

## INTRODUCTION

The latest genomic routine international evaluation for udder traits took place as scheduled at the Interbull Centre. Data from 26 countries were included in this evaluation.

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

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

mas: BEL, CAN, DEU, ESP, FRA, DFS, , ITA, NLD, POL, HUN  
scs: BEL, CAN, DEU, ESP, FRA, DFS, GBR, ITA, NLD, POL, HUN

## CHANGES IN NATIONAL PROCEDURES

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

NLD (HOL) New added edc from a new validation affecting GREL and SD  
BEL (HOL) Same data as August but after correcting some run bugs and removing some previous adjustments  
HUN (HOL) Changes affecting genomic EDC  
ESP (HOL) Stopped incorporating candidates and culled bulls older than 2 years old in the genomic evaluation

## INTERBULL CHANGES COMPARED TO THE AUGUST ROUTINE RUN

Starting with the December 2019 evaluation, the GMACE software was updated to ensure GMACE reliabilities are always at least 1 point higher than the corresponding reliabilities of MACE parent averages. This update affects bulls from countries with extremely low national genomic reliabilities for a given trait. The vast majority of GMACE results were unaffected by the update.

## 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

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

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

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PUBLICATION OF INTERBULL ROUTINE RUN  
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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 2019

Country	Date
CAN	20191201
DEU	20191203
DFS	20191105
FRA	20191204
GBR	20191009
NLD	20191201
ITA	20191112
HUN	20191115
BEL	20190901
ESP	20191111
POL	20191031

Table 2.

Number of bulls in reference population for	scs
CAN 39595.0	
DEU 5814.0 40094.0	
DFS 3928.0 36130.0 37191.0	
FRA 3915.0 34310.0 34015.0 36398.0	
GBR 33090.0 5844.0 3954.0 3912.0 34871.0	
NLD 3873.0 35678.0 35414.0 34037.0 3934.0 37823.0	
ITA 32448.0 4735.0 2989.0 2999.0 31152.0 2933.0 33099.0	
HUN 1677.0 7204.0 6885.0 6867.0 1689.0 7099.0 1521.0 7792.0	

BEL	1777.0	1302.0	1099.0	1279.0	1349.0	1224.0	1633.0	762.0	3219.0		
ESP	4307.0	36744.0	36454.0	34577.0	4343.0	35937.0	3280.0	7125.0	1251.0	37836.0	
POL	4085.0	31658.0	31668.0	30153.0	3766.0	31268.0	3136.0	6961.0	1722.0	32059.0	33679.0

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Number of bulls in reference population for           mas  
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CAN	21682.0										
DEU	4570.0	37656.0									
DFS	3572.0	34724.0	35636.0								
FRA	3674.0	32975.0	32696.0	34789.0							
NLD	3555.0	34361.0	34127.0	32743.0	36085.0						
ITA	16695.0	3808.0	2763.0	2851.0	2707.0	16961.0					
HUN	1566.0	7147.0	6867.0	6844.0	7063.0	1459.0	7666.0				
BEL	1329.0	1258.0	1080.0	1259.0	1205.0	1213.0	753.0	2762.0			
ESP	3929.0	35278.0	35037.0	33208.0	34618.0	3064.0	7087.0	1217.0	36229.0		
POL	3614.0	30376.0	30379.0	28872.0	30019.0	2748.0	6949.0	1631.0	30742.0	32076.0	