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INFLUENCE OF GENOTYPE ON CARCASS CHARACTERISTICS OF CHICKENS REARED UNDER SEMI-INTENSIVE SYSTEMS IN CÔTE D'IVOIRE

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ABSTRACT

This study investigated the effect of genotype on carcass characteristics of chickens reared under a semi-intensive system in Côte d'Ivoire. Four genetic types were compared: local chickens from forest and savannah zones, slow-growing Label chickens, and fast-growing industrial broiler chickens. Eighty-six birds were reared under standardized conditions of feeding, housing, and health management. The parameters evaluated included live body weight, carcass weights, edible and non-edible offal, anatomical cuts, lipid deposition, and carcass yield. Data were analyzed using one-way analysis of variance (ANOVA), followed by Tukey's post hoc test. Genotype significantly affected most of the parameters measured ($p < 0.05$). Label and local chickens, slaughtered at 22 weeks of age, exhibited higher live body weights and carcass weights than broiler chickens slaughtered at 6.5–7 weeks of age. Broilers showed proportionally greater lipid deposition, whereas slow-growing genotypes exhibited a more balanced development of internal organs and skeletal structures. Carcass yield did not differ significantly among genotypes. No significant differences were observed between the Forest and Savannah local ecotypes. These results confirm the zootechnical potential of Ivorian local chickens and highlight their relevance for the development of sustainable poultry production systems adapted to tropical conditions.

Keywords: Carcass Yield; Lipid Deposition; Morphometric Traits; Indigenous Poultry; Tropical Production Systems.

1 INTRODUCTION

Poultry production plays a central role in animal agriculture across West Africa, contributing substantially to food security, household income, and rural livelihoods. In Côte d'Ivoire, poultry farming is strategically promoted within national agricultural policies as a means to enhance protein availability and strengthen short-cycle livestock production systems adapted to local agro-ecological and sanitary constraints [1, 2, 3, 4]. Local chickens represent the dominant component of the national poultry population and are predominantly reared under extensive or low-input semi-intensive systems, particularly in rural areas [5].

Indigenous chicken populations (*Gallus gallus domesticus*) are widely recognized for their hardiness, adaptability to harsh environmental conditions, and relative tolerance to endemic diseases [6]. Beyond their productive role, local chickens fulfill important socio-cultural functions, including their use in traditional ceremonies, rituals, and gift exchanges, thereby contributing to social cohesion within rural communities [2, 7, 8, 9]. Moreover, the meat of local chickens is often preferred by consumers for its distinctive sensory qualities, which confer a relatively high market value in local markets [10]. Despite these advantages, indigenous chickens generally exhibit lower zootechnical performance than improved commercial strains, particularly in terms of growth rate, carcass yield, and product uniformity [5].

Previous studies conducted in Côte d'Ivoire have documented substantial phenotypic and zootechnical variability within local chicken populations, associated with agro-ecological zones (forest versus savannah), management practices, and feeding conditions [10]. Growth performance analyses indicate that, although local chickens typically reach lower live body weights than commercial strains, certain ecotypes may express improved productive potential when reared under better-controlled semi-intensive conditions [11, 12, 13]. However, information on carcass characteristics remains limited and fragmented, particularly with respect to direct comparisons among local genotypes, slow-growing Label strains, and fast-growing commercial broilers reared under comparable management conditions.

Carcass evaluation constitutes a key component of poultry production research, as it provides objective indicators of meat yield, anatomical partitioning, and the relative contribution of edible and non-edible components to marketable output. Such parameters are essential for economic valorisation of poultry products and for informing genetic improvement and management strategies [14]. In the Ivorian context, few studies have addressed carcass traits using standardized comparative approaches across contrasting genetic types, despite the relevance of such information for reducing reliance on poultry imports and promoting the sustainable use of local genetic resources [11].

Within this framework, the present study aimed to characterize and compare carcass traits of different chicken genotypes namely local chickens from forest and savannah zones, slow-growing Label chickens, and fast-growing commercial broiler chickens reared under semi-intensive conditions in Côte d'Ivoire. It should be noted that broilers were slaughtered at a younger age than local and Label chickens, reflecting commercial production practices. Consequently, genotype-related differences in carcass traits observed in this study should be interpreted as reflecting the combined effects of genetic background and age at slaughter. By providing comparative data under standardized management conditions, this study seeks to contribute to the evidence base for the sustainable valorization of local poultry genetic resources and the development of poultry production systems adapted to tropical environments.

2 MATERIALS AND METHODS

2.1 Study site

The experiment was conducted at the IRHO–La Mé research station of the Centre National de Recherche Agronomique (CNRA), located in the District of Abidjan along the Abidjan–Alépé road axis (5°26′ N, 3°50′ W) (Figure 1). The site is situated in a subequatorial climatic zone characterized by mean annual temperatures ranging from 25 to 33 °C and annual rainfall between 1,500 and 2,000 mm, with two rainy seasons (mid-July and October–November) and two dry seasons (December–April and August–September). The vegetation is predominantly forested, and experimental oil palm plantations cover approximately 1,600 ha of the station area [15].

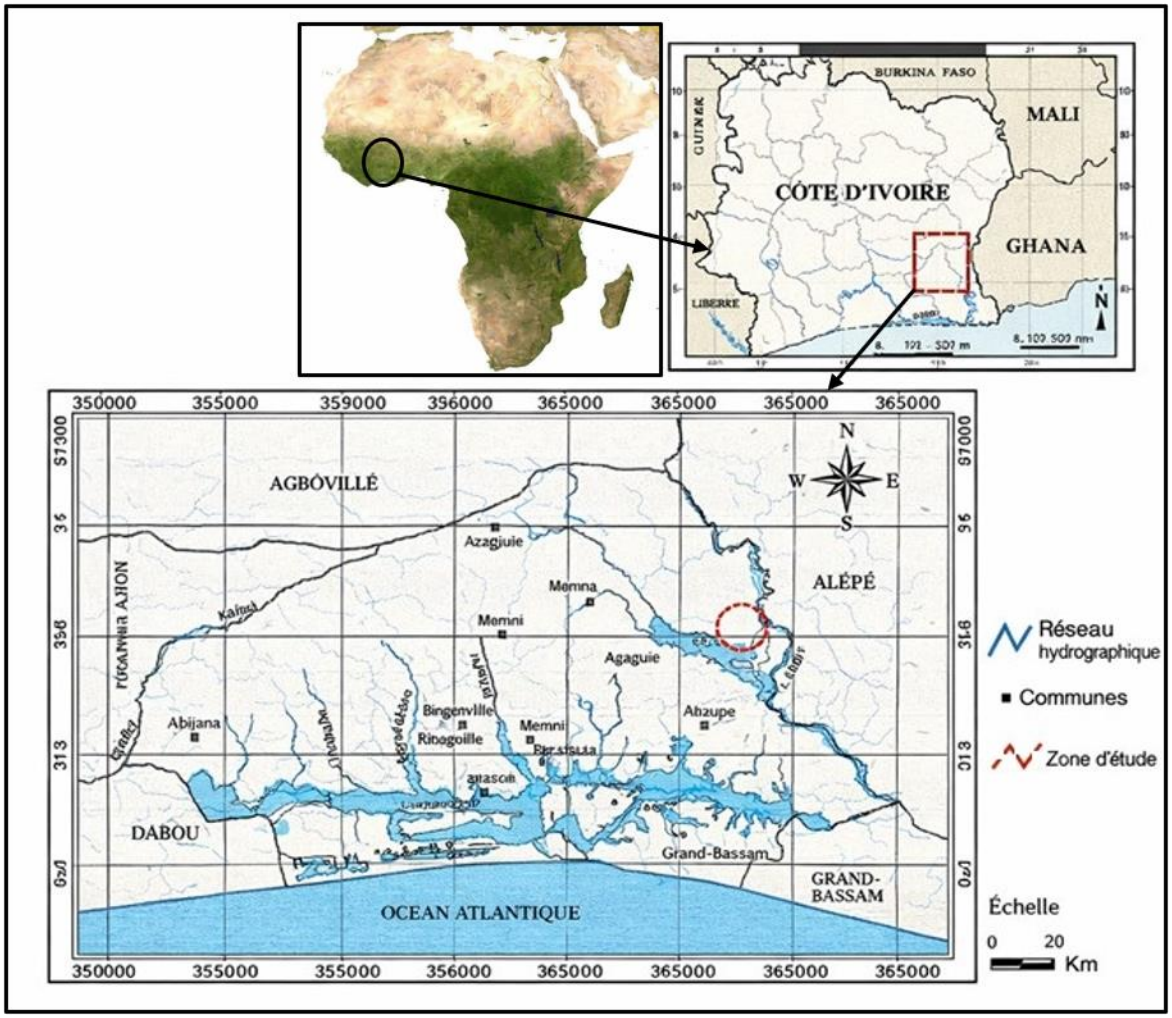


Figure 1. Geographic location of the CNRA IRHO–La Mé research station in northeastern Abidjan.

2.2 Animals and experimental design

A total of 86 chickens belonging to four genetic types were included: Forest local chickens (n = 21), Savannah local chickens (n = 21), slow-growing Label Sasso T55 chickens (n = 20), and fast-growing commercial broiler chickens Vedette (n = 24). Local and Label chickens were reared from hatching.

Local chickens originated from parental populations collected in Aboisso, Agboville, and Alépé (Forest ecotype), and in Didiévi, M'Bahiakro, and Yamoussoukro (Savannah ecotype). Eggs from local and Label chickens were collected and incubated from the 10th day after collection. Broiler chickens were purchased from a farm located near the station at 6.5 to 7 weeks of age, according to the farmer, and were subjected to quarantine upon arrival.

Birds were allocated to three experimental batches (A, B, and C) according to hatching dates. Batch A included 20 Label chickens, 8 broilers, 5 Forest local chickens, and 5 Savannah local chickens. Batches B and C each comprised 8 broilers, 8 Forest local chickens, and 8 Savannah local chickens. Local and Label birds were reared under standardized semi-intensive conditions. Broiler chickens were purchased from a farm located near the station at 6.5 to 7 weeks of age, according to the farmer, and were subjected to quarantine upon arrival.

2.3 Housing and management

Birds were housed in a roofed poultry building subdivided into pens separated by wire mesh. Stocking density and pen size were adjusted according to bird age and batch composition. All genotypes were managed under identical environmental and husbandry conditions throughout the experimental period.

Routine vaccination schedules were applied against Newcastle disease, infectious bursal disease, and fowl pox following standard veterinary protocols. Prophylactic anticoccidial treatments and antibiotics were administered according to common practice in semi-intensive poultry production systems in Côte d'Ivoire.

Birds were weighed individually every two weeks from hatching until slaughter. All weighings were performed in the morning prior to feed distribution to minimize postprandial variation in body weight.

2.4 Feeding regime

All birds received the same commercial diets provided in mash form and adapted to physiological stage (starter, grower, and finisher). Daily feed allowance was adjusted relative to live body weight following local management practices: approximately 65% of live body weight during the starter phase, 12% for Label chickens and 16% for local chickens during the grower phase, and approximately 6% for all genotypes during the finisher phase. Drinking water was provided ad libitum throughout the experiment. The ingredient composition and nutritional values of the diets are presented in Table 1.

2.5 Slaughter procedure and carcass measurements

Birds were fasted overnight prior to slaughter. Live body weight was recorded immediately before slaughter. Birds were slaughtered by jugular bleeding, manually plucked, and eviscerated. Post-bleeding body weight, feather weight, and weights of edible offal (head, neck, legs, heart, liver, and gizzard) and non-edible by-products (abdominal fat, testes) were recorded.

Hot carcasses were stored under refrigeration for five days, then drained and weighed. Anatomical cuts (thigh, drumstick, and remaining carcass) were obtained following standardized procedures. All weights were measured using an electronic balance and expressed in grams.

Table 1*:* Composition of starter, grower, and finisher diets.

Ingredients	Starter (0–4 weeks)	Grower (5–8 weeks)	Finisher (> 8 weeks)
Crude protein (%)	21	20	17.5
Metabolizable energy (kcal)	2 903	3 000	2 750
Crude fiber (%)	3	4.20	4.4
Lysine (%)	1.19	1.1	0.78
Méthionine (%)	0.42	0.5	0.41
Ca (%)	1.2	1.15	4
Total phosphorus (%)		0.1	0.70
Vitamin A (UI kg^{-1})		9 000	10 000
Vitamin D3 (UI kg^{-1})	5 000	4 000	2 200
Vitamin E (mg kg^{-1})	30	22.73	15
Fe (mg kg^{-1})	35	37.75	48.95
Zn (mg kg^{-1})	90	89	5.51
Cu (mg kg^{-1})	22	25	5

For morphometric measurements, carcasses were placed in dorsal recumbency on a flat surface. Carcass depth was measured as the maximum dorsoventral distance between the highest dorsal point of the thoracic vertebral region and the most prominent ventral point of the keel bone (sternum), perpendicular to the longitudinal axis of the carcass. Tarsus length and drumstick length were measured using a digital caliper (precision ±0.01 mm). Measurements followed commonly used morphometric procedures for poultry carcass evaluation.

2.6 Derived variables

Fat percentage (FP), carcass yield (r), heart-to-live weight ratio (HW), and feather-to-live weight ratio (FWP) were calculated as follows:

$$FP = \frac{\text{fat weight}}{\text{live body weight}} \times 100$$

$$r = \frac{\text{eviscerated weight}}{\text{live body weight}} \times 100$$

$$HW = \frac{\text{heart weight}}{\text{live body weight}} \times 100$$

$$FWP = \frac{\text{feather weight}}{\text{live body weight}} \times 100$$

- FP (%): total fat weight relative to live body weight.
- r (%): carcass weight after removal of all offal relative to live body weight.
- HW (%): heart weight relative to live body weight.
- FWP (%): feather weight relative to live body weight.

2.7 Statistical analysis

Data were analyzed using analysis of variance (ANOVA) to assess the effect of genotype on carcass traits. Because birds were distributed across three experimental batches, the potential batch effect was explored. When appropriate, genotype was considered as a fixed factor and batch as a random factor. Tukey's honestly significant difference (HSD) test was applied for post hoc multiple comparisons at a 5% significance level. Statistical analyses were conducted using STATISTICA software (version 7.1).

3 RESULTS

3.1 Effect of genotype on body weight and carcass parameters

One-way analysis of variance (ANOVA), followed by Tukey's test at the 5% significance level, revealed a significant effect of genotype on all body weight and carcass parameters (Table 2).

In batch A, Label chickens exhibited the highest mean values ($p < 0.05$) for all recorded weight traits, including live body weight (2864.0 ± 264.8 g), post-bleeding weight (2742.4 ± 257.1 g), drained weight (2560.2 ± 228.0 g), plucked weight (2585.0 ± 242.6 g), weight without head and neck (2191.8 ± 206.9 g), and eviscerated weight (1915.6 ± 188.3 g). These values were significantly higher than those recorded for Forest local, Savannah local, and broiler chickens (Table 2).

No significant differences ($p > 0.05$) were observed between the Forest and Savannah local chickens for any of these parameters in batch A. Broiler chickens exhibited the lowest mean values for all weight traits.

In batches B and C, a similar pattern was observed. Broiler chickens showed significantly lower live body weights than Forest and Savannah chickens ($p < 0.05$). In batch B, mean live body weight was 1294.8 ± 145.7 g for broilers, compared with 1579.3 ± 155.7 g and 1588.4 ± 113.8 g for Forest and Savannah chickens, respectively. In batch C, broiler chickens also exhibited significantly lower live body weight (1294.8 ± 145.7 g) than Forest (1576.0 ± 180.9 g) and Savannah chickens (1574.1 ± 254.0 g). Similar trends were observed for post-bleeding, drained, and eviscerated weights.

Table 2*:* Body weights and carcass parameters by chicken genotype.

	Genotypes				
	Batches	**Forest**	**Savannah**	**Broiler**	**Label**
Live body weight (g)	A	1659.4 ± 194.31[a]	1694.4 ± 213.71[a]	139.0 ± 45.54[a]	2864.0 ± 264.28[b]
	B	1579.3 ± 155.71[b]	1588.4 ± 113.79[b]	1294.8 ± 145.66[a]	-
	C	1574.1 ± 254.04[b]	1576.0 ± 180.94[b]	1118.5 ± 100.93[a]	-
Post-bleeding body weight (g)	A	1598.0 ± 177.52[a]	1635.6 ± 193.57[a]	1340.4 ± 46.79[a]	2742.4 ± 257.05[b]
	B	1531.3 ± 148.80[b]	1538.4 ± 104.56[b]	1262.8 ± 138.80[a]	-
	C	1537.0 ± 239.94[b]	1540.6 ± 173.56[b]	1072.3 ± 87.90[a]	-
Plucked body weight (g)	A	1524.0 ± 175.95[a]	1570.8 ± 204.00[a]	1285.4 ± 37.34[a]	2585.0 ± 242.64[b]
	B	1446.6 ± 142.99[b]	1448.1 ± 97.65[b]	1200.0 ± 130.64[a]	-
	C	1482.5 ± 233.49[b]	1461.5 ± 161.67[b]	1030.5 ± 81.14[a]	-
Drained carcass weight (g)	A	1524.8 ± 177.69[a]	1552.4 ± 215.04[a]	1277.0 ± 35.78[a]	2560.2 ± 228.01[b]
	B	1434.1 ± 142.29[b]	1438.5 ± 101.08[b]	1192.0 ± 128.80[a]	-
	C	1456.8 ± 236.17[b]	1444.1 ± 160.78[b]	1023.3 ± 80.82[a]	-
Body weight without head and neck (g)	A	1290.2 ± 140.77[a]	1308.0 ± 186.09[a]	1104.1 ± 28.73[a]	2191.8 ± 206.93[b]
	B	1051.1 ± 109.21[b]	1056.4 ± 71.28[b]	824.6 ± 93.75[a]	-
	C	1232.6 ± 197.04[b]	1217.1 ± 138.59[b]	864.0 ± 71.26[a]	-
Eviscerated carcass weight (g)	A	1142.6 ± 131.03[a]	1140.8 ± 165.68[a]	882.5 ± 33.25[a]	1915.6 ± 188.34[b]
	B	1277.9 ± 136.70[b]	1277.8 ± 90.88[b]	996.1 ± 107.20[a]	-
	C	1060.1 ± 177.96[b]	1033.0 ± 121.48[b]	665.8 ± 51.90[a]	-

*Mean values within rows sharing the same superscript letters do not differ significantly ($p < 0.05$).

3.2 Effect of genotype on offal weights and skeletal measurements

Genotype significantly affected offal weights and skeletal measurements (Table 3). In batch A, Label chickens exhibited significantly higher head and neck weights (106.2 ± 16.6 g and 148.4 ± 20.6 g, respectively) than the other genotypes ($p < 0.05$). No significant differences were observed between Forest and Savannah chickens for these parameters, whereas broiler chickens exhibited the lowest values. In the same batch, leg weight was significantly higher in Label chickens (114.2 ± 11.0 g) than in Forest (57.0 ± 12.2 g), Savannah (64.4 ± 12.0 g), and broiler chickens (71.5 ± 4.2 g). No significant differences in leg weight were observed among Forest, Savannah, and broiler chickens. Feather weight did not differ

significantly among Forest, Savannah, and broiler chickens across the three batches ($p > 0.05$), whereas Label chickens exhibited significantly higher feather weight in batch A (157.5 ± 37.4 g). Heart, liver, and gizzard weights varied significantly with genotype (Table 3). In batch A, Label chickens showed the highest mean values for heart (13.8 ± 2.8 g), liver (43.7 ± 5.3 g), and gizzard (46.8 ± 6.3 g) weights, followed by Forest and Savannah chickens, which did not differ significantly from each other. Broiler chickens consistently exhibited the lowest values for these parameters across all batches. Tarsus length was significantly greater in Label chickens (8.6 ± 0.6 cm) than in the other genotypes in batch A ($p < 0.05$). Forest and Savannah chickens showed similar tarsus lengths, whereas broiler chickens exhibited the shortest values across all batches. Abdominal fat weight differed significantly among genotypes. In batch A, broiler chickens exhibited the highest fat weight (12.5 ± 7.3 g), followed by Forest and Savannah chickens, while Label chickens showed the lowest fat deposition (0.7 ± 1.5 g). A similar pattern was observed in batches B and C (Table 3). Testicular weight was very low in broiler chickens across all batches. In contrast, Label, Forest, and Savannah chickens exhibited comparable testicular weights, with no significant differences among these genotypes ($p > 0.05$).

Table 3*:* Offal weights and skeletal measurements by chicken genotype.

	Genotypes				
	Batches	**Forest**	**Savannah**	**Broiler**	**Label**
Head weight (g)	A	77.8 ± 14.04^{b}	81.4 ± 19.18^{b}	49.4 ± 43.11^{a}	106.2 ± 16.67^{c}
	B	78.3 ± 5.39^{b}	78.9 ± 12.79^{b}	41.3 ± 4.77^{a}	-
	C	72.0 ± 13.13^{b}	75.4 ± 9.84^{b}	43.8 ± 4.10^{a}	-
Neck weight (g)	A	102.4 ± 13.78^{b}	101.2 ± 11.86^{b}	54.1 ± 15.89^{a}	148.4 ± 20.58^{c}
	B	84.9 ± 12.96^{b}	84.8 ± 7.81^{b}	64.9 ± 3.14^{a}	-
	C	91.8 ± 17.25^{b}	94.1 ± 8.92^{b}	57.3 ± 4.83^{a}	-
Leg weight (g)	A	57.0 ± 12.17^{a}	64.4 ± 11.97^{a}	71.5 ± 4.2^{a}	114.2 ± 11.03^{b}
	B	55.1 ± 4.39^{a}	54.8 ± 7.15^{a}	64.8 ± 10.44^{b}	-
	C	57.6 ± 11.93^{a}	57.0 ± 8.95^{a}	59.6 ± 4.90^{b}	-
Feather weight (g)	A	64.0 ± 11.60^{a}	84.8 ± 19.23^{a}	55.0 ± 11.45^{a}	157.5 ± 37.38^{b}
	B	84.6 ± 21.03^{b}	90.3 ± 29.35^{a}	62.8 ± 13.46^{a}	-
	C	54.5 ± 12.03^{a}	79.1 ± 14.34^{a}	41.8 ± 14.56^{a}	-
Heart weight (g)	A	10.6 ± 2.80^{b}	11.0 ± 1.07^{b}	6.4 ± 0.91^{a}	13.8 ± 2.79^{b}
	B	10.0 ± 1.69^{b}	10.0 ± 1.20^{b}	7.3 ± 1.28^{a}	-
	C	10.1 ± 0.83^{b}	11.0 ± 1.07^{b}	6.4 ± 0.91^{a}	-
Liver weight (g)	A	24.4 ± 3.91^{b}	25.6 ± 5.08^{b}	35.3 ± 3.37^{a}	43.7 ± 5.34^{c}
	B	24.5 ± 11.85^{b}	26.8 ± 8.92^{b}	31.6 ± 4.72^{a}	-
	C	28.8 ± 6.84^{b}	27.1 ± 7.32^{a}	27.9 ± 4.25^{a}	-
Gizzard weight (g)	A	22.6 ± 1.82^{a}	25.4 ± 6.02^{a}	34.5 ± 7.09^{a}	46.8 ± 6.30^{b}
	B	26.1 ± 12.30^{a}	24.8 ± 4.43^{a}	32.0 ± 4.17^{b}	-
	C	23.8 ± 3.62^{a}	23.5 ± 1.93^{a}	31.0 ± 5.01^{b}	-
Fat weight (g)	A	3.2 ± 2.59^{a}	6.8 ± 4.32^{a}	12.5 ± 7.28^{c}	0.7 ± 1.50^{b}
	B	7.5 ± 6.21^{a}	5.3 ± 8.19^{a}	14.3 ± 5.65^{a}	-
	C	3.6 ± 4.81^{a}	6.4 ± 6.99^{a}	15.6 ± 5.32^{b}	-
Testicular weight (g)	A	28.2 ± 4.21^{b}	18.6 ± 5.41^{b}	0.4 ± 0.03^{a}	28.3 ± 10.73^{b}
	B	16.6 ± 3.70^{b}	17.0 ± 5.90^{b}	0.3 ± 0.06^{a}	-
	C	23.6 ± 5.68^{b}	22.3 ± 5.08^{b}	0.4 ± 0.08^{a}	-
	A	7.2 ± 0.45^{b}	7.7 ± 0.46^{b}	5.9 ± 0.18^{a}	8.6 ± 0.60^{b}

Tarsus length (cm)	B	7.3 ± 0.36[b]	7.4 ± 0.44[b]	6.1 ± 0.35[a]	-
	C	7.4 ± 0.37[b]	7.2 ± 0.24[b]	6.2 ± 0.35[a]	-

*Mean values within rows sharing the same superscript letters do not differ significantly ($p < 0.05$).

3.3 Effect of genotype on slaughter characteristics

Slaughter characteristics were significantly influenced by genotype (Table 4). In batch A, Label chickens exhibited significantly higher thigh (178.0 ± 18.8 g) and drumstick weights (181.9 ± 23.1 g), as well as greater drumstick length (15.4 ± 0.9 cm), than the other genotypes ($p < 0.05$). Across all batches, Forest and Savannah chickens showed comparable values for thigh and drumstick weights and lengths ($p > 0.05$), whereas broiler chickens consistently exhibited the lowest values. Fat percentage relative to live body weight was significantly higher in broiler chickens than in the other genotypes. In batch A, broiler chickens showed a fat percentage of 0.9 ± 0.37%, compared with 0.2 ± 0.15% and 0.4 ± 0.25% in Forest and Savannah chickens, respectively, and 0.1 ± 0.05% in Label chickens. Carcass depth differed significantly among genotypes. In batch A, Label chickens exhibited the highest carcass depth (9.2 ± 0.77 cm), whereas values for the other genotypes ranged from 7.0 to 8.0 cm. In batches B and C, Forest and Savannah chickens showed significantly greater carcass depth than broiler chickens ($p < 0.05$). No significant differences in carcass yield were observed among genotypes within any batch ($p > 0.05$), with values ranging from 59.6% to 80.9%. Feather-to-live weight ratio varied among genotypes in batch A, with Label chickens exhibiting the highest proportion (5.5 ± 1.23%), whereas no significant differences were observed in batches B and C.

The heart-to-live weight ratio was significantly higher in Forest and Savannah chickens (0.6–0.7%) than in Label and broiler chickens (0.4–0.5%) across all batches.

Table 4 *:* Slaughter traits by chicken genotype.

	Genotypes				
	Batches	**Forest**	**Savannah**	**Broiler**	**Label**
Thigh weight (g)	A	114.4 ± 15.61[b]	122.0 ± 18.51[b]	83.6 ± 7.09[a]	178.0 ± 18.80[c]
	B	104.6 ± 15.84[b]	100.9 ± 8.04[b]	73.9 ± 8.74[a]	-
	C	110.9 ± 19.30[b]	103.4 ± 16.95[b]	71.9 ± 5.08[a]	-
Drumstick weight (g)	A	99.0 ± 11.22[a]	98.2 ± 15.47[a]	75.0 ± 2.83[a]	181.9 ± 23.06[b]
	B	86.6 ± 8.11[b]	94.1 ± 8.54[b]	68.3 ± 9.48[a]	-
	C	91.4 ± 17.46[b]	88.1 ± 13.58[b]	54.4 ± 4.60[a]	-
Drumstick length (cm)	A	12.6 ± 0.55[b]	12.8 ± 0.84[b]	10.9 ± 0.35[a]	15.4 ± 0.88[c]
	B	12.0 ± 0.53[b]	11.9 ± 0.64[b]	10.5 ± 0.53[a]	-
	C	12.3 ± 0.61[b]	12.0 ± 0.44[b]	10.3 ± 0.29[a]	-
Carcass depth (cm)	A	8.0 ± 0.00[a]	7.8 ± 0.45[a]	7.0 ± 0.76[a]	9.2 ± 0.77[b]
	B	8.3 ± 0.71[b]	8.1 ± 0.64[b]	6.8 ± 0.89[a]	-
	C	7.6 ± 0.43[b]	7.5 ± 0.55[b]	7.0 ± 0.21[a]	-
Feather weight relative to live body weight (%)	A	3.9 ± 0.73[a]	3.9 ± 1.35[a]	3.0 ± 0.72[a]	5.5 ± 1.23[b]
	B	5.4 ± 1.21[a]	5.7 ± 1.66[a]	4.8 ± 1.58[a]	-
	C	3.5 ± 1.19[a]	5.0 ± 0.54[a]	3.7 ± 1.15[a]	-

Fat percentage (%)	A	0.2 ± 0.15^{b}	0.4 ± 0.25^{b}	0.9 ± 0.37^{c}	0.1 ± 0.05^{a}
	B	0.5 ± 0.37^{a}	0.3 ± 0.54^{a}	1.0 ± 0.57^{a}	-
	C	0.6 ± 0.08^{b}	0.6 ± 0.09^{b}	1.4 ± 0.47^{b}	-
Heart weight relative to live body weight (%)	A	0.6 ± 0.09^{b}	0.6 ± 0.06^{b}	0.4 ± 0.11^{a}	0.5 ± 0.07^{a}
	B	0.6 ± 0.09^{b}	0.6 ± 0.06^{b}	0.4 ± 0.11^{a}	-
	C	0.7 ± 0.10^{b}	0.7 ± 0.10^{b}	0.5 ± 0.08^{a}	-
Carcass yield (%)	A	68.9 ± 0.85^{a}	66.0 ± 2.70^{a}	63.1 ± 1.05^{a}	68.3 ± 6.53^{a}
	B	80.9 ± 1.74^{a}	80.5 ± 1.46^{a}	76.6 ± 1.28^{a}	-
	C	67.3 ± 1.56^{a}	65.5 ± 1.35^{a}	59.6 ± 3.11^{a}	-

*Mean values within rows sharing the same superscript letters do not differ significantly ($p < 0.05$).

4 DISCUSSION

The present study demonstrates a marked influence of chicken genotype on carcass characteristics under semi-intensive rearing conditions in Côte d'Ivoire. However, the observed differences reflect the combined effects of genetic background, growth rate, and age at slaughter, rather than genotype alone. Local and Label chickens, slaughtered at 22 weeks of age, exhibited significantly higher live body weights, carcass weights, and offal weights than broiler chickens slaughtered at 6.5-7 weeks of age. This pattern is consistent with previous findings indicating that longer rearing periods in slow-growing genotypes allow more advanced physiological and anatomical development, resulting in greater carcass mass and organ development [16].

The absence of significant differences between Forest and Savannah local chickens for most carcass and morphometric traits suggests a high degree of phenotypic homogeneity between these ecotypes, despite their distinct agro-ecological origins. Similar observations have been reported for Ivorian local chicken populations, which exhibit limited morphometric divergence across agro-ecological zones [8]. This relative uniformity supports the view that local chickens constitute a broadly shared genetic resource at the national scale, shaped by gene flow and similar selective pressures across regions.

Feather weight differed among genotypes, with Label chickens exhibiting higher plumage mass than local and broiler chickens. This difference likely reflects genetic selection under temperate climatic conditions, where dense plumage confers thermal insulation. In contrast, reduced feather development in local chickens and broilers reared in tropical environments may facilitate heat dissipation and contribute to thermal adaptation. Comparable associations between plumage characteristics, thermoregulation, and growth performance have been documented in chickens raised under hot climatic conditions [17, 18].

Lipid deposition varied markedly among genotypes, with broiler chickens exhibiting the highest abdominal fat weight and fat percentage. This pattern is consistent with the effects of intensive genetic selection for rapid growth in broilers, which is frequently associated with enhanced lipogenesis and increased fat storage capacity [19]. In contrast, slow-growing genotypes appear to allocate nutrients more evenly among muscle tissue, internal organs, and skeletal structures. The intermediate fat deposition observed in local chickens may reflect adaptive metabolic strategies that balance energy storage with thermoregulatory efficiency in tropical environments, as suggested for indigenous chicken populations in other african contexts [20].

The relatively higher heart weights and heart-to-live body weight ratios observed in local and Label chickens compared with broilers suggest more developed cardiovascular systems in slow-growing genotypes. This pattern may be linked to greater locomotor activity and a higher reliance on oxidative metabolism, as reported in comparative studies of traditional and commercial chicken lines [21, 22]. Conversely, intensive selection for muscle yield in broilers has been associated with relatively reduced development of internal organs, including the heart, which may have implications for animal robustness and welfare.

Differences in the weights of edible offal (liver, gizzard, head, neck, and legs) further indicate more progressive and proportionate somatic development in slow-growing genotypes. Similar trends have been described for indigenous and commercial chickens in tropical and subtropical production systems [20, 23]. Variations in thigh and drumstick weights

and lengths were closely related to differences in live body weight and age at slaughter, confirming the strong allometric relationship between body size and carcass component weights [24].

Despite pronounced differences in growth rate and body composition, carcass yield did not differ significantly among genotypes. This finding indicates that, under semi-intensive conditions, the efficiency of converting live body weight into marketable carcass may be comparable across genetic types when birds are slaughtered at appropriate physiological stages. Similar observations have been reported in comparative analyses of historical and contemporary broiler lines, emphasizing the importance of considering slaughter age and body weight when interpreting carcass performance [25].

Marked differences in testicular development were observed between broilers and the other genotypes, with broilers showing very small testicular weights (0.3–0.4 g) compared with label and local birds. This pattern is primarily attributable to differences in age at slaughter, as gonadal development in chickens is strongly age-dependent, although genetic background can modulate the timing and rate of sexual maturation [26, 27]. The developmental framework described by De Reviers [28], with a slow prepubertal phase followed by a marked acceleration of testicular growth from approximately 7 to 20 weeks of age, is consistent with the observed genotype-related contrasts. Overall, these findings support the interpretation that the very low testicular mass observed in broilers mainly reflects early slaughter age, with genotype acting as a secondary modulator of reproductive development. Overall, the present findings highlight the zootechnical potential of Ivorian local chickens under semi-intensive management. Future studies should compare chicken genotypes at a common slaughter age and, separately, at a common slaughter weight, using appropriate factorial experimental designs and mixed-effects statistical models to better distinguish genetic effects from age- and environment-related influences on carcass traits.

5 CONCLUSION

This study provides a comparative characterization of carcass traits among local Forest and Savannah chickens, slow-growing Label chickens, and fast-growing commercial broilers reared under semi-intensive conditions in Côte d'Ivoire. The results demonstrate that marked differences in growth performance, carcass composition, and organ development exist among genetic types. However, these differences reflect the combined effects of genotype and age at slaughter, as birds were processed at different physiological stages. No significant differences were detected between Forest and Savannah local ecotypes for most carcass and morphometric traits, suggesting a high degree of phenotypic and functional homogeneity within ivorian local chicken populations. This relative uniformity supports the consideration of local chickens as a broadly shared genetic resource with potential for genetic improvement and sustainable utilization under tropical production systems. Despite their lower growth rates compared with commercial broilers, local and Label chickens exhibited balanced development of internal organs and skeletal structures and moderate fat deposition, traits that may be advantageous under semi-intensive management in tropical environments. The absence of significant differences in carcass yield among genotypes further indicates that the efficiency of converting live body weight into marketable carcass can be comparable across genetic types when birds are slaughtered at appropriate physiological stages. Overall, these findings highlight the zootechnical value of Ivorian local chickens and their relevance for the development of poultry production strategies aimed at enhancing food security and promoting resilient livestock systems in tropical regions. Future research should prioritize factorial experimental designs with standardized slaughter ages and body weights, combined with mixed-effects statistical modeling, to disentangle genetic effects from age- and environment-related influences on carcass traits and to support evidence-based breeding and management interventions.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare that they have no conflicts of interest regarding the present study.

Author's contribution

The first author collected, processed and drafted this article. The other authors read and corrected the manuscript. All the authors read and approved the final manuscript.

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