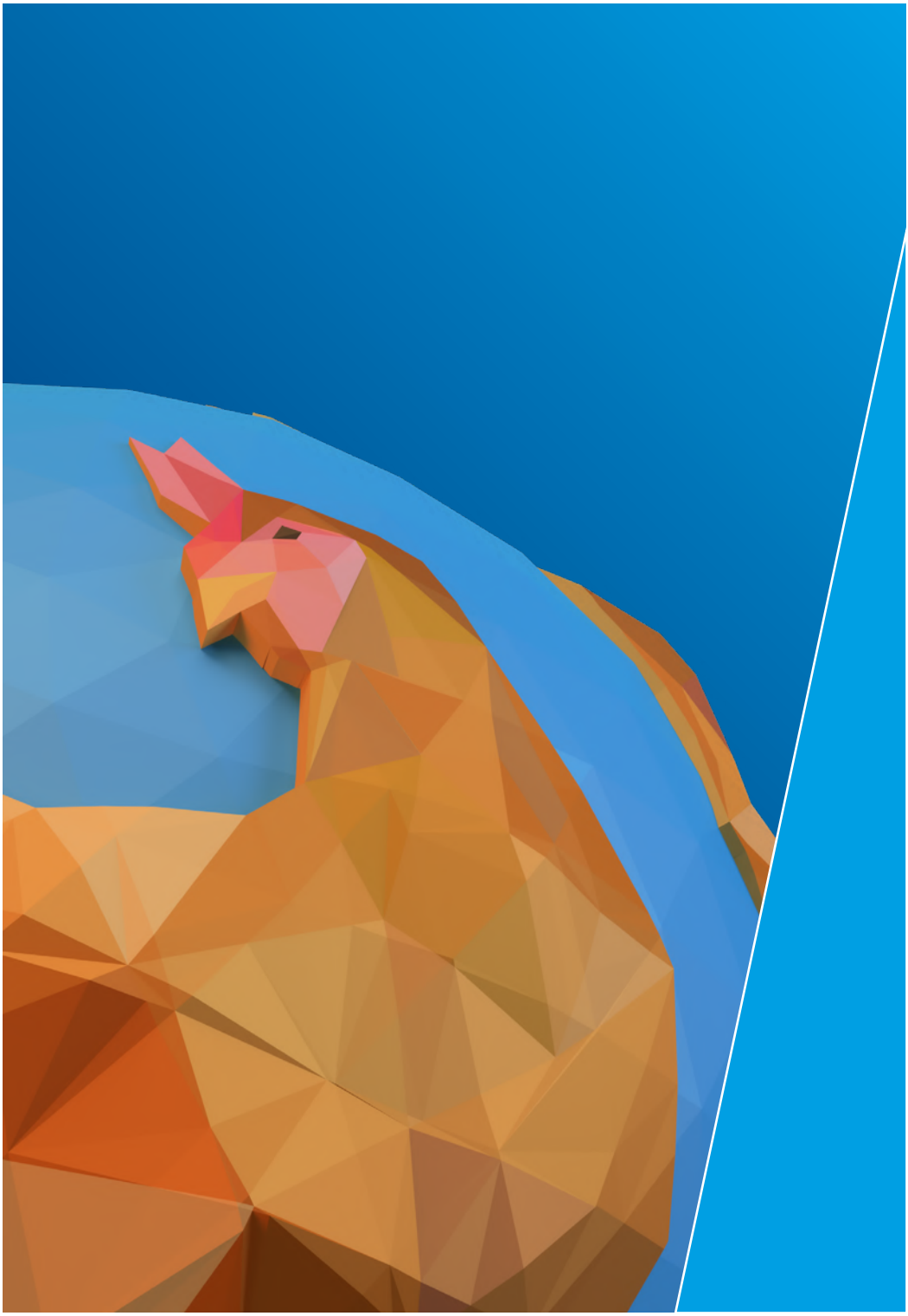

Preface

Discovering Poultry Health Through **Science and Collaboration**

Welcome to the XXIII[rd] World Veterinary Poultry Association Congress, held in Kuching, Malaysia, under the theme *"Sustainable Healthy Poultry for a Healthier World"*.

This collection of scientific abstracts, supported by Ceva Animal Health and scientific partners, offers a compelling journey into the latest innovations, field experiences, and research insights shaping the future of poultry health.

Each abstract in this volume represents a vital contribution to our shared mission: improving poultry health through evidence-based, integrated solutions. From optimizing vaccination strategies in Indonesia to characterizing respiratory co-infections and viral dynamics in Morocco, these studies reflect the diversity and complexity of challenges faced by poultry professionals worldwide.

The research presented here spans a wide range of topics, including:

- **Vaccination innovation:** Evaluating the "Less is More" approach and long-term performance comparisons of vector versus inactivated vaccines.
- **Field efficacy:** Real-world assessments of vectored vaccines against ILT and IBH in layers and broilers.
- **Epidemiological insights:** Surveillance of respiratory pathogens, serotype distribution, and co-infection patterns across regions.
- **Emerging threats:** Identification of evolving IBDV strains and their subclinical impact on flock performance.

What unites these contributions is a commitment to real-world evidence (RWE), scientific rigor, and practical application. These abstracts are not just academic exercises—they are the building blocks of better health outcomes for poultry and more sustainable practices for the industry.

We extend our gratitude to all contributing authors, researchers, and field professionals whose work is featured in this collection. Your dedication drives progress and inspires collaboration across borders.

Let us explore, learn, and innovate—together.

The Ceva Poultry Team

Optimizing layer vaccination programs to improve disease protection and flock performance in Indonesia

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Vaccination is widely recognized as a crucial tool for minimizing disease-related losses. However, it is not uncommon for layer flocks to be subjected to excessive vaccination schedules, which can cause stress and potentially reduce productivity. This study aims to evaluate the benefits of the "Less is More" approach, which seeks to simplify the vaccination program for layer flocks, ultimately enhancing its safety and efficacy. A traditional layer vaccination program against Newcastle and Gumboro diseases that included one live ND vaccine in the hatchery, one inactivated ND IBD vaccine administered at 4 days, a booster with a live ND vaccine at 12 days, and two live IBD vaccines given at 14 and 21 days of age was compared to a new vaccination program consisting of a vector rHVT-NDV vaccine combined with an immune complex IBD vaccine specifically developed for layers in the hatchery, followed by one live ND vaccine at day 14 and one live IBD vaccine at day 21. Serum samples were collected at 1, 21, 28, and 35 days of age and tested with ELISA NDF test kit (IDVet) and ELISA IBD test kit (Biochek). Spleen samples were collected at 4 weeks to evaluate the vector ND vaccine take. Body weight, uniformity, and mortality during the first five weeks of age were compared. Based on the RT-PCR testing results, 100% positivity for the vector rHVT-NDV vaccine was detected, and the ELISA NDF results showed 100% positivity from 3 weeks of age onward. The IBD ELISA results indicated that active antibody response was observed at 3 weeks of age reaching uniform titers at 5 weeks. Body weight, uniformity and mortality rate from flocks vaccinated with "Less is More" concept reached 404 g, 84% and 0.78% while flocks vaccinated with traditional layer vaccination achieved 391 g, 75% and 1.08%. These results suggests that the "Less is More" concept has positive effects on body weight, uniformity, and mortality rates compared to traditional layer vaccination methods.

Keywords: Disease Challenges, Vaccination, Traditional Vaccination Safety, Efficacy, Body Weight, Uniformity, Mortality, Less is More.

Long-term comparison between vector HVT-NDV and inactivated ND vaccines on broilers performance in Indonesia

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A long-term field study involving 20.3 million broilers housed in areas considered as high Newcastle Disease (ND) virus pressure was conducted from January 2017 to July 2024 in Indonesia. The objective was to evaluate the performance of flocks vaccinated either with a vector HVT-NDV vaccine or inactivated ND vaccines applied in the hatcheries. Additionally, the study assessed disease pressure by analyzing the antibody titers at harvest age. The first group comprised of 5.6 million broilers vaccinated with an inactivated ND and live ND-IB vaccines in the hatcheries from 2017 to 2019. The second group included 14.7 million broilers vaccinated with the vector HVT-NDV and live ND-IB vaccines in hatcheries from 2019 to 2024. Both groups received a live ND vaccine (La Sota strain) at 10-12 days of age in the farms. Blood samples per flock were taken at depletion age and the antibody response was assessed by the hemagglutination inhibition (HI) test. Serological results and performance data were compared. When adjusting all productive parameters by age (28.5 days), the vector HVT-NDV group had average body weight of 1.72 kg, mortality rate of 4.4% and FCR of 1.49 points, leading to a performance index of 385.4 points. Alternatively, the body weight, mortality rate and FCR from flocks vaccinated with the inactivated ND vaccine were 1.53 kg, 9.3% and 1.65 points, respectively, with 316.2 points of efficiency index. Overall, the serological results indicated significantly lower titers in the HVT-ND group (3.1 log2) as opposed to the inactivated ND group (4.9 log2). Additionally, a steadily year-to-year decrease in HI titers in flocks vaccinated with vector HVT-NDV suggests a decrease of field pressure. The mortality rate, FCR, performance index and HI titer per group was calculated and compared showing differences statistically significant (p-value<0.05). Finally, the remarkable improvements observed in flocks vaccinated with vector HVT-NDV vaccine cannot be solely attributed to better control of Newcastle Disease. Other contributory factors likely include enhancements in housing conditions, advances in feed quality, genetic improvements of birds and others.

Keywords: Newcastle Disease, Vaccine, HVT-NDV, Inactivated ND vaccine, Broiler Performance, Disease Challenges, Serology, Indonesia.

Efficacy of a Fowl Pox Vectored Vaccine Against Infectious Laryngotracheitis in Layer Pullets in Morocco: a case report

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This study aimed at assessing the effectiveness of a Fowl Pox Vectored infectious laryngotracheitis Vaccine (FPV) in protecting layer hens during the production period under field conditions in Morocco.

Five flocks of Lohman Brown commercial layers were included. Four flocks (B3, B5, B7, B8) received a single FPV injection via wing-web stab at 8 weeks of age, while one flock (B1) served as unvaccinated control. The flocks were distributed across three farms: F1 (B3,B7), F2 (B5,B8) and F3 (B1) in close proximity. Clinical lesions of ILT, mainly blood clots in the trachea, were first observed in flock B8 at 57 weeks of age, then the infection spread to the other farms.

Respiratory diagnosis via qPCR confirmed ILT positivity across all flocks. Cumulative mortality rates during the outbreak were 0.48% in B3 and 4.12% in B7 from 35 to 42 weeks of age, and 5.5% in B8 and 3% in B5 from 57 to 60 weeks of age. A much higher mortality rate was observed in the unvaccinated control B1 (20.9%) from 60 to 65 weeks of age. In contrast, mortality in B3 remained normal.

The laying rate in B3 was unaffected (93%), while it was significantly impacted in the other houses, especially in the control group. The rates were 84% in B7, 89% in B8, 86% in B5, and 50% in B1. Investigations revealed that poor performances in vaccinated houses B8, B5, and B7 were also due to poor management, specifically ventilation issues, contributing to the harmful impact of ILT infection. The vaccinated flock B3, which had no management deficiencies, showed resilience to the viral challenge.

This case report clearly indicates that the FPV vaccine is effective in providing long-term protection against ILT in layer hens, provided that proper management practices are maintained.

Keywords: Infectious Laryngotracheitis (ILT), Fowl Pox Vectored Vaccine (FPV), layer hens, Morocco, mortality rates, long-term protection.

The Hidden Presence of Inclusion Body Hepatitis in Broiler Chickens in Morocco in 2024

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Fowl aviadenoviruses (FAdV) are important avian pathogens, responsible for several poultry diseases prevalent worldwide, including inclusion body hepatitis (IBH). In 2024, multiple cases of Inclusion Body Hepatitis (IBH) were reported in broiler chickens across various regions of Morocco. This study aims to investigate the positivity, involved serotypes, and potential transmission routes of IBH in affected flocks.

A total of 120 liver samples were collected from 15 broiler flocks which mainly showed enlarged liver and hydropericardium lesions often in combination with other diseases such as Gumboro disease or low pathogenic avian influenza H9N2 in different regions of Morocco. These samples were analyzed using Polymerase Chain Reaction (PCR) to detect the presence of FAdV virus. Positive samples were further sequenced to identify the specific serotypes present.

All liver samples tested positive for FAdV. Sequencing results revealed that serotype FAdV 8b was predominant, accounting for 93.3% of the cases, while serotype FAdV 8a was present in 6.7% of the cases. Notably, 47% of the cases were recorded before 20 days of age, with significant mortality observed in the first two weeks. This suggests a potential vertical transmission from breeders. The remaining 53% of cases were detected after 30 days of age, likely due to horizontal transmission as the virus is highly resistant in the environment.

The results of this study showed the presence of FAdV 8b and 8a in several broiler flocks, as already described in Moroccan context. Since cross-protection among serotypes is uneven, strong emphasis must be given to first identifying the circulating strain and second to use homologous inactivated vaccines, potentially opting for multivalent vaccines to protect the offspring. Additionally, reinforcing biosecurity measures is essential, as they play a critical role in disease control and transmission.

Keywords: Inclusion Body Hepatitis (IBH), Fowl aviadenovirus (FAdV), Broiler, Morocco, 2024, Serotype 8b, Serotype 8a.

Respiratory Co-infections in Broiler Chickens in Morocco

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Respiratory diseases represent a major challenge in the poultry industry, leading to significant health issues and substantial economic losses. To identify the main pathogens involved in respiratory infections in broiler chickens in Morocco, blood and organ samples were collected during 2021 from 62 farms exhibiting respiratory signs across various regions of poultry production in Morocco.

Laboratory tests were performed using PCR to detect low pathogenicity avian influenza virus (LPAIV) subtype H9N2, infectious bronchitis virus (IBV) and avian metapneumovirus (aMPV), while indirect ELISA was used to detect antibody response to infectious laryngotracheitis virus (ILTV), Mycoplasma gallisepticum (MG), and Mycoplasma synoviae (MS). Among these pathogens, H9N2 LPAIV emerged as the most frequently detected agent. It appeared in 29 of the 62 positive flocks, often in co-infection with other respiratory agents, indicating a high prevalence of co-infections. Overall, 49% of the tested flocks (30/62) were positive for more than one pathogen. The most common pathogen combinations were H9N2+aMPV (11/30) and H9N2+IBV (8/30). MG and MS infections were usually present with viral agents, suggesting an opportunistic role in exacerbating respiratory symptoms.

The prevalence and severity of respiratory infections in broiler farms can be influenced by various factors. Geographic location is particularly important, regions with high concentrations of poultry farming could be more involved. The age of the flocks also plays a crucial role, with increased vulnerability observed in chickens aged 30 to 39 days. This period often coincides with initial sales, exposing farms to biosecurity breaches. Additionally, seasonal variations also affect the incidence of infections, the avian metapneumovirus peak (aMPV) being particularly noticeable during the cold season.

An integrated approach is required to mitigate the impact of respiratory infections in broiler chickens.

Keywords: Respiratory co-infection, Broiler chicken, Morocco, AIV H9N2, IBV, aMPV, ILTV, MG, MS.

Seroprevalence and Characterization of Avian Metapneumovirus Circulating in Broiler Farms in Morocco From 2019 to 2025

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Avian metapneumovirus (aMPV) is a causative agent of avian rhinotracheitis (ART) that is associated with swollen head syndrome (SHS), which leads to significant economic losses in poultry flocks worldwide, particularly when exacerbated by a secondary infection.

In Morocco, especially after the first detection of low pathogenic avian influenza in 2016, avian Metapneumoviurs (aMPV) has become increasingly included in laboratory investigations as part of respiratory diseases. It is also being detected more frequently in broiler when they are located in risky areas (multi-age poultry areas) or areas where aMPV circulation is not suspected (absence of turkeys or long cycle birds). The objective of this study was to evaluate the seroprevalence of aMPV across different regions and seasons, as well as to isolate and characterize the circulating virus.

A total of 256 flocks and 5120 blood samples at Endpoint serology in the seven most concentrated regions of broiler farms in Morocco from non-vaccinated birds exhibiting respiratory signs were collected from March 2019 to February 2025, and analyzed using direct Enzyme-Linked Immunosorbent Assay (ELISA) serology IDvet Kit (aMPVS). Trachea samples were collected also from the same flocks for virus detection and characterization with reverse transcription PCR (RT-PCR) based on G gene of aMPV.

Serological tests revealed that 67% of broiler flocks were tested positive, indicating prior exposure to aMPV across all regions of our country, regardless of the season. The RT-PCR results demonstrated the detection of both aMPV subtypes A and B, with a predominance of subtype B in all samples tested.

These results showed that the circulation of aMPV is underestimated in broiler farms regardless of the region and the season, which explains furthermore the respiratory coinfection syndromes encountered in different situations. Proper control is therefore requested.

Keywords: Avian metapneumovirus, Broiler, Morocco, Subtype B, Subtype A.

IBDV prevalence in broiler flocks with respiratory or performance problems in Eastern Europe - Middle East - Africa area

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Field IBDVs are known to be frequently present in broiler flocks not showing characteristic Gumboro disease problems but suffering from respiratory infections and impaired performances. Though the dominance of vvIBDV (A3B2) causing significant mortalities faded for a while the "classic" immunosuppressive perception of Gumboro disease, the recent evolution of IBDV and appearance of strains of lower pathogenicity brought the problem back.

The genetic make-up (Segment A/B) of field IBDVs was evaluated in 2024-2025, mainly from routine respiratory troubleshooting samples from Eastern Europe, Middle East and Africa areas. In each areas a shift to subclinical presence of IBDV was noticed, with increasing ratio of new (in the area) antigenic variants, virulence variants and atypical reassortant IBDVs. A3B2 vvIBDV was still sporadically present in all the three investigated areas, sometimes also in subclinical form. Beside A3B2, Eastern Europe was mainly infected with A3B1 ressortant IBDV, while Africa, particularly South Africa is facing dominantly A2bB1 variant IBDV. Middle East area struggles with the widest variety of IBDVs: A3B1 of low-pathogenicity, A3B1 high-pathogenicity reassortants (mainly in Türkiye), A2dB1 (Egypt), A4B1 and A6B1 variants (Saudi, Near East and Gulf countries), A1B2 (Türkiye).

Though the newer, rather subclinical antigenic and virulence variants do not induce direct mortality, they cause immune suppression and may contribute to the severity and performance impact of other infections. This background role can be demonstrated by systematic check for IBDV in broiler flocks with acute respiratory problem. The results of such a survey in Egypt, with confirmatory high prevalence of sub-clinical IBDV in respiratory problems, is displayed.

Keywords: Gumboro disease, IBDV, sub-clinical IBD, variant IBDV, reassortant, broiler flocks, respiratory symptoms.

A new strategy with vector ILT vaccines to protect poultry against ILT infection

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Infectious laryngotracheitis virus (ILTV) is one of the important respiratory viruses for poultry industry. Attenuated live and vector ILT vaccines are used to control the disease and reduce the losses. As live vaccines are shown to be a source of further outbreaks, they are banned to use in several countries where only safe vector ILT vaccines are allowed. New strategies with combination of vector ILT vaccines seem to be more promising to satisfy all efficacy and safety expectations of poultry industry.

A new strategy to provide early and high protection against ILT, with fowl pox virus based vectored ILT vaccine was monitored in this study. This vaccine is commonly used in vaccinating long living birds during rearing period via wingweb method. In this study the vaccine was applied to day-old layer chicks via subcutaneous route in hatchery together with the Marek's disease vaccines, to get an early ILT protection. A field re-vaccination with the same vaccine in the rearing period was carried out via wing web method to induce higher immunity. A specific ELISA kit able to detect ILTV gB antibodies was used in this study to demonstrate the titers provided by the Pox ILT vector vaccine that expresses the ILTV gB gene. Standard ILTV ELISA was used to exclude the positivity due to field challenge (DIVA strategy). Antibody titers after priming in hatchery provided encouraging results compared to only field wingweb vaccination. Serology results at 3 weeks of age demonstrated early protection. The geometric mean titers (GMT's) reached 4.000-8.000 at 3 weeks of age after hatchery vaccination. Following a booster vaccination via wingweb route at 8-9 weeks of age, titers reached 9.000-20.000, 5-6 weeks post-vaccination. The booster effect after second vaccination in the rearing period, demonstrated by the highELISA titers, is expected to provide long lasting protection.

Keywords: ILTV, layers, pox vectored ILT vaccine, early and long lasting immunity.

Fowl Adenovirus: The Philippines Story

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Most viral poultry diseases can cause significant losses in production, but more devastating are those diseases which directly affect the mortality, feed conversion ratio and average liveweights just like in case of Fowl Adenovirus (FAdV) infection. In 2019, the Philippine poultry industry experienced sudden cases of low body weights, increased mortality starting at 7 days, and it became more pronounced as the birds grew older, increased liver condemnation in the processing plants, tremors and nervous signs, increased musculoskeletal and digestive lesions and severe percentage of runting especially in broiler flocks. The surge of cases prompted producers and animal health companies to conduct series of diagnostic tests to identify possible causes and Fowl Adenovirus turned out to be a common finding among affected flocks.

Disease monitoring efforts conducted by Ceva Animal Health (Philippines) Inc. from 2009 to 2023 included samples from broilers, broiler breeders, and layers across various regions of the country.

Diagnostic tests involved the Biochek® FAdV Group 1 ELISA kit. At the same time, PCR testing and gene sequencing were performed. Gene sequencing revealed the involvement of four genotypes (A, B, D, E) and five serotypes: Serotype 1 (1%), Serotype 2 (20%), Serotype 5 (1%), Serotype 8a (4%), and Serotype 8b (74%).

In summary, the analysis of 141 isolates identified five serotypes of FAdV in the Philippines, with Serotype 8b being the most prevalent. Given that protection from vaccination is serotype-specific, poultry producers should consider evaluating their breeder vaccination programs to ensure appropriate protection against the circulating FAdV serotypes.

Duration of immunity of a self-amplifying RNA H5 vaccine against highly pathogenic avian influenza H5Nx 2.3.4.4b clade in mule ducks

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Highly pathogenic avian influenza (HPAI) H5Nx virus, clade 2.3.4.4b, can induce disease in commercial ducks. Since it became a critical issue, France decided to vaccinate all its commercial ducks against HPAI. The self-amplifying RNA technology opens new avenues in terms of efficient vaccination against a moving target, safety, and differentiating infected from vaccinated animals (DIVA) strategy.

This study aimed at assessing the duration of immunity of a self-amplifying RNA H5 vaccine in mule ducks after challenge using a recent European HPAI virus strain of 2.3.4.4b clade.

Thirty-nine commercial ducklings were vaccinated during their first week of life and boosted three to four weeks later. Nineteen of them were challenged at six weeks of age, whereas the remaining twenty were challenged at thirteen weeks of age. Ten controls were also challenged each time.

Post-challenge clinical monitoring lasted for two weeks. Oro-pharyngeal as well as cloacal swabs were collected on days 1, 2, 4, 7, 10 and 14 post-challenge for virus detection and quantification. Blood samples were collected and tested by H5 and NP indirect ELISA tests.

Controls showed strong signs of infection whereas all vaccinated ducks did not; a significant shedding reduction was recorded in vaccinates versus controls. Most of the vaccinated ducks were seronegative by H5 ELISA test at the time of the second challenge. Altogether, these data support a duration of immunity of nine weeks post-booster vaccination in mule ducks, even in the absence of a persistently detectable antibody response.

Performance and serological comparison of GI-13 (1/96) and other IB variant vaccinated broiler flocks, from 2023 to 2024

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Infectious Bronchitis Virus (IBV), a highly contagious disease, is prevalent in Pakistan and causes significant economic losses in the poultry industry. This study compares the performance of 2 groups of hatchery-vaccinated commercial broiler flocks, one group consisting in a combination of IBV Mass (GI-1) and 1/96 IBV variant (GI-13) vaccines (group 1; 25 flocks; 711,000 birds) and another group vaccinated with a combination of Mass (GI-1) and 793B IBV (GI-13) or D274 (GI-12) competitor variant IBV vaccines (group 2; 26 flocks; 686,000 birds).

Serological analysis was conducted using an ELISA kit at slaughter age *(ID Screen® Infectious Bronchitis Indirect 2.0, Innovative Diagnostics, France)*. Performance data included mortality, average final body weight (ABW), and feed conversion rate (FCR). Results showed that group 1 had a significantly lower FCR (1.68) compared to group 2 (1.78). The average mortality in group 1 was lower (5.2%) compared to group 2 (11.9%). The ABW at 38 days of age was 2189 g. for group 1, compared to 2143 g. in group 2 (no significant diff.) Serological analysis revealed significant differences ($p<0.05$) with lower ELISA GMT titres in group 1 (8143; 31% CV), compared to group 2 (10723; 19% CV). In group 1, 48% (12/25) of the flocks had an average GMT above 9000, versus 73% (19/26) of the flocks in group 2, indicating a suspected IBV challenge as per kit manufacturer guidelines.

Statistical analysis confirmed that group 1 significantly improved FCR by 10 points, increased liveability by 6.6%, and proved lower ELISA GMT titres by 2580 units. These findings suggest that a thoroughly controlled application of a 1/96 IBV and Mass-type combination at day old in the hatchery improves flock performance and reduces the challenge titres, when compared to other commercially available GI-1 and GI-13 IBV combinations.

Keywords: Infectious Bronchitis Virus, poultry vaccines, 1/96 strain, 793B group, GI-23, GI-24, FCR, mortality, vaccine efficacy, broiler flocks, Pakistan.

Epidemiology of Infectious Bronchitis Variants in The Philippines

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Infectious Bronchitis is one of the most economically important diseases in the poultry industry. Between 2015 and 2024, the poultry veterinary team of Ceva Animal Health in The Philippines, analyzed the evolution of the infectious bronchitis virus (IBV) ELISA titers and performed IBV qPCR: 5'UTR Callison *J Vir Meth* 2006 and IBV PCR: XCE 1-3 Capua *Av. Pathol*. 1999 in suspected cases. Since different IBV variant clusters have been recently detected in The Philippines *(Gagan et al. 2023)*, an increasing pattern in the serological titers of the investigated farms might suggest a direct IBV challenge.

The survey monitoring was conducted between 2009 and 2024. The samples belong to broiler farms located in various provinces within the 3 major island groups in The Philippines (Luzon, Visayas, Mindanao). A total of 55 cases involving IBV variants were suspected by analyzing the ELISA titers and confirmed later by IBV qPCR: 5'UTR Callison *J Vir Meth* 2006 and IBV PCR: XCE 1-3 Capua *Av. Pathol*. 1999. The ELISA tests were performed using a Biochek® ELISA kit at Bioassets Veterinary Diagnostic and Research Laboratory, Sto Tomas, Batangas and the PCR tests and gene sequencing were conducted at Ceva-Phylaxia Veterinary Biologicals Co. Ltd., Budapest, Hungary. From all detections, 67% were allocated in the IBV cluster GI-7 (TW 1-like), 18% in the GI-19 (QX-like), and 4% in the Malaysian variant cluster. The rest (11%) could not be sequenced.

In summary, TW 1-like, QX-like and Malaysian variants are the most prevalent IBV variants in The Philippines, being TW 1-like the most predominant cluster. As a consequence, poultry producers in The Philippines should assess their IB vaccination strategy to avoid any IB-related economic impact.

Epidemiology of Reovirus in Broilers in The Philippines

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Avian Reovirus (ARV) is a highly pathogenic virus causing economic losses in poultry due to viral arthritis, immunosuppression, and growth retardation. Emerging variants complicate control measures, necessitating ongoing molecular and epidemiological surveillance. These antigenic variants led the way to adjustments in vaccine composition and autogenous vaccine production.

Monitoring aims to isolate the ARV-causing problem in various broiler operations, characterize these isolates through molecular sequencing analyses, and assess their pathogenicity in broilers.

From 2021 to 2024, organ samples (leg, tendon, heart, bursa, intestines, and gizzard) and organ impression smears on FTA cards were collected from flocks in Luzon and Mindanao showing clinical signs of viral arthritis and runting and stunting syndrome. These organ samples were sent to the Scientific Support and Investigation Unit laboratory, in Ceva-Phylaxia, Hungary for molecular diagnosis. Reovirus qPCR (Tang, Infect Genetic Evolution 2016) and Reovirus sC PCR (Kant *et al.*, Vet Research 2003) were used for analysis.

Sixteen samples were successfully isolated and classified though the antigenic mutation in σC (Sigma C) spike proteins. Results showed that the isolates belonged to Clusters I, II, V, and VI, wherein Cluster II and VI are predominant with 43.75% and 37.50% prevalence, respectively. Based on clinical signs, Clusters II and VI are capable of manifesting viral arthritis, runting, and stunting.

Variant isolates in the Philippines exhibited significant gene mutation. This antigenic change could lead to the reduction in the protection of the current commercially-available Reovirus vaccines. Various studies show the no to low cross-protection between intra-cluster and inter-cluster of Reoviruses. This study highlights the need for updated vaccine formulations and continuous surveillance to mitigate ARV economic impact on poultry production.

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Identifying potential relation and correlation between Fowl pox 'take' and antibody titre against Infectious Laryngotracheitis after the wing web application of Vectormune® FP ILT + AE in pullets

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Infectious laryngotracheitis (ILT) is an upper respiratory tract infection caused by *Gallid herpesvirus type 1* (GaHV-1) in chickens. This virus can cause severe production losses due to decreased production and/or mortality. Vaccination is commonly used as an intervention strategy, relying on conventional live attenuated vaccines. Although immunogenicity is high, live attenuated vaccines are known to carry the risk of regaining virulence and potentially causing outbreaks. A new generation of recombinant vaccines, such as Vectormune® FP-ILT-AE, was developed using the Fowl Pox virus (FP) as a vector. Following injection, this vaccine induces a pox-like lesion 4–8 days post-vaccination, which serves as an indicator of successful vaccine application in the field. This study aimed to identify potential relationships and correlations between pox scores and ILT antibody titres.

A total of 263 layer-type pullets (white and brown) at four separate locations under field conditions were vaccinated at 11–12 weeks of age using the wing-web method. After vaccination, pox scores were determined by palpation, and birds were categorised into positive or negative groups. Pox scores were subsequently reassessed using transillumination, a method that applies light to the back of the wing to visualise the pox and measure its length.

Twenty-one days after scoring, blood serum was collected for serological analysis of ILT antibody titres. Of 57 animals categorised as negative (based on palpation), 35 had positive antibody titres, resulting in a test sensitivity of 85.2%. When using the transillumination method, test sensitivity increased to 91.5%. Logistic regression revealed significant correlations between pox length and positive antibody titres for both white and brown birds, with p-values of $8.45e^{-5}$ and $3.65e^{-4}$ and odds ratios of 2.22 and 1.67, respectively.

These findings suggest that palpation-based pox scoring may underestimate vaccination rates in flocks, and transillumination could provide better insight.

Keywords: Fowlpox, Infectious Laryngotracheitis, pox 'take', antibody titre, Vectormune® FP-ILT-AE.

Effect of vaccination on transmission of infectious bronchitis virus strains QX and Var2

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Vaccination plays an important role in the control of infectious bronchitis virus (IBV) in chickens. Next to prevention of clinical signs and associated losses, a relevant characteristic of a vaccination strategy is the ability to reduce replication and prevent transmission of challenge virus. Reduced transmission of IBV within or between flocks results in fewer genetic variations that might lead to new IBV variants. Ideally, the transmission parameter R will be below 1.0 indicating that transmission of the IBV strain is blocked.

The aim of this study was to determine whether vaccination using the combination of a 793B- (GI-13) and a Mass-type (GI-1) IB vaccine could significantly reduce the transmission of IBV challenge strains Qx (GI-19) and Variant 2 (GI-23) in 24-day-old SPF layers. Transmission of the IBV challenge strains was compared between day-old-vaccinated and unvaccinated chickens. Half of the chickens were individually challenged in separate housing unit. On the next day they were reunited with their previous groupmates (contacts), exposing these chickens to IBV excreted by the challenged chickens. The excretion of IBV was measured by RT-PCR on oropharyngeal and cloacal swabs of all birds up to fourteen days post challenge.

Replication and transmission of both challenge viruses was clearly reduced in the vaccinated chickens. The results of the transmission parameter R analyses (are ongoing and) will be presented.

Antibody response to the saRNA H5 vaccine as an indicator of vaccine-take and predictor of efficacy in wild birds

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The recent global resurgence of avian influenza viruses (HPAI) of H5Nx subtype has affected bird populations worldwide. Upon the request of eight Hungarian Zoos and Wildlife Parks, with the support of Ceva WRF, avian influenza vaccination programs are conducted on wild birds kept at the Zoos, using an innovative RNA-based technology vaccine against avian influenza known as Ceva Respons® AI H5.

The vaccination program started in Oct/2024, involving altogether 1,100 birds from 119 species belonging to 20 families.

Serological investigation was performed on serum samples collected from 72 wild birds from 21 species belonging to 9 families, at the time of the 1st vaccination (D0) and 2-4 weeks after the second vaccination to evaluate the serological status of the birds for H5 HPAIV. The following kits were used for this procedure: ID Screen Influenza A Antibody Competition Multi-species (FLUACA) and ID Screen Influenza H5 Antibody Competition 3.0 Multi-species (FLUACH5) ELISA.

52 birds had complete result package (available D0 and follow-up sample results as well). Regarding the FLUACA (Influenza A specific), ELISA kits results, 38% of the birds were seropositive on D0 (due to the previously performed vaccination or natural infection). The serostatus between the 2 sampling points was changed in case of 25% of the birds, 62% of the birds became seropositive for Influenza A virus during the observation period (most probably due to possible natural infection).

Regarding the FLUACH5 (Influenza H5 specific) ELISA kits, 71% of the birds were seronegative on D0 (29% were seropositive due to previously performed vaccination) and 94% of them were seropositive 2-4 weeks after the 2nd vaccination.

According to the results the vaccine-take was confirmed in case of 51 birds (91%) since the S/P ratio of the FLUACH5 ELISA results showed increased serological values.

Keywords: HPAI H5, wild birds, DIVA vaccine.

The efficacy of a novel vector HVT-H9-ND vaccine in comparison to conventional inactivated H9N2 vaccines in commercial broiler chickens in Egypt

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Low pathogenic avian influenza virus (LPAIV) subtype H9N2-G.5.6 is widely distributed in Middle Eastern countries including Egypt for almost two decades. H9N2 as a low pathogenic virus is usually not able to induce disease alone but in case of viral and/or bacterial co-infections, severe respiratory disease and high mortality are common. In this study the efficiency of a novel vector (HVT-H9-ND) vaccine against H9N2 was compared versus conventional inactivated H9N2 vaccines in commercial broiler chickens under field conditions. A total number of 1,000,000 broiler chickens in four farms located in four Egyptian governorates were investigated in this study. The birds were vaccinated with the novel vector (HVT-H9-ND) vaccine at day-old versus the same number of birds in each farm vaccinated with conventional inactivated H9N2 vaccines at 5 days- old under same managemental and field conditions. For evaluation, all zootechnical parameters were recorded in each farm; in addition, tracheal swabs were collected on weekly basis. Also, spleen samples were collected for HVT-H9-ND vaccine takes on 28 days. A significant improvement in mortality rate, feed conversion rate and consequently it is reflected on significant improvement in European body weight index in HVT-H9-ND vaccinated houses versus inactivated H9N2 vaccinated houses. In these farms challenges with H9N2, infectious bronchitis virus (IBV) were detected by qrt-PCR. Zootechnical parameters were significantly better in HVT-H9-ND vaccinated houses compared to conventional inactivated H9N2 vaccinated houses, which suggests that the novel HVT-H9-ND vaccine is able to provide better clinical protection and birds performance owing to unique HA structure and cell mediated immunity induced by the vaccine.

Keywords: Egypt, Vector-H9-ND, novel H9 vector vaccine, respiratory diseases, H9, inactivated vaccines.

Prevalence of avian respiratory viruses in presence of variant IBD in broiler chickens in Egypt during 2024

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Poultry production in Egypt is facing production losses related to endemicity of different avian respiratory viruses including highly pathogenic (HPAI) H5Nx and low pathogenic avian influenza virus (LPAI) H9N2, Newcastle Disease (ND), infectious bronchitis (IB), and recently variant infectious bursal disease (IBD) viruses. In the current study, 186 broiler chicken farms were investigated with a total number 23,551,323 birds. The flocks suffered from acute respiratory symptoms with average mortality rate 11% in 14 Egyptian governorates during 2024. Farms were investigated to HPAIV-H5, LPAIV-H9, IBV, IBD and velogenic ND by real-time qRT-PCR. In positive samples the following genes were partially sequenced: HA of H5 and H9, F of vND, S1 for IBV and VP2 of IBDV. 126, 65, 64, 52, 8, and 1farms were positive to IBV, variant IBDV, LPAIV-H9, vND, HPAIV-H5, and vvIBDV , respectively. A single infection was detected in only 33.8% of them. A mixed infection was detected in 66.2% of them, especially the co-infection of IBV and H9N2 were detected in 54 out of 186 farms (29%). The co-infection of IBV plus H9 only was detected in 25 farms, while IB plus H9 with other viral pathogens was detected in 29 farms. Many combinations of viral infections were detected in 123 farms. Seasonal analysis revealed high mortality rate (22%) during winter while (3-5%) during summer. Partial sequencing analyses revealed continuous circulation of G23.2.3 clade of IBV and H9.5.6 clade of H9N2 LPAIV. Despite increasing ND virulence in farms, the sequence analysis revealed that genotype VII.1.1 is still the prevalent one. In silico analysis also proved that Variant IBD A2d become the most predominant IBDV genogroup at the expense of vvIBD (A3) that was detected only once during this study. This study provides an updated and comprehensive epidemiological information about the most prevalent respiratory pathogens, as well as the frequent underlying immune suppression. Extensive diagnostic surveillance is critical to design appropriate mitigation strategies.

Keywords: Egypt, epidemiological study, respiratory diseases, H5, H9, variant IBD, ND.

Evaluation of vaccination protocols against avian influenza in France using a transmission model

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Since 2015, the French poultry production has faced recurrent incursions of highly pathogenic avian influenza (HPAI) H5Nx viruses. Outbreaks have mainly affected duck fattening farms but have also impacted other poultry operations, including breeding farms. The study aimed to assess the potential effectiveness of different vaccination strategies in mitigating the spread of HPAI viruses within the French poultry production networks.

We developed a stochastic discrete-time compartmental model with farms as epidemiological units. Populated farms transitioned through mutually-exclusive states: susceptible; infected; recovered; vaccinated; and protected by maternal immunity. Farms were depopulated at the end of a production cycle or earlier if an infection was detected and repopulated following a downtime period. The model was designed to represent the main French poultry production sectors (i.e. broiler, layer, turkey, guinea fowl, duck) including breeders farms and indoor and free-range farms. We implemented three vaccination scenarios: (1) vaccination of duck farms, (2) vaccination of duck, turkey and free-range production farms and (3) vaccination of all poultry farms except broiler farms. These scenarios were simulated in an epidemic context, with transmission parameters chosen to reacha mean incidence of 70 outbreaks in the first month following an index case farm.

Over a six-month period, vaccinating ducks alone reduced the number of outbreaks by 60% compared to the absence of vaccination. Vaccinating duck, turkey and free-range farms or all species but broiler kept the mean incidence under 10 outbreaks.

This work can help in the decision-making process for national protocols. Moreover, our model is adaptable and can be used in various poultry production systems and epidemiological contexts.

Transmune: A Crucial Tool in Controlling Variant IBD Spread in Egyptian Poultry Farms

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For years, Egyptian poultry farms have faced high mortality rates due to multifactorial infectious causes. Infectious Bursal Disease (IBD) is a significant contributor. Recently, a variant of IBD was detected, further complicating the situation and exacerbating the challenges.

Vaccination is an effective tool to control the losses and adverse effects of IBD. An immune-complex vaccine like Transmune has proven its effectiveness in controlling variant IBD in Egyptian poultry farms. In the current study, Transmune was used on a problematic chicken farm with 70,000 birds suffering from a high mortality rate (47%). Laboratory tests confirmed the presence of IBD, IBV-var2, and H9. Sequencing of ten bursal tissues revealed that all were positive for the variant IBD A2dB1b. This flock was initially vaccinated with a vector HVT-IBD vaccine.

After this cycle, the flock was vaccinated with Transmune. The performance data showed significant improvement compared to the previous cycle. The mortality rate in the first Transmune cycle was 4.4%, and the feed conversion ratio (FCR) was 1.64, compared to 47% and 2.1%, respectively, in the previous cycle. Sequencing of ten bursal tissues from the first Transmune cycle showed that 70% were positive for Winterfield 2512 (the strain of the Transmune vaccine), while 30% were still positive for the variant IBD.

In the second and third Transmune cycles, performance results continued to improve. Mortality rates were 3.1% and 3.2%, respectively, and FCRs were 1.6 and 1.53. Total body weights were 1.87 kg and 1.99 kg at 32 days of age. Additionally, in both the second and third Transmune cycles, bursal tissues were 100% positive for Winterfield 2512.

These results indicate that Transmune successfully controlled the variant IBD infection. Over successive cycles, it was able to replace the field virus with the vaccinal Winterfield strain, leading to improved flock performance parameters.

Keywords: Egypt, variant IBD, Transmune.

Displacement of Very Virulent Infectious Bursal Disease (A3B2) using Next Generation Immune Complex (W2512) in Indonesia with RT-PCR

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Infectious bursal disease virus is still major infectious disease in Indonesia causing high economy impact. A3B2 IBD virus strain was detected in the outbreak gumboro farm. This study aims to gather field evidence of earlier consistent immunization the use of next generation of IBDV immune complex vaccine consisting of W2512 strain could accelerate for IBDV field strain displacement. 6 cycles flocks monitored with collected 20 individually sera at day 1, 24 and 35 tested with ELISA along with bursa Fabricius smeared onto FTA cards from 35 day of old and tested in scientific studies investigation unit's laboratory – SSIUs. Active seroconversion was detected at three weeks of age with ELISA. The first cycle (cycle 75) detected IBDV clinical sign with 64% of A3B2, 36% of W2512 together with inclusion body hepatitis infection tested by histopathology. Cycle 76 detected IBD clinical sign with lower mortality and the A3B2 strain virus was reduced from 64% to 15%, mix (A3B2 + W2512) 17% and 68% of W2512. Cycle 77, there was no IBD clinical sign detected, the A3B2 strain reduced from 15% to 3%, mix (A3B2 + W2512) 42% and 55% of W2512. Cycle 78, there was an increase in mortality of the birds and showed severe respiratory problem with AI H9 challenge and IBDV virus characterization showed 76% of (A3B2), mix (A3B2 + W2512) 5% and 19% of W2512). After 6 cycles at cycle 80 there was no IBD clinical sign with 100% W2512 detected.

Keywords: Displacement, Infectious bursal disease virus, Immune complex vaccine, W2512, A3B2.

Investigation of the Respiratory Co-Infections in Chickens in Ten Countries from Four Continents (2023/2024)

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Respiratory diseases are responsible for major economic losses and health problems in commercial poultry worldwide. Under field conditions, respiratory diseases are increasingly shown to be complicated infections involving multiple aetiologies. This study aims to investigate the respiratory co-infections in commercial poultry flocks from ten countries in Asia, Middle East, Europe, Africa, and Latin America.

Two hundred and three commercial broiler, layer and breeder flocks showing acute respiratory disease outbreaks in China, Indonesia, Malaysia, Vietnam, Türkiye, Poland, Egypt, Brazil, Colombia, and Mexico were included in the study. Tracheal swabs were collected, within five days from the onset of the disease. Samples were tested for low pathogenicity avian influenza virus (LPAIV) H9N2 type, infectious bronchitis virus (IBV), Newcastle disease virus (NDV), avian metapneumovirus A and B (aMPV), infectious laryngotracheitis virus (ILTV), *Mycoplasma gallisepticum* (MG) and *Mycoplasma synoviae* (MS) using commercial IDvet qPCR kits and for *Ornithobacterium rhinotracheale* (ORT) using Croville *et al.* (2018) qPCR.

Apart from Brazil, where only 20% of the flocks showed co-infections, all other nine countries showed co-infections in over 65% of the investigated flocks. The co-infections rate was higher than 80% in Poland (100%), Vietnam (91.6%), Malaysia (85.7%), Mexico (84%), and Egypt (86.3%) and between 65 and 80% in Indonesia (74%), Türkiye (71.4%), China (68.2%), and Colombia (65.5%). Interestingly, the co-infection patterns varied from country to county and between the production types. For instance, in broilers in Indonesia, the co-infection combinations involved IBV, ILTV, MG and MS whereas in Vietnam it was IBV, H9N2 and MS. Despite this variability, IBV was the common pathogen for all countries and the most involved in the co-infections.

This study demonstrates that the respiratory diseases, in their majority and regardless the geographic area, are co-infections. The screening of a panel of pathogens will open a new era in the respiratory disease diagnosis.

Keywords: Respiratory disease; co-infections, commercial poultry, molecular biology.

Experiences in Conventional Turkeys Given a Commercial Coccidiosis Vaccine as part of a Standard Rotational Program for Coccidiosis Control

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The commercial turkey industry is limited in what tools they have available to use for coccidiosis control. This challenge is largely due to reports of increasing resistance of oocysts to currently available in-feed anticoccidials in many operations. Additionally, recent survey results from the Association of Veterinarians in Turkey Production group identified coccidiosis in turkeys as a top research and development need for their industry. Namely, they were interested in determining the most effective non-ionophore/antibiotic strategies for controlling coccidiosis, and best practices for using coccidial vaccines. As a result, turkey veterinarians and producers are increasingly turning to coccidiosis vaccines and using them in rotation with anticoccidials in the feed as a standard component in their prevention programs. Historically, coccidiosis vaccines were reserved for specialty turkey flocks such as organic or antibiotic free programs, but in recent years, vaccines have been a key component to conventional turkey programs in the United States. This paper will discuss the experiences over the past few years of how coccidiosis vaccines have performed in these programs when used seasonally (fall-spring) in rotation with anticoccidials in the feed. Producers reported a nice improvement in their drug program after vaccine compared to prior years without the vaccine used on the front end. Producers also reported that the flocks that went through the same barn after vaccine was used once they rotated to the chemical program were exceptional. In addition, their data has shown that the commercial coccidia vaccine maintained the same mortality rates as they experienced in the past with the ionophores and chemicals and that during vaccine use, birds competed with other non-vaccinated flocks. Experience in the field has shown that coccidiosis vaccine is another practical tool that can be used in a coccidiosis rotational control program in conventional turkeys.

Keywords: Turkey coccidiosis vaccination, rotational program, conventional turkey production.

Field comparison of two different vaccination approaches to control Infectious Bronchitis in broilers in India

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Infectious bronchitis (IB) is an acute disease in chickens caused by the Infectious Bronchitis virus (IBV), leading to significant production losses in broilers. Infection of the upper respiratory tract results in rapid loss of ciliated epithelium and impaired mucociliary clearance, predisposing chickens to secondary bacterial infections (Hoerr, 2021). In India, the GI-1, GI-13, one field isolate grouped with GIII, GV, and GVI genetic lineage and a variant genotype unique to India (GI-24) have been reported (Raja *et al.*, 2020) and the disease control has become more challenging when relying exclusively on the IB Massachusetts vaccine strains.

A field study compared 1.1 million broilers vaccinated with 1/96 (793 B group) and Massachusetts strains (heterologous approach) to 0.7 million broilers vaccinated with the currently employed program with Massachusetts strain alone. Both protocols were administered at the hatchery using different spray machines: Desvac Hatch spray for heterologous vaccination and a hand spray machine for the traditional method.

Choanal swabs were collected five days post-vaccination to evaluate vaccine uptake. Additionally, serum samples were collected from both groups at lifting age and analyzed using the BioChek IBV ELISA kit. Key production parameters were subsequently compared between the two groups.

The heterologous vaccination approach achieved an average positivity rate of 97% for vaccine uptake, whereas the traditional system reached a mere 9%. Serological analysis demonstrated that mean titers were within the expected vaccination range in 98% of flocks vaccinated with the heterologous strategy, while all flocks under the traditional vaccination approach exhibited expected titers.

Overall, the flocks vaccinated with the heterologous vaccination approach exhibited an additional 110 grams of body weight, a reduction of two points in feed conversion ratio (FCR), and a 1.5 percentage point decrease in mortality. These improvements culminated in a ten-point increase in the European Efficiency Factor (EEF).

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Keywords: Infectious bronchitis, Massachusetts, variant strain, heterologous vaccination approach.

Long-term serological studies of Infectious Bronchitis using different vaccination protocols in broiler flocks in Poland

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Infectious bronchitis (IB) is a disease which cause significant economic losses and under Polish overcrowded production conditions, the choice of an effective vaccination protocol against IB is essential.

The aim of this study was to compare the serological results over a 5-year period from an integrated broiler company that used a standalone heterologous vaccination program against IB (Cevac IBird + Cevac Mass L) in the hatchery to serological results from other integrations that different preventive vaccination programs based on other IB strains were used.

The data from 366 flocks from an integration using the standalone vaccination program and 1014 flocks from the rest of the country were compared based on reports provided by the laboratory. Twenty-three serum samples were randomly collected from each flock before slaughter and analysed using the ELISA method (Biochek). The results over the period 2020-2024 were stored in the Global Protection Services (Ceva Animal Health) data cloud for further analysis.

The results showed a statistically significant decrease of mean IB titers in the integration using the standalone program in the hatchery when compared to other farms. The average titers for the years 2020 to 2024 were: 2513, 1891, 1822, 2086 and 2153 respectively for the integration, whereas the other farms exhibited a marked increase to 4082, 5342, 4452, 4310 and 4254 respectively. Differences were also noted in the other parameters indicating field pressure probability in the farms using different vaccination programs.

This long-term study suggests that the use of a heterologous standalone vaccination program based on the combination of "mass" and variant strains when administered by spray in the hatchery induces a satisfactory level of humoral immunity as detected before slaughter, which in turn appears to offer efficient clinical protection against various IB strains.

Keywords: Infectious bronchitis; IB; serology; broilers; IBird; Mass L; Biochek.

Efficacy and safety of Vectormune® FP-LT+AE in chickens: 4 years of experience in Europe

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Fowl Pox (FP), Infectious laryngotracheitis (ILT) and Avian Encephalomyelitis (AE) are of major concern in poultry worldwide due to the impairment of production parameters. Vectormune® FP-LT+AE is a live genetically modified virus vaccine containing a Fowl Pox virus (FPV) as a vector carrying the glycoprotein B (gB) and UL 32 of ILT virus, and containing live AE virus, strain Calnek 1143. The aim of this study was to assess the serological response for ILT and AE in poultry flocks vaccinated with Vectormune® FP ILT + AE under field conditions focusing of onset of immunity (OOI), duration of immunity (DOI) and performance. More than 700 flocks all over Europe were vaccinated between 8-12 weeks of age by wing-web administration and blood samples were collected at regular weekly intervals post vaccination (PV) up to 58 weeks of age depending on the protocol. The assessment of vaccination quality was done by observing granuloma reactions at 7-10 days PV. Two commercial Elisa kits; one especially developed for the gB insert of the FP vector vaccine (IDVet gB Indirect) and BioChek, were used to measure ILT Immunization, while AE immunity was assessed with BioChek and IDexx kits. The results at 4 weeks PV showed a strong ILT seroconversion, as measured by the gB Elisa regardless the vaccination age, and a positivity rate of 81% which reached 100% at 6 weeks and remained so till the end of the trial. AE serological results exhibited significant seroconversion at 3 weeks PV onwards regardless of the Elisa kit used and a positivity rate up to 88-94% at 6 weeks of age. Performance parameters were also in line to breed standards. Vectormune® FP ILT + AE was proven to be efficacious and safe with strong OOI and long DOI during the production period in the field.

Keywords: Vectormune® FP ILT + AE, Fowl Pox, Infectious Laryngotracheitis, Avian Encephalomyelitis, chickens.

Safety and efficacy of a combined vaccination scheme with Genotype Strains GI-13 (1/96) and GI-1 (B48) against Infectious Bronchitis during lay in commercial layers

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Infectious bronchitis (IB) is one of the most important viral diseases causing significant economic losses for the poultry industry worldwide. The scope of this study was to assess the safety and efficacy of two commercial IB vaccines, belonging to 793B and Massachusetts serotype groups, and investigate the vaccine kinetics during lay in commercial layers.Two different commercial layer flocks were re-vaccinated against IB during the laying period. Flock A was vaccinated with the use of a Mass-like B48 (CEVAC® MASS L) and 1/96 strain (CEVAC® IBird) via drinking water at the age of 40 and 50 weeks, while flock B was vaccinated with the same vaccine combination at the age of 50 and 60 weeks by spray. The immune-response of IB revaccination was evaluated by ELISA method (BIOCHEK) taking blood samples at the time of vaccination and two weeks post vaccination, while the vaccine kinetics was investigated through the ability to recover the vaccine strain 5-6 days post vaccination from oronasal and cloacal swabs by using RT-PCR. In both flocks A and B, a boosting effect in average mean titers (AMT) was observed after the vaccine application at all points of sampling regardless the route of vaccination. The investigation of vaccines' kinetics after revaccination revealed no presence of the 1/96 and B48 vaccine strains in the oropharyngeal or cloacal swabs in both flocks, except 2 weak positive cloacal swabs in Flock A. Regarding the flock production data, in both flocks mortality remained below 0.1% per week after each vaccine application following the normal mortality trends, while the egg production (%) matched to the expected laying percentage specification given for the specific breed and relevant age period. These results confirmed the safety and efficacy of this combined vaccine scheme during the egg production applied by drinking water or spray application route.

Serological evaluation of humoral immunity in commercial layers and layer breeders vaccinated against laryngotracheitis with the use of a vector vaccine (Vectormune® FP-ILT-AE) at the end of rearing period and during late production

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Infectious laryngotracheitis (ILT) is a severe Avian viral disease that manifests respiratory signs. The aim of this study was to evaluate antibody production at 6 weeks post vaccination with the use of a recombinant Fowl Pox (Vectormune® FP-ILT+AE) vaccine under field conditions in layer pullets and breeders, and at late production as well.

Twenty-four commercial pullet and layer breeder flocks were vaccinated with the FP-ILT+AE vector vaccine by wing-web method between 8-10 weeks of age. Twelve serum samples were randomly collected from each flock, 6 weeks post vaccination and before the birds were transferred to the production unit at 14-16 weeks of age.

Additionally, 13 flocks, originating from the previous pullet flocks, were sampled again at 65 weeks of age and a questionnaire was filled out for evaluation of flock health status during production. All serum samples were analyzed using the ELISA method (IDVET, ILTgB kit).

The ELISA results revealed different antibody levels between the two timepoints / ages. The flocks at 65 weeks of age (average mean titer: 9729 ± 630, average CV: 70%, average flock positivity: 99%) showed significantly higher antibody titers compared to those at 14-16 weeks (average mean titer: 3724 ± 214, average CV: 93%, average flock positivity: 90%) when statistically analyzed by independent t-test ($p<0.05$). Additionally, increased mean antibody titers and high average serum positivity (99%) at the timepoint of 65 weeks, suggested probable exposure to the ILT virus in the field. However, according to the stated flock health status history in the questionnaire, none of these flocks displayed clinical signs and macroscopic lesions indicating ILT, while mortality rates remained within expected levels.

This study suggests that the use of the recombinant FP-ILT+AE vaccine induces a satisfactory level of antibody seroconversion as detected 6 weeks after vaccination, which appears to offer efficient clinical protection against ILT virus exposure during the production period in the field.

Keywords: Layers, laryngotracheitis, vector vaccine, serology.

Prevention of egg drop and reduction on H9 low pathogenic avian influenza virus replication after a single vaccination with a recombinant HVT-ND-H9 vaccine

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H9N2 low pathogenic avian influenza virus (LPAIV) infection typically causes mild respiratory issues and a reduction in egg production in commercial layer chickens, leading to significant economic losses. Besides inactivated vaccines, a recombinant turkey herpesvirus vaccine (rHVT-ND-H9) is available, providing long-lasting protection with a single vaccination at day-old, eliminating the need for boosters.

This trial aimed at testing the efficacy of a rHVT-ND-H9 vaccine (Newflend ND H9) against H9 LPAIV challenge during the laying period, assessing viral replication in various organs and egg production.

Day-old commercial layer-type chicks were either vaccinated with a single dose of the vaccine subcutaneously or kept unvaccinated. No additional H9 vaccination was applied. At 47 weeks of age, 40 layers per group were challenged intranasally with 10^6.0 EID_{50} of H9N2 LPAIV from North Africa (G1 lineage / G5.5 clade). Ten chickens from each group were sampled at 4-day post-challenge to measure the challenge virus amount in conjunctival and oronasal swabs and trachea, lung, duodenum, caecal tonsil, oviduct and kidney samples using RT-qPCR. Thirty chickens per group were monitored for egg production up to 28-day post-challenge.

Vaccination reduced viral replication at 4 days post-challenge significantly compared to the unvaccinated challenged control. Challenge caused a significant drop in egg production without eggshell abnormalities in the unvaccinated control group, with a very slow recovery. By the end of the 4-week post-challenge observation period, egg production rates had not returned to normal levels in the controls. In contrast, no drop in egg production was observed in the vaccinated group.

A single vaccination at day-old, using the rHVT-ND-H9 vaccine provided complete protection against egg production drops caused by H9N2 LPAIV challenge at 47 weeks of age and significantly reduced challenge virus replication not only in the respiratory tract, but in the enteric tract, kidney and the reproductive tract as well.

Keywords: LPAIV H9N2, commercial layers, egg drop, virus load, turkey herpesvirus vector vaccine.

The impact of an innovative vector vaccine against Mycoplasma gallisepticum in commercial layers on the reduction of antibiotic usage in India

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Mycoplasma gallisepticum is a pathogen that causes significant economic losses to the poultry industry worldwide. Its prevention relies on farm and flock biosecurity, management strategies, early diagnosis, use of antimicrobials, and vaccination (Mugunthan *et al.*, 2023).

In India, anti-mycoplasma drugs are commonly used to mitigate the impact of Mycoplasma gallisepticum. Typically, layer flocks receive 16 treatment schedules of antibiotics as a prophylactic measure against MG. In this study, five-layer flocks (F1-F5) were vaccinated with the rFPV-MG vaccine via wing web route, and their antibiotic treatment regimens were modified. Specifically, flocks F1 and F5 received no antibiotic treatment, flock F4 received 4 treatments, and flocks F2 and F3 received 9 treatments.

The vaccine-take was assessed by the percentage of birds with a granuloma formation in the wing web membrane at 5 to 7 days post-vaccination. Blood samples were collected before and after vaccination and at 10, 20, 30, 40, 50 and 60 weeks of age and evaluated by BioChek MG ELISA kit. Additionally, vaccinated flocks were monitored throughout their lives for clinical signs attributable to MG infection and egg production. The vaccine-take reached 98%, in average.

The MG ELISA titers from the flocks F1, F3 and F5 remained below the positivity threshold up to 60 weeks of age, indicating that these flocks were not exposed to field MG. Conversely, Flocks F2 and F4 exhibited an increase in titers at 30 weeks and 50 weeks of age respectively, indicating exposure to field infection. Notably, none of these two exposed flocks displayed any abnormal clinical signs or a reduction in egg production demonstrating the vaccine efficacy. Additionally, the vaccination with rFPV-MG vaccine allowed drastic reduction of antibiotic usage resulting in cost savings varying from INR 6,000 to 14,000 (€ 66 to €155) per thousand birds.

References:

Mugunthan, S.P.; Kannan, G.; Chandra, H.M.; Paital, B. Infection, Transmission, Pathogenesis and Vaccine Development against *Mycoplasma gallisepticum*. Vaccines 2023, 11, 469. https://doi.org/10.3390/vaccines11020469.

Keywords: *Mycoplasma gallisepticum*, commercial layer, rFPV-MG vaccine, Antibiotic reduction, India.

First Identification of TC07-2 (GVI-1) strain of Infectious Bronchitis Virus in Malaysia

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Infectious bronchitis virus (IBV) is a single stranded RNA virus, hence highly susceptible to spontaneous mutations and genetic recombination leading to antigenic shift and drift, which may result in the emergence of new variants. This case study describes the first identification of GVI-1 (TC07-2) IBV strain in Malaysia in a co-infection with GI-19 (QX-like) and GI-13 (793B-like) IBV strains.

A broiler farm in Malaysia reported 5-10% mortality with poor body weight and uniformity. Birds were vaccinated with inactivated Newcastle Disease (ND), Infectious Bursal Disease (IBD) immune-complex and ND IB live vaccines at one day of age, followed by two farm boosters including live ND and IB strains at 7 and 14 days of age. Birds started to suffer respiratory clinical signs like swollen heads, coughing and sneezing from day 20 onwards. Necropsy was performed, detecting airsacculitis and swollen kidneys. Organ samples were collected for conventional RT-PCR.

Total RNA was extracted from freshly dissected trachea and cecal tonsil using the RNA Extraction Solution (GeneReach®) following the manufacturer's recommendations. Partial IBV S1 gene was amplified using the primers described by Worthington *et al.*,2008, followed by gel electrophoresis and sequencing. Subsequently, phylogenetic analysis based on the 343 base pairs long of nucleotide sequence of the S1 gene of IBV was performed to depict the evolutionary relationship and distance of various IBV variants.

According to these analyses, the sample contained the TC07-2 (GVI-1), 793B (GI-13) and QX (G1-19) IBV strains, thus becoming the first identification of the TC07-2 (GVI-1) strain in Malaysia. This strain needs to be closely monitored, coupled with the implementation of a robust preventive IBV cross-protection strategy.

Keywords: Infectious bronchitis, GVI-1 (TC07-2), genotype, Malaysia, broiler.

Epidemiology and Impact of Infectious Bronchitis Virus in Malaysia (2021 - 2024)

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Infectious bronchitis (IB) is an economically significant and highly contagious poultry disease caused by infectious bronchitis virus (IBV). IBV has wide and variable tissue tropism, thus disease has diverse clinical manifestations. It is highly prone to antigenic changes through mutation or recombination, which has led to the classification into genotypes and lineages. Surveillance and identification of IBV types are important for the control of the disease and the advancements of molecular methods have aided in this pursuit.

A total of 91 samples were collected from all over Malaysia from 2020 to 2024 in suspected IB outbreak cases. Viral detection was performed through genome amplification using reverse transcriptase polymerase chain reaction (RT-PCR), followed by virus strain identification and characterization, allowing a preliminary distinction between vaccine and field strains.

There was one reported detection of field IBV strain in 2020, followed by 2 cases, 1 case, 9 cases and 19 cases respectively, from 2021 to 2024, which clearly showed an upward IB disease challenge in Malaysia. This trend has been further corroborated by serology monitoring performed in 864 broiler flocks at harvesting age, observing an especially significant trend in the Northern part of Malaysia. This study also highlights the economic importance of proper IB protection, by splitting the performance of the serologically sampled flocks in 2 groups: a low-titre class group (ELISA IBV Biochek® GMT<2000, suggesting lack of challenge) and a high-titre class group (ELISA IBV Biochek® GMT >2000, suggesting field challenge), demonstrating the former a significantly better performance compared to the latter (p-value<0.05).

Interestingly, during the investigation, the TC07-2 (GVI-1) IBV strain was detected in 2024 for the first time in Malaysia.

A holistic approach including disease prevention and control has been introduced since then, showing a significant improvement in IB ELISA titres after an adoption of a protective strategy (p-value<0.05).

Keywords: Infectious bronchitis, epidemiology, GVI-1 (TC07-2), performance index, broiler, ELISA, titres, IB, IBV.

Field serological monitoring of mule ducks vaccinated against highly pathogenic avian influenza with a self-amplifying RNA vaccine in France: importance of the quality of vaccination and vaccine uptake

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Highly pathogenic avian influenza (HPAI) has severely impacted poultry production in France for the last eight years. French authorities were the only ones in Europe to choose vaccination as a complementary tool for controlling HPAI in commercial duck production.

The novel self-amplifying RNA vaccine technology represents a breakthrough in animal health vaccines use. Beyond efficacy and viral shedding reduction expectation, this fully synthetic vaccine aligns perfectly with the differentiating infected from vaccinated animals' strategy (DIVA). To provide guidelines of such a vaccine to the users in the field, it is essential to establish serological response standards.

Enzootic disease control through vaccination can only be ensured if the vaccination quality is suitable. Therefore, monitoring vaccination uptake in various field conditions using accessible tool, namely serology is a crucial issue.

Ten commercial mule ducks flocks (60,000 ducks) were included in a field serological monitoring study. Ducklings were vaccinated with a self-amplifying RNA vaccine at day 1 and before day 28 by intra-muscular route.

Blood was collected from 20 random ducks every two weeks; sera were tested using a commercial Indirect H5 Elisa kit. Post-vaccination antibody titers showed a strong and rapid seroconversion 1 to 2 weeks after the booster. After this peak, a slow antibody detection decrease was observed until the study's end.

Thanks to this field investigation, an optimal blood sampling window has been set to assess the whole vaccination program quality. This will provide standards for the control and evaluation of vaccination uptake from now on in mule duck flocks.

Comparison of the spray application of a GI-13 (1/96) live infectious bronchitis vaccine using conical and flat nozzles

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Spray vaccination is widely used to protect birds against infectious bronchitis (IB). Caused by a gammacoronavirus, IB continues impacting poultry health and profitability margins all over the globe. A successful spray vaccination relies on multiple factors and still remains a key challenge for the poultry industry, especially when performed in non-automated hatcheries. If not applied properly, the protection could be suboptimal or even fail. A spray quality comparison was conducted to investigate this. Two spray cabinet machines, equipped either with conical (group A) or flat nozzles (group B), were compared. A total of 1,400 commercial broiler chicks were vaccinated with 1/96 + Mass L, separated in 2 different rooms in the same location and vaccinated at 1 day of age. From each group, 100 birds were randomly sampled using choanal swabs at days 1 and 5 post-vaccination (d.p.v.). IBV detection was performed by using 5'-UTR RT-qPCR (Callison *et al.* 2006). Higher rate of vaccine detection was observed in group B than A at 1 d.p.v. (78% vs. 72%, respectively, *n.s.*). At 5 d.p.v., the PCR results were statistically similar, however, all samples in group B were 100% positive compared to group A (99%). Additionally, FTA classic cards (Qiagen®, Hilden, Germany) were used in parallel in both groups at 5 d.p.v. The results showed that both sampling techniques could be used for vaccine detection (97% FTA vs. 99% swabs, *n.s.*). We hypothesize that a difference of 6% in vaccine detection rate at 1 d.p.v., although not statistically significant, might show a difference in the uniformity of the application, which in turn could influence early IB protection and vaccine cycling until 5 days of age. To summarize, these results demonstrate that flat nozzle technology is reliable and optimizes IB vaccine detection rate.

Keywords: Bronchitis, hatchery spray vaccination, flat nozzles.

A3B1 IBDv replacement using Frozen Next generation IBD Immune complex vaccine. Impact and control of reovirus as co-infection

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Infectious bursal disease virus(IBDv) is described as major infectious immune suppressive disease causing mortality and economy losses but the diagnostic was easy to do with specific bursa lesions. Since 2020, lot of publications describe the impact of different IBDv strains with some not characteristic symptoms(diarrhoea, prostration, heterogeneity) or lesions(no bursa hemoragy, no bursa oedema).In France ,Europe and recently in Ukraine and Turkey,A3B1 IBDv strain colonize the bursa at early time(beginning at 12 days in some farm) with early digestive syndrome, decreasing the appetite of broiler and create bad bodyweight uniformity and FCR increasing.

Necropsy is the key point of the investigation to investigate the immune suppressive infectious origin: The thymus is reactive with petechiae and congestion at the second and third week of live. A3B1 IBDv is detected on the bursa and the thymus , No Adenovirus, No Chicken Anaemia Virus and in some flock, cluster 2 and cluster 4 Reovirus are isolated.

To control A3B1IBDv early challenge, New Immune complex Frozen IBDv vaccine is applied at day1 in the hatchery for earliest vaccine take and more efficient protection of the immune system organs as bursa and thymus. The pressure of Reovirus and Birnavirus is decreasing by adapted biosecurity process(Cleaning and disinfection with the right dose and right application methodology. In 2 cycles, the results comeback to the standard.

Different IBDv field strains investigation in the immune system organs

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Infectious bursal disease virus is major infectious disease causing mortality, economic impact (Poor performances, poor uniformity, elevated FCR and early immunosuppressive consequences). Since 2020, lot of publications describe the impact of different IBDv strains with some not characteristic symptoms (diarrhoea, prostration, heterogeneity) or lesions (no bursa hemorrhage, no bursa edema, thymus enlargement and petechiae).

This study assessed the capacity of 2 IBDv strains to colonize the bursa but additional immune organs are affected and colonized. On the field in France and China, the primary and secondary immune system organs were collected. The Bursa, spleen, Harder gland, B.A.L.T.(Bronchus Associated Lymphoid Tissue), G.A.L.T.(Gut Associated Lymphoid Tissue), Blood, Caecal Tonsils and Thymus are collected on FTA card for PCR analysis, histology and Immunochimistry analysis to describe the colonization of immune organs by the 2 variant IBDv strains A3B1 and A2dB1.

The results demonstrate a colonization at the fifth week of all immune system organs with damage of the tissues and high quantity of IBDv in all immune system organs, including the BALT.

The emerging IBDv strains as A3B1IBDv and A2dB1 IBDv don't have capacity to create high mortality (0 to 4%) but create several immunodepression, especially on the primary immune system organs and secondary system organs and to increase the capacity for respiratory, digestive or septicaemic virus entrance. The impact depends of the infection age.

Analysis of IBV Infection Pressure in Chicken Flocks from 2022 to 2024 in China

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Avian Infectious Bronchitis Virus (IBV), first reported in China in 1958, is a highly contagious pathogen affecting the respiratory, renal, and reproductive systems of chickens, leading to reduced productivity and significant economic losses. A systematic evaluation of field infection pressure is essential for effective IBV control.

From 2022 to 2024, the Scientific Support and Investigation Unit (SSIU) of Ceva China conducted a large-scale serological study using Biochek and IDEXX IBV antibody ELISA kits. A total of 4,365 serum samples were collected from 35-day-old chickens across 241 vaccinated flocks in 14 provinces of China. IBV antibody titers were analyzed to assess field infection pressure.

Field infection pressure was defined as present when more than 20% of chickens in a flock had titers >1,500 (IDEXX) or >2,500 (Biochek). Infection pressure was further categorized into four levels: a) No or Low: <20% birds with elevated titers; b) Medium: 20–40%; c) High: 40–60%; d) Very High: ≥60%.

The proportion of flocks showing field infection pressure increased from 54.7% in 2022 to 76.4% in 2024, with 46.1% of all flocks experiencing high or very high pressure. Additionally, 129 flocks showed a coefficient of variation (CV) above 60%, indicating inconsistent immunity.

The results demonstrate widespread IBV field exposure in Chinese poultry flocks and highlight the need for improved vaccination strategies and administration practices. Proactive monitoring of IBV antibodies is a practical and effective method for evaluating field infection pressure and guiding preventive interventions.

Monitoring the immune quality after spray immunization with a GI-13 (793/B) infectious bronchitis live attenuated vaccine

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Infectious Bronchitis Virus (IBV) can lead to respiratory symptoms, kidney lesions, and decreased egg production and quality, resulting in significant economic losses for the poultry industry. Live attenuated infectious bronchitis (IB) vaccines are the most effective strategy for controlling the disease. Spray immunization enables vaccine strains to colonize the upper respiratory tract, where they stimulate mucosal immunity and form a protective barrier, reducing the risk of wild-type IBV infection. Therefore, monitoring the quality of vaccine colonization is crucial for effective disease control.

From 2020 to 2024, we monitored 1,209 flocks spray-vaccinated in the hatchery at 1 day of age and collected 21,944 choanal swabs 4 days post-vaccination. Of these, 16,165 samples (Group A) were vaccinated using Cevac® IBird (793/B-Type) and Ceva Huadu ND-IB Live (Mass-Type) using a Desvac spray cabinet or In-Line-Sprayer (ILS) equipment, whereas 5,779 samples (Group B) were vaccinated with other IB vaccine combinations, using 3rd party spraying devices. RT-qPCR was used to detect and quantify vaccine strain colonization. Three indicators were assessed: positivity rate, Ct values (inversely related to viral load), and the coefficient of variation (CV) of the Ct values (reflecting uniformity of immunization).

Group A achieved a global 98.8% positivity rate, median Ct value of 21.2, with 50% of Ct values ranging from 19.2 to 24.5 and a CV of 9.7%. On the other hand, group B showed a lower 78.4% positivity rate, median Ct of 26.5, with 50% of Ct values ranging from 20.8 to 36.4, and a higher CV of 23%.

These findings highlight significant differences in immunization quality. To optimize vaccine efficacy, producers should select vaccines with proven stability and ensure proper use of spraying devices by following standardized procedures and strengthening the training of the personnel involved in the vaccination process.

HVT vector-based ND vaccine improved performance parameters of broiler flocks in moderate and high Newcastle disease challenge regions of Iran

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Despite extensive vaccination efforts with conventional Newcastle disease (ND) vaccines, the disease outbreaks, especially by genotype VII, causing significant economic losses, still affect the poultry sector in Iran.

The current study investigated the impact of an HVT vector-based ND vaccine (rHVT-F: Vectormune ND, CEVA) on flock livability and performance parameters of broiler farms located in moderate and high ND challenge regions of Iran.

The study was conducted on 86 million commercial broilers in 384 farms and a total of 1,627 flocks from January 2024 to January 2025 in 10 provinces of Iran, including moderate and high ND challenge regions. 248 flocks served as reference ("before rHVT-F") cycle, vaccinated with one killed and a live ND vaccine in the hatchery and 3 live ND vaccines, LaSota type, in the farm. The 1,379 rHVT-F vaccinated flocks received rHVT-F vaccine in the hatchery instead of the killed ND vaccine, for up to 1-to 6 consecutive cycles. Performance parameters, including livability, FCR, body weight, average daily weight gain (ADG), and EPEF were recorded and analyzed by SPSS.

In comparison of the rHVT-F group with their reference cycle, 2.15% higher livability, 114 g higher BW, 7.7 points lower FCR, +1.87 g ADG, and 30 points better EPEF were recorded. All performance parameters significantly improved with rHVT-F vaccination ($P \leq 0.05$) in both moderate and high Genotype VII ND-challenge areas. Analysis of key performance parameters, including livability, body weight, ADG, FCR, and EPEF illustrated improvement trend cycle after cycle of application of rHVT-F vaccine.

The results showed the efficacy of the rHVT-F vaccine (Vectormune ND) to improve livability and other performance parameters of broiler flocks in GVII NDV challenge areas when added to the conventional vaccination program. Even more improvement could be expected with the reduction of the heavy live ND vaccination program applied in the field.

Keywords: rHVT-F vaccine, Newcastle Disease, Genotype VII, Viral Infection, Broiler Performances.

Does reassortment consistently change the pathogenicity of IBDV? Comparative pathogenicity and genetic analysis of A3Bx IBDV strains

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Infectious bursal disease virus (IBDV) is a birnavirus, its genome consists of 'A' and 'B' segments. Both mutations and reassortment contribute to its genetic variability. IBDV has several genotypes, most of them consist of strains that cause subclinical infection. Viruses that induce clinical disease belong to two genotypes. The first pathotype, so called classical virulent viruses, belong to A1 genotype (similarly to most of the vaccine strains). The most pathogenic virus strains (very virulent, vv) can be found in A3 genotype.

From 2010, reassortant IBDV strains spread in Europe with a vv segment 'A' and a non-vv segment 'B' (A3B1), that caused only subclinical infection, although the induced long-lasting lesions of the bursa Fabricii may cause prolonged immunosuppression.

During the latest years, genotyping of IBDV on both segments became frequently used, which led to the regular detection of reassortant viruses. To get a strong conclusion on the impact of the different genetic changes on the pathogenicity of these viruses, pathogenicity testing is needed, in a standardized system.

Our studies compared the pathogenicity of 5 IBDV strains with A3Bx genotypes. Five-week-old SPF chickens were infected with a dose of 10^5 EID50. Clinical signs and virus replication were followed in different organs.

Two viruses (A3B1 type, but with presence of D279N and G254D mutation in VP2) caused subclinical infection. These were representatives of currently circulating reassortant viruses in Western Europe. The 3rd A3B1 virus (from 2004), without these mutations induced 65% mortality, meaning very virulent pathotype. Two recent A3B2 viruses, with G254S mutation, caused 10-20% mortality, indicating classical virulent pathotype.

These results show that definition of segment 'A' and 'B' types is not enough to conclude on the expected pathogenicity of IBD viruses, more data is needed to define all the key mutations that contribute to determination of pathogenicity level.

Keywords: IBDV, reassortment, pathogenicity, SPF chickens.

Epidemiological Study of Avian Infectious Bronchitis Virus Strains Circulating in Indonesia during 2017 - 2024

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Infectious Bronchitis (IB), caused by Avian Infectious Bronchitis Virus (IBV), is a gammacoronavirus that causes an acute and highly contagious disease and significant economic losses in global poultry industry. IBV primarily affects the upper respiratory system and urogenital tract in chicken, leading to increased mortality and poor performance in broilers and reduced egg quality and production in layers. IBV has been circulating in Indonesia since 1977 (Wibowo *et al.*, 2019), however, updated epidemiological data on IBV in Indonesia remains limited and complicated due to the large geographical areas and the presence of different IBV strains. Due to its high mutation ability, virus strains are classified into genotypes and lineages. This study aims to provide the latest updates on the circulating IBV strains in commercial poultry flocks in Indonesia. From 2017 to 2024, Ceva Animal Health Indonesia collected 135 IBV positive samples, mostly from sick birds in IB-vaccinated commercial chicken farms (broilers, layers, breeders) across Indonesia. The collected samples included fresh organs (trachea, lung, caecal tonsils, kidney) and tracheal swabs, which were smeared onto FTA card. Viral detection was performed through genome amplification using reverse transcriptase polymerase chain reaction (RT-PCR), followed by virus strain identification and characterization through S1 gene sequencing. At least six differentiated IBV lineages were detected in commercial poultry farms in Indonesia. The most detected IBV types were the GI-19 (QX-like) (65%), followed by GI-13 (739B) (20%), GI-1 (Massachusetts) (11%), Malaysian variant (2%), GI-7 (TW-I) (1%), and even a recombinant of GI-19 strain (1%). This survey indicates that the IBV strains in Indonesia have been continuously evolving since 2017. The frequent presence of very diversified IBV strains in the field, underscores the importance of long-term, continuous surveillance for proper IBV diagnostics, and hints for the implementation of a cross-protection strategy against multiple-IBV clusters, hindering also potential genetic-drift events (Franzo *et al.*, 2024).

Keywords: Infectious Bronchitis Virus (IBV), RT-PCR, Sequencing, S1 gene, QX strain, 4/91 strain, 1/96 strain, Mass strain, Malaysian variant, Recombinant.

Field experience with recombinant ND-H9 vaccine in controlling the impact of Newcastle disease and LPAI H9 infection in high-challenge environment

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Newcastle disease and H9 LPAI infections are common in Azerbaijan, causing direct and indirect mortality and severe loss of performances in commercial broiler production. Conventional vaccination programs including repeated live and inactivated vaccinations against ND, and inactivated vaccines against H9, often fail to control the economical impact of these diseases.

A new recombinant ND-H9 vaccine was used in a big integration throughout several cycles, and at full-fam scale. The results of this vaccination program was evaluated mainly by comparing production performances with the previous cycles. Analysis of trends along with repeated cycles on the same vaccination program was also followed. The lecture will summarize the impact of the bivalent vectored vaccine on the ND and H9 protection, overall health status and production performances.

Keywords: Recombinant ND-H9, Newcastle disease, H9, boiler performances.

Maternally Derived Antibodies against Infectious Bursal Disease virus in commercial layer flocks and their interference with conventional live IBD vaccines in India

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Over the past decade, the population of commercial layers has significantly increased in India, resulting in heightened disease pressure adversely affecting flocks' performance. The occurrence of Infectious Bursal Disease (IBD) in vaccinated flocks poses a major threat to flocks' profitability and is has largely been attributed to the interference between the maternally derived antibodies against IBD virus (MDA^{IBDV}) and conventional IBD vaccines.

To investigate this possibility, serum samples were collected from fifteen (15) layer flocks (F1 to F15) on the day of placement (DOP) to measure the MDA^{IBDV} using the BioChek IBD ELISA kit. Additionally, to assess the dynamic of the vaccine-take, bursa samples from seven of these flocks which were vaccinated with a two-dose regimen of live intermediate plus vaccines at around 12 and 24 days of age were collected on FTA cards at 2, 3, 4, and 6 weeks of age.

No IBD outbreaks were reported during this field study. The geometric mean titers at day of age showed an enormous variation among flocks ranging from 1,849 and 9,911 ELISA units. The percentage of positive bursa of Fabricius at 2, 3 ,4 and 6 weeks of age was 11.1%, 19.4%, 44.4% and 92.8%, respectively. Interestingly, at 3 weeks of age, after the first vaccination at 12 days, only one out of seven flocks turned positive to the vaccine strain. Similarly, at 4 weeks, after the second vaccination), only 2 out of 7 flocks were positive, suggesting an interference between MDA^{IBDV} and the live IBD vaccines and/or problems in their administration in the farms.

The study demonstrated the huge variability of the MDA^{IBDV} across the farms and using similar vaccination schedules for all flocks is unlikely to provide an effective protection against Gumboro disease.

Keywords: Infectious Bursal Disease, Maternal Derived Antibodies, Interference, Commercial layers, Serology, PCR, India.

Detection and Molecular typing of Fowl Adenovirus from commercial broilers in India

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Inclusion body hepatitis (IBH), caused by Fowl Adenovirus (FAdV), has been increasingly reported in India, particularly in broiler flocks, causing significant economic losses mainly due to high mortality and reduced productivity. FAdVs are divided into five species based on genomic differences (FAdV-A to FAdV-E) and they are classified into twelve serotypes (FAdV-1 to FAdV-11, including FAdV-8a and FAdV-8b) through cross-neutralization tests (Cádiz *et al.*, 2024). This study was conducted to investigate the dynamics of FAdV prevalence in India based on the available molecular analysis' results from 2019 to 2023.

During this period, 352 samples were collected from 276 broiler flocks located in Maharashtra, Tamil Nadu, Karnataka, Telangana, and the northern and eastern regions of the country. These samples, suspected of FAdV infection, were collected on FTA cards and submitted for molecular diagnosis (Kiss *et al.*, 2021).

On average, 47% of the suspected flocks tested positive for FAdV, with FAdV D and FAdV E being the most prevalent species. FAdV D and FAdV E were detected in 85.2% and 31.0% of the positive samples, either as the sole FAdV detected or as part of mixed infections, respectively. FAdV B and FAdV C were detected in only 6.5% of the cases. Notably, there was a consistent increase in the detection of mixed infections after 2021 and the most common association was between FAdV D and E, which were detected in 26.5% of the total samples.

Continuous surveillance with molecular typing of FAdV is essential to understand the changes in the prevalence of different species of FAdV in India and to devise effective breeder vaccination strategies to reduce the impact of this disease on commercial broiler flocks.

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Keywords: Broilers, Fowl adenovirus, Molecular typing, FAdV D, FAdV D & E, India.

Assessment of the Effectiveness of rHVT-AI Vaccine in Broad Protection and Reducing Shedding of Avian Influenza Virus H5Nx in Vietnam

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The rHVT-AI[1] vaccine has demonstrated promising results in providing broad protection against various strains of avian influenza virus, specifically H5Nx. This challenge study aimed to assess immunity and virus shedding after exposure to three different HPAIV H5 subtypes.

75 one-day-old chicks with maternal-derived antibodies against AIV H5 were divided into two groups: 60 birds vaccinated with rHVT AI[1] at day 1 via the subcutaneous route, and 15 birds used as a control group. At 42 days of age, each group was divided into three sub-groups and challenged with different HPAIV H5 strains: H5N1 clade 2.3.4.4b, H5N8 clade 2.3.4.4b, and H5N6 clade 2.3.4.4h, via intranasal instillation with 6 log10 TCID50. The study evaluated protection and the ability to reduce virus excretion through oronasal and cloacal swabs post-challenge. Additionally, it assessed humoral immune responses at 28, 35, 42-days post-vaccination using the HI and ELISA test.

All chickens in the control group died within 4 days post-challenge. Survival rates in the vaccine group were 80%, 90%, and 78% after challenge. The GMT HI H5 antibody titer before the challenge was 0.43 ± 1.15 log2, GMT ELISA H5 antibody titer was 13,187 ± 3,240 units. The vaccine groups reduced the H5N1 virus load by 293,000-fold and 339,000-fold; the H5N6 virus load by 42,000-fold and 176-fold; and the H5N8 virus load by 64,600-fold and 62,600-fold.

These results confirm that rHVT AI[1] vaccination can induce broad-clade protection against HPAIV H5Nx and significantly reduce virus shedding.

[1] Vectormune AI® – Ceva Santé Animale, France

Keywords: Avian influenza, rHVT, immunity, H5N1, H5N8, shedding virus.

Field Investigations of Respiratory Disease Co-infections in Broiler and Layer Flocks in Indonesia in 2024

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Respiratory diseases cause significant economic losses for poultry producers in Indonesia. This study, conducted between March and August 2024 in high-density farming areas of Java and Sumatera Islands, investigated the frequency of respiratory co-infections in broilers and layers. Oropharyngeal swab samples were collected from 15 broiler and 11 layer flocks showing acute respiratory symptoms. The samples were transported onto FTA® cards to the National Veterinary School of Toulouse, France. Major respiratory pathogens such as infectious bronchitis virus (IBV), Newcastle disease virus (NDV), low pathogenicity avian influenza H9N2 virus (LPAIV H9N2), avian metapneumovirus (AMPV), infectious laryngotracheitis virus (ILTV), *Mycoplasma gallisepticum* (MG), *Mycoplasma synoviae* (MS), and *Ornithobacterium rhinotracheale* (ORT) were screened using commercial ID.Vet qPCR kits (Innovative Diagnostics, Montpellier, France), except ORT for which a SYBR Green qPCR assay was used (Croville et al.2018). Detected IB viruses were sequenced to characterize the strain. Interestingly, 73.3% and 90.9% of the broiler and layer flocks were positive for multi-pathogens, respectively. Among broiler flocks, IBV was by far the most frequently detected pathogen (100% of them), while NDV, MS, MG, ILTV, LPAIV (H9N2) and ORT were found in 33.3%, 26.7%, 20%, 13.3%, 6.7%, and 6.7% of the samples, respectively. In layer flocks, MS was the most detected pathogen (72.7% of the samples), followed by ILTV (63.6%), MG (54.5%), ORT (36.4%), IBV and H9N2 (18.2% each) and NDV (9.1%). AMPV was not detected in any of the broiler or layer flocks. The most frequently detected IBV strain belonged to the GI-19 lineage (QX-like). This study showed the significant contribution of IBV and of MS to the respiratory disease in broilers and in layers, respectively, in Indonesia. In addition, this study revealed that most of the respiratory diseases in broilers and layers are multi-causal. These findings demonstrate the need for a paradigm shift in the diagnosis approach of respiratory diseases in Indonesia.

Keywords: Respiratory co-infections, infectious bronchitis, Newcastle disease, avian influenza H9N2, avian metapneumovirus, infectious laryngotracheitis, *Mycoplasma gallisepticum*, *Mycoplasma synoviae*.

Effect of Variant Infectious Bronchitis Infection to the Performance Efficiency of Broiler Farms in the Philippines

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Infectious Bronchitis (IB) is one of the most economically important diseases in poultry. It ranked second in terms of economic losses by the World Bank. Disease management is a continuous challenge for poultry producers as there are multiple circulating genotypes and lineages. The objective of this study was to demonstrate the effect of variant IBV infection on the performance parameters of broilers. The scope of the study included three broiler operations. Ten to 15 farms per operation were monitored and analyzed. Based on harvest age Infectious Bronchitis Virus (IBV) ELISA results, farms were grouped as low and high challenged flocks, and performance parameters (livability, Feed Conversion Ratio, Average Live Weight and harvest age) were compared and analyzed. Organ samples (trachea, cecal tonsil, kidney) from high challenge flocks were tested for IBV Polymerase Chain Reaction (PCR) and sequencing.

From the final performance efficiencies of the 340 to 540 thousand total broiler population per company, totaling to 1,240,000 broilers analyzed, results consistently showed that high challenged flock performed worse with 25 to 45 Broiler Production Index (BPI) lower figures than low challenged flocks. This translates to PHP 5.90 to 13.91 (USD 0.10 to 0.24) losses per bird in terms of potential income. Organ samples from high challenged flocks showed the presence of field IBV variant strains particularly Taiwanese Variant I.

Study showed the variant IBV field challenge/ infection has a direct impact on the overall performance of broiler resulting to significant economic losses.

A3B1 genotype of infectious bursal disease virus, a new threat in poultry production in Poland

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The A3B1 genotype virus is the most common infectious bursal disease (IBDV) currently circulating in Europe. These strains, despite their lower pathogenicity, are characterized by significant immunosuppressive properties. The aim of presented study was updating the epidemiological situation regarding the prevalence of infections with A3B1 genotype strains and to assess their impact on poultry production in Poland. Between October 2023 and February 2025, samples of bursa of Fabricius (tissues or FTA prints) from 65 broilers flocks from 12 provinces were obtained for the study. In addition, data were obtained from the farms on vaccinations, health status and performance at the end of the fattening period. RT-PCR based on both IBDV segments were performed according to previously published protocols. Molecular examinations confirmed the presence of IBDV viral genome in 62 flocks. Nucleotide sequence analysis showed the presence of vaccine strains in 30 flocks, while in 32 the presence of field IBDV strains of A3B1 genotype. In contrast, a review of health and production performance data from IBDV infected flocks revealed problems such as increased mortality (n=11), co-infections/ secondary infections (n=16), and worsened production performance (n=6). The obtained results show that A3B1 strains predominate in the field, moreover, a clear increase in the frequency of IBDV infections was observed (49,2%). It should be noted that in all flocks where infection with A3B1 strains was confirmed, immunoprophylaxis was applied using vaccines with varying degrees of attenuation and/or recombinant. Although these strains show reduced virulence, they nevertheless retained immunosuppressive properties, as confirmed by our analysis of health and production results at the end of rearing. The results presented indicate a major shift in the epidemiology of Gumboro disease in the country and highlight the importance of continuous monitoring of IBDV infections in the field.

The impact of the recombinant HVT-NDV vaccine usage on the reduction of reported Newcastle Disease cases in broilers in Indonesia

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Global Protection Services (GPS) is a platform developed by Ceva Animal Health to monitor key parameters that help to define the health status of poultry flocks under field conditions. Basically, history of the flocks, serological results, histopathology, molecular analysis and flocks' performances are continuously uploaded into this database, allowing detailed analysis of the flocks' health conditions. In 2018, the GPS was implemented in Indonesia and since then the data collection has been carried out by 31 veterinarians. The diagnosis of the diseases is based on clinical symptoms and post-mortem findings of affected broiler flocks. Laboratory analyses are carried out whenever necessary. In September 2019, the first recombinant HVT-NDV (rHVT-NDV) vaccine was introduced into the market. From 2019 to 2024, the number of vaccinated broilers per year were 13.8, 84.5, 171.0, 240.9, 256.2 and 335.8 million, respectively. Similarly, the number of reported ND cases and their corresponding percentages of the total per year from 2018 were: 82 (23,3%), 83 (27,5%), 96 (22,6%), 45 (10,4%), 70 (13,0%), 25 (5,6%), and 28 (7,3%). Interestingly, further diagnosis showed that the ND virus involved in these outbreaks belonged to genotypes VIIh and VIIi. These results indicate that the introduction of the rHVT-NDV vaccine in the Indonesian broiler industry significantly reduced ND cases. However, this reduction cannot be solely attributed to the vaccination efforts. Enhancements in biosecurity protocols, farm management, nutrition, housing conditions, and other factors also played crucial roles.

Keywords: Indonesia, Newcastle Disease, rHVT-NDV, recombinant, GPS, Genotypes, GVII.

Detection and Molecular typing of Fowl Adenovirus from different types of chicken in Bangladesh

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In Bangladesh, Inclusion Body Hepatitis (IBH) is now suspected as an emerging disease of poultry which is caused by fowl adenoviruses (FAdVs). FAdVs are divided into five species based on genomic differences (FAdV-A to FAdV-E) and they are classified into twelve serotypes (FAdV-1 to FAdV-11, including FAdV-8a and FAdV-8b) through cross-neutralization tests. This study was conducted to investigate the dynamics of FAdV prevalence in Bangladesh based on the available molecular analysis results from September 2023 to March 2025.

During this period, 129 pooled samples (mainly liver, spleen & kidney) were collected on FTA cards from 95 FAdV suspected flocks; Broiler-66, Layer-22, Sonali (native color broiler)-01, Cockerel-01, Broiler breeder-03, Color breeder-01 and Sonali breeder-01 of different age groups (min. 01 week to max. 71 weeks) with morbidity and varying degree of mortality ranges from 3% to above 60% from all over the country for molecular diagnosis of which 47 (36%) samples were found positive with FAdV infection. Among the 47 positive samples, 33 were from Broilers, 10 from Layers, 01 from Broiler breeders, 01 from Color breeder and 02 from Sonali breeder of which 18 were sequenced and resulted in the following serotype distribution: 17% Serotype-2, 17% Serotype-4, 11% Serotype-8a, 50% Serotype-8b and 39% Serotype-11 either as single serotype infection or as part of mixed infection of multiple serotypes. Within the sequenced samples, 04 (22%) samples were detected as mixed infection of multiple serotypes. Notably, 25 (53%) of the positive samples were detected as concomitant infection from other disease conditions and all the 05 serotypes had been detected from Broilers.

Continuous surveillance with molecular typing of FAdV is essential to understand the changes in the prevalence of different serotypes and to devise effective breeder vaccination strategy to reduce its impact on commercial flocks.

Keywords: IBH, Fowl adenovirus, Serotype-8b, Broiler, Molecular typing, Bangladesh.

Comparison of two immune-complex vaccines for the control of Infectious Bursal Disease in broilers

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Infectious Bursal Disease (IBD) is an immunosuppressive condition in chickens caused by a highly resistant virus, Avibirnavirus genus, with a high mutation rate leading to the emergence of new viruses with various antigenicity and pathogenicity. The increased capability of the IBD virus to bypass the immunity barriers led to the development of a new generation immune-complex vaccine for broilers (Nextmune®, Ceva Animal Health) aiming to induce an even earlier than before onset of immunity against IBD by blocking the colonization of Bursa of Fabricius (BF) from early wild field IBDV strains. This study aimed to evaluate the kinetics of Nextmune® in broilers under field conditions and in comparison, to an old generation immune-complex vaccine (Gumbohatch, Hipra) as shown by the molecular detection of the vaccine strains in BF and the antibody response after vaccination. Two houses in the same broiler farm of 36.724 and 35.990 birds were selected and vaccinated subcutaneously at day-old in the hatchery either with Nextmune® or Gumbohatch respectively. 20 blood samples were collected at 18-39 days of age at 3-4 days intervals and sera were analyzed using a BioChek Elisa kit. Also, 20 BF were collected at the same sampling points for virus detection and identification by RT-PCR. Molecular results showed that BF colonization by Nextmune® was constantly significantly higher than Gumbohatch and started as early as at 28 days of age with 35% positivity rate, reaching 95% at 32 days of age and 100% onwards. Serological results were also in favor of Nextmune either in terms of arithmetic mean titers (AMT) or positivity rate (%) starting at 32 days of age. In conclusion, due to a new balanced formula, Nextmune® colonizes earlier the BF, thus supporting a faster onset of immunity against IBD in vaccinated birds and prevents the shedding of wild field IBDV strains.

Keywords: Nextmune, Gumbohatch, broilers, Infectious Bursal disease, Immune-complex, vaccines.

Epidemiological Investigation of Novel Variant IBDV Strains in China (2020–2024)

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Infectious bursal disease (IBD) is an acute, highly contagious disease caused by the infectious bursal disease virus (IBDV). IBDV has two serotypes: serotype 1 and serotype 2. Five phenotypes of serotype 1 have been identified: classical strains (cIBDV), attenuated strains (atIBDV), variant strains (varIBDV), very virulent strains (vvIBDV), and novel variant strains (nVarIBDV).

From 2020 to 2024, Ceva China Scientific Support and Investigation Unit (SSIU China) studied the VP2 of 5,533 bursal samples from broilers under various IBD vaccination programs, of which 3,470 (62.71%) were positive. After excluding 262 sequencing failures, 3,208 positive samples were analyzed.

VP2 sequencing results revealed that nVarIBDV was the predominant strain, detected in 1,897 samples (59.13%), followed by cIBDV (29.55%), with over 70% of cIBDV cases attributed to the W2512 vaccine strain. vvIBDV was detected in 320 samples (9.98%), while atIBDV and varIBDV had much lower detection rates of 1.25% and 0.09%, respectively. These results indicate that nVarIBDV has become the dominant strain in China.

Further analysis showed that nVarIBDV remained the predominant strain each year from 2020 to 2024, with its highest detection rate observed in 2022 (70.69%).

The bursal samples were collected from 18 provinces across seven regions of China. In four regions, nVarIBDV exceeded 50%, and it was identified in 15 provinces, indicating its widespread distribution.

Although nVarIBDV does not cause overt clinical symptoms, it spreads easily, leading to misdiagnosed immune suppression, reduced production performance, and potential economic losses. Since its first identification in China in 2017, nVarIBDV has rapidly spread nationwide, as confirmed by our findings. Additionally, reports of nVarIBDV have emerged from Japan, Malaysia, Egypt, and other countries, highlighting its increasing global prevalence. Given this trend, a revised strategy becomes critical, which includes enhanced monitoring using relevant diagnostic tools and control with appropriate vaccine selection, immunization strategies, and biosecurity measures.

Broiler breeders vaccinated against Infectious Laryngotracheitis (ILT) and Avian Encephalomyelitis (AE) with a vector r-FP-ILT+ AE: Serological evaluation of duration of immunity during rearing and laying period

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Infectious laryngotracheitis (ILT) and Avian Encephalomyelitis are Avian viral diseases that can affect critically the production causing substantial financial losses. Vectormune® FP-LT+AE is a live, genetically modified virus vaccine consisting of a vector fowlpox virus (FPV) expressing the membrane fusion protein and the encapsidation proteins of LT, and containing live AE virus, strain Calnek. The aim of this study was to monitor the serological response for ILT and AE in broiler breeder farms vaccinated with Vectormune® FP ILT + AE under field conditions up to the end of laying period. Two broiler breeder flocks were vaccinated at 10 weeks of age by wing-web administration and blood samples were collected at 7-10 weeks intervals up to 58 weeks of age. Granuloma reactions were also observed in both farms 5-6 days post vaccination (PV) to access the quality of the vaccination. Immunization for ILT was evaluated through two commercial Elisa kits; one especially developed for the gB insert of the FP vector vaccine (IDVet gB Indirect) and BioChek, while AE immunity was evaluated with only BioChek kit. The results in both farms showed a strong seroconversion of ILT serology, as measured by the gB Elisa, starting 5 weeks post-vaccination and a positivity rate of 100% which remained till the end of the trial. BioChek Elisa for ILT showed low titers and 0% positivity rate as expected indicating no field pressure. AE serological results exhibited also significant seroconversion 5 weeks PV onwards and a positivity rate which fluctuated between 87 and 100% in all sampling points. In conclusion, both flocks vaccinated with Vectormune® FP ILT + AE rapidly developed humoral immunity against ILT and AE as detected 5 weeks post vaccination, which appears to offer efficient clinical protection against ILT and AE virus exposure during the production period in the field.

Keywords: Vectormune® FP ILT + AE, broiler breeders, Infectious Laryngotracheitis, Avian Encephalomyelitis.

The power of heterologous live vaccine combination approaches in controlling emerging GI-23 IBV strains in chickens

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Infectious bronchitis (IB) is caused by a gammacoronavirus, infectious bronchitis virus (IBV). Due to its high genetic variability, several genotypes and lineages of the virus do exist. Genotype I, lineage 23 (GI-23) strains are of particular concern. From the first descriptions in the Near East, these strains have shown an unparalleled ability to spread over large geographical distances: first, they spread to the rest of Middle East countries, then to several Eastern European and West Asian countries, followed by South Africa. More recently, this lineage has been detected in Brazil, and Mexico, therefore our investigations focused on the efficacy of different vaccination approaches which are relevant for this area.

Since a given geographic area is usually dealing with several lineages of IBV, a broad-spectrum protection must be the goal of vaccination. To this aim, the cross-protection approach using the combination of vaccine strains from two different lineages was tested, according to their availability in the countries. For most countries (except Brazil and North America), a Mass (GI-1) + 1/96 (GI-13) combination, for Brazil, a Mass (GI-1) + BR-I (GI-11) combination was used. Finally, to address the possible spread of GI-23 IBV strains from Mexico to the US, a Mass (GI-1) + variant GA08 (GI-27) combination was tested.

The challenge trials were run in SPF chickens, comparing a group vaccinated with the combination of the two live vaccines at day-old to non-vaccinated controls. GI-23 IBV challenge was applied three to four weeks after vaccination, with a standard post-IBV challenge monitoring, including ciliostasis, clinical signs, histopathology, and virus load in target organs.

The three tested vaccine combinations provided a high level of protection against GI-23 IBV challenge. This confirms that the cross-protection strategy brings a powerful, safe, and sustainable option for IBV control.

Comparison of bursal and extrabursal IBDV replication control achieved by an immune-complex or a turkey herpesvirus vaccine in commercial broilers

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Vaccination plays an important role in the control of infectious bursal disease (IBD). Apart from the conventional vaccine technologies, immune-complex and turkey herpesvirus vectored vaccines gained broad acceptance due to the possibility of hatchery vaccination in front of maternally derived antibodies. Both are suitable for the prevention of IBD, although their capability to control IBD virus (IBDV) replication is different.

The aim of the set of three studies to be presented was the comparison of the effect of an immune-complex IBD vaccine (ICX, Nextmune) with a double insert turkey herpesvirus vaccine (rHVT, Innovax ND-IBD) on the strength of IBD challenge virus replication in the bursa, spleen and thymus. The three challenge viruses represented different genogroups of IBDV: genogroup A2, A3 and A4.

Day-old commercial broilers were allocated into 3 groups: (i) ICX vaccinated, (ii) rHVT vaccinated and (iii) unvaccinated control. Vaccines were applied in one commercial dose, subcutaneously, at day-old. Challenge infection was done at 30-31 days post-vaccination using a dose of 4.0 log10 EID50 of IBDV per os. Samples were collected at 4- and 11-days post-challenge (dpch). Discriminative RT-real-time PCR assays were used for the quantification of challenge virus load in the tissue samples.

Uniformly strong IBDV replication was found in unvaccinated broilers (strongest in bursa). Challenge virus was not detectable in the ICX group, regardless the virus and sampling date. Control of IBDV replication varied in the rHVT group: it was strongest in the thymus, while in the bursa, level of IBDV replication was heterogenous at 4 dpch and there was no significant effect at 11 dpch.

IBDV replication was efficiently suppressed by the ICX vaccine, regardless the challenge virus. The rHVT vaccine had only a weak transient effect in the bursa, but moderate or remarkable virus load reduction in the spleen or thymus, respectively.

Keywords: IBDV, bursa, extrabursal, vaccination, suppression of virus replication.

Next generation of immune complex IBD vaccine in Vietnamese native chicken

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Controlling Infectious Bursal Disease (IBD) in Vietnamese native chickens using live attenuated IBD vaccines and previous generation immune complex IBD vaccines is challenging due to the low and uneven levels of maternally derived antibodies (MDA) in chicks. Therefore, a next generation of immune complex [1] IBD vaccines is needed to address this issue. We conducted innovative vaccination trials on seven Vietnamese native chicken flocks at D1 in the hatchery. Serology samples were collected at D1, D28, D35, and D42 to monitor seroconversion with elisa, while bursa samples were collected for vaccine-take testing from D21 to D42 using RT-PCR to continue IBDV sequence characterization. The results showed that in three flocks with low MDA, the W2512 strain from the vaccine was detected in 80% of bursa samples at 21 days post-vaccination (dpv) and 100% at 25 and 28 dpv. Meanwhile, in four flocks with high MDA, the W2512 virus detection rate in bursa samples was 50%, 90%, and 100% at 28, 35, and 42 dpv, respectively. Seroconversion in flocks with low MDA occurred earlier than in flocks with high MDA. There were no deaths of chickens with clinical signs and lesions of Gumboro disease in the seven trial flocks. The trial demonstrated very good protection of the next generation immune complex [1] vaccine against IBD in Vietnamese native chickens, with just one vaccination of chicks at the hatchery, even in flocks with very low MDA.

[1] Nextmune® - Ceva Sante Animale, France

Keywords: Next generation of immune complex, Infectious Bursal Disease, Vietnamese native chickens, MDA.

Assessing the efficacy of a vaccination program against emerging GVI-1 infectious bronchitis virus in China

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Infectious bronchitis virus (IBV) is a highly contagious pathogen which can target a wide range of organs (trachea, kidney, oviduct) and which is provided with a high mutation ability. The current nomenclature (Valastro et al., 2016) describes nine (IX) genotypes which are further divided into 40 lineages as of today. In China, there is a growing concern about the emergence of genotype VI, lineage 1 (GVI-1) IBV strains, since they are frequently detected and are associated with severe disease (Bo et al, 2022; Wang et al, 2022). This emerging lineage was also reported in other countries in East and Southeast Asia, but also in South Africa, with a possible ancestor in Colombia.

Besides biosecurity, control includes vaccination as early as one day of age. Most of the commercially available vaccines belong to Genotype I.

Previous evidence has shown that the combination of GI-1 and GI-13 vaccine strains could provide cross protection against heterologous strains used as challenge. However, these challenge experiments were done using GI strains. GVI-1 IBV is genetically very distant from the two vaccine strains. Our experiment aimed at assessing whether the combination of GI-1 and GI-13 live IBV vaccines applied to day-old SPF chickens could provide significant protection against a Chinese isolate of GVI-1 IBV at 21 days of age.

The combined vaccination deceased morbidity as well as ciliostasis score. In addition, a statistically lower viral load was detected in oropharyngeal swabs, trachea and kidneys of the vaccinated chickens. These data suggest that the combined usage of the two live IBV vaccines belonging to the heterologous GI-1 and GI-13 lineages could serve as an effective vaccination strategy for controlling the currently endemic GVI-1 IBV in chickens.

Comparison of Protective Effects on Production Performance of White-Feathered Broilers under Different Immunization Protocols with Live Infectious Bronchitis Vaccines in field conditions in China

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Infectious Bronchitis Virus (IBV) often causes severe respiratory issues and urinary system dysfunction in infected broilers. Additionally, it is highly prone to inducing secondary infections, resulting in the decline of survival rate and production performance. Currently, Infectious Bronchitis (IB) is a significant viral disease threatening China's poultry industry. Therefore, effective prevention and control of IB are of critical importance for the sustainable development of the broiler industry. To investigate the differences in protective effects on production performance conferred by different live infectious bronchitis (IB) vaccine protocols administered via day-old spray immunization in hatcheries for white-feathered broilers, production data from 68,012,405 birds across 1,010 batches at 10 large-scale poultry companies were tracked and compared between 2019 and 2024. The field trial design was as follows: 304 flocks (22,697,930 birds) were immunized with Mass L + Cevac IBird® via Desvac hatchery sprayer at 1 day of age, while 706 flocks (45,314,475 birds) served as the control group, receiving Mass L + other IB variant live vaccine combinations via the current spray equipment. Apart from the differing day-one IB vaccine protocols, all other vaccinations, geographic regions, farm scales, facilities, feed management, and slaughter ages were consistent between the groups. Results showed that the Mass L + Cevac IBird® group achieved superior performance: survival rate, average slaughter weight, and European Production Efficiency Factor (EPEF) were 92.89%, 2.454 kg, and 325.7, respectively, outperforming the control group (91.59%, 2.373 kg, 311.5) by 1.3%, 81 g, and 14.2 points. Moreover, the feed conversion ratio (FCR) of the Mass L + Cevac IBird® group was 1.70, 0.02 lower than the control group's 1.72. In addition, the statistical analysis results showed that there were significant differences in survival rate, average slaughter weight, EPEF, and FCR between the two IB immunization protocols ($P < 0.05$). These findings demonstrate that distinct immunization protocols significantly impact broiler production performance, with Mass L + Cevac IBird® providing better protection compared to the control group under identical field conditions.

Keywords: Infectious bronchitis virus (IBV); vaccine; protection; broiler.

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