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)	New EDC calculation. Base change. Updated the status of bulls to better reflect their status as AI bull. As a result a good number no longer qualify and were not submitted.
NOR (RDC)	The criterion for type=12 was increased from 10 to 70 2nd batch daughters to make it more realistic. 99 bulls were then reversed to type=11.
SVN (ALL)	Small decrease in inromation due to changes in data base related to the pedigree completness as well as phenotypic data improvement.
DFS (ALL)	Updated our pedigree program used for genetic evaluation. The effect is minor. Finnish bulls born 30-40 years ago have lost daughters. It is expected because old Finnish data was incomplete and should not have been in the evaluation.
ISR (HOL)	Base change
ITA (HOL)	Some changes in number of information due to pedigree update
POL(HOL)	Decrease of information due to data edits.
JPN (HOL)	Base change, now the cows born in 2015 are the base, changes in data editings and drop in information due to pedigree verification
BEL (HOL)	Base change now set to cows born in 2015
ESP (HOL)	Some lose in information due to correction of censoring indicator for some daughters.
HUN (HOL)	Base change
CHE (HOL,BSW)	Changes in information due to manual database changes and to the criterion for herd size changes applied: if the size of a herd changes above some threshold, the whole data of that herd (within some time period) will be excluded from the analysis.
GBR (ALL)	Changes in information due to chnages from data recording agents
NZL (ALL)	Changes in information due to continuous pedigree verification
ZAF (HOL,JER,RDC)	Refining genetic groups. Changing from PEST software to MIX99 for estimation of breeding values and reliabilities. Having a bigger effect on longevity data. Base Year Change.

INTERBULL CHANGES COMPARED TO THE PREVIOUS ROUTINE RUN

Subsetting:

As decided by the ITC in Orlando, new subsetting was introduced in the september test run. Sub-setting is necessary for operational purposes and restrictions of time scales. To minimize the effect of subsetting, larger subsets with 10-12 countries and with 4 link providing countries have been applied.

Window:

According to the decision taken by ITC in Orlando, the following changes have been introduced in regards to the windows used for post processing:

The upper bounds have been set to 0.99 as these were judged to have very little effect on evaluations. The lower values have been set to about the 25% percentile value. The largest changes are for the lower values for conformation traits, with the lowest window being

40% for OFL otherwise it is about 50% for all other confirmation traits.
It is anticipated that these low values may not have large impact on
evaluations since there were very few countries combinations whose
estimated correlations fell between the old limit of 0.30 and these new limits.

The window so far applied for MAS evaluation have been found too high compared to the
within-country genetic correlation between mastitis and SCS available from the literature.
It has been an ITC recommendation to adjust the windows for MAS in the 2001t test run to make them more in line with the
values available from the literature. The recommendation has been approved by the Steering committee.
Also, according to the decision taken by ITC in Orlando (2015) to review all windows every five (5) years, an overall
review of the windows for all traits will take place during the first half of 2020. Implementation of the reviewed windows is aimed for January 2021 test run.

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 2020).
Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		134	7992	1721	713	
BEL			1701			
CAN	233	103	12518	765	865	
CHE	3028		3514			
CZE			4864			
DEA	6583					
DEU			22388		272	
DFS			13847	2560	9303	
ESP			3924			
EST						
FRA	409		17179			
FRM						4687
GBR	122	311	7903	824	558	81
HUN			3513			
IRL			2966	198	65	
ISR			1558			
ITA	2177		9688			
JPN			6445			
KOR						
LTU						
LVA						
NLD	185		15432	169	73	355
NOR					3845	
NZL	58	58	7861	4833	1286	
POL			10748			
PRT						
SVK						

SVN	413		612			625
URY						
USA	1131	796	39160	4801	730	68
ZAF			1252	696	135	
HRV						
MEX						
CAM					40	
No.Records	14339	1402	195065	16567	17885	5816
Pub. Proofs	11793	1119	150921	13497	16106	5121

^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	8.77									
CHE	0.72	10.99								
DEA	0.80	0.83	14.14							
NLD	0.65	0.80	0.78	317.62						
NZL	0.58	0.58	0.44	0.50	323.92					
USA	0.91	0.66	0.77	0.72	0.59	2.72				
ITA	0.78	0.67	0.85	0.62	0.45	0.68	16.00			
FRA	0.66	0.76	0.72	0.67	0.52	0.68	0.53	0.94		
GBR	0.85	0.59	0.52	0.59	0.63	0.84	0.63	0.55	0.31	
SVN	0.71	0.66	0.82	0.72	0.51	0.70	0.77	0.65	0.54	23.76

GUE dlo

	AUS	CAN	NZL	USA	GBR
AUS	0.05				
CAN	0.63	7.75			
NZL	0.72	0.67	282.47		
USA	0.65	0.90	0.66	2.84	
GBR	0.64	0.91	0.69	0.87	0.37

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	0.66	0.38																			
CAN	0.65	0.87	6.16																		
CHE	0.75	0.77	0.84	12.33																	
DEU	0.70	0.85	0.88	0.86	12.62																
DFS	0.72	0.85	0.86	0.82	0.93	12.35															
ESP	0.56	0.79	0.87	0.77	0.84	0.75	11.66														
FRA	0.61	0.60	0.59	0.75	0.63	0.71	0.57	0.98													
GBR	0.69	0.89	0.91	0.79	0.87	0.83	0.88	0.56	0.31												
IRL	0.58	0.83	0.79	0.65	0.74	0.69	0.76	0.45	0.80	2.08											
ISR	0.61	0.58	0.56	0.65	0.65	0.70	0.54	0.66	0.55	0.53	104.84										
ITA	0.51	0.64	0.76	0.73	0.74	0.67	0.87	0.62	0.75	0.62	0.52	5.96									
NLD	0.57	0.64	0.64	0.74	0.72	0.75	0.61	0.66	0.62	0.46	0.65	0.52	266.81								
NZL	0.69	0.75	0.65	0.73	0.76	0.73	0.54	0.56	0.67	0.68	0.51	0.46	0.52	244.90							
USA	0.66	0.86	0.89	0.79	0.88	0.88	0.88	0.64	0.85	0.74	0.68	0.75	0.73	0.65	2.25						
HUN	0.45	0.59	0.68	0.57	0.60	0.54	0.76	0.52	0.66	0.51	0.44	0.70	0.46	0.45	0.72	1.21					
CZE	0.45	0.51	0.60	0.58	0.58	0.49	0.70	0.45	0.59	0.56	0.44	0.68	0.45	0.45	0.59	0.53	13.51				
SVN	0.46	0.79	0.72	0.61	0.74	0.69	0.69	0.51	0.70	0.66	0.57	0.54	0.65	0.65	0.79	0.47	0.45	24.97			
ZAF	0.63	0.82	0.88	0.64	0.78	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	31.94		
POL	0.45	0.45	0.47	0.57	0.59	0.51	0.60	0.45	0.50	0.45	0.44	0.62	0.45	0.45	0.51	0.45	0.52	0.46	0.45	12.73	
JPN	0.61	0.89	0.94	0.71	0.85	0.85	0.85	0.50	0.89	0.83	0.47	0.67	0.59	0.70	0.87	0.67	0.54	0.76	0.90	0.45	1.77

JER dlo

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0.04								
CAN	0.51	7.17							
DFS	0.67	0.68	12.08						
NLD	0.60	0.61	0.80	331.64					
NZL	0.65	0.52	0.69	0.52	222.40				
USA	0.62	0.82	0.79	0.74	0.60	2.38			
GBR	0.57	0.86	0.75	0.64	0.52	0.81	0.29		
ZAF	0.47	0.61	0.53	0.45	0.47	0.67	0.65	27.83	
IRL	0.56	0.70	0.59	0.46	0.53	0.67	0.70	0.72	1.58

RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	0.05											
CAN	0.57	6.91										
DEU	0.65	0.86	12.54									
DFS	0.67	0.74	0.91	12.95								
NZL	0.68	0.52	0.66	0.52	276.94							
USA	0.59	0.86	0.88	0.85	0.52	2.53						
GBR	0.65	0.90	0.84	0.74	0.53	0.81	0.31					
NLD	0.55	0.65	0.73	0.75	0.50	0.76	0.61	326.51				
ZAF	0.54	0.86	0.80	0.59	0.53	0.83	0.80	0.54	32.08			
IRL	0.55	0.76	0.72	0.63	0.61	0.65	0.72	0.48	0.80	1.55		
NOR	0.56	0.77	0.74	0.82	0.45	0.82	0.65	0.78	0.62	0.66	41.39	
CAM	0.50	0.63	0.76	0.74	0.45	0.73	0.63	0.70	0.52	0.45	0.57	9.23

SIM dlo

	FRM	NLD	SVN	GBR	USA
FRM	0.98				
NLD	0.59	281.63			
SVN	0.54	0.73	22.31		
GBR	0.60	0.60	0.69	0.26	
USA	0.75	0.76	0.77	0.82	2.26

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^LAPPENDIX II. Number of common bulls

BSW

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common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	DEA	NLD	NZL	USA	ITA	FRA	GBR	SVN
CAN	0	123	140	41	25	165	121	84	58	35
CHE	102	0	586	92	25	317	462	168	69	88
DEA	117	479	0	139	37	335	718	224	69	118
NLD	36	87	130	0	24	71	119	74	33	50
NZL	23	19	30	16	0	30	29	23	18	13
USA	154	294	297	60	25	0	241	122	83	44
ITA	106	399	609	99	25	171	0	198	71	108
FRA	73	125	167	59	19	83	156	0	52	62
GBR	53	51	45	24	14	73	48	43	0	23
SVN	31	81	109	50	11	36	107	61	18	0

GUE

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common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	NZL	USA	GBR
AUS	0	46	26	61	36
CAN	46	0	13	68	29
NZL	26	11	0	29	16
USA	56	58	26	0	88
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	662	1287	576	1506	1256	847	1195	1413	710	106	1146	1372	1126	1776	709	873	181	464	985	888
BEL	572	0	691	529	1027	802	612	815	854	478	81	758	1046	462	848	505	626	171	301	710	519
CAN	1243	656	0	846	2225	1391	1251	1374	1656	530	130	1654	1430	681	3252	1011	1117	209	472	1335	1336
CHE	497	520	676	0	1106	709	549	628	761	392	64	718	875	382	991	435	552	144	260	654	477
DEU	1098	1041	1580	972	0	2589	1473	2254	2194	855	174	2539	3139	907	3382	1253	1906	328	539	2398	1411
DFS	897	749	1149	616	1900	0	1022	1611	1765	762	159	1660	2161	823	2121	941	1369	269	508	1651	1007
ESP	601	585	740	432	932	758	0	1101	1122	498	111	1261	1077	517	1530	773	898	199	438	1037	911
FRA	755	767	819	529	1093	790	752	0	1593	725	127	1667	1867	753	2423	940	1303	208	462	1593	1202
GBR	1264	870	1886	720	1848	1463	948	1007	0	1042	161	1712	1956	990	2384	961	1279	249	535	1510	1138
IRL	613	471	477	395	748	633	479	554	1112	0	104	670	889	718	786	453	574	129	330	615	461
ISR	67	48	81	39	135	119	63	61	124	80	0	159	169	109	205	126	136	51	70	155	113
ITA	845	714	1280	636	1706	1289	920	865	1449	587	114	0	1730	727	2614	1076	1330	249	487	1642	1222
NLD	1159	1151	1281	833	2841	1913	927	1078	1862	830	127	1410	0	987	2432	995	1582	279	498	1824	1061
NZL	1102	375	670	318	679	579	385	419	907	619	87	550	887	0	1037	496	646	133	351	636	554
USA	1718	735	3443	872	2357	1625	980	1200	2286	703	191	1845	1985	979	0	1378	1762	253	625	2063	2004
HUN	537	423	883	350	988	751	612	605	906	405	86	942	831	384	1336	0	983	174	393	990	756
CZE	583	500	776	406	1496	935	657	804	1038	457	102	981	1420	474	1400	912	0	235	427	1382	905
SVN	124	137	148	103	317	217	149	137	197	100	38	212	237	92	192	130	176	0	102	268	178
ZAF	402	256	398	211	421	384	378	305	488	291	44	383	405	283	600	313	297	72	0	413	431
POL	723	642	1067	526	2113	1342	713	966	1404	516	116	1276	1669	480	1938	879	1150	237	308	0	1014
JPN	518	337	684	323	651	573	451	429	663	316	50	601	591	312	959	448	438	103	310	561	0

JER

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0	242	154	65	421	467	224	226	54
CAN	247	0	110	33	166	422	171	154	10
DFS	126	104	0	108	152	209	188	154	49
NLD	58	28	107	0	67	78	84	67	32
NZL	456	174	133	60	0	341	231	199	118
USA	502	429	191	84	407	0	255	302	45
GBR	232	171	189	82	242	298	0	180	81
ZAF	219	149	137	63	205	316	187	0	38
IRL	52	9	45	31	131	46	87	38	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	94	35	193	127	119	87	25	38	17	63	10
CAN	96	0	12	162	80	211	95	6	72	5	7	0
DEU	35	11	0	49	15	20	14	14	3	6	13	0
DFS	172	164	40	0	160	183	118	46	51	19	139	0
NZL	128	79	15	154	0	109	82	19	37	12	36	9
USA	120	194	20	178	109	0	118	38	63	27	70	21
GBR	85	93	14	114	77	110	0	30	51	23	53	0
NLD	24	6	14	44	19	37	29	0	3	13	39	0
ZAF	39	74	3	50	33	57	44	3	0	3	0	0
IRL	16	5	6	15	12	27	22	13	3	0	54	0
NOR	53	6	12	111	34	71	56	39	0	52	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	109	0	63	49
NLD	130	0	54	42	22
SVN	0	53	0	0	1
GBR	80	40	0	0	19
USA	64	24	1	26	0