

**SHORT COMMUNICATION****An assessment of pregnancy induced physiological changes in West African Dwarf (WAD) does at different stages of gestation****\*Imasuen, J. A<sup>1</sup> and Ogedegbe, S. A<sup>2</sup>**<sup>1</sup> Department of Animal Science, University of Benin, Benin City, Edo State, Nigeria<sup>2</sup> Department of Crop Science, University of Benin, Benin City, Edo State, Nigeria\*Corresponding Author: [james.imasuen@yahoo.com](mailto:james.imasuen@yahoo.com)**ABSTRACT**

Twenty West African Dwarf does were used to assess the effect of pregnancy induced physiological changes in Pulse rate (PR), Respiratory rate (RR), Rectal temperature (RT) at different stages of pregnancy. The experiment was laid down in complete randomized design. . Result from the experiment shows that PR values ranges from  $80.78 \pm 1.63$  to  $92.35 \pm 1.47$  (BPM), showing significant ( $p < 0.05$ ) increases with gestation periods (months) increases. Significant differences ( $p < 0.05$ ) were also observed in RR during the course of gestation, with the values ranging from  $16.73 \pm 0.43$  to  $18.95 \pm 0.59$  (BPM). When RT was measured during pregnancy, the result shows that pregnancy caused significant ( $P < 0.05$ ) increased in rectal temperature and the value increased with the course of gestation too, with values ranging from  $39.33 \pm 0.25$  to  $41.22 \pm 0.53$ . Thus, it was concluded that pregnancy induces physiological changes in PR, RR and RT in does, during gestation period with observable significant increase in values as the course of gestation increases in months.

**Keywords:** Pregnancy Induced, physiological changes, WAD Does.**INTRODUCTION**

In Nigeria, efforts have been made to improve livestock production with the aim of increasing available animal protein intake which as often fall short of the recommended 28g/person/day considered consistent with a balance diet (Ibe, 2004). Throughout recorded history, the consumption of animal protein indicates a position of social and economic prestige. It is noteworthy that meat consumption is often an indication of the economic status of the country or the individual (Ososanya 2004). To achieve success in increasing animal protein consumption in Nigeria efforts must be aimed at improving the management system, the environment, plane of nutrition, selection of breeding animals and disease control. In selecting these breeding stocks, efforts should be made to select animals with high reproductive efficiency as reproduction inefficiency has been recognized as the most costly and limiting constraint to animal production (Cambell and Casley, 1985). The reproductive ability of a female doe begins with the attainment of sexual maturity or puberty when the reproductive organs are in a state of preparedness for conception, implantation of embryo, placentation and pregnancy, as well as terminal delivery or parturition (Health and Olusanya, 1985). Thus the reproductive performance of an animal can be improved or otherwise by the various factors within the

environment in which the animal finds itself. For instance hot environment elucidate responses in livestock; such responses may increase water consumption, pulse rate, respiratory rate and rectal temperature. The physiological state of an animal is an indication of the health status of the animal and the level of adaption of the animal to its environment, plane of nutrition and disease resistance. Research work in the area of how environment, plane of nutrition and diseases can alter the physiological state of an animal abound in literature (Ogbebe *et al.*, 1996; Otoikhian *et al.*, 2009). However, there is paucity of information on how pregnancy can mediate in altering the physiological state of an animal. This research work was therefore aimed at assessing the effect of pregnancy induced physiological changes in pulse rate, respiratory rate and rectal temperature at different stages of gestation in WAD goat does.

**MATERIALS AND METHODS**

The experiment was carried out at the Teaching and Research Farm, Faculty of Agriculture, Ambrose Ali University, Ekpoma, in Edo State, which lies along latitude  $6.5^{\circ}$  and longitude  $6^{\circ}$  North, located in the rainforest zone of Nigeria with an average annual rainfall of about 1500-2000 mm per annum, relative humidity of about 75% with a mean temperature of

24°C (Frederick *et al.*, 2007). The natural vegetation around this area is mainly composed of Guinea grass (*Panicum maximum*), Gamba grass (*Adropogon gayanus*), Elephant grass (*Pennisetum purpureum*), Calapo (*Calapogonium muconoides*), Stylo (*Stylosanthes guianensis*), Centro (*Centrosema pubescens*) and Tridax (*Tridax procubens*) amongst others. The experiment was laid down in completely randomized design with the stages of pregnancy in months regarded as the treatment, thus five treatment periods was observed in the course of the experiment, as shown below:

Treatment I: 1<sup>st</sup> month of Gestation period

Treatment II: 2<sup>nd</sup> month of Gestation period

Treatment III: 3<sup>rd</sup> month of Gestation period

Treatment IV: 4<sup>th</sup> month of Gestation period and

Treatment V: 5<sup>th</sup> month of Gestation period.

Twenty (20) cycling West African Dwarf (WAD) does were subjected to estrus synchronization using medroxyprogesterone acetate (MPA) drug as reported by Imasuen and Ikhimioya (2009). Prior to the commencement of the experiment, all the does were quarantined for 30 days during which routine treatment as developed by NAPRI (1984) was administered under the supervision of veterinarian. Optimum health score conditions and management care were confirmed in each animal before their inclusion. The does were primiparous with age ranging between 2-3 years and average body weight of  $16.59 \pm 0.76$ kg. They were subjected to detailed gynecological examination for pregnancy confirmation after estrus synchronizing and mating with active bucks. All the does were managed semi-intensively and were housed in an open concrete floor. Feeds were provided *ad libitum* in the mornings between 08.00hr and 10.00hr daily, they were fed with *Arachis hypogea* (groundnut) hay, *Gliricidia sepium*, *Panicum maximum* and occasionally *Zea mays* (maize) or *Manihot esculents* (cassava) peelings, when available, before allowing them to go out from their pens into the adjoining fenced paddock. The animals were allowed to remain in the paddock to graze freely between the 10.00hr and 18.00hr before being allowed to return to their pens for confinement. Water and salt

lick were also provided *ad libitum*.

Physiological parameters measured throughout pregnancy were pulse rate (PR), respiratory rate (RR) and rectal temperature (RT). These parameters were measured in the morning (8:00am) and evening (5:00pm) on the day of data collection (i.e. every Monday of the week) and data were collected every 2 weeks until parturition. All physiological indices were measured as described by Kelly (1980) and all data collected were subjected to statistical analysis of variance using the SAS/STAT (2004) package. Mean separation were done using the same software.

## RESULTS AND DISCUSSION

Result from this study as shown in Table 1, reveals that body temperature, pulse rate and respiratory rate shows marked variation as the course of gestation increases from month to month before parturition in pregnant does. In this study the pulse rate range from  $80.78 \pm 1.63$  to  $92.35 \pm 1.47$  with significant ( $p < 0.05$ ) differences observed between the first month and the fifth month of gestation. These values were above the upper limit of 80 beats per minutes reported by Fall *et al.* (1982) for adult goats; however, Paggot (1992) reported that the pulse rate value could be elevated above this upper limit of 80 beats per minutes during gestation.

In goats, respiratory rate under thermo-neutral conditions is about 25 respirations per minutes (Amakiri and Health, 1988). Variation may occur with varying physiological condition such as pregnancy, body fat and strenuous physical activities. In this study respiratory rates were significantly different ( $p < 0.05$ ) between the first month, second month and third month; however the values ranges from  $16.73 \pm 0.43$  to  $18.95 \pm 0.59$  throughout the course of gestation under review the values were within the normal range of respiration in goats as reported by Paggot (1992). When rectal temperature was measured during pregnancy, the result shows that pregnancy caused significant ( $P < 0.05$ ) increased in rectal temperature and the value increased with the course of gestation.

Table 1. Pulse rate, respiratory rate and rectal temperature of West African Dwarf (WAD) does at different stages of pregnancy

Variables	Stages of pregnancy				
	1 <sup>st</sup> Month	2 <sup>nd</sup> Month	3 <sup>rd</sup> Month	4 <sup>th</sup> Month	5 <sup>th</sup> Month
Pulse Rate (BPM)	$80.78 \pm 1.63^d$	$85.45 \pm 1.84^c$	$88.88 \pm 1.86^{a,b}$	$90.71 \pm 1.86^{a,b}$	$92.35 \pm 1.47^a$
Respiratory Rate (BPM)	$16.73 \pm 0.43^c$	$17.65 \pm 0.37^b$	$18.38 \pm 0.40^a$	$18.48 \pm 0.40^a$	$18.95 \pm 0.59^a$
Rectal Temperature (°C)	$39.33 \pm 0.25^b$	$39.83 \pm 0.51^{a,b}$	$40.84 \pm 0.53^a$	$41.22 \pm 0.53^a$	$41.00 \pm 0.31^a$

a, b, c- values with different superscript along the same row are significantly different at ( $P < 0.05$ ). BPM- Beats per Minutes.

The value increased at the last stage of pregnancy slightly above the upper limit of 40°C recorded by Igbokwe (1993) to  $41.22 \pm 0.5$  °C, thus, suggesting that pregnancy induces varying degree of heat stress in goat during pregnancy. West African dwarf goats although said to be well adapted to tropical humid condition could be thermally stressed when exposed to a relatively high ambient temperature for a long time (Imasuen and Otoikhian, 2004). Jaber *et al* (2004) also reported that apart from the environmental situation surrounding the animals, other physiological factors such as diseases and pregnancy can induce stress in WAD does.

## CONCLUSION

Physiologically, West African Dwarf does could become stressed during pregnancy especially as the gestation period progresses to the last two months of gestation. Result from this study showed that pregnancy induces physiological stress when pulse rate, respiratory rate and rectal temperature were measured in pregnant does; therefore care should be taken in handling and management of pregnant goats during the last two months of pregnancy so as not to over stress them.

## CONFLICT OF INTEREST

The authors declare that there is no known conflict of interest as regards the conduct of this study and the data reported in this work.

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