Breakthrough result of a long global collaboration now headed our way

IT'S A RUBBER RING APPLICATOR FOR LAMBS, BUT NOT AS WE'VE EVER KNOWN IT.

Inventor Robin Scott – transforming one of the most common husbandry procedures on sheep farms.

First devised in Scotland, refined and commercialised in Australia, with a development timeline stretching right back to the mid 1990s, Numnuts is now making its way towards New Zealand.

And that's good news for lambs, farmers and vets alike, not least because use of the world-first device has shown close to 70 per cent pain reduction in lambs after ring application, plus faster mothering-up and less miss-mothering.

Numnuts is being brought to the NZ veterinary market by supplier Agilis Vet, which aims to launch it here in 2021.

Meantime, however, it has already begun transforming castration and tailing in Australia, where 200,000 lambs received the treatment in the first year after its pilot launch in 2019.

Rigorously engineered and validated; practical, safe and easy to use, it's a hand-held device which applies elastrator rings over the lamb tail and also scrotum while allowing users to inject pain relief.

The concept was originally prototyped and trialled by scientists at the University of Edinburgh over 20 years ago.

But while it proved successful, the prototype was expensive, and at a time when consumer and market concerns around ethical food production and animal wellness were not the driving force they are today, it was shelved when development funding ran out.

By 2009, however, the market context had changed, and scientists at Edinburgh's Moredun Research Institute teamed up with Glasgow-based innovation and engineering specialists at 4c Design for a new start on the project.

Meat & Livestock Australia and Australian Wool Innovation came on board in 2012, followed by the Australian CSIRO 2013.

Thousands of hours of work and much collaboration later, Numnuts was scientifically evaluated, patented and being field tested on 15,000 Australian lambs in 2018.

4c Design CEO and Numnuts inventor Robin Smith moved from Scotland to Australia with his family last year to commercialise the device via an Australian-based company called Senesino.

An engineer by training, Smith has a strong interest in animal welfare and a good pedigree in the sheep industry.

He's the son and grandson of vets; his father Dr David Smith led the team at Moredun Research Institute that developed Barbervax, the world-first vaccine for Barbers poll worm, and Robin Smith designed the Barbervax production system.

"We had three major design criteria for developing Numnuts," he says. "It had to be practical, safe and quick to use."

The aim was to take a skilled veterinary procedure (a nerve block with local anaesthetic) and, with the aid of a specific applicator, make it straightforward and safe enough for farmers to use at production scale in the field where lambs are being processed at the rate of more than a thousand a day.

"We're not interested in tech for tech's sake, we wanted the simplest solution that does the job well, yet, like most things that're simple, it took many years of trial and error to find it.

"In developing the tool, we have looked at the angle of attack, the depth of needle penetration, the accuracy of dosage, and the ergonomics of the design."

Dr Alison Small from CSIRO was heavily involved in developing and testing Numnuts in Australia.

A principal research scientist at the McMaster Laboratory in Armidale, NSW she leads livestock welfare research in a number of

Animal behaviour scientists recorded 68% less pain behaviour in lambs treated with Numnuts.

More to consider with clostridial disease

WORDS: Ceva Animal Health (NZ)

FARMERS RELY ON YOU FOR INFORMATION AND ALTHOUGH IT MAY BE RARE TO BE ASKED ABOUT CLOSTRIDIAL DISEASE, IT IS A SUBJECT WHERE THERE IS A LOT OF VALUE TO ADD.

For many farmers, other than the annual visit to purchase some vaccine, clostridrial disease discussions are rare unless they have large numbers of animals die suddenly.

This is the gap where genuine value can be added, as farms right across New Zealand continue to have clostridial deaths.

These instances don't need to be mass deaths, rather they may be cases of one death here and there. For other farmers it will be two or more; these are often accepted as normal rather than the unnecessary loss they present.

A small change on-farm can make a lot of difference, and improvements in vaccination could be one of the easiest ways to get there.

Such a change could focus on the vaccination protocol being followed; it could be farmers' injection techniques, and/or it could be the type of vaccine they are using.

Addressing these factors doesn't take much time or effort and could make a significant improvement to farm profitability.

Having a proper vaccination protocol in place is a critical step in any vaccine's ability to provide protection. An animal's capacity to fight off infection is significantly impacted without appropriate treatment timing and boosters.

Getting a protocol in place is the first step, the next is ensuring the vaccine is appropriate for the farm.

Many farmers, for example, still use a 5in1 formulation. Developed 40 years ago, this was a breakthrough in its day, but times have changed.

Farm and stock management is much different; we use different feeds and farm more intensively.

Such changes can all increase risk of clostridial disease, and under the general description of 'clostridial disease' there are specific strains that bear consideration for their tendency to cause losses in today's systems.

Clostridium perfringens produces enteric diseases, generically called enterotoxaemias.

This microorganism can be a normal inhabitant of the intestine but when the intestinal environment is altered by sudden changes in diet or other factors, *C. perfringens* proliferates and produces potent toxins that act locally or are absorbed into the general circulation with usually devastating effects on the host.

You will already be familiar with *Clostridium perfringens* Type D, more commonly known as Pulpy Kidney.

Type D protection is contained in 5in1 vaccine, however, Clostridium perfringens Type A, Type B, and Type C are not protected by 5in1 vaccine.

Clostridial disease can be complex; death can be sudden and unexpected; it doesn't always present outward signs, and one its most well-known attributes, that of rapid decomposition, makes it difficult to be specific in a diagnosis.

Many of your farmers will experience unexpected losses this season. Whether they are related to feed type or feed transition where enterotoxaemia may be involved, or losses of neonatal lambs where Type B may be involved, a review of farm protection level and vaccine protocols is recommended.

Coglavax8 is a new 8in1 vaccine that covers the traditional 5in1 and all the *Clostridium perfringens* Types A, B, C, and D.

For more detail, contact your Ceva Animal Health territory manager.

areas, including alternatives to painful husbandry procedures, pain mitigation for livestock, and humane slaughter.

Extensive animal trials using ethograms developed by vets and animal behavioural specialists over three decades have produced positive results for Numnuts, she says.

"Detailed research studies have been carried out at the CSIRO Chiswick field station, and in addition, commercial trials were carried out for both Merinos and crossbreds on five commercial farms in Australia during the 2018 season.

"There was a significant reduction in pain–related behaviours, such as the 'tucked up' posture, bleating and lying down, when sheep were treated using the Numnuts tool, as compared with just having rubber rings applied."

With any assessment of pain, there is a massive grey scale, she says.

"Some lambs are very stoic and will just grit their teeth and bear it, whereas others will throw a tantrum and roll around on the ground. But with local anaesthetic there is a noticeable decline in the pain behaviour displayed."

The researchers also found that lambs treated with Numnuts were less likely to suffer mismothering.

"We timed the lambs going back to their mums after marking.

"In the lambs that had rings applied without Numnuts, 30-40 per cent had not found their mothers after three minutes. Whereas in the lambs that had been marked using Numnuts, only 10-20 per cent had not found their mothers after three minutes. In our control group, with no rings, all lambs found their mothers within three minutes."

Tellingly, farmers involved in beta testing the device were keen to obtain it because they could physically see a benefit.

"Those who have tried it, are very positive," Small says.

"One of the consistent pieces of feedback I have had is that things seem quieter in the yards after marking and there is a feeling that the lambs are easier to take back to the paddock."