Introduction

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

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

DEA (BSW)	Base change
POL (HOL)	Some decrease in information due to data edits
DEU (ALL)	Base change
ITA (HOL)	Base change, editing and pedigree checks
ITA (BSW)	Base change
BEL (HOL)	Changed the genetic evaluation model: The fixed environmental effect, called Herd - calving year - lactation class (1st, 2nd, 3rd, 4th and later) is now considered as a random effect in order to get more stable solutions over time.
SVN (ALL)	Base change
CHE (HOL,BSW)	Base change
BEL HOL	Changed the genetic evaluation model: The fixed environmental effect, called Herd - calving year - lactation class(1st, 2nd, 3rd, 4th and later) is now considered as a random effect in order to get more stable solutions over time
AUS ALL	New database and procedures for data extraction. Mix99 software will be used for all traits. EBV expression is on the observable scale for a trait into consideration, (kg, days, log(scc),type scores, etc). Drop in reliabilities
NLD ALL	Inclusion of Flemish data
NZL ALL	have continuous DNA parentage testing so daughters, herds, EDC will always change. Small decrease in Reliability as consequence.
NOR ALL	New extraction pipeline. The criteria to enter analysis is now more stringent as records in progress are not entered. This cause loss of daughters compared to earlier, but is in compliance with the trait definition. The rolling definition of hys (random) and herdX5yr (fixed) is causing the daughters to distribute somewhat differently over classes at each evaluation. Therefore some bulls occasionally may loose edc and reliability although number of daughters remain the same

INTERBULL CHANGES COMPARED TO THE DECEMBER 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.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 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 (April Routine Evaluation 2019).
Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		137	7646	1682	685	
BEL			1577			
CAN	212	102	11954	702	831	
CHE	2907		3317			
CZE			4213			3236
DEA	6379					
DEU			23967		303	
DFS			13139	2446	9049	
ESP			3553			
EST						
FRA	383		16641			
FRM						4474
GBR	105	296	7454	785	532	80
HUN			3281			
IRL			2792	181	64	
ISR			1436			
ITA	2085		9373			
JPN						
KOR						
LTU						
LVA						
NLD	175		14700	133	60	334
NOR					3733	
NZL	51	57	7516	4675	1244	
POL			10018			
PRT						
SVK						
SVN	381		545			588
URY						
USA	1080	777	37361	4450	702	44
ZAF			1229	679	133	
HRV						
MEX						
CAM					35	
No.Records	13758	1369	181712	15733	17371	8756
Pub. Proofs	11372	1089	143117	12883	15604	7795

^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	8.89									
CHE	0.74	11.03								
DEA	0.80	0.85	14.21							
NLD	0.65	0.77	0.79	326.71						

NZL	0.52	0.52	0.44	0.47	295.17
USA	0.91	0.68	0.77	0.73	0.54	2.74
ITA	0.79	0.67	0.79	0.61	0.45	0.68	16.30
FRA	0.65	0.79	0.78	0.69	0.47	0.67	0.54	0.94
GBR	0.85	0.60	0.49	0.61	0.57	0.83	0.63	0.53	0.32
SVN	0.76	0.64	0.79	0.71	0.52	0.73	0.79	0.65	0.59	23.82

GUE dlo

	AUS	CAN	NZL	USA	GBR
AUS	0.07				
CAN	0.73	7.39			
NZL	0.72	0.54	341.97		
USA	0.71	0.91	0.53	2.85	
GBR	0.74	0.91	0.60	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
AUS	0.05																			
BEL	0.72	0.38																		
CAN	0.74	0.85	6.01																	
CHE	0.81	0.79	0.85	12.26																
DEU	0.77	0.85	0.89	0.86	12.65															
DFS	0.79	0.85	0.86	0.82	0.92	12.37														
ESP	0.60	0.77	0.87	0.76	0.83	0.75	12.08													
FRA	0.68	0.62	0.59	0.76	0.64	0.71	0.56	0.99												
GBR	0.75	0.88	0.90	0.79	0.87	0.83	0.87	0.56	0.31											
IRL	0.61	0.80	0.79	0.65	0.73	0.68	0.76	0.44	0.80	2.04										
ISR	0.67	0.59	0.57	0.61	0.63	0.70	0.52	0.68	0.54	0.49	104.55									
ITA	0.54	0.63	0.75	0.70	0.74	0.65	0.87	0.60	0.74	0.61	0.51	5.98								
NLD	0.61	0.69	0.65	0.73	0.74	0.75	0.62	0.67	0.64	0.48	0.64	0.54	282.21							
NZL	0.68	0.69	0.55	0.61	0.66	0.65	0.49	0.47	0.60	0.60	0.44	0.44	0.48	210.72						
USA	0.71	0.85	0.90	0.78	0.88	0.88	0.87	0.63	0.86	0.74	0.67	0.74	0.74	0.57	2.27					
HUN	0.45	0.54	0.64	0.50	0.57	0.51	0.74	0.45	0.65	0.49	0.43	0.68	0.48	0.44	0.71	1.24				
CZE	0.45	0.51	0.63	0.58	0.61	0.49	0.71	0.44	0.59	0.58	0.42	0.69	0.45	0.44	0.61	0.53	12.77			
SVN	0.51	0.80	0.72	0.64	0.74	0.69	0.70	0.51	0.71	0.67	0.61	0.54	0.65	0.64	0.79	0.54	0.44	25.01		
ZAF	0.82	0.85	0.88	0.77	0.89	0.86	0.85	0.62	0.90	0.86	0.57	0.71	0.61	0.69	0.89	0.62	0.61	0.70	24.31	
POL	0.45	0.45	0.52	0.60	0.62	0.54	0.62	0.44	0.54	0.46	0.42	0.62	0.45	0.44	0.53	0.44	0.50	0.48	0.55	13.21

JER dlo

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0.05								
CAN	0.53	7.06							
DFS	0.73	0.66	12.19						
NLD	0.65	0.60	0.79	341.93					
NZL	0.64	0.47	0.68	0.51	193.11				
USA	0.69	0.81	0.79	0.76	0.55	2.41			
GBR	0.60	0.84	0.74	0.65	0.48	0.79	0.29		
ZAF	0.52	0.58	0.68	0.55	0.47	0.68	0.77	27.86	
IRL	0.53	0.70	0.57	0.47	0.49	0.59	0.68	0.59	1.53

RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	0.06											
CAN	0.68	6.78										
DEU	0.69	0.86	12.68									
DFS	0.74	0.73	0.89	13.00								
NZL	0.66	0.49	0.59	0.50	233.60							
USA	0.66	0.87	0.86	0.83	0.50	2.53						

GBR	0.70	0.89	0.82	0.73	0.51	0.80	0.30				
NLD	0.61	0.66	0.75	0.77	0.47	0.78	0.62	330.00			
ZAF	0.61	0.85	0.83	0.61	0.53	0.85	0.78	0.62	29.98		
IRL	0.57	0.75	0.72	0.62	0.58	0.65	0.74	0.49	0.80	1.48	
NOR	0.66	0.68	0.67	0.82	0.45	0.78	0.66	0.71	0.52	0.49	41.28
CAM	0.49	0.51	0.59	0.58	0.44	0.56	0.50	0.63	0.45	0.46	0.48	9.74

SIM dlo

	FRM	NLD	CZE	SVN	GBR	USA
FRM	0.99					
NLD	0.58	289.89				
CZE	0.45	0.45	20.20			
SVN	0.71	0.73	0.45	22.84		
GBR	0.52	0.63	0.54	0.71	0.25	
USA	0.74	0.78	0.59	0.79	0.81	2.28

^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	112	126	39	23	154	112	78	54	30
CHE	90	0	555	85	24	306	425	160	62	72
DEA	101	450	0	132	31	318	679	209	64	101
NLD	34	81	122	0	20	64	111	70	30	42
NZL	21	19	24	13	0	29	25	22	17	10
USA	142	286	279	54	24	0	230	118	75	40
ITA	95	366	569	92	21	162	0	184	64	93
FRA	69	121	157	56	19	81	147	0	49	53
GBR	51	48	43	23	14	70	46	41	0	19
SVN	26	68	93	42	8	33	92	53	15	0

GUE

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	NZL	USA	GBR
AUS	0	47	26	60	36
CAN	47	0	13	67	29
NZL	26	11	0	28	15
USA	56	57	26	0	85
GBR	32	24	13	87	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
AUS	0	616	1167	520	1479	1166	768	1122	1321	675	99	1089	1281	1074	1641	655	783	166	454	894
BEL	528	0	625	487	975	722	549	746	794	452	77	704	966	431	783	463	553	155	291	638
CAN	1089	589	0	772	2160	1213	1134	1268	1527	500	110	1501	1250	645	2948	917	906	185	461	1159
CHE	454	484	604	0	1051	637	494	572	693	369	60	663	797	358	909	407	485	134	253	593
DEU	1033	983	1436	900	0	2497	1390	2244	2161	852	160	2424	3041	899	3351	1200	1726	298	547	2160
DFS	791	660	914	552	1671	0	913	1506	1622	723	145	1528	1938	773	1901	862	1183	241	494	1467
ESP	537	525	634	394	849	660	0	1005	1032	472	105	1156	971	479	1397	707	771	179	426	930
FRA	698	695	723	479	1041	686	673	0	1504	695	124	1612	1757	722	2303	878	1156	187	452	1451
GBR	1162	802	1733	658	1778	1287	863	916	0	979	140	1616	1822	933	2193	895	1105	223	523	1367
IRL	581	442	442	367	746	593	453	525	1045	0	94	650	849	688	744	436	529	118	324	572

ISR	60	46	70	36	131	112	59	58	111	72	0	141	149	105	176	112	111	47	63	136
ITA	754	651	1073	584	1533	1109	814	769	1317	555	102	0	1597	714	2445	989	1153	229	481	1467
NLD	1056	1063	1074	749	2649	1628	815	955	1710	789	118	1229	0	932	2219	917	1336	242	485	1581
NZL	1050	349	630	298	674	530	354	384	844	592	85	523	832	0	985	473	586	124	346	593
USA	1534	672	3009	795	2218	1354	863	1096	2064	657	161	1582	1751	921	0	1254	1485	224	613	1823
HUN	485	389	793	325	934	671	550	544	835	386	81	845	734	366	1189	0	856	158	382	889
CZE	485	437	579	351	1311	733	564	673	868	406	83	798	1133	408	1109	783	0	193	405	1153
SVN	118	124	130	99	287	201	136	123	179	93	35	193	204	85	168	122	145	0	98	233
ZAF	387	247	382	204	424	367	364	295	469	282	41	368	391	277	579	298	277	68	0	401
POL	622	567	864	473	1804	1137	624	834	1226	470	104	1079	1389	439	1650	769	893	209	293	0

JER

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0	225	133	57	397	442	204	215	50
CAN	230	0	92	29	155	375	155	149	11
DFS	100	81	0	79	134	182	163	135	43
NLD	49	22	76	0	61	68	70	62	31
NZL	442	166	110	53	0	320	207	187	108
USA	476	380	157	72	388	0	235	288	44
GBR	217	160	161	69	223	276	0	168	74
ZAF	207	144	115	57	196	301	178	0	38
IRL	47	9	36	30	120	45	77	37	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	90	38	182	123	115	84	22	37	15	54	9
CAN	92	0	14	136	74	202	91	6	70	5	5	0
DEU	37	13	0	60	18	27	20	14	3	7	19	0
DFS	161	137	50	0	150	172	111	39	49	19	117	0
NZL	124	73	17	145	0	100	76	18	36	11	35	8
USA	116	186	26	167	100	0	113	35	61	27	65	18
GBR	82	90	19	108	71	106	0	25	49	22	45	0
NLD	21	6	14	38	17	34	25	0	4	13	33	0
ZAF	38	72	3	48	32	55	42	4	0	3	0	0
IRL	14	5	7	15	11	27	21	13	3	0	52	0
NOR	45	5	18	88	33	66	47	33	0	51	0	0
CAM	9	0	0	0	8	18	0	0	0	0	0	0

SIM

common bulls below diagonal
common three quarter sib group above diagonal

	FRM	NLD	CZE	SVN	GBR	USA
FRM	0	100	161	0	63	29
NLD	123	0	139	44	42	15
CZE	192	133	0	59	43	15
SVN	0	43	57	0	0	0
GBR	80	40	39	0	0	18
USA	44	18	15	0	25	0