## Objective

Develop a useful index to express female fertility (pregnancy rate) of the Walloon dairy cattle combining direct and indirect female fertility information available.

## Methods

- Principal Component Analysis (PCA) on 604 common bulls between the six countries.
- Regressions of INTERBULL proofs on the first principal component.
- Multiple regression method to find best predictors among other traits evaluated in the Walloon Region.
- Theory of selection index to combine DFF and IFF.

## Conclusions

Combined female fertility index provides:

- A pretty good expression of female fertility for Walloon dairy cattle.
- A better accuracy for young bulls.
- A useful first indication of female fertility potentiality for bulls without INTERBULL proofs.

## Results

- First component of PCA explained 80% of total variance of six foreign indexes.
- R² of regressions ranged from .510 to .671.
- IFF<sub>BCS</sub> or IFF<sub>ANG</sub> composed of 9 good predictors of female fertility: milk yield, protein, somatic cell score, stature, body depth, overall udder score, overall feet and legs, final conformation score and body condition score (function of its availability) or angularity.
- CFF = .762 * DFF + .374 * IFF<sub>BCS</sub>
  - CFF = .776 * DFF + .364 * IFF<sub>ANG</sub>

## Material

- Published official female fertility indexes provided by Canada, France, Germany, Italy, Netherlands and USA for bulls in each country.
- Genetic breeding values of female fertility came from Walloon pregnancy rate data.
- International bulls proofs of female fertility evaluated by INTERBULL.
- Official genetic breeding values of other traits evaluated in the Walloon Region for bulls.

## Table 1: Correlations between female fertility indexes and the first principal component for publishable bulls in Walloon Region

<table>
<thead>
<tr>
<th></th>
<th>DFF</th>
<th>IFF&lt;sub&gt;BCS&lt;/sub&gt;</th>
<th>IFF&lt;sub&gt;ANG&lt;/sub&gt;</th>
<th>CFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFF</td>
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<td>.99</td>
<td>.80</td>
<td></td>
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<tr>
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<td>.57</td>
<td>.75</td>
<td>.57</td>
<td>.83</td>
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<tr>
<td>IFF&lt;sub&gt;ANG&lt;/sub&gt;</td>
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<td>.57</td>
<td>.57</td>
<td>.83</td>
</tr>
<tr>
<td>CFF</td>
<td>.82</td>
<td>.75</td>
<td>.57</td>
<td>.83</td>
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<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; component</td>
<td>.82</td>
<td>.75</td>
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</tbody>
</table>

No Loss of information to combine DFF with IFF into CFF.

- Increase of accuracy: 25% between DFF and CFF.
- More publishable bulls with CFF than DFF.

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