WVPA's 1st Asian meeting on poultry vaccination is a resounding success

The World Veterinary Poultry Association recently held its first Asian Meeting in Bangkok, Thailand, and it attracted almost 150 poultry veterinarians from across Asia. The theme of the meeting was poultry vaccination and here we feature some of the interesting papers that were presented.

In introducing his presentation 'New Opportunities for IB and ND Protection from the Broiler Hatchery', Branka Alva of Ceva highlighted that Newcastle disease and Gumboro are widespread in Asia, Africa and Central and South America and that classical vaccination against these diseases encounters two problems.

Firstly, maternal immunity often neutralises field Gumboro vaccination and this reduces the efficacy of early Newcastle disease vaccination and, secondly, field vaccination is often improperly done, resulting in poor vaccination cover.

Maternal antibody

In essence, maternal antibody gives little chance for Gumboro disease intermediate or intermediate plus vaccines to take and it delays the onset of vaccinal immunity from conventional live and killed Newcastle disease vaccines.

So, how can we achieve a good, uniform, controlled and safe vaccination of all the birds in the flock? The first thing to do is to eliminate operator variability and this can be done by focusing vaccination on the hatchery. This is now possible with a new generation of Gumboro disease vaccines (Immune Complex and Vector HVT-IBD) that can be applied at day old or in ovo.

Since 2006, the broiler population has risen from 40 billion to 45 billion in 2011 and over the same period the percentage of chicks receiving Gumboro disease vaccination in the hatchery has risen from 2 to 25%.

Classical Newcastle disease vaccines can not be applied in ovo and has a variable efficacy at day old but it is different with the new generation vector HVT-ND vaccine.

Ceva's vector vaccine protects against various types of Newcastle disease viruses and results in a lowered mortality and reduced virus shedding after a field challenge and gives lifelong protection to the broilers.

It is generally accepted that it is not possible to use two vector-HVT vaccines together in the same birds as interference occurs, but full compatibility has been demonstrated between Immune Complex IBD and Vector HVT-ND. Work in Hungary has shown that when giving this combination of vaccines there is:

- No interference to the Newcastle disease immune response.
- No interference to protection against vvND challenge.
- No interference to the reduction in ND virus shedding.
- No interference to the induced Marek's disease protection.
- No interference to the take of Gumboro vaccine as defined histologically.

In summary, Branka said the Immune Complex IBD + Vector HVT-ND vaccination approach is convenient as it is a single shot against two diseases that can be given at day old or in ovo and it is efficacious and safe irrespective of the type of challenge or the level of maternal immunity present and it gives broilers lifelong protection.

An attentive audience.

Brazilian experiences

He concluded with reference to a large Brazilian company that has trialled this vaccine and has achieved a reduction in mortality from 5.3 to 4.1%, accompanied by an improvement in FCR from 1.85 to 1.79 and one in production index from 286 to 314. Another trial reported similar changes (6.0 to 5.0%, 2.25 to 2.16 and 237 to 255).

Chris Morrow from Bioproperties Inc then addressed the topic of 'Avian Mycoplasma Control in Asia'. Vertical Mycoplasma gallisepticum transmission invariably necessitates expensive antibiotic therapy in the broiler flock but if you can control M. gallisepticum vertical transmission you can avoid this expense.

In addition, there are not many anti-mycoplasma drugs and resistance against two of them – tylosin and enrofloxacin had been seen in Australia and Thailand respectively.

Mycoplasma strategies

Globally two strategies have been successful. In the UK, USA, New Zealand and parts of Europe breeders have been kept free of M. gallisepticum, whereas in Australia, China and the Philippines t-11 vaccination of breeders has been practised.

In the former scenario M. synoviae infection has often then become a problem. Freedom can not be guaranteed by antibiotic based programmes.

Chris stressed that broiler performance is the best measure of effective mycoplasma control. When it comes to vaccination only live vaccines induce mucosal immunity and that mucosal immunity is an important part of the bird's defences against mycoplasma infection.

In Asia ts-11 vaccine will protect layers in rear as long as there are antibiotic free windows available (one week before and five weeks

Continued on page 25

Continued from page 23
after vaccination). He then discussed various interactions between different vaccine types and highlighted how for layers in lay the F-strain live vaccine gives a better protection against egg drop than killed vaccine.

When it comes to humoral immunity, the problem is that mucosal rather than humoral immunity bestows protection and so blood testing is of little value for assessing protection.

Maternal antibody for mycoplasma does not protect the day old and may increase the survival of vertically infected embryos, thereby improving the efficiency of vertical transmission. In addition, maternal antibody plays no part in local or mucosal immunity.

In closing, Chris highlighted the benefits that could be obtained from vaccinating layers against M. synoviae (see Table 1).

Taylor Barbosa from Pfizer then considered the benefits and importance of injection site accuracy in in-ovo vaccination.

This is a method that gives us individual dose control without the issues of stress, labour intensity and poor hygiene, which can come with handling each and every individual bird.

Parameter to 57 weeks	Trial 1	Trial 2
Total eggs	+11.4	+13.4
Normal eggs (%)	+1.4	+2.9
Egg mass (g)	+795	+787
FCR	-0.12	-0.07

Table 1. The benefits arising in egg layers from M. synoviae vaccination.

The in ovo concept was first used successfully in the laboratory in the early 1980s and by 1992 the first commercial equipment was available (Embrex Inovoject). By 2011 over 15 billion eggs a year were being vaccinated by the Inovoject.

He defined in ovo vaccination as the delivery of a vaccine inside the egg to an embryo in late development – targeting specific sites where the vaccine is capable of stimulating an immune response.

Nowadays, he considers the benefits of in ovo vaccination to be:

- Automated mass vaccination with individual vaccine deliveries.
- Accurate and gentle volume dispensing.
- Fast processing 20-70,000 eggs per hour.
- Constant disinfection after each application.
- Earlier protection in the chick.

The five key points for in ovo vaccination success are:

- The location or position of the egg.
- Shell penetration.
- Site of injection.
- The vaccine used.
- Sanitation.

The optimal time for in ovo vaccination is between 17.5 and 19.5 days of incubation when the embryo should be in the position for hatching (head under right wing) and the stalk of the yolk sac is being retracted into the abdomen. No more than 1-2% of eggs should be pipping. The impact of embryo age at time of in ovo vaccination is shown in Table 2.

Embryonic age (days)	Proportion vaccinated at correct site (%)
18.0	98.4
18.5	99.6
19.0	100.0

Table 2. The impact of embryo age on in ovo vaccination accuracy.

Dr Ioannis Mavromatis of Lohmann Animal Health then looked at 'Good Vaccination Practices with Live Vaccines' which is an important way to mass vaccinate flocks. He started by considering the most important factors:

- Broilers are often vaccinated with

Continued on page 26

The 1st Avian Pathology Asian Lecture

The 1st Avian Pathology Asian Lecture, which is supported by the Houghton Trust, was presented at the meeting by Assoc. Prof. Dr. Thaweesak Songserm from Thailand's famous Kasetsart University and had as its theme the vaccination of ducks. Dr Songserm was presented with a certificate and award in recognition of his Lecture by Prof. Richard Jones, chairman of the Houghton Trust (see photograph right).

The scene was set by defining the four common duck raising systems used in Asia:

- Closed housing with evaporative cooling (EVAP).
- Traditional open housing.
- Backyard flocks.
- Nomadic (free grazing of paddy fields).

These all present various challenges when it comes to duck vaccination!

The common viral diseases of ducks are duck viral enteritis or duck plague, avian influenza, Derzsy's disease (parvovirus infection) and infectious duck hepatitis. Each was then considered.

Duck viral enteritis is caused by a herpes virus and the disease experiences periods of latency or subclinical disease. Risk factors for this disease include multi-aged farms/flocks, a non-uniformity of vaccination, the fact that it is endemic in some areas and immunosuppression.

Control centres on eradication of clinically affected ducks, proper vaccination and good biosecurity. All vaccines used for duck viral hepatitis are live attenuated vaccines. The vaccine does not prevent viral entry but induces a specific immunity that inhibits viral attachment and/or replication. Cell mediated immunity plays an important role in disease protection but neutralising antibody is needed for effective mucosal immunity. It hinders effective control if infected ducks are vaccinated.

Highly pathogenic avian influenza (HPAI) causes high mortality in fast growing meat ducks, but lowly pathogenic avian influenza (LPAI) shows minimal or no clinical signs in ducks. Risk factors include duck movements, free range and grazing ducks and housing young and old ducks together.

Prevention centres around eradication in the case of HPAI, good biosecurity and, in some countries, vaccination.

When it comes to vaccination killed, subunit or vector vaccines are used and any vaccination campaign needs to focus on biosecurity, active surveillance, serological monitoring, movement controls and buffer zoning. A good vaccine must be able to inhibit shedding after challenge.

Derzsy's disease typically only affects young Muscovies, Mules and geese with no clinical signs in older birds, but long periods of viral shedding. Risk factors include young age, no maternal immunity, being in an endemic area and multi-aged flocks.

Prevention focuses on breeder vaccination to provide maternal immunity in the progeny.

Infectious duck hepatitis type 1 and 3 are caused by a picornavirus, while type 2 is caused by an astrovirus.

All duck species are susceptible with differing severities. Risk factors include multi-aged flocks, young ducks and the absence of maternal immunity.

On the bacterial front, diseases such as fowl cholera, riemerellosis, salmonellosis, streptococcosis and sinusitis are encountered.

Risk factors include multi-age flocks/farms, poor ventilation/high ammonia levels, poor terminal cleaning of duck houses, short down times, pests and vermin, being in an endemic area with water and litter contamination playing a role in disease spread and, possibly, antibiotic resistance.

Control focuses on antibiotic treatment, vaccination (which may be with autogenous products), biosecurity and good, basic management practices.

In summarising, the speaker said that for vertically transmitted diseases vaccination of breeders to give maternal antibody protection to the offspring was important, otherwise control centres on good vaccination of non-immunocompromised ducks.

Good biosecurity is essential. ■

EVAP housing, traditional open ended housing and nomadic production.

Continued from page 25
live vaccines because of the numbers involved, their low unit value and their short life-cycle.

- Bird age, for example, very young chicks can not be easily vaccinated by the drinking water because they irregularly drink very small quantities of water.
- Some live vaccines, for example reo and Marek's, have to be administered by injection.
- Local factors such as availability and cost of labour.

Vaccinate healthy birds

As a general recommendation only healthy birds should be vaccinated and vaccines must be stored and transported in accordance with the manufacturer's recommendation as well as being used within their expiry date.

It is also important to use the correct dosage and to accurately record details of the vaccination and the batch numbers of the vaccine(s) used. Finally, it is always prudent to check the effectiveness of vaccination by blood testing the flock.

Table 3 shows the routes that can be used for the administration of live vaccines.

When vaccinating via the drinking water the quality of the water must be good and the pH and chloride content must be satisfactory. Excess chloride or heavy metal contamination of the water may inactivate live vaccines.

Injection
In ovo vaccination
Spray vaccination
Drinking water vaccination
Ocular/nasal vaccination
Wing web vaccination
Follicle administration
Oral vaccination

Table 3. The routes of administration for live vaccines.

Some drinking water systems, for example ones which can not be quickly and easily drained, might not be appropriate for water vaccination.

Before water vaccination is applied a thirst needs to be generated (typically by removing water access for 2-4 hours).

Then effective water vaccination requires all the birds to have consumed a dose of vaccine for a couple of hours – there are ways to encourage drinking, for example, water vaccination immediately after feeding because at this time birds drink more and more quickly or by vaccinating in the early morning.

Drinking water vaccination, except with live salmonella vaccines, should not occur in very young chickens.

He advocated the use of a water stabiliser to protect the live vaccines against adversities in the water system and where one is not available skimmed milk at a rate of 2g skimmed milk powder per litre of water can be used, although this can cause blockages in nipple systems. ■

Korean delegates.

The World Veterinary Poultry Association (WVPA) is over 50 years old. It is the global organisation for poultry veterinarians and health scientists and has as its goal the furtherance of knowledge of poultry diseases and their control. It has over 2000 members and 40 or so national branches. Anyone interested in knowing more about the WVPA should contact the secretary: francois-xavier.le-gros@merial.com