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:

IRL (HOL)	Some decrease in information due to parentage verification
AUS (ALL)	New EDC calculation. Base change, updated the status of bulls to better reflect their status as AI bull. As a result a good number no longer qualify and were not submitted.
NOR (RDC)	The criterion for type=12 was increased from 10 to 70 2nd batch daughters to make it more realistic. 99 bulls were then reversed to type=11
SVN (ALL)	Small decrease in inromation due to changes in data base related to the pedigree completness as well as phenotypic data improvement.
DEU (HOL,RDC)	An additional fixed effect was added to the model: calf is pure bred or calf is cross bred (dairy cow x beef bull). Heterogeneous variance adjustment is performed according to fixed effects regions x calving years x calving seasons x calf sex. Small decreases in herds, daughters or edc (less than 10%) are caused by data editing or pedigree correction.
DFS (ALL)	Updated our pedigree program used for genetic evaluation. The effect is minor. Data from Norway has been included in the HOL evaluation
ISR (HOL)	Base change
ITA (HOL)	Some changes in number of information due to pedigree update
POL (HOL)	Decrease of information due to data edits. First time for calv.
JPN (HOL)	Base change, now the cows born in 2015 are the base. Some changes in information due to pedigree verification
BEL (HOL)	Base change set to cows born in 2015
ESP (HOL)	Some bulls becoming unofficial because of some lose of daughters or herds and then not reaching the minimum for publication
HUN (HOL)	Base change
USA (BSW,HOL)	Inclusion of calvings before 1990. Bulls dropping information may be expected every single run due to herd-year minimum limits and pedigree corrections due to genotyping. Also, some daugthers may also have been dropped due to some records initially reported as AI and now corrected as being ET.
GBR (ALL)	Changes in information due to changes from data recording agents.
NZL (ALL)	Changes in information due to continuous pedigree verification

INTERBULL CHANGES COMPARED TO THE PREVIOUS 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.

The window so far applied for MAS evaluation have been found too high compared to the
within-country genetic correlation between mastitis and SCS available from the literature.
It has been an ITC recommendation to adjust the windows for MAS in the 2001t test run to make them more in line with the
values available from the literature. The recommendation has been approved by the Steering committee.
Also, according to the decision taken by ITC in Orlando (2015) to review all windows every five (5) years, an overall
review of the windows for all traits will take place during the first half of 2020. Implementation of the reviewed windows is aimed for January 2021 test run.

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 2020).
Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6388			
BEL			1126			
CAN	159		12818		501	
CHE	1965		2361			
CZE						
DEA	5414					
DEU			19345		269	
DFS			10457		6423	
ESP			2176			
EST						
FRA	355		12549			
FRM						
GBR			3018			
HUN			1759			
IRL			2087		55	
ISR			494			
ITA			9726			
JPN						
KOR						
LTU						
LVA						
NLD	146		14848		68	
NOR					3806	
NZL			7542		1107	
POL			5903			
PRT						
SVK			672			
SVN						
URY						

USA	500		35785			
ZAF						
HRV						
MEX						
CAM						
No.Records	8539		149054		12229	
Pub. Proofs	8865	0	130447	0	12724	0

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

BSW dce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	9.82					
NLD	0.91	5.86				
USA	0.78	0.87	0.13			
CHE	0.92	0.96	0.88	12.15		
CAN	0.85	0.96	0.92	0.96	7.37	
FRA	0.79	0.90	0.87	0.86	0.89	0.76

BSW mce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	10.91					
NLD	0.64	5.08				
USA	0.85	0.76	0.15			
CHE	0.88	0.75	0.92	16.03		
CAN	0.60	0.81	0.87	0.75	6.15	
FRA	0.90	0.78	0.93	0.96	0.84	1.00

HOL dce

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	IRL	NZL	SVK	ESP	POL
AUS	0.04																	
CAN	0.78	6.63																
CHE	0.81	0.97	10.26															
DFS	0.78	0.92	0.89	11.65														
FRA	0.81	0.96	0.96	0.90	0.92													
ISR	0.79	0.90	0.86	0.89	0.88	2.80												
ITA	0.70	0.77	0.77	0.77	0.77	0.78	7.26											
NLD	0.86	0.97	0.95	0.93	0.93	0.92	0.77	7.15										
USA	0.76	0.91	0.92	0.87	0.92	0.83	0.77	0.87	0.13									
GBR	0.76	0.80	0.79	0.77	0.77	0.82	0.76	0.85	0.77	0.07								
HUN	0.70	0.77	0.77	0.77	0.77	0.78	0.77	0.77	0.77	0.77	1.22							
DEU	0.82	0.92	0.91	0.89	0.94	0.85	0.76	0.92	0.87	0.78	0.77	12.79						
BEL	0.70	0.77	0.77	0.77	0.76	0.78	0.76	0.77	0.77	0.76	0.77	0.76	9.60					
IRL	0.77	0.89	0.90	0.86	0.89	0.90	0.77	0.92	0.82	0.77	0.77	0.83	0.77	0.09				
NZL	0.80	0.78	0.80	0.79	0.77	0.78	0.77	0.81	0.77	0.77	0.77	0.77	0.76	0.81	2.99			
SVK	0.71	0.77	0.78	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	12.80		
ESP	0.70	0.77	0.77	0.77	0.77	0.78	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	11.28	
POL	0.70	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	14.14

HOL mce

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	SVK	ESP	POL
CAN	6.64														
CHE	0.88	13.50													
DFS	0.83	0.71	12.11												
FRA	0.91	0.97	0.77	1.29											
ISR	0.83	0.73	0.81	0.78	2.64										
ITA	0.79	0.86	0.62	0.85	0.75	9.34									
NLD	0.83	0.77	0.85	0.80	0.70	0.58	5.45								

USA	0.92	0.93	0.78	0.95	0.86	0.86	0.78	0.15				
GBR	0.64	0.76	0.56	0.74	0.59	0.62	0.57	0.68	0.04			
HUN	0.55	0.56	0.55	0.55	0.59	0.55	0.55	0.55	0.56	1.26		
DEU	0.83	0.74	0.91	0.78	0.76	0.67	0.84	0.79	0.57	0.55	12.58	
BEL	0.67	0.70	0.71	0.74	0.61	0.61	0.78	0.68	0.57	0.56	0.75	10.48
SVK	0.56	0.57	0.56	0.56	0.63	0.56	0.56	0.56	0.57	0.56	0.55	0.57	15.97	
ESP	0.68	0.65	0.66	0.68	0.68	0.59	0.67	0.66	0.57	0.56	0.68	0.63	0.57	12.03	
POL	0.55	0.56	0.55	0.55	0.58	0.55	0.55	0.55	0.55	0.56	0.55	0.55	0.56	0.56	15.53

HOL dsb

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL
AUS	0.04											
CAN	0.64	7.33										
CHE	0.44	0.62	16.86									
DFS	0.71	0.87	0.57	12.57								
FRA	0.48	0.75	0.63	0.66	0.76							
ISR	0.83	0.72	0.43	0.75	0.50	1.71						
ITA	0.65	0.56	0.36	0.58	0.40	0.69	7.26					
NLD	0.43	0.79	0.73	0.71	0.68	0.51	0.35	4.47				
USA	0.43	0.60	0.62	0.50	0.62	0.37	0.35	0.57	0.07			
HUN	0.62	0.52	0.37	0.53	0.36	0.67	0.53	0.36	0.36	1.10		
DEU	0.52	0.86	0.65	0.84	0.67	0.67	0.45	0.80	0.61	0.43	12.42	
POL	0.44	0.56	0.55	0.63	0.54	0.39	0.35	0.56	0.54	0.36	0.61	16.67

HOL msb

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU	POL
CAN	6.19										
CHE	0.84	19.95									
DFS	0.95	0.82	11.60								
FRA	0.88	0.84	0.86	0.92							
ISR	0.89	0.81	0.86	0.79	1.74						
ITA	0.53	0.60	0.53	0.55	0.63	9.34					
NLD	0.93	0.75	0.95	0.81	0.82	0.53	4.20				
USA	0.85	0.82	0.83	0.82	0.79	0.53	0.78	0.12			
HUN	0.54	0.54	0.53	0.53	0.53	0.47	0.53	0.53	1.22		
DEU	0.95	0.85	0.97	0.84	0.88	0.53	0.95	0.82	0.53	12.85	
POL	0.85	0.76	0.82	0.69	0.84	0.53	0.78	0.72	0.54	0.81	14.45

RDC dce

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	6.49						
DFS	0.93	11.34					
NOR	0.90	0.94	13.69				
NLD	0.96	0.92	0.93	4.74			
DEU	0.92	0.90	0.94	0.92	13.69		
IRL	0.87	0.85	0.93	0.90	0.82	0.07	
NZL	0.79	0.78	0.79	0.82	0.78	0.81	2.78

RDC mce

	CAN	DFS	NOR	DEU
CAN	6.91			
DFS	0.81	12.17		
NOR	0.71	0.91	15.40	
DEU	0.81	0.85	0.73	12.15

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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	101	177	494	95	194
NLD	89	0	36	68	19	50
USA	132	31	0	177	99	65
CHE	402	66	135	0	89	131
CAN	80	16	90	72	0	53
FRA	137	37	48	89	44	0

BSW

common bulls below diagonal
common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA
DEA	0	97	96	438	35	142
NLD	91	0	29	60	14	43
USA	83	26	0	89	29	44
CHE	338	57	75	0	28	92
CAN	30	11	27	24	0	22
FRA	100	37	39	67	20	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	1257	435	949	1011	76	1077	1081	1569	680	439	1241	467	451	933	187	501	657
CAN	1198	0	679	1212	1343	89	1759	1294	3444	812	691	2208	557	405	689	280	822	1105
CHE	378	565	0	424	518	36	560	563	735	344	251	856	371	250	297	128	328	420
DFS	615	925	350	0	1288	97	1351	1419	1690	742	518	1910	522	427	703	231	544	881
FRA	688	951	446	676	0	80	1656	1518	2059	845	645	2043	602	448	697	277	685	1174
ISR	45	60	19	64	43	0	97	105	119	65	52	101	45	57	83	32	57	78
ITA	769	1445	479	924	931	62	0	1490	2601	972	716	2344	582	471	739	297	847	1209
NLD	803	1075	503	893	789	72	1000	0	2110	920	546	2547	659	539	957	310	607	1221
USA	1457	3700	621	1114	1106	104	1856	1480	0	1172	838	3105	596	526	980	345	918	1548
GBR	490	642	283	403	418	31	609	541	789	0	375	1099	375	404	438	169	428	653
HUN	269	551	175	333	384	33	506	302	654	211	0	828	273	232	325	173	379	473
DEU	928	1683	737	1246	1101	78	1508	2024	2199	648	539	0	767	566	836	481	904	1770
BEL	434	539	368	456	609	21	573	669	551	335	207	792	0	293	338	150	372	460
IRL	394	368	234	344	386	34	388	452	488	356	184	494	281	0	531	108	232	311
NZL	821	618	250	471	441	60	560	788	923	270	198	657	288	475	0	167	335	419
SVK	88	194	57	117	176	13	193	191	234	70	110	377	79	45	100	0	159	236
ESP	371	589	262	428	523	28	626	479	626	305	266	566	362	204	251	72	0	580
POL	529	1031	318	702	815	54	962	1109	1584	516	352	1526	421	261	347	155	409	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	572	1086	1076	80	1349	1030	2211	709	648	1853	487	241	828	970
CHE	449	0	478	470	35	492	577	621	362	259	809	363	115	331	350
DFS	915	416	0	1411	105	1343	1691	1646	727	632	2354	562	230	648	1060

FRA	733	409	704	0	83	1426	1498	1780	639	669	2104	599	236	735	1147
ISR	47	17	68	42	0	97	111	121	76	61	118	45	24	61	81
ITA	1062	406	965	743	57	0	1320	2045	753	708	2069	547	244	818	1062
NLD	958	522	1355	854	81	988	0	1705	750	630	2510	699	277	663	1179
USA	2187	519	1246	906	104	1480	1329	0	887	850	2750	549	288	962	1457
GBR	781	349	729	610	51	809	816	1042	0	398	864	395	152	454	530
HUN	542	192	435	394	39	535	417	716	363	0	897	295	169	429	483
DEU	1296	682	1535	978	87	1252	2005	1828	923	599	0	742	356	988	1738
BEL	481	352	524	603	24	510	737	500	450	234	765	0	136	379	436
SVK	165	50	118	123	9	167	172	200	93	114	258	72	0	151	190
ESP	516	257	471	495	27	553	507	581	416	300	542	347	65	0	574
POL	814	253	828	677	51	784	1005	1405	565	352	1390	372	137	332	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	1212	433	954	876	76	1074	1204	1446	316	1238	648
CAN	1188	0	676	1171	1201	85	1736	1433	3127	487	2196	1089
CHE	376	565	0	425	507	36	559	631	694	189	859	417
DFS	619	927	350	0	1151	99	1355	1525	1557	408	1924	877
FRA	627	891	438	631	0	69	1521	1463	1641	472	1953	1161
ISR	45	59	19	64	41	0	97	109	115	35	101	75
ITA	768	1442	479	929	857	62	0	1651	2429	532	2343	1193
NLD	1004	1339	591	1107	968	82	1281	0	2071	462	2765	1258
USA	1371	3470	583	1061	900	101	1767	1675	0	575	2878	1487
HUN	197	382	136	256	282	26	368	311	428	0	634	292
DEU	931	1689	740	1250	1070	78	1511	2351	2073	419	0	1761
POL	528	1034	321	706	815	54	963	1155	1559	216	1541	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	569	1075	1003	79	1334	1030	2014	469	1809	925
CHE	448	0	484	459	35	490	585	579	211	791	333
DFS	932	423	0	1308	105	1346	1770	1445	510	2349	1028
FRA	710	396	694	0	78	1358	1443	1409	505	1969	1104
ISR	47	17	68	40	0	97	111	116	45	116	79
ITA	1060	405	979	708	57	0	1361	1809	547	2037	1017
NLD	959	534	1435	824	80	1009	0	1552	511	2538	1109
USA	2078	483	1234	795	102	1426	1275	0	582	2372	1329
HUN	387	155	347	296	27	402	357	507	0	708	295
DEU	1250	663	1536	908	84	1222	1981	1674	464	0	1615
POL	785	241	801	646	51	742	922	1299	198	1253	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	160	5	4	11	3	60
DFS	164	0	123	46	74	15	127
NOR	4	98	0	39	23	49	39
NLD	4	44	38	0	20	12	20
DEU	11	67	22	19	0	6	21

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  IRL    3   12   48   12    6    0   12
  NZL   61  110   38   20   21   12    0
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RDC
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 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  DFS  NOR  DEU
 ------------------------------------------------------------------------------
  CAN    0   99    4    9
  DFS   99    0  124   44
  NOR    4   97    0   14
  DEU    9   36   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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