Registration system in Scandinavian countries - Focus on health and fertility traits

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The breeding program – number of cows

	Denmark	Sweden	Finland	In total
Holstein	375,000	149,000	92,800	**616,800**
Jersey	60,000	2,000	-	**62,000**
Viking Red	40,000	130,500	194,300	**364,800**
Red Holstein	5,500	-	-	**5,500**
SKB/Finncattle	-	1,200	2,900	**4,100**
Total	**480,500**	**282,700**	**290,000**	**1,053,200**

Holstein

Viking Red

Jersey

Healthy cows

- Animal welfare
- Better economy
  - More economical production
  - Less costs for the veterinarian
- Best image for dairy production
  - Less external political regulations

- Combination of management and breeding

- How can we create healthy cows by breeding ??

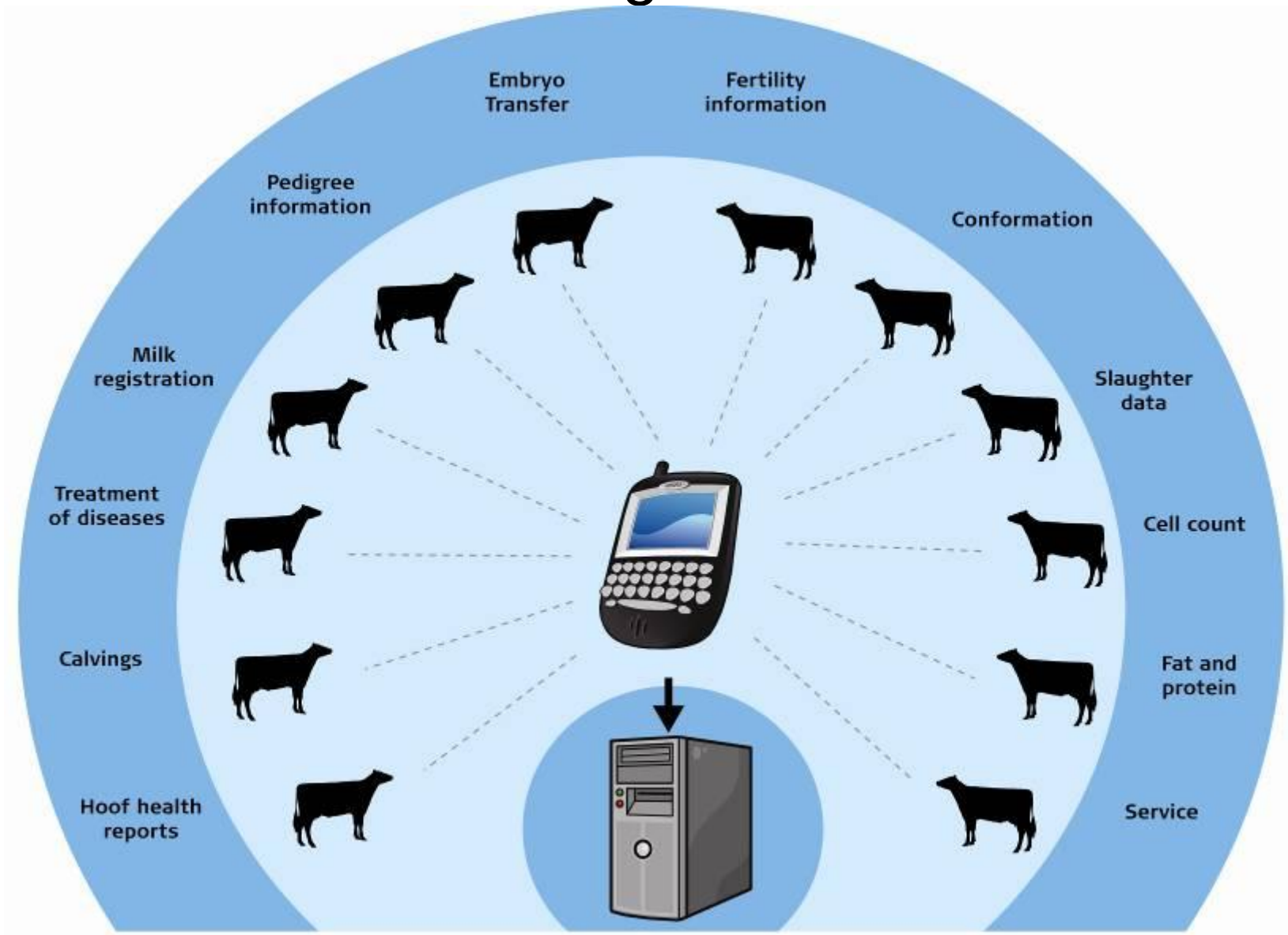
Registrations are the background

- To obtain genetic progress in traits with low heritability – like health and fertility traits – you need superior registrations – and an efficient database

- Our farmers have understood the value of good registrations during years – and we have been able to convert the registrations into reliable breeding values making genetic progress

- So far most registrations have been done voluntarily and with no payments connected
  - Future ???

The Database – and registrations



Goal – One Nordic cattle database

- Today we have one individual cattle database in each of the three ”Viking countries”
  - Denmark, Sweden and Finland

- Our general organizations are looking at different alternatives to create ONE database – like we today have ONE breeding evaluation, ONE breeding goal – and ONE AI organisation

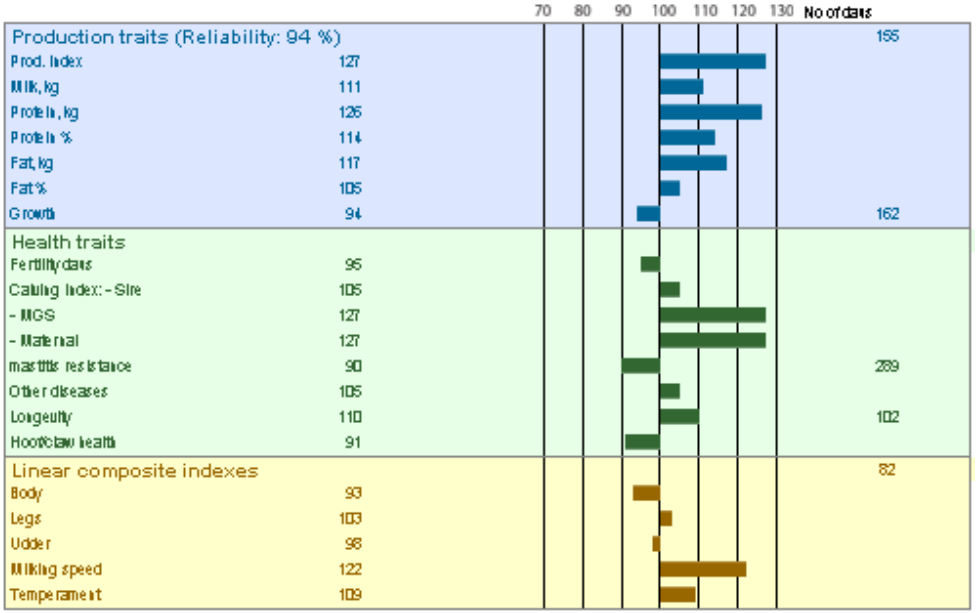
- But it is expensive to develop a new database

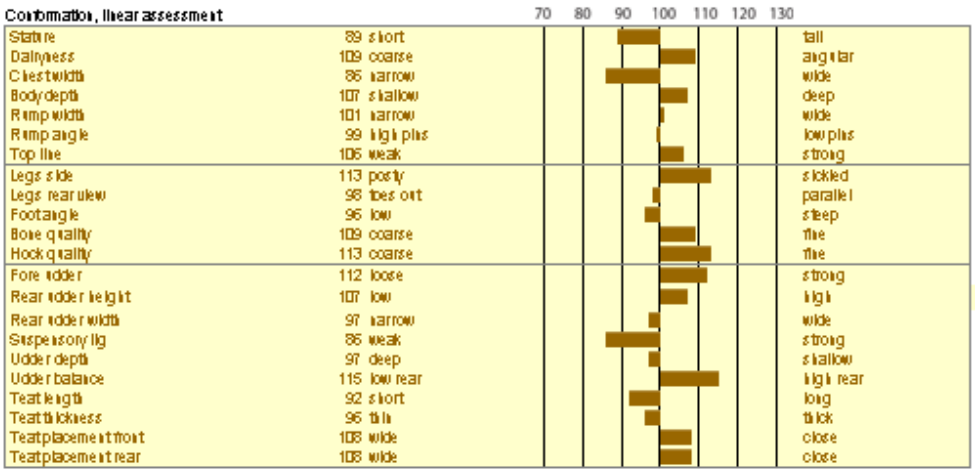
Registration

- All cows in DFS have to be registered by law
  - Present pedigree file goes back to 1960
- More than 85% of all registered dairy cows in milk recording. (MR) ~ 1 million cows
- **More than 85% of all cows in MR contribute with registration of treatments**
- **App 90% of all cows in MR contribute with fertility data**
- **App 90% of all cows in MR contribute to information about size of calves, calf survival and calving ease.**
- Nearly 200,000 cows classified by classifiers every year in DSF
- App. 500,000 cows contributed with hoof trimming data in 2011

Breeding values for all important traits

- Production
- Health
- Conformation





The breeding values are calculated by svenskmjölk SWEDISH DAIRY ASSOCIATION

Breeding values from 2009-11-29

NTM – Nordic Total Merit

- Compares all economically important traits
- Takes genetic correlations into consideration
- Best tool for selection of bulls and cows for the breeding programme
- Permits comparison of cows and bulls directly in Sweden, Denmark and Finland

Traits in NTM

Index	Data
Yield	Milk, protein & fat yield
Female fertility	Days from calving to first insemination Days from first to last insemination Number of insemination Fertility diseases
Calving & birth	Vitality of calf Calving ease Size of calf
Meat production	Carcass weight & carcass classification
Udder health	Diagnoses of mastitis Somatic cell count, Conformation traits

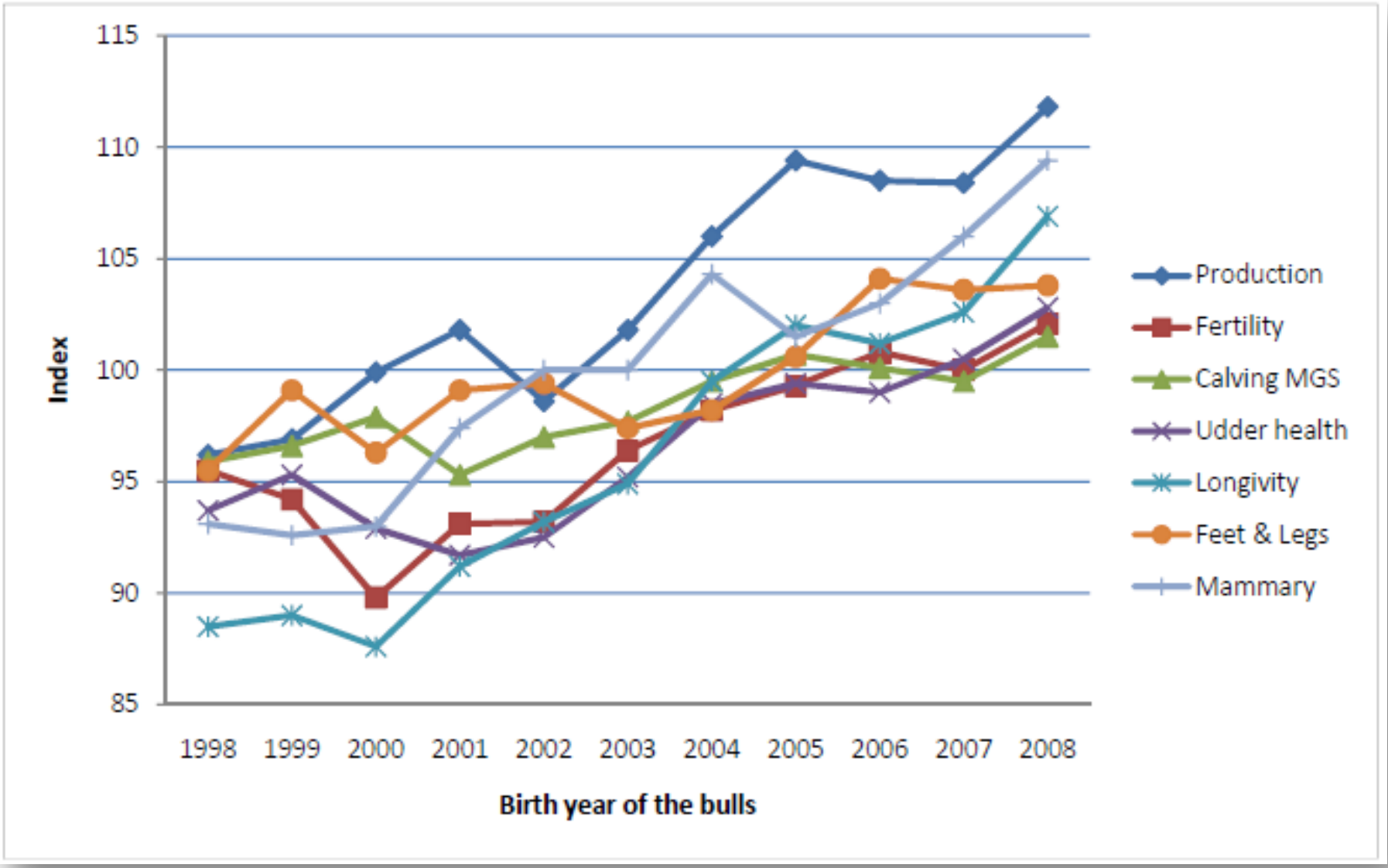
Traits in NTM (**continued)**

Index	**Data**
Longevity	Days in herd (1st calving to culling)
Other health traits	Reproduction diseases Feet & leg diseases Digestive diseases
Conformation	22 conformation traits
Milking speed	Direct data from recording system L/minute
Temperament	Registrated by farmers / classifiers
Hoof health	Registrations made by hoof trimmers

NTM-index – economical weights

	HOL	RED HOL
Production	0.75	0.75
Growth	0.06	0.11
Female fertility	0.31	*0.23*
Birth	0.15	0.17
Maternal calving ease	0.17	0.17
Udder health	0.35	0.35
Other health traits	0.11	0.12
Body	0.00	0.00
Feet / Legs	0.12	0.15
Mammary	0.18	0.24
Milking speed	0.08	0.08
Temperament	0.03	0.03
Longevity	0.11	0.11
Hoof health	0.08	0.10

Genetic trends on selected traits - Holstein



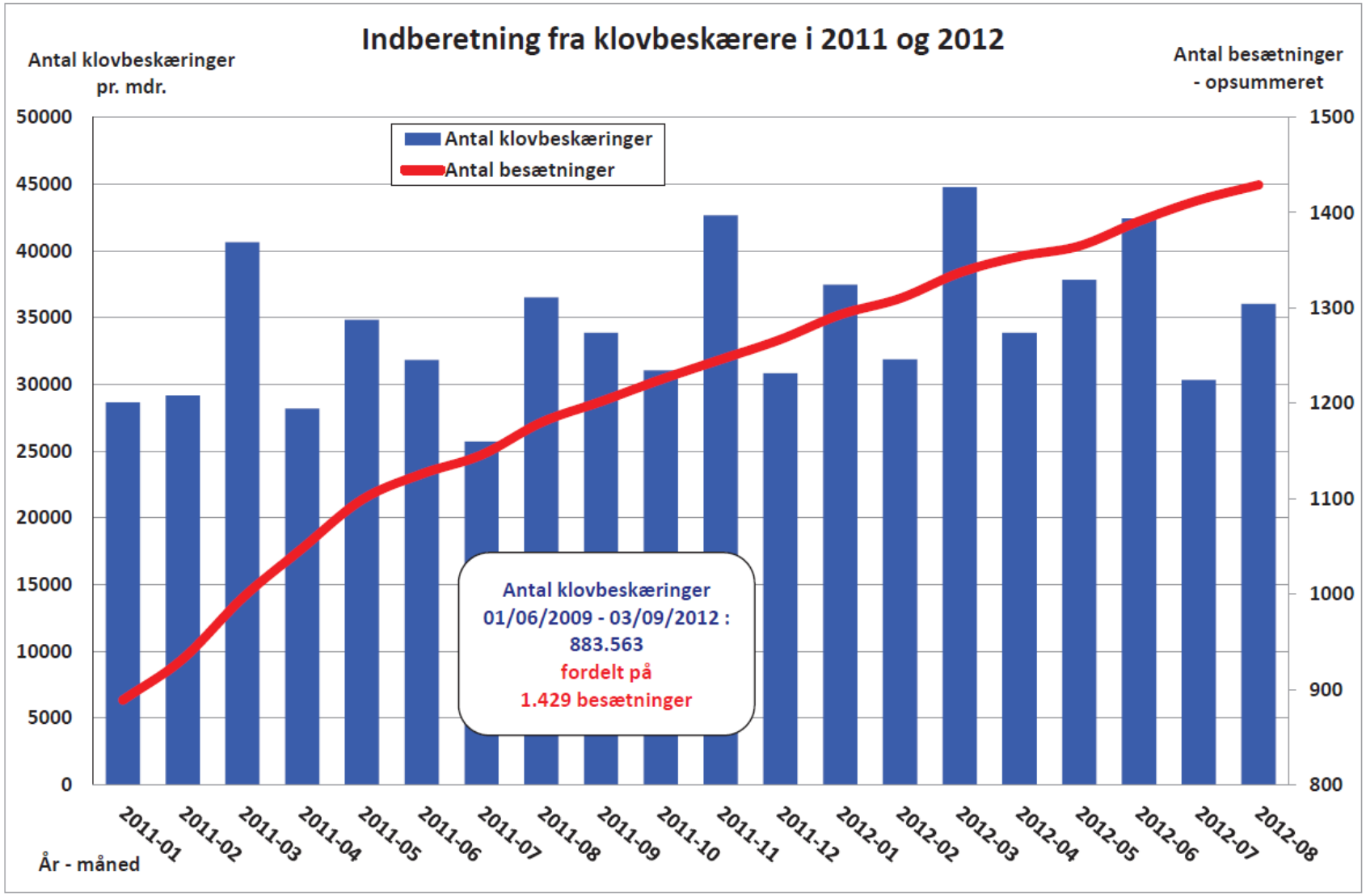
How to breed for improved claw health

- Registrations are the key !!

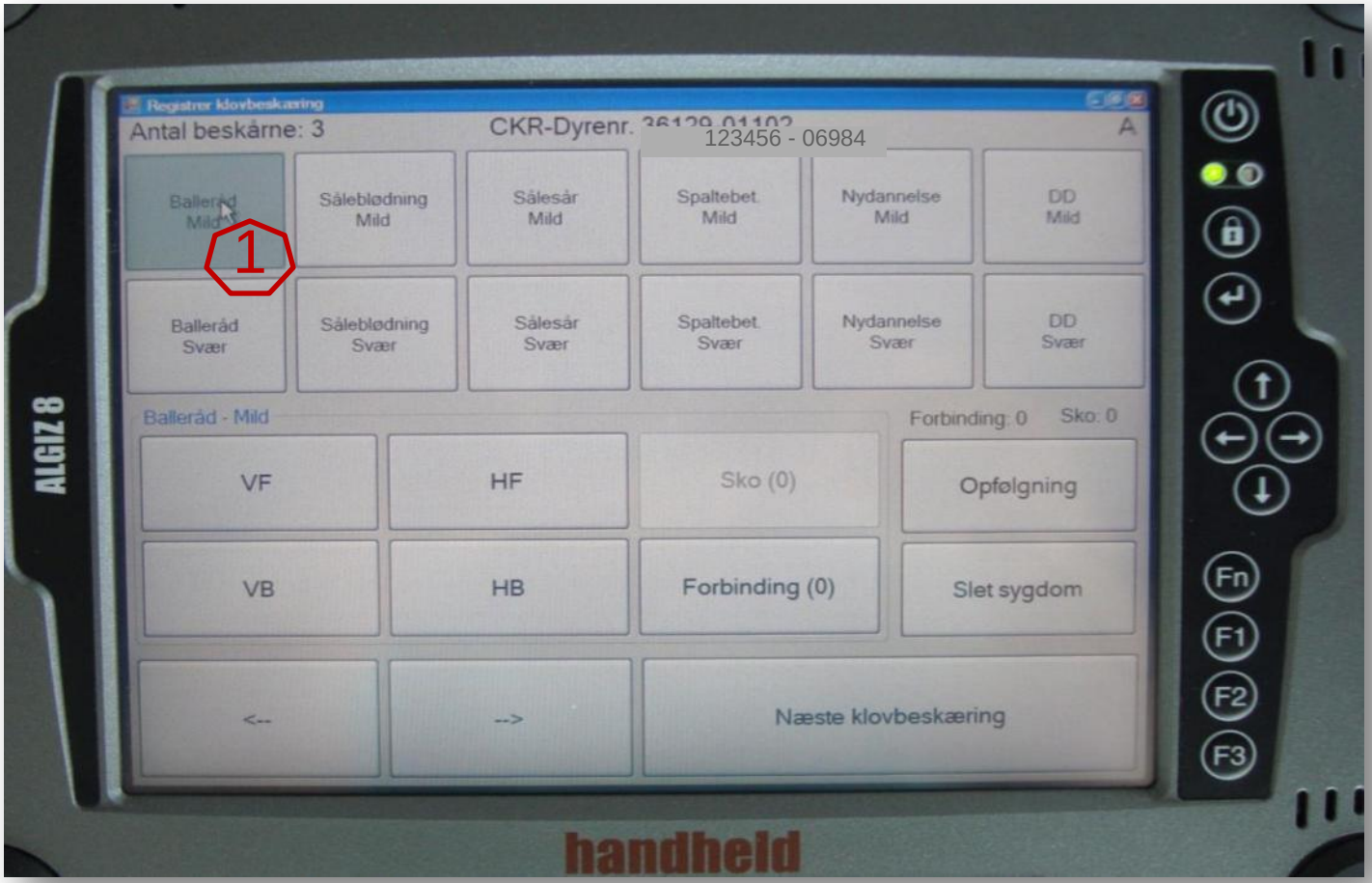
- Registrations have to be easy to handle – especially in larger herds
  - Otherwise too time consuming – and not done
- The claw health registrations are valuable management tools at farm level
  - Important message to farmers
  - Convince hoof trimmers
- Information have to go to a common database

Registration unit in Denmark

Data collection in Denmark – hoof trimmers



Claw disease registration. One claw disease and the severity can be registered in one touch



Trait definition – genetic evaluation

Trait
Dermatitis (DE)
Heel Horn Erosion (HH)
Sole Haemorrhage (SH)
Sole Ulcer (SU)
Cork screw claws (CSC)
Skin Proliferation (SP)
White line separation+ double sole (WLS)

Digital dermatitis

Infection related

Mild

Severe

Interdigital dermatitis

Infection related

Mild

Severe

Heel horn erosion

Infection related

Mild

Severe

Interdigital hyperplasia/Skin proliferation

Infection related

Mild

Severe

Sole haemorrhage

Metabolic related

Mild

Severe

Sole ulcer

Metabolic related

Mild

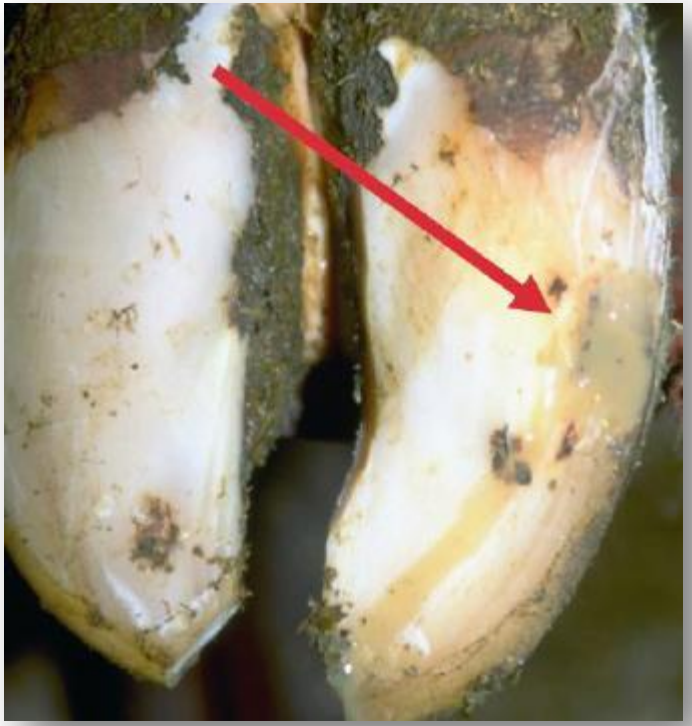
Severe

White line disease

Metabolic related

Mild

Severe



Double sole

Metabolic related

Mild

Severe

Cork screw claw

Malformation claw diagnosis

Mild

Severe

Correlation between claw health and NTM traits

	HOL	RDC
• Longevity	**0.25**	**0.20**
• NTM	0.20	0.05
• Other disease	0.15	0.15
• Udder health	0.15	0.10
• Feet&Legs	**0.05**	**0.15**
• Temperament	-0.05	-0.15

Breeding for health and fertility - conclusion

- It is possible to obtain genetic progress even on low heritability traits
- You need reliable registrations – even when you use genomic selection !
- Important that data is stored in a system so we can get access from the evaluation system
- …and also important to include these traits in the breeding goal with the weight it deserves.