INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print); 2222-5234 (Online)
Website: https://www.innspub.net
Email contact: info@innspub.net
Vol. 27, Issue: 5, p. 225-231, 2025

RESEARCH PAPER OPEN ACCESS

Evolution of the weight of carcasses and offal of Cobb 500 broiler chickens according to the age of slaughter

Soro Soronikpoho*[1], Kouadio Kouakou Parfait[1], Kouassi Koffi Dongo[2], Brou Gboko Konan Gatien[1]

[1]*Peleforo Gon Coulibaly University, Agropastoral Management Institute, Korhogo, Ivory Coast*

[2]*Peleforo Gon Coulibaly University, UFR des Sciences Biologiques, Department of Biological Science, Ivory Coast*

Key words: Broiler chickens, Average live weight, Organs, Carcass yield, Marahoué

DOI: https://dx.doi.org/10.12692/ijb/27.5.225-231 Published: November 22, 2025

ABSTRACT

The quality of poultry meat is a major asset for consumers. However, the cost of production remains a real obstacle for poultry farmers. The general objective of this study was to contribute to improving the quality of broiler meat produced in Ivory Coast. To achieve this objective, 75 Cobb 500 strain chicks with an average weight of 42 g were used. They were divided into 3 batches of 25 chicks each. All batches were fed the same type of feed. Zootechnical parameters such as live weight and average daily gain (ADG) were determined throughout the rearing period. Regarding the characteristics of carcasses and offal, they were determined at the fourth, fifth and sixth week of age. Thus, in each batch, four chickens were randomly selected, slaughtered, plucked and eviscerated. The carcasses obtained were weighed while still hot. From each of the chickens slaughtered at each age, the heart, liver, intestines, gizzard and feet were removed and weighed while still hot. The results showed that chickens slaughtered at the 6th week recorded average live weights of 2313.33 g and ADGs of 60.95 g, significantly higher ($p \leq 0.05$) than those at the 5th week (1886.67 g and 47.11 g) and at the 4th week (1556.9 g and 70.32 g). Carcass yields were also significantly different ($p \leq 0.05$) with 74.92%; 74.80% and 74.60% respectively for the 4th, 5th and 6th weeks of slaughter. Significant differences were also observed for the weights of the offal studied. Ultimately, the early sale of broiler chickens does not seem to be solely motivated by reasons related to the growth of the animals. In-depth economic studies would be necessary to better understand the economic determinants of the slaughter age.

***Corresponding author:** Soro Soronikpoho ✉ soronikpohosoro@gmail.com

INTRODUCTION

Poultry farming is one of the most dynamic sectors of animal production in the world because it plays an important role in food security. In 2020, poultry meat accounted for nearly 40% of global meat production. It plays a growing role in global meat consumption. Consumption is forecast to increase by 15% between 2023 and 2033 (OECD-FAO, 2024). Among poultry, broiler chicken is the most consumed globally, due to its relatively low production cost, good feed conversion, high productivity, and religious and cultural acceptability (Lebas, 2001).

However, consumer expectations are evolving towards specific quality criteria such as tenderness, juiciness, color, low fat content and safety (Font-i-Furnols, 2023; Prache *et al.*, 2023). According to Moula *et al.* (2009), the quality of chicken meat is influenced by several factors classified into two broad categories: intrinsic factors (genetic strain, age, sex, live weight, health status) and extrinsic factors (feed, rearing conditions, slaughter methods, transport, production method). Among these factors, slaughter age plays a determining role. Slaughtering too early, generally before 35 days, leads to light and poorly developed carcasses. Conversely, late slaughter, beyond 49 to 56 days, results in excessive fat accumulation, a more fibrous texture and a reduction in tenderness (Moujahed *et al.*, 2011). Thus, several authors recommend an optimal slaughter age of between 38 and 45 days, depending on the strain and rearing conditions.

However, in Ivory Coast, many poultry farmers sell broiler chickens at 28 days of age. This phenomenon is becoming a golden rule and sometimes the chickens do not have the required weight to be sold. This measure, the basis of which remains opaque, is certainly not intended to improve carcass quality but rather to meet a specific need of poultry farmers. What is the issue of early sale of chickens by poultry farmers at 28 days of age? However, studies conducted by some authors confirm that slaughter age is a key lever for optimizing the quality of poultry products while ensuring good profitability (Moula *et al.*, 2009; Moujahed *et al.*, 2011). In Ivory Coast, this issue remains little studied, although it is essential to improve the economic performance of farms and meet consumer demands. It is therefore necessary to produce local scientific data to support and guide poultry farmers' decisions. The objective of this work is therefore to evaluate the weight characteristics of broiler carcasses and offal according to slaughter age.

MATERIALS AND METHODS

Materials

The animal biological material consisted of 75 Cobb 500 strain chicks with an average weight of 42 ± 1.62 g. The technical equipment consisted of plastic trays for feeding the chicks; anti-waste feeders; 3 L and 10 L waterers; an Electronic Kitchen Scale SF400 with a maximum capacity of 10 kg ± 1 g for weighing the chickens; an ILLUXN scale with a capacity of 20 kg ± 1 g for weighing feed; cleaning and disinfection equipment; and a teaspoon for measuring the dosages of medication to be administered.

Methods

Experimental device

The experiment was conducted in a building with a capacity of 1500 m². Three enclosures were arranged with wire mesh within the building to obtain a density of 10 subjects/m². Inside each compartment, 25 chicks after heating were installed. The three groups were fed with the same feed until the end of the experiment.

Experimental driving

The building used for the trial provided a crawl space before the start of the experiment. Bleach and detergent soap were used to clean and disinfect the facilities. The litter used consisted of rice husks treated with disinfectant one day before the chicks were placed. The litter was changed every 10 days to ensure the cleanliness of the henhouse. The chicks were counted and weighed before being placed in the brooder house. The chicks were heated with charcoal. Three 60-watt bulbs were used for lighting. After heating, the chicks were weighed and divided to ensure uniform batches. They were fed

and watered according to the standards indicated on the technical sheet. Feed and water were provided twice a day (in the morning at 8 a.m. and in the afternoon at 4 p.m.). The medical prophylaxis plan from establishment to culling defined by the chick supplier was respected (Table 1).

Table 1. Medical prophylaxis used

Ages (Days)	Action	Products	Dosages
D1	Sweet water	White sugar	0.5 g/L of water
D2-D5	1st vaccin	Newcastle and bronchite (HB1+H120)	1 Dose for 1000
D6-D10	2nd vaccin	Gumboro	1 Dose for 1000
D11-D21	3rd vaccin	La sota	1 Dose for 1000
D22-D29	Vitamin intake	Amin' total	1 cc for 10 L d'eau
D30-D33	Traitment d'une MR	Tylodox plus	1 cc for 10 L d'eau
D34-D39	Anticoccidial Treatment	Vetacox	1 cc for 10 L d'eau
D40-D42	water		

Determination of zootechnical parameters

To monitor growth parameters, the subjects were weighed weekly on a constant day between 4 p.m. and 4:30 p.m. A sample of 40% of subjects chosen at random was weighed in each group. Within each group, the subjects were weighed individually. These weightings also allowed the calculation of the Average Daily Gain.

Determination of carcass yield and offal weight

Carcass yield was determined in the fourth (4th) week, fifth (5th) week and sixth (6th) week. Thus, in each batch, four chickens were randomly selected, slaughtered, plucked and eviscerated. The carcasses obtained were weighed while hot. From each of the chickens slaughtered at each age, the heart, liver, intestines, gizzard and feet were removed and weighed while hot using the electronic scale.

Data processing

The data collected in the field was processed using Microsoft Excel 2013 software. These data were then subjected to descriptive analysis using the software. The same software was used to plot graphs. For statistical analysis, Statistica 7.1 software was used and the Student t-test was used to compare the means two by two at the 5% threshold.

RESULTS

Chicken growth parameters

Average live weight of chickens

Fig. 1 shows the evolution of the average live weight of chickens by batch as well as their average. From the fourth week to the sixth week, the evolution of the average live weight of the three batches is practically identical.

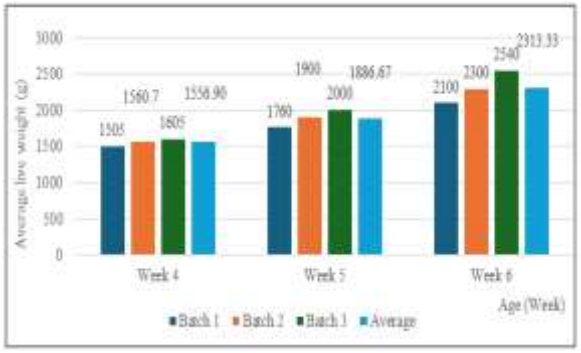

Fig. 1. Evolution of the average live weight of chickens

In the three batches, the average live weights varied between 1,505 g and 1,605 g with a batch average of 1,556.9 ± 25.95 g at the fourth week. At the fifth week, they varied between 1,760 g and 2,000 g with a batch average of 1,886.67 ± 63.33 g. As for the sixth week, they varied from 2,100 g to 2,540 g with a batch average of 2,313.33 ± 113.33 g at the sixth week. A significant difference was observed between these average live weights ($p \leq 0.05$).

Average daily gain of chickens

Fig. 2 shows the evolution of the average daily gains of broilers in the three batches. In the fourth week, these gains varied from 67.29 g to 72.14 g with an average of 70.32 ± 1.52 g. During the fifth week, they varied from 36.43 g to 56.43 g with an average of 47.11 ± 5.34 g. Finally, in the sixth week, they varied between 48.57 g and 77.14 g and displayed an average

of 60.95 ± 8.10 g. Statistical analysis of the means showed a significant difference ($p \leq 0.05$).

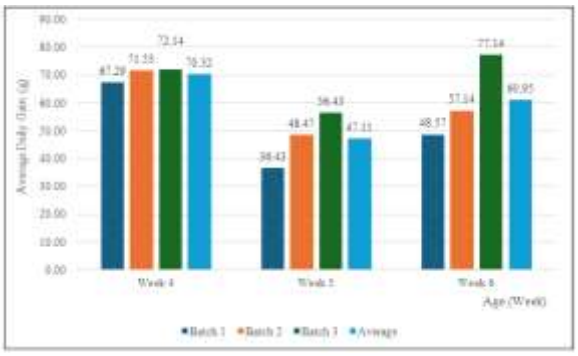

Fig. 2. Average daily gain of chickens

Chicken carcass yield and offal weight

Carcass weight

Fig. 3 shows the evolution of the carcass weights of the chickens. These weights varied from 1,166.25 g to 1,252.5 g with an average of 1,206.5 ± 23 g at the fourth week. During the fifth week, the recorded carcass weights varied between 1,302 g and 1,385 g with an average of 1,344.08 ± 21.04 g while at the sixth week they varied between 1,480 g and 1,835 g with an average of 1,650.83 ± 92.08 g. A significant difference was observed between these average carcass weights ($p \leq 0.05$).

Fig. 3. Evolution of carcass weights of broiler chickens

Carcass yield

Fig. 4 shows the evolution of carcass yields of broiler chickens in the three batches. From the fourth week to the sixth week, carcass yield showed a progressive decrease in all batches. In the fourth week, having varied from 74.8% to 75% with an average percentage of 74.92% in the three batches, carcass yield dropped to reach values ranging from 74.43% to 74.82%, thus showing an average of 74.60%.

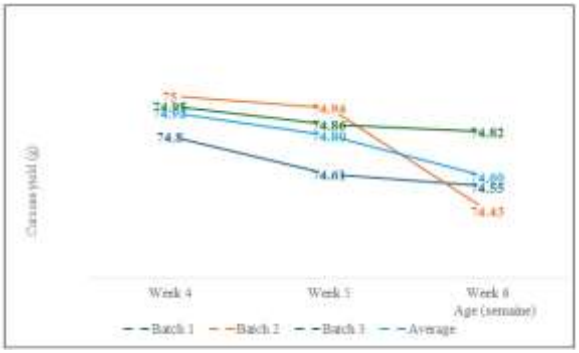

Fig. 4. Evolution of carcass yield of broiler chickens

Organ weight

The evolution of the average weight of the chicken hearts of the three batches is presented in Fig. 5 from the fourth to the sixth week. In the three batches, the weights fluctuated between 9.58 g and 9.7 g with an average of 9.63 ± 0.04 g during the fourth week. During the fifth week, they varied between 10.6 g and 10.8 g with an average of 10.72 ± 0.06 g. As for the sixth week, they fluctuated between 13 g and 14.7 g expressing an average of 13.83 ± 0.43 g. Only the averages of the fifth and sixth weeks showed a significant difference ($p \leq 0.05$).

Fig. 5. Evolution of Heart weight of broiler chickens

Fig. 6 shows the evolution of the average liver weight of the three batches as well as their average. From the fourth week to the sixth week, the evolution of the liver weight within the three batches is practically identical. In the three batches, the liver weights varied between 32.66 g and 33 g with a batch average of 32.83 ± 0.09 g in the fourth week. At the fifth week,

they varied between 36.65 g and 38 g with a batch average of 37.45 ± 0.40 g. As for the sixth week, they varied from 44 g to 50 g with a batch average of 46.73 ± 1.63 g in the sixth week. A significant difference was observed between these recorded values ($p \leq 0.05$).

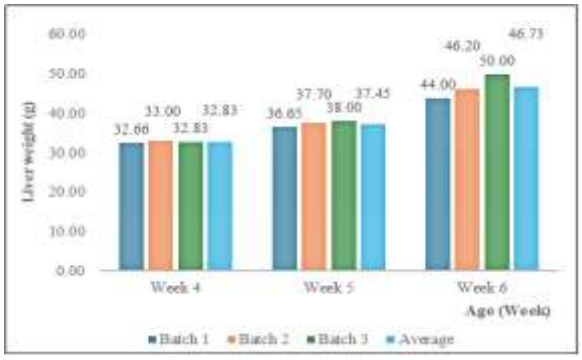

Fig. 6. Evolution of liver weight in broiler chickens

The evolution of the average weight of the gizzards of the chickens of the three batches is presented in Fig. 7 from the fourth to the sixth week. In the three batches, the weights fluctuated between 9.58 g and 9.7 g with an average of 9.63 ± 0.04 g during the fourth week. During the fifth week, they varied between 10.6 g and 10.8 g with an average of 10.72 ± 0.06 g. As for the sixth week, they fluctuated between 13 g and 14.7 g expressing an average of 13.83 ± 0.43 g. Only the averages of the fifth and sixth weeks showed a significant difference ($p \leq 0.05$).

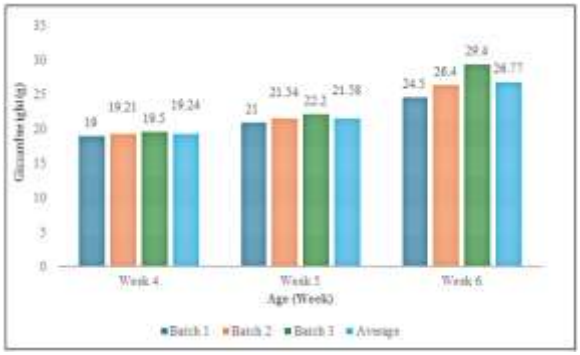

Fig. 7. Evolution of the weight of broiler gizzards

Fig. 8 shows the evolution of the weight of the legs of broiler chickens in the three batches from the fourth to the sixth week. From the fourth to the sixth week their evolution was practically identical. In the three batches, the weights of the legs varied between 69.98 g and 73 g with a batch average of 71.67 ± 0.85 g in the fourth week. In the fifth week, they varied between 78.53 g and 83.25 g with a batch average of 80.85 ± 1.20 g. As for the sixth week, they varied from 89.33 g to 110.25 g with a batch average of 99.53 ± 5.53 g in the sixth week. A significant difference was observed between these recorded values ($p \leq 0.05$).

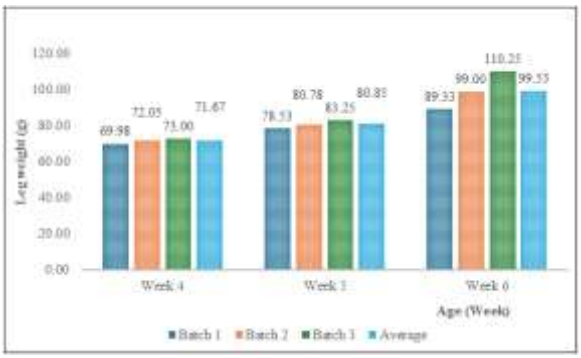

Fig. 8. Evolution of the weight of broiler chicken legs

Fig. 9 shows the evolution of the average intestinal weight of the three batches. From the fourth to the sixth week, the evolution of the curves of the three batches was practically identical. With values between 63 g and 65 g, the weight of the intestines recorded an average of 64.01 ± 0.51 g at the fourth week. At the fifth week, these values oscillated between 69.8 g and 72 g with an average of 71.2 ± 0.7 g. The sixth week, meanwhile, recorded an average of 110 ± 5 g with values that oscillated between 100 g and 120 g. For all these averages, a significant difference was observed ($p \leq 0.05$).

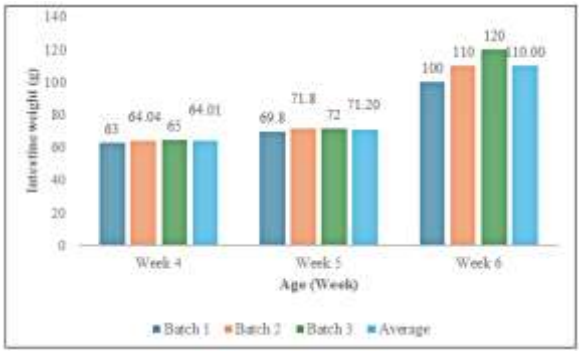

Fig. 9. Evolution of intestinal weight in broiler chickens

DISCUSSION

The average weights of the chickens increased progressively and significantly ($p \leq 0.05$) from the fourth to the sixth week with respective values of

1556.9 ± 25.95 g to 2313.33 ± 113.33 g. This increase confirms that extending the rearing period allows for an increase in the live weight of broilers. The average daily gains (ADG) of the chickens also increased proportionally until the sixth week, probably reflecting a rapid growth phase characteristic of the species. Indeed, this broiler strain is known for its rapid growth. This approach is highlighted by Negari *et al.* (2024) who indicate that Cobb 500 broilers are more efficient in converting feed into meat, which is reflected by their lower feed conversion ratio of 2.43. According to Danlami (2023), Cobb 500 is a powerful strain, which can weigh up to 2626g, with a feed conversion rate of 2.25 at only six weeks of age. Some authors also indicate that this strain has maximum growth between the fifth and sixth week (Moujahed *et al.*, 2011; Kouakou *et al.*, 2015). Hence the interest in raising the flock over a period of 40 to 45 days. Moreover, the results obtained by live weights obtained by David *et al.* (2022) clearly illustrate this. These authors, during their work, recorded weights varying between 3,090.7 g and 3,176.1 g with various diets during a rearing period of 49 days, or 7 weeks.

Regarding carcass yield, average values of 74.92% and 74.60% respectively at the fourth and sixth week reflecting a decrease in carcass yield. Sourokou (2014) in his work conducted in Senegal obtained yield values like ours. These varied between 85.40 and 86.06% at the end of his experiment, held over 6 weeks with various rations. On the other hand, David *et al.* (2022) recorded lower carcass yield values ranging between 64.53% and 65.05% at 7 weeks of rearing. Also, the work of Negari *et al.* (2024) carried out on the Cobb 500 strain made it possible to obtain a lower carcass yield of 67.85%. This decrease in yield could be linked to the duration of rearing. This situation could lead producers to sell chickens early at 28 days of age.

Comparison of offal from the fourth week to the sixth week showed significant differences ($p \leq 0.05$). These differences highlight the continuous growth that this strain exhibits during our rearing period. This therefore reflects the growth of all organs following the rhythm of body mass. This body growth, according to Danlami (2023), in the Cobb500 broiler, is rapid over a period of 11 weeks followed by a decline. For producers and consumers, the combined weight of edible and inedible offal in chicken carcasses is a significant factor (Zawacka *et al.*, 2018). Their growth probably follows the general evolution of body metabolism. According to Micol *et al.* (1993), the weight growth of an animal results from the development in weight of each of the constituent elements of its body. Their size and weight, however, depends on age, sex and diet. According to Uhlíová *et al.* (2018), these are the main factors that influence the quality of the carcass and meat of broiler chickens.

CONCLUSION

This study has highlighted the significant impact of slaughter age on carcass yield and edible offal size of Cobb 500 broiler chickens. The results confirm that extending the rearing period improves weight gain and internal organ development without compromising carcass yield, which remains around 74 to 75%. Poultry farmers could then manage their flocks of chickens for up to 6 weeks. However, it is important to emphasize that these technical performances must be assessed considering the additional costs generated by this rearing period.

REFERENCES

Danlami TC. 2023. Assesment of growth performance of cobb 500 broilers strain at Gic de Sahel poultry farm, Yaounde, center region of Cameroon. Thèse de Doctorat en Santé et prévention des pandémies : Santé et prévention des pandémies, Agriculture, CAIDERA, Cameroun, 86p.

David K, Ajebu N, Sandip B, Seid A. 2022. Growth Performance and Carcass Quality Characteristics of Cobb 500 Broiler Chicken Fed Rations with Different Levels of Water Lily (*Nymphae lotus*) Seed Meal. Ethiopian Journal of Agricultural Sciences **32**(2), 1-12.

Font-i-Furnols M. 2023. Meat consumption, sustainability and alternatives: an overview of motives and barriers. Foods **12**(11), 2144. https://doi.org/10.3390/foods12112144

Kouakou K, Kati-Coulibaly S, N'Goran KE. 2015**.** Élevage avicole et sécurité alimentaire en Ivory Coast: quelles perspectives? Revue Africaine d'Agronomie et de Développement **1**(1), 34–42.

Lebas F. 2001**.** Bases zootechniques de l'aviculture en climat tropical. CIRAD-EMVT, Montpellier, France, 145p.

Micol D, Robelin J, Geay Y. 1993**.** Composition corporelle et caractéristiques biologiques des muscles chez les bovins en croissance et à l'engrais. INRA Productions Animales **6**(1), 61-69. https://doi.org/10.20870/productions-animales.1993.6.1.4188

Moujahed N, Haddad B, Kayouli C. 2011**.** Influence de l'âge d'abattage sur les performances et la qualité de la carcasse chez le poulet de chair. Revue de l'Institut National Agronomique de Tunisie **26**(1), 87–95.

Moula N, Antoine-Moussiaux N, Farnir F. 2009**.** Facteurs influençant la qualité de la viande chez le poulet: une revue bibliographique. Biotechnologie, Agronomie, Société et Environnement **13**(4), 553–560.

Negari B, Yusuf Y, Hundie D, Ameha N, Kebede K, Abrar K, Diba D. 2024. Carcass Characteristics and Blood Biochemical Parameters of Cobb-500 and Hubbard Chicken Strains Fed on Commercial and Farm-Formulated Diets. Journal of World's Poultry Research **14**(3), 308-323. https://dx.doi.org/10.36380/jwpr.2024.32

OCDE-FAO. 2024**.** Les perspectives agricoles de l'OCDE et de la FAO 2024-2033. Editions OCDE, Paris, 366 p.https://doi.org/10.1787/96f19970-fr

Prache S, Adamiec C, Astruc T, Baéza E, Bouillot PE, Clinquart A, Santé-Lhoutellier V. 2023**.** La qualité des aliments d'origine animale: enseignements d'une expertise scientifique collective. INRAE Productions Animales **36**(1), 7480. https://doi.org/10.20870/productionsanimales.2023.36.1.7480

Sourokou SS. 2014**.** Performances zootechnico-économiques des poulets de chair (Cobb 500) nourris aux rations à base de la farine des graines de la variété verte de bissap (*Hibiscus sabdariffa*, Linn.) au Sénégal. Thèse de Doctorat en médecine vétérinaire, Ecole Inter Etats Des Sciences et Médecine Vétérinaires, Dakar, 140p.

Uhlíová L, Tmová E, Chodová D, Vlková J, Ketta M, Volek Z. 2018**.** The effect of age, genotype, and sex on carcass traits, meat quality, and sensory attributes of geese. Asian-Australasien Journal Animal Sciences **31**, 421- 428. https://doi.org/10.5713/ajas.17.0197

Zawacka M, Gesek M, Michalik D, Murawska D. 2018**.** Changes in the content of edible and non-edible components and distribution of tissue components in cockerels and capons. Spanish Journal of Agricultural Research **16**(1), 1-8. https://doi.org/10.5424/sjar/2018161-11834