



IT WORKS: Plantain can cut nitrate losses from soil by up to 30%.

Research starts paying dividends

Over the past two and a half years New Thinking has introduced *Farmers Weekly* readers to a wide range of emerging technology and leading research in the primary sector. **Richard Rennie** revisited some of them to find out what progress they have made.

Forage research brings results

Scientists working on the Forages for Reduced Nitrate Leaching (FRNL) programme that includes DairyNZ, the Foundation for Arable Research, Plant and Food Research, AgResearch and Lincoln and Massey universities have some promising news for farmers wanting to reduce nitrate losses.

Now six years on the forage research has confirmed multi-species pastures can help significantly reduce a farm's nitrate losses without having to change the entire farm system.

Lead DairyNZ researcher Ina Pinxterhuis said plantain has been confirmed for its diluting effects on animal urine, reducing its nitrogen concentration, meaning plants and soils are more capable of absorbing it. It has also been found to reduce the rate of nitrate formation in the soil, the readily leachable form of nitrogen.

That is something researchers are still trying to better understand but, overall, plantain can reduce nitrate losses through the soil by 6-30%.

"But we have found you require a minimum of 30% plantain in the sward to see a significant animal effect."

The trick, however, is ensuring it stays in the pasture and does not get dominated and pushed out by ryegrass.

Researchers are seeking further funding to continue the project while also working on the Plantain Rollout project in Tararua, studying its success on 125 farms there.

Farmers wait and see on Spikey

While fertiliser guru and innovator Dr Bert Quin has stepped aside from Spikey, his nitrogen-inhibiting machine that appeared in New Thinking in September 2017 the machine's full potential remains to be fulfilled.

“Initially, we were expecting to see a 30% reduction in nitrate losses but that has proven through lysimeter sampling to be as high as 70% reductions.”

The founding company Pastoral Robotics has boosted its investment in Spikey and director Lachlan McKenzie hopes its nitrogen-reducing technology can be accepted by regional councils and Overseer as a means to deal practically with nitrogen losses in water catchments.

The tractor-drawn urine patch detector has been in full-time use on five Rotorua dairy units for the past two years and McKenzie says the results have surpassed original hopes.

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The compound delivered onto the detected urine patches

has been modified to not only discourage 'bad' bacterial growth that releases nitrates, but encourage 'good' bacteria that help plants better absorb the nitrogen, along with an improved nitrate inhibitor.

Mckenzie said the company is awaiting publication in an international journal of a peer-reviewed study into Spikey's effectiveness. That should give Ministry for the Environment staff confidence to approve the machine's application and have it incorporated into Overseer.

"So we are still looking at another two years to prove the science and two more years to be incorporated into Overseer.

"We have been overwhelmed with the results we have achieved on our farms here and farmers are very interested and are waiting until they know regional councils will approve its use."

Block chain delivers

Two years ago New Zealand companies were still kicking the tyres of emerging block chain technology while big global players like Walmart and hypermarket owners Carrefour were already running with it to ensure smoother supply logistics.

Block chain acts as a type of digital ledger, recording transactions chronologically in a data block open to selected parties to view as the product moves through the supply chain.

Sometimes a difficult concept to grasp, block chain technology has moved beyond the one-day label to now play a vital part in

primary produce export logistics in NZ.

Auckland University commercial law head and block chain expert Alex Sims says the technology is now well in play with two of country's largest food producers, Fonterra and Silver Fern Farms, through their founding logistics company Kotahi and shipping company Maersk Line.

Known as TradeLens, the shipping solution is designed to promote more efficient and secure global trade while increasing information sharing and transparency during the shipping process.

"Supply chains are the low hanging fruit for block chain technology, lowering transaction costs for all parties."

Another new NZ application is using TrackBack block chain technology to verify the provenance and quality of manuka honey.

The technology means recipients of manuka honey in Shanghai can verify jars received are the same ones packaged and sent from NZ. The project was a joint effort between AsureQuality, NZ Post and The True Honey Company in using the technology.

"Soon people will be using block chain technology without even knowing it is there," Sims says.

Robots are still coming

In 2017 Bay of Plenty company Robotics Plus was working on an autonomous agricultural vehicle capable of switching between

spraying, pollination and pruning jobs on kiwifruit orchards.

Robotic apple packers were also being developed for the booming sector.

Today the company has 60 staff and has launched its first two commercial products.

While work on the autonomous platform progresses in the background the first commercialised robotic product has been the Aporo apple packer, launched 18 months ago in NZ, the United States and Europe. It can pack 120 apples a minute into display trays.

This year marked the launch of the Robotics Plus Robotic Scaling Machine (RSM) to quickly and safely measure logs while on logging trucks for Mount Maunganui company ISO.

The logging truck scales create a 3D image of each wood load, allowing exporters and importers to get a visual representation of their purchase before delivery.

The company has also employed a chief executive, Dr Matt Glenn. He said the company's growth and innovation plans are well supported by local and international research and commercial partnerships.

It also got a US\$10 million investment from Yamaha Motor Company and won two HiTech Awards and a Trans-Tasman Innovation and Growth Award.

"We have a number of new products in the pipeline and expect our growth to continue at over 200% year on year for the foreseeable future," Glenn said.