Introduction

The latest routine international evaluation for workability traits took place as
scheduled at the Interbull Centre. Data from six (6) countries were included
in this evaluation.

International genetic evaluations for workability traits of bulls from
Austria-Germany, Canada, Denmark-Finland-Sweden, France, Italy, Netherlands, Norway
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:

DEA (BSW, SIM) Base change
SVN (HOL, BSW) Changes in pedigree completeness and phenotypic data improvement
CHE (BSW)   Pedigree chnages and slight changes in definition of contemporary groups (herd*3
year period,
                starting with the most recent year with data)
CHE (HOL)   Change in type of proofs and publication rules
FRA (BSW)   First time participating

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
in the 01x-proof file.

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 2015).
Number of records for milking speed by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			5796	1115	438	
BEL						
CAN	158		10557	537	731	
CHE	2427		2619			
CZE						
DEA	3709					
DEU			18627		344	
DFS			10948	1761	5965	
ESP						
EST						
FRA	293		15393			
FRM						
FRR						
GBR			4744			
HUN						
IRL						
ISR						
ITA	1706					
JPN						
KOR						
LTU						
LVA						
NLD	93		12093	24		
NOR					3441	
NZL			5116	3357	527	
POL						
PRT						
SVK						
SVN	235		325			
URY						
USA						
ZAF						
HRV						
==
| No.Records | 8621 | | 86218 | 6794 | 11446 | |
| Pub. Proofs | 7412 | 0 | 77138 | 6357 | 11060 | 0 |
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^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	7.47						
CHE	0.93	15.83					
DEA	0.92	0.96	11.74				
ITA	0.92	0.94	0.92	14.76			
NLD	0.93	0.94	0.95	0.92	6.30		
SVN	0.89	0.89	0.89	0.96	0.88	25.29	
FRA	0.92	0.92	0.86	0.89	0.95	0.86	0.91

```
HOL     msp
--------------------------------------------------------------------------------
        CAN     CHE     DEU     DFS     FRA     NLD     AUS     GBR     SVN     NZL
CAN     7.58
CHE     0.88    12.15
DEU     0.91    0.97    13.74
DFS     0.94    0.95    0.97    14.80
FRA     0.93    0.97    0.96    0.97    1.09
NLD     0.95    0.97    0.96    0.98    0.98    5.60
AUS     0.89    0.88    0.88    0.89    0.91    0.91    3.56
GBR     0.85    0.85    0.85    0.85    0.85    0.85    0.86    0.15
SVN     0.86    0.86    0.86    0.86    0.86    0.86    0.86    0.86    23.20
NZL     0.91    0.89    0.88    0.88    0.92    0.92    0.94    0.85    0.87    0.37


--------------------------------------------------------------------------------
HOL     tem
--------------------------------------------------------------------------------
        CAN     CHE     DEU     DFS     FRA     NLD     AUS     GBR     NZL
CAN     6.96
CHE     0.70    11.20
DEU     0.86    0.82    8.68
DFS     0.79    0.83    0.82    13.22
FRA     0.73    0.90    0.80    0.91    1.00
NLD     0.85    0.73    0.84    0.88    0.82    4.94
AUS     0.70    0.71    0.70    0.72    0.71    0.74    3.06
GBR     0.70    0.81    0.73    0.81    0.86    0.71    0.70    0.15
NZL     0.70    0.71    0.71    0.71    0.70    0.74    0.78    0.70    0.37


--------------------------------------------------------------------------------
JER     msp
--------------------------------------------------------------------------------
        CAN     DFS     NLD     AUS     NZL
CAN     8.63
DFS     0.90    14.39
NLD     0.94    0.97    4.68
AUS     0.86    0.87    0.92    3.36
NZL     0.87    0.86    0.91    0.90    0.33


--------------------------------------------------------------------------------
RDC     msp
--------------------------------------------------------------------------------
        CAN     DEU     DFS     NOR     AUS     NZL
CAN     6.53
DEU     0.91    10.01
DFS     0.97    0.96    13.65
NOR     0.92    0.91    0.95    13.39
AUS     0.88    0.88    0.90    0.87    4.39
NZL     0.92    0.88    0.91    0.91    0.92    0.41


--------------------------------------------------------------------------------
RDC     tem
--------------------------------------------------------------------------------
        CAN     DEU     DFS     NOR     AUS     NZL
CAN     6.43
DEU     0.85    4.96
DFS     0.79    0.80    11.20
NOR     0.84    0.78    0.94    14.05
AUS     0.71    0.72    0.72    0.75    3.35
NZL     0.72    0.72    0.75    0.75    0.77    0.44
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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   87   92   76   32   15   60
   CHE   73    0  462  299   50   32  134
   DEA   81  380    0  460   72   49  160
   ITA   65  235  368    0   66   45  130
   NLD   25   46   62   50    0   21   47
   SVN   13   33   47   44   20    0   28
   FRA   54  100  119  102   38   27    0
 --------------------------------------------------------------------------
HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  DEU  DFS  FRA  NLD  AUS  GBR  SVN  NZL
 --------------------------------------------------------------------------
   CAN    0  613 1623  919 1065  961  812 1148  103  321
   CHE  486    0  751  451  412  593  361  504   74  197
   DEU  708  550    0 1786 1655 1951  881 1350  162  377
   DFS  560  365  701    0 1190 1319  744 1057  133  381
   FRA  526  346  517  406    0 1405  801 1149   99  419
   NLD  778  558 1081  829  621    0  885 1236  141  505
   AUS  642  277  422  349  390  628    0  827   83  544
   GBR 1109  487  733  616  569  914  553    0  125  399
   SVN   82   57  142  109   68  118   53   97    0   41
   NZL  280  161  221  213  189  438  406  294   31    0
 --------------------------------------------------------------------------
HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  DEU  DFS  FRA  NLD  AUS  GBR  NZL
 --------------------------------------------------------------------------
   CAN    0  516 1320  797  931  916  779 1112  309
   CHE  395    0  520  353  361  457  306  447  169
   DEU  506  349    0 1339 1342 1645  773 1170  331
   DFS  443  280  458    0 1074 1131  703  979  369
   FRA  517  301  425  370    0 1300  748 1094  385
   NLD  742  422  831  630  593    0  880 1230  501
   AUS  620  241  330  301  388  621    0  827  543
   GBR 1080  413  577  514  565  916  552    0  396
   NZL  272  140  183  197  187  432  405  293    0
 --------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  DFS  NLD  AUS  NZL
 --------------------------------------------------------------------------
   CAN    0   53    8  132   57
   DFS   38    0   10   68   69
   NLD    6    6    0   13   12
   AUS  131   42   13    0  168
   NZL   61   49   11  159    0
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RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN   DEU   DFS   NOR   AUS   NZL
------------------------------------------------------------------------------
   CAN     0     7    85     4    32    29
   DEU     7     0    38    10    18     4
   DFS    82    28     0    80    87    50
   NOR     4    10    61     0    39    10
   AUS    29    17    65    33     0    33
   NZL    26     4    48     9    30     0
------------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN   DEU   DFS   NOR   AUS   NZL
------------------------------------------------------------------------------
   CAN     0     4    78     4    32    28
   DEU     4     0    18     6    13     2
   DFS    73    12     0    82    90    49
   NOR     4     5    63     0    36     9
   AUS    29    12    67    30     0    33
   NZL    26     2    47     8    30     0
------------------------------------------------------------------------------
```