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, AUS, DFI, GBR, ITA, NLD, POL, HUN submitted GEBVs.

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

ESP (HOL)    Base change
NLD (HOL)    Included a deregression post-processing step to keep the animals with information in the system
HUN (HOL)    First participation with bcs and loc
BEL (HOL)    Corrected a small bug in their routines preparing final GEBV to be submitted
Increase in the size of the reference population (mainly females)

No changes in Interbull procedures

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. 2012a. GMACE reliability approximation. Report to the GMACE working group of Interbull. GMACE_reli 2013
Sullivan, P.G. 2012b. GMACE variance estimation. Report to the GMACE working group of Interbull. GMACE_ves 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 minimizing 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 August 2018

<table>
<thead>
<tr>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL</td>
<td>20180701</td>
</tr>
<tr>
<td>CAN</td>
<td>20180901</td>
</tr>
<tr>
<td>DEU</td>
<td>20180807</td>
</tr>
<tr>
<td>ESP</td>
<td>20180820</td>
</tr>
<tr>
<td>FRA</td>
<td>20180808</td>
</tr>
<tr>
<td>GBR</td>
<td>20180709</td>
</tr>
</tbody>
</table>

Table 2. National evaluation dates in GMACE run August 2018
## Table 2.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Bulls in Reference Population for stas</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL</td>
<td>2736.0</td>
</tr>
<tr>
<td>CAN</td>
<td>1448.0 33770.0</td>
</tr>
<tr>
<td>DEU</td>
<td>1062.0 3322.0 36182.0</td>
</tr>
<tr>
<td>DFS</td>
<td>861.0 2669.0 33592.0 34738.0</td>
</tr>
<tr>
<td>ESP</td>
<td>1011.0 3004.0 34086.0 34083.0 35254.0</td>
</tr>
<tr>
<td>FRA</td>
<td>1081.0 3145.0 32267.0 32135.0 32973.0 34769.0</td>
</tr>
<tr>
<td>GBR</td>
<td>1011.0 27708.0 3174.0 2611.0 2947.0 3070.0 28950.0</td>
</tr>
<tr>
<td>ITA</td>
<td>1308.0 28171.0 3124.0 2372.0 2502.0 26971.0 28465.0</td>
</tr>
<tr>
<td>NLD</td>
<td>998.0 2998.0 3522.0 34282.0 35888.0 32198.0 2951.0 32135.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0 1065.0 6217.0 6193.0 6590.0 6193.0 6356.0</td>
</tr>
<tr>
<td>POL</td>
<td>1526.0 3222.0 29331.0 30575.0 32893.0 32135.0 32973.0</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Number of Bulls in Reference Population for cwi</td>
<td></td>
</tr>
<tr>
<td>BEL</td>
<td>2736.0</td>
</tr>
<tr>
<td>CAN</td>
<td>1448.0 33770.0</td>
</tr>
<tr>
<td>DEU</td>
<td>1061.0 3322.0 34968.0</td>
</tr>
<tr>
<td>DFS</td>
<td>860.0 2669.0 33526.0</td>
</tr>
<tr>
<td>ESP</td>
<td>1010.0 3004.0 32876.0 34500.0</td>
</tr>
<tr>
<td>FRA</td>
<td>1080.0 3145.0 32248.0 31955.0 32973.0 34769.0</td>
</tr>
<tr>
<td>GBR</td>
<td>1011.0 27708.0 3174.0 2611.0 2947.0 3070.0 28950.0</td>
</tr>
<tr>
<td>ITA</td>
<td>1308.0 28171.0 3124.0 2372.0 2502.0 26971.0 28465.0</td>
</tr>
<tr>
<td>NLD</td>
<td>997.0 2998.0 3522.0 34282.0 35888.0 32198.0 2951.0 32135.0</td>
</tr>
<tr>
<td>HUN</td>
<td>492.0 1065.0 6217.0 6193.0 6590.0 6193.0 6356.0</td>
</tr>
<tr>
<td>POL</td>
<td>1525.0 3222.0 29331.0 30575.0 32893.0 32135.0 32973.0</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Number of Bulls in Reference Population for bde</td>
<td></td>
</tr>
<tr>
<td>BEL</td>
<td>2732.0</td>
</tr>
<tr>
<td>CAN</td>
<td>1448.0 33770.0</td>
</tr>
<tr>
<td>DEU</td>
<td>1062.0 3322.0 36182.0</td>
</tr>
<tr>
<td>DFS</td>
<td>861.0 2669.0 33526.0</td>
</tr>
<tr>
<td>ESP</td>
<td>1011.0 3004.0 34086.0 34083.0 35254.0</td>
</tr>
<tr>
<td>FRA</td>
<td>1081.0 3145.0 32267.0 32135.0 32973.0 34769.0</td>
</tr>
<tr>
<td>GBR</td>
<td>1011.0 27708.0 3174.0 2611.0 2947.0 3070.0 28950.0</td>
</tr>
<tr>
<td>ITA</td>
<td>1308.0 28171.0 3124.0 2372.0 2502.0 26971.0 28465.0</td>
</tr>
<tr>
<td>NLD</td>
<td>998.0 2998.0 3522.0 34282.0 35888.0 32198.0 2951.0 32135.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0 1065.0 6217.0 6193.0 6590.0 6193.0 6356.0</td>
</tr>
<tr>
<td>POL</td>
<td>1526.0 3222.0 29331.0 30575.0 32893.0 32135.0 32973.0</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Number of Bulls in Reference Population for ang</td>
<td></td>
</tr>
<tr>
<td>BEL</td>
<td>2722.0</td>
</tr>
<tr>
<td>CAN</td>
<td>1448.0 33770.0</td>
</tr>
<tr>
<td>DEU</td>
<td>1062.0 3322.0 36182.0</td>
</tr>
<tr>
<td>DFS</td>
<td>861.0 2669.0 33526.0</td>
</tr>
<tr>
<td>ESP</td>
<td>1011.0 3004.0 34086.0 34083.0 35254.0</td>
</tr>
<tr>
<td>FRA</td>
<td>1081.0 3145.0 32267.0 32135.0 32973.0 34769.0</td>
</tr>
<tr>
<td>GBR</td>
<td>1011.0 27708.0 3174.0 2611.0 2947.0 3070.0 28950.0</td>
</tr>
<tr>
<td>ITA</td>
<td>1308.0 28171.0 3124.0 2372.0 2502.0 26971.0 28465.0</td>
</tr>
<tr>
<td>NLD</td>
<td>998.0 2998.0 3522.0 34282.0 35888.0 32198.0 2951.0 32135.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0 1065.0 6217.0 6193.0 6590.0 6193.0 6356.0</td>
</tr>
<tr>
<td>POL</td>
<td>1526.0 3222.0 29331.0 30575.0 32893.0 32135.0 32973.0</td>
</tr>
</tbody>
</table>

---

**Note:** The table contains data on the number of bulls in reference populations for different countries and regions, with columns indicating the number of bulls for each country and the associated reference population codes. The data is presented in a tabular format with clear demarcation between different countries and regions.
<table>
<thead>
<tr>
<th>Country</th>
<th>rax</th>
<th>rwi</th>
<th>rls</th>
<th>ran</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BEL</strong></td>
<td>2737.0</td>
<td>2722.0</td>
<td>2737.0</td>
<td>2709.0</td>
</tr>
<tr>
<td><strong>CAN</strong></td>
<td>33770.0</td>
<td>32950.0</td>
<td>33760.0</td>
<td>32835.0</td>
</tr>
<tr>
<td><strong>DEU</strong></td>
<td>3322.0</td>
<td>3314.0</td>
<td>3322.0</td>
<td>3314.0</td>
</tr>
<tr>
<td><strong>DFS</strong></td>
<td>32950.0</td>
<td>32835.0</td>
<td>32950.0</td>
<td>32835.0</td>
</tr>
<tr>
<td><strong>ESP</strong></td>
<td>33770.0</td>
<td>33760.0</td>
<td>33770.0</td>
<td>33770.0</td>
</tr>
<tr>
<td><strong>FRA</strong></td>
<td>3322.0</td>
<td>32950.0</td>
<td>3322.0</td>
<td>32950.0</td>
</tr>
<tr>
<td><strong>GBR</strong></td>
<td>33770.0</td>
<td>33760.0</td>
<td>33770.0</td>
<td>33770.0</td>
</tr>
<tr>
<td><strong>ITA</strong></td>
<td>33770.0</td>
<td>33760.0</td>
<td>33770.0</td>
<td>33770.0</td>
</tr>
<tr>
<td><strong>NLD</strong></td>
<td>33770.0</td>
<td>33760.0</td>
<td>33770.0</td>
<td>33770.0</td>
</tr>
<tr>
<td><strong>HUN</strong></td>
<td>33770.0</td>
<td>33760.0</td>
<td>33770.0</td>
<td>33770.0</td>
</tr>
<tr>
<td><strong>POL</strong></td>
<td>33770.0</td>
<td>33760.0</td>
<td>33770.0</td>
<td>33770.0</td>
</tr>
<tr>
<td>Code</td>
<td>Number of Bulls</td>
<td>Country</td>
<td>Code</td>
<td>Number of Bulls</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>---------</td>
<td>------</td>
<td>----------------</td>
</tr>
<tr>
<td>DEU</td>
<td>1062.0</td>
<td>Germany</td>
<td>DFS</td>
<td>861.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0</td>
<td>Hungary</td>
<td>NLD</td>
<td>999.0</td>
</tr>
<tr>
<td>ITA</td>
<td>1308.0</td>
<td>Italy</td>
<td>CAN</td>
<td>1448.0</td>
</tr>
<tr>
<td>KOR</td>
<td>1525.0</td>
<td>Korea</td>
<td>CAN</td>
<td>1448.0</td>
</tr>
<tr>
<td>USA</td>
<td>1062.0</td>
<td>USA</td>
<td>CAN</td>
<td>1448.0</td>
</tr>
</tbody>
</table>

Number of bulls in reference population for hde

Number of bulls in reference population for fus

Number of bulls in reference population for ruh

Number of bulls in reference population for ruw

Number of bulls in reference population for usu

Number of bulls in reference population for ude
<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Bulls</th>
<th>Reference Population</th>
<th>ftp</th>
<th>ftl</th>
<th>rtp</th>
<th>ocs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL</td>
<td>2722.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td>1446.0</td>
<td>33766.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEU</td>
<td>1022.0</td>
<td>3322.0</td>
<td>56180.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFS</td>
<td>861.0</td>
<td>2669.0</td>
<td>33595.0</td>
<td>34736.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESP</td>
<td>1011.0</td>
<td>3004.0</td>
<td>34086.0</td>
<td>34081.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>FRA</td>
<td>1081.0</td>
<td>3145.0</td>
<td>32071.0</td>
<td>32067.0</td>
<td>34768.0</td>
<td></td>
</tr>
<tr>
<td>GBR</td>
<td>999.0</td>
<td>27704.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>ITA</td>
<td>1301.0</td>
<td>28170.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>988.0</td>
<td>2906.0</td>
<td>33462.0</td>
<td>33462.0</td>
<td>31976.0</td>
<td>2777.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0</td>
<td>1065.0</td>
<td>32170.0</td>
<td>32170.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>1526.0</td>
<td>3222.0</td>
<td>29392.0</td>
<td>30173.0</td>
<td>28382.0</td>
<td>2818.0</td>
</tr>
<tr>
<td>AUS</td>
<td>2917.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEL</td>
<td>364.0</td>
<td>2720.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td>1062.0</td>
<td>3322.0</td>
<td>36135.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFS</td>
<td>861.0</td>
<td>2669.0</td>
<td>33545.0</td>
<td>34691.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESP</td>
<td>1011.0</td>
<td>3004.0</td>
<td>34086.0</td>
<td>34081.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>FRA</td>
<td>1081.0</td>
<td>3145.0</td>
<td>32071.0</td>
<td>32067.0</td>
<td>34768.0</td>
<td></td>
</tr>
<tr>
<td>GBR</td>
<td>999.0</td>
<td>27704.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>ITA</td>
<td>1301.0</td>
<td>28170.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>988.0</td>
<td>2906.0</td>
<td>33462.0</td>
<td>33462.0</td>
<td>31976.0</td>
<td>2777.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0</td>
<td>1065.0</td>
<td>32170.0</td>
<td>32170.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>1526.0</td>
<td>3222.0</td>
<td>29392.0</td>
<td>30173.0</td>
<td>28382.0</td>
<td>2818.0</td>
</tr>
<tr>
<td>AUS</td>
<td>2917.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEL</td>
<td>364.0</td>
<td>2720.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td>1062.0</td>
<td>3322.0</td>
<td>36135.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFS</td>
<td>861.0</td>
<td>2669.0</td>
<td>33545.0</td>
<td>34691.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESP</td>
<td>1011.0</td>
<td>3004.0</td>
<td>34086.0</td>
<td>34081.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>FRA</td>
<td>1081.0</td>
<td>3145.0</td>
<td>32071.0</td>
<td>32067.0</td>
<td>34768.0</td>
<td></td>
</tr>
<tr>
<td>GBR</td>
<td>999.0</td>
<td>27704.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>ITA</td>
<td>1301.0</td>
<td>28170.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>988.0</td>
<td>2906.0</td>
<td>33462.0</td>
<td>33462.0</td>
<td>31976.0</td>
<td>2777.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0</td>
<td>1065.0</td>
<td>32170.0</td>
<td>32170.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>1526.0</td>
<td>3222.0</td>
<td>29392.0</td>
<td>30173.0</td>
<td>28382.0</td>
<td>2818.0</td>
</tr>
<tr>
<td>AUS</td>
<td>2917.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEL</td>
<td>364.0</td>
<td>2720.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td>1062.0</td>
<td>3322.0</td>
<td>36135.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFS</td>
<td>861.0</td>
<td>2669.0</td>
<td>33545.0</td>
<td>34691.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESP</td>
<td>1011.0</td>
<td>3004.0</td>
<td>34086.0</td>
<td>34081.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>FRA</td>
<td>1081.0</td>
<td>3145.0</td>
<td>32071.0</td>
<td>32067.0</td>
<td>34768.0</td>
<td></td>
</tr>
<tr>
<td>GBR</td>
<td>999.0</td>
<td>27704.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>ITA</td>
<td>1301.0</td>
<td>28170.0</td>
<td>3174.0</td>
<td>2947.0</td>
<td>30527.0</td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>988.0</td>
<td>2906.0</td>
<td>33462.0</td>
<td>33462.0</td>
<td>31976.0</td>
<td>2777.0</td>
</tr>
<tr>
<td>HUN</td>
<td>493.0</td>
<td>1065.0</td>
<td>32170.0</td>
<td>32170.0</td>
<td>35522.0</td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>1526.0</td>
<td>3222.0</td>
<td>29392.0</td>
<td>30173.0</td>
<td>28382.0</td>
<td>2818.0</td>
</tr>
</tbody>
</table>

Number of bulls in reference population for ftp, ftl, rtp, ocs.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BEL</td>
<td>2716</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td>1446</td>
<td>3361</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEU</td>
<td>1050</td>
<td>3322</td>
<td>3618</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFS</td>
<td>860</td>
<td>2669</td>
<td>3595</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESP</td>
<td>1010</td>
<td>3004</td>
<td>3405</td>
<td>3408</td>
<td>3553</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRA</td>
<td>1080</td>
<td>3145</td>
<td>3296</td>
<td>3297</td>
<td>3464</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>1021</td>
<td>3220</td>
<td>3224</td>
<td>3225</td>
<td>3422</td>
<td>3428</td>
<td>3487</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HUN</td>
<td>980</td>
<td>2707</td>
<td>3174</td>
<td>2611</td>
<td>2947</td>
<td>3070</td>
<td>3219</td>
<td>3318</td>
<td>3564</td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>984</td>
<td>2518</td>
<td>3123</td>
<td>2562</td>
<td>2855</td>
<td>3018</td>
<td>3560</td>
<td>3565</td>
<td>3853</td>
<td></td>
</tr>
<tr>
<td>GB 8</td>
<td>2564</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of bulls in reference population for ous

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984

Number of bulls in reference population for of1

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984

Number of bulls in reference population for loc

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984

Number of bulls in reference population for bcs

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984

IT A 846.0  1309.0  28151.0  2761.0  2520.0  2585.0  2851.0  2815.0  2515.0  2502.0  26851.0  2845.0
MLD 133.1  897.1  2308.0  3258.0  3154.0  4154.0  4251.0  2715.0  2555.0  3550.0
POL 441.0  1523.0  3221.0  28170.0  2521.0  2761.0  2372.0  2502.0  26851.0  2845.0

NLD 733.0  997.0  2908.0  32928.0  33284.0  31594.0  2851.0  2319.0  3500.0

HUN 453.0  493.0  1065.0  6217.0  6193.0  6067.0  1035.0  983.0  6184.0  6733.0

POL 641.0  1525.0  3221.0  28170.0  2521.0  2761.0  2372.0  2502.0  26851.0  2845.0

Number of bulls in reference population for ous

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984

Number of bulls in reference population for of1

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984

Number of bulls in reference population for loc

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984

Number of bulls in reference population for bcs

BEL 2716
CAN 1446
DEU 1050
DFS 860
ESP 1010
FRA 1080
NLD 1021
HUN 980
POL 984
GBR 984