

## Goat production in the smallholder section in the Boane district in Southern Mozambique

W.A. van Niekerk<sup>#</sup> and P.L. Pimentel\*

Department of Animal & Wildlife Sciences, University of Pretoria, Pretoria 0002, South Africa

---

### Abstract

Results are presented of a study of a smallholder goat production system in the Boane district, southern Mozambique. Goat keepers (n = 65) were selected and their goats (Landim breed) (n = 770) were recorded and monitored over two years (1993 – 1995). Goat numbers per household were small (9.7) and raised under a traditional management system. Females outnumbered males and most of the male kids were removed from the flock before nine months of age. Age of first kidding was on average 390 days. Litter sizes varied between 1.44 and 1.87 and the percentage multiple births (54%) corresponded well with reported values. The mortality rate increased proportionally among twins as the number of twin births increased. This study provided a base-line survey of which the information can be used in future projects of this nature.

---

**Keywords:** Goats, smallholder, productivity, reproduction, production system

<sup>#</sup>Corresponding author. E-mail: willem.vanniekerk@up.ac.za

\*Present address: Instituto de Produção Animal, C.P. 1410, Maputo, Moçambique

### Introduction

Interest is increasing world-wide in goat production. According to Wilson (1988), tropical Africa contains one third of the world's goat population. In Mozambique the small ruminant national herd has decreased during the last two decades, due to the long-term war and drought (Tomo & Vaz, 1994). Government estimates (Dinap, 1992) indicated that small ruminants decreased in Mozambique from 466 548 in 1980 to 188 336 in 1992, of which 166 110 were goats and 22 226 sheep. The distribution of small ruminants in Mozambique is related, not only to favourable agro-climatic factors, but also to its socio-economic role in society (Tomo & Vaz, 1994). Results from this study should shed light on flock characteristics and production limitations of the population in Boane district, Mozambique.

### Materials and Methods

The study area is located in the Boane district in the Maputo province, Mozambique, between the latitude 26°.02' – 26°.04' south and the longitude 32°.17' – 32°.19' west. The survey and follow-up study included four villages of the district, namely: Paulo Samuel Kamkhomba; Umpala; Radio Marconi and Mahilane. These villages were considered to be representative of the social strata of the population as well as of the livestock production in the zone. All goats were of the native Landim breed.

The climate is subtropical, with a monomodal rainfall pattern. The average rainfall per annum is 678 mm. January is the wettest month and August the driest month of the year. The rainy season runs from October to April and the dry season from May to September. The annual average temperature is 22.9 °C. The highest average temperature is in January (25.6 °C) and the lowest during July (17.8 °C). The relative humidity does not vary markedly during the year with values between 65% during August/September and 72% in March/April. The vegetation is of a savannah type, with a good potential for extensive grazing. Shrubs and trees consist mostly of *Acacia* spp., *Combretum* spp. and *Colophospermum mopane* (Timberlake, 1985). However, large areas have been cleared for cropping and other areas were affected by bush encroachment dominated by *Dichrostachys cinerea* (PNUD/FAO, 1990).

The data was recorded using D-Base and was analysed by an analysis of variance or, when comparing differences between two specific variable groups, by the chi-square test. Non-parametric techniques were used to compare differences between two specific groups with the use of the Scheffe test, the Kruskal-Wallis test and the Wilcoxon test (Snedecor & Cochran, 1980).

### Results and Discussion

The average flock size in the study area was 9.7 goats, which was higher than the average flock size of 7.5 goats per flock in Nigeria (Francis, 1988), 5 goats in Cameroon (Ndamukong *et al.*, 1989) and 8 goats in Ghana (Turkson, 1992). Flock structure and composition by sex and age are presented in Table 1.

**Table 1** Flock structure and composition of goats (n = 663) in the Boane district in Mozambique

Sex	Age 0-8 months (%)	Age 9+ months (%)	Total (%)
Females	26.66	42.02	68.68
Males	23.04	8.28	31.32
Total	49.70	50.30	100

Females clearly outnumbered males in all sections of the population. The greater number of females is in agreement with other studies in Africa (Wilson, 1988; Ndamukong *et al.*, 1989; Reynolds & Adediran, 1994). None of the flocks in this study had castrated males. The majority of male kids were removed from the flock before nine months of age. The fastest growing males were removed first from a flock, so the remaining males tended to be the slower growing ones. However, when breeding males were needed, the larger males showing the highest libido were selected for this purpose. Nevertheless, there were flocks without breeding males. Generally, only owners of the larger flocks kept bucks. Similar findings were reported by Reynolds & Adediran (1994) in Nigeria.

According to Wilson (1989) concern is often expressed at the poor reproductive performance of African indigenous livestock. The age at first kidding in this study ( $390 \pm 72$  days) was less than the first kidding age of  $693 \pm 36$  days reported for Landim goats in Mozambique (Wilson *et al.*, 1989). This could be rather due to the type of reproductive management system used than late sexual maturity (McKinnon, 1985). The reproductive characteristics of goats are affected by various genetic and environmental factors (Chiboka *et al.*, 1988). However, very few data exist on the effect of environmental factors on the age at first parturition (Wilson, 1989).

The number of kids per parturition (litter size) produced per female and the percentage of single and multiple births during 1993, 1994 and 1995 are presented in Tables 2 and 3, respectively.

**Table 2** Mean litter size for goats in the Boane district, Mozambique from 1993 to 1995

Year	Number of observations	Litter size	s.e.*
1993	116	1.44	0.49
1994	243	1.87	0.87
1995	175	1.60	0.80

\*s.e. = Standard error

**Table 3** Prolificacy of does from 1993 – 1995 in the Boane district, Mozambique

Year	Number of observations	Type of birth (%)				
		Single	Twins	Triplets	Quadruplets	Quindruplets
1993	116	55	45	-	-	-
1994	243	39	41	14	6	-
1995	175	54	37	3	5	1

No significant differences were found and the litter size (between 1.44 and 1.87) in this study and compared well to the litter size of 1.57 to 1.62 kids for Landim goats at Chobela Station (McKinnon & Rocha, 1985). Other indigenous breeds of East- and West-Africa reported to have litter sizes which varied between 1.19 – 1.90, of which the highest been observed in the Boer goat in South Africa (Erasmus *et al.*, 1985; Armbruster & Peters, 1993). The percentage of does with multiple births in this study (Table 3) (46% - 61%) corresponded well with the 56% reported by McKinnon & Rocha (1985) for Landim goats at Chobela Station. Prolificacy has been reported to be the primary reproductive trait studied that was not directly influenced by management and was rather controlled by genetic and environmental factors (Wilson *et al.*, 1989). The high prolificacy of Landim does has been well documented (Wilson *et al.*, 1989) and seems to be confirmed by the results of this study.

The mortality rate increased proportionally among twins as the number of twin births increased. However, the mortality rate among the single kids remained relatively the same between the first and fourth parity. These findings were, to a certain extent, in contrast to the findings of Chiboka *et al.* (1988) who reported that a higher mortality rate is common in the first parity.

## Conclusion

The characteristics of the study area and its people were typical of towns close to urban areas of Maputo Province. There is a high reproductive efficiency in the system, thanks to an early age at first parturition and a large litter size. However, the overall productivity may be considered low, due to the high mortality rate in young animals as well as due to stock theft.

Mismanagement, poor hygiene and precarious housing conditions all contributed to the incidence of disease and high mortality. The early separation of the kids from their dams, no supplementation to lactating does with multiple births and lack of attention to the newborn could also contribute to the high mortality rate among kids.

## References

- Armbruster, T. & Peters, K.J., 1993. Traditional sheep and goat production in Southern Cote D'Ivoire. *Small Rumin. Res.* 11, 289-304.
- Chiboka, O., Somade, B. & Montsma, G., 1988. Reproduction of West African Dwarf goats – A summary of research work at Ile-Ife, Nigeria. In: Proc. Int. Workshop on Goat Production in the Humid Tropics. University of Ife. July, 20-24, 1987. Eds. Smith, O.B. & Bosman, H.G., Wageningen. pp. 125-137.
- Dinap (National Livestock Directorate, Mozambique), 1992. Annual Report. pp. 80.
- Erasmus, J.A., Fourie, A.J. & Venter, J.J., 1985. Influence of age on reproductive performance of the improved Boer goat doe. *S. Afr. J. Anim. Sci.* 15, 5-7.
- Francis, P.A., 1988. Livestock and farming systems in Southeast Nigeria. In: Proc. Int. Workshop on Goat Production in the Humid Tropics. University of Ife. July, 20-24, 1987. Eds. Smith, O.B. & Bosman, H.G., Wageningen. pp. 125-137.
- McKinnon, D., 1985. Productive capacity of small ruminants – preliminary results. In: Proc. Livestock Production Seminar, 2-7 December, Maputo. Eds. Jordao, C. & Timberlake, J., Maputo, Mozambique. pp.156-166.
- McKinnon, D. & Rocha, A., 1985. Reproduction, mortality and growth of indigenous sheep and goats in Mozambique. In: *Small Ruminants in African Agriculture*. Eds. Wilson, R.T. & Bourzat, D., ILCA: Ethiopia. pp.154-162.
- Ndamukong, K.J.N., Sewell, M.M.H. & Asanji, M.F., 1989. Management and productivity of small ruminants in the North west province of Cameroon. *Trop. Anim. Health Prod.* 21, 109-119.
- PNUD/FAO, 1990. *Estudo Preliminar do Sistema de Produção na Região do Umbelúzi*. Doc. No. 3, Projecto PNUD/FAO/MOZ., Maputo, Moçambique. pp. 20-24.
- Reynolds, L. & Adediran, S., 1994. Composition of village herds in southwest Nigeria. *Small Rumin. Res.* 13, 49-53.
- Snedecor, G.W. & Cochran, W.G., 1980. *Statistical Methods*. 7<sup>th</sup> Edition. The Iowa State University Press. Iowa, USA.
- Timberlake, J., 1985. Natural pastures in Mozambique. In: Proc. Livestock Production Seminar. 2 – 7 December. Eds. Jordão, C. & Timberlake, J., Maputo, Mozambique. pp. 81-106.
- Tomo, P. & Vaz, Y., 1994. Development of small ruminant production in Southern Africa. Base document for the workshop on the "Orientation of small ruminant production and development in Southern Africa". Kadoma. Zimbabwe.
- Turkson, P.K., 1992. The practices and problems of rural women involved in small ruminant production. In: Proc. West African Commonwealth Veterinary Association / Ghana Veterinary Medical Association conference. 7-12 September. Eds. Amanfu, W. & Koney, E.B.M., Ghana. pp. 20-29.
- Wilson, R.T., 1988. Small ruminant production systems in tropical Africa. *Small Rumin. Res.* 1, 305-325.
- Wilson, R.T., 1989. Reproductive performance of African indigenous small ruminants under various management systems: A review. *Anim. Reprod. Sci.* 20, 265-286.
- Wilson, R.T., Murayi, T.H. & Rocha, A., 1989. Indigenous African small ruminant strains with potentially high reproductive performance. *Small Rumin. Res.* 2, 107-117.