
PHYSIOLOGICAL RESPONSES OF CANE RATS SOURCED FROM THREE WEST AFRICAN COUNTRIES DURING THE WET SEASON IN HUMID TROPICAL ENVIRONMENT

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ABSTRACT

*The study was conducted to determine the physiological responses of cane rats during the wet season in the humid tropical environment. The study was carried out at the cane rat unit over a period of 8 weeks between the months of March and April at the Institute of Agricultural Research and Training, Moor plantation, Ibadan, Oyo State. A total of 12 cane rats sourced from Togo, Benin and Ghana were used for the study. The rats were housed in tier hutches provided with compounded feed and grasses containing crude protein 18%, metabolizable energy 2450 kcal/kg and grasses, which included elephant grass (*Pennisetum purpureum*) and Guinea grass (*Panicum maximum*). Each cane rat was weighed weekly and at the end of the experiment the body weight gain was calculated. The rectal temperature was measured weekly using a digital clinical thermometer and head temperature using the infrared thermometer. Respiratory rate was determined by visually counting the movement of the flanks using a stopwatch. Data was analyzed by using ANOVA and means were separated by using Duncan multiple range test. No significant difference in the values obtained from the respiratory rate of the cane rats from the different locations. Same trend was followed for the head and rectal temperature, values obtained fell within the normal range of value for rabbits. Body weight gain of the cane rats were similar. It was concluded from all the parameters taken, that cane rats from the different locations were well adapted to the environment during the wet season.*

Keywords: Cane rat, Respiratory rate, Rectal Temperature, Body weight gain

INTRODUCTION

The high demand for cane rat meat and the economic benefit that accrues from its sale has encouraged its domestication to make it more readily available and also reduce the environmental destruction that accompanies its hunting from the wild (Boluwaji *et al.*, 2019). It does not require an extensive area to function and it can be easily fed any agricultural by products available as it does not require imported raw material inputs to succeed. Cane rat has a high litter size, producing up to 4 -12 kits per litter and can litter twice in a year, with a low mortality rate of about 10% among its offspring (Addo *et al.*, (2007). Adedapo *et al.*, (2013) noted that some levels of successes in the domestication of cane rat in Ghana, Benin and Nigeria have been achieved.

High ambient temperature and humidity particularly in the wet season is common in the tropics and both induce heat stress which hinder animal well-being and militate against animal productivity Nardone *et al.*, (2010). In order to cope with these environmental stressors, animals regulate their body temperature and make physiological adjustments which include panting and increased rectal temperature (Lenis *et al.*, 2019). When animals are exposed to protracted extreme weather conditions, their coping mechanisms tend to fail leading to disturbances in energy metabolism, haematology, enzymatic reactions, hormonal secretions and mineral utilization (Marai *et al.*, 2002).

There is paucity of information on the physiological response of cane rat reared in closed house system during the wet season. This study therefore aims to provide information on the thermo-respiratory physiology of cane rat, specifically, the effects of body weight, on rectal temperature and respiratory rate of cane rat sourced from different location.

MATERIALS AND METHODS

The study was carried out over a period of 8 weeks between the months of March and April at the early onset of the rainy season in the south western zone of Nigeria precisely at the Institute of Agricultural Research and Training, Moor plantation, Ibadan, Oyo State. The animals were acclimatize before taking physiological parameters such as the rectal temperature, head temperature, respiratory rate and body weight gain. Four cane rats with average weight of 150g were selected from

each group of different locations (Togo, Benin and Ghana). A total of 12 cane rats of mixed sex were used for the study. The rats were housed in tier hutches provided with weighed feed (compounded feed and grasses) and water. The compounded contained crude protein 18%, metabolizable energy 2450 kcal/kg) and grasses, which included elephant grass (*Pennisetum purpureum*) and Guinea grass (*Panicum maximum*). The daily and weekly routine management practices was observed promptly. Each cane rat was weighed weekly inside a restrained cage and at the end of the experiment the body weight gain was calculated. The respiratory rate, temperature (rectal and stomach) and relative humidity of the housing were monitored. The rectal temperature of each animal was measured weekly using a digital clinical thermometer calibrated at degrees centigrade. The tip of the thermometer was inserted into the rectum of the cane rat at approximately 3cm for 1 minute to take the temperature. The head temperature was also taken weekly using the infrared thermometer device. The ambient temperature and relative humidity of the house / pen were also measured twice daily in the morning at 8am in the morning and 2pm afternoon

The respiratory rate of each animal was also determined by visually counting the movement of the flanks and a stopwatch was used to get the accurate flank movement for 60 seconds. This measurement was done when the animal was sitting quietly and breathing regularly. All data were analyzed by using ANOVA and means were separated by using Duncan multiple range test.

RESULTS AND DISCUSSION

The result from the respiratory rate of the cane rats from the different location is shown in Figure 1 below. There was no significant difference in the values obtained from the respiratory rate of the cane rats from the different locations. The reason could be due to the fact that similar metabolic activities and reactions take place in animals that are of similar age range (Lenis *et al.*, 2019). This also include the breathing mechanism of the body of animals of the same age range. Similar result was obtained by Boluwaji *et al.*, (2019) where the respiratory rate of cane rats of similar age were comparable.

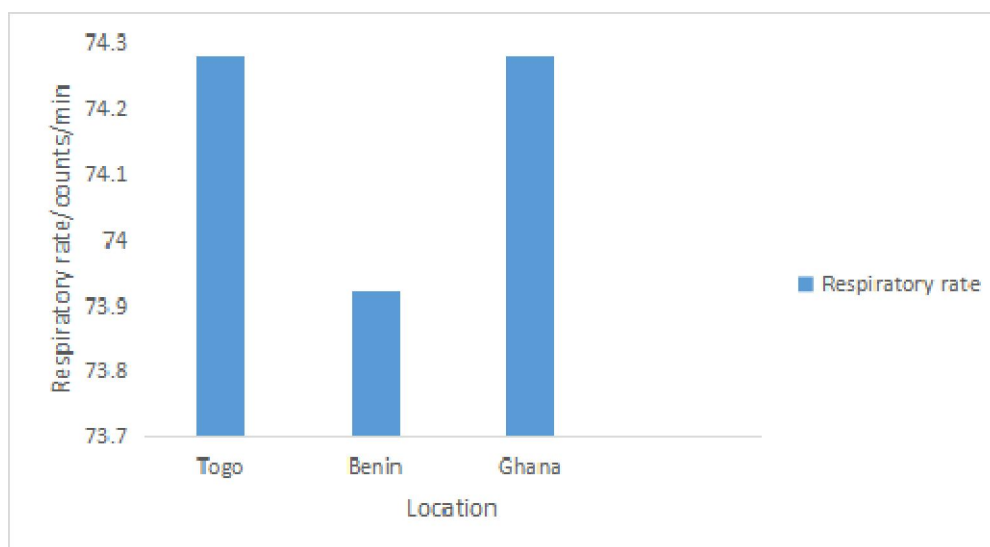


Fig. 1: Respiratory rate of cane rats from different location

Figure 2 and 3 below show the rectal and head temperature of cane rat. There was no significant difference in all the values obtained from the temperature measured from the cane rats of different locations. The maintenance of normal body temperature is critical for the metabolic process of the body, this is because decrease in body temperature affects the organs and body system. Rectal temperature provides a close reflection of the body's internal temperature. It is a reliable method of measuring body temperature. The cane rats all performed well due to the similitude in the environmental condition of the area. The values obtained for the rectal temperature falls within the normal range of value for rabbit and rodents according to MSD Veterinary manual.

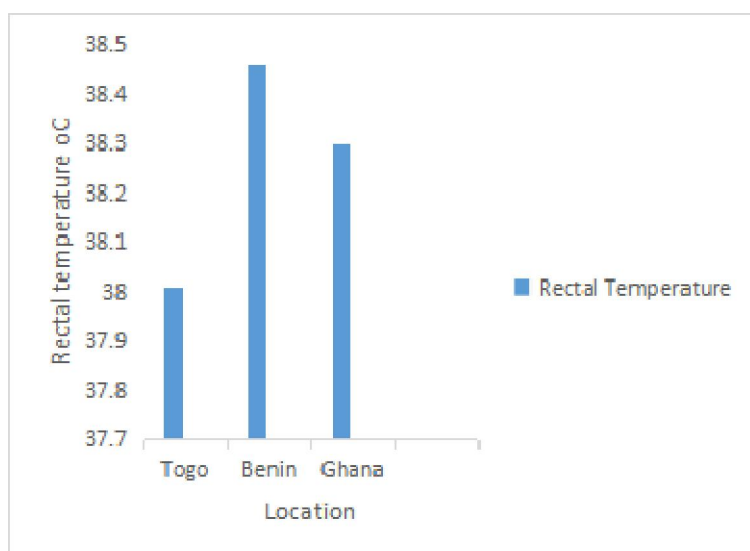


Fig. 2: Rectal temperature of cane rats from different location

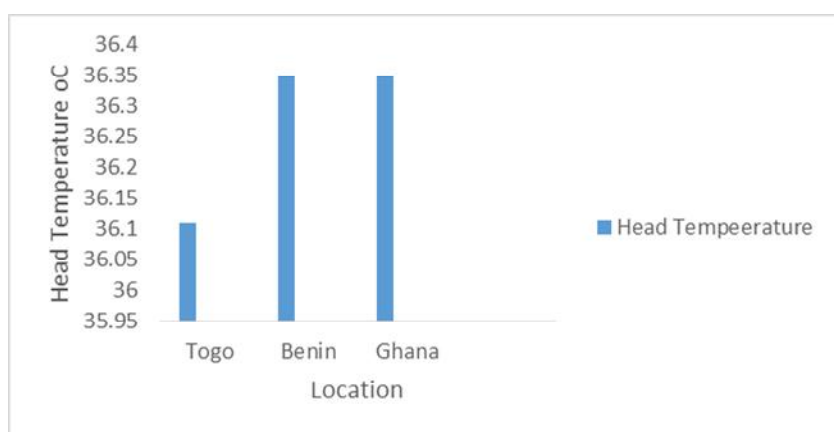


Fig. 3: Head temperature of cane rats from different location

Figure 5 below shows the body weight gain of the animals. There was no significant difference in body weight gain of animals at the end of the experiment. Cane rats from different locations were fed the same crude protein and energy contents according to Taiwo *et al.* (2009). The cane rats gained appreciable weight over the period of time. This shows that the cane rats were well adapted to the feed and environmental conditions.

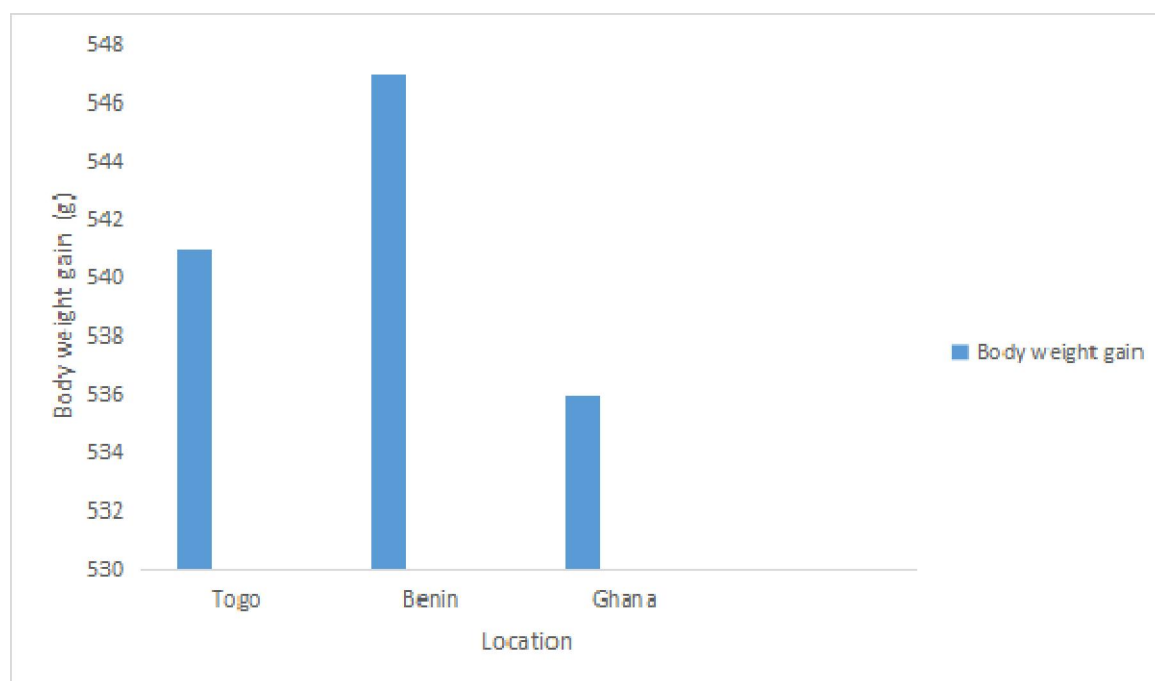


Fig 4: Body weight gain of cane rats from different locations

CONCLUSION

It can be concluded from all the physiological parameters taken, that the cane rats from the different locations were well adapted to the environment in the southwestern part of Nigeria during the wet season.

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