

## 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:

- DEA BSW        Base change
- ISR HOL        Data editing and paternity rejection resulting in decrease in the number of records and herds.
- DEU HOL/RDC   Base change +Refinements and more restrictions in data editing:  
- phantom parents / fixed effects: refinement of definition of phantom parents (genetic groups) and fixed effects  
- data editing: records are only considered, if at least stillbirth is recorded; herd\*year with less than 5 observations are excluded; herd-years, where less than 75% of calf-sire are known, are excluded
- ITA HOL        Cut off one year of data and base change
- AUS ALL        Changes to the rules for the official publication resulting in many bulls changing status to N
- Changes in pedigree resulting in changes in proportion of first and second crop daughters. As following effect there is a change for some animals in proof type from 12 previous (second crop daughters) back to 11 (only first crop daughters).
- AUS HOL/JER   Data editing - some animals lost herds and daughters. This resulted in changes in slope and correlations.
- BEL HOL        Change the "national standards" for official publication in our country (Walloon Region of Belgium) for type of proof = 21. Now, these "national standards" for this type of proof are the same than for type of proof= 11 or 12, i.e. if REL >=30
- NZL ALL        Continuous DNA parentage testing.
- CAN ALL        Base change
- USA RDC        Discovered a bug in the system related to RDC pedigrees. Previously cow heterosis had been computed as if mating AY to Scandinavian does not cause heterosis, whereas bull heterosis assumed they were different breeds. Now we apply the same math to both sexes. The correction is a post-adjustment to the PTAs, not part of the genetic model.

## 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. Subsetting 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 calving (April Routine Evaluation 2018). Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			2193			
BEL			953			
CAN	143		11983		465	
CHE	1818		2128			
CZE						
DEA	5160					
DEU			17967		240	
DFS			9918		6225	
ESP			1727			
EST						
FRA	317		11803			
FRM						
GBR			2451			
HUN			1663			
IRL			1864		56	
ISR			405			
ITA			9327			
JPN						
KOR						
LTU						
LVA						
NLD	79		13197		28	
NOR					3698	
NZL			6945		1059	
POL						
PRT						
SVK			635			
SVN						
URY						
USA	521		34346			
ZAF						
HRV						
MEX						
CAM						
No. Records	8038		129505		11771	
Pub. Proofs	8467	0	119550	0	12110	0

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

BSW dce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	9.79					
NLD	0.91	6.82				
USA	0.78	0.81	0.12			
CHE	0.93	0.95	0.79	12.23		
CAN	0.86	0.95	0.86	0.95	7.50	
FRA	0.80	0.91	0.85	0.86	0.90	0.76

BSW mce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	10.85					
NLD	0.85	5.87				
USA	0.77	0.78	0.15			
CHE	0.88	0.82	0.86	16.03		
CAN	0.61	0.79	0.84	0.75	6.16	
FRA	0.90	0.83	0.90	0.96	0.84	0.94

HOL dce

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN
DEU	BEL	IRL	NZL	SVK	ESP						
AUS	3.02										
CAN	0.81	6.56									
CHE	0.76	0.95	10.36								
DFS	0.78	0.93	0.90	11.82							
FRA	0.79	0.96	0.96	0.91	0.93						
ISR	0.80	0.91	0.88	0.86	0.88	2.87					
ITA	0.68	0.77	0.77	0.77	0.75	0.78	7.23				
NLD	0.82	0.96	0.93	0.93	0.93	0.88	0.76	7.21			
USA	0.72	0.87	0.86	0.82	0.89	0.84	0.74	0.82	0.13		
GBR	0.81	0.80	0.78	0.77	0.78	0.81	0.74	0.84	0.74	0.07	
HUN	0.70	0.77	0.78	0.75	0.75	0.79	0.75	0.76	0.74	0.76	1.24
DEU	0.79	0.89	0.88	0.88	0.92	0.83	0.75	0.90	0.81	0.78	0.75
13.08											
BEL	0.67	0.77	0.77	0.75	0.74	0.80	0.74	0.75	0.74	0.75	0.76
0.75	10.09										
IRL	0.69	0.86	0.82	0.83	0.83	0.90	0.73	0.85	0.77	0.74	0.74
0.77	0.74	1.47									
NZL	0.70	0.78	0.79	0.80	0.77	0.79	0.75	0.81	0.76	0.76	0.75
0.77	0.74	0.82	3.07								
SVK	0.72	0.78	0.79	0.78	0.78	0.82	0.78	0.78	0.77	0.79	0.78
0.77	0.78	0.79	0.78	12.65							
ESP	0.70	0.77	0.77	0.77	0.77	0.80	0.77	0.77	0.77	0.77	0.77
0.77	0.77	0.77	0.77	0.78	11.33						

HOL mce

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU
BEL	SVK	ESP									
CAN	6.53										
CHE	0.87	13.59									
DFS	0.82	0.70	12.28								
FRA	0.92	0.97	0.76	1.30							
ISR	0.79	0.71	0.79	0.75	2.62						
ITA	0.80	0.86	0.58	0.84	0.69	9.38					
NLD	0.82	0.77	0.86	0.81	0.67	0.58	5.31				
USA	0.89	0.89	0.76	0.95	0.79	0.82	0.80	0.15			
GBR	0.66	0.79	0.58	0.78	0.63	0.67	0.64	0.71	0.04		
HUN	0.55	0.56	0.55	0.55	0.59	0.55	0.56	0.55	0.56	1.26	
DEU	0.85	0.74	0.91	0.79	0.75	0.66	0.83	0.77	0.61	0.55	12.95
BEL	0.67	0.68	0.74	0.75	0.62	0.59	0.77	0.68	0.59	0.56	0.74
11.09											
SVK	0.56	0.58	0.56	0.56	0.64	0.56	0.56	0.56	0.57	0.56	0.55
0.57	16.06										
ESP	0.79	0.74	0.67	0.78	0.73	0.69	0.70	0.80	0.60	0.56	0.69
0.64	0.58	12.72									

HOL dsb

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
AUS	3.03										
CAN	0.62	7.75									
CHE	0.44	0.51	16.27								
DFS	0.70	0.87	0.47	12.71							
FRA	0.43	0.74	0.58	0.65	0.75						
ISR	0.75	0.74	0.46	0.72	0.53	1.77					
ITA	0.74	0.58	0.36	0.65	0.42	0.59	7.22				
NLD	0.44	0.77	0.72	0.69	0.66	0.57	0.35	4.27			
USA	0.42	0.75	0.60	0.62	0.70	0.47	0.37	0.63	0.07		
HUN	0.76	0.53	0.37	0.53	0.37	0.72	0.54	0.36	0.37	1.10	
DEU	0.56	0.78	0.56	0.80	0.62	0.74	0.47	0.73	0.61	0.42	12.73

HOL msb

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
CAN	6.29									
CHE	0.85	20.22								
DFS	0.95	0.83	11.63							
FRA	0.89	0.84	0.87	0.93						
ISR	0.89	0.83	0.87	0.81	1.75					
ITA	0.53	0.58	0.52	0.54	0.67	9.39				
NLD	0.93	0.78	0.94	0.81	0.82	0.52	4.26			
USA	0.88	0.82	0.83	0.88	0.81	0.52	0.78	0.13		
HUN	0.54	0.54	0.52	0.53	0.53	0.48	0.53	0.51	1.22	
DEU	0.95	0.84	0.96	0.85	0.89	0.53	0.93	0.81	0.52	13.31

RDC dce

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	6.56						
DFS	0.93	11.28					
NOR	0.89	0.95	13.88				
NLD	0.96	0.93	0.92	4.99			
DEU	0.89	0.90	0.92	0.91	13.58		
IRL	0.86	0.83	0.83	0.85	0.78	0.90	
NZL	0.79	0.80	0.80	0.82	0.79	0.83	2.70

RDC mce

---

	CAN	DFS	NOR	DEU
CAN	6.99			
DFS	0.81	12.22		
NOR	0.72	0.78	17.01	
DEU	0.82	0.83	0.76	11.83

---

^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	54	175	457	84	179
NLD	41	0	23	32	13	34
USA	128	20	0	192	98	71
CHE	369	29	144	0	81	123
CAN	69	10	86	63	0	47
FRA	127	22	50	85	40	0

---

BSW

---

common bulls below diagonal  
common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA
DEA	0	45	105	400	30	126
NLD	35	0	18	26	9	23
USA	88	15	0	95	26	45
CHE	300	24	82	0	26	81
CAN	25	6	23	22	0	21
FRA	89	18	39	60	19	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
AUS	0	664	292	520	561	47	611	447	753	360	285	640	303	322	511	116	345
CAN	651	0	598	1055	1192	71	1544	813	2955	614	644	1914	464	406	619	261	721
CHE	248	482	0	366	439	29	495	371	653	269	234	753	319	255	263	117	290
DFS	384	759	293	0	1190	81	1251	1097	1519	636	485	1680	439	458	640	217	486
FRA	441	815	381	575	0	75	1548	1233	1901	755	609	1847	514	487	653	262	614
ISR	26	51	16	57	42	0	80	83	94	47	47	88	34	54	68	26	50
ITA	482	1146	408	772	809	53	0	1119	2365	819	671	2096	495	496	700	273	744
NLD	262	400	265	466	419	56	471	0	1545	658	437	1806	439	504	786	256	418
USA	698	3083	547	906	972	79	1469	713	0	923	785	2708	505	530	904	321	802
GBR	290	434	211	304	335	22	438	217	527	0	345	891	302	381	380	149	362
HUN	200	519	165	307	358	32	466	205	618	195	0	778	246	241	305	163	361
DEU	535	1343	640	1002	913	71	1205	1000	1707	449	501	0	643	595	739	457	792
BEL	291	452	323	382	516	19	475	370	466	260	194	665	0	302	298	133	319
IRL	309	396	245	380	426	35	437	370	501	341	202	547	305	0	547	113	246
NZL	481	556	225	414	394	51	509	592	841	215	191	570	260	490	0	160	304
SVK	68	180	54	107	161	12	173	126	218	59	104	356	73	53	96	0	145
ESP	268	492	231	354	479	29	530	249	524	241	265	491	305	237	236	71	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
CAN	0	502	934	940	62	1163	638	1972	552	608	1645	406	213	649
CHE	378	0	414	410	27	442	397	551	310	251	716	323	104	276
DFS	724	348	0	1284	91	1207	1280	1479	614	600	2105	464	204	515
FRA	604	350	575	0	77	1336	1185	1683	548	635	1926	507	208	583
ISR	42	15	63	40	0	77	81	96	58	56	103	35	20	48
ITA	847	362	778	642	46	0	970	1866	613	667	1874	469	220	662
NLD	409	321	792	478	63	520	0	1245	507	511	1855	485	207	426
USA	1843	449	1014	787	76	1183	668	0	700	817	2510	464	259	755
GBR	593	298	589	509	38	632	464	777	0	365	707	329	130	359
HUN	514	184	406	368	36	501	305	688	336	0	855	266	157	368
DEU	1041	590	1228	808	78	1038	1112	1497	737	574	0	625	319	794
BEL	400	314	428	519	20	433	440	418	372	217	633	0	111	298
SVK	144	45	99	103	8	143	114	179	72	109	227	56	0	124
ESP	383	212	362	391	23	427	282	430	332	261	427	278	51	0

-----

HOL

-----

common bulls below diagonal  
common three quarter sib group above diagonal

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
AUS	0	488	211	382	358	29	445	432	545	137	467
CAN	430	0	595	1013	1049	67	1516	1236	2678	488	1905
CHE	159	482	0	367	427	29	494	561	615	189	757
DFS	229	761	293	0	1052	83	1256	1363	1405	408	1696
FRA	238	755	373	530	0	64	1394	1318	1503	472	1753
ISR	12	50	16	57	40	0	80	94	90	35	88
ITA	275	1143	408	777	727	53	0	1477	2234	533	2092
NLD	312	1128	516	930	825	74	1070	0	1851	462	2399
USA	440	2870	514	863	770	77	1394	1423	0	582	2532
HUN	73	384	136	256	282	26	368	311	437	0	632
DEU	322	1351	644	1008	880	71	1205	1913	1605	414	0

-----

HOL

-----

common bulls below diagonal  
common three quarter sib group above diagonal

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
CAN	0	499	918	867	61	1148	872	1785	468	1605
CHE	377	0	423	399	27	441	518	515	210	707
DFS	743	360	0	1185	91	1214	1563	1269	509	2115
FRA	580	339	565	0	71	1257	1316	1301	505	1803
ISR	42	15	63	37	0	77	92	88	44	102
ITA	845	361	796	601	46	0	1221	1623	551	1851
NLD	764	463	1158	689	71	827	0	1393	510	2255
USA	1756	425	1012	666	74	1145	1062	0	588	2163
HUN	387	154	346	295	27	401	357	514	0	710
DEU	1005	572	1243	746	77	1010	1606	1372	469	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	135	5	3	10	2	57
DFS	135	0	114	21	55	16	116
NOR	5	88	0	13	20	48	34
NLD	3	21	12	0	11	6	10
DEU	10	48	19	11	0	5	17
IRL	2	13	48	5	5	0	10
NZL	56	98	33	10	17	10	0

RDC

-----

common bulls below diagonal  
common three quarter sib group above diagonal

	CAN	DFS	NOR	DEU
CAN	0	84	3	8
DFS	83	0	115	40
NOR	3	87	0	13
DEU	8	32	13	0

RDC

-----

RDC

-----

SIM

-----

SIM

-----

SIM

-----

SIM

-----