ICAR
International Committee on Animal Recording

Activities in Animal Identification
With special focus on EID

The aim of ICAR

- To provide test and approval of ID-devices to benefit users
- Users are animal keepers, service providers and authorities
- ICAR’s tests and approvals should be at a level of very high acceptance by users

Tasks of Sub-Committee

- Develop international standards of identification systems
- Test and approve identification devices
- Provide publicly available information
- Registration Authority of ISO

ICAR relations in RFID

- … to ISO
  - Working in ISO groups since 1980's
  - since 1996 ICAR has an official "Liaison"
  - in 2007 ICAR by agreement became "ISO Registration Authority"
  - ICAR test procedures are in transition to become ISO standard 24631

ICAR relations in RFID

- … to OIE (World Organisation for Animal Health)
  - Topics of mutual interest
  - Animal identification and traceability standards and related matters
  - Working also as supplement to each other
  - OIE enters into formal agreements with partner organisations that are truly representative globally

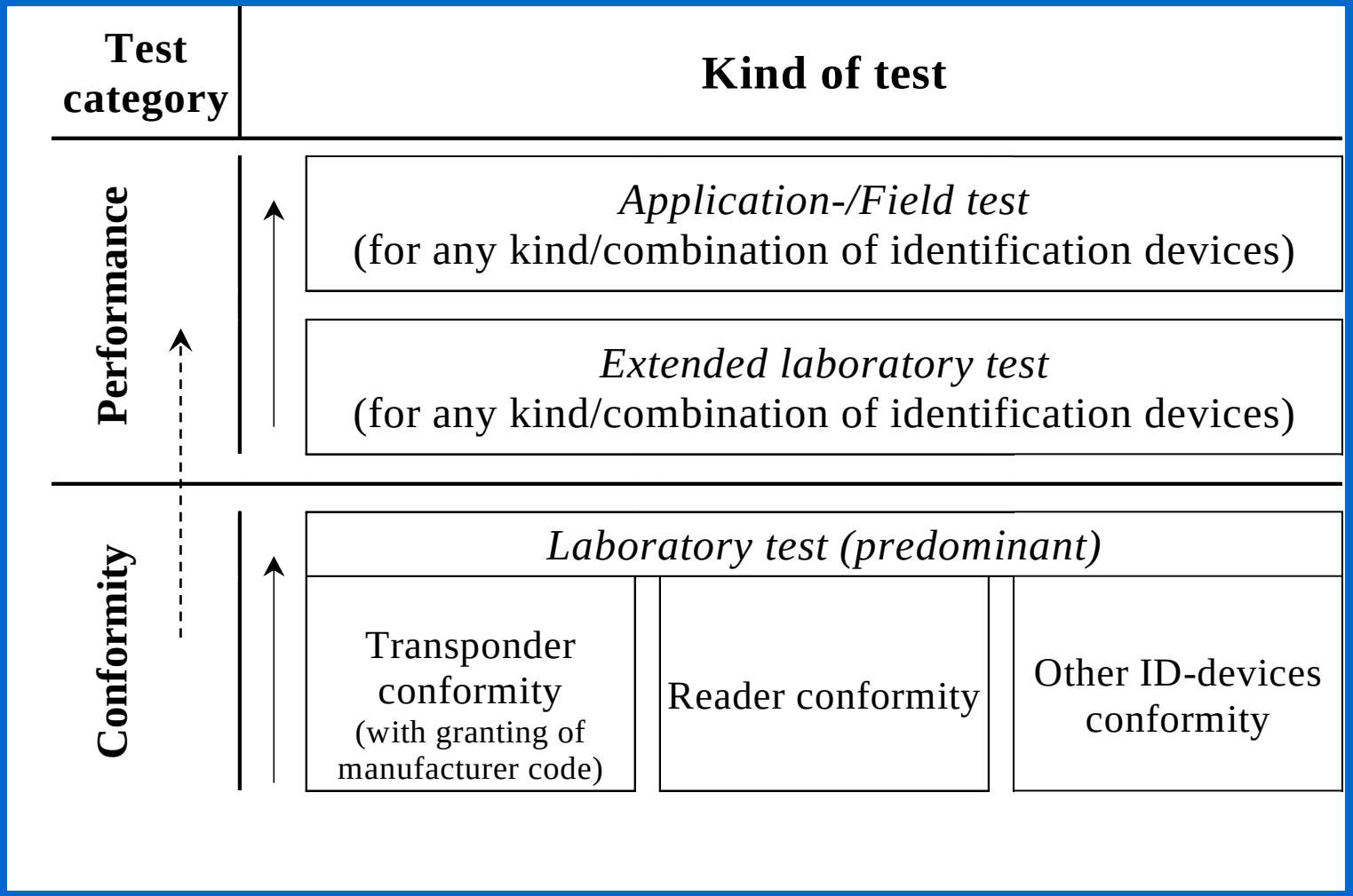
ICAR relations in RFID

- … to authorities
  - ICAR in contact with EU Commission about RFID in sheep and goats
  - ICAR working actively in North America with RFID standards
  - ICAR consulted in an EU survey on RFID in cattle
  - available for authorities in all ICAR member countries

External Meetings

- ISO Working Group
- ISO Technical Working Group
- EU Commission
- OIE International Conference on Animal Identification and Traceability
- ASTM (North American standard organisation)
- FAO workshops
- Competent authorities
- Test Centres
- Manufacturers

Test EID devices



ICAR test protocols

Conformance of RFID-Devices

1 ISO 11784/84 conformance of transponders
(incl. granting of the manufacturer code
NOW published as ISO 24631 – 1

2 ISO 11784/85 conformance of transceivers (2)
NOW published as ISO 24631 – 2

Performance of RFID-Devices

3 Performance of transponders
NOW published as ISO 24631 - 3

4 Performance of transceivers
NOW published as ISO 24631 - 4

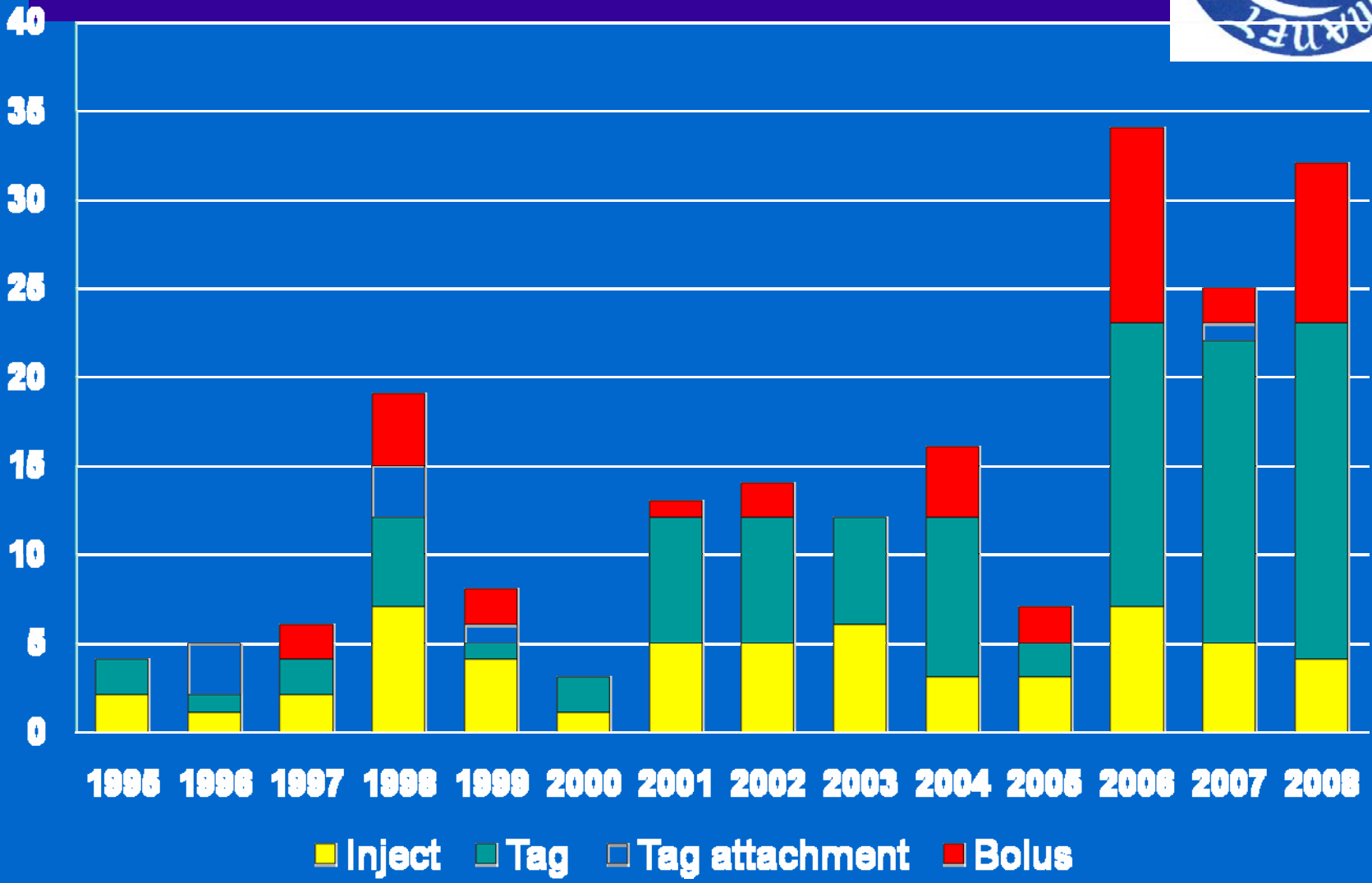
Conformance tests

- Transceivers and transponders:
  - Guaranteeing worldwide readability
  - Feeding station, milking parlour, race, weighing scale
  - Correct data structure and data telegram

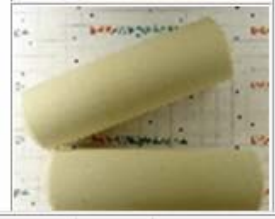
Participation, conformance tests

- 85 Manufacturers
  ... have participated to the conformance test
- 204 ICAR approved transponders
- 48 Manufacturers
  ... have submitted one single transponder
- 37 Manufacturers
  ... have submitted more than one transponder

ICAR Approved transponders per year



ICAR website

84	Chiphandel	900 (shared code)	900050	FDX-B	Inject	Cylindrical glass encapsulated, 2.10 mm in diameter, 12.1 mm in length 0.08 grams in weight, transparent	A	15/01/2009	900/ 96.000.000.000 - 96.000.999.999	
33	Cromasa Identificacion electronica S.A.	953	953007	FDX-B	Tag	Button like shape with a central shaft, black/yellow, 25.3 mm in diameter, 13.8 mm in length, weight 3.6 g	B	31/03/2009		
85	Security Assembly Group	900 (shared code)	900051	FDX-B	Tag attachment	Disk shaped, 24.8 mm in diameter, 1.6 mm in length 1,19 grams in weight, black plastic	A	31/03/2009	900/ 98.000.000.000 - 98.000.999.999	
1	Destron Fearing / Digital Angel Corporation	985	985010	FDX-B	Tag	Button, plastic, yellow 30.6 mm in diameter 15.6 mm in length 8.7 g weight	B	31/03/2009		
20	RF Holding (Beheer) BV	967	967002	FDX-B	Bolus	Cylindrical, ceramic, white 20.5 mm in diameter, 64.5 mm in length, 74.3 gram weight	B	17/04/2009		

Approved transceivers

- Able to read ISO 11784/11785 conform transponders
- Field balanced for the two transponder technologies
- Dual adaptive protocol (time efficient)
- Reader can display country (manufacturer) code + ID code

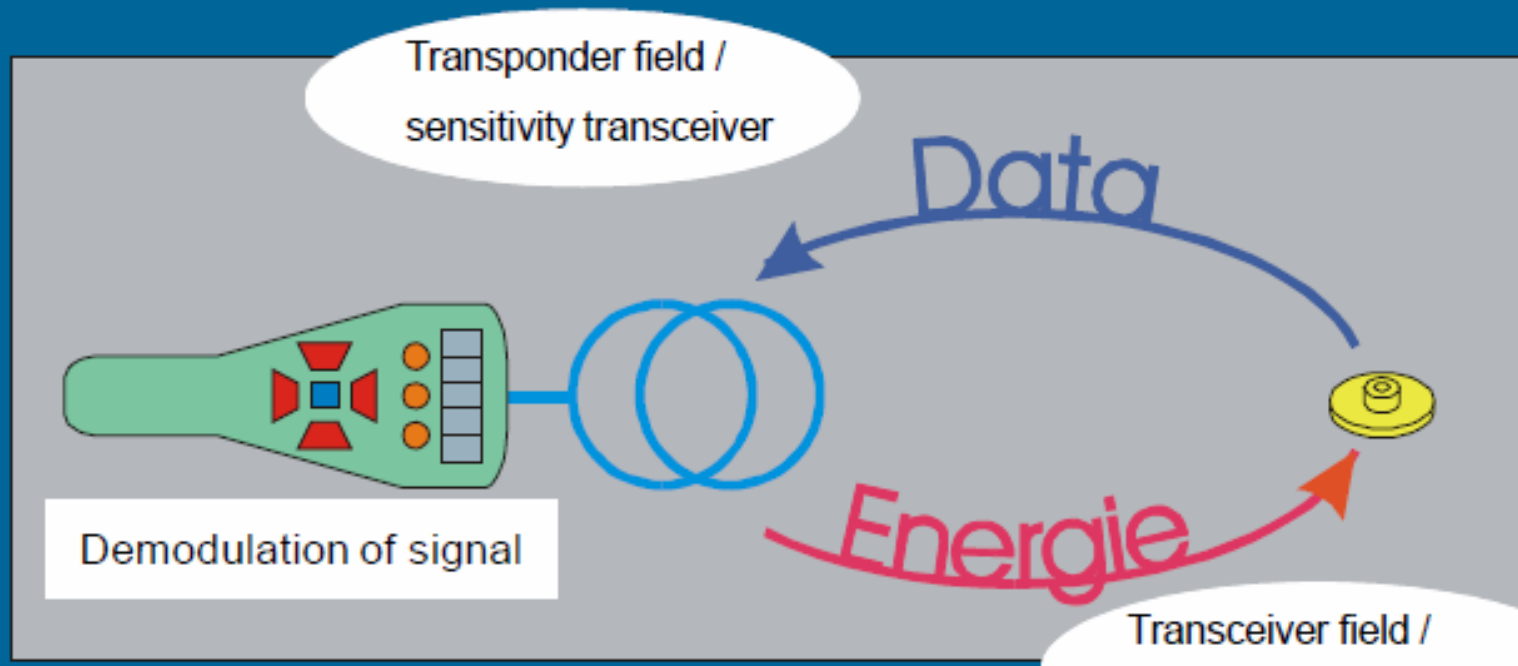
Approved transceivers

- In case of synchronization => no disturbance of other reader
- When used in close distance a non synchronized handheld transceiver will disturb the reading of static transceivers.
- *A limited number of products have been approved*

Performance tests

- Transceivers and transponders
  - Making a founded selection of the available products
  - Is transponder suitable for certain application
    - Cat and dog, sheep and goat, or cattle

Elements, read distance



Readability influenced by transponder & readers

➔ transponders & readers tests shall be INDEPENDENT of each other!

Reading distance

- Depends on both transponder and reader
- Stronger and weaker readers
- Stronger and weaker transponders
- Combinations
  - Strong transponder + weak reader may show show result same as weak transponder + strong reader
- Environmental noise in the field

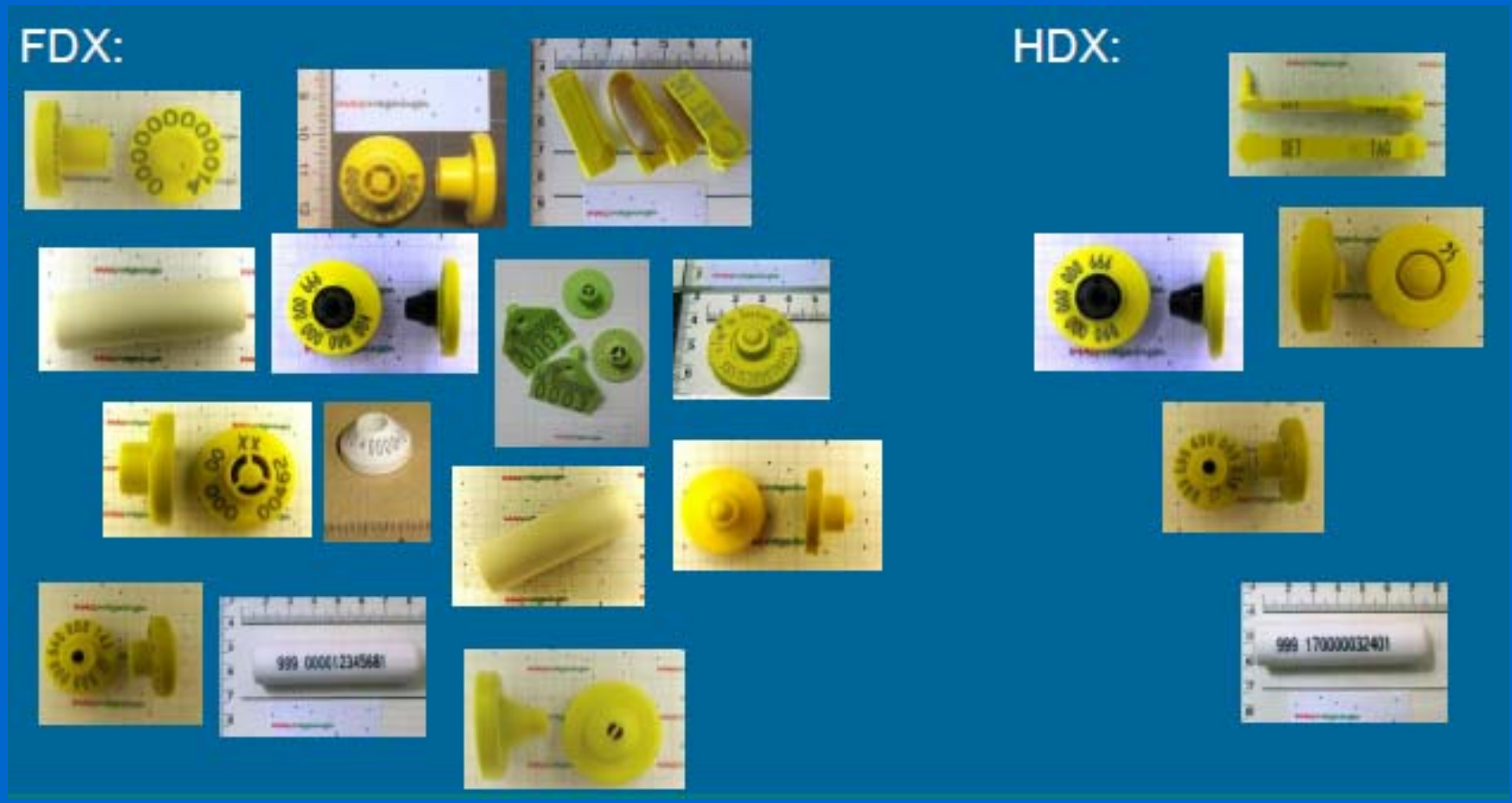
Test approaches rejected

- **Test every reader with every transponder**
  - Complex
  - Expensive
  - What to use as approval criteria ?
- **Use a ‘golden reader’ as reference**
  - Who will provide such a reader (RFID manufacturer) ?
  - Will it be available for all test centres ?
  - How to calibrate ?

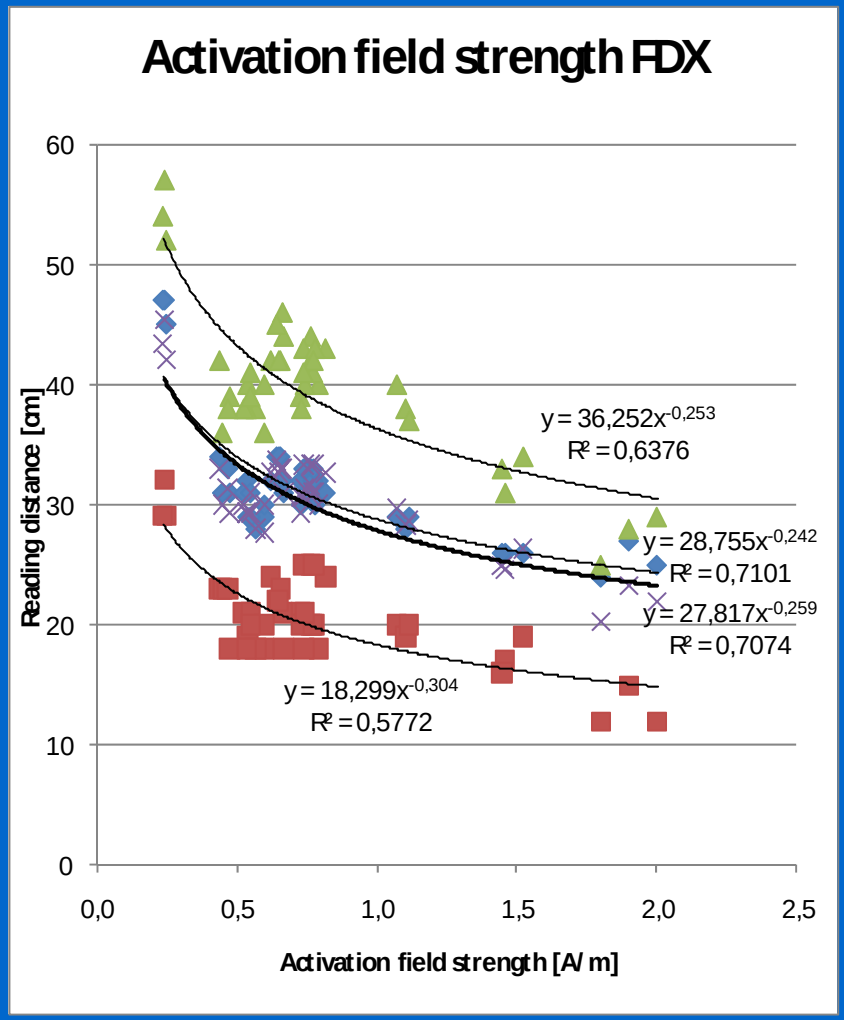
Performance of transponders

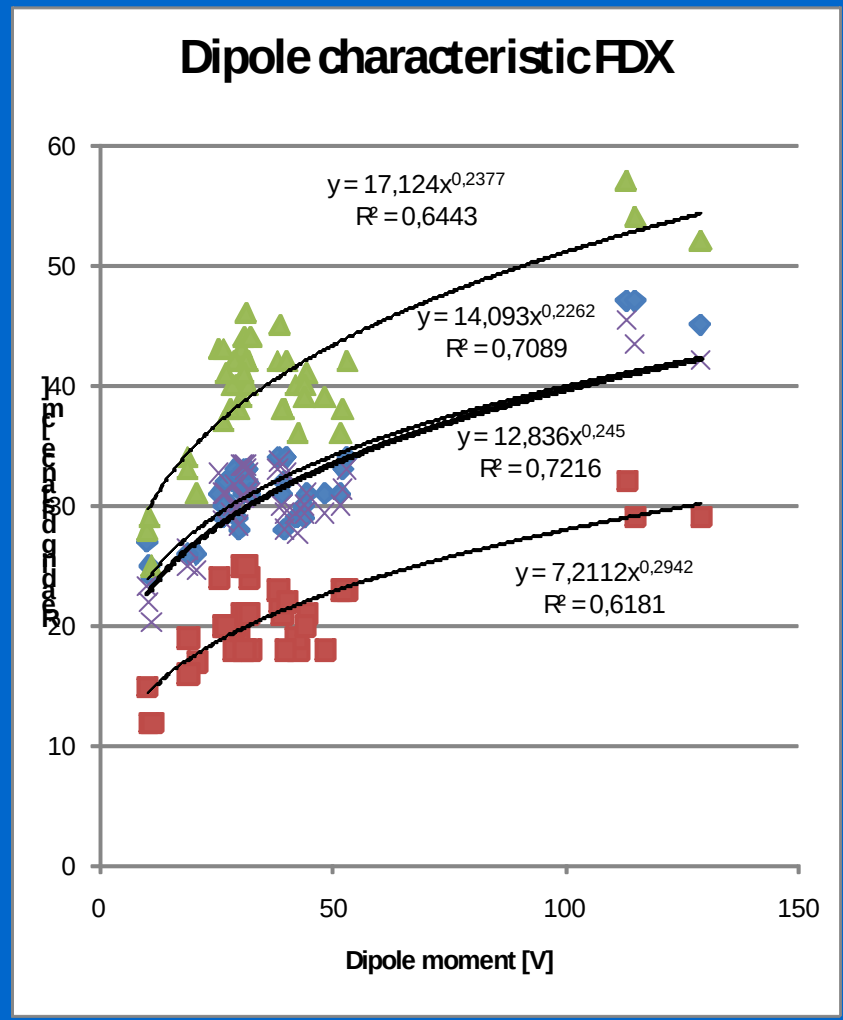
- **Three parameters:**
  - **Transponder minimum activating field strength**
    - Transponders activated by low field strength can be activated from a bigger distance. However influenced also by quality of signal processing of the reader.
  - **Transponder dipole moment**
    - The transponder dipole moment test indicates the functioning of the transponder under different field strength conditions.
  - **Bit length stability (FDX-B) / Frequency stability (HDX)**
    - Test measuring the stability of signal produced by transponder. The more stable the signal, the better it can be demodulated (Important in less optimal reading conditions).

Samples of tested transponders

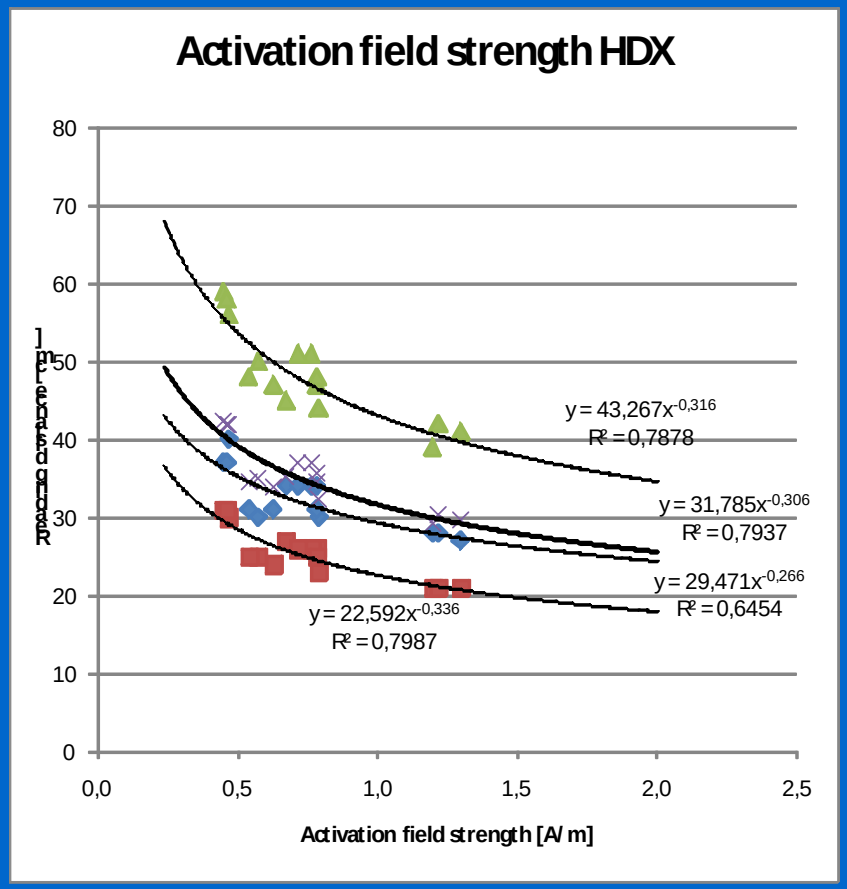


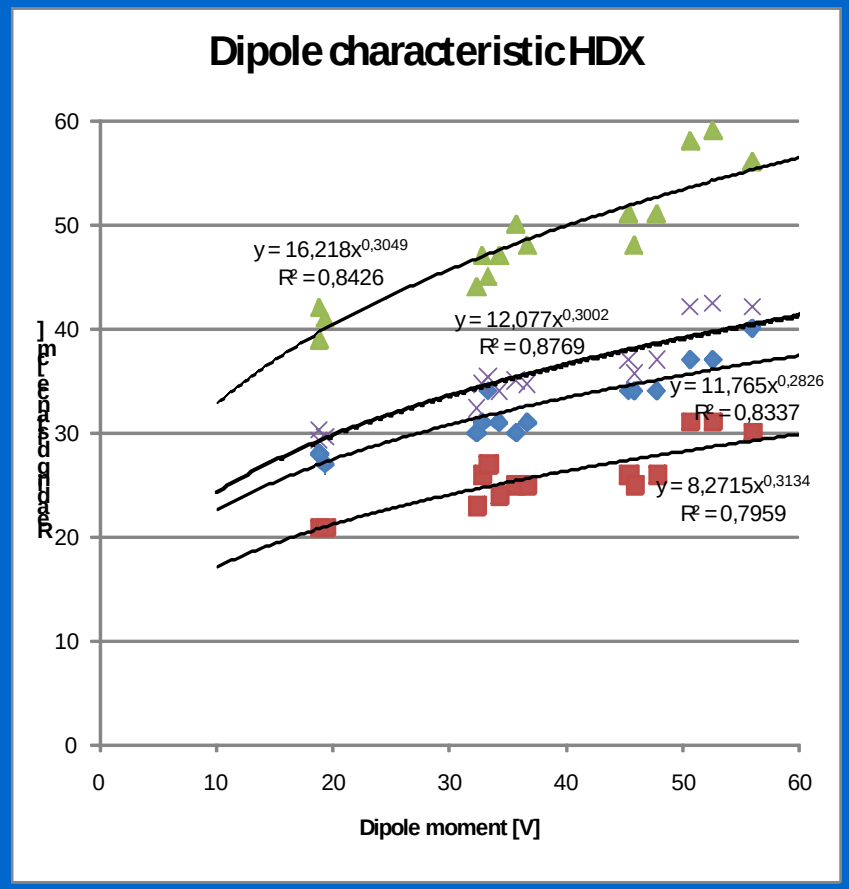
Performance FDX-B





Performance HDX





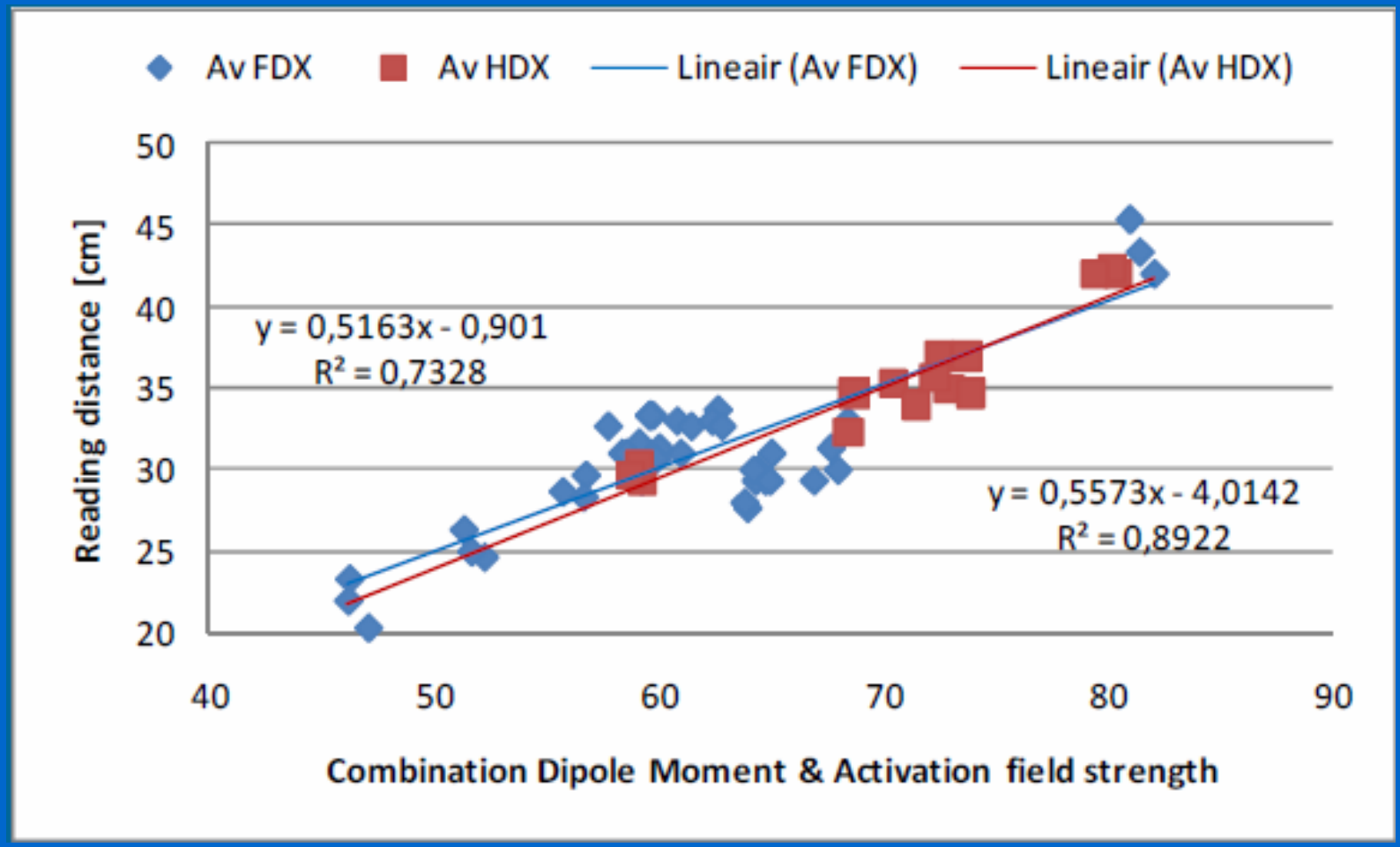
Combination of parameters

- Single parameters:
  - Correlations not strong
- Combination:
  - Method of combining
  - Rationale of the method
- Addition of equations method:

FDX: $27.817 * ActField^{-0.259} + 12.836 * DipoleM^{0.245}$

HDX: $31.785 * ActField^{-0.306} + 12.077 * DipoleM^{0.300}$

Results after combination



Conclusions of test

- With limited number of transponders and readers good correlations was found between technical parameters and reading distance
- For better equations:
  - Tests with more divers performing transponders
  - Including some additional readers (also stationary)
- *A number of products have been officially tested*
- ISO TC23\SC19\WG3:
  - *Relate technical parameters to reading distances*

Test of EID devices

- Conformance and performance tests for transponders and readers are available
- Conformance test transponders is a basic requirement for animal RFID
- Conformance test readers: important where several readers are used

Test of EID devices

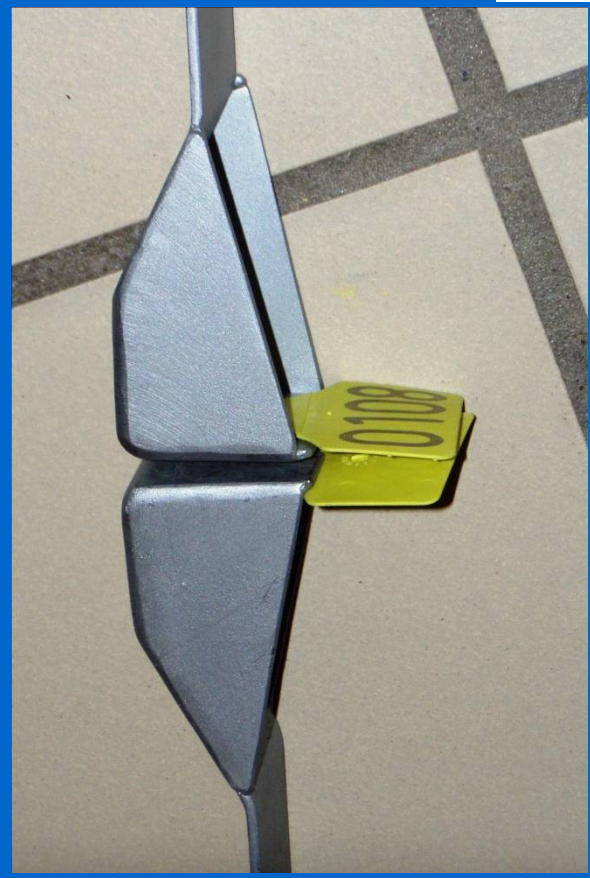
- Performance test transponders:
  - Technology independent
  - Equipment not complex and commercially available
  - Good correlation with reading performance
- Performance test readers: no practical experience at this stage
- Philosophy of ISO and ICAR: Developed a complete system!


QUOD SCRIPTUM EST MANET
ICAR

Conventional plastic eartags

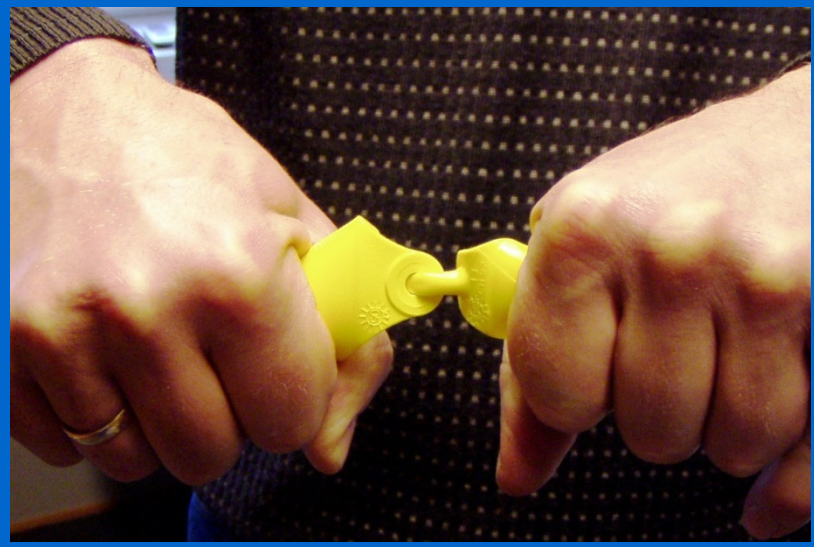
- Eartag testing procedure consists in the following parts:
  - Preliminary basic checks of tags and pliers
  - Laboratory test
  - Preliminary/Extended field test
  - Provisional/Final Approval
- First test run for conventional eartags is about to start the field test
- 3 manufacturers participating

Pre Test, Axial Pull



Ambient temperature and 80 ^{o}C (anti fraud test)

Pre Test, Transverse pull



Ambient temperature and 80 ^{o}C (anti fraud test)

Accelerated ageing

The accelerated ageing process consists of 180 simulated climatic cycles (about 1000 hours) each being comprised as follows:

CLIMATIC CYCLE *	TEMP-ERATURE	HUMIDITYAND LIGHT	DURATION OF THE PHASE
Phase 1 – rain effects	20°C	simulated rain - no light	30 min
Phase 2 – cold effects	-20°C	cold - no light	60 min
Phase 3 – heat and humidity effects	55°C	humidity of air = 95 %	60 min
Phase 4 – dry heat and light effects	55°C	Irradiance : 0.55 W/m^{2}at wavelength 340nm Total light power emitted P = 623 W/m^2 Spectrum : 300 – 800 nm Arc xenon UV light Inner and outer filters in borosilicate the radiant heat is produced by a black board of anodised aluminium with temperate of 55°C	80 min

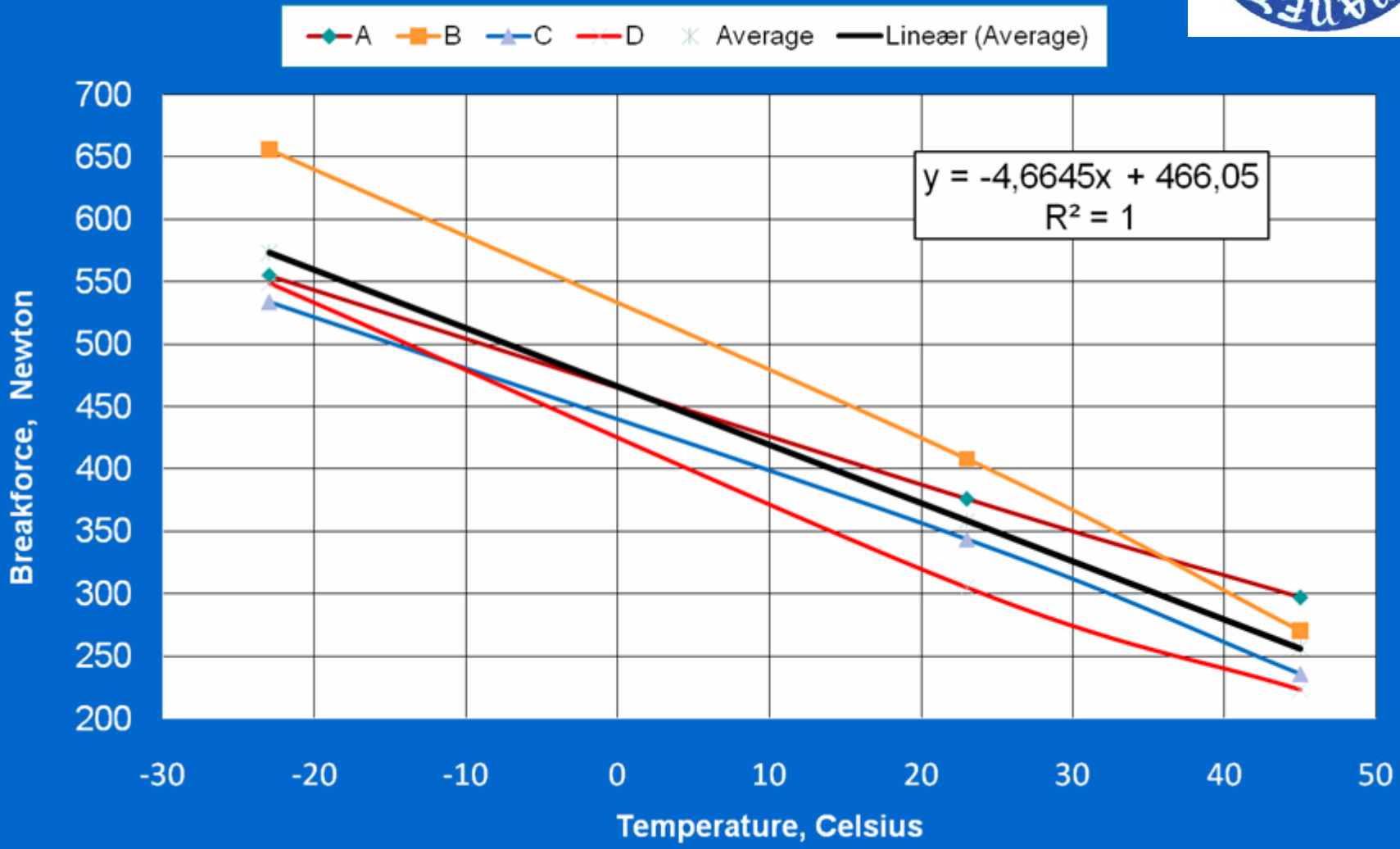
* The rate of temperature change between each phase is 2° C/min.

Tested character-istic	Unused Tag					Aged Tag*		
	Un-treated	Heat & Humidity 23°C	acid bath	alkaline bath	abrasive treatment	Un-treated	Heat & Humidity 23° C	abrasive treatment
Resistance of the locking system		✓					✓	
Visual readability	✓				✓	✓		✓
Machine readability	✓	✓	✓	✓	✓	✓	✓	✓

* An aged tag is a tag that has been subjected to the accelerated ageing process.

Locking mechanism tested also at -23 and 45 ^{o}C

Break force


A
B
C
D
Average
Lineær (Average)
y = -4,6645x + 466,05
R² = 1
Breakforce, Newton
700
650
600
550
500
450
400
350
300
250
200
-30
-20
-10
0
10
20
30
40
50
Temperature, Celsius

Abrasion and readability

Field test

- At least two countries
  - Minimum 400 test animals per country
  - Minimum 15 test farms per country
  - Wide range of typical practical conditions
- Local ICAR approved organisation
- Reference ear tag used to indicate abnormal tag performance

Retention rates

- After three months
  - At least 99 % retention
  - No more than 3 % necrosis
- After twelve months
  - At least 98 % retention
  - No more than 3 % necrosis

Thank you for attention

Ole Klejs Hansen
Chairman
ICAR Subcommittee for Animal Identification