Latest veterinary thinking from Beijing

Recently the World Veterinary Poultry Association held its XVth Congress in Beijing, China and in this review we will highlight papers of interest to poultry breeders and hatcherymen.

Survival of AI virus

J. Lloyd Spencer et al, Canada

High titres of virus are found in faeces and nasal discharges and these viruses have envelopes which influence their resistance to chemical and physical factors including moisture, temperature, pH, light and aeration. Means of disposing of litter that do not require off farm removal of the litter are to be recommended.

Procedure recommended in which following removal of carcases the interior of the buildings is heated to 32-38°C for one week. Dryness affects survival of flu virus which is why the virus does not appear to survive for a long time in dust. For example one report cites flu virus to be present in manure 13 days after onset of the disease but not in the dust.

Faecal material from ducks retains infectivity for 30 days at 4°C and for seven days at 20°C. The virus also tolerates pH as low as 4.0 but not 3.0. Moist, cool conditions favour survival of the flu virus and the virus has been known to survive for more than 100 days in liquid manure during the winter months. Levels of chlorine and salinity in water affect virus survival.

The temperature achieved during composting appears to be the major factor that contributes to the killing of flu viruses in litter and three days at 40°C or higher will kill avian influenza viruses.

Immunosuppressive viruses

Zhizhong Cui, China

This work compared reticuloendotheliosis virus, Marek's disease virus, leucosis subgroup J virus and chicken anaemia virus for their immunosuppressive effects on antibody reactions to vaccines.

It was found that the reticuloendotheliosis virus induced the most severe immunosuppression and that birds infected by this virus at an early age could have significantly inhibited antibody responses to vaccinations for avian influenza ad Newcastle disease.

It was postulated that this scenario would produce some incompletely vaccinated birds which could become targets and sources of infections by these two viruses. It could also facilitate the continuous cycling of these two viruses within flocks which could favour mutations.

Chinese Newcastle disease

ZhiliangWang, China

In 2005 some 83 isolates of Newcastle disease virus were obtained from outbreaks in chickens, pigeons, geese and ducks in China. These isolates belonged to strains VIIc, VIId, VIb, III, II and I.

The major genotype in 2005 was VIId which has been the genotype responsible for most outbreaks of Newcastle disease in China since the end of the last century.

Novel AI diagnostic test

Barend van Dam et al, Holland

Serological tests currently available for screening chickens for antibodies against avian influenza are species specific and, therefore, not suitable for other species.

For this reason a competitive ELISA test was developed that is suitable for the detection of antibodies against avian influenza in the serum of any species. The assay will detect antibodies to all 16 haemagglutinin subtypes and the test has been shown to detect antibodies in various species that have either been infected or vaccinated with avian influenza virus.

Mycoplasmas and their hosts

A. H. Noormohammadi, Australia

Adherence of mycoplasmas to host cells has been considered as an initial step for infection and a pre-requisite for their pathogenicity. Interference with this will prevent colonisation and infection and this could form a basis for disease prevention.

It is well known that inactivated Mycoplasma gallisepticum and M. synoviae vaccines show poor efficacy against a virulent strain even though they induce a very strong antibody response. One can speculate that this may be due to the fact that inactivated vaccines represent a single, or at best, a limited number of surface antigens and consequently live vaccines induce significant protection due to their capacity to express a large number of antigenic variants in response to the selection pressure imposed by the host's immune response.

Thus, despite their limited number of genes and lack of a cell wall, avian mycoplasmas have developed adaptive mechanisms to evade a highly evolved immune system and even take advantage of the strategy used by the host immune system against them to survive and induce a prolonged infection.

Influenza in waterfowl

Xiufan Liu, China

The long term endemicity of H5N1 influenza virus in domestic ducks and geese in Southeast Asia poses a big challenge to the control of H5N1 in poultry. An effective control strategy would require:

- Intensive surveillance of H5N1 in feral aquatic birds and in live poultry markets.
- Vaccination programme for H5N1 influenza in ducks and geese should be implemented in areas with high incidence of carriers to reduce viral load and shedding and to protect from infection and disease. More effective vaccines are needed.
- Change from free range to housed waterfowl production so as to avoid contact between wild and domestic waterfowl. Avoid mixing waterfowl and chickens.
- Strengthen biosecurity and improve disease detection and reporting.

Latent AI infections

Feng Xue, China

A survey of avian influenza viruses in domestic ducks and geese from live poultry markets was undertaken in some regions of eastern China during 2002-2006. In total 908 isolates of avian influenza virus were obtained from 4,990 cloacal swabs and 48 H5N1 avian influenza viruses and their

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genetic sequences were compared. Nine HA subtypes were isolated with H5 being dominant (27.2%) and H3 and H6 were second and third. The highest rates of H5 isolations occurred from January to March with the lowest rates from May to October. All the H5N1 strains isolated were HPAI. The data suggests that avian influenza viruses present in China have diversities in pathogenicity, antigenicity and genotype.

H5N1 feather lesions

Yu Yamamoto, Japan

This study confirmed that Japanese H5N1 HPAI virus can replicate in the feather epithelium causing necrosis from infection by the natural route. It also suggests that feathers infected with the virus could be a potential source of infection to other birds.

Dutch AI surveillance

A. R. W. Elbers et al, Holland

After the HPAI H7N7 epidemic in 2003 the Dutch poultry industry and Ministry of Agriculture implemented a LPAI surveillance programme that is far more comprehensive than current EU requirements. Flocks are screened annually but free range flocks are screened every three months.

Between July 2004 and December 2006 some 4,600 flocks were screened (1.5% duck, 3.6% turkey, 42.6% layers and breeders and 48.7% broilers). A total of four H5 or H7 LPAI incursions were identified. These were:

- H5 in a small flock of 600 free range meat ducks. No clinical signs. These ducks had been imported from another EU country.
- H7 in a 22,000 bird layer flock with free range facilities that showed no clinical signs and no drop in egg production. Six weeks earlier there had been an egg drop which had been attributed to E. coli infection.
- H5 antibodies detected in swans that were about to be exported. No circulating virus found.
- H7 found in a parent stock farm. No virus isolated although tracings identified another flock from which H7N7 influenza virus was isolated.

In January 2006 LPAI H6N5 was detected in two different turkey farms. It was concluded, among other things, that the highest levels of biosecurity were needed to keep AI out of poultry flocks.

Flies and Newcastle disease

Fatemeh Arab Khazaeli, et al, Iran

In this study 2,000 house flies were collected from 20 poultry farms around Tehran with a history of Newcastle disease. The alimentary tracts were removed aseptically from the flies, homogenised and inoculated into eggs. No Newcastle disease virus was isolated suggesting that house flies are not an important vector of Newcastle disease virus.

Embryo vaccination for IB

Mazhar I. Khan, USA

This work indicates the production of a Spike protein specific antibody response prior to challenge and the simultaneous use of interferon A with a DNA vaccine provided 100% protection against infectious bronchitis virus challenge, whereas this was not achieved with ac recombinant DNA vaccine on its own. Interestingly, the interferon on its own strongly influenced weight gain and gave 61% protection against IB virus challenge.

This finding may allow the use of safe DNA vaccine in commercial poultry flocks against IB infection.

In ovo APV vaccination

Fengsheng Lin et al, UK

This work investigated the safety and the onset and duration of immunity following the in ovo delivery of an avian metapneumovirus vaccine.

When administered to maternal antibody positive chicken embryos the onset of immunity was at five days of age and it lasted for 46 days. For turkeys similar figures were eight days and nine weeks.

REV in broiler breeders

Liqing Zhao et al, China

This epidemiological survey for reticuloendotheliosis virus was undertaken on serum samples from a broiler breeding company in Shangdong Province. A positive rate of 85-100% was found and in their offspring the figure was 0-45%.

At the time samples of spleen, kidney and liver were taken and checked for infection by histopathology, PCR and IFA and of these PCR was the most sensitive and most specific.

M. synoviae in Holland

Anneke Feberweee et al, Holland.

Mycoplasma synoviae monitoring is not compulsory in Holland yet that country has had such a monitoring programme for breeders for some time. The prevalence levels for M. synoviae are 0.0% for ayer grandparents, 10.9% for broiler grandparents, 73.0% for commercial layers, 5.9% for broilers and 16.0% for turkeys.

Dry powder vaccines

Evy A. Corbanie et al, Holland

The mass application of dry powder vaccines might be more effective than the application of liquid vaccines by spray or droplet. Modern spray drying techniques enable the production of powders with specific, predetermined particle sizes which, among other things, reduces the risk of post vaccination reactions. In addition, problems such as the uncontrolled evaporation after droplet generation can not occur.

A dry powder Newcastle disease vaccine was made from a proprietary vaccine strain was compared to the traditional vaccine. It was found that the powdered vaccine produced high virus concentrations in the air and generated good immune responses.

M. synoviae egg problems

Anneke Feberwee et al, Holland

This eggshell abnormality is confined to the top of the cone and in most cases is characterised by a very clear demarcation zone with an approximate 2cm diameter. Typically the problem is seen in commercial egg laying flocks.

In a survey of affected flocks M. synoviae was only isolated from the oviducts of birds producing the deformed eggs. The production of deformed eggs ceased a few days after appropriate antibiotic treatment.

Duck plague vaccination

Muhammed Jasim Uddin et al, Bangladesh

This study was undertaken to determine the persistence of maternal antibody and its influence on vaccination against duck plague infection.

Maternal antibody persisted from vaccinated parents until day 19, whereas that from non-vaccinated parents persisted until day 13. Accordingly it was recommended that the optimum time for the administration of the vaccine should be 22 to 28 and 12 to 21 days of age for the progeny of vaccinated and non-vaccinated parents respectively.

Yolk sac retention

Kashif Aziz Khan et al, Pakistan

Certain stressors in early life affect yolk sac absorption and may lead to the indefinite retention of the yolk.

The incidence of unabsorbed yolk sacs varies by bird type and, for example, is twice as high in commercial broilers as it is in layer type chicks.

In addition to bacterial infection, initial type of feeding, post-hatch starvation and brooding temperature all contribute to yolk sac retention.

It was also found that the provision of unbalanced starter feeds may slow down yolk utilisation.