Ø-KO-AVL

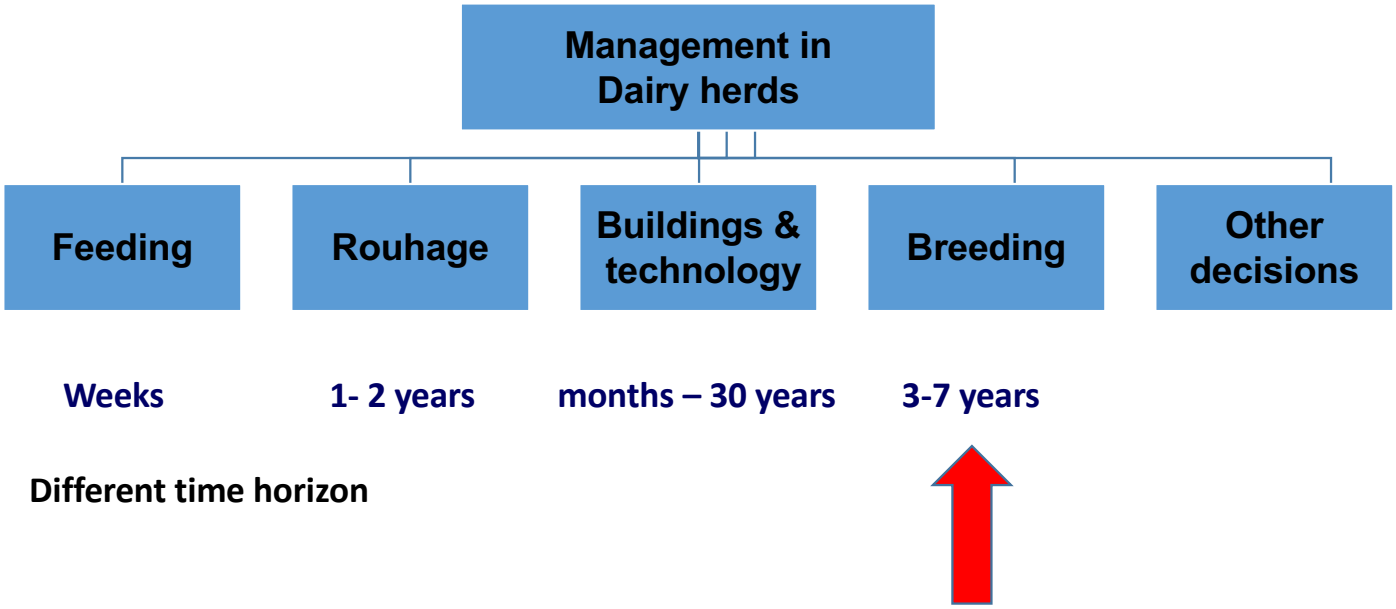
Breeding dairy cows adapted for organic production

Morten Kargo

FoU-dagarna 2025

Uppsala 6-112025

Management in dairy herds



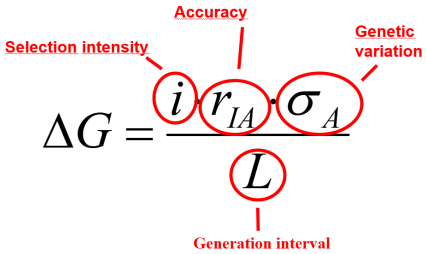
Interactions between genetics and production systems

Feeding

Production systems

Products

INTERACTIONS



Breeding goal (traits included, weighting of traits, recording)

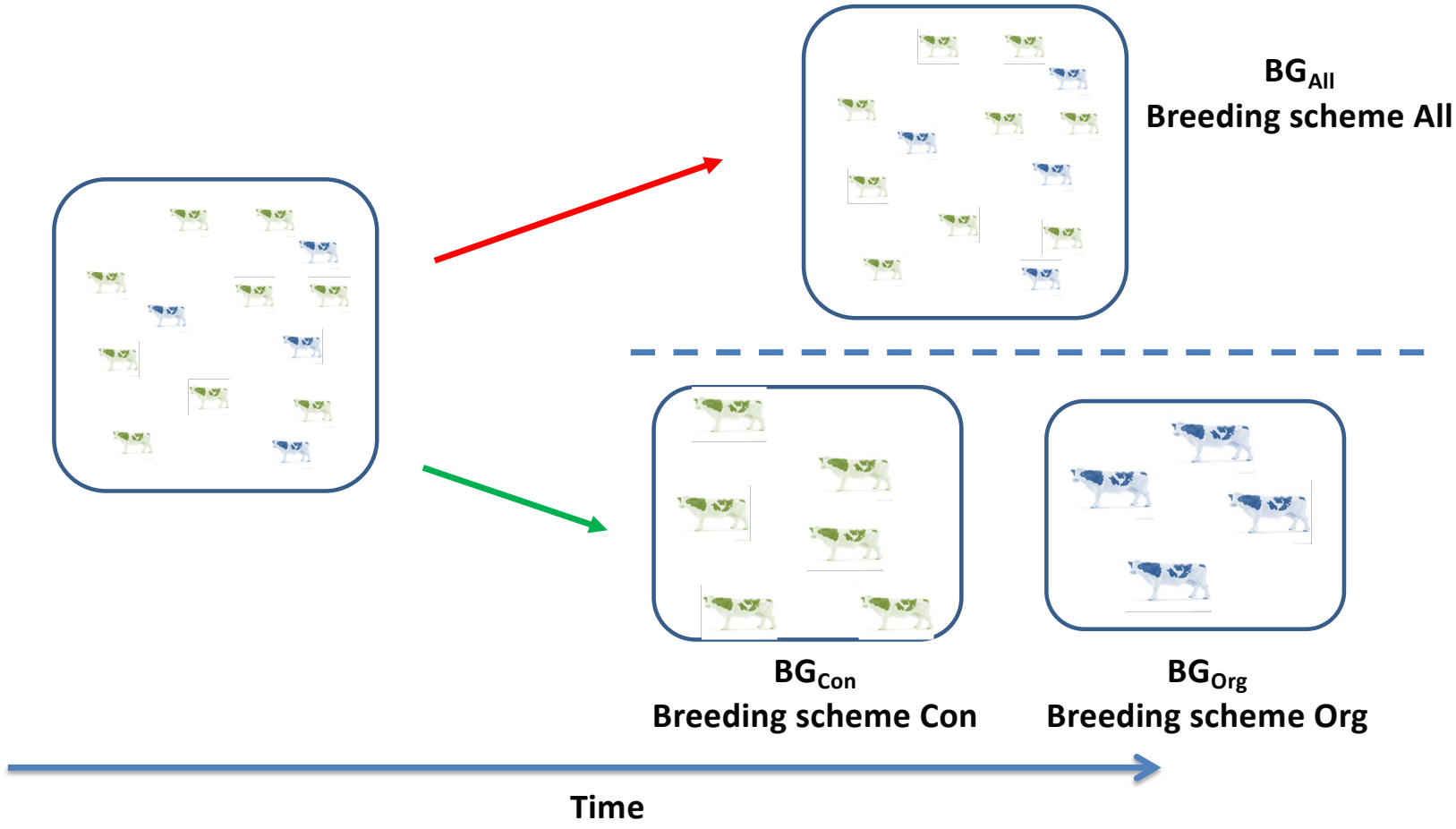
Breeding scheme (progeny testing, genomic selection)

Technologies (MOET, IVF, sexed semen)

Current status – organic dairy breeding

- Most genetic material originates from ‘conventional’ breeding schemes
- Some organic farmers select sires based on customized farm indices
- ‘Organic’ breeding schemes have not been used on a large scale

Specific organic breeding lines?



Specific organic breeding lines? Depending on:

- Differences in breeding goal weights
- Possible G by E interactions
- Public regulations

- Based on above figures correlation between breeding goals can be calculated

Example of regulations: From "Regulation (EU) 2018/848"

Page 61:

"With regard to the breeding of organic animals:

*(a) **reproduction shall use natural methods; however, artificial insemination shall be allowed;***

(b) reproduction shall not be induced or impeded by treatment with hormones or other substances with a similar effect, except as a form of veterinary therapeutic treatment in the case of an individual animal;

*(c) **other forms of artificial reproduction, such as cloning and embryo transfer, shall not be used;***

(d) the choice of breeds shall be appropriate to the principles of organic production, shall ensure a high standard of animal welfare and shall contribute to the prevention of any suffering and to avoiding the need for the mutilation of animals.

When choosing breeds or strains, operators shall consider giving preference to breeds or strains with a high degree of genetic diversity, the capacity of animals to adapt to local conditions, their breeding value, their longevity, their vitality and their resistance to disease or health problems, all without impairment of their welfare.

*In addition, breeds or strains of animals shall be selected to avoid specific diseases or health problems associated with some breeds or strains used in intensive production, such as porcine stress syndrome, possibly leading to pale-soft-exudative (PSE) meat, sudden death, spontaneous abortion and difficult births requiring caesarean operations. **Preference shall be given to indigenous breeds and strains***

How to interpretate that:

1) No MOET/OPU at organic farms ?
2) No use of sires born through MOET/OPU ?
3) No animals in the pedigree born through MOET/OPU ?

How to interpretate that:

1) Can semen from International unadapted breeds be used?
2) Can semen from International adapted breeds be used?
   - e.g. Holstein Jersey
3) Can breeds adapted for large areas (DK, SV, FIN) be used ?
   - e.g. VikingRed

Goal for the level of organic production in EU


EN 2024

19

Special report

Organic farming in the EU

Gaps and inconsistencies hamper the success of the policy

Executive summary

Organic farming is an agricultural method to produce food using natural substances and processes, contributing to greater biodiversity and less water, air, and soil pollution. The Commission considers it a key tool for making agriculture more sustainable and set the target of having 25 % of the EU's agricultural land organically farmed by 2030 – a significant jump from 10.5 % in 2022. In the 2014-2022 period, farmers received around €12 billion in support of organic farming practices under the common agricultural policy.

Overall project goal in Ø-Ko-Avl

To develop a breeding program adapted to organic dairy production and consumer preferences

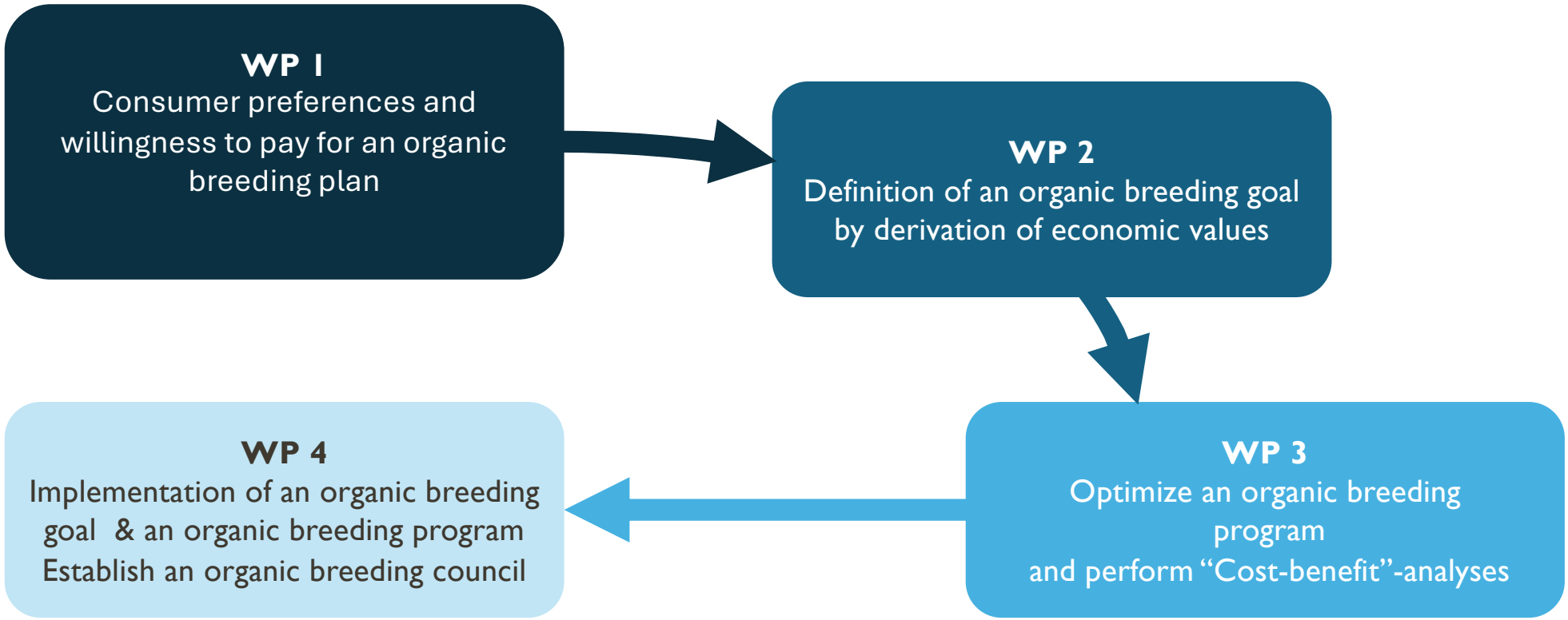
Through

- Definition of an organic breeding goal based on
  - Economic models
  - Economic model + Preferences among consumers, dairy companies and farmers
- Cost benefit analyses of optimized breeding schemes
- Establishment of a separate organic breeding line for VR (VikingRed)

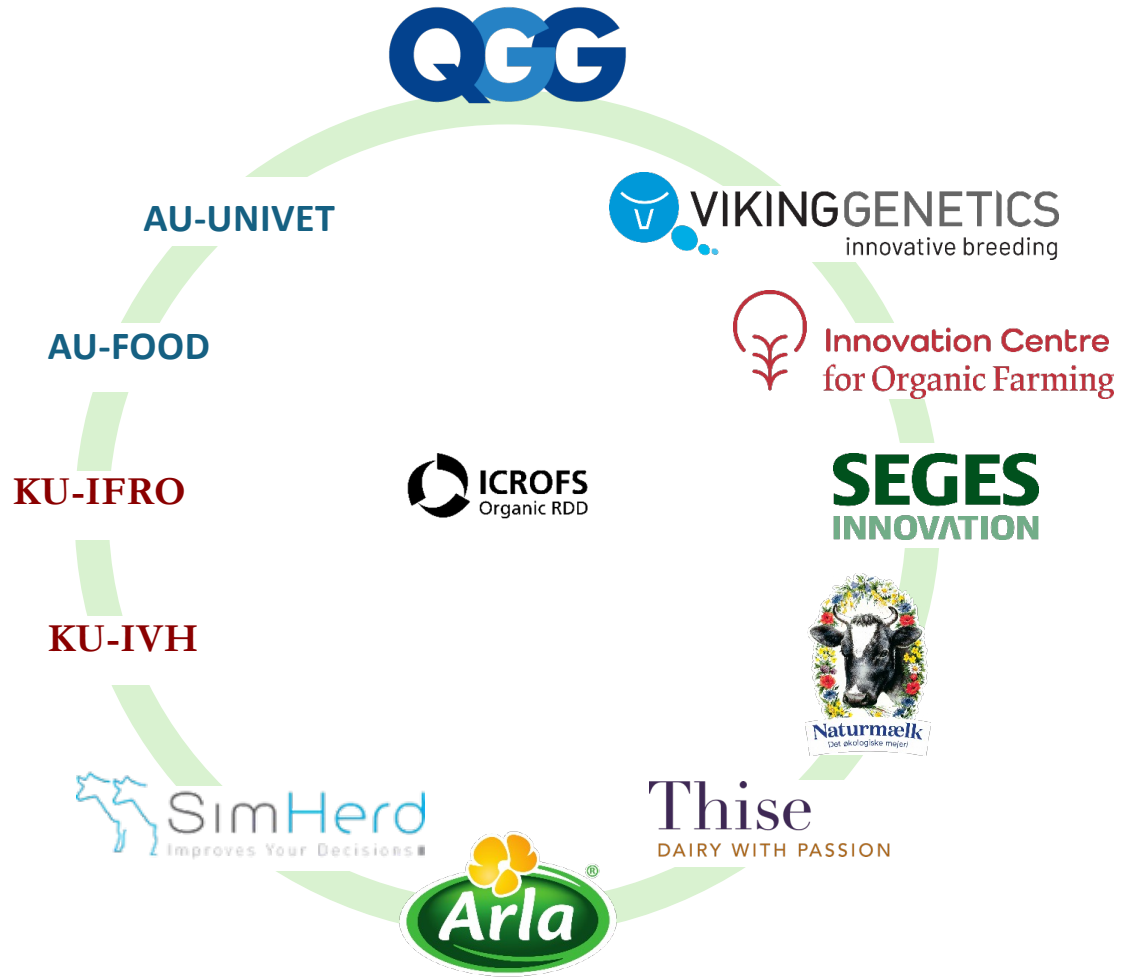
YouTube link (2m33s)

Facebook link (1m15s)

Work packages in Ø-Ko-AvI



Partners in Ø-Ko-Avl

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Willingness to pay

What do consumers want from organic breeding?

Presentation at EAAP 2025 (Innsbruck)

What Breeding Goal Should Organic Dairy Farmers Pursue? - Results from a Willingness-To-Pay (WTP) Study Among Consumers in Denmark, Germany, and Sweden

T. B. Lund[1], T. Christensen[1], S. Denver[1], S. B. Olsen[1], H. M. Nielsen[2], M. Kargo[2], P. Sandøe[1,3]

[1] Copenhagen University, Dept. of Food and Resource Economics, Rolighedsvej 23, 1958 Frederiksberg, Denmark,

[2] Aarhus University, Center for Quantitative Genetics and Genomics, C. F. Møllers Allé 3, bld. 1130, 8000 Aarhus, Denmark,

[3] Copenhagen University, Dept. of Veterinary and Animal Sciences, Grønnegårdsvej 15, 1870 Frederiksberg C, Denmark

UNIVERSITY OF COPENHAGEN

In all countries, and for both products, the *average organic consumer* is willing to pay the most for WELFARE

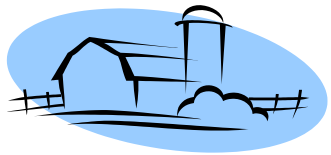
Percentage price premiums compared to the standard price of organic milk or cheese

	Denmark		Sweden		Germany	
	Milk	Cheese	Milk	Cheese	Milk	Cheese
Higher yield	2%	-3%	7%	0%	0%	0%
Better animal welfare	37%***	36%***	59%***	66%***	54%***	62%***
Reduced climate impact	15%***	4%	10%*	17%**	11%**	12%
Healthier milk and meat	13%***	14%***	18%***	23%***	36%***	35%***

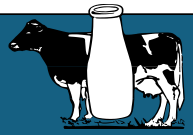
Across the studied countries, products and consumer groups:
Animal welfare is considered the most important breeding goal

Breeding goal

Derivation of economic values



Profit =

Revenues		Costs
Milk Beef		Feed Diseases Calving Reproduction Milking Fixed costs Beef production
Beef		
Heifers		

To be derived by use of SimHerd, Østergård et al, 2016 (Livestock Science)

Production circumstances

Economy
(Prices of products and production factors)

Consumer preferences, Political and social circumstances

Breeding goal

Production circumstances should be relevant when genetic improvement is expressed

Our farmer user group defined possible future systems

	ØKO	ØKO+	ØKO++
Focus	Efficiency Improvement within current organic regulations	Biodiversity High self-sufficiency Minimal transport	Biodiversity Minimal transport Home grown feed "Naturalness" "Max" animal welfare
Yield level (kg ECM)	12000 3xmilking.	9000 AMS	6000 2xmilking
Calvings	All year round	All year round	In spring
Reproduction	Sexed and conventional semen plus Intensive beef breeds	Sexed and conventional semen plus Extensive beef breeds	Sexed and conventional semen plus Extensive beef breeds
BonD calves	Sold at the age of 1 month	Reared at the herd	Reared at the herd

Our farmer user group defined possible future systems

	ØKO	ØKO+	ØKO++
Herd size	500	150	75
Feeding	60% Rouhage 40% Concentrate	70% Rouhage 30% National concentrate 90% Self-sufficiency	100 % Grass/ silage/wrap No concentrate 100% Self-sufficiency
Antibiotica	Allowed According to organic roles	Allowed According to organic roles	NO, but sick animals have to treated -> Sold
Cow –calf interaction	1 day	3 days	With mother or nursing aunt in 3 month

How to include results from consumer surveys in the breeding goal?

- Animal welfare: Mastitis, easy calvings, behavior

  Economic value based on “economy” already included

  Only based on saved cost for vets and farmer workload

- Reduced climate impact: methane

- Healthier milk and meat: Eg. Fatty acid composition

Method to include consumer preferences in BG – an example

$$TMI = (EV_{mast} * Mastitis + EV_{calving} * Calving)$$

$$+ (FV_{mast} * mastitis + FV_{calving} * Calving)$$

FV = Consumer value for mastitis and calving ease – ekstra on top of the pure economy value

Breeding scheme

Slagboom et al., 2020

Assessing different breeding strategies for organic dairy production

- Breeding goal differences
- Embryo transfer
- Selection of conventional bulls

Methods

Breeding goal

- Traits: milk production, mastitis, cow fertility
- Economic values for Holstein
- NTM conventional and NTM organic
- Match correlations sub-index NTM

GxE estimates from Denmark (0.94 – 0.97)

Five scenarios

Scenarios

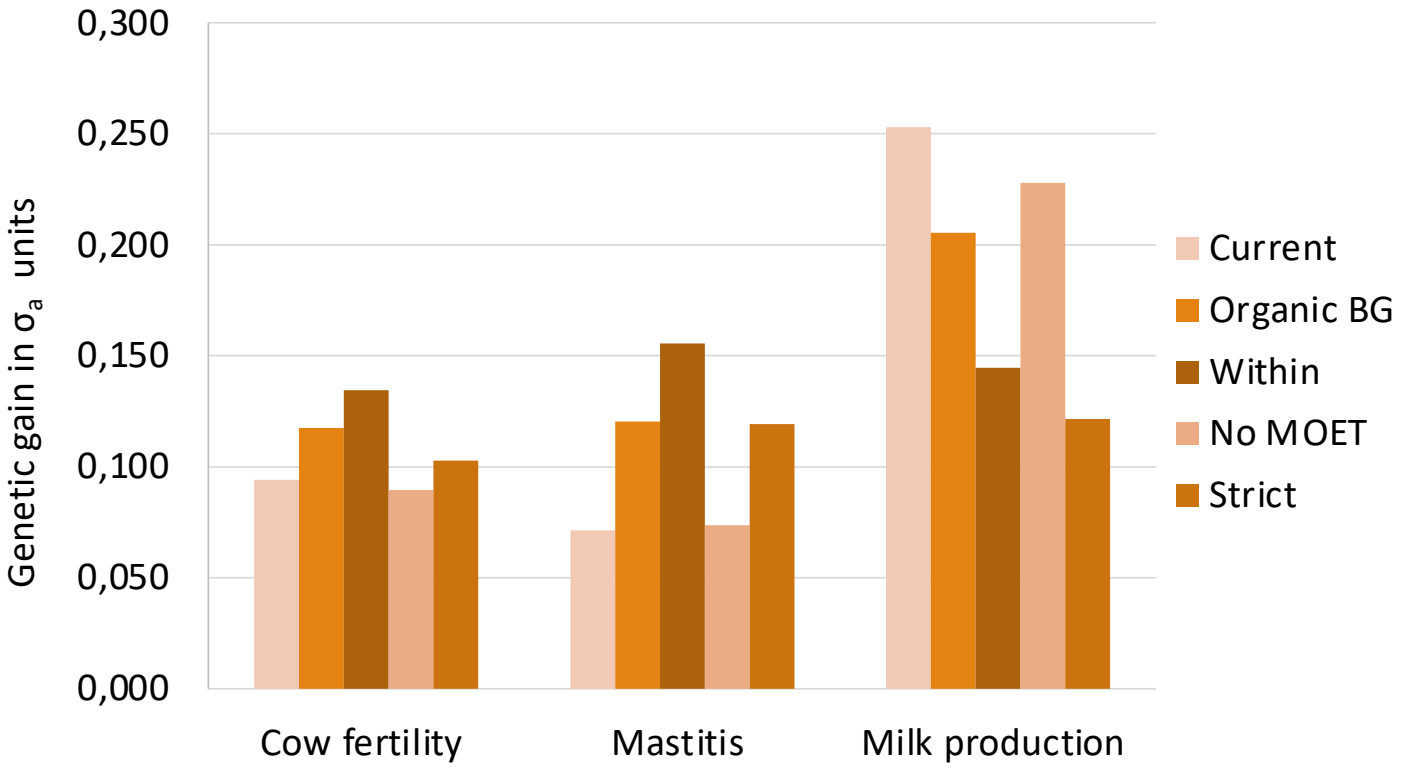
Scenario	Breeding goal	Embryo transfer (MOET)	Selection of conventional bulls
Current	Conventional	Yes	Yes
Organic BG	Organic	Yes	Yes
Within	Organic	Yes	No
No MOET	Organic	No	Yes
Strict	Organic	No	No

Relative total economic gain

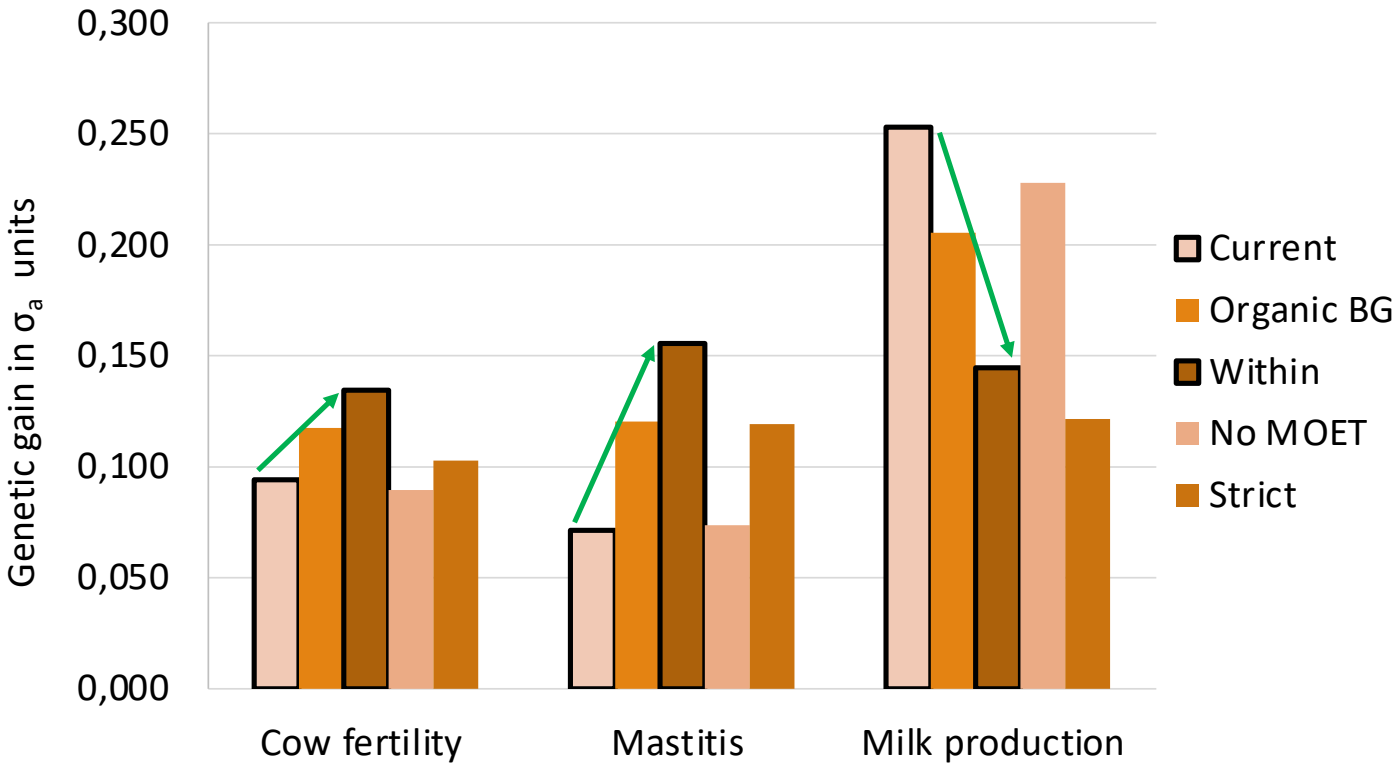
	MOET in the organic breeding program	No MOET in the organic breeding program
Selection of conventional bulls	101%	93%
No selection of conventional bulls	96%	76%

Relative to genetic gain in scenario current (=100%)

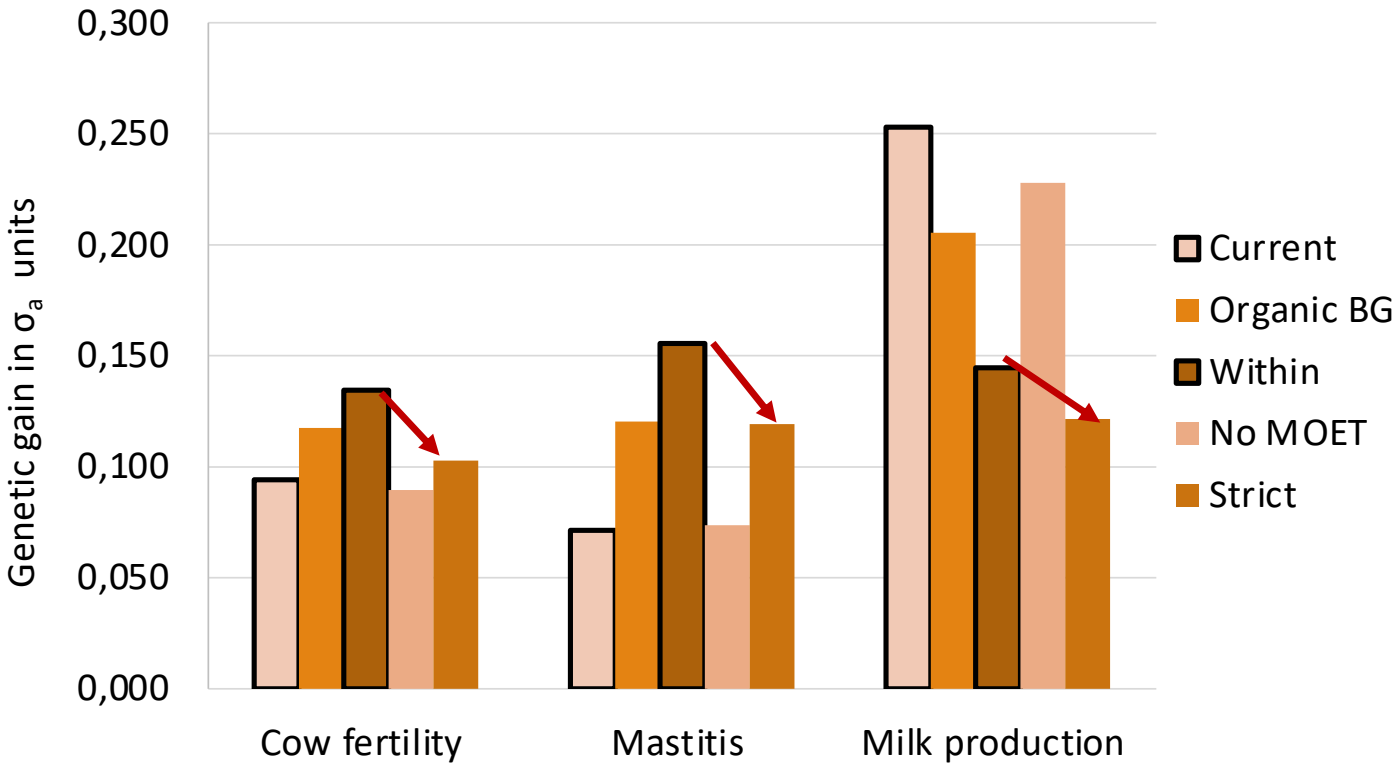
Genetic gain per trait



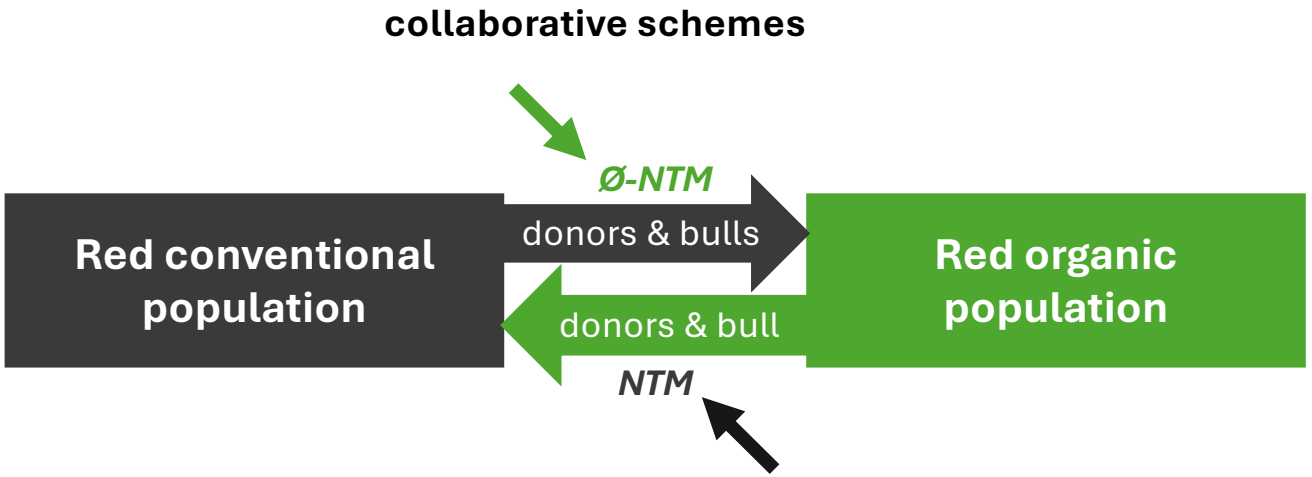
Genetic gain per trait



Genetic gain per trait



Breeding schemes we will test with new breeding goals derived in WP2



By use of an organic breeding goal (Ø-NTM) and a conventional breeding goal NTM)

Breeding schemes we will test with new breeding goals derived in WP2

No collaboration between breeding schemes

NTM

Red conventional population

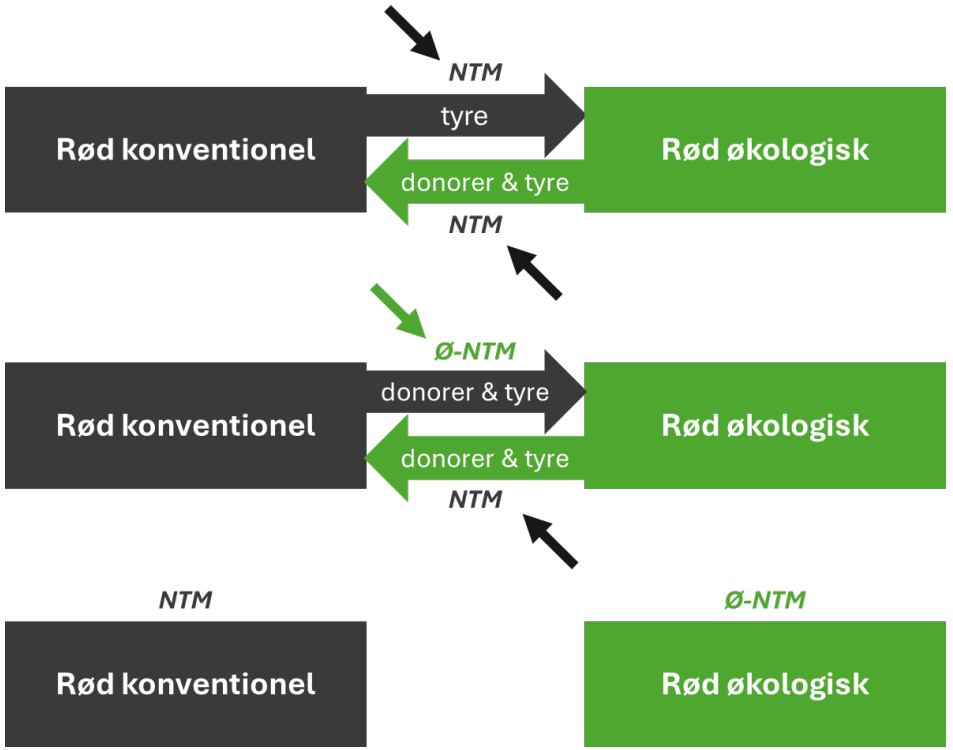
Ø-NTM

Red organic population

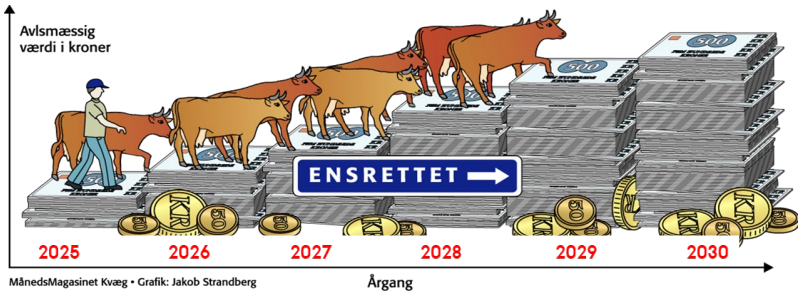
By use of an organic breeding goal (Ø-NTM) and a conventional breeding goal (NTM)

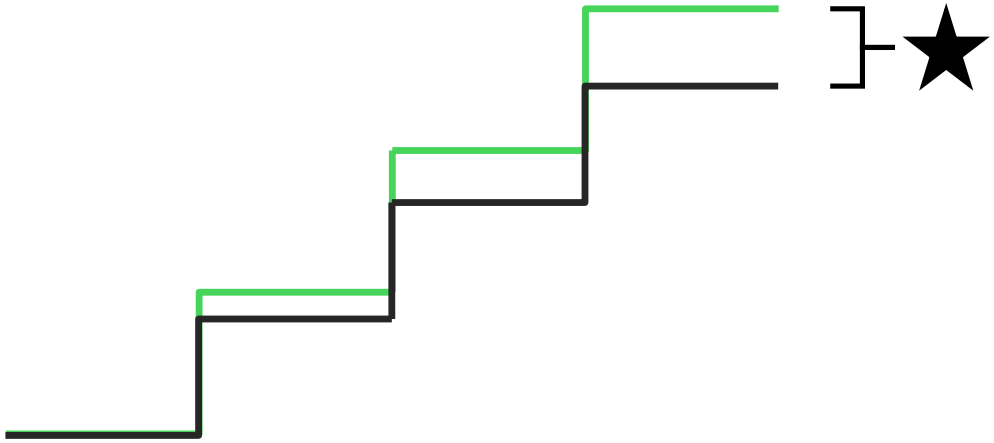
What we also will investigate

- Different correlations between breeding goals(NTM, Ø-NTM)
- Different # of donors and bulls in the breeding schemes
- Use of MOET/OPU or not
- Different sizes of the organic population



Outcome from an organic breeding plan





Black line: Value of genetic gain from a conventional breeding plan among organic producers

Green line: Value of breeding progress from an organic breeding plan among organic producers

★ ***How many organic cows are needed for paying the cost for running an organic breeding plan?***

Take home message

- If the organic community want to have animals suited for organic production systems specific lines/breeds are needed
- If the organic community want to follow EU regulations specific lines/breeds are needed
- Use of MOET/OPU in organic dairy breeding schemes needs to be considered
  - Pros: Larger genetic progress in the “organic” direction”
  - Cons: MOET/OPU is debatable from an organic perspective

- In case some one are interested in the project or wants to collaborate please contact me : morten.kargo@qgg.au.dk

Thank you for your attention

Why VR as our case breed?

- Want to live
- Healthy
- Perfect in size
- Produce milk with high value
- High value from slaughter
- Simple and problem free
- Robust and alert
- Feed efficient
- Good feet and legs
- Good udders and udder health
- Grow and milk on roughage
- Same bottom-line (as Holstein) - different composed

VR ambassadors!