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An Assessment of Pregnancy Induced Physiological Changes in West African Dwarf (WAD) Does at Different Stages of Gestation

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Authors' contributions

This work was carried out in collaboration between the two authors. JAI and CPA designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Both of them managed the analyses of the study. JAI managed the literature searches. Both the authors read and approved the final manuscript.

Research Article

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ABSTRACT

Twenty pregnant WAD goat does were used to assess the effect of pregnancy induced physiological changes at different stages of pregnancy. Pulse Rate values ranges from 80.78±1.63 to 92.35± 1.47(BPM), showing significant ($p<0.05$) increases as gestation periods (months) increases. Significant differences ($p<0.05$) were also observed in respiratory rate during course of gestation and the values of 16.73± 0.43 to 18.95±0.59 were obtained. 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 too, with values ranging from 39.33±0.25 to 41.22±.0.53. Thus, it was concluded that pregnancy induces physiological changes in does, especially as the course of gestation increases in months.

Keywords: Pregnancy Induced, physiological changes, WAD Does.

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1. INTRODUCTION

In Nigeria efforts have been made at improving livestock production with the aim of increasing human consumption of animal protein 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 Caslley, 1995). 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 (Ogebe et al., 1996; Otoikhian et al., 2009). However, there is paucity of information on how pregnancy can mediate in altering the physiological status of animal. This research work was therefore aimed at assessing the effect of pregnancy induced physiological changes at different stages of gestation in WAD goat does.

2. MATERIALS AND METHODS

The experiment was carried out at the Teaching and Research Farm, Faculty of Agriculture, Ambrose Alli University, Ekpoma, in Edo State, which lies along latitude 6½ degree North and longitude 6 degree 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 24ºC (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.

Twenty(20) cycling West African Dwarf (WAD) does subjected to estrus synchronization using medroxy-progestrone acetate (MPA) drug as reported by Imasuen and Ikhimioya, 2009, were used for this experimental trial. Prior to the commencement of the experiment, all the does were quarantined for 30days during which routine treatment development by NAPRI (1984) was administered under the supervision of veterinarian. Optimum health score conditions and management care were confirmed in each animal before including them in the case under trial. This does were primiparous with age ranging between 2-3 years and average body weight of 16.59±0.76kg. They were subjected to detailed gynecological examination for confirmed pregnancy after synchronizing estrus and mated with an active buck.

All the does were managed semi-intensively and were housed in an open concrete floor. Feeds were provided in the mornings between 8.00h and 10.00h daily, and were fed with

Arachis hypogea (groundnut) hay, *Gliricidia sepium*, *Panicum maximum* and occasionally *Zea mays* (maize) or *Manihot esculenta* (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 10.00h and 18.00h before being allowed to return to their pens for confinement. Water and salt lick were provided *ad libitum*.

Physiological parameters assessed 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 and data were collected every 2 weeks until parturition. All physiological indices were measured as described by Kelly (1980) and all data collected were pooled and subjected to statistical analysis of variance using the SAS/STAT (2004) package. Mean separation were done using the same software.

3. RESULTS AND DISCUSSION

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) apart from the environmental situation surrounding the animals, other physiological factors such as diseases and pregnancy can induce stress in WAD doe (Jaber et al., 2004). 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.

Table 1. Physiological performance in pregnant WAD goats at different stages (month) of pregnancy after synchronizing oestrus with MPA drugs

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

In this study the pulse rate range from 80.78±1.63 to 92.35± 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 thermoneutral 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 significant different ($p<0.05$) between the first month, second month and third month; however the value ranges from 16.73± 0.43 to 18.95±0.59

throughout the course of gestation under review. The values were within the normal range of respiration in goats (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. The value increased at the last stage of pregnancy slightly above the upper limit of 40ºC recorded by Igbokwe (1993) to 41.22±0.5ºC, thus, suggesting that pregnancy induces varying degree of stress in goat during pregnancy.

4. CONCLUSION

Physiologically, West African Dwarf does could become stressed during pregnancy especially as the gestation period progress to the last two months of gestation. Result from this study shows 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.

ETHICAL APPROVAL

All authors hereby declare that the Principles of laboratory animal care (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws where applicable.

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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