Productive performance of Jamunapari goat under semi-intensive system of management

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ABSTRACT
Twenty Jamunapari goats were reared in the institute goat farm in semi-intensive system of management to study the productive performance of goat under the system. It was observed that average live weight of grower uncastrated male kids at birth, 3, 6, 9 and 12 th months of age were 2.94 ± 0.19, 8.97 ± 0.53, 15.47 ± 0.66, 18.63 ± 0.44 and 22.48 ± 0.64 kg respectively. Average daily gain during the year was found to be highest in first week ie 110.67 ± 6.52 g / day with an average value of 47.41 ± 3.76 g / day. ANOVA revealed that age had highly significant (P < 0.01) effect on all the body measurements. It was found that age was significantly (P < 0.01) and positively correlated with body length (r = 0.860), body height (r = 0.852) and heart girth (r = 0.853). Multiple regression analysis of live weight of goat with air temperature, relative humidity, temperature humidity index and effective temperature indicated non-significant effect of environmental components on live weight of goats. However, live weight of goat was negatively correlated with THI. It was observed that average daily gain in grower and finisher goat were reduced by 46.11 g / d (P < 0.01) and 24.14 g / d (P < 0.01) respectively per °C rise of effective temperature.

Key Words: Jamunapari goat, Productive performances, Semi intensive system.

INTRODUCTION
Goat occupies a unique place among domestic livestock in eastern region because of their ability to survive and produce under extreme climatic and management condition. Goat possesses superior efficacy for transforming feed into meat and milk. Goat is very hardy animal and so disease incidence is less. Therefore cost of health management is also very less. Goat is capable of selective browsing on undesirable vegetation. Goat consumes less feed which is about one fifth of the consumption in cattle and buffalo. It does not compete with human beings for grains like pig and birds. The goat population in India and in Bihar is 140.54 m and 10.17 m respectively (Anonymous, 2012). So goat population in Bihar is 7.24 % of national level. Goat meat is rich in protein and there is no prejudice about consumption of goat meat i.e. chevon. As per FAO (2008) production of chevon is 0.48 m MT, which is 12.00 % of national level (total meat production in India 4.00 m MT). Goat contributes 4.00 m MT milk which is 3.56 % of national level (total milk yield in India 112.50 m MT). Goat milk is very rich in certain amino acids ie histidine, threonine, phenylalanine and certain minerals ie sodium, iron and copper. So, goat has the significant role in this region to bridge the gap of meat shortage for people of this region. Jamunapari goat is large dual purpose breed commonly found in this region. Therefore realizing the importance of goat in this region, Jamunapari goat was introduced and productive performance was studied under this agro climatic condition.

MATERIALS AND METHODS
Twenty Jamunapari goats were being maintained in goat farm of the Institute. Ten goats were adult female and ten were uncastrated male. Goats were reared in semi-intensive system of management i.e. 8 - 9 hours grazing and rest in stall feeding. Goats were housed in group, in semi-open shed with concrete floor and asbestos roof. Orientation of shed was in east west direction. Each goat was provided a floor space of 1m² / head during growing, 1.5 m² / head during adult and 2 m² / head during breeding stage. Besides grazing goats were being fed concentrate mash feed consisting of 40 % maize crust, 30 %wheat bran, 20 % arahar chuni, 7 % mustard oil cake, 2 % vitamin and mineral mixture and 1 % common salt @ 100 g / head / day to grower, @ 150 g / head / day to adult and @ 200 g / head / day to breeder and nursing

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Live weight and body measurements of goats bimonthly, live weight gain and average daily gain under the housing, feeding and management condition were recorded. Meteorological parameters were also recorded regularly. Temperature Humidity Index (THI) was calculated as per West (1994). Effective Temperature (ET) was calculated as per Bianca (1962). Multiple regression analysis and ANOVA were done as per methods described in Snedecor and Cochran (1967) using SPSS programme of computer.

RESULTS AND DISCUSSION

Average daily gain during the year was found to be highest in first week ie 110.67 ± 6.52 g / day with an average value of 47.41 ± 3.76 g / day. This growth of Jamunapari goat was found to be poorer than the findings in earlier year. It was found that with the advancement of age, body weight, body height and heart girth of goats were increased significantly (P < 0.05) and positively correlated with age. It was found that with the advancement of age and with the increase of body weight of goat all the body measurements were increased significantly.

Simple correlation between age and all body measurements was carried out. It was found that age was significantly (P < 0.01) and positively correlated with BL (r = 0.860), BH (r = 0.852) and HG (r = 0.853). Similarly when correlation between body weight and body measurements was done, it was observed that body weight was significantly (P < 0.01) and positively correlated with BL (r = 0.917), BH (r = 0.923) and HG (r = 0.960). So, it is indicated that with the advancement of age and with the increase of body weight of goat all the body measurements were increased significantly.

Linear equations were developed between body weight and different body measurements. It was observed that with the advancement of age, body weight of Jamunapari goat at 3 m of age but poorer weight at birth in comparison to present findings. They reported mean body weight of Jamunapari goat at birth, 3 m, 6 m and 12 m were 3.02 ± 0.04, 8.74 ± 0.15, 12.44 ± 0.28, 16.31 ± 0.29 and 19.31 ± 1.38 kg respectively. Roy and Pant (2001) in another study indicated better live weight performance ie higher live weights of Jamunapari goat at 3 m of age but poorer weight at birth in comparison to present findings. They reported mean body weight of Jamunapari goat at birth, 3 m, 6 m, 9 m and 12 m were 3.02 ± 0.04, 8.74 ± 0.15, 12.44 ± 0.28, 16.31 ± 0.29 and 19.31 ± 1.38 kg respectively. Roy and Pant (2001) in another study indicated better live weight performance.

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that body weight was significantly (P < 0.01) increased by 840 g, 708 g and 691 g per cm increase of body length, body height and heart girth respectively. Multiple regression analysis of body weight with different body measurements was done. It was revealed that body length and heart girth had highly significant (P < 0.01) effect on body weight of goat at particular age, while body height at withers had no significant effect on body weight of goat. Body weight was increased significantly (P < 0.01) by 216 g per unit increase of body length and body weight was increased significantly (P < 0.01) by 475 g per unit increase of heart girth respectively. The prediction equation of body weight of goat based on BL, BH and HG was as such.

\[ BW = -24.85 + 0.216 \times BL + 0.069 \times BH + 0.475 \times HG, \]

while \( ** \Rightarrow P < 0.01 \)

100% single born with a sex ratio of male to female 2:1 was recorded in present study. In contrast to present findings Roy and Pant (2001) reported 67% single birth, 32% twin birth and 1% triple birth in Jamunapari goat. Average kid weight at birth and kid weight at weaning at one month of age were found to be 2.94 ± 0.19 kg and 5.99 ± 0.50 kg respectively. Number of service per conception was found to be 1.47± 0.28. Average gestation period was 150 ± 1 day which was similar to the findings of Roy and Pant (2001) who found it 148.26 days. Average kidding interval was found to be 226.33 ± 5.27 days.

Milk yield of seven does were recorded and it was found that average daily yield was 210 ± 6 g, average lactation length was 174 ± 2 days and average lactation yield in first lactation was 36.55 ± 1.38 kg. Average lactation length was similar to the findings of Roy and Pant (2001), however lactation yield recorded by them was much higher than the present findings. They recorded average lactation length and average lactation yield 172 days and 141 kg respectively.

Multiple regression analysis of live weight of goat with air temperature (AT), relative humidity (RH), temperature humidity index (THI) and effective temperature (ET) indicated non significant effect of environmental components on live weight of goats in adult, finisher and grower stage. However, live weight of goat was negatively correlated with THI (Table – 2). Live weight was reduced by 6.098 kg, 5.813 kg and 9.950 kg in adult, finisher and grower goat per °C rise of THI. The prediction equation of live weight of goat on AT, RH, THI and ET was as such.

Multiple regression analysis of live weight of goat at different ages with THI and ET revealed that live weight of goat were reduced significantly by 2.04 kg in adult (P < 0.05), 2.77 kg in finisher (P < 0.01) and 3.10 kg in grower (P < 0.01) respectively per °C rise of THI. But live weights of goat were increased by 3.16 kg in adult (P < 0.05), 3.72 kg in finisher (P < 0.05) and 4.32 kg in grower (P < 0.05) per °C rise of effective temperature.

Multiple regression analysis of live weight gain with AT, RH, THI and ET revealed non significant effect of all the environmental components on live weight gain of goats in adult, finisher and grower stage. However live weight gain was negatively correlated with air temperature and relative humidity; positively correlated with THI. Multiple regression analysis of live weight gain with AT and RH revealed that live weight gain of grower goat was significantly (P < 0.01) affected by RH. It was also found that live weight gain of grower goat was reduced by 0.09 kg ie 90 g per % increase of relative humidity. Multiple regression of live weight gain with THI and ET revealed that both THI and ET had significant (P < 0.05) effect on live weight gain of finisher and grower goat. It was also observed that live weight gain of finisher goat was increased significantly (P < 0.05) by 640 g per °C rise of THI and live weight gain of grower goat was increased significantly (P < 0.01) by 980 g per °C rise of THI. However live weight gain reduced by 720 g significantly (P < 0.05) in finisher goat and 1.380 kg significantly (P < 0.01) in grower goat with unit increase of ET.

Multiple regression analysis of average daily gain (ADG) with AT, RH, THI and ET revealed non significant effect of all the micro environmental components on average daily gain of goats in adult, finisher and grower stage. However while multiple regression analysis of average daily gain (ADG) with AT and RH was found out it was observed

**TABLE 2:** Multiple regression analysis of live weight of goat due to air temperature, relative humidity, temperature humidity index and effective temperature.

<table>
<thead>
<tr>
<th>Equation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 = 264.96 + 2.184 X1 – 0.124 X2 – 6.098 X3 + 6.475 X4</td>
<td>Y1 = Live weight of adult goat in kg,</td>
</tr>
<tr>
<td>Y2 = 206.78 + 8.227 X1 + 0.644 X2 – 5.813 X3 – 0.474 X4</td>
<td>Y2 = Live weight of finisher goat in kg,</td>
</tr>
<tr>
<td>Y3 = 364.54 + 11.536 X1 + 0.669 X2 – 9.950 X3 + 1.959 X4</td>
<td>Y3 = Live weight of grower goat in kg,</td>
</tr>
</tbody>
</table>

While, X1 = AT in °C, X2 = RH in %, X3 = THI in °C and X4 = ET in °C.
that average daily gain in grower goat was decreased significantly by 3.18 g / d per % increase of RH. While multiple regression analysis of average daily gain (ADG) with THI and ET was found out it was observed that average daily gain in grower and finisher goat were increased by 32.59 g / d (P < 0.01) and 21.19 g / d (P < 0.05) respectively per °C rise of THI. But it was observed that average daily gain in grower and finisher goat were reduced by 46.11 g / d (P < 0.01) and 24.14 g / d (P < 0.01) respectively per °C rise of effective temperature.

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**REFERENCES**


