Empirical analysis of SCC impact on production and carryover

J. A. Baro, B. Sañudo
Universidad de Valladolid
ICAR compliant milk recording schemes

- Multitrait
- Individual
- Monthly

- Most European countries
- Decades in operation
- Huge data sets
Objective:
To explore the evolution of distributions of yields
Across recorded factors &
Along Somatic Cell Counts

Data:
2\textsuperscript{nd} largest milk recording organization in Spain
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To explore the evolution of distributions of yields
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Data:
2\textsuperscript{nd} largest milk recording organization
Castilla y León, Spain
100,000 milking cows
6.8 Million rec’s
Methods

Test day SCC & Milk yield

Logarithmic\textsubscript{10} transforms of SCC (~ no. of digits)
Empirical analysis of SCC impact

**Methods**

**Test day SCC & Milk yield**

Joint Distribution of milk yield and $\log_{10} \text{SCC}$
Methods

Test day SCC & Milk yield
Regression of milk yield on $\log_{10}SCC$
Across a set of milk yield quantiles
Methods

Test day SCC & Milk yield
Regression of milk yield on $\log_{10}^{\text{SCC}}$
Across a set of milk yield quantiles

![Graph showing the regression of milk yield on log SCC across different yield quantiles.](graph.png)
Impact of SCC on milk yield

- Healthy udder:
  
  \[7.6 \text{ kg/d} \cdot \log_{10} \text{ unit}\]

The trend stops at different SCC:

Yield quantile: \(\text{cel/\mu l}:\)

- 90%: 126
- 70%: 158
- 50%: 200
- 30%: 251
- 10%: 398

[Graph showing the impact of SCC on milk yield with different quantiles and corresponding yield values.]
Methods

Impact of SCC on milk yield

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  \[ 7.6 \text{ kg/d} \cdot \log_{10} \text{unit} \]

The trend stops at different SCC:

**Yield quantile:** cel/µl:
- 90%: 126
- 70%: 158
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High yield cows are more resilient, or vice versa.
Methods

Impact of SCC on milk yield

Carryover: effect of previous count on present yield

Yield Quantile:
- 90
- 70
- 50
- 30
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Methods

Impact of SCC on milk yield

Carryover: effect of previous count on present yield

- Lower previous counts
  (sicker udder now)
  ~1 kg/d lower yield
- *et viceversa*
  except for very low yield cows
  and for counts beyond 2000 cel/μl
CONCLUSIONS

- Regression of yield on log-counts provides accurate and repeatable prediction of mastitis related milk yield losses and carryover effects
- Lower cell counts on the previous month are associated with slightly lower yields
- Use: extension, expert systems, prediction of future yields
- Traditional SCC is not the best systematic indicator of mastitis available anymore
- Better criteria (differential cell counts) will improve the power and scope of this approach.
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Thank you!