

## 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:

DEA (BSW)	Drops in info causing changes in reliabilities
JPN (HOL)	Changes in information caused by additional records and modification of pedigree.
NZL (ALL)	Changes in information caused by continuous DNA parentage testing
DFS (ALL)	Changes in type of proofs: Type of proof is based on information from production. When production information for foreign bulls become available such bulls might change type of proof for other traits as well. Drops in information.
ITA (HOL)	Base change, decrease in information due to data-flow and how and when data are passed to the evaluation system.
SVN (ALL)	Small changes in information due to changes in database related to the pedigree completeness as well as phenotypic data improvement.
POL (HOL)	Small decrease in number of herds and daughters due to data edits caused decrease of EDC.
ESP (HOL)	Base change, drops in information due to data edits

## 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](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

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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

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Dates for the next routine evaluation can be found on  
<http://www.interbull.org/ib/servicecalendar>.

#### NEXT TEST INTERNATIONAL EVALUATION

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Dates for the next test run can be found on  
<http://www.interbull.org/ib/servicecalendar>.

#### PUBLICATION OF INTERBULL ROUTINE RUN

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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 2021).  
Number of records for milking speed by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6460	1287	531	
BEL						
CAN	208		12723	733	841	
CHE	2799		3281	55		
CZE			1782			
DEA	4310					
DEU			12741		203	
DFS			12068	2010	6705	
ESP			3232			
EST						
FRA	377		17093			
FRM						
GBR			5985			
HUN						
IRL						
ISR						
ITA	2063		6529			
JPN			1900			
KOR						
LTU						
LVA						
NLD	115		13768	34		
NOR					3927	
NZL			6417	3985	595	
POL			8235			
PRT						
SVK						
SVN	324		575			
URY						
USA						
ZAF						
HRV						
CAM					35	
No. Records	10196		112789	8104	12837	
Pub. Proofs	8578	0	98299	7537	12408	0

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

BSW	msp						
	CAN	CHE	DEA	ITA	NLD	SVN	FRA
CAN	8.93						
CHE	0.94	15.67					
DEA	0.91	0.96	11.69				
ITA	0.92	0.95	0.92	17.56			

NLD	0.94	0.96	0.94	0.93	5.85		
SVN	0.86	0.90	0.90	0.94	0.87	24.97	
FRA	0.93	0.93	0.85	0.90	0.95	0.84	0.83

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HOL msp  
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	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	SVN	NZL	ITA	JPN	ESP	CZE	POL
CAN	7.56														
CHE	0.92	12.67													
DEU	0.89	0.97	12.53												
DFS	0.94	0.95	0.95	14.39											
FRA	0.94	0.98	0.94	0.96	1.07										
NLD	0.95	0.98	0.95	0.97	0.98	5.11									
AUS	0.84	0.86	0.82	0.84	0.86	0.86	0.25								
GBR	0.81	0.82	0.80	0.82	0.83	0.83	0.81	0.19							
SVN	0.81	0.85	0.86	0.84	0.84	0.85	0.81	0.82	23.56						
NZL	0.89	0.90	0.86	0.86	0.91	0.90	0.92	0.80	0.80	0.36					
ITA	0.94	0.94	0.91	0.94	0.96	0.95	0.84	0.83	0.83	0.87	6.65				
JPN	0.97	0.94	0.89	0.94	0.97	0.96	0.88	0.83	0.82	0.90	0.95	2.15			
ESP	0.95	0.94	0.91	0.94	0.96	0.96	0.84	0.81	0.81	0.88	0.94	0.95	13.60		
CZE	0.87	0.92	0.92	0.90	0.90	0.91	0.83	0.78	0.82	0.83	0.84	0.85	0.89	17.25	
POL	0.73	0.73	0.67	0.73	0.73	0.73	0.73	0.73	0.73	0.69	0.73	0.73	0.74	0.73	15.17

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HOL tem  
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	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA	JPN	POL
CAN	7.26											
CHE	0.69	10.67										
DEU	0.84	0.76	11.82									
DFS	0.77	0.83	0.87	13.12								
FRA	0.70	0.91	0.80	0.92	0.97							
NLD	0.86	0.76	0.89	0.86	0.81	5.48						
AUS	0.65	0.67	0.67	0.69	0.69	0.71	0.23					
GBR	0.66	0.80	0.69	0.78	0.85	0.70	0.67	0.16				
NZL	0.62	0.56	0.74	0.64	0.60	0.72	0.50	0.36				
ITA	0.44	0.39	0.43	0.42	0.39	0.44	0.40	0.42	0.10	6.66		
JPN	0.91	0.80	0.91	0.87	0.85	0.93	0.66	0.70	0.63	0.40	2.66	
POL	0.54	0.50	0.53	0.51	0.50	0.53	0.51	0.50	0.19	0.39	0.52	20.77

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JER msp  
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	CAN	DFS	NLD	AUS	NZL	CHE
CAN	8.07					
DFS	0.91	13.91				
NLD	0.94	0.96	4.67			
AUS	0.82	0.82	0.87	0.24		
NZL	0.76	0.80	0.87	0.82	0.32	
CHE	0.92	0.95	0.96	0.84	0.81	11.61

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RDC msp  
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	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.98						
DEU	0.87	11.42					
DFS	0.92	0.90	13.32				
NOR	0.83	0.74	0.96	14.96			
AUS	0.81	0.72	0.79	0.78	0.27		
NZL	0.88	0.81	0.86	0.81	0.86	0.40	
CAM	0.77	0.69	0.78	0.77	0.72	0.76	7.83

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RDC tem  
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	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.39						

DEU	0.80	10.12																		
DFS	0.71	0.79	11.07																	
NOR	0.72	0.62	0.91	17.11																
AUS	0.65	0.58	0.67	0.64	0.25															
NZL	0.62	0.70	0.70	0.63	0.79	0.44														
CAM	0.63	0.61	0.61	0.61	0.53	0.60	7.45													

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^LAPPENDIX II. Number of common bulls  
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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	112	123	114	37	29	72
CHE	98	0	564	446	61	63	154
DEA	111	478	0	610	87	86	193
ITA	101	384	512	0	81	81	171
NLD	30	60	79	66	0	30	52
SVN	26	61	81	79	29	0	46
FRA	64	115	141	132	43	44	0

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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	851	1650	1208	1370	1320	1016	1557	192	389	1469	371	1064	484	1094
CHE	721	0	855	592	585	772	471	686	122	244	611	136	464	220	438
DEU	1069	706	0	1668	1617	1981	862	1469	282	367	1564	343	1010	660	1498
DFS	904	504	1017	0	1384	1620	890	1287	209	442	1042	217	709	541	1003
FRA	787	486	704	593	0	1677	953	1370	168	471	1163	300	856	553	1157
NLD	1203	736	1467	1212	872	0	1036	1528	232	580	1180	252	804	671	1167
AUS	878	383	537	504	521	801	0	998	128	604	663	170	520	330	503
GBR	1627	659	994	882	773	1260	749	0	201	466	1224	264	818	490	928
SVN	150	90	266	160	116	203	83	157	0	61	205	78	166	100	215
NZL	353	204	263	277	236	521	479	363	46	0	276	80	233	166	187
ITA	1246	537	939	805	634	974	500	1049	178	235	0	363	967	467	1129
JPN	137	74	114	102	96	113	101	112	36	54	122	0	299	141	333
ESP	635	337	550	485	549	623	340	578	119	170	632	99	0	364	742
CZE	223	101	306	205	202	455	111	185	62	66	239	52	167	0	442
POL	1003	332	1231	752	673	985	336	723	189	136	891	137	458	249	0

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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	763	1576	945	1236	1261	983	1522	377	1458	371	1071
CHE	638	0	733	444	533	639	418	634	219	575	135	416
DEU	886	559	0	1350	1568	1893	844	1389	338	1496	322	1367
DFS	605	348	646	0	1209	1291	805	1103	412	856	169	790
FRA	779	443	670	489	0	1571	898	1315	437	1158	300	1140
NLD	1140	604	1232	788	839	0	1029	1512	574	1165	252	1136
AUS	856	349	476	403	518	794	0	999	603	661	170	499
GBR	1593	593	853	645	769	1249	748	0	463	1221	264	916
NZL	345	185	235	236	234	514	478	362	0	275	80	186
ITA	1236	504	846	603	633	956	499	1050	235	0	362	1103
JPN	137	74	111	81	96	112	101	112	54	122	0	328

POL 997 314 959 510 673 968 336 724 136 884 137 0

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 10 177 71 25  
DFS 48 0 14 84 78 41  
NLD 7 10 0 16 14 8  
AUS 177 56 16 0 194 27  
NZL 73 56 12 181 0 25  
CHE 23 40 5 26 23 0  
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JER

RDC

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

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CAN 0 6 143 6 36 33 0  
DEU 6 0 22 7 18 2 0  
DFS 145 14 0 111 118 56 0  
NOR 6 6 88 0 52 11 0  
AUS 33 17 90 43 0 38 8  
NZL 30 2 53 10 35 0 2  
CAM 0 0 0 0 8 2 0  
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RDC

-----  
common bulls below diagonal  
common three quarter sib group above diagonal  
CAN DEU DFS NOR AUS NZL CAM

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CAN 0 8 122 6 36 32 0  
DEU 8 0 37 10 22 5 0  
DFS 124 31 0 107 118 56 0  
NOR 6 10 84 0 50 10 0  
AUS 33 22 90 41 0 38 8  
NZL 30 5 53 9 35 0 2  
CAM 0 0 0 0 8 2 0  
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SIM

SIM