

INTRODUCTION

The latest genomic routine international evaluation for females fertility traits took place as scheduled at the Interbull Centre. Data from 18 countries were included in this evaluation.

International genetic evaluations for female fertility traits of bulls from Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Netherlands, New Zealand, Norway, Poland, Spain, Sweden, Switzerland, South Africa, the United Kingdom and the United States of America were computed. Holstein data were included in this evaluation.

BEL, CAN, DEU, ESP, FRA, DFS, GBR, ITA, NLD, POL submitted GEBVs.

cc1: CAN, DEU, FRA, DFS, GBR, NLD, POL
cc2: BEL, CAN, DEU, ESP, FRA, DFS, GBR, ITA, NLD, POL
crc: BEL, CAN, DEU, ESP, FRA, DFS, GBR, ITA, NLD, POL
hco: CAN, DEU, DFS, POL
int: BEL, CAN, DEU, ESP, DFS, GBR, ITA, NLD, POL

Based on a decision made by Interbull Steering committee in August 2007, female fertility traits are classified as follows:

- T1 (HC): Maiden (H)eifer's ability to (C)onceive. A measure of confirmed conception, such as conception rate (CR), will be considered for this trait group. In the absence of confirmed conception an alternative measure, such as interval first-last insemination (FL), interval first insemination-conception (FC), number of inseminations (NI), or non-return rate (NR,preferably NR56) can be submitted;
T2 (CR): Lactating (C)ow's ability to (R)ecycle after calving. The interval calving-first insemination (CF) is an example for this ability. In the absence of such a trait, a measure of the interval calving-conception, such as says oprn (DO) or calving interval (CI) can be submitted;
T3 (C1): Lactating (C)ow's ability to conceive (1), expressed as a rate trait. Traits like conception rate (CR) and non-return rate (NR, preferably NR56) will be considered for this trait group;
T4 (C2): Lactating (C)ow's ability to conceive (2), expressed as an interval trait. The interval first insemination-conception (FC) or interval first-last insemination (FL) will be considered for this trait group. As an alternative, number of inseminations (NI) can be submitted. In the absence of any of these traits, a measure of interval calving-conception such as days open (DO), or calving interval (CI) can be submitted. All countries are expected to submit data for this trait group, and as a last resort the trait submitted under T3 can be submitted for T4 as well.
T5 (IT): Lactating cow's measurements of (I)nterval (T)raits calving-conception, such as days open (DO) and calving interval (CI).

Based on the above trait definitions the following traits have been submitted for international genetic evaluation of female fertility traits.

Country Traits Submitted traits and their definitions
AUS T2=CY Calving interval converted to 42 days pregnancy rate
T4=C2 Calving interval converted to 42 days pregnancy rate
T5=IT Calving interval converted to 42 days pregnancy rate
BEL T2=CY PR=Pregnancy Rate ([21/(DO-45+11)]*100, with DO=days open)
T4=C2 PR=Pregnancy Rate ([21/(DO-45+11)]*100, with DO=days open)
T5=IT PR=Pregnancy Rate ([21/(DO-45+11)]*100, with DO=days open)
CAN T1=HC NR=Non Return Rate after 56 Days in heifers (NRR), %
T2=CY CF=Interval from Calving to First Service in cows(CF)
T3=C1 NR=Non Return Rate after 56 Days in cows(NRR), %
T4=C2 FC=Interval first insemination-conception in cows
T5=IT DO=Days open

CHE T1=HC CR=Heifers' Conception rate
T2=CR CF=Interval from Calving to First Service (ICF), days
T3=C1 NR=Non Return Rate after 56 Days (NRR), %
T4=C2 NR=Non Return Rate after 56 Days (NRR), %

CZE T1=HC CR=Heifers' Conception rate (pregnant or not after 3 months)
T3=C1 CR=Cows' Conception rate (pregnant or not after 3 months)
T4=C2 CR=Cows' Conception rate (pregnant or not after 3 months)

AUT/DEU T1=HC NR=Heifers' Non Return Rate after 56 days
T2=CY CF=Interval from calving to first insemination cows (days)
T3=C1 NR=Cows' Non Return Rate after 56 days
T4=C2 FL=Interval from first to last insemination cows (days)
T5=IT DO=Days open (days)

DFS T1=HC NR=Heifers' Non Return Rate after 56 days
T2=CY CF=Interval from calving to first insemination cows (days)
T3=C1 NR=Cows' Non Return Rate after 56 days
T4=C2 FL=Interval from first to last insemination cows (days)
T5=IT DO=Days open (days)

ESP T2=CY DO=Days open
T4=C2 DO=Days open
T5=IT DO=Days open

FRA T1=HC CR=Heifers' Conception rate (binary trait) for maiden heifers
T2=CY Interval between calving and first AI
T3=C1 CR=Cows' Conception rate (binary trait) for cows
T4=C2 FL=Interval from first to last insemination cows (days)

GBR T2=CY CI=days between 1st and 2nd calvings
T3=C1 NR=1st lactation non return at 56 days
T4=C2 CI=days between 1st and 2nd calvings
T5=IT CI=days between 1st and 2nd calvings

IRL T2=CY CI=Calving interval
T4=C2 CI=Calving interval
T5=IT CI=Calving interval

ISR T3=C1 CR=Inverse of the number of insemination to conception (%)
T4=C2 CR=Inverse of the number of insemination to conception (%)

ITA T2=CY CF=Days to first service
T3=C1 NR=Non-return rate at 56 days (%)
T4=C2 CI=Calving Interval (days)
T5=IT CI=Calving interval (days)

ITA (BSW) T2=CY CF=Interval calving to first insemination
T4=C2 Days Open
T5=IT CI=Calving interval

NLD T1=HC CR=Heifers' Conception rate
T2=CY CF=Interval calving to first insemination (days)
T3=C1 CR=Cows' Conception rate (binary trait) for cows
T4=C2 FL=Interval from first to last insemination cows (days)
T5=IT CI=Calving Interval (days)

NOR T1=HC NR=NR=Non-return rate 56 days (heifers)
T2=CY CF=Interval calving to first insemination (days)
T3=C1 NR=NR=Non-return rate 56 days (cows)
T4=C2 CI=Calving Interval (days)
T5=IT CI=Calving Interval (days)

NZL T2=CY PM=Lactating cow's ability to start cycling
T4=C2 PC=Lactating cow's ability to conceive (CR42)
T5=IT PC=Lactating cow's ability to conceive (CR42)

POL T1=HC Non return rate at 56 days for heifer
T2=CR Interval from calving to first insemination
T3=C1 Non return rate at 56 days for cows

T4=IT Days open
T5=IT Days open

USA T1=HC CR=Conception rate (heifer)
T2=CY CF=Interval from calving to first insemination
T3=C1 CR=Conception rate (cow)
T4=C2 DP=Daughter Pregnancy Rate
T5=IT DP=Daughter Pregnancy Rate

ZAF T4=IT CI=Calving Interval
T5=IT CI=Calving Interval

CHANGES IN NATIONAL PROCEDURES

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

DEU (HOL) Optimization of the SNP BLUP genomic model and update of genomic reliabilities. Many bulls missing compared to the previous run due to a new editing in the national genomic evaluation.
Base change

CAN (HOL) Update of reliability calculations
Corrected status of about 7500 bulls from 0 to 10

FRA (HOL) -Base change
-corrected proofs status and bull status for some records

DFS (HOL) -corrected proofs status and bull status for some records

NLD (HOL) -corrected proofs status for some records

INTERBULL CHANGES COMPARED TO THE DECEMBER ROUTINE RUN

No changes in Interbull procedures

DATA AND METHOD OF ANALYSIS

Eleven Holstein populations sent GEBV data for up to 38 traits, while classical EBVs for the same traits were used in the analyses. Young bull GEBVs from the GEBV providers have been converted to the scales of all countries participating in classical MACE. A bull will get a MACE EBV or a GMACE EBV but not both.

From those eleven countries, National GEBVs of bulls less than seven years of age and with no classical MACE proofs were included for the breeding value prediction with a further requirement of either a MACE-PA or a GMACE-PA (for young genomic bulls with young genomic sires) being available.

SCIENTIFIC LITERATURE

The international genetic evaluation procedure is based on international work described in the following scientific publications:

VanRaden, P.M. and Sullivan, P.G. 2010. International genomic evaluation methods for dairy cattle. Gen. Sel. Evol. 42:7

Sullivan, P.G. and Jakobsen, J.H. 2012. Robust GMACE for young bulls methodology. Interbull Bulletin 45, Article 1.

Sullivan, P.G. 2012a. GMACE reliability approximation. Report to the GMACE working group of Interbull. GMACE_rels 2013

Sullivan, P.G. 2012b. GMACE variance estimation. Report to the GMACE working group of Interbull. GMACE_vce 2013

Sullivan, P.G. 2012c. GMACE Weighting Factors. Report to the GMACE working group of Interbull. GMACE_gedcs 2013

NEXT ROUTINE INTERNATIONAL EVALUATION

 Dates for next routine run can be found on <http://www.interbull.org/ib/servicecalendar>

NEXT TEST INTERNATIONAL EVALUATION

 Dates for next routine run can be found on <http://www.interbull.org/ib/servicecalendar>

PUBLICATION OF INTERBULL ROUTINE RUN

 Results were distributed by the Interbull Centre to designated representatives in each country. The international evaluation file comprised international proofs expressed on the base and unit of each country included in the analysis. Such records readily provide more information on bull performance in various countries, thereby minimising the need to resort to conversions.

At the same time, all recipients of Interbull results are expected to honour the agreed code of practice, decided by the Interbull Steering Committee, and only publish international evaluations on their own country scale. Evaluations expressed on another country scale are confidential and may only be used internally for research and review purposes.

Table 1. National evaluation dates in GMACE run April 2016

Country	Date
BEL	20160401
CAN	20160401
DEU	20160405
DFS	20160202
ESP	20160311
GBR	20160309
ITA	20160308
NLD	20160401
POL	20160215
FRA	20151204

Table 2.

Number of bulls in reference population for	hco
CAN	19225.0
DEU	1843.0 30752.0
DFS	1635.0 28837.0 29385.0
POL	139.0 2409.0 2522.0 2645.0

Number of bulls in reference population for crc

BEL	1951.0
CAN	1062.0 25759.0
DEU	872.0 1913.0 32334.0
DFS	792.0 1689.0 30365.0 31000.0
ESP	795.0 1646.0 29733.0 29540.0 30295.0
GBR	725.0 22892.0 1754.0 1557.0 1502.0 23149.0
ITA	663.0 21778.0 1269.0 1100.0 1119.0 21588.0 22100.0
NLD	871.0 1994.0 28315.0 27865.0 27346.0 1830.0 1328.0 29515.0
POL	175.0 139.0 2408.0 2521.0 2534.0 164.0 137.0 216.0 2644.0
FRA	821.0 1934.0 27234.0 26887.0 27047.0 1768.0 1302.0 24742.0 2471.0 28858.0

Number of bulls in reference population for ccl

CAN 25769.0
DEU 1906.0 30801.0
DFS 1681.0 28844.0 29403.0
FRA 1940.0 25942.0 25592.0 27462.0
GBR 22727.0 1744.0 1546.0 1759.0 22994.0
NLD 1997.0 26779.0 26271.0 23433.0 1817.0 27601.0
POL 139.0 2410.0 2522.0 2473.0 164.0 216.0 2646.0

Number of bulls in reference population for cc2

BEL 2371.0
CAN 1200.0 27676.0
DEU 882.0 1859.0 32155.0
DFS 793.0 1638.0 30182.0 30815.0
ESP 800.0 1615.0 29627.0 29431.0 30189.0
GBR 766.0 24679.0 1695.0 1503.0 1468.0 24920.0
ITA 672.0 23345.0 1266.0 1098.0 1116.0 23145.0 23587.0
NLD 888.0 1965.0 28132.0 27682.0 27239.0 1786.0 1339.0 29513.0
POL 175.0 139.0 2408.0 2521.0 2534.0 164.0 137.0 216.0 2644.0

Number of bulls in reference population for int

BEL 1626.0
CAN 746.0 26038.0
DEU 855.0 1767.0 31897.0
DFS 784.0 1557.0 29957.0 30589.0
ESP 785.0 1539.0 29411.0 29223.0 29971.0
GBR 720.0 24521.0 1629.0 1438.0 1411.0 24761.0
ITA 659.0 23274.0 1240.0 1072.0 1090.0 23080.0 23516.0
NLD 858.0 1865.0 27897.0 27458.0 27023.0 1720.0 1312.0 29232.0
POL 175.0 139.0 2408.0 2521.0 2534.0 164.0 137.0 216.0 2644.0