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Farmers’ and academia’s views”

## Assessment of natural (KLH) antibodies and specific (Newcastle disease) antibodies in local chicken of Kenya

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### Abstract

Natural and specific antibodies are important in combating and controlling diseases. The antibody traits, as part of the immune function, provide an indication of an individual's health status and are used as indicator traits of disease resistance. Selective breeding to improve any trait, including antibody traits, requires identification of sources of variation. This study aimed at determining non-genetic factors related to biological and environmental effects that confer variation in natural and specific antibodies in local chicken of Kenya. In this study, natural antibodies binding to Keyhole Limpet Hemocyanin (KLH-NABs) and specific antibodies binding to Newcastle disease virus (NDV-IgG) were used as measures of immune traits. The population in the study constituted of indigenous chicken and synthetic chicken populations that have been subjected to selection to develop meat and egg lines over five generations. A total of 1540 chicken of different ages ranging from 12 to 56 weeks were sampled. Titers of KLH-NABs isotypes (KLH-IgM, KLH-IgG and KLH-IgA) and NDV-IgG were measured by indirect enzyme-linked immunosorbent assay. A general linear model was fitted to determine the effect of sex, population, generation, phylogenetic cluster, line, genotype, hatch group, plate and age on the antibody traits. Overall mean ( $\pm$  standard error) concentration levels for KLH-IgM, KLH-IgG, KLH-IgA and NDV-IgG were  $10.33 \pm 0.04$ ,  $9.08 \pm 0.02$ ,  $6.00 \pm 0.02$  and  $10.12 \pm 0.03$ , respectively. Sex, generation and age (linear covariate) influenced ( $p < 0.05$ ) variation across all the antibody traits. Population and genotype effects ( $p < 0.05$ ) were evident in all antibody traits, apart from KLH-IgA. Hatch group had an effect ( $p < 0.05$ ) on KLH-IgA and NDV-IgG. Interaction between generation and line was significant ( $p < 0.05$ ) in KLH-IgM and NDV-IgG while nesting cluster within population influenced ( $p < 0.05$ ) all antibody traits, apart from KLH-IgA. Results from this study indicate presence of biological and environmental effects on natural and specific antibodies. These factors should be accounted for to reduce bias and improve accuracy when evaluating the antibody traits. Adjusting for these factors is further expected to improve accuracies of genetic evaluations of the antibody traits.

**Keywords:** Chicken, natural antibodies, non-genetic factors, specific antibodies