Avian health congress focuses on topical issues from around the world

The World Veterinary Poultry Association recently held its XVII Congress in Cancun, Mexico. International Poultry Production was there and reports on a selection of the keynote presentations.

Prof. David Chapman from the USA reviewed recent advances in our understanding of coccidiosis. He felt that vaccination carried out in the hatchery by spraying with a live coccidiosis vaccine has proved popular and a new development is the administration of a live vaccine in ovo. However, it still remains to be seen whether this will become a practical option.

Coccidial immunity

He highlighted the fact that different species of coccidia vary in their ability to induce immunity – solid immunity to Eimeria maxima can be achieved by a single dose of vaccine but for other species, such as E. tenella, repeated exposure to vaccinal oocysts is required.

Secondary infection with vaccinal oocysts might be the cause of coccidiosis lesions seen at about three weeks of age and he stressed the importance of optimal (dry) litter management for vaccinated flocks.

Another approach for coccidiosis vaccination is based on vaccinating breeder hens with a parasite antigen so that maternal antibodies pass via the yolk to the chick and provide it with passive protection. However, the duration of this protection is limited.

Prof. Chapman urged caution with the use of so called 'natural products' for coccidiosis control as there is little published scientific work on their efficacy.

Salmonella control

Richard Ducatelle from Ghent University in Belgium reviewed salmonella control. Of the control tools available vaccination of egg producing hens is efficacious but the options for control in broilers is limited as the use of antibiotics in live birds is banned in the EU where the decontamination of carcases is also a controversial issue. Classical vaccination has not been successful in broilers because of their short, and ever decreasing, life span.

One interesting development is the inoculation with a strain of salmonella to prevent later colonisation by the same strain and this could be used for Salmonella enteritidis when the first (given) strain is defective in its ability to express pathogenicity for birds or man.

This he felt could open up new perspectives for safe salmonella control in broilers.

He concluded by stating that eradication from food production animals was not a realistic goal so constant monitoring of such flocks would remain as the cornerstone of salmonella control programmes for many years to come.

Mexican influenza

Alejandro Garcia from Mexico updated delegates on avian influenza in Mexico. This first appeared in 1993 in commercial layers which showed respiratory signs and egg drops associated with seroconversion for H5 avian influenza.

In 1994 broilers became involved, albeit asymptomatically. By the time the non-pathogenic H5N2 virus had been isolated, the virus was widespread in the country.

Then in January 1995 highly pathogenic H5N2 avian influenza was detected in broiler breeders. Even prior to this, eradication was not a practical proposition so Mexico became the first country to adopt vaccination as a control tool. Now two decades and three billion doses of inactivated vaccine and two billion doses of vector vaccine later, field challenges with the low path H5N2 strain still occur but the overall situation is much better than it once was.

Prof. Hafez Mohamed Hafez in his keynote lecture reviewed turkey disease and he felt that both infectious and non-infectious diseases are still of major animal welfare and economic importance and infections

Mexico has a lot to offer!

with foodborne pathogens are still an issue. He stressed that early recognition and monitoring programmes are essential for managing infections in turkeys. As he could not review all entities Prof. Hafez focused on salmonella, MRSA, avian influenza and histomoniasis.

When it comes to histomoniasis (the parasitic disease Blackhead) the problem is a lack of licensed products for its control as, for example, the EU banned the use of dimetridazoles (2001) and Nifursol (2003) and since then histomoniasis has had an increasing adverse effect on turkey production.

However, herbal compounds, which originally showed some promising results, have failed to live up to their early promise for controlling histomoniasis.

Fowl adenoviruses

Michael Hess from Austria then reviewed the current situation with respect to fowl adenovirus infections. Although fowl adenoviruses have been known for a long time new technologies such as PCR and sequencing have given us a better understanding of these viruses which are associated with hepatitis-hydropericardium syndrome, inclusion body hepatitis and gizzard erosion. In addition, some fowl adenoviruses are known to be immunosuppressive.

Infectious challenges

Kurt C Klasing from the USA spoke on the role of infectious challenges in nutritional diseases of poultry. For example damage to the gut can impair nutrient absorption.

Also, the classic 'acute phase response' to infection involves depressed feed intake, hepatic production of acute phase proteins, impaired nutrient digestion/absorption, changes in tissue needs/priorities for nutrients, impairment of anabolic processes and a diversion of nutrients to tissues involved in immunity.

All of these changes will impact on nutritional diseases in poultry, usually negatively.

Claire Knott from the UK reflected on animal welfare in poultry production and considered issues such as the 'five freedoms', stocking densities, environmental conditions, problems associated with rapid growth rate, cardiovascular health, foot and leg conditions, conditions during transportation and slaughter,

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housing systems for layers, beak trimming, layer bone strength, predators and outdoor flocks and the humane culling of turkeys.

She concluded by saying, "as we progress through the 21st century the role of welfare in the decisions that are made in improving poultry production will be greater.

"The need for communication, understanding and research in animal welfare will continue to increase and thus it is essential that industry responds to ensure the health and future productivity of our global flock is secured."

Mycotoxin problems

Professor Carlos Augusto Mallmann from Brazil then focused on the topical issue of mycotoxin problems. He stressed that control depends on the implementation of appropriate policies within agricultural management, production systems and storage, which are the root of the problem. Research in these areas needs to be developed and should improve agricultural production and make food safer.

Once mycotoxins are formed detoxification of the feed is an expensive process, therefore the use of antimycotoxins additives is still the best option.

Lisa Kay Nolan from the USA considered the subject of avian pathogenic E. coli (APEC) which affects all aspects of poultry production. The recent completion of the chicken and APEC genomes now makes for an even better understanding of the relationships between APEC and their avian hosts. This has resulted in some previously developed knowledge/theories being discarded and the identification of previously unknown disease mechanisms.

Colicin encoding plasmids typify the APEC pathotype and contribute to the pathogenesis of the disease in avian colibacillosis.

Some of these plasmids are linked to multidrug resistance. The use of antibiotics and disinfectants in poultry production may select APECs with enhanced capacity to cause disease and resist treatments.

Immunosuppression

Silke Rautenschlein from Germany spoke on immunosuppressive diseases of poultry. Immunosuppression can be defined as the inhibition of the normal immune response by infectious and non-infectious causes.

Environmental factors and numerous pathogens are known to induce immunosuppression, often in a multi-factorial scenario and the mainly subclinical and co-infections make the diagnosis of immunosuppressive agents in the field difficult.

In addition, there are no standardised methods available to detect immunosuppression at a flock level but the early diagnosis and identification of contributing factors are important in the effective countering of immunosuppression.

Successful control

The successful control of immunosuppression requires good biosecurity and optimal housing conditions combined to stress reduction and appropriate vaccination strategies.

The continuous challenge of viral disease was the subject covered by Guillermo Zavala from the USA. He highlighted that only a handful of viruses caused significant respiratory diseases and these are Newcastle disease virus, infectious bronchitis virus, infectious laryngotracheitis virus, avian influenza and avian metapneumovirus and the problems they cause represent a great economic loss to the poultry sector.

Important factors in viral respiratory diseases include the interaction between genetics, nutrition, husbandry and infectious disease; the role of biosecurity; vaccines and vaccination; rapid and accurate diagnostic systems and a comprehensive approach to disease control.

Jose A. Linares then looked at egg quality assurance programs for table egg layers in the USA following the experience of an USDA recall of some 500 million eggs in 2011 due to a Salmonella enteritidis outbreak that was traced back to two layer operations in one state.

He highlighted that good salmonella control programmes have three components:

- Salmonella free birds.
- Salmonella free feed.
- Salmonella free environment.

The eradication of all types of salmonella is a daunting task given their ability to infect multiple species and survive in the environment, but the eradication of a specific salmonella,

Factors influencing intestinal integrity and gut health

Timothy S. Cummings from the USA looked at the subject of intestinal health and immunity, the management of which he regards as the most critical aspect of poultry production to manage in modern commercial poultry production.

The intestine starts to develop during incubation and so nutrients for the embryo and maternal antibodies can influence intestinal development and protection in the embryo so adequate breeder nutrition and vaccination will play a role, as does proper incubation.

For example abnormally high incubation temperatures will lower heart, liver, proventriculus, gizzard and small intestines weights with resulting delayed intestinal development.

Critical first week

The next critical period is the first week of the chick's life when the chick has an immature thermal regulation and will not eat if chilled.

During this week the chick switches from a 'yolk' feed to a 'feed' feed, while still having limited digestive and adsorptive capabilities. At this time the chick is deficient in enzymes, has an immature immune system and is also struggling to establish a stable gut flora. A key aspect of management is to get the chick eating as early as possible as delayed feed intake will reduce yolk utilisation, suppress thyroid activity, inhibit muscle growth potential and suppress initial immune response.

Delayed feed intake also reduces the height of the intestinal villi and enterocyte migration, both of which are important for maximising nutrient uptake from the gut. The immature gut has difficulty fully utilising corn-soy based rations so readily digestible alternatives should be considered for chick starter rations.

Intestinal microflora

Another essential process in the first week is the establishment of a normal intestinal microflora as this is an essential prerequisite to maintain intestinal health and efficiency.

In modern poultry production eggs are set in clean, sanitised hatcheries and the resulting chicks are placed on clean litter so it is difficult to quickly establish a gut flora in the chicks. This can be overcome by giving the chicks 'good bacteria' via probiotics.

Antibiotic growth promotants (AGPs) have been in intestinal health programmes for many years and work in part by controlling clostridia which are the primary initiators of enteritis and necrotic enteritis. AGPs have been associated with antibiotic resistance and their use is banned in some parts of the world such as the EU.

Mannanoligosaccharides

Prebiotics, such as mannanoligosaccharides, are used to promote intestinal health and they work by binding certain pathogenic bacteria such as salmonella and E. coli, thereby preventing them from attaching to the intestinal wall.

Improved performance also appears to be related to reduced intestinal wall inflammation and lowered immunological stress which ultimately results in improved nutrient adsorption and a more stable gut microflora.

Prebiotics, like probiotics, play a role in gut health management as do other products such as acidifiers, organic acids, essential oils and certain herbs or spices such as thyme and cinnamon.

Coccidiosis control is very important as this disease certainly impacts on intestinal health and integrity.

Certain mycotoxins impact on numerous body systems including the digestive tract and the liver.

Mycotoxins can decrease liver function, increase intestinal irritation, cause immunosuppression and negatively impact on other functions associated with gut vitality.

Benefits of selenium

Trace minerals are also important. Selenium, especially in its organic form, appears to be important because of its strong antioxidant properties which impacts a host of systems and enhances the immune system and lessens the impact of intestinal tissue damage from a variety of challenges.

In summary, gut health is a complex interaction of many systems and inputs involving intestinal development but is influenced by genetics, nutrition, management and gut microflora.

Thus, we need to give due cognisance to all of this when making management changes and/or decisions which will impact on intestinal efficiency and therefore bird/flock performance. ■

such as Salmonella enteritidis, from an infected operation can be difficult but achievable.

This necessitates placing S. enteritidis free chicks, premises and feed controls, active environmental surveillance, pest control and vaccination.

US Assurance Program

In 1995 the United Egg Producers started its 5-Star Total Quality Assurance Program which at its core has five critical egg safety points:

- Poultry house cleaning and disinfection.
- Rodent and pest elimination.
- Proper egg washing.
- Biosecurity.
- Refrigeration.

In 2011 the newly designed 5-Star Egg Safety Program was launched with 12 critical control point and these were:

- Pullet management.
- Vaccination.
- Biosecurity.
- Feed management.
- Integrated pest management.
- Traceability.
- Cleaning and disinfection.
- Laboratory standards.
- Environmental and egg testing.
- Processing plant sanitation.
- Registration with FDA.
- Refrigeration.

The scientific sessions at the XVII WVPA Congress also had a host of other interesting papers and some of these will now be reviewed.

Rao Z. Abbas from Pakistan reported on a trial that was undertaken to assess the development of resistance in the caecal coccidia, Eimeria tenella, against monensin (100ppm) and salinomycin (60ppm) in broiler chicks.

It was concluded that single drug usage should be minimised and that these anticoccidials should be used by rotating with different anticoccidial drugs to minimise the development of resistance.

Variant IB vaccination

U. Ashash and colleagues from China reported on the efficacy of variant 223A vaccine against a nephropathogenic stain of infectious bronchitis and it was shown that SPF chickens vaccinated twice with 223A vaccine were well protected against the heterologous nephropathogenic YN05-1 stain of infectious bronchitis.

C. Banet-Noah and Israeli colleagues reported on the efficacy of an inactivated Salmonella infantis vaccine. One product was a monovalent formulation and the other a trivalent one which also included S. enteritidis and S. typhimurium. Both products conferred good protection against S. infantis challenge and produce high levels of antibody.

Himel Barua and colleagues from Denmark described how over the last decade 13 out of 19 salmonella positive breeder flocks were positive for S. typhimurium DT41. This strain of S. typhimurium could survive for more than six months in feed pellets but less than four weeks in dust.

Vibe P. Lund and colleagues reported on the prevalence of dead on arrival broilers at a Danish abattoir and their pathologies. The major pathologies seen were lung congestion (52%), lung congestion and trauma (13%), trauma (10%), nephropathy with systemic infection (9%), heart disease (2%) and sepsis (2%).

Catalonian campylobacter

Mar Biarnés and colleagues from Spain reported on campylobacter in Catalonian broilers by testing five birds from 1,306 flocks over a 12 year period. Annual positivity levels ranged from 62.5 to 100% with an average figure of 84.08%. The average prevalence of Campylobacter jejuni was 34.83%.

Beatrice Grafl and colleagues from Austria reported on an ELISA serosurvey of chicken flocks for evidence of Histomonas meleagridis.

The overall prevalence of antibodies against H. meleagridis was higher in layer flocks (37.3%) than in pullet flocks (8.3%) and the highest prevalence was found in free range flocks.

Jiewen Guan and his Canadian colleagues described work that showed that both bleach and Virkon were effective at -25° and it was concluded that the addition of antifreeze bleach to Virkon at -25°C ensured that the Virkon was still effective at activating Newcastle disease virus at sub-zero temperatures.

A. In-Pil Mo and colleagues from Korea described an interesting case of co-infection with chicken astrovirus and group A avian rotavirus in broilers.

Eggshell apex abnormalities

A. Feberwee and W. J. M. Landman from Holland described the use of inactivated water-in-oil emulsified Mycoplasma synoviae autogenous vaccines on M. synoviae induced eggshell apex abnormalities.

They found that M. synoviae autogenous vaccines may prove to be useful in the prevention of M. synoviae induced eggshell apex abnormalities in areas where there are no registered vaccines available and especially on multi-age farms.

Raul Elias C. Lopez and Maria Immaculada P. Torres from the Philippines reported on a survey which showed by PCR that in 16 of 17 cases of respiratory disease a subtype B avian metapneumovirus was involved.

Katarzyna Domanska-Bicharz and colleagues from Poland looked for the presence of four enteric viruses in 168 turkey flocks of varying ages.

The prevalence of each enteric virus was found to be as follows:

- Astrovirus 42.8%.
- Parvovirus 27.3%.
- Rotavirus 15.4%.
- Coronavirus 11.9%.

Avian influenza virus

Celina Buscaglia reported on a survey for haemagglutinating agents in Argentinian sea birds in 2009 and 2010. No avian influenza viruses or paramyxoviruses (including Newcastle disease) were found.

Zerona Minta and colleagues reported on the susceptibility of 18 day old domestic geese and three week old Canada geese to H5N1 highly pathogenic avian influenza virus.

The birds developed clinical signs including listlessness, prostration, torticollis, abnormal movements, paralysis and died 3-8 days (Canada geese) and 2-14 days (domestic geese) after infection.

On post mortem examination congestion and haemorrhagic changes were the most consistently found changes and high loads of viral RNA were found in a variety of organs.

Overall, this was an extremely interesting and thought provoking conference and the social programme was varied and enjoyable.

In fact this is a conference to be recommended to anyone interested in poultry diseases and their management. ■

Mexican culture and hospitality was to the fore.

The WVPA has been established for over 50 years and is the global organisation for poultry veterinarians and avian health scientists.

The WVPA has over 2,000 members in over 60 countries with actual branches in 40 countries. It has a global conference every two years and aims to further matters relating to avian health in the research, regulatory, diagnostic and industry fields by improving links and the distribution of knowledge.

The scientific journal of WVPA is Avian Pathology, now in its 40th year of publication. WVPA also runs awards and provides travel grants.

For further information about WVPA please contact the WVPA Secretary/Treasurer Francois Xavier Le Gros: **Francois.Xavier.LE-GROS@merial.com**

The next Congress of WVPA will be held in Nantes, France on 19-23rd August 2013.

For further details visit: **www.wvpac2013.org**