

# intouch



AgResearch Chief Executive Dr Andrew West (left) with Meat & Wool New Zealand Chief Executive Dr Scott Champion.

## This issue of Intouch highlights our research projects funded by Meat & Wool New Zealand and the benefits of that research for sheep and cattle farmers. Why are we focusing on this work?

Because Meat & Wool New Zealand represents all meat and wool farmers and, on their behalf, invests in initiatives to advance the sector. One of the most important activities is delivering the science, tools and techniques sheep and beef farmers need to operate competitively and sustainably.

AgResearch delivers science and technologies that underpin information and services that add value to farmers' businesses.

For example, government and MWNZ-funded research means we now have a better understanding of internal parasites and drench resistance and more effective strategies to manage them on farm. Development of the Ovine SNP50 BeadChip will allow the small genetic differences that produce a variety of commercially-important traits in sheep to be identified more quickly and accurately. Research on cattle systems for profitable hill country farms resulted in Profitable Farming of Beef Cows, a book that is arguably the New

Zealand manual for beef cow farming.

These are just a few examples of how AgResearch and Meat & Wool New Zealand are working in partnership to deliver information and projects that have impact, value and relevance for sheep and beef farmers.

AgResearch welcomes Meat & Wool New Zealand's plans to continue to work with us and other partners in the pastoral sector who have a definite contribution to make to the sector's future.

This is a crucial time for such collaboration. Food security is the new phenomenon, and New Zealand is ideally placed to provide high quality red meat and wool

products to discerning consumers around the world. If we are to capture this opportunity, everyone involved in the meat and wool industries needs to work together in a cohesive manner. The strong partnership between AgResearch and Meat & Wool New Zealand is an example of this philosophy in action.

In August, meat and wool farmers will have the opportunity to vote on whether they support the continuation of levies to fund Meat & Wool New Zealand's investments. In the following pages you'll see practical examples of how the scientific research the levy has funded helps support a better future for farmers.

# Research shows normal nitrogen fertiliser use environmentally safe

**Nitrogen fertiliser use on hill country at normal commercial rates is unlikely to cause significant adverse effects on the environment. This was one finding from an important project recently completed by AgResearch in conjunction with Meat & Wool New Zealand, FertResearch, and a range of other sponsors.**

In 2004 when the project got underway, hill country farming had become more intensive as farmers responded to financial and other pressures on their businesses. Nitrogen fertiliser provided a cost-effective means of growing out-of-season feed, and its use had grown rapidly. However, there was some concern that its use may have been increasing leaching from the grazed pastures and contaminating waterways.

"Our focus was to identify whether this was a concern or not, so we worked with AgResearch to find out," says Meat & Wool New Zealand Research Manager of Farm Services, Andy Bray.

Paddock trials were conducted over four years at Ballantrae Research Station in southern Hawkes Bay and Invermay Research Centre in Otago. A focus farm component (which investigated the use of nitrogen fertiliser under commercial conditions) ran in parallel. Fifteen farmer groups took part, each having one farm involved in the research.

"In the two research station trials, we had seven or eight nitrogen application rates and measured a range of pasture and environmental variables, but most emphasis was on nitrogen leaching" says AgResearch Agricultural Systems Section Manager, Dr Greg Lambert. "The sheep stocking rate was adjusted to utilise the extra feed grown as the nitrogen application rate was increased; this was important as nitrogen leaching is mainly from animal urine patches rather than the fertiliser itself."

The results showed that the use of nitrogen at usual hill country commercial rates of 50 kilograms of nitrogen per hectare per year or less had a minimal environmental impact. It was only at application rates considerably above this level that significant increases in leaching were apparent. This suggests nitrogen fertiliser application is a safe and viable management option when used at current low commercial rates and, as currently, on a relatively small proportion of the total hill country area farmed.

This will be of particular interest to farmers, regional councils and other groups concerned with the environmental impacts of farming.

The research was made possible by Meat & Wool New Zealand, FertResearch, the MAF Sustainable Farming Fund, the Pastoral Greenhouse Gas Research Consortium, Ballance Agri-nutrients, Ravensdown Fertiliser and AgResearch.



Anders and Emily Crofoot, of Castle Point Station, Wairarapa, where one of the nitrogen fertiliser on-farm trials took place.

# New lamb and beef finishing opportunities on hills

Changes in New Zealand land use over the last ten years, with increased dairying, urban sprawl and a rise in lifestyle blocks, have seen a significant reduction in the land available for farmers to finish sheep and beef on intensive farm systems.

This led to the initiation of a Meat & Wool New Zealand project last year undertaken by AgResearch to find ways to finish these animals on hill country properties.

"More than ever sheep and beef production is reliant on hill country. We have a big challenge to find cost-effective ways of rapidly growing more young stock on hill properties," says Meat & Wool New Zealand Research Manager of Farm Services, Andy Bray.

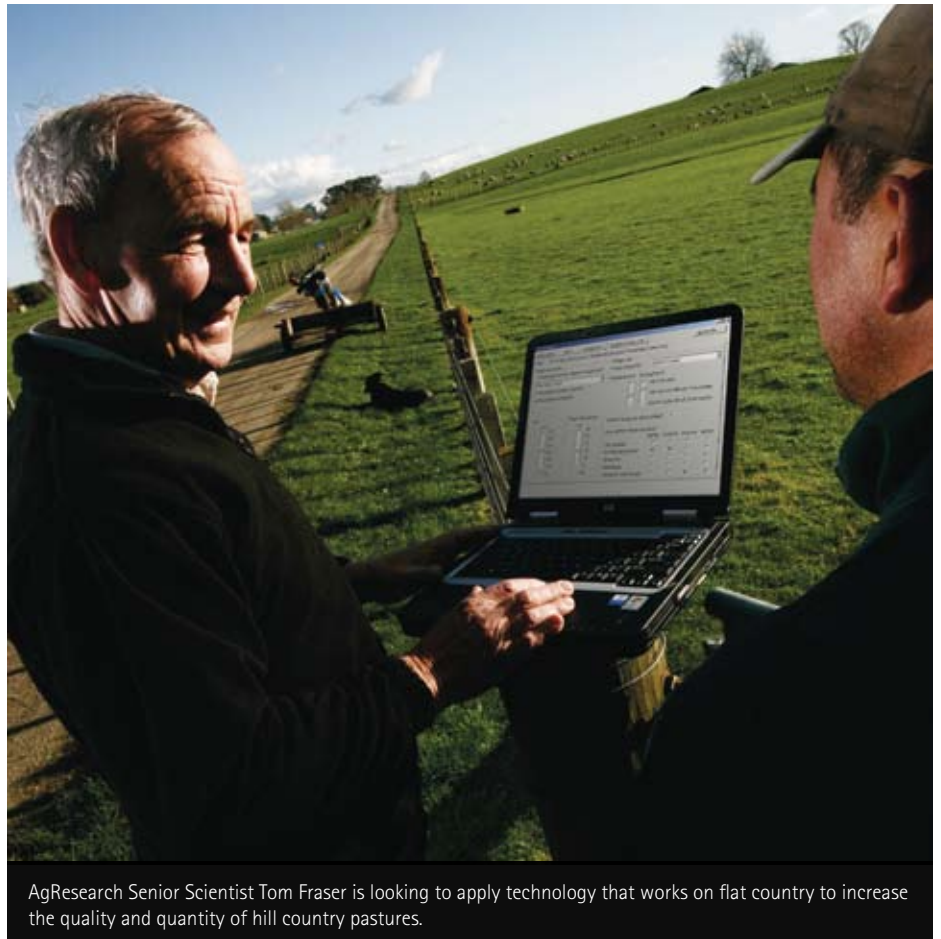
Funded by Meat & Wool New Zealand and MAF Sustainable Farming Fund, the project has another two years to run and is already showing major benefits. It is focused on increasing the quality and quantity of pastures on hill country, with the objective of improving the performance of young sheep and beef animals.

AgResearch Senior Scientist Tom Fraser says it is partly about taking the technology that works on intensive flat land and applying it to hill country properties.

Perennial pasture establishment ranging from spray oversow through to double break crops prior to drilling new pasture are being investigated on farms throughout New Zealand.

"We are focusing increasingly on more productive parts of the farm as these are the areas that have the greatest potential for improvement," says Mr Fraser.

Another component of this project is investigating creep-feeding of lambs. Creep feeding uses a specially designed gate through which lambs but not ewes can pass, to access better quality pasture. This technique has increased lamb weaning



AgResearch Senior Scientist Tom Fraser is looking to apply technology that works on flat country to increase the quality and quantity of hill country pastures.

weights by up to 5kg when used on flat land. Initial work on hill country was promising and new strategies will be tested this year.

"When the ewes and lambs were rotated between paddocks on steep country, lambs had trouble finding the gates to reach the improved pasture because of the land contour and large paddocks," says Ray Moss, Research Associate, who managed the project.

"We're now modifying the technique on hills where we will also investigate using creep-feeding of lambs while the ewes are being set stocked." Mr Moss says.

The project is being conducted on 10 farms throughout the country and will run for a further two years. A number of Field Days have been held with very good feedback from the large numbers of farmers who have attended.

# Breeding cows more profitable than meets the eye

Breeding cows may be viewed a little differently after a recent Meat & Wool New Zealand project undertaken by AgResearch showed they can be more profitable than simple calculations suggest.

The three-year project involved eight focus farms around the country, each with a community group of farmers, all looking at a range of new beef production practices.

"We found that while breeding cow enterprises don't stack up well in an

orthodox financial analysis, this does not tell the whole story," says Meat & Wool New Zealand Research Manager of Farm Services, Andy Bray.

"These types of calculations ignore the fact that the breeding cow can provide a better

return on poor quality pasture than any other stock class. She also does a valuable job in removing this poor feed, which arises from surplus pasture growth in the late spring."

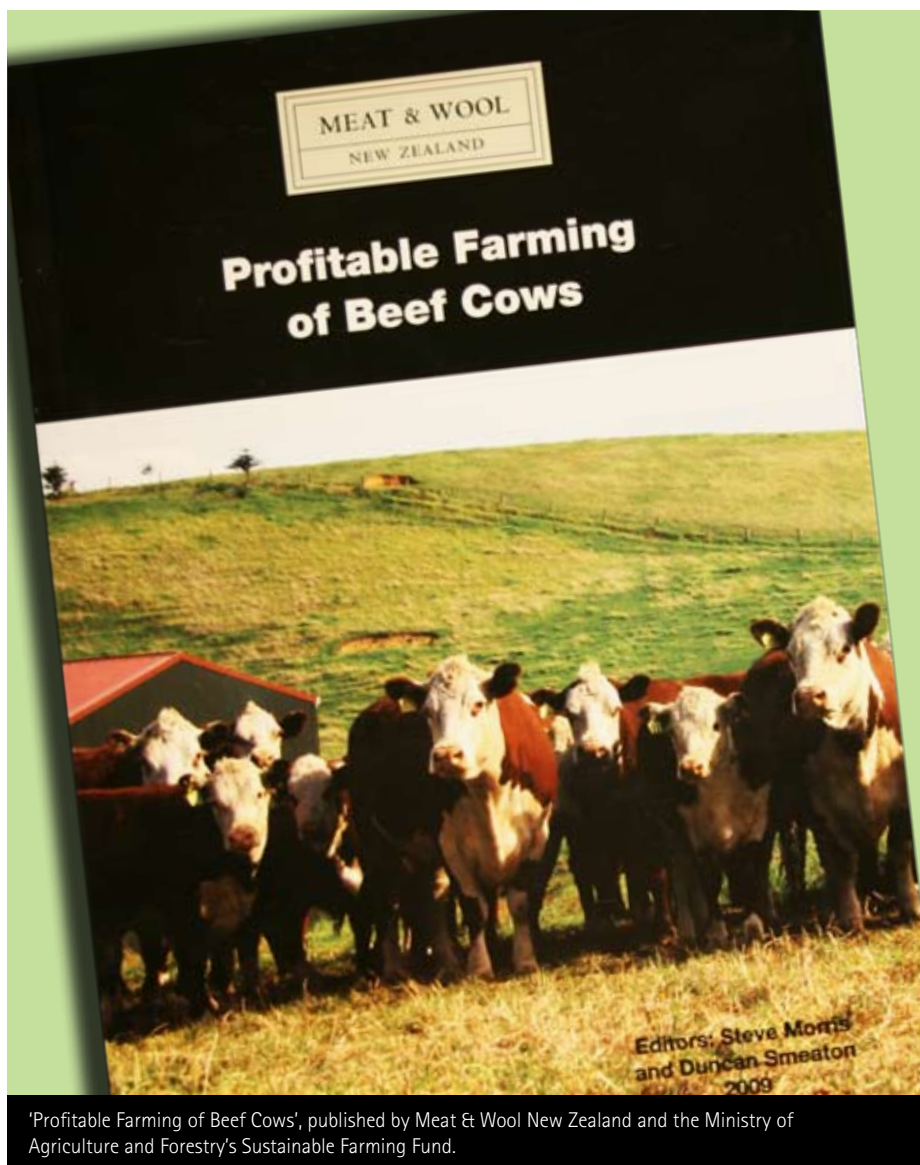
On a focus farm in Northland, calves grew more than 0.8kg/day during lactation so that the breeding cows produced \$363/head per year on poor quality pasture, when finishing bulls on the same pasture would have returned only \$128/head.

The weight the cows lost on poor quality pasture was regained in spring when there was an abundance of high quality pasture available.

AgResearch's Duncan Smeaton says a major benefit observed from this and similar work was the regeneration of good quality feed after the removal of the poor quality pasture.

"When cows eat this old pasture, new pasture comes away which is good for growing stock," he says, "However, if there is no poor quality pasture to 'clean up', the beef cow will be eating high quality feed and in this instance is competing for feed that she is less profitable on, compared to other stock classes."

Following the research, Mr Smeaton and Dr Steve Morris produced the book 'Profitable Farming of Beef Cows' funded by Meat & Wool New Zealand and the Ministry of Agriculture and Forestry's Sustainable Farming Fund. It covers the results of the project and much other research and can be ordered from Meat & Wool New Zealand, 0800 696 328, PO Box 121, Wellington.



'Profitable Farming of Beef Cows', published by Meat & Wool New Zealand and the Ministry of Agriculture and Forestry's Sustainable Farming Fund.

# Mowing in the rain may control Californian thistle



Californian thistle - an AgResearch and Meat & Wool New Zealand programme may have found a way to control this widespread and difficult weed.

## A Meat & Wool New Zealand project undertaken by AgResearch seems to have found a way to control the single most serious weed on New Zealand's pastoral land.

Californian thistle is widespread and difficult to manage because of its creeping root system. Chemical herbicides can knock it back, but not destroy it.

The project began with a country-wide survey of 150 farms in 2005/06 to identify pathogens occurring naturally in Californian thistle that may have potential as bio-control agents.

"One of the fungal pathogens that was isolated from the thistle shoots and roots (from about half of the farms) was *Verticillium dahliae*," says AgResearch's Dr Graeme Bourdôt.

"Its spores are dispersed by rain-splash and this backed up the anecdotal evidence from farmers that mowing Californian thistle in the rain can lead to its demise," says Dr Bourdôt.

To test this theory, 20 of the farms surveyed were followed up in 2008 and 2009 and used in a field experiment. Farmers were asked to mow their Californian thistle-infested pasture when it was raining and when it was dry.

"The final results will be known later this year when we will be able to determine the size of the advantage that mowing in the

rain brings about the demise of the thistle and that *Verticillium dahliae* plays a role in this," says Dr Bourdôt.

Once the results are fully analysed, there could be a simple recommendation that farmers mow their Californian thistle in the rain. An enhancement might be that they apply the pathogen before they mow, but this will require further research and product development.

# SNP Chip offers speedy breeding of superior sheep

A new genomic tool, developed by an international team including AgResearch scientists, is set to revolutionise selection and breeding of sheep around the world.



AgResearch Senior Scientist John McEwan loading a new Illumina Ovine SNP50 BeadChip onto the machine that measures results. Scoring more than 50,000 genetic variations at once, the chip will enable farmers to breed better sheep, faster.

As part of a Meat & Wool New Zealand and Ovita initiative, AgResearch joined scientists from 16 countries in the International Sheep Genomics Consortium (ISGC) to produce the Ovine SNP50 BeadChip, launched in January this year.

This cutting-edge technology enables researchers to scan DNA samples from breeding animals for some 50,000 genetic variants at once, rather than carrying out separate tests for each.

Characterising these variants, called single nucleotide polymorphisms (SNP), helps pinpoint small genetic differences associated with commercially important traits in sheep, and offers farmers a faster path to breeding superior animals.

AgResearch Senior Scientist John McEwan, who led the team that identified the majority of the SNPs, says the technology has immediate on-farm applications.

"Sheep breeders can now access ways to rapidly improve valuable traits like disease resistance, meat quality and maternal ability."

The Consortium worked in partnership with San Diego-based Illumina Inc, to launch the Ovine SNP50 BeadChip, and help research groups around the world identify DNA markers associated with commercially desirable traits.

To view the video on SNP chip research, go to <http://www.agresearch.co.nz/snp/>

## Designer sheep

Farming is a numbers game, so an easy-care sheep that is cheaper to farm and four times less susceptible to flystrike adds up to a winner.

Flystrike costs sheep farmers tens of millions of dollars a year. In 1997, AgResearch Scientist Dr David Scobie set out to find a cost-effective solution to this problem. With investment from Meat & Wool New Zealand and the Foundation for Research, Science and Technology, he embarked on a breeding programme that has produced sheep with bare heads, legs, belly and backsides, along with shorter tails.

Dubbed 'easy-care sheep', the bare breech means less dags, less time spent dagging and crutching and, crucially, reduced susceptibility to flystrike. The bare belly makes it easier for the lamb to find the udder and, along with the bare head and legs, makes for easier shearing and less wool handling. Shorter tails are aimed at eliminating docking. All these traits are highly heritable and can be observed in either young lambs or weaned lambs, so selection progress can be rapid and rewarding. While the easy-care sheep may produce slightly less wool, a Lincoln University study put the cost savings at \$7 per ewe each year.

A number of ram breeders have started selecting sheep that offer these traits to their clients, choosing variations to suit the farmer's existing breeds and farm system.



An Easy Care sheep – cheaper to farm and four times less susceptible to flystrike.

# Achieving a higher value flock through genetics

**Pairing a new genomic tool with an extensive genetic database is another step towards building a profitable sheep industry through breeding for commercially desirable traits.**

Using SNP chip technology (see previous page), a product is being developed that will enable sheep breeders to base selection on a group of traits of high commercial value.

The first SNP chip products will be ready for commercialisation in December and will be based on traits of maximum economic benefit to farmers and extensive industry research. The chip will provide estimates of breeding value for parasite resistance, lambing rates and lamb survival.

Ovita is using technology expertise and industry-knowledge from AgResearch, Sheep Improvement Limited (part of Meat & Wool New Zealand), Pfizer Animal Genetics and AbacusBio Ltd to develop the SNP chip product.

Ovita is a biotechnology company – specifically a consortium with Meat & Wool New Zealand and AgResearch as equal shareholders. Ovita aims to produce sheep genomic tools that will assist farmers in selection decisions.

Ovita sits at the forefront of sheep genetic technology, working with its commercialisation partner Pfizer Animal Genetics to provide key gene tests to farmers, including WORMstar™ for parasite resistance and productivity, and LoinMAX™ for increasing loin muscle, says Ovita Consortium Manager Eleanor Linscott.

“The gene tests are a really good example of science with direct applicability to industry – another selection tool for a farmer’s toolbox,” Eleanor says.

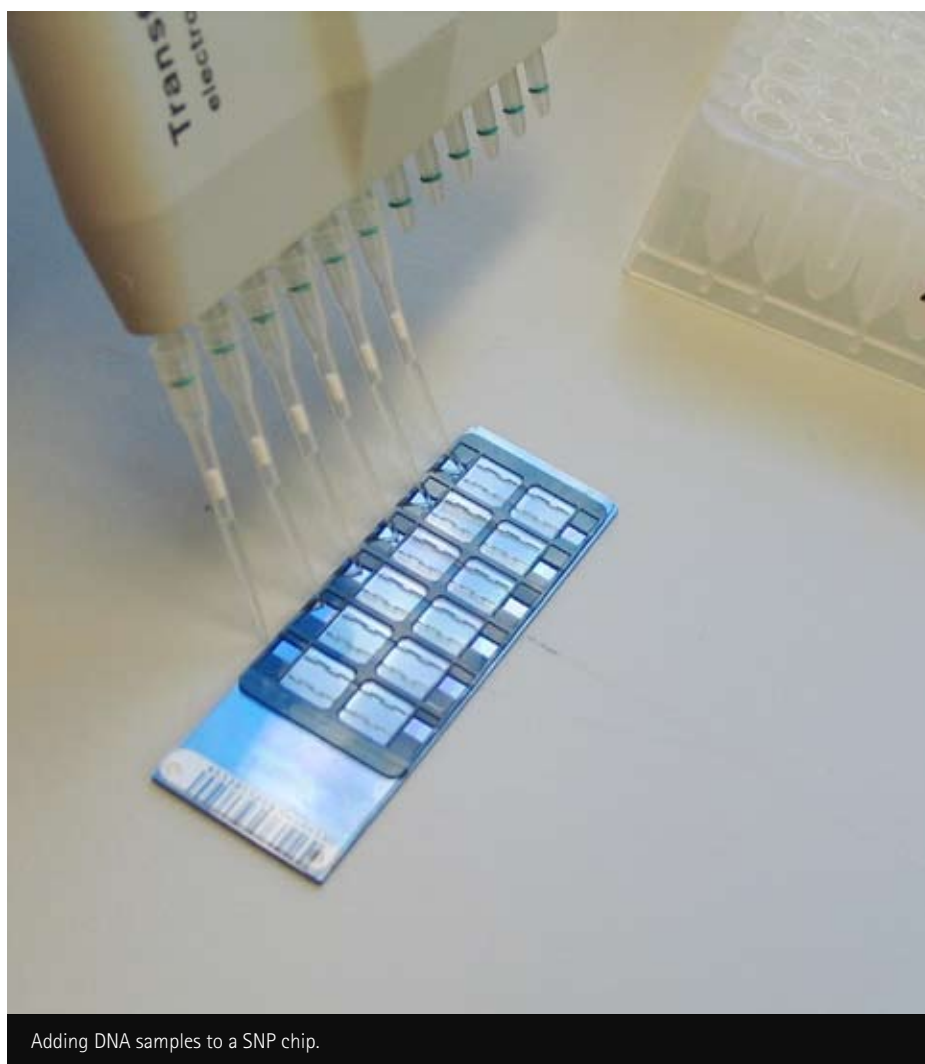
Ovita has consulted heavily with industry groups and farmers to help determine which traits should be priorities for commercial development.

“We want to make sure products we build and deliver are economically relevant to a farmer, and make the technology work for them.”

The results that come out of the SNP chip product will be entered into an extensive sheep genetic database established by Sheep Improvement Limited (SIL). SIL provides the sheep industry with state of

the art genetic information and breeding values to enable ram breeders to identify animals with elite genes.

“Bringing together the genetic result from the SNP chip product with breeding values on the SIL database will give farmers a good overall picture of their breeding capability – and help them to build a high value flock,” says Eleanor.



Adding DNA samples to a SNP chip.

## ■ to contact intouch:

Phone: (03) 489 9008

Email: [intouch@agresearch.co.nz](mailto:intouch@agresearch.co.nz)

Website: [www.agresearch.co.nz](http://www.agresearch.co.nz)

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# Waging war on worms

Worms – or internal parasites – have the potential to wreak havoc on the productivity of livestock. The agricultural sector is waging war on this farming pest with the help of a comprehensive national worm management strategy – Wormwise.



*trichostrongylus colubri formis* parasite larvae in a droplet of water.

Wormwise seeks to arm farmers with knowledge and techniques to effectively manage worms on their farms – now, and in the future. The programme is primarily focused on providing on-farm solutions and management strategies.

The initiative is led and funded by Meat & Wool New Zealand, MAF Sustainable Farming Fund, New Zealand Veterinary Association, Agcarm and the Animal Remedy and Plant Protectant Association, with AgResearch as the main service provider. AgResearch also has an involvement with Senior Scientist John McEwan sitting on the Wormwise Technical Advisory Group to advise on genetic issues.

The Wormwise strategy is delivered through managing and integrating research work, along with education,

communication and extension services for farmers, veterinarians, key industry groups and agricultural retailers.

Even farmers in the most remote locations can access Wormwise resources, through registering by phone or email to receive regular newsletters, workshop information, research updates and seasonal reminders around managing worms in farming systems.

The latest winter 2009 newsletter includes key grazing choices and management options for cattle and sheep farmers to ponder as winter hits, things to look out for during winter in terms of internal parasites, and opportunities around worm control via nutrition.

Wormwise National Spokesperson Trevor Cook, a vet from Feilding who was

instrumental in developing the initiative, says Wormwise focuses on providing easy access to practical information and advice on managing internal parasites.

“Worms are a constant threat to livestock productivity. By bringing together six key industry groups, Wormwise can deliver comprehensive and up-to-date research and education on best practice to minimise the impact of worms on individual farms. We put a lot of time and energy into developing resources that are clear, concise, and easily accessible to best reach the farming sector.”

To register for Wormwise information, updates and newsletters phone 0800 696 328 or email [wormwise@meatandwoolnz.com](mailto:wormwise@meatandwoolnz.com)