Electronic Identification of Beef and Sheep

Better Returns Programme

Information compiled by Jim Turvill, Independent EID Consultant and Liz Ford, AHDB Beef & Lamb.

Key messages

- EID can make it far easier to record and monitor on-farm performance
- Speeds up routine weighing and medicine administration
- Immediate access to animal data can help with management decisions
- Readers can be either handheld or static
- Most readers and weigh scales come with their own software which may be sufficient to meet your requirements. However, if you are looking to invest in a farm software package, ensure it will link with your reader
- Consider where you will be using the equipment. Inside or outside? Does it need to be mobile?
- Metal (especially moving metal parts) and electrical cables are very detrimental to successful EID tag reading
- Speak to and seek advice from the product provider (hardware, software, tags) both during the purchase process and also during set-up and use
- Speak to producers already using equipment – they are generally more than happy to share knowledge on their system

Keywords:

EID, hardware, readers, weigh scales, software, Dual Technology, Half Duplex (HDX), Full Duplex (FDX-B), Ultra High Frequency (UHF)

Contents

Introduction

Electronic Identification (EID) can make it far easier to record and monitor performance on farm compared to using pen and paper and thus can contribute significantly to the improved management of cattle and sheep. For a number of reasons this is particularly true now:

1. Following the introduction of the EID sheep regulations in 2010 and the Animal Reporting and Movement Service (ARAMS) electronic database for sheep in 2014, many farmers have invested in EID tag readers to ensure the accuracy of their records.
2. Since EID for sheep was implemented in 2010, nearly all breeding sheep should have EID tags and so, can be easily recorded individually.
3. All lambs tagged from 01/01/2015 must have an electronic identifier.
4. Since all abattoirs must be able to report sheep movements to the database electronically, there will potentially be an increase of individual data collected at the abattoir which will hopefully increase the level of information fed back to farmers.
5. All EU countries must implement an official cattle EID system by 18 July 2019. This will not necessarily be compulsory, nor will it necessarily use the same EID technology as currently used for sheep in Europe.
6. At present, all tag companies supply official cattle tags with EID transponders that can be read with the same equipment as that used for sheep.

With thanks to Shearwell Data and Didling Farms for photography.

What are the benefits of EID?

+ Fast and accurate collection of information
+ Reduced paperwork and transcription errors
+ Speeds up routine weighing and medicine administration – potential to reduce labour requirements

Speeds up routine weighing and medicine administration.

+ Immediate access to animal data can help with management decisions, eg Daily liveweight gains (DLWG) from last weighing could influence decision to sell, continue to feed or identify potential animal health issues

Immediate access to animal data can help with management decisions.

+ Prevent any potential losses through selling stock still in assurance residency periods, etc
+ Potentially less stressful for the stock than having to manually read ear tags
+ Data easy to upload to spreadsheets or farm software packages to interrogate or monitor performance

Sheep with EID tags

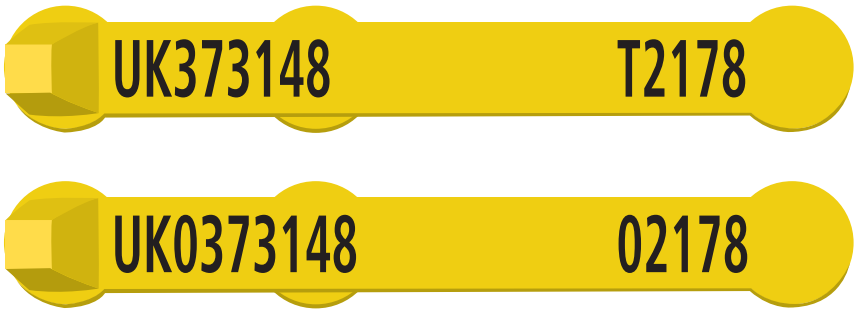
Cattle button tag

Livestock EID Identifiers

Electronic identifiers can be incorporated in tags, boluses, or pastern tags. The vast majority of farmers use EID tags. These are generally much easier to attach to the animal and to read.

Sheep EID tags are What You See Is What You Get (WYSIWYG), ie the number encoded on the chip matches the official tag number as printed on the outside.

Slaughter EID tags have a full individual number on the chip but have only the flock number printed on the tag. For management purposes, many tag companies will print the individual number on the tag at no extra cost (there must be a letter between the Flock Number and the individual number to differentiate it from a full EID tag. Eg UK373148 T2178 as opposed to UK0373148 02178 on full EID tag).



For cattle EID tags, currently the number on the chip does not match the Official Tag number as printed. The EID number is Relational. It can be linked on EID readers, software and weigh scales to the Official ear tag number.

Coil from EID cattle tag

EID chip from sheep tag

EID Technology

Current European Regulations for sheep enforce the use of Low Frequency (LF) Electronic identifiers that meet ISO standards (Nos: 11784 and 11785 established in the 1990's). These can be either Half Duplex (HDX) or Full Duplex (FDX-B). HDX tags tend to have a greater read range but are more expensive.

Radio Frequency Identification (RFID) readers transmit magnetic fields from their antenna that activate the passive chip in the tag. FDX chips transmit their data while the reader's magnetic field is activated, the chip's magnetic field is competing with the reader's thus the range is more limited than the HDX chips which send their information when the reader's magnetic field is turned off.

Most EID readers are Dual Technology (ie they are capable of reading both HDX and FDX tags). This is necessary since tags to be read could be a mix of HDX and FDX, but it does limit the benefit of HDX. Single technology HDX readers are commonly used in dairy parlours. Read rates and speed of these readers tend to be much higher than those of Dual Technology readers.

When considering investing in EID and related equipment (software, readers and weigh scales), farmers need to be very clear what they want from the system. Most suppliers should be able to produce a system to meet your needs. Tell them exactly what you want. If there is no exact fit – ask if they will do a bespoke system to meet your needs.

Hardware

Readers

It is important to ensure the reader you select is ISO compliant (ie will read HDX and FDX tags). Most readers are also Bluetooth enabled (or can be) so tag numbers can be sent in real time to printers, weigh scales, tablets, mobile phones and laptops wirelessly.

Read ranges can vary between products. There are advantages and disadvantages of each – a larger read range means you do not have to get as close to stock to read the tag but can create accuracy issues as you may read the wrong animal, particularly in sheep systems.

Readers can be either handheld or static.

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Handheld recorder

Handheld readers

Basic Stick readers:
These all have internal memory to save tag reads sorted into groups for later download.

Stick Readers with Extra Functionality:
These readers exceed the functionality of basic stick readers. Depending on the model some sticks include a range of the following functions:

+ Alerts for pre-selected animals
+ Entry of customised data
+ Alpha-numeric keyboard
+ Add traits pre-loaded and free text
+ Link dam and offspring
+ View animal history
+ Supplied with performance software

Data Loggers

These all need specific software to be of use. Unless you want to create your own software, you will need to buy one of these units with a software package.

These readers allow the recording of additional data against the tag read as well as a level of data viewing. Most have a touch screen interface.

Static readers

Static reader in motion

Static readers enable hands-free recording. They comprise of a reader and an antenna (the reader transmits and receives radio frequency signals via the antenna).

The antenna can be a single panel, a dual panel (two antennae, one on either side of the race/crush linked to the same reader), or a portal (a single arched antenna through which the animals head will pass). The best option depends upon your circumstances. Portal antenna tend to have the best read results, but can also be the most impractical to fit on a cattle crush.

It is important to remember that, in order for a reader to be able to function as per manufacturer's claims – the type and positioning of the antenna is critical.
NB: The reader is sometimes referred to as a panel reader but should not be confused with a panel antenna as you require both elements.

There are various static readers on the market. Panel size, memory capability/ capacity, external power requirements (12v or 240v) or the option of internal rechargeable batteries varies between products.

It is possible to connect two or more panels (antenna) to any of these readers. However, please note that, due to differences in wiring, readers tend to only link with specific antenna.

Weigh scales

Weigh head to store data

EID linked scales can be used in one or both of two ways:

1. The EID reader is linked to the weigh head. Data is stored on the weigh head, typically, several thousand records can be held. Growth rates can be displayed; additional information on the animal can be shown and added. The data can be downloaded onto a computer, either into the scales' own software or a farm software package for further analysis.
2. The EID reader is linked to a data logger, tablet, or laptop to which the weight is directly sent from the scale (links are either cable or Bluetooth). Usually, a greater variety of animal information can be immediately stored and viewed on these computers than on a weigh head.

While the weigh scales that can be used for the second option (number 2 above) may be much cheaper, environmental conditions may necessitate a very robust tablet that could also be very expensive.

Some companies are involved with setting up bespoke farm systems. There are also, a number of other weigh scales, designed for vet/horse use, that are used for sheep on farm. While these are not as rugged as the farm livestock scales, they tend to be much cheaper.

Main features of weigh scales

When considering purchasing a weigh scale it is important to consider what information you want to collect. Various makes and models have different functions, such as:

- EID input
- Weight output
- Growth rate indication
- Ability to draft stock (eg separating those over a designated weight or based on growth rates, etc)
- Ability to input data

When considering purchasing a weigh scale it is important to consider what information you want to collect.

NB: Most software on advanced weigh scales is written for Australia and New Zealand and may not match your requirements.

Software

Most readers and weigh scales come with their own software which may be sufficient to meet your requirements. However, if you are looking to invest in a farm software package, ensure it will link with your reader and any external websites you may wish to use such as the ARAMS sheep movement database or BCMS for cattle movements.

Most readers and weigh scales come with their own software which may be sufficient to meet your requirements. However, if you are looking to invest in a farm software package ensure it will link with your reader.

Software that can come with readers and weigh scales can vary from simple tag list downloads to full animal management software packages.

Points to consider when choosing software:

- Is your main concern compliance with sheep movement and reporting regulations? If so, you could just have a simple stick reader that can link to a thermal printer to print lists to attach to a movement form. A thermal printer is one that is small and light and uses less power, making it ideally suited to portable applications
- If you want to report sheep movements electronically, most readers will allow you to download a list of tags that can be uploaded to the ARAMS database via the farmer's portal
- While you can keep your flock register on the central database, if you want to keep it on farm, it may be beneficial to use one of the software packages that link to the central database
- If your concern is weighing, many EID enabled weigh scales have quite sophisticated software packages included. These will allow quite detailed analysis of the records collected either on their own or when used with spreadsheet software (eg Excel)
- For full management analysis for flock/herd improvement you may benefit from buying a ready-made software package that enables this. Many of these packages are continually evolving, so often suppliers will add features if requested

+ Full software packages will not link with all types of hardware (readers and weigh scales), so make sure you buy equipment that links. Most software providers will provide a link to popular readers and scales if they are asked. It is very simple. You can ensure integration by buying the hardware from the software developers

Points to consider for successful tag reading

+ Consider where you will be using the equipment. Inside or outside? Does it need to be mobile? In a dark shed or outside in bright sunlight?

Consider where you will be using the equipment. Inside or outside? Does it need to be mobile?

+ Check on the Ingress Protection (IP) ratings, operational temperature range, 'dropability' and screen readability of equipment to ensure it will meet with your environmental conditions

+ Metal (especially moving metal parts) and electrical cables are very detrimental to successful EID tag reading. While with handheld readers, you can always get close enough to the tag for a successful read, static readers will work best where plastic and wood crates and races can be used

Metal (especially moving metal parts) and electrical cables are very detrimental to successful EID tag reading.

+ Do you need to read tags in a heavy duty crush? In any crush, tags can be difficult to read with static readers, but are more difficult in metal crushes. In addition to the excessive interference caused by the metal, it is usually impossible to fix an antenna anywhere near the head of a stationary animal. However, ways around this problem include setting up a platform weigh system with an EID reader in the race outside the crush, or to forgo a complete hands-free system and use a handheld reader

Stick reader

+ Will animals be on the move? It is more difficult to read tags on animals moving at any speed, so the point of reading needs to be considered accordingly

+ Make sure the components of the system you buy all fit together. See the set-up in operation or, at least, have someone set it up and demonstrate it for you

+ Speak to and seek advice from the product provider (hardware, software, tags) both during the purchase process and also during set-up and use

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+ Some companies will hire out equipment which could be an option, especially when embarking on a new system

+ Look at the basics that could affect reading rates. It is not always the hardware but could be a tag issue. If it is a tag issue, speak to your supplier – feedback is important

+ Speak to producers already using equipment – they are generally more than happy to share knowledge on their system

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Ultra High Frequency (UHF) – A future consideration?

UHF reader on a cattle crush

Currently, due to the perceived limitations of LF and current ISO standards (limited data on chip, slow read rates, limited read range); there is some trial work taking place looking at UHF technology in cattle identification. Currently, LF readers would not work with UHF tags.

While there are some perceived benefits of UHF over LF, it must be stressed that the use of UHF is still very much under discussion. ISO standards currently exist for UHF but, as yet, these do not relate to animal identification and so UHF is unlikely to replace LF within the foreseeable future.

EID summary chart

Area of interest	I only want to comply with sheep movement regulations	I want to link progeny to their mothers and record details at lambing or calving	I want to record weights in a crate in a mobile system	I want to record weights in a crate in a permanent system	I want to record animals as they move through race
Hardware requirements	Simple stick reader with thermal printer to attach tag list to movement licence	Stick reader with extra functionality or data logger	Manual entry – data logger Automatic entry – static reader and antenna, or stick reader linked to weigh head, laptop, logger or tablet		Static reader and antenna, linked to weigh head, laptop, logger or tablet
			Check compatibility with 12v power source or internal rechargeable batteries	May use mains electricity	
Software requirements	None for paper movements. Stick readers often include simple software which allows tags to be downloaded to the computer – able to print a list of tags and attach to licence or upload directly to ARAMS database	Buy a unit with software package or alternatively create your own software package	Specialist software is required to link between different hardware. This may be included with the reader. Also links animal records quickly. May want to consider compatibility with and use of a separate farm management package although some work can be done in spreadsheets		Buy a reader with software package
Notes	You can keep your flock register manually or access it on the central database. If you want to keep an electronic flock register on the farm it may be beneficial to buy a software package that links to ARAMS database	Need to be clear about what data you want to record as models vary in the range of functions they can offer. Ensure software package links to ARAMS and/or BCMS database	Make sure the suppliers know that it is going into a mobile race, as may change antenna type. Consider the environment you will use the equipment	Metal and electric cabling can cause interference and affect read rates. May need to position the reader and weigher before the crush	Can be difficult to read low frequency tags as animals move through a race. Position reader at slowest point

Glossary of Terms

DUAL TECHNOLOGY READER	A reader that reads both FDX-B and HDX transponders
EID	Electronic Identification
FDX-B*	Full Duplex. A type of technology used in the transponder
HDX*	Half Duplex. A type of technology used in the transponder
IP	Ingress Protection Ratings (against solids (1st digit) and liquids (2nd digit) – the higher the numbers the better the protection)
ISO	International Standards Organisation
ISO 11784	Standard relating to data content of the EID transponder
ISO 11785	Standard relating to EID reader protocols
LF	Low Frequency
PANEL ANTENNA	An antenna attached to side of race/crush
PORTAL ANTENNA	Single antenna that loops over the race/crush
RELATIONAL	The programmed transponder number is 'random' and doesn't match what is printed on the tag
RFID	Radio Frequency Identification
TRANSPONDER	Electronic microchip contained within the tag or bolus
TWIN ANTENNA	Two antennas attached either side of the race/crush, linked to one reader
UHF	Ultra High Frequency
WYSIWYG	What You See Is What You Get. The number on the programmed transponder matches the printed tag

*These technologies are both approved for sheep in Europe. Presently, there is not an official system for cattle, although FDX-B, HDX and UHF tags are currently available. This may change when an official system is introduced.

Further advice

Tag Suppliers:

All official EID tags sold in England can be read by any LF ISO compliant reader. HDX sheep tags are available, although most tag suppliers only supply FDX-B tags for sheep, but supply both FDX-B and HDX for cattle.

A list of approved tag suppliers can be found by clicking here.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/306817/Approved_ear_tag_Suppliers.pdf

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