Nordisk Avlsværdivurdering

(NAV)

Joint Nordic Genetic Evaluation

General manager Gert Pedersen Aamand

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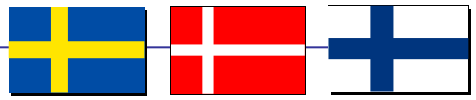


Nordisk Avlsværdivurdering

- Responsible for estimation of BVs for cattle in Finland, Sweden and Denmark
- 2002 – Development has started
- 15 April 2005 – first results were published

NAV

Established 01.01.2002 by:

Finlands Husdjursavelsandelslag (FABA)

Svensk Mjölk

Dansk Kvæg

NAV - goals

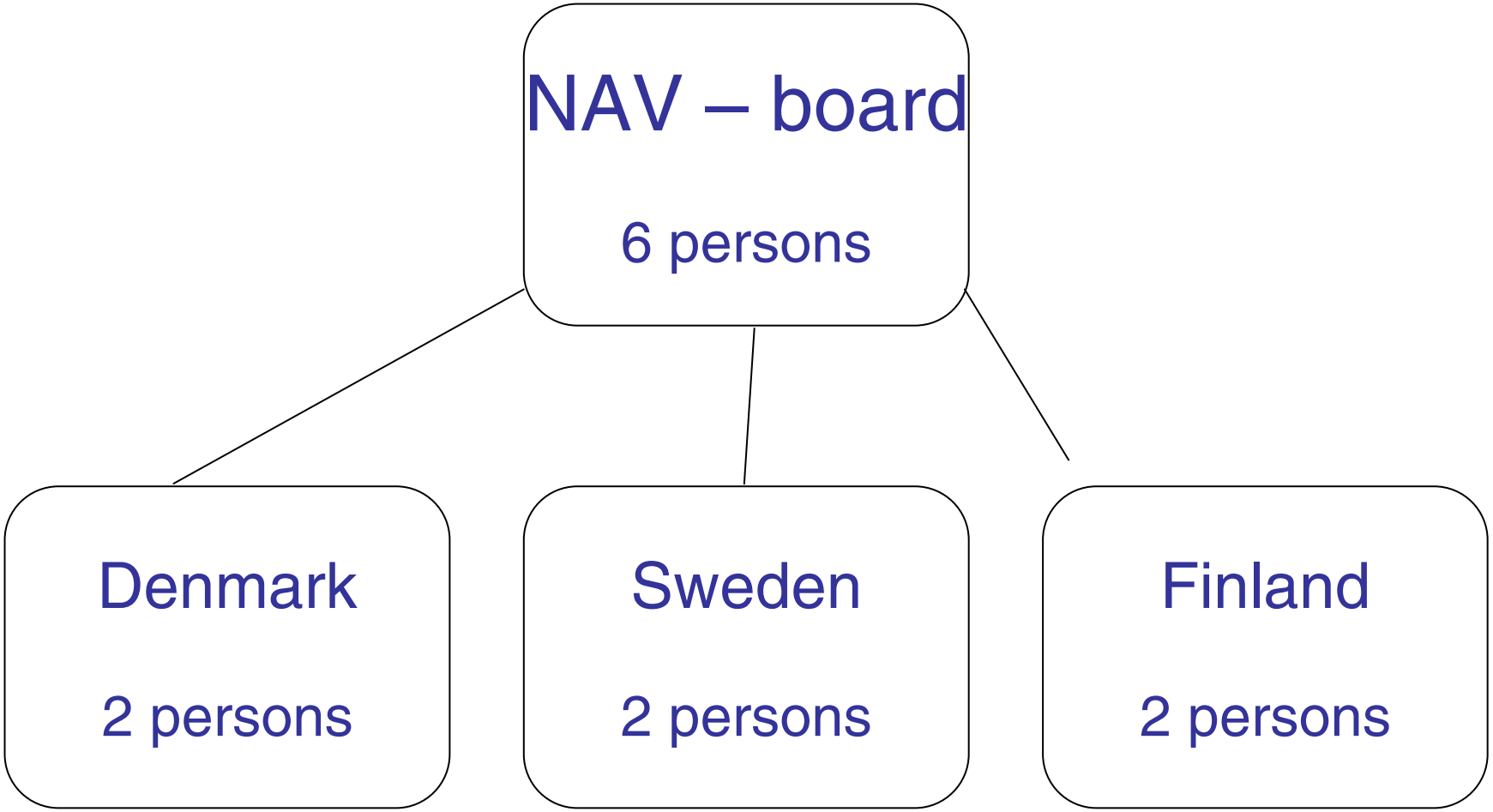
Competitive position

Changes in structure

Nordic breeding profile

Increased population size

Optimal use of resources


NAV – board
6 persons
Denmark
2 persons
Sweden
2 persons
Finland
2 persons

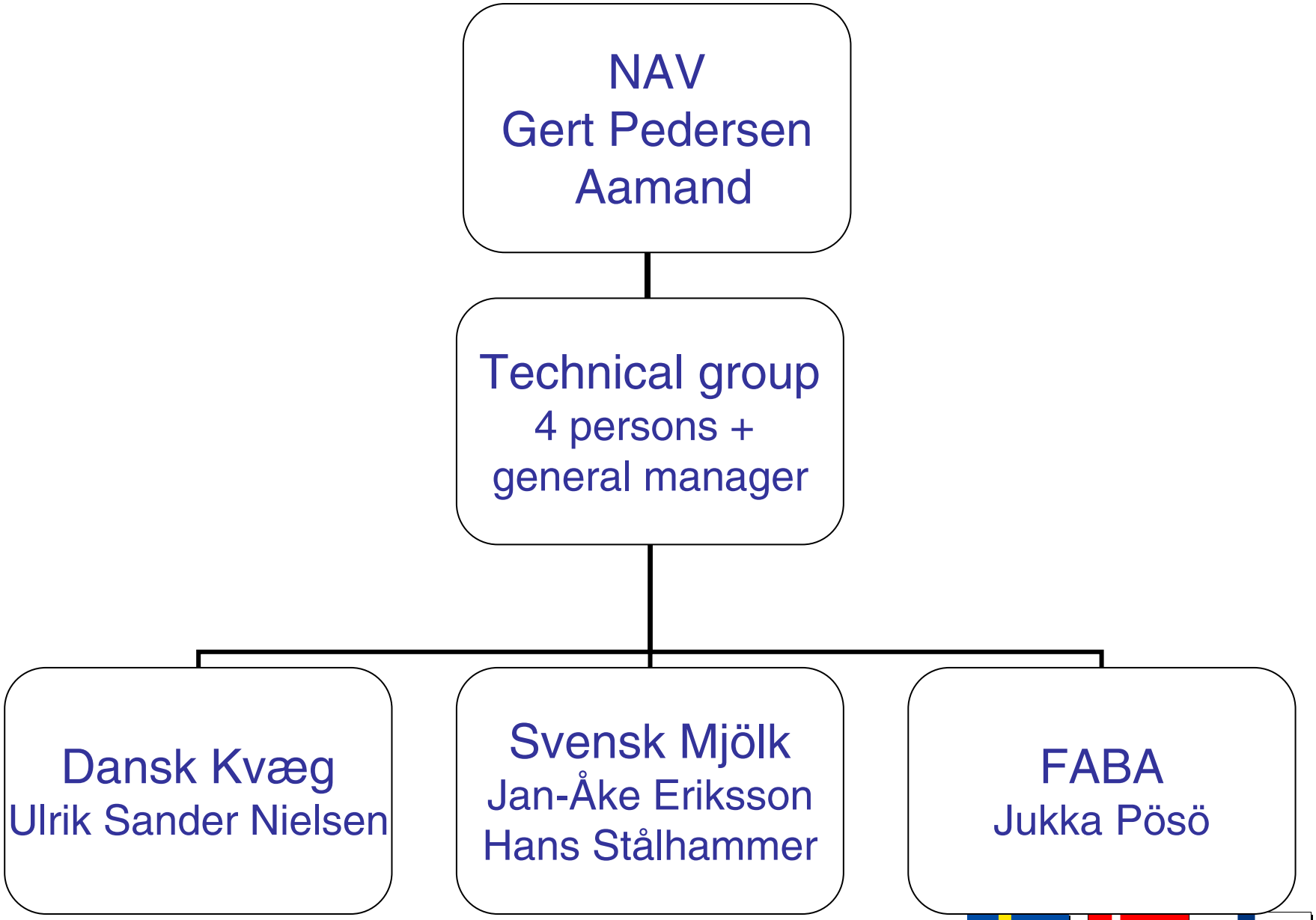
NAVs board

- Finland
  - Jarmo Juga
  - Yrjö Kerkola
- Sweden
  - Lennart Andersson
  - Lars-Inge Gunnarsson (chairman)
- Denmark
  - Henrik Nygaard
  - Christian Ladefoged (vice chairman)

NAV - economics

- Budget 2005 – 5 millioner kr.

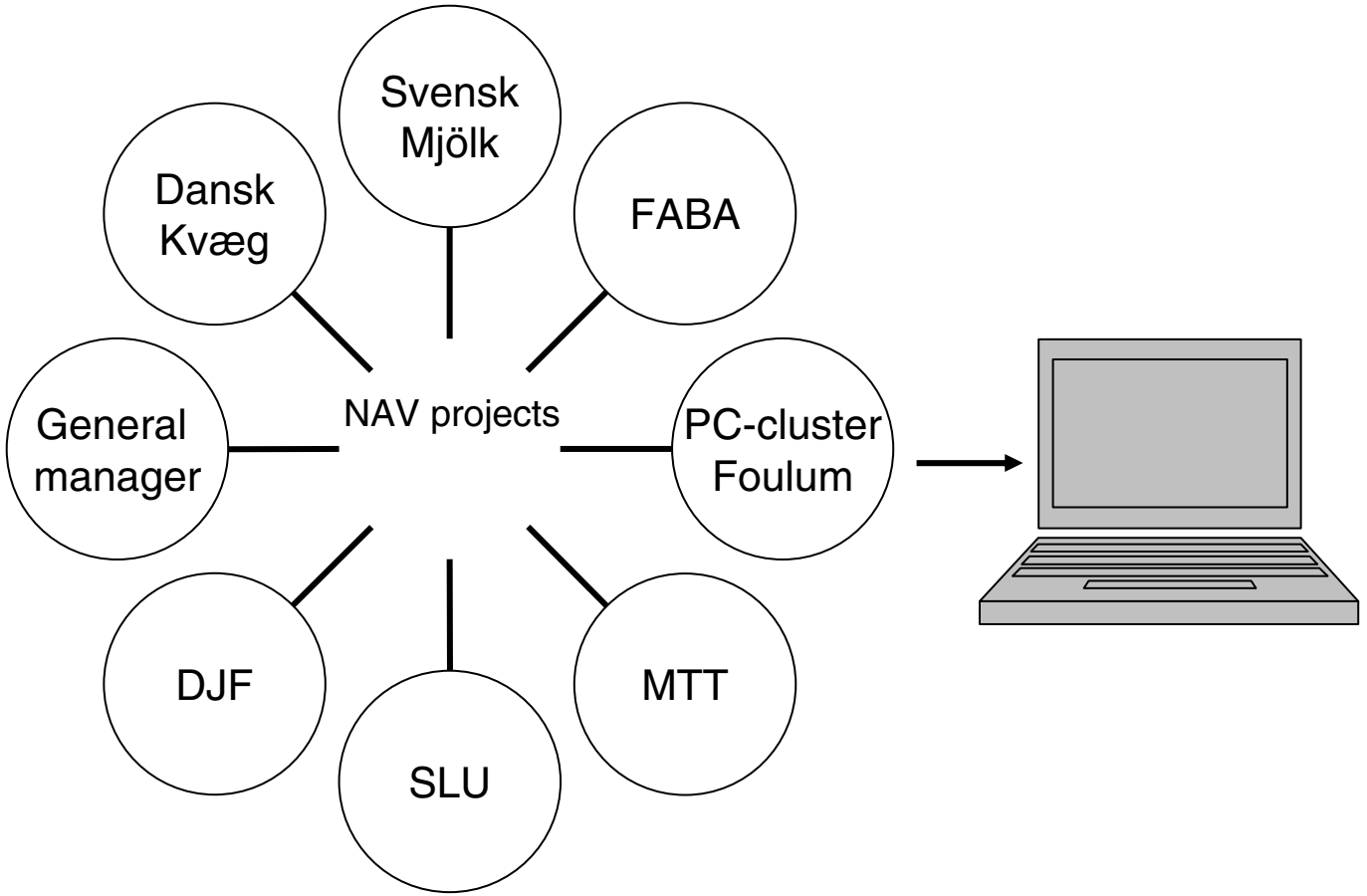
- Payment after 1. ins. pr country
  - Denmark 46%
  - Finland 27%
  - Sweden 27%


NAV
Gert Pedersen
Aamand
Technical group
4 persons +
general manager
Dansk Kvæg
Ulrik Sander Nielsen
Svensk Mjölk
Jan-Åke Eriksson
Hans Stålhammer
FABA
Jukka Pösö

NAV-decisions

- All decisions in relation to NAV-EBVs is taken by the NAV-board
  - Sub breeding goals
  - Presentation of EBVs
  - Start of routine evaluation
  - Etc.
- NAV-board decisions are based on recommendations from NAV-technical group

NAV - Network


Svensk Mjölk
Dansk Kvæg
FABA
General manager
NAV projects
PC-cluster Foulum
DJF
SLU
MTT

Project groups

Project workers (financed by NAV)

+

One person per country

- Back up with national knowledge about data
- Within country information

Cooperation - Network

- Study visits
- Physical meeting
- Video link
- Email / phone

NAV – Goal

- To use international accepted methods for estimation of BVs
- To focus on development of methods within the “Nordic traits” – mastitis, fertility etc.
- To improve our current breeding work by using new registrations

NAV – Goal

- To give the practical cattle breeding the best selection tool to achieve maximal genetic progress

or with other words

- How do we get the best possible methods for estimation of BVs within our Nordic Total Merit index in use in practice

Perspectives - Joint Nordic estimation of breeding values

- Simultaneously use of all data and relationships between Nordic animals
- All cows and sires can be directly compared

Perspectives – joint Nordic Estimation of breeding values

- Use ressources more efficient:
  - Development of new method
  - Routine evaluation
- Joint platform for practical breeding work

EBVs can be compared within the Nordic countries

Nordic

1	Cow 9	Finland
2	Cow 5	Sweden
3	Cow 1	Denmark
4	Cow 2	Denmark
5	Cow 6	Sweden

Same traits measured in all countries

Practical advantage

- One BV per animal

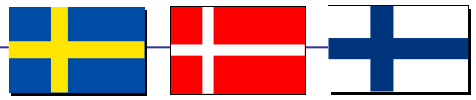
Theoretical reasonable assumption

- INTERBULL-correlations high
- G x E studies no significant effects
- No effect within country even though we have 20 years with a significant increase in production

All models are validated with statistical tests

Estimation of Breeding values before we got NAV

Research	Development	Implementation	Routine evaluation
SLU		Swedish Dairy Ass	Swedish Dairy Ass
MTT		FABA	FABA
DJF / KVL		Danish Cattle	Danish Cattle



Estimation of Breeding values after we got NAV

Research	Development	Implementation	Routine evaluation
SLU		NAV	NAV
MTT		Dansk Kvæg	Dansk Kvæg
DJF / KVL		Svensk Mjølk FABA	Svensk Mjølk FABA

Estimation of breeding values in the future

- Decisions have to be taken Joint Nordic instead of within country:
  - Registration
  - Methods and models
  - Presentation of EBV's
  - Sub breeding goals
  - Future research and development

Nordisk Avlsværdivurdering

Finished work:

- Implementation of routine evaluation of fertility traits, type traits, milk ability and temperament
- Joint presentation of breeding values
- Joint sub breeding goals (type, fertility, production, mastitis)
- Harmonisation of type traits
- New NAV-homepage (www.nordicebv.info)

Mammary system- 2004

	SWE	DNK	FIN
Fore udder	X	X	X
Rear udder heigth	X	X	X
Rear udder width	X	X	X
Udder support	X	X	X
Udder depth	X	X	X
Teat length	X	X	X
Teat thickness	(X)	X	
Teat place. (front)	X	X	X
Teat place. (back)	(X)	X	X
Udder balance	X		X

Mammary system - 2005

	SWE	DNK	FIN
Fore udder	X	X	X
Rear udder heigth	X	X	X
Rear udder width	X	X	X
Udder support	X	X	X
Udder depth	X	X	X
Teat length	X	X	X
Teat thickness	X	X	1.1.2006
Teat place. (front)	X	X	X
Teat place. (back)	X	X	X
Udder balance	X	X	X

Data

- Harmonization of type traits
  - Classified traits (Finland 4 new, Denmark 1)
  - Use of scale (classifier workshop held i May 2005)

- Harmonization of editing rules

Joint sub index
Weight in yield index

	Both Holstein and Red breeds		
	Milk	Fat	Protein
Nordic	-1	1	4

Sub breeding goal - Fertility

	Information	Sub breeding goal
1.ins-last ins heifers	X	X
Number of ins heifers	X	X
Calv.-1.ins cows	X	X
1.ins-last ins cows	X	X
Number of ins cows	X	X
Fertility treatment cows	X	X
Heat strength cows	X	

Current Methods

- NAV-EBVs based on methods already used in at least one of the countries:
  - SI-AM for type
  - MT-Linear SM models for fertility
  - MT-ML-Linear SM models for mastitis

Yield traits

MT-TD for yields traits

- Denmark
  - Multi trait and lactation
  - Testday
  - Better heterogeneous variance correction
- Sweden
  - Multi-lactation
  - Better heterogeneous variance correction
  - Test day data as soon as possible
  - Blending of foreign information
- Finland
  - Heterogeneous variance
  - Heterosis
  - Blending of foreign information

General about methods

- Use the best methods which can be handled in practice
- Update of genetic parameters
- We have to use our data as efficient as possible
- Focus on supporting the strength of Nordic cattle breeding – functional traits

General about methods

- Better methods and use of data for functional traits e.g. fertility, mastitis/disease and calving traits

- Improve our total Merit Index calculations
  - Economic values
  - Use of genetic correlations
  - But total merit index is still a national responsibility

Nordic routine evaluation

- Presentation of breeding values
  - Common base
  - Common standard deviation
- Number of routine runs per year
  - Dates for publishing EBVs
- Breeders in Denmark, Finland and Sweden can see the same BVs at the same time

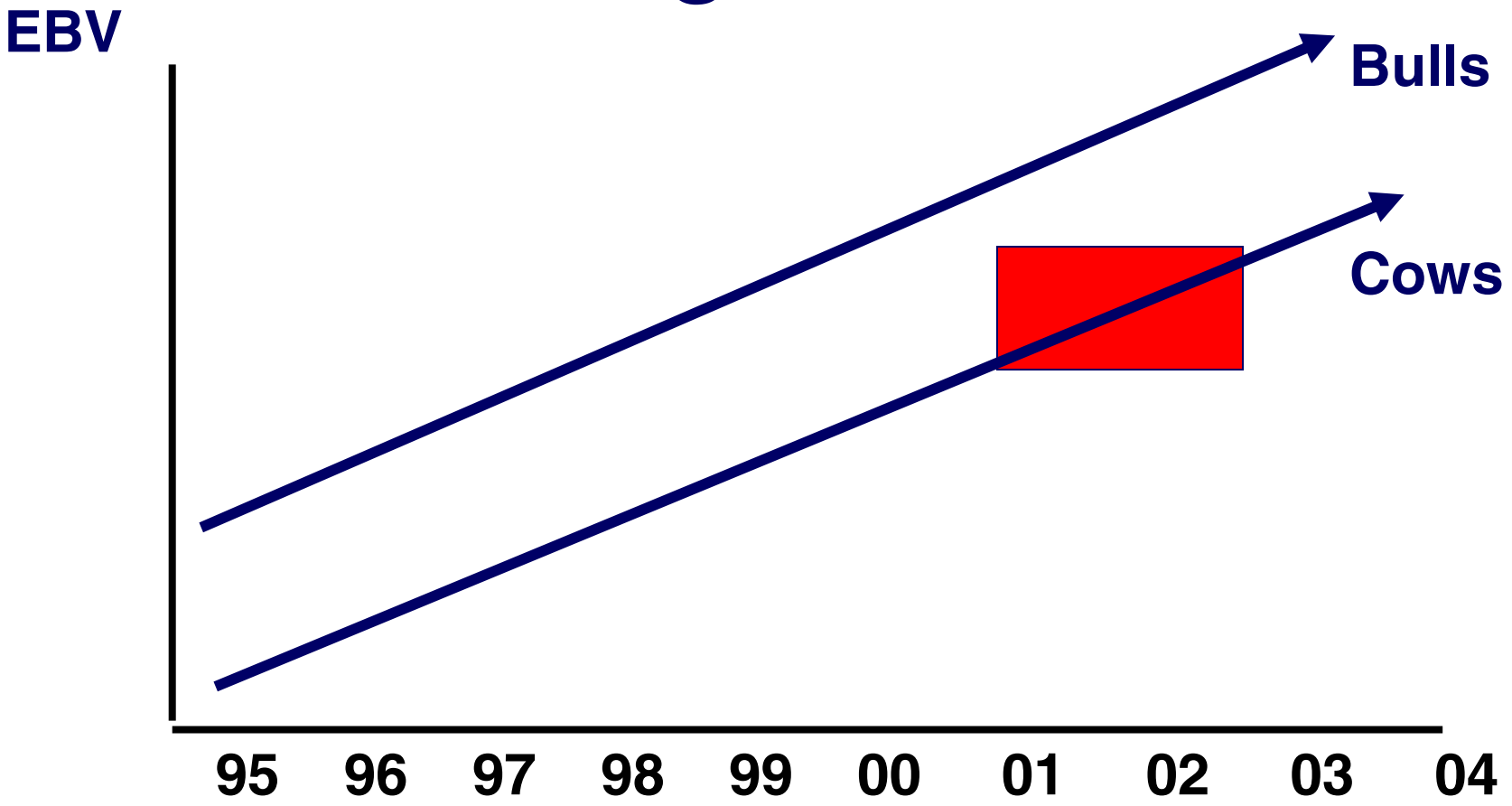
Presentation of EBVs

	Until 15 April 2005		Today	
	Base	Standard deviation	Base	Standard deviation
Sweden	100	7		
Finland	100	10	100	10
Denmark	100	5		
Denmark type	0	1		

Nordic presentation of EBVs

- Common base
  - Cow base – 2 birth years
  - Average 100 all traits
  - Same base for cows/heifers and sires
  - Base update at each routine run

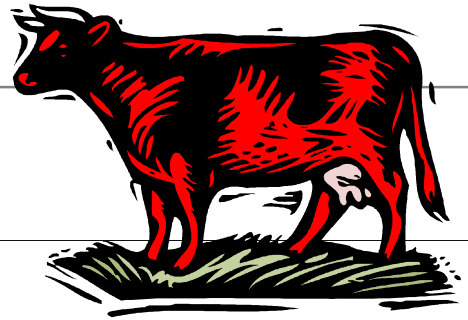
Nordic - genetic base

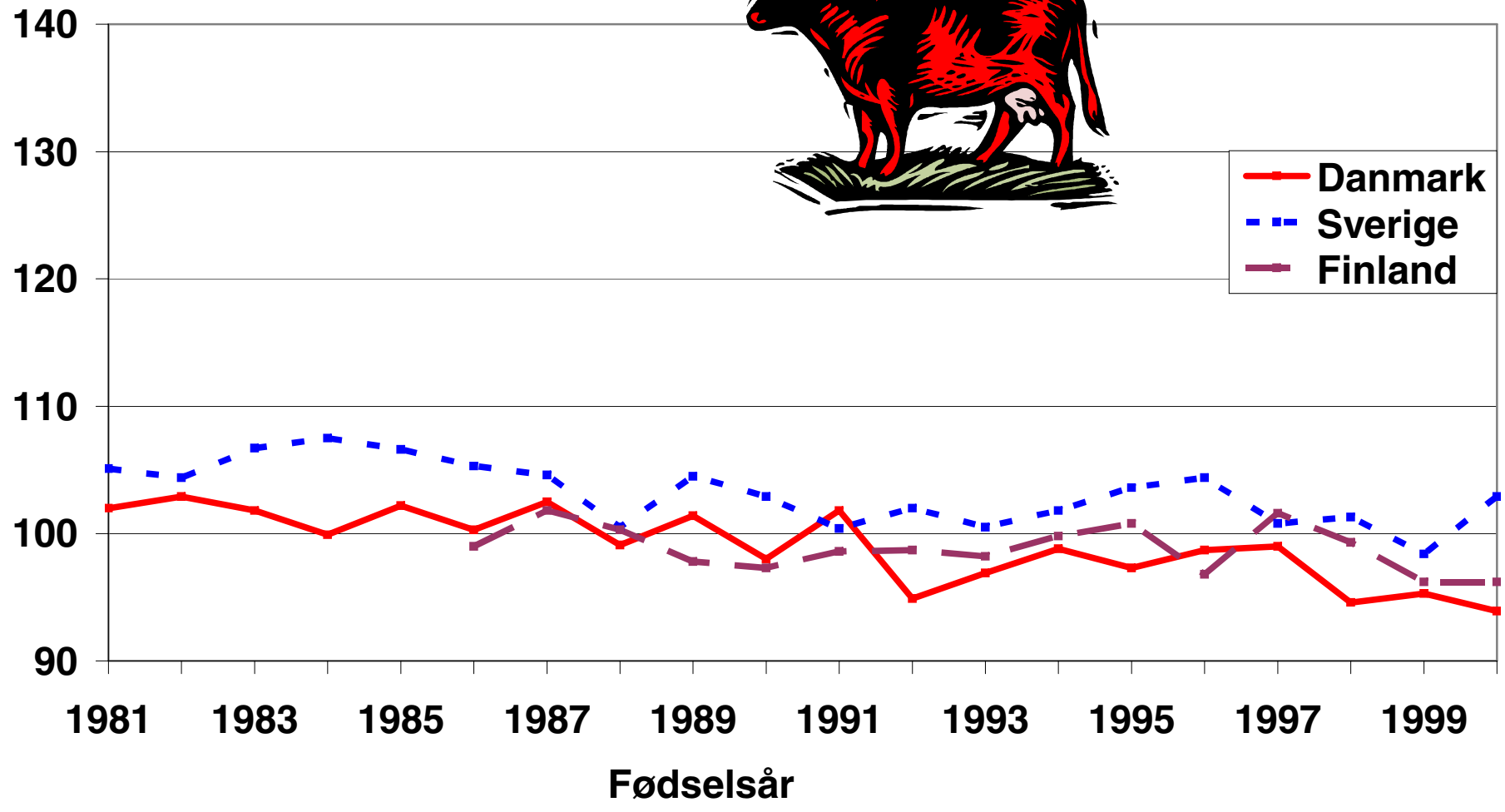


Standard deviation

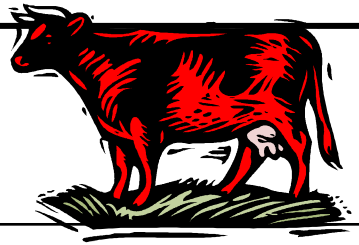
- Express the variation around a mean
- Standard deviation 10
  - 67% of the sires has EBVs between 90 og 110 for traits with out genetic changes over years

Ayrshire- avlsmæssig udvikling

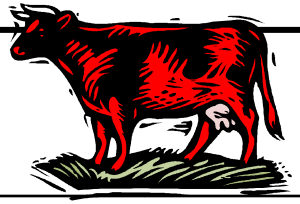




Genetic level red breeds, mean EBV for bulls born 1996-97

	Milking speed	Temperament
Denmark	100	109
Finland	100	98
Sweden	103	100

Genetic level red breeds, mean EBV for bulls born 1996-97

	Body	Feet and Legs	Mammary
Denmark	110	108	107
Finland	93	96	96
Sweden	99	100	101

Number of evaluations

	Until 15 April 2005	NAV
Sweden	7	
Finland	4	7(4)
Denmark	8	

NAV-status

	INTERBULL test	Routine
Type	September 2004	April 2005
Fertility	(Pilot Sept 04)	April 2005
Production	September 2005	January/April 2006
Mastitis	March 2006	April 2006
Calving traits	September 2006	October 2006

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Current work:

- Clarification and implementation of routine evaluation for milk production January/April 2006
- Development work mastitis and calving traits
- Working group automatic registrations on national databases eg. Milking time
- Joint Nordic use of computer program (EVA) for optimisation of genetic progress and inbreeding control

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Future work:

- Including Swedish TD in yield evaluation and update genetic parameters for yield traits
- Further harmonisation of statistical model across countries
- NAV-EBVs for longevity, other diseases and beef production
- Harmonisation of (new) traits
- Better methods for estimation of EBVs – functional traits
- Use of new registrations

Future Estimation of breeding values

National

- Total merit index – overall breeding goal
- Publishing EBVs and support

Nordic

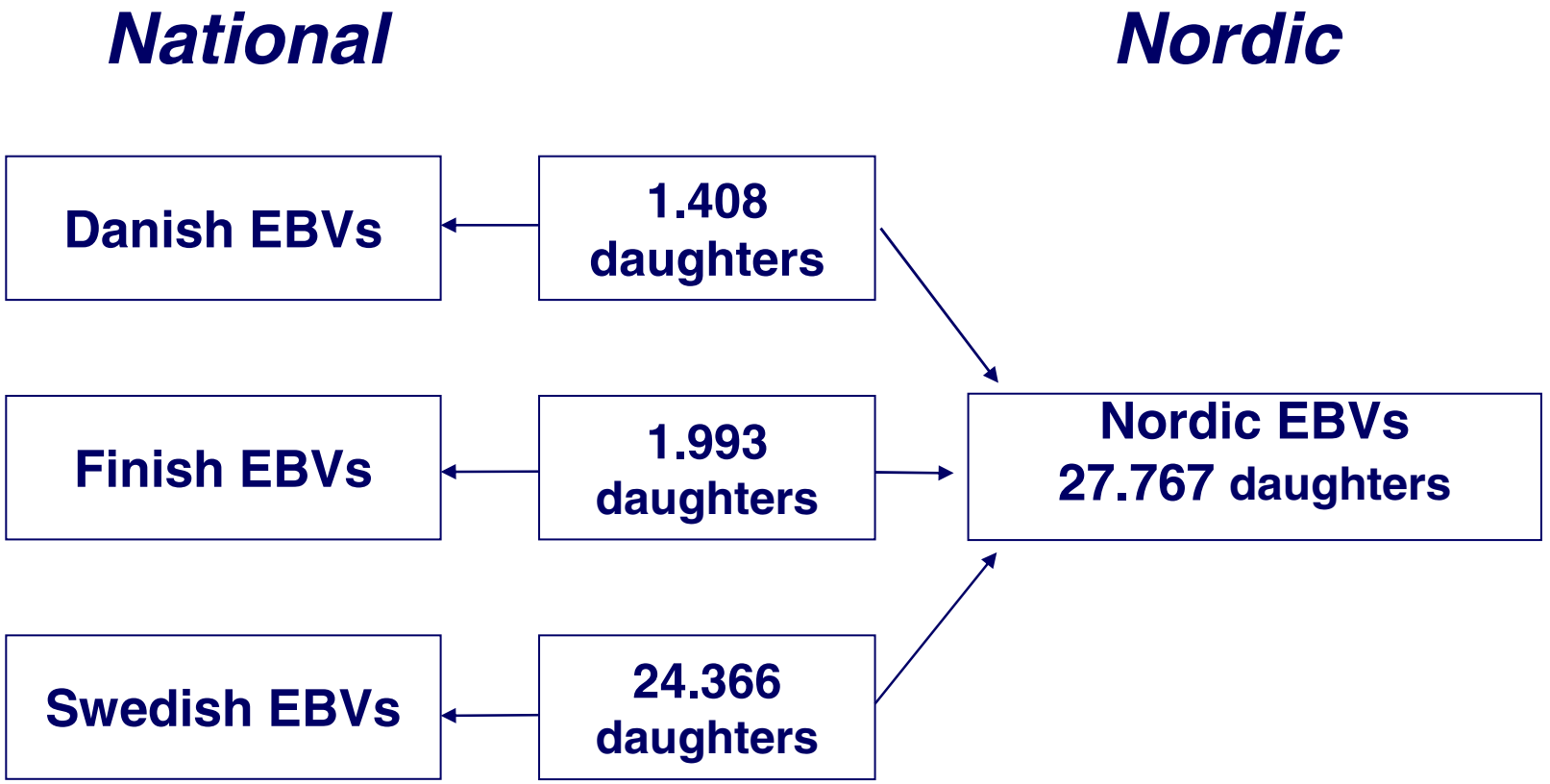
- Editing of data
- Estimation of breeding values
- INTERBULL contact
- Sub breeding goal

Breeding values could only be compared within country

Back gård

	Denmark	Sweden	Finland
Number of daughters	1.408	24.366	1.993
P-index	Danish	Swedish	Finnish

From national to Nordic
SRB-bull Backgård



Backgård – before 15.4.2005

Danish, Finnish and Swedish EBVs could not be compared:

- Information from different daughters
- Sub breeding goals are different
- Differences in genetic level
- Differences in standard dev. of EBVs

Backgård – today October 2005

Danish, Finnish and Swedish EBVSs can be compared directly for:

- Fertility traits (same sub breeding goals)
- Type traits (same sub breeding goals)
- Temperament and milk ability

Oct. 2005 EBVs for fertility and mammary system the same in Denmark, Sweden and Finland

Backgård

	Denmark	Sweden	Finland
Number of daughters		27.767	
Fertility		94	
Mammary system		113	

Backgård – October 2005

Danish, Finnish and Swedish EBVSs can not be compared directly for all other traits since:

- Sub breeding goals are different (expect for yield)
- Differences in genetic level

  but
- Differences in standard dev. of EBVs and

  definition of base are the same

Estimation of breeding values in the future

- Decisions have to be taken Joint Nordic instead of within country:
  - Registration
  - Methods and models
  - Presentation of EBV's
  - Sub breeding goals

Conclusion

- Think Nordic:
  - Registration, sub breeding goals, new ideas in relation to estimations of breeding values (use Nordic data in research)
- 15 April 2005
  - The first joint Nordic EBVs
  - Nordic presentation of all EBVs
    - Standard deviation, genetic base

Conclusion

- A part of the national work in relation to EBVs will be NAV work in the future
- NAV work is solved in a network

EBVs can be compared within the Nordic countries

Nordic

1	Cow 9	Finland
2	Cow 5	Sweden
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5	Cow 6	Sweden

Conclusion

- NAV want to give:

  The practical cattle breeding the best selection tool to achieve maximal genetic progress