Introduction

The latest routine international evaluation for workability traits took place as scheduled at the Interbull Centre. Data from eighteen (18) countries were included in this evaluation.

International genetic evaluations for workability traits of bulls from Austria-Germany, Canada, Denmark-Finland-Sweden, France, Great Britain, Italy, Netherlands, Norway, New Zealand, Slovenia, Japan, Switzerland, Poland, Czech Republic and Spain were computed. Brown Swiss, Holstein, Jersey and Red Dairy Cattle breed data were included in this evaluation.

Changes in national procedures

Changes in the national genetic evaluation of workability traits are as follows:

AUS (ALL)	Decrease in information due to the data clean-up, pedigree changes, bulls' statue changes and rounding effect
FRA (HOL)	All proofs sent to MACE are now â\200\234genomic-freeâ\200\235 single-step proofs, issued from a BLUP evaluation running on single-step preadjusted performances, as suggested as one of the methods of choice to provide unbiased â\200\234genomic-freeâ\200\235 proofs to Interbull by the Interbull working group on this topic. In addition to these changes, unknown parent groups have been modified for all traits.
ESP (HOL)	Decrease in information due to the update of national database
NLD (HOL)	Decrease in information due to pedigree changes /correction.
POL(HOL)	Decrease in information due to the data edits.
CHE(BSW)	Decrease in information due to the edits in database, and change in hys assignment.
DEA (BSW)	Base change, decrease in info due to the pedigree correction based on genotyping, and type of proof changes of some bulls
NZL(HOL,JER,RDC)	Decrease in information due to parent verification

INTERBULL CHANGES COMPARED TO THE PREVIOUS ROUTINE RUN

Post-processing Windows:

According to the decision taken by ITC in Orlando (2015) to review the post-processing windows every 5 years, during the 2020 the relative working group has been re-activated and new windows have been identified.

As before, the upper bounds have been set to 0.99 as these were judged to have very little effect on evaluations while the lower values have been reduced to the 10th percentile. This reduction would provide post-processed correlations to be closer to the real estimated ones. Over the past five years, in fact, the previous adopted lower value (25th percentile) had been found too high causing estimated and post-processed correlations to differ significantly from each other. The new lower values have been applied to all breeds and traits.

The weight assigned to the magnitude of the changes tested by each country has also been revised. The new weight will allow post-processed correlations to take more in consideration the value of the new estimated ones even when no changes are applied by the countries. The new weights are as follows:

No changes :: 2
Small changes:: 1
Big changes :: 0

More information can be read on https://interbull.org/ib/rg_procedure

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 Workability (December Routine Evaluation 2023).
Number of records for milking speed by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6597	1317	559	
BEL						
CAN	215		13390	791	874	
CHE	2934		3020	60		
CZE			2053			
DEA	4509					
DEU			13500		213	
DFS			12462	2063	6862	
ESP			3574			
EST						
FRA	435		18049			
FRM						
GBR			6318			
HUN						
IRL						
ISR						
ITA	2134		7803			
JPN			2306			
KOR						
LTU						
LVA						
NLD	127		14423	45		
NOR					4033	
NZL			6768	4141	523	
POL			9595			
PRT						
SVK						
SVN	250		593			
URY						
USA						
ZAF						
HRV						
CAM					37	
No.Records	10604		120451	8417	13101	
Pub. Proofs	8871	0	100706	7824	12637	0

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

BSW msp

	CAN	CHE	DEA	ITA	NLD	SVN	FRA
CAN	9.18						
CHE	0.94	15.63					
DEA	0.91	0.96	11.73				
ITA	0.85	0.93	0.91	17.43			

NLD	0.92	0.95	0.92	0.85	5.87		
SVN	0.83	0.88	0.87	0.90	0.82	30.17	
FRA	0.93	0.95	0.89	0.89	0.95	0.83	0.78

HOL msp

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	SVN	NZL	ITA	JPN	ESP	CZE	POL
CAN	7.58														
CHE	0.94	12.43													
DEU	0.89	0.96	12.67												
DFS	0.93	0.94	0.95	14.32											
FRA	0.94	0.98	0.94	0.95	1.01										
NLD	0.95	0.98	0.95	0.97	0.97	4.93									
AUS	0.82	0.83	0.78	0.80	0.83	0.82	0.25								
GBR	0.73	0.73	0.74	0.75	0.76	0.75	0.73	0.20							
SVN	0.76	0.86	0.91	0.87	0.84	0.87	0.70	0.67	27.12						
NZL	0.87	0.87	0.80	0.82	0.87	0.85	0.89	0.73	0.73	0.33					
ITA	0.75	0.81	0.79	0.81	0.83	0.82	0.69	0.59	0.76	0.70	6.18				
JPN	0.96	0.93	0.88	0.93	0.97	0.95	0.85	0.78	0.79	0.85	0.81	2.16			
ESP	0.93	0.93	0.89	0.92	0.95	0.94	0.79	0.71	0.80	0.84	0.78	0.93	13.27		
CZE	0.88	0.92	0.92	0.91	0.92	0.92	0.76	0.61	0.81	0.76	0.77	0.86	0.89	18.47	
POL	0.51	0.51	0.50	0.51	0.48	0.50	0.51	0.50	0.51	0.53	0.48	0.51	0.50	0.51	14.84

HOL tem

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA	JPN	POL
CAN	7.69											
CHE	0.68	10.31										
DEU	0.85	0.75	11.76									
DFS	0.77	0.84	0.86	13.07								
FRA	0.70	0.90	0.79	0.91	0.90							
NLD	0.85	0.77	0.89	0.85	0.81	6.01						
AUS	0.58	0.64	0.62	0.68	0.67	0.70	0.23					
GBR	0.59	0.80	0.67	0.77	0.83	0.68	0.61	0.16				
NZL	0.59	0.51	0.72	0.59	0.57	0.69	0.72	0.50	0.36			
ITA	0.11	0.09	0.11	0.09	0.08	0.14	0.09	0.09	0.10	6.18		
JPN	0.92	0.81	0.91	0.87	0.86	0.92	0.64	0.74	0.62	0.10	2.64	
POL	0.24	0.13	0.26	0.16	0.09	0.19	0.20	0.14	0.20	0.09	0.26	19.51

JER msp

	CAN	DFS	NLD	AUS	NZL	CHE
CAN	7.70					
DFS	0.89	13.65				
NLD	0.93	0.94	4.47			
AUS	0.74	0.75	0.82	0.24		
NZL	0.66	0.72	0.82	0.76	0.30	
CHE	0.92	0.93	0.95	0.79	0.74	11.41

RDC msp

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.81						
DEU	0.87	11.53					
DFS	0.92	0.90	13.22				
NOR	0.79	0.76	0.95	14.62			
AUS	0.77	0.72	0.76	0.73	0.27		
NZL	0.85	0.77	0.85	0.79	0.84	0.38	
CAM	0.68	0.67	0.69	0.67	0.60	0.68	7.57

RDC tem

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.25						

DEU	0.79	10.02					
DFS	0.67	0.75	11.06				
NOR	0.64	0.55	0.89	16.76			
AUS	0.60	0.45	0.62	0.56	0.25		
NZL	0.48	0.66	0.66	0.52	0.76	0.43	
CAM	0.54	0.49	0.49	0.51	0.44	0.49	7.48

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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

	CAN	CHE	DEA	ITA	NLD	SVN	FRA
CAN	0	117	129	118	36	24	82
CHE	102	0	599	469	67	55	174
DEA	118	510	0	641	93	71	223
ITA	105	409	539	0	88	67	199
NLD	29	65	84	71	0	28	57
SVN	22	52	67	63	28	0	39
FRA	74	141	183	167	49	39	0

BSW

GUE

GUE

HOL

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common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	SVN	NZL	ITA	JPN	ESP	CZE	POL
CAN	0	856	1793	1317	1571	1474	1085	1715	196	327	1728	433	1162	593	1391
CHE	785	0	892	607	684	801	484	715	116	200	667	164	489	236	531
DEU	1223	782	0	1815	1921	2202	917	1602	299	313	1794	388	1110	758	1880
DFS	1020	555	1161	0	1585	1752	936	1376	196	393	1182	254	775	607	1196
FRA	1089	634	1086	862	0	1950	1048	1557	191	443	1414	348	1020	632	1509
NLD	1361	787	1708	1342	1264	0	1081	1681	223	535	1398	303	899	784	1514
AUS	943	407	592	548	654	839	0	1055	111	546	733	199	556	361	584
GBR	1788	710	1126	971	1052	1407	815	0	190	413	1406	309	887	569	1154
SVN	155	86	289	146	150	196	73	146	0	43	223	87	165	112	260
NZL	293	173	218	238	247	481	429	315	33	0	223	67	192	149	157
ITA	1505	596	1131	920	903	1149	548	1198	192	186	0	425	1099	604	1498
JPN	186	95	148	132	134	153	125	142	39	49	166	0	328	179	391
ESP	745	370	624	555	751	711	372	642	118	137	744	127	0	419	918
CZE	324	121	395	263	290	568	139	256	73	59	359	76	220	0	610
POL	1329	434	1652	941	1091	1367	412	966	232	114	1249	178	642	422	0

HOL

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common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA	JPN	POL
CAN	0	773	1667	978	1439	1386	1052	1680	315	1719	433	1366
CHE	704	0	747	431	620	669	428	661	175	631	163	507
DEU	975	619	0	1419	1845	2056	892	1488	285	1689	359	1680
DFS	635	369	702	0	1339	1348	827	1140	373	926	184	882
FRA	1074	571	1004	663	0	1828	997	1503	414	1407	346	1483
NLD	1277	659	1404	843	1214	0	1073	1633	531	1349	295	1447
AUS	921	373	516	419	653	833	0	1056	545	732	199	578
GBR	1755	645	941	675	1041	1369	814	0	410	1404	309	1141
NZL	285	154	193	212	245	476	428	314	0	222	67	156
ITA	1495	567	999	638	902	1103	547	1198	186	0	424	1469
JPN	186	95	138	94	134	149	125	142	49	166	0	386

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  POL 1323  414 1290  592 1086 1314  412  966  114 1245  178    0
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JER
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 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  DFS  NLD  AUS  NZL  CHE
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  CAN    0   66   11  188   68   29
  DFS   51    0   21   86   80   43
  NLD    8   17    0   18   16    9
  AUS  189   58   18    0  189   30
  NZL   68   59   14  174    0   25
  CHE   28   43    6   29   24    0
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JER
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RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  DEU  DFS  NOR  AUS  NZL  CAM
 ------------------------------------------------------------------------------
  CAN    0    6  161    6   37   28    0
  DEU    6    0   24    8   20    2    0
  DFS  166   16    0  113  135   48    0
  NOR    6    7   91    0   60   10    0
  AUS   34   19  107   51    0   39    9
  NZL   25    2   47   10   36    0    1
  CAM    0    0    0    0    9    1    0
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RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  DEU  DFS  NOR  AUS  NZL  CAM
 ------------------------------------------------------------------------------
  CAN    0    8  136    6   37   27    0
  DEU    8    0   47   11   27    4    0
  DFS  138   41    0  108  135   48    0
  NOR    6   11   86    0   57    9    0
  AUS   34   26  107   48    0   39    9
  NZL   25    4   47    9   36    0    1
  CAM    0    0    0    0    9    1    0
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SIM
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SIM
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