

PERFORMANCE AND CARCASS CHARACTERISTICS OF MALE AND FEMALE BROILER TURKEYS REARED ON DIFFERENT HOUSING SYSTEMS

A. Suleiman^{1*}, M. N. Sabo¹, H. B. Usman¹, C. C. Mbakwe¹, Z. S. Jibia¹ and A. I. Maryam²

¹Department of Animal Science, Faculty of Agriculture, Federal University, Dutsin-Ma, Katsina State, Nigeria.

²Department of Fisheries and Aquaculture, Faculty of Renewable Natural Resource, Federal University, Dutsin-Ma, Katsina State, Nigeria.

****Corresponding author:** smartclassfudutsinma@gmail.com Tel: +234-7083414126

ABSTRACT

The experiment was conducted to evaluate the performance and carcass characteristics of broiler turkeys reared on different housing systems. A total of 48-day-old poults were obtained from a reputable commercial hatchery and reared for 4 weeks indoors. At the end of the fourth week, the poults were moved to the experimental pens. The poults were placed in a 2 x 2 factorial arrangement in a completely randomized design (CRD). The factors were two sexes (male and female) and two housing systems (deep litter and deep litter with outdoor). Data were collected on feed intake, body weight, mortality and carcass characteristics. The result indicated that there were significant ($P<0.05$) differences between the sexes of the turkeys in terms of initial body weight, final body weight, weight gain and total feed intake. The male has higher values as compared to the female turkeys. Feed conversion ratio and mortality were similar between the two sexes. Housing did not influence ($P>0.05$) growth performance parameters measured in this study. The carcass study revealed that live weight, dressed weight and dressing percentage were higher ($P<0.05$) in males compared to females. Housing also has no significant ($P<0.05$) effect on carcass characteristics of broiler turkeys.

Keywords: Performance, Poults, Characteristics, Male, Hen

INTRODUCTION

The poultry industry in general requires that producers consider production costs and improve profit margins to enhance productivity and sustainability (Noonari *et al.*, 2015). Nevertheless, confining high-proficiency production is another good area of concern especially now that consumer's demands meat products that derived from poultry reared in the optimum environment to ensure their welfare (Ferrante *et al.*, 2019). In recent years, the increased emphasis on regulation has driven changes on how animals are fed and managed and will continue, possibly in an accelerated manner with much pressure on considered an environmentally sound and economically viable approach (Suleiman *et al.*, 2023). The environments to which poultry birds are exposed include the housing system, the feed they consume, climatic factors and management systems which affect the performance of the birds (Suleiman *et al.*, 2023). Turkey's production is very vital, viable and very profitable due to the increased demand for its meat globally. Turkeys are more tolerant of heat than chickens, perform well in the tropic and produce meat of better quality which is used for human consumption (Yakubu *et al.*, 2013). In many parts of the world today, turkey production has greatly improved; it has experienced a significant improvement since 1980 (Rasha *et al.*, 2024). The main objective of this study was to determine the effect of different housing systems and sex on performance and carcass characteristics of Nicholas White turkeys.

MATERIAL AND METHODS

The experiment was conducted at the Livestock Teaching and Research Farm, Federal University Dutsin-Ma, Katsina State. A total of 48-day-old poults were obtained from a reputable commercial hatchery company and the poults were reared for 4 weeks indoors (brooding). At the end of the fourth week, the poults were moved to the experimental pens. The poults were placed in a 2 x 2 factorial arrangement in a completely randomized design (CRD). The factors are two housing types (deep litter without outdoor (DL) access and deep litter with outdoor access (DLO)) and two sexes (jakes and hen poults). The poults were separated according to sex and each having four (4) treatments and three (3) replicates in completely randomized design. The treatments allocated are Treatment 1: Jakes under DL (Deep Litter) housing (JDL), Treatment 2: Jakes under DLO housing (JDLO), Treatment 3: Hen poults under DL housing (HpDL) and Treatment 4: Hen poults under DLO housing (HpDLO) respectively. All the birds were given same feed types *ad libitum* containing 30% CP and 2800 ME kcal/kg at weeks 0 to 8 (starter phase) and 23% CP and 3000 ME kcal/kg at weeks 8 to 16 weeks (grower phase) according to recommendations of Ogundipe *et al.* (2022). Data collected includes growth performance, body weight, body weight gain, feed intake, feed conversion ratio, mortality and Carcass characteristics A Greener World (2023). All data generated was analysed using the General Linear Model (GLM) procedure of Statistical Analysis System (SAS) package version 9.2 software (Statistical Analysis System, 2007, SAS Institute Inc., Cary, NC, USA) and

statistical significance was set at $P < 0.05$. Statistical difference was separated using Duncan's Multiple Range Test method in the software.

RESULTS AND DISCUSSIONS

The result of the study as shown in table 1 indicated that there was significant ($P > 0.05$) differences between the sexes of the turkeys in terms of final body weight, weight gain and total feed intake. The males having the highest values as compared to the female turkeys. This is in contrast to the findings of Suleiman *et al.* (2023) who reported that there is no significant difference ($P > 0.05$) between DL and O+P (*Lablab purpureus*) in terms of final body weight and body weight gain of Noiler birds reared under different housing types (DL: 1.64 & O+P: 1.64). Similarly, there are no significant differences in terms of total feed intake (TFI) among all the treatments (Suleiman *et al.*, 2023) except for feed conversion ratio and mortality rate (FCR= 2.17 – 2.56% & Mort= 10.00 – 3.33%) which indicated an insignificant statistical difference between the two sexes. For the housing, initial body weight and total feed intake shows a significant ($P > 0.05$) differences among the treatments. This means that final body weight, weight gained, feed conversion ratio and mortality are statistically the same. Animals will have a higher energy demand living outside because they are expending more energy walking around and using more energy to stay warm/cool (Oyegunle *et al.*, 2021).

Table 1: Performance Characteristics of broiler turkey on different housing systems

Parameters	IBW	FBW	WG	TFI	FCR	MORT
Sex						
Male	4.24 ^a	11.52 ^a	7.28 ^a	15.60 ^a	2.17	10.00
Female	3.66 ^b	9.54 ^b	5.88 ^b	14.78 ^b	2.56	3.33
SEM	0.17	0.34	0.36	0.24	0.17	4.08
Housing						
Indoor	4.04	10.62	6.58	15.10	2.31	6.67
Outdoor	3.86	10.43	6.58	15.28	2.42	6.67
SEM	0.17	0.33	0.36	0.24	0.17	4.08
Interaction						
Sex * Housing	NS	NS	NS	NS	NS	NS

^{a-b} means within rows bearing different superscripts differs significantly at $p > 0.05$; SEM: Standard error of means, IBW: initial body weight, FBW: final body weight, WG: weight gain, TFI: total feed intake, FCR: feed conversion ratio, and MORT: mortality.

The carcass characteristics of the broiler turkeys as shown in table 2 below revealed that live weight, dress weight and dressing percentage (LW= 9.54 - 11.52, DW= 6.74 – 8.70, DP= 70.58 – 75.48%) have a significant ($P > 0.05$) differences among the treatments while for the housing, there is no significant differences across all the treatments. The results of this study did not agree with the finding of Suleiman *et al.* (2023) who reported that there are no significant differences among all the treatments in terms of live weight, dress weight, back weight, breast weight, neck weight, thigh weight, and wing weight. In addition, Castellini *et al.* (2002) found out that percentages of breast and thigh meat increased when birds had an outdoor access and a lower stocking density in an organic production system because of forced motor activity.

Table 2: Carcass Characteristics of broiler turkey on different housing systems

Parameters	LW	DW	DP	WW	BW	BRSW	THW	SHW	NW	HW
Sex										
Male	11.52 ^a	8.70 ^a	75.48 ^a	13.01	14.36	32.89	28.78	4.26	4.27	2.42
Female	9.54 ^b	6.74 ^b	70.58 ^b	12.14	17.90	31.16	27.89	4.15	4.70	2.06
SEM	0.34	0.30	0.92	0.49	1.71	2.53	0.45	0.22	0.47	0.17
Housing										
Indoor	10.62	7.86	73.71	12.73	17.46	29.78	28.91	4.13	4.67	2.32
Outdoor	10.43	7.58	72.34	12.42	14.81	34.26	27.76	4.28	4.31	2.16
SEM	0.33	0.30	0.92	0.49	1.71	2.53	0.45	0.22	0.47	0.17
Interaction										
Sex * Housing	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

^{a-b} means within rows bearing different superscripts differs significantly at $p > 0.05$; SEM: Standard error of means, LW: live weight, DW: dress weight, DP: dressing percentage, WW: wings weight, BW: back weight, BRSW: breast weight, THW: thigh weight, SHW: shank weight, NW: neck weight and HW: head weight

CONCLUSION AND RECOMMENDATION

In conclusion, the housing systems used in this study have no detrimental effect on the growth performance of turkeys reared under different housing systems. Both the indoor and the outdoor housing systems employed in this study can be implemented without any detrimental effect. Furthermore, carcass characteristics of turkeys investigated revealed that there were significant differences between male and female turkeys in term of live weight, dress weight and dressing percentage with the male turkeys having higher percentage.

ACKNOWLEDGEMENT

The Authors gratefully acknowledge Tertiary Education Trust Fund (Tetfund) and Federal University Dutsin-Ma, Katsina State, Nigeria for sponsoring this research work.

REFERENCES

- A Greener World (AGW), (2023). Mortality in Poultry. *A Greener World Technical Advice Fact Sheet* No. 8. PCE11v3 – TAFS 8 - Mortality in Poultry 032111 ©.
- Castellini, C.; Mugnai, C.; Dal-Bosco, A., 2002: Effect of organic production system on broiler carcass and meat quality. *Meat Science* 60, 219–225.
- Ferrante, V., Lolli, S., Ferrari, L., Watanabe, T.T.N., Tremolada, C., Marchewka, J., Estevez, I., (2019). Differences in prevalence of welfare indicators in male and female turkey flocks (*Meleagris gallopavo*). *Poultry Science* 98, 1568-1574.
- Hartcher, K.M., Jones, B., (2017). The welfare of layer hens in cage and cage-free housing systems. *World's Poultry Science Journal* 73, 767-782.
- Noonari, S., Memon, M.I.N., Kolachi, M.A., Chandio, A.A., Wagan, S.A., Sethar, A.A., Kalwar, G.Y., Bhatti, M.A., Korejo, A.S., Panhwar, G.M., Pakistan, T., (2015). Economic Analysis of Poultry Production in Tando Allahyar District Sindh. *Economic Analysis* 6, 118-130.
- Oyegunle E. Ok.; Janet O. A.; Ibukunoluwa D. S.; Deji A. E.; Samson A. R.; Olusiji F. S.; Okanlawon M. O.; (2021). Evaluation of access to different legume pastures on performance and welfare of broiler chickens during dry season under tropical environment DOI:10.1002/vms3.461.
- Rasha R. Ibrahim, Naglaa M. Abdel Azeem, Hosny Emeash, Asmaa K. Abdelghany (2024). Performance, behavior, and welfare of turkey poults reared under different housing conditions. *Journal of Advanced Veterinary Research*, (2024) Volume 14, Issue 1, 30-36. ISSN: 2090-6277/2090-6269
- Suleiman Aliyu, Idris Maryam Abdullahi and Mustapha Nalado Sabo (2023). Performance and carcass characteristics of Noiler chickens reared under different housing types. *Nigerian Society for Animal Production*, 48TH ANNUAL CONFERENCE (DUTSIN-MA 2023), (P) 1531-1535. ISBN: 978-978-799-934-9
- Yakubu, A., Abimiku, K., Musa-Azara, I.S., Idahor, K.O., Akinsola, O.M., (2013). Assessment of flock structure, preference in selection and traits of economic importance of domestic turkey (*Meleagris gallopavo*) genetic resources in Nasarawa state, Nigeria. *Livestock Research for Rural Development* 25, 18.