Introduction

The latest routine international evaluation for workability traits took place as scheduled at the Interbull Centre. Data from fourtheen (14) 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 and Switzerland 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)	Base changed to a rolling cow base, based on cows born 3 to 8 years ago. Standard deviation is based on bulls born 5 to 12 years ago, but the limits will be updated only every second year.
CHE (JER)	The change of herd-year-season assignment for certain data records is causing a very small change in EDC for certain bulls.
CHE (BSW)	Based on manual data edits and the removal of data errors, the number of herds and the number of daughters for very few bulls decreased. The change of herd-year-season assignment of certain data records might explain the very small ch
SVN (HOL,BSW)	Small drop in information due to changes in data base related to the pedigree completness as well as phenotypic data improvement

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.

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 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 2019).
Number of records for milking speed by breed

Country	BSW	GUE	HOL	JER	RDC	SIM

AUS			6281	1228	505	
BEL						
CAN	186		12186	683	814	
CHE	2682		3108	51		
CZE						
DEA	4129					
DEU			18611		265	
DFS			11772	1961	6570	
ESP						
EST						
FRA	348		16730			
FRM						
GBR			5646			
HUN						
IRL						
ISR						
ITA	1971		6690			
JPN						
KOR						
LTU						
LVA						
NLD	108		13382	29		
NOR					3871	
NZL			6148	3851	577	
POL						
PRT						
SVK						
SVN	297		503			
URY						
USA						
ZAF						
HRV						
MEX						
CAM					31	
No.Records	9721		101057	7803	12633	
Pub. Proofs	8227	0	87602	7276	12109	0

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

BSW msp

	CAN	CHE	DEA	ITA	NLD	SVN	FRA
CAN	7.76						
CHE	0.94	15.69					
DEA	0.90	0.96	11.72				
ITA	0.92	0.95	0.93	17.68			
NLD	0.94	0.96	0.94	0.93	6.38		
SVN	0.87	0.90	0.91	0.94	0.88	24.75	
FRA	0.94	0.93	0.86	0.90	0.95	0.86	0.85

HOL msp

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	SVN	NZL	ITA
CAN	7.61										
CHE	0.91	12.57									
DEU	0.91	0.97	11.55								
DFS	0.94	0.95	0.97	14.53							
FRA	0.94	0.98	0.96	0.96	1.08						
NLD	0.95	0.98	0.97	0.97	0.98	5.58					
AUS	0.88	0.89	0.86	0.87	0.90	0.89	0.27				

GBR	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.14			
SVN	0.85	0.87	0.87	0.85	0.85	0.87	0.86	0.85	23.36		
NZL	0.91	0.92	0.88	0.87	0.93	0.92	0.94	0.85	0.86	0.36	
ITA	0.94	0.94	0.93	0.94	0.96	0.95	0.87	0.85	0.85	0.90	6.99

HOL tem

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA
CAN	6.99									
CHE	0.70	10.73								
DEU	0.84	0.78	11.96							
DFS	0.78	0.83	0.87	13.19						
FRA	0.71	0.90	0.81	0.92	0.98					
NLD	0.86	0.75	0.88	0.87	0.81	5.04				
AUS	0.70	0.70	0.70	0.72	0.71	0.74	0.25			
GBR	0.70	0.79	0.71	0.79	0.85	0.71	0.70	0.14		
NZL	0.70	0.70	0.71	0.70	0.70	0.70	0.71	0.70	0.34	
ITA	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	6.99

JER msp

	CAN	DFS	NLD	AUS	NZL	CHE
CAN	8.04					
DFS	0.91	13.79				
NLD	0.95	0.96	4.67			
AUS	0.86	0.86	0.91	0.26		
NZL	0.87	0.86	0.91	0.87	0.32	
CHE	0.93	0.95	0.97	0.88	0.89	12.10

RDC msp

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.84						
DEU	0.91	9.22					
DFS	0.93	0.93	13.36				
NOR	0.90	0.88	0.98	14.92			
AUS	0.87	0.86	0.86	0.86	0.29		
NZL	0.90	0.88	0.88	0.91	0.90	0.40	
CAM	0.90	0.90	0.90	0.90	0.88	0.90	7.94

RDC tem

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.43						
DEU	0.82	9.66					
DFS	0.74	0.80	11.11				
NOR	0.76	0.72	0.92	17.03			
AUS	0.70	0.71	0.71	0.71	0.27		
NZL	0.71	0.71	0.72	0.72	0.78	0.40	
CAM	0.74	0.74	0.74	0.74	0.72	0.73	7.18

^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	101	108	102	36	26	68
CHE	84	0	531	417	58	53	150

DEA	93	449	0	573	83	74	183
ITA	87	359	472	0	76	69	163
NLD	30	55	74	60	0	27	51
SVN	23	52	69	68	26	0	40
FRA	59	111	134	126	41	38	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
CAN	0	778	1827	1111	1295	1215	956	1430	166	369	1411
CHE	647	0	899	548	540	716	437	624	109	229	576
DEU	1035	701	0	1838	1863	2198	967	1554	249	400	1713
DFS	787	461	954	0	1339	1524	845	1216	188	423	1047
FRA	713	448	747	542	0	1627	917	1315	151	459	1203
NLD	1083	681	1458	1104	820	0	995	1431	201	553	1177
AUS	814	352	553	460	502	761	0	942	116	588	662
GBR	1470	599	973	800	715	1151	697	0	177	447	1202
SVN	127	80	234	145	105	177	78	135	0	56	188
NZL	336	193	271	259	225	495	460	348	42	0	284
ITA	1146	506	942	752	606	922	481	991	157	238	0

HOL

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA
CAN	0	691	1567	910	1164	1163	924	1399	358	1408
CHE	565	0	684	422	488	586	384	573	204	536
DEU	823	506	0	1396	1596	1901	859	1368	351	1521
DFS	567	334	619	0	1178	1249	781	1074	402	903
FRA	705	406	650	464	0	1522	863	1261	425	1201
NLD	1034	553	1182	751	788	0	988	1417	547	1168
AUS	792	318	461	380	499	752	0	944	587	662
GBR	1444	534	817	618	711	1145	696	0	444	1202
NZL	328	174	232	229	223	487	459	347	0	284
ITA	1140	468	809	605	605	909	481	992	238	0

JER

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	DFS	NLD	AUS	NZL	CHE
CAN	0	58	9	161	66	22
DFS	44	0	13	75	75	39
NLD	7	9	0	15	13	7
AUS	161	49	16	0	188	25
NZL	67	52	12	174	0	22
CHE	20	38	4	24	20	0

JER

RDC

common bulls below diagonal
common three quarter sib group above diagonal

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      CAN  DEU  DFS  NOR  AUS  NZL  CAM
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  CAN    0    9  124    5   35   33    0
  DEU    9    0   42   10   22    5    0
  DFS  125   32    0  105  110   56    0
  NOR    5   10   81    0   51   11    0
  AUS   32   22   84   42    0   38    8
  NZL   30    5   53   10   35    0    2
  CAM    0    0    0    0    8    2    0
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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  109    5   35   32    0
  DEU    8    0   36   10   22    5    0
  DFS  109   30    0   98  110   56    0
  NOR    5   10   74    0   48   10    0
  AUS   32   22   84   39    0   38    8
  NZL   30    5   53    9   35    0    2
  CAM    0    0    0    0    8    2    0
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SIM
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SIM
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