Genetic parameters of Austrian Fleckvieh cattle in organic and conventional production systems with different levels of management

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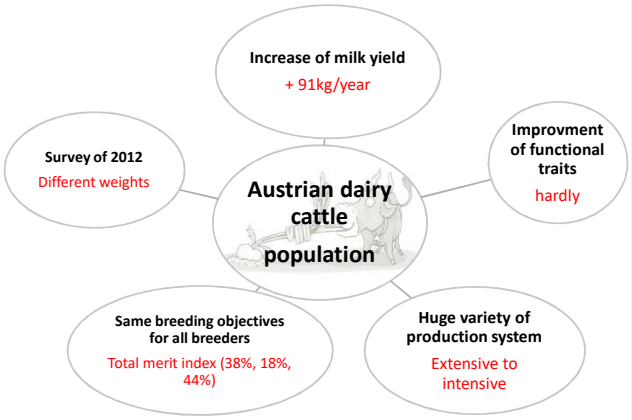
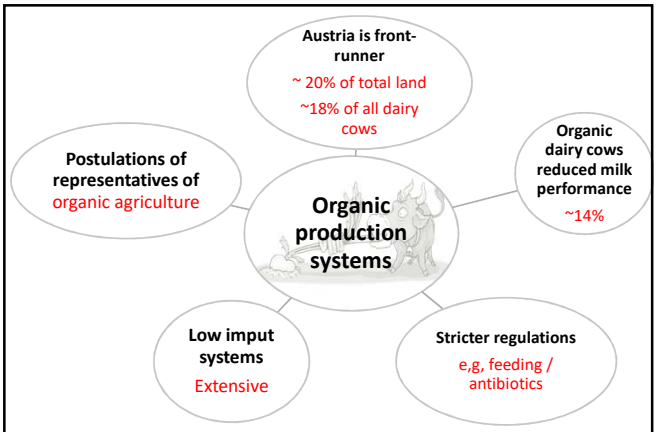
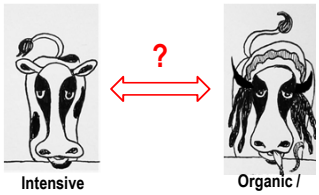




Assumptions

- Organic and extensive farming strategies follow different breeding goals



→ Do we select the best animals for the different production systems in Austria?

Objectives (I)

- Investigation of G x E interaction for different production systems (Pfeiffer et al., 2016 Livestock Science)
- Estimation of genetic parameters (h^2 and r_a) of different production systems
  - Milk kg
  - Fat kg
  - Protein kg
  - Persistency
  - Somatic cell score (**SCS**)
  - Functional longevity (**LONG**)
  - Milking speed (**MS**)
  - Udder health index (**UHI**)
  - Fertility index (**FI**)

Objectives (II)

- Conduct an approximate multitrait 2-step procedure applied to yield devations and de-regressed breeding values
- According to results reccomentations for specific breeding programmes can be given

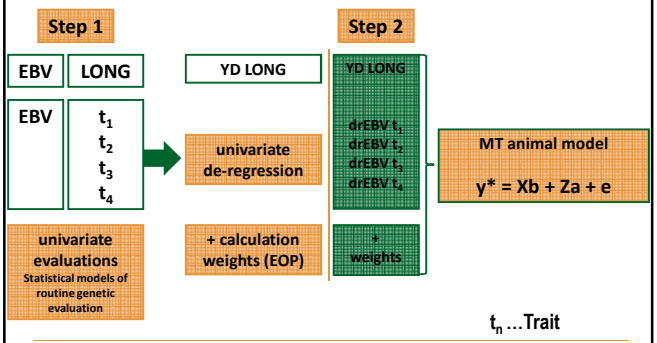
Materials & methods

- Data basis
  - Whole Austrian Fleckvieh cow population
  - Maximum 12.5% non-Fleckvieh-gene proportion
  - All 9 traits recorded
  - Born between 1999 and 2011
  - Known parents
  - Herd size ≥ 5 lactating cows
- Organic (**Organic**) - conventional low (**ConL**) – conventional high (**ConH**)
- Grouping according to the herd-year-effect (**HYE**) for milk yield
  - ± 2 SD from the HYE mean
  - Indicator for farm management

Summary of the production systems

	Organic	ConL	ConH
Animals (n)	46,015	30,840	53,882
Farms (n)	2,657	1,948	1,486
Range HYE	3,274 – 7,287	1,948 – 4,800	6,220 – 8,350
Mean HYE	5,076	4,452	6,558
SD HYE	574	305	312
Pedigree (n)	162,560	118,010	159,943

Approximate multitrait 2-step procedure



Models

- Univariate or bivariate animal model

$$y^* = Xb + Za + e$$

- ASReml

Results and Discussion – Heritabilities

	Organic	ConL	ConH
Milk kg	0.63	0.59	0.65
Fat kg	0.50	0.45	0.55
Protein kg	0.57	0.51	0.57
Persistency	0.56	0.52	0.62
SCS	0.23	0.22	0.29
LONG	0.07	0.09	0.04
MS	0.27	0.21	0.33
UHI	0.12	0.15	0.21
FI	0.06	0.04	0.05

SE ≤ 0,02

Results and Discussion – Genetic correlation MILK kg

	Organic	ConL	ConH
Fat kg	0.66	0.70	0.66
Protein kg	0.84	0.85	0.86
Persistency	-0.04*	-0.12	0.01*
SCS	-0.01*	0.09	0.01*
LONG	-0.23	-0.29	-0.23
MS	0.36	0.45	0.34
UHI	-0.01*	0.05*	0.01*
FI	-0.15	-0.32	-0.14

*not significantly different from zero

Conclusions

- Applied procedure was **feasible**
- **Similar genetic heritabilies** and **genetic correlations** between traits
- **Similar** production environments and farm managements
- **Slight** G x E for **several traits but close to unity** (Pfeiffer et al., 2016)
- ***Independent* breeding objectives** are currently ***not* needed**
- More research required for **indicators** of **ConL** farms