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:

NOR (RDC)	Heritability of milkability now reported as narrow sense.
AUS (ALL)	Drops of information due to data clean up such as pedigree changes or status changes leading to a good number of bulls no longer being qualified. Decreases in EDC are also due to rounding.
ITA (HOL)	Corrected a bug in herds calculation
DEU (ALL)	Base change
CHE (ALL)	Base change. Decrease in information due to manual edits in the database
ITA (BSW)	Base change
POL (HOL)	Decrease in information due to data editings
NZL (ALL)	Daughter counts: New Zealand has continuous DNA parentage testing so daughters will always change. Herd Count: Affected by continuous DNA parentage testing. EDCs: Affected by continuous DNA parentage testing. Reliability changes.
CAN (ALL)	Base change
GBR (ALL)	Drop in information due to data clean up

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

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6516	1302	539	
BEL						
CAN	210		12927	755	856	
CHE	2835		2889	57		
CZE			1851			
DEA	4390					
DEU			12969		207	
DFS			12151	2017	6741	
ESP			3269			
EST						
FRA	383		17241			
FRM						
GBR			6098			
HUN						
IRL						
ISR						
ITA	2089		8491			
JPN			1986			
KOR						
LTU						
LVA						
NLD	114		13913	34		
NOR					3965	
NZL			6418	3976	516	
POL			8749			
PRT						
SVK						
SVN	328		610			
URY						
USA						
ZAF						
HRV						
CAM					35	
No.Records	10349		116078	8141	12859	
Pub. Proofs	8704	0	100322	7574	12420	0

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

BSW msp

CAN	CHE	DEA	ITA	NLD	SVN	FRA

CAN	9.19						
CHE	0.94	15.61					
DEA	0.91	0.96	11.72				
ITA	0.88	0.94	0.92	17.48			
NLD	0.93	0.95	0.93	0.88	5.83		
SVN	0.82	0.89	0.89	0.92	0.83	24.86	
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	7.59														
CHE	0.93	12.40													
DEU	0.89	0.96	12.55												
DFS	0.94	0.95	0.95	14.41											
FRA	0.95	0.98	0.94	0.96	1.07										
NLD	0.95	0.98	0.94	0.97	0.98	5.12									
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	23.26						
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	5.61				
JPN	0.96	0.93	0.88	0.93	0.97	0.96	0.86	0.80	0.75	0.85	0.82	2.16			
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	13.60		
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	17.73	
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	14.91

HOL tem

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA	JPN	POL
CAN	7.48											
CHE	0.68	10.32										
DEU	0.84	0.76	11.79									
DFS	0.77	0.84	0.87	13.11								
FRA	0.71	0.91	0.80	0.92	0.97							
NLD	0.86	0.76	0.90	0.86	0.81	5.47						
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	5.61		
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	19.99

JER msp

	CAN	DFS	NLD	AUS	NZL	CHE
CAN	7.97					
DFS	0.90	13.85				
NLD	0.94	0.95	4.57			
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	11.46

RDC msp

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.88						
DEU	0.87	11.43					
DFS	0.92	0.90	13.30				
NOR	0.79	0.75	0.95	14.80			
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	7.56

RDC tem

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.33						
DEU	0.79	10.13					
DFS	0.69	0.75	11.07				
NOR	0.66	0.54	0.90	16.74			
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	7.53

^LAPPENDIX II. Number of common bulls

BSW

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	DEA	ITA	NLD	SVN	FRA
CAN	0	112	125	116	36	29	73
CHE	98	0	573	454	60	64	157
DEA	115	487	0	616	86	87	197
ITA	103	393	518	0	80	82	174
NLD	29	58	78	65	0	30	52
SVN	26	62	83	80	29	0	47
FRA	64	118	145	135	42	44	0

BSW

GUE

GUE

HOL

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	810	1692	1229	1392	1350	1046	1607	202	317	1684	386	1075	511	1181
CHE	733	0	851	569	571	762	465	679	125	193	677	141	461	220	479
DEU	1105	738	0	1699	1647	2027	888	1509	300	300	1885	352	1022	686	1653
DFS	928	516	1048	0	1405	1648	903	1314	217	382	1266	224	720	563	1071
FRA	806	489	732	615	0	1694	967	1389	173	419	1421	307	871	572	1252
NLD	1233	749	1521	1243	891	0	1056	1562	237	515	1461	258	817	698	1323
AUS	906	387	559	518	536	816	0	1018	134	538	820	181	530	345	546
GBR	1681	674	1038	909	790	1295	771	0	206	400	1457	275	829	513	1003
SVN	157	92	282	165	118	207	88	159	0	51	241	80	169	106	232
NZL	283	167	206	228	195	460	421	304	36	0	272	60	187	142	143
ITA	1457	622	1186	964	731	1195	590	1223	209	222	0	390	1080	564	1322
JPN	148	79	120	105	99	119	106	119	37	44	136	0	305	151	347
ESP	651	343	560	499	564	640	353	590	119	132	714	106	0	376	782
CZE	249	109	330	224	221	487	125	206	68	53	283	58	182	0	489
POL	1096	379	1410	812	769	1154	375	799	209	102	1057	145	497	298	0

HOL

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	726	1603	953	1257	1292	1014	1573	305	1671	386	1158
CHE	651	0	710	414	521	628	409	624	168	626	140	455
DEU	907	582	0	1366	1596	1932	867	1423	275	1825	330	1509
DFS	609	352	660	0	1217	1303	812	1113	364	1055	172	823
FRA	798	447	690	497	0	1585	912	1334	385	1412	307	1236
NLD	1176	617	1272	797	857	0	1049	1546	509	1446	258	1290
AUS	884	353	495	408	533	808	0	1020	537	819	181	540

GBR	1649	608	885	651	786	1281	770	0	397	1454	275	990
NZL	275	148	185	205	193	453	420	303	0	271	60	142
ITA	1444	575	1097	707	730	1175	590	1223	222	0	387	1290
JPN	148	79	116	82	99	118	106	119	44	136	0	342
POL	1090	359	1109	533	769	1140	375	800	102	1048	145	0

JER

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common bulls below diagonal

common three quarter sib group above diagonal

	CAN	DFS	NLD	AUS	NZL	CHE
CAN	0	63	10	184	67	27
DFS	48	0	14	84	74	41
NLD	7	10	0	16	14	8
AUS	184	56	16	0	187	28
NZL	67	53	12	171	0	22
CHE	26	41	5	28	21	0

JER

RDC

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common bulls below diagonal

common three quarter sib group above diagonal

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	0	6	147	6	36	28	0
DEU	6	0	23	7	18	2	0
DFS	149	15	0	112	123	47	0
NOR	6	6	89	0	54	10	0
AUS	33	17	95	45	0	36	8
NZL	25	2	46	10	33	0	1
CAM	0	0	0	0	8	1	0

RDC

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common bulls below diagonal

common three quarter sib group above diagonal

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	0	8	124	6	36	27	0
DEU	8	0	39	11	22	4	0
DFS	126	33	0	109	123	47	0
NOR	6	11	86	0	53	9	0
AUS	33	22	95	44	0	36	8
NZL	25	4	46	9	33	0	1
CAM	0	0	0	0	8	1	0

SIM

SIM
