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Reproductive traits of Boer buck with pairwise comparision till the age of puberty and sexual maturity

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Abstract
The present study was conducted to evaluate Seven Boer bucks from the age of 4 – 5 months and were kept under a semi-intensive system. The linear body measurement parameters *viz*. body weight, stature, wither height, body depth, chest width, heart girth / chest girth, body length, flank width, rump width, testicular length, body condition score and libido were increased gradually from 29th to 49th weeks of age and were statistically significant at 5% (p<0.05) level of significance. The scrotal circumference and scrotal diameter were also increased gradually from 29th to 49th weeks of age with statistically significant (p<0.05) difference and few parameters were not significant (p>0.05). As the age advanced the linear body measurements, testicular measurements and body condition score of Boer kids were increased gradually (from 29th to 49th weeks) with statistically significant difference.

Keywords: Linear body measurements, testicular measurements, pairwise comparision, sexual maturity

Introduction
Puberty is the details view of sexual development at which the animal becomes competent of reproduction (first spermatozoa in the ejaculate of the male), but animals are not yet fully sexually mature at this stage. Reproductive capacity is the time when the animal expresses its full Sexual maturity. In both the female and male 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 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 (Pacheco *et al*. 2009) [27].
The information generated by phenotypic characterization studies is essential for planning the management of AnGR at local, national, regional, and global levels (FAO, 2012). The global plan of action for AnGR recognizes that a good understanding of breed characteristics is necessary to guide decision-making in livestock development and breeding programs (FAO, 2007). Phenotypic characterization is essential in mapping out an inventory of characteristics peculiar to a group of animals and sustainable use of its animal genetic resources. Lack of information on characterization of the genetic
During selection of goat, attention must be given to the age, growth rate, HG, BL, and WH. The prediction of BW and its relationships to other morphological measurements produces appreciable knowledge for breeding investigation with regard to meat production per animal (Janssens and Vandepitte, 2004; Yilmaz *et al*., 2013 and Iqbal *et al*., 2013) [18, 35, 15].
The onset of the breeding season may vary depending on climatic conditions and feed supply. 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) [11]. Age is also one of the major contributing factors to differences in scrotal circumference and semen characteristics (Toe *et al*., 1994) [31], with testicular size being closely related to total sperm output (Oldham *et al*., 1978; Ahmad and Noakes, 1995) [26, 5]. For Boer goats, information is almost non-existing with regard to the relationships between body conformation, testicular traits and reproductive performance under semi-temperate and temperate conditions (Adeyinka and Mohammed, 2006) [4].
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) [12, 10]. 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) [22].

The sperm output has been shown to be positively associated with body weight in bucks (Mekasha 2007) [23] 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) [19]. Large-sized breeds are heavier and have greater testicular measurements than small-sized breeds (Al-Ghalban *et al*., 2004) [8]. Even though body and testicular sizes of animals increase with age, the particular age at which domestic animals reach puberty is usually postponed until they attain a required body size (Karagiannidis *et al*., 2000 and Nsoso *et al*., 2004) [19, 25].

Materials and Methods

Experimental Design and Animal Management

From Nimbkar Agriculture Research Institute (NARI), Phaltan, Maharashtra state Seven Boer kids were purchased at the age of 4 – 5 months and kept separately under routine management. Birth weight and weaning weight values were collected records from NARI. This study was conducted from 29th to 49th weeks of age at the Semen Collection Centre, Department of Veterinary Gynaecology and Obstetrics, Veterinary College, Bidar. Animals received regular inspection and dipping (ectoparasite), as well as drenching (deworming), anti-helminthic and vaccination against endemic diseases. Drinking water was provided *ad libitum.* The experiment commenced when the bucks were 29th week of age and terminated when they were 49th week of age.

Data Collection and Traits Measurement

The various linear body measurements were measured using a tape from 29th to 49th weeks of age in Boer kids. Body weight was measured by digital weighing balance in kilograms. The Heart girth was measured (cm) by circumference of the body at a point immediately behind the fore limbs and perpendiculars to the body axis by using a flexible measuring tape. The Stature was measured (cm) from the top of the spine in between the hip to the ground. The Chest width was measured (cm) from inside the surface between the top of the front legs. Wither height was measured (cm) from highest point over the scapular vertically to the ground. Body depth was measured (cm) from the distance between the top of the spine and bottom of the barrel at the last rib. Body length was measured (cm) from the point of shoulder to the ischium. Flank width was measured (cm) from the highest distances between transverse process of lumbar vertebra. Rump width was measured (cm) from the distance between the posterior points of pin bone using a flexible measuring tape. Growth rate was calculated by using the formula.

$$GR = \frac{\text{Growth rate of Present week – Growth rate of Previous Past week.}}{}$$

Testicular length was measured (cm) with a flexible measuring tape as the distance along the caudal surface of the scrotum from its point of attachment to the tip of scrotum. Scrotal circumference was measured (cm) by encircling the neck of the scrotum with the hand using the finger to push the testicles ventrally to eliminate wrinkles in the scrotal skin. The scrotal tape was passed over the scrotum and tightened at the point of greatest circumference to note down the reading. Scrotal diameter was calculated in centimeters by standard formula i.e. measured scrotal circumference (SC) is product of one by pie (P) where P = 22/7 or 3.143.

$$SD=SC \times 1/p$$

Statistical Analysis

Statistical analysis such as mean, standard error and co-variance were recorded variables and compared using the mixed design ANOVA model tests for repeated measures, considering various parameters and the age and their interaction as fixed effects and the animal into the random effect. Linear measurements of body measured in the standard statistical analysis. Data were presented as mean and mean standard error of the mean. Statistical analyses of data were carried out as per the program SPSS (2008) statistical package designed for windows was used for the statistical analyses. Means were separated using the two-tailed, two-sample *t* test. Differences were considered to be significant at $p<0.05$. Relationships between the several reproductive traits with body measurements were calculated by Pearson correlations, and regression equations were established. Live body weight was regressed on linear body measurements using stepwise multiple linear regression analysis. The coefficient of determination was used to assess the accuracy of prediction equations between body weights and linear body measurements. Separate prediction equations were developed for the male.

Results and Discussion

The mean body weight, Body linear measurements, scrotal parameters and BCS from 29th to 38th week and 39th to 49th week is shown are Table 1 to Table 4 respectively. In the present study, it was revealed that the linear body measurement parameters *viz*. body weight, stature, chest width, heart girth/chest girth, wither height, body depth, body length, flank width, rump width, testicular length and body condition score were increased significantly ($p<0.05$) from 29th to 49th weeks of age (Table 1 to 4) and few were not significantly ($P>0.05$).

Descriptive analysis of body weight and morphological traits

The higher values reported for the morphometric traits of males compared to females seem in accordance with earlier reports on goats (Vargas *et al*., 2007) [34]. The results thus obtained in this study are likely connected with our previous studies. The previous results have shown that the higher live body weight of male kids after weaning may be attributed to their birth weight; this is because they were born heavier than females in crossbred Boer goats (Abd-Allah, 2014 and Abd-Allah *et al*., 2016) [1, 2]. Isaac (2005) [16] reported that sexual dimorphism in body size is clearly widespread among many mammalian taxa, with male-biased dimorphism being the more common, but certainly not the exclusive pattern. It is important that the coefficient of variation in the morphometric traits ranged from 9.70-20.0%; this indicates homogeneity between traits under study. The findings of the present study show that BL is 76.26 cm, HG is 76.43 cm, and WH is 64.96 cm in Shami goats. The observations of the current

investigation are somewhat different from those of Alsheikh (2013) [7] who reported that low mean lives in BL, HG, and WH were 57.21, 31.66, and 41.76, respectively, in Shami does of the same environmental condition in Sinai, Egypt. Also, our values were higher than that reported by Moaeen-ud-Din *et al*. (2006) [24] who reported 64.97 cm body length, 70.23 cm height at withers, and 61.29 cm heart girth, for crossbred goats. The variation in various body measurements in different studies on the same breed may be due to the difference in the environment, size of data set, and other management practices.

Bivariate correlations between body weight and measurements of Shami goats the results are supported by Abdel-Mageed and Ghanem (2013) [3], who decided that both HG (r = 0.91) and BL (r = 0.90) presented the highest correlations with LBW of Shami kids. BL and HG may be used as good reliable predictors to assess live weight according to Bhattacharya *et al*. (1984) [9] and Islam *et al*. (1991) [17] reported that heart girth in males is a good predictor of live weight in Bengal goats. There was a correlation of LBW with length, height, and HG in Black Bengal goats (Prasad *et al*., 1981) [29]. Since there are high correlation coefficients between live body weight and body measurements, either of these variables or combination could provide a good estimate for predicting live weight in Shami goats. Khan *et al*. (2006) [21] concluded that since the body measurements had a high correlation with the live body weight, this may be used as selection criteria.

Table 1: Pairwise comparison between Heart girth and chest width from 29th to 41st week in pubertal Boer kids

		Heart girth																					
	Weeks	Birth weight	Weaning weight	29th week	30th Week	31st week	32th week	33th week	34th week	35th week	36th week	37th Week	38th week	39th week	40th Week	41st week	42nd week	43th Week	44th week	45th week	46th week	47th week	48th week	49th week
Chest width	29th	-	-	-	0.71	0.413	0.159	0.111	0.035	0.017	0.007	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	30th	-	-	0.186	-	0.655	0.298	0.22	0.082	0.042	0.02	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	31st	-	-	0.006	0.142	-	0.551	0.435	0.194	0.111	0.059	0.012	0.008	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	32nd	-	-	0.000	0.000	0.001	-	0.852	0.479	0.315	0.194	0.054	0.039	0.014	0.003	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	33rd	-	-	0.000	0.000	0.000	0.461	-	0.602	0.413	0.265	0.082	0.059	0.022	0.005	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	34th	-	-	0.000	0.000	0.000	0.078	0.303	-	0.766	0.551	0.22	0.17	0.076	0.02	0.01	0.006	0.004	0.001	0.000	0.000	0.000	0.000	0.000
	35th	-	-	0.000	0.000	0.000	0.004	0.028	0.239	-	0.766	0.352	0.281	0.138	0.042	0.022	0.014	0.009	0.003	0.001	0.000	0.000	0.000	0.000
	36th	-	-	0.000	0.000	0.000	0.000	0.004	0.057	0.461	-	0.527	0.435	0.235	0.082	0.046	0.029	0.02	0.007	0.003	0.001	0.000	0.000	0.000
	37th	-	-	0.000	0.000	0.000	0.000	0.001	0.02	0.239	0.658	-	0.882	0.577	0.265	0.17	0.119	0.088	0.039	0.018	0.005	0.003	0.001	0.001
	38th	-	-	0.000	0.000	0.000	0.000	0.000	0.006	0.106	0.377	0.658	-	0.682	0.334	0.22	0.159	0.119	0.054	0.027	0.007	0.004	0.002	0.001
	39th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.078	0.186	0.377	-	0.577	0.413	0.315	0.249	0.128	0.07	0.022	0.014	0.008	0.003
	40th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.013	0.106	-	0.794	0.655	0.551	0.334	0.207	0.082	0.054	0.035	0.017
	41st	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.006	0.057	0.768	-	0.852	0.737	0.479	0.315	0.138	0.095	0.064	0.032
	42nd	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.239	0.377	-	0.882	0.602	0.413	0.194	0.138	0.095	0.05
	43rd	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.142	0.239	0.768	-	0.71	0.503	0.249	0.181	0.128	0.07
	44th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.057	0.106	0.461	0.658	-	0.766	0.435	0.334	0.249	0.148
	45th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.02	0.041	0.239	0.377	0.658	-	0.628	0.503	0.392	0.249
	46th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.02	0.142	0.239	0.461	0.658	-	0.852	0.71	0.503
	47th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.013	0.106	0.186	0.377	0.768	0.883	-	0.852	0.628
	48th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.028	0.057	0.142	0.658	0.461	0.555	-	0.766
	49th	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.009	0.02	0.057	0.303	0.239	0.303	0.658	-

*The given P-values shows $p<0.05$ is significant at 5%.
**The given P-values shows $p>0.05$ is non significant at 5%

Table 2: Pairwise comparison between Body weight and Stature from 29th to 41st week in pubertal Boer kids

		Body weight																					
		Birth weight	Weaning weight	29th week	30th week	31th week	32th week	33th week	34th week	35th week	36th week	37th week	38th week	39th week	40th week	41th week	42th week	43th week	44th week	45th week	46th week	47th week	48th week	49th week
Stature	weeks	-	0.00	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	29th	-	-	-	0.982	0.82	0.757	0.442	0.370	0.346	0.268	0.191	0.151	0.099	0.068	0.031	0.017	0.009	0.004	0.003	0.001	0.001	0.000	0.000
	30th	-	-	0.726	-	0.83	0.774	0.456	0.382	0.358	0.278	0.198	0.158	0.103	0.072	0.033	0.018	0.009	0.005	0.003	0.002	0.001	0.000	0.000
	31th	-	-	0.484	0.540	-	0.940	0.592	0.507	0.479	0.382	0.282	0.229	0.155	0.111	0.054	0.031	0.017	0.009	0.006	0.003	0.002	0.001	0.000
	32th	-	-	0.336	0.406	0.79	-	0.645	0.556	0.527	0.424	0.316	0.259	0.178	0.129	0.064	0.037	0.021	0.011	0.007	0.004	0.003	0.001	0.001
	33th	-	-	0.239	0.127	0.63	0.827	-	0.898	0.862	0.734	0.587	0.502	0.374	0.288	0.162	0.102	0.062	0.035	0.024	0.015	0.010	0.005	0.002
	34th	-	-	0.062	0.068	0.24	0.359	0.484	-	0.964	0.833	0.678	0.587	0.446	0.350	0.204	0.131	0.082	0.047	0.033	0.014	0.007	0.004	0.014
	35th	-	-	0.030	0.726	0.14	0.222	0.315	0.759	-	0.868	0.712	0.619	0.474	0.374	0.220	0.143	0.090	0.052	0.037	0.023	0.016	0.008	0.004
	36th	-	-	0.017	0.041	0.090	0.150	0.222	0.600	0.827	-	0.839	0.740	0.582	0.469	0.288	0.193	0.125	0.075	0.054	0.035	0.024	0.013	0.007
	37th	-	-	0.003	0.010	0.024	0.046	0.075	0.275	0.431	0.570	-	0.898	0.729	0.603	0.390	0.272	0.183	0.115	0.084	0.056	0.040	0.022	0.012
	38th	-	-	0.001	0.003	0.008	0.017	0.030	0.138	0.239	0.336	0.694	-	0.827	0.695	0.465	0.331	0.229	0.147	0.110	0.074	0.054	0.031	0.017
	39th	-	-	0.000	0.001	0.002	0.005	0.010	0.056	0.107	0.163	0.406	0.662	-	0.862	0.608	0.451	0.324	0.217	0.167	0.116	0.087	0.051	0.030
	40th	-	-	0.000	0.000	0.001	0.002	0.004	0.030	0.062	0.098	0.275	0.484	0.793	-	0.734	0.561	0.416	0.288	0.226	0.162	0.124	0.075	0.046
	41th	-	-	0.000	0.000	0.001	0.002	0.003	0.022	0.046	0.075	0.222	0.406	0.694	0.896	-	0.809	0.635	0.469	0.382	0.288	0.229	0.149	0.096
	42th	-	-	0.000	0.000	0.00	0.001	0.001	0.010	0.022	0.037	0.127	0.256	0.484	0.662	0.759	-	0.815	0.629	0.527	0.411	0.335	0.229	0.153
	43th	-	-	0.000	0.000	0.00	0.000	0.000	0.003	0.006	0.012	0.050	0.115	0.253	0.377	0.452	0.655	-	0.803	0.689	0.556	0.465	0.331	0.232
	44th	-	-	0.000	0.000	0.00	0.000	0.000	0.000	0.001	0.002	0.008	0.024	0.068	0.117	0.150	0.256	0.490	-	0.880	0.734	0.629	0.469	0.343
	45th	-	-	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.001	0.004	0.012	0.037	0.068	0.090	0.163	0.341	0.793		0.850	0.740	0.567	0.425
	46th	-	-	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.002	0.007	0.022	0.041	0.056	0.107	0.242	0.630	0.827	-	0.886	0.700	0.542
	47th	-	-	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.010	0.021	0.029	0.059	0.148	0.447	0.618	0.779	-	0.809	0.641
	48th	-	-	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.005	0.007	0.017	0.052	0.206	0.315	0.431	0.612	-	0.822
	49th	-	-	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.004	0.010	0.031	0.138	0.222	0.315	0.468	0.827	-

*The given P-values shows $p<0.05$ is significant at 5%. **The given P-values shows $p>0.05$ is non significant

Table 3: Pairwise comparison between Wither Height and Body depth from 29th to 41st week in pubertal Boer kids

		Wither height																						
		Birth weight	**Weaning weight**	**29th week**	**30th week**	**31th week**	**32th week**	**33th week**	**34th week**	**35th week**	**36th week**	**37th week**	**38th week**	**39th week**	**40th week**	**41th week**	**42th week**	**43th week**	**44th week**	**45th week**	**46th week**	**47th week**	**48th week**	**49th week**
Body depth	29th week	-	-	-	0.479	0.302	0.212	0.143	0.074	0.027	0.011	0.004	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	30th week	-	-	0.794	-	0.744	0.586	0.446	0.277	0.129	0.066	0.027	0.024	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	31th week	-	-	0.682	0.881	-	0.828	0.663	0.446	0.232	0.129	0.058	0.052	0.015	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	32th week	-	-	0.234	0.352	0.434	-	0.828	0.586	0.328	0.193	0.093	0.083	0.027	0.005	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	33th week	-	-	0.102	0.169	0.22	0.654	-	0.744	0.446	0.277	0.143	0.129	0.046	0.01	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	34th week	-	-	0.069	0.119	0.158	0.526	0.852	-	0.663	0.446	0.254	0.232	0.093	0.024	0.01	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	35th week	-	-	0.029	0.054	0.075	0.315	0.576	0.709	-	0.744	0.479	0.446	0.212	0.066	0.031	0.01	0.003	0.000	0.000	0.000	0.000	0.000	0.000
	36th week	-	-	0.018	0.035	0.05	0.234	0.456	0.576	0.852	-	0.703	0.663	0.355	0.129	0.066	0.024	0.007	0.001	0.000	0.000	0.000	0.000	0.000
	37th week	-	-	0.008	0.017	0.024	0.137	0.297	0.392	0.628	0.765	-	0.957	0.586	0.254	0.143	0.058	0.021	0.005	0.001	0.000	0.000	0.000	0.000
	38th week	-	-	0.002	0.005	0.008	0.059	0.147	0.206	0.371	0.479	0.682	-	0.624	0.277	0.158	0.066	0.024	0.005	0.001	0.000	0.000	0.000	0.000
	39th week	-	-	0.001	0.001	0.002	0.02	0.059	0.088	0.181	0.249	0.392	0.654	-	0.549	0.355	0.175	0.074	0.021	0.005	0.002	0.001	0.000	0.000
	40th week	-	-	0.000	0.000	0.000	0.002	0.008	0.014	0.035	0.054	0.102	0.22	0.434	-	0.744	0.446	0.232	0.083	0.024	0.01	0.004	0.001	0.000
	41th week	-	-	0.000	0.000	0.000	0.000	0.001	0.002	0.007	0.011	0.024	0.064	0.158	0.526	-	0.663	0.384	0.158	0.052	0.024	0.01	0.003	0.066
	42th week	-	-	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.011	0.032	0.088	0.352	0.765	-	0.663	0.328	0.129	0.066	0.031	0.01	0.003
	43th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.005	0.018	0.11	0.333	0.502	-	0.586	0.277	0.158	0.083	0.031	0.01
	44th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.038	0.147	0.249	0.628	-	0.586	0.384	0.232	0.104	0.04
	45th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.017	0.075	0.137	0.412	0.737	-	0.744	0.514	0.277	0.129
	46th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.007	0.035	0.069	0.249	0.502	0.737	-	0.744	0.446	0.232
	47th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.007	0.035	0.069	0.249	0.502	0.737	1	-	0.663	0.384
	48th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.018	0.038	0.158	0.352	0.551	0.794	0.794	-	0.663
	49th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.011	0.024	0.11	0.264	0.434	0.654	0.654	0.852	-

*The given P-values shows P < 0.05 is significant at 5%.
**The given P-values shows P > 0.05 is non significant

Table 4: Pairwise comparison between Testicular length and Body length from 29th to 41st week in pubertal Boer kids

		Testicular length																						
		Birth weight	**Weaning weight**	**29th week**	**30th week**	**31th week**	**32th week**	**33th week**	**34th week**	**35th week**	**36th week**	**37th week**	**38th week**	**39th week**	**40th week**	**41th week**	**42th week**	**43th week**	**44th week**	**45th week**	**46th week**	**47th week**	**48th week**	**49th week**
Body length	29th week	-	-	-	0.565	0.338	0.151	0.063	0.041	0.012	0.003	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	30th week	-	-	0.619	-	0.701	0.388	0.196	0.138	0.051	0.015	0.007	0.007	0.004	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	31th week	-	-	0.274	0.55	-	0.388	0.196	0.138	0.051	0.041	0.02	0.02	0.012	0.01	0.006	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	32th week	-	-	0.113	0.274	0.619	-	0.362	0.27	0.115	0.041	0.02	0.02	0.012	0.01	0.006	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	33th week	-	-	0.092	0.233	0.55	0.921	-	0.848	0.502	0.25	0.151	0.151	0.104	0.095	0.063	0.023	0.008	0.004	0.002	0.001	0.001	0.000	0.000
	34th week	-	-	0.023	0.075	0.233	0.486	0.55	-	0.631	0.338	0.213	0.213	0.151	0.138	0.095	0.036	0.014	0.007	0.004	0.001	0.001	0.000	0.000
	35th week	-	-	0.009	0.034	0.124	0.297	0.345	0.727	-	0.631	0.443	0.443	0.338	0.314	0.231	0.104	0.045	0.025	0.015	0.005	0.005	0.002	0.001
	36th week	-	-	0.008	0.03	0.113	0.274	0.32	0.69	0.96	-	0.773	0.773	0.631	0.597	0.472	0.25	0.126	0.077	0.051	0.018	0.018	0.008	0.003
	37th week	-	-	0.000	0.002	0.012	0.043	0.054	0.18	0.32	0.345	-	1	0.848	0.81	0.666	0.388	0.213	0.138	0.095	0.036	0.036	0.018	0.008
	38th week	-	-	0.000	0.001	0.007	0.026	0.034	0.124	0.233	0.253	0.842	-	0.848	0.81	0.666	0.388	0.213	0.138	0.095	0.036	0.036	0.018	0.008
	39th week	-	-	0.000	0.000	0.003	0.014	0.018	0.075	0.15	0.165	0.654	0.803	-	0.962	0.81	0.502	0.292	0.196	0.138	0.056	0.056	0.029	0.014
	40th week	-	-	0.000	0.000	0.000	0.001	0.002	0.011	0.026	0.03	0.214	0.297	0.426	-	0.848	0.533	0.314	0.213	0.151	0.063	0.063	0.032	0.015
	41th week	-	-	0.000	0.000	0.000	0.000	0.001	0.004	0.011	0.012	0.113	0.165	0.253	0.727	-	0.666	0.415	0.292	0.213	0.095	0.095	0.051	0.025
	42th week	-	-	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.003	0.043	0.067	0.113	0.426	0.654	-	0.701	0.533	0.415	0.213	0.213	0.126	0.07

	43th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.008	0.016	0.102	0.197	0.398	-	0.81	0.666	0.388	0.388	0.25	0.151
	44th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.011	0.034	0.197	-	0.848	0.533	0.533	0.362	0.231
	45th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.043	0.455	-	0.666	0.666	0.472	0.314
	46th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.023	0.32	0.803	-	1	0.773	0.565
	47th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.009	0.18	0.55	0.727	-	0.773	0.565
	48th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.137	0.455	0.619	0.881	-	0.773
	49th week	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.054	0.233	0.345	0.55	0.654	-

*The given P-values shows $p<0.05$ is significant at 5%. **The given P-values shows $p>0.05$ is non significant

Conclusion

As there is a paucity of data on breeding soundness in Boer goats, the present study showed as age advances linear body measurements, testicular measurements and body condition score of Boer kids increases significantly. The study showed positive relation of age with testicular measurement and linear body measurement and this would help in predicting the semen production ability as well as provide information that will be useful in early selection of sires for genetic improvement in Boer goats.

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