



# SimHerd

a valuable decision tool for dairy farmers

Julie Clasen

World Jersey Cattle Bureau, International Conference, Denmark  
June 17th 2024





# Main topics

- Introduction to SimHerd
- How SimHerd is used in Denmark
- Setting the optimal breeding strategy



# The SimHerd team

## **Søren Østergaard**

CEO and Partner (20 %)

Professor at Aarhus university (80 %)

## **Jehan Ettema, Ph.D.**

Partner and consultant

## **Ruth Davis, M.Sc.**

Breeding specialist

## **Bodil Nielsen, DVM, Ph.D.**

Veterinary specialist

## **Julie Brastrup Clasen, Ph.D.**

Breeding specialist

## **Nanna Bull**

Breeding specialist

Shared position with VikingDanmark



## **Owners**

VikingDanmark (51%)

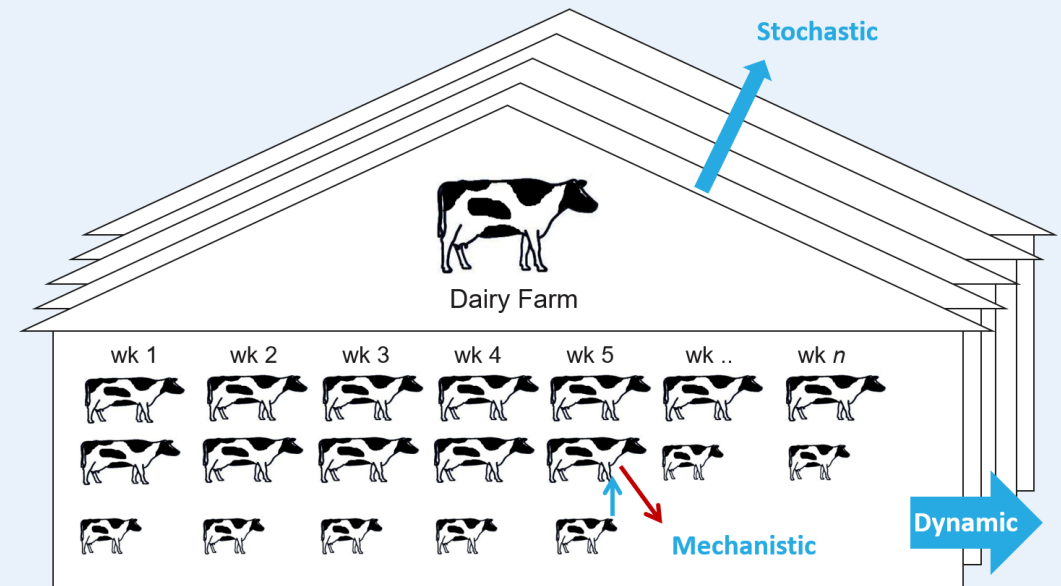
Aarhus University (29%)

Søren Østergaard (10%)

Jehan Ettema (10%)

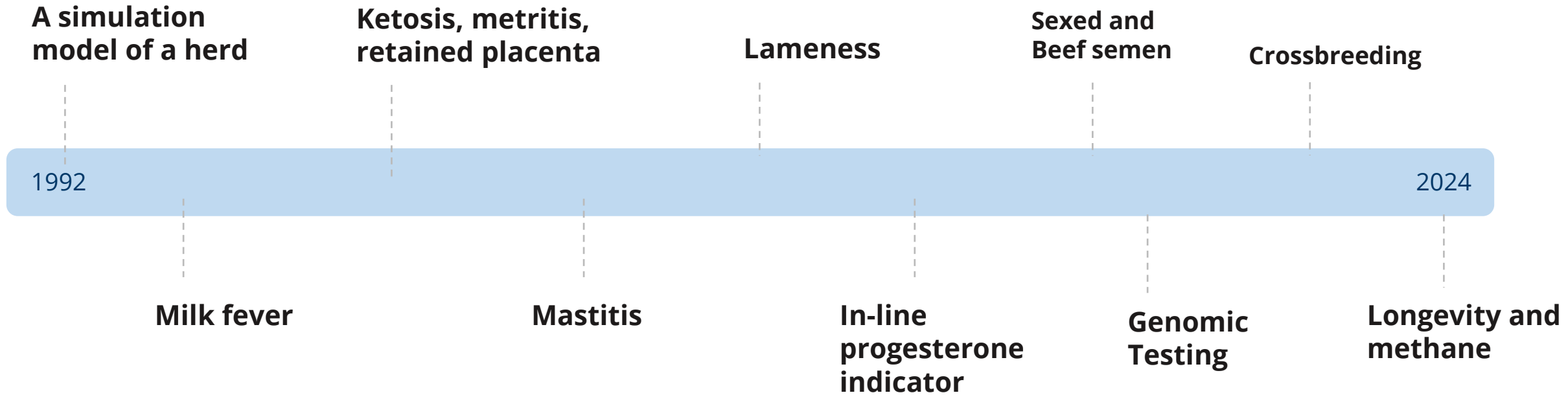
# What is SimHerd?

- A dairy herd simulation model
- Can simulate all aspects from insemination to slaughter
- Developed at Aarhus University for more than 30 years
- Commercialized in 2010
- Predicts **economic consequences** and **changed herd dynamics** of given **management changes**



# Our journey

- Documented in over 30 articles



# Scientific projects today

Feed efficiency and optimal culling



Disease surveillance, economics and climate



Crossbreeding on population level



Biosecure (Horizon, EU)



# Who uses SimHerd?



And more!



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# What can be calculated?

- Identify economic potentials of:
  - Cow health
  - Reproduction
  - Dry-cows
  - Welfare
  - Breeding strategies
  - Herd expansion
  - SenseHub
  - Investments
  - **Climate impact**





# Case example: switching to sand bedding

## SimHerd simulation

ECM yield/cow	+600 kg
Cell count	-35,000
Cow mortality	-0.5%
Replacement	-6%



**Beregning:**  
Kristina Brødvæk,  
VikingDanmark, var  
med til at lave den  
bagvedliggende  
beregning i SimHerd,  
som viste et  
indtjeningspotentiale  
på 300.000 kr. hos  
Dorte og Lars Hansen.

”Kristina Brødbæk from VikingDanmark was involved in creating the underlying calculation in SimHerd, which showed an **earning potential of 300,000 DKK** for Dorte and Lars Hansen.”

Kvæg Magasinet, December 2016

## Case example: switching to sand bedding

	SimHerd simulation	Actual herd results*
ECM yield/cow	+600 kg	+400 kg
Cell count	-35,000	-30,000
Cow mortality	-0.5%	-1.5%
Replacement	-6%	-6%

\*17 months later



**Beregning:**  
Kristina Brødvæk, VikingDanmark, var med til at lave den bagvedliggende beregning i SimHerd, som viste et indtjeningspotentiale på 300.000 kr. hos Dorte og Lars Hansen.

”Kristina Brødbæk from VikingDanmark was involved in creating the underlying calculation in SimHerd, which showed an **earning potential of 300,000 DKK** for Dorte and Lars Hansen.”

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# How is SimHerd used in Denmark?

- Vets use SimHerd to identify economic potentials in health improvements
- Breeding advisors in Denmark, Sweden, Finland and Norway uses SimHerd to
  - Find the optimal level of beef semen and sexed semen
  - Show the value of genomic testing
  - .. In each individual herd!



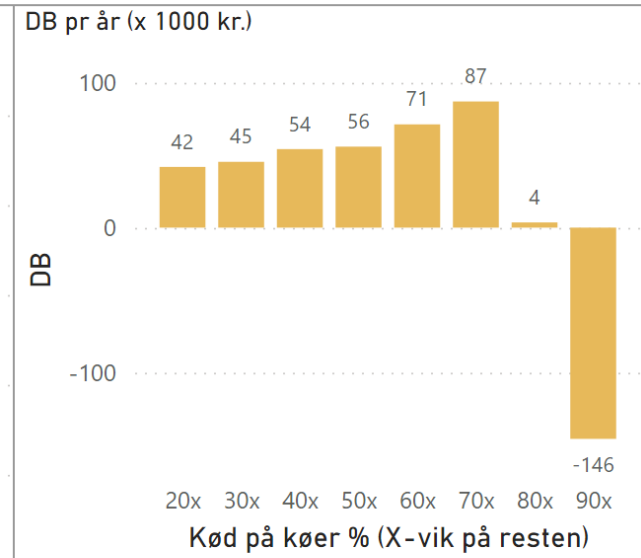
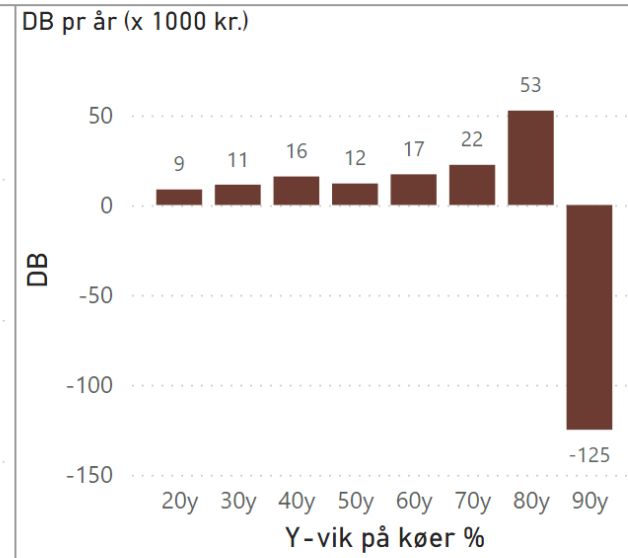
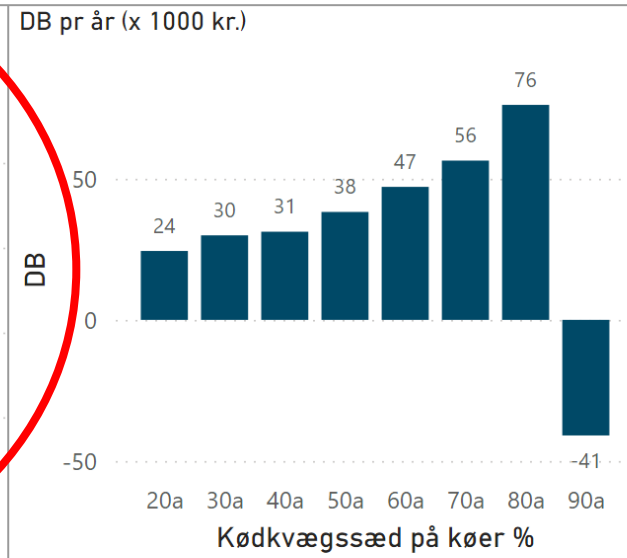
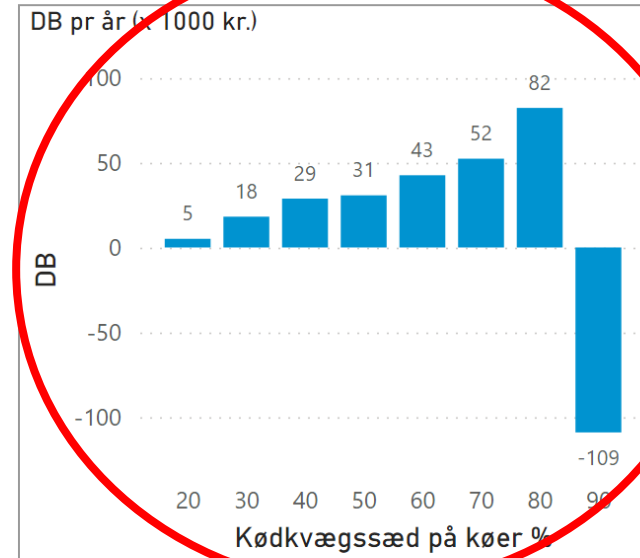


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# A case herd

- An average conventional Jersey herd
  - 250 cows
  - 10,100 kg ECM
  - 34 % replacement rate
  - 100 % sexed semen on heifers
  - 50 % sexed semen on cows
- **How much beef semen can they use?**





### Standard analysis

X-vik strategi i nudrift

Kvier %	Antal ins.	Køer %	Antal ins.
100	2	50	2

Kødkvægssæd på køer %

0



### Alternative X-vik strategy

Kvier %	Antal ins.	1. kalvs %	Ældre %	Antal ins.
100	3	50	50	3



### Male-sexed semen

X-vik strategi i nudrift

Kvier %	Antal ins.	Køer %	Antal ins.
100	2	50	2

Kødkvægssæd på køer %

0



### No conventional semen

20-90% af kørerne insemineres med kød  
80-10% af kørerne insemineres med Xvik (2x).

Omløbere efter 2x Xvik insemineres med kød.

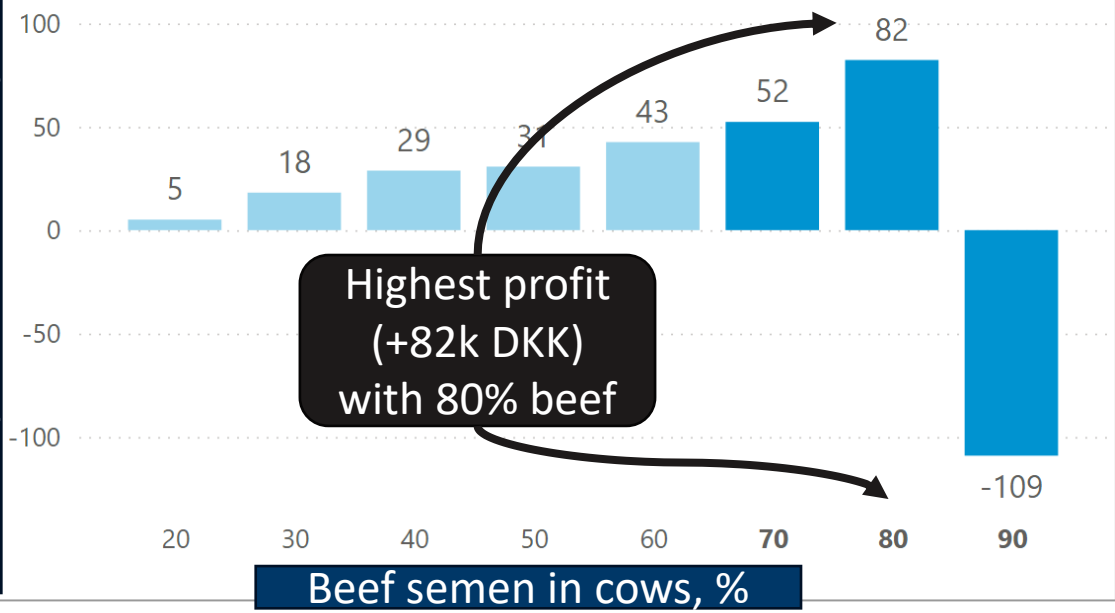
Alle kvier løbes med Xvik (2x) og omløbere insemineres med kød.





Herd profit, 1000 DKK/year

pr år (x 1000 kr.)



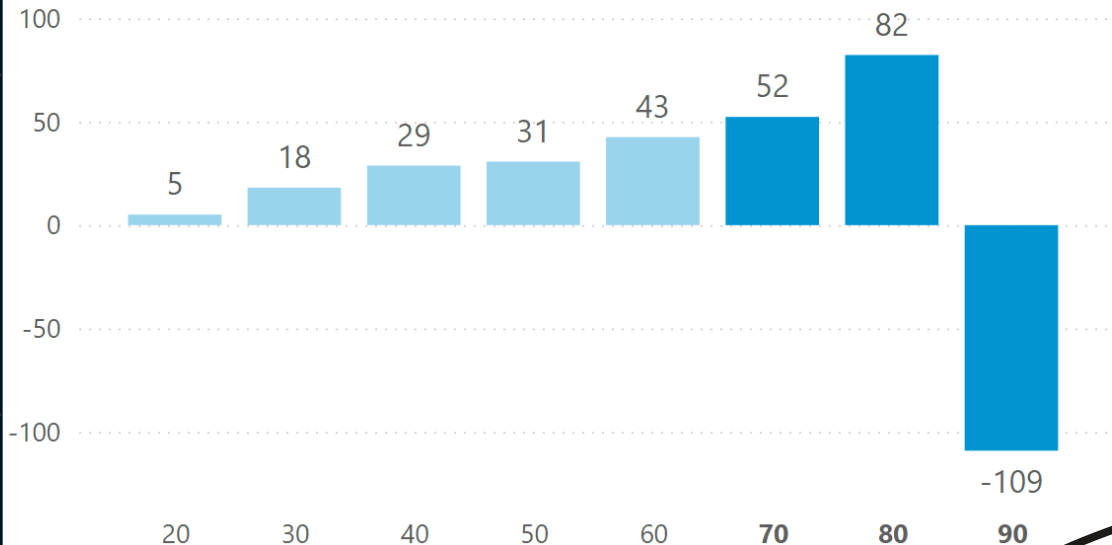






Herd profit, 1000 DKK/year

pr år (x 1000 kr.)



Beef semen in cows, %

Mainly from saved costs on heifers!

		Nudrift	70	80	90
Udskiftningspct.	34	-2	-6	-9	
EKM pr. årsko	10.100	-8	-49	-270	
Antal årskøer	250	0	0	-9	

		Nudrift	70	80	90
Krydsningskalve, tyre	0	65	73	74	
Krydsningskalve, kvier	0	61	68	70	
Solgte kælvkvier	78	-64	-75	-78	
Solgte tyre	72	-50	-54	-55	
# heifers	331	136	-177	-227	

Økonomi (x 1000 kr.)		Nudrift	70	80	90
Mælk	8.291	-16	-63	-529	
Køer	240	-23	-53	-84	
Kvier	841	-681	-804	-843	
Kalve	-7	53	60	61	
Avlsfremgang	963	35	38	42	
Indtægter i alt	10.328	-632	-823	-1.353	
Foder, køer	3.208	-8	-25	-190	
Insemineringer	139	-43	-57	-75	
Behandlinger	183	2	1	-11	
Heifer costs	1.584	-634	-824	-1.059	
Øvrige	307	0	-1	-11	
Udgifter i alt	5.422	-684	-906	-1.244	
DB	4.906	52	82	-109	

Vis økonomi

Skjul

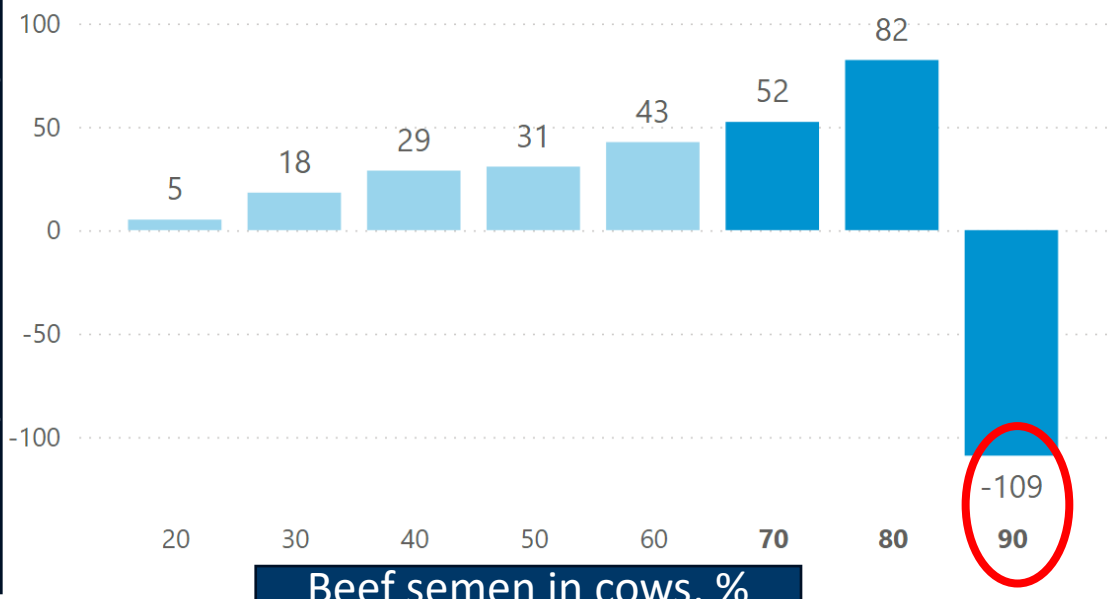
Økonomien i genomisk test





Herd profit, 1000 DKK/year

pr år (x 1000 kr.)



Beef semen in cows, %

		Nudrift	70	80	90
Udskiftningspct.	34		-2	-6	-9
EKM pr. årsko	10.100		-8	-49	-270
<b># COWS</b>	250		0	0	<b>-9</b>
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Krydsningskalve, tyre	0		65	73	74
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**Loss of cows**  
(not enough replacement heifers)

Vis økonomi

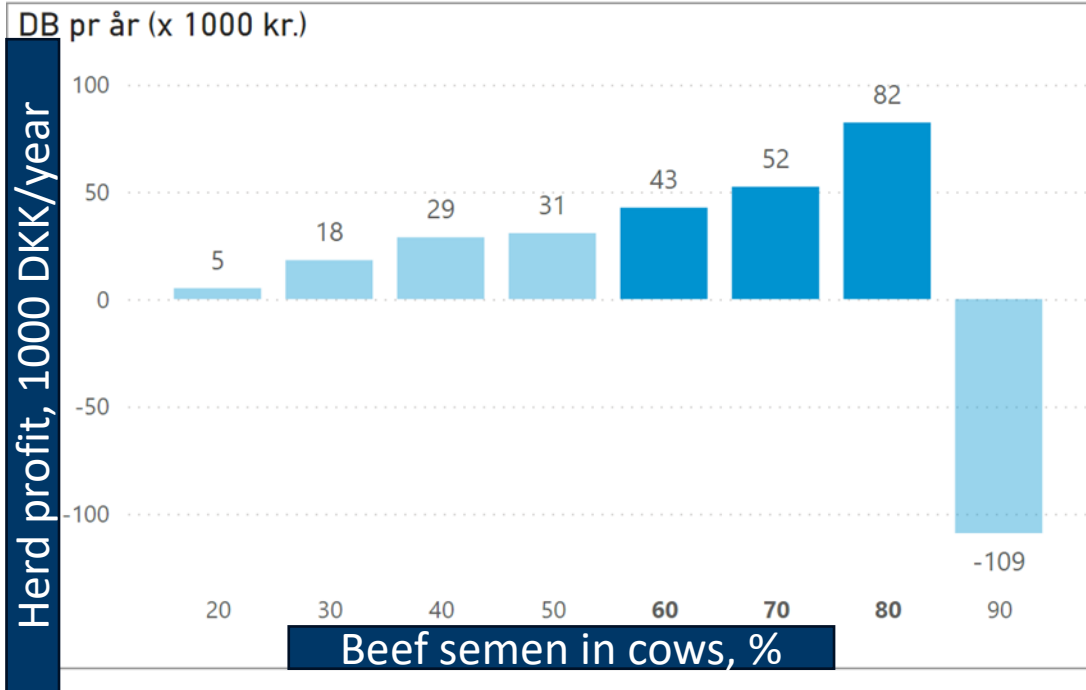
Skjul

Økonomien i genomisk test

# Value of genomic testing today vs in combination with beef semen



CHRNumber



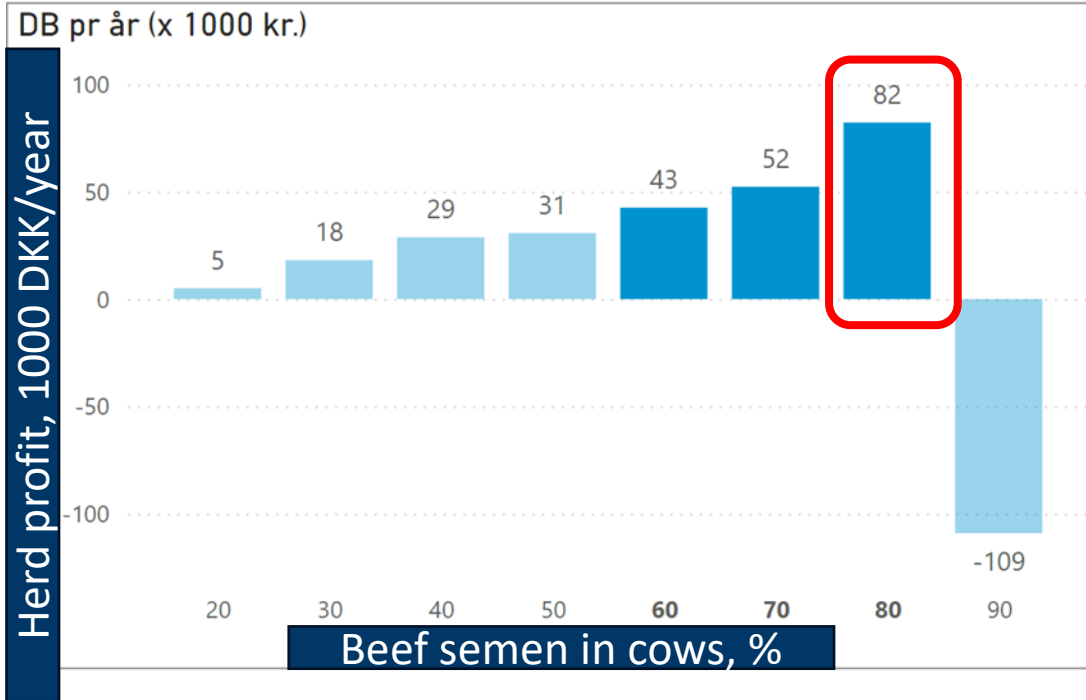
	today	60	70	80	90
<b>Tested heifers/yr</b>	183	-62	-79	-101	-128
<b>Testing costs/yr</b>	23,8	-8,0	-10,2	-13,2	-16,6
<b>Value of genetic gain/yr</b>	20,1	3,9	2,3	-0,4	-6,5
<b>Additional profit/yr</b>	-3,7	11,9	12,6	12,7	10,2



# Value of genomic testing today vs in combination with beef semen



CHRNumber



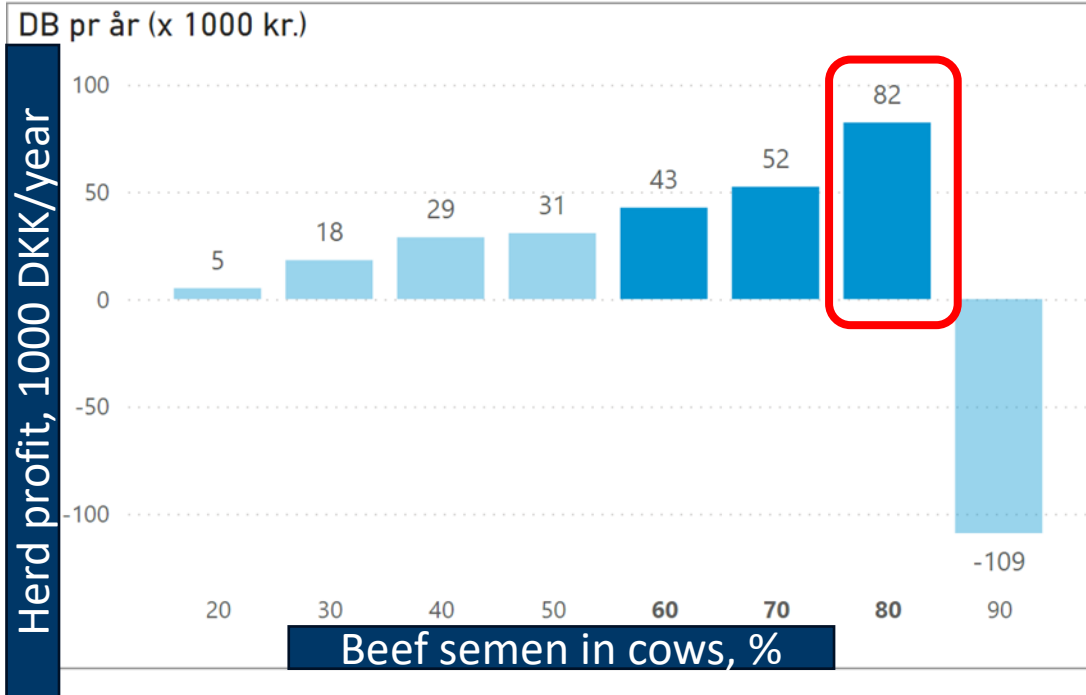
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Fewer heifers to test  
→ fewer testing costs

# Value of genomic testing today vs in combination with beef semen



CHRNumber



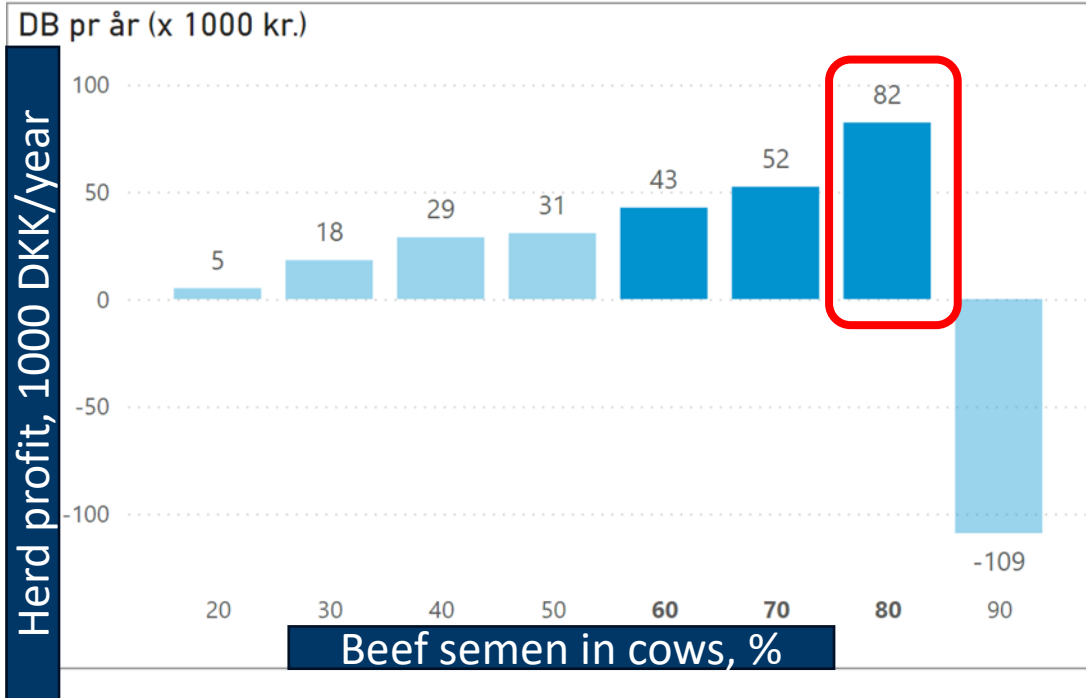
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A small loss of genetic gain

# Value of genomic testing today vs in combination with beef semen



CHRNumber



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<b>Additional profit/yr</b>	-3,7	11,9	12,6	<b>12,7</b>	10,2

.. But still a profit from genomic testing



# Heifer price calculator

## What should you get paid for your heifers?

Age at sale	-	18.0	+	months
Variable costs (feed, breeding, vet)	-	0.95	+	€ / day
Labor costs	-	0.40	+	€ / day
Fixed costs (housing, capital)	-	0.45	+	€ / day
Calf mortality	-	7	+	%
Slaughtered heifers	-	10	+	%
Bonus for crossbred calves	-	30	+	€ / calf
Minimum sales price		<b>1,214</b>		€/heifer

Try it out!



<https://simherd.com/en/heifer/>

# Your options for a SimHerd calculation

- **Denmark** – contact VikingDanmark
- **Sweden** – contact Växa Sverige
- **Finland** – contact Faba
- **Norway** – contact TINE
- **Other countries** – contact us for more information!

Visit [simherd.com](https://simherd.com) to learn more