



Cross-breeding for better beef

Commercial cattlemen must optimise a number of economically important traits, while simultaneously reducing production costs, to remain competitive.

Traits such as fertility, growth and maternal ability all influence productivity and profitability of a beef enterprise, making technologies and systems that reduce costs and enhance productivity, essential. One of the oldest and most fundamental approaches is cross-breeding. It can increase production in two ways:

- By combining the desirable characteristics of two or more breeds it will achieve a higher overall performance level in desired traits in cross-bred animals.
- Cross-breeding increases productivity by increasing performance in particular traits due to heterosis or hybrid vigour. Increased productivity results from hybrid vigour exhibited by the cross-bred calf and the cross-bred cow.

HETEROSIS

Heterosis is the phenomenon where a cross-bred individual

has increased performance for certain traits over and above the average performance of its pure-bred parents. Heterosis is the difference in performance of the cross-bred animals compared to the average performance of the pure-bred animals involved.

WHY CROSS-BREED?

- Traits with low heritability that cannot be rapidly improved by selection can be considerably improved by cross-breeding. One example is fertility, the most important factor in beef production.
- Increased production in especially the following traits can be obtained:
 - with the correct breeds, the weaning weight of cross-bred calves is approximately 16% above the average of the parent breeds;
 - depending on the breed combination and environment, the growth rate of the

cross-bred animal is 5% to 25% faster;

- cross-bred animals utilise feed more efficiently;
- the calf mortality of a European breed in heartwater areas can be reduced by crossing with a Zebu breed.
- To improve specific shortcomings in a herd within one generation by using a bull from another breed that excels in those characteristics.

‘CROSS-BREEDING CAN INCREASE PRODUCTION.’

- To introduce changes in a breeding herd to meet new requirements. For example, breeding for the production of steers to be marketed from the veld at three years can be rapidly changed for the necessary characteristics for weaner production.

HOW CAN YOU ENSURE SUCCESS?

Use good bulls and cows. Good calves

ABOVE FROM LEFT TO RIGHT:

The Simmentaler/Bonsmara F1 cross is a fine example of how cross-breeding can combine desirable traits for better performance levels.

cannot be bred from inferior parents by cross-breeding.

The breeds used in a cross-breeding system must complement each other's shortcomings to produce a better combination of characteristics. The cross-bred progeny must also be well adapted to the environment.

The cross-breds must get sufficient feed to express their higher potential.

The success of any cross-breeding programme depends on the quality of the parent breeds. Buy sires based on their estimated breeding values (EBVs) and structural soundness.

WHICH BREDS TO CROSS?

Environmental factors such as climate, nutritional level, the standard of management and the production system determine the requirements with which the cross-breds must comply.

A cattleman can find a combination best suited to the environment and production system.

The greater the genetic difference between two breeds, the greater the effect of hybrid vigour. An important reason why the Simmentaler is increasingly used for cross-breeding is that genetically the breed differs widely from traditional breeds or breed combinations.

In the extensive grazing regions of Southern Africa, the best results with cross-breeding are obtained when a European (*Bos taurus*) breed is crossed with a Zebu (*Bos indicus*) breed or the Bonsmara (*Bos taurus africanus*). In most cross-breeding cases, a dual purpose breed – Simmentaler is by far the best known – gives the best results due to its higher milk production and excellent growth rate.

CROSS-BREEDING SYSTEMS

Hybrid vigour is not heritable. To maintain it, cross-breeding must be planned correctly. These are two long-term cross-breeding systems: 1. 'Criss-cross' cross-breeding with two breeds, eg Bonsmara and Simmentaler. Divide the herd into two breeding herds for the two breeds of bulls. The daughters of the Bonsmara bulls are served by Simmentaler bulls and vice versa.

If the type and performance of the original herd indicate that bulls from only one of the two breeds will supplement its shortcomings, use only one breed for the first crossing.

The first cross (F1) heifers are then mated to bulls of the other breed. Consequently, two breeding herds will result, the first with Simmentaler bulls and the second with Bonsmara bulls. The 'criss-crossing' may be continued for an indefinite period. 2. Where three breeding herds can be accommodated, a three-breed rotation cross-breeding system can be applied in the same way as the two-breed rotation or 'criss-crossing'.

A three-breed rotation retains more hybrid vigour than a two-breed rotation. In a three-breed rotation system, the best results are obtained by combining a Zebu-type, a dual purpose breed and a British beef breed.

CROSS-BREEDING SIMMENTALERS

Despite the wide genetic difference between the Simmentaler and the most popular breeds in Southern Africa, it has characteristics that rectify defects in British beef breeds and in Zebu breeds:

- **High milk production.** In Europe, Simmentalers have been tested for milk production for more than 95 years, and every cow is milked.
- **Excellent growth rate.** According to official SA performance test results, the Simmentaler surpasses



ABOVE: Simmentaler/Brahman F1 crosses. Maintenance of hybrid vigour can be achieved by criss-cross mating between two breeds.

BELOW: The Simmentaler is increasingly used for cross-breeding because it differs widely from traditional breeds in its genetic make-up. PHOTOS COURTESY OF THE SIMMENTALER SOCIETY



all other breeds that have been tested on a reasonably large scale.

- **Good muscling.** It is visually perceptible.

- **High fertility.** International studies and research results at Mara (South Africa) and Omatjenne (Namibia) confirm this.

- **Little excess fat.** The breed has been selected for little fat and there is an increased consumer demand for less fatty meat.

- **Good adaptability in a hot environment.** This has been proved at Mara and Omatjenne.

- **Genetic diversity.** Since dual purpose Simmentaler represents a different cattle classification group to all other beef breeds, its great diversity will result in maximum heterosis when crossed with local Zebu/Sanga breeds or types.

- **Pure-bred.** The Simmentaler has a

record of 105 years of pure breeding. From day one the breed society has only registered animals meeting the strict requirements of technical advisors who inspect every animal before registration.

- **Availability.** The Simmentaler has more performance tested bulls in Southern Africa than the second, third and fourth British/Continental beef breeds combined.

- **Performance.** Simmentaler ranks number one among all popular breeds in fertility, weaning weight, yearling weight and feedlot gain. An important advantage for cross-breeding is maternal heterosis, resulting in increased performance of progeny from the Sim-cross-bred cow.

- The producer must be alert for possible changes in the herd's nutritional programme.

- The same basic breeding principles apply to the selection of breeding animals as in a pure-bred programme. In both, genetically superior breeding stock will yield progeny with above-average performance.

- Select the best animals available for cross-breeding.

- Using cattle of the same genetic merit in a pure-bred programme, cross-breeding will increase overall production by approximately the amount of heterosis present for the relevant production traits.

- Combining complementarity between breeds crossed and the added impact of heterosis makes cross-breeding very feasible in commercial production systems.

A planned cross-breeding system can increase the total weight of calf produced per cow in the breeding herd.

- *Contact the Simmentaler and Simbra Cattle Breeders' Society of Southern Africa on 051 446 0580 or email info@simmentaler.org.*

PRACTICAL CROSS-BREEDING

- Cross-breeding provides the commercial producer the opportunity to increase the total production of beef per cow in the herd.

- It is not a substitute for good management, nor a cure-all for unproductive cattle.