



Practicalities of selection for fertility

LJ Angus (Pr.Sci.Nat.)

Also with thanks to
Dr Michael Bradfield
BREEDPLAN SA



Fertility: What is my Goal? \$\$\$

- To make more money from the same operation size through increased fertility. Vertical.
- How do I achieve my fertility goals?
Management and Feeding and Genetic Selection
- Make sure you prioritize your fertility goals
- Firstly minimum thresholds for management and feeding (pasture management) before genetic selection for fertility can take place.

PRINCIPLES OF PASTURE MANAGEMENT AND LIVESTOCK FARMING.

1. Remember fertility: the % of calves/lambs weaned is always the no. 1 profit criteria (x4). Also per unit area or kg/ha. Then only comes weaning weight, carcass traits, slaughter % etc.
2. To be a good livestock farmer you must firstly be a good pasture farmer. The “feed factory” should be functioning correctly. This implies adhering to certain basic principles.
3. Fodder flow must be sufficient throughout the year. Animals must always have enough feed at their disposal to be fully fed within a short period.
4. When animals are in production with calves or lambs (working the hardest) the best or better quality feed should be available.

PRINCIPLES OF PASTURE MANAGEMENT AND LIVESTOCK FARMING.

5. This implies strict breeding seasons. Breeding seasons allows one to put pressure on fertility by selecting the animals that are in high production in the spring. Breeding seasons also simplifies management.
6. Natural veld must be fully rested at least one growing season every 3 years. This applies irrespective of your grazing system. When only cattle are being farmed one can fully rest half your camps every second growing season.
7. Grazing of veld or pasture is always better than feeding. If one has to feed, feed where the dung and urine can fertilize a pasture and regularly move the feed to avoid excessive trampling. The same applies when putting out lick.
8. Your pasture/livestock system must be long term ecologically and also economically sustainable. Therefore there must be a 5 and 10 year plan. You must measure.

Pasture Management Wisp-Will

- Changed from a CSG to a NSG system 20 years ago.
- 3 groups of camps. One group always rests a whole growing season.
- Carrying capacity increased by 25%.
- Specie composition improved (>Themeda's)
- Buffer advantage in severe drought
- Common factor in ANY system? Full growing season rest

Whole growth season
rested pasture

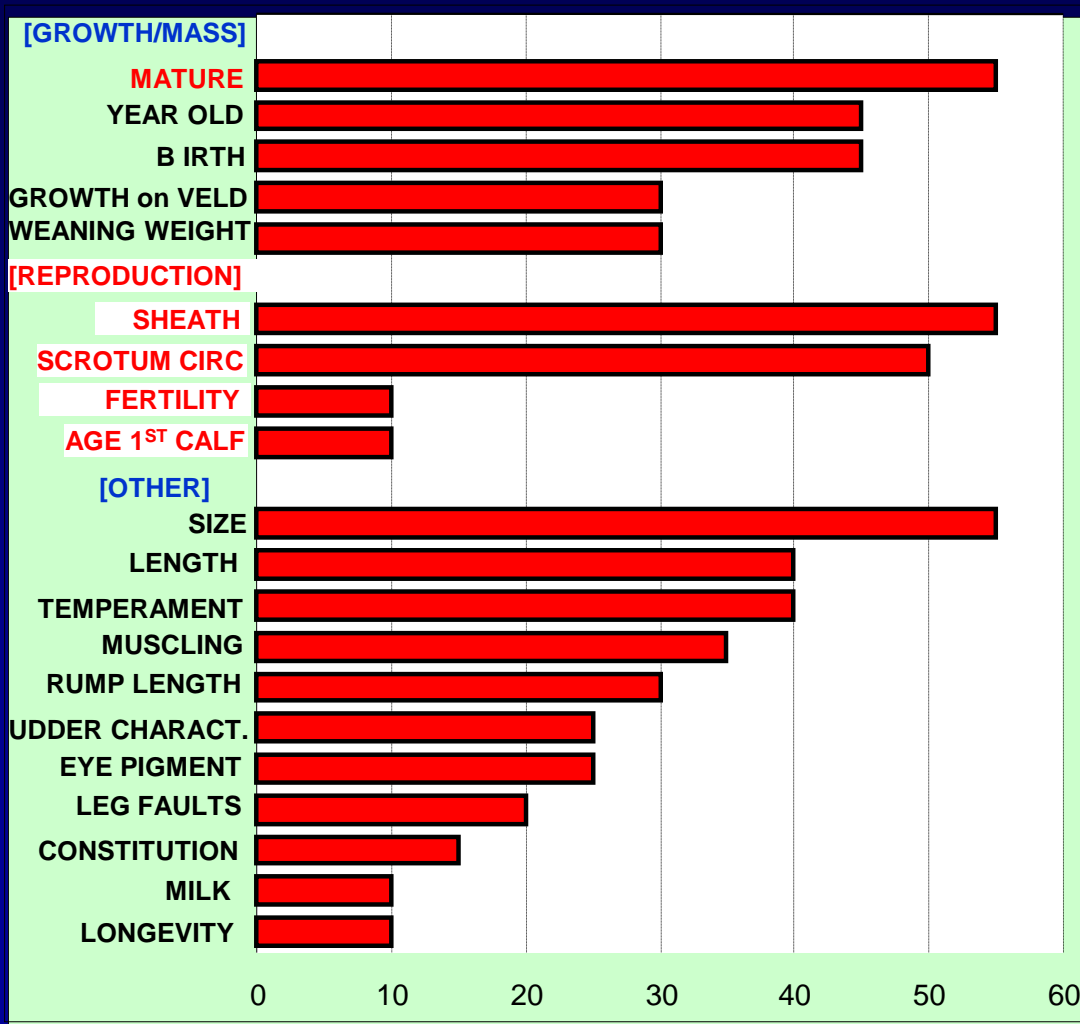


Heritability

- The genetic proportion of a trait that is passed onto the offspring
- The more heritable a trait the greater the genetic improvement
- Heritability for fertility is only 10%. **LOW**
- **Repeatability is HIGH**: great example is Merino sheep in SA

The heritability* plays an important role in **SELECTION**

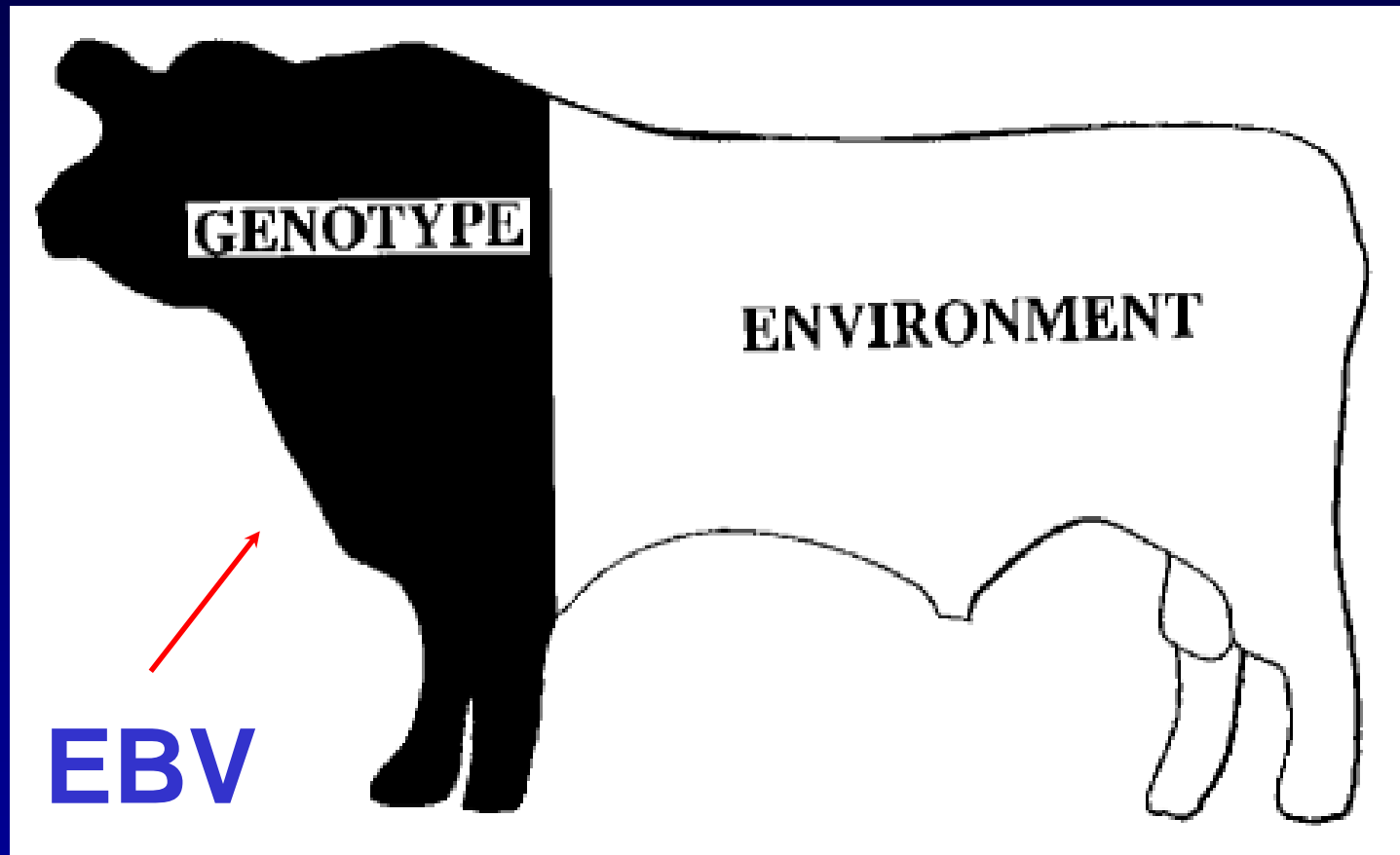
- it indicates which % of a trait is transferred to the progeny.



* a trait which is 40% heritable, means that 40% of the differences between animals is due to genetics and 60% to differences in management and environment

The lower (shorter red bar) the slower the progress for which you are **selecting +** conversely.

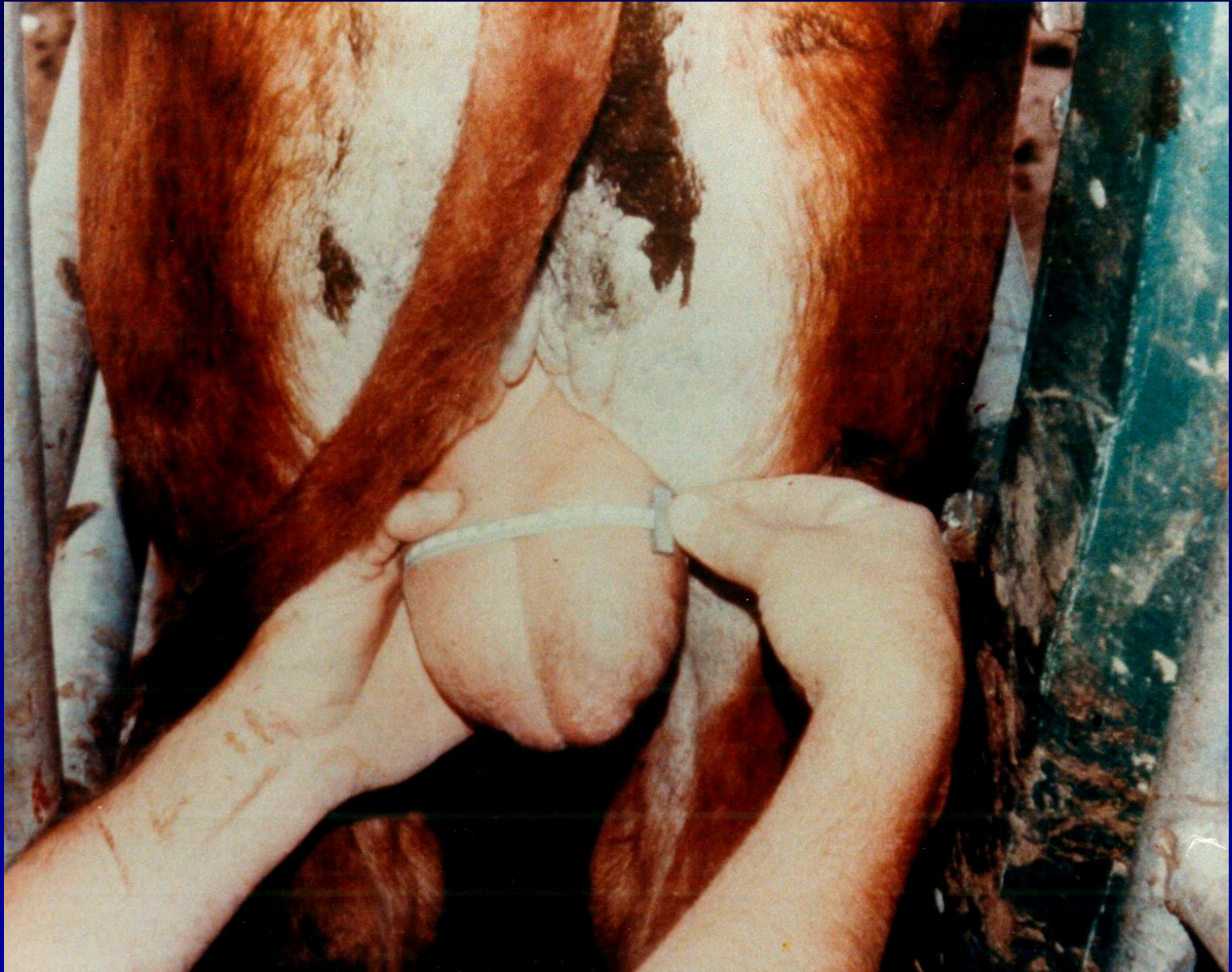
$$P=G+E$$



EBV?

- EBV = (weight of individual – average weight of group) x heritability eg. 400 days
 - = (380 – 350) x 0.4
 - = 30 x 0.4
 - = + 12 kg based on own performance.
- **An EBV is the prediction of the genetic value of a trait eg. 400 day weight as above.**
- The animal's own performance, pedigree and progeny and correlations are used.
- It is ALWAYS shown with a % accuracy.
- GEBV'S are on the way/marker genes/BGP project.

Measuring scrotal circumference



MATURE MASS: How big must a cow be?



The cow that

- calves annually and
- weans above 40% even upto
- 50% of her own mass

➤ That's the cow that's the right size for her area.



current vs future herd

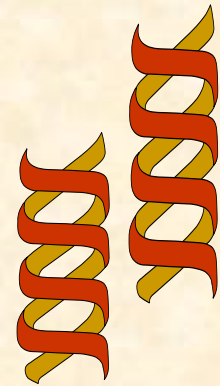
Current herd

- nutrition & management that affect the animals in the herd now!
(can't change their genetics already set)



Future herd

- genetic make-up of the future herd
- traits influenced by genes
- change through breeding/selection



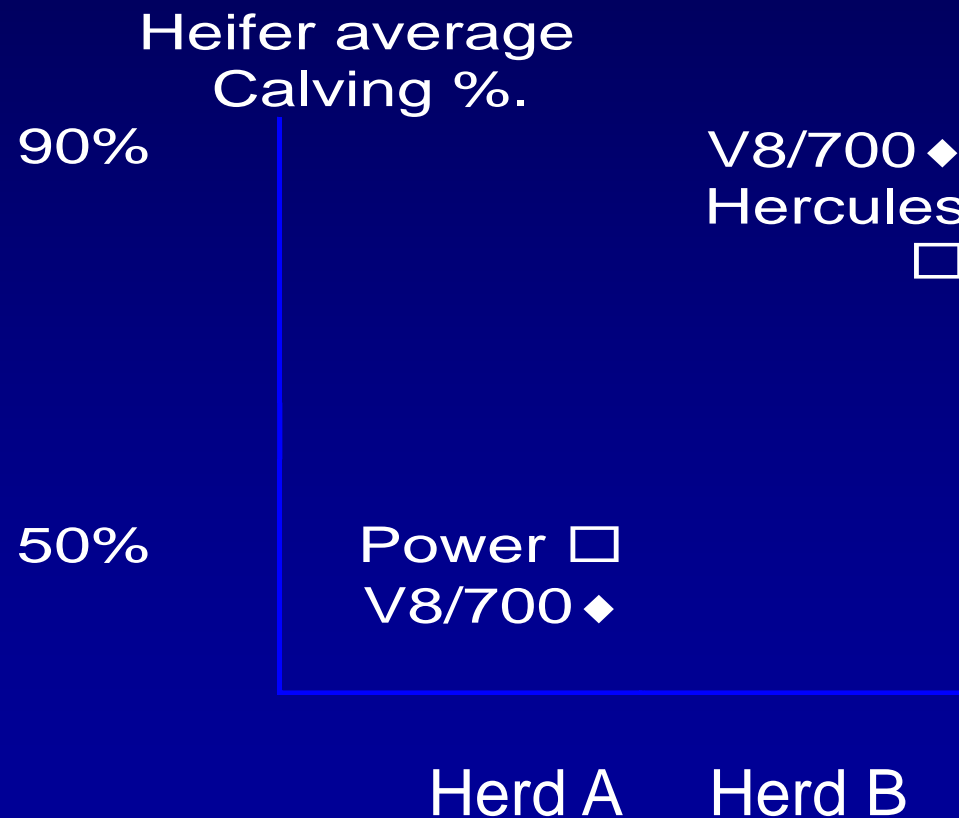
**FERTILITY: Why Days to
calving and not ICP or age at
first calf?**

Can you really compare the ICP of cows in these two environments?

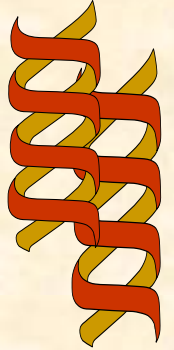


Move to a genetic measure that is
directly comparable across
environments

BREEDPLAN USES REFERENCE BULLS TO COMPARE ANIMALS ACROSS HERDS FOR FERTILITY



Improving **FUTURE** herd fertility



➤ breeding a genetically fertile herd

- need measures of traits under genetic control
- use measures to estimate breeding value (EBV)

- Days to calving

- Scrotal Size



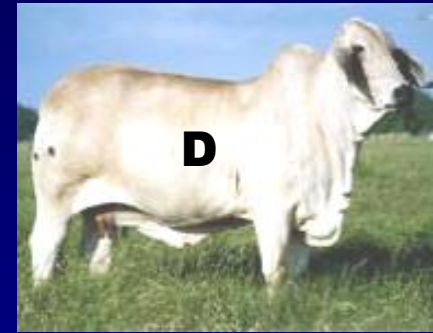
Important genetic relationship

- Cull empties not very effective

- low heritability (....failures not genetic)
- few genes in a herd from a single cow

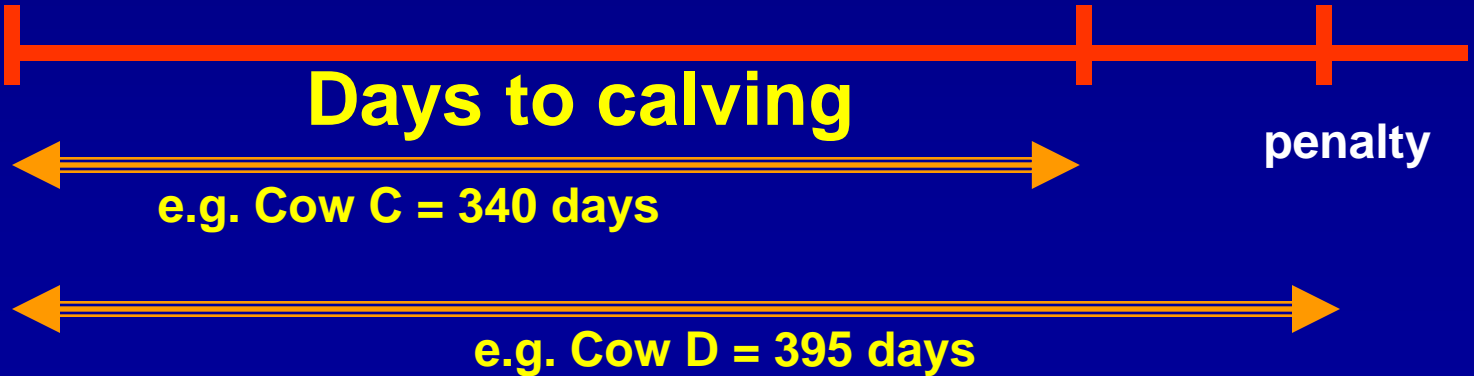
➤ pump better genes in .. rather culling cows out

Recording days to Calving



**BULL in
date**

Date of birth Non-calve



Advantages of days to Calving

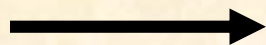
- ✓ Records stage of cycle (short breeding season)
- ✓ Identifies cows that have short gestation length
- ✓ Identifies cows that have ability to produce a calf every year (despite the environment)
- ✓ Identifies the non calvers
- ✓ Identifies the bulls that carry the genes that produces fertile daughters

Days to calving EBV

A



EBV = **-20** days



daughters
managed
the same



BULL A
daughters
calve **15** days
earlier than

B



EBV = **+10** days



BULL B
daughters

Earlier and extra (2/3 calf/DC day) per year

Possible lifetime (50 daughters x 6 yrs)

10%

45 more calves

The importance of the bull.
Genetic contribution of the last 3
bulls towards the cow herd.

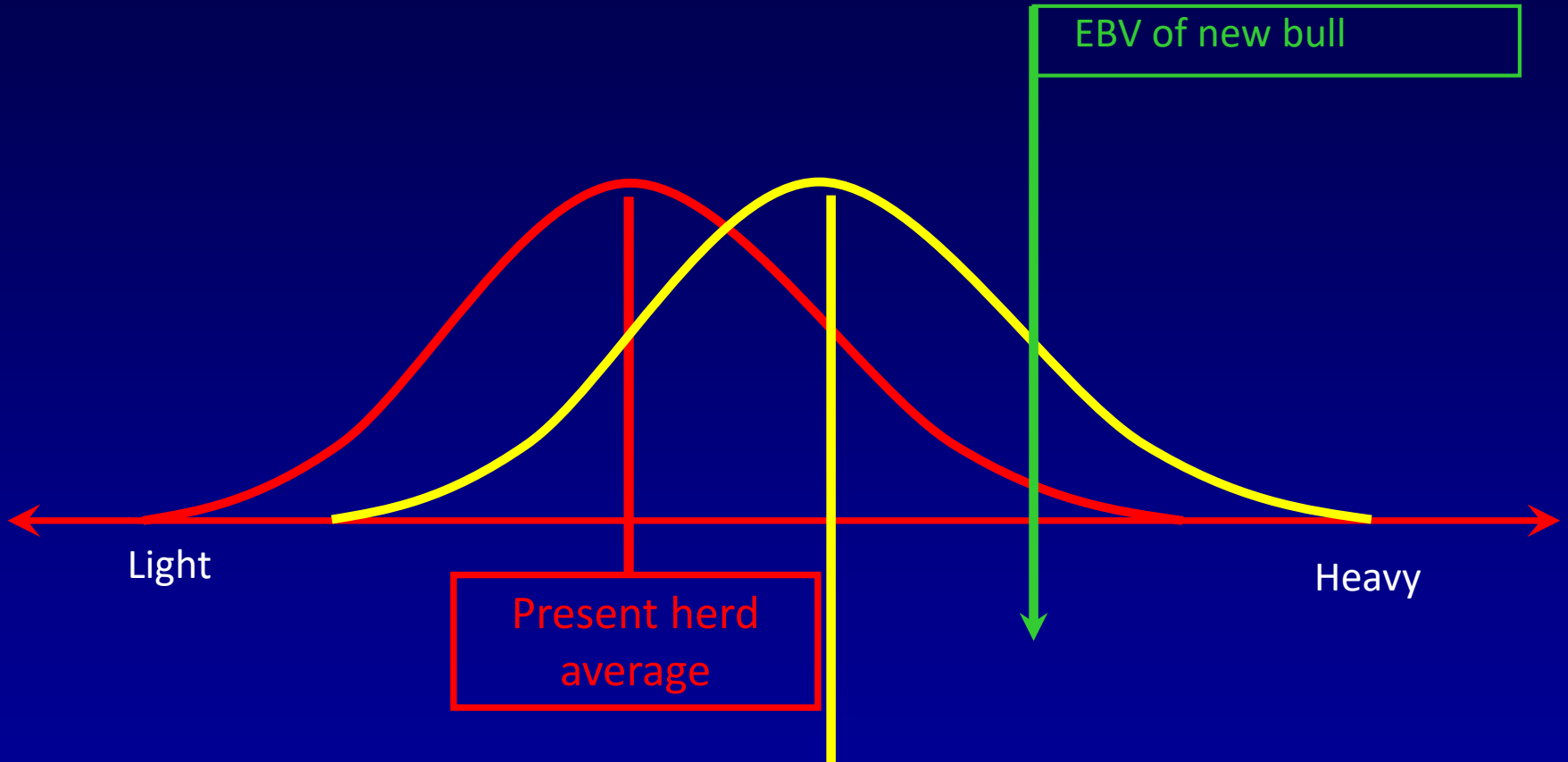


Last bull
Last 3 bulls

50%
33%
17%

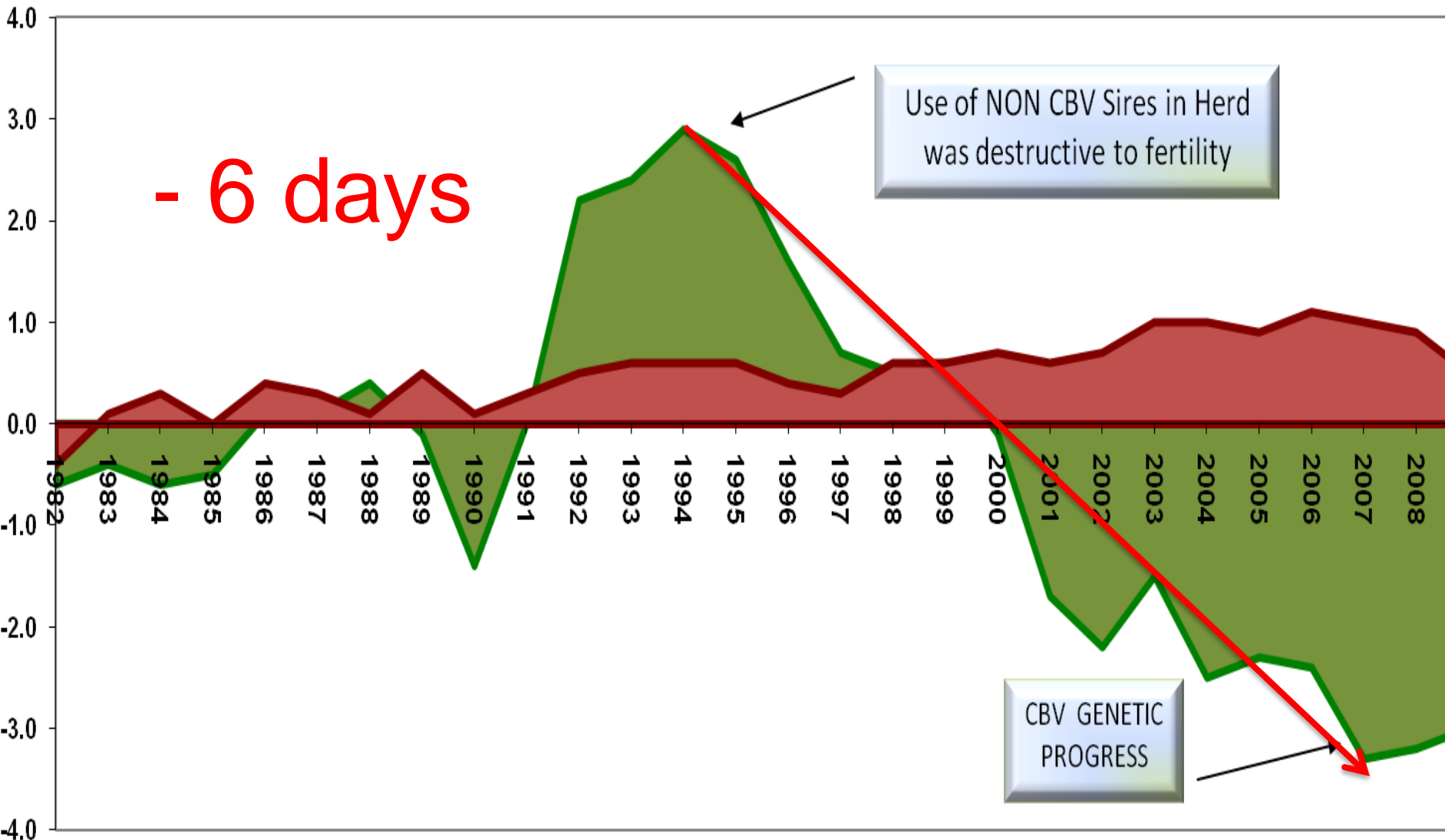


By using **SELECTED** bulls with **good EBVs** you improve your cow herd like this



The average of the new bulls daughters lies here (yellow upright line) between the *new bulls EBV (green upright)* and the *present herd average (red upright)*.

Collins CBV Genetic Trend For Fertility



- 6 days

Use of NON CBV Sires in Herd was destructive to fertility

CBV GENETIC PROGRESS

CBV days to calving EBV'S compared with breed average

CBV EBV
 BREED AV EBV

SOME FERTILITY THOUGHTS 101

- ADAPTED BREEDS : TAURUS FOR INTENSIVE, > INDICUS EXTENSIVE
- FARM WITH NATURE: CALVE WHEN PASTURE STARTS GREENING OVER
- CALVING SEASONS ARE A MUST: FOR SELECTION AND MANAGEMENT PURPOSES
- GRADUALLY BRING SEASON DOWN FROM SAY 90 DAYS TO 65 DAYS: THIS IS ASSUMING YOU ARE ON YOUR STOCKING RATE
- PUT CONSTANT PRESSURE ON FERTILITY: EMPTIES HELP CASHFLOW
- KEEP MORE HEIFERS THAN USUAL: DO MOST OF THEIR CULLING WHEN PREGCHECKING.
- FERTILITY MAY BE ONLY 10% HERITABLE BUT IT IS HIGHLY REPEATABLE.
- IDENTIFY THOSE FERTILE COWLINES OR EWELINES (eg. MERINO SHEEP IN SA 70% WEANING RATE TO 120%)
- THE BULL EFFECT: USE BULLS WITH GOOD SCROTUMS, HIGHLY NEGATIVE DAYS TO CALVING.
- STRUCTURED CROSSBREEDING IS THE ONLY FREE RIDE: INCREASES FERTILITY, LONGEVITY, GROWTH. EG CRISSCROSS, 3 WAY TERMINAL.

SOME FERTILITY THOUGHTS 201

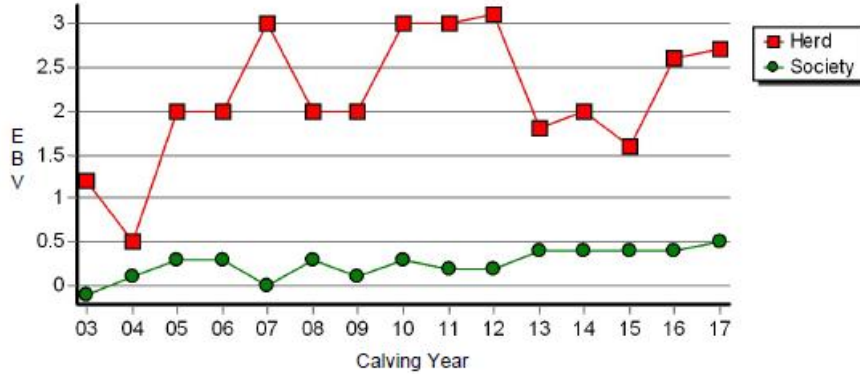
- AI AND SYNCHRONIZATION PLAY A HUGE ROLE (PROF C LAMB)
- THE RIGHT SIZE ANIMAL (MATURE) IS THE ONE THAT CALVES EVERY YEAR
- REMEMBER SCROTUM SIZE: + CORRELATED TO FERTILITY
- IT PAYS TO “LOOK AFTER” YOUR GROWING HEIFERS.
- IDEALLY LET THEM REACH 40 TO 50 KG OVER TARGET MASS FOR MATING
- HEIFERS MUST BE MATED SEPARATELY AND MATED HEIFERS MUST IDEALLY BE KEPT SEPARATE
- FIRST CALVERS: SEPARATE AND SPOIL THEM
- DEFINITELY PRIOR TO CALVING, PRIOR TO BREEDING, IF POSSIBLE DURING BREEDING. POST BREEDING NOT CRITICAL
- WHERE MANAGEMENT STOPS THE CEILING IS LIFTED WITH GENETICS: DAYS TO CALVING EBV'S

May 2018 South African Simmentaler GROUP BREEDPLAN

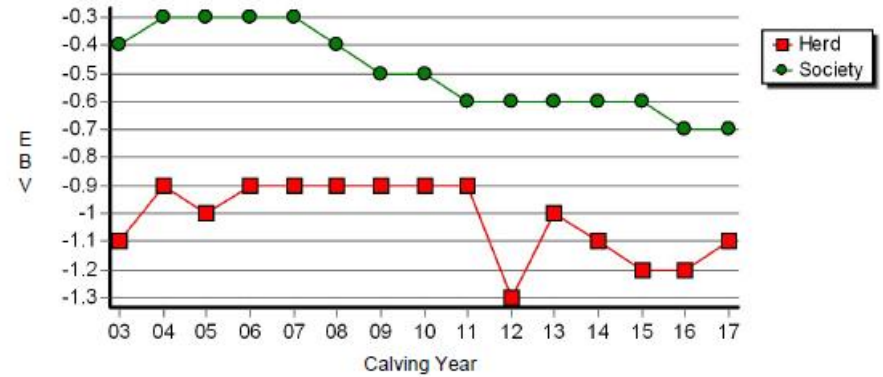
Graphs of Herd Compared with Breed Genetic Trends

Date: 28May18

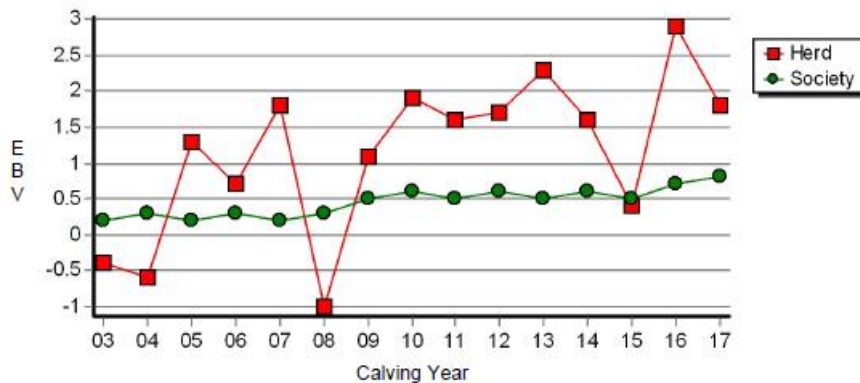
Calving Ease Dir (%)



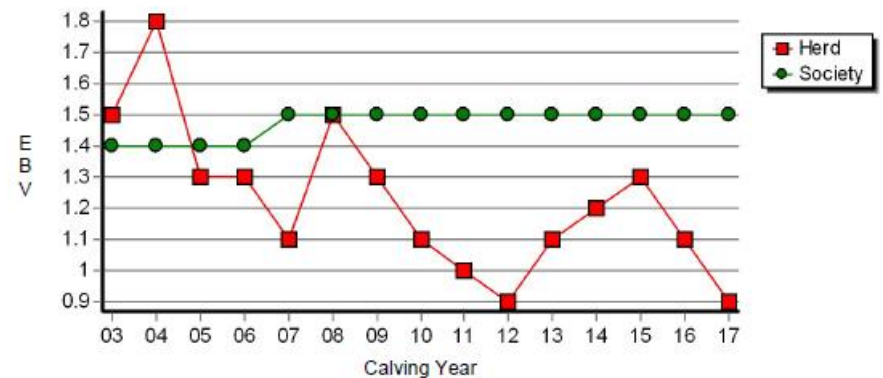
Gestation Length (days)



Calving Ease Dtrs (%)



Birth Weight (kg)

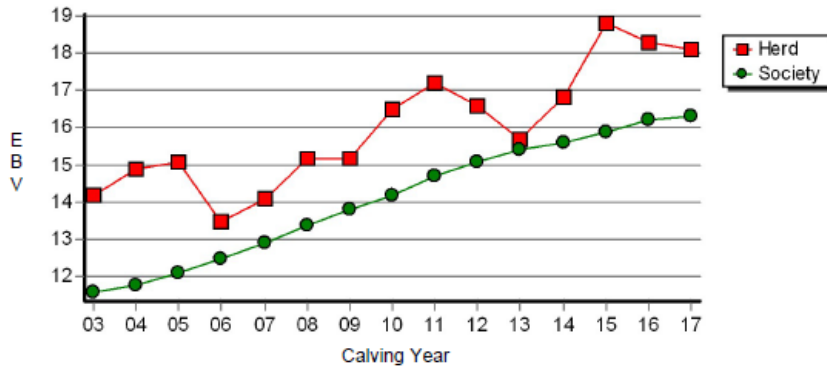


May 2018 South African Simmentaler GROUP BREEDPLAN

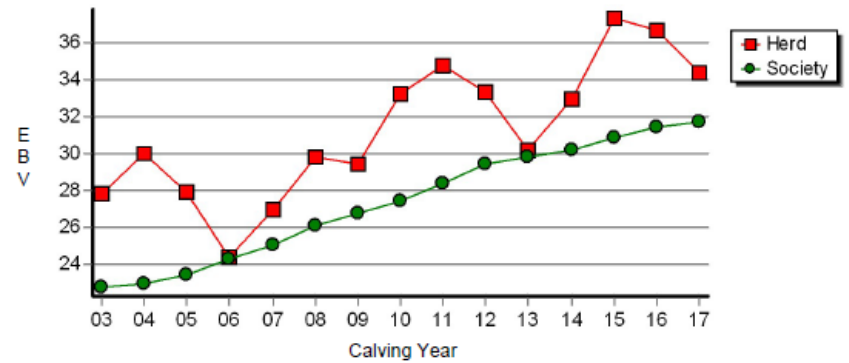
Graphs of Herd Compared with Breed Genetic Trends

Date: 28May18

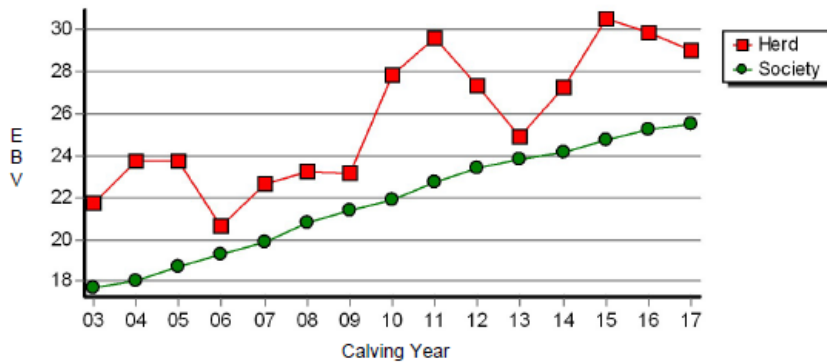
200 Day Growth (kg)



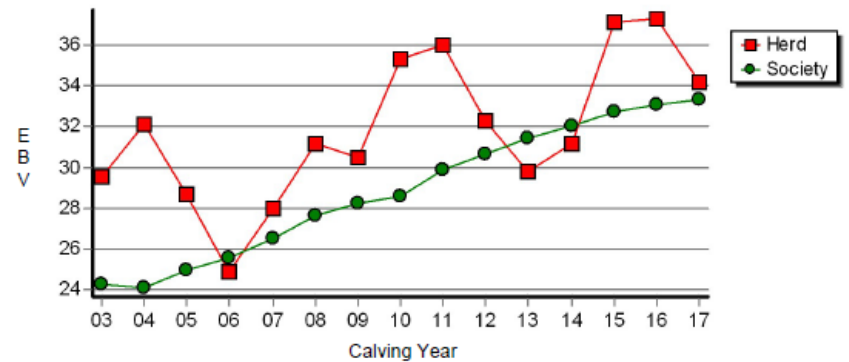
600 Day Weight (kg)



400 Day Weight (kg)



Mature Weight (kg)



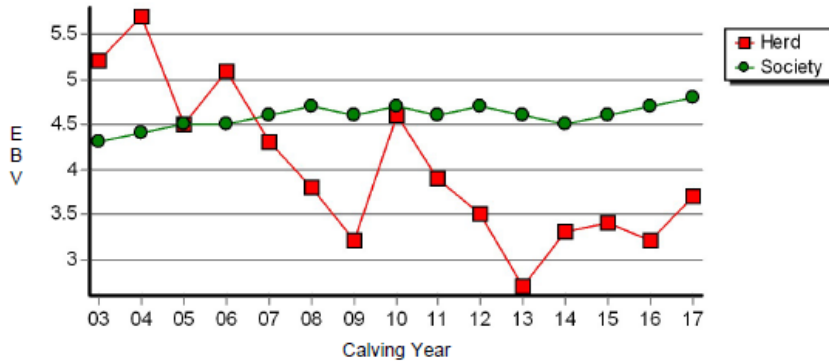
Fertility is 4 x more important than growth.

May 2018 South African Simmentaler GROUP BREEDPLAN

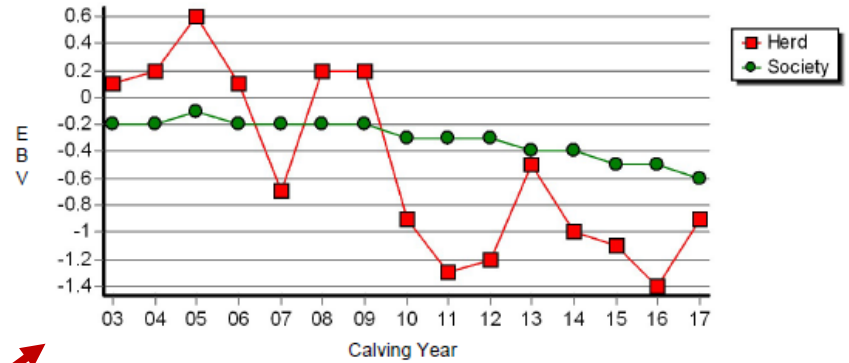
Graphs of Herd Compared with Breed Genetic Trends

Date: 28May18

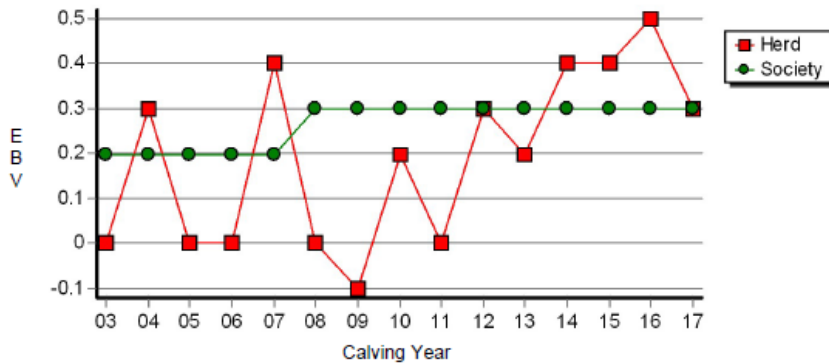
200 Day Milk (kg)



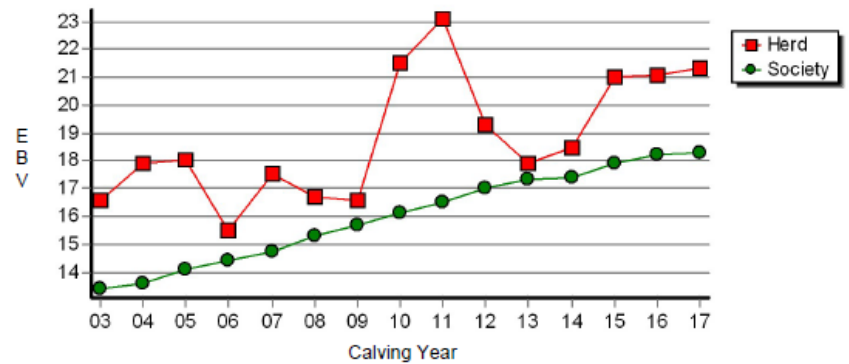
Days to Calving (days)



Scrotal Size (cm)



Carcase Weight (kg)



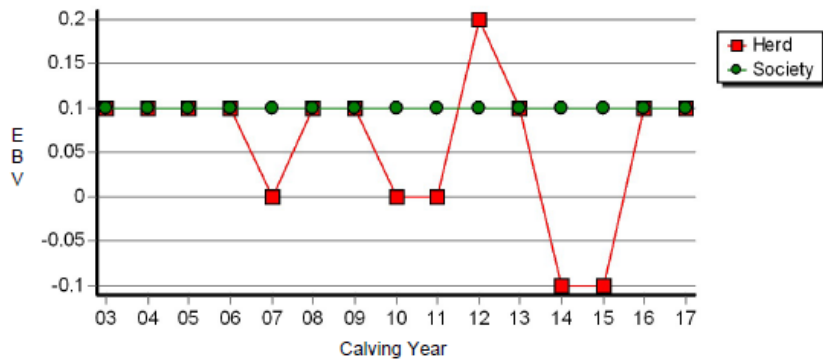
Days to calving is the fertility breeding value. See correlation with scrotal size.

May 2018 South African Simmentaler GROUP BREEDPLAN

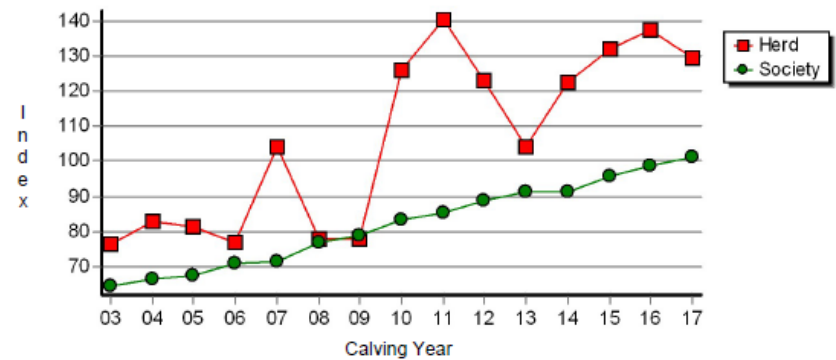
Graphs of Herd Compared with Breed Genetic Trends

Date: 28May18

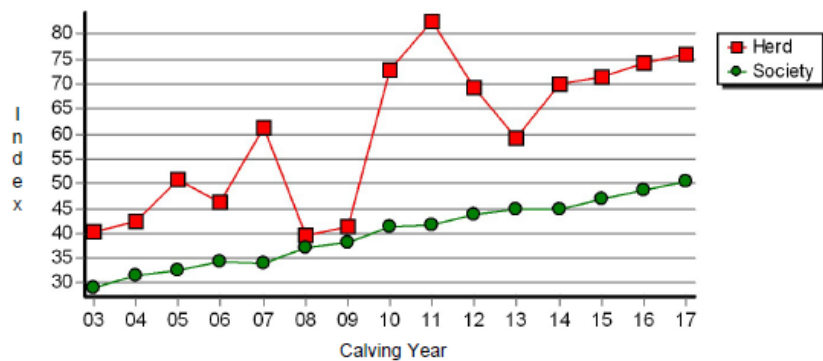
Carcase IMF (%)



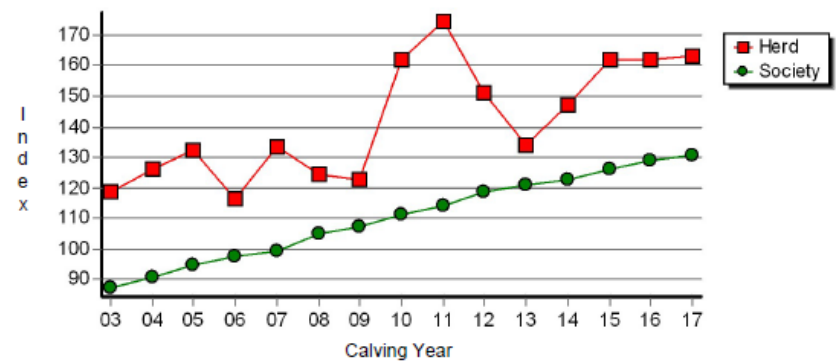
Self Replacing Grassfed (R)



Self Replacing Feedlot (R)



Terminal Sire (R)





THANK YOU FOR THE OPPORTUNITY!