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Clinical and Immunological Aspects of Newcastle Disease Vaccination in Budgerigars (*Melopsittacus undulatus*)

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Abstract: Clinical and immunological aspects of budgerigars, vaccinated against Newcastle disease were evaluated. Seventy-two birds were distributed into four different experimental groups, vaccinated or not against Newcastle disease: GI (Ulster 2C strain), GII (B1 strain), GIII (LaSota strain) and GIV (not vaccinated-control). The immune response was evaluated by the HI test. Budgerigars showed high antibody titres when vaccinated against Newcastle disease with Ulster 2C, B1 and LaSota strains. No clinical signs associated with post-vaccinal reactions were observed.

Key words: Budgerigars, newcastle disease, *Melopsittacus undulatus*, Ulster 2C, B1, LaSota strains

INTRODUCTION

Budgerigars also known as the common pet parakeet (*Melopsittacus undulatus* Shaw, 1805, Psittaciformes: *Psittacidae*) is widely acknowledged as the most common pet parrot in the world. They are intelligent and social birds and its natural habitat is in Australia (London, 1973).

Newcastle Disease (ND) is caused by *Avian Parainfluenzavirus* serotype 1 (APMV-1) viruses, which is a member of the genus *Avulavirus*, of the *Paramyxoviridae* family (ICTV, 2007). The disease is world-wide 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). They report a high level of susceptibility in Psittaciformes, including budgerigars (Erickson, 1977). However, there is little information available on health programs in this species. Because of the potential of these birds to be kept as a pet in captivity, it may lead to the dissemination of ND. Thus, the aim of this study was to evaluate the humoral antibody response and clinical aspects of budgerigars vaccinated against ND.

MATERIALS AND METHODS

Experimental birds and management: A total number of 72 (5 month-old) budgerigars were distributed in a completely randomized experimental design with four different treatments, with three replicates of six birds each. Birds were allocated in experimental cages,

receiving water *ad libitum*. The diet comprised fresh fruits, seeds, vegetables and vitamin supplements.

Vaccines: Birds were designated to treatments, according to vaccination strain as GI (Ulster 2C), GII (B1), GIII (LaSota) and GIV (control-not 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 7, 8.5 and 10 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: 264 blood samples of budgerigars were collected by clipping of a toenail, from 5 to 10.5 months of age. The blood samples were impregnated in 1.5 cm² of Whatmann (n^o. 1) filter-paper, which corresponded to 75 µL of blood. The filter-papers were kept in paper bags for 24 h in 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

Table 1: Mean antibody titres measured by HI test (\log_2) of budgerigars (*Melopsittacus undulatus*) submitted to different vaccination programs against Newcastle disease

		Mean antibody titres measured by HI test (\log_2)										
		Budgerigars' age (months)										
Groups	Vaccine	5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5
I	Ulster 2C	0.0	4.4a	0.0	0.0	7.5a	7.6a	0.0	3.0a	6.0a	7.0a	8.1a
II	B1	0.0	7.2a	0.0	0.0	7.4a	8.8a	0.0	2.8a	5.0a	6.5a	7.5ab
III	LaSota	0.0	4.0a	0.0	0.0	7.0a	7.6a	0.0	3.1a	7.4ab	7.4a	6.6b
IV*	Control	0.0	0.0b	0.0	0.0	0.0b	0.0b	0.0	0.0b	0.0c	0.0b	0.0c

*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 ($p>0.05$)

reconstituted resulted in a 1:16 serum dilution (Fonseca *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 titres against ND from budgerigars are shown in Table 1. Until five months of age, none of the birds showed maternally-derived antibodies against ND. As the control group (GIV) was not vaccinated, its antibody titres were null during all the experimental period. Budgerigars from all groups vaccinated or not against ND did not show any clinical signs of post-vaccinal reactions.

At six months of age, antibody titres against NDV were detected in the vaccinated groups (GI to GIII). This active immunity was induced by vaccination at 5 months of age. However, at 6.5, 7 and 8.5 months of age, antibody titres against NDV were null. On the other hand, the procedure of revaccination at 7, 8.5 and 10 months of age, maintained antibody titres against NDV up to 10.5 months 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) are not compatible with the high antibody titres detected by HI in vaccinated budgerigars. The high antibody titres detected for the budgerigars vaccinated with LaSota strain are compatible with the great diffusion potential of this strain (Winterfield *et al.*, 1957). Generally, 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 budgerigars produce antibody when vaccinated against NDV.

Conclusion: Budgerigars showed an equally efficient antibody response when vaccinated with commercially available live ND vaccines for chickens, without any clinical signs of post-vaccinal reaction.

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