WHY SHEEP EID

Technology to benefit the NZ Sheep Farmer or not?

2011 Kellogg Rural Leadership course Project Report

Will Foley

Background

The National Animal Identification and Tracing scheme otherwise known as NAIT is new legislation created for all cattle and deer owners to adhere to as of July 1 2012. The NAIT bill was first introduced into parliament in December 2010.

Federated farmers fiercely opposed the bill in all proposed and current forms as an unnecessary cost laboured onto farmers with no perceived rewards for the expense. That said it soon became clear they were not going to be able to stop the introduction of this legislation. All bar 1 MP voted in favour of the bill and so Federated Farmers had to change tack.

So as to not be totally excluded from the development of this important new rules to be imposed on farmers Federated Farmers had to accept the pending scheme but aim to work proactively with the government, select committee and eventually NAIT board to ensure the scheme is workable, practical and at least cost as possible to achieve the desired outcome of the scheme.

The inclusion of sheep is a topic on a lot of sheep farmers minds at present but not being spoken about too loudly as they certainly don't want to create the debate and hope the possibility is nowhere near the minds of the decision makers. That said I have thought about how feds fought for farmers rights to use EID in cattle and deer at our own discretion and to achieve a price premium if there was one to have. With sheep farmers they do still have that option. There is no rules applied to sheep to mandatorily have EID, yet there are farmers already utilising this technology. Therefore I set out this project to discover whether there are benefits or not to using EID in sheep and if so, hopefully see sheep farmers taking up this technology on their own accord to show the government and the likes that if there is something to benefit farmers they will uptake the costs, etc incurred to gain perceived benefits without unnecessary rules being imposed on them.

Also I feel, for New Zealand's farmers to be competitive, sustainable and viable they must keep up with the latest technology and trends that do work and offer benefits to their current systems. EID has been around for just over a decade, yet there has been limited uptake as a choice. The cost of setup for equipment and tags has been reasonably high and therefore a barrier but that will surely reduce as there will be a high demand for equivalent products on the cattle and deer side of things. There are farmers now who do tag their sheep with visual tags and so already going through the necessary management procedures with a lot of potential efficiencies to gain if they convert to EID. Also there are already farmers that do use EID in their sheep flocks. It is these farmers which have a lot to offer the industry by telling and describing their experiences so far with the use of EID and gauging their opinions on the use of it on a wider scale.

Table of Contents

Introduction

The sheep industry, while largely depressed over the last few years of the last decade, has seen resurgence in the last twelve months and remains an integral part of New Zealand's agricultural and National economy. Farmers must take advantage of current improved prices by improving productivity, becoming more efficient and remain competitive to ensure the sustainability of the industry in years to come.

One way to improve efficiencies and productivity is to take up new technology with proven benefits. One such technology not necessarily proven but with limited and increasing uptake available to farmers for just over a decade now is Electronic identification (EID). EID is also known as Radio frequency identification (RFID) but for the purpose of this project I will refer to just EID.

With the implementation of NAIT next year (July 2012) EID is well and truly and the forefront of cattle and deer farmers minds. This is being deemed necessary for the continuation of trade with our international markets with traceability and biosecurity response as the key reasons behind its implementation. Detractors question the need to impose such a cost on the beef and venison industry without proof of premium on price and wonder why the legislators don't let the market forces take effect itself. Nonetheless NAIT is definitely taking effect in 2012 and so now one potential question is to how can beef or deer farmers with sheep use it as an opportunity as opposed to contemplating it as simply another cost.

My project is to simply assess the use of EID in the sheep industry either current or the viability of it to existing systems. The concept of individually identifying animals is not new but the ability to do it electronically relatively is albeit at a significant start-up cost and so are there benefits to this on farm technology?

I have no prior experience with EID and has a cattle farmer as well as sheep, have not yet instigated any setup towards the impending NAIT scheme due July next year and so have started this project with no preconceptions as to whether EID in sheep is beneficial or non beneficial to the management or productivity of those sheep. With limited uptake thus far though I thought it was important to investigate what is being done on NZ farms already and so assess the benefits of this technology on a wider scale.

What is EID

EID is a generic term and is used to refer to any identification system that utilises electronic or radio frequency signals to transfer data between the ID tag or transponder and a transceiver or reader.

Transponder

A Tamperproof EID tag

The sheep electronic tag is the transponder and there are two main types available on the market, HDX and FDX.

HDX or half duplex tags are generally more expensive but tend to have better read range.

FDX or full duplex tags require fewer components to manufacture and therefore cheaper but can work just as well depending on environment.

A reusable EID Tag

The main difference between the two is how they communicate with the reader. They are both passive and therefore need to excite the reader. The full duplex's excite signal is on all the time while the Half duplex's excite signal is on half the time.

Readers

Two common handheld or stick readers used in New Zealand. They are waved at the direction of the tag to read the ID.

Panel readers are used in fixed positions where large numbers are running through yard setups. They tend to cause less stress on animals as there is no interference from the user trying to read the tag with a stick as the panel readers are automatic.

The important part to note here first is the tags don't have batteries and therefore can potentially last indefinitely.

The readers or transceivers put out radio frequency signals which provide a way of communicating with the tag but also providing the tag with energy to communicate back. Once the reader has the information it then sends that info to a storage device such as the unit that might be weighing the stock which records the weight alongside the tag number.

Weigh & Data Monitor

Some common weigh monitors/ data collectors available in New Zealand. Top of the range models include Bluetooth for wireless communication with the readers to receive information and send data to a laptop computer for analysis or storage of data.

Why Sheep EID?

The key reason NZ farmers would take up EID is to measure and record their livestock. While this certainly isn't a new concept to farmers it is the method in which this is done and achieved which brings about the benefits.

Individual Management

Individual recording is already done within a stud flock and EID simply raises the bar for the accuracy and efficiency of recording. Commercial farmers tend to more measure mob averages as a gauge to their performance and so by individual recording they can get a much better handle on the range within a mob and detect characteristics or issues they may not have otherwise.

Accuracy

By relying on electronic equipment to read tags, and record information such as bodyweights, scanning, fleece etc the accuracy of the information is improved as there are less errors as opposed to using labour to read and write down information multiple times before then maybe inputting into a computer database.

Efficiency

By sheep walking past panel readers while being weighed or being scanned with a handheld reader and to then weigh fleece for example has removed all necessity for reading tags visually and then writing information down so the time or labour savings is immense. Access to information required is easily and quickly obtained, assessed and amended if necessary. Paperwork is dramatically reduced if not eliminated.

Less stress on the animals

By not having to really be near to or touching animals to record tag or data the animal doesn't stress out as can do with human contact.

Automatic drafting

Provided the farmer has auto drafting capabilities they can input criteria and automatically draft according to those.

Traceability

The UK has brought in a compulsory EID scheme for this exact reason in the event of a disease outbreak. While it is hoped this stance is never taken in NZ it is a possibility with the NAIT scheme developed ready for cattle and deer. Regardless of that sheep with EID would definitely be easier to track or pick up if they had escaped or passed through to neighbouring properties than solely relying on earmarks.

Practical Issues

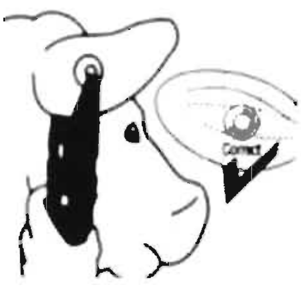
Problems farmers either have or would like to see improved.

Faulty Tags	Some tags just do not read or initiate from new when activated from the reader.
Fall out/ missing	Tags that have gone missing since their last management date
Shearers	Tagging them on the inside third of ear means they are close to where the shearers work with their hand piece and tend to hit them.
Dogs	Some dogs are prone to nipping the ears between the fence rails in the yards and unfortunately connect with the tag as they pull back ripping them out.
Metal	Metal nearby the tag or reader at time of transmission can cause interference and disrupt the communication between the two from occurring.
Read Range	The maximum range with current equipment is 1 metre. This is one area where the tech companies are hopefully working on to improve.
Re usable tags	A good way to save costs but the software used in data storage and analysis needs provision to be able to accommodate the reuse of the same tag for a different animal

Tag companies only talked of one issue or response they to farmer's discussion and that is the way the tag is applied.

Firstly they feel some farmers aren't using the correct applicator for the job. Many of the old applicators are not designed or suited to the new tags because of subtle differences in style.

Secondly they talked about the placement of the tag as being very important to the retainment of the tag. The correct placement is advised as in the middle of the inside third of the ear.



Cost

The cost to setup equipment and the initial cost of the tags can be seen as a barrier to getting into EID. Itemised the components and their approximate prices are as follows.

Loadbars	$800-$1000
Panel reader	$2000-$2500
Hanheld Reader	$2000-$2500
Weigh Scale/ monitor	$2500-$3000
Autodrafter	$15,000-$25,000
Tags	$2-$3 each but there are reusable types.

Farmers interested in looking into EID for management may already be proactive farmers in terms of monitoring and therefore may have some of the equipment. It is not uncommon for farmers to have loadbars for weighing of sheep and or cattle. The monitor that already is used with those is likely to be needed to be upgraded though. Large scale finishing farmers may already have auto-drafters which can easily adapt to accommodate the EID equipment. Computers with software are a must to store and analyse data further but I have assumed the type of farmer entering into EID management will already have and use a computer as part of their everyday office routine.

Why wouldn't you use EID

Cost

The cost is definitely prohibitive for small block owners who don't have the number of sheep to warrant the inital outlay. I suspect as with most new technologies the price will come down as uptake increases and the intial development cost is paid for. NAIT will also drive sales of EID equipment and so that too will have an effect.

Intensity of Farming

Some farmers are quite content with the way they farm and have no economic drivers needing them to increase production or improve efficiencies.

The Future

GPS

One possibility to upgrade the tag is to install GPS capability. This would enable the livestock owner to have full traceability of their stock within the farm system with a record of all movements. It would also help manage or explain some deaths and missing which can occur at significant levels when dealing with large scale sheep flocks. A very accurate stock reconciliation would be able to be produced at any one time.

Memory

This is where I see a major benefit to sheep farmers. If a memory could be included into the tag and written to and record on a regular basis the lifetime history of that animal can be with it at all times. This isn't so important to a farmer that owns a particular sheep for its lifetime because he can recall data from the storage device he uses but when animals are traded; they may or may not be passed on with a history of performance and management so far.

If the animal traded had a memory of management and performance history the buyer would then have information to base his own management decisions on. For example he would know what drench chemicals or families to use based on what the animal has already been exposed to. In terms of performance he could rate the animals performance while on his own property, rank the animal amongst its own breedline and then relate this back to the original breeder. Very few breeders would get lifetime performance information back from their clients or finishers. Most performance is ranked up until the time of sale of the ram. Therefore I feel there is huge opportunity to increase genetic potential of animals by measuring more of their lifetime performance and ranking stock by that.

To have a memory installed in the tag the tag would have to have battery power installed too. Currently all tags available on market don't have battery power and therefore potentially have an unlimited life. With current technology though, a tag with battery power could last up to ten years. One extra advantage with a battery powered chip could be improved read range which is an issue among current users.

NAIT

Where Sheep & Beef are combined on farms some farmers will be investing in all the equipment to read and record EID in their cattle and utilise the technology even though it has been imposed on them. Not all farmers will though and these will just spend the minimum necessary to comply with NAIT which is to just put the electronic tag in the animal's ear.

Those that do setup will have the scanner, reader either panel or handheld & recorder which will read and record sheep tags just as cattle tags. Therefore these farmers have the opportunity to utilise this equipment for a quicker payback by EIDing part or all of their sheep flock as well.

Case studies

Stud Breeder

Stud breeders with intensive selection processes and ones where they might be slightly different to the normal selection processes amongst competitors have elected to use EID in their stud flocks.

For example one breeder has been testing for worm resilience in his lambs with EID tags since 2000. He stipulates a requirement of weight gain while under worm challenge. So no drenches are given but they are weighed every two weeks with a tail draft coming off each time. The tail are then removed and treated commercially to fatten and sell. The rest are then taken through until March when the final stud rams are selected meanwhile still having no drench since birth.

The next trait the breeder wants to record is the first time the stock does get drenched. So if enough pressure comes on the young stock once selected they are drenched but recorded so any potential buyer knows how long they have coped without and how many if any drenches are needed before sale. Normally once ewe replacements enter the stud flock, these are never drenched unless sever pressure calls for intervention.

Finally the stud breeder sees an enormous gain in eliminating manual recording, reducing labour requirement at most management tasks and alleviating the error rate that occurs with manual recording. The stud breeder said he was manually recording or writing down data up to three times before he got it into his computer database. That in itself was onerous and was always open to errors.

Commercial Farmer

On commercial farms currently using EID they are both tagging and recording the performance of fattening lambs or tagging their ewe flock or both.

Breeding farmers are tagging & weighing their lambs at docking and then recording their performance from then on. From docking to weaning lambs have enormous potential while still on their mothers to grow at high rates. Therefore this is a critical time to monitor the lamb growth rates and ensure there are no limiting factors affecting their performance. Monitoring at this stage will help detect a problem to then further analyse feed quality, feed quantity, genetics, trace element deficiency or worm challenge.

Tagging breeding ewes enable commercial farmers to take on some selection pressure like their stud breeding counterparts. Scanning data is one measure easily inputted against an animal's record and with lambing percentage a major driver in profitability would be first on the list. Wool data is one area easily recorded relative to an individual animal with a little bit of extra work and time in the woolshed. With the current resurgence in wool prices, this could be a valid exercise. Tagging lambs at birth to record parentage is a possibility but unlikely given the intensity of this operation.

If processors were to give individual carcase feedback against tag number id, then farmers would really start to see some gains from EID on the meat side of production. There is a large range of variance between carcases in terms of meat value yet the current system basically pays farmers on the average meat yield. With feedback farmers know which animals are doing better than others and can start selecting on that to increase meat returns. If any form of parentage is recorded, which this may incentivise farmers to do, then information can also be fed back to the stud breeder too Genetic gains could potentially be far greater than previously because the commercial breeder is starting to select where he didn't before and the stud breeder is selecting on a lot more data than he did before.

Finishers

There are links currently happening between breeders and finishers too where EID lambs are tagged and recorded from docking. These are then transferred to the finishing farmer who completes the lifetime history of the animal before processing. This information fed back to the stud breeder once again increases the data he has available to select from.

One important input in any finishing system is the various feeds grown and what performance animals do on these. With EID lambs monitoring can be done on an intensive basis to compare different feeds or crops and also individual animals on the crop. For example popular crops at the moment are Chicory, Plantain, Lucerne or brassica rape. Instead of just mob averages individual data will allow the finisher to deduct better conclusions as to which crop lambs perform the best on and also whether there are other factors affecting performance other than the feed. With most crops there will always be certain animals that don't adjust from their normal grass diet to the new crop. These animals can be identified early and withdrawn so as not to waste the expensive feed on animals that won't provide the return.

Animal health is a big concern to most finishers as mineral deficiencies or worm challenges can make a big difference to the weight gain of lambs and the profitability of the trade. Where mob averages are used to deduct conclusion regarding animal health treatments the farmer is using very limited data and providing a diagnosis and treatment which probably doesn't suit the majority and therefore either wasting chemical and money or in another instance not using enough and losing out on production. By individually weighing and recording animals there will be better information to make decisions especially when related to their previous performance and also animals can be drafted up to then receive different treatments or further testing such as faecal egg counts or liver biopsies.

With the advent of the Europe and UK farmers being forced to compulsory tag all sheep with EID due to traceability issues there should be the opportunity arising for NZ farmers for price premiums. While it is still an option and not every NZ farmer using EID yet, the signals coming from our customers are for safe food and so there must be premiums available from being able to market sheep meat with EID traceability. There is no known premium paid in NZ yet for those farmers supplying EID sheep but it is something either meat companies or Beef and Lamb NZ should be working on to benefit this use of technology further and increase its viability to a wider audience..

Conclusion

After talking to farmers, meat companies, tag manufacturers and reading about local and overseas experience and data I feel there are some definite merits to using sheep EID in some New Zealand systems. Scale of business would be a big factor so as to be able to bear the initial cost of setup. Small operators would not see enough of a return to outlay the capital cost. In saying that the likelihood of the cost of equipment and tags is likely to decrease as with most technology but depends on the amount of development that is put into improving the performance of the set up or increasing the amount of services the tag can offer the farmer such as those discussed in the main report.

Even if not all farmers can participate in the use of the technology because of economic constraints the whole industry would benefit from a significant use due to the findings from various monitoring and the feedback passed back down the chain to the stud breeder. A faster improvement in genetics would result from the breeder having more data to select his replacements from. This will benefit all his clients from subsequent years on, irrespective of whether they use EID or not. Also trial work or analysis of different feeding regimes will surely flow from those farmers achieving the findings through to the rest of the industry.

Sheep farmers have done it tough over the last few years of the last decade and have seen a lot of their neighbours convert land use to dairy or other perceived more profitable options. The national flock tally has now reached a point where it needs to stabilise or increase again so as to not start losing vital infrastructure and stability to keep the industry viable and still retain some scale of supply in key markets offshore. Sheep farmers know this and therefore will be happy to promote best practice among their peers to help the sustainability of what is still a vital part of New Zealand's Economy.

Finally without initiating debate, regulation has taken over farming counterparts in UK and Europe. New Zealand farmers definitely don't want to go down that track and take on costs with no perceived benefit or premium. Hopefully markets will offer premiums to those farmers that take the initiative and let others decide if they want to as well when the offer is there. To let the market forces take effect rather than intervention or regulation has to be the best way for everyone.

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