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, Switzerland, the United Kingdom, Slovack 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:

NOR RDC — Standard deviation changed from 10 to 12, this mimicks the expected effect of future change to a cow-base. The rolling definition of hys is causing the daughters to distribute somewhat differently over hys-classes at each evaluation. Therefore some bulls occasionally may loose EDC although the number of daughters stay the same. Reliability changes is a function of the EDC changes.
Further explanations for MCE: Bulls are modeled by sire of calf and sire of cow as correlated traits. Results are transformed to direct and maternal effect. Direct effect is more stable, because direct=sire of calf. Whereas, maternal= sire of dam - 0.5sire of calf.

BEL HOL — Decreases in the number of herds but also in the number of daughters could be explained by the existence of "breed" alias. These decreases can lead to decreases in EDC and in reliability.

FRA HOL/MON BSW/SIM RED — Base change, missing bulls: they are not missing, we corrected their ID (alias was sent in the previous run). Some decrease in information which are expected

DEA BSW — Multi trait evaluation with gestation length, new parameters
Fix a problem with the data from particularly 1 Austrian region in the early 90s after the January test run. This leads to some larger EBV changes mainly for bulls born in the late 80s and early 90s. Through relationships this influences the EBVs also of a few younger bulls, but not many

ISR HOL — new animal model algorithm

ITA HOL — base change+ one year cut off of data

DEU HOL/RDC — data editing is more strict than previously,
Previously herds were partly divided into subsettings, this distinction is now neglected, therefore the number of bulls with decrease in number of herds is quite large.

NZL (ALL) Data provided by a new organization Dairy NewZealand (DNZ): daughter counts, herd counts and EDC have changed due to parentage verification. Herd count is now calculated on the daughters that are used to estimate breeding values.

CAN BSW/GUE HOL/JER RDC — Change in base for all traits, and some changes in correlations for years with fewer bulls.

CHE BSW New trait definition for calving ease and stillbirth, Data cut-off has been altered. lost of information is due to changes in data edits and we exclude calving information from twins. New software for type of proofs, implemented new rules for publication of proofs, new genetic parameters

ITA BSW Base change, changed procedure to estimate reliabilities and EDC, parentage correction. Changed formula to standardized the ebv. Since testrun we have upply a new rolling base for all traits that change every run

SVK	HOL	First time (dce,mce)
NOR	RDC	Standard deviation of RBV changed from 10 to 12. This mimicks the expected effect of future change to a cow-base.
NZL	BSW/JER HOL/RDC GUE	In conjunction with LIC, we identified an undocumented feature (i.e. bug) in the current pre-processing of fertility records and also use of a historic data table for calving difficulty and fertility for records older than 2 years. After considerable testing, we have rectified the bug and now re-extract any old phenotypic data from the database at each run. This is why you see a lower correlation between NZAEL (DairyNZ) Test Run and LIC Routine Run.
DEA	BSW	New data preparation – multi-trait evaluation calving ease with gestation length (old: calving ease and stillbirth) - new genetic parameters
CHE	BSW	Changed the deduction of type of proofs for all traits. Implemented new rules for the publication of proofs, Various changes in data edits, New genetic parameters for all traits, New trait definition for calving ease and stillbirth, Data cut-off has been altered. Loss of information is due to changes in data edits. Now we include only data from 7.2001 (before from 10.1993) and we exclude calving information from twins
ISR	HOL	In this evaluation is by our new animal model algorithm, and is therefore quite different from the previous evaluation. The reason for reduction in the numbers of daughters and herds is due to the new restriction on days pregnant from 261 to 292 days. Base change

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. 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

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 2016).
Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			1838			
BEL			662			
CAN	128		11234		422	
CHE	1673		1890			
CZE						
DEA	4939					
DEU			17156		224	
DFS			11565		6477	
ESP						
EST						
FRA	302		11055			
FRM						
FRR						
GBR			2154			
HUN			1533			
IRL			1720		57	
ISR			349			
ITA			9275			
JPN						
KOR						
LTU						
LVA						
NLD	79		12870		31	
NOR					3564	
NZL			6179		908	
POL						
PRT						
SVK			595			
SVN						
URY						
USA	475		32257			
ZAF						
HRV						
No.Records	7596		122332		11683	
Pub. Proofs	8072	0	113904	0	11530	0

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

BSW dce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	9.81					
NLD	0.90	6.08				
USA	0.78	0.79	0.13			
CHE	0.93	0.92	0.78	13.17		
CAN	0.79	0.87	0.81	0.82	7.34	
FRA	0.81	0.91	0.85	0.85	0.87	0.75

BSW mce

	DEA	NLD	USA	CHE	CAN	FRA
DEA	10.82					
NLD	0.68	5.26				
USA	0.79	0.84	0.15			
CHE	0.91	0.79	0.88	17.19		
CAN	0.61	0.80	0.85	0.73	6.48	
FRA	0.91	0.80	0.88	0.95	0.84	0.94

HOL dce

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU
BEL	IRL	NZL	SVK									
AUS	3.15											
CAN	0.74	6.31										
CHE	0.75	0.89	12.25									
DFS	0.81	0.91	0.90	12.64								
FRA	0.80	0.91	0.94	0.92	0.93							
ISR	0.81	0.90	0.87	0.88	0.89	2.88						
ITA	0.64	0.71	0.77	0.75	0.72	0.79	7.21					
NLD	0.83	0.89	0.89	0.93	0.92	0.87	0.73	6.42				
USA	0.72	0.80	0.82	0.83	0.89	0.83	0.68	0.80	0.13			
GBR	0.80	0.81	0.78	0.76	0.78	0.82	0.68	0.83	0.68	0.07		
HUN	0.67	0.71	0.78	0.71	0.71	0.80	0.71	0.71	0.68	0.71	1.26	
DEU	0.80	0.85	0.89	0.91	0.91	0.83	0.70	0.89	0.78	0.80	0.71	11.71
BEL	0.60	0.68	0.77	0.70	0.69	0.81	0.68	0.68	0.68	0.68	0.71	0.68
10.85												
IRL	0.67	0.78	0.79	0.82	0.81	0.89	0.65	0.81	0.75	0.66	0.68	0.74
0.66	1.53											
NZL	0.68	0.76	0.78	0.82	0.77	0.79	0.72	0.77	0.74	0.71	0.71	0.76
0.68	0.81	3.16										
SVK	0.72	0.78	0.79	0.78	0.78	0.83	0.78	0.78	0.78	0.79	0.78	0.77
0.78	0.79	0.78	12.48									

HOL mce

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	GBR	HUN	DEU	BEL
SVK												
CAN	6.58											
CHE	0.88	13.98										
DFS	0.84	0.73	12.46									
FRA	0.92	0.96	0.78	1.31								
ISR	0.75	0.72	0.80	0.75	2.63							
ITA	0.78	0.85	0.58	0.83	0.66	9.29						
NLD	0.82	0.82	0.81	0.84	0.70	0.63	5.36					
USA	0.90	0.88	0.77	0.95	0.80	0.82	0.84	0.15				
GBR	0.67	0.79	0.60	0.80	0.68	0.68	0.69	0.73	0.05			
HUN	0.55	0.56	0.55	0.55	0.60	0.55	0.56	0.55	0.56	1.24		
DEU	0.87	0.75	0.92	0.79	0.75	0.66	0.81	0.78	0.59	0.55	11.35	
BEL	0.64	0.63	0.74	0.71	0.64	0.56	0.75	0.68	0.61	0.56	0.71	11.20
SVK	0.56	0.58	0.56	0.56	0.66	0.56	0.56	0.56	0.57	0.56	0.56	0.58
15.68												

HOL dsb

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
AUS	3.17										
CAN	0.53	6.85									
CHE	0.44	0.57	16.37								
DFS	0.80	0.74	0.48	13.64							
FRA	0.42	0.68	0.55	0.62	0.74						
ISR	0.80	0.70	0.46	0.81	0.56	1.78					
ITA	0.77	0.49	0.36	0.76	0.44	0.61	7.21				
NLD	0.39	0.70	0.62	0.63	0.63	0.52	0.41	3.78			
USA	0.39	0.65	0.59	0.61	0.67	0.52	0.41	0.60	0.07		
HUN	0.74	0.50	0.37	0.52	0.39	0.73	0.56	0.39	0.41	1.10	
DEU	0.71	0.69	0.54	0.89	0.59	0.84	0.58	0.61	0.60	0.50	11.44

HOL msb

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
CAN	6.38									
CHE	0.87	20.25								
DFS	0.96	0.87	12.95							
FRA	0.89	0.80	0.87	0.92						
ISR	0.89	0.82	0.88	0.80	1.77					
ITA	0.52	0.54	0.48	0.53	0.67	9.29				
NLD	0.93	0.80	0.94	0.81	0.81	0.46	4.28			
USA	0.81	0.81	0.79	0.82	0.81	0.49	0.75	0.13		
HUN	0.49	0.54	0.49	0.49	0.53	0.50	0.49	0.46	1.22	
DEU	0.94	0.78	0.95	0.84	0.89	0.52	0.90	0.76	0.49	11.84

RDC dce

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	6.45						
DFS	0.89	9.20					
NOR	0.89	0.96	15.11				
NLD	0.89	0.93	0.92	4.73			
DEU	0.85	0.92	0.93	0.89	11.57		
IRL	0.79	0.83	0.86	0.82	0.76	0.91	
NZL	0.78	0.85	0.80	0.79	0.79	0.82	2.74

RDC mce

	CAN	DFS	NOR	DEU
CAN	6.30			
DFS	0.77	10.75		
NOR	0.72	0.74	16.09	
DEU	0.85	0.83	0.77	9.50

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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	55	159	419	73	177
NLD	42	0	21	32	13	34
USA	109	18	0	181	88	75
CHE	332	30	137	0	73	122
CAN	57	10	76	57	0	50
FRA	133	24	55	89	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	55	93	371	28	132
NLD	44	0	22	30	9	33
USA	78	18	0	86	22	47
CHE	276	27	73	0	25	85
CAN	24	6	20	22	0	21
FRA	101	26	42	66	19	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	GBR	HUN	DEU	BEL	IRL	NZL	SVK
AUS	0	543	245	482	475	38	513	410	621	294	246	539	230	282	434	99
CAN	503	0	510	1084	1058	56	1401	764	2598	508	578	1734	330	361	543	233
CHE	202	392	0	366	377	22	436	347	561	222	209	669	251	225	221	101
DFS	360	774	299	0	1210	74	1310	1266	1591	616	491	1843	352	449	634	226
FRA	374	708	322	578	0	65	1475	1144	1772	682	557	1675	390	443	579	229
ISR	23	40	13	58	36	0	67	74	77	37	37	70	24	47	58	20
ITA	389	908	349	780	729	44	0	1118	2242	712	611	1959	366	446	631	251
NLD	241	359	249	632	374	53	448	0	1505	607	416	1745	353	467	708	236
USA	527	2548	452	987	865	62	1196	687	0	790	718	2502	360	481	801	290
GBR	228	317	174	272	272	13	337	198	386	0	315	782	221	320	323	129
HUN	179	468	152	321	334	26	426	202	559	174	0	721	199	222	274	149
DEU	432	1124	548	1139	773	55	1025	947	1501	343	477	0	466	550	667	427
BEL	224	314	245	325	399	15	333	312	319	181	161	457	0	238	222	95
IRL	270	339	219	390	389	31	388	345	443	276	193	509	239	0	475	96
NZL	397	476	188	432	336	47	444	521	723	167	180	507	193	432	0	138
SVK	53	162	46	114	138	9	154	111	199	43	98	330	54	44	82	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
CAN	0	440	845	840	48	1050	638	1717	444	541	1492	215	180
CHE	321	0	373	347	23	407	394	482	252	221	649	176	84
DFS	620	308	0	1207	77	1169	1330	1378	515	557	2020	246	181
FRA	511	297	503	0	67	1285	1210	1571	451	577	1772	266	171
ISR	33	13	55	33	0	67	76	79	46	47	84	15	16
ITA	699	322	704	570	42	0	1030	1738	506	618	1779	240	196
NLD	422	320	794	457	58	537	0	1340	466	508	1975	276	195
USA	1514	389	877	684	58	993	738	0	570	741	2278	245	223
GBR	457	240	482	407	31	518	452	610	0	310	582	156	98
HUN	447	167	379	327	29	450	319	614	290	0	797	145	137
DEU	875	526	1085	698	62	934	1177	1264	595	539	0	325	280
BEL	199	160	216	257	9	196	240	205	157	117	280	0	49
SVK	125	40	85	86	6	122	102	154	55	101	194	25	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	383	170	345	286	22	359	359	426	136	376
CAN	310	0	508	1051	914	52	1363	1058	2324	487	1720
CHE	125	392	0	374	365	22	435	489	526	185	671
DFS	205	807	308	0	1063	76	1330	1535	1493	447	1882
FRA	189	647	314	542	0	54	1293	1183	1376	471	1578
ISR	9	39	13	59	34	0	67	77	73	35	70
ITA	199	905	349	808	637	44	0	1395	2083	535	1956
NLD	242	911	436	1122	705	64	910	0	1669	461	2189
USA	298	2339	421	979	660	60	1114	1194	0	582	2319
HUN	72	384	131	292	281	26	367	309	436	0	635
DEU	237	1128	550	1191	738	55	1025	1651	1390	423	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
CAN	0	437	831	769	47	1032	761	1531	468	1453
CHE	320	0	381	340	23	406	464	446	202	643
DFS	635	311	0	1107	78	1175	1460	1170	512	2036
FRA	486	289	488	0	61	1184	1189	1190	501	1648
ISR	33	13	54	30	0	67	80	71	44	84
ITA	696	321	718	523	42	0	1157	1467	558	1764
NLD	622	409	1013	573	62	718	0	1244	504	2150
USA	1422	365	873	566	56	950	874	0	589	1917
HUN	387	151	345	292	27	402	348	513	0	717
DEU	840	516	1100	637	62	911	1463	1141	474	0

RDC

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	0	114	4	3	10	3	43
DFS	114	0	104	24	53	18	93
NOR	4	77	0	14	20	50	32
NLD	3	24	13	0	11	8	9
DEU	10	47	20	11	0	7	17
IRL	3	14	48	7	7	0	9
NZL	43	79	30	9	16	9	0

RDC

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	DFS	NOR	DEU
CAN	0	74	3	6
DFS	71	0	108	37
NOR	3	81	0	12
DEU	6	30	12	0