INFLUENCE OF BODY WEIGHT ON SEMEN CHARACTERISTICS IN SURTI BUCKS

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ABSTRACT

Semen samples were collected by artificial vagina method twice in a week from nine Surti bucks.The ejaculates were divided in to three groups based on the body weight of bucks *viz.,*G1-up to 30 kg (n=112); G2-30.1 to 40 kg (n=98) andG3 - above 40 kg (n=78). Mean density was significantly (P<0.05) highest in G3. Semen volume (ml) was significantly (P<0.01) lower in G1. The average mass activity, progressive motility,live sperm and HOS reacted sperm were non-significantly differed between all the groups.The average sperm concentration was significantly (P<0.01) higher in G3. The mean total sperm count and semen index were significantly (P<0.01) increased with increase in body weight.The average progressive motility at 30 min intervals was non-significantly higher in G2. Average motility degeneration rate at 30, 60 and 120 min was non-significantly higher in G1. Average normal sperm percent was non-significantly differed between all the groups.

Key words: Artificial vagina, Body weight, Buck, Motility degeneration rate, Semen parameters

INTRODUCTION

Goat husbandry practice is gaining importance as an alternate food source in India. To improve the productive potential of goat, incorporation of superior germplasm into progeny is essential by using outstanding sires. Artificial Insemination (AI) has very crucial role in goat breeding, especially to improve milk production. AI has made possible through usage of best breeding males to improve the genetic potential of breeding herds (Sharma *et al*., 2012) and its success is chiefly depends on the quality of semen. Body size and testicular measurements are important parameters (Chaudhari *et al.,* 2006 and Chaudhari *et al.,* 2007) in breeding soundness evaluations in buck (Agga *et al*., 2011). As various semen parameters are fluctuated by body weight of the buck (Zamiri and Heidari, 2006 and Zinat Mahal *et al*., 2013) it is aimed to study the influence of body weight on Surti buck semen parameters.

MATERIALS AND METHODS

Semen was collected by artificial vagina twice a week from nine Surti bucks up to 16 weeks. To monitor the effect of body weight on various semen parameters, ejaculates collected in particular week were divided in to three different groups based on the body weight of the bucks *viz.,*group 1 (G1): up to 30 kg (n=112), group 2 (G2): 30.1 to 40 kg (n=98) and group 3 (G3): above 40 kg (n=78). Immediately after collection, semen samples were transported to the laboratory and evaluated for various semen characteristics *viz.,* density, volume, mass activity, initial progressive motility, sperm concentration, motility at 30 min intervals up to 120 min, live sperm count, sperm functional membrane integrity by hypo-osmotic swelling test(HOST) and morphological abnormalities by standard methods (Shamsuddin *et al.,* 2000; Chaudhari *et al.,* 2011; Sharma *et al.,* 2012; Kumar *et al.,* 2013).Semen index was calculated bymultiplying semen volume, sperm concentration/ml, percent live spermand progressive motility (Barkawi *et al.,* 2006) and Motility degeneration Rate (MDR), was determined by incubating at 37^0 C in water bath and assessed the motility at 30, 60, 90 and 120 minutes after incubation (Campos *et al*., 2004).The data were suitably tabulated and analyzed using Statistical Package for Social Science (SPSS, Version 20). The means of different parameters were compared using Analysis of Variance, Duncan's multiple range test and presented as mean $\pm$ standard error.

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RESULTS AND DISCUSSION

In present experiment, mean density was gradually increased with an increase in body weight. Semen density was lowest in G1 (3.79$\pm$0.04), followed by G2 (3.83$\pm$0.04)and it was significantly (P<0.05) highest in G3 (3.94$\pm$0.03) which was in accordance with Zamiri and Heidari(2006). The average semen volume (ml) wasincreased with an increase in body weight in present study. It was significantly (P<0.01) higher in G2 (1.00$\pm$0.03) and G3 (1.00$\pm$0.04) than G1 (0.81$\pm$0.04). In accordance with the present findings, several workers also observed significantly (P<0.01) increased semen volume with increased body weight of bucks (Zamiri and Heidari, 2006; Mia *et al*., 2013 and Zinat Mahal *et al*., 2013).

The average mass motility in G1 to G3 groups (4.64$\pm$0.05, 4.72$\pm$0.05 and 4.73$\pm$0.05, respectively)was insignificantly different anditwas in accordance with the findings of Zinat Mahal *et al*.(2013). Contrary to the

present findings, significantly (P<0.05) decreased mass motility with increased body weight was observed by Mia *et al*. (2013). The initial progressive motility (%) in G1 to G3 groups (93.57±0.27, 93.98±0.24 and 93.65±0.27, respectively) was insignificantly different. Lower sperm motility percentage (83.80±0.949) than the present study in bucks weighing between 30-50 kg body wt. was alsoreported by Anand and Yadav (2016).

The average sperm concentration (million/ml) was gradually increased with an increase in body weight. It was significantly (P<0.01) higher in G3 (2804.10±107.79) than G2 (2107.40±80.75) and G1 (1959.60±77.74). Kadam *et al*. (2020) also found positive relationship between body weight and sperm concentration in Beetal bucks. Moreover, insignificantly increased sperm concentration with increased body weight of bucks was noticed by Zinat Mahal *et al*. (2013). While, inconsistent sperm concentrations between three body weight groups of bucks was observed by Mia *et al.* (2013).The mean total sperm count was also increased gradually with an increase in body weight with significantly (P<0.01) highest concentration in G3 (2779.37±158.57) followed by G2 (1899.76±86.21) and lowest in G1 (1450.63±77.10). Significantly (P<0.05) higher total sperm count with increased body weight of bucks was also noticed by Zamiri and Heidari (2006).

The average live sperm count (%) in G1 to G3 (76.70±0.91, 75.78±0.99 and 74.08±1.18, respectively) was insignificantly different. Similarly, average HOS reacted sperm (%) was also differed insignificantly (85.13±0.25, 85.30±0.26 and 85.53±0.35) among the groups. In accordance with the present investigation, insignificant differences in live sperm percentage between different body weight groups of bucks were reported by different workers (Zamiri and Heidari, 2006; Mia *et al*., 2013 and Zinat Mahal *et al.,* 2013). However, the live sperm count reported by Zamiri and Heidari (2006) was comparatively lower than present findings. While, the live sperm counts reported by Mia*et al*. (2013) and Zinat Mahal *et al.* (2013) were comparatively higher than present report.

In the present experiment, average semen index was gradually and significantly increased with increase in body weight with the highest value in G3 (1918.65±106.10)followed by G2 (1341.79±60.87) and the lowest in G1 (1052.78± 60.67).Initial progressive motility(%) examined immediately after semen collection, and at 30, 60, 90 and 120 minutes was insignificantly higher in G2 (87.96±0.34, 81.12±0.45, 74.64±0.55 and 67.81±0.76) than G3 (87.31±0.46, 80.90±0.61, 74.49±0.75 and 66.28±0.99) and lowest in G1 (87.14±0.47, 79.91±0.59, 72.68±0.76 and 65.18±0.89)groups, respectively.The average motility degeneration rate (%) at 30 min, 60 min and 120 min was insignificantly higher in G1 (6.92±0.32, 14.68±0.49 and 30.49±0.88) than G2 (6.42±0.22, 13.70±0.39 and 27.91±0.77) and G3 (6.80±0.33, 13.66±0.54 and 29.31±0.99) groups, respectively but the same was significantly (P<0.05) higher at 90 min.

Average normal sperm (%) in G1 to G3 (97.30±0.15, 97.50±0.21 and 97.50±0.20, respectively) was insignificantly different and was in concurrence with the findings of Mia*et al*. (2013) and Zinat Mahal *et al*. (2013).Total morphological abnormalities (%) wereinsignificantly different (2.70±0.15, 2.50±0.21 and 2.50±0.20) between all the three groups. In accordance with the present study, insignificant difference in total abnormal sperm percentage between two different body weight groups of bucks was reported by Zamiri and Heidari (2006).

Based on the above findings, it was concluded that body weight of the bucks significantly influenced important semen characteristics *viz.,* semen density, volume, sperm concentration, total sperm count and semen index.

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