REPORT ON SCOTTISH EID TRIALS

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January 2007

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1. Introduction

As part of the SEERAD EDT/EID project, EID trials were to be undertaken to assess the capability of EID systems in real working conditions. The trials were to be carried out in response to EU regulation 21/2004 that requires sheep born after 1 January 2008 to be identified with an electronic device.

2. Trial Objectives

The overall objective of the trials was to assess the capability of EID systems in real working situations. The main focus of the activity was on the performance of the equipment used to read the EID devices.

The key points to be assessed at each site were: -

- The speed of throughput
- Read rate accuracy
- Ease of use of the equipment

It was a pre-requisite that the equipment used should not interfere with any existing equipment.

The aim of SEERAD and the Scottish Industry Advisory group was to identify workable EID systems.

It was not the intention of the trial to make direct comparisons between suppliers'/manufacturers' equipment directly against each other's.

The trials were to identify systems and technologies that work in livestock markets and abattoirs, and were not to result in acceptance or rejection of any particular equipment.

The trials were to be a method for information gathering only and were not to lead SEERAD to purchase any of the equipment, or for a particular supplier/manufacturer to gain competitive advantage. Any subsequent requirement/legislation that means that SEERAD has to purchase EID devices/equipment will be subject to competitive tendering rules (EU Procurement Legislation and Scottish Government Policy), i.e. fair and open competition via a prescribed procedure.

3. Methodology

Devices that conform to ISO standards were to be used.

In addition any other technology that could offer benefits was to be considered as part of the trial.

The positioning and type of reading equipment, e.g. hand-held, static, etc. to be used was to be agreed with each of the facilitators, i.e. markets and abattoirs, in advance of the trial commencing.

Devices on trial animals were required to be read once only.

4. Initial Contact with EID Suppliers

In order to trial the widest range of EID reading devices possible, a list of EID suppliers worldwide was drawn up, and suppliers contacted to enquire if they wished to take part in the trials. In addition a notice to that effect was placed on the ICAR website.

Companies were requested to contact SEERAD to note their interest in taking part in the trials.

Of the initial 21 notes of interest received from EID suppliers, 7 companies agreed to take part in the trials. Three companies out of the 7 subsequently withdrew from taking part in the trials.

The trials were held in 2 livestock markets and 2 abattoirs. In all 6 separate trials were conducted with sheep and 4 with cattle.

5. Summary of Results

A summary of results of the EID trials is shown below.

SITE 1.

The trial took place on 7 April 2006.

The site of the trial was a large abattoir that processes both cattle and sheep. The cattle and sheep used in the trial were processed under normal commercial conditions.

Equipment Used

The equipment used operates using UHF technology and therefore does not conform to the ISO 11784 / 11785 standard.

Two types of reader were used: -

1. A static panel (plate) reader that was attached to a control box.
2. A hand-held portable reader.

The same readers were used for both cattle and sheep.

Results

Sheep

For the sheep trial, the static panel reader was situated at the top of the elevator just prior to where the animals were stunned. The reader was positioned within three feet of the stunning equipment and was unattended during the trial, i.e. no manual operation.

The hand held reader was operated in the post slaughter area just before the animals' heads were removed.

A total of 170 sheep were tagged prior to the trial. The same company supplied the readers and all the ear tags used in the trial. One sheep lost its tag or was not tagged in error before the trial began, leaving 169 sheep with tags to be read.

The control box connected to the static reader stopped working after 126 sheep passed through, with two tags not read by the static reader up to this point, i.e. 124 read successfully. After the control box stopped working, 43 sheep that passed through the reader were not read.

The results for the static reader are summarized in the following Table 1 below: -

Table1.

CATEGORY	NUMBER
Tags read successfully (before control box malfunctioned)	124
Tags not read successfully (before control box malfunctioned)	2
Tags not read successfully (after control box malfunctioned)	43
TOTAL	169

The hand-held reader read all 169 sheep with tags successfully.

The results for the hand-held reader are summarized in Table 2 below: -

Table 2.

CATEGORY	NUMBER
Tags read successfully	169
TOTAL	169

Cattle

The static reader was positioned at the top of the race immediately prior to where the animals were stunned. The reader was unattended throughout the trial, i.e. no manual operation.

The hand-held reader was operated in the post slaughter area before the heads were removed.

A total of 44 cattle were tagged prior to the trial. The same company that supplied the readers supplied all the ear tags used in the trial.

The control box attached to the static reader was not operating at the start of the trial and was replaced after 9 cattle had passed through the system. The static reader read the remaining 35 cattle successfully.

The results for the static reader are summarized in Table 3 below: -

Table 3.

CATEGORY	NUMBER
Tags read successfully	35
Tags not read successfully (before control box replaced)	9
TOTAL	44

The hand held reader read all 44 tags successfully.

The results for the hand-held reader are summarized in the Table 4 below: -

Table 4.

CATEGORY	NUMBER
Tags read successfully	44
TOTAL	44

At the end of the trial the abattoir personnel were asked for their comments as to how they perceived that the trial had gone, and these are summarized below.

Abattoir's Comments

- Some concerns were expressed regarding the size of tag and the ease of use of the applicators.
- The longer reading distance was seen as a positive attribute.
- The ability of the tags to hold increased amounts of data was regarded as having potential benefits.
- The control boxes need to be more robust with audible signals to signify the equipment is working satisfactorily.

Note: No-one from the EID supplier was present at the trial, and therefore unable to comment.

SITE 2.

The trial was conducted on 10 April (cattle) and 11 April (sheep) 2006.

The auction market that was used for this trial sells both sheep and cattle but they are sold on separate days, therefore the trial was held on two consecutive sale days. On both days cattle and sheep used in the trial were sold under normal commercial conditions as part of a live auction.

Equipment Used

The readers used conformed to the ISO 11784 / 11785 standards.
Static readers were used for both cattle and sheep and were connected to a lap-top computer.

The ear tags were sourced from a number of different suppliers and incorporated both half duplex (HDX) and full duplex (FDX-B) technologies. All the tags used in the trial were read successfully before being inserted into the animals in the trial.

Results

Sheep

The reader used was incorporated into a sheep race (handling) system that was able to control the flow of sheep through the race using gates that were operated hydraulically. The system provided the facility to shed off sheep that were not read successfully. The reader was situated in the alleyway leading to the auction ring just before the last pen at the entrance to the ring.

A total of 174 sheep were tagged prior to the trial.

The reader read 172 tags successfully. It identified 2 sheep with tags that did not read and identified 7 sheep that had not been tagged but were mixed in with the sheep with tags. All of these 9 sheep were shed off to the side and marked for further examination after the animals had passed through the sale ring. Of the two sheep that did have tags but were not read successfully, one was found to have been broken when it was inserted into the animal and the other did not transmit a signal (dead tag).

The results for the sheep reader system are summarized in Table 5 below: -

Table 5.

CATEGORY	NUMBER
Tags read successfully	172
Tags not read successfully	2
Sheep not tagged	7
TOTAL	181

The sheep reader system was manned by 3 of the EID suppliers' staff to ensure that the flow of sheep passing through the race kept pace with the market operation. The system did not slow down the throughput of sheep in the market on the day of the sale.

Cattle

The reader was situated in the cattle race next to the auction ring.

A total of 50 cattle were tagged on-farm 2 days before being transported to the auction market. By the time the cattle had reached the market 2 tags had been lost or were missing.

Of the remaining 48 cattle with tags, all were read successfully.

The results for the reader used for cattle are summarized in Table 6 below: -

Table 6.

CATEGORY	NUMBER
Tags read successfully	48
TOTAL	48

The cattle put through the reader did not slow down the throughput of cattle in the market on the day of the sale.

At the end of the trial both the market personnel and EID supplier were asked for their comments as to how they perceived that the trial had gone, and these are summarized below.

Market's Comments

- The cattle trial was viewed as successful with all cattle read successfully.
- The sheep system used in the trial did not hold up the sale and the tag reading consistency was good.
- The ability of the sheep system to identify non-reads was considered to be a plus point.
- The system used for the sheep trial required 3-4 extra people to ensure that sheep moved at a sufficient speed so as not to slow down the sale.
- Some concerns were expressed regarding the health and safety of workers, who would be required to operate the automatic gate/shedding equipment used in the sheep system.
- As most of the market is open to the elements, the ability of the sheep system equipment to withstand inclement weather conditions would have to be considered.

EID Supplier's Comments

- All sheep that were put through the system as part of the trial, including animals that did not read successfully due to faulty tags or with no EID device, were identified and separated for further attention.
- All the cattle put through the system were read successfully.
- The market operation was not slowed down due to the equipment used in the trial.
- The sheep system should have been situated further away from the entry to the ring to allow more time to deal with non-reads.

SITE 3.

The trial took place on 30 May 2006.

The site of the trial was a livestock auction market. As no cattle were being sold on the day of the trials only sheep were included in the trial. The sheep used in the trial were sold under normal commercial conditions as part of a live auction.

Equipment Used

The equipment used operates using UHF technology and therefore does not conform to the ISO 11784 / 11785 standard.
Two readers were used and installed in a race adjacent to each other to extend the reading range. Both readers were attached to separate control boxes.

Results

Sheep

The readers were situated in a race, specifically constructed for the trial, at the exit from the sale ring.

A total of 125 sheep were tagged prior to the trial. The same company that supplied the readers supplied the entire number of ear tags used in the trial.

The results for the sheep reader system are summarized in Table 7 below: -

Table 7.

CATEGORY	NUMBER
Tags read successfully	117
Tags not read successfully	8
TOTAL	125

Of the 125 sheep that were tagged and put through the race 117 were read successfully.

At the end of the trial both the market and EID supplier were asked for their comments as to how they perceived that the trial had gone, and these are summarized below.

Market's Comments

- The market management commented on the size of the tags, which were considered large for sheep, and expressed concern that the tags would be easily caught on fences etc. on farms and be torn out. It was suggested that for practical and welfare reasons a new smaller tag would have to be developed for the system to be acceptable.
- It was suggested that one larger panel reader would be preferable.
- It was noted that the system was operated without any additional staff and did not slow down the throughput of the market.
- The software used was not able to report on the number of tags successfully read immediately after the trial.
- The longer read range meant that tags in coat pockets were picked up.

EID Supplier's Comments

- No additional personnel were required to operate the equipment and did not hamper the normal operation of the market or slow down the sale.
- They regarded the read rate as satisfactory given that they were not able to test the equipment with animals prior to the trial.
- The EID supplier recognised that the reading reliability of the readers needed to be improved.

SITE 4.

The trial took place on 26 June 2006.

The site was a large livestock auction market. Both sheep and cattle were sold on the same day and were sold under normal commercial conditions as part of a live auction.

Equipment Used

Static readers were used for both sheep and cattle.

In the case of the sheep trial a single reader was used.

For the cattle trial a gate reader system was used. This involved 2 synchronized readers being placed on either side of the cattle race.

The ear tags were sourced from a number of different suppliers and incorporated both HDX and FDX-B technologies. All the tags used in the trial were read successfully before being inserted into the animals in the trial.

Results

Sheep

The reader was situated in the race system used by the market for sheep prior to being weighed. A section of the race (sheet panel) was removed and replaced with a metal gate section to which the reader was attached.

In total 144 sheep were tagged.

The results for the sheep reader system are summarized in Table 8 below: -

Table 8.

CATEGORY	NUMBER
Tags read successfully	122
Tags not read successfully	22
TOTAL	144

Of the 144 sheep that were tagged and put through the race 122 were read successfully.

Of the tags that were not read successfully 11 were FDX-B tags and 11 were HDX tags.

In addition to the tags that were inserted for the trial, the equipment read 8 other EID devices. The assumption is that these were sheep that had been bolused under the National Scrapie Plan scheme but were not made known to the project coordinator or the market staff before the trial.

Cattle

A gate reader configuration was used for the cattle with a panel reader situated on either side of a race temporarily constructed for the trial. The race was positioned immediately after the area where the animals' passports were checked against their ear numbers before being penned prior to the sale.

In total 35 cattle were tagged.

The results for the cattle reader system are summarized in Table 9 below: -

Table 9.

CATEGORY	NUMBER
Tags read successfully	30
Tags not read successfully	5
TOTAL	35

Of the 35 cattle that were tagged and put through the race 30 were read successfully.
The 5 tags that were not read successfully were FDX-B tags.

At the end of the trial both the market personnel and EID supplier were asked for their comments as to how they perceived that the trial had gone, and these are summarized below.

Market's Comments

- One farmer asked that his sheep be excluded from the trial.
- Some concerns were expressed regarding the ease of use of one EID supplier's applicators.
- Sheep passing through a single race on market days was not considered to be a problem in relation to speed of throughput.
- Having to construct a temporary race for cattle to reduce the effect of metal sheeting on the operation of the readers was questioned.
- The lack of consistency of using only one reader for sheep but two for cattle was questioned.
- The level of radio wave emissions, that market employees are exposed to from the reading equipment, was questioned.
- The farmers at the market, who in the main considered that EID would be of benefit in certain farming situations, showed interest.
- If the readers could be connected to the weigh scales, the information could be displayed in the auction ring.
- A hand-held reader could be used to identify cattle that would reduce the risk of having to clean dirty tags under the current manual system.

EID Supplier's Comments

- The reading equipment requires to be mounted on non-metallic surfaces to operate optimally.
- Adjustments and tuning of the reading equipment needs to be made using live animals so that the best position for optimal reading performance can be established.

- Variable height adjustments for readers would increase the reading performance of the readers
- The routine operation of the market was not interrupted during the trial.
- A range of EID devices were able to be read without any adjustments to the equipment during the trial.
- The help and support of market staff and project coordinator were acknowledged.
- EID can be integrated into existing procedures.
- Animals not read by the reader need to be separated in an expedient way.
- Suppliers of livestock handling equipment need to be involved in further development.
- The company will investigate improvements that can be made to the reader capability by considering all possible orientations of applied tags.
- Standards for synchronizing and communication between reading devices would ease the implementation of EID systems.

SITE 5.

The trial took place on 10 July 2006.

The site was a large abattoir. Both sheep and cattle were being processed on the same day. The cattle and sheep used in the trial were processed under normal commercial conditions.

Equipment Used

For the cattle trial one large static panel reader was installed in the race immediately after the point where the cattle ear tags were checked and compared to the passport.

The ear tags were sourced from a number of different suppliers and incorporated both HDX and FDX-B technologies. All tags used in the trial were read successfully before being inserted into the animals in the trial.

Results

Sheep

For sheep, a smaller panel reader was used and was situated at the bottom of the elevator before the animals were stunned.

In total 156 sheep were tagged.

The results for the sheep reader system are summarized in Table 10 below: -

Table 10.

CATEGORY	NUMBER
Tags read successfully	149
Tags not read successfully	7
TOTAL	156

Of the 156 sheep that were tagged and put through the race 149 were read successfully. Of the 7 tags not read successfully 6 were FDX-B tags and 1 was an HDX tag.

Cattle

In total 39 cattle were tagged.

The results for the cattle reader system are summarized in Table 11 below: -

Table 11.

CATEGORY	NUMBER
Tags read successfully	39
Tags not read successfully	0
TOTAL	39

Of the cattle that were tagged and put through the race, all the animals were read successfully.

At the end of the trial both the abattoir personnel and EID supplier were asked for their comments as to how they perceived that the trial had gone, and these are summarized below.

Abattoir's Comments

- It was commented that from an abattoir perspective the trial had gone well with no hold ups in production as a result of the trial.
- A steady flow of animals to the stun box had been maintained.
- The abattoir personnel involved stated that they thought that if the system worked it would be of great assistance in recording the identity of cattle and sheep prior to slaughter.
- The abattoir would be willing to be involved in any further trials concerning EID.

EID Supplier's Comments

- On the cattle trial there was limited space in the working area that made it difficult to monitor the reader's performance.
- Similar problems were encountered in the sheep trial.
- Situating the reader further back in the cattle handling system would help to resolve these issues, as would clear routing of cables and power points.
- It was thought that using two readers would improve reading performance for both cattle and sheep.
- The assistance provided by the abattoir staff was acknowledged.
- Results from the sheep trial were viewed as disappointing and this was put down to the panel reader not being situated low enough.
- Overall the company was pleased with the results even though the equipment was situated in an unsuitable position.
- The trial was regarded as a good opportunity to demonstrate the flexibility of EID to abattoir staff.

- The use of EID would help to improve identifying livestock at abattoirs as this is regarded as a time consuming and dangerous job.
- Readers have to be able to read any manufacturers' devices.
- The company expressed a desire to be involved in any further EID trials.

SITE 6.

The trial took place on 22 August 2006.

The site was a medium sized livestock auction market. As no cattle were being sold on the day of the trials only sheep were included in the trial. The sheep used in the trial were sold under normal commercial conditions as part of a live auction.

Equipment Used

A single panel reader was used. It was the intention to use 2 panel readers, one on either side of the race, but due to technical problems this approach had to be abandoned before the trial began and so only one reader was used.

Results

Sheep

The results for the sheep reader system are summarized in Table 12 below: -

Table 12.

CATEGORY	NUMBER
Tags read successfully	166
Tags not read successfully	42
TOTAL	208

Of the 208 sheep that were tagged and put through the race, 166 were read successfully. Of the tags not read successfully 31 were FDX-B tags and 11 were HDX tags.

At the end of the trial both the abattoir personnel and EID supplier were asked for their comments as to how they perceived that the trial had gone and these are summarized below.

Market's Comments

- Some sheep were tagged in the right ear and some tagged in the left ear and this appeared to have an adverse effect on the number of successful reads.
- The use of 2 readers, on either side of the race, may have alleviated this problem.
- The flow of sheep through the market on the day of the trial was not restricted in any way.
- The reader appeared to handle a slightly wider race than previous trials.
- The equipment appeared to be reasonably foolproof and easy to install.
- No print-out of the results was available on the day of the trial.

- Overall the trial was perceived as having been a step forward and it was considered that the system was workable in a live market situation.

EID Supplier's Comments

- The race constructed for the trial was not fixed and the movement of the barriers allowed the sheep to pass through faster than would have been preferred.
- Some of the sheep had tags inserted in the right ear rather than the left ear as had been requested.
- Limited time was allowed to set up and test the equipment prior to the trial with no testing using live animals.
- The suppliers would have preferred to use a custom designed race with readers on both sides of the race. A gate would have been used to slow down the throughput of sheep when required.
- The trial did not slow down the operation of the market.
- The assistance of market staff was acknowledged.
- The open environment allowed the equipment to be installed relatively easily.
- It would be difficult to achieve 100% results without permanent changes to the auction market equipment.
- The use of the supplier's race would have achieved a higher success rate.
- The company regards the development of EID reading equipment for sheep to be a priority.