

**PRODUCTIVITY AND DISEASES OF SAANEN, INDIGENOUS
AND CROSSBRED GOATS ON ZERO GRAZING**

by

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DECLARATION

I, EDWARD FRANCIS DONKIN, hereby declare that the work on which this thesis is based is original (except where acknowledgements indicate otherwise); and that neither the whole work nor any part of it has been, is being, or shall be submitted for another degree at this or any other university, institution for tertiary education, or professional examining body.

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SUMMARY

Saanen and South African Indigenous goats were bred to kid at twelve months and annually thereafter. Milk production was recorded. Conception rates were generally more than 90 %, except for Indigenous goats in their first year. Few Indigenous goats (12 %) had twins at the first parturition, whereas 45% of Saanens had twins at 12 months of age. Twinning increased with age, and Saanen and Indigenous goats had kidding rates of 182% and 174% respectively in their third year, with Saanens later exceeding 200%. Triplets were infrequent, except in mature Saanens (9% of parturitions), and in Crossbreds (16%). Mean lactation yields were 579, 838, and 758kg for Saanens in first, second and third lactations, respectively. Lactation lengths were 283, 293 and 290 days respectively (excluding milk production beyond 300 days). Mean lactation yields for Crossbreds were 317, 446 and 438kg for first, second and third lactations. Lactation lengths were slightly shorter for Crossbreds than for the Saanens at 236, 248 and 257 days respectively. Indigenous goats were recorded at a mean milk yield of 23kg per lactation, and a mean lactation length of 94 days. Milk composition analyses for Saanens averaged 3.43, 2.88, and 4.49% for milk fat, protein and lactose, respectively. The analyses for Crossbred goats were 5.47, 3.88 and 4.81%, and for Indigenous goats were 9.33, 5.04 and 5.12%, respectively. These results showed that Crossbred goats gave less milk than Saanens, but significantly more than Indigenous goats. Milk production of Crossbred goats was found to be adequate for household requirements (subsistence purposes). In this way, the Crossbred goats were shown to be able to fulfil one of the objectives of the crossbreeding programme.

The main disease identified was coccidiosis, accompanied by pneumonia, which caused unacceptably high mortality among goat kids: 31% of Saanen, 24% of Crossbred, 38% of Three-quarter Saanen and 28% of Indigenous female kids. It is believed that this problem is largely management related, and worsened by overcrowding and the consequent poor hygiene; but the presence of rotavirus might also be significant. These aspects warrant further investigation. The main disease problem identified in mature goats was mastitis, which caused deaths of goats from peracute cases. Another important problem which became apparent after four years of age, was the incidence of squamous cell carcinoma on the udders of Saanens. Reduced exposure to the sun, by the provision of adequate shade should alleviate this problem; but the crossbreeding programme was seen to be of benefit, since no cases occurred in Crossbred goats.

The experiment on heartwater aimed to assess resistance to this disease. Saanen, Indigenous and Crossbred goats were reared in a tick-free environment. In Year 1, eight goats of each type at eight months of age were given 5ml virulent heartwater blood of the Ball 3 stock. Temperatures and clinical sign were monitored. All eight Saanens were overcome by the disease, but only one Indigenous goat and two Crossbreds. In Year 2, Phase 1 of the experiment included six males and six females each of Indigenous and Crossbred goats at 11 months of age. Seven Crossbreds, but no Indigenous goats died. In Phase 2, nine Saanens were treated with tetracycline and compared to two untreated Saanens and nine untreated Three-quarter Saanen goats at 12 months of age. Both of the untreated and one of the treated Saanens died, and seven of the Three-quarter Saanens died. There were only small differences in temperature reactions; but Indigenous goats showed less clinical signs than other breeds. No differences of gender or year were apparent. These experiments indicated that Saanen goats show no genetic resistance, but that South African Indigenous goats appear to be genetically resistant to heartwater, and can transmit this resistance to a good proportion of Crossbred progeny.

It has been shown therefore that it is feasible to develop a dairy goat resistant to heartwater, which could contribute significantly to the reduction of human malnutrition in rural and peri-urban communities in Southern Africa.

Keywords: Milk, goats, crossbreeding, goat diseases, heartwater, complete feed

A PRAYER FOR THE MILCH GOAT PROJECT

(1989)

*O Lord,
I want this work to be
 for the sake of the little children;
Therefore please guide me on the way:
That they may have good food to eat
 and grow strong and healthy.
Thank you for these wonderful goats.
By using them well,
 and the milk that they give,
I want to show something
 of how you provide for us,
If only we will work
 and perceive what is there,
Waiting in the wealth of your creation:
That you may be glorified in our generation;
And the mouths of little children
Will give you thanks and praise.*

Amen.

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There have been many people who have helped over the years:

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INTRODUCTION

Goats have been used as a source of milk for a long time in the history of mankind:

"Look after your sheep and cattle as carefully as you can, because wealth is not permanent. Not even nations last for ever. You cut the hay and then cut the grass on the hillsides while the next crop of hay is growing. You can make clothes from the wool of your sheep and buy land with the money you get from selling some of your goats. The rest of the goats will provide milk for you and your family, and for your servant-girls as well."

Proverbs: 27: 23 to 27

[Good News Bible Translation]

The rapidly growing population of Southern Africa will result in an increasing need for high-quality protein to reduce malnutrition, especially in children. Milk production from dairy goats is one source that should be developed. There are many advantages in the use of dairy goats rather than cows for subsistence production by householders and smallholder farmers.

Problems identified in developing the use of dairy goats include their scarcity and their susceptibility to disease.

*** Scarcity**

Millions of Indigenous goats are kept by subsistence farmers in developing areas, but not usually for milk production. Crossbreeding with male dairy goats may provide an economical means for the supply of suitable animals. This research project was aimed at measuring the effects of crossbreeding on milk production. Associated aspects such as the survival of young stock are also important, and were monitored.

*** Disease**

Indigenous goats are alleged to be resistant to diseases, especially heartwater, a tick-borne disease which is a problem in many developing areas. It was necessary to establish whether this resistance was a fact, and to determine if it could be inherited by Crossbred goats.

In summary, two main hypotheses were proposed:

Crossbreeding of Saanen and Indigenous goats will:

- * be suitable for milk production;***
- * result in resistance against heartwater.***