

## Using Science in the selection of Beef Cattle

L J Angus (Wisp-Will Herd) – Winner of the ARC National Beef Cattle Improvement Herd of the Year 2017



### What is the goal?

The main goal of every enterprise is to make a long-term sustainable profit. So too with breeding beef cattle. Breeders usually know what they need to improve in their herds e.g. they need more milk or heavier weaners or easier calving. Make sure you prioritize your goals but always remember that fertility is the most important trait. Correct selection is the way to achieve these goals. Using science, in this case EBV's (estimated breeding values) in conjunction with visual appraisal and structural correctness would be the answer. One assumes that animals's feed requirements are met throughout the year.

### Heritability and EBV's

The heritability of growth traits are around 30 to 40%. This means that 30 to 40% of differences in an animal's growth is due to their genetic make-up and 60% to 70% due to environmental influences. An EBV for yearling weight based on an animal's own performance would be:  $EBV = (\text{weight of individual} - \text{weight of group}) \times \text{heritability}$ .

E.g.  $EBV = (380 \text{ kg} - 350 \text{ kg}) \times 0.4 \text{ (40\%)}$

$= 30 \times 0.4 = +12 \text{ kg (based only on own performance)}$

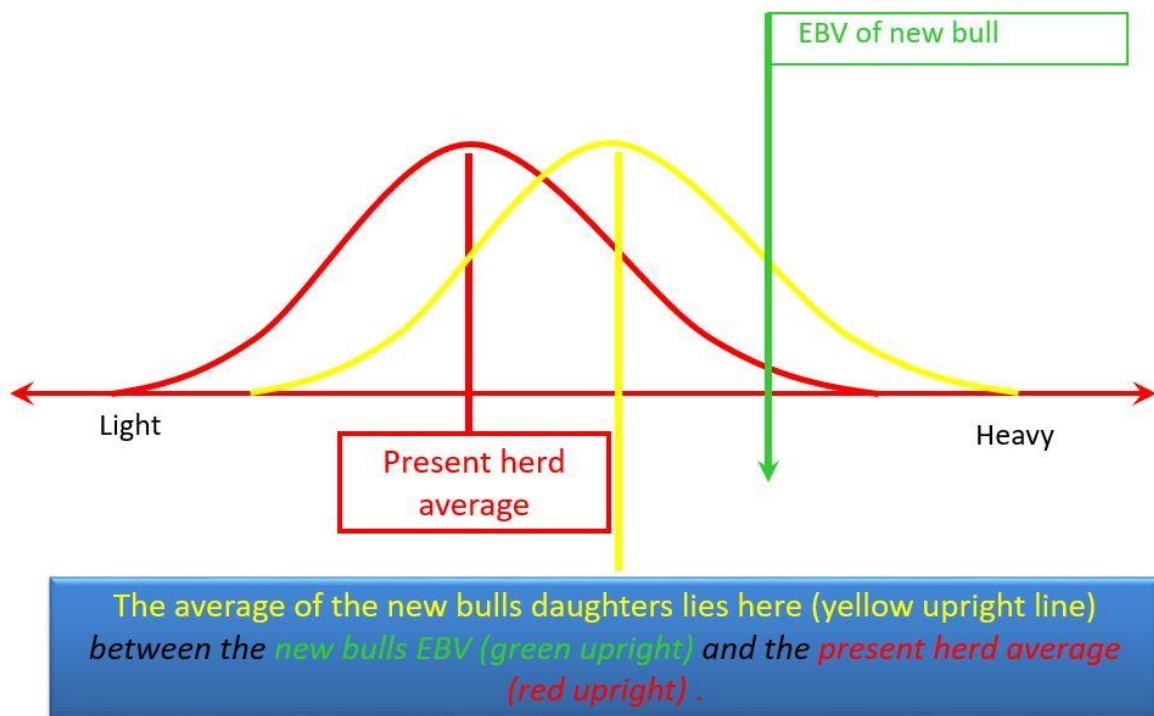
### Selection on EBV's

Remember that when one looks at an animal, 70% of what you see is environment influenced and only 30% is genetics. Phenotype = genotype + environment. Remember

that EBV's are the prediction of the genetic value an animal has for certain traits. The animal's own performance, pedigree and progeny performance are all used. Also correlations between traits. As more information comes in the accuracy increases.

Always look at EBV's in conjunction with their accuracy. A 60% accuracy for traits of younger animals e.g. for 200 day weight is already a useful tool to use for selection. Bulls sold on sales are usually 2 to 3 years old with accuracies round 60% if the breeder is doing thorough performance testing. Once GEBV's (genomic EBV's) become available the accuracies will also increase at younger ages.

**By using SELECTED bulls with good EBVs you improve your cow herd like this .....**



From looking at this diagram it is obvious that the new yellow herd average (let's say for 400 day growth) has shifted upwards and the poorest animals of the new bull will be better than the old herd's poorest animals. Alternatively, the new best animals will be better than the old herd's best animals. We are always working on averages.

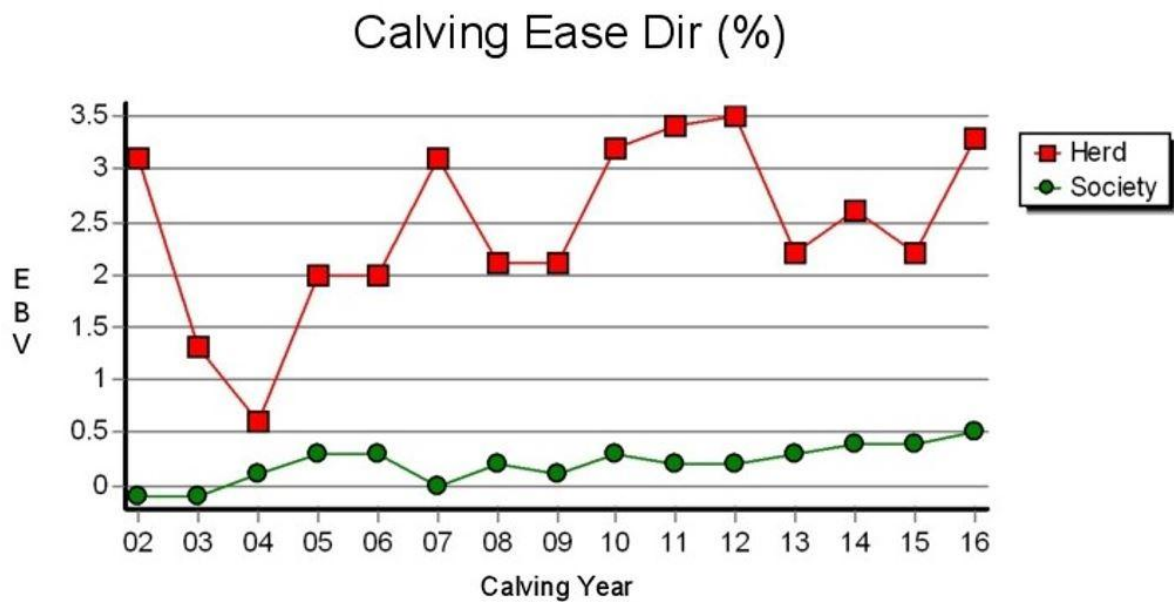
### **The bull's importance**

The genetic contribution of the last 3 bulls towards a cow herd, of let's say 40 animals, is vast and amounts to 87.5%. The latest bull you are using has a 50% contribution towards his calves, the previous bull's contribution is 25% and the first bull you used has a 12.5%

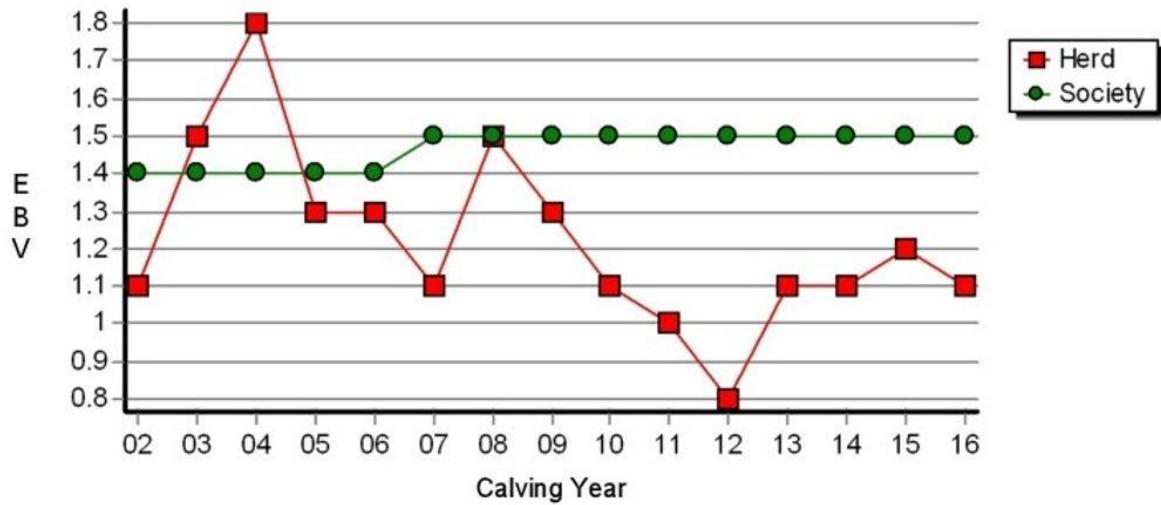
contribution totalling 87.5%. This means that selecting the “right bulls for your herd” will move your cowherd in the desired direction in one generation and, after 3 generations, your younger animals will be what you selected for. If you used the wrong bull or bulls e.g. the ones that caught your eye but with average or poor growth EBV’s your herd will effectively have low growth.

The old saying “a good bull is half your herd and a poor bull your whole herd” still holds true.

### Wisp-Will genetic trends

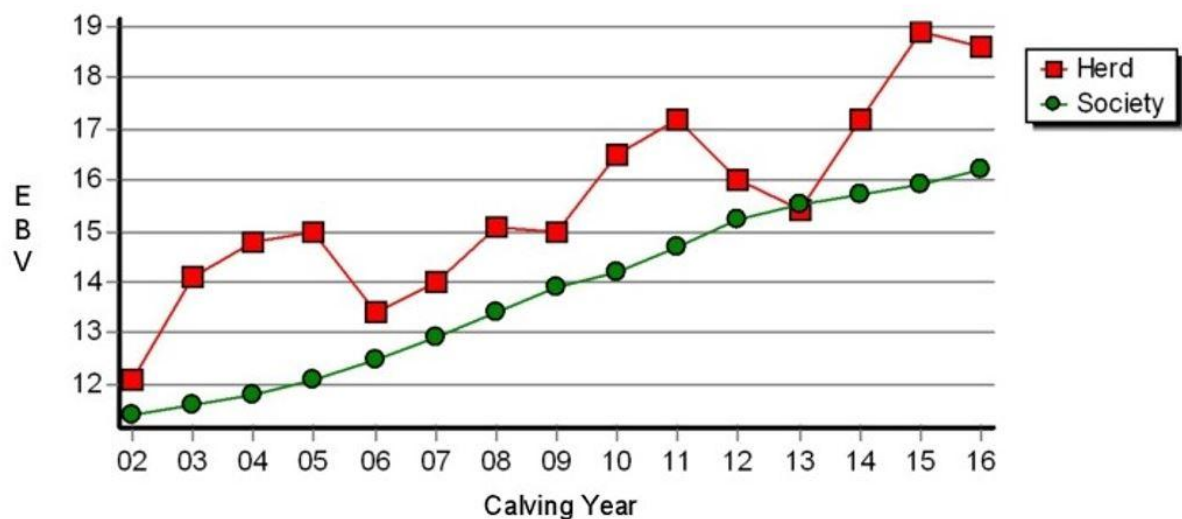


## Birth Weight (kg)



When one looks at the Wisp-Will herd's genetic trends for calving ease direct we see the calving ease EBV consistently above or better than the breed average. So too is the birth weight EBV consistently below the breed average. This is ideal and stems from selection in the right direction over many years.

## 200 Day Growth (kg)

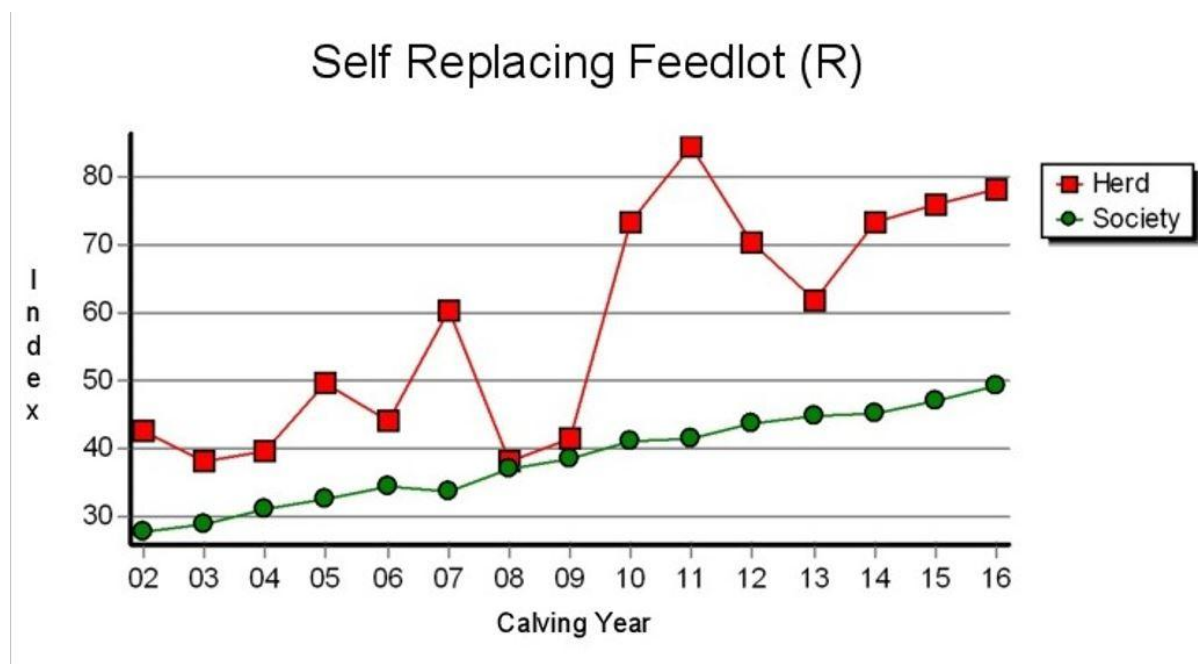


Looking at the 200 day or weaning EBV we again see a pattern consistently above the breed average. The 2013 growth dropped to breed average due to the heavy use of a bull that had

an average 200 day EBV but an excellent visual score. Once again the lesson was learnt to first make sure the figures are what is needed before looking at the bull. Luckily this was rectified quickly.

### Economic selection indexes

These are overall economic values for specific purposes. The self-replacing feedlot index is for the replacing of heifers with own-bred weaners and selling off the bulls to a feedlot for fattening and slaughter just before or around one year of age. The weightings for fertility are high as is calving ease, 400 day weight and carcass yield. Most commercial breeders would fit into this category. The Wisp-Will stud places a high value on this index when selecting bulls for breeding. Why? **You as a stud breeder must breed the cattle that will result in your buyer, who is mostly the commercial man, making more money.** The commercial man buys 9 out of 10 of our bulls and is our “bread and butter”.



Other indexes would be the grass-fed index, the terminal sire index where all progeny are old and the Namibian grass-fed index where oxen are sold at 2 to 3 years of age off the veld. Here 600 day weight and mature weight plays a big role. In other words “horses for courses”.

## How to select a bull for your herd

First decide what your herd's shortcoming is. It may be low 200 day weight. If you as commercial breeder sell your bull calves and keep the heifers you would rank the sale bulls on the self replacing feedlot index. You then put cut-offs on specific EBV's like birth weight and calving ease and make sure the 200 day EBV is well above breed average. Some breeds do not have economic indexes yet. Here you would simply place cut-offs on certain EBV's and mark the bulls that have "passed" on paper. Only then do you do **visual appraisal of only the bulls you marked**. You will then end up with a final few bulls. Do not buy the most eye appealing bull if he is not on your list!

## Summary

- Breed cattle that are the most profitable for you and your buyers.
- Consider breeding values in conjunction with the respective accuracies.
- Always buy registered bulls and if possible, with high EBV accuracies.
- Have a well-defined breeding goal but don't try to breed for too many traits at once.
- Rather keep it simple.
- Remember fertility is always the number one trait.
- When buying bulls look at the selection indexes first, if available, for rankings. Otherwise base your selection on EBV's only.
- Then physically only look at your shortlisted bulls.
- Your calving season must coincide with the best quality and enough quantity pasture.

Remember that you can never see an animal's genetic make-up by only looking at the animal visually. Use the EBV data that is available as it is based on an animal's genetic value only. You will also visually inspect the animal for structural correctness and other attributes.

It is always about making a profit and a combination of figures and looks.



Simbra heifers from the Wisp-Will herd



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