MARCH 2004

ISSUE 5

poultry focus

business news for the poultry industry

intervet

In this issue of Poultry Focus we continue our look at Infectious Bronchitis (IB), and in particular its effect on Britain's broiler industry. There's new data on the protective power of various live vaccine regimes, an analysis of the disease's costs, and a discussion about the best way to cope with emergent new serotypes. You'll also find a handy troubleshooting guide to help improve your spray vaccination techniques.

Variant IB vaccines – do they differ in spectrum?

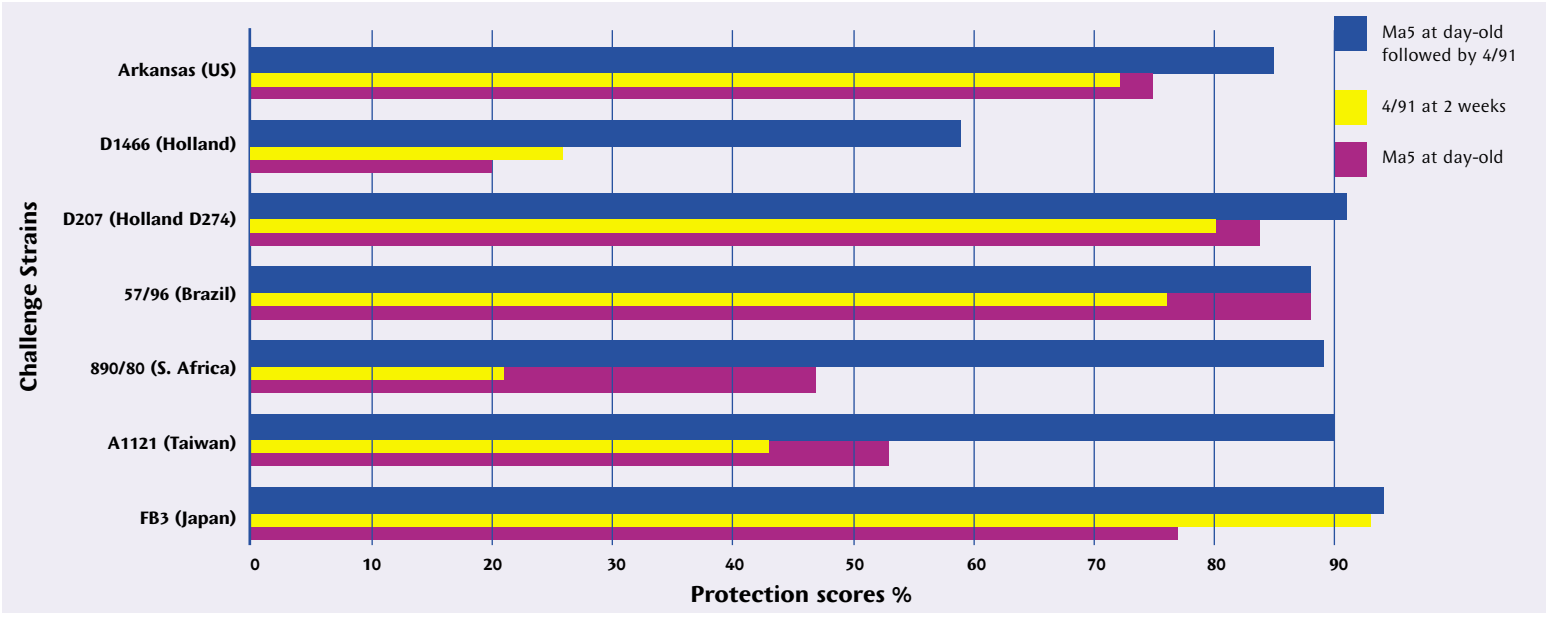
One reason for IB's continuing threat to the chicken industry is its ready ability to mutate into new genetic serotypes, much like the common cold in humans. When it comes to vaccination, this means that the disease is effectively a moving target.

The last major outbreak in the UK was due to the appearance of the variant strain, IB4/91, which is still the basis of the UK's most popular variant vaccine (Nobilis IB 4/91).

However, a regime based on the use of Nobilis IB Ma5 (classical Massachusetts strain vaccine) at day-old, followed by Nobilis IB 4/91 at 2 weeks of age, has been shown to be highly effective in reducing the respiratory signs of infectious bronchitis in vulnerable chickens against challenge from many different, and genetically-distinct, serotypes.

For the broiler sector, this approach seems to offer the best possible protection against the virus mutations of the future (Jane Cook et al, Avian Pathology (1999) 28, 477-485).

The use of Nobilis Ma5 followed by Nobilis 4/91 improved protection against all the challenge serotypes used in the trial, even though most are genetically distinct from the strains used in the vaccines



COMMON ERRORS IN SPRAY VACCINATION TECHNIQUE ON FARM

by Dr. Tibor Cserep

As the leading supplier of vaccines to the UK poultry industry, Intervet make regular audits of spray vaccination techniques in farms and hatcheries. These audits are often requested because of:

- poor serological results
- high level of bacterial contamination found in routine monitoring
- high first week mortality
- respiratory problems after spraying ND vaccine at day old.

The audits revealed a number of common problems. In this issue we refer only to farm spray audits. These are listed below, and can be used as a checklist to improve performance.

ISSUES	SOLUTIONS
Preparation technique	
Sprayer shared between farms, is dirty, creating a biosecurity hazard.	Ideally each farm should have their own sprayer. When that is not possible, sprayers must be cleaned according to manufacturer's instructions.
Sprayer's spinning disc is dirty, or its teeth are broken or distorted.	Spinning disc needs to be clean at all times. If teeth are distorted or missing, the disc must be replaced.
Vaccine vials are placed on dirty surfaces before mixing and vials opened before submersing them into water.	Use clean bench in the office or cover working surfaces with clean paper or plastic sheets. Open vaccine vials under water only.
Chlorinated tap water is used for mixing and spraying the vaccine and also for cleaning and rinsing the container of the sprayer.	Use distilled or deionized water.
Battery is not fully charged before spraying, so the sprayer delivers droplets to less than the expected distance (2.5-3.0 metres) and leaves unvaccinated paths in the shed.	Check the battery the day before vaccination and recharge it if necessary.
Shed is either too dark or too bright. If too dark, people can't see what they're doing. If it's too bright, birds tend to run away from the vaccinator and coverage is uneven.	Dim the light so that birds settle down but keep visibility good enough for the operator.
Calibration of the spray nozzle in use is often missed, because people are unaware of its importance. Very few of the farm staff have actually seen or read the sprayer's Instruction Manual, and consequently have very little knowledge about its maintenance.	Obtain a manual and read it several times before starting vaccination.
Administration technique	
Plastic screw which holds the spinning disc is not tightened before spraying, the disc may sometimes fall off unnoticed. As a result, the shed has to be revaccinated.	Always check the screw before the start of vaccination; but do not over-tighten, as its thread can be broken easily.
Few farms have a written vaccination- or sprayer-maintenance protocol for the staff to follow.	Prepare company-specific vaccination protocol.
Spinning disc sprayer (Electrafan/Ulvafan) is held forward and swayed; instead of sideways and steady. Swaying the sprayer changes the size and shape of the swath leading to uneven coverage.	Hold the sprayer sideways from the body and do not sway.
One or two fans are left on during vaccination and create an air current in the shed that leads to uneven coverage and the waste of vaccine.	All fans should be switched off during vaccination.

ISSUES	SOLUTIONS
Obstacles in the sheds such as perches, slave hoppers, slats etc can take up a substantial proportion of the vaccine.	Remove obstacles if possible or adjust spraying pattern.
When spraying, staff may misjudge their pace or fail to adopt a suitable walking pattern and often have no vaccine left for a second lap of the shed. Some areas of the shed may be missed as a result.	Draw up a plan the day before vaccination and do your calculations. If still uncertain, you can conduct a mock vaccination run with plain water.

CONCLUSION

These examples are typical of areas that need improvement on farms. They confirm the importance of staff training and highlight some of the consequences of incorrect vaccination.

With training and careful planning, most problems can be prevented and vaccination results improved. Intervet offers regular training sessions and vaccination audits. For further information, or to arrange an audit, please contact us on 01908 685249.

IB: THE COST OF GETTING IT WRONG

IB is a continual threat to the broiler industry and many different approaches are taken to its control.

But not all of these prove effective. Here we investigate the true cost of IB infection in a 30,000 bird house and demonstrate the absolute necessity of getting the vaccination strategy right.

Assumptions

- 30,000 bird house.
- FCR of 1.8.
- Broiler liveweight price 50.7p/kg
- Rejects @ 0.5%
- Feed costs £160/tonne
- Birds grown to 2kg live weight.

Cost of an outbreak

Disease factor	Impact	Cost
Decreased weight gain	Reduction in liveweight 100-200g	£1,500-£3,000
	Fall in FCR of 10pts	£960
Increase in mortality	Increase in rejects to 1%	£170
	Potential loss per 30,000 birds	£2,630-£4,130*
		*or, around **10p** per bird placed plus residual challenge

By contrast, the on-farm cost of vaccinating with Nobilis Ma5 at day-old and Nobilis 4/91 at 14 days – the "gold standard" broiler vaccination schedule – is around a half pence per bird.

SUMMARY NEW DATA: IB VACCINES IN BROILERS

Full technical trial paper will be published shortly

In most countries today, broilers are routinely vaccinated against Infectious Bronchitis (IB) with Massachusetts-type IB vaccines at day-old. Depending on the disease situation, some flocks are then revaccinated with variant IB vaccines at around two to three weeks of age.

The trial objective was to compare the efficacy of different vaccination schedules using vaccines based on the classical and variant IB viruses.

VACCINATION AND CHALLENGE

The birds were vaccinated with the coarse spray method using a hand held garden sprayer and challenged with M41 and 4/91(793B) viruses through the oculonasal route at six and eight weeks of age.

MATERIALS AND METHODS

'As hatched' broiler chicks of a single broiler parent flock were used in the trial, with 60 chicks in each group. They were tested as follows:

Table 1. Treatment schedule

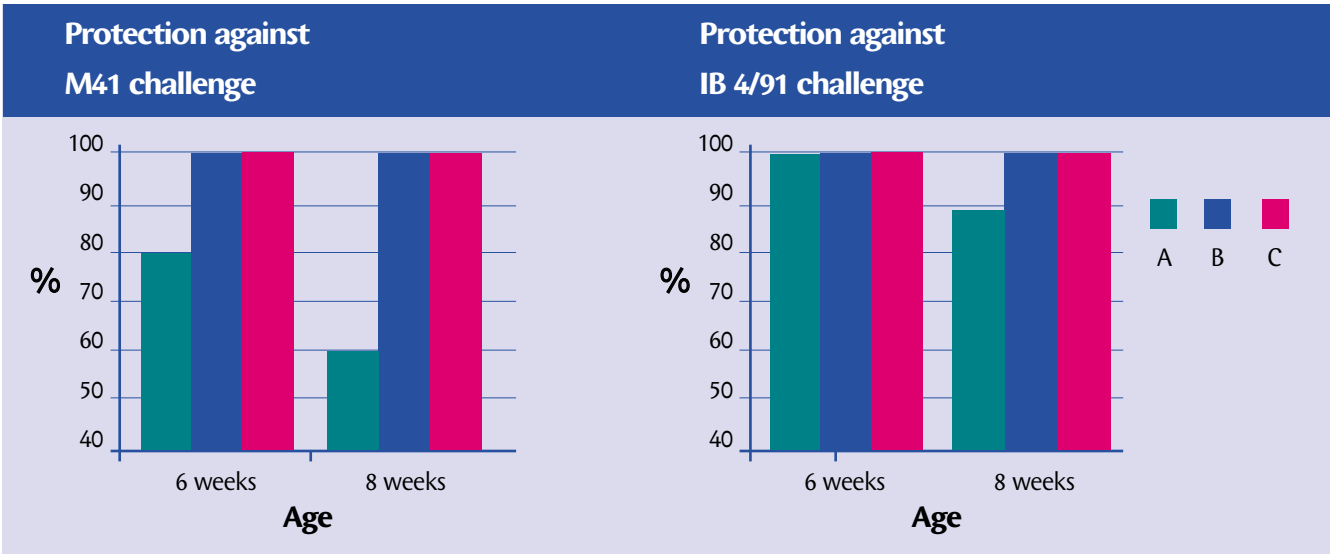
Age/days	Groups and treatments			
	A	B	C	D
Day-old	Modified Massachusetts + Arkansas (variant-type)	Ma5, IB 4/91 (UK variant)	Ma5	No vaccine (control)
14	-	-	IB 4/91	
28	Serology			
42	Challenge with M41 and IB 4/91(793B) - Serology			
56	Challenge with M41 and IB 4/91(793B) - Serology			

RESULTS

Protection

All IB vaccines produced a significant level of protection for up to 6 weeks post vaccination.

With the exception of group A, levels of protection were still high at 8 weeks post vaccination.



GENERAL CONCLUSIONS

Day old vaccination with vaccine A induced adequate protection against both challenges up to 6 weeks of age, but by 8 weeks this protection had declined considerably, particularly when the birds were challenged with M41. In contrast, vaccination with Ma5 and IB 4/91 gave 100% protection against both challenge viruses, at both 6 and 8 weeks.

The results indicate that simultaneous administration of Ma5 and IB 4/91 vaccines at day-old does not interfere with efficacy of either vaccine and that their use provides sufficient protection against Massachusetts and IB 4/91 (793B) type challenge for up to at least eight weeks of age. Chickens may be vaccinated with both vaccines in the hatchery and will not require revaccination following placement on the farm.

However, if the disease situation requires a broader spectrum of protection against IB variants, note that a vaccination programme based on separate administration of Ma5 and IB 4/91 vaccines (as in group C) has been shown to provide protection against other IB serotypes including D274 (D207)*, D1466 or the nephropathogenic B1648 (Jane Cook et al, Avian Pathology (1999) 28, 477-485 – see front page).

* Reference to D274 is equivalent to D207.
These strains are considered to be the same.

ACKNOWLEDGEMENT

Intervet wishes to record its grateful thanks to Dr. R. Gough and his colleagues at VLA–Weybridge for conducting this challenge study on their behalf.

Nobilis IB Ma5:
Live freeze dried virus vaccine containing Infectious Bronchitis virus strain Ma5 (serotype Massachusetts) plus stabilisers. For active immunisation of chickens against the Massachusetts or serologically related types of Infectious Bronchitis. Legal category PML.

Nobilis IB 4-91: Live attenuated Infectious Bronchitis virus variant strain 4-91‡ 3.6 $\log_{10}$ EID_{50}. For the active immunisation of chickens to reduce the respiratory signs of Infectious Bronchitis caused by the variant strain of IB 4-91. Legal category POM.

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Item code: 09332
09332 • March04/FC/7K