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EFFECT OF SEX AND NUMBER OF DEVELOPING FOETUS ON PHYSIOLOGICAL RESPONSE IN CROSSBRED DOES

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ABSTRACT

Fifteen, 19-24 months old, farm born primiparous crossbred goats were randomly selected to study the effect of foetal sex and number on physiological responses and body weight changes during last three months of pregnancy. The pulse rate was significantly (P<0.05) higher in pregnant than non-pregnant does by about 47.54% during entire study periods. The respiration rate during study period of 3 months was non-significantly higher by approximately 37% in pregnant than non-pregnant does. The pulse rate was significantly higher (P<0.05) in pregnant does carrying female foetus over those who had male or male and female foetus during gestation. The does having single foetus in their womb had significantly higher (P<0.05) pulse rate than the does bearing twin. The pulse and respiration rate had increasing trend with significant (P<0.05) differences during different months of pregnancy and it was maximum in the last month of gestation irrespective of foetal sex or number. The body weight changes was higher in pregnant than non-pregnant dams. It was concluded that the physiological responses as well as the body weight changes can be used for prediction of pregnancy, sex and number of growing foetus at farmers' doorstep.

Keywords: Doe, foetus, rectal temperature, Pulse rate, respiration rate, body weight.

Rectal temperature, pulse rate and respiration rate are important physiological responses in animals to asses health status and physiological conditions of body. The range of different physiological responses remains constant in healthy animals except in certain conditions like ill-health, pregnancy, younger or older age etc[7]. During pregnancy dam's physiological responses are the reflection of foetal growth in their womb. Due to foetal growth a number of hormonal changes occur in dams' body which appears in the form of deviated physiological responses. Since the information on the effect of developing foetus on physiological responses and body measurements in does is meager, therefore, the present study was undertaken to establish the trend of physiological responses and body measurements due to foetal sex and foetal number in crossbred does during last three months of gestation.

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MATERIALS AND METHODS

Fifteen crossbred farm born primiparous female goats aging 19-24 months were selected. All the managemental practices were as per standard norms. All selected goats were assigned to bucks whenever they were detected in heat. Mating twice over 10-12 hrs. were allowed. No method of pregnancy diagnosis were applied and after 2 months from date of service, rectal

temperature, pulse rate and respiration rate were recorded twice per week by standard procedures. The body weight changes of goats were calculated by the use of Shaeffer's formula[5].

After completion of gestation period of about 5 months, number of pregnant and non-pregnant goats were 11 and 4, respectively. Non-pregnant goats were used as control. Out of 11, 4 goats kidded with female, 4 goats with males and rest 3 goats gave birth to both male and female kids. Six goats kidded with single and 5 goats with twin kids. On the basis of foetal sex and number, previously collected data from 15 goats during gestation period were pooled for further statistical analysis. The pooled data were subjected to one way ANOVA to test the difference between various treatments[8]. The significant means between different treatments were compared by Duncan's Multiple Range Test[3].

RESULTS AND DISCUSSION

Ludhiana is located at 30°54'N latitude, 75°48'E longitude and 247m above mean sea level. The maximum and minimum mean monthly ambient temperature during the study period (January-March) was 24.3°C and 12.5°C, respectively.. Similarly, range of relative humidity was 62-86%.

Fig 1 revealed that there were no significant differences between various physiological responses except pulse rate between pregnant and non-pregnant does. The pulse rate was significantly ($P<0.05$) higher in pregnant than non-pregnant does by about 47.54% during entire study periods. [4]reported that heart rate remains higher during pregnancy than during dry periods in goat. [6]hypothesized that mean cardiac output in dairy goats was higher by 35% during pregnancy period. Similar findings were reported by[1,9]. The respiration rate during study period of 3 months was non-significantly higher by approximately 37% in pregnant than non-pregnant does. This may be due to higher basal metabolic rate (BMR) of pregnant does[5]. This was in agreement with the findings of[2]. The rectal temperature was slightly higher in pregnant than non-pregnant does. This was in agreement with the findings of[11], who also observed significant difference ($P<0.05$) in body temperature among non-reproductive, pregnant and lactating females of subterranean rodents.

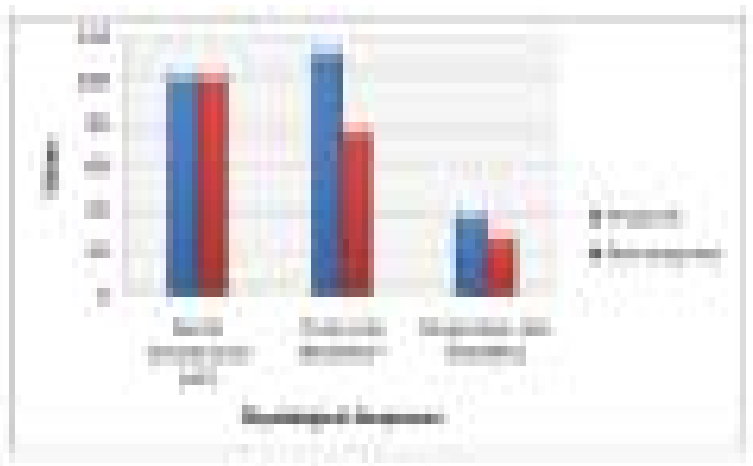
Fig 2 clearly revealed that rectal temperature and respiration rate was not affected by foetal sex and it was similar in all does irrespective of whether male, female or both male and female kids were developed in their womb. The pulse rate was significantly higher ($P<0.05$) in pregnant does carrying female foetus over those who had male or male and female foetus during gestation. The reasons for these findings were not so clear.

The rectal temperature of does carrying single or twin foetus was similar during last 3 months of gestation (Fig. 3). The does having single foetus in their womb had significantly higher ($P<0.05$) pulse rate than the does bearing twin. This may be due to lower Na, K and cholesterol level in the blood of does with twins as reported by[10]. As Na & K are the main elements who maintain the rhythm of heart beat at normal level, so, lower level of Na / K may have resulted in lower heart rate of twin mothers. This may also be explained on the basis of "Maryey's law of heart" which states that higher the blood pressure lower will be pulse rate. Since heart of dams having twin might have supplied more blood to foetus due to which their blood pressure might have higher than dam with single foetus. The higher blood pressure in pregnant than non-pregnant females was reported by[4]. Slightly higher, though non-significant, respiration rate was recorded in the twin bearing does. Since the twin bearing does might have more requirement of oxygen in their blood for their growing foetus, therefore, it may have resulted in increased breathing rate by those females.

The physiological parameters except rectal temperature of pregnant does were significantly ($P<0.05$) affected during different months of gestation (Table 1 and 2). However, non-pregnant

does did not depict such changes in their physiological responses during three months of study period. The pulse and respiration rate had increasing trend with significant ($P<0.05$) differences during different months of pregnancy and it was maximum in the last month of gestation irrespective of foetal sex (Table 1) or number (Table2). This may be due to the principle of increasing basal metabolic rate with advancement of pregnancy[5]. As foetus developed in size, BMR of dam increased gradually due to which physiological responses like pulse and respiration rate increased from mid to end of pregnancy.

The does having single or female foetus in their womb gained less weight (8.52 kg) than those who had twins with male foetus (16.43 kg) or both male and female foetus (14.84 kg). This was may be due to higher foetal weight of twins than single one. No such changes were recorded in non-pregnant goats during entire study period.



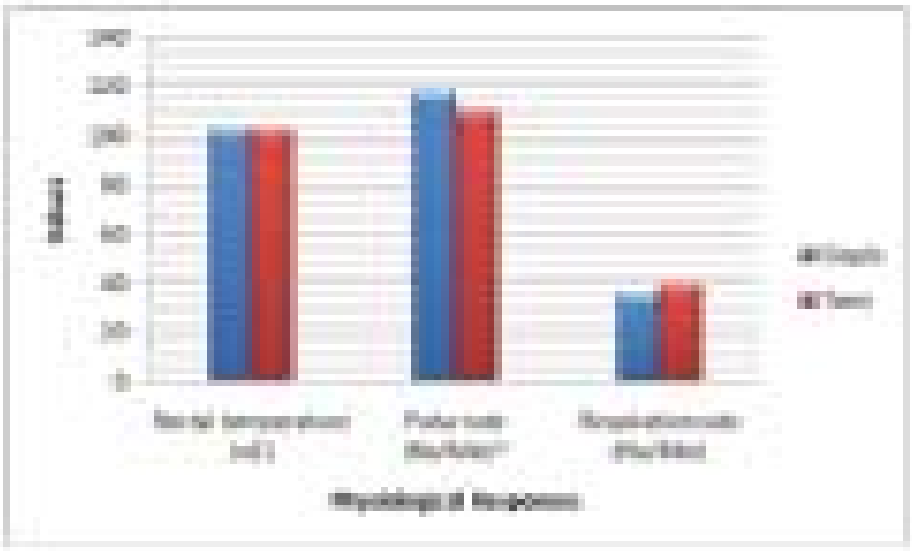


Fig.3: Rectal temperature, pulse and respiration rate of dams due to number of developing foetus (P<0.05).

Table 1: Monthly rectal temperature, pulse and respiration rate of dam due to sex of developing foetus

Months of pregnancy	Rectal temperature (°C)		Pulse rate (No/Min)		Respiration rate (No/Min)	
	Male	Female	Male	Female	Male	Female
3rd	102.81 ± 0.12	101.68 ± 0.07	83.78 ± 1.48[a]	87.59 ± 1.47[a]	33.76 ± 0.55[a]	35.70 ± 0.38[a]
4th	102.73 ± 0.10	102.46 ± 0.07	118.38 ± 5.89[b]	111.83 ± 6.98[b]	32.13 ± 2.13[a]	32.83 ± 1.72[a]
5th	103.36 ± 0.13	103.17 ± 0.10	142.10 ± 1.47[c]	145.87 ± 0.80[c]	53.96 ± 3.29[b]	46.82 ± 1.79[b]

Means with different superscripts in a column differ significantly (P<0.05)

Table 2: Monthly rectal temperature, pulse and respiration rate of dam due to number of developing foetus

Months of pregnancy	Rectal temperature (°C)		Pulse rate (No/Min)		Respiration rate (No/Min)	
	Single	Twin	Single	Twin	Single	Twin
3rd	101.76 ± 0.89	101.93 ± 0.09	86.55 ± 1.41[a]	83.86 ± 1.42[a]	28.65 ± 0.35[a]	35.71 ± 0.62[a]
4th	102.56 ± 0.87	102.50 ± 0.07	118.79 ± 6.89[b]	115.16 ± 4.81[b]	32.58 ± 1.72[a]	33.31 ± 1.42[a]
5th	103.20 ± 0.10	103.20 ± 0.07	144.83 ± 0.80[c]	148.05 ± 0.98[c]	46.87 ± 1.78[b]	57.83 ± 2.09[b]

Means with different superscripts in a column differ significantly (P<0.05)

Table 3: Monthly rectal temperature, pulse and respiration rate of non-pregnant does

Months of experiment	Rectal temperature (°C)	Pulse rate (No/Min)	Respiration rate (No/Min)
3rd	101.97 ± 0.05	77.94 ± 0.56	27.89 ± 0.72
4th	101.98 ± 0.04	76.58 ± 0.47	28.19± 0.61
5th	102.05 ± 0.05	76.45 ± 0.52	26.39 ± 0.58

CONCLUSION

Since the physiological responses and the body weight changes were higher in pregnant than non-pregnant does, it was concluded that the physiological responses as well as body weight changes can be used for prediction of pregnancy and number of growing foetus at farmers doorstep. The pulse rate was higher in does having female or single foetus in their uterus. It was also concluded that pulse and respiration rate was maximum during last months of pregnancy, irrespective of developing foetal sex or number in the uterus of mother.

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