

ISSN 1682-8356
ansinet.org/ijps



INTERNATIONAL JOURNAL OF
POULTRY SCIENCE

ANSI*net*

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

Humoral Antibody Immune Response of Newcastle Disease Vaccination in Lovebirds (*Agapornis roseicollis*)

Gislaine Regina Vieira Martins^{1,2}, Antonio Carlos Paulillo^{1,3,4},
Elizabeth Moreira dos Santos Schmidt⁵ and Janine Denadai^{1,2}

¹Alunos Programa de Pós-graduação em Medicina Veterinária da FCAV, Unesp, Jaboticabal, Brazil

²Bolsistas, FAPESP, Brazil

³Departamento de Patologia Veterinária, FCAV, Unesp, Jaboticabal, Brazil

⁴Research Fellow-CNPq-Brazil

⁵Departamento de Clínica Veterinária, FMVZ, Unesp, Botucatu, Brazil

Abstract: Clinical and immunological parameters of vaccinated lovebirds (*Agapornis roseicollis*) against Newcastle Disease (ND) were evaluated. Forty eight birds were distributed into four different experimental groups, vaccinated or not against ND: GI (Ulster 2C strain), GII (B1 strain), GIII (LaSota strain) and GIV (not vaccinated-control). The humoral antibody immune response was evaluated by the inhibition of hemagglutination test (HI). The LaSota strain provided higher antibody response when compared to Ulster 2C and B1 strains. No clinical signs associated with post-vaccinal reactions were observed.

Key words: Lovebirds, vaccination, newcastle disease, Ulster 2C, B1 and LaSota strains

INTRODUCTION

Lovebirds (*Agapornis roseicollis* Selby, 1836) are birds of the order Psittaciformes, common in captivity in Brazil (Lima, 2007; Silva *et al.*, 2009). They are native of African forests and savannas and are colorful, small birds and reach approximately 15 cm (Forshaw, 1989). Newcastle Disease (ND) is an acute viral disease that can affect domestic and wild birds. It is considered one of the most important infectious diseases in birds throughout the world (Alexander *et al.*, 1997). Routine vaccination combined with the sacrifice of affected birds have helped to control this disease caused by a virus classified as *Avian Parainfluenzavirus* type 1 (APMV-1/NDV) viruses which is a member of the genus *Avulavirus*, of the *Paramixoviridae* family (Mayo, 2002; ICTV, 2010).

Newcastle disease is one of the main sanitary barriers for the international trade of poultry and poultry products (OIE, 2012) and the disease is worldwide distributed in a large range of hosts. Natural or experimental infection with ND virus has been demonstrated in at least 241 species from 27 of the 50 orders of birds (Kaleta and Baldauf, 1988). A high level of susceptibility to the NDV was reported for Psittaciformes (Erickson, 1977). However, there is no information available on health programs considering ND in Lovebirds. Thus, the aim of this study was to evaluate the humoral antibody response and clinical aspects of lovebirds vaccinated against ND.

MATERIALS AND METHODS

Experimental birds and management: A total number of 48 (5 month-old) lovebirds were distributed in four

different treatments, with 12 birds each. Lovebirds were allocated in experimental cages, receiving water and food proper to this species *ad libitum*.

Vaccines: Birds were designated to treatments, according to vaccination strain as GI (Ulster 2C), GII (B1), GIII (LaSota) and GIV (control-non vaccinated). Commercial line NDV vaccines (Ulster 2C, B1 and LaSota strains) were administered to each experimental group, as described by Paulillo *et al.* (1996). All birds, except those in the control group, were vaccinated at 5 months of age and revaccinated at 6.5, 7.5 and 8.5 months 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. Titers of live vaccine strains Ulster 2C, B1 and LaSota were 7.15 log₁₀/0.1 mL, 7.2 log₁₀/0.1 mL and 7.35 log₁₀/0.1 mL, respectively. Birds were vaccinated and revaccinated by eye drop.

Serology: 216 blood samples from the lovebirds were collected by clipping of a toenail, from 5 to 9.5 months of age. The blood was impregnated in Whatmann (n°1) filter-paper with 1.5cm², with corresponded to 75 µL of blood. The filter-papers were kept in paper bags for 24 hours at room-temperature. The filter papers were divided into two equal parts; each part was treated with 187.5 µL of PBS, at 4°C overnight. There was 12.5 µL of serum in each half of the filter paper that when reconstituted resulted in a 1:16 serum dilution (Fonseca

Table 1: Mean antibody titers measured by HI test (log₂) of lovebirds (*Agapomis roseicollis*) submitted to different vaccination programs against Newcastle disease (n = 48)

Groups	Vaccination/ Revaccination	Mean antibody titers by HI test (log ₂) lovebird's age (months) ¹								
		5	6	6.5	7	7.5	8	8.5	9	9.5
I	Ulster 2C	0.0	2.17b	2.33a	7.33ab	0.0a	0.0ab	0.0	4.33a	5.67a
II	B1	0.0	0.0a	2.17a	5.5a	1.5ab	5.5a	0.0	5.17ab	5.67a
III	LaSota	0.0	4.4c	3.33a	8.33b	3.0b	7.0b	0.0	6.0b	7.33b
IV*	-	0.0	0.0a	0.0b	0.0c	0.0a	0.0c	0.0	0.0c	0.0c

*Control group-not vaccinated

¹Means followed by the same letter, in the same column, are not different at 5% of probability by Tukey's test (p>0.05)

et al., 2007). Sera samples were submitted to inhibition of hemagglutination (HI) test, according to Cunningham (1971).

The data were analyzed by ANOVA and those with statistical differences were submitted to Tukey's test at 0.05% using Statview[®] (version 5.0).

RESULTS AND DISCUSSION

Mean antibody titers against ND from lovebirds are shown in Table 1. Lovebirds from all groups vaccinated or not against ND did not show any clinical signs of post-vaccine reactions. Until 5 months of age, none of the birds showed maternally-derived antibodies (HI) against ND. As the control group (GIV) was not vaccinated, its antibody titers (HI) were null during all the experimental period. At seven months of age, antibody titers (HI) against NDV were detected in the vaccinated groups (GI to GIII). This active immunity was induced by revaccination at 6.5 months of age. However, at 8.5 months of age, antibody titers against NDV were null for GI, GII and GIII but the procedure of revaccination at 9 months of age maintained antibody titers against NDV up to 9.5 months of age. Table 1 shows that the LaSota vaccine strain provided higher antibody response to lovebirds when compared to Ulster 2C and B1 strains. 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 lovebirds. The high antibody titers detected for the lovebirds vaccinated with LaSota strain are compatible with great diffusion potential of this strain (Winterfield *et al.*, 1957). Generally, there was significant differences (p<0.05) among groups vaccinated with Ulster 2C, B1 and LaSota strains. The analysis of the serological results clearly shows that lovebirds produce antibody when vaccinated against ND.

Conclusion: The LaSota strain provided higher antibody response to lovebirds when compared to Ulster 2C and B1 strains. Furthermore, lovebirds from all groups vaccinated against ND did not show any clinical signs of post-vaccine reactions.

ACKNOWLEDGMENTS

Dr. Gislaíne Regina Vieira Martins wishes to thank FAPESP (Brazil) for the assistant ship and financial support (process number 2010/04543-0).

REFERENCES

- Alexander, D.J., 1997. Newcastle disease and other paramyxovirus infections. In: Hofstad, M.S., H.J. Barnes, B.W. Calnek, W.M. Reid and H.N. Yoder (Eds.), Diseases of Poultry, 10th Edn., Ames: Iowa State University Press, pp: 541-569.
- Cunningham, C.H., 1971. Virologia practica. 6a Edn., Zaragoza: Acribia, Pages: 260.
- Erickson, G.A., 1977. Interaction between viscerotropic velogenic Newcastle disease virus and pet birds of six species I. Clinical and serological responses and viral excretion. Avian Dis., 21: 642-654.
- Fonseca, F., S.O. Hubner, G.D. Vargas, G. Fischert and T. Vidor, 2007. Avaliação do uso de sangue em papel-filtro para detecção e quantificação de anticorpos para o vírus da doença de Newcastle. Ciência Animal Brasileira, 8: 319-324.
- Forshaw, J.M., 1989. Parrots of the world. Landsdowne: Willoughby, Pages: 450.
- Hofstad, M.S., 1951. A quantitative study of Newcastle disease virus in tissues of infected chickens. Am. J. Vet. Res., 12: 334-339.
- ICTV, 2010. The International Committee on Taxonomy of Viruses. <http://www.ncbi.nlm.nih.gov/ICTV>.
- Kaleta, E.F. and C. Baldauf, 1988. Newcastle disease in free-living and pets birds. In: Alexander, D.J. (Ed.), Newcastle disease. Kluwer Academic, Boston, pp: 197-246.
- Lima, R.G., 2007. Análise filogenética de psittaciformes (aves) com base em caracteres morfológicos siringeais e osteológicos. Tese (Doutorado em Ciências, na área de Zoologia)-Instituto de Biociências da Universidade de São Paulo.
- Mayo, M.A., 2002. Virus taxonomy. Arch. Virol., 147: 1071-1076.
- McFerran, J.B. and R. Nelson, 1971. Some properties of an avirulent Newcastle disease virus. Archiv fur die Gesamte Virusforschung, 34: 64-74.

- OIE-World Organisation for Animal Health, 2012. Manual for Animal Disease Reporting to the World Organization for Animal Health. <http://www.oie.int/>
- Paulillo, A.C., G.S. Silva, L. Doretto Junior, M.V. Meireles, S.N. Kronka, J. Ariki, N.K. Sakomura and R.C. Ribeiro, 1996. Estudos zootécnico e imunológico de aves de corte submetidas a diferentes programas de vacinação contra a doença de Newcastle In: Reunião da Sociedade Brasileira de Zootecnia 33, Fortaleza, Brazil, Anais, pp: 388-390.
- Silva, A.S., D.L. Mahl, J.F. Soares, L. Faccio, S.L. Dau, R.A. Zanette and S.G. Monteiro, 2009. Parasitismo por *Isoospora* spp. em *Agapornis fischeri* (Pássaro-do-Amor) Criados Em Cativeiro No Brasil. Caderno de Pesquisa Série Biologia, 21: 53-57.
- Winterfield, R.W., C.L. Goldman and E.H. Seadale, 1957. Newcastle disease immunization studies: Vaccination of chickens with B1, F and LaSota strains of Newcastle disease virus administered through the drinking water. *Poult. Sci.*, 36: 1076-1088.