GENETIC EFFECT OF FIVE COMMERCIAL BREED OF BROILERSRAISED IN THE HUMID TROPICS OF ENUGU STATE ON GROWTH, CARCASS AND HAEMATOLOGICAL PARAMETERS.

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ABSTRACT

The study was designed to investigate whether strain of broiler has influence on growth performance, carcass characteristics and haematological parameters of chickens managed under controlled management. 250 finisher broiler chickens comprising of fifty each of the five breeds (Ross, Cobb, Abor Acre, Hubbard and Marshall) were used in a completely randomized design experiment which lasted for 28 days. 5 replicates of 10 birds each are used to represent each breed as a treatment. Throughout the trial, the birds were given the same finisher feed ad libitum, and they were also given unrestricted access to water. Analysis of Variance (ANOVA) was used to analyse the data, and the Duncam Multiple Range Test was used to separate the means at 0.05 significance levels.

Results showed non-significant (P>0.05) differences in final weight, total weight gain and daily weight gain between the breeds. However, Ross strain consumed significantly (P<0.05) more feed (5496.25g) than Marshal (5123.45g), followed by Abor Acre (5031.30g), which in turn consumed more than Hubbard (5001.22g) then Cobb (3959.43g) consuming significantly (P<0.05) the least. This pattern was repeated in the daily feed intake; consequently, resulting to a better feed conversion ability of the Cobb strain which had significantly (P<0.05) better FCR (2.11%) as against Hubbard (2.58%) and Abor Acre (2.50%), then Marshall (2.70%) and Ross (2.74%) being significantly (P<0.05) the poorest feed converter. For carcass characteristics, there were no significant (P>0.05) differences in the live weights, eviscerated weights, carcass weights and dressing percentage of the broiler breeds, however, in the prime cuts, there were significant (P<0.05) differences in the thigh; Ross (13%) and Abor acre (12.33%) had highest; followed by Cobb (11.99%) and Hubbard (10.67%) and least being Marshall (9.85%) and this pattern was repeated for breast muscle. The haematological parameters of the different breeds were non-significantly (P>0.05) different. However, PCV, RBC, Hb, Eosinophil and Basophil were within the range of normal avian blood parameters but WBC and lymphocyte were above while Neutrophil value was below the normal avian range.

The finding indicates no genetic effect of breed of broiler on growth and carcass weight as well as on haematological parameters, however, the increase in WBC and lymphocyte counts may confer higher degree of disease resistance of the birds to the local environment.

Key words: Finisher Broiler, Growth parameters, Carcass characteristics, Haematological Parameters

INTRODUCTION

It is impossible to overstate the importance of poultry to the supply of animal protein (Ahmed *et al.,* 2018). Meat and eggs from poultry are great sources of animal proteins that are needed to satisfy human protein needs (Olawumi*et al.,* 2012). Different strains of broiler chicken have been introduced to the Nigerian poultry sector over time (Ojedapo*et al.,* 2016). Selection for broiler strains that will reach market weight at an acceptable age is crucial for profit maximisation since breeding and selection procedures may be used to produce the greatest results in the poultry business (Sam, 2019).Comparatively, the choice for Ross, Cobb, Marshal, Hubbard and Arbor acre broiler breeds which exhibit exceptional growth rates and efficient feed conversion, making them top choices for commercial broiler production. However, subtle differences in their genetic make-up may lead to variations in specific performance metrics. For Instance, Cobb broilers might have a slight edge in breast muscle development, while Arbor Acres broilers might excel in overall robustness and health resilience (Ahiwe*et al.,* 2024).

In an attempt to review existing literatures, Kareem-Ibrahim *et al.,* (2021) deduced from their study using Arbor Acre, Cobb, Marshall and Rossthat performance in terms of growth parameters for Arbor Acre, Cobb and Ross were similar with the exception of Marshall breed which had significantly ($P<0.05$) lowest values; confirming he works of Udeh*et al.,* (2015), who reported that at eight weeks of age, Arbor Acre and Ross 308 were equivalent in weight but superior to Marshal. This was in contrast to the findings of Fadare*et al.,* (2020), who found that the Marshall strain of broiler chicken out-performed the Arbor acre and Cobb strains in terms of growth performance. Additionally, Olajide*et al.,* (2020) using three broiler breeds represented by the letters A, B, and C, to report breed differences, posited that there was breed difference for breed C was deemed the best of the three breeds based on blood parameters that measured performance, cost, carcass, and health.Earlier Kalia*et al.,* (2017) using Vencobb, RIR cross-bred, and Hubbard, the RIR being the crossbred of Vencobb and Hubbard concluded that the crossbred performed better than both parent breeds (Vencobb and Hubbard).Prior research by Razuki*et al,.* (2011) and Ajayi and Ejiofor (2009) revealed notable strain variations in the live body weight of broiler chicken at 8 weeks, whereas Amao*et al.,* (2011) claimed that Ross 308 was heavier than other strains of birds tested in their trial.

Recently, Sam and Okon (2022) on the other hand in their comparative study of Cobb, Ross and Abor acre observed that Cobb 500 strain of broiler chicken was significantly ($p<0.05$) superior in body height than Arbor Acre and Ross 308. Going further, Sam *et al.,* (2023) indicated in their study that haematological and serum biochemical indices of the birds studied were within normal ranges, however, RBC, PCV, and Hb were significantly ($p < 0.05$) higher in cobb500 than Arbo Acre and Ross. They concluded that Cobb 500 had significantly better haematological profiles (RBC, PCV and Hb) and could be better adapted to the local production system and environment of the experiment; interpreted by Kral and Suchy (2000) to mean accurate interpretation of health status of birds for diagnostic and management purposesbeneficial to improving the genetic makeup of both domestic and industrial chicken as well as for creating novel broiler strains that are genetically resistant to poultry illnesses.

According to Chukwuka*et al.,* (2010), the poultry sector is undergoing a modest but noticeable shift in product diversification in response to industry and customer needs, efforts to compare the performance of the various available and popular breeds of broilers with the intent of recommending the best to the farmersshould continue (Olajide*et al.,*2020). Instructively, the various results using Ross, Abor Acre, Cobb, Marshall and Hubbard by the various researchers indicates that breed of broiler may have influence on broiler growth performance however; this superiority is varied and is not ascribable to any specific broiler used by poultry farmers in Nigeria. It is in the light of the foregoing that the present work attempts to investigate whether there is any breed effect using the five commercial broilers earlier investigated by the different researchers and ascertain if there is any pattern of effect.

METHODOLOGY

2.1 Experimental Site

The investigationwas carried out in the poultry unit of the Teaching and Research Farm, Enugu State University of Science and Technology, Agbani Enugu Nigeria. It is situated in Nkanu West Local Government Area of Enugu State.The site lies within latitude 07°41North and 08° 21 and longitude 06° 81 East and 07° 61 west. They aremarked by a tropical weather of wet and dry seasons. The wet season begins in March and ends in October while the dry season commences in October and ends in February. The mean rainfall ranges from 1680 mm to 1800 mm. The temperature in the dry season ranges from 20^{o} C to 38^{o} C and in the wet season the range is 16^{o} C to 28^{o} C. The vegetation of the area is rainforest, characterised by stunted trees and pockets of wood land and secondary forest consisting of few shrubs and dispersed large trees and climbers.

2.2 Experimental Animals

250 finisher broilers comprising of Ross, Cobb, Abo acre, Hubbard and Marshal were procured from a reputable distributor in Enugu. All hygienic measures, including cleaning, disinfecting, and washing the pen and other equipment, were completed prior to the birds' arrival. Throughout the 28-day trial, the finisher broilers were reared in a deep litter system with unlimited access to feed and water. Routine vaccination schedule for broilers were observed.

2.3 Management of the Experimental Birds

For the investigation, a total of 250 finisher broiler chicks were employed at 50 each for the Ross, Cobb, Abor Acre, Hubbard, and Marshall strains. They were given a broiler finisher diet that included 20% crude protein and 2950 kcal/kg of metabolisable energy. Throughout the trial, the birds had unrestricted access to clean water. The birds were fed New hope finisher mash. The Gumboro and Lasota immunisation schedules were closely followed, and sick birds received the proper medical care.

2.4 Experimental Birds and Experimental Design

The 250 finisher broiler Ross, Cobb, Abo acre, Hubbard and Marshal breed of broilers were randomly allocated to five treatments of Ross, Cobb, Abor Acre, Hubbard and Marshall strains in a completely randomized design experimental model. Each of the treatments consists of five replicates with ten birds per replicate making a total of fifty.

2.5 Data Collection

2.5.1 Weight gain: The birds' initial body weight was determined at the start of the experiment and then every week after that to determine their weight gain as itemized below:

Weight gain = Final weight – Initial weight

$$\text{Average weekly weight gain} = \frac{\text{Current week weight} - \text{Preceding week weight}}{\text{no of days (7 days)}}$$

$$\text{Average daily weight gain} = \frac{\text{Final weight} - \text{Initial weight}}{\text{no of days (28 days)}}$$

2.5.2 Feed intake: This was obtained by subtracting left over feed from feed supplied.

Feed intake = Feed supplied – Leftover

Average weekly feed intake = Current Week Feed supplied – Leftover/no of days (7 days)

$$\text{Average daily feed intake} = \frac{\text{Total Feed supplied} - \text{Total Leftover}}{\text{no of days (28 days)}}$$

2.5.3 Feed conversion ratio: The average weight gain and average feed intake of the birds in each treatment were used to calculate the feed conversion ratio (FCR)..

This will be calculated as $\frac{\text{Feed intake}}{\text{Body Weight Gain}}$

2.5.4 HaematologicalIndices

During the study's final phase, blood samples were taken. Samples were taken from ten randomly selected birds per treatment (two birds per replicate). 5ml s of blood were extracted and poured into test tubes and EDTA bottles for the analysis of haematological parameters, respectively, after the wing vein was used to collect the blood and the region was cleaned with cotton wool moistened with methyl alcohol swab and by vein puncture. Prior to collection, all EDTA bottles and sample test tubes had the proper labels.

The haematological parameters determined include the following:

Procedure

2.5.4.1 Packed Cell Volume (PCV)

The haematocrit centrifuge method, as outlined by Dacie and Lewis (1991), was used to determine the blood's packed red cell percentage. A capillary tube was dipped into a blood sample and filled to approximately three-quarters of its length; any excess blood on the tube's side was wiped off to ensure accuracy of the results. One end of the tube of the capillary tube was then sealed over to separate the plasma from the red cells. The capillary tube was then placed on a micro-heamatocrit reader and the level of packed cell read.

2.5.4.2 White Blood Cell Differentials (WBC)

As soon as the blood sample was taken from the experimental birds, the Neubauerhemocytometer counting chamber was used to quantify the total quantity of white blood cells. 0.2 ml of the test birds' blood sample was pipetted and combined with 4 ml of WBC dilution fluid (WBC fluid is composed of 1% gentian violet and 3% aqueous solution of acetic acid). After the sample was placed in the maemo-cytometer, the number of cells was determined to be 109 WBC per litre of blood.

2.5.4.3 Haemoglobin (Hb)

Each blood sample's Hb concentration was determined by applying Jain's (1986) cyanomethaemoglobin technique. 20 µl of each individual bird's blood sample was combined with 4 ml of modified Drabkin's solution (which was made by combining 200 milligrammes of potassium ferricyanide, 50 mg of potassium cyanide, and 140 mg of potassium dihydrogen phosphate) and the pH was set to 7.0. Drabkin's solution and an experimental bird blood sample combination were allowed to pass through a spectrophotometer set to 540 nm. A standard curve was used to extrapolate the real haemoglobin value.

2.5.4.4 Determination of Red Blood Cell (RBC) Content

Neubaeurhaemo-cytometer counting was used to determine the total RBC as soon as the blood sample was collected. 4ml of RBC diluting fluid (o1ml of 40% formaldehyde and 99 ml of 3% aqueous sodium citrate solution) were combined with 0.2 millilitres of blood sample. Using a fine bore pipette, the mixture was put into haemocytometer. The solution was spread evenly and cells were counted under the microscope and expressed as 10^9 RBC per line of blood.

2.6 Statistical analysis

Data gathered were subjected to one way analysis of variance (ANOVA) based on the Completely Randomized Design model. Where differences occurred at 5% level of significance ($p<0.05$), they were separated using Duncan's Multiple Range Test (SPSS version 26).

Result and Discussion

Below in Table 1 is the growth statistics for the bird.

Table 1: Growth Performance of the Five Broiler Breeds

	BREED					
Parameter	**Ross**	**Cobb**	**Abor Acre**	**HUBBARD**	**MARSHAL**	**SEM**
INIWT (g)	811.25	812.07	825.17	800.24	812.98	8.91
AFBW (g)	2820.25.	2690.46	2864.48	2738.73	2711.89	87.97
TOTWTGN (g)	2009.00	1878.39	2039.32	1938.49	1898.91	91.59
ADWG (g)	71.75	67.09	72.15	69.23	67.82	3.21
TOTFI (g)	5496.25[a]	3959.43[c]	5031.30[b]	5001.22[b]	5123.45[b]	179.55
ADFI	196.30[a]	141.40[c]	179.69[b]	178,62[b]	182.98[b]	6.41
FCR.	2.74[c]	2.11[a]	2.50[b]	2.58[b]	2.70[c]	0.11

a,b Mean within row with different superscript differ ($p < 0.05$) significantly

INIWT: Initial Body Weight; AFBW: Final Body Weight; ADWG: TOTWTGN: Total Weight Gain; Average Daily Weight Gain; TOTFI: Total feed Intake; ADFI: Average Daily Feed Intake; FCR: Feed Conversion Ratio

3.1 Weight Change: The influence of strain on growth performance of five strains of broiler birds; Ross, Cobb, Abor Acre, Hubbard and Marshal did not indicate significant differences ($P>0.05$) in all the growth performance parameters measured (Table 1). The result showed that the final body weights were significantly similar ($P>0.05$) in Ross (2820.25g), Cobb (2690.46g), Abor Acre (2864.48g), Hubbard (2738.73g) and Marshal (2711.89g).Total weight gains were similar among the five breeds; Ross (2009g), Cobb (1878.39g), Arbor Acre (2039.23g), Hubbard (1938.48g) and Marshal (1898.91g).

This result indicated similar genetic potential for weight gain for all the breeds and agrees with the report ofOlajide*et al.,* (2020) that there was no significant difference in the average final weight and average body weight gain per bird per day observed among the three broiler breeds (A, B, and C) used in their study.It also supports the work of Kalia*et al.,* (2017)whoreported no significant differences (P > 0.05) in weight gain between Vencobb, RIR cross-bred, and Hubbard broiler strains. It somewhat supports the findings of Kareem-Ibrahim *et al.,* (2021), who found that the three breeds (Arbor Acre, Cobb, and Ross) had very comparable weights, with the exception of the Marshall breed, which had a highly substantially (P<0.01) lower initial weight, final weight, total weight gain, and average daily gain.It is contrary to the findings of Fadare*et al.,* (2020) who found that Marshall had the highest body weight of 1804.37± 50.47g followed by Cobb with a weight of 1760.16 ±15.38g) while Arbor acre had the least body weight of 1683.43 ± 25.06g at 8weeks and concluded that Marshall strain had better growth performance than Arbor acre and Cobb strain of broiler chicken.

3.2 Feed Intake: The influence of strain on feed intake of the five strains of broiler birds; Ross, Cobb, Abor Acre, Hubbard and Marshall was highly significant (P<0.05) in both total feed intake and daily feed intake values of the five breeds (Table 1). The result showed that the total feed intake was significantly (P<0.05) highest in Ross (5496.25g), followed by Marshal (5123.45, then Abor Acre (5031.30g), Hubbard (5001.22g) and finally Cobb (3959.43g). This pattern was repeated in daily weight gain with Ross breed recording the highest and Cobb been the least.

This partially agrees with the work of Sam and Okon (2022) who found significant (P<0.05) difference in feed intake among the three breeds. However, it differs from the present study because their work indicated higher feed consumed by Cobb breeds, followed by Abor Acre and Ross been the least. This differences is contrary to the current work which showed that the Ross breed consumed highest followed by the Abor Acre breed and the least been the Cobb breed. On the other hand, Kalia*et al.,* (2017) reported that no significant differences (P > 0.05) were observed in feed intake between Vencobb, RIR cross-bred, and Hubbard broiler strains used in their experiment contrary to the current work.

3.3 Feed Conversion Ratio (FCR): The result indicated that feed conversion ratio was significantly better (P<0.05) in Cobb (2.11) than the other four strains; Arbor Acre (2.50), Hubbard (2.58), Marshal (2.70) and Ross (2.74). Cobb had significantly better (P<0.05) feed conversion than the other four strains, which supports earlier work of Sam and Okon (2022), though the values obtainedwere higher than the range reported by Amao*et al.,*(2011); Udeh*et al.,*(2015); Sam and Okon(2022). Conversely, Amao*et al.,* (2011)found that Ross broilers had a higher feed conversion ratio than other bird strains, while Olajide*et al.,* (2020) found no significant (P>0.05) breed-to-breed differences. This was in contrast to Cobb broilers' superior performance.

Abdullah *et al.,* (2010) and Udeh and Ogbu (2011) noted notable variations in the feed conversion ratio between several broiler strains they investigated and opined that the difference could be as a result of genetic potential of the different breeds. Similarly, the better feed conversion ratio (2.11) of Cobb breed in this study indicated that it performed better than the other strains in weight gained per gram of feed consumed, which may the indicative of the genetic potential of the Cobb breed of broilers raised by Nigerian farmers. According to Skinner-Noble and Teeter (2003), the feed conversion ratio gauges how effectively feed is being used, which is clearly important from an economic standpoint given that feed accounts for over 75% of the entire cost of producing chicken (Amao*et al.,* 2011).
Result of performance parameters reported by the authors differ; while Olajide*et al.,* (2020); Kalia*et al.,* (2017) agrees with the present study that there were no significant (P<0.05) difference in breeds regarding weight changes at finisher phase, Kareem-Ibraheem*et al.,* (2021) reported that Marshall breed had significantly (P<0.05) lower final weight while the other breeds (Abor Acre, Cobb and Ross) were similar. On the other hand Fadare*et al.,* (2020) reported that Marshal breed had significantly (P>0.05) highest final weight compared to the other broiler breeds (Abor Acre and Cobb) investigated which had similar final weights. The feed intake in this study showed significant (P<0.05) differences between the breeds with Ross consuming the most and Cobb the least. This agrees with the work of Sam and Okon (2022) of significant (P<0.05) breed effect in feed intake though their work indicated higher feed consumed by Cobb breeds, followed by Abor Acre and Ross been the least, which is contrary to the present work that Ross breed consumed highest and the least been the Cobb breed. On the other hand, Kalia*et al.,* (2017) reported no significant differences (P > 0.05) in feed intake between Vencobb, RIR cross-bred, and Hubbard broiler strains used in their experiment.The FCR in this study was significantly (P<0.05) better in Cobb breed and least in Ross, which is similar to the work of Sam and Okon (2022); Udeh*et al.,* (2015) and

Amao*et al.,* (2011) but contrary to the work of Olajide*et al.,* (2020) who found no significant (P<0.05) difference.

It is therefore suggestive that there is no apparent genetic potential of any particular breed over the other breed on growth performance of the broiler birds. The differences observed from the different experiments do not follow a specific pattern and could be adjudged as caused by the environment. This agrees with the report of Olajide*et al.,* (2020) who stated that the differencesrecorded for growth parameters could be as a result of the effects of environment, feed and other exogenous factors. For example, Cobb breed in this study had the best FCR yet was not significantly (P>0.05) different from other breeds in final body weight. The reason being that the Cobb breed compensated for its lower maturity body weight, though numericallyby consuming significantly (P<0.05) less feed which it converted to flesh most efficiently with significantly (P<0.05) better FCR.The lower final weight of Cobb breed could be attributed to exogenous factor of response to disease situation as it had least WBC and Lymphocyte percentage values numerically.

Carcass Characteristics

In Table 2 below the carcass performance of the different breeds are shown.

Table 2: Carcass characteristics of different breeds of Broiler Chickens Fed Bush Buck Leaf Extract in drinking water

Parameter	ROSS	ABOR ACRE	COBB	HUBBARD	MARSHAL	SEM
Live weight (g)	2820.25	2690.46	2864.48	2738.73	2800.11	38.71
Eviscerated weight (g)	2423.44	2346.12	2456.82	2412.11	2398.45	10.01
Carcass weight (g)	2211.64	2113.89	2151.22	2041.45	2106.52	11.54
Dressing %	78.42	78.57	75.10	74.54	75.23	17.77
Prime Parts						
Drum stick (%)	11.25	11.20	10.75	10.25	10.75	0.37

Thigh (%)	13.00^{a}	12.33^{a}	11.99^{b}	9.85^{c}	10.67^{b}	0.44
Breast (%)	22.00^{a}	23.75^{a}	19.00^{b}	16.75^{c}	19.25^{b}	0.37
Wing (%)	9.50	9.00	8.74	8.60	8,88	0.46
Back (%)	13.50^{a}	14.00^{a}	12.50^{b}	12.00^{b}	12.71^{b}	0.55
Neck (%)	6.75	6.50	5.95	5.25	6.01	0.45
Shank (%)	7.07	7.13	6.56	6.76	6.24	0.38
Organs						
Heart(%)	1.50	1.61	1.33	1.47	1.39	0.40
Gizzard (%)	5.14	5.61	4.90	4.78	5.01	0.87
Liver(%)	3.99	3.82	3.11	2.91	2.91	1.64
Lungs(%)	6.92	6.43	6.55	6.18	6.24	0.53
Kidney (%)	1.30	1.47	1.55	1.25	1.32	0.36
Intestine full (%)	10.86^{b}	10.12^{b}	12.65^{a}	12.62^{a}	12.42^{a}	0.74

Means without different superscripts along the same row are significantly (P>0.05) not different

The result from Table 2 showed that there were no significant (P>0.05) differences in the live weights, eviscerated weights, carcass weights and dressing percentage of the broiler breeds under study. However, in the prime cuts, there were significant (P<0.05) differences in the thigh; Ross (13%) and Abor acre (12.33%) had highest; followed by Cobb (11.99%) and Hubbard (10.67%) and least being Marshall (9.85%). This pattern was repeated in breast muscle but, while the back weighed highest in favour of Ross (13.50%) and Abor acre (14%), it was the same for Cobb, Marshall and Hubbard; 12.50%, 12% and 12.71% respectively. The organ weights were significantly (P>0.05) similar between the breeds, though full intestine percentage was significantly (P<0.05) heavier in Cobb, Marshal and Hubbard and least in Ross and Abor acre.

Bot *et al.,* (2013) argued that the plucked weight, eviscerated weight, dressed weight and weights of breast, wings and drumsticks had been linked to reflect the live weight of the birds. This phenomenon was partially observed in this present study. Dressing percentage though not significantly (P>0.05) different was numerically higher from Abor Acre (78.57) to Ross (78.42), followed by Marshall (75.23), then Cobb (75.10), and finally Hubbard (74.54). Instructively, where there are significant (P<0.05) differences like thigh, breast, back and full intestine, Ross and Abor Acre have similar weights while Cobb, Hubbard and Marshall share similar weights. The percentage values obtained for dressed weight and prime cuts in this study are higher than the weights obtained by Olajide*et al.,* (2020) and Ayoola *et al.,* (2015).

Haematological Parameters

The result of the haematological indices is presented below in Table 3.

Table 3: Haematological Parameters of Broiler Chickens Fed Bush Buck Leaf Extract

Parameter	Normal*	ROSS	ABOR ACRE	COBB	HUBBARD	MARSHAL	SEM
PCV (%)	27 – 42	27.83	28.10	27.48	28.23	28.06	3.74
RBC ($x10^6$/ul)	2.2 – 4.0	2.66	3.04	2.87	2.73	2.79	0.44
WBC ($x10^3$/ul)	1.0 – 9.5	13.71	11.46	10.33	11.01	11.44	4.80
Hb (g/dl)	7.0 – 11.0	8.13	9.05	8.77	9.12	8.88	0.88
N/H (%)	50 – 65	35.42	35.17	38.58	37.15	36.77	12.50
L (%)	20 – 50	67.67	62.33	62.17	65.34	63.47	10.00
E (%)	0 – 4	1.68	2.29	2.28	2.18	2.11	0.59
B (%)	0 – 2	0.50	1.55	1.27	1.35	1,45	0.60

Means without different superscripts along the same row are significantly (P>0.05) not different

***As reported by Barde*et al.,* (2022)**

Table 3 showed that the difference between the breeds on all parameters were not significantly (P>0.05) different. This agrees with the works of (Sam *et al.,* 2023; Olajide*et al.,*2020) who found no significant (P>0.05) difference among breeds with the exception of neutrophils which differed significantly (P<0.05) among breeds. Most of the blood parameters were within normal avian range as reported by Barde*et al.,* (2022), but the values for WBC and lymphocytes were higher than as reported by Barde*et al.,* (2022) for avians.

Haematological tests can be used to diagnose a number of diseases and assess the extent of blood damage (Onyeyili*et al.,* 1992;Togun and Oseni, 2005). Haematological studies, which are of ecological and physiological interest in understanding the relationship of blood characteristics to the environment (Ovuru and Ekweozor, 2004), may help select animals that are genetically resistant to particular diseases and environmental conditions (Mnereole, 2008; Isaac *et al.,* 2013). Khan and Zafar (2005) assert that haematological indices are trustworthy indicators of the physiological condition of an animal. The haematological parameters of the investigation indicated that the chicken breeds were in good health.

Further that the percentage values for WBC and lymphocytes in this study were higher than the normal range for avian broilers may suggest that the local environment in this study had some disease condition that the birds were fighting. Fighting infections, phagocytosing foreign organisms to protect the body against invasion, and producing, or at least transporting, and distributing antibodies as part of an immune response are the main roles of white blood cells and their derivatives. Accordingly, animals with low white blood cell counts are more likely to get sick, while those with high counts can have a high level of disease resistance, produce antibodies during phagocytosis, and enhance their capacity to adjust to local environmental and disease-prevalent conditions (Kabir*et al.,* 2011; Iwuji and Herbert, 2012; Isaac *et al.,* 2013).

Discussion

The result obtained in this study which showed no breed effect on growth, carcass and haematological parameters supports the works of (Sam and Okon2022;Olajide*et al.,* (2020; Sam *et al.*(2010 and 2019; Razuki*et al.*2011; Ajayi and Ejiofor2009)but partially similar to the reports of Kareem-Ibrahim *et al.,* (2021) who reported heavier weights for Abor Acre, Cobb and Ross over Marshal breed. This was in support of earlier works of Udeh*et al.* (2015) who reported heavier weights at maturity in favour of Arbor Acre and Ross 308 than Marshal while Amao*et al.* (2011),reported that Ross 308 had superior weight to other strains of birds used in their experiment at eight weeks of age. In contrary opinion, Fadare*et al.,*(2020) reported that Marshall strain had the highest body weight followed by Cobb while Arbor acre had the least body weight at 8 weeks, which was in support of earlier works by (Ahmed *et al.,* 2018;Atansuyi*et al.,*2017;Gwaza*et al.,* (2017). On the other hand, Makka (2016) reported that Abor Acre had higher body weight at 8 weeks over Marshall supporting earlier work of Olawumi*et al.,* (2012). Furthermore, the non-significant (P>0.05) difference in dressed percentage between the breeds also reflects the final weights obtained in the study and supportsBot *et al.,* (2013) who argued that the plucked weight, eviscerated weight, dressed weight and weights of breast, wings and drumsticks had been linked to live weight of the birds and in line to values obtained by Olajide*et al.,* (2020).

The above inconsistency lends credence to the present finding that there was no significant (P>0.05) difference in growth parameters between the commercial breeds. This was also reflected in their dressing percentage. Hence the study revealed similar genetic potential for weight gain for all the breeds suggesting that achieving higher weight differences may be the result of superior management strategies that each farmer may deploy in rearing of the birds. Instructive though is the fact that observed was the higher values of WBC and lymphocytes of the breeds when compared to values reported by Barde*et al.,* (2022) for normal avian birds. Blood parameters are generally helpful in diagnosing a variety of illnesses, determining the degree of blood damage (Onyeyili*et al.,* 1992;Togun and Oseni, 2005), and studying the physiological and ecological significance of helping breeds adapt to their surroundings (Ovuru and Ekweozor, 2004).The high values observed could have been in response to disease condition not encountered in other studies in agreement with Khan and Zafar (2005) thathaematological parameters are good indicators of the physiological status of animals.

Conclusion and Recommendation

The results of the study showed no genetic effect of breed of broiler (Abor Acre, Ross, Cobb, Hubbard and Marshall) on growth and carcass performance as well as blood parameters. The attainment of expected market weight of the breed of broiler depends on management strategy.

It is therefore recommended that farmers and commercial broiler producers should deploy superior management strategies for better economic returns in broiler production.

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