UHF electronic identification may improve efficiency and animal welfare in sheep production

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Outline

• Background - UHF radio frequency identification for sheep

• The “ROSEI” project – Robust Sheep Electronic Identification
  • Work, results and lessons learned

• What’s next?
RFID – Radio Frequency Identification:
- wireless use of electromagnetic fields to transfer data - automatically identify tags/chips

**LF** - Low Frequency (wave length \( \approx 2.2 \, \text{km} \))
**UHF** - Ultra High Frequency (... \( \approx 35 \, \text{cm} \))

LF is the approved EU standard for livestock

UHF – faster reading, longer range, absorbed by water-rich bodies
LF – stable, shorter range, less affected by water-rich bodies
Tag & reader

• Tag contains an rfid chip with a small antenna

• A reader generates an electromagnetic field that induces / capacitates power in the (passive) tag which then send its stored information to the reader
ROSEI – SMEs and R&D partners, with contacts

- Agrident  Helmut Ruppert
- TLR       Les O’Leary
- Roxan      Brian Eadie
- PageUp     Florian Gimbert
- ISRI/PERA  Brian Stevens
- NMBU       Geir Steinheim & Øystein Holand
- Farmer / end-user  Michael McHugh
The ROSEI project

Objectives:

• 7\textsuperscript{th} FP project, 2013-2015

• Goal: develop a UHF-based a reliable and robust EID solution for tracking sheep movements in flock conditions

• UHF tags, readers, mobile applications, cloud based database, anti-collision solutions
Off-the-shelf antennas and readers
UHF tag

• Small & light: ceramic materials
  • The chip was fitted inside a 24 x 4.5 x 5.5 mm tag body
Setup, race tests
100 sheep, 1.6 m wide runway, 2 stationary antennas
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Results

• Flock of 100 sheep, 1.6 m wide race made of metal, 2 antennas
• The flock sent through 28 times
• All 2800 tag*runs were read

• Wooden race 1.4 m wide, 2 antennas, 20 tagged sheep
• Through race 20 times
• 419 out of 420 tag*runs were read
Tags read several times each run (20 – 50 times/sec)

Number of times a tag was read per run
What affects number of times a tag is read?

• How fast the sheep moves past the antennas, explains 80% of variation

• Other individual and flock behaviours?
  • Head up/down
  • How tight the flock is packed together
  • Body size relative to other individuals …?

→ likely to affect reading
UHF vs LF

• UHF good for recording IDs of all sheep in a group: flexible & relatively inexpensive reader/antenna setup (but: price of the tag still high…)

• LF good for recording ID of specific animals, e.g. when weighing (but output of UHF readers may be adjusted until suitable read range)

• UHF – most relevant for abattoirs, transporter and large sheep farms?

• Most realistic to use UHF tags in addition to the EU approved LF tags?
Extensive pasture husbandry: monitoring presence of animals using UHF tags and reader at salt-licks or by tracks?

Include monitoring ewe-lamb associations?
Thank you!