

# Project Catalyst Trial Report

## Ag Lime products trial.

### Grower Information

<b>Grower Name:</b>	Alan Lynn
<b>Entity Name:</b>	Jenallynn Holdings Pty Ltd
<b>Trial Farm No/Name:</b>	Ag Limes products trial 138A
<b>Mill Area:</b>	Herbert
<b>Total Farm Area ha:</b>	200 ha
<b>No. Years Farming:</b>	33 years
<b>Trial Subdistrict:</b>	Forest Home
<b>Area under Cane ha:</b>	198.38 ha

## **Background Information**

### **Aim:**

To improve cane yield and soil health focusing on pH levels & aluminium saturation

### **Background: (Rationale for why this might work)**

The trial is focusing on Agricultural lime products and which one is most beneficial to yield, sugar and economics.

We will look at a pH timeline of when and how much the lime products shift pH levels and which one is more economic over a crop cycle. There is concern that fine lime products like Calipril will tie up phosphorous when put within the fertiliser band, so this too is being investigated.

### **Potential Water Quality Benefit:**

By improving soil pH, soil health will improve.

By correcting the soil pH balance, plant nutrients will become available to the plant which will better utilise nutrient uptake and reduce losses to waterways

### **Expected Outcome of Trial:**

That economically the ag lime products will be better in a crop cycle compared to the economics of the Calipril which needs to be applied every year. Which product will shift pH levels more effectively is still to be determined?

**Service provider contact:** Megan Zahmel 0447 317 102

**Where did this idea come from:** Alan Lynn

<b>Plan - Project Activities</b>	<b>Date : (mth/year to be undertaken)</b>	<b>Activities :(breakdown of each activity for each stage)</b>
<b>Stage 1</b>	<b>Establish trial 2016/2017</b>	Baseline soil nutrient samples taken and GPS'd. - 20 <sup>th</sup> of Dec 2016 EM mapping – 21/06/2017 Applied Ag lime and Kiln dust mix – 7/07/2017 Lime sample tested for quality – 28/07/2017 NMP completed – August 2017
<b>Stage 2</b>	<b>Plant Cane 2017</b>	Q231 planted on 10/08/2017 Calcipril applied to trial as one of the treatments – 11/10/2017
<b>Stage 3</b>	<b>Sampling 2017/2018</b>	1 <sup>st</sup> pH testing – 13/11/2017 2 <sup>nd</sup> pH testing – 20/12/2017 3 <sup>rd</sup> pH testing – 30/01/2018 4 <sup>th</sup> pH testing – 30/08/2018 – after harvest sampled 3 <sup>rd</sup> leaf samples taken - 24th April 2018 Final yield and CCS data through mill – 2 <sup>nd</sup> of August 2018 Re-applied Calcipril – 14 <sup>th</sup> of September 2018
<b>Stage 4</b>	<b>Economic analysis</b>	Late 2018
<b>Stage 5</b>	<b>Sampling 2019</b>	3 <sup>rd</sup> leaf sampling – 15 <sup>th</sup> May 2019 pH & soil sampling – May 2019 (having difficulties getting to trial site due to a heavy continuous wet season) Harvest – 2019 season pH sampling after harvest. Late 2019
<b>Stage 6</b>		

## Project Trial site details

<b>Trial Crop:</b>	Sugar cane
<b>Variety:</b>	Plant cane – Aug 2017
<b>Rat/Plt:</b>	Q231
<b>Trial Block No/Name:</b>	Block # 7-1
<b>Trial Block Size Ha:</b>	2.567ha
<b>Trial Block Position (GPS):</b>	Refer to google earth map
<b>Soil Type:</b>	Clay/ Terrace loam

### Block History, Trial Design:

Alan Lynn																		
Lime Product Trial																		
Headland																		
										T1	Ag Lime							
										T2	Kiln dust 20% mix							
										T3	Lime							
										T3	Calcipril							
S a c h s  L a n e	Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7		Plot 8		Plot 9	
	T2		T1		T3		T2		T1		T3		T3		T2		T1	
	R3		R3		R3		R2		R2		R2		R1		R3		R2	
5 rows		5 rows		6 rows		5 rows		5 rows		6 rows		6 rows		5 rows		5 rows		
Headland																		
												Row width. 1.83m						
				Rep 3				Rep 2				Rep 1						

**Treatments:**

Trt 1 – Agriculture Lime 4t/ha

Trt 2 – Kiln Dust 20% Ag Lime 80% 4t/ha

Trt 3 – Calcipril @ 350kg/ha

## Results:

3 soil samples supplied by Herbert Cane Productivity Services Ltd on 28th July, 2017. Lab Job No. G1619

Analysis requested by M Zahmel. Your Reference: Ag Lime/Kiln Dust  
PO Box 135 INGHAM QLD 4850

SAMPLE ID	>2mm Gravel/ Organic Matter	1 - 2mm Very Coarse Sand	500µm - 1mm Coarse Sand	250 - 500µm Medium Sand	125 - 250µm Fine Sand	63 - 125µm Very Fine Sand	<63µm Mud (Silt/Clay)	Percentage of effective lime
Sample 1 - lynn farm	1.18%	1.28%	17.37%	25.60%	16.88%	23.12%	14.56%	80.17%
Sample 2 - trial sample	0.02%	0.13%	18.04%	27.76%	15.73%	16.48%	21.84%	81.81%
Sample 3 - Kiln dust 20% mix	2.97%	0.43%	9.67%	22.05%	15.55%	28.31%	21.01%	86.93%

Note:  
1: The Dry and Wet Sieving Analysis method was used for this grain size determination (Method of: Lewis and McConchie, 1994. Analytical Sedimentology. Chapman and Hall, USA.)

3 samples supplied by HCPSL on the 28 July, 2017 - Lab Job No. G1619.  
Analysis requested by M Zahmel.

			Sample 1	Sample 2	Sample 3
			Sample 1 Lynn Farm Ag Lime HCPSL	Sample 2 Trial site Ag Lime HCPSL	Sample 3 Trial site Kiln Dust HCPSL
Nutrient		Units	G1619/1	G1619/2	G1619/3
Calcium	Ca	%	39.7	40.8	40.0
Magnesium	Mg	%	0.17	0.13	0.33
Acid Neutralising Capacity	CaCO <sub>3</sub> Equivalents	%	72.0	67.1	82.1

### Laboratory testing notes:

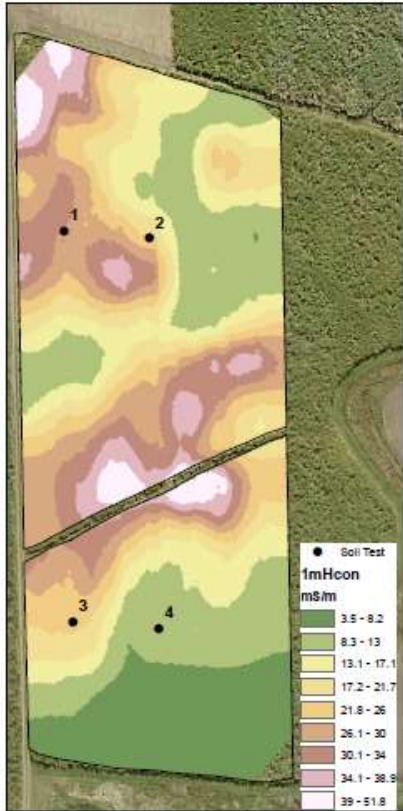
- All analysis conducted on sample as supplied. (Samples are lightly crushed as required)
- Samples are digested on a hotblock digester using Nitric acid then read on the ICP-MS (EPA3050B and APHA 3125 ICPMS or ICP-OES for Sulfur).
- Carbon / Nitrogen measured using a LECO CNS2000 Analyzer
- mg/kg = ppm; 1% = 10,000ppm
- Moisture based on sample dried at 105° C
- Total Soluble Phosphorus = Water Soluble Phosphorus + 2% Citrate Soluble Phosphorus

Quality Checked: Kris Saville  
Analyses, Agricultural testing division

**Lynn**  
**BLOCK 0138A-07-01**

**Electromagnetic Conductivity**

**1mHcon** EC measurements in millisiemens per metre (mS/m)

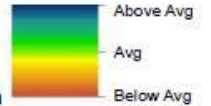


Scale All Maps - 1:2,000  
0 50 100  
Metres

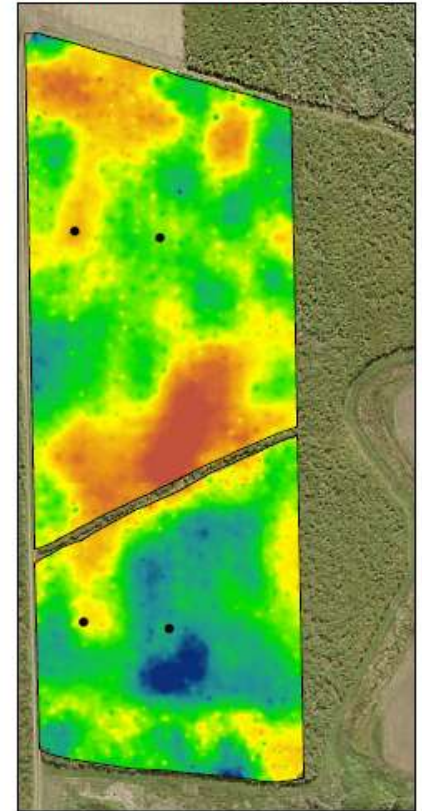


Soil Samples

1. 415732.101E, 7939394.174N
2. 415762.134E, 7939414.254N
3. 415627.799E, 7939521.269N
4. 415658.28E, 7939540.727N



**Yield 2015 5th Ratoon**

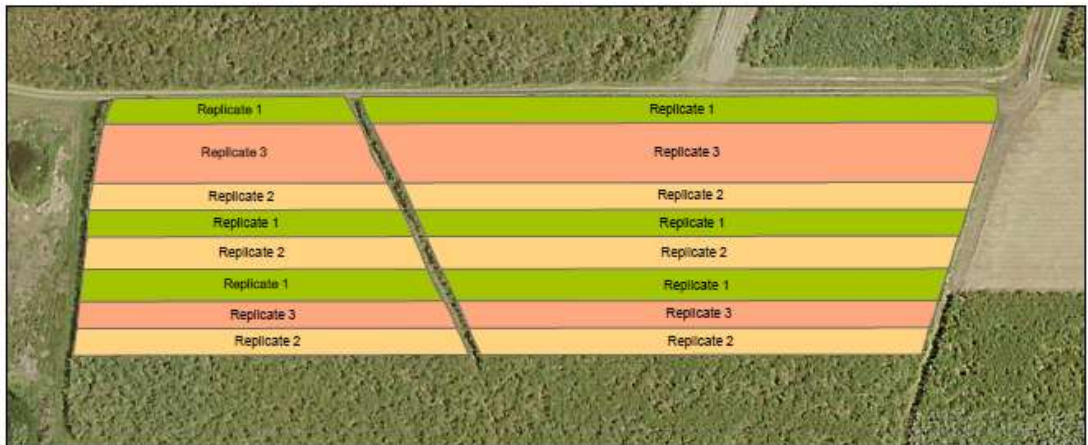
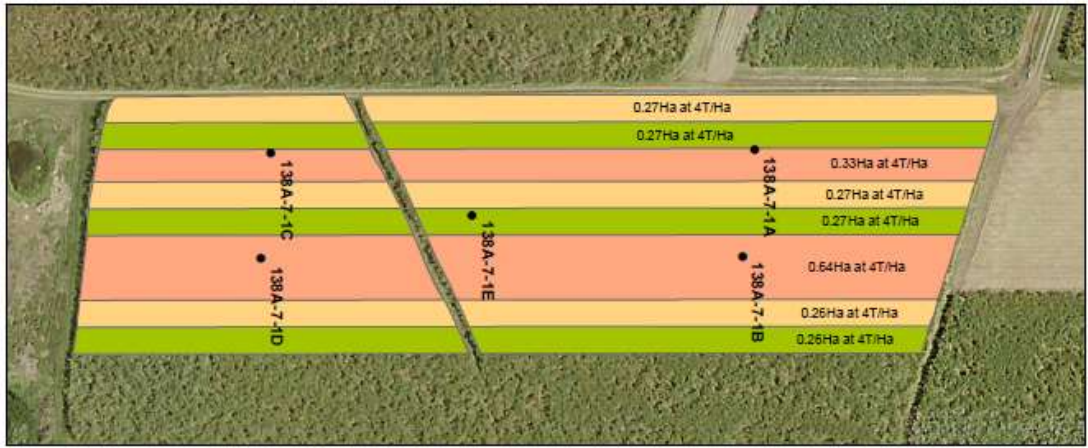
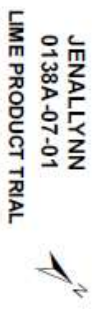


**pH Shift over 1<sup>st</sup> year of trial**

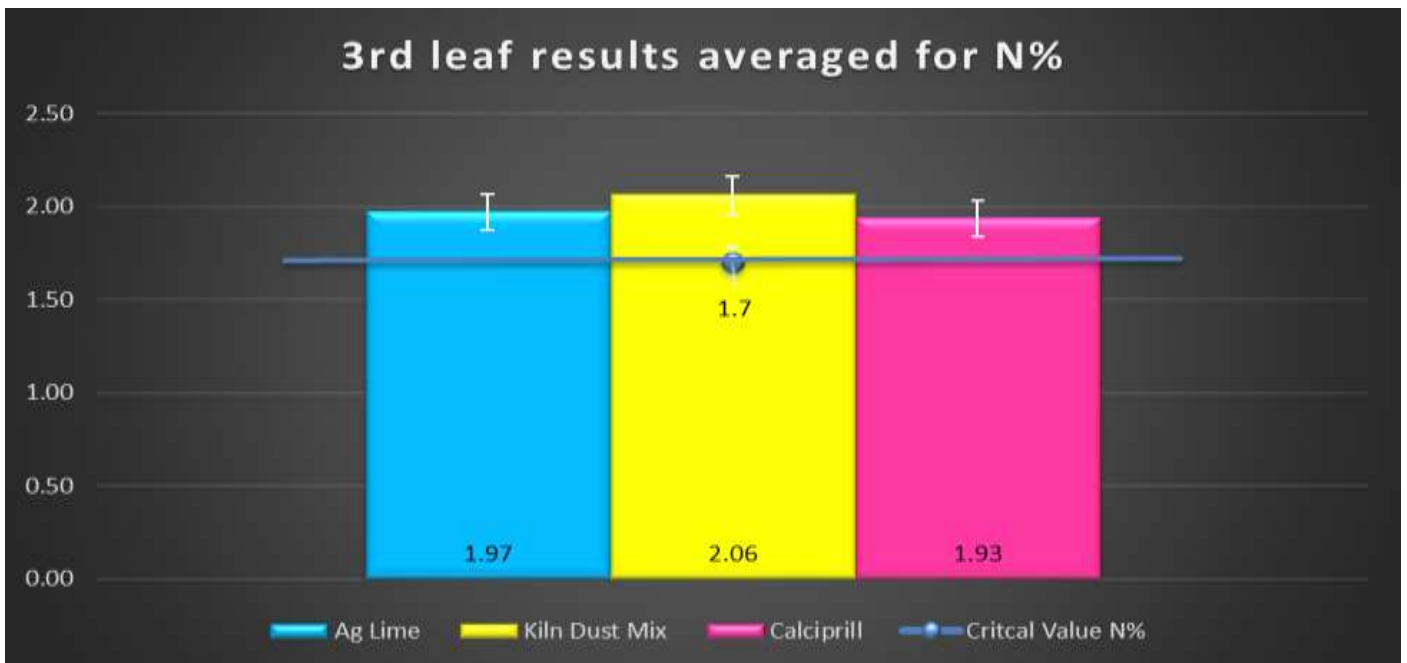
	Starting pH value	Average for 13/11/2017	Average for 20/12/2017	Average for 30/01/2018	Average for 30/08/2018	pH shift over 1st year of trial
Average Centre Mean for Ag Lime	5	5.62	5.97	6.00	6.35	<b>1.35</b>
Average Shoulder Mean for Ag Lime	5	5.73	5.78	5.87	6.23	<b>1.23</b>
Average Centre Mean for Kiln Dust	5	5.32	5.12	5.40	5.58	<b>0.58</b>
Average Shoulder Mean for Kiln Dust	5	5.28	5.35	5.33	5.66	<b>0.66</b>
Average Centre Mean for Calcipril	5	4.88	4.98	4.83	5.50	<b>0.50</b>
Average Shoulder Mean for Calcipril	5	4.87	4.92	4.72	5.23	<b>0.23</b>

**JENALLYNN**  
0138A-07-01  
**LIME PRODUCT TRIAL**

Scale - 1:1,500  
Treatment 1: 0.803Ha, 3.21Tonnes  
Treatment 2: 0.804Ha, 3.22Tonnes  
Treatment 3: 0.960Ha, 3.845Tonnes

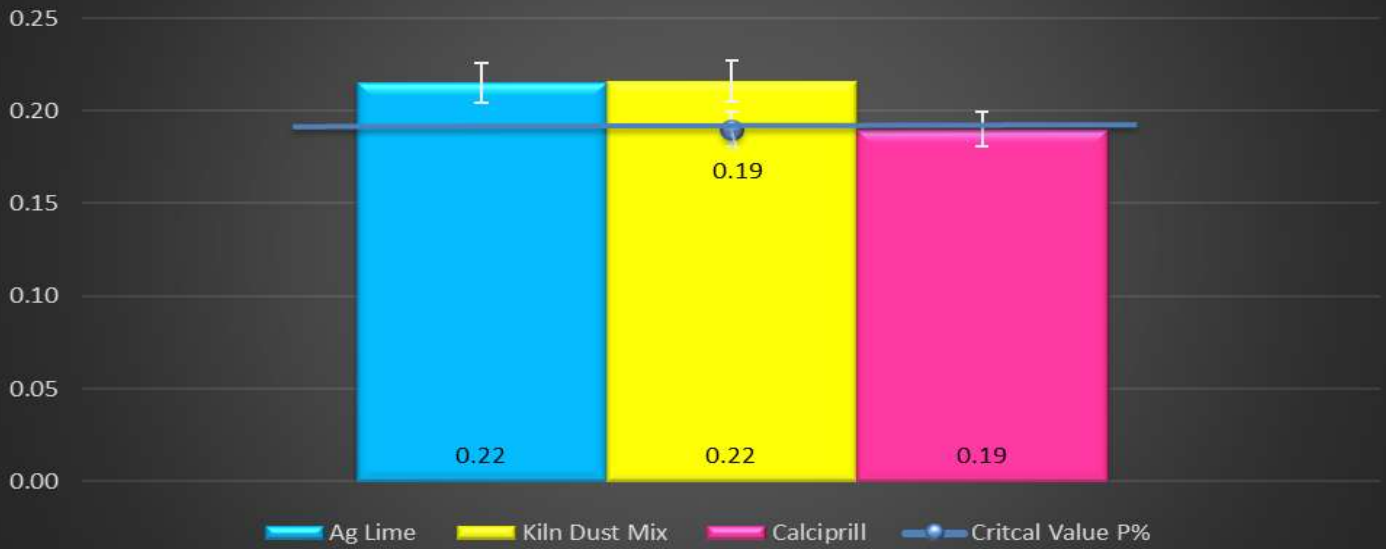


### Leaf samples taken 24<sup>th</sup> April 2018





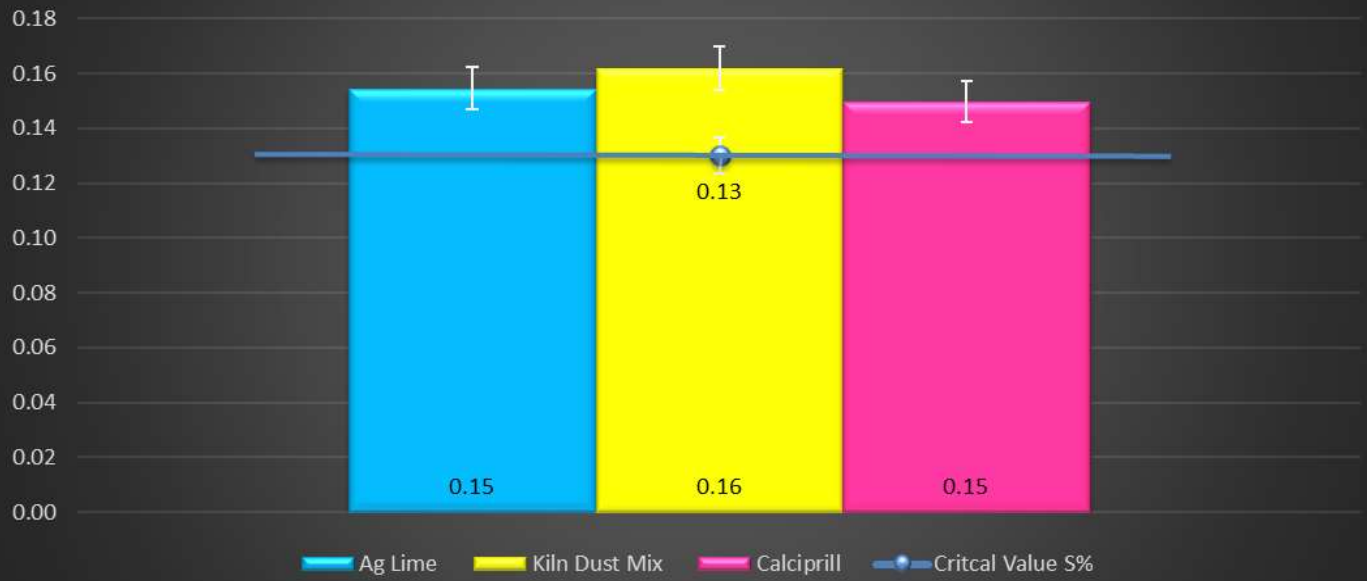
### 3rd leaf results averaged for P%



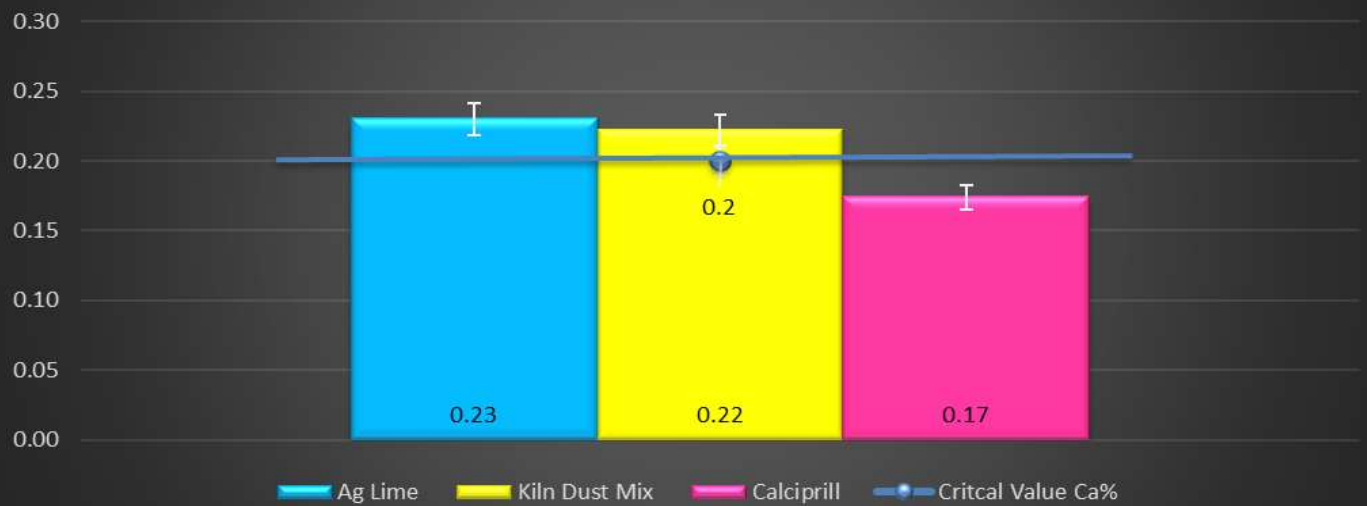
### 3rd leaf results averaged for K%



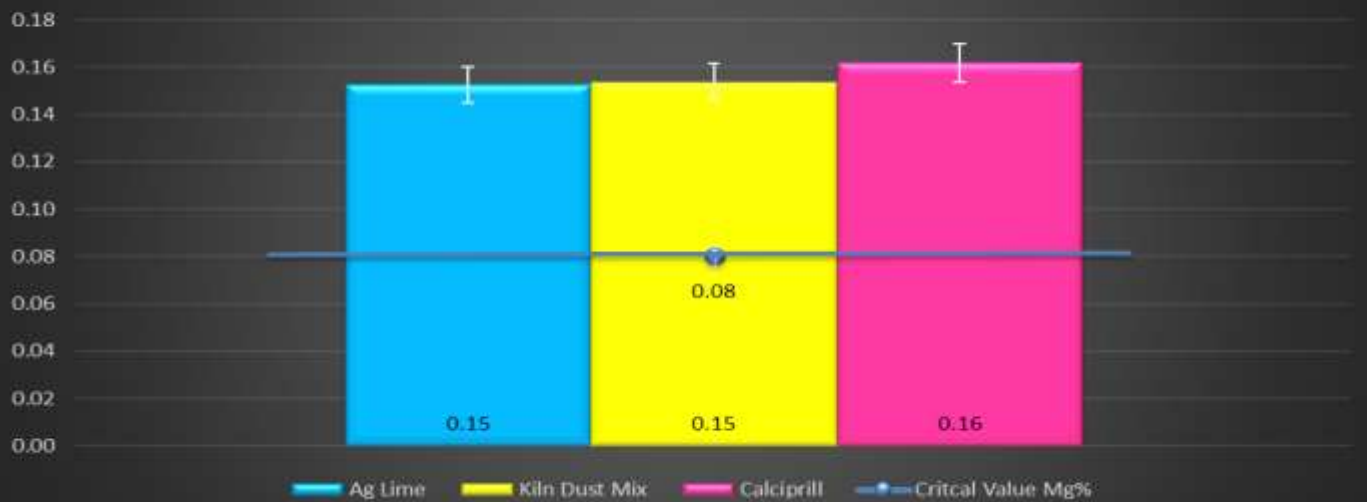
### 3rd leaf results averaged for S%



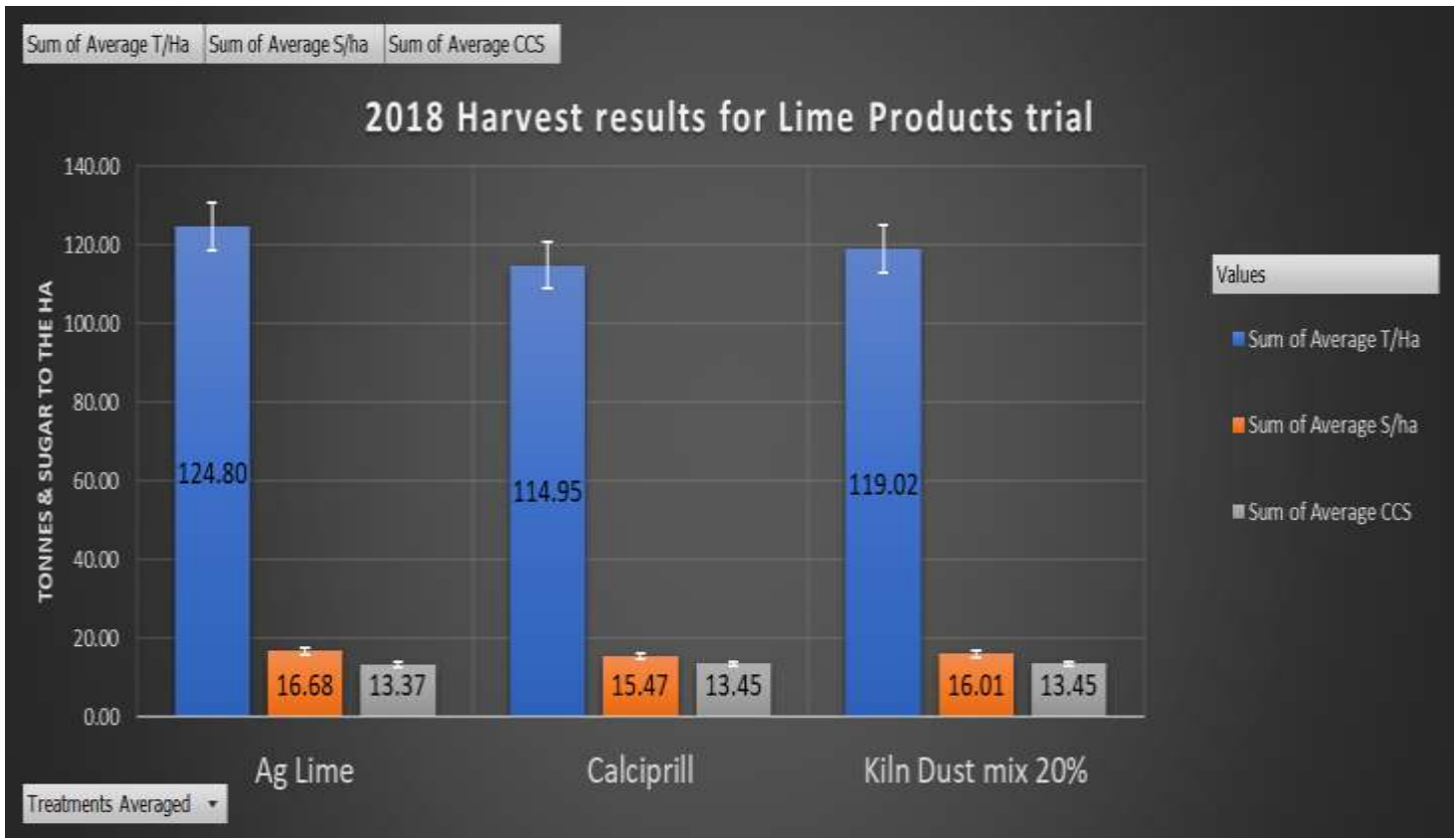
### 3rd leaf results averaged for Ca%



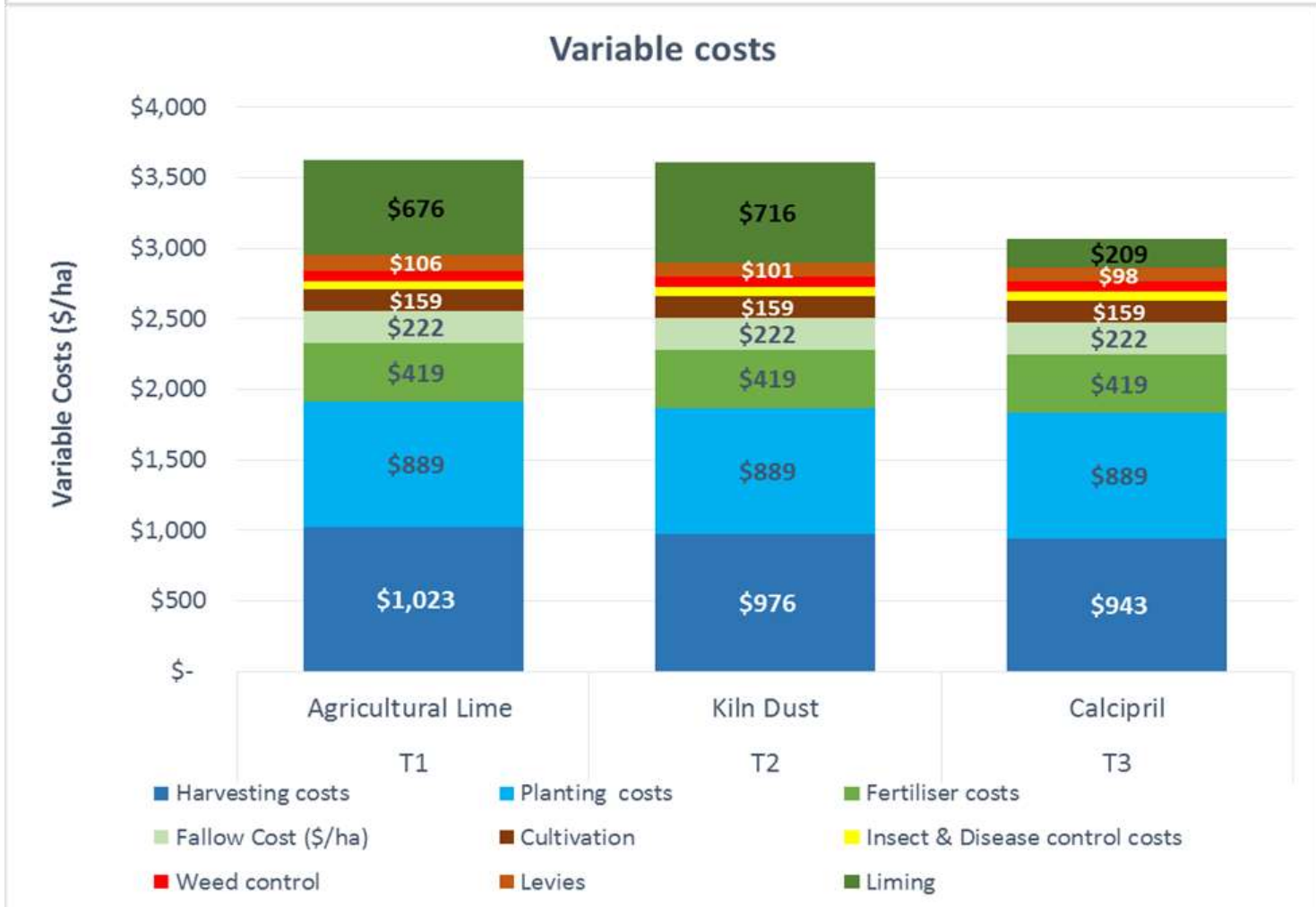
### 3rd leaf results averaged for Mg%



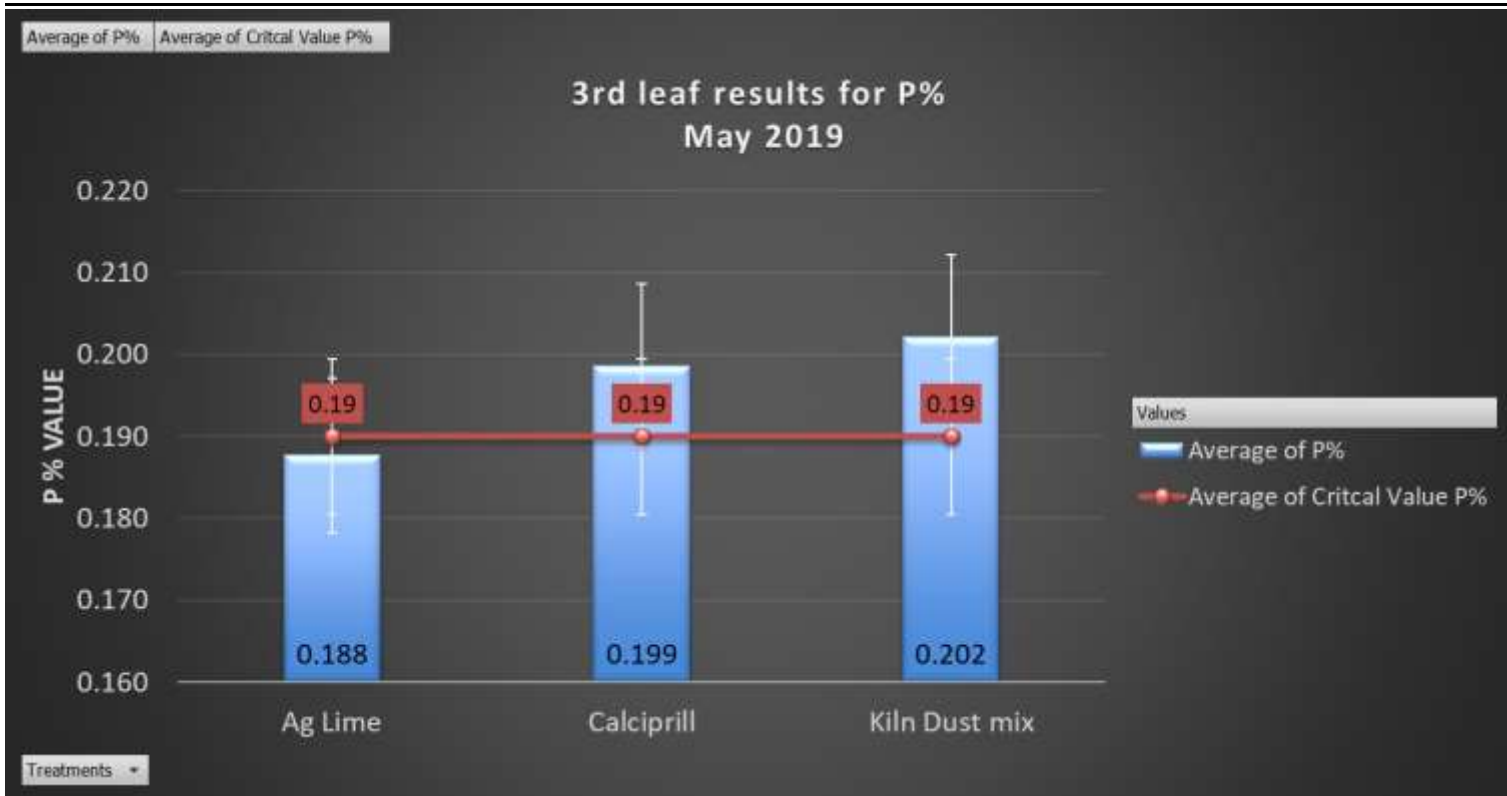
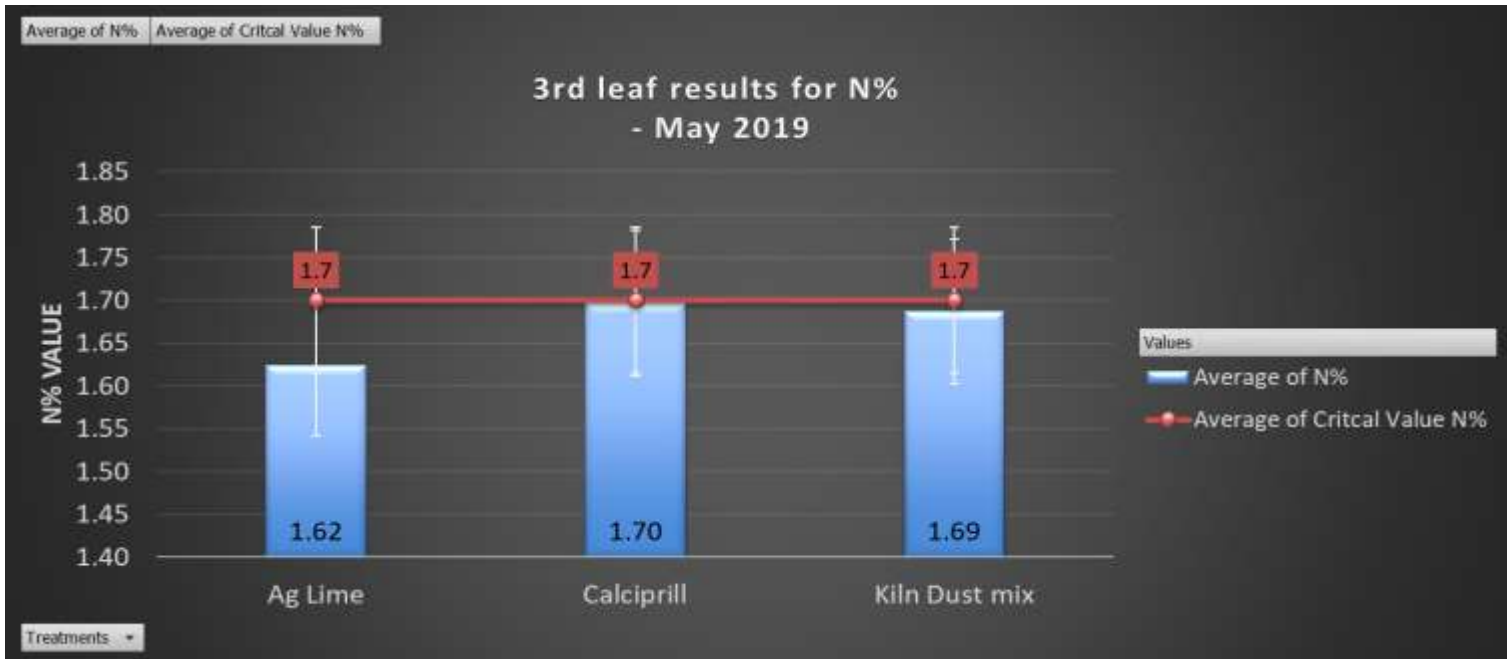
## Harvest Data 2018

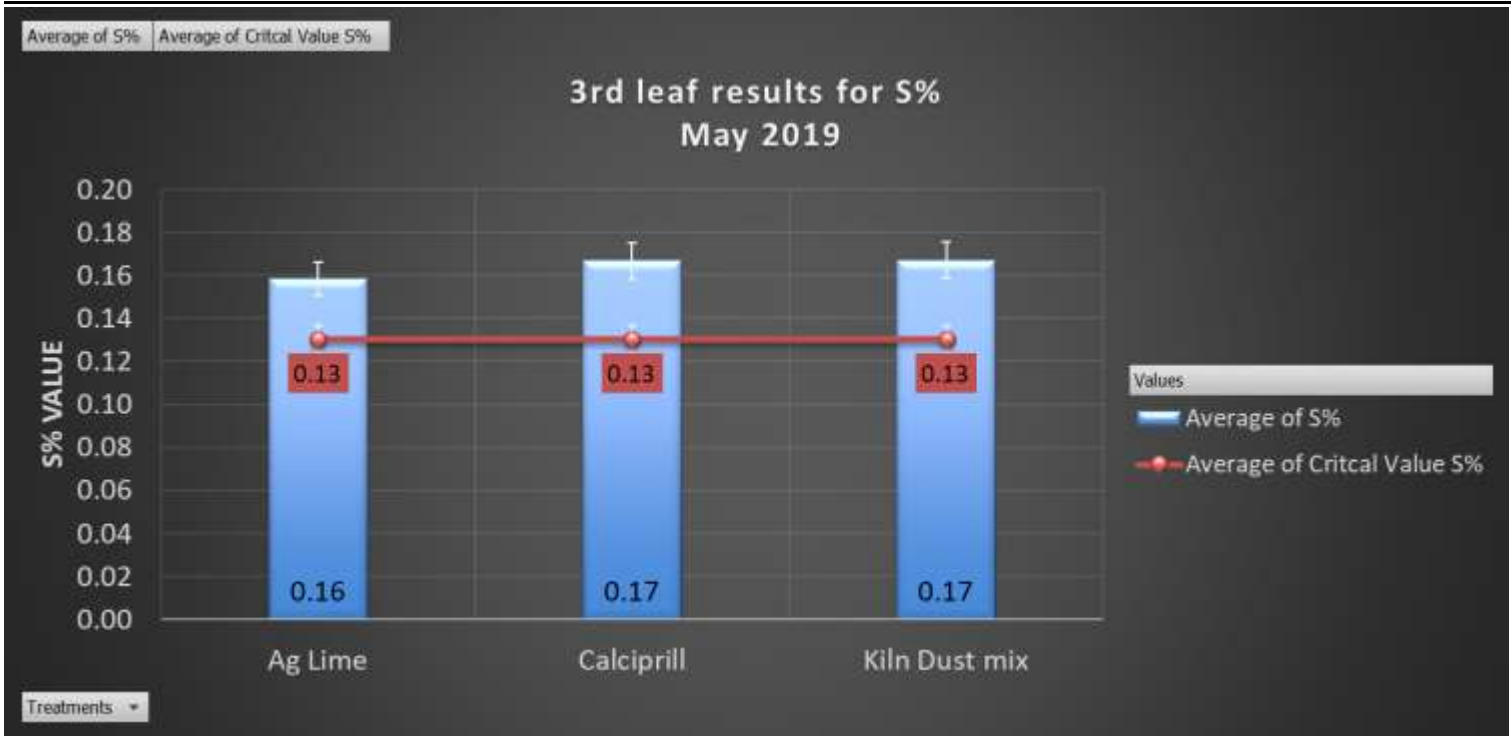
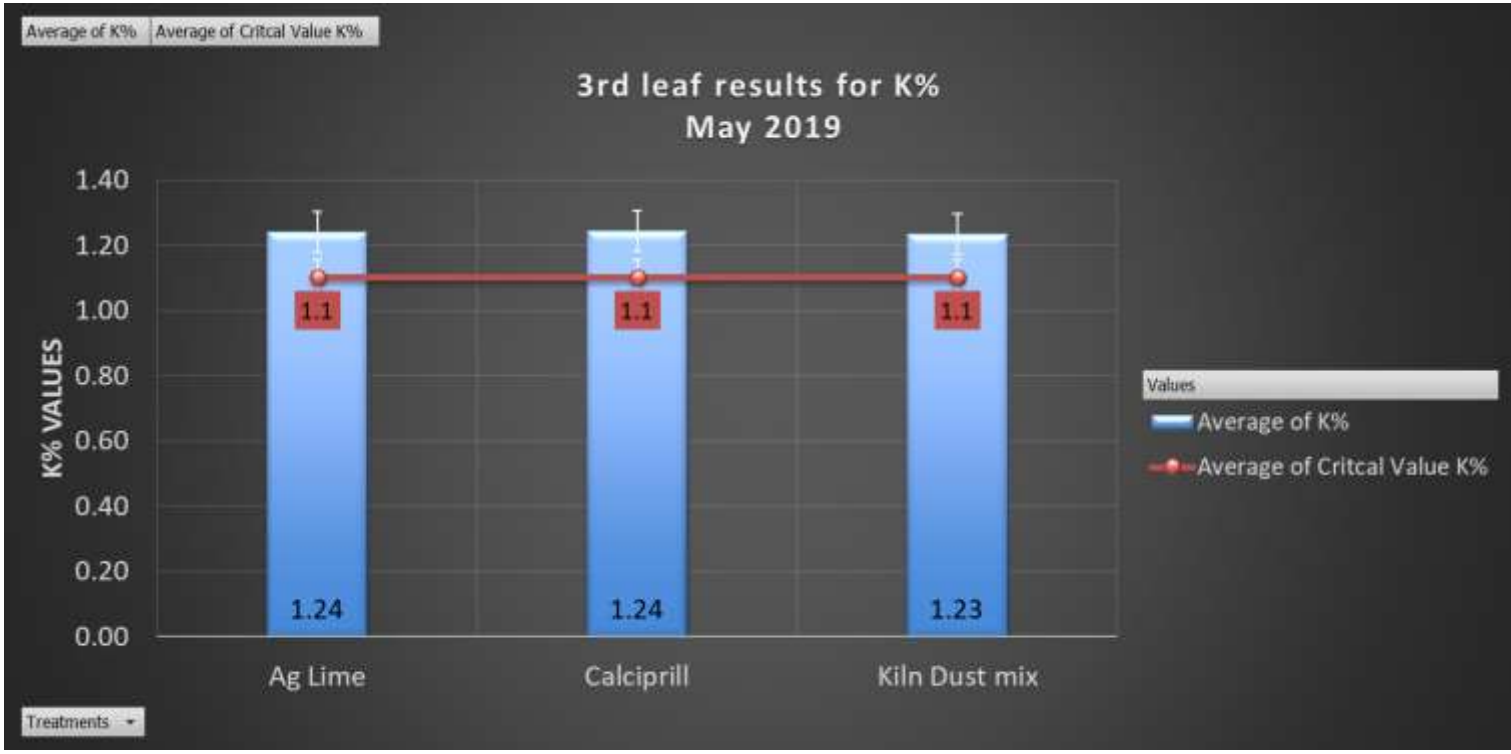


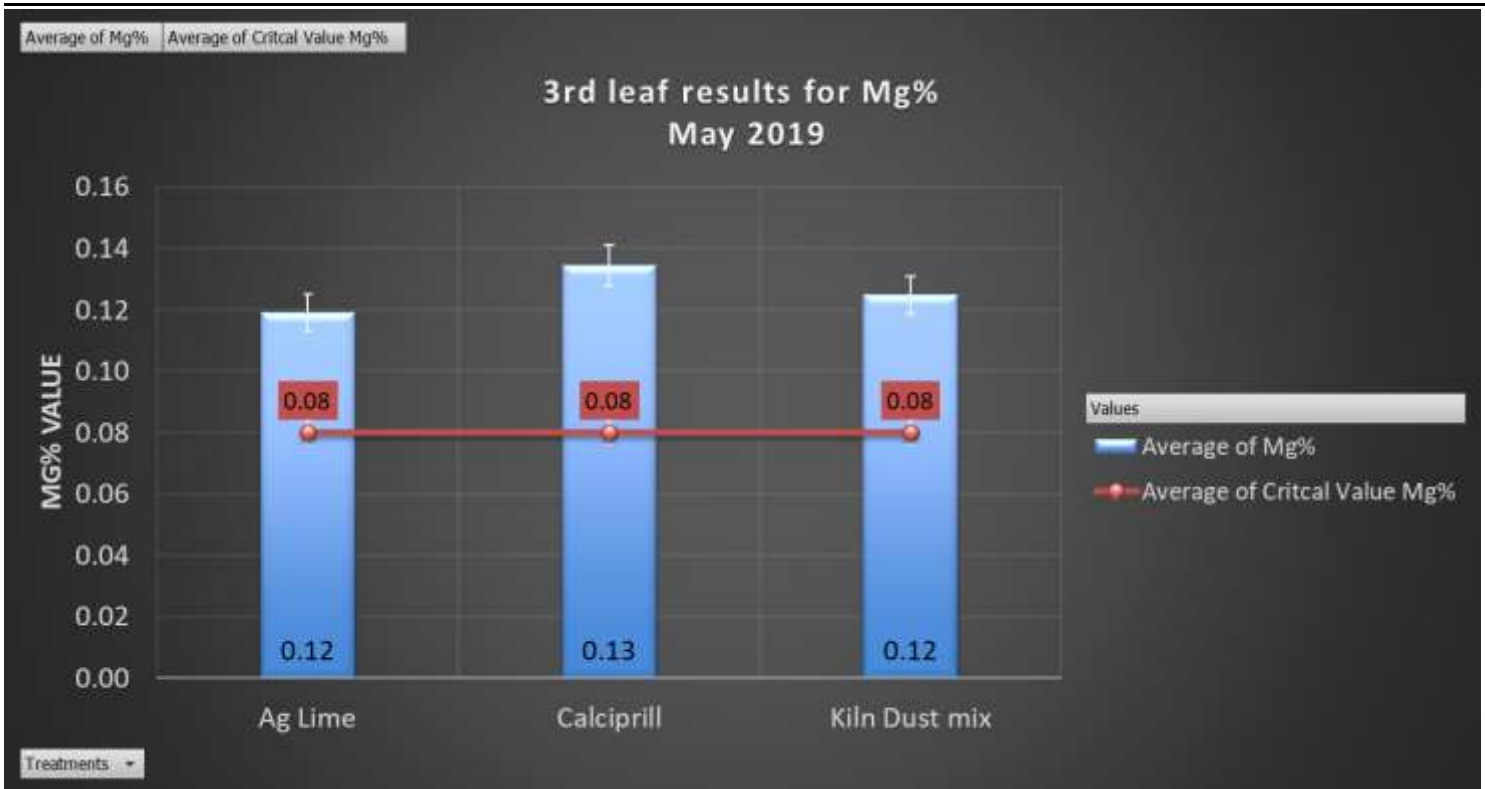
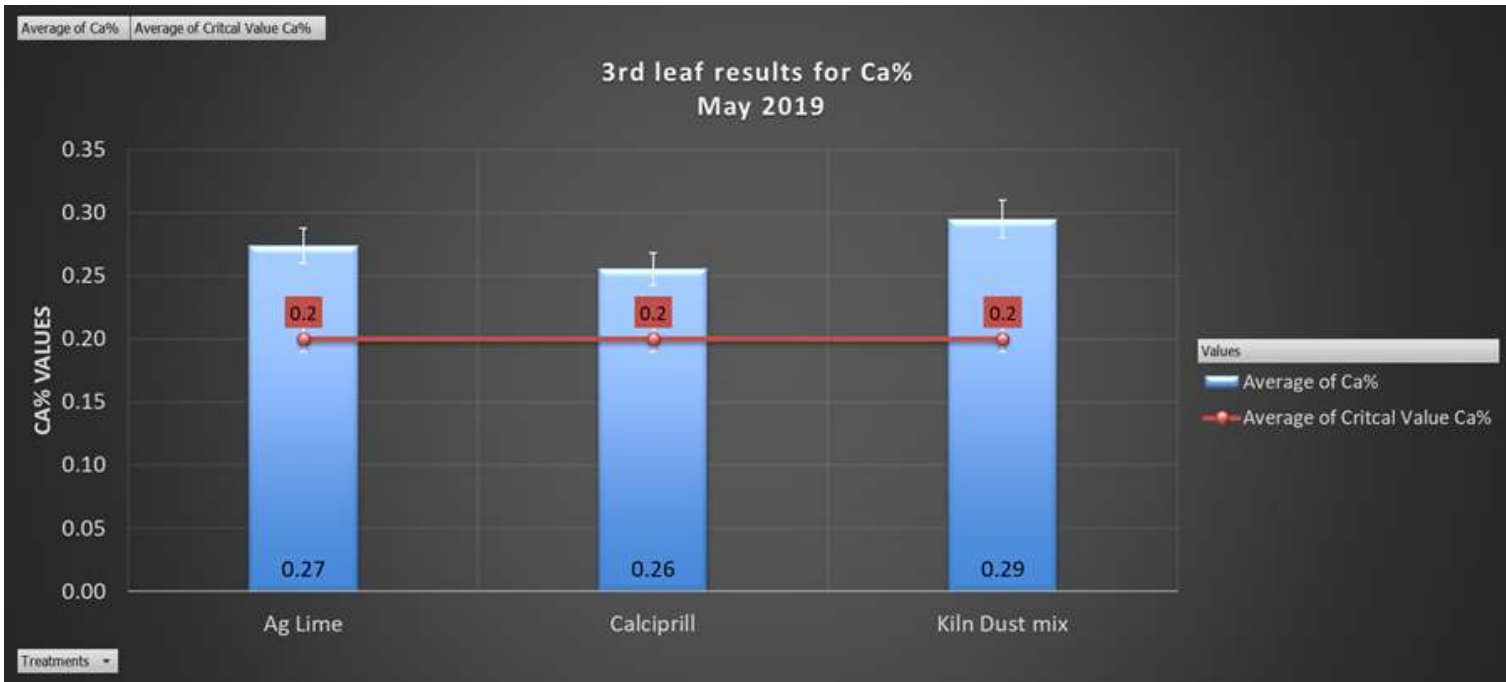
## Economic Analysis for 1<sup>st</sup> year of trial



### 3<sup>rd</sup> leaf results taken 15<sup>th</sup> May 2019

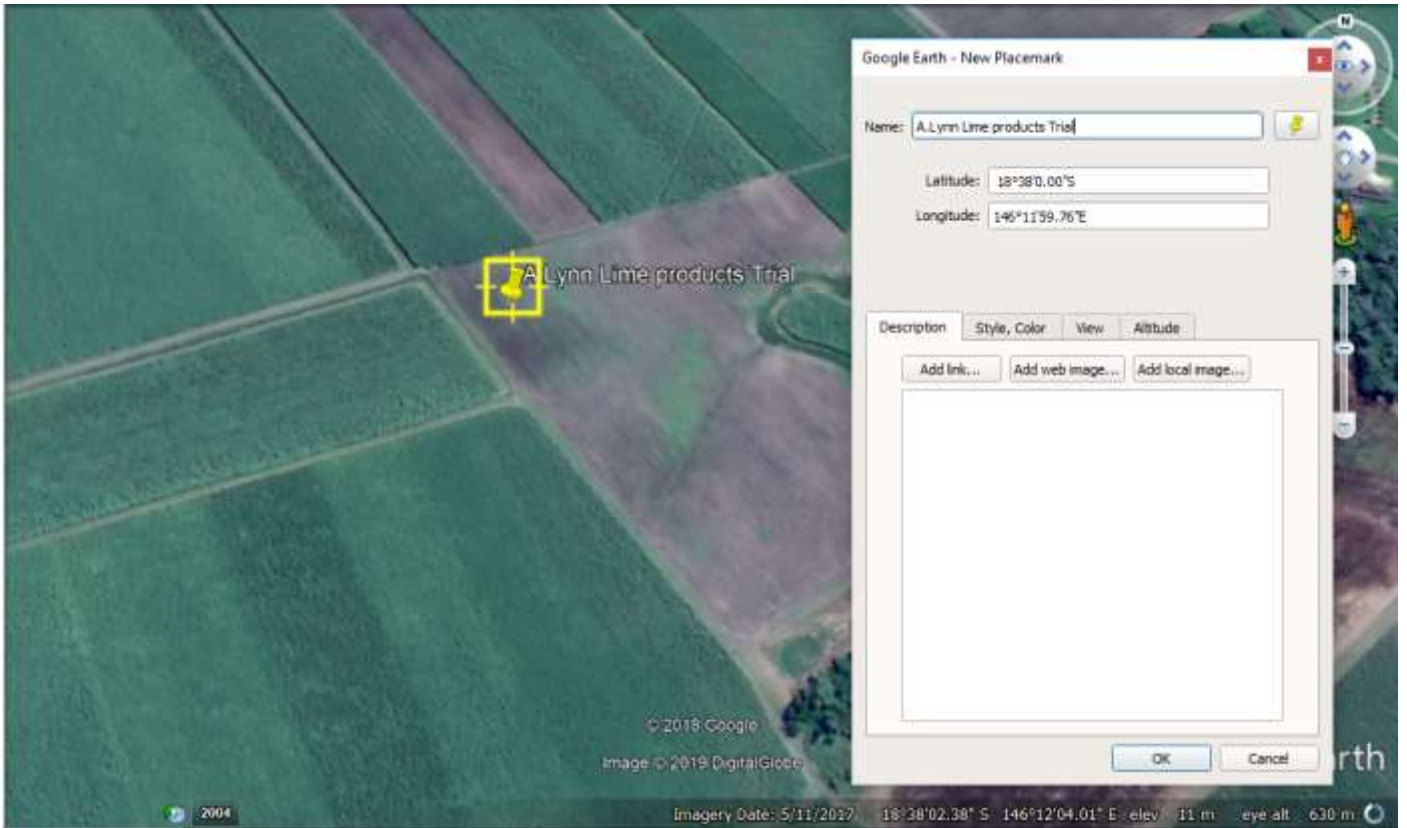






## 2019 pH and Soil sample results per treatment

## Google Earth Reference Map





## Conclusions and comments

The 2018 season would suggest that the traditional use of Ag Lime has more benefits than the other treatments. The Ag Lime application cost is initially higher, but will be a one-off payment for the crop cycle. Calciprill will be added every year of the trial so over a crop cycle, I believe the economics would change. Also, when looking at leaf results, pH results and Harvest results the Ag lime treatments have performed the best in shifting the pH value, nutrient uptake and yield in the 1<sup>st</sup> year of results.

The 2019 season Leaf sample results suggest that there could be a shift in results for the treatments. Though Ag Lime performed the best in the first year the heavy wet weather we have experienced in 2019 may have changed the results when comparing treatments. Waiting on soil and pH results from the lab and yield and CCS results from the 2019 harvest season to see if the leaf results reflect in the overall treatment results.

### **Advantages of this Practice Change:**

The Ag Lime application is a once a crop cycle application. If the weather is bad and the grower is unable to get onto the block, it will go without lime for a crop cycle. By using products such as calciprill the growers can be assured that if he misses his initial application of lime because of rainy weather, he can still have an opportunity to apply a lime-based product to the paddock. This is especially important in the Herbert region as acidic soils are commonplace and this issue needs to be addressed to gain yield and CCS potential.

### **Disadvantages of this Practice Change:**

Having to apply Calciprill every year for a full crop cycle could become un-economical. From observations the Calciprill works better after decent rainfall has dissolved the product into the soil profile. Until the initial rain event, after the application of Calciprill, there is a delay in the product working to move pH values. This could be undesirable in a dry season due to the fact the pH value would not shift until heavy rainfall and this could impact on potential yield.

### **Will you be using this practice in the future?**

We will continue with the trial for a few more years until results become clearer.

### **% of farm you would be confident to use this practice:**

Still waiting on trial results before planning.