BREEDING AND GENETICS IN BEEF CATTLE FARMING

By

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"Buying a bull is a genetic decision and not a financial one." (Gerhard van Zyl. LBW)

Why this emphasis on genetics? Let us assume one put a new bull for two years in a row with 30 cows. After two years one should have 30 heifers plus the initial cows. The genetics of the heifers hail 50% from the bull and 50% from the cows. A cheap, inferior bull would have put you back genetically, but a "expensive" superior bull would have put you in a win-win situation.

What would such a genetic decision entail?

The Covid-19 pandemic forced the world to trust science. Science in this context refers inter alia to the identifying of the virus and its variants, the proper treatment thereof, and the development of vaccines. Furthermore, data technology assisted in crunching big data in a meaningful manner. The latter included the development of certain probabilities and accuracies (in percentages) of the various outcomes.

Animal breeding, especially beef cattle, is at a similar crossroad. Do one trust only visual judgement of animals and/or do one make use of genetic breeding values. The latter is also derived from big data (BLUP) and the interpretation thereof.

Our breeding policy at Econotech Simmentaler is based on the intensive use of genetic breeding values PLUS an annual functional/visual examination of new entrants to our seedstock.

Economic selection indexes give one the sum total of the Rand value which each genetic breeding value (EPD, estimated progeny difference) contribute to the specific objective of such an index. The economic selection indexes for the Simmentaler have been upgraded lately using the latest information and methodology. The Simmentaler Breeders Index (SBI) give one the Rand value of the underlying breeding attributes to profit for a stud farmer (seedstock producer) and the Simmentaler Profit Index (SPI) provide the value to cross breeding by commercial cattle farmers. The two indexes, SBI and SPI, for our herd are both in the top 5% of the SA 2019 crop.

Our main objective of our breeding policy at Econotech Simmentaler is, therefore, to increase the SBI and SPI of our herd year by year.

One could increase your herd's SBI by increasing all the relevant breeding values or to concentrate on specific values which are important for your operation. We farm in a harsh and uncompromising climate, which made fertility of utmost importance. The following simple calculation showed to us the value of fertility.

Assume one has the choice between two different types of heifers, namely an A-heifer which is an early starter (1st calf at 24 months) against a B-heifer – a late starter (1st calf at 36 months). Over a productive life of 8 years the A-heifer would produce 7 calves, whereas the B-heifer would produce 6 calves. One, therefore, obtain an increase of the number of calves of 17% by opting for A-heifers instead of the B-heifers.

With our objective to have the heifers to calf at 24 months, we used to follow the general guideline of putting only those heifers to a bull which have reached 65% of the mass of mature cows. However, our everchanging climate played havoc to this rule. An American, Burke Teichert, suggested another route – let nature (bull) do your culling. All the empty heifers would then be culled at our annual pregnancy examination. Furthermore, again on Burke's advice, we assist the 1st calvers and all the other cows to wean their calves at five months (and not the usual seven months

of age). Thus, we provide to the 1st calvers (especially) and other cows a longer period to regain their condition for the next calving season. Furthermore, we aim at a below average "milk" breeding attribute (in fact, this measures the growth of a cow's heifers at 200 days). This assists a cow to conserve her energy for obtaining condition for her next calf.

Eventually, we achieved on Doornbult-Boven in the Karoo an average 1st calving at 24 months of age of heifers (SA breed average is 31 months). The herd's average ICP (inter calving period) reached also a commendable 376 days (SA breed average is 440 days). The relevant breeding value for the main fertility indicator, Days to Calving (DC), for our herd amounts to -2.3 (this value is in the top 10 % of the SA 2019 crop).

The genetics behind our breeding policy became clearer when Michael Bradfield from Breedplan directed me to an Australian study in this regard. The background to that study was the dilemma of Australian farmers who tried to increase feed efficiency in beef cattle by selecting for a lower mature cow weight (MCW). Those farmers experienced cows with less weight and body condition and eventually lower fertility. Hip height is, however, negatively correlated to body condition. The outcome of their research was that one should concentrate on hip height instead of MCW to achieve animals adapted to their climate. They should also concentrate on an increase in condition as measured by the breeding values of eye muscle area (EMA), rib and rump fat, and intramuscular fat (IMF).

The research of the Australians was an eye opener and helped us to apply the following dictum to our own operation: "*That what you know, you will see*."

We are now able to formulate our breeding policy in a more concise manner: "*Breed animals with lower body weight plus body condition in order to thrive in our severe climate*."

In practice this translates in animals with lower hip height and body mass, but most importantly with positive body condition counts as measured by EMA, Rib and Rump Fat, and IMF.

Our climate dictates, therefore, that the "*genetic decision"* for selecting a bull should entails the following:

Stick to the economic index of SBI (or SPI if you do cross breeding) – the higher the better, BUT select also for the following:

- High fertility as measured by a negative Days to Calving (DC) and high scrotal size (SS) (positive correlated with early heifer puberty)
- Positive condition values
- Lower hip height (the associated breeding value is, unfortunately, not yet available) and thus animals with lower body weight
- Below average milk EBV's as a cow needs to conserve condition for getting pregnant with her next calve
- High calving ease (for extensive management); and
- Growth breeding values (in our seedstock operation growth is not neglected. On average our estimated 200 days mass of a calve as % of its dam's mass resulted in 50%+.)

Enjoy the journey!

Note: Michael Bradfield directed me to another leading scientist in animal breeding, Prof Bob Weaber of Kansas State University. In the attached graph I try to apply his criteria to our herd. IT WORKS.

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