

Introduction

The latest routine international evaluation for longevity trait took place as scheduled at the Interbull Centre. Data from twenty two (22) populations were included in this evaluation.

International genetic evaluations for direct longevity trait of bulls from Australia, Belgium, Canada, Switzerland, Germany, Denmark-Finland-Sweden Spain, France, The United Kingdom, Ireland, Israel, Italy, New Zealand, The Netherlands, The United States of America Hungary, Norway, Slovenia, Czech Republic and Japan were computed. Brown Swiss, Guernsey, Holstein, Jersey, Red Dairy Cattle and Simmental breed data were included in this evaluation.

Changes in national procedures

Changes in the national genetic evaluation of longevity traits are as follows:

ISR (HOL)	Slight reductions for a few bulls in number of daughters due to edit and paternity corrections
SVN (ALL)	Some changes in information due to changes in data base related to the pedigree completeness and phenotypic data improvement
FRA (ALL)	Some drops in information due to corrections made in pedigree
AUS (ALL)	Decrease in information as a result of data clean up such as pedigree changes, causing also changes in type of proofs. Change of status of bull which leads to a good number of bulls no longer being qualified. Decreases in EDC due to rounding.
POL (HOL)	Decrease in information due to data edits
JPN (HOL)	Drops in information due to parentage checks
BEL (HOL)	Some decrease in information due to pedigree correction
ESP (HOL)	Decrease in information due to data editing
ZAF (RDC)	Some fluctuations in reliability due to the use of apax
CHE (HOL)	In-depth corrections and renewal of the database table containing bull information by one of our breeding associations lead to changes in status of bulls and type of proof as well as a fewer number of EBV delivered. Slight changes in number of daughters, number of herds and EDC are due to manual edits in the database.
CZE (HOL)	Daughter decrease in some bulls are due to pedigree or phenotype corrections
NZL (ALL)	Daughter counts $\hat{a}_{200\ 223}$ affects all traits. New Zealand has continuous DNA parentage testing so daughters will always change Herd Count $\hat{a}_{200\ 223}$ affects all traits. Affected by continuous DNA parentage testing. EDCs $\hat{a}_{200\ 223}$ affects all traits. Affected by continuous DNA parentage testing and a bug was found in the EDC calculation so a fix was applied
NZL (HOL,JER,RDC)	As above, plus: completely new model estimating direct survival, is measured as a percentage instead of days. The following changes on extraction of data were also applied: any cows with missing records from lactation 1-2 were excluded from the extract if they were present at lactation 2-3 as it was messing with the contemporary group. There has also been some filtering done to remove records where there is not variation in CG

INTERBULL CHANGES COMPARED TO THE PREVIOUS ROUTINE RUN

Post-processing Windows:

According to the decision taken by ITC in Orlando (2015) to review the post-processing windows every 5 years, during the 2020 the relative working group has been re-activated and new windows have been identified.

As before, the upper bounds have been set to 0.99 as these were judged to have very little effect on evaluations while the lower values have been reduced to the 10th percentile. This reduction would provide post-processed correlations to be closer to the real estimated ones. Over the past five years, in fact, the previous adopted lower value (25th percentile) had been found too high causing estimated and post-processed correlations to differ significantly from each other. The new lower values have been applied to all breeds and traits.

The weight assigned to the magnitude of the changes tested by each country has also been revised. The new weight will allow post-processed correlations to take more in consideration the value of the new estimated ones even when no changes are applied by the countries. The new weights are as follows:

No changes :: 2
Small changes:: 1
Big changes :: 0

More information can be read on https://interbull.org/ib/rg_procedure

DATA AND METHOD OF ANALYSIS

Data were national genetic evaluations of AI sampled bulls with at least 10 daughters or 10 EDC (for clinical mastitis and maternal calving traits at least 50 daughters or 50 EDC, and for direct calving traits at least 50 calvings or 50 EDC) in at least 10 herds. Table 1 presents the amount of data included in this Interbull evaluation for all breeds.

National proofs were first de-regressed within country and then analysed jointly with a linear model including the effects of evaluation country, genetic group of bull and bull merit. Heritability estimates used in both the de-regression and international evaluation were as in each country's national evaluation.

Table 2 presents the date of evaluation as supplied by each country

Estimated genetic parameters and sire standard deviations are shown in APPENDIX I and the corresponding number of common bulls are listed in APPENDIX II.

SCIENTIFIC LITERATURE

The international genetic evaluation procedure is based on international work described in the following scientific publications:

International genetic evaluation computation:
Schaeffer. 1994. J. Dairy Sci. 77:2671-2678
Klei, 1998. Interbull Bulletin 17:3-7

Verification and Genetic trend validation:
Klei et al., 2002. Interbull Bulletin 29:178-182.
Boichard et al., 1995. J. Dairy Sci. 78:431-437

Weighting factors:
Fikse and Banos, 2001. J. Dairy Sci. 84:1759-1767

De-regression:
Sigurdsson and G. Banos. 1995. Acta Agric. Scand. 45:207-219
Jairath et al. 1998. J. Dairy Sci. Vol. 81:550-562

Genetic parameter estimation:
Klei and Weigel, 1998, Interbull Bulletin 17:8-14
Sullivan, 1999. Interbull Bulletin 22:146-148

Post-processing of estimated genetic correlations:
Mark et al., 2003, Interbull Bulletin 30:126-135
Jorjani et al., 2003. J. Dairy Sci. 86:677-679
<https://wiki.interbull.org/public/rG%20procedure?action=print>

Time edits
Weigel and Banos. 1997. J. Dairy Sci. 80:3425-3430

International reliability estimation
Harris and Johnson. 1998. Interbull Bulletin 17:31-36

NEXT ROUTINE INTERNATIONAL EVALUATION

Dates for the next routine evaluation can be found on
<http://www.interbull.org/ib/servicecalendar>.

NEXT TEST INTERNATIONAL EVALUATION

Dates for the next test run can be found on
<http://www.interbull.org/ib/servicecalendar>.

PUBLICATION OF INTERBULL ROUTINE RUN

Results were distributed by the Interbull Centre to designated representatives in each country. The international evaluation file comprised international proofs expressed on the base and unit of each country included in the analysis. Such records readily provide more information on bull performance in various countries, thereby minimizing the need to resort to conversions.

At the same time, all recipients of Interbull results are expected to honor the agreed code of practice, decided by the Interbull Steering Committee, and only publish international evaluations on their own country scale. Evaluations expressed on another country scale are confidential and may only be used internally for research and review purposes.

PUBLICATION OF INTERBULL TEST RUN

Test evaluation results are meant for review purposes only and should not be published.

^LTable 1. National evaluation data considered in the Interbull evaluation for Longevity (December Routine Evaluation 2021).
Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		137	8193	1757	731	
BEL			1763			
CAN	251	104	12852	791	880	
CHE	3089		3145			
CZE			4999			
DEA	5003					
DEU			22955		281	
DFS			14196	2554	9396	
ESP			4122			
EST						
FRA	429		17415			
FRM						4808
GBR	131	317	8143	857	577	83
HUN			3642			
IRL			3079	210	69	
ISR			1615			
ITA	2217		9496			
JPN			6676			
KOR						
LTU						
LVA						
NLD	190		15785	191	77	375
NOR					3880	
NZL	59	58	7170	4233	965	
POL			11242			
PRT						
SVK						
SVN	427		658			655
URY						
USA	1160	801	40188	4979	759	78

ZAF			1257		704		134			
HRV										
CAM									40	

No. Records	12956	1417	198591	16276	17789	5999				
Pub. Proofs	10352	1131	152122	13229	16027	5282				

^LAPPENDIX I. Sire standard deviations in diagonal and genetic correlations below diagonal

BSW	dlo									

	CAN	CHE	DEA	NLD	NZL	USA	ITA	FRA	GBR	SVN
CAN	8.52									
CHE	0.72	10.78								
DEA	0.88	0.85	12.25							
NLD	0.65	0.78	0.73	329.73						
NZL	0.57	0.56	0.44	0.50	331.39					
USA	0.91	0.65	0.83	0.72	0.57	2.70				
ITA	0.79	0.69	0.87	0.63	0.45	0.69	15.79			
FRA	0.65	0.76	0.72	0.66	0.48	0.67	0.52	0.94		
GBR	0.85	0.58	0.61	0.59	0.65	0.84	0.64	0.56	0.31	
SVN	0.70	0.67	0.83	0.72	0.47	0.71	0.76	0.63	0.53	23.46

GUE	dlo				

	AUS	CAN	NZL	USA	GBR
AUS	0.05				
CAN	0.60	7.91			
NZL	0.68	0.68	279.41		
USA	0.63	0.90	0.63	2.87	
GBR	0.62	0.91	0.69	0.87	0.38

HOL	dlo																				

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	IRL	ISR	ITA	NLD	NZL	USA	HUN	CZE	SVN	ZAF	POL	JPN
AUS	0.04																				
BEL	0.64	0.38																			
CAN	0.62	0.88	6.26																		
CHE	0.73	0.77	0.83	12.19																	
DEU	0.68	0.86	0.87	0.87	12.59																
DFS	0.70	0.85	0.86	0.82	0.93	12.28															
ESP	0.55	0.80	0.88	0.77	0.84	0.76	11.58														
FRA	0.59	0.60	0.60	0.75	0.63	0.70	0.58	0.98													
GBR	0.68	0.90	0.91	0.78	0.87	0.83	0.88	0.56	0.31												
IRL	0.56	0.84	0.79	0.65	0.75	0.70	0.76	0.44	0.80	2.09											
ISR	0.59	0.57	0.55	0.66	0.68	0.71	0.56	0.63	0.56	0.56	105.66										
ITA	0.51	0.66	0.76	0.73	0.74	0.68	0.88	0.63	0.76	0.62	0.54	5.93									
NLD	0.55	0.64	0.64	0.73	0.71	0.75	0.61	0.66	0.62	0.46	0.68	0.52	268.69								
NZL	0.63	0.66	0.67	0.73	0.72	0.67	0.51	0.50	0.65	0.62	0.44	0.46	0.49	2.27							
USA	0.64	0.86	0.89	0.79	0.88	0.88	0.88	0.65	0.84	0.73	0.70	0.76	0.73	0.58	2.24						
HUN	0.44	0.59	0.69	0.57	0.59	0.54	0.77	0.52	0.65	0.50	0.44	0.71	0.46	0.45	0.72	1.20					
CZE	0.44	0.50	0.58	0.58	0.57	0.48	0.69	0.44	0.58	0.56	0.44	0.66	0.44	0.44	0.58	0.52	15.82				
SVN	0.45	0.77	0.72	0.61	0.73	0.68	0.69	0.51	0.70	0.65	0.58	0.55	0.65	0.54	0.78	0.46	0.44	24.28			
ZAF	0.61	0.82	0.88	0.65	0.79	0.73	0.85	0.49	0.85	0.86	0.46	0.67	0.45	0.62	0.85	0.68	0.55	0.68	29.93		
POL	0.44	0.44	0.45	0.56	0.57	0.48	0.59	0.44	0.47	0.44	0.44	0.61	0.44	0.44	0.50	0.44	0.51	0.45	0.44	12.52	
JPN	0.60	0.89	0.94	0.72	0.85	0.85	0.85	0.51	0.90	0.83	0.48	0.68	0.60	0.69	0.87	0.68	0.54	0.76	0.90	0.44	1.67

JER	dlo								

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0.04								
CAN	0.49	7.27							
DFS	0.68	0.69	12.08						

NLD	0.59	0.62	0.79	339.07								
NZL	0.47	0.50	0.63	0.47	1.97							
USA	0.60	0.82	0.80	0.73	0.55	2.36						
GBR	0.54	0.87	0.74	0.64	0.54	0.80	0.29					
ZAF	0.46	0.64	0.52	0.45	0.46	0.67	0.64	26.91				
IRL	0.53	0.70	0.60	0.46	0.48	0.68	0.71	0.72	1.60			

RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	0.05											
CAN	0.55	7.02										
DEU	0.66	0.85	12.38									
DFS	0.66	0.75	0.92	12.98								
NZL	0.62	0.56	0.72	0.65	2.46							
USA	0.57	0.86	0.88	0.85	0.68	2.48						
GBR	0.63	0.90	0.84	0.75	0.56	0.81	0.31					
NLD	0.55	0.65	0.72	0.76	0.55	0.77	0.62	330.22				
ZAF	0.51	0.86	0.78	0.57	0.52	0.81	0.80	0.50	33.20			
IRL	0.53	0.76	0.72	0.64	0.58	0.65	0.72	0.48	0.80	1.49		
NOR	0.55	0.78	0.74	0.80	0.45	0.80	0.66	0.79	0.61	0.65	41.18	
CAM	0.51	0.66	0.80	0.77	0.79	0.79	0.66	0.76	0.54	0.44	0.59	8.68

SIM dlo

	FRM	NLD	SVN	GBR	USA
FRM	0.98				
NLD	0.58	285.05			
SVN	0.49	0.72	21.97		
GBR	0.63	0.60	0.70	0.27	
USA	0.73	0.75	0.77	0.82	2.12

^LAPPENDIX II. Number of common bulls

BSW

common bulls below diagonal

common three quarter sib group above diagonal

	CAN	CHE	DEA	NLD	NZL	USA	ITA	FRA	GBR	SVN
CAN	0	132	144	42	26	174	134	88	64	37
CHE	114	0	588	93	27	320	481	172	76	93
DEA	126	490	0	142	36	326	696	223	76	121
NLD	36	88	131	0	23	70	121	74	33	53
NZL	26	21	30	15	0	30	31	23	18	15
USA	169	296	289	59	25	0	249	122	93	45
ITA	121	418	604	98	27	177	0	202	80	113
FRA	79	129	165	59	19	84	161	0	56	65
GBR	64	60	53	29	15	91	60	49	0	23
SVN	34	87	113	52	13	37	111	64	20	0

GUE

common bulls below diagonal

common three quarter sib group above diagonal

	AUS	CAN	NZL	USA	GBR
AUS	0	48	26	62	37
CAN	46	0	13	69	30
NZL	26	11	0	29	16
USA	58	59	26	0	89
GBR	32	24	14	90	0

HOL

common bulls below diagonal

common three quarter		sib group		above diagonal																	
AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	IRL	ISR	ITA	NLD	NZL	USA	HUN	CZE	SVN	ZAF	POL	JPN	
AUS	0	679	1346	583	1576	1319	880	1237	1473	734	116	1160	1430	1009	1858	738	907	190	468	1043	923
BEL	589	0	722	540	1071	843	634	844	880	494	85	765	1087	403	880	524	647	182	303	755	533
CAN	1311	688	0	822	2333	1494	1301	1426	1744	554	141	1700	1520	576	3434	1059	1157	223	473	1448	1377
CHE	515	539	710	0	1092	712	556	638	757	396	70	719	893	313	987	436	545	152	251	677	475
DEU	1161	1086	1714	1021	0	2744	1530	2318	2293	886	184	2566	3308	771	3524	1310	1975	353	541	2589	1468
DFS	958	792	1263	663	2082	0	1084	1668	1849	789	174	1682	2300	706	2253	989	1428	287	510	1773	1062
ESP	629	616	803	457	985	824	0	1140	1171	514	118	1292	1139	449	1591	817	933	213	440	1112	942
FRA	793	799	867	551	1160	851	792	0	1641	747	132	1648	1924	669	2492	973	1327	215	465	1667	1231
GBR	1333	900	1981	753	1949	1562	992	1057	0	1087	173	1730	2057	880	2491	1005	1323	260	537	1611	1173
IRL	632	485	500	406	776	661	490	570	1160	0	108	680	916	677	818	471	592	138	331	645	471
ISR	71	48	87	40	141	124	65	61	131	84	0	168	181	102	224	134	146	54	70	168	122
ITA	866	740	1347	655	1768	1351	952	882	1497	595	116	0	1767	600	2626	1099	1348	260	480	1732	1236
NLD	1217	1206	1384	875	3036	2072	993	1142	1968	859	132	1459	0	843	2551	1049	1653	296	500	1968	1109
NZL	968	312	526	263	548	479	326	350	787	579	82	437	738	0	902	436	574	119	328	542	488
USA	1821	772	3718	914	2567	1789	1052	1262	2427	738	212	1928	2131	817	0	1442	1820	267	630	2235	2069
HUN	563	443	935	365	1051	813	660	634	942	416	90	980	881	334	1417	0	1017	185	395	1058	783
CZE	607	519	816	420	1565	997	686	822	1080	473	108	1009	1485	411	1471	943	0	246	429	1460	938
SVN	133	145	159	112	344	234	161	142	212	108	38	227	253	80	206	139	187	0	102	289	190
ZAF	407	257	397	210	422	386	381	310	491	291	44	379	408	260	606	315	299	73	0	416	433
POL	781	683	1204	567	2338	1486	791	1042	1517	539	126	1384	1844	404	2154	960	1231	259	311	0	1070
JPN	550	351	724	345	697	622	474	448	694	322	53	636	633	264	1021	468	466	110	311	609	0

JER

common bulls below diagonal		sib group		above diagonal					
AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL	
AUS	0	248	159	69	360	480	234	232	55
CAN	254	0	112	36	136	440	182	157	11
DFS	130	105	0	110	130	214	197	155	51
NLD	62	31	110	0	57	87	91	71	33
NZL	393	146	110	50	0	297	213	170	122
USA	518	452	198	94	357	0	267	306	48
GBR	247	187	202	90	230	315	0	188	86
ZAF	226	153	139	67	181	321	198	0	39
IRL	53	10	47	32	136	49	92	39	0

RDC

common bulls below diagonal		sib group		above diagonal								
AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM	
AUS	0	95	36	199	104	126	89	28	36	18	68	9
CAN	97	0	13	175	50	222	101	6	70	5	7	0
DEU	36	12	0	54	11	23	14	15	2	6	13	0
DFS	178	180	45	0	123	203	123	49	49	20	141	0
NZL	105	49	11	118	0	72	56	12	30	10	28	8
USA	126	204	22	199	73	0	124	44	61	28	76	21
GBR	87	101	14	121	55	119	0	33	50	24	57	0
NLD	27	6	14	47	12	43	32	0	2	14	41	0
ZAF	37	72	2	48	26	55	43	2	0	2	0	0
IRL	17	5	6	16	10	28	23	14	2	0	58	0
NOR	58	6	12	114	26	76	60	40	0	56	0	0
CAM	9	0	0	0	8	21	0	0	0	0	0	0

SIM

common bulls below diagonal		sib group		above diagonal	
FRM	NLD	SVN	GBR	USA	
FRM	0	114	0	65	58
NLD	135	0	60	43	25
SVN	0	59	0	0	1

GBR	82	41	0	0	19
USA	73	27	1	26	0
