

INTRODUCTION

The latest routine international evaluation for calving traits took place as scheduled at the Interbull Centre. Data from eighteen (18) countries were included in this evaluation.

International genetic evaluations for calving traits of bulls from Australia, Austria-Germany, Belgium, Canada, Denmark-Finland-Sweden, France, Germany, Hungary, Ireland, Israel, Italy, Netherlands, Norway, Spain, Switzerland, the United Kingdom, Slovak Republic, Poland and the United States of America were computed. Brown Swiss, Holstein, and Red Dairy Cattle breed data were included in this evaluation.

CHANGES IN NATIONAL PROCEDURES

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

AUS (HOL)	Drops of information due to data clean up such as pedigree changes, status change of a bull which leads to a good number of bulls no longer qualifying.
DFS (HOL,RDC)	New parameters have been estimated. Snell score is introduced for HV correction, Inbreeding in the A-matrix Inbreeding depression included in the model. Correction in the EDC calculation.
ESP (HOL)	Database update from regional milk recording organizations, several bulls are affected but very slight change in information per bull.
CHE (HOL,BSW)	Drops in information due to manual edits in database. The change of herd-year-season assignment of certain data records might also explain small changes in EDC and reliabilities for some bulls
ITA (HOL)	Drop in information due to data editing
GBR (HOL)	Minor changes in data due to re-extraction procedure at each run and changes introduced by data providers
NLD (BSW,HOL,RDC)	Applied to dce only: Update of genetic parameters.
BEL (HOL)	Inclusion of inbreeding effect. Proofs calculated via an updated program (BLUP method)

INTERBULL CHANGES COMPARED TO THE PREVIOUS ROUTINE RUN

Post-processing Windows:

According to the decision taken by ITC in Orlando (2015) to review the post-processing windows every 5 years, during the 2020 the relative working group has been re-activated and new windows have been identified.

As before, the upper bounds have been set to 0.99 as these were judged to have very little effect on evaluations while the lower values have been reduced to the 10th percentile. This reduction would provide post-processed correlations to be closer to the real estimated ones. Over the past five years, in fact, the previous adopted lower value (25th percentile) had been found too high causing estimated and post-processed correlations to differ significantly from each other. The new lower values have been applied to all breeds and traits.

The weight assigned to the magnitude of the changes tested by each country has also been revised. The new weight will allow post-processed correlations to take more in consideration the value of the new estimated ones even when no changes are applied by the countries.

The new weights are as follows:

No changes :: 2
Small changes:: 1
Big changes :: 0

More information can be read on https://interbull.org/ib/rg_procedure

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 ROUTINE RUN

Results were distributed by the Interbull Centre to designated representatives in each country. The international evaluation file comprised international proofs expressed on the base and unit of each country included

in the analysis. Such records readily provide more information on bull performance in various countries, thereby minimizing the need to resort to conversions.

At the same time, all recipients of Interbull results are expected to honor the agreed code of practice, decided by the Interbull Steering Committee, and only publish international evaluations on their own country scale. Evaluations expressed on another country scale are confidential and may only be used internally for research and review purposes.

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 calving (December Routine Evaluation 2022).
 Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6681			
BEL			1248			
CAN	169		13332		526	
CHE	1653		2194			
CZE						
DEA	3584					
DEU			20256		291	
DFS			11171		6672	
ESP			1943			
EST						
FRA	397		13242			
FRM						
GBR			3228			
HUN			1765			
IRL			2367		61	
ISR			567			
ITA			9418			
JPN						
KOR						
LTU						
LVA						
NLD	180		15548		83	
NOR					3913	
NZL			7542		1107	
POL			6803			
PRT						
SVK			703			
SVN						
URY						
USA	547		37100			
ZAF						
HRV						
CAM						
=====						
No. Records	6530		155108		12653	
Pub. Proofs	6885	0	131817	0	12921	0

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

 BSW dce

 DEA NLD USA CHE CAN FRA

DEA	9.27					
NLD	0.86	5.93				
USA	0.65	0.83	0.13			
CHE	0.85	0.93	0.80	10.54		
CAN	0.78	0.94	0.90	0.92	7.72	
FRA	0.75	0.86	0.81	0.83	0.86	0.77

BSW mce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	9.74					
NLD	0.42	4.71				
USA	0.76	0.60	0.15			
CHE	0.72	0.56	0.86	13.05		
CAN	0.36	0.60	0.84	0.72	6.03	
FRA	0.82	0.58	0.91	0.92	0.79	1.03

HOL dce

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	IRL	NZL	SVK	ESP	POL
AUS	0.04																	
CAN	0.76	6.92																
CHE	0.74	0.92	9.02															
DFS	0.74	0.92	0.84	11.30														
FRA	0.78	0.95	0.92	0.88	0.92													
ISR	0.71	0.84	0.68	0.85	0.79	2.72												
ITA	0.46	0.58	0.59	0.58	0.60	0.61	7.14											
NLD	0.83	0.97	0.91	0.93	0.92	0.86	0.60	7.55										
USA	0.72	0.91	0.85	0.85	0.91	0.79	0.55	0.86	0.13									
GBR	0.75	0.80	0.70	0.70	0.75	0.70	0.44	0.83	0.68	0.07								
HUN	0.48	0.57	0.46	0.44	0.59	0.58	0.31	0.54	0.54	0.51	1.26							
DEU	0.80	0.93	0.89	0.89	0.94	0.80	0.54	0.93	0.86	0.75	0.59	12.58						
BEL	0.57	0.62	0.66	0.65	0.66	0.48	0.43	0.65	0.64	0.42	0.57	0.61	9.19					
IRL	0.77	0.86	0.82	0.84	0.85	0.78	0.54	0.89	0.81	0.67	0.51	0.80	0.58	0.09				
NZL	0.78	0.77	0.73	0.78	0.75	0.69	0.45	0.80	0.74	0.61	0.36	0.77	0.50	0.81	2.99			
SVK	0.43	0.32	0.29	0.30	0.31	0.33	0.28	0.29	0.30	0.31	0.34	0.30	0.31	0.30	0.23	13.10		
ESP	0.63	0.84	0.79	0.72	0.83	0.67	0.52	0.82	0.79	0.59	0.58	0.82	0.60	0.75	0.65	0.29	11.61	
POL	0.43	0.51	0.45	0.54	0.52	0.44	0.29	0.46	0.48	0.45	0.31	0.47	0.36	0.50	0.26	0.32	0.34	14.23

HOL mce

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	SVK	ESP	POL
CAN	6.69														
CHE	0.84	11.57													
DFS	0.83	0.68	11.69												
FRA	0.90	0.95	0.76	1.28											
ISR	0.85	0.68	0.80	0.78	2.63										
ITA	0.58	0.54	0.58	0.58	0.62	9.04									
NLD	0.62	0.55	0.63	0.63	0.59	0.50	5.28								
USA	0.92	0.90	0.78	0.95	0.85	0.59	0.61	0.15							
GBR	0.60	0.65	0.48	0.69	0.52	0.42	0.41	0.64	0.04						
HUN	0.40	0.34	0.40	0.38	0.46	0.31	0.30	0.39	0.35	1.28					
DEU	0.84	0.70	0.90	0.77	0.77	0.59	0.66	0.79	0.53	0.44	12.40				
BEL	0.65	0.68	0.66	0.71	0.53	0.51	0.64	0.66	0.49	0.42	0.72	10.16			
SVK	0.29	0.30	0.28	0.30	0.42	0.28	0.22	0.29	0.48	0.30	0.29	0.42	15.53		
ESP	0.74	0.61	0.80	0.68	0.72	0.42	0.64	0.69	0.49	0.51	0.80	0.59	0.30	12.31	
POL	0.49	0.44	0.51	0.47	0.46	0.40	0.38	0.50	0.36	0.27	0.53	0.49	0.28	0.44	15.55

HOL dsb

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL
AUS	0.04											
CAN	0.61	7.71										
CHE	0.22	0.65	17.45									
DFS	0.65	0.88	0.63	11.23								

FRA	0.45	0.75	0.63	0.66	0.77							
ISR	0.82	0.72	0.36	0.73	0.51	1.65						
ITA	0.52	0.42	0.31	0.43	0.34	0.52	7.14					
NLD	0.33	0.79	0.74	0.71	0.67	0.48	0.29	4.57				
USA	0.35	0.71	0.63	0.61	0.68	0.37	0.29	0.62	0.07			
HUN	0.59	0.44	0.21	0.45	0.26	0.65	0.34	0.21	0.27	1.10		
DEU	0.51	0.90	0.73	0.86	0.68	0.66	0.34	0.82	0.67	0.43	12.24	
POL	0.31	0.58	0.58	0.63	0.49	0.36	0.20	0.56	0.49	0.19	0.64	16.57

HOL msb

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL
CAN	5.92										
CHE	0.78	16.64									
DFS	0.95	0.76	10.61								
FRA	0.86	0.79	0.84	0.93							
ISR	0.88	0.74	0.85	0.77	1.73						
ITA	0.50	0.52	0.49	0.49	0.56	9.04					
NLD	0.93	0.75	0.95	0.80	0.82	0.49	4.20				
USA	0.88	0.80	0.85	0.84	0.80	0.47	0.79	0.12			
HUN	0.21	0.29	0.22	0.25	0.48	0.42	0.21	0.29	1.22		
DEU	0.95	0.79	0.97	0.82	0.86	0.51	0.95	0.83	0.22	12.67	
POL	0.85	0.75	0.81	0.74	0.81	0.41	0.77	0.74	0.22	0.80	14.16

RDC dce

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	6.74						
DFS	0.90	10.80					
NOR	0.78	0.91	13.63				
NLD	0.95	0.91	0.88	5.18			
DEU	0.92	0.88	0.85	0.92	13.59		
IRL	0.82	0.81	0.88	0.86	0.79	0.07	
NZL	0.73	0.68	0.65	0.77	0.73	0.74	2.78

RDC mce

	CAN	DFS	NOR	DEU
CAN	6.95			
DFS	0.75	11.55		
NOR	0.59	0.87	15.76	
DEU	0.82	0.87	0.73	12.12

^LAPPENDIX II. Number of common bulls

BSW

common bulls below diagonal
common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA
DEA	0	118	182	417	98	200
NLD	109	0	44	81	20	54
USA	138	39	0	154	107	72
CHE	348	74	121	0	88	121
CAN	85	18	98	74	0	58
FRA	151	42	56	88	50	0

BSW

common bulls below diagonal
common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA
DEA	0	99	105	479	36	165

NLD	92	0	32	63	15	51
USA	95	29	0	100	31	49
CHE	386	62	86	0	33	112
CAN	32	12	29	28	0	24
FRA	125	45	43	82	21	0

BSW

BSW

GUE

GUE

GUE

GUE

HOL

common bulls below diagonal

common three quarter sib group above diagonal

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	IRL	NZL	SVK	ESP	POL
AUS	0	1369	416	1032	1088	87	1105	1184	1710	745	446	1341	501	474	946	193	481	763
CAN	1318	0	665	1332	1474	107	1893	1482	3725	924	697	2373	612	434	691	295	774	1329
CHE	360	577	0	396	482	31	523	564	701	345	197	815	358	217	244	109	281	465
DFS	683	1041	335	0	1417	107	1370	1575	1818	810	526	2077	570	455	710	244	530	1062
FRA	783	1111	422	821	0	88	1696	1706	2208	903	669	2259	684	476	733	300	672	1393
ISR	56	73	16	74	53	0	107	125	151	78	54	119	50	65	84	33	53	101
ITA	821	1624	460	1012	1065	72	0	1611	2706	1072	715	2513	633	485	697	315	791	1467
NLD	902	1282	527	1046	1012	88	1191	0	2315	1036	561	2865	757	601	965	331	587	1474
USA	1612	4030	607	1240	1293	138	2107	1713	0	1297	843	3269	651	569	980	366	863	1878
GBR	552	757	298	469	493	42	725	673	938	0	380	1210	428	444	447	175	422	800
HUN	273	554	131	333	410	34	511	313	656	214	0	833	278	234	328	174	340	493
DEU	1025	1876	739	1408	1361	91	1738	2386	2424	764	543	0	854	609	844	498	857	2093
BEL	464	588	351	501	706	25	636	774	602	378	207	886	0	312	345	156	355	546
IRL	419	389	201	369	428	43	409	511	533	398	183	531	296	0	545	113	218	363
NZL	837	620	209	477	495	62	543	798	924	282	198	667	294	488	0	168	306	449
SVK	92	206	47	128	192	15	211	211	255	76	110	392	86	46	101	0	153	260
ESP	329	517	207	388	515	24	555	444	552	283	217	493	321	177	214	61	0	590
POL	628	1257	370	859	1051	77	1232	1363	1969	656	370	1884	503	306	372	177	400	0

HOL

common bulls below diagonal

common three quarter sib group above diagonal

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	SVK	ESP	POL
CAN	0	628	1222	1217	94	1467	1166	2453	821	650	2035	545	263	648	1138
CHE	529	0	517	532	43	533	616	679	388	242	849	379	119	299	458
DFS	1061	465	0	1575	117	1381	1892	1811	818	631	2566	618	248	520	1253
FRA	908	468	910	0	96	1474	1707	1914	749	690	2353	696	263	600	1383
ISR	57	21	79	55	0	104	124	147	86	62	129	47	29	54	97
ITA	1195	451	1089	882	67	0	1423	2181	832	695	2186	586	258	630	1258
NLD	1104	584	1575	1126	91	1140	0	1866	870	645	2836	773	302	532	1418
USA	2463	591	1450	1093	131	1695	1519	0	1052	853	2963	603	311	704	1716
GBR	900	371	830	753	60	906	950	1232	0	401	1004	436	168	395	663
HUN	545	178	432	426	40	527	436	719	366	0	901	299	175	327	502
DEU	1500	758	1761	1285	96	1435	2391	2101	1073	602	0	819	376	719	2065
BEL	541	376	584	719	25	568	833	554	490	238	845	0	147	338	508
SVK	181	47	134	147	12	179	195	220	105	118	273	79	0	138	213
ESP	466	235	411	479	22	488	446	508	364	243	459	310	66	0	488
POL	995	345	1032	943	70	992	1265	1729	703	367	1741	449	154	340	0

HOL

common bulls below diagonal

common three quarter sib group above diagonal

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL
AUS	0	1324	403	1035	961	87	1101	1327	1587	318	1339	754
CAN	1308	0	640	1287	1328	103	1880	1713	3407	488	2359	1319
CHE	350	555	0	387	474	30	508	600	642	129	789	455
DFS	688	1045	328	0	1279	109	1373	1711	1683	411	2089	1059
FRA	732	1048	415	784	0	77	1618	1704	1777	485	2170	1378
ISR	56	72	16	74	50	0	107	129	147	35	121	98
ITA	820	1623	445	1017	1025	72	0	1812	2567	524	2511	1456
NLD	1141	1681	576	1297	1280	99	1519	0	2366	468	3174	1551
USA	1524	3801	548	1188	1072	135	2023	2050	0	575	3042	1815
HUN	199	382	89	256	303	26	369	320	428	0	634	303
DEU	1029	1881	710	1412	1342	91	1739	2857	2297	419	0	2088
POL	626	1264	364	866	1056	77	1236	1480	1943	224	1904	0

HOL

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL
CAN	0	623	1220	1147	93	1457	1248	2252	469	1981	1086
CHE	525	0	524	524	43	528	645	638	179	826	432
DFS	1093	473	0	1483	117	1391	2020	1617	510	2567	1217
FRA	884	463	907	0	91	1433	1701	1549	522	2218	1320
ISR	57	21	79	53	0	104	130	142	45	127	95
ITA	1193	448	1111	863	67	0	1499	1986	528	2149	1206
NLD	1219	616	1720	1153	94	1221	0	1799	519	2937	1385
USA	2355	556	1451	990	130	1647	1576	0	580	2565	1565
HUN	387	134	348	320	27	392	370	508	0	708	307
DEU	1437	728	1775	1210	93	1394	2477	1915	464	0	1915
POL	956	324	1007	883	69	942	1228	1592	209	1571	0

JER

JER

JER

JER

RDC

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	0	167	6	5	11	4	60
DFS	172	0	137	57	84	19	126
NOR	5	111	0	45	26	53	39
NLD	5	55	44	0	26	12	21
DEU	11	77	25	25	0	6	21
IRL	4	15	52	12	6	0	13
NZL	61	110	38	21	21	13	0

RDC

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	DFS	NOR	DEU
CAN	0	108	4	9
DFS	107	0	135	51
NOR	4	108	0	15
DEU	9	43	14	0

RDC

RDC

SIM

SIM

SIM

SIM