Type traits
Possibilities – collecting and using AMS data

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Outline

- Background
- Data collection
- Udder conformation
Background

- Collecting data from AMS
  - More difficult than expected and not yet successful for other than Lely systems

- Define an optimal cow for AMS
  - Technical improvements solved some problems
  - Breeding for NTM is also beneficial for AMS herds (improved milk ability, health, fertility etc.)

- Utilize data to improve traditional breeding values
  - Big potential – lot of data!
Data collection from AMS herds

Approx 240 herds and 57,000 cows in total

32,786 cows

No of herds

No of visits in AMS


0 25 50 75 100 125 150 175 200

0 500,000 1,000,000 1,500,000 2,000,000 2,500,000 3,000,000 3,500,000 4,000,000
Data collection from AMS herds

- Collected by technicians in connection with milk recording (6 or 11 times a year)
- No extra work for technician
- Software used for extraction can easily be shared with Sweden and Finland
- Data are subsequently transferred to the national cattle database
- At present only data from Lely’s milking robots
  - But work is on-going with Delaval
- Long-term strategy is real time transfer of data
- Help for possibility to collect data from DeLaval is needed!
Advantages of data from milking robots

- Repeated measurements of a variety of traits
- Objective measurements
- Measured on all cows in milk
- Measured over more lactations
How to handle repeated measurements

- Great many observations
- Average of the variable in question over a period of time
- Presumably more sophisticated methods to utilize the information further
Udder conformation

Teat co-ordinates

- Front teat placement
- Rear teat placement
- Distance, front - rear
- Udder balance
- Udder depth
Example of X coordinates
1\textsuperscript{st} parity cow

LF X-POSITION  RF X-POSITION  LR X-POSITION  RR X-POSITION
Calculated front and rear teat distance

1st parity cow

Front teat distance
Rear teat distance
Foot rot
Insemination
All udder traits
1\textsuperscript{st} to 4\textsuperscript{th} parity

Front teat distance  Rear teat distance  Distance front to rear  Udder balance  Udder depth

26-06-2009  12-01-2010  31-07-2010  16-02-2011  04-09-2011  22-03-2012  08-10-2012
Is udder conformation from AMS and traditional classifications comparable?

- A study on variance components was conducted in spring 2013
- Aim was to investigate to what degree udder conformation based on AMS data is comparable to traditional udder conformation traits
- Study based on Danish data:
  - 2,591 cows with AMS data (avg. of obs. 30-60 DIM)
  - 102,818 classified cows
  - 1,480 having both
Is udder conformation from AMS and traditional classifications comparable?

- The model was chosen to contain similar fixed effects as used in routine evaluation for udder traits:
  - Herd-year-season*
  - Age at calving
  - Month of calving
  - Classifier-2 month period**
  - Distance calving to classification**

*Only Herd-year for AMS data
**not used for AMS data
## Heritabilities and genetic correlations

<table>
<thead>
<tr>
<th>Trait</th>
<th>$h^2$ (S.E.) - AMS</th>
<th>$h^2$ (S.E.) – CLA</th>
<th>$r_g$ (S.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front teat placement</td>
<td>0.46 (0.06)</td>
<td>0.31 (0.01)</td>
<td>0.92 (0.04)</td>
</tr>
<tr>
<td>Rear teat placement</td>
<td>0.38 (0.05)</td>
<td>0.32 (0.01)</td>
<td>0.94 (0.04)</td>
</tr>
<tr>
<td>Distance, front - rear</td>
<td>0.46 (0.09)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Udder balance</td>
<td>0.44 (0.07)</td>
<td>0.22 (0.01)</td>
<td>0.90 (0.04)</td>
</tr>
<tr>
<td>Udder depth</td>
<td>0.65 (0.06)</td>
<td>0.42 (0.01)</td>
<td>0.94 (0.02)</td>
</tr>
</tbody>
</table>

- High heritabilities
  - AMS > Classifiers assessments

- High genetic correlations
Conclusion – Udder conformation

- Teat co-ordinates from robots will be included as supplement to traditional classification in the genetic evaluation
- NAV implementation is planned to start this year
- Earlier registrations from AMS in many cases
- Cheap way to get phenotypic information on important udder traits in later lactation
- More reliable indices for later lactations
- More reliable indices for cows not classified
- Data can be used to set deviation codes in the insemination plan programme
Den Europæiske Union ved Den Europæiske Fond for Udvikling af Landdistrikter og Ministeriet for Fødevarer, Landbrug og Fiskeri har deltaget i finansieringen af projektet.