

Bonsmara

Genomic Evaluation

SA Stud Book

October 2024

Herd Number: 719783

LESEDI BONSMARAS
T/A FONTEINLOOP PROJECTS (PTY) LTD
P.O. BOX 951
THABA NCHU
9780



Contemporary Groups

The correct composition of contemporary groups is one of the cornerstones of BLUP breeding value estimation. Breeding values are estimated from the differences between animals exposed to the same environment, as these differences are caused by genetics. The following aspects are important:

1. Animals at the same time, place and treatment

A contemporary group is a comparable group of animals measured at the same time in the same environment. It is therefore a comparable group of animals that were together on the same farm or camp in the same year and season. If there are animals in the group that were treated differently, they should be given a separate treatment code because their performance is influenced by other environmental influences than the rest of the group. Examples of possible different treatments are when some animals received supplements or creep feed, sale or show animals, embryo donors, sick or foster calves or even purchased cows and calves. If bull and heifer calves or older cows and young heifers were in the same camp, they should be placed in the same group – corrections for sex, age and first calving of cows are automatically made during breeding value estimation.

2. Progeny of at least two sires, of which one is a link sire

The progeny of different sires needs to be compared in the same group in order to determine the sires' genetic merit relative to each other. At least one sire should be a link sire with progeny in other herds. Genetic links between herds are used to determine the position of sires in the breed. AI sires are good link sires. Smaller herds could artificially inseminate some cows or allow some cows to be covered by another herd's bull.

3. Larger groups stabilise Breeding Values

Larger groups result in more accurate and stable breeding values, as the mean and distribution of the group can be more accurately determined and are thus more representative. Groups should preferably have more than 5 animals. Weigh all the animals in the same group on the same day, as corrections for age differences are made during genetic evaluation. The use of breeding seasons rather than through the year calving will also increase contemporary group size. Groups with less than 3 animals' are not included in breeding value estimation. An accidental mistake in a small group affects the animal itself, its family, all the other animals in the group and their families. The effect could be much less in large groups.

4. Measure all animals in the contemporary group

Weigh ALL the animals in the contemporary group, the good as well as the poor performers. Weigh animals before they are culled, so their parents can be penalized for their poor breeding.

Logix Cow Value

Calving Ease Value

Calf Growth Value

Milk Value

Maintenance Value

Fertility Value



Selecting for:

- fertile,
- low maintenance,
- easy calving cows
- with heavy weaners
- and enough milk



Logix Growth Value

Selecting for efficient growers on veld and feedlot



Logix Weaner Calf Value

Selecting for:

- heavy weaning weights
- more milk and
- lower birth and mature weights



Logix Carcass Value

Selecting for higher meat yield on carcass



Herd and Breed Averages

130

120

110

100

90

80

70

	Trait	EBV Herd	EBVi Herd	EBV Breed
Prewrite Growth	Birth Weight			
	Wean Weight			
	Birth Mat.			
	Milk (Wn.Mat.)			
Postwean Growth	Postwean Wt			
	Mature Weight			
	ADG			
	FCR			
Fertility	Scrotal Circumf.			
	Heifer Fertility			
	Cow Fertility			
	Longevity			
Frame	Height			
	Length			
Carcass	Dressing%			
	Marbling			

Selection Value	Ave. Herd
Calving Ease	
Calf Growth	
Milk	
Maintenance	
Fertility	
Cow Value	
Weaner Calf Value	
Growth Value	
Production Value	
Carcass Value	

Genomic Breeding Values (GEBVs):

Brth:	Birth weight	Scr:	Scrotal circumf.
Wn:	Weaning weight	HF:	Heifer Fertility
B.m:	Birth maternal	CF:	Cow Fertility
Mlk:	Milk	LL:	Longevity
PW:	Post-wean weight	Ht:	Height
MW:	Mature weight	Ln:	Length
ADG:	Average Daily Gain	Dr%:	Dressing%
FCR:	Feed Conversion Ratio	Mar:	Marbling

Selection Values:

CEV:	Calving Ease Value
CGV:	Calf Growth Value
MkV:	Milk Value
MnV:	Maintenance Value
FV:	Fertility Value
CV:	Cow Value
WCV:	Weaner Calf Value
GV:	Growth Value
PV:	Production Value
CCV:	Carcass Value

- Average of live animals in the breed: 100
- Above 100: **more favourable**,
- Below 100: **less favourable**

What does a sub-selection value above breed average (100) mean?:

Calving ease:	Smaller calf at birth - easier calving
Calf growth:	Heavier calves at wean due to growth potential of the calf
Milk:	Cows with more milk and better mothering ability
Maintenance:	Animals with low maintenance requirements (lower mature weight).
Fertility:	Cows/daughters that calve earlier and/or more regularly.

Genetic Windows

Bulls on the farm

Bulls born in and earlier

Total:

130
120
110
100
90
80
70

130
120
110
100
90
80
70

Sires of young animals

Sires of animals 3 years and younger

Total:

130
120
110
100
90
80
70

130
120
110
100
90
80
70

Bull calves

Bulls born in

Total:

130
120
110
100
90
80
70

130
120
110
100
90
80
70

Cow Herd

Cows born in and earlier

Total:

Cows older than 6 years

Cows born in and earlier

Total:

Heifer calves

Heifers born in

Total:

Summary of Cow Herd

			Selection Values (SV)								Calf Weight		Dam		Growth & Efficiency				Fertility				Frame		
Birth Year	No. Cows	Average Cow Value	Calving Ease	Calf Grwth	Milk	Maint.	Fertility	Cow Value	Growth Value	Prod Value	Birth Weight	Wean Weight	Birth Mat.	Milk (Wn.Mat)	Postwn Weight	Mature Weight	ADG	FCR	Scrotal Circumf.	Heifer Fertility	Cow Fertility	Longevity	Height	Length	
			Cows in Breed Average:										100	100	100	99	100	100	99	99	99	99	100	100	100
2017	23																								
2019	2																								
2020	7																								
2021	6																								

Cows in Herd Average:

Genetic Trends for On-Farm Traits

The graphs show the genetic gain of the herd relative to the breed. Only data of animals with measurements are included.

Herd

Birth Year	Calving Ease				Calf Growth			Milk			Maintenance						Fertility						Cow Value
	Birth Weight		Dir EBV	Calv. Ease	Weaning Weight		Calf Growth	Milk (Wn.Mat.)		Milk	Postwean Weight		Mature Weight		Mainte- nance	Heifer Fert.		Cow Fert.		Longevity		Ferti- lity	
	Number	EBV			Number	EBV		Number	EBV		Number	EBV	Number	EBV		Number	EBV	Number	EBV	Number	EBV		

Breed

Birth Year	Calving Ease				Calf Growth			Milk			Maintenance					Fertility						Cow Value	
	Birth Weight		Mat EBV	Calv. Ease	Weaning Weight		Calf Growth	Milk (Wn.Mat.)		Milk	Postwean Weight		Mature Weight		Mainte-nance	Heifer Fert.		Cow Fert.		Longevity			Ferti-lity
	Number	Dir EBV			Number	EBV		Number	EBV		Number	EBV	Number	EBV		Number	EBV	Number	EBV	Number	EBV		
2014	49232	1.07	-0.15	99	39735	12.5	94	39735	3.28	99	27352	20.9	6729	8	101	9904	-7.3	6479	-1.8	50670	20.3	93	90
2015	48033	1.07	-0.16	99	37430	12.9	95	37430	3.24	98	25367	21.6	6917	8	101	9686	-7.7	6541	-1.8	48391	21.1	94	91
2016	45138	1.09	-0.19	99	35245	13.2	96	35245	3.41	99	24467	22.1	6533	8	101	8424	-7.9	6146	-2.0	45177	22.0	96	92
2017	46224	1.10	-0.19	99	37045	13.6	97	37045	3.46	99	26009	22.9	6679	8	101	8766	-8.5	6356	-2.1	46061	22.9	97	94
2018	43430	1.06	-0.22	100	35721	13.7	97	35721	3.39	99	24863	23.0	6614	7	101	8172	-8.7	5973	-2.2	42914	23.5	97	94
2019	43212	1.07	-0.24	100	35103	14.3	98	35103	3.35	99	24657	24.0	6707	8	100	8459	-9.2	5897	-2.3	40053	24.2	98	96
2020	43323	1.03	-0.26	100	35883	14.4	99	35883	3.35	99	26173	24.3	6470	8	100	8783	-9.9	3158	-2.8	21185	23.9	100	97
2021	43361	1.03	-0.28	101	35981	14.8	99	35981	3.39	99	26529	25.1	2153	9	100	5259	-10.4	236	-3.3			102	99
2022	43274	1.03	-0.28	101	36360	15.0	100	36360	3.65	100	26248	25.7	12	8	99	452	-12.0	1	-7.4			104	100
2023	43682	0.99	-0.28	101	33935	14.9	100	33935	3.76	100	9706	26.0			98								101
2024	17538	0.92	-0.29	102	1690	15.4	101	1690	3.78	100	3	31.2			88								98

Genetic Trends for Growth Test Traits

Herd

Birth Year	Growth						Frame						Carcass Traits						Selection Values					
	FCR			ADG			Scrotal Circumf.			Height			Length				Dressing%		RMeat Yield		Marbling		Growth Value	Prod Value
	Number	EBV	EBVi	Number	EBV	EBVi	Number	EBV	EBVi	Number	EBV	EBVi	Number	EBV	EBVi	Number	EBV	EBVi	EBV	EBVi	EBV	EBVi		

Breed

Birth Year	Growth									Frame						Carcass Traits								Selection Values	
	FCR			ADG			Scrotal Circumf.			Height			Length			Number	Dressing%		RMeat Yield		Marbling		Growth Value	Prod Value	
	Number	EBV	EBVi	Number	EBV	EBVi	Number	EBV	EBVi	Number	EBV	EBVi	Number	EBV	EBVi		EBV	EBVi	EBV	EBVi	EBV	EBVi			
2014	389	-53	103	8378	105	99	9594	12.5	99	9299	3	104	8418	19	101	1967	0.08	98	0.65	98	-0.104	100	98	91	
2015	366	-55	104	7266	110	100	8400	12.7	99	8398	3	104	7305	20	102	1942	0.10	99	0.77	99	-0.115	100	99	93	
2016	245	-53	103	7605	114	101	9081	13.3	100	8940	3	105	7635	20	102	1897	0.10	99	0.75	99	-0.126	100	100	94	
2017	659	-55	104	8459	118	102	9041	14.0	101	8541	3	104	8457	21	103	3129	0.12	100	1.25	101	-0.088	101	100	95	
2018	628	-53	103	8227	121	102	8717	14.2	102	7978	3	104	7980	22	103	2986	0.16	102	1.47	102	-0.061	101	101	97	
2019	628	-55	104	8523	126	103	8902	14.7	102	8363	2	103	8366	23	104	3151	0.22	106	2.01	104	-0.053	101	102	98	
2020	636	-56	105	8817	127	104	9374	15.2	103	8824	2	103	8827	23	104	4040	0.20	104	2.11	105	-0.112	100	103	99	
2021	664	-55	104	8962	132	104	9592	15.5	104	9198	2	103	9197	23	104	3802	0.22	105	2.43	106	-0.195	99	104	101	
2022	728	-58	106	8904	138	106	9633	16.0	104	9492	2	102	9495	24	105	4265	0.25	107	2.82	108	-0.018	102	105	103	
2023	659	-57	105	3741	143	107	3671	16.2	105	3851	2	103	3851	25	106	2172	0.26	107	3.02	109	-0.025	101	106	104	

Sires

Sire		Selection Values (SV / Acc)									Calf Weight		Mother		Growth & Efficiency				Fertility				Frame		Carcass			Measured Progeny	
ID Number	Sire ID	Calf Ease	Calf Grwth	Milk	Maint.	Fer-tility	Cow Value	WnC Value	Grwth Value	Prod. Value	Birth Weight	Wean Weight	Birth Mat.	Milk Wn.Mat.	Postwn Weight	Mature Weight	ADG	FCR	Scrotal Circumf.	Heifer Fert.	Cow Fert.	Longe-vity	Height	Length	Dress %	Carcass Value	Marb-ling	Birth	Wean
	Dam ID	Breed average:																										Grwth test	Dght/Calv.
	Parentage Not tested Verified Conflict																												

Bulls

Inbreeding in red is high

EBV
Acc Index

Breeding values with an accuracy < 5% are not printed

EBVIndex
Acc

Bull			Selection Values (SV / Acc)								Calf Weight		Mother		Growth & Efficiency				Fertility				Frame		Carcass					
ID Name	% Inbreeding	Sire ID Dam ID	Calf Ease	Calf Grwth	Milk	Main-ten.	Fer-tility	Cow Value	WnC Value	Grwth Value	Prod. Value	Birth Weight	Wean Weight	Birth Mat.	Milk Wn.Mat.	Postwn Weight	Mature Weight	ADG	FCR	Scrotal Circumf.	Heifer Fert.	Cow Fert.	Longe-vity	Height	Length	EMA	Fat	Marb-ling	Dres %	Carc. Value
	% Inbreeding Genomic Parentage Sire ID Dam ID Parentage: Not tested Verified Conflict	Breed average:																												
		Bull average:																												
		Shaded EBVi									90-110	>100	>100	>100	>100	90-110	>100	>100	>100	>100	>100	>100	90-110	90-110	>100	>100	>100	>100		

Cows

Inbreeding in red is high										EBV Acc Index		Breeding values with an accuracy < 5% are not printed														EBVIndex Acc													
Cow				Selection Values (SV / Acc)							Calf Weight		Mother		Growth & Efficiency				Fertility				Frame		Carcass														
ID	Inbreeding %	Genomic Parentage	Sire ID Dam ID Parentage: ☐ Not tested ☒ Verified ☒ Conflict	Calf Ease	Calf Grwth	Milk	Main-ten.	Fer-tility	Cow Value	WnC Value	Grwth Value	Prod. Value	Birth Weight	Wean Weight	Birth Mat.	Milk Wn.Mat.	Postwn Weight	Mature Weight	ADG	FCR	Scrotal Circumf.	Heifer Fert.	Cow Fert.	Longe-vity	Height	Length	EMA	Fat	Marb-ling	Dres %	Carc. Value								
Name				Breed average:										1.08	15.1	-0.26	3.7	24.7	9	110	-48	13.3	-11.4	-2.3	29.3	0	18	100	100	100	100	100							
				Cow average:										1.09	100	15.0	100	-0.26	100	3.7	100	24.4	100	8	99	106	99	-47	99	12.6	99	-11.4	100	-2.4	100	-1	100	17	99
				Shaded EBVi										90-110	>100	>100	>100	>100	90-110	>100	>100	>100	>100	>100	>100	90-110	90-110	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100		

Selection List on Cow Value

Cows 2 years and older

ID	Name	Sire ID	Dam ID	Visual Score	% Inbreeding	Horned / Polled	Myostatin				Calving Ease Value	Calf Growth Value	Milk Value	Maint. Value	Fertility Value	Cow Value	Weaner Calf Value	Growth Value	Prod Value	Carcass Value
							Q204X	nt821	F94L	Genomic test										
Sorted on ID				Italics: DNA Test				Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	Acc	

LCV: Logix Cow Value (Combination of EBVs based on measurements of cows and calves on the farm)

Sub-values	Calving Ease		Calf Growth	Milk	Maintenance	Fertility			
Traits for which breeding values (EBVs) and EBV indices (EBVi) are estimated	Birth weight  Calf's genetic potential for birth weight	Mat. Birth weight  Cow's genetic ability to limit calf weight	Weaning weight  Calf's genetic potential for growth	Milk  Mothering ability of cow	Mature weight  Mature weight + Milk	Longevity  Stayability	Heifer Fertility  Age at 1st calving	Cow Fertility  ICP	
	Interpretation	Calving Ease		Calf growth	Milk	Maintenance	Fertility		
	Sub-value above 100	Easier calving		Heavier weaner calf	More milk	Lower maintenance	More fertile and retained in herds		
	Sub-value below 100	Difficult calving		Lighter weaner calf	Less milk	Higher maintenance	Less fertile and culled early		
	Birth weight	Mat. birth weight	Weaning weight	Milk	Cow weight	Longevity	Heifer Fertility	Cow Fertility	
Higher EBV	Heavier weight	Heavier weight	Heavier weight	More milk	Heavier weight	Family remains longer	Later calving	Longer ICP	
Lower EBV	Lighter weight	Lower weight	Lighter weight	Less milk	Lighter weight	Family culled earlier	Earlier calving	Shorter ICP	
Optimum EBV	Lower intermediate	Lower intermediate	Higher	Higher	Higher intermediate	Higher	Lower	Lower	
Optimum EBVindex*	Higher intermediate	Higher intermediate	Higher	Higher	Higher intermediate	Higher	Higher	Higher	

*EBV index above 100 is in a more favourable direction and better than breed average (100).

LGV: Logix Growth Value (Combination of EBVs based on bulls measured in growth tests)

Traits for which breeding values (EBVs) and EBV indices (EBVi) are estimated	ADG  Average daily gain	Kleiber Ratio  Growth efficiency	FCR  Feed conversion ratio	Scrotal circumference  Bull fertility	Height  Shoulder/Hip height	Length  Body length	Carcass  Dressing%, Red Meat Yield and Marbling from RTU Measurements
Interpretation	ADG	Kleiber ratio	Feed conversion ratio	Scrotal circumference	Height	Length	Carcass
Higher EBV	More growth	More efficient on veld	Higher intake per kg gain	Larger scrotum	Taller animal	Longer animal	More
Lower EBV	Less growth	Less efficient on veld	Lower intake per kg gain	Smaller scrotum	Shorter animal	Shorter length	Less
Optimum EBV	Higher	Higher	Lower	Higher	Intermediate	Intermediate/high	Higher
Optimum EBV index	Higher	Higher	High	Higher	Higher intermediate	Higher intermediate	Higher

LPV: Logix Production Value (Combination of LCV and LGV)

Notes on the interpretation of EBVs, EBVi's, sub-values and selection values

EBVi (EBVindex) is the breeding value index and is easier to interpret than the breeding value, especially for commercial farmers buying from stud farmers. The base of a breeding value index is 100, which is the average of all the live animals in the breed, and all values are expressed relative to this value. Values above 100 are always in a more desirable direction: an index of 105 for AFC indicates a genetic potential to calve earlier. Note that a very high index is not always desirable. For certain traits, such as birth weight, average values can be better.

EBV: (Estimated Breeding Value) indicates the genetic potential of the animal for a specific trait. It is presented in the unit of measurement and relative to the average of animals born in the base year (1990 for most breeds and traits). Higher values for certain traits are better while lower values for other traits are better, for example, an EBV of -2 for AFC (age at first calving) indicates that the animal has the genetic potential to calve 2 days earlier than the average heifer in 1990 (the base year). Earlier calving is better and therefore low breeding values (high breeding value indices) are better. For weaning weight, higher values are better.

Sub-values combine similar breeding values in a scientific manner to simplify the selection of animals. For example, AFC (age at first calving) and ICP (inter-calving period) are combined to form the sub-value Fertility by taking the heritability and economic importance in consideration. The sub-value is expressed in an index format, thus an animal with a sub-value of 110 for Fertility will genetically be above average compared to the live animals in the breed.

Selection Values (Cow Value and Growth Value) combine the sub-values into a single value. This gives a quick and easy indication of the combined genetic value of an animal compared to the breed. It is advised to still look at the sub-values to see where the strengths and weaknesses lie.

How to use breeding values to select animals

Selecting animals on breeding values is easy if you know how. There is a common saying that “good nutrition can mask poor breeding”. This is very true. If an animal that is genetically inferior is fed well, it can appear as a great animal. This great performance will not be passed over to future generations. An animal that is genetically superior can appear to be inferior if its environment did not allow it to reach its true potential. It is best to select animals that are most adapted to the environment and can reach their full potential. To continuously adapt the environment to the animal can be expensive.

The reason why the use of breeding values is such a valuable tool is because it “removes” the environmental effect that contributes to the performance.

Scientific methods are used to determine how much of the performance is due to genetics and to identify genetically superior animals. This involves the measurement of animals under controlled environments, complete record keeping and pedigree information. *If performance recording and pedigree information are not done correctly, breeding values of these animals will not be useful.* Keep in mind that breeding is a long-term option: the effect of a bull selected/bought today will only show much later. If it is a good decision, his daughters will become part of the breeding herd and contribute to overall profitability in future.

Even if a bull is not perfect in all aspects, knowing the shortcomings will allow strategic selection with suitable cows. Traits are genetically correlated, meaning that a change in one trait can lead to a change in another. This change can be favourable or unfavourable. An increase in weaning weight can lead to an increase in birth weight, which can lead to calving difficulty. It is therefore advisable to not only select on a single trait. Take other traits in consideration to avoid negative effects.

How to improve the herd genetically

The first and most important aspect is to know what type of animal will improve the herd genetically. This can be determined through the following factors:

What happens to the calves? For example: used as replacement heifers, sold as stud animals or sold to commercial breeders who sell weaner calves.

How much feed is available? The availability of feed (or the hardness of the environment) determines the optimal frame size. If feed is abundant and the environment is less harsh, larger animals would be ideal. If not, medium framed animals would be ideal.

What is the genetics of the cow herd? Are they the wrong frame type, grow too slowly, do not have enough milk, etc.? Always aim to breed a calf that is superior to its dam.

Conclusion

Different types of bulls are suitable for different types of cows, environments and breeding objectives. Inbreeding should be avoided or limited as much as possible. Mating programs are available to aid in the pairing of bulls and cows.

The data used for this evaluation is pedigree information and performance data found on LOGIX as provided by breeders. All attempts are made to present accurate information. SA Stud Book takes no responsibility for the use and interpretation of information presented in this report.

