Cattle have a dual role: efficient grass conversion and land improvement

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Introduction

The current goal of cattlemen and academics focuses on maximum production per animal. This results in the practice of selective grazing together with extraneous inputs (i.e. feed; antibiotics; chemicals) and the breeding of "productive" (high requirement) genotypes. This is neither ecologically nor economically sustainable.

Paradigm Shift Required

All involved in cattle production need to change their goal from "maximum production per animal" to "maximum sustainable production per hectare". The management and breeding practices will be very different for the two goals.

Missing Keys

- Stocking rate is the most important determinant of profit per unit of land.
- A combination of high stocking rate and high fertility result in maximum profit per unit of land.
- Growth should be considered in relative and not absolute terms. The individual that grows fastest relative to size (regardless of size) is the most efficient grass / feed convertor. The problem with larger frame individuals is that, although they need to grow in proportion to size, they cannot eat in proportion to size. Smaller frame individuals have a larger relative intake making them more efficient.
- There is a mutually beneficial relationship between cattle and grass IF certain management and breeding principles are implemented. Grass productivity and grass harvest efficiency are dramatically improved under a grazing regime of time-controlled non-selective grazing and high animal impact.
- Everything in cattle breeding and management revolves around body condition. Breeding and management decisions influence, and are influenced by, body condition.
- Fat meat contains much more energy per kilogram than lean meat. Therefore, lean individuals will have larger absolute gain. This is currently misinterpreted to mean that the larger and leaner animals are better feed convertors. In reality the opposite is true. The individual that is heaviest or grows faster relative to its mature size (fatter; fuller package) is the most efficient.
- Contrary to conventional belief, fertility is highly heritable. The main determinants of fertility are hormonal balance and body condition. Body condition is influenced by inheritance (inherent body condition) and nutrition. Both hormonal balance and inherent body condition are highly heritable making fertility highly heritable. The challenge is using genetically discerning selection criteria.
- Inbreeding (half-brother to half-sister) of naturally selected individuals is desirable (concentration of desirable genes). Inbreeding of conventionally selected individuals is undesirable (concentration of undesirable genes).

- Overgrazing is not the result of too many animals, but rather the time in and out of an area.

Grazing Management

The most appropriate form of grazing is: The most animals possible in the smallest area possible doing the severest grazing possible together with the most soil surface disturbance possible followed by an APPROPRIATE recovery period (grass recovery; animal nutrition). This requires animals to be managed at very high stock density (UHDG).

The easiest and most cost effective way to implement Ultra High Density Grazing (UHDG) is via the use of electric fencing – strip grazing with a cross wire that is moved several times per day.

There is no doubt about the fact that non-selective grazing will impact negatively on body condition and individual animal performance. This is particularly true for conventionally bred cattle that are selected for absolute growth. The following practices need to be implemented in order to mitigate a drop in body condition:

- The use of genotypes with high inherent body condition. These would be the so-called "unimproved" breeds that have developed under a regime of natural selection.
- Appropriate grazing management:
  *Frequent moves to fresh grazing – several moves per day. This allows a larger daily intake.
  *Shorter recovery period in fast growth environments (higher rainfall tropics and sub-tropics) where grasses lose nutritive value quickly. This is particularly relevant during calving and breeding. Grazing still needs to be non-selective. Areas that are intensively "overgrazed" in one season need a longer recovery period the following season. This can be incorporated into the dry season reserve necessary for seasonal rainfall areas.
  *Preferential grazing ahead of the main herd for high requirement animals such as pregnant yearling heifers.
- Calve, breed and wean during the period of highest nutrition. This may require weaning early (four months) in order to allow cows to calve in optimum body condition.
- Effective rumen supplementation (protein; urea, etc.) allowing rumen microbes to break down fiber resulting in an increase in grass intake.
- In cases where the genotype used has poor inherent body condition production feeding (above maintenance) will be economically feasible due to the fact that stocking rate will be increased multiple times allowing a high return on investment (land and cattle).

Selection

Selection must be based on a foundation of inherent body condition (high relative intake) and hormonal balance (testosterone in males and estrogen in females). It must be understood that a high relative intake and early sexual maturity are both positively related to a smaller frame. Therefore, selection for absolute growth and size will negatively affect fertility.

Thy traits required for veld productivity are:

- Inherent Body Condition:
  *Smaller frame size

*Climatic adaptation
*Disease and Parasite resistance
*Individual Appetite

- Hormonal Balance
- Optimum Milk
- High Meat: Bone Ratio (high dressing percentage)
- Easy-Care attributes:
  *Calving ease
  *Mothering ability
  *Temperament

Selection Criteria

Current selection criteria being used are largely inappropriate and not genetically discerning with the emphasis on man deciding what is desirable or undesirable. The result is discord between animals and their environment. The only way harmony can be achieved is by allowing Nature (environment) to decide the best genotype.

The following selection criteria will ensure a sound foundation as well as high practical fertility (inherent body condition plus hormonal balance):

- 2 + 3 Cows.
- Cows calving at two years of age and reconceiving for their second calf at three must be the nucleus from which bulls are selected
- Bull Yearling Maturity
- Yearling kg / Hip height
- Package fullness
- Yearling bull breeding ability determined by multi-siring.

Accelerate natural selection by closing the herd and inseminating as many cows as possible with the most fertile bull/s and replacing such bull/s with the younger generation.

Composite Breeding

Environments differ so much that a conventional breed may not fulfill all requirements in terms of adaptation and production. In such cases the best option would be to breed a composite composed of several (two to four) breeds. The following procedures, in increasing order of importance, must be followed:

- Choose the appropriate breeds
- Choose the appropriate individuals within each breed
- Select appropriately
- Close the herd and breed half-brother to half-sister

Summary

In order for cattlemen to achieve “maximum economically and ecologically sustainable profit per unit of land” they will need to mimic Nature in terms of breeding (accelerate natural selection) and management (enhance natural processes).