

Effect of parasite control on immune response of Newcastle disease vaccination and productivity of free range chicken, Eastern Province, Kenya

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Abstract

This study was conducted to determine the effect of reducing parasite burden (through treatment) on effectiveness of Newcastle disease (ND) vaccination in free-range village chicken of Mbeere district, Eastern province, Kenya. Only one aspect of the study has been completed (i.e., establishing ND antibody titre levels in chicken with respect to age wetness of season) There was a significant ($P=0.05$) season effect on ND antibody titre, with more in the wet season. Therefore, seasonality effect on occurrence of disease implies that management approaches for ND should be designed to provide maximum care for birds during the wet season. The effect of endo- and ecto-parasites on the effectiveness of the ND vaccine is still on-going.

Key words: Antibody titre, Newcastle disease, village chicken

Résumé

Cette étude a été menée pour déterminer l'effet de réduire la charge parasitaire (par le traitement) sur l'efficacité de la vaccination contre la maladie de Newcastle (MN) chez le poulet fermier du village du district de Mbeere, en province orientale, au Kenya. Un seul aspect de l'étude a été achevé (p.ex. établir les niveaux du titre d'anticorps de MN dans le poulet à l'égard de l'humidité de l'âge de la saison). Il y avait un effet significatif de la saison ($P = 0,05$) sur le titre de l'anticorps de MN, avec plus dans la saison des pluies. Par conséquent, l'effet de la saisonnalité sur l'occurrence de la maladie implique que les approches de gestion pour la MN devraient être conçues pour fournir des soins au maximum pour les oiseaux pendant la saison humide. L'effet de l'endoparasite et l'ectoparasite sur l'efficacité du vaccin contre la MN est toujours en cours.

Mots clés: Titre d'anticorps, maladie de Newcastle, poulet du village

Background and Literature Summary

Diseases and especially Newcastle disease are reported to be the main constraint in production of free range village chicken in Kenya, causing mortalities of as high as 100% (Njagi *et al*, 2010). The disease is endemic in Eastern Province (Njagi *et al*, 2010) and, being a viral disease, it can only be effectively controlled by vaccination (Alders and Spradbrow, 2001).

Free range village chickens have a great diversity of ecto-, endo- and hemoparasites with a prevalence of 90-96% in Eastern Province (Sabuni, 2007; Maina, 2005). This causes stress, which has been associated with immunosuppression (Njagi, 2008) and lowering humoral immunity (Permin *et al*, 1998). The high rate of parasitism in chicken may thus have a negative effect on the effectiveness of ND vaccination in village chicken. As a result, Hønning *et al.* (2003) speculated that the vaccination failure they observed in village chicken might have been as a result of immune suppression induced by parasitism. This study was therefore conducted to find the effect of parasite control on immune response of Newcastle Disease vaccination and productivity of free range chicken in the Eastern Province, Kenya.

Study Description

The study was conducted in Eastern province, Kenya. Study birds were acquired from Mbeere district (0°20' ,0°50S; 37°16' ,37°56' E ; 500 - 1200 metres above sea level) during the wet (November) and dry (March) seasons. A total of 48 birds were captured for the study. One half (7 chicks, 8 growers and 9 adults) were captured in the wet season, while the second half (9 chicks, 8 growers and 7 adults) were captured in the dry season. Birds were brought to the Department of Veterinary Pathology, Microbiology and Parasitology, slaughtered, blood collected and serum obtained. Antibody titre in serum was determined by the Haemmagglutination inhibition test using 4HAU virus antigen following a method described by OIE (2000). titre

Research Application

Serum samples from the chicken from Mbeere district collected during the wet and dry season were found to be positive for ND antibody titre with a 100% and 95% specific immunity respective and geometric mean titre of 65.85 and 31.08 respectively (Table 1). There was a significant season effect ($P>0.05$) in the antibody titres, with less titres in the dry season. This result confirmed previous findings of endemicity of Newcastle disease in village chicken in Eastern Province. Seasonality effect on occurrence of disease requires that

Table 1. Haemmagglutination inhibition (HI) titres in free-range chicken serum collected from Mbeere district, eastern Kenya during the wet season.

Chicken category	No. of samples	Titre								GMT
		1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256	
Chicks	7	-	-	-	1	-	4	1	1	70.66
Growers	8	-	-	-	1	2	4	-	1	53.82
Adults	9	-	-	-	-	1	5	3	-	74.65
Total	24	0	0	0	2	3	13	4	2	65.85

Key: Chicks < 2 months of age, Growers; between 2-8 months of age and Adults > 8months old; GMT = Geometric mean titre.

Table 2. Haemmagglutination inhibition (HI) titres in free-range chicken serum collected from Mbeere district, eastern Kenya during the dry season.

Titre age	Samples	Titre								GMT
		1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256	
Chicks	9	-	1	1	2	4	1	-	-	20.16
Growers	8	-	-	-	2	-	3	3	-	58.69
Adults	7	-	-	2	2	-	2	1	-	26.25
Total	24	0	1	3	6	4	6	4	-	31.08

Key: Chicks < 2 months of age, Growers; between 2-8 months of age and Adults > 8months old; GMT = Geometric mean titre.

management approaches should be designed to provide maximum care for birds during the wet season. No virus was isolated from swabs and tissues from the birds. The study is on-going and results of the effect of parasites on ND vaccination immune response will be reported in due course.

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