



# Breeding for Survival (Longevity)

## Key Messages

- Genetic selection for survival (longevity) will increase profitability.
- Survival is a complex trait, but selection is made easier by using the Survival ABV.
- The Survival ABV is one of the major traits of economic importance included in the APR

The two most important determinants of a dairy bull's genetic merit for profitability are milk production and survival. And although many people express the desire for long lasting cows, few identify the Survival ABV as part of their selection process. Survival – also known as longevity or productive herd life – refers to a bull's ability to produce daughters that last in the herd for many lactations.

Survival is a significant contributor to overall profitability on dairy farms in Australia. By improving longevity:

- fewer replacements are needed, which means lower heifer rearing costs (or greater income as surplus heifers are sold);
- the herd is more mature – more mature cows produce more milk than younger cows; and
- a greater proportion of the culling decisions are based on production, resulting in an increase in the average production of the herd.

## Estimating survival at an early age

Actual survival records are the best way to analyse survival. However until enough survival data are collected predictor traits are used. Around the world, the use of some form of predictors has been adopted in most countries. These traits are not perfectly related to survival but give an early estimate.



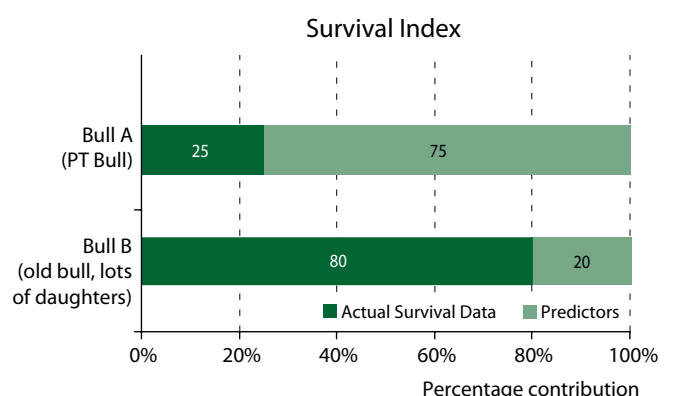
Recent research from the Victorian Department of Primary Industries analysed about one million Australian cows to look at the relationships between various traits and survival (Haile-Mariam and Goddard 2009). The researchers found that the main traits affecting the survival of cows from lactation to lactation are production index, overall type and likeability. As a cow ages, other traits, such as udder depth and pin set, become more important. The results of the recent study confirm that the predictors currently used by ADHIS provide the best estimate of survival at an early age.

**In a young bull, overall type, likeability, udder depth and pin set are used to predict survival. The accuracy of the Survival ABV increases as more actual survival data become available.**

## Improving reliability

The accuracy of the Survival ABV increases as more survival data are added. The Survival ABV of older bulls with many daughters is derived mainly from actual survival data, as shown in Graph 1. Over time, as more survival data are added, the Survival ABV provides an accurate indicator of a bull's ability to sire cows that will last from lactation to lactation.

**Figure 1: Contribution of actual and predictor data to the Survival ABV.**



## April 2009 ABVs – Active Publishable Jersey bulls – Top 20 APR™ – Proven in Australia

To be listed, a bull must be actively marketed and have a publishable production, workability and type ABV. Official ABVs for all top bulls can be found on the ADHIS website.

Rank	Bull ID	Bull Name	Defect Codes	Profit Indexes			Production Traits										Surv
				APR \$	Rel	ASI \$	Prot kg	Prot %	Milk L	Fat kg	Fat %	Rel	No. Dtrs	No. Herds	RIP %		
1	VALERIAN	KAARMONA VALERIAN		147	80	118	29	0.28	472	33	0.15	89	90	43	11	106	
2	LARFALOT	LIGHTWOOD LUCRATIVE		130	75	98	20	0.26	235	36	0.45	81	73	38	28	105	
3	AMBMANHATTEN	OKURA MANHATTEN-ET SJ3		128	93	116	25	0.41	169	34	0.47	98	680	120	23	103	
4	SPIRITUAL	RIVERSIDE SPIRIT		107	66	69	20	0.23	269	6	-0.16	74	40	18	12	108	
5	ELTON	CAIRNBRAE JACES ELTON		106	75	74	12	0.21	54	36	0.62	80	66	25	40	104	
6	TAILBOARD	NOWELL TARSAN		105	87	90	15	0.33	-1	36	0.68	95	333	102	29	101	
7	DOUBLED	DOUBLE D JACE VIKING		102	76	78	10	0.32	-140	37	0.84	81	65	27	30	105	
8	14J365	O.F. MANNIX REBEL		93	87	82	19	0.10	436	33	0.18	94	173	46	12	106	
9	BADGER	BEULAH TARANAK BADGER		89	92	64	13	0.03	344	35	0.30	98	681	172	35	105	
10	BARTPOWER	DARAWAY FLOWERPOWER SATIRA		88	83	54	16	0.05	402	13	-0.17	90	124	54	18	104	
11	FLOWERPOWER	CLAYDON PARK FLOWER POWER		84	99	74	22	0.06	569	20	-0.21	99	5862	754	16	104	
12	FARMSTEAD	BUSHLEA ETTA FY HALLMARK		84	78	60	16	0.12	300	16	0.00	87	90	45	24	104	
13	BETAHEAD	KINGSVILLE OUTDO		81	74	62	11	0.17	100	27	0.41	80	64	32	26	105	
14	PASSIVE	BERCAR PASSIVE		79	94	68	8	0.30	-166	31	0.76	98	772	172	26	105	
15	FUTUREARM	DARAWAY ARMADA FUTURA		77	77	71	20	-0.12	750	36	-0.09	85	78	38	25	100	
16	TESTRUN	LIVEWIRE LEMVIG THOR-ET		77	84	67	9	0.33	-195	27	0.71	92	156	72	18	103	
17	OUTINFRONT	LIGHTWOOD LEDA		76	97	71	23	0.01	650	18	-0.32	99	1851	319	20	104	
18	MEDIATOR	SILHOUETTE MEDIATOR		75	89	66	3	0.62	-759	20	1.14	96	394	108	33	102	
19	LANDLINE	ECHO GLEN ALDER		72	98	63	18	0.06	444	18	-0.11	99	1735	409	14	104	
20	CLEARCUT	JARNDIE CLEARCUT		70	87	48	10	0.19	42	12	0.18	93	191	66	24	104	

Survival ABVs can be found in the ADHIS ABV Summary or on the ADHIS website.

### Using the Survival ABV

Survival ABV is expressed as a percentage more or less than the average, which is 100.

There is a difference of about 20% between the highest and lowest bulls for Survival ABV. For example, in the Holstein breed, the highest bull has a Survival ABV of 111, compared to the lowest bull at 91. The distribution of Survival ABVs for several breeds is shown in Table 1.

The easiest way to breed cows that survive and thrive in the herd is to select top-ranking bulls with a Survival ABV of more than 100.

**A bull with a Survival ABV of 108 is 5% greater for survival than a bull with a Survival ABV of 103.**

Table 1: Ranges and distributions for Survival ABV – Holstein, Jersey, All Red Breeds (April 2009).

	Holstein	Jersey	All Red Breeds
Number of bulls	3406	680	205
Stand Dev.	2.7	3.1	4.3
Minimum	91	84.0	86
Maximum	111	109	108
Top 1%	107	107	107
Top 10%	104	104	105

### References

Haile-Mariam, M. and Goddard M.E. 2009. CRITERIA FOR SELECTING AND PREDICTING HERDLIFE IN DAIRY CATTLE. 18th AAABG conference (submitted).

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