

## 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:

CAM RDC First time participating with MSH in RDC population, with population code CAM.

DFS HOL HOL and RED HOL (RED) have merged. Cows with min 87 % HOL genes and and bulls with min 93 % HOL genes have been converted to HOL. Animals with less % HOL genes will no longer be a part of the evaluation, and it is the reason, number of bulls and daughters drop more for HOL.

SVN HOL/BSW Some changes in data base related to the pedigree completeness as well as phenotypic  
SIM data improvement.

DEU HOL Cows without culling date and with last calving date over 750 days ago are excluded.

DEU RDC Type of proof corrected for some bulls resulting in few bulls being not publishable anymore.

CHE HOL/BSW Some decrease in herds/daughters/EDC due to the continuous work on the raw data by  
SIM herd-book organizations.

ITA HOL Some changes in information due to data-flow and editing.

NZL BSW/GUE Continuous DNA parentage testing affecting daughters, herds, EDCs and reliabilities.  
HOL/JER  
RDC

ESP HOL Some corrections on EDC, daughters, herds and reliabilities.

## 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

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 2017).  
 Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		132	7312	1605	645	
BEL			1015			
CAN	199	98	11426	652	800	
CHE	2798		3149			
CZE			4228			3236
DEA	6219					
DEU			25158		389	
DFS			12852	2386	8899	
ESP			3343			
EST						
FRA	362		16279			
FRM						4302
GBR	98	286	7047	752	505	78
HUN			3113			
IRL			2571	156	57	
ISR			1345			
ITA	2008		9126			
JPN						
KOR						
LTU						
LVA						
NLD	156		13735	112	50	271
NOR					3343	
NZL	44	56	6881	4356	1167	
POL			9456			
PRT						
SVK						
SVN	366		492			555
URY						
USA	1041	761	35216	4128	665	41
ZAF			1209	648	130	
HRV						
MEX						
CAM					34	
No. Records	13291	1333	174953	14795	16684	8483
Pub. Proofs	11041	1067	140869	12151	15081	7539

^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	8.58									
CHE	0.76	11.03								
DEA	0.81	0.85	14.13							
NLD	0.70	0.73	0.75	355.68						
NZL	0.52	0.54	0.44	0.49	294.12					
USA	0.91	0.69	0.77	0.80	0.55	2.76				
ITA	0.81	0.67	0.80	0.61	0.45	0.68	16.67			
FRA	0.65	0.78	0.78	0.68	0.47	0.66	0.56	0.94		
GBR	0.84	0.59	0.47	0.67	0.57	0.83	0.63	0.53	0.33	
SVN	0.77	0.61	0.77	0.72	0.53	0.72	0.81	0.62	0.60	24.98

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GUE dlo  
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	AUS	CAN	NZL	USA	GBR
AUS	7.11				
CAN	0.73	7.75			
NZL	0.73	0.55	342.82		
USA	0.68	0.91	0.53	2.82	
GBR	0.74	0.91	0.60	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	4.46										
BEL	0.76	0.37									
CAN	0.73	0.84	6.12								
CHE	0.81	0.80	0.85	12.27							
DEU	0.72	0.85	0.90	0.85	12.93						
DFS	0.78	0.87	0.87	0.82	0.91	12.40					
ESP	0.55	0.73	0.84	0.74	0.83	0.73	12.22				
FRA	0.68	0.65	0.60	0.76	0.62	0.70	0.54	1.00			
GBR	0.74	0.87	0.90	0.78	0.86	0.83	0.84	0.55	0.31		
IRL	0.56	0.77	0.79	0.64	0.73	0.68	0.74	0.43	0.80	2.03	
ISR	0.63	0.63	0.59	0.65	0.63	0.70	0.54	0.71	0.56	0.47	102.57
ITA	0.47	0.61	0.76	0.69	0.74	0.64	0.85	0.59	0.73	0.62	0.50
6.23											
NLD	0.68	0.74	0.67	0.74	0.71	0.80	0.61	0.66	0.66	0.49	0.67
0.51	319.43										
NZL	0.68	0.68	0.55	0.60	0.61	0.64	0.47	0.45	0.59	0.59	0.43
0.42	0.49	209.27									
USA	0.71	0.85	0.91	0.78	0.87	0.88	0.84	0.63	0.86	0.75	0.68
0.73	0.78	0.56	2.29								
HUN	0.43	0.50	0.62	0.48	0.55	0.50	0.71	0.44	0.65	0.50	0.42
0.68	0.48	0.43	0.71	1.20							
CZE	0.43	0.47	0.63	0.59	0.62	0.48	0.69	0.42	0.58	0.58	0.40
0.69	0.43	0.42	0.61	0.55	12.76						
SVN	0.56	0.80	0.78	0.71	0.75	0.72	0.71	0.53	0.74	0.69	0.69
0.58	0.69	0.64	0.82	0.56	0.45	26.00					
ZAF	0.77	0.85	0.89	0.77	0.88	0.84	0.83	0.59	0.90	0.86	0.57
0.71	0.60	0.67	0.88	0.61	0.59	0.70	24.51				
POL	0.49	0.45	0.56	0.64	0.63	0.55	0.60	0.44	0.54	0.47	0.40
0.61	0.45	0.44	0.53	0.44	0.53	0.47	0.54	13.11			

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JER dlo  
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	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	5.31								
CAN	0.51	6.77							
DFS	0.75	0.67	12.21						
NLD	0.66	0.64	0.79	371.15					
NZL	0.65	0.46	0.65	0.54	189.86				
USA	0.71	0.81	0.79	0.79	0.55	2.44			
GBR	0.57	0.82	0.74	0.65	0.46	0.78	0.28		
ZAF	0.50	0.60	0.72	0.58	0.47	0.64	0.79	27.91	
IRL	0.51	0.70	0.57	0.48	0.49	0.59	0.69	0.59	1.52

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RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR
CAM											
AUS	5.52										
CAN	0.67	6.70									
DEU	0.64	0.87	11.73								
DFS	0.78	0.74	0.84	12.99							
NZL	0.65	0.48	0.56	0.50	230.20						
USA	0.66	0.88	0.85	0.82	0.49	2.60					
GBR	0.67	0.88	0.84	0.74	0.50	0.79	0.30				
NLD	0.69	0.67	0.70	0.81	0.49	0.79	0.66	349.40			
ZAF	0.58	0.85	0.82	0.61	0.52	0.85	0.77	0.59	29.54		
IRL	0.56	0.75	0.72	0.62	0.57	0.66	0.75	0.50	0.81	1.45	
NOR	0.75	0.64	0.52	0.73	0.50	0.79	0.54	0.79	0.60	0.48	40.90
CAM	0.45	0.45	0.45	0.48	0.45	0.52	0.49	0.45	0.45	0.45	0.45
9.33											

SIM dlo

	FRM	NLD	CZE	SVN	GBR	USA
FRM	0.99					
NLD	0.59	302.92				
CZE	0.43	0.44	20.23			
SVN	0.66	0.78	0.44	22.87		
GBR	0.55	0.66	0.53	0.72	0.25	
USA	0.77	0.79	0.58	0.81	0.83	2.26

^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	106	118	36	19	146	104	74	53	28
CHE	84	0	523	81	18	296	402	151	58	69
DEA	92	414	0	120	25	311	644	197	60	95
NLD	30	74	108	0	16	62	105	68	28	40
NZL	17	14	19	9	0	24	20	16	14	7
USA	131	280	272	49	20	0	223	117	71	37
ITA	87	344	539	84	17	156	0	173	62	88
FRA	63	114	148	53	13	80	140	0	47	51
GBR	49	46	42	20	12	68	45	39	0	19
SVN	25	65	88	40	5	29	87	51	14	0

GUE

common bulls below diagonal  
common three quarter sib group above diagonal

	AUS	CAN	NZL	USA	GBR
AUS	0	45	26	58	35
CAN	45	0	13	63	27
NZL	26	11	0	28	14
USA	53	53	26	0	81
GBR	31	22	12	83	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	438	1058	490	1372	1085	698	1060	1230	631	91	1017	1161	999	1506	594	752	151
437	803																	
BEL	343	0	417	346	629	493	384	534	536	325	52	483	649	299	519	315	395	117
222	414																	
CAN	955	369	0	710	1959	1142	1071	1192	1412	454	96	1381	1095	587	2693	840	908	169
449	1051																	
CHE	421	313	541	0	963	608	472	535	649	343	53	629	719	325	834	386	484	126
242	553																	
DEU	866	533	1018	776	0	2451	1308	2213	2009	777	143	2258	2590	809	3050	1099	1729	264
543	1913																	
DFS	699	409	816	525	1354	0	880	1458	1534	685	135	1464	1801	725	1809	819	1181	225
483	1366																	
ESP	492	356	589	374	763	627	0	949	974	445	95	1101	893	446	1319	661	769	168
417	862																	
FRA	641	472	648	448	939	631	639	0	1440	659	115	1593	1631	681	2214	834	1153	176
441	1350																	
GBR	1061	483	1588	613	1470	1193	828	858	0	921	127	1504	1658	861	2040	830	1086	211
508	1243																	
IRL	534	299	393	342	640	555	426	492	972	0	84	611	791	641	687	400	510	110
311	528																	
ISR	57	29	59	34	110	105	57	56	100	67	0	129	134	95	153	101	110	43
60	119																	
ITA	671	387	904	549	1280	1012	766	718	1205	520	94	0	1464	671	2296	918	1161	218
476	1361																	
NLD	926	657	847	666	1809	1425	723	833	1478	713	109	1028	0	848	2011	827	1296	220
463	1390																	
NZL	969	222	578	269	563	482	330	354	774	546	78	488	743	0	919	435	571	111
339	549																	
USA	1357	411	2629	728	1678	1227	805	1012	1859	598	136	1363	1426	846	0	1159	1478	206
599	1659																	
HUN	434	242	710	308	796	616	515	506	776	355	75	781	626	343	1088	0	842	145
372	818																	
CZE	458	281	579	348	1266	726	558	670	857	399	83	796	1082	397	1104	770	0	191
401	1134																	
SVN	106	89	120	95	241	188	129	116	171	88	34	182	183	78	156	110	143	0
96	212																	
ZAF	366	175	370	196	390	357	356	281	453	271	41	357	370	270	561	292	273	67
0	387																	
POL	545	339	750	434	1475	1033	579	743	1084	431	94	968	1152	395	1438	699	877	191
280	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	207	126	51	370	416	192	201	44
CAN	211	0	86	25	149	339	148	136	9
DFS	94	75	0	63	129	175	154	129	33
NLD	45	19	61	0	52	60	62	55	23
NZL	411	161	107	44	0	305	195	178	92
USA	444	342	152	66	374	0	223	267	41
GBR	204	155	151	62	209	262	0	160	61
ZAF	194	134	111	52	188	278	172	0	32
IRL	41	7	28	22	100	42	64	32	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	CAM
AUS	0	87	30	172	117	107	80	17	35	13	49	10
CAN	88	0	11	125	71	192	87	6	69	4	5	0
DEU	29	10	0	51	11	14	13	9	2	5	14	0
DFS	151	126	41	0	141	156	102	29	48	16	99	0
NZL	118	70	11	137	0	95	71	12	35	8	33	9
USA	108	173	14	152	95	0	104	29	60	21	57	18
GBR	79	86	12	99	67	99	0	22	48	19	37	0
NLD	16	6	9	29	12	27	20	0	2	9	26	0
ZAF	36	71	2	47	31	54	41	2	0	2	0	0
IRL	12	4	5	13	8	21	18	8	2	0	46	0
NOR	40	5	14	77	31	58	38	25	0	45	0	0
CAM	10	0	0	0	9	18	0	0	0	0	0	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	99	163	0	61	26
NLD	121	0	134	36	42	14
CZE	192	129	0	58	43	14
SVN	0	36	57	0	0	0
GBR	78	41	39	0	0	17
USA	41	17	14	0	24	0