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:

BEL (HOL)	Inclusion of inbreeding effect in the model
AUS (ALL)	Lose of information due to data clean up such as pedigree changes, status change of a bull which leads to a good number of bulls no longer qualifying. Base change for RDC
SVN (ALL)	Reduced the performance data to 2010-2022 and estimated variance components for all traits
JPN (HOL)	Some decrease in information due to pedigree correction
ESP (HOL)	Database update from regional milk recording organizations, affecting several bulls but very slight change in information by bull.
NZL (ALL)	Continuous DNA parentage testing affecting numbers of daughters, herds and EDCs. EDC are also affected by changes in phenotype records
CHE (HOL,BSW)	Drops in information due to manual edits in database. The change of herd-year-season assignment of certain data records might also explain small changes in EDC and reliabilities for some bulls.
ITA (HOL)	Drop in information due to data editing
GBR (HOL)	Minor changes in data due re-extraction at each run and changes introduced by data providers

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 2022).
Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		142	8384	1790	753	
BEL			1825			
CAN	257	106	13171	825	897	
CHE	3146		3240			
CZE			5140			
DEA	5104					
DEU			23481		291	
DFS			14517	2559	9475	
ESP			4324			
EST						
FRA	486		18212			
FRM						4917
GBR	136	327	8364	880	600	83
HUN			3646			
IRL			3203	231	73	
ISR			1680			
ITA	2283		9455			
JPN			6883			
KOR						
LTU						
LVA						
NLD	205		16150	223	82	402
NOR					3936	
NZL			7834	4538	1022	
POL			11665			
PRT						
SVK						
SVN	289		606			468
URY						
USA	1193	815	41138	5188	788	89
ZAF			1258	716	134	
HRV						
CAM					41	
No.Records	13099	1390	204176	16950	18092	5959
Pub. Proofs	10442	1142	154427	13758	16240	5568

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

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BSW dlo

	CAN	CHE	DEA	NLD	USA	ITA	FRA	GBR	SVN
CAN	8.73								
CHE	0.71	10.80							
DEA	0.89	0.84	12.26						
NLD	0.66	0.78	0.73	332.51					
USA	0.91	0.64	0.84	0.72	2.67				
ITA	0.79	0.70	0.86	0.63	0.70	15.81			
FRA	0.64	0.77	0.72	0.65	0.67	0.51	0.95		
GBR	0.85	0.59	0.64	0.60	0.84	0.64	0.57	0.32	
SVN	0.64	0.64	0.78	0.73	0.66	0.74	0.56	0.56	23.44

GUE dlo

	AUS	CAN	USA	GBR
AUS	0.05			
CAN	0.59	8.01		
USA	0.63	0.90	2.91	
GBR	0.62	0.91	0.86	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	0.61	0.88	6.37																		
CHE	0.72	0.77	0.83	12.20																	
DEU	0.67	0.86	0.87	0.87	12.52																
DFS	0.69	0.85	0.86	0.82	0.92	12.25															
ESP	0.55	0.80	0.87	0.78	0.84	0.76	11.49														
FRA	0.57	0.61	0.61	0.75	0.63	0.70	0.58	0.98													
GBR	0.68	0.90	0.90	0.78	0.86	0.83	0.88	0.57	0.31												
IRL	0.57	0.85	0.79	0.66	0.75	0.70	0.76	0.44	0.80	2.10											
ISR	0.60	0.57	0.54	0.68	0.69	0.70	0.58	0.63	0.58	0.58	105.94										
ITA	0.52	0.67	0.75	0.73	0.74	0.68	0.88	0.63	0.77	0.62	0.55	6.01									
NLD	0.54	0.65	0.65	0.72	0.70	0.75	0.61	0.65	0.63	0.47	0.69	0.53	268.98								
NZL	0.64	0.67	0.67	0.74	0.73	0.68	0.51	0.51	0.65	0.63	0.46	0.46	0.50	2.23							
USA	0.63	0.86	0.89	0.79	0.88	0.89	0.88	0.66	0.84	0.72	0.72	0.76	0.73	0.59	2.22						
HUN	0.44	0.59	0.69	0.57	0.59	0.54	0.77	0.53	0.65	0.49	0.44	0.71	0.46	0.45	0.72	1.20					
CZE	0.44	0.50	0.56	0.57	0.56	0.48	0.69	0.44	0.57	0.55	0.44	0.63	0.44	0.44	0.57	0.52	18.12				
SVN	0.44	0.75	0.66	0.68	0.73	0.65	0.65	0.57	0.68	0.64	0.63	0.58	0.64	0.58	0.71	0.44	0.44	22.93			
ZAF	0.60	0.82	0.89	0.67	0.81	0.74	0.85	0.50	0.85	0.86	0.52	0.68	0.47	0.62	0.85	0.68	0.57	0.60	29.77		
POL	0.44	0.44	0.45	0.54	0.56	0.48	0.60	0.44	0.47	0.44	0.44	0.60	0.44	0.44	0.49	0.44	0.51	0.44	0.44	12.51	
JPN	0.60	0.90	0.94	0.73	0.86	0.86	0.86	0.53	0.90	0.83	0.50	0.69	0.61	0.68	0.87	0.68	0.54	0.72	0.90	0.44	1.60

JER dlo

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0.04								
CAN	0.49	7.25							
DFS	0.68	0.70	12.09						
NLD	0.58	0.63	0.79	329.12					
NZL	0.47	0.50	0.61	0.47	1.97				
USA	0.59	0.83	0.80	0.73	0.55	2.36			
GBR	0.53	0.88	0.74	0.64	0.53	0.80	0.30		
ZAF	0.46	0.64	0.52	0.46	0.46	0.65	0.68	26.77	
IRL	0.51	0.70	0.59	0.46	0.48	0.67	0.70	0.69	1.57

RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	0.05											
CAN	0.54	7.15										

DEU	0.66	0.85	12.33									
DFS	0.64	0.75	0.92	13.00								
NZL	0.62	0.56	0.71	0.62	2.52							
USA	0.56	0.86	0.88	0.86	0.68	2.44						
GBR	0.62	0.90	0.84	0.75	0.56	0.80	0.31					
NLD	0.56	0.65	0.71	0.76	0.54	0.76	0.62	328.43				
ZAF	0.50	0.87	0.77	0.56	0.53	0.79	0.81	0.49	32.67			
IRL	0.53	0.75	0.72	0.65	0.58	0.65	0.71	0.49	0.80	1.51		
NOR	0.53	0.79	0.73	0.80	0.46	0.81	0.68	0.81	0.62	0.61	40.92	
CAM	0.46	0.62	0.75	0.73	0.70	0.81	0.62	0.69	0.52	0.43	0.55	8.92

SIM dlo

	FRM	NLD	SVN	GBR	USA
FRM	0.98				
NLD	0.57	293.62			
SVN	0.44	0.54	22.94		
GBR	0.67	0.62	0.69	0.26	
USA	0.73	0.75	0.70	0.82	2.09

^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	136	149	45	178	138	96	65	27
CHE	117	0	607	103	326	499	196	78	68
DEA	131	508	0	150	331	719	256	80	89
NLD	39	96	139	0	79	130	81	35	41
USA	173	302	294	68	0	253	134	94	33
ITA	124	439	629	104	179	0	230	83	84
FRA	87	153	204	68	98	191	0	65	45
GBR	65	62	57	31	92	63	59	0	16
SVN	25	61	83	41	27	79	45	14	0

GUE

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	USA	GBR
AUS	0	51	66	38
CAN	50	0	70	31
USA	63	61	0	90
GBR	33	26	92	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	704	1397	608	1632	1375	910	1348	1531	757	125	1160	1469	1067	1938	765	933	148	469	1099	952
BEL	611	0	749	559	1115	878	670	954	912	508	88	777	1128	433	910	535	671	146	303	792	545
CAN	1383	716	0	859	2452	1591	1340	1580	1828	578	151	1809	1626	626	3654	1059	1210	194	473	1550	1423
CHE	535	559	751	0	1131	746	577	731	789	416	75	741	931	342	1017	441	555	122	251	709	489
DEU	1224	1132	1845	1063	0	2890	1608	2619	2402	919	194	2649	3497	840	3681	1316	2043	327	541	2749	1511
DFS	1021	830	1373	696	2238	0	1138	1879	1936	819	185	1726	2439	766	2381	1021	1480	248	510	1882	1098
ESP	661	657	844	480	1069	888	0	1329	1224	536	122	1343	1206	491	1656	833	969	175	443	1177	968
FRA	950	952	1072	673	1581	1163	1106	0	1825	805	151	1778	2175	748	2688	1037	1467	209	500	1913	1320
GBR	1398	926	2064	783	2057	1654	1050	1350	0	1127	183	1772	2149	939	2604	1022	1358	212	538	1711	1213
IRL	656	497	523	426	810	692	517	676	1201	0	112	672	949	708	854	483	606	102	331	674	485
ISR	76	49	93	41	147	133	69	91	141	84	0	169	192	112	241	135	154	48	71	176	130
ITA	902	769	1506	683	1893	1445	1014	1130	1547	597	116	0	1836	611	2725	1097	1372	238	460	1835	1245

NLD	1268	1253	1505	913	3265	2223	1066	1503	2070	893	140	1571	0	914	2688	1059	1718	260	500	2087	1152
NZL	1027	333	569	282	608	527	357	453	839	608	84	457	805	0	977	469	610	91	334	592	522
USA	1937	803	3983	953	2754	1945	1111	1552	2545	775	228	2129	2283	900	0	1447	1895	231	630	2379	2121
HUN	586	452	937	370	1059	842	678	754	952	426	91	983	893	351	1425	0	1036	152	395	1075	793
CZE	637	537	864	428	1639	1052	725	1008	1111	481	114	1058	1550	441	1556	966	0	211	429	1530	965
SVN	99	112	143	90	320	197	126	157	169	78	33	202	225	60	183	111	152	0	64	263	156
ZAF	408	258	397	210	422	387	386	383	491	291	44	368	408	263	607	315	300	45	0	416	434
POL	847	721	1318	597	2518	1615	867	1361	1618	564	135	1527	1980	439	2346	984	1307	235	311	0	1110
JPN	578	364	770	358	738	656	505	551	725	335	54	671	672	287	1073	483	490	88	312	647	0

JER

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0	259	162	74	387	496	247	239	61
CAN	265	0	115	40	151	467	189	165	14
DFS	136	110	0	113	139	217	205	157	53
NLD	67	34	115	0	69	96	101	74	38
NZL	418	159	121	62	0	322	233	184	134
USA	536	480	204	103	380	0	285	320	52
GBR	260	195	211	100	247	334	0	196	91
ZAF	233	161	143	70	194	335	205	0	42
IRL	59	13	49	36	150	53	98	42	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	97	37	209	109	133	94	31	36	21	71	10
CAN	100	0	13	184	52	228	105	6	70	5	7	0
DEU	37	12	0	61	12	23	14	15	2	6	14	0
DFS	188	191	52	0	129	219	131	51	49	20	146	0
NZL	109	51	12	124	0	75	63	14	30	10	29	8
USA	134	210	22	216	76	0	135	48	61	31	82	22
GBR	93	105	14	129	62	129	0	37	50	27	61	0
NLD	30	6	14	49	14	47	36	0	2	16	46	0
ZAF	37	72	2	48	26	55	43	2	0	2	0	0
IRL	20	5	6	16	10	31	26	16	2	0	61	0
NOR	61	6	13	119	27	83	64	45	0	59	0	0
CAM	10	0	0	0	8	22	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	117	0	65	68
NLD	138	0	61	43	28
SVN	0	61	0	0	1
GBR	82	41	0	0	19
USA	83	30	1	26	0