



LIBIDO AND PHYSICO-MORPHOLOGICAL CHARACTERISTICS OF SEMEN IN PANTJA BUCKS

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Manuscript received on 26.08.2015, accepted on 03.04.2016

DOI: 10.5958/0973-9718.2016.00041.6

Key words: Libido, Pantja goats, Physico-morphological, Semen

Pantja goat (newly registered breed by ICAR-National Bureau of Animal Genetic Resources, Karnal on 6th January, 2015) is the 24th goat breed of India. It is a medium-sized, dual purpose goat breed in Tarai region of Uttarakhand and constitutes about 21% of goat population of this region. Reproductive performance is a function of both doe and buck fertility. Therefore, all aspects related to semen evaluation are important in management practices, especially for artificial insemination in a breeding programme. A study was undertaken to evaluate the performance of Pantja bucks based on libido and physico-morphological characteristics of semen.

Pantja male goats (50) divided into 3 groups of 6-12 months (Gr 1), 12-24 months (Gr 2) and > 24 months (Gr 3) and maintained on grazing with concentrate feed @ 500 g/ head/ day. All the bucks were clinically examined and confirmed to be free from any obvious abnormalities of the palpable reproductive organs viz., testis, prepuce, penile portion of penis, cauda epididymis and other abnormalities like cryptorchidism, orchitis, phimosis, paraphimosis. Five bucks from each group were used for observational studies on sexual behaviour. Semen was collected at weekly intervals for five weeks. The collected samples were first stored in lukewarm water at 37°C and subsequently evaluated for physico-morphological characteristics like volume, pH, mass activity, progressive motility, sperm concentration and

proportion of live, dead and abnormal sperm (Zemjanis, 1970; Hafez, 1980). One way analysis of variance was performed to observe the effects of age of buck on scrotal biometry. Paired sample t-test was used to find the difference between left and right side values of testicular measurements. Pearson's correlation coefficients were calculated to find out the relationship between body weight, body measurements and scrotal measurements.

The libido characteristics like reaction time and number of mounts/day were significantly ($P < 0.05$) higher (89.28 ± 4.41 sec and 4.43 ± 2.12 , respectively) in 6-12 months old bucks compared to other age groups (Table 1). Tiwari (2000) reported non-significant difference in reaction time in Barbari bucks of 1-2 years and 2-3 years. The low libido in <1 year old bucks (in terms of higher reaction time) could be attributed to the low level of circulating plasma testosterone. The semen volume significantly ($P < 0.05$) ranged from 0.35 ± 0.01 ml in Gr 1 to 0.53 ± 0.05 ml in Gr 3. The average semen volume in Pantja bucks was relatively lower than other documented breeds like Black Bengal (0.58 ml), Barbari (0.92 ml) and Malabari (0.50 ml) (Banerjee, 2005) but comparable to Jamunapari bucks (0.37 ml) (Saxena and Tripathi, 1980). In the present study ejaculate volume increased with age, which is in agreement with the findings of Al-Ghalban et al. (2004) for Damascus bucks in Jordan. Half of the ejaculates

collected from 1-2 year old bucks were yellowish, viscous and milky while in >2 year old bucks, ejaculates were mostly creamy white, thick creamy

and viscous. The pH of the semen was not affected by age of buck and ranged from 6.74 ± 0.02 in Gr 1 to 6.85 ± 0.03 in Gr 2.

Table 1. Libido and physical characteristics of semen in Pantja bucks

Age (months)	Libido (n=5)		in each group) Physical characteristics	
	Reaction time (sec)	No. of mounts/day	Volume (ml)	pH
6-12 (20)	89.28 ± 4.41^a	4.43 ± 2.12^a	0.35 ± 0.01^a	6.74 ± 0.02
12-24 (20)	38.59 ± 1.00^b	3.14 ± 0.14^b	0.48 ± 0.05^b	6.85 ± 0.03
>24 (10)	39.28 ± 7.72^b	2.90 ± 0.87^b	0.53 ± 0.05^b	6.75 ± 0.06

Means bearing different superscripts differ significantly ($P < 0.05$) within the column; Figures in parentheses indicates number of observations

In the present study the average mass activity on 0-5 scale ranged non-significantly from 3.05 ± 0.05 (Gr 1) to 3.60 ± 0.22 (Gr 3). Similarly, non-significant effect of age on sperm mass motility was reported by Mia et al. (2013) in Black Bengal bucks. The average progressive motility in the semen of Pantja bucks was not influenced by age of buck and ranged from 73.85 ± 1.45 to $78.3 \pm 1.87\%$ (Table 2). The sperm concentration ranged significantly ($P < 0.05$) from $2.62 \pm 0.04 \times 10^9$ /ml (Gr 1) to $2.93 \pm 0.18 \times 10^9$ /ml (Gr 3). These could be due to higher testicular size with

higher spermatogenic activity in the bucks Gr 3. The sperm concentration in Pantja bucks was at a par with Barbari ($2.78 \pm 0.16 \times 10^9$ /ml), lower than Malabari ($3.53 \pm 0.18 \times 10^6$ /ml) and higher than Black Bengal ($2.29 \pm 0.38 \times 10^9$ /ml) (Banerjee, 2005) and Jamunapari (2.62×10^9 /ml) bucks (Singh et al., 1985). This may be attributed to pattern of reproductive maturity in bucks, particularly testicle size and thermo-regulatory mechanisms which are still developing in the young buck, but have reached maturity level in the adult buck.

Table 2. Morphological characteristics of semen from Pantja bucks

Characteristics	Age (months)		
	6-12 (20)	12-24 (20)	>24 (10)
Mass activity (0-5 scale)	3.05 ± 0.05	3.20 ± 0.20	3.60 ± 0.22
Progressive motility (%)	75.25 ± 0.65	73.85 ± 1.45	78.30 ± 1.87
Sperm concentration ($\times 10^9$ /ml)	2.62 ± 0.04^a	2.88 ± 0.02^b	2.93 ± 0.18^b
Live sperm (%)	81.70 ± 0.18	83.29 ± 1.16	82.62 ± 1.33
Dead sperm (%)	18.32 ± 0.20	16.70 ± 1.16	17.38 ± 1.33
Abnormal sperm (%)	7.37 ± 0.76^a	5.79 ± 0.23^b	4.77 ± 0.19^b
Primary	4.60 ± 0.47^a	4.21 ± 0.11^b	3.69 ± 0.14^b
Secondary	2.77 ± 0.29^a	1.58 ± 0.11^b	1.08 ± 0.11^b

Mean values bearing different superscripts in a row differ significantly ($P < 0.05$)

The live and dead sperm percentage in Pantja bucks were not influenced by age group. The present values were higher than reported by Kabiraj et al. (2011) in Black Bengal bucks, but lower than reported by Karagiannidis et al. (2000) in Alpine, Saanen and Damascus bucks. In Pantja bucks, percent abnormal sperms (both primary and secondary abnormalities) were significantly ($P < 0.05$) higher in younger bucks

(Gr 1) than older ones (Gr 2 and 3). This might be due to the differences in the development of the reproductive organs which might have affected some physiological processes, like sperm production, sperm maturation and sperm storage capacity, as well as the relative secretions of the various accessory sex organs/glands. The abnormal spermatozoa percentage in the present study was higher than

Barbari (4.50%) and almost similar to Malabari (6.12%) (Banerjee, 2005). The reason for the variation might be different genetic makeup, physiological stage of the animal, nutrition, climatic factors and disease. However, it is worth noting that total abnormal sperm morphology in the Pantja buck obtained is within the permissible range of not more than 20% of the semen acceptable for use in artificial insemination. It can be concluded that the values of seminal biology of local Pantja bucks were within the normal range of well-established breeds.

SUMMARY

A study was conducted on Pantja bucks to evaluate libido and physico-morphological characteristics of semen. The libido expressed by reaction time (sec) in bucks of Gr 1 (6-12 months), Gr 2 (12-24 months) and Gr 3 (> 24 months) were 89.28 ± 4.41 , 38.59 ± 1.00 , 39.28 ± 7.72 sec and no. of mounts/ ejaculation as 4.43 ± 2.12 , 3.14 ± 0.14 , 2.90 ± 0.87 , respectively. The average semen volume in Pantja bucks ranged from 0.35-0.53 ml. The average mass activity, progressive motility, live and dead sperm percentage were not influenced by age of buck. The sperm concentration ranged significantly ($P < 0.05$) from $2.62 \pm 0.04 \times 10^9$ / ml (Gr 1) to $2.93 \pm 0.18 \times 10^9$ / ml (Gr 3). The average abnormal spermatozoa ranged significantly ($P < 0.05$) from $7.37 \pm 0.76\%$ in 6-12 months bucks to $4.77 \pm 0.19\%$ in >24 months old bucks. Similar pattern was observed for primary and secondary abnormalities. Of the characters studied, libido, semen volume, sperm concentration and % abnormal spermatozoa were significantly influenced by age of the bucks. It can be concluded that the values of seminal biology of local Pantja bucks were within the normal range of well-established breeds.

ACKNOWLEDGEMENTS

The authors are thankful to the Director, Experiment Station, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar and the Dean, College of Veterinary and Animal Sciences, Pantnagar for providing necessary facilities.

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