Improved genetic evaluation for General Health

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General Health evaluation - November 2017

• First time animal model
• First time all disease traits for Jersey in General Health evaluation, not only metabolic disorders
• New data: BHB/Acetone
  • EBV for ketosis and "other" metabolic disorders
New General Health Index

**GH index** = Early Reproductive Disorders (ERP) 
+ Late Reproductive Disorders (LRP) 
+ Feet & Leg Problems (FLP) 
+ **Ketosis (KET)** 
+ Other Metabolic Disorders (OMB)

Publication of EBV for: ERP, LRP, FLP, KET and OMB

Data changes – November 2017

New Data

- BHB/acetone as indicator traits for ketosis (DNK)

<table>
<thead>
<tr>
<th></th>
<th>Holstein</th>
<th>RDC</th>
<th>Jersey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>2013-</td>
<td>2013-</td>
<td>2013-</td>
</tr>
<tr>
<td>Sweden</td>
<td>Recording starting in 2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>Recording starting in 2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of population</td>
<td>60%</td>
<td>10%</td>
<td>95%</td>
</tr>
</tbody>
</table>
Data changes – November 2017

Trait harmonization

• Re-define feet & leg disease (DNK)
• Remove data from herds with incomplete recording of veterinary treatments (SWE)
• Include reproductive and feet & leg problems for Jersey

Important to have accurate reporting

Model changes – November 2017

• Sire model to an animal model with more accurate EBVs for both sires and cows
• Possibility to include cows in the reference population
• General Health model also for Jersey including Swedish and Finnish data
• Re-estimation of genetic parameters
• Improved approximation of EBV reliabilities
Effects on EBVs for the GH index - bulls

- EBV correlations between old vs. new model
  - HOL: 0.92
  - RDC: 0.89
- Re-ranking (change ≤ 3 units of EBVs)
  - HOL: 76%
  - RDC: 75%

EBV changes are in accordance with the new data editing – larger changes for Feet & leg problems and other metabolic disorders for HOL and RDC

Heritabilities and Genetic correlations

<table>
<thead>
<tr>
<th>Lactation 1 Holstein</th>
<th>Other metabolic</th>
<th>Ketosis</th>
<th>BHB</th>
<th>Acetone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other metabolic</td>
<td>0.006</td>
<td>0.74</td>
<td>0.48</td>
<td>0.65</td>
</tr>
<tr>
<td>Ketosis</td>
<td>0.012</td>
<td>0.65</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>BHB</td>
<td></td>
<td>0.149</td>
<td></td>
<td>0.88</td>
</tr>
<tr>
<td>Acetone</td>
<td></td>
<td></td>
<td></td>
<td>0.053</td>
</tr>
</tbody>
</table>
Additional information from BHB and acetone

Reliabilities for cows with or without BHB and Acetone observations, that have veterinary treatment observations but not own progeny

<table>
<thead>
<tr>
<th>Breed</th>
<th>BHB &amp; Acetone observations</th>
<th>Other Metabolic disorders</th>
<th>Ketosis</th>
<th>GH index</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOL</td>
<td>Yes</td>
<td>0.34</td>
<td>0.36</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0.29</td>
<td>0.29</td>
<td>0.30</td>
</tr>
</tbody>
</table>

General Health evaluation – further improvements during 2018

- Improved adjustment for differences in disease frequencies between Denmark, Finland and Sweden
- Re-estimation of heritabilities and genetic correlations
- Add heterosis effects
- Add Norwegian data (HOL and JER)
General Health evaluation – further improvements during 2018

- (BHB and Acetone for Finland and Sweden)
- Test the value of using Clinical Mastitis as an indicator trait in GH index
- Validation of the General Health evaluation
- Revision of the GH Index based on NTM work
- Aim for implementation during the fall 2018

THANK YOU – QUESTIONS?