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Diseases and mortality of adult goats in a South African milk goat herd

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Abstract

Saanen and South African Indigenous goats were crossbred, and all three types were compared in terms of productivity, milk production and diseases between 1988 and 1994. Clinical mastitis occurred in the herd at a moderate level (28 cases of clinical mastitis, including peracute outbreaks, in 251 lactations in six years). Peracute cases resulted in deaths, or loss of an udder half. The main organism identified was *Staphylococcus epidermidis*, infecting 109 of the 1032 udder halves sampled (10.6%). The other bacterial isolations were only 27 of 1032 udder half samples (2.6%), primarily of *Staphylococcus aureus* (23 of 27 colonies: 85%). *Mannheimia haemolytica* (formerly *Pasteurella*) and *Streptococcus sp.* were each identified once, and *Escherichia coli* twice. Somatic Cell Counts (SCC) were an unreliable indication of subclinical mastitis. Abscesses were not a major problem (up to 10 cases a year). Dystocia and the resultant metritis, occurred in only 11 cases in a six year period. Squamous cell carcinoma developed on the udders of half of the 24 pure Saanens from the fourth lactation onwards, and they were culled. No cases were reported in the Crossbred goats. Alterations to the goat pens which provided adequate shade resolved the problem. Foot problems occurred when hooves had not been trimmed regularly. Serious eye infections seldom occurred. Six cases of adult goats with pneumonia were recorded. On two occasions samples were collected from goats that had swollen joints, but tests for caprine arthritis encephalitis (CAEV) were negative; this disease appears not to exist in South Africa. Internal parasites were not a significant problem in adult goats. Lice were the only external parasites in the penned goats. Indigenous goats appeared to be relatively resistant to tick infestation. Mortality increased with age, and as the size of the herd increased. The annual mortality rates of 10% for Saanens and 15% for Crossbreds were high, compared to that for the Indigenous goats of 4%. The most important causes of death were mastitis, ketosis and pneumonia. Pneumonia was diagnosed as the cause of death for five adult goats. Few cases of dystocia were recorded, but some goats were lost as a result of uterine infections and peritonitis. Pregnancy toxaemia occurred with increased demand for energy late in gestation. Plastic bags in the rumen caused deaths of some Indigenous goats in the veld paddocks in later years. Only two cases of heartwater were recorded.

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Introduction

The Milch Goat Project was initiated in 1987 to study the factors affecting the establishment of goat milk production for small-scale farmers and households in the developing areas of Southern Africa. Saanen and South African Indigenous goats were crossbred, and kept on a zero grazing system (a total mixed ration diet). In later years, the Indigenous goats were kept in a veld paddock. Some results have been reported previously (Donkin *et al*., 1992; Donkin *et al*., 1996; Donkin, 1997; Donkin *et al*., 2000).

Materials and Methods

Saanen milk goats were purchased from Fairview Estates in the Western Cape Province, and South African Indigenous goats were loaned from the Department of Development Aid farm Delftzyl in the Limpopo Province. A specific programme was carried out to assess resistance to heartwater (Donkin *et al*., 1992). Breeding, kidding, milk production, diseases and mortality were recorded (Donkin, 1997). Diagnosis was based on clinical signs, lesions, post-mortem examination and diagnostic tests. Post-mortems were carried out by the Pathology Department of the Faculty of Veterinary Science.

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Results and Discussion

The incidence of diseases in goats that recovered is shown in Table 1. These are in addition to those reported as post-mortems (Table 5).

Table 1 Goat diseases recorded

Disease Condition	1989	1990	1991	1992	1993	1994
Mastitis	1	7	4	2	2	4
Dystocia	-	2	1	-	1	4
Abscesses	-	7	10	-	1	-
Eye infections	-	-	3	-	-	-
Pneumonia	-	-	1	-	-	-

Clinical mastitis occurred periodically (28 cases in 251 lactations of Saanens and Crossbreds) and included occasional peracute outbreaks. The goats were milked by machine, using standard measures for mastitis prevention and control (Kingwill *et al.*, 1979). This comprised: washing and drying the udder; stripping foremilk to test for mastitis; teat disinfection after milking; prompt antibiotic treatment of clinical cases; intramammary therapy in the dry period (only for the first three years); and strategic culling of chronically infected animals. Some goats were lost from peracute mastitis (Tables 1 and 4) resulting in deaths or in the loss of an udder half. One peracute outbreak was caused by a *Pseudomonas* infection apparently transmitted by the milking machine.

In the years 1990/91 milk samples were taken regularly to monitor subclinical infections (Table 2). The incidence of subclinical mastitis as indicated by growth of bacterial colonies was generally low, and infections identified did not often persist. The main organism identified was *Staphylococcus epidermidis*, infecting 109 of the 1032 udder halves sampled (10.6%). This was considered to be an environmental contaminant, and not a true mastitis-causing organism. The other bacteria were few in comparison (27 of 1032 udder half samples: 2.6%), and consisted primarily of *Staphylococcus aureus* (23 of 27 colonies: 85%). *Mannheimia haemolytica* (formerly *Pasteurella)* and *Streptococcus* sp. were each identified once and *Escherichia coli* twice. As was expected in goats, the somatic cell counts (SCC) were an unreliable indication of subclinical mastitis (Table 3).

Table 2 Subclinical Mastitis Survey: 1990/91: Bacterial growth

Date	Udder halves sampled	No growth	Growth of bacterial colonies				Percent showing growth	
				Totals *Staph.*			*Staph.*	Total
				epidermidis	*aureus*		Other	Partial*
18/09/90	76	73	3	2	1	0	3.9	1.3
02/10/90	114	106	8	5	2	1	7.0	2.6
16/10/90	140	129	11	10	1	0	7.9	0.7
06/11/90	132	113	19	14	4	1	14.4	3.0
27/11/90	126	106	20	11	9	0	15.9	7.1
05/02/91	118	99	19	17	1	1	16.1	1.7
12/03/91	120	100	20	18	1	1	16.7	1.7
16/04/91	121	98	23	19	4	0	19.0	3.3
14/05/91	85	72	13	13	0	0	15.3	0.0
Totals	1032	896	136	109	23	4	13.2	2.6

* Excluding *Staph. epidermidis*

Abscesses (caseous lymphadenitis) were not experienced as a major problem (up to 10 cases per year). Dystocia, and the resultant metritis, occurred in a few goats (11 cases in six years). Some goats died from uterine infections and peritonitis.

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Squamous cell carcinoma developed in half of the original herd of 24 pure Saanens on the skin of the udder from the fourth lactation onwards. It was incurable, and these goats were culled. None occurred in Crossbred goats perhaps because of greater skin pigmentation. A new goat shed was constructed which provided more shade, and the problem abated. Foot problems occurred when hooves had not been trimmed regularly. A few goats appeared to have had a genetic weakness, making them susceptible to foot deformities, especially if they became overweight. A few showed laminitis, and spent a proportion of their time kneeling. This may have resulted from the high energy diet fed to the milk goats. Serious eye infections seldom occurred (Table 1). A low incidence of pneumonia occurred (6 cases). (Table 1 and Table 5). On two occasions samples were collected from goats that had swollen joints, but tests for caprine arthritis encephalitis (CAEV) were negative. This disease appears not to exist in South Africa.

Table 3 Subclinical Mastitis Survey: 1990/91: Somatic Cell Counts (SCC) (cells x 1000/mL) (mean ± s.e.)

Date	n	No growth	Growth
18/09/90	76	1687 ± 2866	1222 ± 1080
02/10/90	114	1042 ± 1712	2334 ± 3989
16/10/90	140	1194 ± 2500	1022 ± 1100
06/11/90	132	508 ± 614	670 ± 696
27/11/90	126	527 ± 1020	1344 ± 2214
05/02/91	118	864 ± 1171	696 ± 525
12/03/91	120	825 ± 1362	671 ± 726
16/04/91	121	831 ± 1242	954 ± 590
14/05/91	85	839 ± 1795	1313 ± 855

Internal parasites were not a problem in the adult goat herd. Levamisole was given in the dry period. Indigenous goats were dosed with various anthelmintics once or twice a year. Lice occurred on goats in the pens about twice a year, and were controlled with a synthetic pyrethroid. Saanen or Crossbred goats generally were not kept in the veld paddocks because they lost body condition and were at risk of tick-borne diseases. In contrast, Indigenous goats appeared to be relatively resistant to tick infestation. Tick populations on the Indigenous goats were low, under the tail and between the hoof claws, sometimes causing lameness.

Only two cases of heartwater were recorded during this period (1988 to 1994), one of which was from a goat kept in the goat pens. The tick could have been transported via guinea fowl that flew in to eat spilled goat feed in the pens, or it could have been carried in by an Indigenous goat that had been in the veld. Because of the risk of heartwater, Saanen and Crossbred goats were seldom sent out to the veld paddocks.

There were few deaths in the early years, but the incidence increased in older animals, and as the size of the herd increased (Table 4). The average annual losses of 10% for Saanens and 15% for Crossbreds were high, compared to those of Indigenous goats (4%). There were too few Three-quarter Saanens to draw conclusions.

Table 4 Mortality of adult female goats: 1988 - 1993

Year	Saanen		Crossbred		75% Saanen		Indigenous	
	No	Deaths	No	Deaths	No	Deaths	No	Deaths
1988	25	1	-	-	-	-	33	-
1989	24	-	-	-	-	-	3	1
1990	34	5	9	-	-	-	44	6
1991	48	4	21	7	2	-	40	1
1992	41	4	22	2	8	4	48	2
1993	41	9	21	2	9	1	49	1
Averages	35.5	3.8	18.2	2.7	6.3	1.7	41.2	1.8

The most important causes of death identified from post-mortem examinations were mastitis, ketosis and pneumonia (Table 5). Both mastitis and ketosis are management-related diseases. Pneumonia was diagnosed as the cause of death for five adult goats, but this may have been the final complication to other disease problems.

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Table 5 Recorded post-mortems of adult goats (n = 32)

Aetiology	No	Aetiology	No
Mastitis	8	Hepatic cirrhosis	2
Pregnancy toxaemia (ketosis)	6	Heartwater (cowdriosis)	1
Pneumonia	5	Plastic bags in rumen	1
Peritonitis	3	Squamous cell carcinoma	1
Dystocia, metritis, uterine prolapse	4	Nephrosis / renal calculi	1
Corynebacterium abscesses	1	Heart failure	1

[Note: This is a sample of the goats that died, because post mortems were not carried out in all cases]

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