

A NOTE ON CRYPTORCHIDISM IN ANGORA GOATS

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Cryptorchidism is known to occur in Angora goats and has been discussed by Gist in 1923 in the United States of America. Later, Lush, Jones and Dameron (1930) published results of breeding experiments at Texas, and found that most, if not all, cases were inherited and that the genes were recessive and few in number. More recently Warwick (1961) has described the effect of selection on the incidence of cryptorchidism in Angoras. The object of the present study was to establish the incidence of cryptorchidism among pedigree flocks in South Africa, to establish whether it is related to chromosome abnormalities and to compare the reproductive tracts of cryptorchids with those of normal goats.

With the co-operation of the Stud Breeders' Society, a survey was conducted of all the registered breeders by means of a circular, thirty of whom provided details of their flocks. Eight unilateral cryptorchid rams, and one bilateral cryptorchid ram were purchased and compared with three normal rams. The chromosomes were compared between three unilateral cryptorchids and two normal goats using the method of Moorhead, Nowell, Mellman, Batipps and Aungerford (1960). The rams were slaughtered in January 1972, at an age of 15 months, the reproductive tracts dissected out and compared morphologically, histologically and histochemically as described by Skinner and Rowson (1968).

The 30 farmers who replied to the questionnaire had a total of 7945 rams in their flocks in 1970. Only three farmers reported no cryptorchids and the average percentage was 1.98% with a maximum of 10%. Five farmers reported an incidence of 0.001% of bilateral cryptorchids and this condition did not occur amongst the remainder. It was apparent from the returns that the farmers are all well informed about this abnormality and select strictly against it. Most farmers (13) reported an incidence of 1.5 to 2.0% and only six had an incidence higher than this. In his study Warwick (1961) reduced the incidence to 0.8% by strict selection so the incidence in South African flocks can be reduced further.

The chromosome picture is illustrated in Plate 1. The count showed the same number in both normal and abnormal goats. There were 60 chromosomes of which 59 were acrocentric and one chromosome, the small Y chromosome was metacentric. The X chromo-

some is one of the acrocentric chromosomes of average size.

In outward appearance the farmers reported that the cryptorchids looked like normal rams with mohair of similar quality. This was so for the rams we purchased except that the single bilateral cryptorchid had no scrotum. The undescended testicles were sited near the kidneys.

The reproductive tracts of the rams are illustrated in Plate 2 and the weights of the rams and their reproductive organs in Table 1. The differences in histology between scrotal and cryptorchid tests are illustrated in Plate 1.

Recent anatomical and cytogenetic studies on European milch goats have demonstrated that abnormal sexual development is correlated with an XX sex chromosome complement and marked testicular development (Basrur & Coubrough, 1964; Biggers & McFeely, 1966; Short, Hamerton, Grieves & Pollard, 1968). From the results of our survey it would appear that inter-sexes are extremely rare in the Angora breed and that the chromosome picture of the cryptorchids is the same as that for normal rams. As in the case of the bilaterally cryptorchid springbok ram reported on by Skinner (1971) no scrotum or pouch formation was present in the bilaterally cryptorchid Angora ram. Unlike the springbok, however, the epididymides and ampullae were not fused, the uterus masculinus had regressed and the reproductive tracts was normally developed. Both in this ram and the unilateral cryptorchids some factor inhibited testicular descent.

Histologically the seminiferous tubules in abdominal testes resembled those of goats prior to puberty. Supporting cells had not differentiated into Sertoli cells, and gonocytes were still present. In the scrotal testes all stages of the spermatogenic cycle were evident (Plate 1, Fig. 3, 4, 5 and 6). It was interesting that, as in the naturally occurring cryptorchid stallion (Skinner & Rowson, 1968), and unlike artificially induced cryptorchid bulls and rams, the hydroxysteroid dehydrogenase activity in the cryptorchid testis was greatest within the tubules whereas it occurred in the interstitium in the scrotal testes. As in the lamb and calf (Skinner & Rowson, 1968) in unilateral cryptorchid goats the contralateral scrotal testes were larger and the diameter of the seminiferous tubules was greater

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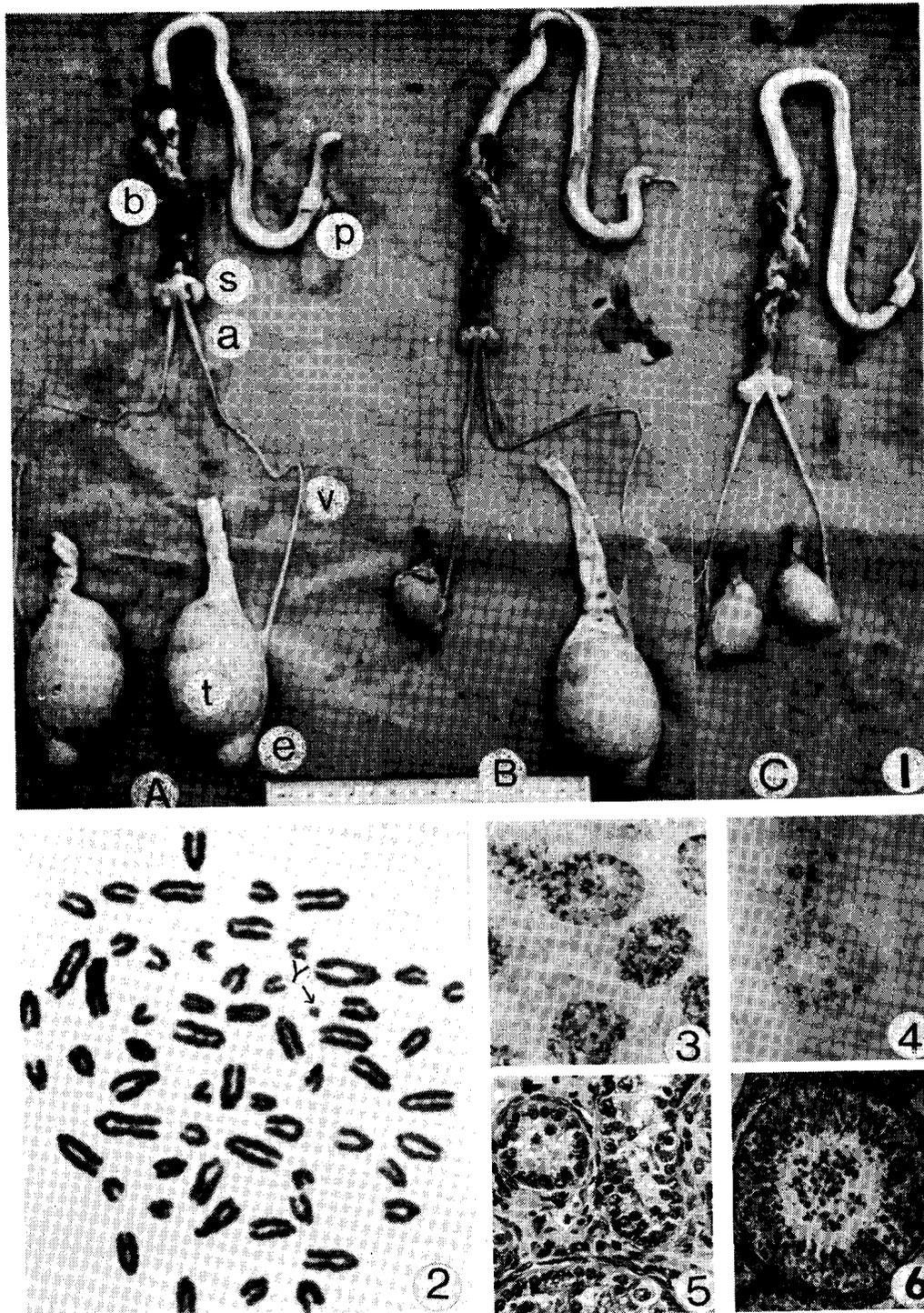


Plate 1

Fig. 1. — The reproductive tracts of (A) normal, (B) unilaterally (C) bilaterally cryptorchid Angora rams showing testes (t), epididymides (e) vasa deferentia (v), ampullae (a), seminal vesicles (s), bulbo-urethral glands (b) and penis (p.) Scale in cm.

Fig. 2. — Metaphase spread from blood culture of a unilateral cryptorchid showing 59 acrocentric chromosomes and the Y chromosome (Acetic orcein, x 1500).

Fig. 3 and 4. — Unfixed frozen sections from testes incubated for 3 hr to demonstrate $\Delta^5-3\beta$ -hydroxysteroid dehydrogenase activity in the interstitium. There was less activity in the cryptorchid testis where it was sited within the tubules (fig. 2) than in the contralateral scrotal testis where activity occurred in the interstitium (fig. 3). x 128.

Fig. 5 and 6. — Paraffin sections from the same goat. Note the single layer of supporting cells and gonocytes in the seminiferous tubules of the cryptorchid testis (fig. 4) x400. The contralateral scrotal testis (fig. 5) shows all stages of spermatogenesis. x 128.

Table 1

Comparison of mean weights, diameter of seminiferous tubules, sperm reserves and vesicular fructose from normal, unilateral cryptorchid and bilaterally cryptorchid Angora goat rams

	No. of rams	Live weight (kg)	Testis weight (g)	Semi-niferous tubule diameter (µm)	Epididymis		Seminal	Vesicles	Ampullae weight (g)
					Weight (g)	Sperm reserves (x10 ⁹)	Weight (g)	Fructose (mg/100g)	
Normal rams	Right side (scrotal)	3	55.5	176	10.0	4.4	1.7	28.8	1.1
	Left side (scrotal)		52.5	175	9.5	3.7	1.4		1.0
Unilateral Cryptorchid rams*	Right side (scrotal)	8	58.6	184	11.6	3.7	1.2	25.9	0.7
	Left side (abdominal)		9.4	76	1.4	0.0	1.2		0.6
Bilaterally Cryptorchid	Right side	1	8.0	88	1.6	0.0	0.8	26.0	0.4
	Left side		7.9	88	1.3	0.0	0.8		0.4

* The left testis was retained in all instances

but epididymal sperm reserves were of the same order.

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