

## RESPONSE OF BROILERS, NOILERS AND NATIVE CHICKENS TO TRANSPORTATION STRESS

\*Anoh, K. U. and Opusunju, E. F.

Department of Animal Science, University of Calabar, Nigeria

\*Corresponding author: [kevin2us.man@gmail.com](mailto:kevin2us.man@gmail.com)

---

### ABSTRACT

*This study evaluated the response of broilers, noilers and native chickens to transportation stress. A total of forty-five chickens were used for this study. There were 15 chickens representing the three genetic groups that served as the treatments. The chickens were randomly placed in the transportation crates in a completely randomized design. Rectal Temperature (RT) and Body Temperature (BT) of chickens were recorded before, during, and after transportation while the weights of each of the birds were measured before and after transportation. Body weight changes were significantly ( $p < 0.05$ ) higher in the noiler and the native chicken. There was no weight change ( $p > 0.05$ ) in the broiler chicken. The body temperatures of the broilers before, during, and after transportation were significantly ( $p < 0.05$ ) higher than those of the noiler and the native chickens. It was concluded that broilers were more susceptible to transportation stress than the noilers and local chickens.*

**Keywords:** Native Chicken, Noilers, Stress, Transportation

---

### INTRODUCTION

In Cross River State Nigeria, chickens are the most transported farm animals; they are transported and sold alive because of limited stockpiling space and scattered farm locations in the absence of a central slaughterhouse. This makes transportation a crucial activity along this value chain. Transportation of animals is known to induce both psychological and physiological stress, which may result in major physiological disturbances such as aberrant behaviours, immune suppression, and disruption of general homeostasis (Minka and Ayo 2008; 2010).

Important indices of stress due to road transportation in livestock include rectal temperature (RT) (Anoh *et al.*, 2018; Minka and Ayo, 2007) and live weight (Minka and Ayo, 2010). Signs of transportation stress have been reported in different animal species by previous studies; for example, increased heart rate (Anoh *et al.*, 2018), increased rectal temperature (Anoh *et al.*, 2018; Minka and Ayo, 2007), increased adrenal-cortical activity (Minka and Ayo, 2007), increased morbidity and mortality (Chirase *et al.*, 2004).

The Noiler chicken a cross between the Nigeria indigenous chicken and the Plymouth breed of chicken was developed by Amo farm Sieberer Hatchery Limited, Awe, Oyo State, Nigeria for smallholders to address the challenges of food insecurity and financial dependency among the rural populace, especially women. It has been emphasized that the introduction of tropically adapted genotypes with high performance, diseases, and high environmental temperature resistance is beneficial to resource-poor poultry farmers (Yakubu and Ari, 2018). The study aimed to evaluate the response of broilers, noilers and native chickens to transportation stress.

### MATERIALS AND METHODS

#### Study Location

The study was carried out from 18<sup>th</sup> to 21<sup>st</sup> May, 2024 in Calabar and Akamkpa. The study location has an average temperature of 36°C and average relative humidity of 75%.

#### Pre-conditioning period

Three chicken genetic groups (mature indigenous, noiler birds of 6 months old, and broilers of 9 weeks old) were used in this study. The native chickens were purchased from a local chicken vendor in Bogobiri Calabar while the noiler and broiler chickens were obtained from a reputable poultry farm in Calabar. Feed and water were served *ad libitum* to the birds for three consecutive days and was withdrawn 6 hours before the commencement of the experiment.

#### Experimental Design

A total of 45 chickens were used for this study. There were 15 chickens representing the three genetic groups that were used as the treatments. The chickens were randomly placed in the transportation crates in a completely randomized design.

#### Data collection

At 12 h in the afternoon before the transportation, the Rectal Temperature (RT) and Body Temperature (BT) of the chickens were measured. The RT and BT were measured by inserting a digital clinical thermometer (Electron thermometer manufactured in China) for about 1 to 2 min into the rectum and wings of each bird, respectively

---

until an alarm sound was produced, indicating the end of the readings. The weight of each of the birds that were transported was measured with the help of a table weighing scale. The readings obtained were recorded as initial weight before transportation.

#### Transportation Period

The crates with the birds were loaded in a Hi-jet mini-bus and transported on road. The birds were loaded in perforated rectangle crates of 1.5m (Length) x 1m (width) and 0.4m (height) from Calabar to Akamkpa and back to Calabar, covering a distance of 80 km at a speed of about 70 km/h. During the journey, RT and BT values were recorded and immediately on arrival in Calabar when the journey was completed. The weight of each of the transported birds were measured with the help of a table weighing scale. The readings obtained were recorded as final weight after transportation. Weight changes were obtained by subtracting the final weight after transportation from the initial weight before transportation.

#### Statistical Analysis

Data obtained from the study were subjected to analysis of variance using the general linear model procedure of Statistix software 10.0 version. Significant differences among treatment means were separated using the least significant difference (LSD) method.

#### Results and Discussion

##### Body weight changes of chicken transportation by road

The body weight changes of the chicken transported by road (Table 1) showed that the initial final weight of the broiler chicken in this study was significantly ( $p < 0.05$ ) higher than the weights of noiler and the native chicken. The weight of the noiler was higher than that of the native chicken. Body weight changes were significantly ( $p < 0.05$ ) higher in the noiler, and the local chicken. There was no weight change in the broiler chicken.

Feed withdrawal might have resulted in higher live weight loss noticed in the noiler and local chicken. The noilers and local chickens are slow eaters and have small crops to store consumed feed compared to the broilers. Contrary to the findings of this study, Northcutt and Buhr (2010), and Chikwa *et al.* (2019) reported varied mean weight losses in broiler chickens and turkeys transported by road. This increment in weight change percentage in their study could be a result of the longer fasting during longer journeys at high average temperatures. The rate of moisture losses in the noiler and local chicken as a strategy to combat heat stress might have been responsible for the significant weight changes recorded by the noiler and local chicken. Sarjana *et al.* (2022) showed that weight loss after transportation could be because of excretion, and losses from moisture and nutrients leaving body tissues.

**Table 1: Body weight changes of chicken transportation by road**

| Parameters     | Broilers             | Noilers              | Native Chicken       | SEM   |
|----------------|----------------------|----------------------|----------------------|-------|
| Initial Weight | 2583.30 <sup>a</sup> | 1645.30 <sup>b</sup> | 1100.00 <sup>c</sup> | 37.56 |
| Final Weight   | 2583.30 <sup>a</sup> | 1606.70 <sup>b</sup> | 1071.70 <sup>c</sup> | 41.73 |
| Weight Changes | 0.00 <sup>c</sup>    | 43.30 <sup>a</sup>   | 28.30 <sup>b</sup>   | 1.30  |

<sup>a, b, c</sup> Means on same row with different superscripts are significantly different ( $p < 0.05$ )

SEM: Standard Error of Mean.

##### Thermoregulatory response of chicken transportation by road

The thermoregulatory response of the three strains of chicken transported by road (Table 2) showed that the average body temperature of the broilers before, during, and after transportation was significantly ( $p < 0.05$ ) higher than those of noiler and the native chicken. The rectal temperature of the broiler chicken during and after transportation was outside the normal range indicating that the birds were stressed. The adult chicken's normal body temperature ranges from 41–41.5°C (Luthra, 2017). The observed low temperature recorded in the local chicken and broilers agrees with the findings of Scott *et al.* (1998). The authors observed that chickens raised in a free-range cage showed lower signs of fear and a shorter duration of tonic immobility than chickens raised inside cages and in confinement when transported for over 60 km or for longer than one hour. Fear could lead to nervousness and subsequently stress. The genetic makeup of the native chicken which can tolerate heat stress could have been responsible for the low rectal temperature as well. These traits are also present in the noilers. Chepete (2008) reported an increase in the rectal temperature of broilers with a corresponding increase in environmental temperature. The increased rectal temperature at that time of transportation indicated that the thermoregulatory mechanisms were completely failing (Etches, 1989).

**Table 2: Thermoregulatory response of chicken transportation by road**

| Parameters                   | Broilers           | Noilers            | Local Chicken      | SEM  |
|------------------------------|--------------------|--------------------|--------------------|------|
| <b>Before transportation</b> |                    |                    |                    |      |
| Body Temperature             | 37.10 <sup>a</sup> | 34.67 <sup>b</sup> | 34.45 <sup>b</sup> | 0.27 |
| Rectal Temperature           | 39.66 <sup>a</sup> | 37.43 <sup>b</sup> | 37.33 <sup>b</sup> | 0.29 |
| <b>During transportation</b> |                    |                    |                    |      |
| Body Temperature             | 38.00 <sup>a</sup> | 36.33 <sup>b</sup> | 35.16 <sup>b</sup> | 0.22 |
| Rectal Temperature           | 44.50 <sup>a</sup> | 40.00 <sup>b</sup> | 38.16 <sup>c</sup> | 0.19 |
| <b>After transportation</b>  |                    |                    |                    |      |
| Body Temperature             | 39.00 <sup>a</sup> | 36.66 <sup>b</sup> | 35.66 <sup>b</sup> | 0.43 |
| Rectal Temperature           | 46.33 <sup>a</sup> | 40.67 <sup>b</sup> | 38.33 <sup>c</sup> | 0.33 |

<sup>a, b, c</sup> Means on the same row with different superscripts are significantly different ( $p < 0.05$ ) SEM: Standard Error of Mean.

## CONCLUSION

This study revealed that broilers were more susceptible to transportation stress than the noilers and native chickens.

## REFERENCES

- Anoh, K. U., Atte, P. O., Olayinka, O. I., and Abdulahi, I. (2018). Effect of transportation stress on the thermoregulatory response of young and adult rabbits. *Nigerian Journal of Animal Science*, 20 (4): 490-495
- Chepete H.J. (2008). "Rectal Temperature Changes in Broilers Kept Under Hot and Dry Conditions". *Agricultural Engineering International: The CIGR Ejournal*, 8 (1): 1-10
- Chikwa, K., Padwar, P., Viswakarma, R., Atkare, S.S., Bhardwaj, J.K., Nema, R.P. and Kumar, J. (2019). Transportation of broilers: An issue of welfare. *Pharma Innov. J.*, 8:68–70.
- Chirase, N., W. Greene, C. Pudy, R.W. Loan, B. Auvermann, D. Parke, E. Walborg, D. Stevenson, Y. Xu and J. Klauning, (2004). Effect of transport stress on respiratory disease, serum, antioxidant status and serum concentrations of lipid peroxidation biomarkers in beef cattle. *America Journal of Veterinary Research*, 65: 860- 864.
- Etches R.J. (2000). *Poultry production in hot climates*. CAB International, Wallingford, UK, 1989.
- Luthra, K. 2017. Evaluating thermal comfort of broiler chickens during transportation using heat index and simulated electronic chickens. <https://core.ac.uk/download/pdf/127621677>.
- Minka N. S and Ayo J. O. (2007). Physiological responses of transported goats treated with ascorbic acid during the hot-dry season. *Animal Science Journal*, 78: 164-172.
- Minka N. S. and Ayo J. O. (2010). Behavioural and rectal temperature responses of Black Harco pullets administered vitamin C and E and transported by road during the hot-dry season. *Journal of Veterinary Behaviour, Clinical and Application Research*, 5(3): 134-144.
- Northcutt, J.K. and Buhr, R. (2010). Preslaughter factors affecting poultry meat quality. In: *Poultry Meat Processing*. Second edition. CRC Press, New York. Pp. 5–24.
- Sarjana T.A., Suprijatna E., Mahfudz L.D., Sunarti D., Kismiati S., Ma'rifah B., Muryani R. and Susanti S. (2022). Effect of transportation distance on the physiological condition and carcass traits of kampung chickens. *S. Afr. J. Anim. Sci.*, 52: 530- 538
- Scott, G.B., Connell, B.J. and Lambe, N.R. 1998. The fear levels after transport of hens from cages and a free-range system. *Poult. Sci.*, 77:62–66. <http://dx.doi.org/10.1093/ps/77.1.62>
- Yakubu, A. and Ari, M. M. (2018). Principal component and discriminate analyses of bodyweight and conformation traits of Sasso, Kuroiler and indigenous Fulani chickens in Nigeria. *Journal of Animal and Plant Science*. 28 (1): 46-55