RESEARCH COMMUNICATION

Antibodies to Newcastle disease virus in the sera of indigenous chickens in Oodi, Kgatleng, Botswana

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ABSTRACT

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A serological survey was conducted to determine the prevalence of antibodies to Newcastle disease virus in apparently healthy and unvaccinated adult indigenous chickens. Haemagglutination inhibiting antibodies to Newcastle disease virus were found in the sera of 51 out of 89 (57.3 %) chickens sampled.

Keywords: Antibodies, Botswana, indigenous chickens, Newcastle disease virus

INTRODUCTION

Indigenous chickens are local breeds of *Gallus gallus domesticus* kept by most households in Africa and Asia (Spradbrow 1993). These chickens serve as an important source of animal protein in the form of meat and eggs to the rural poor in most parts of Africa (Gueye 1998), and are usually kept on free-range where they scavenge for food and water. Newcastle disease (ND) is the most devastating disease of poultry and is capable of destroying all the chickens in a village (Spradbrow 1993). Newcastle disease has previously been reported in Botswana from both exotic and indigenous breeds of chickens (Mushi, Diteko & Wibberley 1992; Binta, Adom & Mushi 1996).

This paper reports the current prevalence of antibodies to ND virus in indigenous chickens in Oodi, Kgatleng, Botswana.

MATERIALS AND METHODS

Blood samples were collected from a total of 89 apparently healthy indigenous chickens from 16 different randomly selected homesteads in Oodi village in Kgatleng district, Botswana. The approximate age of the chickens ranged from 6–18 months. They had no history of vaccination to any poultry disease. Blood samples were collected from the brachial vein of the chicken using a vacuum tube without anticoagulant. Sera were separated, kept in sterile plastic vials in aliquots of 5 mℓ and stored at –20 °C until used.

Antibody titres to ND virus were detected and quantified using the haemagglutination (HA) inhibition test according to standard procedure (Allan & Gough 1974). Briefly, 4 HA units of ND virus were added to serial serum dilutions. The cut-off point was < 8 and such sera were regarded as negative. For ND virus isolation, suspensions of cloacal swabs collected from 30 healthy chickens were inoculated into the allantoic cavity of 8–10 day-old embryonated chicken eggs. These eggs were from specific pathogen free chickens kept at the National Veterinary Laboratory at Sebele, Gaborone. The eggs were incubated at 37 °C and examined daily for any embryo deaths. The allantoic fluid was monitored for HA activity to chicken red blood cells.

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RESULTS

Out of the 89 chickens sampled, 51 contained haemagglunation-inhibiting antibodies to ND virus giving a seropositivity rate (prevalence) of about 57.3 ± 10.3%. The antibodies were found in chickens in 10 of the 16 (62.5%) homesteads sampled (Table 1). The antibody titres ranged from approximately 4–9 $\log_2$ (Table 2, Fig. 1).

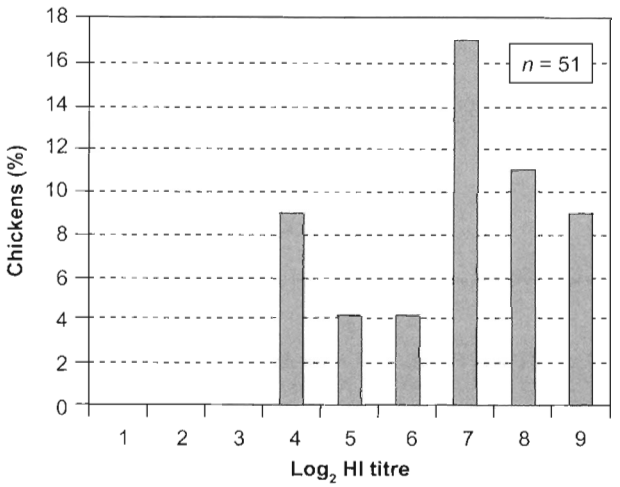

FIG. 1 Distribution of ND virus seropositive chickens by titres

TABLE 1 Haemagglutination inhibition antibodies to ND virus in indigenous chickens from the 16 homesteads

Homestead	No. tested	No. positive	Percentage positive
1	6	4	66.60
2	6	0	0.00
3	7	0	0.00
4	8	5	62.50
5	6	5	83.33
6	3	0	0.00
7	4	0	0.00
8	1	0	0.00
9	2	0	0.00
10	6	3	50.00
11	4	2	50.00
12	4	4	100.00
13	11	11	100.00
14	3	3	100.00
15	6	6	100.00
16	12	8	66.70

TABLE 2 Antibody titres to ND virus in sera collected from the indigenous chickens

Range of titre[a]	No. of sera	Geometric mean titre ± SD
< 5	4	4.00 ± 0.00
5–7	29	6.30 ± 0.80
> 7	18	8.40 ± 0.50

[a] Expressed in $\log_2$

No haemagglunating viral agent was detected in the 30 chicken cloacal swab samples.

DISCUSSION

Antibodies to ND virus were demonstrated in 57.3% indigenous healthy chickens in 62.5% of the homesteads which were sampled. They could only have been acquired from natural infection since there was no history of vaccination of the chickens. Since all the birds were over six months of age the presence of maternal antibodies can be ruled out for such antibodies are known to wane after the age of 2–3 weeks. These results further confirm the endemic status of indigenous chickens to ND virus.

The seroprevalence of 57.3% may be considered high when compared to 28% in Zimbabwe (Kelly, Chitauro, Rohde, Rukwava, Majok, Davelaar & Mason 1994) and 38% in Nigeria (Oyawale, Ogundipe & Durojaiye 1996). This high seroprevalence may imply infection with a mesogenic strain of ND virus, from which the birds did not die. However, attempts to isolate ND virus from some of these birds failed.

This investigation has demonstrated that the indigenous chickens had had previous exposure to ND virus, most probably as a subclinical infection which could spread to highly susceptible exotic broiler and layer chickens, and also to farmed ostriches.

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