

RELATIONSHIP OF TESTICULAR SIZE AND LIBIDO TO AGE AND SEASON IN SAHIWAL BULLS

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ABSTRACT

The scrotal circumference and libido were studied during four seasons of the year in 21 Sahiwal bulls of three age groups i.e. group-I (upto 3 years of age), group-II (3-5 years of age) and group-III (above 5 years of age), maintained under similar managerial conditions. Scrotal circumference was measured monthly. Libido of each bull was recorded once a month at the time of semen collection. The results showed that the scrotal circumference of bulls in group-II (33.35 ± 0.41 cm), group-III (32.38 ± 0.81 cm) and group-I (30.49 ± 0.57 cm) differed significantly ($P < 0.05$) from each other. Non significantly smaller scrotal circumference was recorded during summer (31.31 ± 0.97 cm) than spring (32.80 ± 0.86 cm), autumn (32.04 ± 0.68 cm) and winter (32.15 ± 1.02 cm) seasons. Significantly ($P < 0.05$) longer reaction time was noted in bulls of group-III (3.28 ± 0.50 min) than bulls of group-I (2.44 ± 0.29 min) and group-II (2.04 ± 0.34 min). Although non significant but longer reaction time was recorded during summer season (2.78 ± 0.41 min) than spring (2.46 ± 0.43 min), autumn (2.54 ± 0.65 min) and winter (2.75 ± 0.52 min) seasons. There was significant difference ($P < 0.05$) in the overall mean libido score of the bulls of group-II (3.83 ± 0.31), group-III (3.14 ± 0.42) and group-I (2.80 ± 0.21). Significantly lower ($P < 0.05$) libido score was noted during summer season (2.95 ± 0.19) than autumn (3.32 ± 0.19), winter (3.37 ± 0.21) and spring (3.39 ± 0.21) seasons. Based on the findings of the study, it was concluded that age had significant effect on the testicular size, whereas seasonal effect was non significant. However, age and season both had significant effect on libido of Sahiwal bulls.

Key words: Sahiwal bulls, testicular size, libido, age, season

INTRODUCTION

Measurement of testis size or scrotal circumference is an important aspect of breeding soundness examination of bulls and rams. Measurements of scrotal circumference have great value as indicators of onset of puberty, total semen production, semen quality, pathological conditions of testes and the potential subfertility or infertility of bulls (Ott, 1991). Testicular measurements have been used to predict the reproductive and spermatogenic capabilities in the post pubertal period of a bull (Ahmad *et al.*, 1989). Bulls with large testes produce more spermatozoa and bulls with low scrotal circumference at 12 months of age and poor semen quality at 16 months of age did not improve their performance by two years of age (Ott, 1991). Scrotal circumference is significantly correlated with age and body weight (Coulter, 1991). Testis size and body weight also provide information about the physical and physiological maturity of the animal, its semen output and the birth weight of its off springs (Smith *et al.*, 1989; Evans *et al.*, 1995). Scrotal circumference also has a significant positive relationship with semen volume and sperm concentration per ejaculate.

The testes are extremely sensitive to high ambient temperature, resulting in degenerative changes

characterized by a reduction in testicular size and a change in its consistency (Jubb *et al.*, 1985; McEntee, 1990). Scrotal circumference also tends to vary with season (Strumpt *et al.*, 1993). A reduction in spermatogenesis per unit of testis occurs with advancing age (Pant *et al.*, 2003).

Libido is a useful measure of the reproductive efficiency of a bull. Bulls with high libido are capable of producing sufficient number of viable spermatozoa to sustain fertility through multiple ejaculates in a short time. Such bulls tend to produce uniform calf group, as they can serve more females within a limited time period than bulls with low libido (Chenoweth, 1983). The differences in environment, age and management are responsible for variation in libido and semen characteristics (Younis *et al.*, 1980).

The present paper describes the testicular size and libido in relation to age and season in Sahiwal bulls maintained at the Semen Production Unit, Qadirabad, Pakistan.

MATERIALS AND METHODS

Experiment animals

A total of 21 adult bulls of Sahiwal breed with clinically normal reproductive tract and maintained

under similar managerial conditions at the Semen Production Unit, Qadirabad, District Sahiwal, Pakistan were selected for this study. These bulls were divided into three equal groups, Group-I (upto 3 years of age), Group-II (3-5 years of age) and Group-III (above five years of age).

Scrotal circumference

Scrotal circumference of each bull was measured at monthly intervals while bulls were restrained in standing position in a metallic crush. The testes were brought into the distal part of the scrotum until the ventral scrotal skin folds, if any, were eliminated. Testes were then held firmly in place by grasping the scrotum with left hand above the head of the epididymides. The right hand was then used to guide the loop of a flexible measuring tape around the scrotum. The scrotal circumference was then measured with sufficient manual pressure on the measuring tape to cause slight skin indentation (Coulter, 1991).

Estimation of libido

The libido of each bull was judged once a month, at the time of semen collection, in term of reaction time and libido score. An intact bull restrained in a metallic service crush was used as a teaser. Before introduction into the test area, each bull was given a sexual preparation for about ten minutes. The time between introduction of a bull into the test area and the first mount was defined as reaction time (Singh and Pangawkar, 1989). A libido score ranging from 0 to 6 was calculated for each bull depending on his sexual interest in the teaser (Chenoweth, 1981), as detailed below:

- 0 No interest in teaser, although the bull was led up and allowed to mount.
1. Little interest in mounting, despite sniffing and vague mounting attempts.
2. Mounting after repeated hesitation with weak clasping and seeking.
3. Comparatively quick mounting without obvious eagerness but with satisfactory holding and seeking.
4. Quick mounting with bull's attention focused upon the teaser and very good holding and seeking.
5. Eager mounting with very good holding and seeking.

6. Uncontrolled eager mounting with very good holding and intensive seeking.

Statistical analysis

The mean values (\pm SEM) of scrotal circumference and libido were calculated for bulls of three age groups and different seasons. To determine the effect of season, the months of the year were grouped into four seasons viz., winter (November, December, January), spring (February, March, April), summer (May, June, July) and autumn (August, September, October). The data were analyzed by two-way analysis of variance using statistical package Minitab (Anonymous, 2000).

RESULTS AND DISCUSSION

Mean values (\pm SEM) of scrotal circumference in Sahiwal bulls of three age groups during four seasons of the year are presented in Table 1. It shows that there was significant difference ($P < 0.05$) among three groups of bulls. The mean value of scrotal circumference in group-II (33.35 ± 0.41 cm) was significantly higher ($P < 0.05$) than group-III (32.38 ± 0.81 cm) and group-I (30.49 ± 0.57 cm). The group-III bulls also had significantly higher values than bulls in group-I. It has been reported that scrotal circumference increases rapidly in young bulls, gradually in mature bulls and decline in old bulls due to senile atrophy (Coulter, 1991).

As far as the effect of season on scrotal circumference is concerned, there was non significant effect in all four seasons of the year. However, during the summer season scrotal circumference values were the lowest (31.31 ± 0.97 cm) as compared to the other three seasons of the year. This might be due to the effect of high ambient temperature during summer that causes thermal degeneration of the testes (Coulter *et al.*, 1988).

The results of the present study showed that the over all mean reaction time of Sahiwal bulls was 2.58 \pm 0.25 minutes, the range being 1.5 to 6 minutes. Mean values (\pm SEM) of reaction time and libido score in bulls of three age groups during four seasons of the year are presented in Table 2.

Table 1: Mean values (\pm SEM) of scrotal circumference (cm) in Sahiwal bulls of three age groups during four seasons of the year

Age groups	Spring	Summer	Autumn	Winter	Overall mean
Group-I	31.05 ± 0.97	29.05 ± 0.87	30.99 ± 1.07	30.90 ± 1.07	$30.49 \pm 0.57c$
Group-II	34.26 ± 1.26	32.98 ± 1.16	33.14 ± 1.27	33.04 ± 1.27	$33.35 \pm 0.41a$
Group-III	33.09 ± 1.57	31.91 ± 1.42	32.01 ± 1.57	32.51 ± 1.47	$32.38 \pm 0.81b$
Mean	32.80 ± 0.86	31.31 ± 0.97	32.04 ± 0.68	32.15 ± 1.02	32.07 ± 1.91

Values with different letters in a column differ significantly ($P < 0.05$).

Table 2: Mean values (\pm SEM) of reaction time and libido score in bulls of three age groups during four seasons of the year

Age groups	Spring	Summer	Autumn	Winter	Overall mean
Reaction time (min)					
Group-I	2.34 \pm 0.81	2.46 \pm 0.44	2.38 \pm 0.81	2.42 \pm 0.31	2.44 \pm 0.29 b
Group-II	1.94 \pm 0.30	2.25 \pm 0.35	1.98 \pm 0.41	1.99 \pm 0.21	2.04 \pm 0.34 b
Group-III	3.10 \pm 0.49	3.46 \pm 0.50	3.25 \pm 0.61	3.31 \pm 0.71	3.28 \pm 0.50 a
Mean	2.46 \pm 0.43	2.78 \pm 0.41	2.54 \pm 0.65	2.75 \pm 0.52	2.58 \pm 0.25
Libido score					
Group-I	2.94 \pm 0.31	2.54 \pm 0.51	2.85 \pm 0.25	2.90 \pm 0.33	2.80 \pm 0.21c
Group-II	4.01 \pm 0.29	3.31 \pm 0.42	3.99 \pm 0.23	4.00 \pm 0.21	3.83 \pm 0.31a
Group-III	3.24 \pm 0.43	3.00 \pm 0.33	3.14 \pm 0.41	3.21 \pm 0.32	3.14 \pm 0.42b
Mean	3.39 \pm 0.21 a	2.95 \pm 0.19 b	3.32 \pm 0.19 a	3.37 \pm 0.21 a	3.26 \pm 0.45

Values with different letters in a column or a row differ significantly ($P < 0.05$).

The reaction time was significantly longer ($P < 0.05$) in group-III (3.28 \pm 0.50 minutes) than group-II (2.04 \pm 0.34 minutes) and group-I (2.44 \pm 0.29 minutes) bulls, the difference between the later two groups was not significant. Similar results have been reported by Bhosrekar *et al.* (1992) that adult bulls had a shorter reaction time than old bulls. The result of the present study also showed that slightly longer reaction time was recorded during the summer (2.78 \pm 0.41 minutes) season as compared to other seasons (Table-2). This may be due to the reason that during hot season thyroid activity is depressed, resulting in low plasma testosterone level, which prolongs the reaction time (Arthur, 1975). Gupta *et al.* (1978) also recorded higher reaction time in summer than in winter.

The overall mean libido score was 3.26 \pm 0.45 in bulls of three age groups in the present study. This is in line to that recorded by Chenoweth (1981), who observed a libido score of 3.65 in cattle bulls. Libido score observed in group-II bulls (3.83 \pm 0.31) was higher ($P < 0.05$) than group-I (2.80 \pm 0.21) and group-III (3.14 \pm 0.42) bulls in the present study. The difference between the later two groups was also significant. Afiefy *et al.* (1988) stated that the adult bulls showed best libido as compared to younger or older bulls.

A significantly higher ($P < 0.05$) libido score (3.39 \pm 0.21) was recorded during the spring season than the summer (2.95 \pm 0.19) season in the present study. However, there was no significant difference among spring, autumn and winter seasons. During dry hot season, reaction time and libido of bulls has been reported to be adversely affected due to heat stress and shortage of green fodder (Chenoweth, 1981).

Conclusions

Based on the findings of the present study, it can be concluded that adult and old bulls had greater testis size than that of young bulls. However, seasonal effect was non significant although slightly smaller testicular

size was observed in summer than other seasons. Age and season both affected the libido significantly as the adult bulls showed better libido than the young and old bulls. Libido score was lower during summer than other seasons.

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