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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

Clinical and Immunological Parameters of Newcastle Disease Vaccination in Juvenile Ring - Necked Pheasants (*Phasianus colchicus*)

Elizabeth Moreira Dos Santos Schmidt^{1,2}, Antonio Carlos Paulillo^{3,4}, Luiz Felipe Caron⁵, Tobias Fernandes Filho⁵, Marcelo Agustini⁵, Henrique Larsen Brunow Ventura⁵, Luciano Doretto Junior³

¹Post-doctorate Researcher, Medicina Veterinária - FCAV, Unesp - Jaboticabal, Brazil

²Bolsista CNPq - Brazil, ³Departamento de Medicina Veterinária

⁴Pesquisador CNPq - Brazil

⁵Departamento de Patologia Básica, UFPR, Curitiba, Brazil

Abstract: Clinical and immunological parameters of vaccinated ring-necked pheasants against Newcastle disease were evaluated. Sixty young birds were distributed into four different experimental groups, vaccinated or not against Newcastle disease (ND): G1 (Ulster 2C strain), G2 (B1 strain), G3 (LaSota strain) and G4 (nonvaccinated -control). The immune response was evaluated by the HI test. The vaccinations of pheasants with NDV Ulster 2C, B1 and LaSota strains did not cause any clinical signs associated with post-vaccinal reactions and were similar in the humoral immune response stimulus (HI).

Key words: Ring - necked pheasant, vaccination, Newcastle disease, Ulster 2C, B1 and LaSota strains

Introduction

Newcastle disease (ND) is the one of the most important infectious disease in birds throughout the world. Routine vaccination combined with the sacrifice of affected birds have helped to control the virulent disease caused by ND virus, classified as *Avian parainfluenzavirus* type 1. Newcastle disease is one of the main sanitary barriers for the international trade of poultry and poultry products (Office International Des Epizooties, 1996). The disease is world-wide distributed in a large range of hosts, with 27 of the 50 orders of birds reported to be possibly infected by this agent (Kaleta and Baldauf, 1988). One of the affected species is the ring-necked pheasant (*Phasianus colchicus* Linnaeus, 1758; *Galliformes*, *Phasianidae*), which commercial production is extensively distributed in several countries around the world for meat and as a game or ornamental birds (Manetti, 1991; Oliveira and Rossi, 2000). However, there is little information available on health programs in this species. Because of the potential of these birds to produce high nutritive meat, the massive production of this species is increasing in many countries and this may cause high bird concentration in some areas that can lead to the dissemination of infectious diseases.

The present study aimed to evaluate vaccination programs against Newcastle disease in juvenile ring-necked pheasants.

Materials and Methods

Experimental birds and management: A total number of 60 day-old ring-necked pheasants were distributed into four different treatments of 15 birds each. Birds were designated to treatments, according to vaccination strain

as G1 (Ulster 2C), G2 (B1), G3 (LaSota) and to treatment G4 (control group - not vaccinated).

Ring-necked pheasants were allocated in experimental floor-pen housed, receiving water and feed *ad libitum*. The feed was formulated with corn and soybean according with NRC (1994) recommendations.

Vaccines: Commercial line NDV vaccines (Ulster 2C, B1 and LaSota strains) were administered to each experimental group, as described by Paulillo *et al.* (1996). Birds were vaccinated at 10 days of age, and revaccinated at 38 and 66 days of age with the same vaccine strain that was applied in the first vaccination. Vaccine titers were obtained by determining 50% of the embryo-infecting dose in embryonated eggs of specific-pathogen-free breeders at 8 and 10 days of incubation. Titters of live vaccine strains Ulster 2C, B1 and LaSota were 7.15 log₁₀/0.1mL, 7.2 log₁₀/0.1mL and 7.35 log₁₀/0.1mL, respectively. Birds were vaccinated and revaccinated by eye drop.

Serology: Blood samples of ring-necked pheasants were collected from the jugular and ulnar superficial vein, from seven to 94 days of age, at regular fourteen-day intervals. Sera were inactivated at 56°C for 30 minutes, frozen and stored at -20°C. Sera samples were submitted to inhibition of hemagglutination (HI) test, according to Cunningham (1971).

Results and Discussion

Ring-necked pheasants from all groups, vaccinated or not against ND, did not show any clinical signs of post-vaccinal reactions.

Mean antibody titers against NDV from ring-necked

Table 1: Mean antibody titers measured by HI test (\log_2) of ring-necked pheasants (*Phasianus colchicus*) submitted to different vaccination programs against ND

		Mean antibody titers measured by HI test (\log_2)						
		Ring-necked pheasants age (days)						
Group	Vaccine	7	24	38	52	66	80	94
G1	Ulster 2C	0.0	5.0 ^a	4.4 ^a	4.4 ^a	4.3 ^a	4.7 ^a	4.8 ^a
G2	B ₁	0.0	4.2 ^b	4.8 ^a	5.0 ^b	5.0 ^b	4.9 ^a	4.6 ^{ab}
G3	LaSota	0.0	4.6 ^{ab}	4.2 ^a	4.4 ^a	4.0 ^a	4.8 ^a	4.3 ^b
G4 [*]	-	0.0	0.0 ^c	0.0 ^b	0.0 ^c	0.0 ^c	0.0 ^b	0.0 ^c

*Control group – not vaccinated against ND. 1- Means followed by the same letter, in the same column, are not different at 5% of probability by Tukey test ($p>0,05$)

pheasants are shown in Table 1. At seven days of age, none of the birds showed maternally-derived antibodies against NDV, as breeders were not submitted to any vaccination programs against this disease. As the control group (G4) was not vaccinated, its antibody titers were null from seven to 94 days of age.

At 24 days of age, antibody titers against NDV were detected in the vaccinated groups. This active immunity was induced by vaccination at 10 days of age. Ring-necked pheasants were revaccinated at 38 and 66 days of age and this procedure maintained antibody titers against NDV up to 94 days of age. The low diffusion potential of the Ulster 2C strain (McFerran and Nelson, 1971) and the low invasion capacity of the B1 strain (Hofstad, 1951) may explain the low to moderate antibody titers detected by HI in vaccinated ring-necked pheasants. On the other hand, the low antibody titers detected for the ring-necked pheasants vaccinated with the LaSota strain (G3) are not compatible with the great diffusion potential of this strain (Winterfield *et al.*, 1957). The Tukey test did not demonstrate significant differences among groups vaccinated with Ulster 2C, B1 and LaSota strains. The analysis of these serological results clearly shows that ring-necked pheasants produce antibody when vaccinated against NDV.

Conclusion: In conclusion, our study has shown that commercially available live ND vaccines for chickens induced a moderated antibody response in the ring-necked pheasant, without any clinical signs of post-vaccinal reaction.

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