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:

AUS (ALL)	Decrease in information due to the data clean-up, pedigree changes, bulls' statue changes and rounding effect
ISR (HOL)	Decrease in information due to the data edits, paternity correction and updated UPG grouping and number of iterations.
FRA (ALL)	All proofs sent to MACE are now â\200\234genomic-freeâ\200\235 single-step proofs, issued from a BLUP evaluation running on single-step preadjusted performances, as suggested as one of the methods of choice to provide unbiased â\200\234genomic-freeâ\200\235 proofs to Interbull by the Interbull working group on this topic. In addition to these changes, unknown parent groups have been modified for all traits.
ESP (HOL)	Drop in information due to the update of national database.
NZL (HOL)	Decrease in information due to parentage verification
BEL (HOL)	Small decrease in information due to the pedigree(alias) correction and rounding effect
JPN (HOL)	Small decrease in information due to the pedigree modification
CAN(HOL,JER,RDC)	Drop in information due to ï»¿to the data edits/changes.ï»¿
POL(HOL)	Decrease in information due to the data edits.
NLD (HOL)	Decrease in information due to pedigree changes /correction.
CHE(HOL,BSW)	Decrease in information due to the edits in database, and change in hys assignment.
ITA (HOL)	Drop in information due to data flow and edits
DEA (BSW)	Base change, decrease in info due to the pedigree correction based on genotyping, type of proof changes for some bulls

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 2023).
Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		143	8558	1822	775	
BEL			1886			
CAN	261	111	13491	850	908	
CHE	3209		3313			
CZE			5268			
DEA	5183					
DEU			23949		301	
DFS			14880	2704	9550	
ESP			4512			
EST						
FRA	495		18426			
FRM						5028
GBR	144	336	8548	909	633	107
HUN			3645			
IRL			3359	245	76	
ISR			1753			
ITA	2339		9510			
JPN			7094			
KOR						
LTU						
LVA						
NLD	222		16426	245	88	429
NOR					3976	
NZL			8101	4662	1046	
POL			12261			
PRT						
SVK						
SVN	301		650			505
URY						
USA	1215	824	41949	5320	807	100
ZAF			1259	721	134	
HRV						
CAM					43	
No.Records	13369	1414	208838	17478	18337	6169
Pub. Proofs	10621	1156	156372	14066	16400	5751

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

BSW	dlo

	CAN	CHE	DEA	NLD	USA	ITA	FRA	GBR	SVN
CAN	9.07								
CHE	0.72	10.75							
DEA	0.89	0.84	12.26						
NLD	0.68	0.76	0.72	326.85					
USA	0.91	0.64	0.85	0.73	2.67				
ITA	0.79	0.71	0.86	0.64	0.71	15.82			
FRA	0.65	0.82	0.77	0.69	0.69	0.55	0.96		
GBR	0.85	0.59	0.65	0.60	0.84	0.65	0.62	0.32	
SVN	0.67	0.65	0.81	0.71	0.69	0.74	0.70	0.58	23.25

GUE dlo

	AUS	CAN	USA	GBR
AUS	0.06			
CAN	0.59	8.04		
USA	0.63	0.89	2.90	
GBR	0.63	0.91	0.87	0.39

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	0.61	0.88	6.76																		
CHE	0.72	0.77	0.82	12.22																	
DEU	0.66	0.85	0.86	0.87	12.43																
DFS	0.69	0.85	0.86	0.81	0.92	12.20															
ESP	0.56	0.81	0.87	0.78	0.84	0.76	11.39														
FRA	0.56	0.65	0.66	0.78	0.66	0.69	0.63	0.94													
GBR	0.68	0.90	0.90	0.79	0.86	0.82	0.88	0.62	0.31												
IRL	0.57	0.85	0.79	0.67	0.75	0.70	0.76	0.45	0.80	2.11											
ISR	0.60	0.57	0.52	0.70	0.71	0.71	0.59	0.57	0.59	0.58	107.11										
ITA	0.53	0.69	0.76	0.73	0.74	0.68	0.89	0.71	0.78	0.64	0.56	6.07									
NLD	0.53	0.66	0.66	0.72	0.70	0.75	0.61	0.66	0.63	0.47	0.68	0.53	264.01								
NZL	0.65	0.68	0.68	0.75	0.75	0.69	0.53	0.49	0.67	0.65	0.50	0.49	0.50	2.22							
USA	0.63	0.85	0.89	0.80	0.88	0.88	0.88	0.69	0.84	0.72	0.72	0.76	0.74	0.61	2.21						
HUN	0.44	0.59	0.70	0.59	0.60	0.54	0.78	0.59	0.65	0.49	0.43	0.72	0.47	0.45	0.73	1.20					
CZE	0.44	0.50	0.57	0.57	0.56	0.46	0.69	0.44	0.56	0.56	0.45	0.62	0.44	0.44	0.57	0.52	18.61				
SVN	0.43	0.75	0.68	0.67	0.74	0.67	0.68	0.62	0.70	0.65	0.57	0.61	0.65	0.57	0.73	0.47	0.44	22.24			
ZAF	0.60	0.82	0.89	0.71	0.82	0.75	0.86	0.58	0.86	0.86	0.53	0.70	0.48	0.65	0.86	0.69	0.60	0.63	29.84		
POL	0.44	0.44	0.44	0.52	0.56	0.47	0.61	0.44	0.48	0.44	0.44	0.60	0.44	0.44	0.49	0.44	0.51	0.44	0.46	12.17	
JPN	0.61	0.90	0.94	0.74	0.86	0.86	0.86	0.58	0.90	0.83	0.49	0.70	0.63	0.70	0.87	0.68	0.55	0.74	0.90	0.44	1.56

JER dlo

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0.04								
CAN	0.49	7.35							
DFS	0.67	0.69	11.98						
NLD	0.57	0.63	0.80	311.68					
NZL	0.48	0.50	0.60	0.47	1.97				
USA	0.58	0.82	0.79	0.73	0.55	2.34			
GBR	0.52	0.88	0.72	0.62	0.52	0.79	0.29		
ZAF	0.46	0.63	0.50	0.45	0.46	0.65	0.66	27.13	
IRL	0.50	0.68	0.57	0.46	0.49	0.65	0.68	0.68	1.60

RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	0.05											
CAN	0.53	7.40										
DEU	0.66	0.84	12.46									
DFS	0.64	0.75	0.91	13.01								
NZL	0.63	0.57	0.71	0.58	2.58							

USA	0.56	0.86	0.88	0.86	0.68	2.46					
GBR	0.62	0.90	0.85	0.75	0.58	0.80	0.31				
NLD	0.57	0.65	0.71	0.77	0.54	0.76	0.62	318.84			
ZAF	0.50	0.88	0.78	0.58	0.57	0.79	0.82	0.48	34.56		
IRL	0.53	0.74	0.73	0.66	0.60	0.64	0.71	0.48	0.79	1.53	
NOR	0.52	0.77	0.71	0.80	0.45	0.81	0.70	0.80	0.63	0.54	40.87
CAM	0.44	0.67	0.73	0.73	0.60	0.84	0.66	0.66	0.59	0.43	0.59	8.99

SIM dlo

	FRM	NLD	SVN	GBR	USA
FRM	0.94				
NLD	0.58	291.02			
SVN	0.47	0.60	22.50		
GBR	0.76	0.63	0.72	0.26	
USA	0.72	0.75	0.74	0.83	2.15

^LAPPENDIX II. Number of common bulls

BSW

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	DEA	NLD	USA	ITA	FRA	GBR	SVN
CAN	0	141	154	48	180	142	97	66	28
CHE	121	0	627	113	331	515	193	80	71
DEA	135	525	0	160	338	751	251	81	95
NLD	41	107	148	0	85	139	84	37	43
USA	174	307	302	74	0	258	135	96	33
ITA	128	455	659	113	184	0	229	84	88
FRA	88	156	207	71	100	195	0	66	47
GBR	66	63	57	31	93	63	58	0	16
SVN	26	66	88	43	27	83	47	14	0

GUE

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	USA	GBR
AUS	0	51	67	39
CAN	50	0	75	35
USA	64	66	0	95
GBR	34	30	96	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	726	1467	637	1699	1432	939	1382	1592	790	133	1185	1515	1106	2029	784	958	158	471	1162	979
BEL	632	0	783	578	1161	921	697	986	949	528	94	795	1171	447	953	548	691	155	304	828	561
CAN	1456	748	0	886	2548	1707	1399	1613	1901	609	167	1909	1703	660	3827	1062	1262	209	474	1680	1471
CHE	562	580	781	0	1173	775	595	749	812	438	77	766	950	362	1046	444	563	132	250	742	504
DEU	1299	1184	1958	1102	0	3071	1675	2687	2492	958	206	2773	3628	885	3804	1318	2115	352	542	2970	1555
DFS	1077	870	1507	732	2439	0	1205	1942	2003	859	197	1825	2572	810	2531	1030	1551	267	511	2054	1142
ESP	684	680	910	497	1129	955	0	1367	1265	554	127	1391	1263	516	1726	843	1003	191	444	1261	990
FRA	979	982	1109	691	1645	1223	1147	0	1858	831	155	1775	2231	766	2717	1047	1492	221	503	2010	1341
GBR	1460	963	2149	811	2150	1733	1090	1389	0	1176	193	1818	2231	993	2699	1028	1408	230	539	1812	1243
IRL	685	515	553	447	845	728	532	699	1255	0	127	675	990	749	899	496	627	114	332	712	506
ISR	82	54	101	43	156	143	73	94	152	93	0	182	201	122	273	136	167	51	71	197	140
ITA	944	800	1646	712	2077	1579	1070	1172	1612	613	124	0	1920	615	2839	1083	1414	263	440	2008	1265
NLD	1310	1298	1590	933	3424	2364	1118	1558	2159	933	153	1690	0	967	2777	1059	1774	273	499	2241	1192
NZL	1068	346	600	299	643	561	376	470	894	644	91	477	852	0	1027	484	632	102	334	634	543
USA	2055	837	4217	978	2911	2127	1183	1581	2660	823	263	2315	2385	955	0	1448	1970	248	631	2607	2189

HUN	597	463	941	373	1067	856	686	760	962	435	93	979	893	364	1426	0	1044	155	396	1090	802
CZE	653	553	907	435	1708	1112	755	1034	1154	496	126	1116	1600	457	1629	971	0	221	430	1621	992
SVN	106	120	161	96	346	218	138	166	185	85	35	229	239	69	203	115	157	0	65	292	162
ZAF	409	260	398	210	423	388	386	385	492	292	44	355	407	263	608	315	301	46	0	417	435
POL	899	756	1461	636	2767	1794	953	1469	1735	600	150	1733	2139	481	2619	1000	1393	259	311	0	1159
JPN	602	380	813	368	777	693	524	573	751	353	60	703	707	306	1132	488	514	93	312	687	0

JER

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0	266	188	77	398	510	257	247	64
CAN	273	0	144	45	158	484	199	166	15
DFS	163	141	0	160	157	268	238	175	61
NLD	68	38	162	0	74	108	110	76	41
NZL	436	168	139	67	0	334	251	191	146
USA	551	498	257	113	395	0	295	322	57
GBR	267	202	244	109	263	343	0	199	104
ZAF	239	162	162	72	200	337	209	0	44
IRL	62	14	57	39	161	58	112	44	0

RDC

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	0	98	41	220	115	139	98	35	36	22	75	11
CAN	101	0	13	194	54	234	113	6	70	5	7	0
DEU	40	12	0	65	15	24	14	18	2	6	15	0
DFS	199	202	56	0	137	226	147	55	49	21	148	0
NZL	116	53	15	132	0	79	67	19	30	11	31	9
USA	141	216	22	223	80	0	147	48	61	33	86	26
GBR	97	113	14	144	65	141	0	39	50	30	71	0
NLD	34	6	17	53	19	47	38	0	2	17	49	0
ZAF	37	72	2	48	26	55	43	2	0	2	0	0
IRL	21	5	6	17	11	33	29	17	2	0	63	0
NOR	64	6	14	122	29	87	75	48	0	61	0	0
CAM	11	0	0	0	9	26	0	0	0	0	0	0

SIM

common bulls below diagonal
common three quarter sib group above diagonal

	FRM	NLD	SVN	GBR	USA
FRM	0	122	0	65	79
NLD	143	0	73	44	31
SVN	0	71	0	0	1
GBR	82	42	0	0	20
USA	94	32	1	27	0