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, Slovack 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:

NLD (HOL)	Added the sex effect to the model for the stillbirth traits, done some minor data edits.
NOR (RDC)	High quality reliability meant for IB test 4 are now used.
POL (HOL)	Small decrease in information due to data edits
GBR (HOL)	Base change
ITA (HOL)	Cut-off of one year of data causing decrease in information. Base change
DEA (BSW)	Base change, pedigree verification caused some animals to become unofficial. Same model but new data edit: data used since 2000 instead of 1990 causing decrease in information and changes in ToP, additionally ToP are now derived separately for each trait and no longer using the same ToP from the milk evaluation.
CHE (ALL)	Base change, new algorithms in the data preparation, excluded data recorded before November 2005 and used Pete Sullivans MT-EDC software for the estimation of the EDCs. Small change in heritability for HOL dce and mce
USA (BSW,HOL)	DCE: Drops in information due to editing of data. For HOL: The current genetic base is made of bulls born 5 years and 7 years ago for direct and maternal traits, respectively. The inclusion of a massive and (now) more corrected set of data from data provider has had an effect on several bulls, including the base bulls. Some bulls lost/increased records and obviously their evaluation has changed
IRL (ALL)	Some changes in information due to pedigree verification
DEU (ALL)	base change, few bulls lost information due to data editing
NZL (ALL)	Drops in information due to continuous DNA parentage testing
CAN (ALL)	Base change
BEL (HOL)	Few bulls missing due to no longer having enough daughters. Some bulls changed in ToP due to the new program assigning such values.
AUS (HOL)	Change in information due to data clean up: pedigree changes or changes in status of bull causing a good number of bulls to no longer qualified

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 (April Routine Evaluation 2021).
Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6425			
BEL			1160			
CAN	162		12913		506	
CHE	1548		2073			
CZE						
DEA	3454					
DEU			19509		276	
DFS			10508		6434	
ESP			2176			
EST						
FRA	359		12618			
FRM						
GBR			3062			
HUN			1762			
IRL			2111		56	
ISR			507			
ITA			9374			
JPN						
KOR						
LTU						
LVA						
NLD	149		14921		70	
NOR					3819	
NZL			7542		1107	
POL			6085			
PRT						
SVK			682			
SVN						
URY						
USA	503		35992			
ZAF						
HRV						
CAM						
No.Records	6175		149420		12268	
Pub. Proofs	6624	0	130321	0	12756	0

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

BSW dce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	9.30					
NLD	0.89	5.79				
USA	0.72	0.86	0.13			
CHE	0.88	0.94	0.85	10.52		
CAN	0.81	0.95	0.92	0.94	7.59	
FRA	0.77	0.89	0.84	0.84	0.88	0.77

BSW mce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	9.75					
NLD	0.64	5.08				
USA	0.82	0.76	0.15			
CHE	0.84	0.73	0.89	12.89		
CAN	0.48	0.79	0.86	0.74	6.03	
FRA	0.87	0.77	0.92	0.94	0.81	1.02

HOL dce

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	IRL	NZL	SVK	ESP	POL
AUS	0.04																	
CAN	0.77	6.82																
CHE	0.70	0.92	9.15															
DFS	0.76	0.92	0.83	11.63														
FRA	0.80	0.95	0.91	0.89	0.92													
ISR	0.71	0.83	0.67	0.83	0.80	2.78												
ITA	0.62	0.71	0.64	0.71	0.72	0.69	7.23											
NLD	0.85	0.97	0.89	0.93	0.93	0.86	0.73	7.13										
USA	0.75	0.91	0.87	0.86	0.92	0.79	0.70	0.86	0.13									
GBR	0.75	0.79	0.66	0.72	0.76	0.70	0.66	0.84	0.73	0.07								
HUN	0.61	0.68	0.51	0.62	0.69	0.67	0.57	0.68	0.67	0.67	1.21							
DEU	0.81	0.93	0.88	0.89	0.93	0.79	0.69	0.92	0.86	0.76	0.69	12.75						
BEL	0.65	0.70	0.64	0.71	0.71	0.57	0.64	0.71	0.72	0.62	0.69	0.69	9.52					
IRL	0.77	0.88	0.79	0.85	0.87	0.77	0.70	0.91	0.82	0.72	0.64	0.82	0.68	0.09				
NZL	0.76	0.76	0.77	0.76	0.75	0.69	0.53	0.80	0.74	0.60	0.37	0.76	0.49	0.79	2.99			
SVK	0.56	0.57	0.36	0.56	0.57	0.53	0.57	0.57	0.56	0.56	0.60	0.57	0.56	0.51	0.26	12.78		
ESP	0.64	0.75	0.67	0.71	0.75	0.63	0.67	0.73	0.75	0.67	0.66	0.75	0.68	0.71	0.56	0.59	11.28	
POL	0.58	0.65	0.45	0.67	0.65	0.60	0.58	0.63	0.64	0.62	0.58	0.63	0.58	0.63	0.23	0.59	0.60	14.12

HOL mce

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	SVK	ESP	POL
CAN	6.76														
CHE	0.87	11.68													
DFS	0.83	0.69	12.09												
FRA	0.91	0.96	0.77	1.29											
ISR	0.83	0.69	0.81	0.78	2.65										
ITA	0.79	0.84	0.62	0.84	0.75	9.23									
NLD	0.83	0.75	0.85	0.80	0.70	0.57	5.44								
USA	0.92	0.92	0.78	0.95	0.86	0.85	0.78	0.15							
GBR	0.63	0.71	0.54	0.73	0.56	0.61	0.56	0.67	0.04						
HUN	0.49	0.44	0.50	0.48	0.53	0.45	0.49	0.48	0.47	1.25					
DEU	0.83	0.73	0.91	0.77	0.76	0.67	0.84	0.79	0.56	0.50	12.54				
BEL	0.67	0.69	0.70	0.73	0.58	0.60	0.78	0.67	0.53	0.50	0.74	10.44			
SVK	0.45	0.42	0.45	0.45	0.55	0.45	0.45	0.45	0.55	0.45	0.44	0.50	15.93		
ESP	0.66	0.60	0.66	0.65	0.67	0.56	0.67	0.65	0.54	0.51	0.67	0.61	0.47	12.03	
POL	0.53	0.50	0.54	0.52	0.54	0.52	0.52	0.53	0.48	0.44	0.54	0.52	0.45	0.52	15.56

HOL dsb

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL

AUS	0.04										
CAN	0.63	7.59									
CHE	0.36	0.63	17.57								
DFS	0.69	0.87	0.59	12.56							
FRA	0.47	0.75	0.63	0.65	0.76						
ISR	0.83	0.72	0.41	0.75	0.49	1.69					
ITA	0.63	0.54	0.33	0.56	0.39	0.69	7.23				
NLD	0.39	0.78	0.73	0.71	0.68	0.50	0.32	4.50			
USA	0.40	0.65	0.62	0.54	0.64	0.38	0.33	0.60	0.07		
HUN	0.61	0.49	0.30	0.50	0.32	0.66	0.45	0.30	0.32	1.10	
DEU	0.52	0.88	0.67	0.85	0.67	0.66	0.44	0.81	0.63	0.43	12.38
POL	0.38	0.56	0.55	0.63	0.52	0.36	0.32	0.56	0.52	0.29	0.62	16.61

HOL msb

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL
CAN	6.11										
CHE	0.80	16.92									
DFS	0.95	0.79	11.58								
FRA	0.87	0.82	0.86	0.93							
ISR	0.88	0.77	0.85	0.78	1.73						
ITA	0.50	0.61	0.48	0.54	0.63	9.23					
NLD	0.93	0.75	0.95	0.81	0.82	0.46	4.20				
USA	0.86	0.81	0.84	0.83	0.80	0.52	0.79	0.12			
HUN	0.40	0.38	0.42	0.43	0.52	0.45	0.40	0.43	1.22		
DEU	0.95	0.81	0.97	0.84	0.87	0.48	0.95	0.83	0.40	12.78	
POL	0.85	0.76	0.82	0.71	0.83	0.45	0.78	0.73	0.41	0.81	14.36

RDC dce

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	6.57						
DFS	0.92	11.33					
NOR	0.85	0.93	13.65				
NLD	0.96	0.92	0.91	4.88			
DEU	0.92	0.89	0.90	0.92	13.78		
IRL	0.85	0.83	0.90	0.88	0.81	0.07	
NZL	0.73	0.72	0.68	0.78	0.73	0.75	2.78

RDC mce

	CAN	DFS	NOR	DEU
CAN	6.90			
DFS	0.80	12.17		
NOR	0.67	0.89	15.45	
DEU	0.81	0.85	0.72	12.02

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^LAPPENDIX II. Number of common bulls

BSW

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common bulls below diagonal
common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA
DEA	0	95	177	391	94	176
NLD	88	0	37	65	19	49
USA	132	33	0	149	102	66
CHE	322	61	115	0	84	104
CAN	82	17	93	72	0	53
FRA	124	37	49	69	45	0

BSW

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common bulls below diagonal

common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA
DEA	0	96	97	448	35	136
NLD	89	0	29	63	14	44
USA	85	26	0	95	30	44
CHE	357	62	81	0	32	93
CAN	31	11	28	26	0	23
FRA	97	38	39	65	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	1273	385	962	1019	78	1073	1092	1586	689	443	1256	475	454	938	188	505	674
CAN	1215	0	626	1229	1355	93	1768	1305	3492	833	693	2242	574	411	689	285	822	1150
CHE	328	528	0	371	438	28	490	511	666	317	197	767	339	203	247	108	287	423
DFS	624	945	306	0	1294	99	1327	1434	1708	754	519	1938	530	429	704	233	547	914
FRA	700	964	368	685	0	81	1624	1531	2075	848	645	2055	610	449	699	281	691	1204
ISR	48	66	15	67	44	0	99	109	124	67	53	103	46	58	84	32	58	82
ITA	773	1470	418	934	931	66	0	1485	2572	978	719	2366	595	470	723	299	847	1259
NLD	811	1089	474	911	803	76	1029	0	2122	934	546	2583	678	546	957	313	609	1263
USA	1476	3767	568	1135	1123	111	1896	1500	0	1195	841	3132	615	538	981	352	918	1614
GBR	498	660	266	421	427	34	628	558	812	0	375	1117	389	415	442	170	433	682
HUN	272	552	130	333	384	34	508	302	655	212	0	830	275	232	326	173	380	477
DEU	943	1722	681	1278	1118	82	1554	2075	2237	671	541	0	794	573	839	485	906	1828
BEL	441	554	330	462	620	23	592	688	566	343	208	818	0	295	339	151	376	479
IRL	397	370	186	345	387	36	389	455	499	365	183	498	282	0	532	110	231	322
NZL	827	618	209	472	443	62	556	789	924	274	198	660	288	475	0	168	335	425
SVK	88	198	45	118	177	14	193	192	241	70	110	380	79	45	100	0	160	239
ESP	373	589	229	432	530	28	631	480	626	307	267	571	365	203	251	72	0	596
POL	543	1074	323	734	844	61	1012	1152	1663	538	355	1598	438	268	350	156	418	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	594	1109	1092	84	1361	1043	2260	727	649	1878	501	247	828	1007
CHE	479	0	467	462	38	493	576	637	348	240	807	353	111	331	408
DFS	938	414	0	1429	106	1324	1717	1677	746	634	2387	578	237	653	1098
FRA	750	394	723	0	83	1395	1508	1793	651	670	2125	611	240	738	1174
ISR	53	18	70	43	0	97	112	126	78	62	118	46	25	61	82
ITA	1078	408	978	742	61	0	1317	2037	762	703	2051	552	247	818	1094
NLD	970	526	1387	867	83	1005	0	1717	767	628	2550	719	283	665	1217
USA	2239	545	1277	919	111	1509	1352	0	920	852	2779	564	295	962	1511
GBR	803	331	746	623	54	826	837	1079	0	398	887	404	156	456	550
HUN	543	174	435	395	40	531	416	717	364	0	897	296	170	429	486
DEU	1323	688	1579	1000	90	1271	2062	1875	951	599	0	760	362	989	1799
BEL	496	351	541	617	25	521	759	516	456	235	786	0	139	384	453
SVK	171	44	123	126	10	168	177	207	96	115	263	74	0	155	194
ESP	517	245	474	498	27	552	508	581	418	300	543	350	68	0	583
POL	858	294	868	705	54	823	1052	1474	586	353	1462	391	141	342	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	1228	375	966	884	78	1069	1217	1464	318	1252	665
CAN	1205	0	602	1188	1213	89	1752	1448	3176	487	2228	1138
CHE	320	510	0	362	429	27	474	530	608	130	744	411
DFS	628	947	300	0	1157	101	1329	1540	1574	408	1952	909
FRA	639	904	362	640	0	70	1513	1477	1654	472	1964	1191
ISR	48	65	15	67	42	0	99	113	120	35	104	79
ITA	772	1468	404	939	866	66	0	1651	2415	532	2363	1244
NLD	1016	1358	494	1123	983	86	1295	0	2085	460	2807	1304
USA	1390	3538	511	1082	915	107	1809	1695	0	575	2905	1550
HUN	199	382	89	256	282	26	368	310	429	0	634	292
DEU	945	1726	655	1282	1086	82	1556	2407	2110	419	0	1822
POL	542	1079	317	737	845	61	1013	1201	1636	216	1613	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	589	1098	1018	83	1348	1051	2060	469	1829	960
CHE	476	0	474	455	38	489	575	597	184	785	386
DFS	956	419	0	1328	106	1328	1796	1472	510	2386	1065
FRA	725	387	713	0	78	1342	1458	1424	505	1989	1123
ISR	53	18	70	41	0	97	112	121	45	116	79
ITA	1076	406	992	715	61	0	1349	1827	543	2022	1048
NLD	981	525	1465	837	82	1020	0	1576	509	2583	1151
USA	2129	508	1265	816	109	1462	1310	0	580	2396	1378
HUN	387	134	347	296	27	399	356	507	0	708	295
DEU	1272	658	1581	928	87	1240	2031	1709	464	0	1668
POL	820	276	841	664	53	781	968	1363	198	1310	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	159	5	4	11	3	60
DFS	163	0	127	48	78	16	127
NOR	4	102	0	39	24	50	39
NLD	4	46	38	0	22	12	20
DEU	11	71	23	21	0	6	21
IRL	3	13	49	12	6	0	13
NZL	61	110	38	20	21	13	0

RDC

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	DFS	NOR	DEU
CAN	0	99	4	9
DFS	100	0	128	47
NOR	4	101	0	14
DEU	9	39	13	0

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RDC
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RDC
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SIM
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SIM
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SIM
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SIM
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