4th WVPA Asia Meeting looks at detection and control of poultry diseases

The World Veterinary Poultry Association recently held its 4th Asia Meeting in Kuala Lumpur, Malaysia. The meeting had 'Detection and Control of Poultry Diseases' as its theme and featured technical presentations from industry and researchers.

Avian Pathology Lecture

The keynote Avian Pathology Lecture was given by G Dhinakar Raj from India and focused on the case for new generation poultry vaccines.

Institutions start the ball rolling with research, which results in leads with translatable potential. Since they are not industry ready they are not converted into viable products and processes and Dhinakar feels that there are instances where the conversion of research into tangible benefits for stakeholders is lacking to some extent.

Traditional research needs to focus on two key areas – converting research into technology and distributing the technology between the stakeholders. Funding agencies tend to focus on the former, whereas they are both equally important and essential.

The Translational Research Platform for Veterinary Biologicals (TRPVB) has a partnership with Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) to facilitate product/process development in the field of animal sciences – a key part of which is to foster productisation in veterinary biologicals by converging the presently distant academic research institutions and industry.

Dhinakar introduced the translation scoring card (Fig. 1). Using this system, if a score of >50 is produced, the chances of the research in question being translatable are quite high.

Table 1. Translation score card.

S. No.	Commercialisation parameter	Score	Remarks
I.a	Fulfilling an unmet need	25	New vaccine or disease diagnostics that is not so far available
I.b	Reducing existing cost with equivalent performance	20	Reverse engineering; import substitute
I.c	Improving existing performance – overcomes lacunae	15	Mab-based cELISA improves specificity; DIVA
II	Novel – IP protected	25	More so for multinationals
III	Fulfilling regulatory requirements	10	Testing to be done to comply with regulation – they would necessarily have to be done
IV	Availability of complete portfolio	15	Not restricted to only one disease diagnosis but should also be available for other related diseases
V	Ease and market of technology adoption	12.5	User-friendly; POC – strip test, FPA
VI	Availability of raw materials/ingredients	7.5	For bulk production – Mabs, recombinant proteins; tuberculin etc.
VII	Create awareness/ aggressive marketing	5.0	Users need to know of availability

Fowl adenovirus

Phang Yuen Fun from the host country then gave her presentation on 'The Return of an Old Enemy' (fowl adenovirus) and reported on 12 isolates from field cases involving broilers or broiler breeders in 2017.

All of these isolates came from birds that were three weeks of age or less. They showed typical lesions of inclusion body hepatitis (IBH) with pale and enlarged livers accompanied by mortalities as high as 12%.

All the viruses isolated were fowl adenovirus type E serotype 8b and all showed a close genetic relationship (95.4-98.3%) with the reference strain FAV-LNDL-121011-B.

Phang Yuen Fun speaking on the return of fowl adenovirus.

		AFL	ZEN	DON	T-2	FUM	OTA
E. Asia	No. of samples tested	1756	2116	2235	440	1383	458
	Contaminated samples (%)	28	54	95	3	86	10
	Above risk threshold (%)	11	32	89	0	52	0
	Average of positives (ppb)	34	210	755	20	1753	3
	Maximum (ppb)	476	8113	13206	40	169500	20
S.E. Asia	No. of samples tested	659	659	659	659	659	458
	Contaminated samples (%)	54	52	50	4	86	25
	Above risk threshold (%)	42	22	21	2	42	2
	Average of positives (ppb)	109	151	767	68	1077	6
	Maximum (ppb)	10918	7080	10996	221	46515	270
S. Asia	No. of samples tested	272	272	272	272	272	272
	Contaminated samples (%)	81	12	14	1	88	76
	Above risk threshold (%)	64	1	1	0	22	19
	Average of positives (ppb)	33	21	76	18	406	9
	Maximum (ppb)	517	79	872	21	3490	134

Table 2. Detailed mycotoxin survey results for Asian sub-regions in 2017.

Mycotoxin overview

Seong Lim Tan from Singapore gave an interesting overview on the impact, prevalence and management of mycotoxins in poultry. He defined mycotoxins as secondary metabolites from fungi that harm animals including poultry. The occurrence of multiple mycotoxins contaminating feed are increasingly common and some combinations produce synergistic consequences.

In poultry, mycotoxins can produce depressed performance, reproductive disorders, poor egg production, increased mortality and can trigger immunosuppression that can cause disease associated with vaccination failures.

Mycotoxin risk management focuses on using different strategies including preventive measures before and after harvesting. When it comes to countering mycotoxins in

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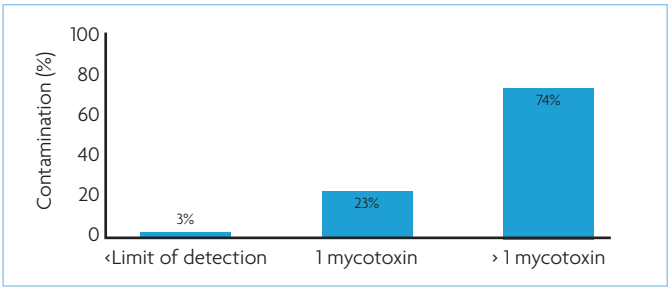

Fig. 1. Co-contamination of mycotoxins in all samples – tested for at least three mycotoxins.

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feed the use of microbes and enzymes to induce their biotransformation is considered to be the most effective strategy.

This is especially the case with fusarial mycotoxins since their structure is not suitable for adsorption by binders. The biotransformation of mycotoxins into non-toxic metabolites is fast, specific and irreversible.

Avian metapneumoviruses

Jorge Villa from Spain addressed the subject of the control of respiratory and reproductive problems caused by avian metapneumoviruses.

Control is centred round the use of live and killed vaccines and is used in the four main categories of commercial poultry. The live vaccines are used to give local respiratory tract immunisation, with the dead vaccines reinforcing the immunity derived from the live vaccines both locally and systemically.

At broiler level, on farm vaccination has controlled the appearance of outbreaks of disease caused by avian metapneumovirus by using seasonal vaccination in areas of low or medium field challenge and using a full year vaccination approach in areas with high pressure field challenge.

The general rules to keep in mind when designing an avian metapneumovirus vaccination programme for breeder or table egg layers are:

- First dose of vaccine should be given while the birds are still ELISA negative.
- Live vaccines should be applied directly to the respiratory tissue by eye drop or coarse spray.
- In farms with medium or high field pressure, revaccinate with live vaccine every six weeks until killed vaccine is given.

Antibiotic free production

Derek Detzler shared his experiences from North America of antibiotic free broiler production which came about as a result of consumer pressures, increasing antibiotic resistance issues and the fact that there are few antibiotics in the development pipeline.

In the spring of 2004 moving from a standard anticoccidial rotation programme to three consecutive cycles with just coccidiosis vaccination proved to be reasonably successful and it was concluded that vaccination for coccidiosis in the hatchery was a viable alternative to using anticoccidials.

The following year the same three-cycle approach yielded similar results and the decision was made to continue vaccination. By the end of a year of continuous vaccination, overall bird performance was slightly improved. First week performance and nutrition were then focused on.

Experience and constant bench-marking allowed the management and nutrition to be refined to take the company further into the development of an antibiotic free regime.

To date, performance is acceptable with a 1-2% increase in mortality and a 2-6 point increase in FCR.

Infectious bronchitis

Marcelo Paniago addressed the topical subject of infectious bronchitis (IB), which is still one of the most damaging global diseases of poultry.

A key factor is that the IB virus has the ability to mutate and, as such, has often been called the 'ever changing virus'.

In Asia it was first reported in the 1950s in Japan and Thailand and the virus spread through the continent. In a recent review, the economically important IB viruses were classified as Mass-type, Japanese/Taiwanese, Taiwanese, Middle East, Far East, Chinese, LX4, QX, QX-like variants and Korean/Chinese isolates.

Marcelo reported on a study in which tissues were obtained between 2007 and 2018 from eight Asian countries from broiler, broiler breeder, commercial layer and native (broiler) flocks (Table 3).

Classification	%
QX-like	57.6
Taiwanese variant 1	12.6
Malaysian variant	16.8
Indian variant	0.8
Xindadi-like type	1.6
untyped	1.6

Table 3. Classification of 125 samples taken from broiler, broiler breeder, commercial layer and native broiler flocks in eight Asian countries.

Usually homologous IB vaccines provide the highest level of protection. However, when homologous vaccines are not available a cross protection approached is needed.

In reality, an approach based on combining vaccines of different serotypes can be used – in fact the combination of Massachusetts and 793B has been used for several decades and is the most extensively tested and validated combination.

Role of water sanitisation

Rik Daneels from Belgium reflected on the role of water sanitisation in livestock production. He advocated that maintaining high quality drinking water was important in relation to biosafety and production yields because water plays a fundamental role in digestion and the regulation of body temperature. It also plays a role in the introduction and/or spread of diseases in the poultry house. Although chlorine is used as a water disinfectant, it is not able to prevent biofilm and the pathogens protectively contained in it. Chlorine dioxide is not chlorine – it is a very different chemical with a different chemistry! It is the disinfectant of choice for removing and preventing biofilms and is effective in killing bacteria, viruses, spores, moulds, yeasts and protozoa.

Rik Daneels speaking on the merits of water sanitisation.

When considering the importance of water, the following should be taken into account:

- Many birds have access to the water source.
- All the birds ingest the water daily.
- Water is a good transmission vehicle for pathogens
- Residues (faeces) from humans and animals pollute many water sources.

The presence of biofilm in a watering system is considered to be one of the most overlooked threats to broiler flocks. Biofilms contain a mixture of bacteria and their metabolites and bacteria that can cause diseases in poultry such as pseudomonas, enterobacteria, clostridia, various cocci are just some of the bacteria frequently found in biofilms.

Watering systems in broiler houses operate at low pressures thereby producing no shearing force capable of removing the biofilms. ■

To be continued in a future issue of International Poultry Production

Table 4. Microbial water quality standards and treatment options in poultry rearing.

Water quality indicator	Levels considered average	Maximum acceptable level	Maximum acceptable levels indicate:	Treatment options/comments
Total bacteria (TPC)	0 CFU/ml	1,000 CFU/ml	Dirty system, may taste bad and could have pathogens in the water system	Clean the system between flocks with approved sanitising cleaners and establish a daily water sanitation system when birds are present
Total coliforms	0 CFU/ml	50 CFU/ml	Water with ›50 total coliforms or any faecal coliform has been in contact with human or animal faeces	Additional disinfection shock
Faecal coliforms	0 CFU/ml	0 CFU/ml		