INTRODUCTION

The latest routine international evaluation for **calving traits** took place as scheduled at the Interbull
Centre. Data from seventeen (17) countries were included in this evaluation.

International genetic evaluations for calving traits of bulls from
Australia, Austria-Germany, Belgium, Canada, Denmark-Finland-Sweden,
France, Germany, Hungary, Ireland, Israel, Italy, Netherlands, Norway,
Switzerland, the United Kingdom, Slovak Republic and the United States of America were computed.
Brown Swiss, Holstein, and Red Dairy Cattle breed data were included in this evaluation.

CHANGES IN NATIONAL PROCEDURES

Changes in the national genetic evaluation of calving traits are as follows:

NLD ALL   Re-estimation of new parameters

NZL ALL   New Zealand has continuous DNA parentage testing therefore daughter counts,
             herd counts, edc and reliability are subjected to changes

DEU ALL   Base change

CHE BSW/HOL Use of new software (MiX99) for estimation of breeding values and corresponding
             reliabilities
             Base change

CHE SIM   Base change

FRA HOL   Inclusion of FRR population in HOLFRA
             Base change

FRA BSW/SIM Base change

NOR RDC   The rolling definition of hys is causing the daughters to distribute somewhat differently
             over hys-classes at each evaluation. Therefore some bulls occasionally may lose EDC
although the
             number of daughters stay the same. Reliability changes is a function of the EDC changes

ITA HOL   Base change + one year cut-off data

DEA BSW   Base change

CAN ALL   Base change

AUS ALL   Base change

BEL ALL   Correction of an error in mce for calculation of number of herds and progenies.

INTERBULL CHANGES COMPARED TO THE DECEMBER ROUTINE RUN

Subsetting:

As decided by the ITC in Orlando, new sub-setting was introduced in the September test run. Sub-
setting is necessary for operational purposes and restrictions of time scales. To minimize the effect
of sub-setting, 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

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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 TEST RUN
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Test evaluation results are meant for review purposes only and should not be published.
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^LTable 1. National evaluation data considered in the Interbull evaluation for calving (April Routine Evaluation 2017).
Number of records for direct calving ease by breed

Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			2313			
BEL			722			
CAN	132		11650		443	
CHE	1747		2027			
CZE						
DEA	5055					
DEU			17729		234	
DFS			9899		6109	
ESP						
EST						
FRA	300		11516			
FRM						
GBR			2303			
HUN			1605			
IRL			1834		58	
ISR			375			
ITA			9270			
JPN						
KOR						
LTU						
LVA						
NLD	76		13020		28	
NOR					3664	
NZL			6634		1027	
POL						
PRT						
SVK			622			
SVN						
URY						
USA	502		33316			
ZAF						
HRV						
MEX						
===						
No.Records	7812		124835		11563	
Pub. Proofs	8287	0	116681	0	11825	0

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^LAPPENDIX I. Sire standard deviations in diagonal and genetic correlations below diagonal
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--------------------------------------------------------------------------------
BSW     dce
--------------------------------------------------------------------------------
          DEA     NLD     USA     CHE     CAN     FRA
DEA      9.79
NLD      0.90    6.99
USA      0.78    0.81    0.12
CHE      0.93    0.94    0.79   12.26
CAN      0.86    0.95    0.86    0.95    7.73
FRA      0.80    0.90    0.85    0.85    0.89    0.74


--------------------------------------------------------------------------------
BSW     mce
--------------------------------------------------------------------------------
          DEA     NLD     USA     CHE     CAN     FRA
DEA     10.83
NLD      0.82    6.04
USA      0.78    0.79    0.14
CHE      0.89    0.83    0.88   16.15
CAN      0.61    0.80    0.85    0.76    6.01
FRA      0.90    0.83    0.90    0.96    0.85    0.90


--------------------------------------------------------------------------------
HOL     dce
--------------------------------------------------------------------------------
          AUS     CAN     CHE     DFS     FRA     ISR     ITA     NLD     USA     GBR     HUN     DEU
BEL      IRL     NZL     SVK
AUS      3.03
CAN      0.81    6.48
CHE      0.75    0.94   10.45
DFS      0.79    0.93    0.89   11.92
FRA      0.80    0.95    0.95    0.92    0.93
ISR      0.80    0.91    0.87    0.86    0.88    2.89
ITA      0.67    0.77    0.77    0.76    0.74    0.78    7.24
NLD      0.83    0.96    0.92    0.92    0.93    0.87    0.76    7.33
USA      0.73    0.87    0.84    0.83    0.89    0.84    0.72    0.82    0.13
GBR      0.80    0.79    0.78    0.77    0.78    0.81    0.72    0.83    0.72    0.07
HUN      0.69    0.77    0.78    0.74    0.73    0.79    0.74    0.75    0.72    0.74    1.25
DEU      0.79    0.88    0.87    0.88    0.91    0.82    0.74    0.90    0.80    0.78    0.74   11.36
BEL      0.65    0.77    0.77    0.73    0.72    0.79    0.72    0.74    0.72    0.72    0.74    0.73
10.44
IRL      0.68    0.85    0.80    0.82    0.82    0.89    0.70    0.83    0.77    0.71    0.72    0.76
0.71    1.49
NZL      0.69    0.78    0.78    0.81    0.77    0.79    0.74    0.80    0.75    0.74    0.74    0.77
0.72    0.82    3.12
SVK      0.72    0.78    0.79    0.78    0.77    0.83    0.78    0.78    0.77    0.79    0.78    0.77
0.78    0.79    0.78   12.71


--------------------------------------------------------------------------------
HOL     mce
--------------------------------------------------------------------------------
          CAN     CHE     DFS     FRA     ISR     ITA     NLD     USA     GBR     HUN     DEU     BEL
SVK
CAN      6.50
CHE      0.87   13.50
DFS      0.82    0.71   12.32
FRA      0.92    0.97    0.77    1.31
ISR      0.78    0.71    0.78    0.75    2.63
ITA      0.81    0.86    0.58    0.84    0.69    9.38
NLD      0.83    0.79    0.84    0.83    0.67    0.60    5.32
USA      0.89    0.89    0.76    0.95    0.80    0.82    0.82    0.15
GBR      0.65    0.79    0.58    0.79    0.65    0.67    0.65    0.72    0.04
HUN      0.55    0.56    0.55    0.55    0.59    0.55    0.56    0.55    0.56    1.25
DEU      0.86    0.75    0.91    0.79    0.75    0.68    0.80    0.78    0.63    0.55   11.08
BEL      0.69    0.66    0.75    0.74    0.63    0.57    0.77    0.68    0.61    0.56    0.73   11.18
SVK      0.56    0.58    0.56    0.56    0.65    0.56    0.56    0.56    0.57    0.56    0.56    0.58
15.75
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--------------------------------------------------------------------------------
HOL     dsb
--------------------------------------------------------------------------------
        AUS     CAN     CHE     DFS     FRA     ISR     ITA     NLD     USA     HUN     DEU
AUS     3.04
CAN     0.62    7.93
CHE     0.44    0.48    16.07
DFS     0.73    0.87    0.45    12.83
FRA     0.43    0.74    0.55    0.65    0.75
ISR     0.76    0.74    0.47    0.74    0.55    1.79
ITA     0.77    0.60    0.36    0.69    0.43    0.59    7.24
NLD     0.44    0.77    0.72    0.69    0.66    0.56    0.35    4.28
USA     0.41    0.74    0.59    0.63    0.69    0.51    0.38    0.63    0.07
HUN     0.76    0.53    0.37    0.53    0.38    0.73    0.54    0.36    0.39    1.10
DEU     0.58    0.74    0.54    0.80    0.60    0.80    0.49    0.69    0.59    0.45    11.09


--------------------------------------------------------------------------------
HOL     msb
--------------------------------------------------------------------------------
        CAN     CHE     DFS     FRA     ISR     ITA     NLD     USA     HUN     DEU
CAN     6.42
CHE     0.85    19.52
DFS     0.95    0.83    11.64
FRA     0.89    0.83    0.87    0.92
ISR     0.89    0.83    0.87    0.81    1.76
ITA     0.53    0.58    0.50    0.55    0.68    9.38
NLD     0.92    0.79    0.94    0.81    0.81    0.51    4.23
USA     0.88    0.82    0.82    0.87    0.81    0.51    0.77    0.13
HUN     0.54    0.54    0.51    0.52    0.53    0.48    0.52    0.49    1.22
DEU     0.95    0.83    0.96    0.84    0.89    0.53    0.92    0.80    0.51    11.58


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RDC     dce
--------------------------------------------------------------------------------
        CAN     DFS     NOR     NLD     DEU     IRL     NZL
CAN     6.52
DFS     0.93    11.26
NOR     0.89    0.96    15.07
NLD     0.96    0.93    0.92    5.12
DEU     0.88    0.89    0.92    0.90    11.11
IRL     0.86    0.83    0.84    0.84    0.77    0.89
NZL     0.79    0.81    0.80    0.81    0.79    0.83    2.72


--------------------------------------------------------------------------------
RDC     mce
--------------------------------------------------------------------------------
        CAN     DFS     NOR     DEU
CAN     6.92
DFS     0.80    12.19
NOR     0.73    0.79    17.04
DEU     0.84    0.84    0.81    9.30


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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
      DEA  NLD  USA  CHE  CAN  FRA
 --------------------------------------------------------------------------------
  DEA    0   52  166  437   74  168
  NLD   39    0   20   31   13   33
  USA  118   17    0  187   90   71
  CHE  352   29  140    0   73  115
  CAN   49    7   69   49    0   44
  FRA  120   22   49   79   33    0
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```
--------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       DEA   NLD   USA   CHE   CAN   FRA
--------------------------------------------------------------------------------
   DEA    0    42    98   384    27   117
   NLD   33     0    17    25     7    22
   USA   82    14     0    90    21    44
   CHE  288    23    76     0    22    76
   CAN   19     4    17    16     0    18
   FRA   86    18    39    57    15     0
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HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS   CAN   CHE   DFS   FRA   ISR   ITA   NLD   USA   GBR   HUN   DEU   BEL   IRL   NZL   SVK
--------------------------------------------------------------------------------
   AUS    0   715   300   524   538    44   607   455   803   340   270   681   267   322   512   113
   CAN  706     0   562   986  1127    63  1472   788  2787   562   610  1841   355   399   595   248
   CHE  248   449     0   349   415    26   466   361   616   249   223   732   272   253   251   111
   DFS  383   672   265     0  1161    76  1215  1107  1442   602   469  1677   348   451   623   218
   FRA  424   766   360   546     0    74  1516  1204  1841   720   587  1802   420   475   631   252
   ISR   25    44    14    55    40     0    75    79    84    42    43    78    28    50    66    24
   ITA  453  1025   377   707   773    50     0  1117  2289   764   640  2031   390   480   679   260
   NLD  265   386   257   454   409    55   458     0  1513   632   426  1798   367   495   768   250
   USA  755  2813   514   822   918    68  1329   690     0   855   749  2627   389   522   865   307
   GBR  272   375   193   267   309    15   381   212   452     0   326   841   246   354   360   139
   HUN  194   496   162   297   348    28   444   202   586   185     0   755   206   236   294   155
   DEU  566  1276   617   965   882    61  1120  1000  1652   403   492     0   497   595   731   449
   BEL  261   349   270   300   435    17   360   318   358   205   165   500     0   262   242   100
   IRL  306   391   244   376   421    34   421   364   494   312   200   551   267     0   527   109
   NZL  481   531   214   405   377    50   491   577   792   197   189   566   212   473     0   151
   SVK   64   170    49   105   155    10   163   118   207    51    99   348    55    51    90     0
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HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN   CHE   DFS   FRA   ISR   ITA   NLD   USA   GBR   HUN   DEU   BEL   SVK
--------------------------------------------------------------------------------
   CAN    0   472   880   893    57  1105   611  1843   508   580  1568   251   201
   CHE  351     0   397   383    26   425   383   515   283   239   685   217    96
   DFS  658   332     0  1249    86  1186  1263  1422   572   582  2080   295   197
   FRA  561   333   544     0    75  1327  1153  1638   506   610  1895   330   195
   ISR   38    15    59    38     0    76    79    89    55    54    95    21    19
   ITA  769   346   740   615    46     0   962  1805   571   647  1841   298   210
   NLD  392   314   758   460    60   513     0  1215   474   500  1865   310   196
   USA 1677   422   937   742    68  1084   649     0   643   786  2419   291   246
   GBR  539   278   548   473    36   596   444   709     0   345   660   208   118
   HUN  488   179   393   352    33   479   301   658   318     0   834   182   147
   DEU  969   566  1170   789    70   996  1152  1429   697   564     0   379   308
   BEL  238   197   258   330     9   240   271   246   206   138   333     0    64
   SVK  139    42    95    99     8   136   107   170    66   107   217    28     0
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HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      AUS  CAN  CHE  DFS  FRA  ISR  ITA  NLD  USA  HUN  DEU
 ------------------------------------------------------------------------------
  AUS    0  693  298  524  470   44  605  617  754  205  677
  CAN  700    0  559  943  984   59 1439 1157 2508  489 1827
  CHE  246  449    0  350  402   26  465  533  578  189  734
  DFS  384  673  265    0 1021   78 1221 1343 1329  408 1691
  FRA  389  707  352  501    0   63 1342 1268 1443  472 1701
  ISR   25   43   14   55   38    0   75   85   80   35   78
  ITA  453 1022  377  712  687   50    0 1446 2148  536 2028
  NLD  531 1036  486  874  780   70  996    0 1760  462 2331
  USA  722 2596  481  778  716   66 1250 1318    0  583 2438
  HUN  150  384  135  256  282   26  368  311  437    0  635
  DEU  567 1282  619  969  845   61 1122 1848 1539  423    0
 ------------------------------------------------------------------------------
HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  CHE  DFS  FRA  ISR  ITA  NLD  USA  HUN  DEU
 ------------------------------------------------------------------------------
  CAN    0  469  863  822   56 1091  821 1656  468 1528
  CHE  350    0  405  376   26  424  496  477  207  678
  DFS  671  341    0 1150   88 1193 1518 1209  513 2091
  FRA  537  324  534    0   70 1237 1270 1256  505 1771
  ISR   38   15   61   36    0   76   90   81   44   95
  ITA  767  345  757  572   46    0 1200 1551  556 1827
  NLD  693  442 1077  650   68  775    0 1327  509 2264
  USA 1585  398  923  623   66 1042  969    0  589 2054
  HUN  387  153  347  295   27  402  354  514    0  718
  DEU  930  552 1174  728   70  972 1601 1294  475    0
 ------------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  DFS  NOR  NLD  DEU  IRL  NZL
 ------------------------------------------------------------------------------
  CAN    0  115    4    3   10    3   52
  DFS  114    0  108   21   56   17  111
  NOR    4   83    0   13   22   50   34
  NLD    3   21   12    0   11    7   10
  DEU   10   49   21   11    0    7   20
  IRL    3   14   49    6    7    0   10
  NZL   51   93   32   10   19   10    0
 ------------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  DFS  NOR  DEU
 ------------------------------------------------------------------------------
  CAN    0   74    3    7
  DFS   70    0  107   39
  NOR    3   80    0   13
  DEU    7   31   13    0
 ------------------------------------------------------------------------------
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