Divergent selection for length of productive life in rabbit

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Context

- Length of productive life in rabbit breeding
  - High replacement rate
  - Cost of replacement
  - Low reproduction performances of young females

- Selection on length of productive life
  - A matter for numerous species
  - Selection on genetic merit (e.g. survival analysis)
  - But no experimental demonstration
Objective

- Experiment the feasibility of a selection
  - on length of productive life
  - with estimated breeding values
  - using a survival analysis model

- Evaluate the correlated responses on
  - reproductive performances
  - energy balance
Experimental set up

- Divergent selection
  - L+: high longevity
  - L-: low longevity

- Two experimental farms
  - Farm1: low sanitary control
  - Farm2: high sanitary standard

- Genetic merit estimated
  - from offspring number of AI
  - with the ‘Survival Kit’
  - using previously estimated genetic parameters
Selection criterion

- Batch management
- AI every 42 days
- Length of productive life = total number of AI
- Does still in production after 8 AI were censored
Survival analysis

- Discrete data

- Fixed effects:
  - Time dependant effects:
    - Farm-year-season, parity-physiological status, litter size
  - Time independant effects:
    - age at first fertile AI

- Random effects:
  - Animal
Selection scheme

G1

- Nov 2003: Selection of 48 males
- 240 females + 7 IA from Farm1
- 240 females + 8 IA from Farm2
- Selection: 5 males + 5 males -
- 24 sons + 24 sons -

G2

- Jan 2006: Selection of 8 Al from Farm1
- 240 females + 8 Al from Farm2
- Aug 2007: Selection of 8 AI from Farm1
- 240 females + 8 AI from Farm2
Results G2

Survival rate (%)
## Culling reasons

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<thead>
<tr>
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<th>L-</th>
<th>L+</th>
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<tbody>
<tr>
<td><strong>Farm1</strong></td>
<td>56</td>
<td>54</td>
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<td><strong>Farm2</strong></td>
<td>24</td>
<td>9</td>
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<td><strong>Mortality (%)</strong></td>
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<td><strong>Culled females (%)</strong></td>
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Reproductive performances

- No effect of selection
  - On fertility
  - On litter size
Conclusion

- Selection seems efficient
- No unfavourable response on reproductive performances
- Unanswered question: symmetry of the response
- In progress: balance energy analyses
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