KNOWLEDGE CENTRE FOR AGRICULTURE

Requirements for future recording systems

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LIVESTOCK REGISTRATION
AND MILK RECORDING

Nordic Cattle Genetic Evaluation

RECORDING MUST BE ATTRACTIVE

Attractive - only if it is useful

How is “useful” defined?

Examples:

- Somatic cell counts
- Fat, protein
- Veterinary results (PCR, paratuberculosis, salmonella, etc.)
- Management tools
- Etc.

RECORDING DISADVANTAGES

The “not-attractive” part

Examples:

- Work
- Expenses
- Paper/data
- Etc.

WHAT KIND OF TECHNICIANS IN THE FUTURE??

The farmers contact to yield recording is the technician

Personality often means more than the skills:

Advantage for the technician:

a. Smiling personality
b. Get along with all kind of farmers and their staff
c. Authoritative personality
d. Service-minded
e. Skilled
f. Loyal to “the system”

Do we have the right education?

WHAT KIND OF RECORDING??

Traditional thinking:

- **Pedigree**
- **Milk recording**
- **Classification**
- **Beef recording**

WHAT KIND OF RECORDING??

What about:

- Health
- Welfare
- Veterinary treatment
- Milk ability
- Weight after each milking
- PCR
- Milk temperature
- Animal activity
- Etc. etc.

WHY AND HOW??

Increasing herd size
- Herdsman knows less about each animal

Automated milking systems
- Herdsman knows less about each animal

Technology (on-farm or in recording devices)
- Increasing possibility for automated data recording

Reports based on recorded data will be the future tool
- Support (or replace) herdsman's memory
- Everyday routines for immediate recording required
- Availability of recorded data will be a key issue
- Data standards important

WHAT DO WE NEED ??

Management tools:

Production
1. Documentation
2. Prognosis

Health
1. Symptoms: Observed or automatically recorded
2. Treatments: Own and veterinarian
3. Reasons for deaths, culling and killings

Reproduction
1. Cows in heat and inseminations
2. Animal activity and milk temperature

Welfare
- Indicators at herd level based on individual cow data

WHAT DO WE NEED ??

Breeding value estimation:

- Genomic selection impossible without recorded data
- Even genomic selection needs an ongoing calibration by real recorded data
- Milk ability based on objective data provided by milk meters
- Possible new traits based on new data

WHAT DO WE NEED ??

Farmer wants:

- **Management data**
- **Spend as little time as possible on recording**
- **All information needed should be available**

WHAT DO WE NEED ??

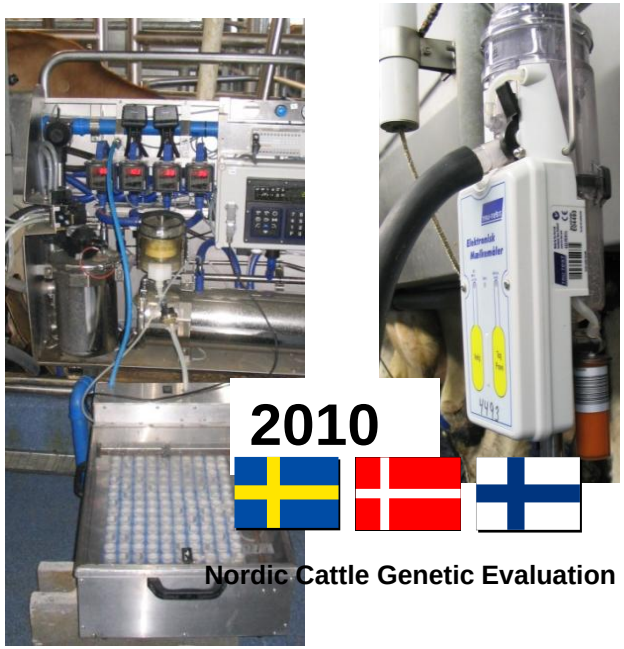
Automated data capture can help provide both

- **Without sensors on or in animal**
- **Electronic identification and electronic milk meters**
- **Collect data on milk ability from AMS systems**
- **Collect data from mandatory hoof trimming programmes**
- **Automatic weighing of cows leaving milking**

- **With extra sensors on or in animal**
- **Automatic recording of animal activity**
- **Automatic recording of animal temperature**

2000 – 2010 (Denmark)

	2000	2010
Producers	10,500	4,250
•Dairy cows	660,000	572,000
•Average herdsize	63	135
Recorded herds	8,850	3,800
•Recorded cows	593,000	530,000
•Average herdsize	67	139
•Manual recording	8,800	300
•Automatic recording, herds	50	3,500
•% cows in AMS systems	0.5 %	27 %
•Robotic herds	50	830



LIVESTOCK REGISTRATION
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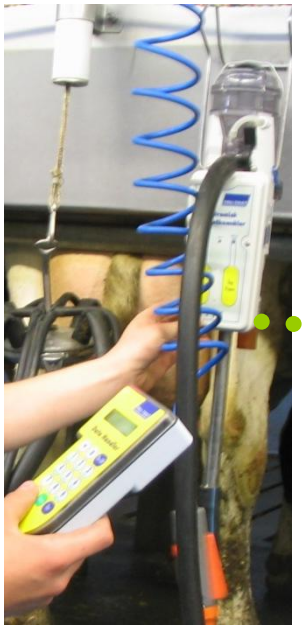
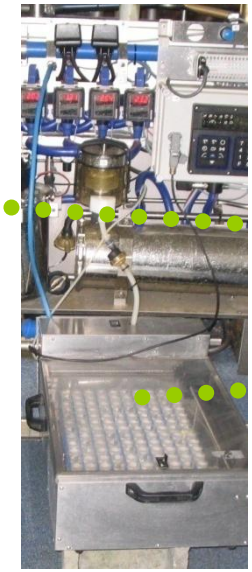
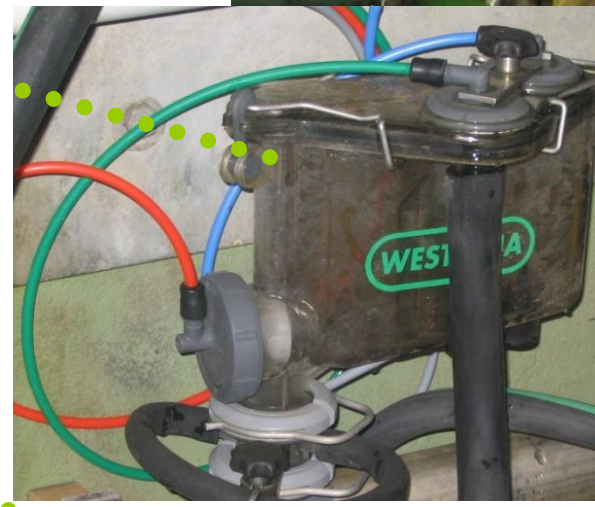
Nordic Cattle Genetic Evaluation

The center is the sample - not the meter!







RYK

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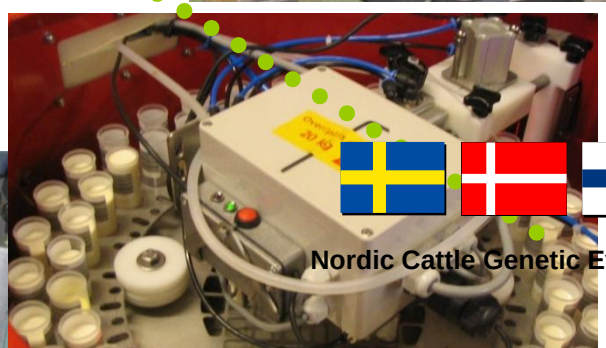

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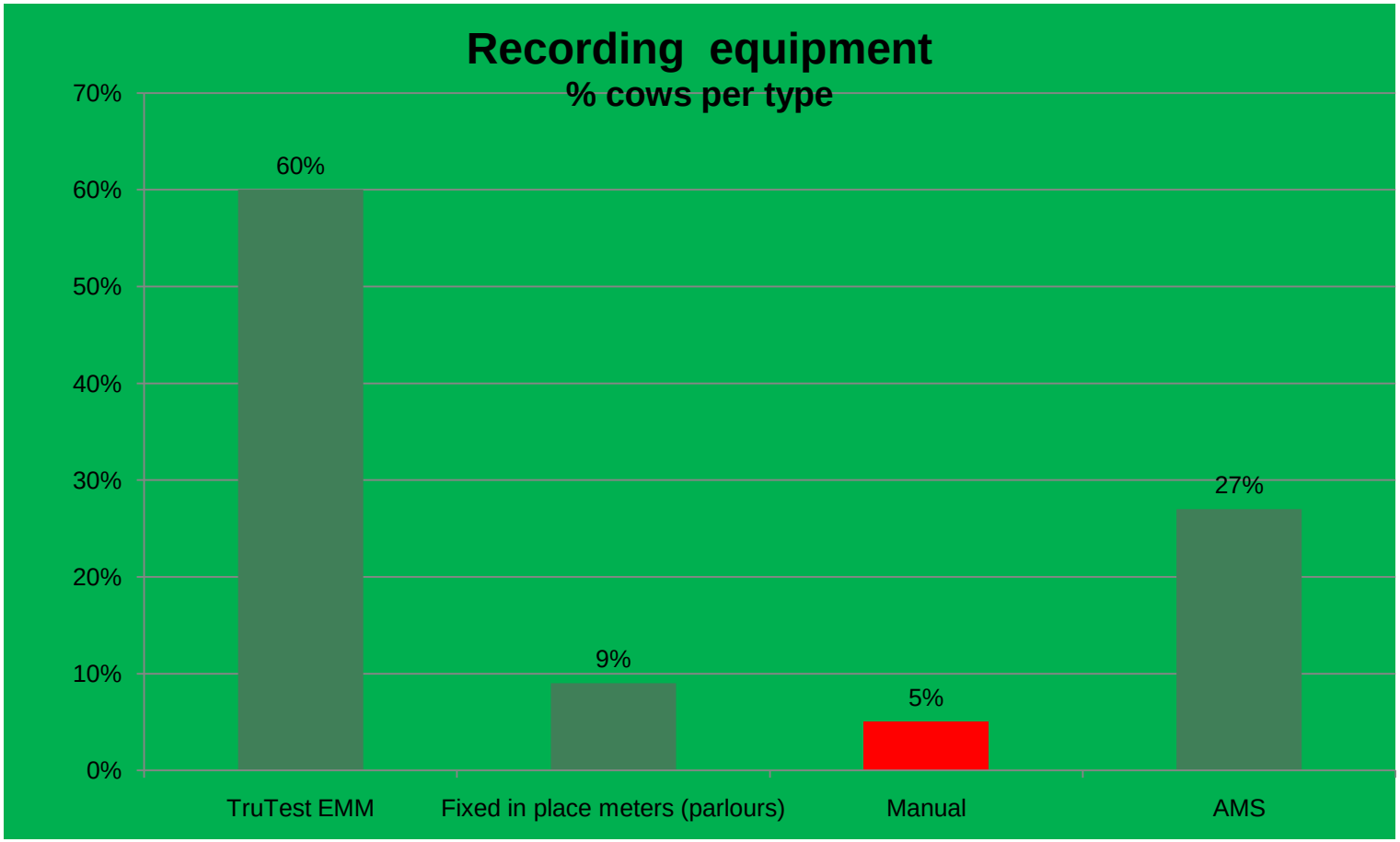
Analysis on DHI samples

Standards:
Fat, protein, SCC

Options:
Paratuberkulose (Johnes)
Salmonella Dublin
PCR
Urea
Lactose
Fatty Acids
Lactoferrin
Inhibitors
Minerals
Hormones

…% F - …% P - …SCC …. ELISA…PCR

Recording status 2010 (Denmark)



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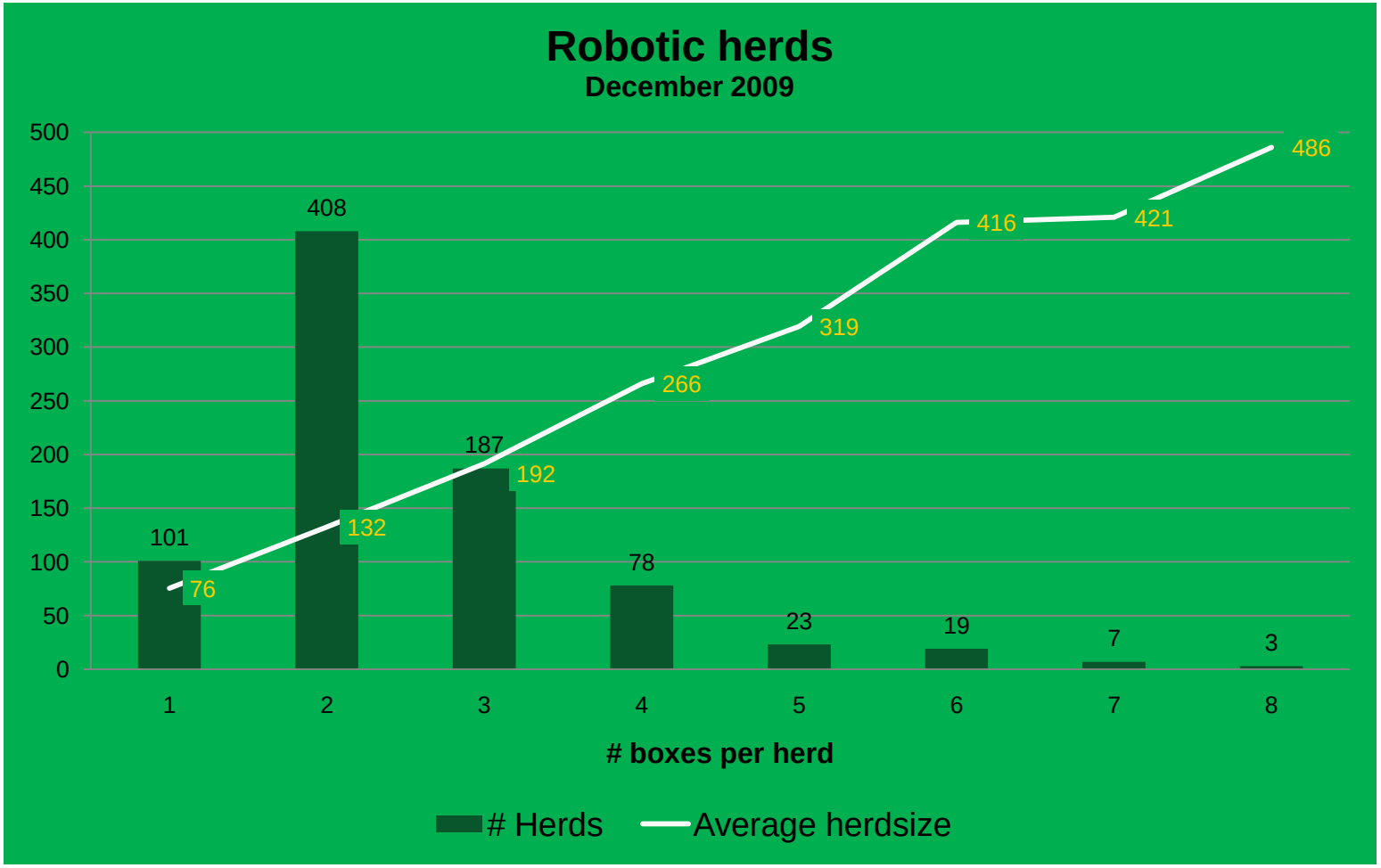
Recording status 2010 (Denmark)



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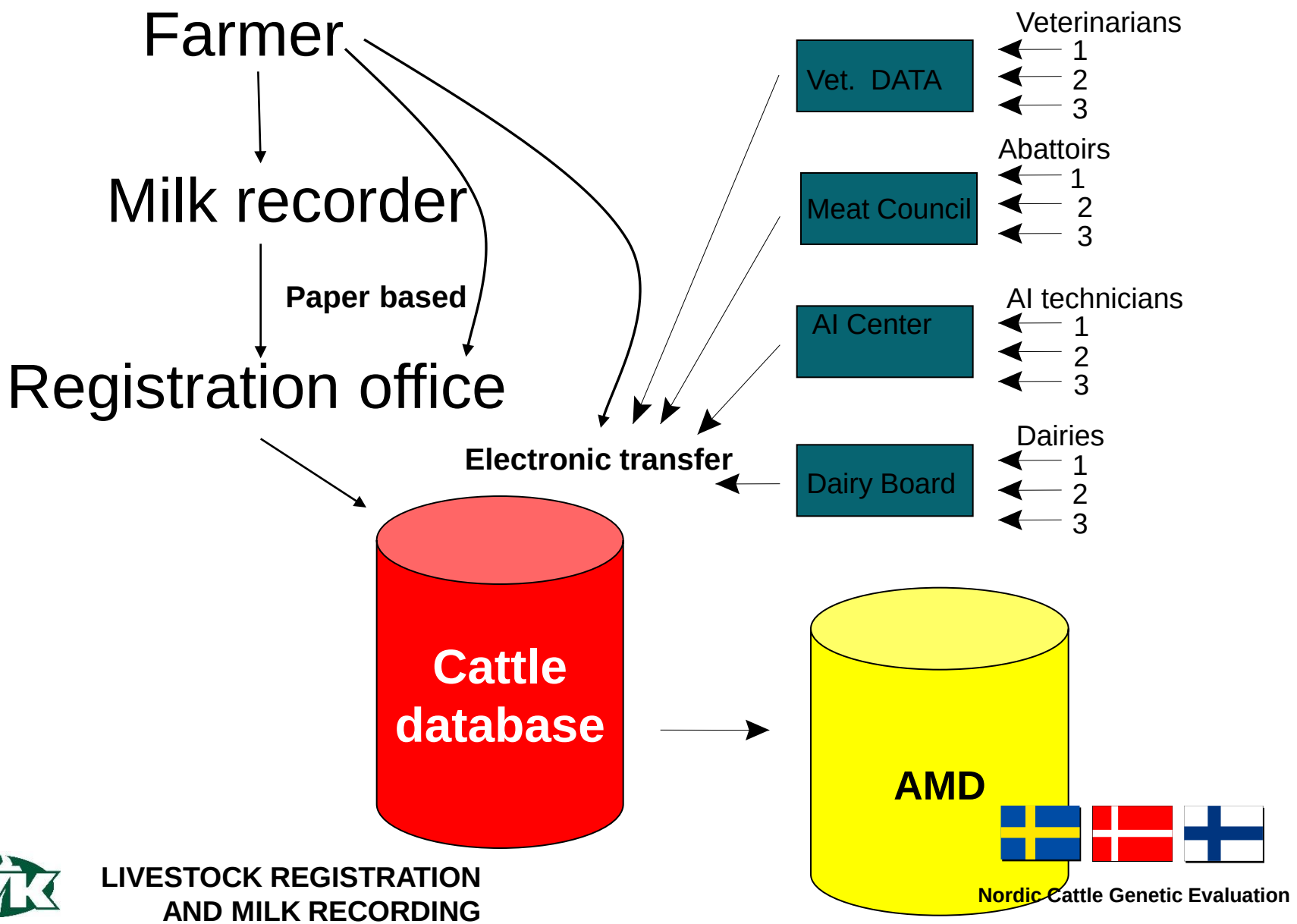

Farmer
Milk recorder
Paper based
Registration office
Electronic transfer
Vet. DATA
Veterinarians
1
2
3
Meat Council
Abattoirs
1
2
3
AI Center
AI technicians
1
2
3
Dairy Board
Dairies
1
2
3
Cattle database
AMD
Nordic Cattle Genetic Evaluation

Example: Milking speed

Data collection

95 % recordings through automatic data capture

Transfer and handling by recording staff

Validation on the farm

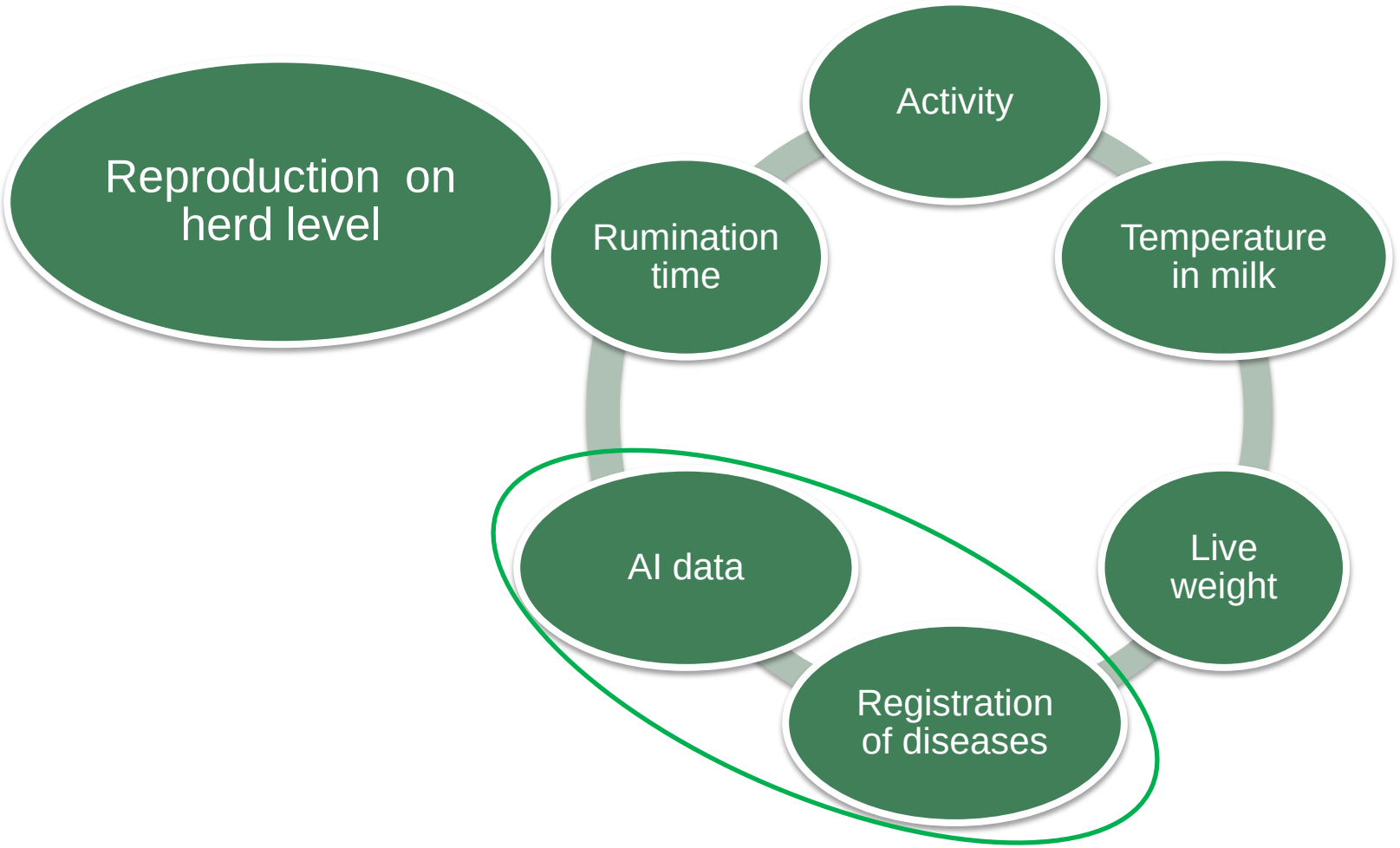
New parameters links to existing logistic systems

Use of data, example

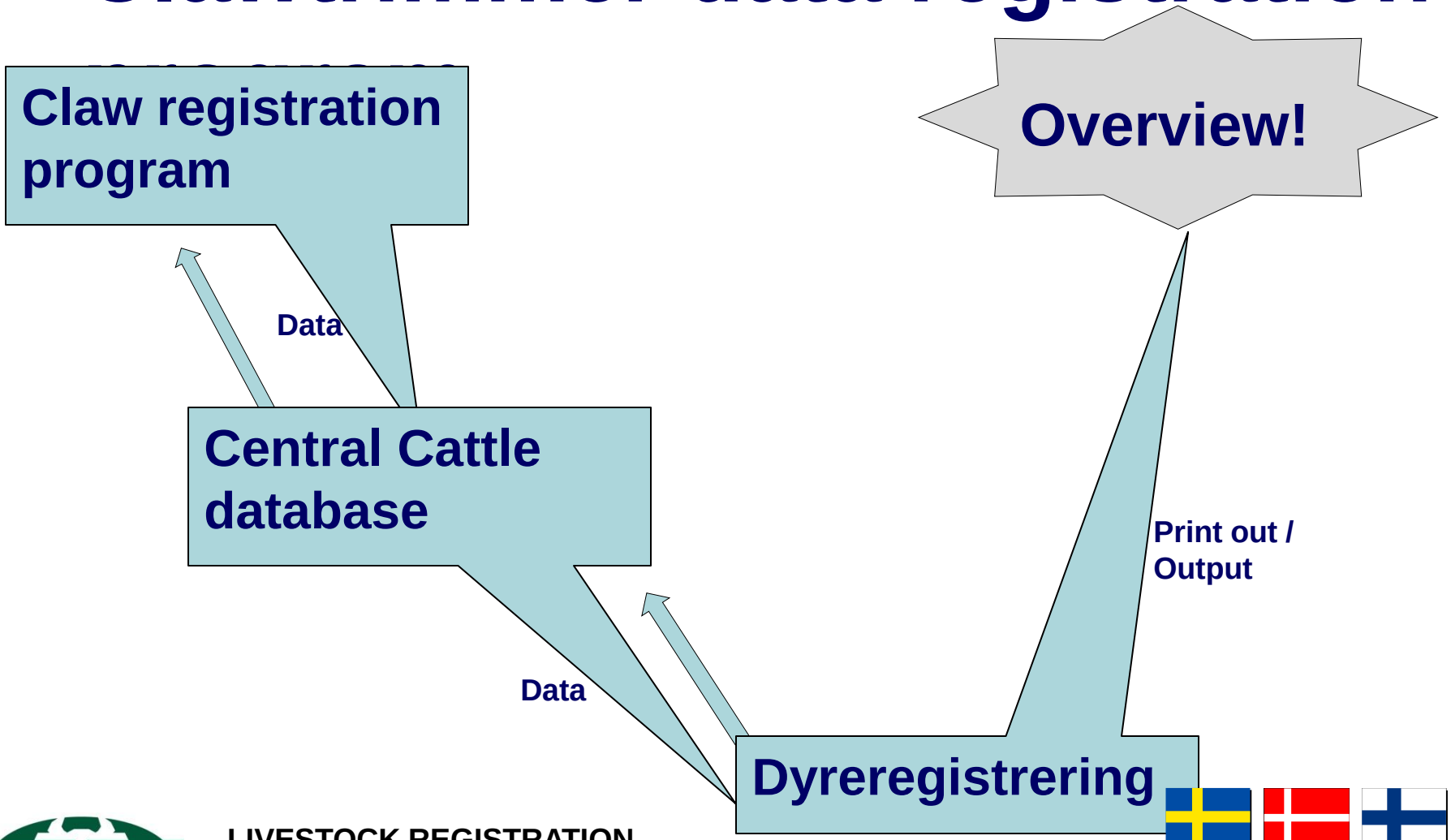
Milking speed registered manual has a heritability of app. 0.20

Milking speed registered by the milk meter, has a heritability of app. 0.30 and we get more registrations per cow and more cows recorded

Example: Management tools for reproduction



Example : Clawtrimmer data registration



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Started spring
2010
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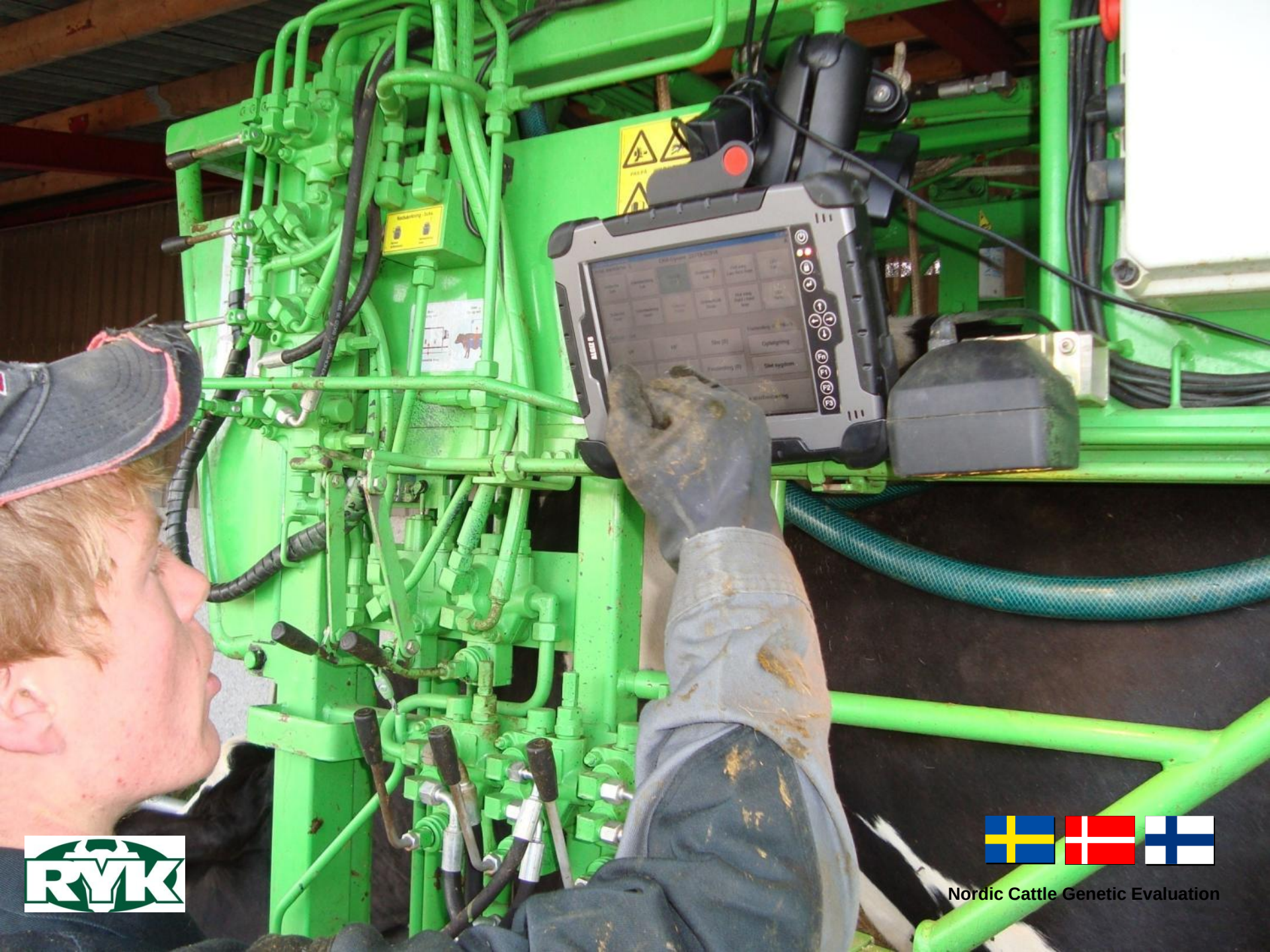

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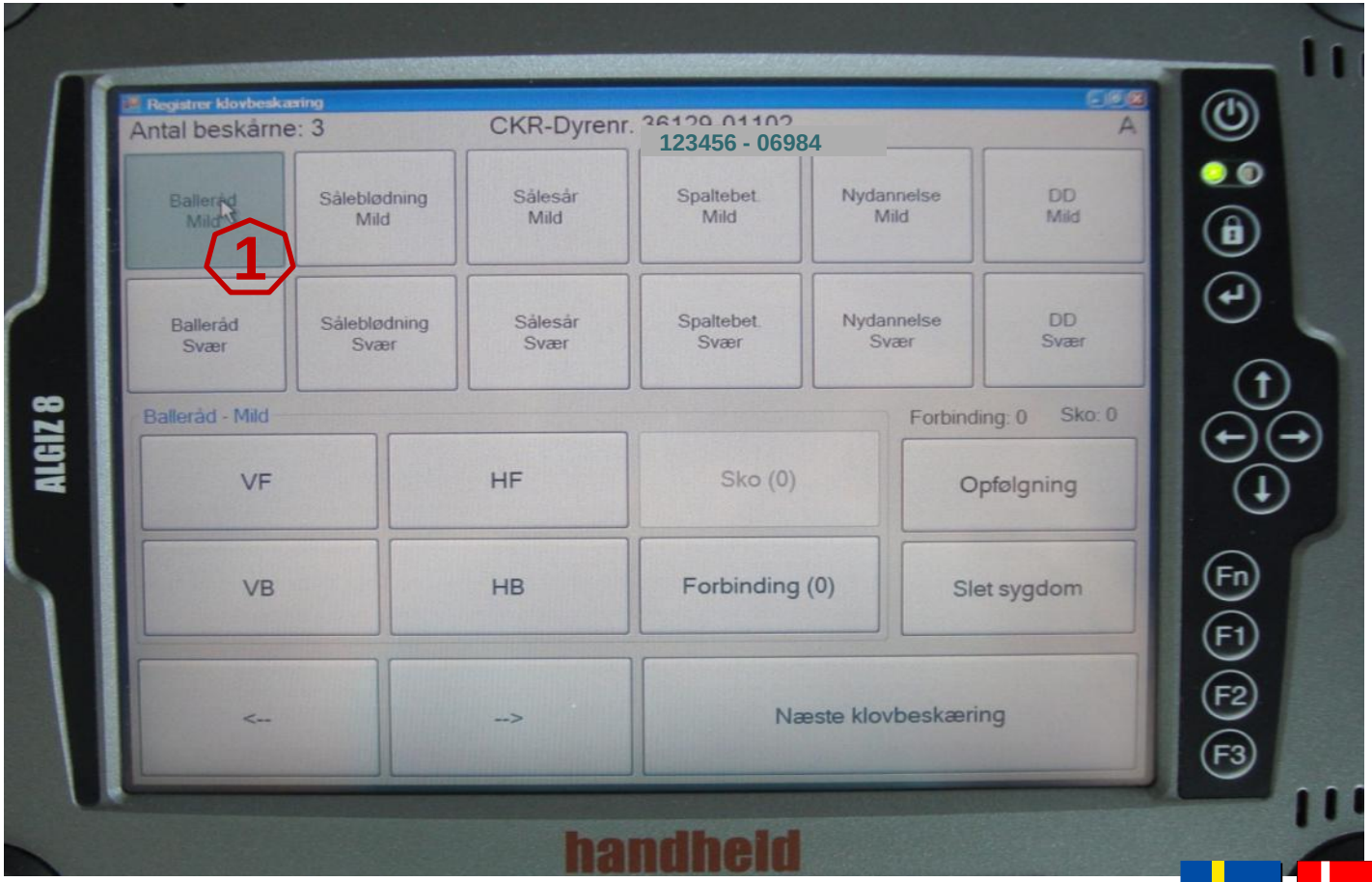
Claw disease registration. One claw disease and the severity can be registrered by one touch



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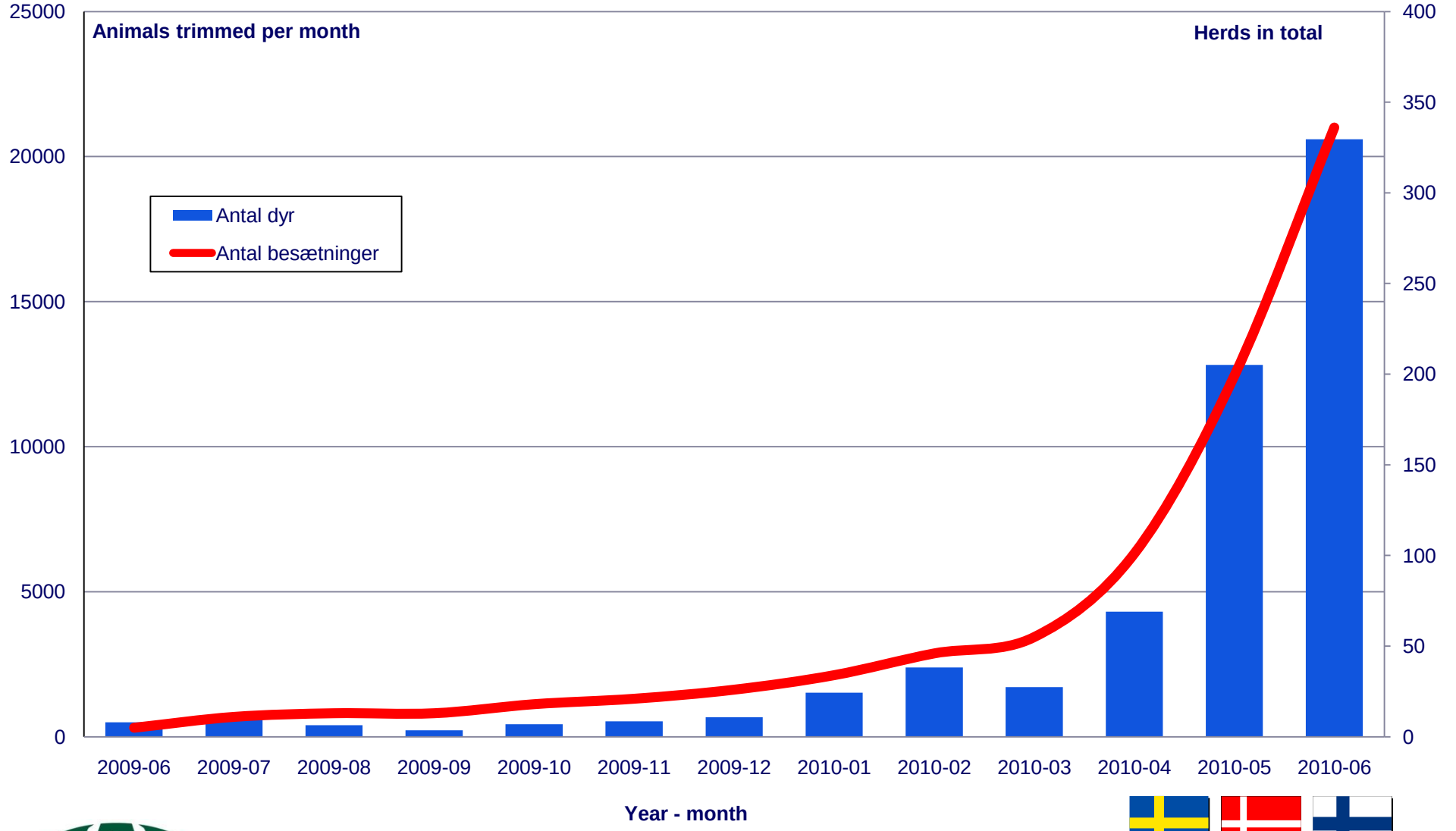
Claw trimmings recorded in the "Klovregistreringsprogram" 1 July 2010



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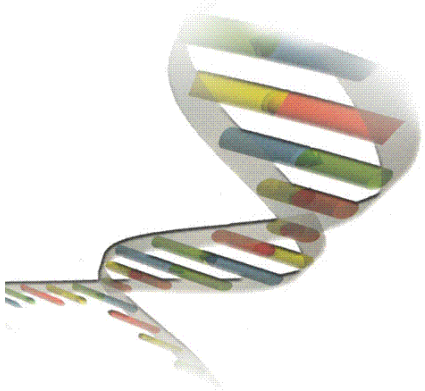
Example:
Collection of DNA a integrated part of the future registration system?

Today

Bulls with known EBVs and SNPs create the ”DNA-dictionary” (reference pop.)

SNPs ⟷ EBVs

SNPs from young animals can be translated to DGVs



One dictionary per breed

Reliability today "50-60%"

SNPs from young animals → **Genomic EBVs**

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Bulls with known EBVs and SNPs create the ”DNA-dictionary”

The quality of the dictionary is correlated to the size of the <u>reference population</u>

SNPs ⟷ **EBVs**

Future

SNPs 3K,50K,700K (whole genome)

Phenotypes

Number of animals tested depends on prices:

- **Today in total about 300 Euro**
- **Future prices for 3K, 50K, 700K?**

Future

SNPs ⟷ **EBVs**

Low prices → **Large scale testing/screening**

→ **Large scale DNA collection**

→ **DNA available on females with new registrations 3 years ahead!**

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Nordic Cattle Genetic Evaluation

Future

SNPs ⟺ **EBVs**

It is time to plan for a large scale DNA collection - the first countries make already plans

E.g.

New registrations available in 2014 – DNA collection has to start in 2011, if it takes place along with ear tagging

LIVESTOCK REGISTRATION AND MILK RECORDING

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Future collection of DNA samples

Will be

- **An integrated part of the recording system**
- **Give benefit genetic progress**
- **Give new possibilities in relation to trace ability**

Systems have to established soon in Nordic countries:

- **How to collect and store DNA on farm, how to collect/send it/use of DNA from ear tags, storage etc.?**

Access to data?

a. Data available to everybody through Internet ?

b. Only a few sensitive personal data are protected?

c. What do the farmers think about it??

d The farmers use the opportunities themselves?

Recording/registration and use of data

Once registered data should, when possible, be reutilised in other applications

Coordination of requested data necessary

Less bother – More precision

Open minds on all sides (Authorities, Farmers, Industry)

Data for estimating of breeding values: ***E.G:***

a. ***Data from AMS: Udder health and conformation***

b. ***Data from claw-trimmers***

RECORDING IN THE FUTURE:
Only attractive if useful !
Fulfilled ?

a. Gives a lot of information
b. New equipment gives even more data
c. Demands for collecting the data
d. Profit: Management tools
e. New traits (e.g. udder, claws)
f. Useful for others (e.g. research, authorities)

The answer:

YES