CORRELATION BETWEEN TESTICLE MEASUREMENTS AND LIBIDO AND SEMEN QUALITY IN RAMS

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Summary

A study was conducted at Ijok, Malaysia, to determine the relationship of testicular measurements with libido and semen quality in tropical and imported temperate breeds of sheep. Ten rams each of Malin (M), Siamese Longtail (L), Cross of Merino with Border Leicester (C), Dorset (D) and Suffolk (S) were used for the study. Libido, semen volume and semen quality were recorded monthly for a year together with testicular length, width and circumference. The results showed that there were breed differences in volume and quality of semen where the tropical breeds had better semen compared to the temperate breeds. There was positive and significant correlation between testicle length and semen volume in all the breeds. Testicular length was found to be positively and significantly correlated with motility and sperm concentration in the tropical breeds (L and M). The relationship between libido and testicle measurements in the tropical breeds was not significant ($p < 0.05$). There was variable relationship between the testicular measurements and libido in the temperate breeds where the relationship was significant and negative in breeds C and D and highly significant and positive in S. It was evident that the long testicles influenced the quality of the semen whereas testicles with greater circumference influenced the libido of the rams.

(**Key Words**: Correlation, Testicle Measurement, Libido, Semen Quality, Tropical and Temperate Rams)

Introduction

The diameter of intact testes is positively related to high testes growth rate of the male (Land, 1973). Scrotal circumference has also been found to be significantly correlated with testicular weight (Amann, 1970; Lino, 1972), and males with longer testes tend to sire daughters that reach puberty at an earlier age. As testicular development is also positively correlated with the ovarian activity in genetically related females, testicular weight is an important parameter for evaluation of fertility in rams as well as ewes. Consequently, any variation in libido, semen quality and semen quantity in the rams would be a sequel to changes in testes weight. In the absence of a direct measure of testicular weight in a live animal the indirect measure of scrotal circumference can be used to show the response. Therefore, a study was conducted to determine the relationship between testes measurements and libido, semen quantity and semen quality in the tropical and imported temperate breeds of sheep.

Materials and Methods

Ten rams each of tropical sheep breeds (Malin - M and Siamese Longtail - L) and imported temperate breed groups (Cross of Merino with Border Leicester (CMBL) - C, Dorset - D and Suffolk - S) were used for the study. Testicular measurements were taken monthly for a year. The testicle length, width and circumference were measured using a flexible cloth measuring tape as described by Abdul Wahid and Yunus (1991). The animals were tested for libido by recording the time taken to mount a teaser from a distance of 3 m and the time taken to ejaculate. Semen was collected using an artificial vagina and evaluated monthly as reported earlier (Abdul Wahid et al., 1988).

The animals were grazed on Guinea grass (Panicum maximum) from 09:00-15:00 hr daily. They were supplemented with a formulated con-

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centrate ration containing 12% CP and 72% TDN at the rate of 0.25 kg/head/day. Salt lick and clean drinking water was provided *ad libitum* in the shed. The animals were in good health and had normal testes.

The data was analyzed statistically at MARDI using the correlation and summary methods of Luginbuhl et al. (1985).

Results and Discussion

The results (table 1) showed that the tropical breeds (L and M) had better libido compared to the temperate breeds although D demonstrated very good libido by recording the shortest time to mount and shortest time to ejaculate among the temperate breeds. M had the shortest time to mount as expected as well as shorter time to ejaculate in agreement to earlier findings (Abdul Wahid et al., 1992) which can be attributed to the impatience and aggressive behaviour of the rams. The failure in penetration on the first attempt resulted in increase of the frequency of mounts in L. The aggressive behaviour is desirable as it would increase the chances of mating a larger number of females.

TABLE 1. COMPARATIVE DIFFERENCE IN LIBIDO AND SEMEN QUALITY OF SOME TEMPERATE AND TROPICAL BREEDS OF SHEEP

Variables	Temperate breeds			Tropical breeds	
	C	D	S	L	M
Time to mount (sec)	22.32 ± 1.14^{ab}	21.77 ± 1.11^{ab}	24.56 ± 1.55^{a}	21.89 ± 1.21^{ab}	19.88 ± 1.25^{b}
Time to ejac. (sec)	34.32 ± 2.00^{a}	33.32 ± 1.88^{a}	36.19 ± 3.07^{a}	31.63 ± 1.90^{a}	32.77 ± 2.98^{a}
No. of mounts (No.)	1.50 ± 0.07^{b}	1.49 ± 0.07^{b}	1.46 ± 0.09^{b}	$1.57 + 0.09^{ab}$	1.40 ± 0.13^{a}
Volume (ml)	0.94 ± 0.03^{a}	0.75 ± 0.02^{bc}	0.80 ± 0.02^{c}	0.90 ± 0.20^{a}	0.71 ± 0.02^{c}
Motility (%)	52.79 ± 3.07^{c}	42.23 ± 2.17^{d}	55.62 ± 2.84^{c}	77.45 ± 1.30^{a}	70.00 ± 2.45^{b}
Sperm count ($\times 10^{8}$)	$14.48 + 0.85^{c}$	13.71 ± 0.66^{c}	14.26 ± 0.87^{c}	21.67 ± 0.84^{a}	17.28 ± 0.79^{b}
Dead sperm (%)	48.28 ± 2.76^{a}	51.63 ± 1.99^{a}	$41.15 + 2.44^{b}$	23.88 ± 0.83^{c}	27.74 ± 1.03^{c}

Means ± S.E. (Row-wise amongst breeds) with the same lower-case letters are not significantly different ($p > 0.05$).

Breeds C - Cross of Merino with Border Leicester, D - Dorset, S - Suffolk, L - Siamese Longtail, M - Malin.

The breed C produced the maximum quantity of semen (0.9 ml) followed by L and S respectively. Breed (M) produced least volume of semem (0.7 ml) which corresponded to its small body size. However, although S was a heavier breed it did not necessarily produced the greater volume of semen. This indicated that breed differences existed in respect to semen production.

The temperate breeds produced poor quality semen compared to the tropical breeds. Among the temperate breeds the motility ranged from 42.23% in D to 55.62% in S with a mean of 50.21% for the three breeds. The tropical breeds on the other hand produced semen with 70-78 % motility with a mean of 73.73%. The number of sperm was also low with greater number or dead sperm in the temperate breeds. It was demonstrated that the temperate breeds produced more semen compared to the tropical breed (M and L), which may be related to the bigger testes, but the quality was poor. Between the two tropical breeds L possessed better semen, and comparatively was the best breed group. The semen of the tropical breeds was also of better consistency and colour. The semen of the temperate breeds was very watery and at times resembled coconut water. The sperm were scanty with greater percentage being abnormal.

There was significant difference ($p < 0.05$) between the size of testes of the three imported temperate breeds (table 2), but there was no difference between breeds S and C. S had the biggest testicles followed by C and D respectively. In comparison to the tropical breeds there was significant difference in all the three measurements. The length, width and circumference of the temperate breeds were greater than that of the tropical breeds. Breed M being the smallest of all possessed the smallest testes although it produced semen as much as D. It was also observed that

the right testis of all the breed groups was slightly longer which suggested that the right testis was more functional. Similar trend had been observed in the female where the right ovary was found to be more active than the left ovary.

The volume of semen was positively correlated to the testicular length, width and circumference in most of the breed groups which suggested that the bigger were the testicles the greater was the volume of semen produced (table 3). Similar results were reported by Amann (1970) who showed that sperm production was related to

TABLE 2. TESTICLE MEASUREMENTS OF TEMPERATE AND TROPICAL BREEDS OF SHEEP

Variables	Temperate breeds			Tropical breeds	
	C	D	S	L	M
Length (R) (cm)	15.65 ± 0.11^{a}	15.16 ± 0.09^{b}	15.79 ± 0.11^{a}	14.75 ± 0.06^{c}	12.53 ± 0.05^{d}
Length (L) (cm)	15.51 ± 0.11^{a}	14.72 ± 0.09^{b}	15.62 ± 0.11^{a}	14.69 ± 0.06^{b}	12.52 ± 0.05^{c}
Width (cm)	11.83 ± 0.12^{a}	11.47 ± 0.10^{b}	11.82 ± 0.07^{a}	10.57 ± 0.04^{c}	9.18 ± 0.04^{d}
Circumfer. (cm)	31.84 ± 0.17^{a}	30.87 ± 0.16^{b}	32.06 ± 0.17^{a}	29.52 ± 0.09^{c}	25.74 ± 0.08^{d}

Means ± S.E. (Row wise amongst breeds) with the same letters are not significantly different ($p > 0.05$).
Breeds C - Cross of Merino with Border Leicester, D - Dorset, S - Suffolk, L - Siamese Longtail, M - Malin.

TABLE 3. CORRELATION BETWEEN TESTICLE MEASUREMENTS AND SEMEN CHARACTERISTICS IN TEMPERATE AND TROPICAL BREEDS OF SHEEP

Breed		T Mount	T-Ejac	N-Mount	Vol	Mot	Count	Dead
Temperate								
C	Length (R)	−0.16*	−0.22*	−0.13	0.32**	0.11	0.14	−0.12
	Length (L)	−0.19*	−0.23*	−0.10	0.34**	0.14	0.18*	−0.14
	Width	-0.14	−0.17	−0.09	0.18	0.11	0.14	0.09
	Circumf.	−0.27**	−0.27**	−0.13	0.52**	0.23**	0.11	−0.28**
D	Length (R)	−0.28**	−0.28**	0.01	0.02	0.02	0.05	−0.02
	Length (L)	−0.02	−0.29**	−0.20**	0.15*	−0.01	0.01	0.07
	Width	−0.16*	0.16**	0.10	0.13*	−0.12	0.02	−0.03
	Circumf.	−0.17**	−0.31**	−0.04	0.21**	−0.04	0.03	−0.01
S	Length (R)	0.26**	0.12	−0.09	0.61**	0.11	0.07	-0.09
	Length (L)	0.27**	0.12	−0.11	0.58**	0.11	0.11	−0.07
	Width	0.20*	0.08	−0.07	0.19*	-0.06	0.11	−0.09
	Circumf.	0.22**	0.11	−0.01	0.25**	−0.10	0.10	−0.02
Tropical								
L	Length (R)	0.01	−0.11	−0.20**	0.15**	0.33**	0.23**	0.09
	Length (L)	0.02	−0.10	−0.20**	0.15*	0.23**	0.27**	0.08
	Width	0.07	−0.10	−0.11	0.11	−0.01	0.26**	−0.11
	Circumf.	0.08	−0.06	−0.10	0.09	0.04	0.25**	−0.25**
M	Length (R)	−0.01	−0.09	−0.10	0.30**	0.33**	0.29**	−0.10
	Length (L)	0.02	−0.09	−0.09	0.31**	0.30**	0.30**	−0.08
	Width	0.05	−0.05	−0.05	0.31**	−0.04	−0.01	0.15
	Circumf.	−0.06	−0.11	−0.10	0.36**	−0.01	−0.02	0.14

* Significant at $p < 0.05$.
** Significant at $p < 0.01$.
Breeds C - Cross of Merino with Border Leicester, D - Dorset, S - Suffolk, L - Siamese Longtail, M - Malin.

testicular development as illustrated by a positive correlation between testicular weight and sperm production. Such trend have also been reported in goats by Abdul Wahid and Yunus (1991). In the case of the tropical breeds the volume, motility and number of sperm were significantly and positively correlated with testicular length suggesting that longer testes produced more fertile sperm. The longer epididymis possibly provided a more conducive environment for the spermatozoa. In the temperate breeds the libido of C and D was negatively correlated to the testicle size whereas in breed S there was a positive relationship between the two parameters which indicated that the bigger were the testicles the better was the libido. This phenomenon was absent in the tropical breeds. It was reported earlier (Abdul Wahid et al., 1992) that bigger testicles secreted greater quantity of testosterone which produced the characteristic aggressive behaviour. Though S demonstrated libido during the day and night it was more intense at night contrary to the other temperate breeds.

The present study showed that positive correlation did exist between testicle measurements and semen attributes in some breeds whereas it was negative in the others. Since testicle length was correlated with fertility it was evident that selection for longer testicles could improve conception and lambing. The greater testicular size of the temperate breeds as depicted by the circumference produced greater volume of semen but of poor quality. Therefore, importation of temperate breeds of sheep should be done with caution as gain in body size may be upset by poor conception, reduced lambing rate and poor adaptability as indicated from the studies conducted in Malaysia.

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