



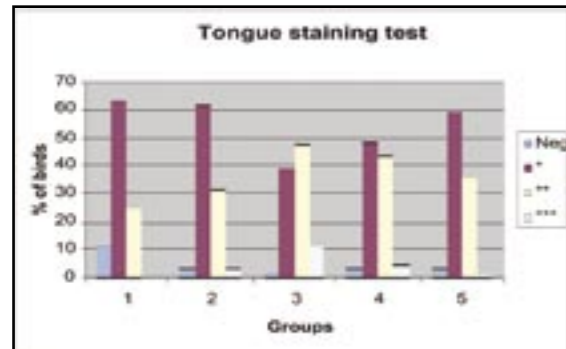
poultry focus

business news for the poultry industry

vaccination the dye was still 8 metres away (18 % of the line!) from the far end of line. Three hours later there was still about two metres of clear water at the end of the line. Birds were eating, resting and some of them drinking but not too many. There was much less activity here than in adjacent pens. This situation remained the same through the six hour vaccination period.

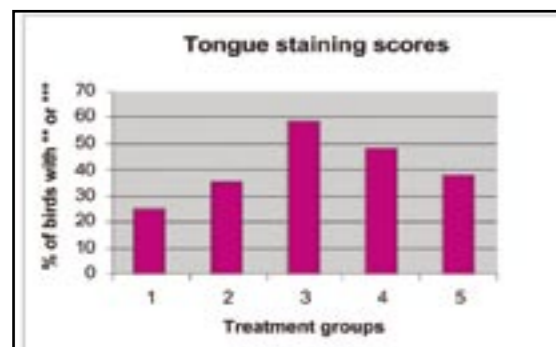
Sixty birds per group gave a fairly good idea about the dye uptake or the lack of it and the scores per groups are presented in Figure 1.

Figure 1: Tongue staining scores per group



If we add the percentages of the ** and *** birds together the rating of the groups was as follows:

Figure 2: Percentage of birds with ** or * score**



Discussion

The tongue staining scores clearly indicate that the practice of putting the vaccine into the drinker system without any preparation gave the poorest results, even if vaccinated water was available for six hours. The best result was achieved when the drinker lines were raised, drained and primed and then lowered to birds. This or similar methods are recommended by vaccine manufacturers.

Findings of this trial and our vaccination audits also suggest that water withdrawal for half an hour prior to vaccination is not sufficient. Broilers can be withheld from water at the early part of the day for up to two hours without any detrimental effect. The results of this trial are consistent with the findings of D.Grieve (1) who suggested that 1-1.5 hours of water deprivation is essential to obtain best tongue staining results.

We are fully aware of the practical difficulties

poultry producers face when it comes to draining long and numerous drinker lines for vaccination. As a compromise, some farmers let the birds drink the lines 'dry' and then add the vaccine into the system. However, those allegedly 'dry' lines will still contain substantial amount of residual chlorinated water. This residual water slows down the spread of vaccine, dilutes the vaccine, and as it is chlorinated it neutralizes some part of the vaccine.

Birds that drink the clear residual water or the diluted vaccinated water only with fractional dose in it may or may not return for a second or a third sip when there is still some vaccine in the drinker line. There is very little known about the drinking pattern of individual birds in a flock and the variability of so many factors may result in a totally non uniform immune status after vaccination. Consequently, it is only a question of time when disease outbreaks happen if the infection pressure is high enough.

Using the Hi-Light tablets dye as an indicator for mock vaccination, anyone can test their current system and establish a baseline from which improvements can be made.

Conclusion

For farms with a current history of Gumboro disease, in addition to thorough cleanout and strict biosecurity measures we recommend the method called Treatment 3 in this trial. For the other methods of treatment everyone has to decide what risks they are prepared to take when they starts cutting corners.

Acknowledgements

Intervet would like to thank Chris Belyavin Technical Limited and Crowshall Veterinary Services for their technical assistance in this trial.

Amendment to November 2004, Poultry Focus, Issue 8

Please accept our apologies for an error in the above mentioned Poultry Focus. The first paragraph on the last page under title **Correlation between maternally derived antibodies and performance parameters** should read as follows:-

In another Dutch trial comprising 40 broiler flocks, it was found that those with lower serum titres at six weeks of age had lower production indices (6 points), higher FCR (3 points) and lower daily growth (0.6 grams) compared to flocks with high serum titres.

References

1. D.B. Grieve at al.: Newcastle protection in birds exhibiting various degrees of tongue staining after consumption of vaccine solution containing a blue dye. J.Appl.Poultry Res, 1992 1:415-418
2. Dr. Douglas Grieve : Evaluation of water, spray vaccination using a blue dye. , Poultry Digest , November 1992,28-32.

In our previous Poultry Focus (November 2004), we promised to continue the story of Reoviruses. Some of our readers may already have heard about the so called Polish Reo but probably not the full story. In addition to the intriguing Polish Reo article we have included an article on drinking water vaccination with Hi-Light tablets. Success or failure is all down to administration and this article provides an in-depth look at the best method of administering live vaccines via drinking water using Hi-light tablets.

The Polish Reovirus

Our intention with this article is to bring you up to date in this field and show you how old diseases can emerge in new forms forcing us to find new ways of fighting them.

In recent years a new highly pathogenic reovirus appeared in Poland and in other countries in Europe causing high mortalities and production losses. This virus has also been isolated in the UK but its prevalence and role in any disease condition is unknown as yet. When screening for reoviruses in the field, it was observed that enteric reovirus strains (ERS) were also present in other countries and were usually isolated from birds with signs of growth retardation / malabsorption syndrome (MAS).

In 1999, high mortality due to reovirus infection was reported in broiler flocks in Poland. Some of these broilers were progeny of parent flocks vaccinated with live and killed reovirus vaccines. The affected flocks showed difficulty with walking, retarded growth and up to 30% mortality at 5-14 days. Post mortem findings included congested and enlarged spleen, liver and thymus, pericarditis and white foci on the liver (see Diagram 1). Vertical transmission plays an important role in the spread of the virus from parents to progeny.

Diagram1: Broiler liver affected by ERS



The causative agent was found to be a new reovirus designated ERS-1 (Enteric Reovirus Strain). In experimental challenge studies this new reovirus caused 100% mortality in 1-day-old SPF birds after oral infection. ERS-1 caused 53% or 12% mortality when applied to 3-week-old SPF birds when injected into the footpad or under the skin of the neck, respectively. It caused 12% mortality when applied to 9-week-old SPF birds via the foot pad route (Table 1). These results are in agreement with the general finding that **chickens are most susceptible to reoviruses in the immediate post hatching period and become increasingly resistant to infection with age.**

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Table 1. Mortality rate after challenge with ERS

Age	1 day	3 week	3 week	9 week
Route	oral	footpad	s.c.	footpad
Mortality	100%	53%	12%	12%

Characterization of ERS-1 and ERS-2 from Poland with a panel of monoclonal antibodies revealed that these strains showed a distinct pattern when compared to reovirus strains described in the literature. Based on these findings it can be stated that the new ERS strains are unique and different from previously known reoviruses.

Dissemination studies with 3-week-old SPF birds infected via the subcutaneous route revealed that the virus could be reisolated from many different organs 3 and 7 days after infection. These studies also showed that the virus was still present in the pancreas 3 weeks after infection. Furthermore, the results of the challenge studies show that the reovirus isolate from Poland is pathogenic and is capable of inducing growth retardation (Table 2).

Table 2: Growth retardation of chicks inoculated with ERS

Age of infection	Body weight	% growth retardation
1 day	1635 ± 276	34
8 days	1742 ± 480	29
Not infected	2464 ± 261	-

Serological studies

In the serum-neutralization tests ERS-1 was not neutralized by antibodies developed against well known pathogenic reovirus strains (1733, 2408, and 2177). Furthermore, antibodies induced by different inactivated commercial reovirus vaccines were also unable to neutralize the reovirus strains from Poland. It was concluded that the Polish isolates were different from the strains described in the literature.

It was observed that the ERS-1 virus from Poland could be neutralized with antibodies induced by ERS (isolate 4) from the Netherlands. Furthermore, the ERS virus from the

Netherlands could be neutralized by antibodies induced by ERS-1 from Poland. This indicates that the ERS isolated from the Netherlands and Poland belongs to the same serotype. In conclusion, it was postulated that ERS plays a role in growth retardation/MAS even though it is not considered the only cause.

Vaccine development

The ERS-1 isolate as the causative agent behind the losses in Poland and elsewhere in Europe was used for the development of a new inactivated Reo vaccine Nobilis Reo ERS inac (not licenced in the UK). Its efficacy in the laboratory was measured by its capability of inducing a measurable antibody response and reducing clinical symptoms after challenge (Diagram 2). Laboratory studies on SPF birds have demonstrated that the vaccine induced good measurable sero response, prevented mortality and clinical symptoms after ERS challenge.

Diagram 2: Footpad swelling after challenge with ERS



The vaccine is used for the vaccination of broiler breeders, and the antibodies induced by the vaccine, block the vertical transmission of the virus and provide passive immunity against early field challenge by ERS.

This vaccine was successfully used under a temporary license in Poland as part of the broiler breeder vaccination program, in addition to the previously used Reo virus vaccines.

Introduction

Drinking water vaccination is commonly used for administration of live vaccines to poultry. It is perceived as a bird friendly, simple and easy method compared to other administration techniques. Bearing in mind, that less and less people are looking after larger flocks, it is not surprising at all that its popularity is increasing.

We have carried out numerous vaccination audits in the past five years in the UK. The audits have concluded that if anybody wants to vaccinate using this method correctly, a lot more mental and physical preparation is needed in comparison with the other methods. If short cuts are taken, the results can be disappointing and very costly.

It is very difficult to assess at the end of a drinking water vaccination session, which proportion of the flock have drunk the vaccinated water and which proportion have not. Fortunately, there are some products available that stain the water, the tongue and other parts of the chicken's body blue and can be used as indicators. These products contain a food dye that can also be seen in the crop and in the faeces. The staining effect is only temporary and the colour disappears within two to three days. Literature data suggest that there is good correlation between the intensity of tongue staining and resistance, for example to Newcastle disease challenge after vaccination.⁽¹⁾

Another study with dye⁽²⁾ also revealed that in order to achieve best tongue staining results broilers need to be withheld water for 1-1.5 hours prior to vaccination.

Objective of the trial

There are several methods of preparation and administration of vaccines through drinking water. In our study we chose five of them to see which method would give the best tongue staining and hopefully the best immune response to vaccination.

Materials and methods

One broiler shed of a trial farm (Chris Belyavin Technical Ltd.), was divided into five pens along the drinker lines. The length of each drinker line is 137 feet (45 metres) and each is supplied with water from their own separate header tank.

The birds used in the trial were as hatched broilers of a single parent flock. They were kept on a commercial diet containing coccidiostat and the feed was available ad libitum. Lights were put on at 6 a.m. and left on for 18 hours.

Based on previous farm experience, the volume of water for vaccination was calculated as 11ml/bird/hour at 22-23 days of age. The flock was vaccinated at 22 days of age with Nobilis® Gumboro D78 vaccine. The optimal age for vaccination was established from blood test results using the Deventer method calculator.

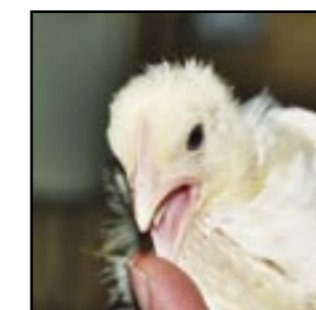
We chose five vaccination techniques to represent the wide range of practices from the field. The preparation and treatment regime of the groups were as follows:

Groups	Treatment
1	No water deprivation; vaccine added to the header tank in 3x2 hours periods, without any draining or priming of the drinker line.
2	Birds drink the drinker line dry; half an hour water deprivation; vaccine given in 2x2 hours period.
3	One hour water deprivation by raising and draining the line, line primed with vaccine and then lowered to bird level, vaccine given in volume of water lasting for two hours.
4	Two hours water deprivation followed by vaccination the same way as in group 3.
5	Birds drink the line dry, 2.5 hours water deprivation, vaccine volume lasting for two hours (Method currently used on the farm for Gumboro vaccination).

Hi-Light tablets were added to the vaccine solution at rate of one tablet per 20 litres of water. 20 birds from the front, middle and far end of the pens were picked up after vaccination and their tongues were scored for staining on a scale of 0-3 (Diagram 3 & 4).

Diagram 3 & 4: Chicken tongue staining test

Chicken with tongue score: negative



Chicken with tongue score: ***



Results

As the drinker system of Group 1 was not prepared in any way for vaccination we monitored the spread of the dye in this drinker line. One and a half hours after the start of