

## INTRODUCTION

The latest routine international evaluation for calving traits took place as scheduled at the Interbull Centre. Data from seventeen (17) 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 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:

BEL (HOL)	Definition of genetic groups were updated/improved. Genetic groups are always based on selection path, type of breed, degree of Holsteinisation, origin (North-America vs Europe) and time. Periods of time were updated and improved.
ESP (HOL)	Many bulls changing from official to unofficial for DCE because of erroneous assignment on previous evaluation. Drops in information for some bulls higher than usual due to updating the database used for extracting the data.
DEU (ALL)	Small changes in information due to data editings and pedigree corrections.
IRL (HOL,RDC)	Rewritten the code for assigning Proof Type/Status of Bull/Publishable as it was based on a very old code. Relabeled the base to X05CC07, so as to have a more correct label for base description. Note the actual base has not changed, we just made the label more accurate.
GBR (ALL)	Minor data updates
USA (ALL)	Drops in information due to the normal editing of herds/daughters
NZL (ALL)	Seasonal drop in information due to changes in matings, calvings and continuous DNA verification.
ITA (HOL)	Drops in information caused by data flow and data editings.

## 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.

### 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

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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

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Dates for the next routine evaluation can be found on  
<http://www.interbull.org/ib/servicecalendar>.

#### NEXT TEST INTERNATIONAL EVALUATION

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Dates for the next test run can be found on  
<http://www.interbull.org/ib/servicecalendar>.  
PUBLICATION OF INTERBULL TEST RUN

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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 2019).

Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6154			
BEL			1049			
CAN	158		12522		492	
CHE	1912		2277			
CZE						
DEA	5328					
DEU			18792		256	
DFS			10232		6353	
ESP			1997			
EST						
FRA	337		12294			
FRM						
GBR			2685			
HUN			1735			
IRL			1829		48	
ISR			451			
ITA			9783			
JPN						
KOR						
LTU						
LVA						
NLD	134		14575		63	
NOR					3857	
NZL			7541		1107	
POL						
PRT						
SVK			660			
SVN						
URY						
USA	556		36181			
ZAF						
HRV						
MEX						
CAM						
=====						
No. Records	8425		140757		12176	
Pub. Proofs	8760	0	126513	0	12737	0
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^LAPPENDIX I. Sire standard deviations in diagonal and genetic correlations below diagonal

BSW	dce					
	DEA	NLD	USA	CHE	CAN	FRA
DEA	9.81					
NLD	0.91	5.77				
USA	0.78	0.84	0.13			
CHE	0.92	0.96	0.83	12.14		
CAN	0.86	0.96	0.89	0.96	7.52	
FRA	0.80	0.91	0.86	0.86	0.90	0.74

BSW	mce					
	DEA	NLD	USA	CHE	CAN	FRA
DEA	10.87					
NLD	0.66	4.96				
USA	0.81	0.75	0.14			
CHE	0.88	0.77	0.89	16.04		
CAN	0.60	0.81	0.86	0.75	6.16	

FRA 0.90 0.79 0.92 0.96 0.84 0.99

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HOL dce  
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	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	IRL	NZL	SVK	ESP
AUS	0.04																
CAN	0.77	6.56															
CHE	0.79	0.96	10.31														
DFS	0.77	0.92	0.89	11.72													
FRA	0.80	0.96	0.96	0.90	0.92												
ISR	0.78	0.91	0.86	0.89	0.88	2.86											
ITA	0.70	0.77	0.77	0.77	0.76	0.78	7.23										
NLD	0.84	0.97	0.94	0.93	0.93	0.91	0.77	6.90									
USA	0.73	0.88	0.88	0.83	0.90	0.82	0.76	0.84	0.13								
GBR	0.73	0.80	0.78	0.77	0.78	0.83	0.76	0.84	0.76	0.07							
HUN	0.70	0.77	0.77	0.76	0.76	0.78	0.76	0.77	0.76	0.76	1.23						
DEU	0.81	0.91	0.90	0.88	0.93	0.84	0.76	0.92	0.81	0.78	0.76	13.01					
BEL	0.70	0.77	0.77	0.76	0.76	0.79	0.76	0.76	0.76	0.76	0.77	0.76	9.83				
IRL	0.77	0.92	0.93	0.88	0.93	0.90	0.77	0.94	0.85	0.77	0.77	0.86	0.77	0.11			
NZL	0.80	0.79	0.80	0.80	0.77	0.78	0.76	0.82	0.77	0.76	0.76	0.77	0.76	0.81	2.99		
SVK	0.71	0.77	0.78	0.77	0.77	0.79	0.77	0.77	0.77	0.78	0.78	0.77	0.78	0.78	0.78	12.68	
ESP	0.70	0.77	0.77	0.77	0.77	0.79	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.78	11.19

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HOL mce  
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	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL	SVK	ESP
CAN	6.45													
CHE	0.88	13.54												
DFS	0.82	0.70	12.16											
FRA	0.92	0.97	0.77	1.29										
ISR	0.82	0.72	0.81	0.77	2.64									
ITA	0.80	0.86	0.61	0.85	0.74	9.41								
NLD	0.82	0.77	0.85	0.80	0.68	0.58	5.23							
USA	0.90	0.92	0.77	0.95	0.83	0.84	0.78	0.15						
GBR	0.65	0.78	0.56	0.76	0.61	0.64	0.60	0.69	0.04					
HUN	0.55	0.56	0.55	0.55	0.59	0.55	0.56	0.55	0.56	1.25				
DEU	0.82	0.73	0.91	0.78	0.75	0.66	0.84	0.78	0.58	0.55	13.28			
BEL	0.68	0.71	0.72	0.75	0.62	0.62	0.78	0.69	0.57	0.56	0.76	10.76		
SVK	0.56	0.57	0.56	0.56	0.64	0.56	0.56	0.56	0.57	0.56	0.55	0.57	16.05	
ESP	0.70	0.68	0.67	0.71	0.70	0.62	0.68	0.71	0.57	0.56	0.69	0.65	0.57	12.38

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HOL dsb  
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	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
AUS	0.04										
CAN	0.62	7.40									
CHE	0.44	0.59	16.56								
DFS	0.70	0.87	0.54	12.64							
FRA	0.48	0.75	0.62	0.65	0.76						
ISR	0.83	0.73	0.44	0.75	0.50	1.76					
ITA	0.63	0.56	0.36	0.60	0.40	0.68	7.22				
NLD	0.43	0.78	0.72	0.70	0.67	0.51	0.35	4.27			
USA	0.43	0.75	0.63	0.63	0.70	0.44	0.36	0.63	0.07		
HUN	0.62	0.53	0.37	0.53	0.36	0.69	0.53	0.36	0.37	1.10	
DEU	0.47	0.83	0.61	0.81	0.64	0.69	0.44	0.76	0.62	0.41	12.64

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HOL msb  
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	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
CAN	6.15									
CHE	0.85	19.99								
DFS	0.95	0.82	11.63							

FRA	0.88	0.85	0.86	0.93						
ISR	0.90	0.82	0.86	0.79	1.75					
ITA	0.53	0.59	0.53	0.54	0.64	9.41				
NLD	0.93	0.76	0.94	0.81	0.82	0.53	4.26			
USA	0.88	0.82	0.84	0.88	0.81	0.52	0.78	0.13		
HUN	0.54	0.54	0.53	0.53	0.53	0.47	0.53	0.52	1.22	
DEU	0.95	0.85	0.97	0.84	0.89	0.53	0.94	0.82	0.53	13.25

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RDC      dce  
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	CAN	DFS	NOR	NLD	DEU	IRL	NZL			
CAN	6.43									
DFS	0.93	11.35								
NOR	0.90	0.96	12.82							
NLD	0.96	0.93	0.93	4.43						
DEU	0.92	0.90	0.94	0.92	13.44					
IRL	0.89	0.86	0.91	0.90	0.82	0.08				
NZL	0.79	0.79	0.79	0.83	0.79	0.82	2.78			

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RDC      mce  
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	CAN	DFS	NOR	DEU						
CAN	7.01									
DFS	0.81	12.18								
NOR	0.71	0.91	16.18							
DEU	0.80	0.85	0.76	12.51						

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^LAPPENDIX II. Number of common bulls  
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BSW  
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common bulls below diagonal  
common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA				
DEA	0	98	189	477	94	189				
NLD	87	0	35	61	19	49				
USA	140	29	0	198	103	74				
CHE	386	59	149	0	87	128				
CAN	79	16	92	70	0	52				
FRA	133	36	51	87	43	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	92	112	428	33	136				
NLD	86	0	31	58	13	42				
USA	93	26	0	101	29	48				
CHE	327	56	86	0	28	90				
CAN	27	10	26	24	0	22				
FRA	96	37	41	66	20	0				

BSW  
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BSW  
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GUE  
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GUE  
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GUE

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GUE

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HOL

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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
AUS	0	1151	402	902	976	66	1055	1024	1456	616	432	1156	434	387	908	178	472
CAN	1083	0	648	1143	1291	77	1683	1211	3286	700	679	2063	519	343	686	271	778
CHE	348	536	0	401	487	32	538	536	716	306	243	818	347	215	292	123	317
DFS	570	854	325	0	1260	89	1331	1343	1618	679	511	1805	485	377	696	226	514
FRA	658	902	425	643	0	79	1643	1474	2016	806	637	1975	571	388	686	272	647
ISR	40	52	17	61	42	0	87	96	105	53	49	92	39	45	76	28	52
ITA	718	1326	448	868	900	56	0	1445	2555	896	705	2250	546	406	750	290	792
NLD	751	985	475	808	741	68	927	0	2036	826	534	2381	614	473	953	301	564
USA	1310	3528	604	1027	1065	89	1723	1401	0	1044	826	2928	561	457	988	337	871
GBR	425	526	239	344	379	24	524	451	657	0	364	978	342	329	419	159	391
HUN	266	545	170	328	381	32	495	292	647	205	0	810	268	212	321	169	366
DEU	837	1526	700	1140	1039	73	1380	1827	1978	538	521	0	714	483	816	472	848
BEL	410	505	347	421	575	21	530	628	521	294	205	740	0	250	326	145	348
IRL	343	313	201	301	337	27	337	396	423	287	171	426	247	0	485	94	203
NZL	789	615	247	461	431	57	557	783	932	248	198	634	282	433	0	166	325
SVK	84	190	57	116	172	13	188	185	232	68	108	372	78	41	100	0	153
ESP	354	540	250	392	492	27	569	432	570	278	260	514	333	177	246	71	0

HOL

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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
CAN	0	548	1036	1031	70	1274	965	2162	638	641	1775	451	236	786
CHE	426	0	455	447	33	478	552	610	341	258	773	345	114	312
DFS	851	390	0	1367	96	1309	1605	1614	673	622	2256	525	227	603
FRA	691	389	658	0	82	1423	1448	1785	607	660	2043	570	232	694
ISR	44	16	65	41	0	86	100	110	67	59	107	43	23	59
ITA	971	393	895	724	51	0	1279	2018	687	702	2002	520	242	778
NLD	875	495	1245	802	77	913	0	1676	687	621	2383	656	269	622
USA	2092	502	1166	884	91	1366	1251	0	809	854	2707	520	286	909
GBR	698	324	665	573	45	721	738	925	0	388	793	366	147	423
HUN	533	192	425	390	37	527	410	715	353	0	888	286	168	417
DEU	1210	652	1425	930	81	1173	1854	1713	838	594	0	696	352	930
BEL	447	338	485	575	24	479	695	473	416	228	718	0	128	350
SVK	161	50	116	122	8	162	164	199	89	114	257	67	0	146
ESP	480	246	427	470	26	525	472	538	385	290	504	322	62	0

HOL

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common bulls below diagonal

common three quarter sib group above diagonal

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
AUS	0	1104	400	906	839	66	1052	1141	1347	317	1155
CAN	1071	0	645	1102	1149	73	1655	1354	3002	487	2057
CHE	346	536	0	402	476	32	537	608	677	189	821
DFS	574	856	325	0	1123	91	1335	1453	1502	408	1820
FRA	596	843	417	598	0	68	1489	1421	1619	472	1883
ISR	40	51	17	61	40	0	87	97	101	35	92
ITA	717	1323	448	873	818	56	0	1605	2422	533	2247
NLD	953	1251	568	1022	926	76	1210	0	2024	462	2610
USA	1222	3306	570	983	863	87	1647	1607	0	585	2756
HUN	198	382	136	256	282	26	368	311	437	0	632
DEU	840	1535	703	1146	1007	73	1381	2165	1879	414	0

HOL

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common bulls below diagonal
common three quarter sib group above diagonal
  CAN  CHE  DFS  FRA  ISR  ITA  NLD  USA  HUN  DEU
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CAN   0  545 1019  959   69 1258  974 1973  469 1736
CHE  425   0  461  438   33  476  567  574  211  764
DFS  869  398   0 1269   96 1312 1692 1404  510 2266
FRA  668  378  650   0   77 1344 1399 1404  505 1922
ISR   44   16   65   39   0   86  103  102   45  106
ITA  969  392  913  682   51   0 1323 1773  551 1977
NLD  887  513 1332  782   77  948   0 1543  511 2438
USA 1998  478 1162  763   88 1324 1233   0  588 2354
HUN  387  155  346  296   27  402  357  514   0   710
DEU 1172  636 1437  866   80 1143 1856 1587  469   0
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JER

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RDC

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common bulls below diagonal
common three quarter sib group above diagonal
  CAN  DFS  NOR  NLD  DEU  IRL  NZL
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CAN   0  152   5   4  11   3  60
DFS  155   0  117  44  65  14 127
NOR   4   92   0  35  21  44  38
NLD   4   42  34   0  21  11  20
DEU  11   58  20  20   0   5  19
IRL   3   11  43  11   5   0  10
NZL  61  109  37  20  19  10   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
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CAN   0   93   4   9
DFS  93   0  129  44
NOR   4  102   0  14
DEU   9   35  13   0
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RDC

RDC

SIM

SIM

SIM

SIM