Scientific selection: a boost for the bottom line

Breeding beef cattle for greater efficiency and sustained profit is both a science and an art, says Arlington farmer **Llewellyn Angus**. The award-winning farmer spoke to **Chris Nel**.

Systematically selecting and matching bulls and females for breeding, based on scientific principles and incorporating performance recording, will improve the bottom line of any herd.

So says Llewellyn Angus, a leading Simmentaler and Simbra stud breeder and natural scientist from Arlington in the Free State. Last year, Llewellyn won the Agricultural Research Council's National Beef Cattle Improvement Herd of the Year award, the

'FERTILITY IS THE MOST ECONOMICALLY IMPORTANT TRAIT'

latest in a long list of accolades. His late father, Willie, started farming on the farm Whispering Willows in the late 1940s, and established the Wisp-Will Simmentaler stud in 1966. Llewellyn joined him in 1980, and he in turn has been joined by his son, Gareth.

The operation comprises five farms covering 3 200ha, two beef cattle studs, a commercial beef herd, Merino sheep, game farming and a lodge run by Llewellyn's wife, Elzette.

Over the years, crops have been replaced with perennial pasture, and the Anguses have managed the veld wisely, ensuring that it remains a major grazing resource.

AIMING FOR PROFIT

Long-term sustainable profit should be every farmer's main goal, stresses Llewellyn, and a beef cattle breeder is no different.

"A breeder usually knows what he wants or has to improve in his herd, whether more milk, heavier weaners or easier calving. So prioritise the goals, but bear in mind that fertility is the most economically important trait. Correct selection and matching bulls with females, using EBVs [estimated breeding values] along with visual appraisal for structural correctness, will ensure this goal."

The farmer should also be able to meet the animals' nutritional requirements all year round, he adds. "Good livestock farming starts with good veld and pasture."

HERITABILITY AND EBVs

The heritability of a growth trait is between 30% and 40%, Llewellyn explains. "This means that 30% to 40% of the influence on an animal's growth is due to its genetic make-up. The balance is due to environmental factors."

An EBV for yearling weight, based on an animal's own performance, is shown in the following formula:

EBV = (the weight of the individual) – (the average weight of all animals in the group) x heritability.

"When looking at an animal, 70% of what you see is due to the environmental influence and only 30% to its genetic composition," Llewellyn explains. "In technical terms, the phenotype is the sum of the animal's genotype and its total environment. An EBV is a numerical value that predicts the genetic value of that specific trait. The animal's own performance, pedigree and progeny performance, as well as the correlations between traits, are all used to calculate that EBV. As more information becomes available, the accuracy of the EBV increases."

1: Llewellyn Angus (right) and son Gareth of Wisp-Will Simmentalers and Simbras.

2: Correct selection, matching bulls with females, and using EBVs along with visual appraisal for structural correctness, will ensure high fertility levels.

3: The Wisp-Will herds' calving ease EBVs are consistently above, and their birthweight EBV consistently below, the breed average, the result of directed selection for smaller calves over many years.

4: Merinos help diversify the enterprise and promote optimal veld and pasture utilisation.

FAST FACTS

- **Llewellyn Angus stresses that high fertility is the most important trait, and constantly aims to attain this by using EBVs to select and match bulls and females optimally.**
- **An accuracy of 60% for traits in younger animals, such as for 200-day weight, is a useful selection tool.**
- **Selecting the correct bulls will move the cow herd in the desired direction in one generation.**

Llewellyn recommends that the breeder consider any EBV in light of its accuracy. "An accuracy of 60% for traits in younger animals, such as for 200-day weight, is already a useful selection tool. Bulls sold on a sale are usually between two and three years old; their EBV accuracy should be about 60% if the breeder carried out thorough performance testing. Once genomic EBVs [GEBVs] become available, the accuracy will increase at an increasingly younger age."

THE BULL'S IMPORTANCE

Llewellyn adds that the poorest progeny sired by the new bull will be better than the poorest of the old herd, while the best of the new animals will be better than the best animals in the old herd. "So in these calculations, we always work on averages."

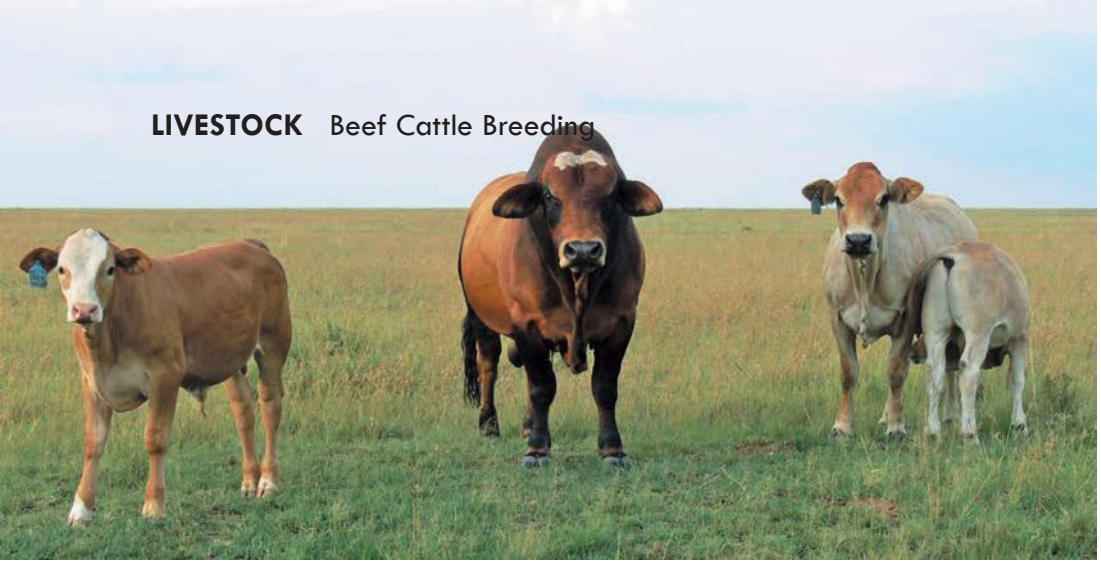
The genetic contribution of the last three bulls used for three consecutive seasons in a cow herd of, for example 40 animals, totals 87,5%.

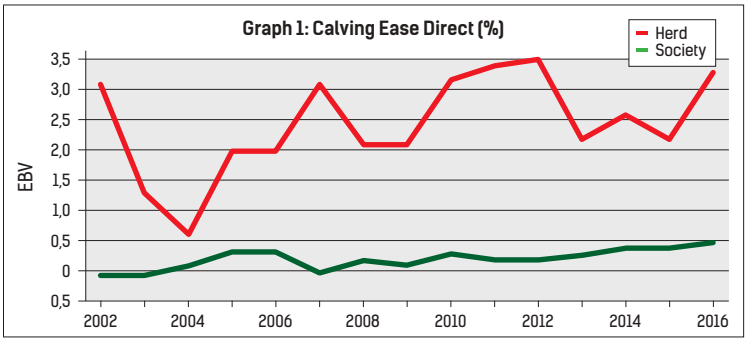
1

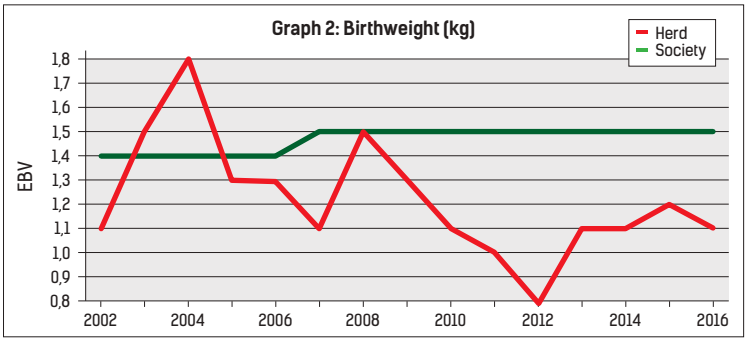
2

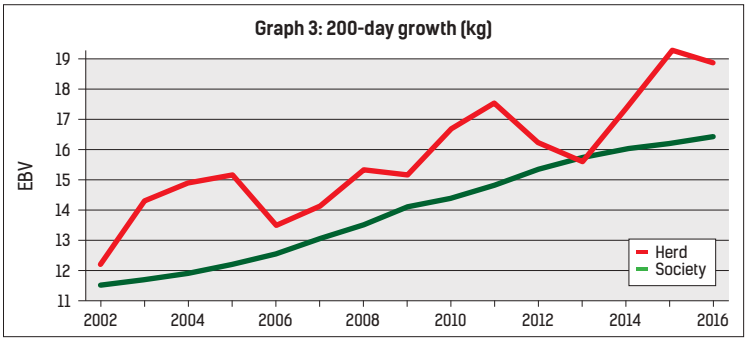
3

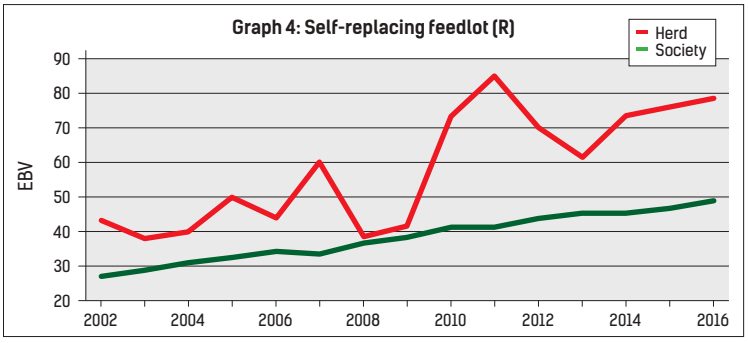
4











ABOVE:
The self-replacing feedlot (SFR) index applies to commercial farmers in particular. With high weightings for fertility, calving ease, 400-day weight, and carcass yield, it is a valuable tool for replacing heifers with own-bred weaners and sending bull calves to a feedlot.

"The latest bull you used contributed 50% towards the genetic composition of the third-generation calf crop, the previous bull 25%, and the first bull 12,5%. Adding up the three gives 87,5%.

"This means that selecting the correct bulls will move the cow herd in the desired direction in one generation; after three generations, the calves will be what you selected for. If you use the wrong bull or bulls, such as those that caught your eye but had average or poor growth EBVs, your herd will have low growth.

"The old saying, 'a good bull is half your herd, but a poor bull your whole herd', holds as true as ever," he stresses.

GENETIC TRENDS

The Wisp-Will Simmentaler herd's genetic trend for Calving Ease Direct (*see Graph 1*) shows that its calving ease EBV is consistently better than the breed average. Similarly, the birthweight EBV (*see Graph 2*) is consistently below the breed average.

This is ideal, and is the result of directed selection in the desired direction (smaller calves) over many years.

In the 200-day growth weight EBV (*see Graph 3*), there is again

Points to consider when selecting a bull

- Breed cattle that are the most profitable for you and for your buyers.
- Consider all breeding values in conjunction with their respective accuracies.
- Commercial breeders should buy only performance-tested registered bulls with, if possible, high EBV accuracies.
- Have a well-defined breeding goal, but don't try to select for too many traits at once.
- Keep it simple.
- Fertility is always the number one trait.
- When buying a bull, first look at the selection indices, if available, for ranking purposes. Otherwise base your selection on EBVs only, then physically look at only the bulls on your short list.
- The calving season should coincide with optimal veld and pasture condition: the best quality and sufficient quantity.

a pattern of values consistently above the breed average.

The 2013 growth dropped to the breed average due to using a bull with an average 200-day EBV, but an excellent visual score.

"We learnt to first make sure the figures are what are needed before inspecting the bull. Fortunately, we could rectify it quickly," says Lewellyn.

THE SFR INDEX

Economic selection indices are overall economic values for specific purposes.

The self-replacing feedlot index (SFRI) (*see Graph 4*) is for replacing heifers with own-bred weaners, and sending the bull calves to a feedlot for fattening and slaughter at about one year of age.

The weightings for fertility, calving ease, 400-day weight and carcass yield are high.

Most commercial cattle breeders fit into this category.

The Wisp-Will stud places a high value on this index when selecting bulls for breeding, as a stud breeder must breed animals that will enable the buyers, mostly commercial producers, to make more money.

"Commercial cattlemen buy 90% of our bulls. They're our bread and butter," he says.

BULL SELECTION

Identifying a herd's shortcomings is essential.

"It may be a low 200-day weight," says Llewellyn. "If you sell your bull calves and keep the heifers, rank the sale bulls on the SRFI. Place cut-off points on specific EBVs, such as for birthweight and calving ease, but ensure that the 200-day EBV is well above breed average.

"Some breeds don't yet have economic indices. So place cut-off points on certain EBVs and mark the bulls that have 'passed' on paper. Then visually appraise the bulls you've marked, ending up with a final few bulls. Never buy the most eye-appealing bull if he's not on this list."

Llewellyn stopped participating in shows in 2000. The selection criteria for show animals did not include breeding values, hampering the accuracy of the herds' breeding values. Today, they try to include all their cattle in one large management group.

"It's impossible to judge an animal's genetic make-up by its appearance. Use all available EBV data based on genetic value only, then inspect the animal for externally visible attributes."

He adds that profit is based on combining performance figures [genotype] with external appearance [phenotype].

• *Phone Llewellyn Angus on 082 805 5101. Visit wisp-will.co.za.* ■ FW

RIGHT: Wessel Motaung (left) and Lefu Radebe represent their families as legal owners of portions 3 and 4 of the farm Tweepoort 198, totalling 172ha, in the Senekal district, Free State. Note their high-quality Simmentaler and Simbra cattle in the background.

Tweepoort, a model cattle farm on a smaller scale

The 172ha Tweepoort farm can be described as a small model cattle farm, an independent running concern operating as a trust. On 25 April 2007, the Tweepoort Trust took ownership of portions 3 and 4 of the farm Tweepoort 198, totalling 172ha, in the Senekal district in the Free State. The trustees are three members of the Motaung and Radebe families respectively.

William Angus (Pty) Ltd, with Llewellyn Angus as a director, sold the land to the Department of Land Affairs and Rural Development. Assisted by Llewellyn, the Motaung and Radebe families then applied for ownership of the land.

Land use on Tweepoort 3 and 4 is limited to cattle farming. Each of the two farms has a 50ha block on which the company established perennial Smuts finger grass pasture. The Ackerman Foundation donated R125 000 to establish the pasture, repair the fencing and buy 10 heifers for each of the two new farms in 2007. The Motaung and Radebe families currently live in their original houses on William Angus land and are still in the full-time employ of the farming company.

Both families also run their own cattle on Tweepoort Trust land, bringing the total to 50 cows, with a few bulls and calves. Six head of cattle belonging to William Angus also run on the land, 'paying' the mentors for the time and labour their families spend on their own trust farm as part of their everyday farm work.

The mentors also make grazing land available for a month or two each year, with Tweepoort Trust paying rent for this period. "This prevents overstocking," says Llewellyn.

The veterinary, mating and other relevant programmes are fully integrated with those of William Angus. Tweepoort Trust carries its own lick and veterinary costs, as well as the cost of maintaining and repairing its water infrastructure and fencing.

Llewellyn and his son, Gareth, regularly inspect the farms, with the permission of the two families. They serve as mentors, advising on rotational grazing and making selected registered bulls available to the trust to improve its herd.