SELECTION FOR FEED EFFICIENCY IN HOLSTEIN COWS BASED ON DATA FROM THE EFFICIENT COW PROJECT

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Approach – field data for novel traits

- Study based on data of Austrian project **„Efficient Cow"**

- Extended data recording on-farm on **161 farms in Austria** with app. 6,500 cows for one year (1.1.2014 – 31.12.2014)

- **Data recorded**: general information about the farm, various data related to **health** (veterinarian diagnoses, claw trimming, farmer observations, milk ketotest,...), **feeding information**, **body weight** and body measures, linear scoring, **body condition score**, **lameness**, infrared-spectra,...

- **Dry matter intake:** Individual feed intake was impossible to measure on-farm. To get information on feed intake on a relatively large number of cows, dry matter intake was estimated according to the model of Gruber et al. (2004).

Aim of the presentation

- Genetic parameters for efficiency traits

- Efficient cows
  - Milk yield
  - Body weight
  - Dry matter intake
  - BCS
  - Fat-protein ratio
  - Fertility
  - Health

Genetic parameters for efficiency

Data: 7,037 records from 1,152 Holstein cows

Efficiency traits

- $ECM/BW^{0,75}$ = Body weight efficiency
- ECM/DMI = Feed efficiency
- $ECM/INEL$ = Energy efficiency

Model

- <u>Fixed effects:</u> Herd, Year*season of calving, Parity-age at calving, Parity-lactation stage, Parity-pregnancy stage

- <u>Random effects:</u> Animal (genetic effect), Permanent environmental effect, Herd-test-day

Genetic parameters for efficiency

Trait	Heritability
ECM/BW^{0,75}	0.14
ECM/DMI	0.12
ECM/INEL	0.11

Efficiency traits were highly correlated (0.93-0.99)

Efficient cows

Estimated breeding values for **ECM/INEL**

Division into 3 groups

- **Low EBV for efficiency** (10% of cows)

- **Medium EBV for efficiency**

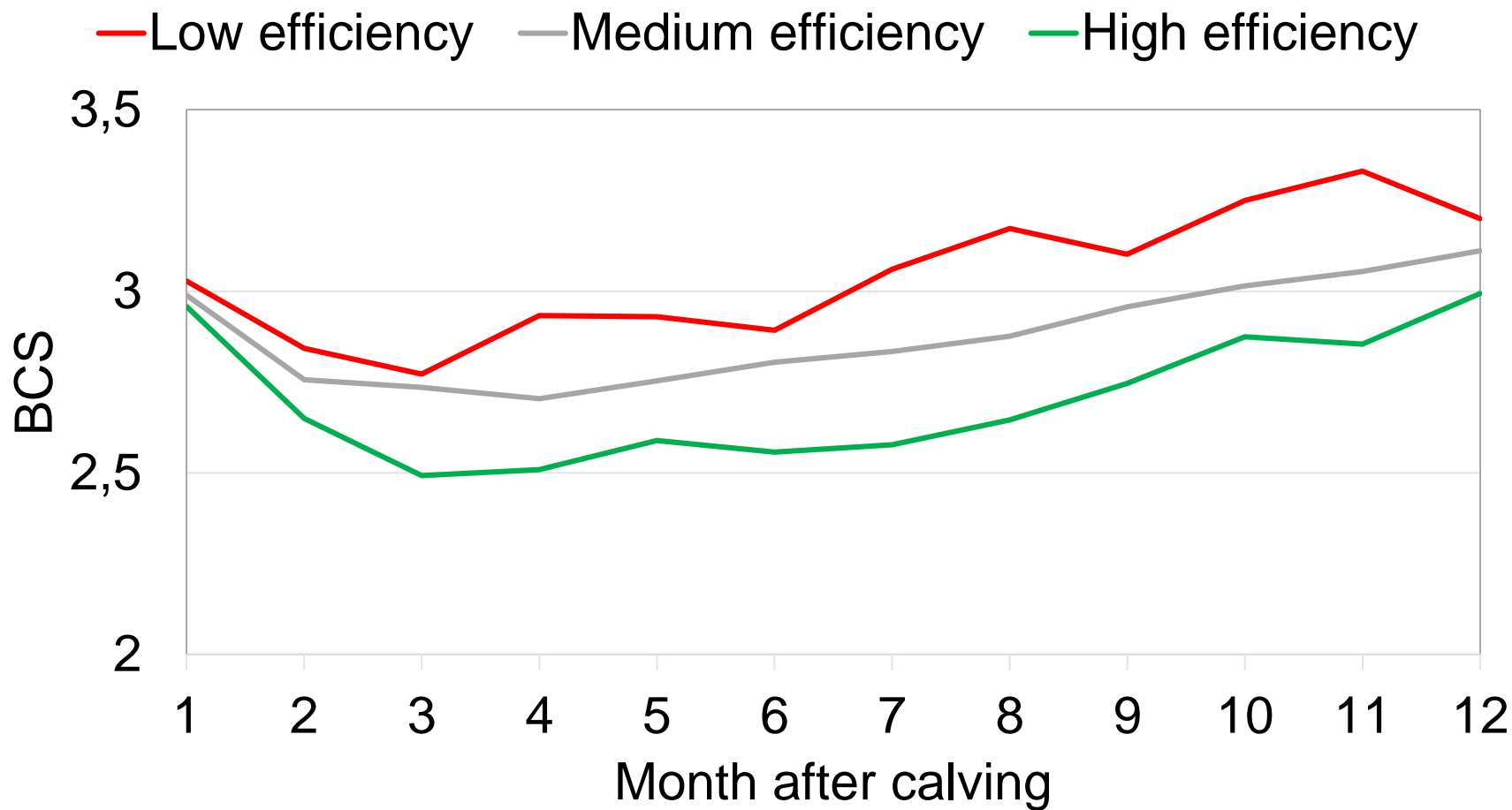- **High EBV for efficiency** (10% of cows)
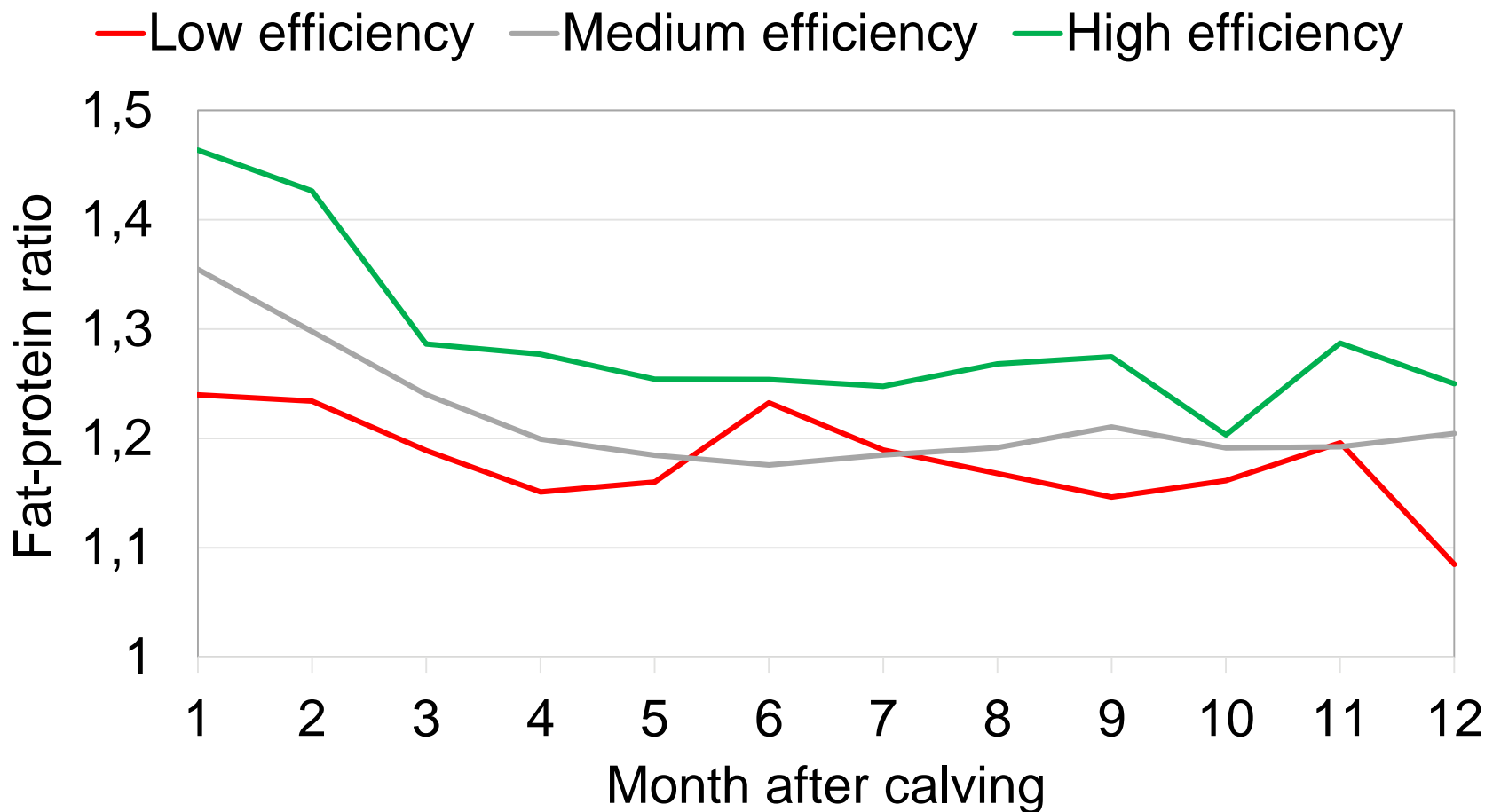
Efficiency and milk yield
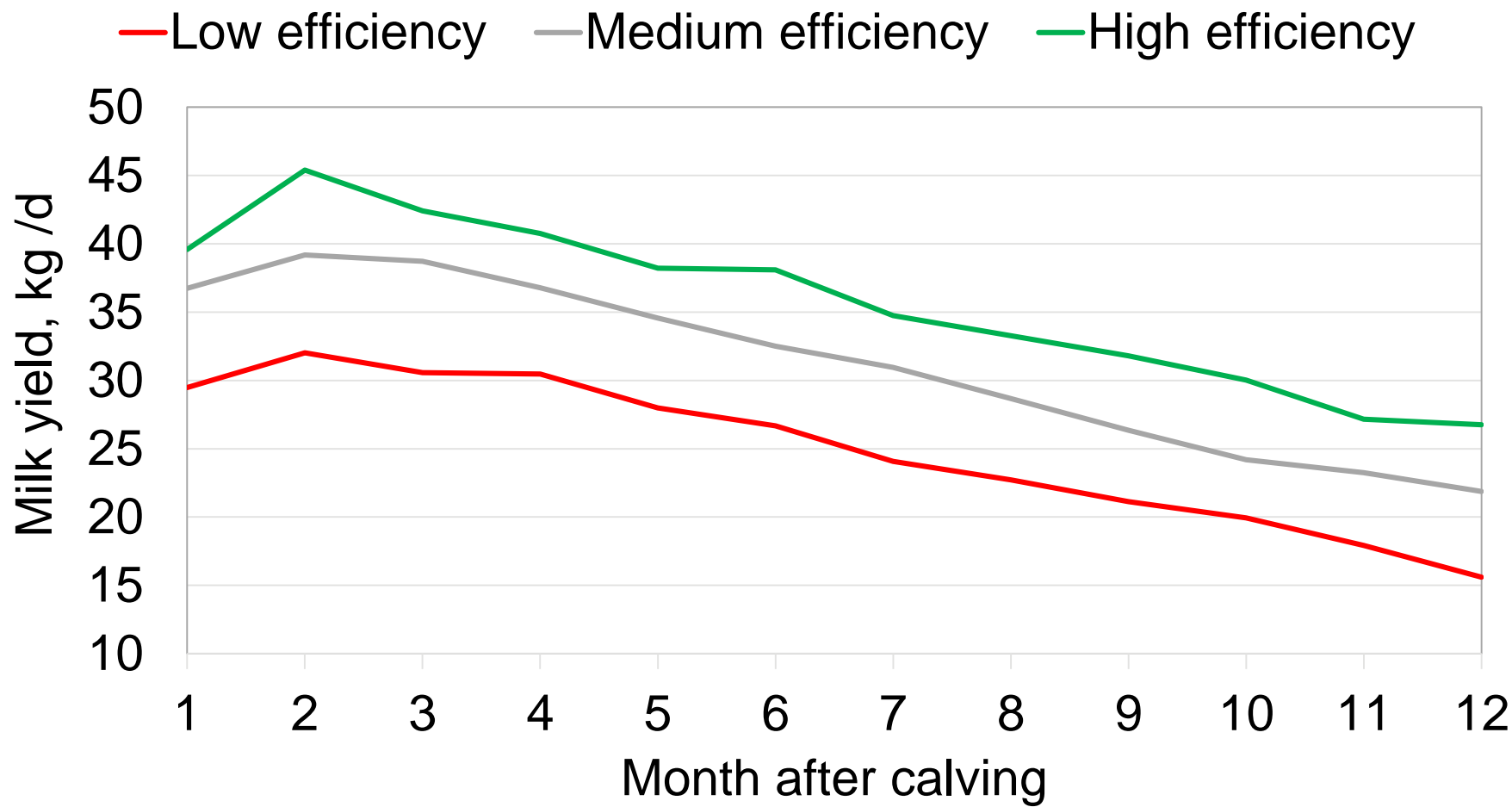
Efficiency and body weight
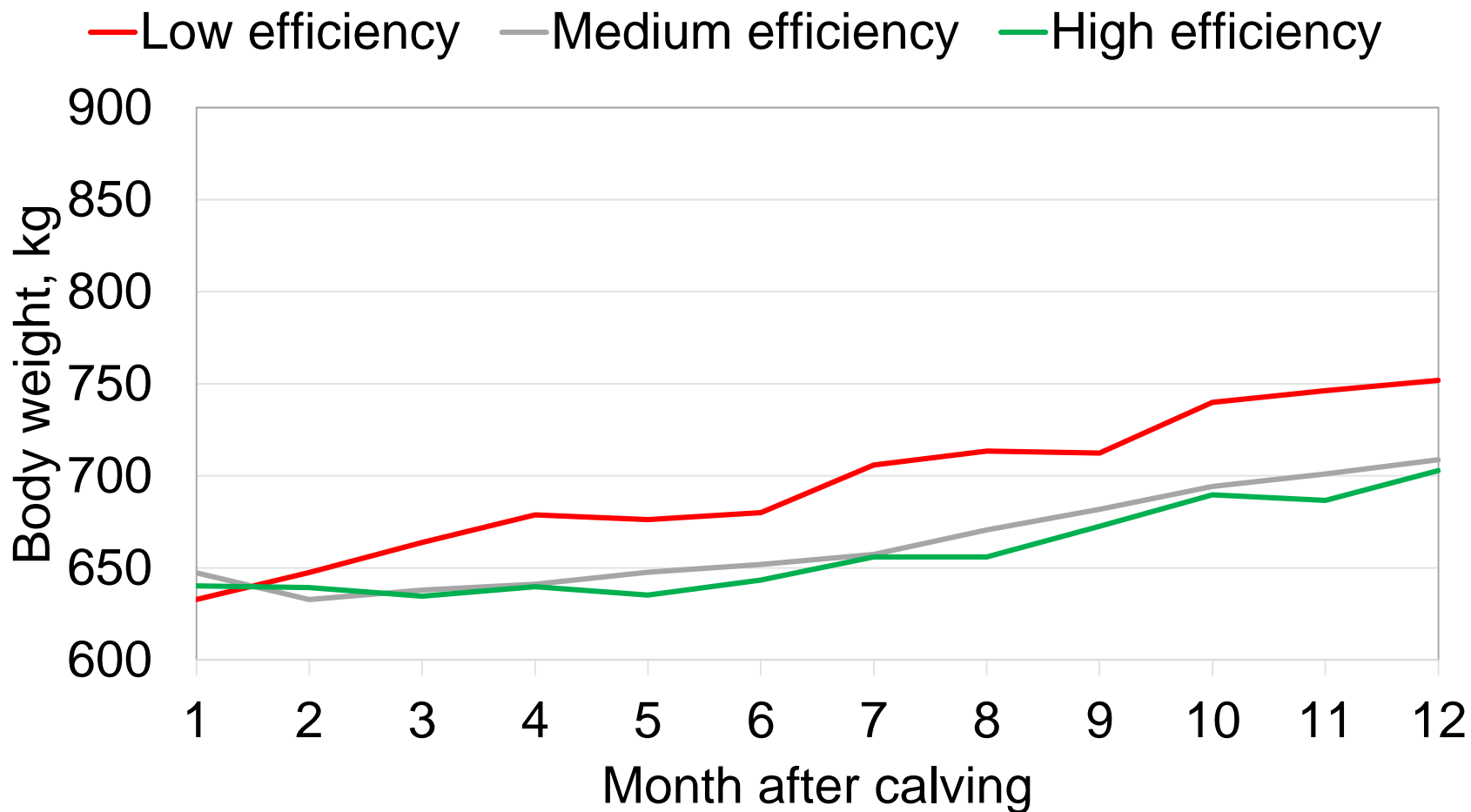
Efficiency and dry matter intake
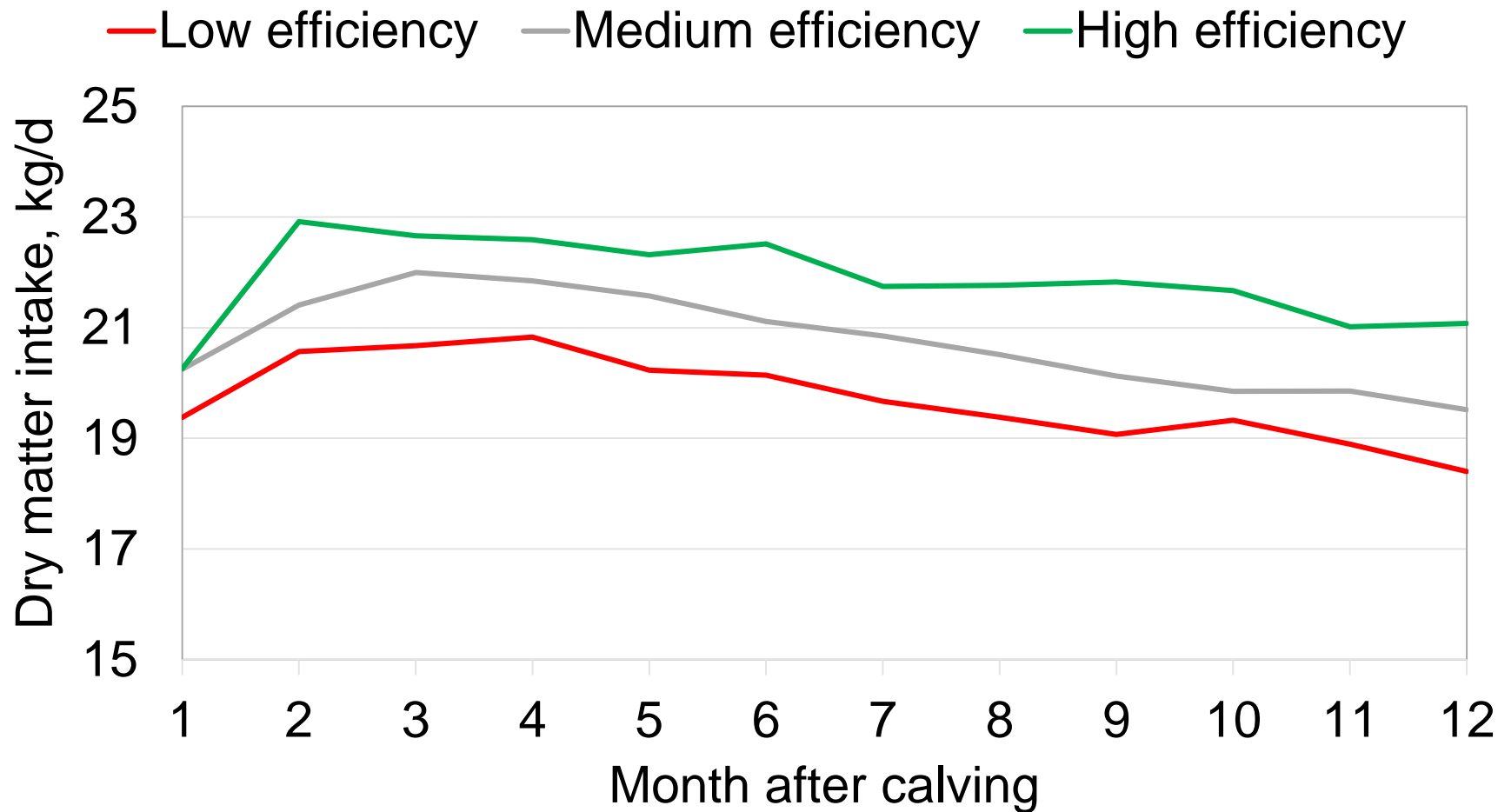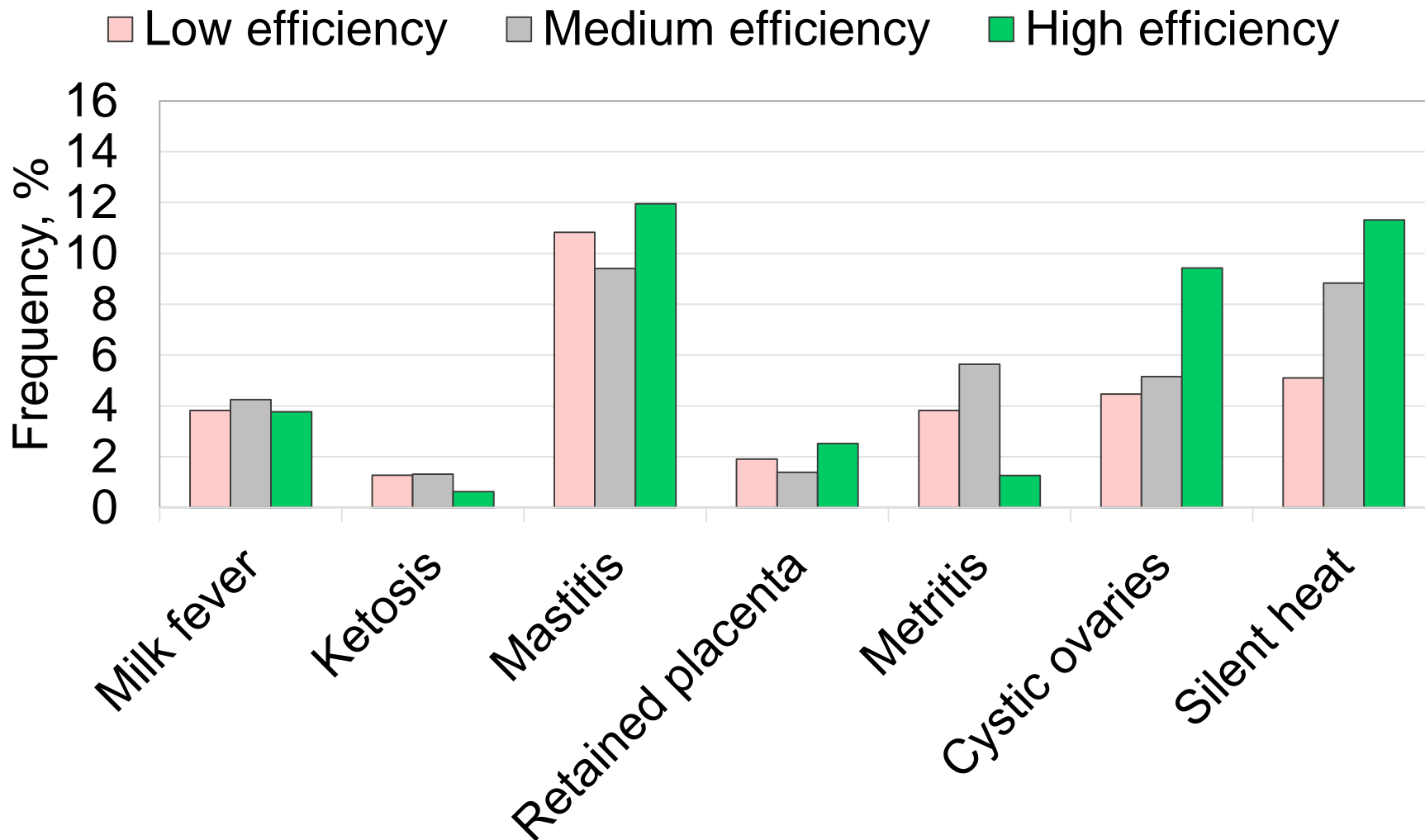
Efficiency and BCS

Efficiency and fat-protein ratio
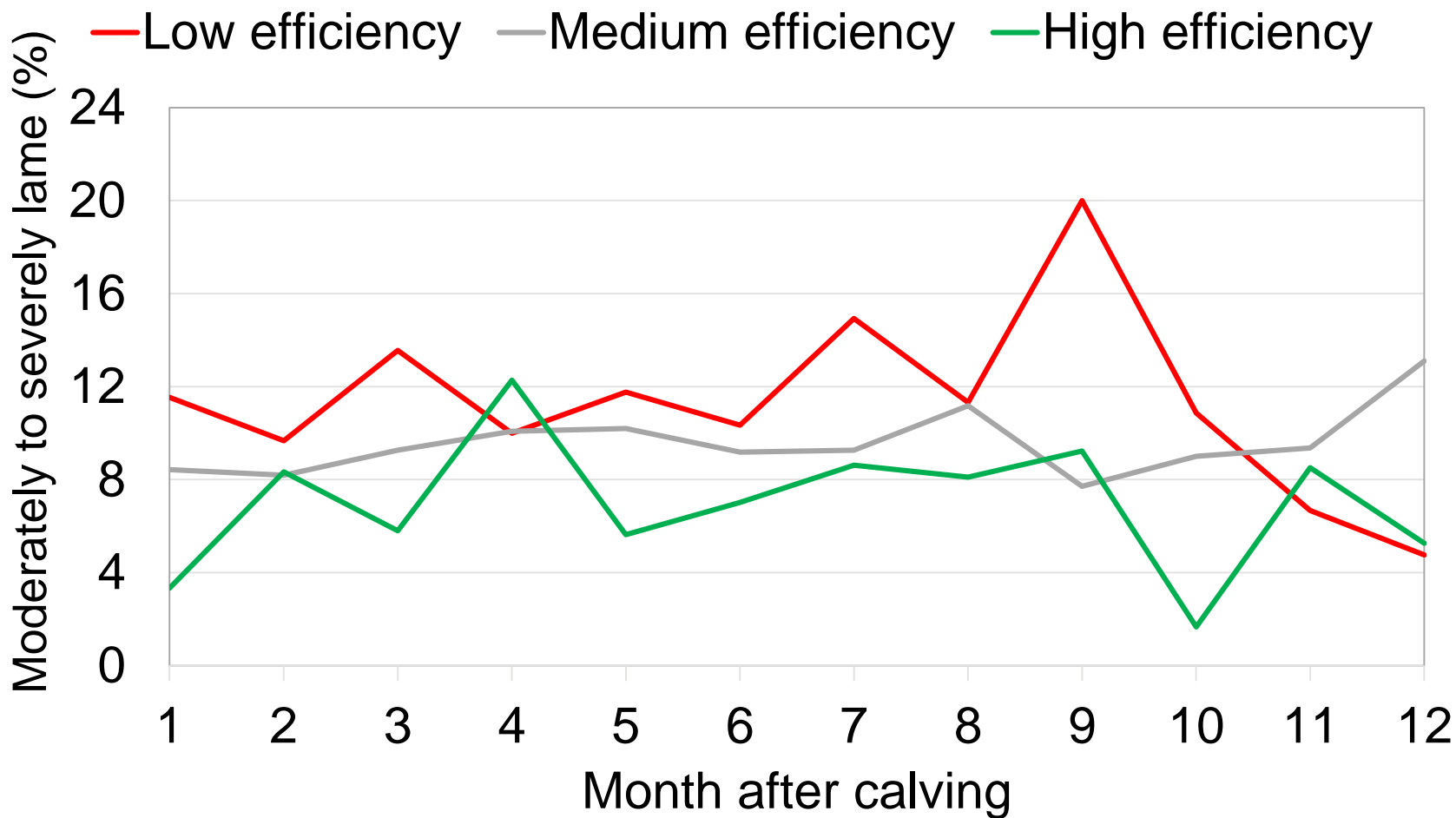
Efficiency and calving interval
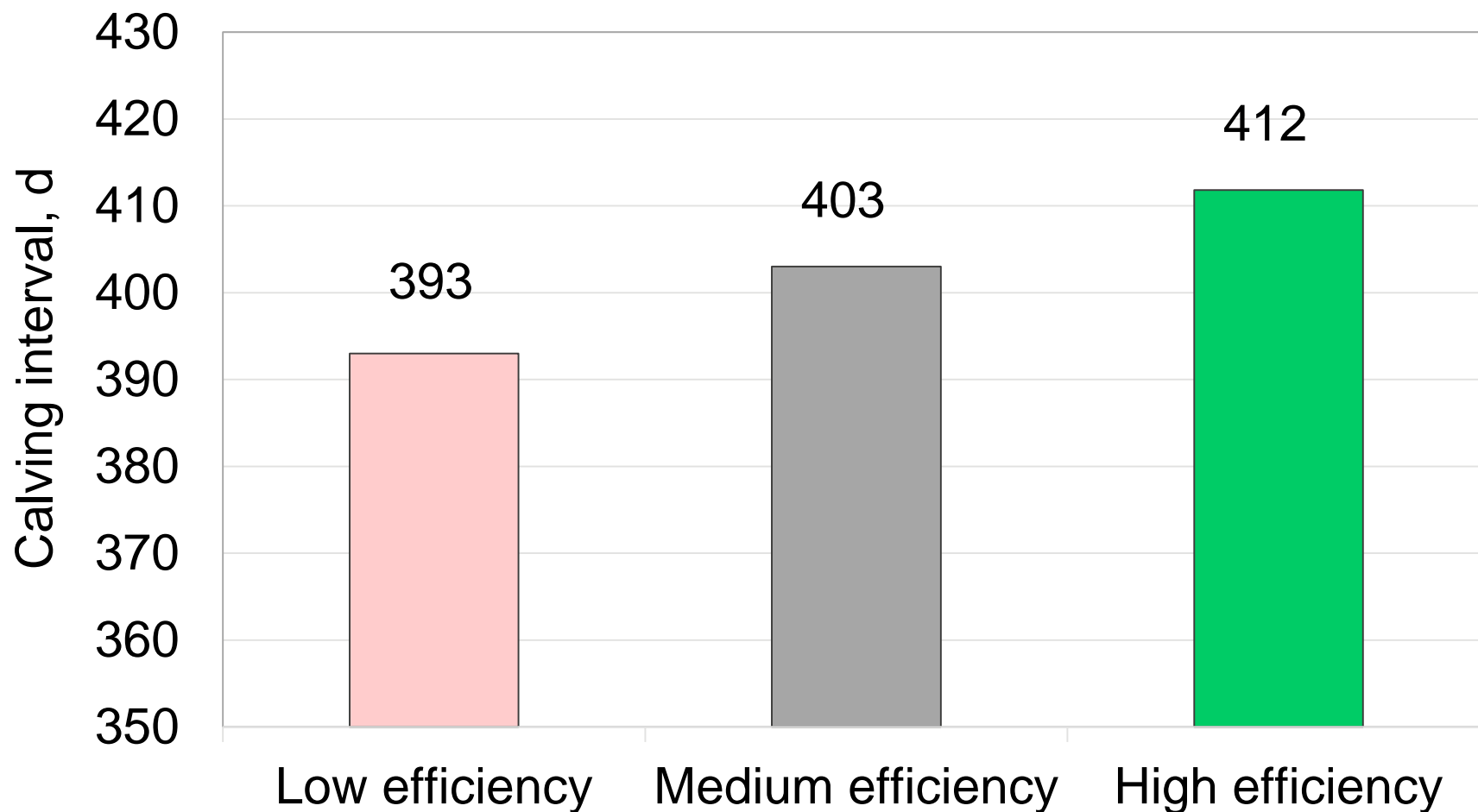
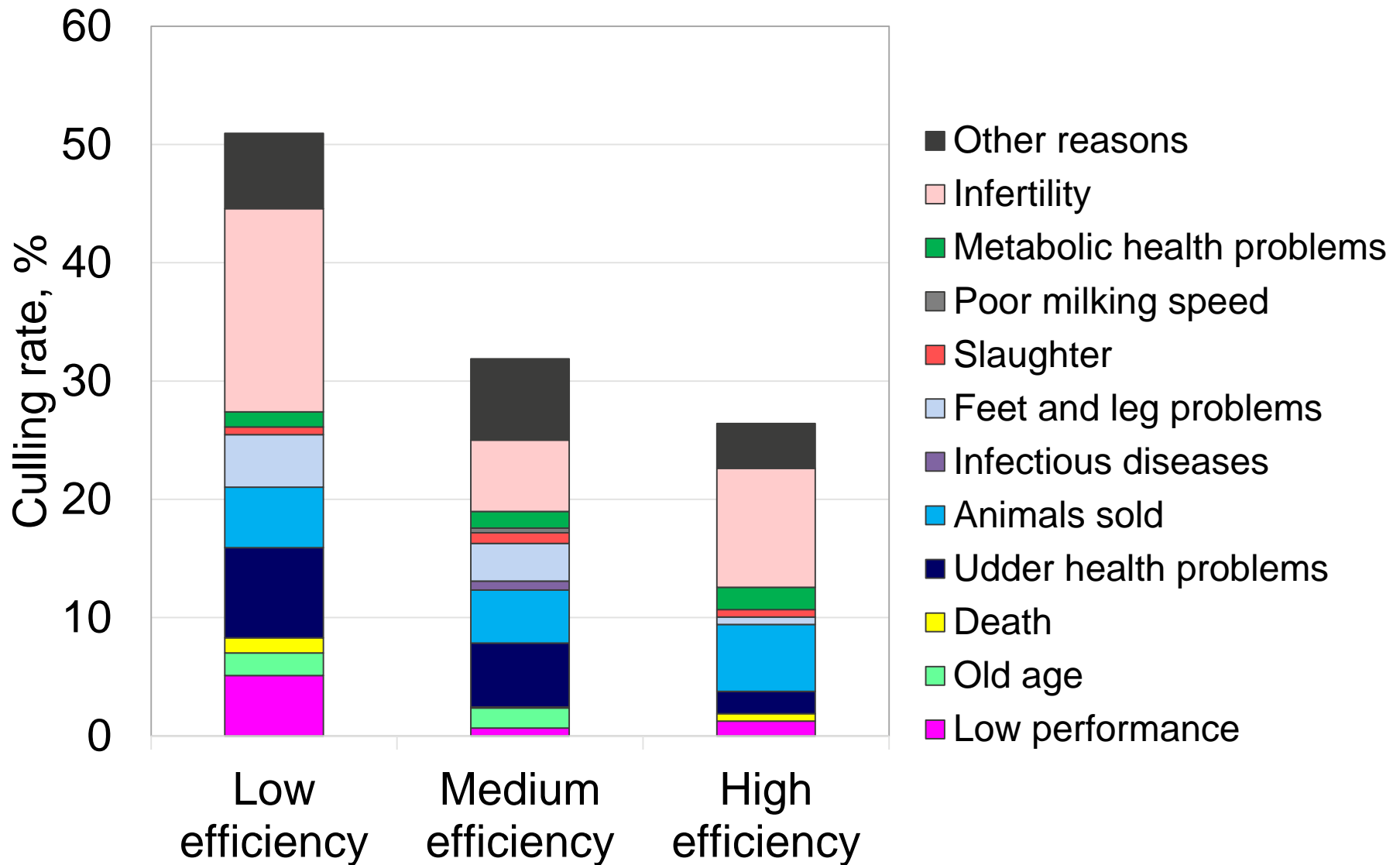# Efficiency and disease resistance

Efficiency and SCS
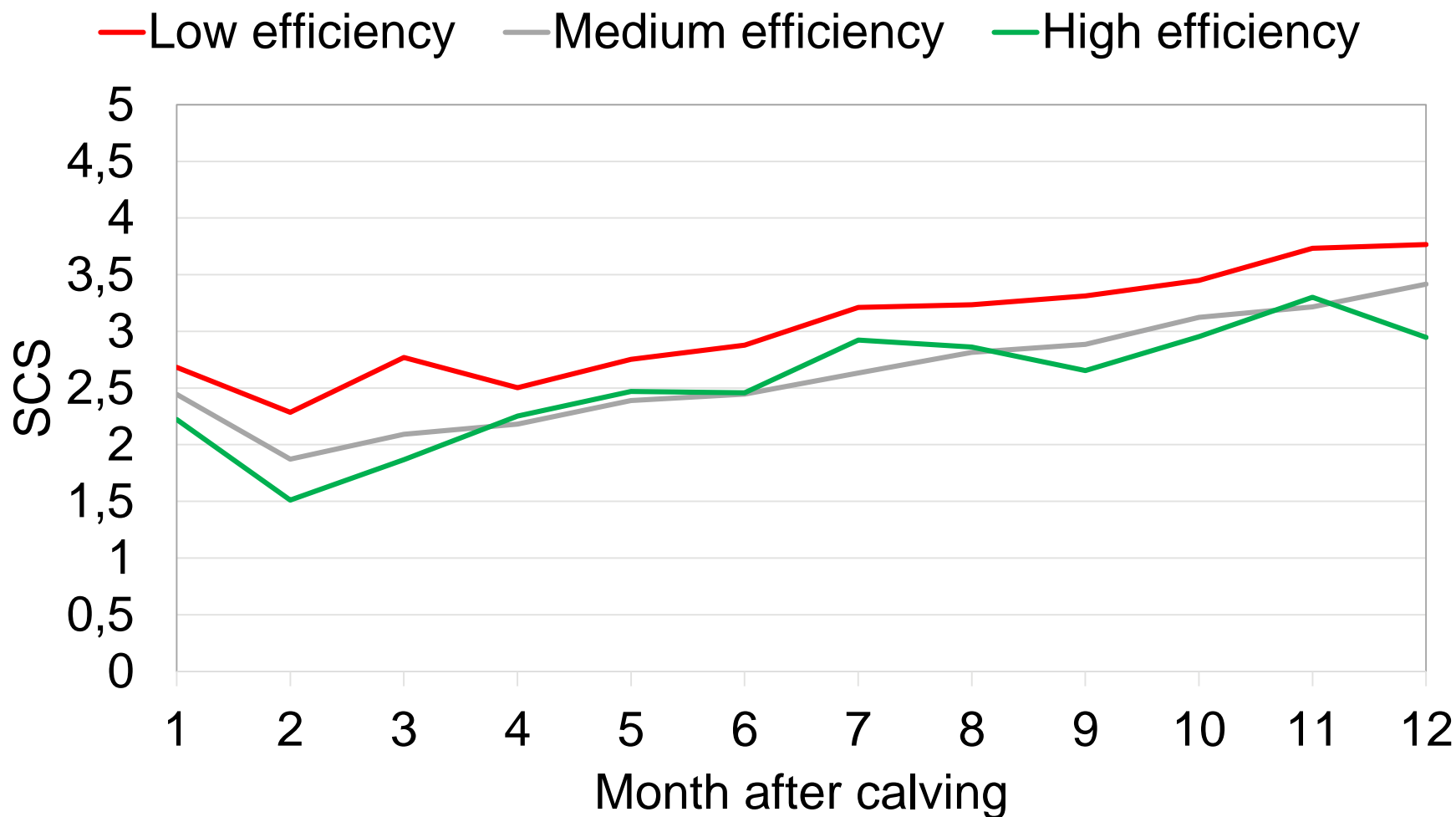
Efficiency and lameness

Efficiency and culling rate

Conclusions

Efficient cows

- Milk yield ↑
- Body weight ↓
- Dry matter intake ↑
- BCS ↓
- Fat-protein ratio ↑
- Fertility ↓ (calving interval ↑, cystic ovaries ↑, silent heat ↑)
- Somatic cell score ↓
- Lameness ↓
- Culling rate ↓

Cows with a medium efficiency combine both, a high milk yield with good fertility and health!

Acknowledgement

Thank you!

Dry matter intake and SCS
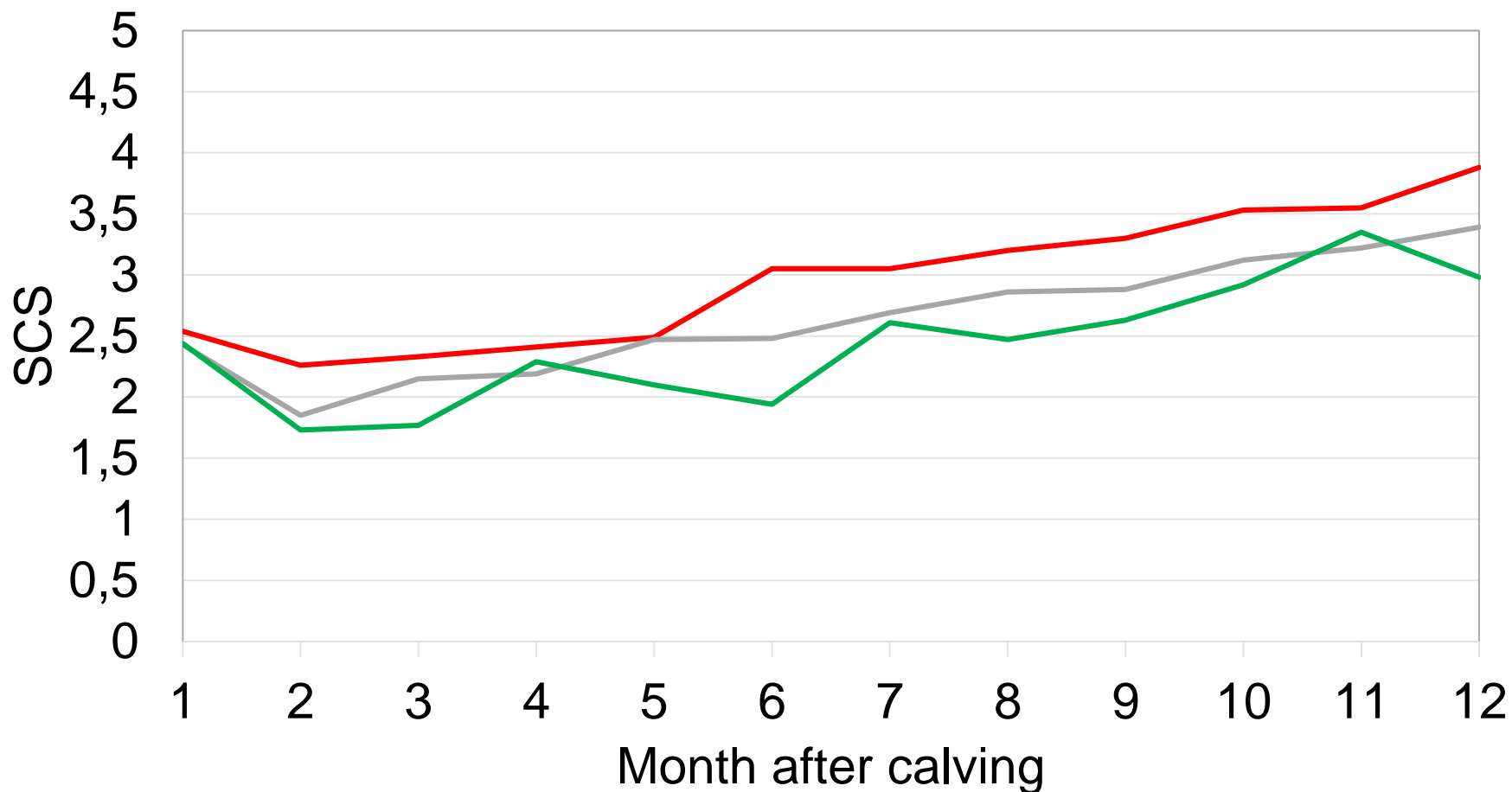
Dry matter intake and lameness