

DISCUSSION OF COW EFFICIENCY MEASURES

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Cows consume up to 94% of the total nutrients in a cow-calf pair, which requires that every cow must produce regularly. This article looks at the criteria reproduction index, calving tempo breeding value and cow efficiency index as important tools in increasing cow productivity.

Efficient cows play a major role in any beef production system, since the cow consumes approximately 94% of the total digestible nutrients of the cow-calf pair, up to weaning age of the calf. Even if the total digestible nutrients consumed is calculated until marketing age of the calf (after feedlotting), the cow still consumes 74% of the total nutrients. Furthermore 70% of the energy required by the cow herd can be attributed to cow maintenance, with only 30% available for cow reproduction and production. It is therefore clear that no cow can be allowed to be only a passenger – every cow needs to produce.

The following objectives can be regarded as important in respect of cow efficiency:

- Age at first calving
- Number of calves a cow produces
- Intercalving period (days between successive calvings)
- Weaning weight of a cow's calf in comparison to her own maintenance weight (weight 0.75) – cow efficiency

These objectives are based purely on biological or economic efficiency grounds, and not whether they are difficult or easy to measure or changed genetically.

What is important, is the criteria or means through which these objectives can be achieved. The ARC has developed three such criteria. They are summarized in Table 1.

Table 1

| Objective / Goal | Criteria |
|---|--|
| Age at first calving Number of calves Intercalving period Cow efficiency | Reproduction index Calving tempo breeding value Cow efficiency index |

REPRODUCTION INDEXES

The Reproduction Index (RI) evaluates the overall reproduction performance of a cow, taking into account age at first calving (AFC) and average intercalving period (ICP). Days since last calving are, for technical reasons, not taken into account. Using the RI, one can directly compare cows with different AFC and ICPs. Please note that the RI's standard of comparison is the average reproduction performance of all cows (irrespective of breed) participating in the National Beef Cattle Improvement Scheme. Currently the national standard used is 1 004 days for age at first calving and 435 days for intercalving period.

In Table 2 the Reproduction Indexes of four cows with different calving patterns are compared. Please note that cows 1, 2 and 3 all had their first calves at different ages (39, 40 and 27 months) and their intercalving periods differ. However, at 99 months of age (8 years and 3 months) they all had 5 calves and therefore they have the same Reproduction Index at this point.

TABLE 2 : Reproduction Indexes of cows with different calving patterns

| Cow 1 | | Cow 2 | | Cow 3 | | Cow 4 | |
|-----------------------------|-----|-----------------------------|-----|-----------------------------|-----|-----------------------------|-----|
| Age at calving (year:month) | RI | Age at calving (year:month) | RI | Age at calving (year:month) | RI | Age at calving (year:month) | RI |
| 3:3 | 3:3 | 3:4 | 3:3 | 2:3 | 3:3 | 3:3 | 3:3 |
| 4:3 | 4:3 | 4:8 | 4:3 | 3:3 | 4:3 | 4:3 | 4:3 |
| 6:3 | 6:3 | 6:2 | 6:3 | 5:3 | 6:3 | 5:3 | 6:3 |
| 7:3 | 7:3 | 7:5 | 7:3 | 6:3 | 7:3 | 6:3 | 7:3 |
| 8:3 | 8:3 | 8:3 | 8:3 | 8:3 | 8:3 | 7:3 | 8:3 |

CALVING TEMPO BREEDING VALUE

Bulls' daughters are classified as follows:

- 0: Culled before calving
(not retained in national herd)
- 1: Calved once before the age of 6 years
- 2: Two calves before the age of 6 years
- 3: Three calves before the age of 6 years
- 4: Four calves before the age of 6 years

These classification measurements of a bull's daughters are used to calculate breeding values for the bull. The breeding value is an indication of fertility as well as the retention of female progeny. In order for a bull to receive a high breeding value for calving tempo, his daughters must calve regularly up to 6 years of age. Bulls with low breeding values do not necessarily have fewer daughters, but they may have poor retention in the herd.

This breeding value reflects the number of calves that a 100 of a specific bull's daughters will give above or below the average of the Nguni stud bulls in the breed.

The measurements of all related animals are taken into account through the registration system. The information available for the total breed, and not only the herds that participate in performance recording, are thus used to estimate this breeding value. An accuracy figure is published along with the calving tempo breeding value. Currently this breeding value is only available for males in the breed.

The Calving Tempo Breeding Value for the top 5% bulls in the breed is 23, whereas that of the bottom 5% is -4. A hundred daughters of the top 5% bulls will thus produce 27 more calves than the bottom 5% up to six years of age.

COW EFFICIENCY INDEXES

The Cow Efficiency Indexes (CEI) evaluates the weaning weight (adjusted for age to 205 days) of a cow's calf in comparison to her own metabolic or maintenance weight (weight 0,75). Cow weight at calving is the preferred weight used for this purpose. If cow weight at calving was not recorded, cow weight at weaning is used instead. A cow of 500 kg weaning a calf of 250 will be more efficient than a cow of 600kg weaning a calf of the same weight. The standard of comparison of the CEI is the average cow efficiency of the particular group of cows and calves.

An investigation conducted in 1994 on the change in cow weight between birth of the calf and weaning of the calf, indicated that in a specific Nguni herd some of the cows lost as much as 98 kg and others gained up to 66 kg. In a Bonsmara herd some of the cows lost as much as 85 kg, whereas others gained up to 117 kg. The average difference between cow weight at birth and cow weight at weaning of the Nguni and Bonsmara herds were -21 kg and + 20 kg respectively.

This clearly demonstrates why both cows and calves should be weighed at least at weaning, if cow efficiency is important for the Nguni breed.