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:

DFS (ALL)   Change in lactation weights for all traits and breeds
FRA (ALL)   Evaluation now performed by a new genetic centre, GENEVAL
NOR (RDC)   Testing an animal model for MSP. New data extraction pipeline, genetic groups, evaluation and EDC by Mix99, change of genetic base,
                change of genetic merit from T+ to B+.
CHE (HOL)   Correction in the software used for preparing the data, milking speed observations have been assigned to cows that actually
                did not have it. This error has now been corrected. As a consequence many bulls loose data. Only observations made from 2005
  or earlier were affected by this.
CHE (ALL)   Decrease of information due to continuous work on the raw data by herd-book organizations and joined data from two databases (for
                HOL-CHE and SIM-CHE).
NZL (ALL)   Continues DNA parentage testing resulting in pedigree editing.
SVN (ALL)   Pedigree updates and phenotypic data improvements

INTERBULL CHANGES COMPARED TO THE DECEMBER 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 2018).
Number of records for milking speed by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			6190	1187	485	
BEL						
CAN	177		11844	647	795	
CHE	2602		2978	51		
CZE						
DEA	4023					
DEU			18193		255	
DFS			11566	1920	6476	
ESP						
EST						
FRA	333		16456			
FRM						
GBR			5431			
HUN						
IRL						
ISR						
ITA	1929		6672			
JPN						
KOR						
LTU						
LVA						
NLD	106		13109	25		
NOR					3817	
NZL			5885	3745	561	
POL						
PRT						
SVK						
SVN	278		457			
URY						
USA						
ZAF						
HRV						
MEX						
CAM					31	
No.Records	9448		98781	7575	12420	
Pub. Proofs	8016	0	86379	7041	12001	0

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

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BSW   msp

	CAN	CHE	DEA	ITA	NLD	SVN	FRA
CAN	7.58						
CHE	0.93	15.69					
DEA	0.89	0.96	11.71				
ITA	0.91	0.95	0.93	17.78			
NLD	0.93	0.95	0.94	0.93	6.41		
SVN	0.87	0.90	0.91	0.94	0.87	24.25	
FRA	0.94	0.93	0.86	0.90	0.95	0.86	0.86

HOL   msp

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	SVN	NZL	ITA
CAN	7.63										
CHE	0.90	12.47									
DEU	0.91	0.97	11.52								

DFS	0.94	0.94	0.97	14.57						
FRA	0.94	0.97	0.96	0.96	1.08					
NLD	0.95	0.97	0.96	0.97	0.98	5.58				
AUS	0.91	0.92	0.89	0.90	0.93	0.93	3.54			
GBR	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.14		
SVN	0.86	0.86	0.86	0.85	0.85	0.86	0.86	0.85	23.48	
NZL	0.91	0.90	0.87	0.87	0.93	0.92	0.94	0.85	0.86	0.37
ITA	0.94	0.93	0.93	0.95	0.96	0.95	0.94	0.85	0.85	0.92	7.10

HOL   tem

	CAN	CHE	DEU	DFS	FRA	NLD	AUS	GBR	NZL	ITA
CAN	6.95									
CHE	0.70	10.87								
DEU	0.85	0.78	12.01							
DFS	0.78	0.83	0.87	13.21						
FRA	0.71	0.90	0.81	0.92	0.98					
NLD	0.86	0.73	0.88	0.87	0.81	4.99				
AUS	0.74	0.71	0.72	0.77	0.76	0.79	3.07			
GBR	0.70	0.79	0.71	0.80	0.86	0.71	0.72	0.14		
NZL	0.70	0.70	0.71	0.70	0.70	0.70	0.74	0.70	0.34	
ITA	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	7.26

JER   msp

	CAN	DFS	NLD	AUS	NZL	CHE
CAN	8.16					
DFS	0.91	14.36				
NLD	0.94	0.97	4.63			
AUS	0.86	0.86	0.90	3.31		
NZL	0.87	0.86	0.91	0.88	0.32	
CHE	0.92	0.95	0.96	0.87	0.88	11.93

RDC   msp

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.72						
DEU	0.91	9.15					
DFS	0.95	0.93	13.51				
NOR	0.90	0.88	0.98	14.70			
AUS	0.87	0.86	0.87	0.86	4.36		
NZL	0.90	0.88	0.89	0.91	0.90	0.41	
CAM	0.90	0.90	0.90	0.90	0.88	0.90	7.82

RDC   tem

	CAN	DEU	DFS	NOR	AUS	NZL	CAM
CAN	6.46						
DEU	0.83	9.90					
DFS	0.75	0.81	11.11				
NOR	0.77	0.72	0.93	17.70			
AUS	0.70	0.71	0.72	0.72	3.44		
NZL	0.71	0.72	0.73	0.72	0.79	0.40	
CAM	0.74	0.74	0.74	0.74	0.72	0.74	7.24

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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

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         CAN   CHE   DEA   ITA   NLD   SVN   FRA
--------------------------------------------------------------------------------
   CAN     0    96   104    97    34    17    63
   CHE    78     0   512   399    56    42   144
   DEA    88   429     0   550    81    64   175
   ITA    81   341   454     0    72    58   154
   NLD    28    53    72    56     0    23    51
   SVN    14    41    59    57    22     0    33
   FRA    55   108   129   123    41    31     0
--------------------------------------------------------------------------------
BSW
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GUE
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GUE
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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   736  1761  1070  1247  1157   918  1358   149   356  1355
   CHE   612     0   855   518   508   685   420   592   100   225   553
   DEU   948   657     0  1779  1789  2120   934  1498   227   386  1683
   DFS   738   437   889     0  1295  1467   820  1188   174   414  1039
   FRA   662   420   678   508     0  1581   889  1277   137   449  1190
   NLD  1009   648  1348  1033   766     0   966  1392   184   541  1163
   AUS   777   340   520   437   479   732     0   911   104   574   656
   GBR  1390   566   910   762   673  1103   663     0   164   435  1177
   SVN   117    77   211   138    95   163    75   126     0    52   173
   NZL   324   190   259   253   219   485   449   339    39     0   285
   ITA  1056   486   892   717   562   868   463   935   144   239     0
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HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN   CHE   DEU   DFS   FRA   NLD   AUS   GBR   NZL   ITA
--------------------------------------------------------------------------------
   CAN     0   647  1514   890  1117  1106   888  1327   346  1246
   CHE   528     0   638   413   455   553   367   540   200   491
   DEU   760   464     0  1362  1536  1831   824  1322   338  1438
   DFS   542   327   582     0  1153  1225   759  1061   397   926
   FRA   654   377   590   441     0  1476   835  1226   415  1209
   NLD   961   517  1087   724   737     0   957  1380   534  1137
   AUS   758   306   433   362   477   723     0   914   573   688
   GBR  1368   500   768   601   669  1097   664     0   434  1148
   NZL   317   171   223   226   217   477   449   339     0   315
   ITA   892   419   718   575   553   799   457   867   253     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
--------------------------------------------------------------------------------
   CAN     0    59     9   152    64    22
   DFS    44     0    11    75    75    39
   NLD     7     7     0    14    13     7
   AUS   153    48    15     0   182    24
   NZL    66    52    12   170     0    22
   CHE    20    38     4    23    20     0
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JER
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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
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   CAN    0    9  118    5   34   33    0
   DEU    9    0   40   10   22    5    0
   DFS  118   31    0  105  106   54    0
   NOR    5   10   81    0   50   10    0
   AUS   31   22   80   42    0   35    8
   NZL   30    5   52    9   32    0    1
   CAM    0    0    0    0    8    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  102    5   34   32    0
   DEU    8    0   33   10   21    5    0
   DFS  101   28    0   94  106   54    0
   NOR    5   10   70    0   45    9    0
   AUS   31   21   80   37    0   35    8
   NZL   30    5   52    8   32    0    1
   CAM    0    0    0    0    8    1    0
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SIM
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SIM
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