

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:

DEU HOL/RDC -Introduction of a new model in Longevity
New trait definition: Survival of a cow in the first three lactations (up to the fourth calving), each lactation separated in three periods (9-trait linear model). All 9 estimates are combined in an relative index, which represents the functional longevity. New data cut: Due to data quality, only cows with birth year of 1995 and later are used in the model, sires with progeny are born ca. 1990. All bulls born before this date will have no daughter proven EBV -Base change

BEL HOL Change the "national standards" for official publication

NLD ALL New model (Random regression animal model)

DEA BSW Base change

FRA ALL Base change

ITA HOL Base change + cut-off of one year of data

ITA BSW Base change

AUS ALL Changes in publication rules resulting in many bulls changing status to N
Pedigree changes + data editing

NZL ALL Continuous parentage testing

CAM RDC Base change

CAN ALL Base change

SVN ALL Base change

USA RDC Corrected a bug in the Pedigree system

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 2018).
 Number of records for direct longevity by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS		132	7444	1627	654	
BEL			1484			
CAN	202	99	11549	662	808	
CHE	2827		3184			
CZE			4214			3236
DEA	6261					
DEU			23086		280	
DFS			12987	2397	8940	
ESP			3343			
EST						
FRA	369		16352			
FRM						4348
GBR	102	288	7135	755	512	78
HUN			3158			
IRL			2656	169	60	
ISR			1367			
ITA	2032		8928			
JPN						
KOR						
LTU						
LVA						
NLD	156		13872	116	50	275
NOR					3462	
NZL	47	56	7184	4515	1203	
POL			9637			
PRT						
SVK						
SVN	371		503			564
URY						
USA	1050	765	35620	4200	678	42
ZAF			1213	657	130	
HRV						
MEX						
CAM					34	
No. Records	13417	1340	174916	15098	16811	8543
Pub. Proofs	11134	1072	139267	12392	15179	7595

^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	8.95									
CHE	0.75	11.09								
DEA	0.80	0.85	14.27							
NLD	0.66	0.75	0.76	333.37						
NZL	0.52	0.54	0.44	0.48	310.90					
USA	0.91	0.68	0.77	0.74	0.55	2.76				
ITA	0.81	0.67	0.80	0.60	0.45	0.68	16.57			
FRA	0.64	0.78	0.78	0.68	0.47	0.66	0.55	0.93		
GBR	0.85	0.60	0.48	0.64	0.58	0.84	0.63	0.53	0.32	
SVN	0.77	0.61	0.77	0.69	0.52	0.73	0.80	0.63	0.61	24.57

GUE dlo

	AUS	CAN	NZL	USA	GBR
AUS	7.13				
CAN	0.73	7.62			
NZL	0.73	0.55	344.93		
USA	0.68	0.91	0.53	2.82	
GBR	0.74	0.91	0.60	0.88	0.36

HOL dlo

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	IRL	ISR	ITA
NLD	NZL	USA	HUN	CZE	SVN	ZAF	POL					
AUS	4.48											
BEL	0.76	0.37										
CAN	0.74	0.84	6.05									
CHE	0.81	0.81	0.85	12.28								
DEU	0.74	0.86	0.90	0.85	12.66							
DFS	0.78	0.87	0.86	0.82	0.92	12.40						
ESP	0.56	0.74	0.85	0.75	0.83	0.74	12.22					
FRA	0.68	0.65	0.59	0.76	0.64	0.70	0.54	1.00				
GBR	0.74	0.88	0.90	0.79	0.87	0.83	0.85	0.55	0.31			
IRL	0.57	0.78	0.79	0.65	0.74	0.68	0.75	0.44	0.81	2.03		
ISR	0.64	0.63	0.58	0.65	0.64	0.70	0.53	0.71	0.56	0.48	102.92	
ITA	0.48	0.62	0.76	0.70	0.74	0.65	0.85	0.59	0.73	0.62	0.51	6.18
NLD	0.62	0.72	0.65	0.74	0.74	0.76	0.62	0.67	0.65	0.48	0.64	0.54
280.25												
NZL	0.68	0.69	0.55	0.61	0.65	0.64	0.48	0.46	0.59	0.60	0.44	0.43
0.49	210.54											
USA	0.71	0.85	0.91	0.78	0.88	0.88	0.85	0.63	0.86	0.74	0.68	0.74
0.74	0.56	2.29										
HUN	0.43	0.51	0.63	0.49	0.57	0.50	0.73	0.44	0.65	0.49	0.43	0.68
0.48	0.44	0.71	1.21									
CZE	0.43	0.48	0.63	0.59	0.61	0.49	0.71	0.43	0.59	0.58	0.41	0.69
0.45	0.43	0.61	0.54	12.76								
SVN	0.56	0.80	0.78	0.70	0.76	0.71	0.71	0.52	0.74	0.69	0.67	0.57
0.65	0.65	0.82	0.56	0.45	25.75							
ZAF	0.78	0.85	0.89	0.77	0.89	0.85	0.84	0.60	0.90	0.86	0.57	0.71
0.62	0.68	0.88	0.62	0.60	0.71	24.32						
POL	0.48	0.45	0.55	0.63	0.62	0.55	0.61	0.44	0.55	0.47	0.42	0.61
0.45	0.44	0.53	0.44	0.52	0.49	0.55	13.13					

JER dlo

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	5.28								
CAN	0.52	6.87							
DFS	0.75	0.66	12.19						
NLD	0.65	0.60	0.77	338.58					
NZL	0.65	0.47	0.68	0.50	192.47				
USA	0.71	0.81	0.79	0.77	0.55	2.42			
GBR	0.58	0.83	0.74	0.64	0.47	0.78	0.29		
ZAF	0.50	0.59	0.71	0.59	0.47	0.65	0.79	28.07	
IRL	0.52	0.70	0.57	0.47	0.49	0.59	0.68	0.59	1.52

RDC dlo

	AUS	CAN	DEU	DFS	NZL	USA	GBR	NLD	ZAF	IRL	NOR	CAM
AUS	5.53											
CAN	0.67	6.69										
DEU	0.67	0.86	12.82									
DFS	0.78	0.73	0.87	12.98								
NZL	0.66	0.49	0.58	0.50	231.23							
USA	0.66	0.88	0.86	0.83	0.49	2.59						
GBR	0.67	0.89	0.83	0.74	0.51	0.79	0.30					
NLD	0.62	0.66	0.75	0.76	0.48	0.78	0.65	333.55				
ZAF	0.57	0.85	0.83	0.61	0.53	0.85	0.77	0.63	29.54			
IRL	0.56	0.75	0.72	0.62	0.58	0.66	0.74	0.47	0.80	1.44		
NOR	0.73	0.62	0.52	0.74	0.47	0.79	0.54	0.65	0.57	0.50	40.85	
CAM	0.52	0.55	0.53	0.57	0.44	0.56	0.57	0.61	0.44	0.44	0.44	9.47

SIM dlo

	FRM	NLD	CZE	SVN	GBR	USA
FRM	0.99					
NLD	0.58	306.30				
CZE	0.44	0.44	20.23			
SVN	0.64	0.73	0.44	22.61		
GBR	0.54	0.65	0.53	0.72	0.25	
USA	0.71	0.78	0.59	0.80	0.81	2.20

^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	108	119	36	21	146	107	75	54	29
CHE	85	0	532	81	21	297	412	153	59	69
DEA	93	426	0	120	28	310	653	200	61	96
NLD	30	74	108	0	19	61	104	68	28	40
NZL	19	17	22	12	0	26	23	19	17	10
USA	132	280	272	48	22	0	225	118	73	38
ITA	88	353	548	83	19	157	0	176	63	90
FRA	64	116	150	53	16	81	142	0	49	52
GBR	50	47	43	21	14	69	46	41	0	19
SVN	26	65	89	40	8	30	89	52	15	0

GUE

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	CAN	NZL	USA	GBR
AUS	0	45	26	57	35
CAN	45	0	13	64	27
NZL	26	11	0	28	14
USA	53	54	26	0	82
GBR	31	22	12	84	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	0	582	1093	495	1393	1110	721	1085	1256	642	95	1021	1184	1016	1544	613	758	153	440	
834	BEL	496	0	576	466	911	684	519	712	741	427	70	658	873	402	718	436	546	144	285
589	CAN	1001	539	0	724	1991	1151	1071	1210	1434	464	100	1393	1116	607	2740	864	906	172	450
1075	CHE	431	460	559	0	980	616	474	543	659	351	56	634	732	337	853	395	482	127	244
565	DEU	939	906	1175	831	0	2400	1306	2162	2017	805	152	2293	2724	844	3088	1149	1714	269	533
1987	DFS	735	615	832	531	1527	0	885	1470	1554	694	140	1456	1833	744	1829	830	1183	225	485
1395	ESP	505	502	591	378	803	629	0	954	978	449	98	1094	894	456	1320	669	769	168	418
873	FRA	661	664	665	455	965	646	646	0	1455	667	119	1563	1645	696	2235	849	1154	176	443
1373	GBR	1092	745	1622	626	1598	1216	829	873	0	935	132	1513	1680	886	2070	849	1088	213	513
1272	IRL	545	418	404	351	696	565	432	503	990	0	88	612	804	655	700	412	515	114	314
534	ISR	58	43	63	34	124	107	57	56	104	68	0	132	142	99	160	108	111	45	61
123	ITA	692	606	939	557	1377	1017	767	722	1210	524	94	0	1460	677	2287	939	1148	216	470
1377	NLD	956	927	878	679	2204	1469	731	853	1507	732	111	1040	0	880	2039	845	1298	224	465
1420	NZL	991	325	597	281	619	500	337	364	797	561	79	492	775	0	943	449	576	118	341
562	USA	1408	610	2705	750	1868	1261	807	1029	1899	609	144	1394	1469	875	0	1190	1477	210	601
1697	HUN	453	366	732	315	868	634	520	522	794	366	80	790	649	354	1121	0	848	149	373
839	CZE	462	429	578	350	1292	731	558	670	857	400	83	791	1087	398	1105	776	0	189	402
1140	SVN	108	117	120	95	256	188	128	116	173	90	34	179	185	81	158	114	141	0	97
214	ZAF	370	240	373	199	411	361	358	285	459	273	41	360	371	273	564	293	275	67	0
388	POL	571	525	763	446	1600	1055	588	762	1116	440	96	982	1188	409	1486	715	884	191	281
0																				

JER

common bulls below diagonal
 common three quarter sib group above diagonal

	AUS	CAN	DFS	NLD	NZL	USA	GBR	ZAF	IRL
AUS	0	212	128	52	378	423	197	207	47
CAN	216	0	87	25	154	348	151	138	10
DFS	96	76	0	68	129	177	156	131	36
NLD	44	19	66	0	52	60	62	55	23
NZL	420	165	107	44	0	315	200	180	99
USA	450	348	154	64	384	0	226	273	42
GBR	207	157	153	61	215	265	0	164	63
ZAF	199	135	112	51	191	284	174	0	34
IRL	43	8	31	22	111	43	65	34	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	88	32	174	117	107	82	18	35	13	51	9
CAN	88	0	11	128	73	194	88	5	69	4	5	0
DEU	31	10	0	45	11	17	13	11	3	5	14	0
DFS	153	129	36	0	144	163	108	31	48	17	110	0
NZL	118	72	11	140	0	99	72	13	35	8	35	8
USA	107	175	17	158	99	0	108	30	60	23	61	17
GBR	80	87	12	104	68	102	0	23	48	20	41	0
NLD	17	5	11	31	13	29	23	0	2	10	27	0
ZAF	35	71	3	47	31	54	41	2	0	2	0	0
IRL	12	4	5	13	8	23	19	9	2	0	49	0
NOR	42	5	14	81	33	62	43	26	0	48	0	0
CAM	9	0	0	0	8	17	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	98	163	0	61	27
NLD	119	0	135	39	42	14
CZE	192	131	0	59	43	14
SVN	0	39	57	0	0	0
GBR	78	40	39	0	0	17
USA	42	17	14	0	24	0