Interbull 2016
24-25 October 2016, Puerto Varas, Chile

GENETIC PARAMETERS FOR BODY WEIGHT, BCS AND LAMENESS IN AUSTRIAN DAIRY COWS

Astrid Köck[1], Birgit Fuerst-Waltl[2], Franz Steininger[1] and Christa Egger-Danner[1]

[1] ZuchtData EDV-Dienstleistungen GmbH

[2] University of Natural Resources and Life Sciences, Dep. Sust. Agric. Syst., Div. of Livestock Sciences

Approach – field data for novel traits

- Study based on data of Austrian project „Efficient Cow“
- **Preselection of farms** with higher degree of phenotype recording across different production conditions in Austria
- Extended data recording on-farm on **170 farms in Austria** with app. 5,500 cows for one year (1.1.2014 – 31.12.2014)
  - 3,200 Fleckvieh (Simmental)
  - 1,200 Brown Swiss
  - 1,100 Holstein
- **Data recorded**: general information about the farm, various data related to health (veterinarian diagnoses, claw trimming, farmer observations, ketotest,...), feeding information, body weight and body measures, linear scoring, body condition score, lameness, infrared-spectra,...

Aim of the presentation

- Does body weight have an impact on lameness?
- Use of management traits like body weight (BW), body condition score (BCS) and lameness (LAME) for breeding ?

Observed data

	Nr. obs.	Nr. cows	Body weight (kg/std)	BCS (1-5/std)	Lame (1-5/std)
Fleckvieh (Simmental)	21,650	3,421	731,3 (85,2)	3.29 (±0.55)	1,29 (±0.66)
Brown Swiss	9,826	1,488	651,9 (75,4)	3.06 (±0.51)	1.24 (±0.62)
Holstein	7,319	1,192	682,8 (77,4)	2.86 (±0.62)	1.44 (±0.75)

Records between 5 and 365 DIM

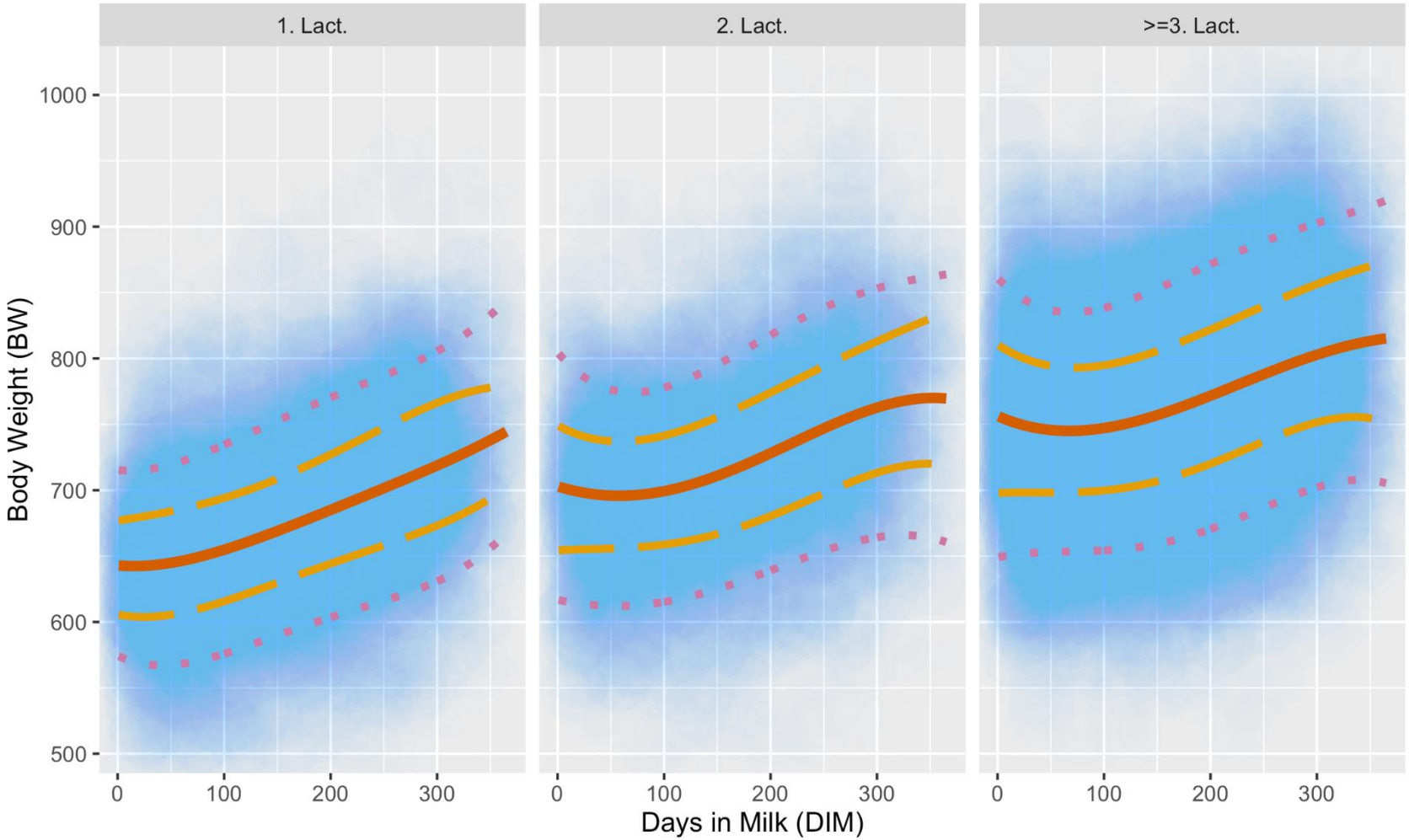
Body weight

- In Austria standard housing systems for dairy cows are without equipment for weighing routinely.

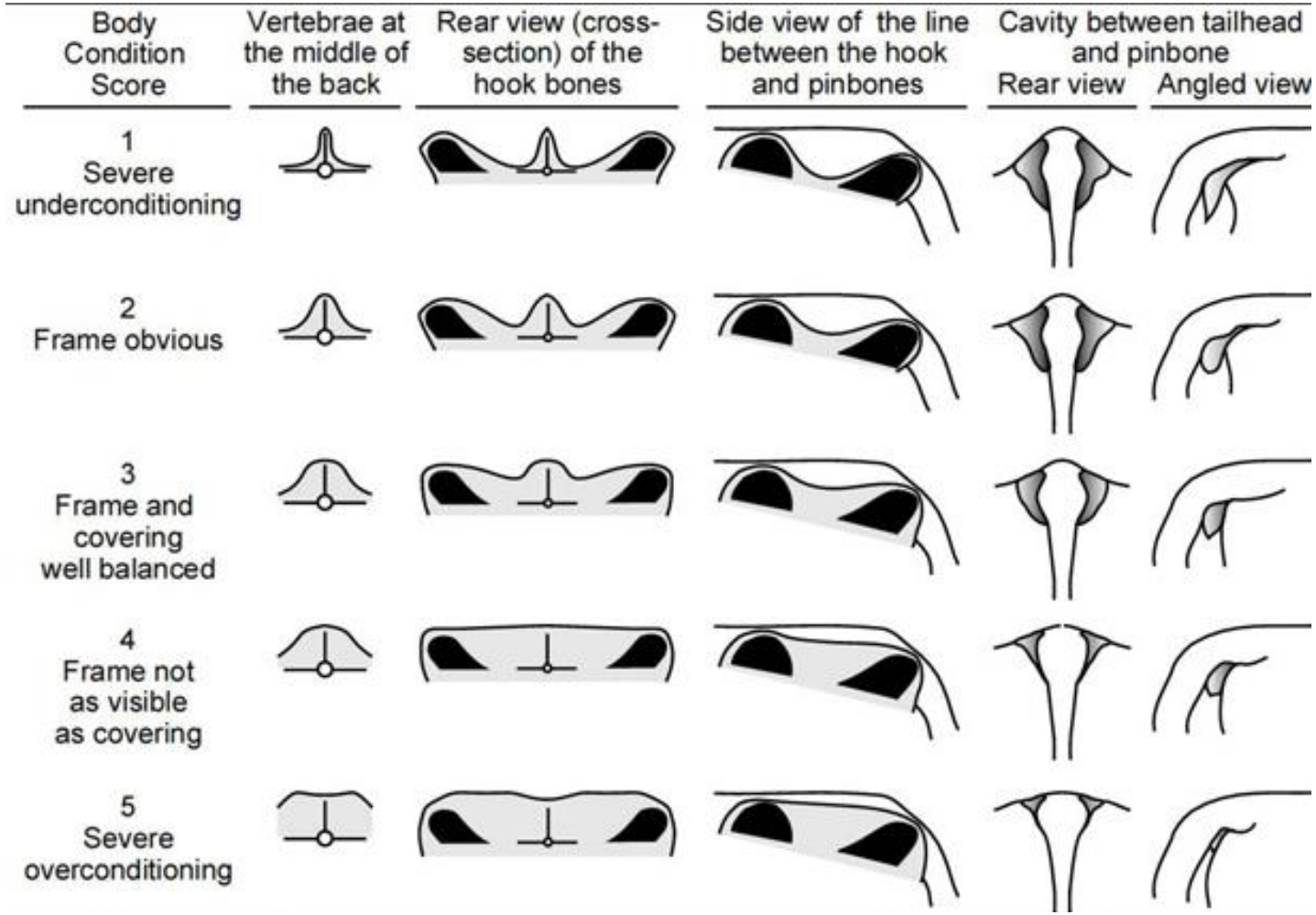
- During the observation period of the project “Efficient Cow”, all cows were weighed at each time of milk recording.

Trend of Body Weight (BW)

Efficient Cow, 2014 - Fleckvieh (Simmental)



Body condition score (BCS)

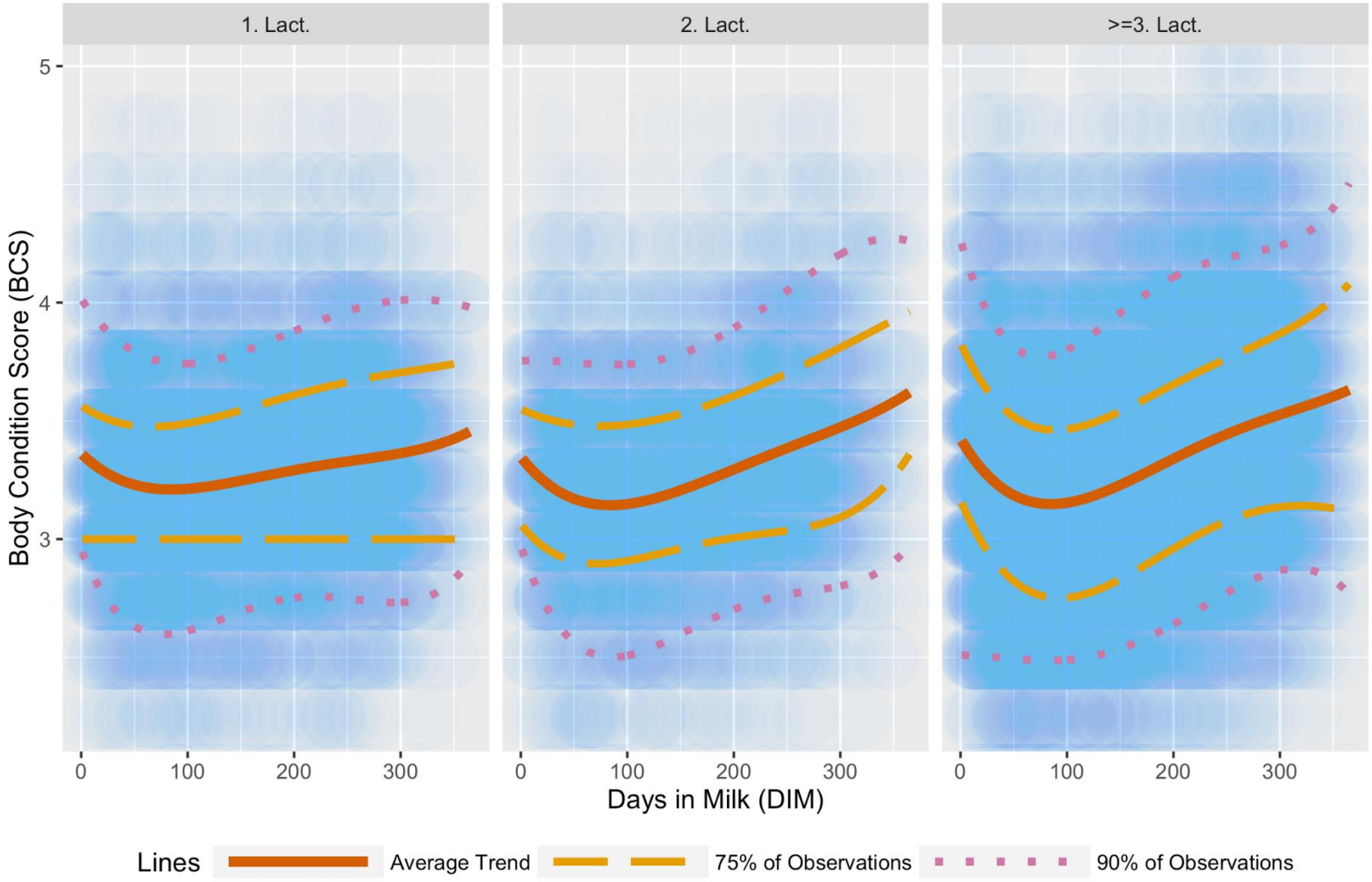


Recorded at each milk recording by trained stuff.

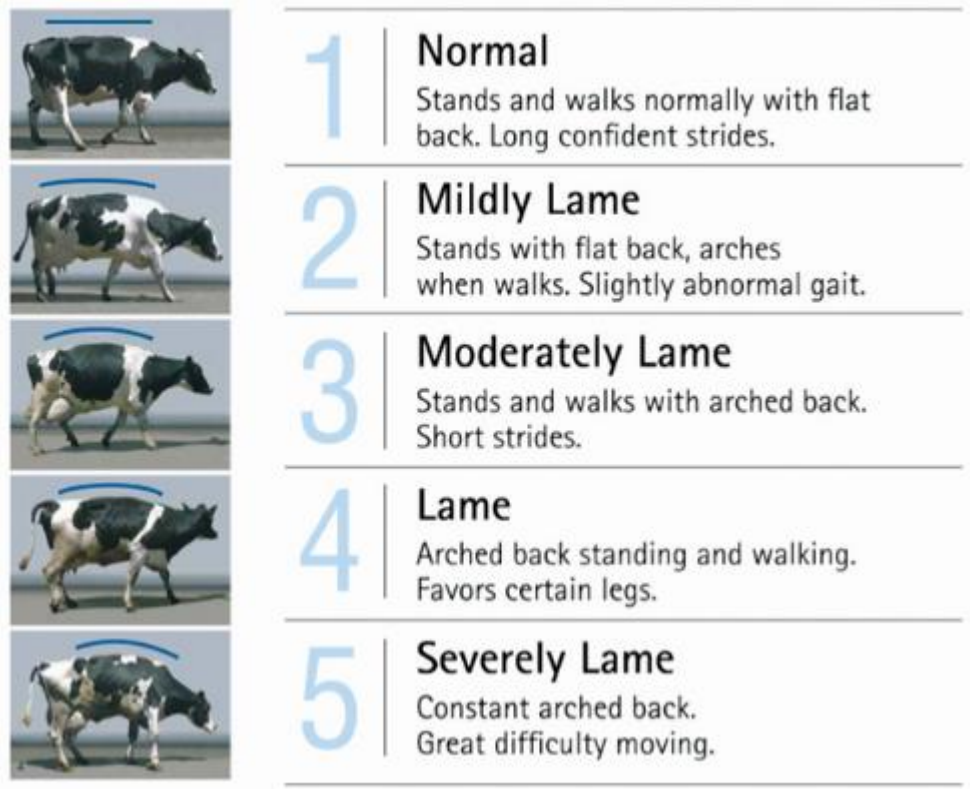
BCS 1= severe underconditioning; BCS 5 = severe overconditioniong

Trend of Body Condition Score (BCS)

Efficient Cow, 2014 - Fleckvieh (Simmental)



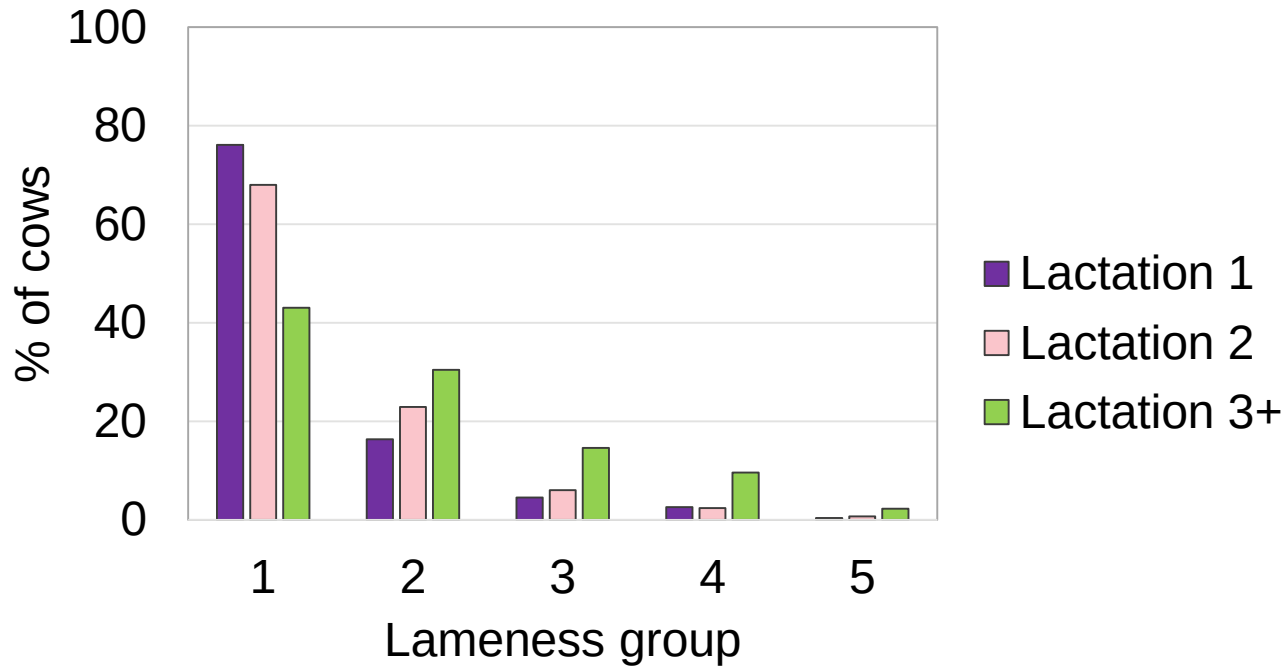
Lameness score (Sprecher et al. 1997)



Efficient Cow: Lameness was recorded by trained staff from the milk recording organisations at each milk recording using the scoring system (Sprecher et al. 1997) with 1 = normal to 5 = severely lame.

% of cows with different lameness scores (Fleckvieh)

1 = % of cows never lame (only score 1)
2 = % of cows with at least one lameness score of 2 and lower
3 = % of cows with at least one lameness score of 3 and lower
4 = % of cows with at least one lameness score of 4 and lower
5 = % of cows with at least one lameness score of 5 and lower



Observed data

	Nr. obs.	Nr. cows	Body weight (kg/std)	BCS (1-5/std)	Lame (1-5/std)
Fleckvieh (Simmental)	21,650	3,421	731,3 (85,2)	3.29 (±0.55)	1,29 (±0.66)
Brown Swiss	9,826	1,488	651,9 (75,4)	3.06 (±0.51)	1.24 (±0.62)
Holstein	7,319	1,192	682,8 (77,4)	2.86 (±0.62)	1.44 (±0.75)

Records between 5 and 365 DIM

Model

Linear animal model

Fixed effects:

- Herd
- Calving year-season
- Calving age-lactation
- Days in milk class within lactation
- Classifier (for BCS and lameness)

Random effects:

- Animal (genetic effect)
- Permanent environmental effect

Heritabilities and genetic correlations
Fleckvieh (Simmental)

	Body weight	BCS	Lameness
Body weight	**0.44 (0.05)**	0.39 (0.08)	0.57 (0.13)
BCS		**0.22 (0.03)**	0.05 (0.15)
Lameness			**0.07 (0.02)**

Standard error in ()

Heritabilities and genetic correlations
Brown Swiss

	Body weight	BCS	Lameness
Body weight	**0.36 (0.07)**	0.58 (0.10)	0.69 (0.27)
BCS		**0.18 (0.05)**	0.71 (0.41)
Lameness			**0.03 (0.02)**

Standard error in ()

Heritabilities and genetic correlations
Holstein Friesian

	Body weight	BCS	Lameness
Body weight	**0.35 (0.07)**	0.56 (0.10)	0.63 (0.34)
BCS		**0.34 (0.07)**	-0.10 (0.26)
Lameness			**0.04 (0.03)**

Standard error in ()

Conclusions

- Recording of body weight was easier to handle than taking different body measures
- Positive feedback for management tools like body condition scoring or lameness from farmers
- Genetic analysis showed that animals that are heavier have more lameness
- Similiar results for all three breeds (except BCS/lameness)
- Potential to use these management data for breeding – possibilities for automation

Acknowledgement

Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) in Austria, Federal States of Austria and the Federation of Austrian Cattle Breeders for the support within the projects „Efficient cow“.

Project partner within the project „Efficient Cow“.

Comet project ADDA „Adjustment of Dairying in Austria“.

Gene2Farm (EU-FP7-KBBE-2011-5-PNr.: 289592).

Thank you!