Project Catalyst

Case study

Alan Lynn trials which lime product improves overall soil condition and plant health

Grower Name: Alan Lynn

Entity Name: Jenallynn Holdings Pty Ltd

Mill Area: Herbert

Total Farm Area: 200ha

Area under Cane: 198ha

No. Years Farming: 33

Trial Subdistrict: Forest Home

Alan Lynn

OVERVIEW

Alan started changing his farming practices in 2009 when he started changing row spacing to 1.8m.

He started mounding and bean fallow crops in 2011/12 and has fully converted to mixed species fallow crops from 2014/15.

Alan wants to improve overall farm soil health and has a whole farming system approach for future sustainability.

THE CHALLENGE

Alan farms in an area with heavy clays and major waterlogging for at least half the year. His soils have naturally low pH value, low calcium and high aluminium saturation percentages.

Liming his fallow blocks every crop cycle is essential to achieve benefits from his mixed species fallow crops and to maximise cane yields.

This trial came about because Alan was wondering which lime product was going to have the best bang for his buck, to improve overall soil conditions and plant health.

THE TRIAL

Alan has been working with HCPSL's Extension Agronomist Megan Zahmel (Herbert Project Catalyst service provider) to assess different lime products to improve pH, aluminium saturation and overall cane productivity.

The trial was established in July 2017. The first two treatments applied were treatment 1, traditional agricultural lime and treatment 2, a kiln dust/ag lime mix of 20:80 ratio. These were applied to the trial block in July 2017 at a rate of 4t/ha, based upon soil testing data.

The Prilled lime product was applied at the same time as the fertiliser in October 2017, at a rate of 350kg/ha, as advised by the company rep after looking at Alan's soil test results.

What it's about

Project Catalyst is a grower-led innovation project in sugar cane that was formed to explore and validate farm management practice change leading to improved water quality for the Great Barrier Reef. For more information on Project Catalyst please visit our website https://www.projectcatalyst.net.au/ or phone Catchment Solutions on 07 4968 4216.

The cane was planted in August 2017. pH sampling commenced in Nov 2017 and was repeated intensively during the plant cane crop phase.

The trial is a strip plot trial with 3 reps per treatment. pH testing has been the focus of the trial to date. See Table 1.

THE RESULTS

Assessing pH differences has been the focal point of the trial. pH samples were taken after harvest of the previous ratoon with an average soil pH (H2O) of 5 being reported.

HCPSL staff collected more pH samples, four months after product application, to find a small shift in pH values compared to our starting value. This indicated to Alan that it took at least four months for the lime products to start influencing soil pH.

This finding pointed out to Alan that he needs to get his lime products onto the block early, if he wants the most benefits for his mixed species fallow crops and subsequence cane crop.

HCPSL have now collected two years of data on soil pH. The results to date show that the traditional use of agricultural lime has shifted the pH the greatest when compared to all treatments. See Table 2.

The project has also undertaken an economic valuation of the treatments over several years. One of the differences between products is that the traditional ag lime products are applied once before planting, whereas the new prilled limes are applied every year.

The question was then raised, "which product works out to be more economically valuable after a full crop cycle?".

Alan & HCPSL will continue this trial for a full crop cycle to compare overall cost between products. Though Alan has stated, he believes its only economical to apply the prilled lime for three years to the cane crop because of the cost of the product.

See Table 3 on comparing cost of product per hectare and cost of calcium per product.

The project is also assessing cane yield and CCS value over the crop cycle. The second ratoon crop will be harvested in 2020.

The project hypothesis is that with a better pH value over a crop cycle, this will lead to better crop nutrient uptake, leading to improvements in cane yield, longer ratoon life and less loss of nutrients to waterways.

See Table 4 for the cane t/ha and sugar t/ha yields for the plant and 1st ratoon crops.

CONCLUSION THUS FAR

The trial will continue to be monitored over the full crop cycle. At this stage, after the second year of the trial, the use of agricultural lime is still the best value for product concerning cost effectiveness and bang for buck.

Sachs Lane	Headland									
	Headland	Rep 3			Rep 2			Rep 1		
		Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9
		T2 R3 5 rows	T1 R3 5 rows	T3 R3 6 rows	T2 R2 5 rows	T1 R2 5 rows	T3 R2 6 rows	T3 R1 6 rows	T2 R1 5 rows	T1 R1 5 rows

Table 1 - Trial Design

		Lab results	*Note Lime was put down in July 2017				
		Starting pH value @ baseline soil sample 26/12/2016	pH meter reader Average for 13/11/2017	Average for 20/12/2017	Average for 30/01/2018	Average for 30/08/2018 After Harvest	Average for 28/10/2019 After Harvest
Treatment 1	Centre of row for Ag Lime	5	5.62	5.97	6.00	6.35	6.02
Ag Lime	Shoulder of row for Ag Lime	5	5.73	5.78	5.87	6.23	6.40
Treatment 2	Centre of row for Kiln Dust	5	5.32	5.12	5.40	5.58	5.93
Kiln Dust 20% mix	Shoulder of row for Kiln Dust	5	5.28	5.35	5.33	5.66	5.85
Treatment 3	Centre of row for Prilled Lime	5	4.88	4.98	4.83	5.50	5.76
Prilled Lime	Shoulder of row for Prilled Lime	5	4.87	4.92	4.72	5.23	5.75

Table 2 - pH

Product	Cost of Product per Tonne	Cost of product per ha	Ca % per product	kg of Ca per Tonne	Rate in kg of product per ha applied	kg of Ca applied per ha	$ paid per ha for Ca	Cost Ca per kg/ Tonne	**Price of product per ha over 5 years**
Ag Lime	$165.00	$660.00	40.80	408.00	4,000.00	1632.00	$4,035.49	$0.40	$825.00
Kiln Dust 20% Ag Lime 80%	$196.92	$787.68	40.00	400.00	4,000.00	1600.00	$3,250.05	$0.49	$984.60
Prilled Lime	$560.00	$196.00	36.00	360.00	350.00	126.00	$81.00	$0.64	$980.00

Table 3 - Products Costing

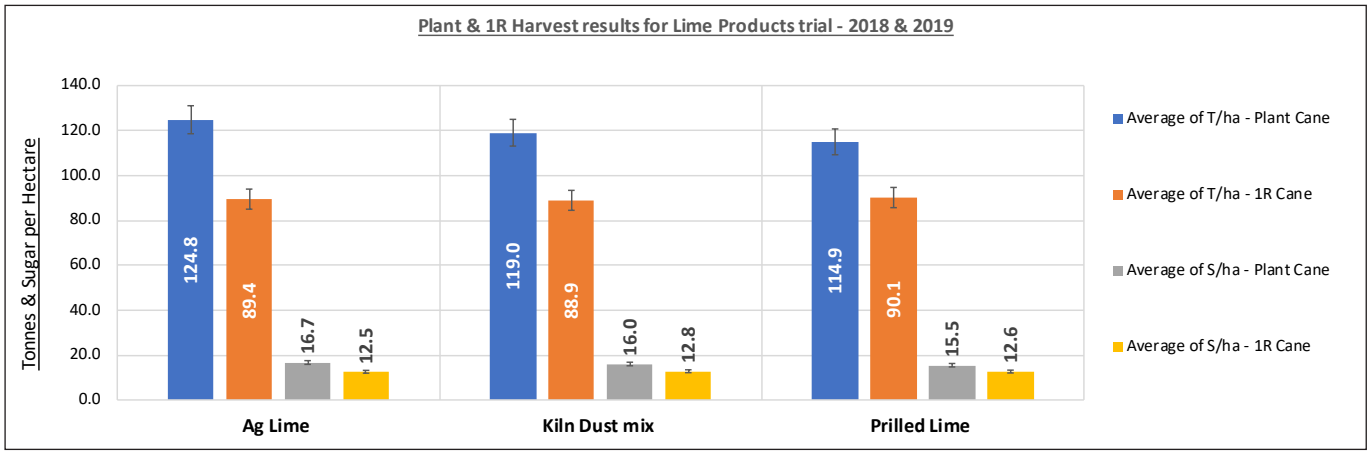

Table 4 - Plant & 1R Harvest results for Lime Products trial - 2018 & 2019