Future needs and challenges in dairy cattle breeding

Based on a survey with Austrian farmers

August 26, 2013

F. Steininger¹, B. Fuerst-Waltl², C. Pfeiffer², C. Fuerst¹, H. Schwarzenbacher¹ and C. Egger-Danner¹

¹ ZuchtData EDV-Dienstleistungen GmbH, Dresdner Str. 89/19, 1200 Vienna, Austria
² University of Natural Resources and Life Sciences, Dep. Sust. Agric. Syst., Div. of Livestock Sciences, Gregor-Mendel-Str. 33, 1180 Vienna, Austria
Earlier – today - future?

Cows today

Cows in future?

Source: Miesenberger
## Development of the last 15 years

<table>
<thead>
<tr>
<th></th>
<th>Fleckvieh</th>
<th>Brown Swiss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk kg</td>
<td>5231</td>
<td>7039</td>
</tr>
<tr>
<td>Fat and Protein kg</td>
<td>396</td>
<td>533</td>
</tr>
<tr>
<td>Longevity (years)</td>
<td>3.92</td>
<td>3.81</td>
</tr>
<tr>
<td>calving interval (days)</td>
<td>393.5</td>
<td>391.4</td>
</tr>
<tr>
<td>Somatic cell count (in 1000)</td>
<td>188.8</td>
<td>190.6</td>
</tr>
</tbody>
</table>

- Tremendous increase in milk yield
- Marginal or no increase of functional traits
- Negative genetic correlations between production and functional traits
- Changing economic conditions
Breeding goal expressed by Total Merit Index (TMI) since 2002

Revision of breeding goals needed due to changing circumstances (genomics, consumer demands, prices,..)

<table>
<thead>
<tr>
<th>Weights (%)</th>
<th>Dairy</th>
<th>Beef</th>
<th>Fitness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fleckvieh (Simmental)</td>
<td>38</td>
<td>16</td>
<td>46</td>
</tr>
<tr>
<td>Brown Swiss</td>
<td>48</td>
<td>5</td>
<td>47</td>
</tr>
</tbody>
</table>
Project: OptiGene

- Optimization of long-term genetic progress of Austrian cattle breeds with emphasis on health and genomic selection
- Breeds: Fleckvieh, Brown Swiss, Holstein, Pinzgauer, Tyrolean Grey
- Main topics
  - Review of breeding goals
  - Optimization of Total Merit Index (TMI)
  - Optimization of breeding programs including genomic selection
  - Management of inbreeding
Survey in Austrian cattle breeders

- Breeds: Fleckvieh (Austrian Simmental), Brown Swiss, Pinzgauer, Tyrolean Grey
  - 20,000 breeders were potential participants
  - 7,700 got invited by Email
  - 2,200 breeders completed the questionnaire
  - Rate of response: 11%

- Pure online survey with [www.surveymonkey.com](http://www.surveymonkey.com)

- March to August 2012

- Similar questionnaire in Southern Germany and Czech Republic
Material and Methods II

- Questionnaire with 25 questions
  - statistics of the farm (7)
  - statistics of the respondent (3)
  - breeding goal of the respondent (4)
  - strengths and weaknesses of the main breed (4)
  - trust in estimated breeding values (1)
  - usage of young bulls (2)
  - usage of service offered by breeding organisations (2)
  - agricultural and socio-political topics (2)
Response rate

OptiGene-Survey

Response rate
all breeds

- < 5 breeders *
- < 1 %
- 1 to 3 %
- 3 to 5 %
- 5 to 10 %
- 10 to 15 %
- 15 to 20 %
- > 20 %

Online survey was opened from 2012-03-16 to 2012-08-08.
* Districts with less than 5 cattle breeding farms are coloured white.
Rate of return

Email-Reminder

<table>
<thead>
<tr>
<th>Weeks after start of survey</th>
<th>FL</th>
<th>BS</th>
<th>GR</th>
<th>PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>331</td>
<td>91</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>428</td>
<td>122</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>3</td>
<td>474</td>
<td>141</td>
<td>27</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>625</td>
<td>152</td>
<td>31</td>
<td>51</td>
</tr>
<tr>
<td>5</td>
<td>842</td>
<td>238</td>
<td>82</td>
<td>61</td>
</tr>
<tr>
<td>6</td>
<td>880</td>
<td>248</td>
<td>87</td>
<td>61</td>
</tr>
<tr>
<td>7</td>
<td>924</td>
<td>255</td>
<td>89</td>
<td>62</td>
</tr>
<tr>
<td>8</td>
<td>960</td>
<td>261</td>
<td>89</td>
<td>62</td>
</tr>
<tr>
<td>9</td>
<td>1012</td>
<td>267</td>
<td>90</td>
<td>63</td>
</tr>
<tr>
<td>10</td>
<td>1055</td>
<td>275</td>
<td>90</td>
<td>63</td>
</tr>
<tr>
<td>11</td>
<td>1445</td>
<td>348</td>
<td>90</td>
<td>78</td>
</tr>
<tr>
<td>12</td>
<td>1539</td>
<td>377</td>
<td>101</td>
<td>82</td>
</tr>
<tr>
<td>13</td>
<td>1559</td>
<td>384</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>14</td>
<td>1601</td>
<td>389</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>15</td>
<td>1612</td>
<td>396</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>16</td>
<td>1617</td>
<td>396</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>17</td>
<td>1629</td>
<td>397</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>18</td>
<td>1632</td>
<td>397</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>19</td>
<td>1637</td>
<td>398</td>
<td>103</td>
<td>82</td>
</tr>
<tr>
<td>20</td>
<td>1639</td>
<td>398</td>
<td>103</td>
<td>82</td>
</tr>
</tbody>
</table>
Change of weights (Fleckvieh)

Weighting of trait groups
Comparison between surveys from 1999 and 2012 (Fleckvieh)

- 1999:
  - Fitness: 18.8%
  - Conformation: 15.3%
  - Meat: 21.7%
  - Milk: 44.2%
  - n: 7559

- 2012:
  - Fitness: 28.7%
  - Conformation: 19.5%
  - Meat: 15.8%
  - Milk: 36.0%
  - n: 1635
Personal breeding goal (FL)

Kruskal–Wallis one-way analysis of variance (± 0.05)
Priority of new traits (FL)

Kruskal–Wallis one-way analysis of variance (±= 0.05)
Challenges for next 10 years

- Increasing costs for energy
- Increasing costs for concentrates
- Price of sale
- Safety of the market
- Consumer requests
- Political conditions
- Animal welfare
- Antibiotic contamination
- Shortage of arable land
- Antibiotic resistance
- Climate change
- Animal epidemic
- Organic farming

n = 2932
Use of online surveys

- Online surveys are a quite cheap method to give breeders the possibility to participate in defining the breeding goals.
- Breeders are interested in these possibilities.
- Although the response rate looks low, most results were stable after only 2-3 weeks.
  - Average response rate at week 3: 3.12 %
- Chance to force the contact between breeders and breeding associations.
Circumstances of production are changing.
The weights of fitness and conformation traits increased from 1999 to 2012.
Especially longevity and fertility are in the focus of the breeders.
Breeders demand inclusion of new traits; e.g. claw health, metabolism
Slight differences in breeding goals between farms; e.g. dependent on herd milk yield
Conclusions II

- It is important to consider the needs of the farmers for designing breeding goals.
- Results of such surveys have to be carefully interpreted.
- Every farmer has his own personal preferences. But defining breeding goals for our breeding programs will not be decisions of single breeders.
- Breeding associations have to use this information to define the breeding goals.
Acknowledgement

- Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)
- Federation of Austrian Cattle Breeders
- International partners:
  - ASR (Association of cattle breeders in southern Germany)
  - LfL (Bavarian State Research Centre for Agriculture)
  - Czech Fleckvieh Breeders Association
- Farmers for answering the questionnaire
Thank you for your attention!

steininger@zuchtdata.at