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Farming, Food and Health. First™
Te Ahuwhenua, Te Kai me te Whai Ora. Tuatahi

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AgResearch's Dr Neels Botha (right) and his team uncovered concerning stress levels when interviewing a group of Central North Island farmers.

Help urged for farmer stress levels

An AgResearch study has uncovered the severe pressure our farmers are under, and prompted warnings of the serious implications of poor farmer welfare – depression, relationship breakups and suicide.

AgResearch's Social Research team, led by Dr Neels Botha, made the discovery about "shocking" stress levels when interviewing around 60 Central North Island farmers about new environmental technologies.

"With the recession, drought in many areas, and the 'greening' of our policies, farmers are under incredible pressure. In talking to them, you see this is real, and you realise the serious consequences," Neels says.

"Stress manifests itself through shock and denial, fear and anger, and if it becomes more serious, people become withdrawn and depressed, they make poor decisions and do things they wouldn't normally do, like drink excessively. Relationships may deteriorate when they become moody or violent, and ultimately may even lead to suicide."

Neels says international literature makes it painfully clear that poor farmer welfare is a serious and worldwide issue, with reports of 20,000 farmers committing suicide in India between 1998 and 2000, and startling figures from Southern Australia, with tales of depression, marriage breakups and farmers sobbing in their trucks.

Neels says there are concerns that the trends may be the same here, backed by a MAF-commissioned literature review in 2000 that summarised, 'Most studies report increased stress and significant stress levels.'

He will now work with industry groups to develop tools and support networks to ease the situation, encouraged by a well-attended farmer welfare seminar last year, and several councils contacting him for help in working with farmers.

For more information contact neels.botha@agresearch.co.nz

Watch the video

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Getting a true picture of an environmental footprint

Carbon, carbon, carbon – it's a trendy topic when it comes to reducing agricultural emissions. But an AgResearch scientist suggests we should have a wider focus in order to meet legislative requirements and consumer demand for products with low environmental footprints.

The focus, says AgResearch's Dr Stewart Ledgard, should be on efficient use of resources, and reducing multiple environmental emissions. And the best way to do this? Life Cycle Analysis, or LCA, he says, a tool that enables the evaluation of systems and practices to give a full picture of resource use, and where emissions occur.

"Up to now, a lot of work on greenhouse gases or water quality has focused on the farm as a unit," Stewart says, "But, for example, the maize silage used in that farm system might be produced somewhere else, with its own issues of resource use and environmental emissions, so LCA methodology looks at the whole system, to identify and target hotspots."

Stewart's been working with Fonterra in a long-term project using LCA to look at the carbon footprint of various milk products in different markets. The work has showed an interesting argument for the food miles debate, in that shipping a dairy product from New Zealand to the UK makes up just three to five percent of the product's total greenhouse gas emissions. It also showed the farm stage of producing a dairy product is the largest contributor to its total carbon footprint, at 85%.

"Therefore, if we are going to try and reduce the environmental footprint of milk, the place where we can have the most impact is at the farm level, so we're looking at all the opportunities for reducing emissions on-farm. As part of the Emissions Trading Scheme, individual farms are likely to need their footprints determined, and opportunities for reduction examined."

One of the first farms in New Zealand to undertake such an assessment is AgResearch's Tokanui Dairy Farm. A comprehensive 'cradle-to-farm-gate' report showed that while the conversion from a low intensity beef farm to dairy has increased emissions, the farm's greenhouse gas footprint is predicted to be 20% lower than the average New Zealand dairy farm, achieved by increased on-farm efficiency.

To further help New Zealand stake its claim as an efficient global produce provider with a low environmental footprint, Stewart's working with industry groups using LCA on lamb, beef, venison, wool and fertiliser products to determine where emissions occur and focus mitigation options.

For more information contact stewart.ledgard@agresearch.co.nz

Dr Stewart Ledgard is using a life cycle analysis approach to determine a product's true environmental footprint.

Watch the video

CLICK HERE

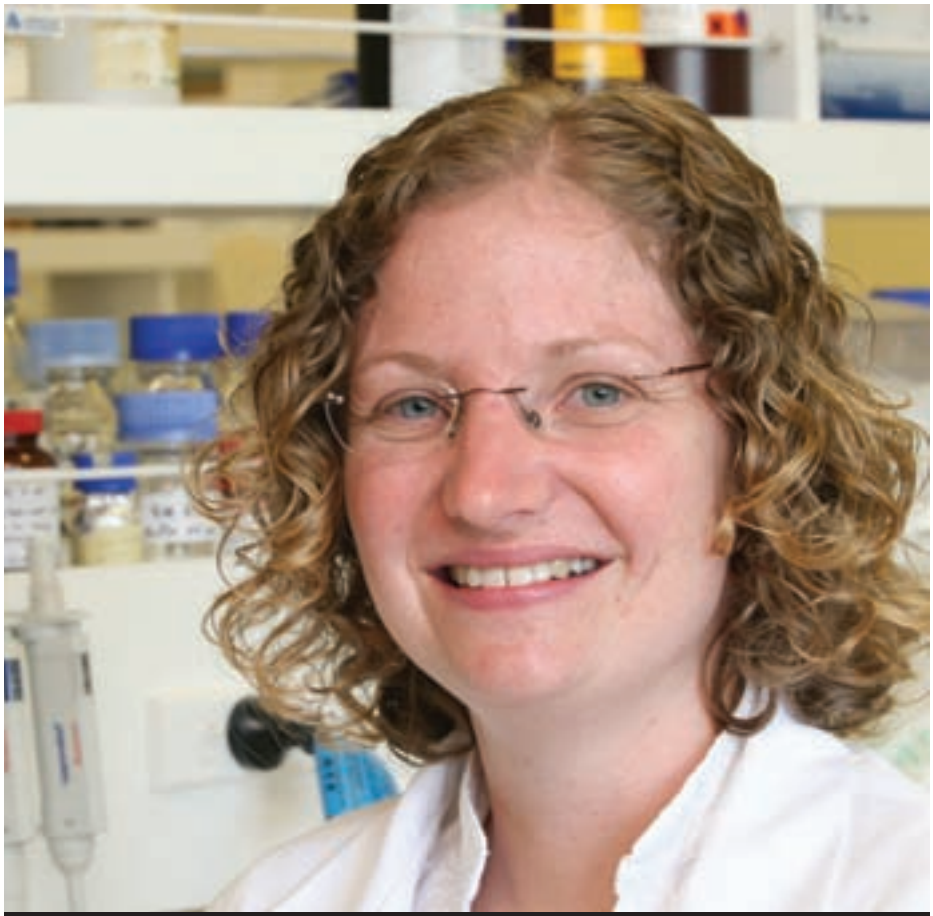
Fellowship paves way for developing 'Smart Foods'

A quest to uncover how bacteria and food affect intestinal health has led to a prestigious Fellowship for an AgResearch scientist.

Dr Rachel Anderson has been awarded a Foundation for Research, Science and Technology Bridge to Employment Fellowship, one of only four awarded each year in New Zealand. The one-year funding will enable Rachel to continue her work in AgResearch's Food, Metabolism & Microbiology Section, where she undertook her Postdoctoral Fellowship.

With the help of the Fellowship, Rachel wants to understand how intestinal cells and bacteria interact to maintain intestinal function, and how this is influenced by foods. Long-term, she wants to use this knowledge to help New Zealand food companies develop high-value, scientifically-founded 'Smart Foods' that enhance intestinal health.

Specifically, she will look at the intestinal barrier, and how intestinal cells and bacteria can affect the way it functions. With a surface area of 300 to 400 m2 (bigger than a tennis court), the intestinal barrier is the largest interface between a person and the outside world, and said to be the first line of defence against an increasingly toxic environment.



Dr Rachel Anderson has been awarded a prestigious FRST Fellowship.

It's important to the general population because it can become temporarily impaired during times of stress, and deteroriates with aging. The intestinal barrier is compromised in conditions such as Inflammatory Bowel Disease, Crohn's Disease, and Irritable Bowel Syndrome and, if it becomes damaged, it can allow unwanted compounds to enter the body. This can result in pathological changes in distant organs and tissues, which can lead to further complications in susceptible people, such as asthma, chronic heart failure, type-1-diabetes, chronic fatigue syndrome and depression.

Rachel's passionate about developing knowledge of how foods affect human health, and also has a personal interest in her research as she has Ulcerative Colitis (a form of Inflammatory Bowel Disease), with a strong belief that her condition is greatly affected by the foods she eats.

"I believe that we are only beginning to understand the importance of intestinal microbes in maintaining intestinal health. I hope to build a career in the field of food-microbe-host interactions and contribute knowledge that helps to unravel this complex system."

For more information contact rachel.anderson@agresearch.co.nz

Highlights from AgResearch's exhibit at the Southern Field Days at Waimoumou


FREE
Improving land application
farm dairy effluent (FDE)


Winter feeding
for better farming

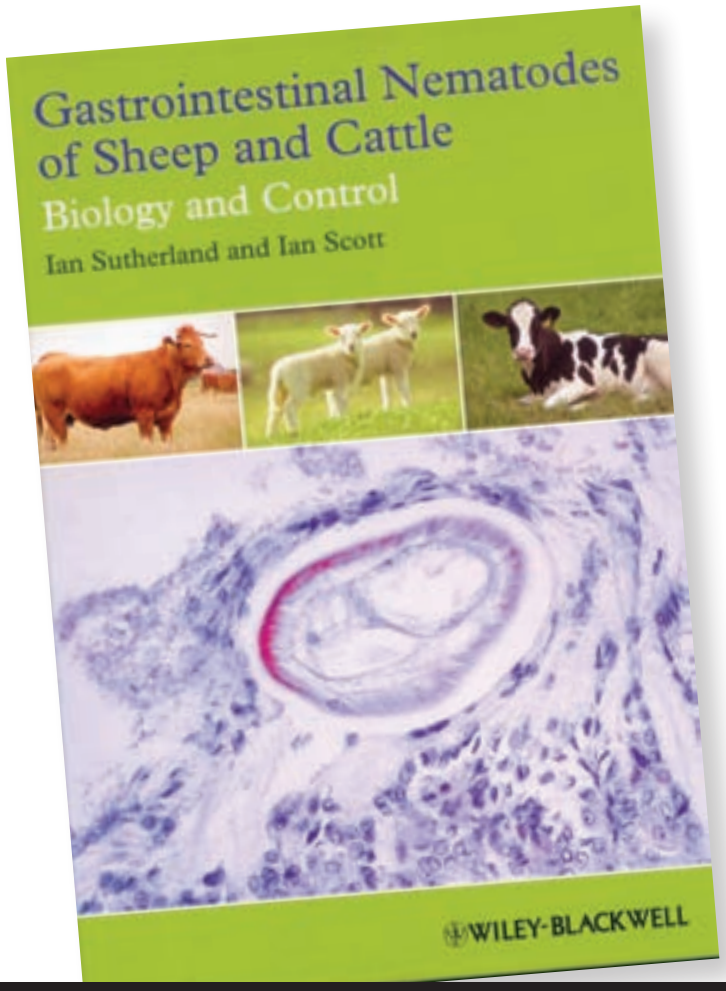
New guide to winning the worm war

Internal parasites are a constant threat to livestock productivity worldwide – and an AgResearch scientist is doing his bit on the war against worms with a book on strategies for controlling these agricultural bugbears.

AgResearch's Team Leader of Molecular Immunology and Parasitology, Dr Ian Sutherland, has teamed up with Dr Ian Scott, Senior Lecturer in Parasitology at Massey University's Institute of Veterinary, Animal and Biomedical Sciences, to write 'Gastrointestinal Nematodes of Sheep and Cattle: Biology and Control'.

More than two years in the making, the book provides an over-arching view of past, present and suggested future strategies for the control of gastrointestinal nematode parasites in grazing livestock.

Aimed primarily at scientists, vets and students interested in parasitic disease and livestock production, it delves into the economic impact of worms, their impact on livestock, the drugs used to get rid of them, the emerging problem of drug resistance and resistance management. Dr Sutherland and Dr Scott also break new ground by discussing alternative options for worm control, including nutritional interventions, biological control, breeding for desirable genetics and artificially improving immunity to infection.



A handbook for worm control strategies, written by AgResearch's Dr Ian Sutherland and Massey University's Dr Ian Scott.

Dr Sutherland is well-qualified to put together such a book, having over 20 years of experience both in the lab and out in the field. He's also the current President of the New Zealand Society for Parasitology, while Dr Scott is the Treasurer, and an expert in aspects of parasite-induced pathophysiology (changes in functions caused by parasitic disease).

As well as getting great personal satisfaction out of publishing such a book, Dr Sutherland says he saw the end-result as an excellent way of raising the profile of the discipline of parasitology in New Zealand, both nationally and internationally.

"Looking at the reference lists in almost every chapter of the book, you can see the huge contribution New Zealand parasitologists have made to our body of knowledge."

"We wanted the book to be a general introduction to the area. It was also important to make it accessible to both researchers and non-scientists, and from feedback I've had it seems to have hit the mark," Dr Sutherland says.

The book is available from bookstores and a number of online sellers, and for more information contact ian.sutherland@agresearch.co.nz

Acclaim for vaccination delivery breakthrough

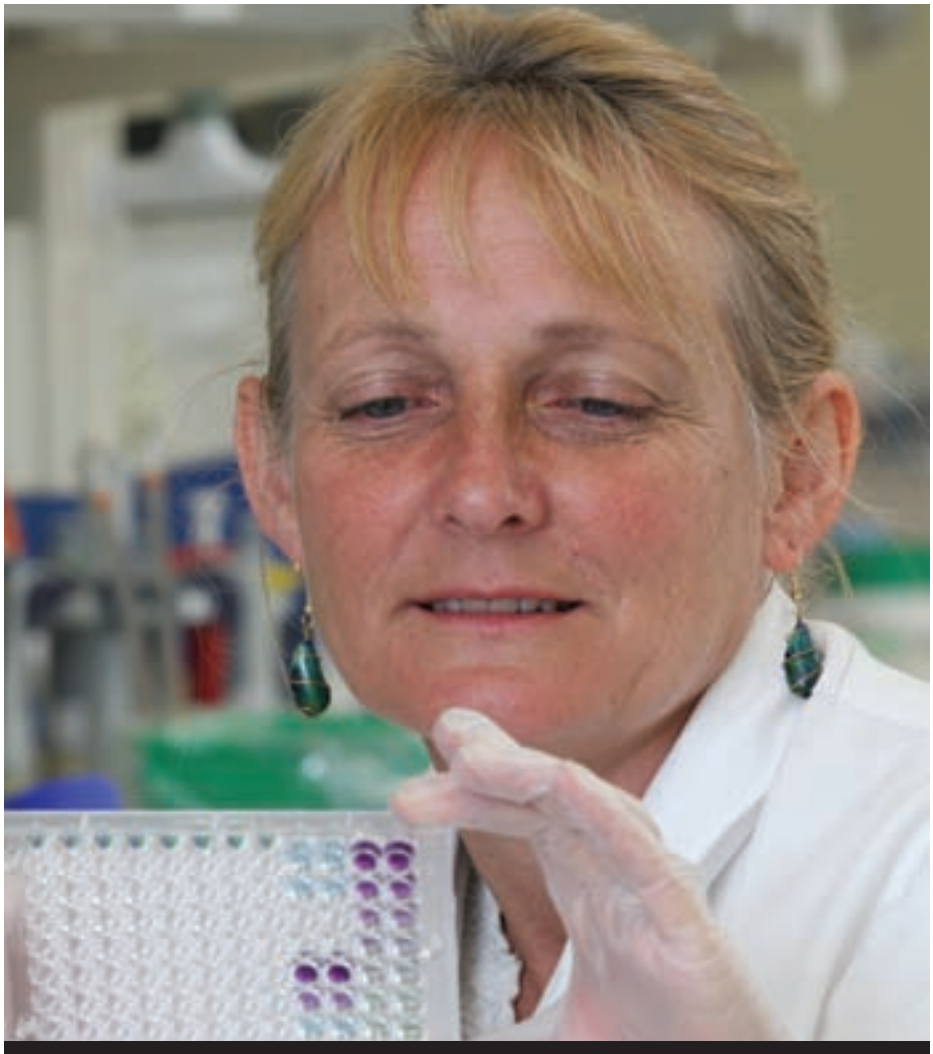
Developing a faster, cheaper way to produce vaccines has seen an AgResearch team recognised by a prestigious US scientific publication.

AgResearch Scientist Natalie Parlane, along with co-authors Dr Neil Wedlock and Dr Bryce Buddle, and Massey's Professor Bernd Rehm had their paper 'Bacterial polyester inclusions engineered to display vaccine candidate antigens for use as a novel class of safe and efficient vaccine delivery agents' featured in the American Society for Microbiology's News Highlights – one of just a handful of papers selected from the Society's stable of journals.

The research is a collaborative project between the AgResearch team at the Hopkirk Research Institute and Professor Rehm's group at the Institute of Molecular BioSciences at Massey University.

Professor Rehm's group firstly developed a technique of getting bacteria to produce tiny polyester beads. These kinds of bioengineered microstructures are increasingly being used in medical sciences, with polyester known to be non-toxic and biodegradable in biomedical applications. These granules can also be engineered to include other things, in this case, a vaccine antigen. The bacterium itself is destroyed, leaving polyester particles that offer a safe and effective means of delivering the vaccine antigen. An advantage is that when antigens are delivered on a nanoparticle like this, they stimulate the immune response more than when delivered alone.

Natalie then applied this system to deliver a TB vaccine in animal studies. The most exciting thing about this system is its versatility, however, because the particles could be engineered to produce antigens for any type of disease that needs a vaccine. Another exciting area of development could be a 'multivalent' vaccine, where two or more disease antigens are included in the granule.



Natalie Parlane looks at plates which show a vaccine's protein concentration.

The beauty of this discovery is the speed and cost of production. In the past, disease antigens were created by firstly producing bacteria or yeast to make large quantities of a single viral or bacterial protein, at huge expense and fraught with difficulty. This novel method, where the bacteria produces the polyester particles with the antigens all together in a simple, quick, one-step process is a world first, and a breakthrough for producing low unit-cost vaccinations.

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