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)	Few bulls missing due to drop in daughters, changes in type of proofs caused by the program assigning them.
DEA (BSW)	Drops in info causing changes in reliabilities
ISR (HOL)	Some bulls had slight reductions in the numbers of records due to editing and parentage corrections.
JPN (HOL)	Changes in information caused by additional records and modification of pedigree.
NZL (ALL)	Changes in information caused by continuous DNA parentage testing
DFS (ALL)	Changes in type of proofs: Type of proof is based on information from production. When production information for foreign bulls become available such bulls might also change type of proof for other traits, drops in information.
ITA (HOL)	Decrease in information due to data editing.
SVN (ALL)	Smal changes in information due changes in data base related to the pedigree completness as well as phenotypic data improvement.
POL (HOL)	Small decrease in number of herds and daughters due to data edits caused decrease of EDC.
ESP (HOL)	Drops in information due to data edits
ZAF (ALL)	Reliabilities estimated with Jamrozik et al. method

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 (August Routine Evaluation 2021).
Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		135	8144	1750	724	
BEL			1744			
CAN	249	103	12743	783	878	
CHE	3072		3582			
CZE			4864			
DEA	4981					
DEU			22791		279	
DFS			14096	2557	9380	
ESP			4061			
EST						
FRA	424		17334			
FRM						4763
GBR	129	315	8068	845	573	83
HUN			3603			
IRL			3077	210	69	
ISR			1584			
ITA	2206		9310			
JPN			6605			
KOR						
LTU						
LVA						
NLD	186		15673	184	76	368
NOR					3866	
NZL	59	58	7883	4846	1286	
POL			11084			
PRT						
SVK						
SVN	418		644			648
URY						
USA	1148	800	39872	4914	749	75
ZAF			1258	703	135	
HRV						
CAM					40	
No.Records	12872	1411	198020	16792	18055	5937
Pub. Proofs	10317	1127	152152	13665	16218	5226

^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	8.65									
CHE	0.73	10.79								
DEA	0.88	0.86	12.28							
NLD	0.65	0.78	0.74	324.18						
NZL	0.57	0.56	0.44	0.51	331.39					
USA	0.91	0.66	0.83	0.71	0.59	2.70				
ITA	0.78	0.69	0.87	0.62	0.45	0.68	15.92			
FRA	0.66	0.76	0.72	0.66	0.50	0.68	0.53	0.94		
GBR	0.85	0.58	0.61	0.59	0.64	0.83	0.63	0.55	0.31	
SVN	0.71	0.67	0.83	0.72	0.47	0.70	0.76	0.65	0.52	23.48

GUE dlo

	AUS	CAN	NZL	USA	GBR
AUS	0.05				
CAN	0.61	8.09			
NZL	0.69	0.67	279.41		
USA	0.64	0.90	0.65	2.86	
GBR	0.63	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	0.65	0.38																			
CAN	0.63	0.87	6.30																		
CHE	0.73	0.77	0.83	12.25																	
DEU	0.68	0.85	0.88	0.87	12.59																
DFS	0.70	0.85	0.86	0.82	0.93	12.29															
ESP	0.55	0.79	0.87	0.77	0.84	0.76	11.70														
FRA	0.60	0.60	0.60	0.75	0.63	0.70	0.57	0.98													
GBR	0.68	0.89	0.91	0.79	0.87	0.83	0.88	0.56	0.31												
IRL	0.57	0.84	0.79	0.65	0.75	0.70	0.76	0.44	0.80	2.08											
ISR	0.60	0.57	0.55	0.66	0.67	0.71	0.55	0.65	0.55	0.54	104.96										
ITA	0.50	0.65	0.76	0.73	0.74	0.68	0.88	0.62	0.76	0.62	0.54	5.95									
NLD	0.55	0.63	0.64	0.73	0.72	0.75	0.60	0.66	0.62	0.46	0.66	0.52	267.57								
NZL	0.65	0.74	0.64	0.72	0.77	0.73	0.53	0.54	0.67	0.68	0.48	0.47	0.53	248.59							
USA	0.64	0.86	0.89	0.79	0.88	0.88	0.88	0.65	0.85	0.73	0.69	0.75	0.73	0.64	2.24						
HUN	0.45	0.59	0.69	0.57	0.59	0.54	0.76	0.52	0.66	0.50	0.44	0.70	0.46	0.44	0.72	1.21					
CZE	0.45	0.50	0.59	0.59	0.58	0.49	0.70	0.44	0.59	0.56	0.44	0.67	0.45	0.44	0.58	0.52	13.51				
SVN	0.45	0.77	0.72	0.60	0.74	0.68	0.69	0.51	0.70	0.66	0.57	0.54	0.64	0.64	0.79	0.46	0.44	24.52			
ZAF	0.62	0.82	0.88	0.64	0.79	0.73	0.85	0.48	0.85	0.86	0.44	0.67	0.45	0.63	0.84	0.68	0.55	0.69	29.64		
POL	0.45	0.45	0.46	0.57	0.58	0.49	0.60	0.45	0.48	0.45	0.44	0.62	0.45	0.44	0.50	0.45	0.52	0.45	0.45	12.51	
JPN	0.60	0.89	0.94	0.72	0.85	0.85	0.85	0.51	0.89	0.83	0.47	0.67	0.60	0.70	0.87	0.68	0.54	0.76	0.90	0.45	1.70

JER dlo

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0.04								
CAN	0.50	7.35							
DFS	0.67	0.69	12.07						
NLD	0.60	0.61	0.79	335.24					
NZL	0.59	0.53	0.73	0.51	227.31				
USA	0.61	0.82	0.79	0.74	0.61	2.38			
GBR	0.56	0.86	0.75	0.64	0.53	0.81	0.29		
ZAF	0.47	0.62	0.52	0.46	0.46	0.68	0.64	27.04	
IRL	0.54	0.70	0.59	0.46	0.51	0.67	0.71	0.72	1.59

RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	0.05											
CAN	0.56	6.99										
DEU	0.65	0.86	12.43									
DFS	0.66	0.74	0.91	12.96								

NZL	0.62	0.52	0.68	0.52	279.05							
USA	0.58	0.86	0.88	0.85	0.52	2.51						
GBR	0.64	0.90	0.84	0.75	0.54	0.81	0.31					
NLD	0.54	0.65	0.73	0.75	0.50	0.76	0.62	325.58				
ZAF	0.52	0.86	0.78	0.58	0.50	0.83	0.80	0.51	32.73			
IRL	0.54	0.76	0.72	0.63	0.62	0.66	0.72	0.48	0.79	1.50		
NOR	0.55	0.76	0.74	0.81	0.44	0.81	0.64	0.79	0.61	0.67	41.19	
CAM	0.51	0.66	0.78	0.76	0.44	0.75	0.66	0.72	0.54	0.44	0.58	8.61

SIM dlo

	FRM	NLD	SVN	GBR	USA
FRM	0.98				
NLD	0.59	285.17			
SVN	0.51	0.73	22.20		
GBR	0.61	0.60	0.70	0.26	
USA	0.73	0.75	0.78	0.82	2.16

^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	131	142	41	26	174	132	88	60	36
CHE	113	0	586	91	27	319	476	171	70	91
DEA	124	489	0	138	36	320	690	222	69	119
NLD	35	86	128	0	23	69	119	71	33	51
NZL	26	21	30	15	0	30	31	23	18	14
USA	169	295	283	58	25	0	248	122	84	44
ITA	119	412	598	96	27	177	0	201	73	110
FRA	78	128	163	57	19	83	159	0	54	64
GBR	57	51	46	24	14	73	49	44	0	23
SVN	33	85	111	50	12	36	109	62	17	0

GUE

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	NZL	USA	GBR
AUS	0	47	26	61	37
CAN	46	0	13	68	30
NZL	26	11	0	29	16
USA	57	58	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	675	1330	600	1560	1301	871	1224	1458	730	114	1142	1415	1144	1837	733	891	188	468	1027	913
BEL	582	0	714	548	1057	831	629	834	874	493	85	755	1076	469	871	520	636	180	303	742	529
CAN	1291	677	0	875	2298	1465	1286	1405	1715	554	135	1650	1490	694	3365	1046	1117	217	473	1407	1360
CHE	513	537	705	0	1147	743	571	652	792	407	71	729	905	393	1024	451	561	152	260	690	497
DEU	1143	1068	1668	1012	0	2697	1514	2294	2260	886	180	2508	3242	917	3482	1300	1913	346	541	2524	1451
DFS	940	777	1228	654	2024	0	1066	1645	1822	789	172	1651	2259	839	2215	977	1389	283	510	1729	1044
ESP	622	607	786	453	968	803	0	1127	1149	515	119	1275	1121	528	1573	805	907	206	441	1089	939
FRA	779	786	846	549	1138	831	779	0	1623	745	131	1634	1901	763	2466	964	1310	212	464	1645	1221
GBR	1308	890	1946	746	1915	1529	976	1034	0	1080	171	1696	2021	1013	2463	990	1292	258	537	1574	1160
IRL	626	484	499	409	775	659	491	568	1152	0	107	678	917	735	819	472	586	137	331	642	472
ISR	71	48	81	40	137	122	66	61	130	83	0	163	176	111	211	131	139	53	70	162	121
ITA	853	721	1281	643	1695	1309	930	870	1459	595	114	0	1721	707	2566	1082	1305	254	480	1676	1215

NLD	1197	1188	1345	864	2967	2028	978	1120	1932	859	128	1406	0	1001	2509	1034	1588	293	500	1925	1091
NZL	1125	381	678	324	690	589	396	429	929	635	88	539	900	0	1052	506	653	139	352	653	567
USA	1791	761	3619	904	2505	1737	1033	1236	2386	737	198	1845	2081	992	0	1426	1764	263	630	2174	2047
HUN	556	437	919	362	1037	794	647	623	932	415	87	955	863	392	1390	0	992	181	395	1043	774
CZE	591	507	772	411	1504	954	672	813	1049	468	102	964	1427	479	1403	919	0	239	429	1407	918
SVN	130	143	154	111	337	230	157	140	207	106	38	223	250	95	202	136	180	0	102	284	185
ZAF	407	257	397	211	422	386	383	308	491	291	44	380	408	285	607	315	299	72	0	416	433
POL	765	667	1152	552	2263	1431	762	1019	1471	535	120	1314	1792	495	2078	932	1174	255	311	0	1053
JPN	543	346	709	340	680	607	470	441	681	321	52	617	618	321	1001	459	448	108	311	587	0

JER

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0	245	158	68	424	474	232	230	55
CAN	250	0	112	35	166	433	178	156	11
DFS	130	105	0	110	153	214	193	155	51
NLD	61	30	110	0	68	85	86	71	33
NZL	462	175	133	61	0	346	238	200	126
USA	512	445	198	91	414	0	264	305	48
GBR	242	179	195	84	250	309	0	186	86
ZAF	225	152	139	67	207	320	194	0	39
IRL	53	10	47	32	140	49	92	39	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	95	36	195	128	124	89	27	37	18	65	10
CAN	97	0	13	171	80	220	98	6	71	5	7	0
DEU	36	12	0	52	15	21	14	15	3	6	13	0
DFS	174	177	43	0	159	198	121	48	50	20	139	0
NZL	129	79	15	153	0	109	83	19	36	12	36	9
USA	124	202	21	194	109	0	121	42	62	28	74	21
GBR	87	97	14	118	78	114	0	33	51	24	58	0
NLD	26	6	14	46	19	41	32	0	2	14	41	0
ZAF	38	73	3	49	32	56	44	2	0	2	0	0
IRL	17	5	6	16	12	28	24	14	2	0	58	0
NOR	55	6	12	112	34	75	62	40	0	56	0	0
CAM	10	0	0	0	9	21	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	111	0	65	55
NLD	132	0	60	43	24
SVN	0	59	0	0	1
GBR	82	41	0	0	19
USA	70	26	1	26	0