Epididymal sperm reserves of the goat (*Capra hircus*)

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Summary. Epididymal sperm reserves were determined in 6 sexually mature goats. The numbers of spermatozoa in the caput, corpus and cauda epididymidis were 1.90 ± 0.16 , 0.66 ± 0.04 and $6.18 \pm 0.91 \times 10^9$ respectively and they represented 21.7, 7.5 and 70.8% respectively of the sperm reserve on that side. The total epididymal sperm reserve/male was about 17.5×10^9 spermatozoa.

Introduction

The number of spermatozoa stored in the epididymis has been said to be related to the rate of sperm production by the testes, although there are reports in the literature to the contrary (Swanson, Hafs & Peterson, 1968; Orgebin Crist, 1968; Amann, 1970). Ortavant (1958) showed that a good correlation existed between the testicular spermatid population and the number of spermatozoa in the cauda epididymidis and in the whole epididymis. Almquist & Amann (1961), however, found an insignificant correlation between the daily sperm production and the epididymal sperm reserves.

Epididymal sperm reserves have been estimated for bulls (Amann & Almquist, 1962; Igboeli & Rakha, 1971), boars (Kennelly & Foote, 1964; Egbunke & Elemo, 1978), rats (Robb, Amann & Killian, 1978), rabbits (Orgebin Crist, 1968), monkeys (Amann, Johnson, Thompson, Rand & Pickett, 1976), horses (Swierstra, Gebauer & Pickett, 1975) and buffaloes (Sharma & Gupta, 1978). There has been only one study on the epididymal sperm reserves of goats, which were 140 and 168 days of age (Corteel, 1973). The present study was therefore designed to determine the epididymal sperm reserves of mature goats in tropical conditions, because the information is of importance for rating the fertility of male animals of this useful livestock species.

Materials and Methods

The testis and epididymides from 6 adult sexually mature billies were collected into prechilled polythene bags immediately after slaughter and were brought to the laboratory covered in ice and were processed on the same day. The testis and epididymis were carefully separated and weighed individually. The latter was divided into caput, corpus and cauda regions on the basis of external morphology and minced thoroughly in a Petri dish with about 10 ml saline (9 g NaCl/l). The homogenate was decanted and the remaining portion was again homogenized in a Potter–Elvehjem homogenizer for about 15 sec at the lowest speed. The volume was finally made up to the desired level with saline. The volume was 35 ml for caput and cauda segments and 25 ml for the corpus epididymidis. The combined homogenate was filtered through double-washed muslin cloth and kept at 4°C. This process yielded more complete recovery of intact spermatozoa with less debris and clumping than did the Waring-blendor method which was

invariably associated with enough debris to make the haemocytometer counting difficult. The filtrate was thoroughly shaken and to each Erlenmeyer flask containing the filtrate was added 100 000 units of crystalline penicillin (Hindustan Antibiotics, Pimpri, India). Then 1 ml of the filtrate was diluted with 5 ml 0.2% water-soluble eosin. The test-tubes and flasks were covered with aluminium foil and kept at 4°C overnight. Next day the sperm concentration was determined by direct haemocytometric counting (see Sharma & Gupta, 1978). Student's *t* test was used to test the significance of differences between means.

Results and Discussion

The mean $\pm$ s.e.m. weights of the testes and the epididymides from the 6 goats were 69.13 ± 4.13 g ($n = 12$) and 9.08 ± 0.06 g ($n = 12$) respectively. The sperm counts obtained are given in Table 1. The reserves in the epididymides varied from 4.30 to 13.5×10^9 spermatozoa. All the correlations examined were high and significant: testicular and epididymal weight, 0.89 ($P < 0.01$) epididymal weights and epididymal sperm number, 0.96 ($P < 0.01$), and testicular weight and epididymal sperm number, 0.94 ($P < 0.01$). Significant values for these 3 correlations have also been reported by Almquist & Amann (1961) and Verma, Singh & Sharma (1965) but not by Sharma & Gupta (1978). The value of 8.75×10^9 spermatozoa for the mean total epididymal sperm reserve in each epididymis is much higher than that reported by Corteel (1973) but this may be due to a difference in the breed of goat used and the younger age of the goats studied by Corteel (1973).

Table 1. Epididymal sperm numbers ($\times 10^9$) in goats

Goat	Epididymis			Total
	Caput	Corpus	Cauda	
1	1.45	0.78	5.20	7.43
	1.37	0.80	4.43	6.60
2	1.39	0.66	7.52	9.57
	1.92	0.70	8.64	11.26
3	1.69	0.48	5.62	7.79
	1.68	0.46	3.54	5.68
4	2.66	0.88	9.92	13.46
	3.02	0.85	8.84	12.71
5	1.53	0.57	2.20	4.30
	1.63	0.30	2.61	4.54
6	1.76	0.65	7.42	9.83
	2.74	0.85	8.24	11.83
Mean	1.90	0.66	6.18	8.75
$\pm$ s.e.m.	± 0.16	± 0.04	± 0.75	± 0.91

The relative distribution of spermatozoa in the caput, corpus and cauda regions of the epididymis of goats (21.7, 7.5 and 70.8% respectively) is similar to that reported by Amann & Almquist (1962) for the bull. However, the epididymal sperm reserve in this species is much lower than those found for bulls (Amann & Almquist, 1962), rams (Ortavant, 1958) and boars (Egbunke & Elemo, 1978).

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