

EFFECT OF MANAGEMENT SYSTEM ON BLOOD INDICES OF JAPANESE QUAILS

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ABSTRACT

This study investigated the effect of management systems on the haematology and blood chemistry of Japanese quails. A total of 150-day-old Japanese quails were procured from National Veterinary Research Institute, Vom and use for the experiments. Blood samples were collected according to management systems and immediately taken for laboratory analysis. Data collected were subjected T-test to of the SPSS statistical software version 21. Results obtained revealed that management system had no significant effects on all the haematological and serum biochemistry of Japanese quails. From the findings of this study, it was concluded that, Japanese quails can be reared successfully in either battery cage or deep litter system without any deteriorating effects.

Keywords: Blood platelet, Creatinine, Haemoglobin, Neutrophil, Red blood cell, White blood cell

INTRODUCTION

The Japanese quail (*Coturnix coturnix japonica*), due to its easy maintenance, low feed requirement, early sexual maturity, shorter generation interval, better meat flavour, high rate of egg production has become a pilot animal in the field of research. The bird is generally used for both meat purpose and egg production. Japanese quails and its products are one of the cheapest and easily affordable animal protein sources for the teeming population thus could play very significant socio-cultural and economic roles in our societies. The adaptation and resistance of these birds to endemic diseases makes the birds more valuable than most poultry and livestock species with respect to genetic diversity studies. Extensive research on *Coturnix japonica* has showed that it was a valuable animal for avian research (Gaurav, 2018). Housing system is the most important factor affecting poultry production; therefore, many researchers studied the effect of housing systems on behavioral, productive and reproductive traits of poultry (Ugwuene, 2011). Housing system is one of the most important factors affecting poultry performance (Ugwuene, 2011).

MATERIALS AND METHODS

The experiment was carried out at the Livestock Teaching and Research Farm of the Faculty of Agriculture, Shabu-Lafia Campus, Nasarawa State University, Keffi, Nasarawa State. Nasarawa State falls within the Southern Guinea Savannah Zone of Nigeria. Lafia lies between Latitude 7° and 9° North and Longitude 7° and 10° East. It has a climate typical of the tropical zone because of its location. It has a temperature ranging from 20°C in October to 36°C in March while rainfall varies from 13.73 cm in some places to 14.00 cm in others (Faculty of Agriculture Lafia Weather Station 2023).

Experimental Procedure and Management

The total of 150-day-old Japanese quails were procured from National Veterinary Research Institute, Vom Plateau State and use for the experiments. On arrival the chicks were weighed, vaccinated using Gumboro and Lasota. Seventy-five (75) quails each were housed separately in battery cage and deep litter. The birds were allocated to each treatment and replicate randomly in a completely randomized design. Each treatment was replicated three times with twenty-five birds per replicate. The same pens and cages were used for both brooding and rearing. They were thoroughly cleaned, scrubbed and disinfected using Vinkokil and allowed to dry for two weeks before the arrival of the chicks. Brooding was carried out for additional period of 14 days using stoves and electric bulbs as sources of heat and illumination. Wood shavings were used as litter materials in the deep litter while plain sheets were used in the battery cage. Litter material was spread at a 5cm depth in the deep litter pens. The chicks were brooded at a temperature of 35°C with adequate drinker and feeder spaces provided. The temperature was monitored using clinical thermometer and reduced gradually at the rate of 3.5°C on weekly basis as brooding progresses. Light was provided for 24 hours during brooding to avoid pilling and death. Stone pebbles were disinfected and place in the drinking water to avoid drowning. The birds were managed following the standard procedure as described by Gambo *et al.* (2014).

Parameters Measured

At the end of the finisher phase (6 weeks), birds were bled and 1 ml of whole blood was collected to determine the effect of management system on blood parameters. Two birds per replicate and 6 birds per treatment whose body weights were close to the pen average weight were selected and properly identified by means of leg bands to correspond with the management system and used for biochemical analysis. Birds selected for blood collection were slaughtered for ease of blood collection. Before slaughtering, the birds were fasted for 12 hours and bled the following morning by severing the jugular veins and carotid arteries using a clean sharp table knife. The blood samples were collected in a marked Ethylene Diamine Tetra Acetic Acid (EDTA) bottle large enough to accommodate 1 ml of blood. Each blood sample was marked against each management system and gently rocked to mix the EDTA and blood together. Blood samples collected were taken to Bafawat Diagnostic Laboratory, Lafia, Nasarawa State within one hour of collection for haematological analysis such as packed cell volume (PCV), Haemoglobin concentration (HB), red blood cell (RBC), white blood cell (WBC) etc. The haematological parameters of the blood were determined by the Sysmex KX-2IN Autoanalyzer and the biochemical factors with Flexor Jnr. Autoanalyzer.

Automatic biochemical Analyzer was used to determined total protein (g/l), glutinin (g/l), albumin (g/l), globulin (g/l), urea (mmol/l), creatinine (mmol/l), concentration of glucose (mmol/l), and total cholesterol (mmol/l), serum aspartate aminotransferase (u/l) and alanine aminotransferase (u/l). Serum total protein (g/l) was determined calorimetrically, while albumin (g/l) value was measured by bromocresol green method. Globulin concentration (g/l) was calculated as the difference between total protein and albumin. Serum glucose (mg/l), total cholesterol (mg/dL), urea (mmol/l), creatinine (mmol/l), serum aspartate aminotransferase (u/l) and alanine aminotransferase (u/l) were monitored calorimetrically (Hassan *et al.*, 2017)

Data Analysis

Data collected on all the parameters were analysed using T-test of the SPSS statistical software (version 21) to test the effect of management systems on measured parameters at 5% level of probability. Where significant difference exist, Duncan multiple range was used to separate the means.

RESULTS

The effect of management system (Table 1) on haematological and serum biochemical parameters of Japanese quails. Management system had no significant ($P>0.05$) effect on haematological and serum biochemical parameters of Japanese quails.

Table 1: Effect of management system on haematological and serum chemistry of Japanese quails

Blood parameters	Battery Cage	Deep Litter	SEM	P-value
Hematological parameters				
Haemoglobin	17.93	18.27	0.21	0.493 ^{NS}
Packed Cell Volume	43.00	45.00	1.06	0.407 ^{NS}
Red Blood Cell	3.33	3.43	0.01	0.664 ^{NS}
White Blood Cell	116.33	107.33	3.44	0.222 ^{NS}
Platelet	88.33	84.67	7.87	0.844 ^{NS}
Mean corpuscular Volume	130.33	129.00	1.94	0.772 ^{NS}
Mean corpuscular Haemoglobin	54.67	53.33	0.68	0.387 ^{NS}
Mean Corpuscular Haemoglobin Concentration	41.33	39.33	0.56	0.055 ^{NS}
Serum biochemistry				
Albumin	32.67	29.00	1.24	0.157 ^{NS}
Protein	58.00	57.00	2.66	0.874 ^{NS}
Globulin	20.00	23.67	1.28	0.169 ^{NS}
Glutamate-oxaloacetate Transaminase	98.00	111.67	6.77	0.369 ^{NS}
Glutamic-pyruvic Transaminase	35.00	36.33	6.84	0.935 ^{NS}
Alkaline Phosphatase	371.67	470.00	30.91	0.113 ^{NS}
Urea	1.83	2.13	0.14	0.327 ^{NS}
Creatinine	62.33	78.33	6.59	0.265 ^{NS}
Glucose	8.43	5.60	1.29	0.321 ^{NS}

NS= Not significant *= Significant at 5% level of probability

DISCUSSION

Management system had no effect on haematological and serum biochemical indices of Japanese quails. The non-significant difference of management system on haematological parameters as observed in this study may be an indication of the adequacy of the two-management system for normal blood for normal and proper immune defence mechanism of the quails. These findings were in line with the report of Samuel *et al.* (2022) who worked on quail production systems, prospects and constraints in Ghana.

CONCLUSION

From the findings of this study it was concluded that rearing of Japanese quails in battery cage or on deep litter system does not have negative effect on the haematological and blood biochemical parameters of the birds.

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