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:

CHE (HOL,BSW)	Drops in information due to manual edits
NOR (RDC)	The rolling definition of effects redistribute the daughters and some bulls loose EDC.
AUS (HOL,JER,RDC)	Decreasing in information due to pedigree changes, changes in status of bull which leads to a good number of bulls no longer being qualified
JPN (HOL)	Some changes in proofs caused by additional records and in EDCs caused by modification of pedigree.
POL (HOL)	Drops in information due to data edits.
ITA (HOL)	Applied the yearly cut-off of data (lower time bound of the dataset used for the evaluation).Base change.
USA (ALL)	Drops in information for most traits are due to pedigree corrections and herd-year minimum edits.
NZL (BSW,GUE,HOL,JER,RDC)	Continuous DNA parentage testing affected daughter counts, herd count, EDCs, and reliabilities.
SVN (BSW,HOL,SIM)	Some bulls losing information (herds/daughters/EDC), due to changes in data base, related to the pedigree completeness as well as phenotypic data improvement.
ESP (HOL)	Change in base definition. Some Bulls lost some EDC, due to some daughters that were assigned as culled but did contribute more information now.
ITA (BSW)	For some traits, new information cause low correlation with previous evaluation for some years.
FRA (HOL)	The reliability from the singlestep is now used as a factor of the publication.

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 (August Routine Evaluation 2022).
Number of records for milking speed by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6541	1303	542	
BEL						
CAN	211		13020	763	858	
CHE	2854		2919	57		
CZE			1889			
DEA	4421					
DEU			13094		208	
DFS			12233	2031	6786	
ESP			3356			
EST						
FRA	388		17816			
FRM						
GBR			6145			
HUN						
IRL						
ISR						
ITA	2100		8442			
JPN			2068			
KOR						
LTU						
LVA						
NLD	116		13978	35		
NOR					3980	
NZL			6418	3976	516	
POL			8888			
PRT						
SVK						
SVN	330		625			
URY						
USA						
ZAF						
HRV						
CAM					35	
No.Records	10420		117432	8165	12925	
Pub. Proofs	8758	0	95268	7597	12481	0

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

BSW msp

	CAN	CHE	DEA	ITA	NLD	SVN	FRA
CAN	9.25						
CHE	0.94	15.62					
DEA	0.91	0.96	11.71				

ITA	0.88	0.94	0.92	17.55			
NLD	0.93	0.95	0.93	0.88	5.80		
SVN	0.82	0.89	0.89	0.92	0.83	24.91	
FRA	0.93	0.93	0.86	0.88	0.95	0.81	0.82

HOL msp

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	SVN	NZL	ITA	JPN	ESP	CZE	POL
CAN	7.61														
CHE	0.93	12.42													
DEU	0.89	0.96	12.56												
DFS	0.94	0.95	0.95	14.45											
FRA	0.95	0.98	0.94	0.96	1.07										
NLD	0.95	0.98	0.94	0.97	0.98	5.13									
AUS	0.83	0.84	0.79	0.81	0.85	0.84	0.25								
GBR	0.76	0.77	0.76	0.77	0.80	0.78	0.75	0.20							
SVN	0.71	0.81	0.84	0.80	0.79	0.81	0.70	0.73	23.35						
NZL	0.87	0.88	0.81	0.83	0.88	0.87	0.89	0.73	0.68	0.33					
ITA	0.76	0.83	0.81	0.83	0.84	0.84	0.71	0.61	0.75	0.72	5.75				
JPN	0.96	0.93	0.88	0.93	0.97	0.96	0.86	0.80	0.75	0.85	0.82	2.15			
ESP	0.94	0.93	0.90	0.93	0.95	0.95	0.82	0.75	0.75	0.83	0.80	0.94	13.66		
CZE	0.88	0.91	0.92	0.90	0.89	0.91	0.78	0.68	0.74	0.78	0.75	0.84	0.89	17.86	
POL	0.56	0.57	0.54	0.56	0.56	0.57	0.57	0.54	0.57	0.53	0.48	0.57	0.57	0.57	14.88

HOL tem

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA	JPN	POL
CAN	7.50											
CHE	0.68	10.33										
DEU	0.84	0.76	11.77									
DFS	0.77	0.84	0.87	13.09								
FRA	0.71	0.91	0.80	0.92	0.97							
NLD	0.86	0.76	0.90	0.86	0.81	5.48						
AUS	0.60	0.65	0.64	0.68	0.68	0.70	0.23					
GBR	0.61	0.80	0.67	0.77	0.84	0.69	0.62	0.16				
NZL	0.59	0.51	0.73	0.58	0.56	0.69	0.71	0.49	0.36			
ITA	0.13	0.09	0.12	0.09	0.08	0.15	0.09	0.11	0.10	5.75		
JPN	0.91	0.80	0.91	0.87	0.85	0.93	0.64	0.72	0.60	0.10	2.65	
POL	0.31	0.23	0.32	0.23	0.22	0.29	0.28	0.19	0.23	0.09	0.32	19.96

JER msp

	CAN	DFS	NLD	AUS	NZL	CHE
CAN	7.95					
DFS	0.90	13.82				
NLD	0.94	0.95	4.48			
AUS	0.76	0.77	0.85	0.24		
NZL	0.68	0.74	0.86	0.77	0.30	
CHE	0.92	0.94	0.96	0.80	0.76	11.71

RDC msp

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.90						
DEU	0.87	11.45					
DFS	0.92	0.90	13.28				
NOR	0.79	0.75	0.95	14.71			
AUS	0.78	0.72	0.76	0.73	0.27		
NZL	0.85	0.78	0.85	0.79	0.84	0.38	
CAM	0.70	0.68	0.71	0.69	0.62	0.69	7.38

RDC tem

CAN	DEU	DFS	NOR	AUS	NZL	CAM

CAN	6.36						
DEU	0.79	9.91					
DFS	0.69	0.75	11.07				
NOR	0.66	0.54	0.90	16.69			
AUS	0.62	0.49	0.65	0.59	0.25		
NZL	0.49	0.67	0.65	0.51	0.76	0.43	
CAM	0.56	0.52	0.52	0.53	0.40	0.49	7.61

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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	113	125	116	36	29	73
CHE	99	0	577	457	61	66	156
DEA	115	490	0	620	87	88	195
ITA	103	396	522	0	81	83	175
NLD	29	59	79	66	0	31	53
SVN	26	63	84	80	30	0	47
FRA	64	120	147	138	43	44	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	821	1709	1253	1550	1364	1055	1638	209	317	1737	392	1097	528	1214
CHE	747	0	859	582	670	770	468	689	130	193	687	143	469	225	485
DEU	1130	746	0	1731	1871	2055	895	1534	304	301	1899	357	1044	698	1689
DFS	953	527	1078	0	1552	1669	913	1333	222	383	1263	228	734	572	1095
FRA	1071	616	1039	834	0	1900	1033	1531	211	440	1560	325	977	606	1414
NLD	1246	757	1553	1263	1219	0	1058	1580	240	515	1454	260	834	715	1345
AUS	916	391	569	524	637	818	0	1026	135	538	809	186	535	348	552
GBR	1711	685	1060	923	1035	1309	780	0	213	401	1474	280	847	523	1028
SVN	162	97	287	168	166	210	89	163	0	51	247	81	174	111	239
NZL	283	167	207	229	243	460	421	305	36	0	257	60	187	142	143
ITA	1536	631	1214	974	986	1198	592	1255	215	214	0	396	1098	568	1363
JPN	152	79	124	109	119	121	110	121	37	44	142	0	308	156	354
ESP	677	351	576	514	711	657	357	605	123	132	741	109	0	387	796
CZE	268	112	342	230	265	503	131	219	72	53	299	61	189	0	508
POL	1138	389	1449	838	987	1182	381	827	213	102	1113	151	521	317	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	737	1610	959	1418	1304	1023	1603	305	1722	392	1191
CHE	665	0	713	418	606	636	412	635	168	641	142	460
DEU	916	585	0	1379	1799	1950	872	1434	275	1829	333	1536
DFS	617	355	671	0	1320	1311	815	1120	364	1034	176	837
FRA	1056	553	967	648	0	1792	982	1478	411	1547	324	1393
NLD	1187	624	1296	808	1177	0	1050	1560	509	1433	260	1308
AUS	894	357	499	408	636	810	0	1028	537	808	186	546
GBR	1678	620	897	658	1024	1294	779	0	398	1469	280	1016
NZL	275	148	185	205	241	453	420	304	0	256	60	142
ITA	1521	590	1113	703	981	1176	592	1254	214	0	393	1328

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  JPN  152   79  119   84  119  121  110  121   44  142    0  349
  POL 1131  368 1135  548  984 1163  381  828  102 1101  151    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   63   10  186   67   27
  DFS   48    0   15   84   74   41
  NLD    7   11    0   17   14    8
  AUS  186   56   17    0  187   28
  NZL   67   53   12  171    0   22
  CHE   26   41    5   28   21    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  154    6   36   28    0
  DEU    6    0   23    7   18    2    0
  DFS  157   15    0  112  124   47    0
  NOR    6    6   89    0   55   10    0
  AUS   33   17   96   46    0   36    8
  NZL   25    2   46   10   33    0    1
  CAM    0    0    0    0    8    1    0
 ------------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  DEU  DFS  NOR  AUS  NZL  CAM
 ------------------------------------------------------------------------------
  CAN    0    8  127    6   36   27    0
  DEU    8    0   42   11   22    4    0
  DFS  129   36    0  109  124   47    0
  NOR    6   11   86    0   54    9    0
  AUS   33   22   96   45    0   36    8
  NZL   25    4   46    9   33    0    1
  CAM    0    0    0    0    8    1    0
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SIM
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SIM
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