
An evaluation of the breeding strategies used in the development of the Dorper sheep and the improved Boer goat of South Africa

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The development of the Dorper sheep and the Improved Boer Goat are undoubtedly two of the most successful long-term livestock programmes in South Africa. The Dorper is a composite mutton sheep breed developed through crossing an indigenous breed with a British mutton breed and the Improved Boer Goat was developed using a breeding strategy based largely on selection for fertility and meat production.

Both breeds were developed for low input production environments and both have subsequently been influenced by market preferences and trends as well as 'fancy points' that often have no bearing on adaptive or production traits.

Both breeds were also part of Government-assisted programmes and both benefited from the establishment of a breed society and a national recording and evaluation scheme.

This paper reviews the strategies put into place to develop the Dorper sheep and the Improved Boer Goat and discusses aspects that have been improved and could have been improved upon.

The main objective of the Dorper programme was to develop a hardy meat-producing sheep for the extensive production areas of the country. The breed was developed by crossing Dorset Horn sheep with the fat-rumped black headed Persian sheep, a local Somali sheep variety.

A major catalyst in the development of the breed was market and consumer resistance to the carcass quality of traditional fat-tailed and fat-rumped breeds, such as the Afrikaner and the Persian, that made up most of the sheep farmed in the arid to semi-arid areas of the country during the 1930s.

Introduction

The Dorper sheep

The Department of Agriculture initiated a series of trials from 1933 to 1946 at research stations and participating farms in South Africa. This was done in cooperation with farmers who had indigenous breeds to develop a composite that could produce a quality carcass in harsh conditions. This followed less controlled cross-breeding using rams from exotic breeds such as the Suffolk, Border Leicester, South down, Welsh Mountain and the Dorset Horn. The largest disadvantage of the latter initiative was the fact that, while breeding half crosses again to British mutton breeds improved carcass quality, adaptability decreased. The need to keep breeding flocks of less adapted pure British mutton breeds was also a problem.

Trials to evaluate British mutton sire lines began in earnest at this stage. After analysing the results, it was decided in 1942 to develop a composite breed using the half-cross Dorset Horn-Blackhead Persian as a basis. Of particular importance was the fact that this cross was less seasonal as far as breeding was concerned.

The Grootfontein Research Institute of the Department of Agriculture played a major role in the further development of the breed. The overriding trait in the breeding programme was adaptability. This can be described as follows:

- ability to survive unfavourable conditions;
- ability to reproduce regularly in local conditions;
- ability of lambs to grow rapidly to a marketable size.

One of the major advantages of cooperative development is that it is easier to establish a half-cross composition this way. A sufficient number of animals exist to select and breed unrelated half-cross rams.

Although numbers of the composite increased, progress was not as expected until a breed society was formed in 1950. The name DORPER was also established. The years that followed saw participation in the national mutton performance testing scheme (introduced in 1964) and the development of the all white Dorper, a cross between the Dorset horn, Persian, Dorper and the Van Rooy sheep (an Afrikaner-Rambouillet composite).

As the popularity of the Dorper increased, its distribution widened from the more traditional arid to semi-arid areas to include higher rainfall areas and semi-intensive production systems. Selection in these conditions as well as buyer preferences had an influence on breeding objectives and breed standards. Table 1 shows changes in 100 day masses of performance tested

It can be seen that the Dorper has changed. It is shorter-legged and more compact. Fat is more evenly distributed and the hair coat is short and smooth. Performance data shows that growth has also improved.

Table 1. Changes in the 100 day masses of performance tested Dorper lambs (Data from the National Sheep performance-testing scheme).

Year	100 day weight (kg) Ram Lambs	100 day weight Ewe Lambs
1964	25.40	24.20
1970	30.60	28.22
1978	30.96	28.03
1982	34.83	32.40
1989	34.80	31.50

Can the breed still use the natural resources as effectively as it did in the 1950s? Is the shorter sturdier modern Dorper still as adaptable?

- Can it still move effectively in extensive conditions?
- Does it still have the necessary adaptive traits?
- Does it still graze effectively or has it become a destructive grazer?

Is the modern Dorper still as adaptable as it was 50 years ago?

Lochner (1996) claimed that breeding objectives had moved from a hardy extensive type to a type more suited to temperate climates and Nel (1980) was of the opinion that selection for size and discrimination against certain fat deposits could possibly influence the breeds' adaptive traits. Van Niekerk (1999) referred to changes as a result of breeding objectives that could influence sexual maturity and fertility and Campbell, (1998) advised breeders to pay attention to economically important traits of mutton sheep and to resist the temptation to intensively select for "fancy points". Olivier (1999) advised that there should be a balance between marketability and the genetic improvement of the breed. Over emphasis in either direction could do long-term damage to the whole breed.

The Breed Society is located in Middelburg in the Cape Province, about ten kilometres from Grootfontein Agricultural Development Institute. Close ties are maintained with key researchers and the Government still contributes a third to the running costs of the National performance-testing scheme that includes the small stock testing schemes. Grootfontein has also recently developed a new recording and evaluation system under the guidance of Dr Buks Olivier. The updated goal of the breed reflects these links.

It is, however, important to constantly monitor breed progress with the most suitable aids available.

Improve the efficiency of production of a marketable product. Meat and Skin

Performance testing should be used sensibly to facilitate a balance between reproduction and growth. The new small-stock recording and improvement scheme that has been developed at Grootfontein is capable of meeting all these needs.

It is encouraging to note that Grootfontein, the Institute that has contributed the most to the development of the breed, continues to do so, using a healthy balance between modern technology and phenotypic observation. This Institute would make an ideal small stock centre for Africa and has all the necessary facilities to render advisory and support services to all farmers and farm systems.

Participation in the new scheme has increased rapidly over the last few months owing to breeders and breed societies that had become disillusioned with performance testing. This is most encouraging and shows the Society's commitment towards on-going evaluation and improvement.

Modern breed evaluation techniques will now enable those involved to predict trends as far as the major traits were concerned. With this information, it will be possible to avoid a skewed approach to production traits where adaptability might be compromised by such directions

The improved Boer goat

The improved Boer Goat had its origins in the Eastern Cape Province where farmers began keeping lop-eared goats obtained from Hottentot and Bantu owners. During the early stages, the goats were multi-coloured and were used in the thornveld areas to utilise and control bush.

Although unsubstantiated, there are indications of early Eastern/Indian and European introductions. While these may have had an influence on some animals, the overall breeding objectives did not take these into consideration.

In the late 1920s and early 1930s a few breeders focussed breeding objectives on improved conformation for meat production, quality meat and the ability to browse. Colour selection followed and the typical white goat with a red head began to establish itself as the only meat goat in Africa. The late Theunis Jordaan, a farmer from near Somerset West in the Eastern Cape Province, played a major role in this selection and development programme by concentrating on heavier short-haired goats with light red heads.

A Boer Goat Breeders' Association was formed on 4 July 1959. The aims of this society were to:

- further improve the Boer Goat as a Breed in South Africa;
- appoint an administrative staff;

- implement an annual short course on Boer Goats and to train judges and inspectors;
- compile and distribute an information brochure and to organize demonstrations to disseminate information regarding the breed;
- establish an inspection service to class and inspect flocks;
- introduce a more efficient grading system for Boer Goat meat;
- stage sales and inspect all animals offered at sales under the auspices of the association.

Government support included trials in the late 1960s on grazing and browsing patterns and its impact on the improvement of grass coverage. This was followed by research into the productivity of the breed. This information was made available in the form of departmental publications and through the popular agriculture media. Other Government assistance included technical advice and the establishment of herds at Dohne Research Station in the Eastern Cape and at Grootfontein in the Northern Cape. Additional institutional support came from the South African StudBook who provided certification services as the only registering authority in the country. Active membership of the South African Stud Book has, however, fluctuated over the years, particularly amongst breeders who saw no need for recording and identification. Currently, there are 12 breeders with a total of 3 866 animals registered with the South African Stud Book. Another eight breeders are currently being registered.

The lack of recording in some herds recently led to problems where embryos with no pedigree or performance information were exported to Canada. Prospective importers have been advised that only breed society endorsed genetic material can be guaranteed.

In 1964 when the mutton sheep performance testing scheme started Boer goat breeders joined the scheme. In 1970 a National Goat Performance testing scheme was started under the mutton scheme. This scheme provided a framework to record and evaluate the performance of goats through the following phases:

- Phase A: Records details of the dam, fertility, milk production and the growth rate of the kid/kids from birth to weaning;
- Phase B: Records the post weaning growth rate of the kid;
- Phase C: Records and determines the efficiency of feed conversion and the growth rate of male kids;
- Phase D: Measures the post weaning growth rate of male kids in standard conditions at a central ram-testing centre;
- Phase E : Determines the qualitative and quantitative carcass components of the progeny of a specific sire.

**First phase of
the
development
of the breed**

Second phase of the development of the breed

The number of participants has fluctuated over the years. In 1975 there were eight breeders with 500 ewes in the scheme and at present, there are 12 breeders.

Table 2 gives details of the mean adjusted 100 day mass (kg) of performance tested Boer Goat kids from 1970 to 1998.

Table 2. Mean adjusted 100 day mass (kg) of performance tested boer goats from 1970 to 1998 (Data from the National performance testing scheme).

Year	Ram (kg)	Ewes (kg)
1970	24.0	21.9
1975	23.6	21.7
1979	36.5	29.2
1982	32.3	27.8
1986	26.9	23.4
1988	25.3	22.3

Although selection has been largely concentrated on the ability to produce a saleable carcass off the savanna bushveld, there has been a tendency amongst some breeders to select for 'fancy points', some of which may be negatively correlated with more important adaptive traits. Campbell (1990) who has played a key advisory role in the development of the breed for many years warned breeders not to pay too much attention to traits of little to no economic importance when selecting breeding stock.

The breed was developed in the Eastern Cape where tick borne diseases were not a problem. Consequently, the Improved Boer goat has a low level of resistance to heartwater (*Cowdria*) compared to unimproved goats in areas where heartwater is endemic.

Management practices and selection policies in some herds have also seen a loss of maternal behaviour where ewes do not bond effectively with their kids.

These issues show that there is no universal breed. The Improved Boer goat was developed with focussed breeding objectives to fit into a specific environment. The development was very successful and the animals produce more meat per unit area than any other goat breed in a similar environment. The breed is also being used very successfully in semi-intensive smallholder systems in many countries. Environmental factors are of less importance where farmers can afford to make the necessary management adjustments. It should, however, always be remembered

that small stock are often of critical importance as the only sustainable form of animal production in arid to semi-arid areas. As such, adaptability and the ability to produce a useable/saleable product are the key overriding considerations.

Future breeding plans must therefore always take aspects such as adaptability and production environment factors into consideration. Breed information should include production environment information to enable prospective breeders to make an informed choice.

The strategies followed and experience gained during the development of the Dorper and the Improved Boer goat will be useful when formulating guidelines for livestock breeding strategies for low input environments. In addition, modern animal recording and evaluation technology should be adapted for use with specific programmes. This will enable planners and farmers to ensure that objectives remain focussed.

The role of the Government and supportive institutions should also be taken into consideration, particularly when it comes to identification, recording, evaluation of production traits and processing of performance data

In developing guidelines, the following should be taken into consideration:

- What are the objectives of the programme? Meat, milk, fibre, a combination?
- What can the production environment support?
- What genetic material is available and what is the potential of this material?
- What shortcomings are there in the general phenotype and genotype?
- Can the available resource be used to produce?
- What breeds can be used to develop a composite that will meet the needs of the basic objective?
- Will the development require institutional support? If so, in what form? and what is available?
- What identification, recording and evaluation system will ensure that the primary objective remains focussed?

Taking the Dorper as an example, modern breeding, recording and evaluation technology can assist in ensuring that the initial objective, the development of an adapted meat-producing sheep will remain focussed. Evaluations would be able to predict trends that could be rectified earlier than present. Throughout this process, the following should always be kept in mind:

Discussion.
Using the
experience to
develop
guidelines

Breeding goals should always be defined in simple but explicit economic and biological terms. These include: more emphasis on reproduction rates, reducing the number of traits selected for by excluding those of doubtful economic importance and maintaining effective herd/flock sizes and composition (Hofmeyr, 1978).

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