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

DFS HOL/RDC For calving traits Animal Model is introduced. Method for calculating of
            reliability and EDC has been changed. Sweden has registered calving ease
            both a two and a four step scale, and previous the results from the four
            step scale has been transformed to thee step scale. Changes is done for both
            HOL and RDC.

DEA BSW     few cases with a decrease of data is due to some corrections in the
             different data bases (parentage, culling reasons, breed percentages
             and so on). So that happens every evaluation and cannot be completely
             avoided.

ITA HOL      pedigree corrections and data editing causing decrease in information

DEU HOL/RDC  In general small decreases in number of daughters and/or herds are
             caused by data corrections. These decreases may also result
             in small decreases in reliability (-1).

CAN ALL      using pregnancy check data to determine conception dates when calculating the interval
between first service and conception, the overall impact is fairly
             small. In addition parameter were re-estimated which also included a much longer data
history than our previous estimated.
             For many of the traits there was a considerable drop in the heritability which resulted
changes in proofs, reliability

CHE BSW/HOL  Decreased numbers of daughters/EDC/herds are small and due to changes
             in rawdata.

CHE BSW       Change calculation of reliability for maternal traits: now the calculation is done
without consideration of the permanent environmental
              effect of the dam. As a consequence, reliabilities for the maternal traits increased.

NZL BSW/GUE  NZL has a continuous DNA parentage testing. This affects the daughter
    HOL/JER  counts, herd counts, EDCs and reliabilities.
    RDC



INTERBULL CHANGES COMPARED TO THE DECEMBER ROUTINE RUN
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Subsetting:
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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.
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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.


^LTable 1. National evaluation data considered in the Interbull
evaluation for calving (December Routine Evaluation 2016).
Number of records for direct calving ease by breed
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Country	BSW	GUE	HOL	JER	RDC	SIM
AUS			1900			
BEL			691			
CAN	135		11525		436	
CHE	1713		1977			
CZE						
DEA	5015					
DEU			17544		230	
DFS			9863		6090	
ESP						
EST						
FRA	296		11227			
FRM						
GBR			2227			
HUN			1580			
IRL			1811		58	
ISR			371			
ITA			9474			
JPN						
KOR						
LTU						
LVA						
NLD	79		12751		31	
NOR					3633	
NZL			6502		933	
POL						
PRT						
SVK			611			
SVN						
URY						
USA	496		33052			
ZAF						
HRV						
FRR						
===========						
No.Records	7734		123106		11411	
Pub. Proofs	8202	0	115741	0	11696	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      9.80
NLD      0.90     6.07
USA      0.78     0.80     0.12
CHE      0.92     0.92     0.79    13.13
CAN      0.86     0.95     0.86     0.95     8.29
FRA      0.81     0.90     0.85     0.85     0.89     0.75


--------------------------------------------------------------------------------------
BSW    mce
--------------------------------------------------------------------------------------
          DEA      NLD      USA      CHE      CAN      FRA
DEA     10.84
NLD      0.68     5.20
USA      0.79     0.84     0.15
CHE      0.91     0.79     0.88    17.25
CAN      0.61     0.81     0.84     0.74     6.08
FRA      0.91     0.81     0.89     0.95     0.84     0.92


--------------------------------------------------------------------------------------
HOL    dce
--------------------------------------------------------------------------------------
          AUS      CAN      CHE      DFS      FRA      ISR      ITA      NLD      USA      GBR      HUN      DEU
BEL      IRL      NZL      SVK
AUS      3.13
CAN      0.80     6.49
CHE      0.74     0.93    12.25
DFS      0.80     0.93     0.89    11.95
FRA      0.80     0.93     0.94     0.92     0.93
ISR      0.80     0.90     0.87     0.87     0.88     2.89
ITA      0.65     0.77     0.77     0.76     0.73     0.78     7.23
NLD      0.82     0.96     0.89     0.92     0.92     0.86     0.74     6.39
USA      0.72     0.87     0.83     0.83     0.89     0.83     0.70     0.81     0.13
GBR      0.80     0.77     0.78     0.76     0.78     0.81     0.71     0.82     0.70     0.07
HUN      0.68     0.77     0.78     0.72     0.72     0.79     0.73     0.73     0.70     0.73     1.26
DEU      0.79     0.88     0.87     0.88     0.91     0.82     0.74     0.89     0.79     0.78     0.74    11.48
BEL      0.63     0.77     0.77     0.72     0.70     0.80     0.70     0.70     0.70     0.71     0.73     0.73
10.66
IRL      0.67     0.85     0.79     0.82     0.82     0.89     0.68     0.81     0.76     0.69     0.70     0.76
0.69     1.50
NZL      0.68     0.77     0.77     0.81     0.77     0.79     0.73     0.77     0.75     0.73     0.73     0.76
0.70     0.81     3.12
SVK      0.72     0.78     0.79     0.78     0.78     0.83     0.78     0.78     0.77     0.79     0.78     0.77
0.78     0.79     0.78    12.56


--------------------------------------------------------------------------------------
HOL    mce
--------------------------------------------------------------------------------------
          CAN      CHE      DFS      FRA      ISR      ITA      NLD      USA      GBR      HUN      DEU      BEL
SVK
CAN      6.51
CHE      0.87    13.93
DFS      0.81     0.72    12.33
FRA      0.92     0.96     0.78     1.30
ISR      0.78     0.72     0.79     0.75     2.63
ITA      0.81     0.86     0.58     0.83     0.68     9.34
NLD      0.83     0.82     0.82     0.84     0.70     0.63     5.36
USA      0.89     0.89     0.77     0.95     0.81     0.82     0.84     0.15
GBR      0.65     0.79     0.59     0.80     0.67     0.68     0.68     0.72     0.04
HUN      0.55     0.56     0.55     0.55     0.60     0.55     0.56     0.55     0.56     1.25
DEU      0.86     0.75     0.91     0.79     0.76     0.68     0.79     0.78     0.63     0.55    11.18
BEL      0.69     0.64     0.75     0.71     0.64     0.56     0.76     0.68     0.61     0.56     0.72    11.01
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
15.70
```

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--------------------------------------------------------------------------------
HOL     dsb
--------------------------------------------------------------------------------
          AUS     CAN     CHE     DFS     FRA     ISR     ITA     NLD     USA     HUN     DEU
AUS      3.14
CAN      0.62    8.16
CHE      0.44    0.47   16.85
DFS      0.74    0.87    0.44   12.85
FRA      0.43    0.72    0.55    0.63    0.75
ISR      0.78    0.73    0.48    0.75    0.56    1.77
ITA      0.77    0.60    0.36    0.71    0.44    0.60    7.23
NLD      0.40    0.72    0.62    0.62    0.63    0.51    0.40    3.81
USA      0.40    0.74    0.59    0.62    0.68    0.51    0.39    0.60    0.07
HUN      0.75    0.53    0.37    0.52    0.39    0.73    0.55    0.39    0.40    1.10
DEU      0.60    0.73    0.54    0.80    0.59    0.81    0.50    0.63    0.59    0.46   11.24


--------------------------------------------------------------------------------
HOL     msb
--------------------------------------------------------------------------------
          CAN     CHE     DFS     FRA     ISR     ITA     NLD     USA     HUN     DEU
CAN      6.44
CHE      0.83   21.21
DFS      0.95    0.85   11.63
FRA      0.89    0.80    0.87    0.92
ISR      0.89    0.82    0.88    0.80    1.77
ITA      0.53    0.54    0.49    0.53    0.67    9.34
NLD      0.93    0.79    0.94    0.81    0.81    0.48    4.28
USA      0.88    0.80    0.80    0.83    0.81    0.50    0.76    0.13
HUN      0.54    0.54    0.50    0.49    0.53    0.49    0.50    0.48    1.22
DEU      0.94    0.82    0.96    0.84    0.89    0.53    0.91    0.79    0.51   11.68


--------------------------------------------------------------------------------
RDC     dce
--------------------------------------------------------------------------------
          CAN     DFS     NOR     NLD     DEU     IRL     NZL
CAN      6.52
DFS      0.93   11.26
NOR      0.89    0.96   14.48
NLD      0.95    0.92    0.92    4.69
DEU      0.87    0.89    0.92    0.89   11.29
IRL      0.86    0.83    0.85    0.82    0.77    0.94
NZL      0.79    0.84    0.80    0.79    0.79    0.82    2.73


--------------------------------------------------------------------------------
RDC     mce
--------------------------------------------------------------------------------
          CAN     DFS     NOR     DEU
CAN      6.80
DFS      0.80   12.20
NOR      0.75    0.79   16.54
DEU      0.85    0.84    0.81    9.35


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^LAPPENDIX II. Number of common bulls
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BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
     DEA  NLD  USA  CHE  CAN  FRA
 --------------------------------------------------------------------------
  DEA    0   55  164  430   76  168
  NLD   42    0   21   32   14   33
  USA  114   18    0  184   94   71
  CHE  344   30  139    0   77  115
  CAN   59   11   84   59    0   47
  FRA  120   22   49   79   41    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    58    95   378    29   116
  NLD   45     0    22    32     9    31
  USA   79    18     0    89    24    44
  CHE  283    28    75     0    25    74
  CAN   24     6    22    21     0    21
  FRA   85    24    39    56    19     0
-------------------------------------------------------------------------------
--------
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   560   258   463   495    42   536   410   641   314   256   560   236   297   448   103
  CAN  526     0   545   972  1098    62  1458   771  2717   539   602  1808   341   390   569   242
  CHE  218   434     0   342   395    25   459   359   600   238   220   710   265   246   235   110
  DFS  334   658   262     0  1130    76  1211  1087  1434   584   464  1665   340   444   602   214
  FRA  394   744   341   520     0    70  1505  1142  1806   706   574  1721   404   459   598   240
  ISR   24    43    14    55    38     0    73    79    83    42    42    78    28    50    63    24
  ITA  408   988   369   684   759    47     0  1126  2306   742   629  2004   383   471   651   258
  NLD  246   378   255   454   387    55   465     0  1481   620   417  1784   361   486   722   241
  USA  552  2733   495   807   895    67  1283   602     0   826   738  2598   373   512   829   301
  GBR  242   348   186   252   296    15   361   207   424     0   324   818   236   340   339   136
  HUN  188   491   161   294   344    28   442   203   578   183     0   742   204   233   283   152
  DEU  450  1236   594   948   810    61  1083   992  1621   379   489     0   485   584   695   438
  BEL  234   331   261   291   415    17   348   317   336   194   164   481     0   257   228    98
  IRL  285   382   239   371   408    34   409   360   484   295   200   542   258     0   505   106
  NZL  413   506   200   388   350    49   465   539   755   180   183   532   197   456     0   145
  SVK   54   168    49   104   145    10   162   114   205    50    98   340    55    49    85     0
-------------------------------------------------------------------------------
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   463   871   872    56  1090   648  1798   492   566  1548   235   195
  CHE  344     0   393   363    26   423   408   506   278   237   676   198    94
  DFS  646   325     0  1226    83  1191  1326  1408   554   571  2061   267   191
  FRA  542   315   520     0    74  1320  1206  1606   492   597  1820   286   180
  ISR   37    15    58    37     0    75    81    87    53    52    94    19    18
  ITA  743   341   726   598    46     0  1044  1793   559   639  1832   263   206
  NLD  428   331   797   467    59   546     0  1332   485   516  1991   288   202
  USA 1627   414   918   713    66  1045   708     0   625   768  2374   262   237
  GBR  523   270   536   460    35   581   465   685     0   332   640   181   111
  HUN  471   179   386   344    33   471   321   640   311     0   821   161   143
  DEU  941   555  1138   729    70   976  1214  1380   670   555     0   353   298
  BEL  222   183   237   283    10   220   251   224   184   127   312     0    56
  SVK  134    41    92    91     7   131   109   164    62   104   208    29     0
-------------------------------------------------------------------------------
```

```
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  396  178  331  305   26  379  372  444  136  394
  CAN  324    0  542  929  955   58 1419 1131 2441  489 1797
  CHE  133  434    0  343  383   25  458  520  565  189  712
  DFS  189  659  262    0  991   78 1217 1330 1321  408 1679
  FRA  204  684  333  475    0   59 1322 1211 1411  471 1624
  ISR   10   42   14   55   36    0   73   84   79   35   78
  ITA  213  985  369  689  667   47    0 1439 2146  535 2001
  NLD  258 1002  469  860  738   69  973    0 1749  462 2291
  USA  318 2518  463  762  692   65 1201 1293    0  581 2412
  HUN   72  384  135  256  281   26  368  311  435    0  635
  DEU  251 1242  596  952  775   61 1085 1782 1505  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  460  854  801   55 1070  798 1612  468 1509
  CHE  343    0  401  356   26  422  488  468  207  668
  DFS  657  334    0 1125   86 1196 1496 1195  513 2073
  FRA  520  307  508    0   68 1219 1217 1229  502 1697
  ISR   37   15   60   34    0   74   89   79   44   94
  ITA  740  340  743  552   46    0 1194 1526  558 1816
  NLD  668  433 1051  600   67  752    0 1295  506 2221
  USA 1538  389  904  599   64 1002  931    0  588 2011
  HUN  387  153  346  292   27  402  349  513    0  718
  DEU  909  542 1149  671   70  955 1554 1254  475    0
 -----------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  DFS  NOR  NLD  DEU  IRL  NZL
 -----------------------------------------------------------------------------
  CAN    0  114    4    3   10    3   45
  DFS  113    0  104   24   55   17   97
  NOR    4   78    0   14   21   50   31
  NLD    3   24   13    0   11    8    9
  DEU   10   49   21   11    0    7   18
  IRL    3   14   49    7    7    0   10
  NZL   45   83   29    9   17   10    0
 -----------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  DFS  NOR  DEU
 -----------------------------------------------------------------------------
  CAN    0   74    3    6
  DFS   70    0  107   38
  NOR    3   80    0   13
  DEU    6   30   13    0
 -----------------------------------------------------------------------------
```