CEVA SANTE ANIMALE
Ceva Animal Health Asia Pacific

HATCHERY
EXPERTISE ONLINE

ceva.asiapacific@ceva.com

Issue No.31 / July 2010

MONITORING IBD VACCINATION
FROM HATCHERY TO FARM

by Dr Vincent TURBLIN – Deputy Regional Market Manager, Poultry
Ceva Animal Health Asia Pacific – Malaysia

INTRODUCTION

Any good vaccine needs a proper administration to provide its full benefits. That's why CEVA has always been at the spearhead of hatchery vaccination in the world, and much more than only in manufacturing vaccines, has found out new technologies to administer them in a convenient and trustable way.
Moreover, the utilization of these machines and these vaccines needs to be checked regularly, implying a reliable control in the hatcheries. Any industrial production has its own Quality Control, and CEVA package is now providing the tool for this QC follow up of vaccination in hatcheries thanks to C.H.I.C.K. Program. This is a real tool for preventing vaccination failure and improving the vaccination technique itself.
Part of this program is indeed to explain in detail the monitoring to be done with specific SOP (Standard Operating Procedures): you will find hereafter some key points of its implementation in hatcheries, and then, how we can monitor further in the farms with the new available laboratory tools, the vaccine take of live vaccines like CEVAC® TRANSMUNE IBD.

Vaccination Control Theory

Control of the Volume Injected: Dosing Accuracy

Volume control is systematically performed at the beginning of each vaccination day and repeated each time the number of vaccinated chicks does not match the number of vaccine doses used (e.g., 800 or 1,200 chicks for a 1,000 doses bag/bottle). It consists in measuring the volume obtained after 50 injections in a graduated cylinder. The amount found must be 5ml with a syringe adjusted for 0.1ml dose, and 10ml with a syringe adjusted at 0.2ml. This volume may appear quite high but is necessary to reach a good evaluation assessment.

One should bear in mind that semi-automatic machines are set to deliver 5% extra dose and that a vaccine bottle generally contains 5% more vaccine than the volume indicated in the label (safety margins). The mechanical construction tolerances of these machines (0.1 mm) result in practice in a dose variation ranging between 0% and 10%. Therefore, it is considered normal to vaccinate between 900 and 1,100 chicks with a 1,000 dose bag/bottle and between 4,500 and 5,500 chicks with a 5,000 dose bag/bottle.

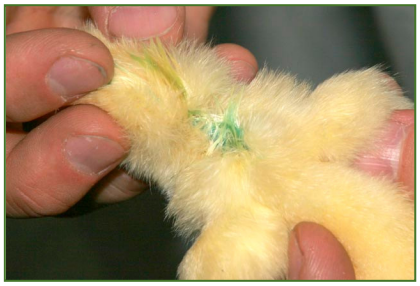
Control of Injection Site: Injection Quality Efficiency

Accuracy of the injection site depends on the machine settings, which must be corrected if required. Also, when the work pace is too fast in semi-automatic or manual vaccination, it is not rare that the operator maintains the chick in an inadequate position and injection is not performed properly. The operator's level of fatigue is often involved.

Injection Quality Efficiency (%)	Birds effectively injected / Total of Vaccinated Birds
Badly vaccinated chicks are:	
1. Wet fluff	The dose is not fully injected inside the bird
2. Bloody /Injured Chicks	Bleeding on the neck caused by the injection
3. Wrong position	Injection in the bad place.
4. Killed chicks	Chicks killed by the injection.
5. Non vaccinated	Without vaccine trace

An oil-based vaccine (white) can be readily discerned under the skin. On the contrary, a water-based vaccine like CEVAC® TRANSMUNE IBD will require the use of a specific dye (e.g. Patent Blue V).

Pic. 1 : Correct subcutaneous injection of a colored water-based vaccine.



Pic. 2 : "Wet fluff": Injection in dawn or insufficient insertion of the needle under the skin. The vaccine flows out from the puncture site.

Pic. 3 : Injury due to incorrect machine setting or inadequate positioning of the chick during subcutaneous injection in the neck.

Monitoring of the Number of Vaccinations and the Vaccination Speed Rate

It is essential to fill in a vaccination record that includes all the useful elements for reliable traceability of the operations:

- Date and time
- Machine number
- State of the machine at the beginning of vaccination
- Operator's name
- Vaccine name and presentation (number of doses)
- Expiry date and batch number of the vaccine/diluent
- Number of vaccinated chicks and volume injected per bird
- Number of chicks with "wet dawn", bleeding, lameness or killed
- Remarks

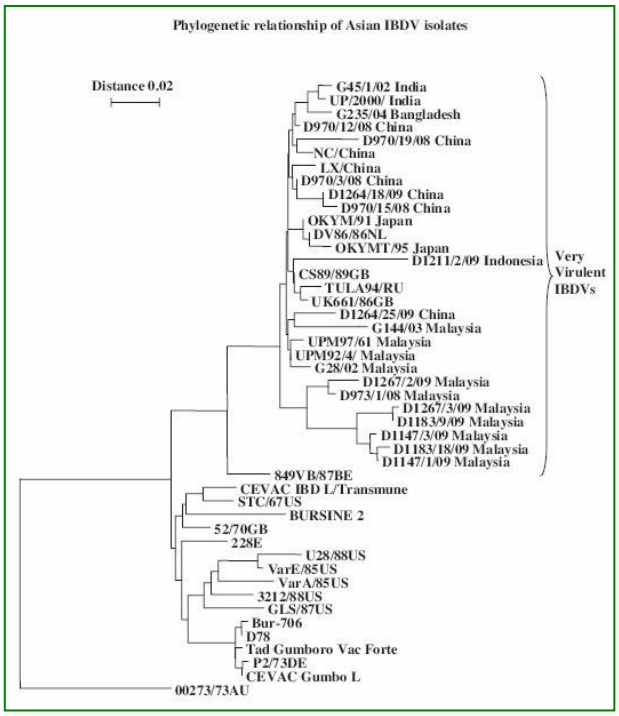
For the evaluation of the Vaccination Speed, it should be considered the number displayed in the counter at the Start Time of the evaluation and the same for the end. The best is to consider an average speed in different moments (3 rounds) per operator and then by the vaccination crew.

Equipment	Standard Range of Birds Vaccinated / Hour
AUTOVAC	2,500 to 3,000
DOVAC SINGLE	2,500 to 3,000
DOVAC DOUBLE	2,000 to 2,500

Monitoring in the Field

In general, with conventional IBD vaccination through drinking water, serology is not very easy to interprete. There are indeed big variations, related to the initial level of MDA of the day-old chicks, the overall immune status of the chicks and the time needed to seroconvert, the possible confusion with field pressure seroconversion, and the live vaccine strain used.

Combined with a good traceability of the hatchery injection, a farm monitoring of the vaccine take is however very important for IBD vaccination since subclinical forms are very frequent and cause big economical losses. Only the new biomolecular tools can provide us a clear picture of the situation in the monitored farms, by a direct demonstration of the presence of IBDV and its precise identification.



Practically in the farms, the replication of the IBD vaccine strain in the bursa will obviously occur BEFORE the onset of the serological response. Therefore, the samples can be taken earlier than blood samples, in general between 20 and 30 days of age. The bursas are sampled individually and placed in clean vials or plastic bags, to be sent frozen to a laboratory able to proceed the Polymerase Chain Reaction and, then, the sequencing or RFLP (*Restriction Fragment Length Polymorphism*) identification on the amplified Nucleic Acid. In case of sequencing, the homology with the Genbank and laboratory database can state if it is either the vaccine strain (successful vaccination) or a wild strain (classical vvIBD, or variant).

The phylogenic analysis by sequencing performed on the 408 base pairs long (721-1128 bp) nucleotide sequence of the hypervariable region of the vp2 gene of IBDV will then give the kind of following results, appreciating the distances between each strain.

Another interest of this new kind of farm monitoring is linked to the following works of Palya and co-workers (personal communication). They indeed evaluated the time needed for the development of protection against vvIBDV infection after the vaccine take. Demonstration was done that as soon as 2 days post-replication of W2512, no other IBD virus could replicate in the bursa: the place was taken, and the door closed for field virus infection. This mechanism of action could explain the excellent protection of live immune-complex vaccines against early challenge by wild IBD viruses, even with low titers between the 3rd to 4th weeks of age as it can be noticed sometimes before the complete seroconversion.

Transportation of the Bursa of Fabricius

For transportation of the bursa samples, the FTA cards are much easier to handle and safer since the paper is purposely soaked with disinfectant to denature viruses but can preserve the nucleic acids (RNA or DNA). Nevertheless, some critical points related in our specific SOP for its usage have to be respected in order not to contaminate it and get a reliable analysis.

CONCLUSION

In practice, vaccination control in hatcheries involves performing On-site technical assistance by training and audits programs for hatchery managers and operators. In this context, the C.H.I.C.K. Program, can provide some Audits and Diagnostic Forms for monitoring all factors related to the injection vaccination process from the preparation and handling of vaccines, including the equipment operability and the vaccination process itself. These materials were developed to support the practices of hatchery vaccination in order to reach an optimal standard on Vaccination Quality and to keep records.

Besides, the monitoring of IBD vaccination can be extended to farm level thanks to biomolecular techniques, providing a complete information about both the vaccination quality and the field pressure occurring in some particular areas. Both surveys are complementary and are aiming at the best control of IBD in the field and hence to the best economical performance of the flocks.