

Management system and performance of Yoruba and Fulani ecotype chickens in Ogbomoso North Local Government Area

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Abstract

This study evaluated the management practices, production constraints, and growth performance of two Nigerian indigenous chicken ecotypes, the Fulani Ecotype (FE) and Yoruba Ecotype (YE), in Ogbomoso North Local Government Area. Data were collected from 49 poultry farmers using structured questionnaires and direct observations, while growth performance was assessed from the first to the sixth week of age through body weight and morphometric measurements. Descriptive statistics were used to characterize production systems and management practices, and growth traits were compared between ecotypes. Most farmers reared chickens primarily for meat production (84%) under traditional management systems, relying mainly on natural mating and home-formulated feeds. Disease prevalence was identified as the major production constraint, followed by inadequate farmer training and limited access to credit facilities. Growth evaluation revealed significant differences ($p < 0.05$) between the ecotypes. FE chickens consistently exhibited greater body weight, body length, chest girth, and thigh length than YE chickens throughout most of the experimental period. At six weeks of age, FE birds reached a mean body weight of 269.85 g, compared with 225.30 g in YE birds, whereas YE chickens showed relatively greater wing length at specific growth stages. Overall, indigenous chicken production in the study area remains predominantly traditional and is limited by health, technical, and financial challenges. The superior growth performance of the Fulani Ecotype highlights its potential as a valuable genetic resource for meat production and breeding programmes aimed at improving indigenous chicken productivity.

Keywords: management, system, performance, Yoruba ecotype, Fulani ecotype, Ogbomoso.

Sistema de manejo e desempenho de galinhas dos ecótipos Yoruba e Fulani na Área de Governo Local do Norte de Ogbomoso

Resumo

Este estudo avaliou as práticas de manejo, as limitações da produção e o desempenho de crescimento de dois ecótipos de galinhas indígenas da Nigéria, o Ecótipo Fulani (FE) e o Ecótipo Yoruba (YE), na Área de Governo Local do Norte de Ogbomoso. Os dados foram coletados junto a 49 avicultores por meio de questionários estruturados e observações diretas, enquanto o desempenho de crescimento foi avaliado da primeira à sexta semana de idade por meio de mensurações do peso corporal e de características morfológicas. Estatísticas descritivas foram utilizadas para caracterizar os sistemas de produção e as práticas de manejo, e as características de crescimento foram comparadas entre os ecótipos. A maioria dos produtores criava galinhas principalmente para produção de carne (84%), sob sistemas tradicionais de manejo, utilizando predominantemente acasalamento natural e rações formuladas na própria propriedade. A ocorrência de doenças foi identificada como a principal

limitação da produção, seguida pela insuficiência de capacitação dos produtores e pelo acesso restrito ao crédito. A avaliação do crescimento revelou diferenças significativas ($p < 0,05$) entre os ecótipos. As aves do Ecótipo Fulani apresentaram, de forma consistente, maior peso corporal, maior comprimento corporal, maior perímetro torácico e maior comprimento da coxa em comparação às aves do Ecótipo Yoruba durante a maior parte do período experimental. Na sexta semana de idade, as aves FE atingiram peso corporal médio de 269,85 g, enquanto as aves YE apresentaram 225,30 g. Em contrapartida, as aves do Ecótipo Yoruba apresentaram comprimento de asa relativamente maior em determinados estágios de crescimento. De modo geral, a produção de galinhas indígenas na área de estudo permanece predominantemente tradicional e é limitada por desafios sanitários, técnicos e financeiros. O desempenho superior de crescimento do Ecótipo Fulani destaca seu potencial como um valioso recurso genético para a produção de carne e para programas de melhoramento genético voltados ao aumento da produtividade de galinhas indígenas.

Palavras-chave: manejo, sistema de produção, desempenho, ecótipo Yoruba, ecótipo Fulani, Ogbomoso.

1. Introduction

Poultry production remains one of the fastest-growing agricultural subsectors globally, and Nigeria is no exception (FAO, 2020). In Nigeria, poultry farming plays a pivotal role in food security and household income generation, especially in rural communities where indigenous chickens are an integral part of smallholder farming systems (Oluwafemi and Adeola, 2021). Recent estimates indicate that over 60% of the poultry population in Nigeria is made up of indigenous chickens, which are kept by rural households primarily under extensive free-range systems (Ajayi; Ologunagba, 2020).

The economic and nutritional importance of poultry cannot be overemphasized. Poultry meat and eggs provide affordable sources of high-quality animal protein for millions of Nigerians. Poultry farming creates employment opportunities along the value chain from smallholder farmers and feed millers to traders, processors, and input suppliers (Adene and Oguntade, 2020). Indigenous chickens, in particular, contribute significantly to household nutrition, cultural obligations, and income diversification in rural areas (Abdul-Rahman et al., 2022).

Among the various types of poultry in Nigeria, indigenous chickens have attracted growing interest from researchers and policymakers due to their adaptability to harsh environments, low input requirements, and potential for genetic conservation (Adedokun et al., 2021). Two notable local ecotypes are the Yoruba ecotype chickens, commonly found in southwestern Nigeria, and the Fulani ecotype chickens, widely kept by Fulani pastoralists and agro-pastoralists in various parts of the country (Isa et al., 2019). These ecotypes are valued for traits such as disease tolerance, excellent foraging ability, and broodiness, which make them well-suited for low-input, small-scale production systems (Ajayi; Ologunagba, 2020; Abdul-Rahman et al., 2022).

Ogbomoso North Local Government Area, located in southwestern Nigeria, is well known for its vibrant agricultural activities, including indigenous poultry production. The LGA is predominantly inhabited by Yoruba-speaking communities and a significant number of Fulani settlers, both of whom keep local chickens for meat, eggs, cultural practices, and as a ready source of cash income (Oladeji et al., 2022).

With the rising demand for sustainable livestock production and the need to preserve valuable indigenous genetic resources, the proper evaluation and management of these local chickens has become crucial. Improved management can help boost productivity, enhance rural household food security, generate income, and contribute to the conservation of unique genetic traits that could be vital for future breeding programs (Oke et al., 2020; Singh et al., 2022).

The objective of this study is to evaluate the current management systems and performance characteristics of Yoruba and Fulani ecotype chickens in Ogbomoso North Local Government Area.

2. Materials and Methods

2.1 Study locations

Poultry farmers at open poultry markets and farms in Ogbomoso, Oyo State, Nigeria, were recruited for the study. Ogbomoso is located in the southwest region of Nigeria, which lies on the longitude of 40°, 150' East of the Greenwich meridian and latitude of 80°, 150' North-East of Ibadan, the capital of Oyo State. The altitude is between 300 m and 600 m above sea level. The mean annual rainfall of 1247 mm and a mean temperature of 30 °C with a relative humidity between 60-8560% and 85%ever, the performance evaluation was carried out at the Poultry Unit of the Teaching and Research Farm, Ladoke Akintola University of Technology (LAUTECH),

Ogbo, Ogbomosho, Oyo State, Nigeria. Ogbomosho is a derived savannah zone located in the Southwestern part of Nigeria. It is located at latitude 8°07' N and longitude 4° 14' E (Google Earth Map, 2023).

2.2 Study design

A cross-sectional survey design was employed to assess farmer perceptions and preferences for Yoruba and Fulani ecotype chickens. The study utilized a quantitative approach through a structured questionnaire for farmers. The target population consisted of smallholder farmers in the derived savanna zone who are actively engaged in indigenous chicken production, specifically those keeping the Yoruba ecotype, Fulani ecotype, or both ecotypes of chickens.

2.3 Sampling procedure

A total of 50 farmers were sampled in the Ogbomosho North government area. However, 49 questionnaires were retrieved due to incomplete information. A multistage sampling technique was employed for this study:

Stage 1: Purposive selection of a state (Oyo State) within the derived savanna zone based on the presence of both Yoruba and Fulani ecotype chickens.

Stage 2: Random selection from Ogbomosho North Local Government Area (LGA) from the selected state.

Stage 3: Purposive selection of farmers keeping indigenous chickens from the community.

2.4 Data collection and procedure

A structured questionnaire was developed and used as the primary data collection instrument. The questionnaire was divided into five main sections: Section A: Purpose of Chicken Production, Section B: Breeding and Selection Practices, Section C: Nutrition and Feeding Management, Section D: Health Management Practices, Section E: Major Constraints and Challenges

Data collection was carried out by enumerators who were familiar with the local languages and customs. The questionnaires were administered through face-to-face interviews with farmers at the markets and farms. Each questionnaire administration lasted approximately 10-15 minutes. Data collection was conducted over a period of two (2) weeks. To ensure data quality, a daily review of completed questionnaires was conducted, and incomplete or inconsistent questionnaires were excluded from analysis

2.5 Variables measured

Dependent variables: Farmer preferences for Yoruba ecotype chickens vs. Fulani ecotype chickens.

Independent variables: purpose of chicken production, breeding practices, feeding systems, disease prevention practices, and major constraints

2.6 Growth parameters

2.6.1 Experimental birds and management

The experimental birds consisted of two Nigerian indigenous and chickens genotypes, namely Yoruba ecotype (23 birds) and Fulani ecotype (27 birds) of mixed sexes, sourced from Ogbomosho environs. Before the arrival of the birds, the pen was washed and disinfected properly using Lysol® and was left to dry for five days before the arrival of the birds.

2.6.2 Brooding, house management, feeding, and vaccination

The birds were taken to an already disinfected pen. Litter was changed regularly at an interval of 3 days to prevent ammonia gas build-up. Birds were fed finisher mash (18% Crude Protein, 2800 kcal metabolizable energy) throughout the study period. Feed and water were supplied *ad libitum*. Medication of birds was done as and when due.

2.7 Experimental design

The experimental design was a Completely Randomized Design (CRD), and the experiment lasted for 6 weeks.

2.8 Growth traits

The following parameters were evaluated:

Body weight (BDW): this was measured with the use of an electronic sensitive scale and measured in grams.

Body length (BDL): it was measured as the distance between the base of the neck and the cloaca using a tape rule in cm.

Chest Girth (CG): This was taken as the circumference of the breast around the deepest region of the breast. A tape rule calibrated in centimetres (cm) was used to take the measurement.

Keel Length (KL): This was taken as the length of the sternum using a tape rule calibrated in centimetres.

Shank Length (SL): This was measured as the length of the tarsometatarsus from the hock joint to the metatarsal pad with the use of a tape rule in centimetres.

Thigh Length (TL): Measured as the length between the mid region of the thigh hip bone and the hock joint using a tape rule in centimetres.

Wing Length (WL): measured as the length of the wing from the scapula joints to the last digit of the wing using a tape rule in centimetres.

2.9 Animal ethics committee

The experimental procedures involving the birds used were reviewed and approved by the Institutional Animal Ethics Committee (AEC) of the Department of Animal Nutrition and Biotechnology, Ladoke Akintola University of Technology, Ogbomoso, with approval number of ANB/PG/2023011824. The study was conducted in accordance with the institutional guidelines for the care and use of animals in research. The birds were managed under appropriate housing, feeding, and health care conditions to ensure their welfare throughout the experiment. All handling and sampling procedures were carried out by trained personnel using methods designed to minimize stress, pain, and discomfort.

2.10 Data analysis

Collected data were coded, entered into Microsoft Excel, and arranged before analysis. Data were then exported to statistical software packages for analysis.

Data analysis was performed using SPSS. The following analytical approaches were employed:

1. Descriptive Statistics: Frequencies, percentages, means, and standard deviations were calculated to describe the purpose of chicken production management practices and preferences, etc.
2. Comparative Analysis: Chi-square tests and t-tests were used to compare preferences between different farmer groups and ecotypes.
3. Ranking Analysis: Weighted scores were calculated for trait preferences using the formula:
Weighted Score = $\Sigma(\text{Rank} \times \text{Frequency}) / \text{Total responses}$

Data collected for growth traits were subjected to analysis of variance (ANOVA) using the procedure of General Linear Model of SPSS (2003), and significant means were separated by *Duncan* Multiple Range Test at $p \leq 0.05$. The following models were adopted;

$$Y_{ij} = \mu + \alpha_i + e_{ij}$$

Were,

Y_{ijk} = Individual observation with each genotype, μ = Overall Mean, α_i = Fixed effect of the i^{th} genotype (1,2), and e_{ij} = Experimental error, which is evenly distributed.

3. Results

This presents a comprehensive analysis of the data collected from the field survey in Ogbomoso North Local

Government Area, based on responses from 49 famers rearing Yoruba and Fulani ecotype chickens. The results address the study's objectives: determining production characteristics, evaluating management practices, and identifying major constraints. Descriptive statistics, including frequencies, percentages, mean, and standard deviations, were utilized.

3.1 Purpose of production

Table 1 showed that chicken production among the surveyed farmers was mainly for meat production. Out of the 49 farmers surveyed, 41 farmers (84%) kept chickens primarily for meat, while only 7 farmers (14%) focused on egg production. Dual-purpose production, involving both meat and egg production, was reported by only 1 farmer (2%). This indicates that poultry farming in the study area is predominantly meat-based, suggesting a stronger market preference for chicken meat than for eggs. The very low proportion of dual-purpose producers may also imply that most farmers prefer specialised production systems rather than maintaining birds for multiple purposes.

Table 1. Detailed distribution of farmers by purpose of chicken production.

Purpose of Production	Frequency (n = 49)	Percentage (%)	Cumulative Percentage (%)
Meat Production	41	84	84
Egg Production	7	14	98
Dual-Purpose	1	2	100
Total	49	100	-

Source: Authors, 2026.

3.2 Evaluation of management practices

Management practices are predominantly traditional, relying on low-input methods tailored to the hardy traits of Yoruba and Fulani ecotypes. These include natural breeding, scavenging-based feeding, and reactive health strategies, which, while sustainable, limit productivity compared to intensive systems.

3.3 Breeding practices

Table 2 indicates that natural insemination was the most common breeding practice among the famers. A total of 44 farmers, representing 90% of the respondents, relied on natural mating for breeding their chickens. In contrast, only 4 famers (8%) used artificial insemination, while 1 farmer (2%) combined both natural and artificial insemination methods. The high dependence on natural insemination suggests that most farmers operate under traditional or semi-intensive production systems, where access to reproductive technologies may be limited. The low adoption of artificial insemination may be associated with inadequate technical knowledge, limited availability of trained personnel, or the additional cost involved in the procedure.

Table 2. Distribution of farmers by breeding practices.

Breeding Practice	Frequency (n = 49)	Percentage (%)	Cumulative Percentage (%)
Natural Insemination	44	90	90
Artificial Insemination	4	8	98
Combined Methods	1	2	100
Total	49	100	-

Source: Authors, 2026.

3.4 Feeding systems

Table 3 revealed that home-made feeds were the most commonly used feeding system. Twenty-five farmers, representing 52% of the respondents, prepared feeds locally using available feed ingredients. Commercial feeds

were used by 13 farmers (27%), while 10 farmers (21%) combined home-made and commercial feeds. The results suggested that farmers may prefer home-made feeds because they are more affordable and allow flexibility in the use of locally available ingredients. However, the use of non-standardised home-made diets may affect nutrient balance and bird performance if feed formulations are not properly developed. The proportion of farmers using commercial feeds or a combination of both feeding systems indicated that some farmers recognise the importance of formulated diets for improved productivity.

Table 3. Distribution of farmers by feeding systems.

Feeding System	Frequency	Percentage (%)	Cumulative Percentage
Home-Made Feeds	25	52	52
Commercial Feeds	13	27	79
Combination	10	21	100
Total	49	100	-

Source: Authors, 2026.

3.5 Disease prevention practices

Table 4 evaluated that medication was the most frequently reported disease prevention practice, used by 23 farmers (47%). Vaccination was reported by 11 farmers (22.4%), while sanitation and biosecurity were practised by 9 farmers (18.4%) and 6 farmers (12.2%), respectively. The results indicated that farmers relied more on medication than on preventive approaches such as vaccination, sanitation, and biosecurity. This pattern may increase the risk of disease outbreaks, antimicrobial misuse, and the development of antimicrobial resistance. The relatively low adoption of biosecurity measures is particularly important because biosecurity is essential for preventing the introduction and spread of infectious poultry diseases.

Table 4. Distribution of farmers by disease prevention practices.

Prevention Practice	Frequency	Percentage (%)	Cumulative Percentage
Medication	23	47	47
Vaccination	11	22.4	69.4
Sanitation	9	18.4	87.4
Biosecurity	6	12.2	100
Total	49	100	-

Source: Authors, 2026.

3.6 Major constraints affecting productivity

Table 5 showed that disease problems were the most important constraint affecting chicken production, reported by 28 respondents (57%) and ranked first. Training needs and inadequate access to credit were jointly ranked second, each reported by 18 farmers (37%). Infrastructure gaps were reported by 11 farmers (22%) and ranked fourth, while market volatility was reported by 10 farmers (20%) and ranked fifth. Since multiple responses were allowed, the total number of responses was 85. The findings demonstrate that health-related challenges remain the major limitation to poultry production. However, the substantial proportion of farmers reporting training and credit constraints suggests that improving farmers' technical capacity and financial access could also enhance poultry productivity and profitability.

Table 5. Distribution of major constraints (Multiple Responses Allowed).

Constraint	Frequency	Percentage	Rank
Disease Issues	28	57	1
Training Needs	18	37	2
Credit Access Requirements	18	37	2
Infrastructure Gaps	11	22	4
Market Volatility	10	20	5
Total Responses	85	N/A	-

Source: Authors, 2026.

3.7 Growth traits of Fulani and Yoruba chicken ecotypes

Table 6 presents the growth performance and body measurements of Fulani ecotype (FE) and Yoruba ecotype (YE) chickens from week 1 to week 3. At week 1, genotype had a significant effect ($p < 0.05$) on body length, chest girth, and wing length. Body weight did not differ between the genotypes, with FE recorded at 47.41 ± 0.86 g and YE recording 47.65 ± 0.10 g. However, FE birds had significantly greater body length (8.13 ± 0.14 cm) than YE birds (7.49 ± 0.09 cm), whereas YE birds had significantly higher wing length (8.29 ± 0.18 cm) than FE birds (7.56 ± 0.26 cm).

At week 2, there was a significant ($p < 0.05$) effect of genotype on body weight, body length, and wing length. Fulani Ecotype chickens showed significantly higher body weight than YE chickens, with values of 83.93 ± 2.35 g and 73.65 ± 1.95 g, respectively. Fulani Ecotype birds also had greater body length (9.38 ± 0.11 cm) than YE birds (8.90 ± 0.08 cm). In contrast, YE birds recorded a significantly longer wing length of 11.33 ± 0.15 cm compared with 10.43 ± 0.21 cm in FE birds. However, at week 3 of age, there was a significant ($p < 0.05$) effect of genotype on body weight and body length.

Fulani Ecotype birds maintained significantly higher body weight, recording 118.70 ± 3.83 g compared with 105.70 ± 3.27 g in YE birds. FE chickens also had greater body length, with a mean of 10.67 ± 0.13 cm, compared with 9.81 ± 0.14 cm in YE chickens. However, wing length remained higher in YE birds (14.33 ± 0.21 cm) than in FE birds (13.60 ± 0.30 cm). The results from the study suggested that FE chickens had better early growth in terms of body weight and body length, whereas YE chickens showed a relatively greater wing development.

Table 6. Mean values of growth parameters as affected by genotypes of chicken at weeks 1 to 3.

Parameters	OBS	BDW (g)	BDL (cm)	CH (cm)	KL (cm)	SHK (cm)	THG (cm)	WL (cm)
Week 1								
FE	27	47.41 ± 0.86	$8.13^a \pm 0.14$	$9.01^a \pm 0.14$	2.53 ± 0.09	3.07 ± 0.37	4.36 ± 0.13	$7.56^b \pm 0.26$
YE	23	47.65 ± 0.10	$7.49^b \pm 0.09$	$8.93^b \pm 0.11$	2.45 ± 0.70	2.50 ± 0.48	3.86 ± 0.13	$8.29^a \pm 0.18$
Week 2								
FE	27	$83.93^a \pm 2.35$	$9.38^a \pm 0.11$	11.29 ± 0.15	3.19 ± 0.03	3.13 ± 0.03	4.04 ± 0.06	$10.43^b \pm 0.21$
YE	23	$73.65^b \pm 1.95$	$8.90^b \pm 0.08$	11.27 ± 0.08	3.06 ± 0.07	3.00 ± 0.63	4.09 ± 0.04	$11.33^a \pm 0.15$
Week 3								
FE	27	$118.70^a \pm 3.83$	$10.67^a \pm 0.125$	12.28 ± 0.14	3.97 ± 0.02	4.12 ± 0.04	5.39 ± 0.08	13.60 ± 0.30
YE	23	$105.70^b \pm 3.27$	$9.81^b \pm 0.14$	11.86 ± 0.13	3.94 ± 0.03	3.94 ± 0.04	5.14 ± 0.08	14.33 ± 0.21

Note: ^{a,b} mean along the same column within each class having different superscripts are significantly different ($p < 0.05$), OBS: number of observation, BDW = body weight, BDL = body length, CH = chest girth, KL = keel length, SHK = shank length, THG = thigh length, WL = wing length, FE = Fulani Ecotype chicken, YE = Yoruba Ecotype chicken. Source: Authors, 2026.

Table 7 revealed that body weight increased progressively in both genotypes from week 4 to week 6. There was a significant ($p < 0.05$) effect of genotype on body weight and wing length. At week 4, FE chickens had a significantly higher body weight of 151.52 ± 5.90 g compared with 133.09 ± 3.95 g in YE chickens. The same pattern was observed at week 5, where FE birds recorded 208.37 ± 5.40 g, while YE birds recorded 169.70 ± 6.08 g. At week 6, FE birds remained significantly heavier, with a body weight of 269.85 ± 8.54 g compared with 225.30 ± 9.06 g in YE birds.

Body length was numerically higher in FE chickens throughout weeks 4 to 6. Fulani Ecotype birds recorded body lengths of 11.64 ± 0.14 cm, 11.97 ± 0.15 cm, and 12.40 ± 0.15 cm at weeks 4, 5, and 6, respectively, compared with 10.65 ± 0.09 cm, 11.37 ± 0.14 cm, and 12.03 ± 0.19 cm in YE birds. Chest girth also increased with age in both genotypes, rising from 13.55 ± 0.12 cm in FE and 12.49 ± 0.13 cm in YE at week 4 to 16.20 ± 0.19 cm and 15.66 ± 0.27 cm, respectively, at week 6. Wing length was higher in YE chickens at week 4 and week 6. At week 4, YE birds had a wing length of 16.27 ± 0.17 cm compared with 15.72 ± 0.29 cm in FE birds.

At week 6, YE birds also recorded a higher wing length of 20.26 ± 0.29 cm compared with 19.74 ± 0.31 cm in FE birds. However, at week 5, FE birds had a slightly higher wing length of 17.72 ± 0.23 cm than YE birds (17.46 ± 0.22 cm). However, FE chickens demonstrated superior body weight gain and greater body length across the growth period. The difference in body weight between FE and YE birds increased from 18.43 g at week 4 to 44.55 g at week 6, indicating that FE chickens had a fast growth rate. Yoruba Ecotype chickens tended to have relatively longer wings, suggesting genotype-related differences in body conformation and growth pattern.

Table 7. Mean values of growth parameters as affected by genotypes of chicken at weeks 4 to 6.

Parameters	OBS	BDW (g)	BDL (cm)	CH (cm)	KL (cm)	SHK (cm)	THG (cm)	WL (cm)
Genotype				Week 4				
FE	27	$151.52^a \pm 5.90$	11.64 ± 0.14	13.55 ± 0.12	4.69 ± 0.011	4.01 ± 0.11	5.67 ± 0.11	$15.72^b \pm 0.29$
YE	23	$133.09^b \pm 3.95$	10.65 ± 0.09	12.49 ± 0.13	4.41 ± 0.08	4.17 ± 0.06	5.73 ± 0.11	$16.27^a \pm 0.17$
				Week 5				
FE	27	$208.37^a \pm 5.40$	11.97 ± 0.15	14.89 ± 0.13	5.31 ± 0.38	4.94 ± 0.03	5.94 ± 0.06	$17.72^b \pm 0.23$
YE	23	$169.70^b \pm 6.08$	11.37 ± 0.14	14.04 ± 0.18	14.04 ± 0.08	4.35 ± 0.07	5.86 ± 0.11	$17.46^a \pm 0.22$
				Week 6				
FE	27	$269.85^a \pm 8.54$	12.40 ± 0.15	16.20 ± 0.19	5.75 ± 0.08	5.17 ± 0.06	6.57 ± 0.11	19.74 ± 0.31
YE	23	$225.30^b \pm 9.06$	12.03 ± 0.19	15.66 ± 0.27	5.50 ± 0.11	4.59 ± 0.09	6.10 ± 0.14	20.26 ± 0.29

Note: ^{a,b} mean along the same column within each class having different superscripts are significantly different ($p < 0.05$), OBS: number of observation, BDW = body weight, BDL = body length, CH = chest girth, KL = keel length, SHK = shank length, THG = thigh length, WL = wing length, FE = Fulani Ecotype chicken, YE = Yoruba Ecotype chicken. Source: Authors, 2026.

4. Discussion

The predominance of meat production among the surveyed farmers suggests that poultry keeping in the study area is largely market-oriented and driven by demand for chicken meat. Meat chickens are often preferred by smallholder farmers because they can be sold within a relatively short production cycle, providing relatively quick returns and supporting household income. This production pattern is common in many developing countries where poultry production contributes to food security, income generation, and livelihood diversification. However, the low level of dual-purpose production may indicate limited diversification of poultry enterprises. Dual-purpose chickens can be beneficial to smallholder farmers because they provide both meat and eggs, thereby improving household nutrition and reducing dependence on a single source of income. Strengthening access to improved dual-purpose genotypes and farmer training may therefore support more resilient poultry production systems (Rachman et al., 2024; Wondmeneh et al., 2016).

The dominance of natural insemination indicates that poultry breeding in the study area is mainly based on

traditional flock mating systems (Begna et al., 2025). Natural mating is simple, inexpensive, and suitable for small-scale poultry production because it does not require specialised equipment or advanced technical expertise. Nevertheless, reliance on uncontrolled natural mating may limit genetic progress, especially when breeding males and females are not selected using performance traits such as growth rate, fertility, hatchability, survivability, and body conformation. Planned breeding programmes are important for improving the productivity of indigenous chickens while maintaining their adaptation to local climatic and disease conditions. Recent genomic evidence has shown that Nigerian indigenous chickens possess valuable genetic diversity and adaptation to environmental stress, indicating that these populations can be improved through structured selection rather than indiscriminate crossing (Kpomasse et al., 2022; Rachman et al., 2024).

The widespread use of home-made feeds suggests that farmers are attempting to reduce feed costs by using locally available ingredients. Feed represents a major proportion of the total cost of poultry production; therefore, the use of farm-formulated diets may be economically attractive, particularly for smallholder producers. However, the nutritional quality of home-made feeds may vary depending on ingredient availability, processing methods, storage conditions, and the technical knowledge of the farmer.

Inadequately formulated diets may fail to meet the nutrient requirements of birds and may result in poor growth, reduced immunity, low reproductive performance, and increased susceptibility to disease. The use of commercial feeds, either alone or in combination with home-made feeds, may indicate that some farmers recognise the importance of nutritionally balanced diets. Training farmers on feed formulation, ingredient quality control, feed storage, and stage-specific nutrient requirements would likely improve flock performance and profitability.

The greater use of medication compared with vaccination, sanitation, and biosecurity suggests that disease management among the farmers is more treatment-based than prevention-based. Although medication may help reduce losses during disease outbreaks, frequent or inappropriate use of antimicrobial drugs may increase production costs and contribute to antimicrobial resistance (Singh et al., 2024). Preventive approaches, including vaccination, hygiene, movement control, isolation of sick birds, and proper disposal of dead birds, are more sustainable for maintaining flock health. Biosecurity is particularly important because it reduces the likelihood of pathogens entering farms and spreading within poultry populations. Recent studies in low- and middle-income countries have shown that biosecurity practices are often inadequate in poultry farms, despite their importance for reducing disease occurrence and limiting the spread of zoonotic pathogens (Mdemu et al., 2025; Nielsen et al., 2025; Saleem et al., 2025).

The relatively limited use of vaccination and biosecurity in the present study highlights the need for stronger veterinary extension services. Farmers should be supported with practical information on vaccination schedules, farm sanitation, visitor control, quarantine of newly introduced birds, disinfection procedures, and responsible use of veterinary drugs. Such interventions may reduce mortality, improve productivity, and protect public health by reducing the risk of antimicrobial resistance and zoonotic disease transmission (Mdemu et al., 2025; Nielsen et al., 2025).

Disease was identified as the major constraint affecting chicken production, indicating that flock health remains a major barrier to sustainable poultry production. Disease outbreaks can reduce bird survival, growth performance, reproductive efficiency, and farm profitability. The prominence of disease as a constraint is consistent with the limited adoption of preventive health practices observed in the study. In smallholder poultry systems, disease challenges are often worsened by inadequate housing, poor sanitation, irregular vaccination, limited access to veterinary services, and unrestricted movement of people, birds, and equipment between farms. Recent evidence from poultry systems in low- and middle-income countries has similarly identified weak biosecurity and limited disease-control capacity as important contributors to poultry health risks (Houghton et al., 2025; Nielsen et al., 2025).

Training needs and poor access to credit were also important challenges. Inadequate technical knowledge may limit farmers' ability to formulate balanced diets, identify diseases early, apply vaccination programmes, maintain records, and make appropriate breeding decisions. Limited access to credit can also restrict investment in quality chicks, feed, housing, vaccines, equipment, and veterinary services. Infrastructure limitations and unstable market conditions may further reduce profitability and discourage expansion. These findings indicate that poultry development programmes should combine farmer training with access to affordable credit, veterinary support, improved input supply, and stable marketing channels.

The results showed that the two chicken genotypes differed in early growth pattern and body conformation. Although body weight was similar at the beginning of the study, the FE genotype subsequently showed greater body weight and body length than the YE genotype. This suggests that FE chickens may possess a higher early

growth potential and may allocate more nutrients towards body mass development. Differences in growth among chicken genotypes are often associated with genetic variation in growth rate, nutrient utilisation, skeletal development, and adaptation to the production environment.

The observed relationship between body weight and body length agrees with recent studies showing that body weight is closely associated with several morphometric traits in indigenous chickens. Linear body measurements such as body length, chest girth, shank length, keel length, and wing length can provide useful information for evaluating body size and identifying birds with desirable growth characteristics. Lamido et al. (2024) reported significant positive relationships between body weight and morphometric traits in indigenous normal-feathered chickens, indicating that these measurements can support selection for improved growth. Similarly, Morris et al. (2024) demonstrated that morphometric variation can distinguish indigenous chicken populations and provide useful information for sustainable breeding and conservation programmes.

The relatively higher wing development observed in YE chickens suggests that the two genotypes may differ in their pattern of skeletal growth and body conformation. Such differences are important because body weight alone may not fully describe the biological and production characteristics of a chicken genotype. Genotype-specific variation in body structure should therefore be considered when designing breeding programmes, particularly where both growth performance and adaptation are important selection objectives (Lamido et al., 2023; Musa et al., 2018).

The later growth period confirmed the superior body weight performance of FE chickens. The continued advantage of the FE genotype in body weight and body length indicates that this genotype may have a greater capacity for growth under the management conditions of the study. Progressive increases in body weight and linear measurements with age are expected because chickens undergo rapid skeletal and muscle development during the early stages of life. However, the magnitude of growth differs among genotypes due to variation in genetic potential and interaction with nutrition, health status, and environmental conditions.

The higher body weight and body length of FE chickens suggest that this genotype may be more suitable for selection programmes aimed at improving growth and meat production. Recent studies have shown that morphometric traits can be used as practical indicators of body weight and growth potential, particularly in indigenous chicken populations where weighing scales may not always be available. A study by Lamido et al. (2024) found that chest girth and shank length could predict body weight at different ages in Nigerian indigenous chickens. This supports the use of body measurements as low-cost selection tools in smallholder breeding programmes.

Despite the superior body weight of FE chickens, the YE genotype showed relatively greater wing development at some stages. This indicates that the genotypes differ not only in overall body size but also in body conformation. Such variation may reflect differences in the genetic control of skeletal and muscular development. Recent studies have emphasised that indigenous chickens possess considerable phenotypic and genetic diversity, which can be utilised for targeted breeding, conservation, and adaptation to changing production environments (Chebom et al., 2024; Rachman et al., 2024).

The results indicated that FE chickens have better potential for body weight gain and body-frame development, while YE chickens may possess distinct conformation traits that could be valuable for adaptation or future breeding objectives.

5. Conclusions

This study showed that chicken production in the study area was mainly focused on meat production, with most farmers relying on natural insemination and homemade feeds. The production system was largely characterised by traditional management practices, particularly in breeding, feeding, and disease prevention. Medication was more commonly used than vaccination, sanitation, and biosecurity, indicating that farmers depended more on treatment than on preventive flock-health measures.

The growth results revealed clear differences between the two chicken genotypes. Fulani Ecotype chickens showed better body weight gain and generally greater body length throughout the study period, indicating superior growth potential under the management conditions used. However, YE chickens showed relatively greater wing development at some stages, suggesting differences in body conformation and growth pattern between the genotypes. Therefore, FE chickens may be more suitable for improvement programmes targeting body weight gain and meat production, while YE chickens may possess useful structural traits that should be considered in breeding and conservation programmes.

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7. Authors' Contributions

Abimbola Deborah Matt-Obabu: conceptualization, methodology, data curation and supervision, writing-original draft preparation, Project administration. *Azeem Oladiran Ige*: conceptualization, methodology, writing-review and editing, project administration. *Hameed Olayemi Salawu*: methodology, investigation, data curation, and supervision, writing-review and editing. *Hammed Opeyemi Oladipupo*: investigation. *Adeola Badrat Ajibola*: data curation and supervision. *Tolulope Margaret Adedibu*: project administration. *Abigeal Oluwakemi Akingbade*: investigation. *David Olasunkanmi Oyelami*: project administration, data curation, supervision, writing, review, and editing. All authors have read and agreed to the published version of the manuscript.

8. Conflicts of Interest

No conflicts of interest.

9. Ethics Approval

Yes applicable. The experimental procedures involving the birds used were reviewed and approved by the Institutional Animal Ethics Committee (AEC) of the Department of Animal Nutrition and Biotechnology, Ladoke Akintola University of Technology, Ogbomoso, with approval number of ANB/PG/2023011824.

11. Artificial Intelligence Statement: Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

Generative AI and AI-assisted tools were used exclusively for language editing and the preparation of the Graphical Abstract. The AI-generated content was carefully reviewed, verified, and approved by the authors, who assume full responsibility for the accuracy, integrity, and scientific content of the manuscript. The Graphical Abstract legend identifies the AI tool used, including its name. No AI tool was involved in the study design, data collection, data analysis, interpretation of results, or the preparation of the scientific conclusions. AI tools are not authors and assume no responsibility for the content of this manuscript.

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