

## 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:

NOR RDC	First participation
SLV BSW/SIM HOL	Change in the definition of genetic reference base. Genetic parameters re-estimated
CHE BSW/SIM HOL	Base change
FRA BSW/SIM	Base change
FRM SIM	Base change
FRA HOL	Base change, inclusion of FRR in HOLFRA population
ITA HOL	Base change + one year cut-off data
DEU HOL/RDC	Base change
NZL BSW/GUE JER/HOL RDC	Continuous DNA parentage testing therefore daughter counts, herd counts, edc and reliability are subjected to changes
DEA BSW	Base change
CAN BSW/GUE CAN/JER RDC	Base change
AUS GUE/RDC HOL/JER	Base change

## INTERBULL CHANGES COMPARED TO THE DECEMBER ROUTINE RUN

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### Sub-setting:

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As decided by the ITC in Orlando, new sub-setting was introduced in the September test run. Sub-setting is necessary for operational purposes and restrictions of time scales. To minimize the effect of sub-setting, 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 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 (April Routine Evaluation 2017).

Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		130	7246	1587	638	
BEL			989			
CAN	174	97	11092	617	784	
CHE	2755		3064			
CZE			4228			3236
DEA	6140					
DEU			24735		379	
DFS			12607	2341	8769	
ESP			3166			
EST						
FRA	352		16033			
FRM						4227
GBR	94	282	6876	735	496	77
HUN			3038			
IRL			2534	150	55	
ISR			1301			
ITA	1981		8855			
JPN						
KOR						
LTU						
LVA						
NLD	148		13474	107	48	261
NOR					3235	
NZL	44	56	6868	4356	1163	
POL			9124			
PRT						
SVK						
SVN	354		466			539
URY						
USA	1017	753	34396	3979	647	37
ZAF			1200	639	130	
HRV						
MEX						
No. Records	13059	1318	171292	14511	16344	8377
Pub. Proofs	10885	1059	138563	11937	14810	7446

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

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BSW dlo

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	CAN	CHE	DEA	NLD	NZL	USA	ITA	FRA	GBR	SVN
CAN	8.74									
CHE	0.77	11.03								
DEA	0.82	0.85	14.08							
NLD	0.72	0.72	0.74	349.93						
NZL	0.52	0.54	0.43	0.48	286.70					
USA	0.92	0.70	0.77	0.82	0.55	2.78				
ITA	0.80	0.67	0.80	0.61	0.45	0.68	16.70			
FRA	0.65	0.78	0.78	0.69	0.46	0.66	0.56	0.94		
GBR	0.84	0.59	0.46	0.68	0.57	0.83	0.63	0.52	0.32	
SVN	0.76	0.61	0.77	0.74	0.52	0.71	0.81	0.62	0.59	25.22

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GUE dlo

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	AUS	CAN	NZL	USA	GBR
AUS	7.06				
CAN	0.72	7.50			
NZL	0.72	0.55	345.81		
USA	0.67	0.91	0.53	2.81	
GBR	0.73	0.91	0.59	0.88	0.37

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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	4.45											
BEL	0.76	0.36										
CAN	0.73	0.84	6.15									
CHE	0.80	0.79	0.85	12.30								
DEU	0.70	0.84	0.90	0.84	13.02							
DFS	0.78	0.86	0.87	0.82	0.90	12.40						
ESP	0.54	0.71	0.83	0.74	0.83	0.71	13.01					
FRA	0.68	0.64	0.60	0.76	0.62	0.70	0.53	1.00				
GBR	0.73	0.87	0.90	0.78	0.86	0.82	0.81	0.54	0.31			
IRL	0.55	0.76	0.78	0.63	0.72	0.67	0.73	0.42	0.80	2.02		
ISR	0.61	0.63	0.57	0.63	0.60	0.70	0.54	0.72	0.55	0.44	101.94	
ITA	0.46	0.60	0.76	0.68	0.75	0.64	0.83	0.59	0.72	0.62	0.48	6.25
NLD	0.71	0.75	0.69	0.72	0.71	0.81	0.60	0.67	0.67	0.50	0.68	0.49
316.22												
NZL	0.67	0.68	0.55	0.60	0.59	0.63	0.46	0.44	0.58	0.58	0.42	0.42
0.47	210.87											
USA	0.71	0.84	0.91	0.77	0.87	0.88	0.82	0.63	0.86	0.75	0.66	0.73
0.80	0.56	2.30										
HUN	0.42	0.49	0.62	0.47	0.55	0.49	0.69	0.44	0.64	0.50	0.42	0.68
0.51	0.43	0.71	1.17									
CZE	0.42	0.47	0.62	0.58	0.63	0.47	0.68	0.41	0.58	0.58	0.38	0.68
0.42	0.42	0.60	0.55	12.76								
SVN	0.57	0.80	0.79	0.72	0.74	0.73	0.70	0.53	0.75	0.69	0.70	0.58
0.71	0.64	0.82	0.55	0.45	26.61							
ZAF	0.76	0.84	0.90	0.76	0.87	0.83	0.82	0.58	0.90	0.86	0.56	0.71
0.58	0.66	0.88	0.61	0.58	0.70	24.66						
POL	0.50	0.45	0.58	0.65	0.64	0.56	0.58	0.44	0.54	0.48	0.39	0.60
0.46	0.43	0.53	0.43	0.54	0.46	0.54	13.19					

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JER dlo

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	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	5.29								
CAN	0.49	6.84							
DFS	0.73	0.68	12.17						
NLD	0.60	0.68	0.77	366.24					
NZL	0.65	0.45	0.64	0.50	191.05				
USA	0.71	0.82	0.80	0.80	0.55	2.45			
GBR	0.52	0.82	0.73	0.67	0.46	0.77	0.28		
ZAF	0.49	0.61	0.73	0.60	0.47	0.63	0.78	28.40	
IRL	0.50	0.70	0.57	0.48	0.48	0.60	0.70	0.60	1.54

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RDC dlo

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	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR
AUS	5.54										
CAN	0.65	6.70									
DEU	0.61	0.88	11.63								
DFS	0.77	0.73	0.82	12.98							
NZL	0.65	0.48	0.54	0.51	231.81						
USA	0.66	0.89	0.85	0.81	0.49	2.62					
GBR	0.64	0.88	0.85	0.77	0.50	0.81	0.30				
NLD	0.70	0.68	0.70	0.81	0.48	0.79	0.67	344.99			
ZAF	0.58	0.85	0.82	0.60	0.52	0.86	0.76	0.58	29.39		
IRL	0.55	0.76	0.73	0.63	0.56	0.68	0.78	0.50	0.81	1.38	
NOR	0.80	0.61	0.51	0.70	0.55	0.81	0.53	0.81	0.64	0.45	41.49

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SIM dlo

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	FRM	NLD	CZE	SVN	GBR	USA
FRM	1.00					
NLD	0.55	290.77				
CZE	0.41	0.43	20.23			
SVN	0.63	0.84	0.42	23.26		
GBR	0.50	0.62	0.52	0.71	0.25	
USA	0.81	0.80	0.58	0.81	0.83	2.31

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^LAPPENDIX II. Number of common bulls  
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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	89	101	32	17	121	87	63	50	25
CHE	60	0	513	79	18	295	395	148	57	66
DEA	69	407	0	116	25	306	632	193	59	91
NLD	25	72	103	0	15	61	102	65	27	38
NZL	11	14	19	8	0	24	20	16	14	7
USA	96	279	268	49	20	0	222	116	71	36
ITA	62	338	532	82	17	155	0	170	60	83
FRA	47	112	146	51	13	78	137	0	45	49
GBR	39	45	41	19	12	68	45	38	0	18
SVN	20	64	84	38	5	29	84	49	13	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
AUS	0	44	26	57	34
CAN	44	0	13	61	26
NZL	25	10	0	28	14
USA	52	51	25	0	78
GBR	30	21	12	80	0

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	429	1036	477	1347	1059	684	1039	1211	627	88	997	1147	994	1486	583	746	145	430
784																			
BEL	338	0	399	335	605	476	372	518	520	320	47	463	635	296	502	308	390	110	218
400																			
CAN	925	351	0	683	1902	1090	1021	1146	1366	448	89	1324	1037	585	2559	801	905	160	443
1002																			
CHE	404	299	509	0	932	580	449	515	624	340	48	604	699	321	805	378	476	119	237
532																			
DEU	831	505	939	740	0	2379	1268	2165	1975	765	131	2197	2521	803	2976	1068	1718	248	536
1836																			
DFS	674	395	755	492	1261	0	850	1416	1487	675	128	1401	1712	715	1744	790	1162	209	477
1307																			
ESP	476	345	547	354	750	603	0	919	944	443	90	1050	864	445	1261	634	761	158	414
823																			
FRA	618	456	606	425	897	596	623	0	1407	651	110	1549	1597	672	2164	804	1146	164	433
1296																			
GBR	1038	469	1518	588	1405	1135	805	822	0	904	122	1465	1607	854	1985	809	1075	204	503
1201																			
IRL	529	293	383	338	628	544	422	483	951	0	82	606	780	635	683	398	504	107	307
517																			
ISR	57	26	53	33	103	98	54	53	96	66	0	121	128	93	142	95	107	41	57
114																			
ITA	650	367	831	525	1214	959	729	684	1147	514	89	0	1407	664	2226	887	1152	208	470
1293																			
NLD	911	640	782	636	1705	1317	695	788	1410	700	105	964	0	842	1942	801	1291	205	456
1326																			
NZL	960	220	577	263	553	470	328	345	761	539	76	479	736	0	918	434	571	109	336
543																			
USA	1335	395	2457	698	1582	1152	764	969	1781	591	123	1283	1355	844	0	1116	1478	196	593
1602																			
HUN	430	234	665	297	766	591	502	488	754	352	73	741	607	341	1042	0	838	143	367
794																			
CZE	455	279	576	342	1250	711	555	662	847	395	82	785	1078	397	1104	769	0	183	397
1122																			
SVN	101	84	113	86	222	173	117	106	165	82	32	171	169	76	152	112	139	0	92
201																			
ZAF	360	170	364	189	383	350	354	274	446	266	40	350	363	268	554	287	270	63	0
380																			
POL	523	325	689	412	1377	963	551	703	1031	417	90	918	1084	387	1345	680	866	179	272
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	201	121	49	367	408	187	194	39
CAN	204	0	84	25	149	326	144	133	7
DFS	89	72	0	59	128	172	149	127	30
NLD	43	19	57	0	52	59	62	54	22
NZL	406	160	105	44	0	304	188	175	90
USA	435	327	149	66	373	0	218	262	37
GBR	196	149	148	62	203	255	0	154	52
ZAF	187	129	108	51	185	273	168	0	29
IRL	37	5	25	21	98	38	55	29	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	NOR
AUS	0	86	28	172	117	104	78	17	35	13	47
CAN	86	0	9	118	69	184	84	5	69	4	4
DEU	26	8	0	47	10	12	12	8	1	5	14
DFS	150	116	37	0	140	148	97	27	48	16	91
NZL	117	68	9	135	0	90	68	12	35	8	31
USA	105	166	11	146	90	0	97	28	60	21	53
GBR	77	83	11	95	64	92	0	22	47	18	34
NLD	16	5	7	27	12	26	20	0	2	9	26
ZAF	35	71	1	47	31	54	40	2	0	2	0
IRL	12	4	4	13	8	21	17	8	2	0	46
NOR	38	4	13	70	29	55	35	25	0	45	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	96	163	0	61	23
NLD	118	0	131	34	42	14
CZE	192	126	0	58	43	14
SVN	0	34	57	0	0	0
GBR	77	40	39	0	0	17
USA	37	16	14	0	22	0