

# Genetic and genomic selection as a methane mitigation strategy in dairy cattle

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# Current status

- 📍 VERY limited data all over the world
- 📍 Almost all Holstein
- 📍 Very complex biology
- 📍 Huge interest – political and from consumers

# Geneticists vs Nutritionists



- Acceptance by both disciplines
- Accurate, repeatable measures
- High correlations between methods
- Same ranking of animals between methods




# Good and bad




 High capacity

 Non invasive

 Small investment

 Spot samples

 No control of breath

 Quantification is a challenge



# Data available in Denmark

- 4000 HOL, 2400 JER and 500 RDC
- Measured for 4 weeks continuously in given lactation and lactation stage
- Continuous recording scheme is not implemented
- Genotyping cows





# Results

- Heritabilities around 0.2
- Unfavourable correlation to yield
- Expected favourable correlation to RFI and saved feed

# Genetic correlation to other traits



Trait	Rg	
Body condition score	-0.28	favourable
Body depth	-0.03	
Chest width	-0.20	
Height	0.01	
Dairy character	0.28	unfavourable
Calving to first insemination	0.17	
First to last insemination	0.28	favourable
Number of inseminations	0.07	
Udder health	-0.32	favourable
Other diseases	0.06	

Significant if  
nummercial  
greater than 0,2

Zetouni et al., 2017 JDS



# Economic value



- 🔍 Consumer driven
- 🔍 Companies have sustainability strategies
- 🔍 Cannot come without on farm documentation
- 🔍 Who will pay?



# Current status

- 🕒 Trying to attract money for projects
- 🕒 Current projects cannot drive a routine recording scheme
- 🕒 No genetic evaluation without such a scheme
- 🕒 No other country or AI has an evaluation based on methane measurements

# Perspectives



- 🕒 An index as for other traits
- 🕒 Economic value? Take selection pressure from which traits?
- 🕒 Documentation method important for farmer and society



# Conclusion

- 🔍 You can select for lower methane emission through genetics in dairy cattle if registrations are available
- 🔍 This will be a valuable mitigation strategy
- 🔍 A positive effect is expected from using saved feed
- 🔍 Cannot stand alone but will compliment improved feeding and management