

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:

NOR (RDC) Calvings involving sires and dams from HOL, BSW and SIM are no longer extracted causing drops in information. Genetic groups are removed from the model, whereas inbreeding is being included. This time we have changed to a rolling cow base, based on cows born 3 to 8 years ago. Std is based on bulls born 5 to 12 years ago, but the limits will be updated only every second year. The rolling definition of hys is causing the daughters to distribute somewhat differently over hys-classes at each evaluation.

IRL (HOL, RDC) Previously there were edits around minimum amount of variation required within contemporary groups. That removed a lot of small contemporary groups which had no variation (e.g. all phenotypes were 'easy calving'). This edit

USA (ALL) Base change

NLD (ALL) Base change, now the cows born in 2015 are the base (it was 2010)

AUS (ALL) Changed the method for calculation of reliabilities

BEL (HOL) Some change in type of proof due to changes in pedigree information and the fact that the program that determines the type of proof for bulls is based on pedigree information

ISR (HOL) Small decrease in information due to pedigree corrections.

ITA (HOL) Base change plus cut off of 1 year of data causing decreases in information.

DEA (BSW) Base change

CHE (ALL) Base change, small drops in information due to manual editings, BSW:few bulls missing in this evaluation due to change in status of bulls.

DEU (ALL) Base change. Performance data: phenotypic data from 2000 onwards (used to be 1990 before) Pedigree: sire and maternal grandsire of animals having own performance must be known. Breed: breed of animal having own performance must be consistent with the breeds of parents, some bulls have lost daughters (and herds) due to data editing

NLD (ALL) Base change

CAN (ALL) Base change

GBR (ALL) Drops in daughters due to minor data editings. For RDC some daughters of these bulls were duplicated with some of them having eartag numbers and herd book numbers. Data providers have now correctly eliminated

USA (ALL) Pedigree corrections and herd-year minimum edits causing drops in information. Calving ease: update of the genetic parameters. The variance components have been re-estimated using 3 samples and their weighted averages used in the EBV estimation. Exclusion of any herds with ge 95% of easy calvings (scoring only 1) exclusion of calvings before 1990 use of score 4 for scores ge 4 estimation of the year of birth of any missing MGS using the daughter's year of birth (dam of the calf) Stillbirth: exclusion of calvings before 1990 Inclusion of parity in the definition of random HYS groups Inclusion of the interaction of Parity-Sex-Year of birth of Sire and MGS

AUS (ALL) Changed the method for calculation of reliabilities, Pedigree corrections based on genotype information has caused drops in information

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 this 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 with the aim of implementation set for the September 2020 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 (April Routine Evaluation 2020).
 Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			5536			
BEL			1075			
CAN	158		12625		497	
CHE	1929		2308			
CZE						
DEA	5366					
DEU			19041		260	
DFS			10286		6377	
ESP			1997			
EST						
FRA	342		12398			
FRM						
GBR			2780			
HUN			1747			
IRL			1981		54	
ISR			469			
ITA			9542			
JPN						
KOR						
LTU						
LVA						
NLD	140		14668		66	
NOR					3769	
NZL			7541		1107	

POL
PRT
SVK 670
SVN
URY
USA 485 35344
ZAF
HRV
MEX
CAM

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No.Records      8420          140008          12130
Pub. Proofs    8765          125257          12637          0
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^LAPPENDIX I. Sire standard deviations in diagonal and genetic correlations below diagonal

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BSW      dce
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      DEA      NLD      USA      CHE      CAN      FRA
DEA      9.79
NLD      0.91      5.93
USA      0.78      0.87      0.13
CHE      0.92      0.96      0.88      12.19
CAN      0.85      0.96      0.92      0.96      7.45
FRA      0.80      0.90      0.87      0.86      0.89      0.75
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BSW      mce
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      DEA      NLD      USA      CHE      CAN      FRA
DEA     10.88
NLD      0.65      5.09
USA      0.85      0.76      0.15
CHE      0.88      0.76      0.92      16.03
CAN      0.60      0.81      0.87      0.75      6.11
FRA      0.89      0.78      0.93      0.96      0.84      0.98
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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      0.05
CAN      0.78      6.65
CHE      0.81      0.96      10.29
DFS      0.77      0.92      0.89      11.71
FRA      0.81      0.96      0.96      0.90      0.92
ISR      0.79      0.90      0.86      0.89      0.88      2.83
ITA      0.70      0.77      0.77      0.77      0.76      0.78      7.26
NLD      0.86      0.97      0.95      0.93      0.93      0.92      0.77      7.16
USA      0.76      0.91      0.92      0.87      0.92      0.83      0.77      0.87      0.13
GBR      0.75      0.80      0.78      0.77      0.77      0.82      0.76      0.85      0.77      0.07
HUN      0.70      0.77      0.77      0.77      0.76      0.78      0.77      0.77      0.77      0.77      1.23
DEU      0.82      0.92      0.90      0.89      0.93      0.84      0.76      0.92      0.87      0.78      0.76      12.86
BEL      0.70      0.77      0.77      0.76      0.76      0.78      0.76      0.77      0.77      0.76      0.77      0.76      9.78
IRL      0.77      0.89      0.91      0.86      0.90      0.90      0.77      0.92      0.82      0.77      0.77      0.83      0.77      0.10
NZL      0.80      0.79      0.80      0.79      0.77      0.78      0.76      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      0.78      0.77      0.77      0.77      0.78      0.77      0.77      0.78      0.77      0.78      12.73
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      0.78      0.78      11.19
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HOL      mce
-----
      CAN      CHE      DFS      FRA      ISR      ITA      NLD      USA      GBR      HUN      DEU      BEL      SVK      ESP
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CAN	6.64														
CHE	0.88	13.49													
DFS	0.83	0.70	12.14												
FRA	0.92	0.97	0.77	1.29											
ISR	0.82	0.72	0.81	0.77	2.65										
ITA	0.80	0.86	0.62	0.85	0.75	9.33									
NLD	0.83	0.77	0.85	0.80	0.70	0.58	5.45								
USA	0.92	0.93	0.78	0.95	0.87	0.86	0.78	0.15							
GBR	0.64	0.77	0.56	0.75	0.60	0.63	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	1.25					
DEU	0.83	0.74	0.91	0.78	0.76	0.67	0.84	0.79	0.58	0.55	12.58				
BEL	0.68	0.70	0.71	0.75	0.62	0.62	0.78	0.68	0.57	0.56	0.75	10.64			
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	16.03		
ESP	0.69	0.66	0.66	0.69	0.69	0.61	0.67	0.67	0.57	0.56	0.68	0.64	0.57	12.38	

HOL dsb

	AUS	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
AUS	0.05										
CAN	0.64	7.37									
CHE	0.44	0.60	16.85								
DFS	0.71	0.87	0.56	12.63							
FRA	0.49	0.75	0.63	0.66	0.76						
ISR	0.83	0.73	0.44	0.76	0.51	1.74					
ITA	0.64	0.56	0.36	0.59	0.41	0.69	7.25				
NLD	0.43	0.79	0.72	0.71	0.68	0.52	0.35	4.46			
USA	0.43	0.47	0.61	0.39	0.54	0.37	0.35	0.55	0.07		
HUN	0.62	0.52	0.37	0.53	0.36	0.68	0.53	0.36	0.36	1.10	
DEU	0.51	0.85	0.63	0.83	0.66	0.69	0.45	0.79	0.54	0.43	12.49

HOL msb

	CAN	CHE	DFS	FRA	ISR	ITA	NLD	USA	HUN	DEU
CAN	6.20									
CHE	0.84	19.91								
DFS	0.95	0.82	11.61							
FRA	0.88	0.84	0.86	0.93						
ISR	0.90	0.81	0.86	0.79	1.75					
ITA	0.53	0.60	0.53	0.55	0.64	9.34				
NLD	0.93	0.75	0.95	0.81	0.82	0.53	4.20			
USA	0.82	0.80	0.81	0.78	0.73	0.53	0.78	0.13		
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	0.81	0.53	12.84

RDC dce

	CAN	DFS	NOR	NLD	DEU	IRL	NZL
CAN	6.52						
DFS	0.93	11.35					
NOR	0.90	0.95	13.67				
NLD	0.96	0.92	0.93	4.68			
DEU	0.92	0.90	0.94	0.92	14.00		
IRL	0.87	0.85	0.93	0.90	0.82	0.07	
NZL	0.79	0.79	0.79	0.83	0.79	0.81	2.78

RDC mce

	CAN	DFS	NOR	DEU
CAN	7.07			
DFS	0.81	12.17		
NOR	0.71	0.91	15.41	
DEU	0.80	0.85	0.76	12.11

^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	99	174	483	94	191
NLD	88	0	35	66	19	49
USA	129	30	0	175	98	65
CHE	393	64	133	0	88	128
CAN	79	16	89	71	0	52
FRA	133	36	47	87	43	0

BSW

common bulls below diagonal
 common three quarter sib group above diagonal

	DEA	NLD	USA	CHE	CAN	FRA
DEA	0	95	95	430	33	138
NLD	89	0	29	58	13	42
USA	82	26	0	87	27	44
CHE	329	56	74	0	28	90
CAN	28	10	25	24	0	22
FRA	97	37	39	66	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
AUS	0	1106	403	865	937	67	982	970	1357	600	423	1117	431	422	864	173	467
CAN	1040	0	663	1160	1311	80	1700	1243	3323	737	685	2129	531	391	688	280	779
CHE	346	549	0	409	499	33	542	549	717	320	248	836	351	244	295	127	319
DFS	563	869	333	0	1266	91	1311	1359	1616	688	515	1834	495	418	696	230	515
FRA	645	921	433	652	0	79	1628	1485	2017	818	638	2002	574	436	689	272	654
ISR	40	54	18	62	42	0	90	97	109	56	49	93	40	52	78	28	52
ITA	703	1368	459	878	904	58	0	1438	2530	920	710	2274	550	457	733	296	797
NLD	712	1014	489	823	756	68	945	0	2045	846	538	2460	625	528	953	308	565
USA	1224	3555	604	1037	1069	94	1763	1409	0	1080	829	2976	564	508	978	344	871
GBR	429	568	258	357	395	27	560	478	701	0	367	1012	347	370	423	165	396
HUN	263	549	173	331	382	32	500	296	649	208	0	822	271	230	324	171	370
DEU	826	1598	716	1169	1061	74	1427	1925	2058	579	533	0	732	553	833	480	851
BEL	405	514	350	428	583	21	540	640	525	306	206	757	0	285	327	146	348
IRL	369	356	230	335	379	33	380	442	472	322	185	486	277	0	518	106	227
NZL	754	616	249	463	436	58	554	784	920	257	198	652	282	463	0	167	325
SVK	85	194	57	117	172	13	191	189	234	69	109	376	78	45	100	0	154
ESP	350	540	252	394	498	27	571	433	568	284	261	519	334	201	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
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CAN    0  561 1047 1048   71 1294  994 2154  671  645 1806  467  239  785
CHE  436    0  460  458   34  480  560  606  353  259  782  354  115  315
DFS  873  398    0 1383   97 1295 1629 1587  691  627 2267  540  228  605
FRA  707  400  672    0   82 1394 1466 1748  621  665 2058  588  232  699
ISR   44   16   65   41    0   88  103  110   67   59  108   43   23   59
ITA 1003  398  911  722   51    0 1284 1963  708  707 1997  526  242  778
NLD  908  503 1276  820   78  941    0 1660  712  627 2429  674  274  623
USA 2109  506 1180  875   93 1387 1276    0  840  847 2659  529  284  902
GBR  735  338  691  587   47  752  775  970    0  396  821  382  148  428
HUN  538  192  430  393   37  534  415  712  359    0  895  291  168  421
DEU 1241  657 1438  939   82 1182 1906 1720  874  597    0  716  354  928
BEL  459  345  498  592   24  488  708  481  434  230  739    0  133  360
SVK  163   50  116  122    8  164  169  198   91  114  256   69    0  146
ESP  480  249  431  473   26  526  477  537  393  291  502  329   62    0
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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  HUN  DEU
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AUS    0 1065  401  870  810   67  978 1087 1243  304 1113
CAN 1031    0  660 1120 1169   76 1676 1381 3006  487 2119
CHE  344  549    0  410  488   33  541  619  678  189  840
DFS  567  872  333    0 1129   93 1315 1469 1485  408 1848
FRA  589  862  425  607    0   68 1492 1433 1602  472 1912
ISR   40   53   18   62   40    0   90  100  105   35   93
ITA  702 1365  459  883  830   58    0 1599 2359  532 2270
NLD  905 1278  579 1040  940   77 1228    0 2004  462 2684
USA 1153 3320  568  988  864   91 1675 1603    0  576 2756
HUN  196  382  136  256  282   26  368  311  430    0  634
DEU  829 1604  721 1175 1032   74 1428 2262 1937  419    0
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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  558 1035  976   70 1278  997 1960  469 1759
CHE  435    0  467  447   34  478  572  564  211  764
DFS  890  406    0 1286   97 1299 1707 1390  510 2268
FRA  683  387  663    0   77 1326 1412 1378  505 1929
ISR   44   16   65   39    0   88  104  105   45  106
ITA 1001  397  929  687   51    0 1319 1730  547 1965
NLD  918  522 1355  796   77  965    0 1511  511 2451
USA 2002  470 1166  766   91 1333 1227    0  583 2287
HUN  387  155  346  296   27  402  357  508    0  707
DEU 1192  638 1446  873   80 1152 1887 1565  464    0
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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	153	5	4	11	3	60
DFS	156	0	122	45	70	15	128
NOR	4	97	0	39	23	48	39
NLD	4	43	38	0	21	11	20
DEU	11	63	22	20	0	6	21
IRL	3	12	47	11	6	0	12
NZL	61	111	38	20	21	12	0

RDC

common bulls below diagonal
common three quarter sib group above diagonal
CAN DFS NOR DEU

CAN	0	95	4	9
DFS	96	0	123	43
NOR	4	96	0	14
DEU	9	35	13	0

RDC

RDC

SIM

SIM

SIM

SIM