

INTRODUCTION

The latest genomic test international evaluation for conformation traits took place as scheduled at the Interbull Centre. Data from twenty-four (24) countries were included in this evaluation.

International genetic evaluations for conformation traits of bulls were computed from: AUS BEL CAN CHE CZE DEU DFS ESP EST FRA GBR HUN IRL ITA JPN KOR NLD NZL POL PRT SVN USA ZAF LVA Holstein data were included in this evaluation.

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

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

CHANGES IN NATIONAL PROCEDURES

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

CAN (HOL) Base change
FRA (HOL) Base change
ITA (HOL) Cut off one year of data and base change
DEU (HOL) Base change, new trait definition and heritability for trait ang.
NLD (HOL) Base change
AUS (HOL) OUS: Some bulls have had genotypes updated, and some bulls may have been affected by relatives adding data to our reference set.

INTERBULL CHANGES COMPARED TO THE DECEMBER ROUTINE RUN

No changes in Interbull procedures

DATA AND METHOD OF ANALYSIS

Thirteen 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 thirteen 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 test 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 2023

Country	Date
BEL	20201201
CAN	20230401
DEU	20230404
DFS	20230207
ESP	20230314
FRA	20230405
GBR	20230309
ITA	20230308
NLD	20230401
HUN	20211122
POL	20230310
CZE	20230320

Table 2.

Number of bulls in reference population for sta

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BEL 1670.0
CAN 723.0 39272.0
DEU 726.0 9005.0 44569.0
DFS 633.0 5120.0 38396.0 39356.0
ESP 701.0 6563.0 40135.0 38619.0 41219.0
FRA 710.0 4032.0 34724.0 34174.0 34808.0 36452.0
GBR 682.0 32926.0 9619.0 5655.0 7189.0 4118.0 35146.0
ITA 717.0 33579.0 8475.0 4513.0 5918.0 3300.0 32737.0 34506.0
NLD 740.0 4105.0 36579.0 35929.0 36561.0 34231.0 4447.0 3464.0 38359.0
HUN 549.0 2228.0 8220.0 7666.0 8054.0 7283.0 2443.0 2209.0 7805.0 9028.0
POL 994.0 4849.0 33712.0 33398.0 34046.0 30337.0 5288.0 4250.0 31839.0 7626.0 35440.0
CZE 843.0 1794.0 2300.0 1735.0 2134.0 1682.0 1713.0 1727.0 1714.0 1406.0 2514.0 3655.0

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Number of bulls in reference population for      cwi
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CAN 39269.0
DEU 9006.0 43349.0
DFS 5121.0 37186.0 38139.0
ESP 6564.0 38920.0 37408.0 39991.0
FRA 4032.0 33531.0 32988.0 33613.0 35246.0
GBR 32923.0 9620.0 5656.0 7190.0 4118.0 35143.0
ITA 33576.0 8476.0 4514.0 5919.0 3300.0 32734.0 34503.0
NLD 4105.0 35386.0 34734.0 35368.0 33064.0 4447.0 3464.0 37164.0
HUN 2228.0 7684.0 7128.0 7516.0 6773.0 2443.0 2209.0 7267.0 8489.0
POL 4849.0 32557.0 32242.0 32891.0 29208.0 5288.0 4250.0 30691.0 7087.0 34281.0
CZE 1794.0 2297.0 1732.0 2131.0 1679.0 1713.0 1727.0 1712.0 1405.0 2511.0 3652.0

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Number of bulls in reference population for      bde
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CAN 39272.0
DEU 9005.0 44010.0
DFS 5120.0 37837.0 38793.0
ESP 6563.0 39577.0 38059.0 40659.0
FRA 4032.0 34192.0 33641.0 34276.0 35919.0
GBR 32926.0 9619.0 5655.0 7189.0 4118.0 35146.0
ITA 33579.0 8475.0 4513.0 5918.0 3300.0 32737.0 34506.0
NLD 4105.0 36020.0 35368.0 36001.0 33698.0 4447.0 3464.0 37798.0
HUN 2228.0 7708.0 7152.0 7540.0 6797.0 2443.0 2209.0 7291.0 8513.0
POL 4849.0 33199.0 32883.0 33531.0 29850.0 5288.0 4250.0 31324.0 7111.0 34924.0
CZE 1794.0 2299.0 1734.0 2133.0 1681.0 1713.0 1727.0 1713.0 1405.0 2513.0 3654.0

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Number of bulls in reference population for      ang
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BEL 1578.0
CAN 718.0 38334.0
DEU 683.0 8540.0 30817.0
DFS 604.0 4684.0 25667.0 26589.0
ESP 665.0 6108.0 27279.0 25941.0 28336.0
FRA 677.0 3607.0 23035.0 22653.0 23113.0 24742.0
GBR 658.0 32493.0 9035.0 5097.0 6613.0 3573.0 34223.0
ITA 711.0 33068.0 8153.0 4209.0 5602.0 3008.0 32380.0 33949.0
NLD 680.0 3654.0 23813.0 23340.0 23814.0 22613.0 3809.0 3155.0 25127.0
HUN 512.0 2200.0 5021.0 4501.0 4851.0 4179.0 2337.0 2187.0 4462.0 5517.0
POL 957.0 4399.0 20906.0 20764.0 21289.0 18727.0 4718.0 3939.0 19141.0 4425.0 22614.0
CZE 823.0 1779.0 2220.0 1675.0 2061.0 1614.0 1701.0 1713.0 1642.0 1361.0 2438.0 3558.0

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Number of bulls in reference population for      ran
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CAN 39271.0
DEU 9004.0 44472.0
DFS 5119.0 38299.0 39259.0
ESP 6562.0 40043.0 38527.0 41127.0
FRA 4032.0 34629.0 34079.0 34718.0 36357.0
GBR 32925.0 9618.0 5654.0 7188.0 4118.0 35145.0

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Number of bulls in reference population for fua

CAN 39269.0
DEU 9003.0 43744.0
DFS 5121.0 37584.0 38538.0
ESP 6564.0 39318.0 37805.0 40395.0
FRA 4032.0 33934.0 33388.0 34016.0 35657.0
GBR 32924.0 9614.0 5656.0 7189.0 4118.0 35140.0
ITA 33577.0 8471.0 4514.0 5918.0 3300.0 32732.0 34501.0
NLD 4105.0 35778.0 35128.0 35760.0 33458.0 4446.0 3463.0 37555.0
HUN 2227.0 7685.0 7130.0 7518.0 6775.0 2442.0 2208.0 7269.0 8490.0
POL 4849.0 32907.0 32592.0 33239.0 29560.0 5287.0 4249.0 31039.0 7089.0 34632.0
CZE 1794.0 2299.0 1734.0 2133.0 1681.0 1713.0 1727.0 1713.0 1405.0 2513.0 3654.0

Number of bulls in reference population for ruh

CAN 39266.0
DEU 9002.0 43430.0
DFS 5120.0 37265.0 38191.0
ESP 6563.0 39004.0 37459.0 40054.0
FRA 4032.0 33627.0 33076.0 33710.0 35351.0
GBR 32921.0 9613.0 5655.0 7188.0 4118.0 35135.0
ITA 33574.0 8470.0 4513.0 5917.0 3300.0 32729.0 34498.0
NLD 4105.0 35455.0 34804.0 35438.0 33141.0 4446.0 3463.0 37231.0
HUN 2227.0 7696.0 7141.0 7529.0 6786.0 2442.0 2208.0 7280.0 8501.0
POL 4849.0 33043.0 32728.0 33375.0 29696.0 5287.0 4249.0 31174.0 7103.0 34768.0
CZE 1794.0 2299.0 1734.0 2133.0 1681.0 1713.0 1727.0 1713.0 1405.0 2513.0 3654.0

Number of bulls in reference population for ruw

Number of bulls in reference population for usu

BEL 1670.0
CAN 723.0 39271.0
DEU 726.0 9004.0 44563.0
DFS 633.0 5122.0 38396.0 39356.0
ESP 701.0 6566.0 40135.0 38620.0 41220.0
FRA 710.0 4032.0 34724.0 34174.0 34808.0 36452.0
GBR 682.0 32926.0 9615.0 5657.0 7191.0 4118.0 35142.0
ITA 717.0 33579.0 8472.0 4515.0 5920.0 3300.0 32734.0 34503.0
NLD 740.0 4105.0 36577.0 35929.0 36561.0 34231.0 4446.0 3463.0 38356.0
HUN 549.0 2227.0 8219.0 7666.0 8054.0 7283.0 2442.0 2208.0 7805.0 9027.0
POL 994.0 4849.0 33709.0 33396.0 34043.0 30336.0 5287.0 4249.0 31838.0 7626.0 35437.0
CZE 843.0 1794.0 2300.0 1735.0 2134.0 1682.0 1713.0 1727.0 1714.0 1406.0 2514.0 3655.0

Number of bulls in reference population for ude

CAN 39263.0
DEU 9004.0 44564.0
DFS 5119.0 38393.0 39351.0
ESP 6562.0 40133.0 38615.0 41215.0
FRA 4032.0 34724.0 34173.0 34808.0 36452.0
GBR 32922.0 9616.0 5655.0 7189.0 4118.0 34851.0
ITA 33576.0 8474.0 4513.0 5918.0 3300.0 32735.0 34504.0
NLD 4102.0 36578.0 35927.0 36561.0 34231.0 4368.0 3464.0 37916.0
HUN 2225.0 8219.0 7666.0 8054.0 7283.0 2366.0 2208.0 7666.0 8760.0
POL 4850.0 33711.0 33397.0 34045.0 30337.0 5288.0 4250.0 31840.0 7627.0 35439.0
CZE 1795.0 2300.0 1735.0 2134.0 1682.0 1714.0 1728.0 1714.0 1406.0 2514.0 3656.0

Number of bulls in reference population for ftp

POL	4844.0	33697.0	33395.0	34028.0	30325.0	5284.0	4246.0	31828.0	7627.0	35421.0	
CZE	1794.0	2300.0	1735.0	2134.0	1682.0	1713.0	1727.0	1714.0	1406.0	2514.0	3655.0

Number of bulls in reference population for of1

CAN	39074.0										
DEU	8971.0	43842.0									
DFS	5117.0	37756.0	38708.0								
ESP	6548.0	39467.0	37980.0	40530.0							
FRA	4030.0	34071.0	33536.0	34150.0	35781.0						
GBR	32765.0	9580.0	5653.0	7175.0	4117.0	34678.0					
ITA	33421.0	8436.0	4510.0	5904.0	3298.0	32571.0	34335.0				
NLD	4097.0	35948.0	35314.0	35934.0	33607.0	4359.0	3454.0	37257.0			
HUN	2221.0	8216.0	7664.0	8052.0	7283.0	2361.0	2203.0	7665.0	8755.0		
POL	4844.0	33079.0	32777.0	33412.0	29705.0	5285.0	4247.0	31217.0	7626.0	34802.0	
CZE	1794.0	2298.0	1733.0	2132.0	1680.0	1713.0	1727.0	1713.0	1406.0	2512.0	3653.0

Number of bulls in reference population for loc

CAN	33848.0										
DEU	8912.0	39732.0									
DFS	5071.0	33898.0	34703.0								
ESP	6499.0	35630.0	34052.0	36563.0							
FRA	3988.0	30406.0	29802.0	30441.0	32011.0						
GBR	31006.0	9527.0	5616.0	7134.0	4087.0	32894.0					
ITA	31431.0	8378.0	4470.0	5860.0	3269.0	30820.0	32298.0				
NLD	4060.0	32280.0	31575.0	32222.0	29994.0	4327.0	3425.0	33482.0			
CZE	1785.0	2264.0	1702.0	2100.0	1649.0	1706.0	1717.0	1681.0	3528.0		
HUN	2214.0	6501.0	5957.0	6333.0	5630.0	2351.0	2197.0	5946.0	1377.0	7024.0	
POL	4796.0	29256.0	28845.0	29521.0	26006.0	5245.0	4204.0	27511.0	2400.0	5907.0	30735.0

Number of bulls in reference population for bcs

DEU	36328.0										
FRA	27246.0	28691.0									
GBR	9398.0	4050.0	31525.0								
ITA	8319.0	3255.0	29285.0	30955.0							
NLD	28912.0	26751.0	4363.0	3407.0	30562.0						
CZE	2258.0	1644.0	1695.0	1709.0	1678.0	3403.0					
CAN	8805.0	3938.0	29474.0	30111.0	3999.0	1774.0	34020.0				
ESP	32240.0	27276.0	6987.0	5805.0	28828.0	2095.0	6395.0	33138.0			
HUN	7292.0	6404.0	2427.0	2193.0	6873.0	1392.0	2214.0	7128.0	8081.0		
POL	27945.0	24789.0	5101.0	4150.0	26179.0	2329.0	4693.0	28166.0	6708.0	29357.0	