Alternated milk recording - recalculation, results and conclusion for future test planning

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vit – Who we are!

- non profit organisation, owned by DHI, AI and Herdbook organisations

- vit provide services for
  - Herdbook and AI-organisation (all Germany and Luxembourg)
  - Genetic evaluation (all Germany, Austria and Luxembourg)
  - Identification and registration (regional)
  - DHI organisation

- our service for DHI organisation
  - data processing and verification
  - data collecting software for electronic devices
  - laboratory software to connect farm data and milksample data
  - data supply for all kind of herd management
    - paper
    - software
    - web based
  - do research and development for our customers
Introduction of alternated milk recording in Germany

- alternated milk recording an alternative in Germany since the late 90’s
  - driven by
    - costs for DHI service
    - problems to require staff
    - retention against owner based milk recording

- to calculate own factors dedicated and high motivated farmers participate at a large field study over a year
  => Result: Method of Liu et al. published in 2000 and part of the ICAR guidelines

- introduction into practice with discussion about
  - accuracy and comparability of results
  - influence on calculation of breeding values

- since 2010 the proportion of alternated milk recording is nearly constant
  24-26% of farms, 19-20% of cows

- new factors for milk yield in 2008 but not for fat % (protein %)
Development of DHI farms

<table>
<thead>
<tr>
<th>Year</th>
<th>Nr Farm</th>
<th>cows</th>
<th>Cow/farm</th>
<th>Mkg</th>
<th>F %</th>
<th>E%</th>
<th>Nr Farm</th>
<th>cows</th>
<th>Cow/farm</th>
<th>Mkg</th>
<th>F %</th>
<th>E%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>18.751</td>
<td>924.470</td>
<td>49</td>
<td>8.118</td>
<td>4,17</td>
<td>3,41</td>
<td>3.794</td>
<td>780.480</td>
<td>206</td>
<td>8.362</td>
<td>4,09</td>
<td>3,42</td>
</tr>
<tr>
<td>2015</td>
<td>12.797</td>
<td>1.042.037</td>
<td>81</td>
<td>8.705</td>
<td>4,05</td>
<td>3,39</td>
<td>2.496</td>
<td>747.422</td>
<td>299</td>
<td>9.404</td>
<td>3,97</td>
<td>3,38</td>
</tr>
<tr>
<td>2018</td>
<td>10.799</td>
<td>1.046.752</td>
<td>97</td>
<td>9.106</td>
<td>4,00</td>
<td>3,42</td>
<td>2.072</td>
<td>672.056</td>
<td>324</td>
<td>9.750</td>
<td>3,93</td>
<td>3,41</td>
</tr>
</tbody>
</table>

- as expected:
  - a decrease of farms
  - an increase of milkyield (~3,000 kg)
  - a decrease of fat % (~ 0,38 % point)
  - stable protein %
  - the number of cows increased
Milking interval at farms (~10,500)

% of farms in interval classes

- Intervall between evening and morning milking

- > 840 min.
- 811 - <= 840 min.
- 781 - <= 810 min.
- <= 780 min.
Testplaning

- 2 data sets

- one for estimation
  - preselected farms
    - milking intervall
    - size

- one independent data set for validation
  - to compare actual formulas and true results with new formulas
  - criteria (within and over all classes)
    - systematic bias: mean difference
    - random error: std.dev. of the difference
Data collection for estimation of new formulas

for estimation
- data collection in 2017
- 3 month, 135 farms, 20,810 cows
- testing every month over 2 days (4 samples)

validation:
- 700,000 milkings
- cow individual milking times
- 2 milk yield, 2 sample
Results

- the new model considers
  - daytime (morning/evening)
  - milking interval (8 classes for every daytime)
  - lactation number (2 classes: 1, 2+)
  - lactation stadium (7 classes: each 60 days, (last class open))

- the results are different to the old ones

- more milking interval classes represent better the real situation on farms

- new formulas shows better accordance for cows with high milk yields

- subjectively a smaller saw-tooth-effect for milk yield and fat %
  - evaluation through the next month

- subjectively less reclamation of farmers after implementing new model at the begin of 2019
Challenges

- for estimation the minimum number of observations per subclass should be >1000 (better 2000)

- data edits
  - How to handle/consider extreme performances in the dataset for estimation?
  - Balance between plausibility checks/edits and future application on extreme yields
  - As more extreme data we accept for estimation as less fit for „normal“ yields

- we should not use more information for derivation of formulas as we have later in routine application available
General Remarks

- re-estimate formulas every 5-8 years
  - Significant increase in average yields
  - Significant change in correlations between milk yield and milk contents
  - ...

- We need data from representative herds, i.e. herds in which we have to adopt the (re)-estimated formulas later

- Data for (re)-calculation should cover all environmental subgroups resulting potentially in different formulas, i.e. breeds, regions, milking intervals, ..... 

- Data should be large enough for splitting into a
  - Learning/estimation sample (2/3)
  - Validation sample (1/3)
Thanks for your attention!

IT-Solutions for Animal Production