



No quick fix to nutrient loss

As CANEGROWERS' EEF60 enhanced efficiency fertiliser trial draws to a close, a fresh perspective is emerging of young, progressive cane growers eager to trial new approaches to nutrient management.

Whether or not slow-release EEFs prove to be the answer to reducing nutrient loss, the expansive three-year trial has growers such as Mackay's Lindsay Neilsen redefining their approach to soil health and nutrients.

BY JOHN FLYNN

The enthusiasm was obvious as Mackay Area Productivity Services Senior Extension Agronomist David McCallum walked the rows of a recently-prepared block on Lindsay Neilsen's farm at Septimus in the scenic hinterland west of Mackay.

Clutching a clump of sandy soil in his fist, the fresh smatterings of mill mud and lime oozing from his fingers were all the evidence a veteran dirt doctor needed to know that this grower was doing everything in his power to boost soil health in preparation for planting a legume fallow.

"He's doing the basics, putting a bit of nutrition and he's fixing his PH and he's not doing a hell of a lot of ground work, which is really good."

Mill mud at 50 tonnes to the hectare and lime at 1.5 tonnes to the hectare, closely followed by back-to-back fallow crops of nitrogen-binding legumes is the sort of soil health recipe an extension agronomist wants to see.

"He's put a bit of mill mud down just for a bit of nutrition for the next crop which is going to be mung beans and he's also put a bit of lime down," David explained. "It's a sandy soil, it's not a very great soil.

"I think the fact he's putting the trash back into it to break down slowly, he hasn't burnt the trash which is really good...he's doing the basics.

“Last year was the first time we’ve taken any beans through to harvest. It worked really well, we actually got four tonnes to the hectare of soya beans, which for our first effort was pretty good.”

Pictured: Mackay grower Lindsay Neilsen is using a combination of trash, mill by-products, legume fallows and minimum cultivation as part of a progressive nutrient management plan.



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Legume fallow planting is not a new concept on the Septimus farm which has been in the Neilsen family for four generations.

Soya beans have been grown as a break crop for 15 years and, prior to that, Meringa cowpea.

More recently however, amid a climate of fluctuating sugar prices and a need to develop a more sustainable farming system that centres on boosting organic nitrogen, the focus has shifted from legumes as a manure crop to legumes as a cash crop.

“Last year was the first time we’ve taken any beans through to harvest,” Lindsay said.

“It worked really well, we actually got four tonnes to the hectare of soya beans, which for our first effort was pretty good.

“It’s a big benefit to your soil, admittedly taking it to seed you lose a little bit of that benefit, but there’s still a lot of benefit in the change of the crop.

“With the low price of sugar at the moment, and the bean price being high, you’ve got to try and make a few extra dollars where you can.”

The family business recently purchased a combine harvester in a determined shift to towards end-to-end bean production on its cane fallows.

With that has come a side-hustle of sorts, which has added a welcome income stream to the business, while

helping out the neighbours at the same time.

“We bought the header last year to make sure we could get it harvested when it needed to be done and take control of the final product,” Lindsay said.

“I’ve inherited a bit of outside work with it, so that’s helped pay for it and its also helped other people get into doing the same thing, so it hasn’t worked out too bad.”

EEF60 TRIAL A NATURAL FIT

When Lindsay was approached by Sugar Research Australia to take part in the CANEGROWERS EEF60 slow release fertiliser project, it was an ideal fit.

Alongside efforts to boost organic nitrogen, he has also been trialling slow release fertilisers on the farm for several years in an effort to maximise productivity while minimising non-organic nitrogen losses.

A Smartcane BMP accredited grower, Lindsay was eager to see if the trial would provide any useful data to assist with his forward-thinking nutrient management plan.

“They were aware that I was already doing a bit of slow release-type fertilisers

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across the farm and I was interested in seeing the responses I was getting out of it," said Lindsay.

"So the trial fitted into what I was trying to achieve."

Approaching the end of its third and final year, the EEF60 project has seen enhanced efficiency fertiliser trials being undertaken at 60 sites in the Wet Tropics, Burdekin, Central and Southern growing regions. Water quality monitoring is also taking place at several locations.

The comprehensive trial is a partnership involving Canegrowers, Sugar Research Australia (SRA) and local productivity services groups, including MAPS.

On the Neilsens' farm, strip trials were set up over three seasons using four different treatments, replicated three times, commencing at R1 stage:

- Granular urea 160kg/hectare at 100% of SIX EASY STEPS rate
- Granular urea at 128kg/hectare at 80% of SIX EASY STEPS rate
- 1/3 Entec 2/3 Agromaster 128kg/hectare slow release blend at 80% of SIX EASY STEPS rate
- Grower choice 20% N90/ 80% urea at 128kg/hectare 80% of SIX EASY STEPS rate

Consistent with Smartcane BMP best practice guidelines, fertiliser was applied sub-surface, beneath the trash layer of the ratoon crop using a stool splitting fertiliser box.

Sub-surface application reduces the risk of losses through runoff in rain events or volatilisation, when nitrogen escapes in gaseous form into the atmosphere.

In the Mackay region the trial conditions proved less than ideal, with drier Spring periods during the first two growing seasons.

In theory at least, this limited the potential benefits that might have emerged through the use of nitrogen inhibiting fertilisers such as Entech or N90 or polymer coated slow release granular fertilisers like Agromaster, versus standard granular urea, which is more likely to be lost to leaching or denitrification in larger rainfall events.

Results from the 2019 harvest showed similar results for all four treatments



on the Neilsens' farm, with cane yield in the range of 101 tonne/hectare and CCS at just below 16 for the first three treatments.

The only slight variation was in the fourth treatment with yield in the range of 103 tonne/hectare, but CCS was much the same.

"The last three years haven't been ideal for it, they've all been very dry starts and that's led to our yields being lower than in previous years," Lindsay said.

"But I believe that with more favourable weather conditions, the higher nitrogen blends and slow-release fertilisers would be required to grow a crop to its full potential.

"On other parts of the farm where I have been using slow-release fertilisers it has been regularly producing a higher sugar content.

"The Entech has certainly got a place and I have no doubt the poly-coat would have a place too in different conditions, but as I said, the last three years it hasn't worked for it or shown the potential it really has."

Similar growing conditions during the third year of the trial suggest it's unlikely there will be any great variance in results, at least in the Mackay region, when the final crop is harvested.

That doesn't mean the EEF60 trial hasn't been worth the effort. As the final year's data is collected, there will undoubtedly be lessons to take away.

"The one thing that has come out in some of the trials is that the economic returns of 80% of SIX EASY STEPS nitrogen rate

using EEF's has come out as good as the 100% SIX EASY STEPS rate using urea," David noted.

"These slow release fertilisers do have a place, perhaps in different climates in different soils but it just hasn't shown up in Mackay in the past couple of years."

In terms of getting the balance right from one season to the next, Lindsay is confident the existing SIX EASY STEPS rates of application are within range of what the crop requirements.

"I think the SIX EASY STEPS is sort of pretty close to the mark as far as what the cane actually needs in different areas," he said.

"I guess if you can tweak things with slow releases to get to the next stage, then you do what you can."

For Lindsay Neilsen, there's also the knowledge that he's doing the best he can to reduce nutrient loss from the farm and contributing to research efforts that will ultimately benefit the industry.

"We're not out to destroy anything, we're certainly all aware of all the reef rules and regulations and abide by them and hopefully go a little bit above that," Lindsay said.

"We're best management practice growers here and have been for three or four years now so we're certainly trying to do all the right things." ■

Pictured: (above) Mackay Area Productivity Services Senior Extension Agronomist David McCallum; (right) Lindsay Neilsen's Mackay Farm hosted one of the 60 Enhanced Efficiency Fertiliser trial sites across the industry.