

Lime and cultivation demonstrations – pH monitoring

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ACKNOWLEDGEMENTS: Will Browne (Warradarge), Dennis Martin (Badgingarra) and Ferret McAlpine (Badgingarra)

Purpose:	The WMG has established these three demonstrations over the last 4 years looking at the interaction of lime rate and cultivation in changing subsoil pH. The Brown and McAlpine demonstrations were funded by NACC (Project XXX). Soil pH has been sampled and tested by Precision SoilTech as part of the final monitoring of the three sites.
Location:	Warradarge (Browne) and North Badgingarra (Martin & McAlpine)
Soil Types:	North Badgingarra (Martin) – gravelly sandy duplex Warradarge – deep white / pale yellow sand North Badgingarra (McAlpine) – sandy gravel

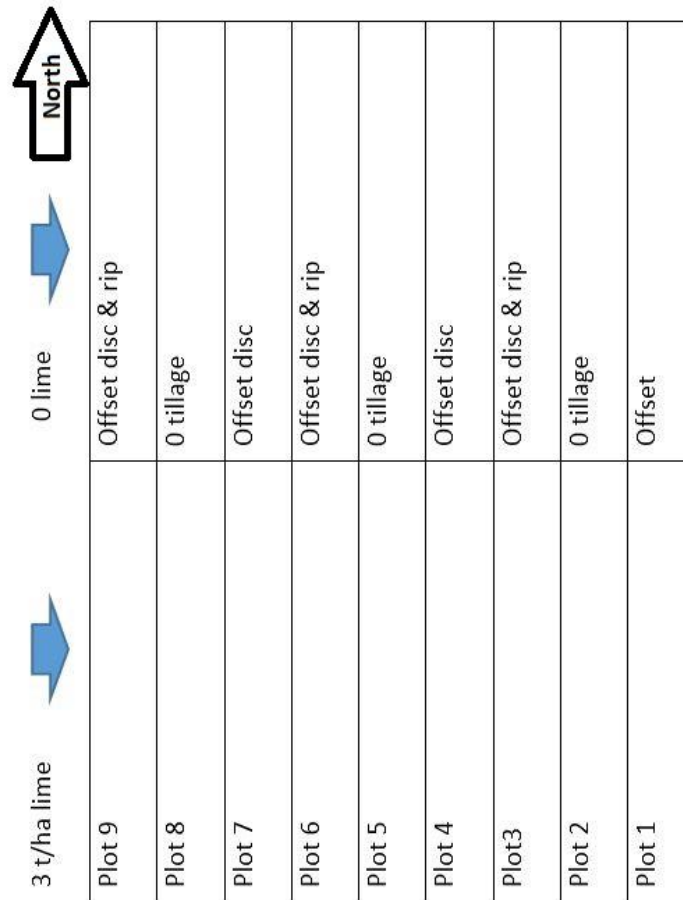
BACKGROUND SUMMARY

Surface applied lime can take many years to ameliorate subsoil acidity. Ongoing acidification has resulted in lower subsoil pH's and the depth of the acidic layer is increasing. This has generated renewed interest in one-off lime incorporation using strategic tillage to reduce the time required to ameliorate the subsoil acidity and to get a more rapid return on investment from applying lime. Effective amelioration of subsoil acidity requires the creation of continuous pathways of pH corrected soil from the soil surface through the acidic subsoil layers.

Spading and mould-boarding are two common methods to attack two problems at once in the West Midlands: to incorporate lime to increase subsoil pH, and to reduce non-wetting by burying and/or mixing the topsoil with lower soil layers. Both methods are relatively expensive, so the NACC-funded demonstrations aimed to assess the effectiveness of a modified one-way plough at achieving subsoil pH change.

LAYOUTS

Martin, North Badgingarra



The demonstration was limed and cultivated in autumn 2013.

Browne, Warradarge



1	"Ploz Plough" - deep dish 30" discs, every second jump-arm removed.
2	Nil
3	Standard Chamberlain plough
4	Nil
5	"Bought discs" - 30" discs with every second jump-arm lifted.
6	mistake
7	"Bought discs" - 30" discs with every second jump-arm lifted.
8	"Ploz Plough" - deep dish 30" discs, every second jump-arm removed.
9	Nil
10	Standard Chamberlain plough

The demonstration was ploughed on 30 May 2015.

McAlpine, North Badgingarra

Three demonstration strips were established in May 2016.

Nil cultivation

“Plozza” plough

Standard Chamberlain plough.

OBSERVATION/ DISCUSSION/ MEASUREMENTS

All pH measurements are reported as pH (CaCl₂)

Summary – Martin

January 2015 pH results			
Treatments	0-10cm	10-20cm	20-30cm
Nil	4.8	4.8	4.8
Offsets	4.9	5.0	4.8
Offset + rip	4.8	4.9	4.8
3T Lime	6.2	5.4	4.9
3T Lime + Offsets	5.7	5.2	4.8
3T Lime + Offset + rip	6.0	5.4	4.8
April 2016 pH results			
Treatments	0-10cm	10-20cm	20-30cm
Nil	4.6	4.6	4.8
Offsets	4.5	4.7	4.8
Offset + rip	5.0	4.6	4.7
3T Lime	6.1	5.0	4.9
3T Lime + Offsets	6.2	5.5	5.1
3T Lime + Offset + rip	6.2	5.6	5.1
February 2017 pH results			
Treatments	0-10cm	10-20cm	20-30cm
Nil	4.9	4.8	5.1
Offsets	4.8	5.0	5.1
Offset + rip	5.2	4.9	4.8
3T Lime	6.3	5.4	5.1
3T Lime + Offsets	6.3	5.8	5.1
3T Lime + Offset + rip	6.5	6.0	5.3

There were no significant differences between cultivation treatments at this site. There was a significant effect from lime applied, as expected.

There is an interesting trend of increasing pH over the 3 years in the limed treatments, suggesting that the lime applied in 2013 is still acting to reduce soil acidity after three years.

Summary - Browne

April 2016 pH results			
Treatment	0-10 cm	10-20 cm	20-30 cm
Nil	4.6	4.1	4.1
"Ploz Plough" - deep dish 30" discs, every second jump-arm removed.	4.1	4.0	5.1
"Bought discs" - 30" discs with every second jump-arm lifted.	4.6	4.0	4.7
Standard Chamberlain plough	4.7	4.3	4.0
February 2017 pH results			
Treatments	0-10 cm	10-20 cm	20-30 cm
Nil	5.1	4.4	4.8
"Ploz Plough" - deep dish 30" discs, every second jump-arm removed.	4.8	4.6	5.0
"Bought discs" - 30" discs with every second jump-arm lifted.	5.2	4.4	4.6
Standard Chamberlain plough	5.2	4.8	4.7

There were no significant differences between cultivation treatments at any depth in either year.

Summary - McAlpine

February 2017 pH results				
	0-10 cm	10-20 cm	20-30 cm	30-40 cm
Nil	5.5	5.1	5.2	5.2
"Ploz Plough" - deep dish 30" discs, every second jump-arm removed.	5.5	5.4	5.1	5.2
Standard Chamberlain plough	5.7	4.8	5.1	5.3

There were no significant differences between cultivation treatments at any depth.

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