



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(10): 1235-1240
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www.thepharmajournal.com
Received: 14-07-2022
Accepted: 19-08-2022

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A research study on reproductive behaviour of Boer (*Capra hircus*) kids

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Abstract

The research investigation was carried out to study the sexual behaviour, effect of presence of a female kid and effect of season on age of puberty and sexual maturity. Seven Boer kids were purchased at the age of 4 – 5 months were kept under a semi-intensive system. The Boer kids were not showing any sexual interest but sniffing the penile region during 29th - 31st week of age. During 32nd weeks, all the bucks exhibited mounting attempt with sliding. During 33rd -35th week of age Boer kids exhibited Flehmen's reaction and nudging by forelimbs. During 36th - 41st weeks of age all the bucks started to show intromission of penis and during 42nd - 47th weeks along with signs of sexual interaction bucks started showing complete erection of penis and self enurination. At 48th and 49th weeks of age all the Boer bucks in the herd showed all the signs of sexual interaction like, sniffing, sliding, jumping, Flehmen's reaction, complete erection of penis, intromission of penis and self enurination. The Sexual behaviour interaction between male-to-male Boer bucks was increased gradually from 29th to 49th weeks of age. There were no special effects of presence of a female Osmanabadi doe on sexual behaviour in Boer male kids. All the Boer kids under this study have reached the puberty and sexual maturity in the same season within normal age range. Hence, the effect of season on the age of puberty and sexual maturity in Boer kids could not be analyzed.

Keywords: Boer, goat, sexual behavior

1. Introduction

Boer goat (*Capra hircus*) is one of the most desirable goat breed for meat production and is known for excellent body conformation, fast growing rate and good meat quality. Boer goats have good mothering ability, adaptability, hardiness and resistance to diseases (Barry and Godke, 1997) [2].

Puberty is defined as the point of sexual development at which the animal becomes capable of reproduction (first spermatozoa in the ejaculate of the male), but animals are not yet fully sexually mature at this stage. Sexual maturity is the time when the animal expresses its full reproductive capacity. In both the male and female goats, puberty may often be reached without adequate physical growth to support reproduction. In bucks, at puberty, complete separation of the prepuce and the penis occurs and motile spermatozoa are first detected in the ejaculate. In immature rams and bucks, the penis has adhesions that prevent it from being fully extended. At puberty, these adhesions dissolve under the influence of testosterone and the penis can be fully extended. This may occur as early as 5 months. However, full reproductive competence may not occur until 15 months of age. Spermatogenesis has been found to begin as early as 84 days of age with spermatozoa present in the epididymis at 140 days of age.

Age is also one of the major contributing factors to differences in scrotal circumference and semen characteristics (Toe *et al.*, 1994) [10], with testicular size being closely related to total sperm output (Ahmad and Noakes, 1995) [11]. 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 (Bezerra *et al.*, 2009) [3]. 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) [7].

The buck stimulates through pheromones, behavioral and visual clues that act in a synergistic way. Several experiments have provided different and sometimes contradictory information about the importance of the different clues but this may be a consequence of using does in different status of "receptiveness".

The introduction of a male to anovulatory females previously separated from any males may induce sexual activity within a few days, the male effect or teasing, has been extensively studied in ewes and goats. In goats, the reproductive condition of the buck seems to be the limiting factor determining the response of anestrus does to the male effect.

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) [8]. When male offspring become mature they disperse from the female group (Shackleton and Schank, 1984) [9]. 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) [5] and aggressive behavior 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) [6].

In view of this, present research was carried out with the following objectives.

1. To study sexual behavior of Boer kids till the age of puberty and sexual maturity.
2. To study the effect of presence of a female kid on the age of puberty and sexual maturity in Boer kids.

2. Materials and Methods

The research investigation entitled "Studies on reproductive traits of Boer bucks" was carried out to study the reproductive traits, sexual behaviour, effect of presence of a female kid and effect of season on age of puberty and sexual maturity. The study also included the age at which the appearance of first spermatozoa in preputial smear, preputial microflora and semen picture of first ejaculate in Boer kids.

2.1 Source of Boer kids

Seven Boer kids were purchased at the age of 4 – 5 months from Nimbkar Agriculture Research Institute (NARI), Phaltan, Maharashtra state and kept separately under routine management.

2.2 Location of the research work

This study was conducted from August to December 2014 (29th to 49th weeks of age) at the Semen collection centre, Department of Veterinary Gynaecology and Obstetrics, Veterinary College, Bidar.

2.3 Management

Immediately after purchase, the flock was subjected for general health examination, and the male goats were kept under a semi-intensive system.

2.4 Sexual behavior of Boer kids until the age of puberty and sexual maturity

The sexual behavior of Boer male kids was carried out on

weekly basis from 29–49 weeks of age as per Ford *et al.* (2009) [4] according to following scorecard.

Table 1: Scorecard

Score	Observations
0	Bucks do not mount, i.e. show no sexual interest
1	Sexual interest shown only once, i.e. sniffing of the perineal / penile region
2	Bucks make a mounting attempt with sliding
3	Bucks mounting between sliding and jumping
4	Bucks mount by jumping
5	Bucks mount with great enthusiasm

2.5 Presence of a female goat kid and reproductive behavior with Boer kids

A female Osmanabadi goat kid was mixed with Boer kids for 30 to 40 minutes to study the change in reproductive behavior on weekly basis from 29 to 49 weeks of age.

3. Results

1. Sexual behaviour interaction between male-to-male Boer male kids

The male Boer kids were kept in a separate pen and observed for the changes in sexual behaviour for about 20 to 45 minutes from 29th to 49th weeks at weekly interval. The Boer kids were not showing any sexual interest but sniffing the penile region during 29th- 31st week of age. During 32nd weeks, all the bucks exhibited mounting attempt with sliding. During 33rd-35th week of age Boer kids exhibited Flehmen's reaction and nudging by forelimbs. During 36th - 41st weeks of age all the bucks started to show rectal copulation and during 42nd-47th weeks along with signs of sexual interaction bucks started showing complete erection of penis and self enurination. At 48th and 49th weeks of age all the Boer bucks in the herd showed all the signs of sexual interaction like, sniffing, sliding, jumping, Flehmen's reaction, complete erection of penis, rectal copulation and self enurination.

2. The Sexual behaviour interaction between male-to-male Boer bucks was increased gradually from 29th to 49th weeks of age. The aggressive behavior with bucks, erection of penis, self-enurination, self-enurination and Flehmen's reaction were also noticed.

3 Presence of female Osmanabadi doe on sexual behaviour in Boer male kids

The male Boer kids were kept in a separate pen and an Osmanabadi female kid of same age group was allowed to mix with male kids for about 20-45 minutes and observed for the reproductive behaviour at weekly interval from 29th to 49th weeks of age. The Boer kids did not show any sexual interest from 29th to 33rd weeks of age while they show sniffing of perineal region of doe in 34th weeks of age. During 35th weeks of age, all the bucks were exhibiting mounting attempt with sliding and Flehmen's reaction. After 36th – 38th weeks of age, onwards bucks started showing Flehmen's reaction and nudging forelimbs, by 39th - 43rd week's intromission of penis and by 44th - 47th weeks along with signs of sexual interaction bucks started showing complete erection of penis and self-enurination. During 48th and 49th weeks of age all the Boer kids showed all the signs of sexual interaction like, sniffing, sliding and jumping, Flehmen's, complete erection of penis, intromission of penis and self enurination,

mounting with great enthusiasm

There were no special effects of presence of a female Osmanabadi doe on sexual behaviour in Boer male kids. The male approached female doe, smelled the doe aggressive

behavior with doe, jumping an hitting forehead , Incomplete protrusion of penis , sniffing of ano-genital region Flehmen's reaction erection of penis nudging of forelimb were also noticed.

Table 2: Sexual behaviour interactions between male to male from 29th to 41st week in Boer kids

Buck No.	29 th to 31 th week	32 th week	33 th week	34 th week	35 th week	36 th week	37 th week	38 th week	39 th week	40 to 41 st week	
2284	No interest , Sniffing	Sniffing, Sliding	No interest, Sniffing	No interest, Sniffing	Sniffing, Sliding, Flehmen's reaction, Nudging of fore limb	Sniffing, Sliding, Rectal copulation	Sniffing, Sliding	Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction, Jumping	Sniffing, Sliding, Flehmen's reaction, Jumping & eager, Rectal copulation	
2296			Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Nudging of fore limb		Sniffing, Sliding	Sniffing, Sliding, Flehmen's reaction, Rectal copulation	Sniffing, Sliding, Flehmen's reaction, Jumping, Rectal copulation	Sniffing, Sliding, Flehmen's reaction, Jumping, Rectal copulation		
2297			Sniffing, Sliding	Sniffing, Sliding, Nudging of fore limb		Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction, Jumping, Rectal copulation	Sniffing, Sliding, Flehmen's reaction, jumping and eager	Sniffing, Sliding, Flehmen's reaction, Jumping		Sniffing, Sliding, Flehmen's reaction
2319			Sniffing, Sliding				Sniffing, Sliding, Flehmen's reaction, Jumping, Rectal copulation				
2342			Sniffing, Sliding	Sniffing, Sliding, Nudging of fore limb		Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction		
2352			Sniffing, Sliding	Sniffing, Sliding		Sniffing, Sliding	Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction		
2354	Sniffing, Sliding	Sniffing, Sliding	Sniffing, Sliding	Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction	Sniffing, Sliding, Flehmen's reaction					

Table 3: Sexual behaviour interactions between male to male from 42nd to 49th weeks in Boer kids

Buck No.	42 nd week	43 th to 44 th week	45 th to 47 th week	48 th week	49 th week
2284	Sniffing, Sliding, Flehmen's reaction, Jumping, Rectal copulation, Complete erection of penis and Self enurination	Sniffing, Sliding, Flehmen's reaction, Jumping, Complete erection of penis and Self enurination	Sniffing, Flehmen's reaction, Jumping and eager, Complete erection of penis, Rectal copulation and Self enurination	Sexually aroused males exhibit more frequent, Self-enurination, Genital grooming, Nudging of forelimb, Flehmen's reaction, Mounting, Rectal copulation	Sexually aroused males exhibit more frequent, Self-enurination, Genital grooming, Nudging of forelimb, Flehmen's reaction, Mounting, Rectal copulation
2296	Sniffing, Sliding, Flehmen's reaction				
2297		Sniffing, Sliding, Flehmen's reaction			
2319	Sniffing, Sliding, Flehmen's reaction, Jumping and eager, Rectal copulation	Sniffing, Sliding, Flehmen's reaction, Jumping, Rectal copulation, Complete erection of penis and self enurination			
2342		Sniffing, Sliding, Flehmen's reaction			
2352		Sniffing, Sliding, Flehmen's reaction			
2354		Sniffing, Sliding, Flehmen's reaction			

Table 4: Sexual behaviour interaction between male to female Osmanabadi from 29th to 42nd weeks in Boer kids

Buck No.	29 th to 33 th week	34 th week	35 th week	36 th week	37 th week	38 th week	39 th week	40 th week to 42 th week			
2284	No interest	No interest, Sniffing	No interest, Sniffing	No interest, Sniffing, Flehmen's reaction, Nudging of fore limb	No interest, Sniffing, Flehmen's reaction	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb			
2296			No interest, Sniffing, Flehmen's reaction	No interest, Sniffing, Flehmen's reaction				No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb			
2297			No interest, Sniffing	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb			No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb
2319			No interest, Sniffing, Sliding								No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb
2342			No interest, Sniffing, Flehmen's reaction, Sliding								No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb
2352			No interest, Sniffing, Flehmen's reaction, Sliding								No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb

2354		No interest, Sniffing		Sniffing, Flehmen's reaction, Nudging of fore limb		reaction, Nudging of fore limb, Sliding	
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Table 5: Sexual behaviour interaction between male to female Osmanabadi from 43rd to 49th weeks in Boer kids

M-F Buck No.	43 rd week	44 th week	45 th week	46 th week	47 th week	48 th week	49 th week
2284	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb, Incomplete Intromission of penis	Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb	Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb			All the sexual behavior present	Sniffing of perineal region, Sliding and Jumping, Flehmen's reaction, Complete erection of penis, Intromission of penis, Self enurination and Mounting with great enthusiasm
2296							
2319	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb, Intromission of penis	Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb, Erection of penis and Self enurination	Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb, Erection of penis and Self enurination	Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb, Erection of penis and Self enurination	Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb, Erection of penis and Self enurination	Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb, Erection of penis and Self enurination	
2342	No interest, Sniffing, Flehmen's reaction, Nudging of fore limb, Sliding	No interest, Sniffing, Flehmen's reaction, Sliding, Nudging of fore limb Incomplete Intromission of penis					
2352							
2354							



Plate 1: Jumping



Plate 4: Aggressive behaviour with buck

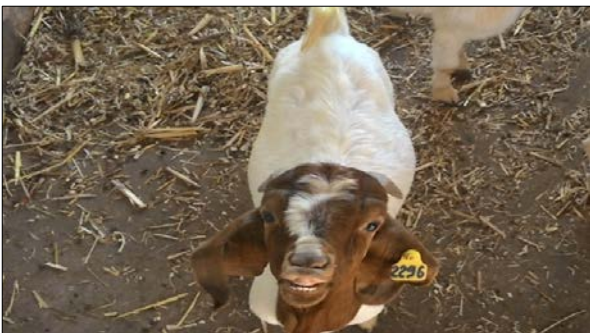


Plate 2: Flehmen's reaction



Plate 5: Erection of penis



Plate 3: Nudging of forelimb



Plate 6: Self – enurination



Plate 7: Self – enurination and Flehmen’s reaction



Plate 12: Mount by jumping (Score – 4)



Plate 8: No sexual interest with doe (Score – 0)



Plate 13: Mount by great enthusiasm (Score – 5)



Plate 9: Sniffing of perineal region of doe (Score – 1)



Plate 14: Approach to doe



Plate 10: Mounting attempt with sliding (Score – 2)



Plate 11: Sliding and jumping (Score – 3)

The male Boer kids were kept in a separate pen and observed for the changes in sexual behaviour for about 20 to 45 minutes from 29th to 49th weeks at weekly interval. The Boer kids were not showing any sexual interest but sniffing the penile region during 29th - 31st week of age. During 32nd weeks, all the bucks exhibited mounting attempt with sliding. During 33rd -35th week of age Boer kids exhibited Flehmen’s reaction and nudging by forelimbs. During 36th - 41st weeks of age all the bucks started to show intromission of penis and during 42nd - 47th weeks along with signs of sexual interaction bucks started showing complete erection of penis and self enurination. At 48th and 49th weeks of age all the Boer bucks in the herd showed all the signs of sexual interaction like, sniffing, sliding, jumping, Flehmen’s reaction, complete erection of penis, intromission of penis and self enurination. The sexual behaviour interaction between male-to-male Boer bucks was increased gradually from 29th to 49th weeks of age. The male Boer kids were kept in a separate pen and an Osmanabadi female kid of same age group was allowed to mix with male kids for about 20-45 minutes and observed for the reproductive behaviour at weekly interval from 29th to 49th weeks of age. The Boer kids did not show any sexual interest from 29th to 33rd weeks of age while they show sniffing of perineal region in 34th weeks of age. During 35th weeks of age, all the bucks were exhibiting mounting attempt with sliding and Flehmen’s reaction. After 36th – 38th weeks of age,

onwards bucks started showing Flehmen's reaction and nudging forelimbs, by 39th - 43rd week's intromission of penis and by 44th - 47th weeks along with signs of sexual interaction bucks started showing complete erection of penis and self-enurination. During 48th and 49th weeks of age all the Boer kids showed all the signs of sexual interaction like, sniffing, sliding, jumping, Flehmen's, complete erection of penis, intromission of penis and self enurination, mounting with great enthusiasm.

There were no special effects of presence of a female Osmanabadi doe on sexual behaviour in Boer male kids.

It can be concluded that

1. The sexual behaviour interaction between male-to-male Boer bucks was increased gradually from 29th to 49th weeks of age.
2. There were no special effects of presence of a female Osmanabadi doe on sexual behaviour in Boer male kids.

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