Development of ID Techniques for Herd Management

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ISO TC23\SC19\WG3 (Animal) Identification

ICAR approved ISO 17025 accredited RFID Laboratory

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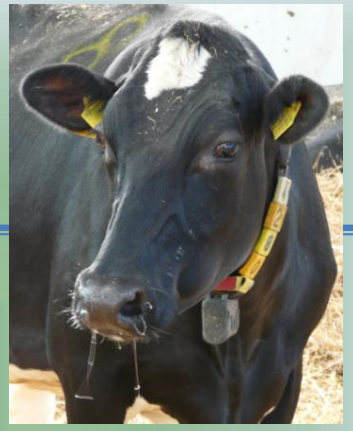
Introduction: Visually Identifying Animals

- There always has been a need to identify animals
  - ✓ Passport with drawing
  - ✓ Freeze marking
  - ✓ Branding
  - ✓ Collar with number
  - ✓ Ear tags

- Mechanisation and automation: identification without human interaction

Introduction: Low Frequency RFID Systems

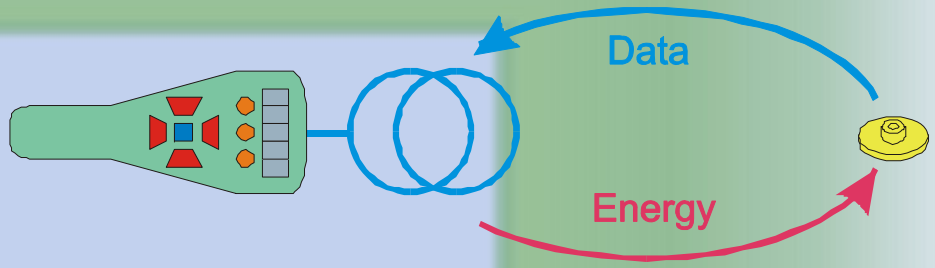


- Development of Radio Frequency Identification
  - ✓ Started already in the 1960ies
  - ✓ Symposium 1976: Cow Identification Systems and their Applications
    - Results reported from UK, Germany, The Netherlands & USA
    - Commercial systems for (dairy) animal identification
  - ✓ Nowadays compulsory traceability systems based upon LF RFID
    - Farm animals & companion animals
  - ✓ Need of standards was recognized
    - 1991 First ISO animal RFID meeting
    - 1994 Standard for all categories of animals
    - 1996 Standards published

ISO International Organization for Standardization

Introduction: The Technology I

- Technology
  - ✓ Passive (no battery)
  - ✓ Low frequency 134.2 kHz
    - Signal is not impacted by body tissue and dirt
    - Useable as bolus, ear tag or injectable transponder
    - Reliable and robust signal
    - Sufficient reading performance (~ 1m)
    - Response time sufficient (~ 30 km/h)
  - ✓ Available for reasonable prices
  - ✓ Easy to apply
  - ✓ Sustainable
  - ✓ Applicable for:
    - Companion animals, livestock, endangered species & fish



Introduction: The Technology II

- LF RFID technology is used in
  - ✓ Tags for identification schemes
    - Approved devices: www.icar.org
  - ✓ Farm management labels

Type	Application	Fraud safety	User friendly	Animal friendly	Farm automation	Food safety
Ear tag	at birth	±	+	±	+	+
Bolus	~ 1 month	+	±	±	-	±
Injectable	at birth	+	±	±	-	-

Animal RFID in Dairy Farming I

- LF RFID technology is used in large variety of applications
  - ✓ Concentrate dispensing
  - ✓ Milk recording
    - Approved devices: www.icar.org
  - ✓ Dynamic feeding of cows
    - ✓ Milk production
    - ✓ Economic modeled for individual animal

G. André et. al., 2009

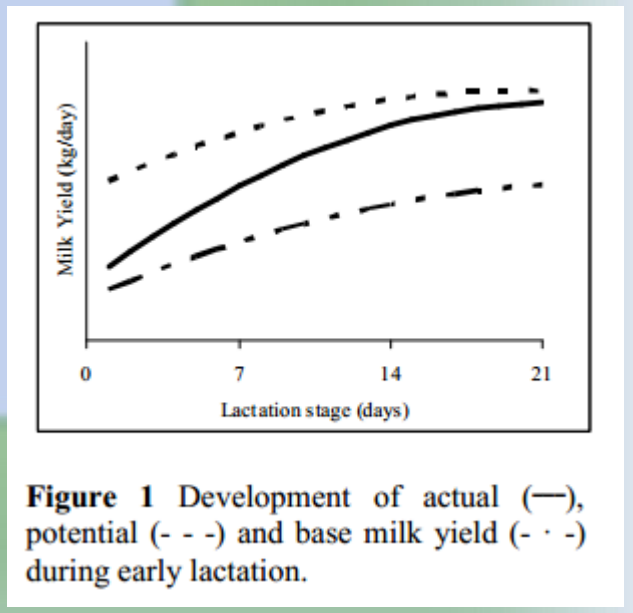


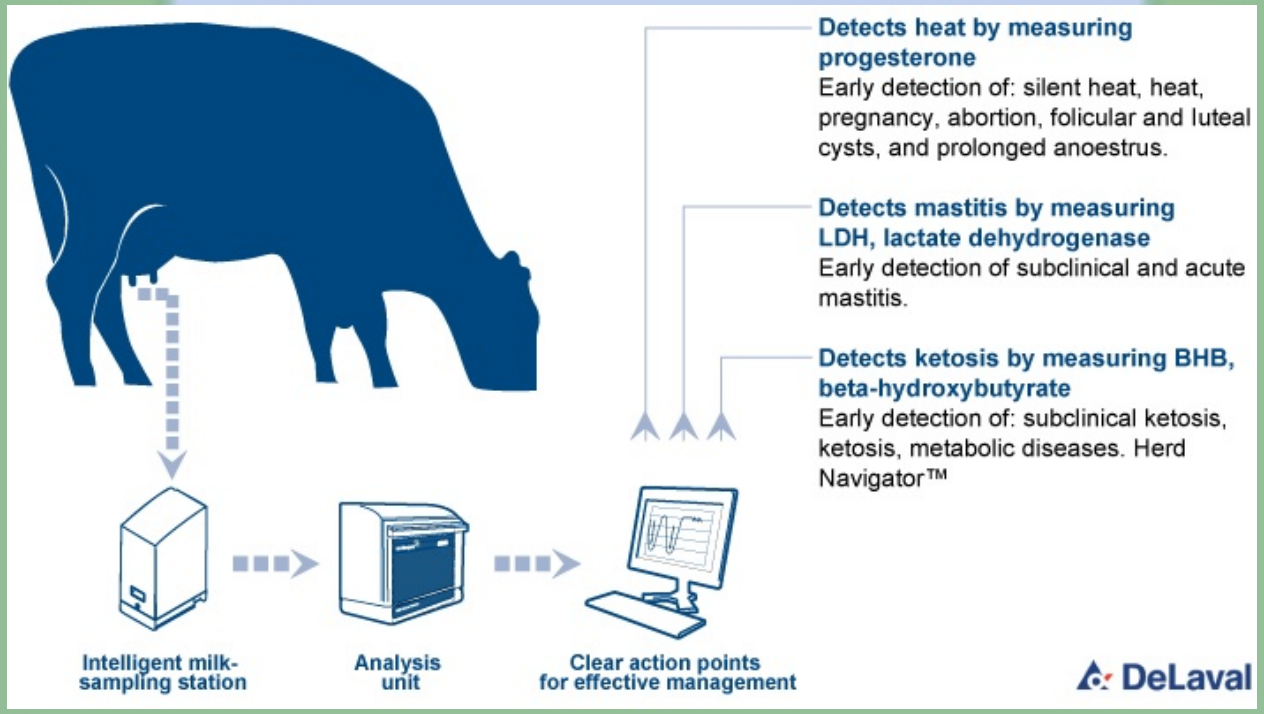
Figure 1 Development of actual (—), potential (- - -) and base milk yield (- · -) during early lactation.

Animal RFID in Dairy Farming II

- LF RFID in relation to Automatic Milking
  - ✓ Selecting of cows for milking
  - ✓ Storing of cow / udder characteristics
  - ✓ Recording of information
    - Milk production
    - Milk composition
    - Body weight
    - Equipment for milk sampling

Animal RFID in Dairy Farming III

- Systems for analyzing milk composition have been introduced



Animal RFID in Dairy Farming IV

- Systems for recording the body weight

- Systems for characterizing
  - ✓ Walking activity
  - ✓ Animal activity
    - Laying, standing, walking, eating, ruminating
  - ✓ Eating and rumination

Animal RFID in Goat, Sheep and Saw Farming

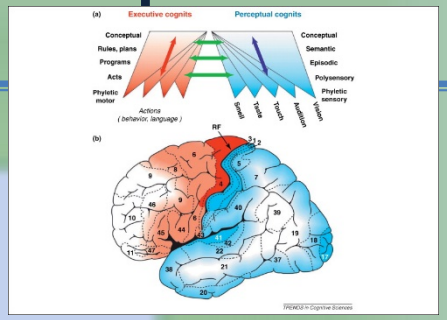
- Since 2011 RFID schemes in most Europe countries for sheep & goat
  - ✓ Positive impact on use of RFID in farm management
    - Goat: milk recording
    - Sheep; weight based sorting system

- RFID based weighing, selection & feeding of saws in group housing

Animal RFID Developments: Position Measurement

- In stall position measurement for dairy cows
  - ✓ Tool for finding cows
    - Automatic milking
    - Insemination
    - Treatment by vet

Animal RFID Developments: Advanced Transponders

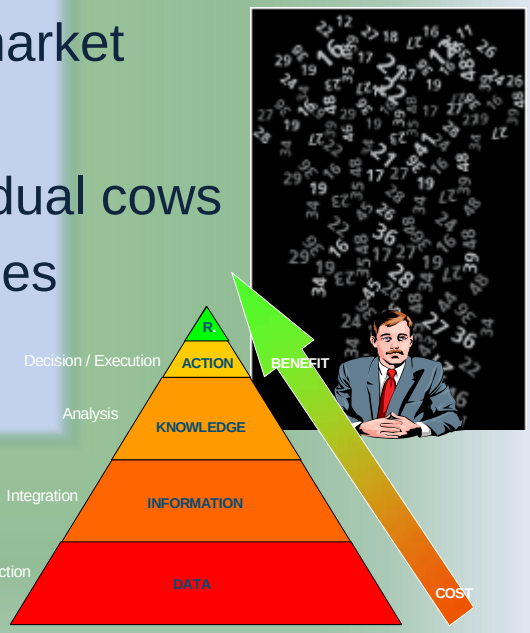


- Additional features:
  - ✓ Storing (locking) information on transponder
  - ✓ Anti collision (readable with several transponders in field)
  - ✓ Compatible with NON advanced LF transponder
- ISO 14223-3 different memory parts accessible
  - ✓ ISO 11784 11785 ANIMAL ID
  - ✓ Single Access Memory (SAM)
    - Defined information with fixed allocation (e.g. birth date)
    - Use is optional
  - Data Directory Memory (DDM)
    - Flexible content, OID (object identifier) based (e.g. amount of concentrate eaten)
    - Use is optional

Concluding Remarks

- Two different types of RFID systems
  - ✓ Farm management labels
  - ✓ Identification tags for identification schemes
- Identification tags can replace farm management labels (with RFID only)
- RFID labels with additional features will stay on the market

- RFID major tool in developing management for individual cows
- In smart farming systems importance of RFID increases
- Smart Farming Systems
  - Decision support
  - Instead of signaling deviating animals
  - Will be introduced in goat, sheep & sow farming



Thank you!

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