



Inclusion of direct health traits in the total merit index of Fleckvieh and Brown Swiss cattle in Austria and Germany

C. Fuerst and C. Egger-Danner,
fuerst@zuchtdata.at

ICAR 2014 – Session „Functional Traits“

Berlin, 22nd of May, 2014

ZuchtData EDV-DIENSTLEISTUNGEN GMBH

ZAR RINDERZUCHT AUSTRIA

Background

- Recording of veterinarian diagnoses started in Austria in 2006
- Official breeding values for direct health traits for Fleckvieh (Simmental) in Austria and Germany (DEA) since 2010
- Southern Germany (Bavaria and Baden-Württemberg) start of recording of veterinarian diagnoses in 2010
- Since August 2013 German veterinarian diagnoses included in routine genetic evaluation in DEA for Fleckvieh and Brown Swiss
- Since August 2013 inclusion of breeding values for direct health traits in official total merit index (TMI) in DEA

Objective of presentation

- present the construction of fertility and udder health index
- present their implementation into the official total merit index in Austria and Germany
- give an overview about further developments

Direct health traits in genetic evaluation (DEA)

	Fleckvieh		Brown Swiss	
Trait	N	Frequency (%)	N	Frequency (%)
Mastitis (MAS) (till 150 d)	670,772	9.5	75,325	10.5
Early repr. disorders (EREP)* (till 30 d)	741,911	4.5	83,812	6.4
Cystic ovaries (CYST) (30-150 d)	658,355	4.7	74,036	2.9
Milk fever (MF) (till 10 d)	756,774	2.4	85,421	2.8

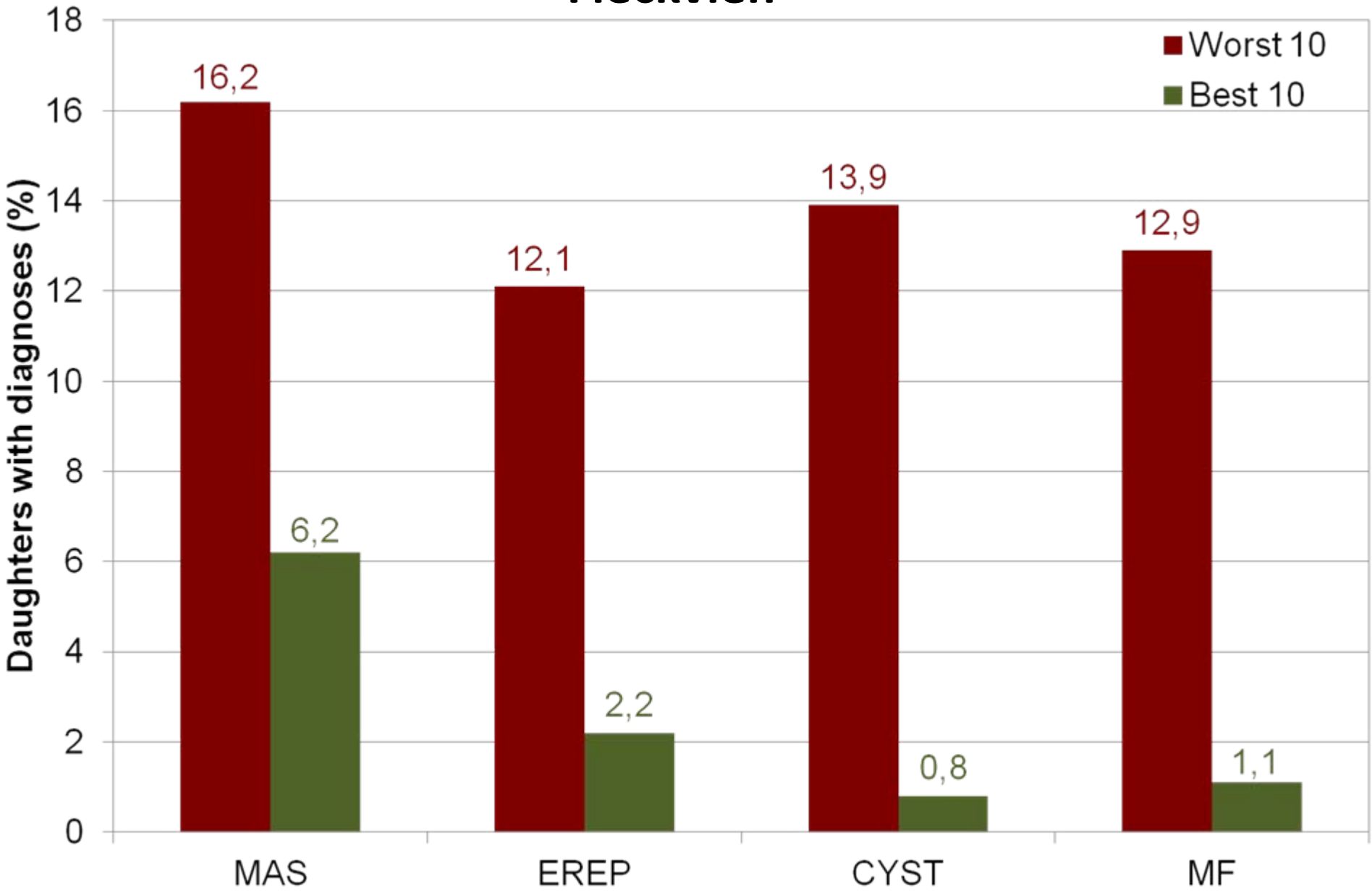
* metritis, retained placenta, puerperal disorders

Routine genetic evaluation in DEA

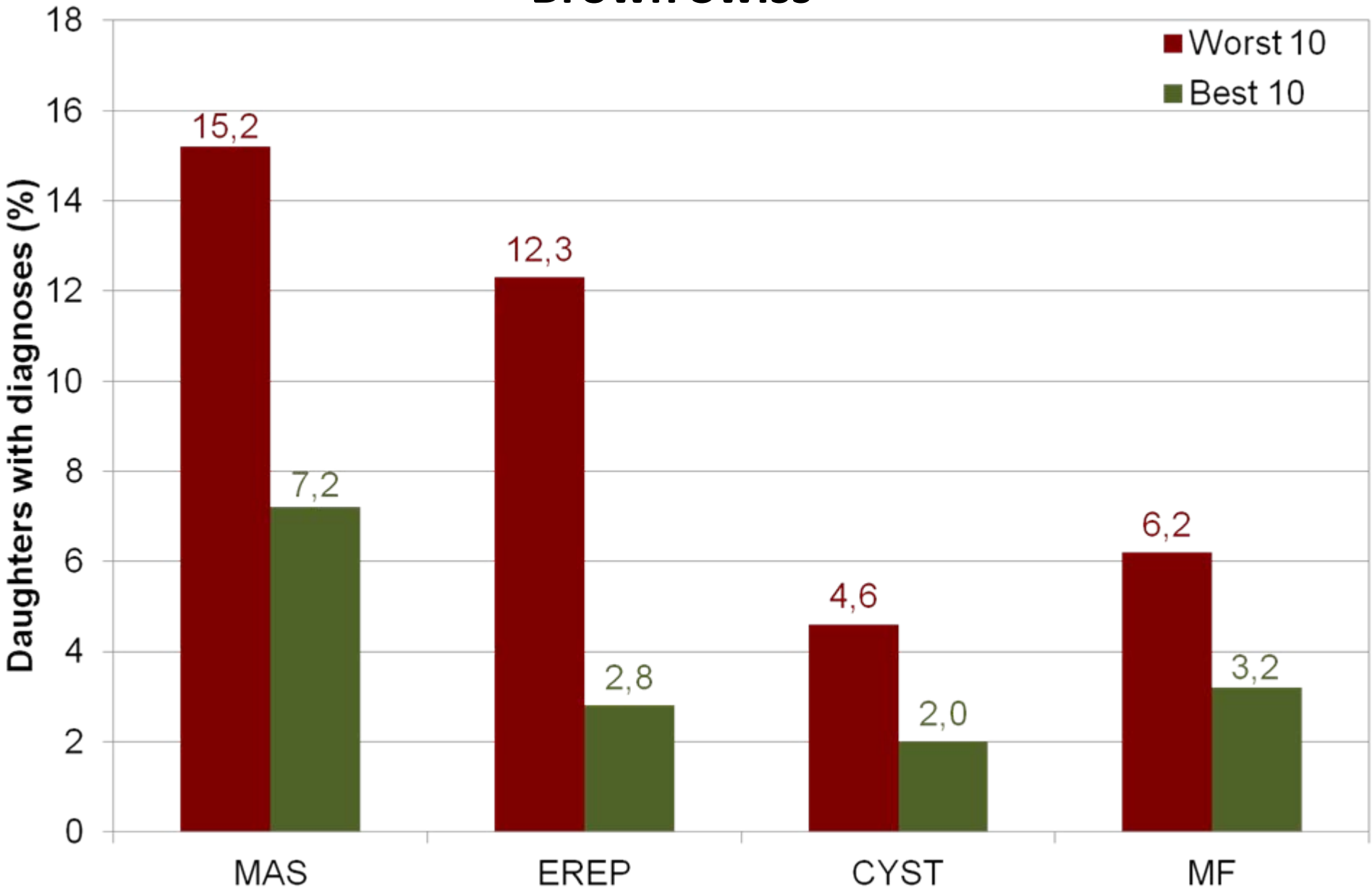
Model and genetic parameters

- Routine genetic evaluation with MiX99 (Lidauer et al., 2008) based on a univariate linear AM (Fuerst et al. (2011))
- Heritabilities:
  - *Fleckvieh: MAS (2.0%), EREP (2.3%), CYST (4.6%), MF (3.6%)*
  - *Brown Swiss: MAS (3.0%), EREP (2.2%), CYST (1.1%), MF (1.7%)*
- Routine evaluation 3 times a year by ZuchtData
- Published as relative EBVs - mean of 100 and 12 points for one genetic SD
- Between 3,161 and 4,128 Fleckvieh bulls and between 323 and 677 Brown Swiss bulls with official EBVs for different health traits (reliability >30%)

Fleckvieh


Daughters with diagnoses (%)
18
16
14
12
10
8
6
4
2
0
Worst 10
Best 10
16,2
6,2
12,1
2,2
13,9
0,8
12,9
1,1
MAS
EREP
CYST
MF

Brown Swiss


Daughters with diagnoses (%)
18
16
14
12
10
8
6
4
2
0
Worst 10
Best 10
15,2
7,2
12,3
2,8
4,6
2,0
6,2
3,2
MAS
EREP
CYST
MF

Fertility index

- **Old fertility index (FRUm):** non-return rate and interval from first to last insemination for heifers and cows (Fuerst & Gredler, 2009).
- **August 2013**: index extended by the two direct health traits EREP and CYST.

	FRUm	EREP	CYST
FRUm	1.00	0.52	0.44
EREP		1.00	0.22
CYST			1.00

- **Relative economic weights** per genetic standard deviation are 53, 33 and 14% for Fleckvieh and 51, 34 and 15% for Brown Swiss for FRUm, EREP and CYST (Fuerst-Waltl et al., 2010).
- **New fertility index FRW replacing FRUm**.

Udder health index

- EBVs for MAS were published for Fleckvieh bulls since 2010, but were not included in any selection index.
- **New udder health index (EGW)** consists of the EBVs for SCS and MAS with economic weights of 70 and 30. Weights based on analyses to optimize the selection response for udder health.
- Additionally three udder conformation traits included as indicator traits:
  - Fleckvieh: fore udder attachment, udder depth and front teat placement
  - Brown Swiss: fore udder attachment, udder depth and rear teat placement
  - **EGW is published additionally to the EBVs for SCS and MAS.**

Genetic correlations - udder health index

Fleckvieh

	SCS	MAS	Fore udder attachment	Udder depth	Front teat placement
SCS	1.00	0.71	0.28	0.40	0.18
MAS		1.00	0.38	0.64	0.28
Fore udder attachment			1.00	0.62	0.41
Udder depth				1.00	0.34
Front teat placement					1.00

Brown Swiss

	SCS	MAS	Fore udder attachment	Udder depth	Rear teat placement
SCS	1.00	0.60	0.24	0.30	0.15
MAS		1.00	0.60	0.51	0.16
Fore udder attachment			1.00	0.65	0.39
Udder depth				1.00	0.33
Rear teat placement					1.00

Composition of new TMI for Fleckvieh in DEA (new and *old* TMI)

		w per unit	Relative (%)	
Dairy	**Fat kg**	0.45	4.4	**37.8**
	Protein kg	4.50	33.4	
Beef	**Net daily gain**	1.34	7.3	**16.5**
	Dressing %	0.85	4.6	
	Trading score	0.85	4.6	
Fitness	**Longevity**	2.47	13.4	**43.7**
	Persistency	0.36	2.0	
	Fertility index *(Fertility female)*	1.25	6.8 *(6.8)*	
	Calving ease	0.68	3.7	
	Stillbirth	1.49	8.1	
	Udder health index *(Somatic Cell Count)*	1.78	9.7 *(9.7)*	
	Milkability	0.36	2.0	**2.0**

Composition of TMI

- No higher weight on the trait complexes at the moment, only impact on composition within fertility index and udder health index presently
  - correlation between new and old TMI > 0,997
- **Research project "OptiGene" in process**:
  - re-estimate the economic weights
  - optimize the index calculation
  - and revise the composition of traits in the TMI in order to improve the genetic gain particularly for fitness and health traits
- Committee to evaluate and update TMI for Fleckvieh and Brown Swiss in DEA installed.

Further measures

- Measures to extend recording of direct health data (veterinarian diagnoses and observations):
  - different projects and initiatives to promote recording of veterinarian diagnoses (management tools for veterinarians, ...)
  - health related observations by farmers especially around calving (very good experience for retained placenta and milkfever)

➡ Conclusion of experience on recording of direct health traits in Austria:

  - continuing emphasis on veterinarian diagnoses in Austria as multidisciplinary use and additional benefits are possible,
  - but measures to improve data quality and quantity need to be implemented

Summary

- Direct health traits included in fertility index and udder health index and TMI for Fleckvieh and Brown Swiss in DEA since August 2013
- So far on inclusion of direct health traits first in total merit index with relatively low weight (genetic correlation between old and new TMI =0,997) – first step!
- Expansion of data recording for health traits required for higher weight in the index
- Research project ongoing to improve TMI
- Accompanying process of evaluation and updating of TMI has been started for Fleckvieh and Brown Swiss in Austria and Germany

Acknowledgement

- Excellent cooperation within committee of genetic evaluation between Austria and Germany.
- Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) in Austria, the University of Life Sciences, Vienna and the Federation of Austrian Cattle Breeders for the support within the project „OptiGene“.


Thank you for your attention!