

## Introduction

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The latest routine international evaluation for longevity trait took place as scheduled at the Interbull Centre. Data from twenty one (21) 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 and Czech Republic were computed. Brown Swiss, Guernsey, Holstein, Jersey, Red Dairy Cattle and Simmental breed data were included in this evaluation.

## Changes in national procedures

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

ZAF (RDC): Inclusion of heterosis and recombination in the model  
New method of calculation of reliability based on PEVs  
ZAF (JER): New method of calculation of reliability based on PEVs  
Data for ARC herds since 2012 previously not available were included. This caused some changes in averages and sds for certain birth years, especially 2004 and 2005.  
CHE (BSW): Big change in pedigree with many bulls losing information (missing dam, sire or both)  
CHE (HOL): Some changes in type of proofs and publication rules  
Many bulls lose herds/daughters/EDC. This is related to plausibility tests with respect to herd size change. Some bulls have 0 EDC. As EDC the number of uncensored observations in the evaluation is provided (which is actually 0 for these bulls).  
HUN (HOL): New genetic base  
USA (SIM): participating for the first time  
USA (BSW, GUE, HOL, JER, RDC): change of unknown parent group definitions  
SVN (HOL, BSW, SIM): some pedigree changes and phenotypic data improvement.  
DEU (HOL): Daughters without culling date and with last calving date over 750 days ago are excluded causing reduction in information.  
GBR (GUE, BSW): Due to data changes, very few bulls lost herds /daughters.  
DEA (BSW): Slight decrease in number of daughters for several bulls due to minor corrections.

## INTERBULL CHANGES COMPARED TO THE DECEMBER ROUTINE RUN

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### Subsetting:

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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:

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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.

## DATA AND METHOD OF ANALYSIS

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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 in the 0lx-proof file.

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

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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

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

## NEXT TEST INTERNATIONAL EVALUATION

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

## PUBLICATION OF INTERBULL TEST RUN

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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 2015).  
Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		126	6864	1513	594	
BEL			902			
CAN	193	97	10530	577	752	
CHE	3001		2922			
CZE			4116			3236
DEA	5993					
DEU			23798		365	
DFS			11499	2181	8164	
ESP			2944			
EST						
FRA	329		15398			
FRM						4054
FRR						
GBR	84	276	6523	696	437	66
HUN			2883			
IRL			2225	125	46	
ISR			1226			
ITA	1914		8904			
JPN						
KOR						
LTU						
LVA						
NLD	152		12937	117	53	246
NOR						
NZL	41	56	6577	4163	1109	
POL			8368			
PRT						
SVK						
SVN	327		402			490
URY						
USA	981	733	32742	3736	601	30
ZAF		28	1164	613	128	
HRV						
No. Records	13015	1316	162924	13721	12249	8122
Pub. Proofs	10828	1055	133430	11345	11148	7222

^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		8.09									
CHE		0.78	10.94								
DEA		0.82	0.85	13.97							
NLD		0.73	0.71	0.71	367.01						
NZL		0.47	0.52	0.38	0.45	293.10					
USA		0.93	0.70	0.78	0.82	0.53	2.82				
ITA		0.79	0.66	0.80	0.59	0.33	0.69	16.89			
FRA		0.67	0.76	0.77	0.67	0.38	0.65	0.57	0.95		
GBR		0.82	0.59	0.45	0.68	0.53	0.82	0.60	0.51	0.33	
SVN		0.72	0.63	0.81	0.77	0.48	0.71	0.80	0.66	0.55	25.08

GUE dlo

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	AUS	CAN	NZL	USA	GBR	ZAF
AUS	6.96					
CAN	0.72	7.85				
NZL	0.68	0.56	349.64			
USA	0.67	0.90	0.52	2.79		
GBR	0.71	0.90	0.57	0.88	0.37	
ZAF	0.68	0.81	0.60	0.86	0.81	18.53

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HOL dlo

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	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	IRL	ISR
ITA	NLD	NZL	USA	HUN	CZE	SVN	ZAF	POL			
AUS	4.44										
BEL	0.76	0.36									
CAN	0.73	0.84	6.32								
CHE	0.79	0.78	0.85	12.38							
DEU	0.66	0.85	0.91	0.81	13.11						
DFS	0.76	0.86	0.87	0.81	0.87	12.50					
ESP	0.46	0.68	0.78	0.74	0.82	0.67	13.17				
FRA	0.68	0.63	0.62	0.75	0.61	0.70	0.53	1.00			
GBR	0.70	0.87	0.88	0.77	0.85	0.81	0.76	0.54	0.31		
IRL	0.53	0.75	0.77	0.61	0.73	0.66	0.70	0.38	0.81	2.15	
ISR	0.61	0.60	0.55	0.56	0.54	0.68	0.48	0.74	0.54	0.43	102.45
ITA	0.44	0.60	0.76	0.66	0.76	0.62	0.84	0.60	0.72	0.63	0.45
6.48											
NLD	0.72	0.74	0.69	0.68	0.68	0.82	0.52	0.66	0.65	0.51	0.67
0.48	314.27										
NZL	0.66	0.66	0.52	0.56	0.53	0.60	0.44	0.39	0.56	0.56	0.34
0.34	0.44	209.47									
USA	0.71	0.84	0.91	0.77	0.87	0.88	0.79	0.63	0.86	0.76	0.66
0.73	0.80	0.55	2.32								
HUN	0.39	0.48	0.61	0.43	0.54	0.48	0.65	0.43	0.63	0.52	0.39
0.68	0.49	0.37	0.71	1.11							
CZE	0.39	0.47	0.61	0.59	0.64	0.47	0.64	0.36	0.56	0.59	0.32
0.65	0.37	0.34	0.60	0.55	19.68						
SVN	0.55	0.73	0.73	0.65	0.75	0.75	0.72	0.50	0.69	0.61	0.60
0.54	0.72	0.60	0.82	0.56	0.40	25.23					
ZAF	0.74	0.82	0.89	0.74	0.86	0.81	0.76	0.57	0.90	0.87	0.54
0.71	0.59	0.63	0.88	0.60	0.57	0.66	25.09				
POL	0.52	0.44	0.61	0.63	0.64	0.56	0.56	0.43	0.54	0.49	0.32
0.59	0.44	0.39	0.52	0.41	0.53	0.52	0.51	13.17			

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JER dlo

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	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	5.37								
CAN	0.45	6.87							
DFS	0.73	0.68	12.20						
NLD	0.59	0.71	0.73	335.22					
NZL	0.64	0.40	0.62	0.44	188.79				
USA	0.71	0.83	0.79	0.80	0.56	2.47			
GBR	0.50	0.83	0.75	0.66	0.40	0.76	0.28		
ZAF	0.49	0.59	0.74	0.56	0.47	0.61	0.78	28.73	
IRL	0.51	0.73	0.58	0.47	0.43	0.62	0.70	0.61	1.72

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RDC dlo

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	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL
AUS	5.59									
CAN	0.64	6.78								
DEU	0.60	0.88	11.46							
DFS	0.78	0.73	0.81	13.02						
NZL	0.64	0.41	0.50	0.50	228.69					
USA	0.66	0.90	0.86	0.79	0.49	2.69				
GBR	0.60	0.88	0.86	0.78	0.44	0.82	0.30			
NLD	0.71	0.70	0.69	0.80	0.46	0.78	0.67	345.16		
ZAF	0.57	0.84	0.84	0.59	0.52	0.87	0.73	0.57	29.44	
IRL	0.61	0.78	0.76	0.69	0.57	0.70	0.80	0.56	0.82	1.46

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SIM dlo

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	FRM	NLD	CZE	SVN	GBR	USA
FRM	1.00					
NLD	0.54	292.34				
CZE	0.36	0.40	20.23			
SVN	0.48	0.79	0.35	22.35		
GBR	0.46	0.61	0.52	0.65	0.24	
USA	0.83	0.79	0.58	0.81	0.82	2.53

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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	102	111	43	19	136	101	72	50	23
CHE	85	0	516	77	17	293	401	137	53	53
DEA	93	406	0	119	23	297	607	180	54	77
NLD	37	68	110	0	17	68	105	73	28	34
NZL	19	14	17	10	0	23	19	15	13	6
USA	132	275	260	58	19	0	214	115	65	30
ITA	89	346	502	86	16	148	0	160	55	72
FRA	65	102	135	58	12	77	127	0	41	42
GBR	52	44	39	24	11	66	43	37	0	14
SVN	21	53	72	34	4	24	73	42	12	0

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GUE

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common bulls below diagonal  
common three quarter sib group above diagonal

	AUS	CAN	NZL	USA	GBR	ZAF
AUS	0	43	26	55	34	3
CAN	43	0	13	61	27	2
NZL	26	11	0	28	14	2
USA	51	51	26	0	75	7
GBR	29	22	12	78	0	3
ZAF	2	0	0	4	2	0

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HOL

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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																		
AUS	0	393	954	443	1263	960	643	974	1128	560	79	952	1082	947	1389	553	707	129
415	710																	
BEL	292	0	362	306	553	415	340	469	482	280	44	425	590	278	462	279	361	89
204	356																	
CAN	808	311	0	636	1796	927	969	1062	1293	393	78	1265	957	552	2375	739	873	133
420	888																	
CHE	359	266	472	0	878	500	431	466	592	295	46	569	661	308	760	359	461	107
223	484																	
DEU	739	433	803	677	0	2149	1202	1970	1852	691	118	2142	2354	762	2822	1005	1653	212
509	1637																	
DFS	550	318	540	405	996	0	750	1272	1313	599	112	1278	1489	648	1537	704	1039	174
444	1093																	
ESP	434	300	497	328	683	505	0	862	894	393	83	1000	816	422	1196	600	735	136
391	755																	
FRA	545	400	537	381	753	468	558	0	1332	591	101	1531	1472	636	2071	752	1086	141
411	1139																	
GBR	933	414	1421	560	1253	929	750	751	0	816	111	1413	1514	812	1876	769	1038	176
481	1094																	
IRL	450	250	326	290	550	446	371	416	837	0	72	550	708	556	618	359	455	88
282	444																	
ISR	53	23	44	31	90	87	52	47	84	60	0	111	116	83	126	86	100	35
53	105																	
ITA	577	316	730	489	1111	785	665	632	1064	444	82	0	1381	639	2200	841	1126	179
457	1179																	
NLD	830	576	683	598	1513	1045	645	690	1302	618	95	911	0	810	1843	757	1249	182
435	1217																	
NZL	901	201	552	248	508	395	303	314	717	459	67	445	703	0	871	412	552	99
318	493																	
USA	1190	350	2167	658	1405	881	702	889	1640	515	103	1163	1236	796	0	1046	1433	167
569	1432																	
HUN	398	207	599	287	720	513	475	455	712	319	66	689	572	323	962	0	809	126
348	739																	
CZE	422	254	542	331	1179	612	527	618	810	356	75	754	1021	385	1049	737	0	165
379	1058																	
SVN	86	69	92	76	184	136	102	87	140	65	28	147	145	70	129	97	126	0
83	169																	
ZAF	342	159	346	179	358	317	335	258	425	242	39	331	344	253	532	281	261	60
0	353																	
POL	443	275	576	374	1174	742	496	555	903	334	79	819	959	338	1137	614	806	146
251	0																	

JER

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common bulls below diagonal  
common three quarter sib group above diagonal

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0	178	112	52	345	376	173	183	37
CAN	184	0	74	28	136	297	131	119	5
DFS	81	63	0	65	119	160	142	116	25
NLD	47	22	62	0	54	65	67	57	18
NZL	387	151	98	46	0	287	171	167	73
USA	405	301	139	71	358	0	199	243	32
GBR	184	138	142	68	186	238	0	144	41
ZAF	176	117	96	54	175	254	155	0	26
IRL	34	4	21	17	80	34	43	27	0

## RDC

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 common bulls below diagonal

common three quarter sib group above diagonal

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL
AUS	0	78	24	153	103	88	52	16	31	8
CAN	78	0	9	91	66	174	73	5	68	2
DEU	22	8	0	45	7	10	4	11	1	3
DFS	134	87	35	0	127	120	56	32	46	11
NZL	104	65	7	123	0	82	52	7	33	6
USA	89	156	9	120	82	0	79	25	60	14
GBR	51	72	4	55	49	75	0	11	45	8
NLD	14	5	10	32	7	24	11	0	2	7
ZAF	31	69	1	44	30	53	38	2	0	2
IRL	7	2	3	8	6	14	8	6	2	0

## SIM

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 common bulls below diagonal

common three quarter sib group above diagonal

	FRM	NLD	CZE	SVN	GBR	USA
FRM	0	101	162	0	53	21
NLD	123	0	129	25	43	14
CZE	191	125	0	52	41	14
SVN	0	25	50	0	0	0
GBR	66	41	37	0	0	15
USA	30	15	13	0	18	0