

## SERO-EPIDEMIOLOGICAL EVALUATION OF NEWCASTLE DISEASE ANTIBODIES IN SOME HOUSE-REARED WILD FOWLS

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### ABSTRACT

A serological evaluation of Newcastle disease (ND) antibody was carried out in native guinea fowls and ducks. The house reared wild fowls were vaccinated using the locally manufactured (NVRI, Vom) Newcastle disease vaccines. Beta-haemagglutination inhibition (HI) technique was used in determining the antibody titre levels. The study investigated the occurrence of ND in the wild fowls with respect to the sustenance of wild ND virus in the local environment. The responsiveness of these fowls to active vaccination against Newcastle disease was also determined. NDV (La Sota) and NDV (Komarov) were administered at different intervals over a period of eight weeks. The wild fowls showed significant immune responses from the mean baseline antibody titre value of  $\log_2 5$  to  $\log_2 8$  following the different vaccinations thus indicating positive sero-conversion to protective titre levels ( $> \log_2 5$ ) against ND in the fowls. This finding established the fact that the wild birds were previously exposed to the wild ND virus and that the fowls were immuno-competent in responding positively to the routine Newcastle disease vaccinations. The epizootiological implication of this finding is discussed with respect to the sustenance of wild ND virus in the local environment.

**Key words:** Newcastle disease, wild fowls, antibodies, epizootiological survey

### INTRODUCTION

Newcastle Disease (ND) is an infectious, highly contagious, viral disease of poultry and a wide range of non – poultry avian hosts characterized by variable clinical and pathological manifestations with variable morbidity and mortality. Despite the production and improvement in ND vaccines and vaccination techniques, the disease has persisted as a major cause of mortalities and production losses in poultry (Bell, 1990).

Some wild fowls such as ducks (*Anas*

*sparsa*), guinea fowls (*Numida mitrata* and *N. meleagris*) and pigeons (*Columba guinea*) are reared as domestic birds in several households as sources of animal protein for household consumption and cash substitutes. Therefore, there is every need to enlighten livestock farmers and other household keepers of poultry about the potential of these wild fowls in transmitting the ND virus to the domestic avian species (chicken).

Haemagglutination Inhibition (HI) test is

an immunodiagnostic tool used to determine the immune status (antibody titre levels) of flocks following a direct exposure to wild ND virus or efficacy of ND vaccinations (Beach, 1948; Adebayo *et al.*, 2002).

Consequently, the focus of this study is to carry out a sero-epidemiological evaluation of Newcastle Disease antibodies in the wild fowls using beta-haemagglutination inhibition (HI) technique with a view to determining their levels of previous exposure to ND (Adebayo, *et al.*, 2004).

This study is also intended to verify the responsiveness of the wild fowls to active vaccination against Newcastle disease. These two objectives will assist to a very great extent in mapping out strategies for the control of ND in rural backyard and commercial poultry farming.

## **MATERIALS AND METHODS**

### ***Experimental Site***

The experiment took place at the Teaching and Research Farm, Federal University of Technology, Akure, for a period of eight weeks.

### ***Management of Experimental Birds***

The pens were cleaned and disinfected with Morigad®. The floor was covered with wood shavings. Drinkers and feeders were cleaned daily.

12 adult wild fowls (i.e., 6 ducks (*Anas sparsa*) and 6 guinea fowls (*Numida meleagris*) were purchased from an open market and vaccinated with ND vaccines at an interval of one week following a one-week resting period.

The birds were fed every day *ad-libitum* with dry maize and guinea corn. Water was provided without restrictions.

### ***Veterinary Care***

Routine veterinary care was provided using water-soluble antibiotic powder with vitamin/mineral supplement at 1g/L w/v. Prior to the routine vaccinations, bleeding was done using the jugular veni-puncture technique so as to establish the natural ND antibody status of the fowls thereby determining whether the fowls had any previous exposure to ND. ND vaccinations i.e. NDV La Sota and NDV Komarov were done at one-week interval according to National Veterinary Research Institute (NVRI) guidelines.

### ***Experimental Techniques***

The immunological response of the wild fowls was determined using the sera obtained from the fowls. Beta-haemagglutination inhibition test was employed in the determination of the responses to the routine ND vaccinations while the lymphocyte and erythrocyte counts were done according to the methods described by Kelly (1979) and Schalm *et al.* (1975).

### ***Statistical Analysis***

Data on haematological parameters and Haemagglutination Inhibition (HI) titre values (immunological responses) were analyzed using SAS 2007 on computer.

## **RESULTS AND DISCUSSION**

Haemagglutination inhibition (HI) test is an immunodiagnostic tool used to determine the immune status (antibody titre levels) of flocks following a direct exposure to wild ND virus or efficacy of ND vaccina-

tions (Beach, 1948; Adebayo *et al.*, 2002).

The baseline antibody titre values obtained from the wild fowls ranged from  $\log_2 5$  to  $\log_2 6$  in the guinea fowls and  $\log_2 4$ - $\log_2 5$  in the ducks (Figure 1) indicating that the birds had already been exposed to the wild ND virus and that the wild fowls were protected against the disease as an antibody titre value of  $\log_2 5$  was known to be a protective level in poultry (Adene, 2004). This finding goes a long way to suggest that the wild birds could serve as a reservoir of the wild ND virus.

After the administration of NDV (LaSota), there was a significant increase ( $p < 0.05$ ) from the initial ND antibody level (before active vaccination) to post NDV (K) titre value (from the mean baseline antibody titre value of  $\log_2 4$  to  $\log_2 7$ ) thus indicating a positive sero-conversion (more solid protection) against ND in the birds. Following NDV (Komarov), administration in the wild fowls, an increase in the erythrocyte and lymphocyte counts were observed (Figure 2) with a corresponding increase in the HI titre values ( $\log_2 8$  to  $\log_2 9$ ), thus, conferring a more long lasting protection on the experimental birds.

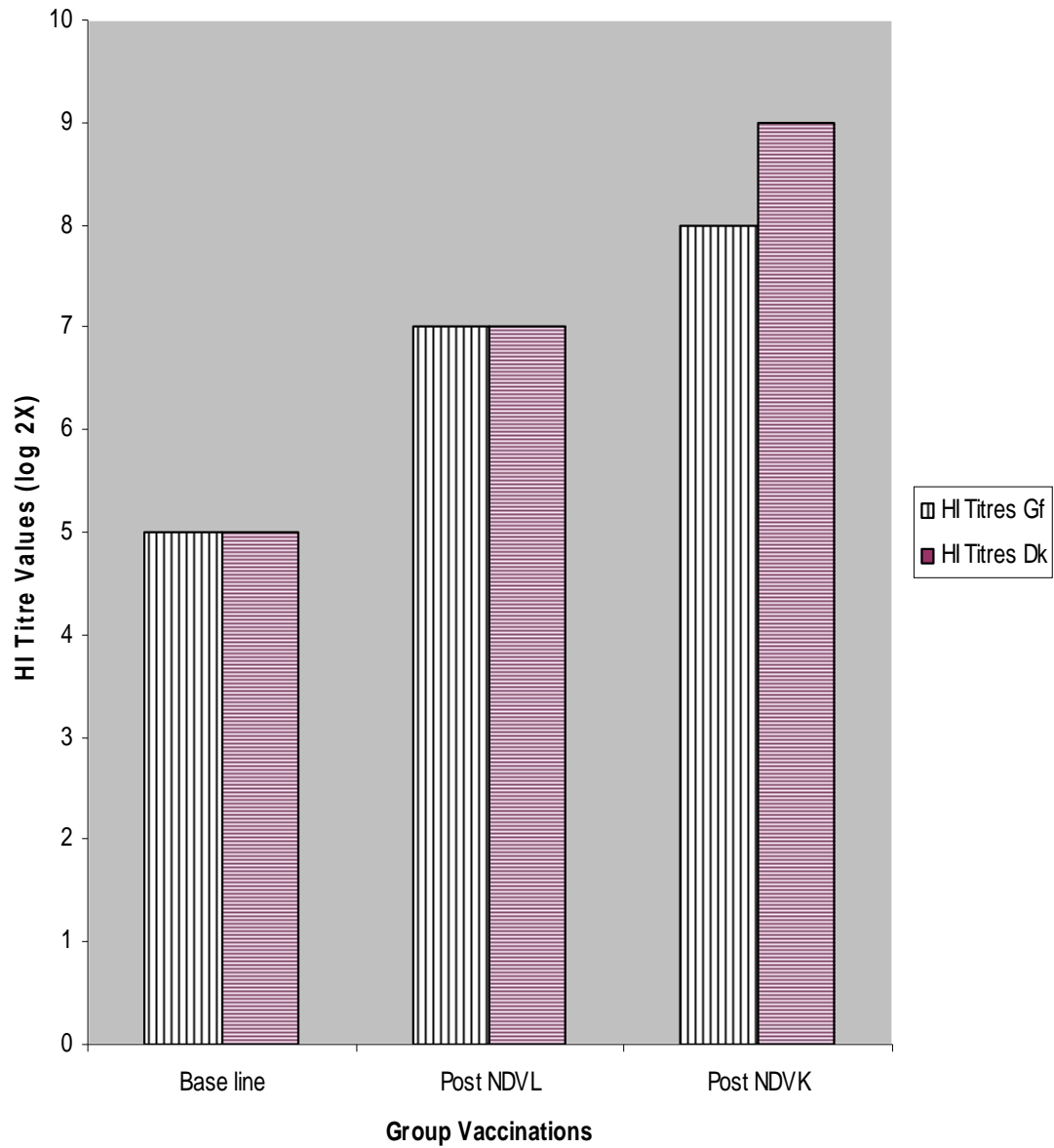
In this study, the presence of circulating ND antibodies in the wild birds as a result

of previous exposure to natural infections with wild ND virus was established. Consequently, it could be rightly deduced that these birds could serve as a major reservoir of the circulating wild virus thus actively involved in the epidemiology of Newcastle disease.

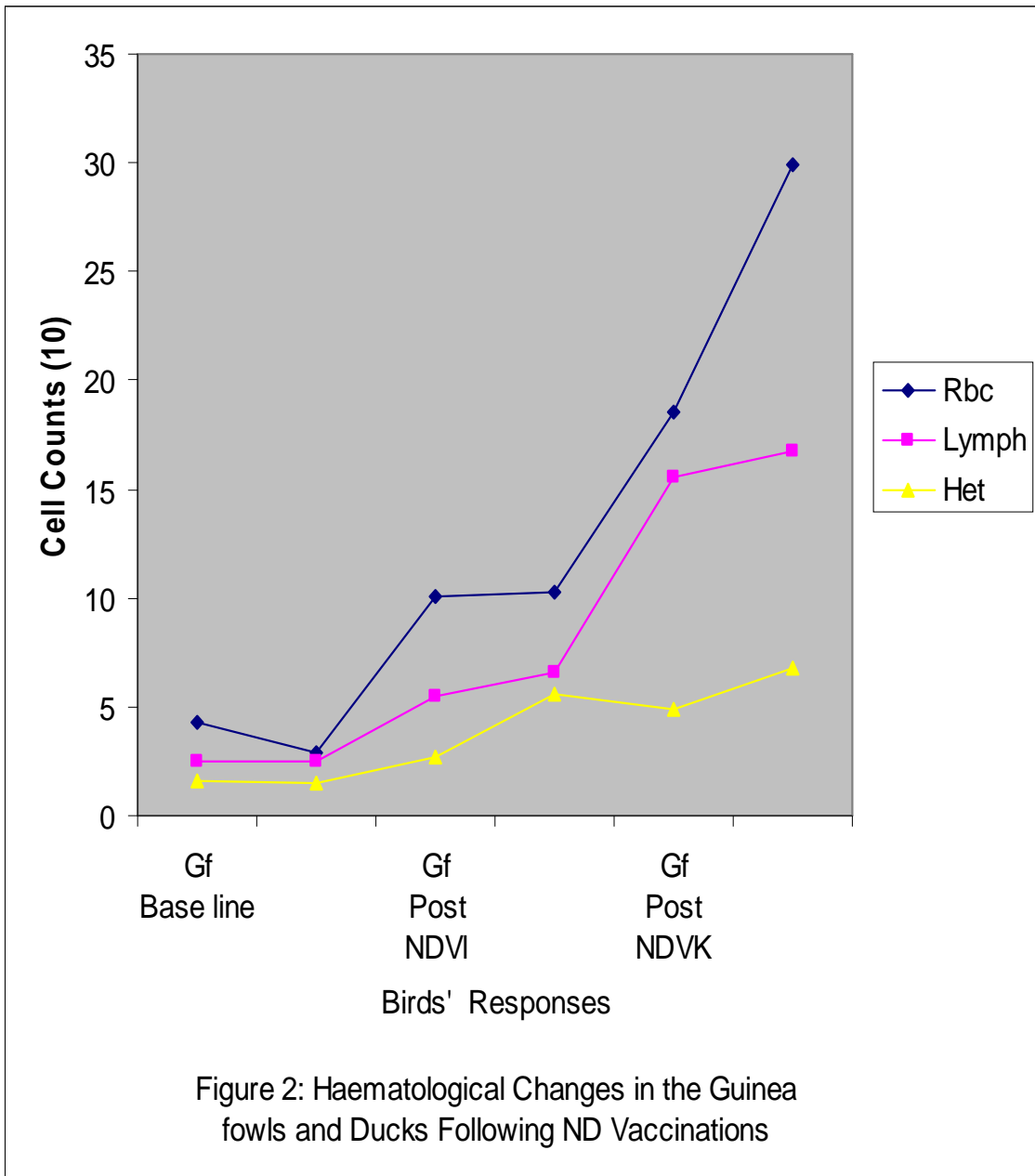
The positive response (sero-conversion) of the experimental birds (guinea fowls and ducks) to routine Newcastle disease vaccinations has a lot of epizootiological relevance.

This suggests that should the co-habitation of these wild fowls as backyard poultry become inevitable, the risk of infection could be minimized by vaccinating both the wild fowls and the commercial (domesticated) chickens.

From the results of this survey, there is the need for poultry farmers to always ensure prompt vaccination of their flock. There should be concerted effort at ensuring that contacts between the populations of these wild fowls and the commercial chickens are reduced to the barest minimum so as to stem the spread of the infection. Poultry houses must be properly screened from these wild fowls with the use of  $\frac{1}{2}$  inch wire mesh. There is also the need to control human and vehicular traffics while more attention should be paid to other adjunct biosecurity measures.



**Figure 1: HI titre Values Obtained following the Routine ND Vaccinations of The Guinea fowls and Ducks**



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