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## Studies on semen picture of Boer bucks

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### Abstract

The research investigation was carried out to study the age at which the appearance of first spermatozoa in preputial smear and semen picture of first ejaculate in Boer kids. Seven Boer kids were purchased at the age of 4-5 months were kept under a semi-intensive system. The first spermatozoa were noticed in Boer kids at the age of 31<sup>st</sup>-33<sup>rd</sup> weeks. The first ejaculates were collected from all the Boer bucks using an artificial vagina and subjected for routine evaluation. The findings of macroscopic test viz. colour – creamy white, average volume of 0.85 mL and pH range 6.5-7.5 were recorded. The microscopic test viz. mass activity score of 5, progressive motility average of 90%, sperm concentration range from 2.6–3.2 (10<sup>9</sup>/ml), live sperm count range from 80-89%, dead sperm count range from 11-20% and the abnormalities like loose head average of 1.85% , bent and coiled mid piece 1.42% and tail abnormality range from 6.3–9.1% were noticed. The first ejaculates collected from all the Boer bucks using an artificial vagina shown normal in quality in the volume, sperm mass motility, individual motility, percentage of live and abnormal sperm.

**Keywords:** Semen picture, Boer bucks, preputial smear

### Introduction

The onset of the breeding season may vary depending on feed supply and climatic conditions. Boer goats can reach puberty at 6 months and at 18 kg body weight. Bucks reach sexual maturity at about 40% of their ultimate mature size but they begin sexual behaviors at an earlier age. This means most bucks are fertile at about 16 to 20 kg body weight (Chemineau *et al.*, 1992) [24]. Age is also one of the major contributing factors to differences in scrotal circumference and semen characteristics (Toe *et al.*, 1994) [22], with testicular size being closely related to total sperm output (Oldham *et al.*, 1978; Ahmad and Noakes, 1995) [18, 1]. Important puberty indicators in goats are age, weight at birth, weaning weight, growth rate, weight gain, scrotal circumference (SC) at puberty, weight and age at puberty, volume of ejaculate and individual and mass motility, abnormal morphology spermatozoa and the concentration of spermatozoa and penis detachment (De La Vega *et al.*, 2001 and Bezerra *et al.*, 2009) [5, 2]. The display of mating behavior is an important criterion for male selection since early sexual behavior allows for the evaluation of reproductive capacity of an animal that will be used to intensify genetic selection and shorten the generation gap (Madani and Rahal, 1988) [16].

The sperm output has been shown to be positively associated with body weight in bucks (Mekasha 2007) [17] and delayed growth in body size and testicular mass obviously leads to reproductive wastage and economic loss. Increase of testicular size and body mass is influenced by several factors, including breed, age, nutrition and other environmental clues (Karagiannidis *et al.*, 2000) [11].

For several male animals, development of sexual behavior is best described by a learning pattern in which the male gradually associates his 'internal state' with female reproductive hint (i.e. visual, olfactory and tactile) that reflect her 'internal state' and are rapidly associated with the sexual act. Thus, each time a male approaches a sexually receptive female; his behavior is influenced by prior experiences with other females. For example, a common sexual behavior measurement such as number of ejaculations during a serving capacity test would be low when a sexually inexperienced male is first exposed to a receptive female. As the male gains sexual experience, the frequency of ejaculations increases (Pfaus *et al.*, 2001) [19]. When male offspring become mature they disperse from the female group (Shackleton and Schank, 1984). The testis – probably through androgens – is involved in the segregation. As the time of breeding approaches, males join the female groups. Nudging, blocking, and rubbing (Jewell, 1976) [9] and aggressive behavior (Lincoln and Davidson, 1977) [14] by males begin before

females come into estrus, probably because of the earlier activation of the male reproductive system increased LH pulsatility, increasing FSH and testosterone concentrations (Lincoln and Short, 1980) [15].

## Materials and Methods

### Appearance of first spermatozoa in preputial smear

The preputial smear technique was used to determine the onset of puberty. The preputial smears were taken from all Boer kids during experiment period on weekly basis by gently and carefully rotating moistened cotton in the preputial pouch between the orifice and the glans penis. In each buck, the adherent material was smeared on a clean dry glass slide and screened under a microscope for presence of spermatozoa. This was continued until three consecutive positive readings from all Boer kids (Vandenberg, 1971; Egbunike, 1979 and Immanuel *et al.* 2012) [23, 6, 8].

### Semen picture in first ejaculate of Boer bucks

Semen collection was carried out by artificial vagina and examined for various macroscopic and microscopic tests like volume, colour, consistency, pH, mass activity, individual motility, live and dead sperm, sperm morphology and sperm concentration as per standard procedure.

## Results and Discussion

### Appearance of first spermatozoa in preputial smear in Boer male kids

The preputial smear was collected on a clean glass slide and observed under a phase contrast microscope at weekly interval starting from 29<sup>th</sup>–49<sup>th</sup> weeks for appearance of first spermatozoa to determine the onset of puberty. The first spermatozoa were noticed in two Boer kids at the age of 31<sup>st</sup> weeks (Plate 1) and rest of bucks at 33<sup>rd</sup> weeks.

The first spermatozoa were noticed in Boer kids at the age of 31<sup>st</sup> - 33<sup>rd</sup> weeks.

### Semen picture in first ejaculation Boer buck

The first ejaculates were collected from all the Boer bucks using an artificial vagina and subjected for routine evaluation. The findings of macroscopic tests viz. colour - creamy white, average volume of 0.85 mL and pH range 6.5-7.5 were recorded. The microscopic tests viz. mass activity score of 5, progressive motility average of 90%, sperm concentration range from 2.6-3.2 (10<sup>9</sup>/ml), live sperm count (Plate 2) range from 80-89%, dead sperm count range from 11-20% and the

abnormalities like loose head average of 1.85%, bent and coiled mid piece 1.42% (Plate 3) and tail abnormality (Plate 4 and 5) range from 6.3-9.1% were noticed (Table 1).

The first ejaculates collected from all the Boer bucks using an artificial vagina shown normal in quality in the volume, sperm mass motility, individual motility, percentage of live- and abnormal sperm.

Chakraborty *et al.* (1989) [3] stated that the onset of puberty in males refers to the appearance of the first motile spermatozoa in the ejaculate and it results from complex interactions in gonads. However, animals may not be fully sexually competent at puberty, have grown enough to physically support reproduction, in monitoring its sperm profile, which in turn indirectly indicates the degree of testicular and epididymal maturity.

### Semen picture in first ejaculate of Boer bucks

The ejaculates were collected first time from all the Boer bucks using an artificial vagina and subjected for routine evaluation and the semen picture is depicted in Table 10. The first ejaculates collected from all the Boer bucks using an artificial vagina shown normal in quality in the volume, sperm mass motility, individual motility, percentage of live- and abnormal sperm.

The average semen volume obtained in the present study was 0.85 ml that agreed strongly with the findings of other researchers (Karim, 2008; Singh *et al.*, 1985) [12, 21]. Kabiraj *et al.* (2011) [10] reported 0.32 ± 0.04 and 0.55 ± 0.05ml at 0.5 to 1, and 1.5 to 2 years of age, respectively. Further, Furstoss *et al.*, (2009) [7] reported 0.48 ± 0.10 ml of semen volume from Alpine bucks at 7 months of age that is slightly lower. Das *et al.*, (2006) [4] reported semen volume that ranged from 0.16 to 0.51 ml in black Bengal buck, which is slightly lower to the values of the present study. These might be due to breed and nutritional differences, seasonal variation, collection methods and time of semen collection.

Lacuesta *et al.* (2015) [13] mentioned that all semen characteristics increased with age ( $P < 0.001$ ). Individual motility was greater in four adult goats (FEM) kids than that in isolated from females (ISO) kids at 15 and 17 weeks ( $P < 0.005$ ); mass motility was greater in ISO than that in FEM kids at 32 weeks ( $P < 0.005$ ); total number of spermatozoa / ejaculate was greater in ISO kids at 30, 32, and 40 weeks and in FEM kids at 43 weeks ( $P < 0.005$ ); total number of motile spermatozoa was greater in ISO kids at 32 and 40 weeks, whereas at 43 weeks, it was greater in FEM kids ( $P < 0.005$ ).

**Table 1:** Semen picture in first ejaculate of Boer buck

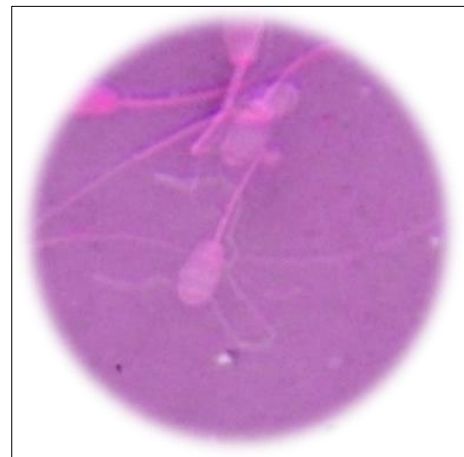
Parameter	Buck No. 2284	Buck No. 2296	Buck No. 2297	Buck No. 2319	Buck No. 2342	Buck No. 2352	Buck No. 2354	Mean
Color	Creamy white	Creamy white	Creamy white	Creamy white	Creamy white	Creamy white	Creamy white	Creamy white
Volume (ml)	0.9	0.8	0.9	0.9	1	0.8	0.7	0.86
pH	7.5	7.5	7.0	6.5	6.5	7.0	7.5	7.07
Mass activity (1-5 score)	5	5	5	5	5	5	5	5
Progressive motility (%)	100	100	90	100	100	100	100	98.57
Sperm concentration (10 <sup>9</sup> /ml)	3.1	3	3.2	2.6	3.2	2.7	2.9	2.96
Live sperm (%)	84	80	81	86	89	80	88	84
Dead sperm (%)	16	20	19	14	11	20	12	16
Head Abnormalities (%)	2	1	2	2	1	2	3	1.86
Mid piece abnormalities (%)	1	2	1	1	1	2	2	1.43
Tail Abnormalities (%)	8.4	8.3	8.4	8.1	6.3	9.1	8.1	8.1
Total abnormalities (%)	11.4	11.3	11.4	11.1	8.3	13.1	13.1	11.39



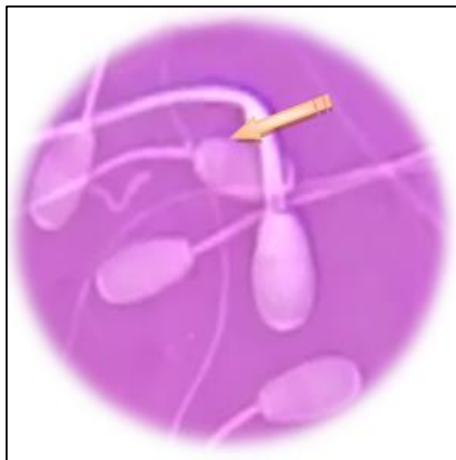
**Plate 1:** Appearance of first spermatozoa in preputial smear



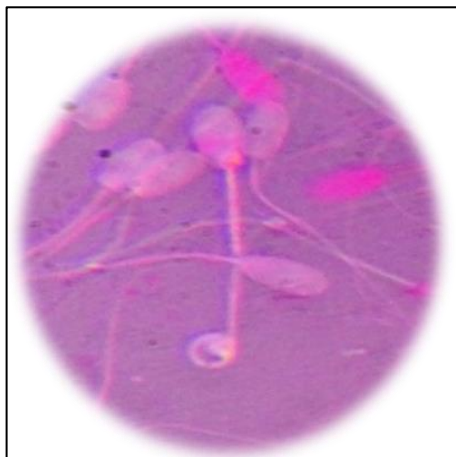
**Plate 2:** Live and dead sperm



**Plate 5:** Loose tail in Boer sperm



**Plate 3:** Proximal protoplasmic droplet defect of Boer sperm



**Plate 4:** Live and dead sperm

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