

INTRODUCTION

The latest genomic routine international evaluation for conformation traits took place as scheduled at the Interbull Centre. Data from twenty (22) countries were included in this evaluation.

International genetic evaluations for calving traits of bulls from Australia, Belgium, Canada, Switzerland, Czech Republic, Germany, Denmark-Finland-Sweden, Spain, France, United Kingdom, Hungary, Ireland, Italy, Japan, Korea, The Netherlands, Norway, New Zealand, Poland, South Africa, Estonia, Slovenia, Portugal and the United States of America were computed. Holstein data were included in this evaluation.

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

ang: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
bcs: , CAN, DEU, ESP, FRA, , , GBR, ITA, NLD, ,
bde: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
cwi: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
fan: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
ftl: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
ftp: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
fua: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
loc: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD,
ocs: BEL, CAN, DEU, ESP, FRA, AUS, , GBR, ITA, NLD, POL, HUN
ofl: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
ous: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
ran: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
rlr: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
rls: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
rtp: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL
ruh: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
rwi: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
sta: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
ude: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN
usu: BEL, CAN, DEU, ESP, FRA, , DFS, GBR, ITA, NLD, POL, HUN

CHANGES IN NATIONAL PROCEDURES

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

FRA (HOL) Evaluation now performed by a new genetic centre, GENEVAL

ESP (HOL) First participation with bcs

BEL (HOL) Changed the pedigree rules for the genomic evaluation, the pedigree is now reduced and limited to birth year of YYYY-15

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.

The parameter-space approach is used for the GMACE genetic evaluations (Sullivan, 2016)

SCIENTIFIC LITERATURE

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

- Sullivan, P.G. 2016. Defining a Parameter Space for GMACE. Interbull Bulletin 50, p 85-93.
- 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
- Jakobsen, J.H. and Sullivan, P.G. 2013. Trait specific computation of shared reference population. Reference sharing Nov 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 December 2018

| Country | Date |
|---------|----------|
| BEL | 20181201 |
| CAN | 20181201 |
| DEU | 20181204 |
| DFS | 20181106 |
| ESP | 20181113 |
| FRA | 20181205 |
| GBR | 20181105 |
| ITA | 20181116 |
| NLD | 20181201 |
| HUN | 20181119 |
| POL | 20181031 |

| | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|----------------|
| ITA | 1495.0 | 29052.0 | 3321.0 | 2512.0 | 2571.0 | 2720.0 | 27736.0 | 29419.0 | | |
| NLD | 1099.0 | 3195.0 | 32537.0 | 32443.0 | 32482.0 | 31187.0 | 3190.0 | 2634.0 | 34119.0 | |
| HUN | 564.0 | 1196.0 | 5811.0 | 5562.0 | 5686.0 | 5635.0 | 1178.0 | 1118.0 | 5790.0 | 6293.0 |
| POL | 1609.0 | 3443.0 | 28551.0 | 28761.0 | 28618.0 | 27380.0 | 3142.0 | 2844.0 | 28405.0 | 5712.0 30690.0 |

Number of bulls in reference population for hde

Number of bulls in reference population for fua

| | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|----------------|
| BEL | 2936.0 | | | | | | | | | |
| CAN | 1579.0 | 34444.0 | | | | | | | | |
| DEU | 1156.0 | 3804.0 | 36496.0 | | | | | | | |
| DFS | 980.0 | 3055.0 | 33867.0 | 34955.0 | | | | | | |
| ESP | 1091.0 | 3053.0 | 34008.0 | 33871.0 | 34808.0 | | | | | |
| FRA | 1165.0 | 3282.0 | 32296.0 | 32218.0 | 32245.0 | 34433.0 | | | | |
| GBR | 1149.0 | 28447.0 | 3812.0 | 3105.0 | 3060.0 | 3315.0 | 29661.0 | | | |
| ITA | 1496.0 | 29058.0 | 3321.0 | 2512.0 | 2571.0 | 2720.0 | 27741.0 | 29425.0 | | |
| NLD | 1123.0 | 3197.0 | 33654.0 | 33556.0 | 33595.0 | 32261.0 | 3267.0 | 2635.0 | 35693.0 | |
| HUN | 565.0 | 1196.0 | 5954.0 | 5704.0 | 5829.0 | 5771.0 | 1178.0 | 1118.0 | 5933.0 | 6437.0 |
| POL | 1610.0 | 3443.0 | 29612.0 | 29820.0 | 29679.0 | 28398.0 | 3142.0 | 2844.0 | 29463.0 | 5854.0 31754.0 |

Number of bulls in reference population for ruh

| | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|----------------|
| BEL | 2936.0 | | | | | | | | | |
| CAN | 1579.0 | 34444.0 | | | | | | | | |
| DEU | 1156.0 | 3804.0 | 36184.0 | | | | | | | |
| DFS | 980.0 | 3055.0 | 33550.0 | 34611.0 | | | | | | |
| ESP | 1091.0 | 3053.0 | 33696.0 | 33528.0 | 34470.0 | | | | | |
| FRA | 1165.0 | 3282.0 | 31991.0 | 31908.0 | 31941.0 | 34129.0 | | | | |
| GBR | 1149.0 | 28447.0 | 3812.0 | 3105.0 | 3060.0 | 3315.0 | 29661.0 | | | |
| ITA | 1496.0 | 29058.0 | 3321.0 | 2512.0 | 2571.0 | 2720.0 | 27741.0 | 29425.0 | | |
| NLD | 1123.0 | 3197.0 | 33343.0 | 33244.0 | 33285.0 | 31956.0 | 3267.0 | 2635.0 | 35381.0 | |
| HUN | 565.0 | 1196.0 | 5969.0 | 5719.0 | 5844.0 | 5786.0 | 1178.0 | 1118.0 | 5948.0 | 6452.0 |
| POL | 1610.0 | 3443.0 | 29749.0 | 29957.0 | 29816.0 | 28535.0 | 3142.0 | 2844.0 | 29599.0 | 5869.0 31891.0 |

Number of bulls in reference population for ruw

Number of bulls in reference population for usu

| | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|----------------|
| BEL | 2936.0 | | | | | | | | | |
| CAN | 1579.0 | 34445.0 | | | | | | | | |
| DEU | 1156.0 | 3804.0 | 37312.0 | | | | | | | |
| DFS | 980.0 | 3055.0 | 34677.0 | 35771.0 | | | | | | |
| ESP | 1091.0 | 3053.0 | 34822.0 | 34684.0 | 35630.0 | | | | | |
| FRA | 1165.0 | 3282.0 | 33085.0 | 33003.0 | 33036.0 | 35227.0 | | | | |
| GBR | 1149.0 | 28448.0 | 3812.0 | 3105.0 | 3060.0 | 3315.0 | 29662.0 | | | |
| ITA | 1496.0 | 29059.0 | 3321.0 | 2512.0 | 2571.0 | 2720.0 | 27742.0 | 29426.0 | | |
| NLD | 1123.0 | 3197.0 | 34452.0 | 34356.0 | 34395.0 | 33033.0 | 3267.0 | 2635.0 | 36493.0 | |
| HUN | 565.0 | 1196.0 | 6487.0 | 6239.0 | 6364.0 | 6278.0 | 1178.0 | 1118.0 | 6468.0 | 6973.0 |
| POL | 1610.0 | 3443.0 | 30413.0 | 30623.0 | 30482.0 | 29173.0 | 3142.0 | 2844.0 | 30261.0 | 6390.0 32558.0 |

Number of bulls in reference population for ude

| | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|--|--|--|--|--|
| BEL | 2899.0 | | | | | | | | | |
| CAN | 1577.0 | 34441.0 | | | | | | | | |
| DEU | 1156.0 | 3804.0 | 37311.0 | | | | | | | |
| DFS | 980.0 | 3055.0 | 34676.0 | 35770.0 | | | | | | |
| ESP | 1091.0 | 3053.0 | 34821.0 | 34683.0 | 35629.0 | | | | | |

| | | | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|--|
| FRA | 1165.0 | 3282.0 | 33085.0 | 33003.0 | 33036.0 | 35227.0 | | | | | | |
| GBR | 1130.0 | 28444.0 | 3812.0 | 3105.0 | 3060.0 | 3315.0 | 29165.0 | | | | | |
| ITA | 1495.0 | 29058.0 | 3321.0 | 2512.0 | 2571.0 | 2720.0 | 27741.0 | 29425.0 | | | | |
| NLD | 1100.0 | 3195.0 | 34451.0 | 34355.0 | 34394.0 | 33033.0 | 3190.0 | 2634.0 | 36040.0 | | | |
| HUN | 565.0 | 1196.0 | 6488.0 | 6240.0 | 6365.0 | 6279.0 | 1178.0 | 1118.0 | 6469.0 | 6974.0 | | |
| POL | 1610.0 | 3443.0 | 30413.0 | 30623.0 | 30482.0 | 29174.0 | 3142.0 | 2844.0 | 30261.0 | 6391.0 | 32558.0 | |

Number of bulls in reference population for ftp

| | | | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|--|
| BEL | 2936.0 | | | | | | | | | | | |
| CAN | 1579.0 | 34446.0 | | | | | | | | | | |
| DEU | 1156.0 | 3805.0 | 37267.0 | | | | | | | | | |
| DFS | 980.0 | 3056.0 | 34632.0 | 35726.0 | | | | | | | | |
| ESP | 1091.0 | 3053.0 | 34777.0 | 34639.0 | 35585.0 | | | | | | | |
| FRA | 1165.0 | 3283.0 | 33040.0 | 32958.0 | 32991.0 | 35182.0 | | | | | | |
| GBR | 1149.0 | 28449.0 | 3813.0 | 3106.0 | 3060.0 | 3316.0 | 29663.0 | | | | | |
| ITA | 1496.0 | 29060.0 | 3322.0 | 2513.0 | 2571.0 | 2721.0 | 27743.0 | 29427.0 | | | | |
| NLD | 1123.0 | 3197.0 | 34406.0 | 34310.0 | 34350.0 | 32987.0 | 3267.0 | 2635.0 | 36447.0 | | | |
| HUN | 565.0 | 1196.0 | 6487.0 | 6239.0 | 6364.0 | 6278.0 | 1178.0 | 1118.0 | 6468.0 | 6973.0 | | |
| POL | 1610.0 | 3444.0 | 30414.0 | 30624.0 | 30482.0 | 29174.0 | 3143.0 | 2845.0 | 30261.0 | 6390.0 | 32559.0 | |

Number of bulls in reference population for ftl

| | | | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|--|
| BEL | 2899.0 | | | | | | | | | | | |
| CAN | 1577.0 | 34431.0 | | | | | | | | | | |
| DEU | 1156.0 | 3806.0 | 37313.0 | | | | | | | | | |
| DFS | 980.0 | 3056.0 | 34677.0 | 35771.0 | | | | | | | | |
| ESP | 1091.0 | 3053.0 | 34821.0 | 34683.0 | 35629.0 | | | | | | | |
| FRA | 1165.0 | 3283.0 | 33086.0 | 33004.0 | 33036.0 | 35228.0 | | | | | | |
| GBR | 1130.0 | 28446.0 | 3814.0 | 3106.0 | 3060.0 | 3316.0 | 29167.0 | | | | | |
| ITA | 1495.0 | 29060.0 | 3323.0 | 2513.0 | 2571.0 | 2721.0 | 27743.0 | 29427.0 | | | | |
| NLD | 1100.0 | 3195.0 | 34451.0 | 34355.0 | 34394.0 | 33033.0 | 3190.0 | 2634.0 | 36040.0 | | | |
| HUN | 565.0 | 1196.0 | 6488.0 | 6240.0 | 6365.0 | 6279.0 | 1178.0 | 1118.0 | 6469.0 | 6974.0 | | |
| POL | 1610.0 | 3444.0 | 30414.0 | 30624.0 | 30482.0 | 29175.0 | 3143.0 | 2845.0 | 30261.0 | 6391.0 | 32559.0 | |

Number of bulls in reference population for rtp

| | | | | | | | | | | | | |
|-----|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--|--|
| BEL | 2916.0 | | | | | | | | | | | |
| CAN | 1579.0 | 31322.0 | | | | | | | | | | |
| DEU | 1154.0 | 3799.0 | 34979.0 | | | | | | | | | |
| DFS | 978.0 | 3049.0 | 32349.0 | 33349.0 | | | | | | | | |
| ESP | 1089.0 | 3046.0 | 32491.0 | 32271.0 | 33213.0 | | | | | | | |
| FRA | 1163.0 | 3276.0 | 30840.0 | 30706.0 | 30736.0 | 32926.0 | | | | | | |
| GBR | 1147.0 | 26590.0 | 3807.0 | 3099.0 | 3053.0 | 3309.0 | 27798.0 | | | | | |
| ITA | 1496.0 | 27096.0 | 3317.0 | 2507.0 | 2565.0 | 2715.0 | 25945.0 | 27464.0 | | | | |
| NLD | 1121.0 | 3171.0 | 32146.0 | 31998.0 | 32034.0 | 30758.0 | 3241.0 | 2610.0 | 33979.0 | | | |
| POL | 1607.0 | 3436.0 | 28903.0 | 29054.0 | 28915.0 | 27664.0 | 3135.0 | 2838.0 | 28698.0 | 30918.0 | | |

Number of bulls in reference population for ocs

| | | | | | | | | | | | | |
|-----|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|---------|--|
| AUS | 2922.0 | | | | | | | | | | | |
| BEL | 398.0 | 2919.0 | | | | | | | | | | |
| CAN | 1068.0 | 1579.0 | 34417.0 | | | | | | | | | |
| DEU | 737.0 | 1155.0 | 3802.0 | 36678.0 | | | | | | | | |
| ESP | 684.0 | 1090.0 | 3051.0 | 34191.0 | 34987.0 | | | | | | | |
| FRA | 698.0 | 1164.0 | 3280.0 | 32451.0 | 32399.0 | 34577.0 | | | | | | |
| GBR | 1198.0 | 1149.0 | 28424.0 | 3811.0 | 3059.0 | 3314.0 | 29638.0 | | | | | |
| ITA | 856.0 | 1496.0 | 29037.0 | 3320.0 | 2570.0 | 2719.0 | 27720.0 | 29404.0 | | | | |
| NLD | 761.0 | 1122.0 | 3196.0 | 33848.0 | 33791.0 | 32429.0 | 3266.0 | 2634.0 | 35885.0 | | | |
| HUN | 477.0 | 565.0 | 1196.0 | 6488.0 | 6365.0 | 6279.0 | 1178.0 | 1118.0 | 6469.0 | 6974.0 | | |
| POL | 649.0 | 1609.0 | 3441.0 | 29800.0 | 29870.0 | 28560.0 | 3141.0 | 2843.0 | 29660.0 | 6391.0 | 31945.0 | |

