

Lime incorporation into acidic sandplain soils in the West Midlands

Chris Wilkins, Cropping R&D Coordinator, WMG

Purpose: To improve understanding of the range of tillage implements and techniques available to incorporate lime into acidic soils, their respective costs and benefits.

Locations: Badgingarra

Soil Types: Gravelly sand

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 layer.

TRIAL DESIGN

In 2013, West Midlands Group and farmer Dennis Martin established a trial to assess the efficacy of a range of lime incorporation techniques.

Plots 12 mts wide

north



3 t/ha lime



0 lime



66 mts to fence

Plot 9	Offset disc & rip
Plot 8	0 tillage
Plot 7	Offset disc
Plot 6	Offset disc & rip
Plot 5	0 tillage
Plot 4	Offset disc
Plot3	Offset disc & rip
Plot 2	0 tillage
Plot 1	Offset

55 mts to fence

RESULTS

Precision SoilTech sampled the site for pH in January 2015. The results are presented in Table 1, below.

Table 1: pH (CaCl₂) at three different depths

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

There was no significant differences in pH between the tillage treatments at any depth. There was a significant difference in 0-10cm and 10-20cm pH between the nil lime and 3 T/ha lime blocks. There were no significant differences in the interactions of lime rate and tillage.

Dennis Martin planted the paddock to Latrobe barley on 26 June 2015. The trial was harvested by DAFWA's Geraldton RSU in November, and the results are presented in Table 2, below.

Table 2: 2015 Barley yield (T/ha)

Tillage	Lime rate	
	Nil	3T/ha
Nil	0.9	0.7
Offsets	0.8	0.8
Offset + rip	1.3	1.1
<i>l.s.d. (5%)</i>	<i>0.26</i>	<i>0.26</i>

Interestingly, there was a significant difference at both lime rates between the "Offset + rip" tillage treatment and the other tillage treatments. There was no significant difference between the nil lime and 3 T/ha lime treatments, despite the 0-10cm and 10-20cm pH differences.

PEER REVIEW/REVIEW

Anne Wilkins

ACKNOWLEDGEMENTS/ THANKS

Dennis Martin, Stephan Davies, DAFWA, Aglime and Soiltech