EFFECT OF DAY OLD BODY WEIGHT ON GROWTH PERFORMANCE AND BODY LINEAR MEASUREMENTS OF ROSS 308 BROILERS

BY

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A PROJECT SUBMITED TO THE DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH, FACULTY OF AGRICULTURE IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF AGRICULTURE (B.AGRIC), FEDERAL UNIVERSITY OYE-EKITI.

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DECLARATION

I hereby declare that this project titled "EFFECT OF DAY OLD BODY WEIGHT ON GROWTH PERFORMANCE AND BODY LINEAR MEASUREMENT OF ROSS 308 BROILERS" was written by me in the Department Of Animal Production and Health Federal University Oye-Ekiti, Ekiti State under the supervision of Dr. (Mrs.) M. Orunmuyi. No part of this work has been presented in any previous work for an undergraduate degree in any University. Information obtained from any literature has been duly acknowledged in the project and a list of references provided

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CERTIFICATION

This is to certify that this project titled "EFFECT OF DAY OLD BODY WEIGHT ON GROWTH PERFORMANCE AND BODY LINEAR MEASUREMENTS ON ROSS 308 BROILERS" by Abolaji Abolade John meets the regulations governing the award of the Degree of Bachelor of Agriculture of Federal University Oye-Ekiti. Ekiti State and is approved for its contribution to knowledge and literary presentation. The above declaration is confirmed by

______________________ ______________________ ______________________

Supervisor Signature Date

DR EKEDOCHA A. H ______________________ 14/3/19

Head of Department Signature Date

DEDICATION

This project is dedicated to the Almighty God and also to my ever supporting parents, Mr. and Mrs. G. D. Abolaji

ACKNOWLEDGMENT

I sincerely express my profound gratitude and immense appreciation to God Almighty whose grace is sufficient for me in all things.

I am highly indebted to my beloved parents Mr. and Mrs. G. D. Abolaji who are solidly behind me morally, financially, and spiritually. I pray that they live to reap the fruit of their labour. (Amen)

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ABSTRACT

An experiment was conducted on 126 unsexed commercial broilers (Ross 308). Birds were individually weighed and grouped according to their body weight at day old. They were assigned to three (3) groups according to their body weight (i.e. 39grams and below, between 40-42grams and above 43grams and above). Each chick was wing tagged and tag number recorded according to group. All chicks were fed the same diet and they were weighed at the end of every week. At eight weeks of age, the body linear measurement was taken on all birds in each group.). In this study, the variable used were; Body weight at week 0, 1, 2, 3, 4, 5, 6, 7, and 8 which was represented by BWT0, BWT1, BWT2, BWT3, BWT4, BWT5, BWT6, BWT7 and BWT8 respectively. Also, wing length, drum stick length, shank length and leg length were represented by WG_LT, DS_LT, SH_LT, and LEG_LT respectively. Data obtained on body weight was subjected to analysis of variance using the GLM procedure of SAS. The body linear measurement data was analyzed using correlation procedure of SAS. The result of this experiment shows that the group with the lowest body weight at hatch showed significant difference (P< 00) from the other groups until the fourth week. Starting from the 4th week of the experiment till 8th week of age, the lowest body weight group and the medium body weight group were not significantly different in body weight while the highest body weight group maintained its position till the end of the experiment. Correlation analysis showed that

CHAPTER ONE

1.0 INTRODUCTION

A broiler (*Gallus gallus domesticus*) is any chicken that is bred and raised specifically for meat production (Kruchten, 2002). Commercial broilers are often raised in large, open houses called pens, where they roam, explore, eat, and commune with other chickens. Some (including free-range chickens) have varying access to the outdoors, based on farmer preference. It takes a broiler chicken about eight to twelve weeks to grow to market weight, and once they've reached the right age and size, they'd be sold or processed. It is a bird of either sex (straight-run chicks) with an average body weight of 1.5 to 2.0 kg with a flexible breast bone cartilage, pliable and tender meat.

Day-old chicks are the end product of the hatchery and important starting material for the poultry farms. A good-quality day-old chick is hence a crucial hinge between the hatchery and the farm. Pre-incubation factors such as pre-storage incubation, length of egg storage and age of breeders, as well as incubation conditions, affect day-old chick quality and subsequent bird performance (Petek and Dikmen, 2006). There is an increasing demand for broiler meat due to its tenderness and unique taste when compared with layers' meat. In the past, broilers were sold whole but due to high cost of production, leading to exorbitant price of whole chicken coupled with reduced purchasing power, customers now demand for chicken parts to reduce financial burden on family finances (Nowsad *et al.* 2000)

However, the broiler industry has grown tremendously in the last few decades due to consumer demand for affordable poultry meat. Breeding for rapid growth traits and improved nutrition have been used to increase the weight of the breast-muscle. Chicken meat has become one of the most extensively consumed food products in the world (Magdelaine *et al. 2008*). Apart from its low price, chicken is popular as it is an important source of proteins, vitamin B and minerals and is low in saturated fats (Windhorst, 2006). Commercial broiler chickens are bred to be very fast growing in order to gain weight quickly (Silvestre *et al.,* 2013).

1.1 Problem Definition

There is a dearth of information and contradictory reports on broilers showing the effects of day old body weight on growth performance and body linear measurements. Differences in reports may be due to strains or breed effects. A study that relates the effect of day old weight of broilers on subsequent growth performance will therefore help hatchery operations and farmers to predict flock performance of their farms.

1.2 Aim and Objective

The aim of the study is to evaluate the effects of day old broiler (Ross 308) body weight on their subsequent growth performance and body linear measurements. The specific objectives of the study are to evaluate:

1. The effect of body weight of group at day old on subsequent growth to 8weeks of age.

2. The correlation between day old body weight and body weight to 8 weeks,

3. The correlation between 8 weeks body weight and body linear measurements at 8th week.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Origin and distribution of chicken

The chicken (*Gallus gallus domesticus*) is a type of domesticated fowl, a subspecies of the red junglefowl. It is one of the most common and widespread domestic animals, with a total population of more than 19 billion as of 2011. There are more chickens in the world than any other bird or domesticated fowl. The Food and Agriculture Organization, (2011) stated that humans keep chickens primarily as a source of food (consuming both their meat and eggs) and, less commonly, as pets. According to Perry-Gal *et al.* (2015), chickens were originally raised for cockfighting or for special ceremonies and chickens were not kept for food until the Hellenistic period (4th–2nd centuries BC).Genetic studies have pointed to multiple maternal origins in Southeast Asia, East Asia, (Xiang *et al.*, 2014) and South Asia, but with the clade found in the Americas, Europe, the Middle East and Africa originating in the Indian subcontinent. From ancient India, the domesticated chicken spread to Lydia in western Asia Minor, and to Greece by the 5th century BC (Maguelonne, 2009). Fowl had been known in Egypt since the mid-15th century BC, with the "bird that gives birth every day" having come to Egypt from the land between Syria and Shinar, Babylonia, according to the annals of Thutmose III.

2.1.1 Broilers

A broiler (*Gallus gallus domesticus*) is any chicken that is bred and raised specifically for meat production. (Kruchten, 2002). Many typical broilers have white feathers and yellowish skin. Most commercial broilers reach slaughter-weight between four and seven weeks of age (Bessei, 2006), although slower growing breeds reach slaughter-weight at approximately 14 weeks of age because the meat broilers are this young at slaughter (roughly 500 g), their behaviour and physiology are that of an immature bird. Due to extensive breeding selection for rapid early growth and the husbandry used to sustain this, broilers are susceptible to several welfare concerns, particularly skeletal malformation and dysfunction, skin and eye lesions, and congestive heart conditions. Management of ventilation, housing, stocking density and in-house procedures must be evaluated regularly to support good welfare of the flock. The breeding stock (broiler-breeders) grow to maturity and beyond but also have welfare issues related to the frustration of a high feeding motivation and beak trimming. Broilers are usually grown as mixed-sex flocks in large sheds under intensive conditions.

2.2 Taxonomy

Conservation Status

Domesticated

Scientific Classification

Kingdom: *Animalia*

Phylum: *Chordata*

Class: Aves

Order: *Galliformes*

Family: *Phasianidae*

Genus: *Gallus*

Species: *G. gallus*

Subspecies: *G. g. domesticus*

Trinomial Name

Gallus gallus domesticus

(Linnaeus, 1758)

2.3 Feeders and drinkers space

Feeding and watering space is very important to achieve good uniformity of the broiler flock. Birds should have enough space to eat and drink comfortably in order to attain the required body weight in order to increase its productivity. Hudsonet et al., (2001) stated that when feeder and water space were unavailable, the uniformity would be less.

Yeboah (1998) stated that if the feeding and water space were inadequate, birds would have to struggle for feed and water. The stronger ones would always out compete the weaker ones who will remain usually underweight and therefore, vulnerable to disease and pests.

2.4 Vaccination and Disease control

Yeboah, (1998) stated that a vaccination programme can be stressful to birds and affects their growth. Both the programme used and procedure are important to ensure that vaccination is beneficial and not harmful to birds. Gassiem, (1998) stated that Diseases and pests can have a serious effect on the growth rate of any flock. Disease and pests can affect the uniformity of the flock. It is therefore, essential to monitor the health of the birds to ensure that they are free of diseases, internal and external parasites. All infections should be promptly treated. Oderkirk, (1999) showed that early exposure to disease elements usually has the worst lasting effect on uniformity of the flock.

2.5 Ventilation

Oderkirk (1999) showed that proper air movement during holding and transport allows for fresh air to birds at all times. Since chicks are releasing carbon dioxide and live right on the litter, where gases like ammonia are being released from their droppings, the need for air exchange increases as the birds grow.

Yeboah, (1998) showed that using natural or artificial ventilation, it is important that free flow of fresh air and removal of gases are ensured. When this isnot done, appetite and health are adversely affected.

2.6 Feeding Programme

The only accurate way to feed broilers is in accordance with their energy requirements. Requirements are based on maintenance needs, desired growth rate, ambient temperature, egg production rate and equipment among other factors (Costa, 1980). Overfeeding results in broilers obesity, which is associated with poorer production.

2.7 Growth Performance and Linear Measurement of Broiler Chickens

The expansion and improvement of the Nigerian poultry industry has been one of the major focuses of the federal government in order to improve the animal protein consumption of her citizenry (CBN, 2004). As a result, the Nigerian poultry industry has over the years been flooded with different exotic broiler strains. Ude *et al.* (2015) observed that many strains of broilers have been imported into Nigeria. The performance of these birds is affected by their genotype as well as the rearing environment. Genotype and environment interaction may cause loss of fitness traits for those strains that are not suited in a particular environment. Thus, broiler producers' needs to select those strains that are best suited in a particular environment for rearing.

Yahaya *et al.* (2012) noted that apart from strain, body weight and conformation traits such as breast width, keel length, shank length, thigh length etc. are known to be good estimators of body growth and market value of broilers. Edward, (2000) reported that selection programmes is mainly focused on these economic traits. In corroboration, Owojori *et al.* (2011) reported that studies on conformation traits had found application in selection and breeding. Amao *et al.* (2012) also stated that animal linear body measurements had been used to predict live gain, examine relationship among economic characteristics, reproduction, and performance and to study the relationship between heredity and environment. There are also evidences that there are differences in body weight among strains of broilers (Leeson *et al.*, 1997; Musa *et al.*, 2006). Razuki *et al.* (2011) reported significant strain differences in body weight and linear body traits at various ages among broiler chickens. Ojedapo, (2013) wrote about the body weight and other linear parameters of broilers. He said in Nigeria, poultry contributes significantly to the animal protein supply of the populace. The poultry population was put at 114.3 million comprising of 82.4 million chickens (11% of which was commercially raised) and 31.9 million other poultry which include pigeons, ducks, guinea fowls and turkeys (RIM, 1992).

In the past, broilers were mainly sold whole but now many customers demand for chicken parts to reduce burden on family finances (Olawumi, 2013). According to Ewart, (1993), there was a dramatic increase in the proportion of birds being grown for portioning and that this is the situation in all countries where broilers are raised for human consumption. It then implies that producers' needs strains of broilers with fast growth rate and more meat yield for maximum economic returns in their peculiar environment. The aim of this study was to evaluate growth performance, body conformation, carcass characteristics of broilers (Arbor Acre and Anak) in a humid tropical environment of Nigeria.

Chicken production is increasing due to increased product output per animal, high feed conversion efficiency, improved fertility, hatchability, growth rate, egg yield and meat quality. Poultry keeping requires less land, and most of the poultry species are more prolific than other species of livestock. Poultry breeders have tried to establish the relationships that exist between body weight and physical characteristics (body conformation) such as body length, shank length, thigh length, breast girth and keel length as this information reflects on the feed efficiency as well as performance of the broilers birds. Interrelationships among body measurements can be applied speedily in selection and breeding. Besides, this will help the breeders to organize the breeding program in order to achieve an optimum combination for maximum economic return (Okon *et al.*, 1997). Breeders of meat-type chicken have become interested in adult body weight; the trend being towards a big-bodied chicken at early age in order to attract better price at marketing (Malik *et al.*, 1997). Body weight is regarded as a function of frame work or size of the animal and its condition. An increase in body weight is highly correlated with feed consumption when selecting for rapid growth under ad-libitum feeding, indicating that more energy is available for growth over the maintenance requirement of chickens.

The live body weight of any animal is an important variable that determines the market value of that animal. The exact time at which the animal is ready for slaughter can be accessed on the basis of its body weight and general development (Akanno and Ibe, 2006). Body weights are shown to be influenced by maternal effect or dominance effects or both, up to maturity as indicated by consistently higher heritability estimates from dam variance components as opposed to those from sire components. Adeyinka *et al.* (2004) reported moderate heritability for body weights for naked neck broilers at various ages, but observed high heritability estimates for body weight at 56 days of age and finally suggested that selection for body weight at this age will improve body weight in subsequent generations. It was observed that heritability for body weight of broilers tends to increase in age. Selection is usually based on breeding values, and this value for a trait can be measured more than once in an animal's life time. Repeatability is the correlation between two or more measurements on each individual in a given population. It is of great importance in the profitability of the poultry industry. The magnitude of a repeatability estimate gives an indication of the extent to which selection applied at any stage will affect subsequent flock performance (Ibe, 1995).

In addition, strain and sex effects on carcass traits had been reported in literature (Jaturasitha *et al.*, 2008; Zhao *et al.*, 2009). In fowls, Ige *et al.* (2007) reported positive phenotypic correlation between body weight and linear measurements, while Razuki *et al.* (2011) reported significant strain differences in body weight at different ages among breeds of broiler chickens. As regards relationship between body weight and carcass traits, Musa *et al.* (2006) reported significant positive phenotypic correlation between live weight and carcass weight, breast muscle weight and abdominal fat weight. Studies on chicken meat qualities by Musa *et al.* (2006) revealed that colour density was positively related with pH, tenderness and water holding capacity of the meat. However, the effect of day-old weight on juvenile growth rate and carcass performance of broilers at market age varied among different studies. Some researchers have found that day-old chick weight affects performance of broiler chicks to market age (Al-Murrani, 1978; Whiting and Pesti, 1984; Mafeni *et al.*, 1986), while other studies have shown that, for broiler, the advantage of initially higher chick weight diminishes rapidly during early growth period and has little influence on economic traits at market time (Morris *et al.*, 1968; Pinchasov, 1991). Information on whether and how day-old chick weight affects post-hatch growth in quality chicken is lacking.

2.8 Factors affecting growth performance in broilers (poor body weight)

2.8.1 Environmental factors

a. **Temperature Extremes**: When there are temperature variances during the brooding period, the growth of the chicks will be negatively affected resulting in poor growth and poor flock uniformity. In very hot weather, birds eat less and target weights will not be attained.

b. High ammonia levels as well as dusty, poorly ventilated houses will also affect body weight gain.

1. **Disease control**
   - a. Correct clean-out procedures and a rest period of at least 14 days for your chicken house will have a very positive impact on final broiler performance.
   - b. Erosive diseases such as Reovirus, infectious bursal disease (Gumboro), sub-clinical Newcastle disease and infectious bronchitis will all impact negatively on the growth patterns of broilers.
   - c. Coccidiosis control is always essential and be aware of the impact of sub-clinical coccidiosis.
   - d. Excessive applications of vaccines, especially the vaccines against respiratory disease like Newcastle disease, can affect performance. Care must be taken to ensure that there is sufficient protection against disease challenges, without over-vaccinating.
   - e. Infectious coryza (Cold or roup) is always a problem as the affected chickens stop eating for a few days.
   - f. Always discuss your health control programme with a poultry veterinarian.

2. **Feed and stocking density**
   - a. **Feed Quality and Availability**: Here, the concern is the increase in mycotoxins being seen worldwide. It is also vital that your feed contains the correct levels of nutrients required by the broilers for optimum growth.
   - b. **Stocking Density:** Make sure that the number of drinkers and feeders are sufficient to supply feed and water to the broilers, and that access is not impeded by incorrect height adjustments of the equipment

3. **Management**

   a. New findings indicate that using at least a 6 to 8 hour period of darkness after the end of the first week is an overall benefit in broiler health status, which will outweigh the possible slightly lowered body weight gains. In fact, most growers have found that there's been no negative effect on the growth rate and there has certainly been a positive impact on the reduction in the incidence of Ascites (water belly) and heart attacks (flips).

   b. Basic attention to detail remains a vital part of broiler production. Make sure that, during the period of darkness, good management practices continue.

   c. The broiler grower should strive to ensure a stress-free environment for the chicks and provide the nutrients required for optimal growth.

   d. The broilers' genetic make-up will respond and the final body weight targets set by the breeds will be attained if all the negative factors are removed.

2.9 Stocking density and enzymatic growth promoters on broiler performance

Relatively great number of studies are focused on the effect of stocking density in broiler production and were primarily motivated by its great economic importance, also factor of carcass quality (Edriss *et al.,* 2003; Yadgari *et al.,* 2006) and in recent period, as factor of poultry welfare (Weeks *et al.,* 2000; Thomas *et al.,* 2004; Skrbic *et al.,* 2009). Numerous studies have demonstrated that increasing placement density (of broiler chickens approximating 2.4 to 2.7 kg) adversely affects growth performance, carcass yield, and skin scratches and tears (Feddes *et al.,* 2002). The higher stocking densities caused stress on the birds compared with the lower stocking densities. Moreover, high stocking density has been reported to increase ammonia production, footpad lesions, litter moisture, locomotion, heat stress, and preening (Ritz *et al., 2005;* Bennett *et al.,* 2003).

However, high stocking densities reduce the fixed costs of production and produce more kilograms of broiler per area. Therefore, up to a critical point, profitability increases with increased stocking density (Puron *et al.,* 1995). The effects of group size and density on social behavior and move within available space have received much attention (Estevez, *2007;* Leone *et al.,* 2010) few studies investigate their impact on broiler performance under feed additive feeding. An alternative to intensify poultry production is the use of enzymes or probiotics as feed additives to improve broilers performance in environmentally controlled houses. According to European legislation, using of all Antibiotic Growth Promoters (AGP) are forbidden in feed. During the past few years, numerous trials have been conducted to compare the incorporation of mannan-oligosaccharides and direct fed microbials in the diets, versus conventional AGP (Markovic *et al.,* 2009). The addition of commercial enzyme products to broiler diets generally results in a significant improvement in performance and a reduction in intestinal viscosity by break down of soluble of non-starch polysaccharides (Khan *et al.,* 2006).

Moreover, the use of appropriate feed enzymes offers an opportunity to overcome some of the potential limitations imposed by exclusive vegetable protein-based diets including lower digestibility of protein and starches (Mushtaq *et al.,* 2009). The effect of feed multi enzyme has been reported to improve in vitro digestibility of starch and acid soluble nitrogen fraction of autoclaved high fibre (Kocher *et al.,* 2000). Broiler feed formulation based on ideal protein concept may be a better option than based on CP or total Amino Acid (AA). Most non-soy vegetable protein sources used in poultry diet formulations are moderate to low in lysine contents; hence supplementation with lysine is inevitable in growing broilers to ensure rapid growth and optimum efficiency of feed utilization (Corzo *et al.,* 2006; Ahmad *et al.,* 2007). It was necessary to throw some more light on these enzymes supplemented to plant diet with different densities concerning their effects on broiler performance and carcass yield. So, this study examined the effects of various stocking densities on birds fed on diet supplemented with enzymatic growth promoters or without to evaluate growth performance and carcass yields of broilers.

2.10 The effect of grouping one-day-old chicks by body weight on the uniformity of broilers

According to Roberto *et al.* (2013), the effect of the grouping of 1-day-old chicks according to initial body weight on the subsequent homogeneity and distribution of the weight of the broilers at harvest was evaluated. Two treatments were tested: in one treatment (random), the chicks' placement was at random and not grouped by initial weight; in the other treatment (homogeneous groups), the chicks were grouped according to their initial weight. Despite the difference in placement, the distributions of the weight data for the 2 groups did not differ between 21 or 42 d of age. Based on these results, the grouping of chicks by weight does not produce more uniform broilers at the end of the production period.

The average weight and homogeneity in weight of a group of broilers are important parameters in poultry production (Dalanezi *et al.*, 2005; Molenaar *et al.*, 2008). Uniform groups with adequate weights present several management advantages (Dalanezi *et al.*, 2005). Poultry are handled in large groups and can be simultaneously exposed to changes in management like lighting, feeding, and environment (Molenaar *et al.*, 2008), more effective overall performance is obtained, and (Kosba *et al.* 2010) the birds achieve a level of performance that approaches their maximum genetic potential (Kosba *et al.*, 2010). The emphasis on broiler uniformity has frequently been dictated by the last step in the production line: the processing facility. Automation used for processing requires a uniform carcass size to meet the standards for the quality of the poultry received by the processing unit (Griffin *et al.*, 2005). Often, the quality of the management procedures used by the producer affects the uniformity obtained in a flock. Indeed, the homogeneity of harvest weight may be strongly influenced by events occurring during the production period (Judice *at al.*, 199) because increases in uniformity during the production period are unlikely, several authors view the uniformity of chicks at placement as a key prerequisite for obtaining a uniform final product (Rocha *et al.*, 2008).

At placement, the weight of the chicks is an economically important feature because every 1g increase in the initial weight results in a 7 to 13 g increase in the harvest weight of the broilers (Wilson, 1991). In contrast, several researchers have shown that improvements in the uniformity of chicks or segregation by initial weight, especially in chicks from small eggs or young flocks, may reduce the degree of competition. This results in decreasing the level of mortality and increasing the homogeneity of the weight of the broilers entering the processing unit (Joseph *et al.*, 1973; Hearn *et al.*, 1993). Chick flocks that lack sufficient uniformity cannot be properly managed. This situation results in lower growth, increased feed intake, and higher mortality during the first weeks (Van-der-Ven, 2005). Based on studies with several broiler flocks, the CV of individual body weight from a single flock of breeder hens may vary between 7.5 and 10.7%, with an average of approximately 9.25%. Accordingly, the 95% CI of the CV would include values from 8.5 to 10% (Wilson and Suarez, 1993; Bondarenko, 1989; Shalev and Pasternak, 1995). In addition, based on a survey, broiler flocks with higher values of the CV (reduced uniformity) experienced higher mortality rates. This measure of dispersion can indicate the zoo technical quality of the chicks; a lower CV corresponds to higher chick quality (Le Turdu *et al.,* 1984). The purpose of the present study was to assess the effect of the grouping of chicks by initial weight on the subsequent homogeneity and distribution of weight of the broilers.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Housing and study location of experiment

The study was carried out at the Teaching and Research Farm of the Department of Animal Production and Health, Faculty of Agriculture, Federal University Oye-Ekiti, Ikole Campus, Ekiti State, Nigeria. The location is situated at Latitude of 7.7982661^{0}N and longitude 5.514493^{0}E. It has an average temperature of 24.2^{0}C and experience a warm humid tropical climate. The animal housing comprise of an open sided wall house with asbestos roofing.

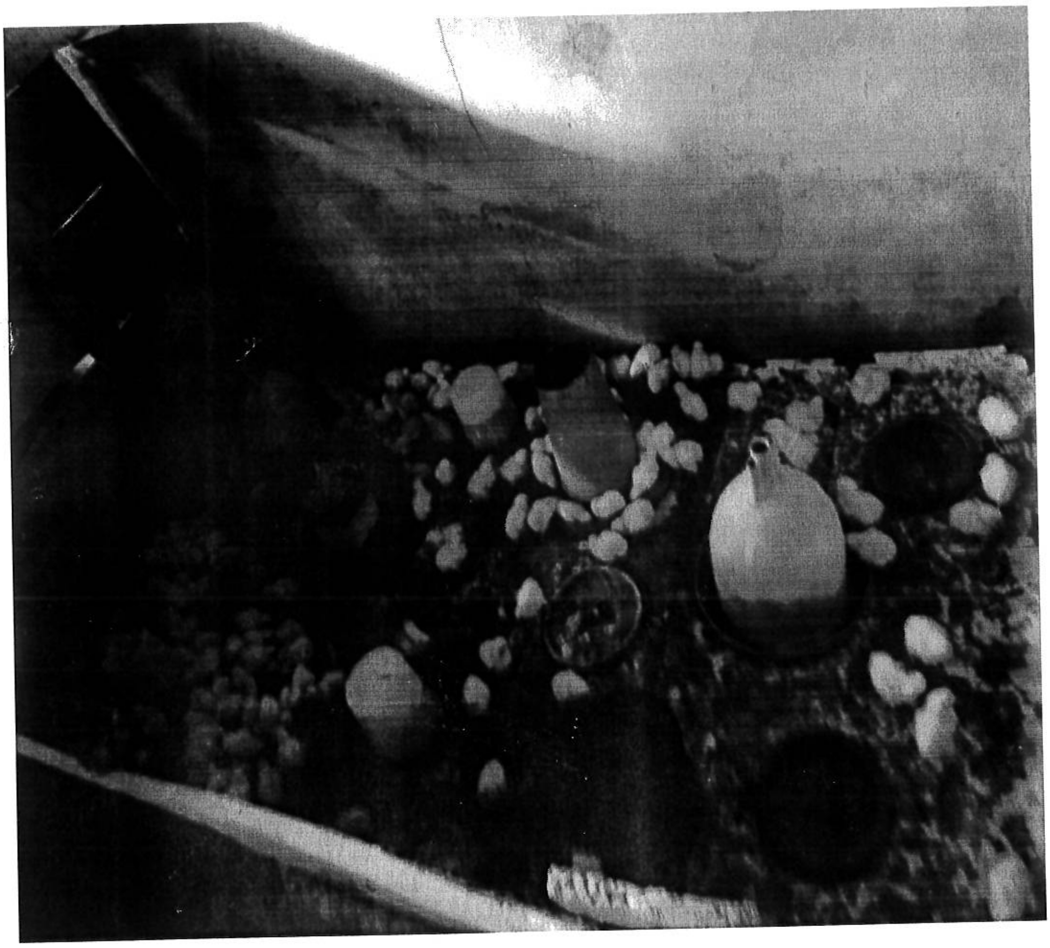
3.2 Experimental birds and management

A total number of 126 broiler day-old chicks of Ross 308 were purchased from a farm in Ibadan, Nigeria .The experiment was carried out at the Poultry Research Unit of the Department of Animal Production and Health, Federal University, Oye-Ekiti, Ikole Campus. Preparation for the chick's arrival was done on the experimental site. All necessary things were done including clearing the cobwebs, fixing the worn out nets and making the farm house suitable for brooding chicks by covering all the available space which would allow the escape of heat. Farm house was washed with disinfectant (Izal) before arrival of the chicks.

The chicks were raised on deep litter for 56 days (8 weeks). The chicks were tagged on the first day of their arrival. Tagging was done on their left wing. The chicks were weighed using a digital scale and the chicks were assigned to 3 treatments according to their weight. The chicks were brooded using coal pot and kerosene stove to supply heat for the first three weeks of life. Vaccines against Infectious Bursal (using Attenuated Infectious Bursal Disease Vaccine) were given on the second and fourth week of life respectively. Vaccine against Newcastle disease using (Lasota Vaccine) was given on the third week of life. All vaccines were administered orally.

Their beddings were made up of dry wood shavings to prevent coccidiosis outbreak, and high level of hygiene was maintained by changing their beddings every two weeks throughout the experimental period to ensure unhindered conducive environment for growth. Wet portion of the bedding were changed immediately it was noticed. The birds were fed with a commercial broiler starter and broiler finisher feed (VITAL FEEDS), purchased within Ikole-Ekiti metropolis. The feed is a Maize-Soybean based diet containing premix, essential Amino acid, salt, antioxidant, antibiotics, prebiotics, and enzyme as indicated on the product label.

The birds were fed *ad libitum* with pelletized broiler starter feed (1- 4weeks) containing 3000Kcal/Kg (Min.) of Metabolisable Energy, 18%CP and finisher feed (4-8weeks) containing 3100Kcal/Kg(Min.) 0f Metabolisable Energy, 16%CP. There was availability of adequate water.



This figure shows the chicks were brooded with charcoal pot, kerosene stove and lantern

Table 1: Feed composition of the experimental diet

Components	Pelletized broiler starter	Pelletized broiler finishers
Crude Protein	22%	19%
Crude Fiber	5%	8% (max)
Calcium	1.2	0.85%
Available Phosphorus	0.50	0.42%
Metabolisable Energy	3100Kcal/Kg	3225Kcal/Kg

3.3 Data Collection

Data were collected every week from all birds. The birds were weighed to get their live body weight using a sensitive scale (Camry Electronic kitchen scale; Model: EK5350) with 1g gradation which were expressed in grams and kilograms. The body linear parts of the chicken (wing length, shank length, drum sticks length, leg length) were measured on the 7th and 8th weeks of age using a tape rule and were expressed in centimeter.

3.4 Experimental design

The experimental design used is "Completely Randomized Design" using a total of 126 tagged broilers chicks (Ross 308). They were assigned to three (3) experimental units according to their body weight (i.e. 39grams and below, between 40-42grams and 43grams and above).

3.5 Data analysis

All data collected were subjected to the analysis of variance (ANOVA) using the General Linear Model (GLM) of SAS (SAS 2008) and means were separated using Duncan's Multiple Range Test. From the result of individual body weights of the chicks from day old to 8 weeks, data was analyzed to compare: (i) the effect of body weight of group at day old on subsequent growth to 8weeks of age (ii) the correlation between day old body weight and body weight at 8 weeks (iii) the correlation between 8 weeks body weight and body linear measurements at 8th week of age.

CHAPTER 4

4.0 RESULT

4.1 Effect of group body weight of chicks at day-old on body weight gain to eight weeks

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Table 4.1 shows the effect of body weight of group at day old on growth to 8weeks of age. At day-old, there was significant difference between the average body weight of the chicks, with group 1 having the lowest average weight, followed by group 2 and group 3 respectively. The difference in the average body weight was still showing in all the groups till 3 weeks of age. At week 4, there was no significant difference between group 1 and group 2 but the two groups were significantly lower in weight than group 3. This trend was observed till week 8, whereby chicks in group 1 and group 2 were not showing significant difference in their average body weight. At week 5 and week 6, there was a significant difference between group 2 and group 3, but the significant difference in weight continued from week 7 and week 8.

Table 4.1. Effect of day-old weight on weekly body weight of broilers

VARIABLES	GROUP1	GROUP2	GROUP3	SEM	LOS
BWT0	38.22^{c}	40.90^{b}	44.12^{a}	0.12	***
BWT1	87.96^{c}	95.25^{b}	104.63^{a}	0.93	***
BWT2	173.18^{c}	190.70^{b}	217.55^{a}	3.22	***
BWT3	321.57^{c}	360.65^{b}	407.18^{a}	6.92	***
BWT4	470.09^{b}	503.64^{b}	563.16^{a}	10.05	**
BWT5	638.13^{b}	698.53^{ab}	768.27^{a}	14.49	**
BWT6	877.52^{b}	940.74^{ab}	1020.94^{a}	20.50	*
BWT7	1103.95^{b}	1142.33^{b}	1301.79^{a}	4.80	**
BWT8	1236.41^{b}	1316.23^{b}	1478.36^{a}	29.72	**

SEM = Standard error of mean; LOS = Level of significance;

abc = means with different superscript in the same row are significantly different

* = Significant at $p \leq 0.05$;

** = Very Significant at $p \leq 0.01$;

*** = Highly Significant at $p \leq 0.001$;

4.2 The Correlation between Body Weight and Body Linear Measurements at 8weeks

Correlation between body weight and body linear measurement of the three groups are shown in Table 4.2., 4.3., and 4.4. , while the correlation for all the three groups is shown in 4.5. The tables show that relationship exists between body weight and body linear measurement establishing the fact that an increase in body weight could lead to an increase in some body linear measurements. There relationships between the three body weight groups were mostly positive and ranged from low to high.

In Table 4.2.2, the correlation in the low group showed that only the LEG_LT was significantly correlated to BWT8, DS_LT, and SH_LT However, the correlation between SH_LT and other linear parameters were not significant. In table 4.3.1, in the middle body weight group, all body linear parameters were significantly correlated to body weight at 8th week. (i.e. WG_LT and DS_LT were significantly correlated to BW8 ($p \leq 0.05$). SH_LT and LEG_LT were also significantly correlated to BW8 ($p \leq 0.001$).

In table 4.4.1, in the highest body weight group, all linear parameters were highly significant ($p \leq 0.001$) to BW8 except for SH_LT which was just significant ($p \leq 0.05$).

In Table 4.5.1, regardless of the grouping, all body linear parameters were significantly correlated ($P \leq 0.01$, $P \leq 0.001$) to BW8 except for SH_LT (shank length)

Table 4.2.1 Summary statistics for group 1 (below 39g)

Variable	N	Mean ± Std Dev	Minimum	Maximum
BWT8	22	1236.00±230.18	704.00	1782.00
WG_LT	22	17.07 ± 0.91	15.80	18.80
DS_LT	22	14.35 ± 1.26	11.00	16.00
SH_LT	22	14.18 ± 0.97	13.00	17.00
LEG_LT	22	28.53 ±1.77	26.00	33.00

WG_LT= wing length; DS_LT= drums stick length; DS_LT= drum stick length; SH_LT= shank length; LEG_LT= leg length

Table 4.2.2 Correlation between eight week body weight and body linear measurements for group 1 (39g and below)

	BWT8	WG_LT	DS_LT	SH_LT	LEG_LT
BWT8	-	0.39^{NS}	0.37^{NS}	0.39^{NS}	0.47*
WG_LT		-	0.34^{NS}	-0.03^{NS}	0.23^{NS}
DS_LT			-	0.25^{NS}	0.85***
SH_LT				-	0.72***
LEG_LT					-

NS= Not significant * = Significant at $p \leq 0.05$ ** = Very Significant at $p \leq 0.01$

*** = Highly Significant at $p \leq 0.001$

Table 4.3 Summary statistics for group 2 (between 40-42g)

Variable	N	Mean ± Std Dev	Minimum	Maximum
BWT8	40	1316.00±234.99	769.00	1768.00
WG_LT	40	17.29250±1.09	15.20	20.00
DS_LT	40	14.26750±1.19	11.00	16.50
SH_LT	40	14.27000±0.92	12.80	16.50
LEG_LT	40	28.04±2.89	15.80	31.500

WG_LT= wing length; DS_LT= drums stick length; DS_LT= drum stick length; SH_LT= shank length; LEG_LT= leg length

Table 4.3.1 Correlation table for group 2 (between 40-42g)

	BWT8	WG_LT	DS_LT	SH_LT	LEG_LT
BWT8	-	0.46*	0.44*	0.62***	0.53***
WG_LT		-	0.22^{NS}	0.59***	0.24^{NS}
DS_LT			-	0.15^{NS}	0.49***
SH_LT				-	0.49***
LEG_LT					-

NS= Not significant * = Significant at p≤ 0.05 ** = Very Significant at p≤ 0.01

*** = Highly Significant at at p≤ 0.001

Table 4.4 summary statistics for group 3 (above 43g)

Variable	N	Mean ±Std Dev	Minimum	Maximum
BWT8	34	1471 .00± 369.83	936.00	2419.00
WG_LT	34	17.80±1.25	15.50	20.10
DS_LT	34	14.58±1.49	11.00	18.00
SH_LT	34	14.35±1.87	5.00	16.00
LEG_LT	34	29.37±2.00	26.00	34.00

WG_LT= wing length; DS_LT= drums stick length; DS_LT= drum stick length; SH_LT= shank length; LEG_LT= leg length

Table 4.4.1: Correlation table for group 3 (above 43g)

	BWT8	WG_LT	DS_LT	SH_LT	LEG_LT
BWT8	-	0.56***	0.67***	0.33*	0.61***
WG_LT		-	0.52***	0.24^{NS}	0.59***
DS_LT			-	0.016^{NS}	0.75***
SH_LT				-	0.23^{NS}
LEG_LT					-

NS= Not significant * = Significant at p≤ 0.05 ** = Very Significant at p≤ 0.01
*** = Highly Significant at at p≤ 0.001

Table 4.5 Summary statistics for Body weight and linear measurement at eight week for all groups

Variable	N	Mean±Std Dev	Minimum	Maximum
BWT8	97	1353.00 ±299.50	704.00	2419.00
WG_LT	97	17.43±1.14	15.20	20.10
DS_LT	97	14.40±1.31	11.00	18.00
SH_LT	97	14.28±1.32	5.00	17.00
LEG_LT	97	28.63±2.41	15.80	34.00

WG_LT= wing length; DS_LT= drums stick length; DS_LT= drum stick length; SH_LT= shank length; LEG_LT= leg length

Table 4.5.1: Correlation table for all the groups

	BWT8	WG_LT	DS_LT	SH_LT	LEG_LT
BWT8	-	0.53***	0.54***	0.39***	0.54***
WG_LT		-	0.39***	0.29**	0.38***
DS_LT			-	0.08^{NS}	0.62***
SH_LT				-	0.36***
LEG_LT					-

NS= Not significant * = Significant at p≤ 0.05 ** = Very Significant at p≤ 0.01
*** = Highly Significant at at p≤ 0.001

CHAPTER 5

5.0 DISCUSSION

5.1 Effect of Day Old Body Weight on Growth Performance on Ross 308 Broilers

In this present study, it was realized that there were significantly difference ($P \leq 0.05$) in the body weight group at day old and even on subsequent growth. This result is supported by Petek *et al.,* (2010). It was reported that the body weight of day-old chicks in small, middle and large length groups were significantly different ($P \leq 0.001$). The final body weight parameter exhibited significant difference for chick length groups ($P \leq 0.001$). Results obtained in this study is in accordance with the result obtained by Monika *et al.,* (2011). It was observed that the body weight of Ross 308 broilers at zero weeks was significantly different ($P \leq 0.01$ and $P \leq 0.05$) and during the successive weeks of rearing (1, 2, 3 and 4 weeks) significant difference were obtained between all groups of chickens. There was also significant difference ($P \leq 0.05$) on the 5th week of life but only between group 1 and group 3. On the 6^{th} week of life, differences in body weight of the birds were not significantly different

Patbandha *et al* (2017), also reported that there was significant difference in body weight at day1 in low, medium and high groups among the groups of day old chicks ($P \leq 0.05$). Body weight significantly increased on the 8^{th} day and 15^{th} day in those chickens with high initial body weight as compared to low weight group ($P \leq 0.05$). However, on subsequent growth, statistically, they were not significantly different, though the body weight of chicken remained higher numerically in high weight group. Day old chicks with medium weight increased in live weight on day 8 as compared to low weight group ($P \leq 0.05$). Initial chick length though significantly ($P \leq 0.05$) affected the body weight of chickens, the effect gradually diminished towards market age. Chicks with high initial body length had significantly ($P \leq 0.05$) more live weight throughout the study period as compared to other two groups (small and medium groups), but chicks with medium length group had higher body weight on day 8 only as compared to those with low body length. Chicks with high initial body length gained more live weight up to market age as compared to low to medium length groups ($P \leq 0.05$). Medium length group chicks had 8.39g higher live weight on day 8 than the low length group ($P \leq 0.05$).

5.2 The Correlation between Body Weight and Body Linear Measurements at 8weeks

In this study, the mean final body weight of chicks from large weight group was significantly higher than the other groups. Similarly, middle chicks group birds showed higher mean body weight value than those of belonging to small body weight. These results were found similar to the finding of Molenear *et al.* (2007) who reported that a positive correlation between chick weight at day 0 and chick weight at later stage. And also, these results are concurrent with the findings of Msoffe *et al.* (2001) who reported a positive correlation between day old body length and adult body weight. The correlations obtained in this study were higher than those obtained by Adeyinka et al. (2006) using Anak strain. This may be attributed to strain differences.

CHAPTER 6

6.0 CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

According to the results of this study, there was significant difference in the mean of the group from the start of the experiment until the fourth week. Starting from the fourth week of the experiment until the final week of the experiment, the lowest weight group and the medium weight group were not showing significant difference. Also, the medium body weight group met up with the highest body weight group on the fifth and sixth week but the large group maintained its position as the group with the highest body weight. The relationships between body weight and the body linear measurements when combined were all positive.

6.2 Recommendations

Research should be continued in this field to reveal more information about the effect of day old body weight on growth performance and body linear measurements on broilers using different strains and breeds. In addition, sorting chicks by weight after hatching may improve growth performance.

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