

Original Research Article

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Monthly Variations in Fresh Semen Parameters of Surti Buck in Rainy Season

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ABSTRACT

Keywords

Buck semen, Fresh semen parameters, Rainy season, Surti buck

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Ninety six semen ejaculates from eight Surti bucks were collected and examined for various fresh semen parameters during rainy season. Weekly one ejaculate was collected from each buck up to 12 weeks from July to September months. All the ejaculates were divided and compared month-wise viz., July (n=32); August (n=40) and September (n=24) months. All the fresh semen parameters viz., semen volume, density, mass activity, sperm concentration and total sperm count were non-significantly differed between individual bucks. The average semen volume, density and mass activity differed non-significantly between three months. While, the sperm concentration and total sperm count were significantly ($P < 0.01$) increased from early rainy season towards the end of the season.

Introduction

Goat husbandry practice is gaining importance as an alternate food source. Population of goat in India showing an increase of 10.14% from 135.17 million in 2012 to 148.88 million in 2019. Goats play an important role in the food and nutritional security of the rural poor especially in the rainfed regions where crop production is uncertain, and rearing large ruminants is restricted by acute scarcity of feed and fodder (Kumar *et al.*, 2010). Artificial insemination (AI) has been most popular in veterinary

practices and has been universally accepted for the genetic improvement of the animals (Chaudhari *et al.*, 2007). The AI technique plays very crucial role in goat breeding to improve milk production potential of future progeny. The success of AI is chiefly depending upon semen quantitative and qualitative parameters.

Goat is a seasonal breeder animal and semen parameters in buck are influenced by age (Atara *et al.*, 2018), scrotal circumference (Kadam *et al.*, 2020), season (Leboeuf *et al.*, 2000; Atara *et al.*, 2019) and body weight

(Zinat Mahal *et al.*, 2013). Surti goat is a medium sized dual purpose breed and mostly confined to small towns and cities situated on the western coastal belt of the South Gujarat and mostly reared under the semi-intensive management system. Various climatic parameters *viz.*, temperature, relative humidity, temperature humidity index, sunshine period and rainfall were significantly fluctuated between rainy and dry seasons in South Gujarat (Atara, 2017).

As the Surti goat is reared under humid heavy rainfall area in South Gujarat and the seasonality affects on semen thereby limiting the application of AI on large scale in goat, the present investigation was conducted to study monthly variation in fresh semen parameters in Surti goat particularly in rainy season.

Materials and Methods

In present experiment, total eight apparently healthy Surti male bucks above 1½ years of age maintained under All India Coordinated Research Project (AICRP) on Goat at Livestock Research Station, Navsari Agricultural University, Navsari were selected. The selected bucks were managed under uniform managemental and feeding conditions. They were housed in a common covered pen separated from females under naturally existing photoperiod and air temperature of the South Gujarat. The bucks were trained to donate the semen in artificial vagina using male as dummy for entire June month.

After completion of the training period, semen was collected regularly by artificial vagina once in a week from each buck up to 12 weeks during rainy season from July to September months. Before semen collection, one false mount was given to the bucks on male dummy secured in trevis. During entire

experiment, total ninety six semen ejaculates were collected and examined for fresh semen parameters *viz.*, semen volume, density, mass activity, sperm concentration and total sperm count. Month-wise, all the ejaculates were divided and fresh semen parameters were compared between July (n=32); August (n=40) and September (n=24) months.

The data pertaining to fresh semen parameters 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 + standard error.

Results and Discussion

Individual buck-wise fresh semen parameters are summarized in table 1. All the fresh semen parameters were non-significantly differed between all the bucks. Similar to present findings, Sultana *et al.*, (2013) also noticed non-significant difference in sperm concentration among the bucks. However, the semen volume differed significantly among the bucks in their experiment. Khadse *et al.*, (2019) studied the buck-wise semen parameters from Sirohi goat semen. They observed comparatively higher average semen volume and comparatively lower average mean sperm concentration then the present study.

Month-wise semen parameters *viz.*, semen volume, density, mass activity, sperm concentration and total sperm count are depicted in fig. 1 to 5. The average semen volume (ml) of Surti buck was non-significantly differed between July (0.60 ± 0.03), August (0.63 ± 0.02) and September (0.58 ± 0.03) months in present study (Fig. 1). Similarly, Dias *et al.*, (2017) also found non-significant difference in semen volume during July, August and September months in Alpine

bucks. While, Farshad *et al.*, (2012) reported non-significant difference between July and August months; and significant difference in September month in Markhoz buck. Moreover, Zamiri and Heidari (2006) observed increasing trend in semen volume from July to September months. Catunda *et al.*(2011) reported non-significant difference between two seasons. While, Atara *et al.*, (2019) reported significant difference in semen volume between two seasons. However, contrary to present findings, Ahmad and Noakes (1996) observed significant difference in semen volume between July, August and September months in British buck.

In present study, the mean density differed non-significantly between July (4.00±0.00), August (4.00±0.00) and September (3.96±0.04) months (Fig. 2). Similar trend was noticed by Farshad *et al.*, (2012) and Dias *et al.*, (2017). They also found non-significant difference in sperm density between July, August and September months in their experiments. While, Zamiri and Heidari (2006) found decreased sperm density from July to September months which was in accordance with present study. Atara *et al.*, (2019) also reported non-significant difference in semen density between two seasons.

Table.1 Individual buck-wise fresh semen parameters (Mean ± SE) in Surti bucks

Sr. No.	Buck No.	N	Volume (ml)	Density	Mass activity	Concentration (x10 ⁶ /ml)	Total sperm count (x10 ⁶)
1	1201	12	0.57±0.02	4.00±0.00	4.92±0.08	3266.67±151.27	1840.63±87.79
2	1439	12	0.58±0.03	4.00±0.00	4.83±0.11	3143.75±162.17	1834.17±147.35
3	1517	12	0.63±0.04	4.00±0.00	4.75±0.13	3062.50±176.28	1867.50±109.68
4	2520	12	0.67±0.06	4.00±0.00	4.92±0.08	3081.25±141.46	2001.67±142.56
5	2546	12	0.63±0.05	4.00±0.00	4.75±0.13	3052.08±91.52	1946.04±186.91
6	2547	12	0.64±0.05	3.92±0.08	4.83±0.11	3002.08±164.55	1873.33±115.27
7	2655	12	0.58±0.02	4.00±0.00	4.92±0.08	3193.75±124.44	1849.38±117.25
8	2995	12	0.58±0.03	4.00±0.00	4.83±0.11	3252.08±161.51	1884.58±118.09
Overall		96	0.61±0.01	3.99±0.01	4.84±0.04	3131.77±51.52	1887.16±44.99
F value		0.84 ^{NS}	1.00 ^{NS}	0.42 ^{NS}	0.43 ^{NS}	0.20 ^{NS}	
P value		0.56	0.44	0.89	0.88	0.99	

NS: Non-significant

Fig.1 Month-wise semen volume (Mean ± SE) in Surti bucks

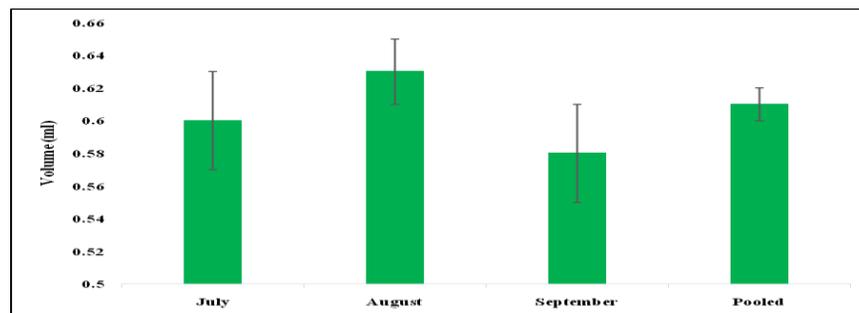


Fig.2 Month-wise semen density (Mean \pm SE) in Surti bucks

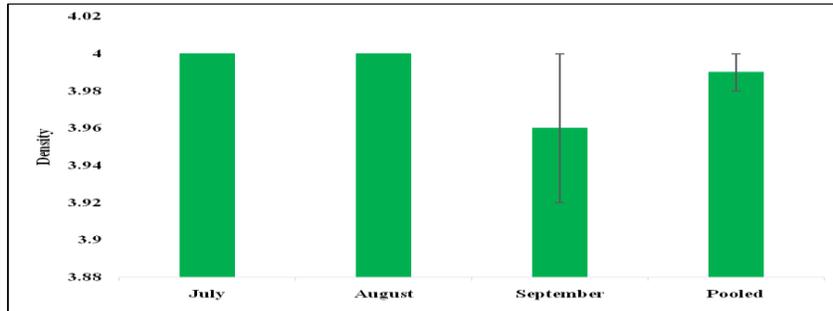


Fig.3 Month-wise semen mass activity (Mean \pm SE) in Surti bucks

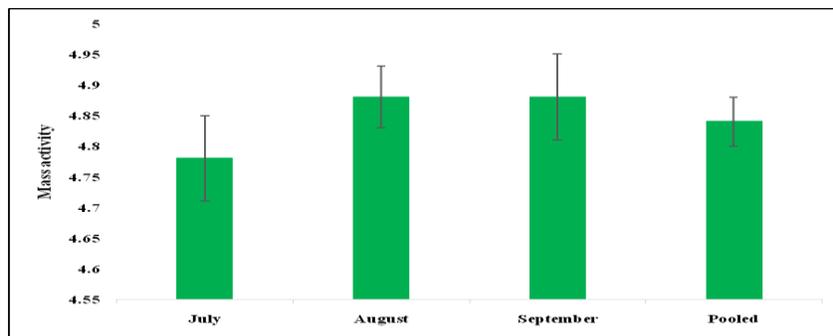


Fig.4 Month-wise sperm concentration (Mean \pm SE) in Surti bucks

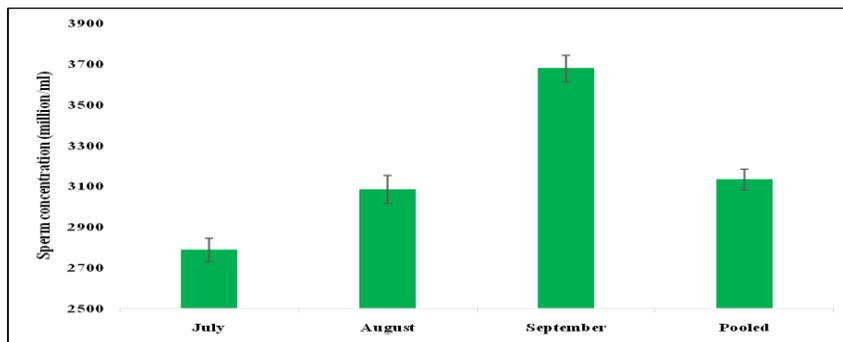
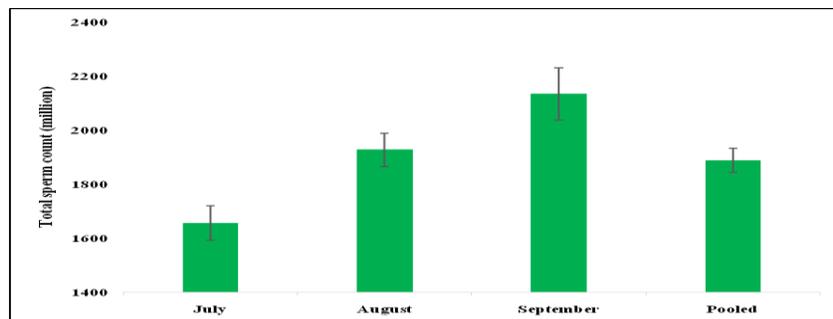


Fig.5 Month-wise total sperm count (Mean \pm SE) in Surti bucks



The mass activity differed non-significantly between July (4.78 ± 0.07), August (4.88 ± 0.05) and September (4.88 ± 0.07) months in present study (Fig. 3). Similarly, Dias *et al.*, (2017) also found non-significant difference in mass activity during July, August and September months in Alpine bucks. Atara *et al.*, (2019) also reported non-significant difference in mass activity between two seasons. In concurrence to present findings of gradual increase in mass activity, Ahmad and Noakes (1996) also reported gradually increased mass motility from July, August to September months.

The sperm concentration was significantly ($P < 0.01$) increased from early rainy season towards the end of the season in present experiment. It was significantly ($P < 0.01$) increased from July (2785.94 ± 56.52 million/ml), August (3081.88 ± 70.08 million/ml) to September (3676.04 ± 65.13 million/ml) months (Fig. 4). In accordance with the present findings, Dias *et al.*, (2017) also observed gradual increased in sperm concentration from July to September months in Alpine bucks. However, the difference between them was non-significant. While, Ahmad and Noakes (1996) reported totally reverse trend with gradually decreased sperm concentration from July, August to September months. While, Atara *et al.*, (2019) reported non-significant difference in sperm concentration between two seasons.

Similar trend like sperm concentration was also noticed in total sperm count. It was significantly ($P < 0.01$) increased from July (1654.84 ± 63.77 million), August (1926.06 ± 62.26 million) to September (2132.08 ± 96.59 million) months in present study (Fig. 5).

Ahmad and Noakes (1996) and Farshad *et al.*, (2012) also found gradually increased total sperm count from July, August to September months. Atara *et al.*, (2019) also reported significant difference in total sperm count

between two seasons. While, Zamiri and Heidari (2006) observed inconsistency in total sperm count between July to September months.

Based on the above findings it was concluded that months of the season influenced significantly on some important quantitative semen parameters *viz.*, sperm concentration and total sperm count in Surti buck as they were improved with progression of rainy season in present experiment; breeding practices could be managed accordingly to augment reproductive efficiency of breeding bucks.

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