Cross breeding – an update

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SEGES has a plan for 2020

– 40 % of herds is using planned crossbreeding programs of some kind within the dairy cow herd
– 150,000 beef*dairy crosses slaughtered
– Replacement rate down to 32 %.

• This can only achieved through strict control of number of heifers (preferable by use of beef semen) and improved feeding and management. Furthermore use of crossbreeding within the dairy herd will help.
Why use cross breeding?

• Dairy cross (Combi-Cross):
  – +130.000 DKK in herd with 200 cows

• Beef cross:
  – +160.000 DKK in herd with 200 cows
    • Mostly due to reduced rearing costs
  – Beef (50%) + KSS (60%)
  – Possibility to have more cows not included

Good production results among Danish crosses

<table>
<thead>
<tr>
<th></th>
<th>Milk kg</th>
<th>Fat kg</th>
<th>Protein kg</th>
<th>Insemination interval days</th>
<th>Number of inseminations</th>
<th>Udder treatments, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. lactation</td>
<td>- 98</td>
<td>+ 10</td>
<td>+ 4</td>
<td>- 6</td>
<td>- 0,10</td>
<td>- 9</td>
</tr>
<tr>
<td>2. lactation</td>
<td>- 381</td>
<td>+ 2</td>
<td>- 3</td>
<td>- 6</td>
<td>- 0,08</td>
<td>- 21</td>
</tr>
</tbody>
</table>

Therefore improved survival

| Survival until 2nd calving, % | + 4 |
| Survival until 3rd calving, % | + 12 |
Results from one of the Combi-Cross demonstration herds

<table>
<thead>
<tr>
<th></th>
<th>Hol</th>
<th>Jer X Hol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cows</td>
<td>Cows</td>
</tr>
<tr>
<td>Kg milk</td>
<td>8773</td>
<td>7845</td>
</tr>
<tr>
<td>Kg fat</td>
<td>376</td>
<td>411</td>
</tr>
<tr>
<td>Kg protein</td>
<td>305</td>
<td>299</td>
</tr>
<tr>
<td>Kg F+P</td>
<td>681</td>
<td>710</td>
</tr>
<tr>
<td>Days from clv. to 1. ins.</td>
<td>85</td>
<td>91</td>
</tr>
<tr>
<td>Days 1. to last ins.</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>Number of ins.</td>
<td>1.72</td>
<td>1.70</td>
</tr>
<tr>
<td>Number of mastitis tr.</td>
<td>0.06</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Dairy cross
Number of born crossbreed heifer calves in DK

Between 9 and 10% of born calves in 2015
Advisory concept
– backbone for expansion of dairy crossbreeding

- Documentation
  - Breed comparisons
  - Cross bred systems
  - Heterosis effects

- New results
  - Based on national data
  - International results

- Good "stories"
  - In magazines
  - In pictures

Advisory concept
– backbone for expansion of dairy crossbreeding

- SimHerd Crossbred
- New insemination plan program
- DMS print out
  - Following the principles from Combi-Cross print out:
SimHerd Crossbred

- Each animal in the herd will be simulated
- Herd specific assumptions will be used (as done in normal SimHerd simulations)
- Each animal will be given genetic level dependent on breed frequencies
- Each animal will be given heterosis effects dependent on breed frequencies of parents
- Both Combi-Cross schemes and rotational crossbreeding schemes can be evaluated
- Output: Annual net return per slot

Printout from DMS
Performance of crossbred cows

<table>
<thead>
<tr>
<th></th>
<th>RDM</th>
<th>HOL</th>
<th>RDM X HOL</th>
<th>RDM X HOL</th>
<th>RDM X (HOL RDM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kg Milk</td>
<td>9401</td>
<td>97</td>
<td>10224</td>
<td>18</td>
<td>102841</td>
</tr>
<tr>
<td>Kg Fat</td>
<td>354</td>
<td>97</td>
<td>341</td>
<td>18</td>
<td>265</td>
</tr>
<tr>
<td>Kg protein</td>
<td>330</td>
<td>97</td>
<td>341</td>
<td>18</td>
<td>265</td>
</tr>
<tr>
<td>Kg F+</td>
<td>689</td>
<td>97</td>
<td>652</td>
<td>18</td>
<td>7270</td>
</tr>
<tr>
<td>Days calf to 1st calving</td>
<td>77</td>
<td>82</td>
<td>94</td>
<td>15</td>
<td>80</td>
</tr>
<tr>
<td>Days 3 to last calving</td>
<td>34</td>
<td>37</td>
<td>38</td>
<td>16</td>
<td>50</td>
</tr>
<tr>
<td>Calv. int. to 2nd calv.</td>
<td>386</td>
<td>43</td>
<td>434</td>
<td>9</td>
<td>381</td>
</tr>
<tr>
<td>Freq. mastitis</td>
<td>0,11</td>
<td>0,85</td>
<td>0,13</td>
<td>16</td>
<td>0,13</td>
</tr>
</tbody>
</table>

- All combinations of sire-, MGS and G-MGS breeds
- Performance of same cows for all traits
- More traits and more lactations
- Published in spring 2016
Beef cross
Number of beef inseminations on dairy cows

Knowledge and tools
– backbone for expansion of beef crossbreeding

- X-index
- Breed statistics
- New insemination plan program
- Simulation results
  - Hjortø et al., 2015, JDS
  - Ettema et al., 2016, JDS
X-index
– Compares beef bulls are across breeds

X-index is a breeding value that helps Danish dairy farmers to select beef sires that produce the economically best crossbred calves

Traits included:
• g/daily net gain
• EUROP classification
• Still birth
• Calving ease

Conclusion

- Production results confirm the SEGES goals on crossbreeding
- Soon the tools needed to handle crossbreeding are available
- Increased Nordic cooperation will be good