

TOPIC: SOIL RENOVATION

Group: Yuna
2011

ABSTRACT

Subsoil acidity, non wetting soils and resistant weeds are a significant issue for many areas of the northern ag region. Recently, some novel cultural methods are currently being carried out by farmers to attempt to rectify these issues. This is a long term trial which will be harvested annually to determine the outcome of these methods, whilst also determining which method sustainably corrects these issues while also being profitable in the longer term.

This is a continuation of the exploration of low risk, best bet strategies for the low rainfall cropping zone.

TRIAL DETAILS

| | |
|--------------------------------|--|
| Property | <i>Brady Green, South Yuna.</i> |
| Soil type | <i>Yellow sand</i> |
| Crop | <i>Wheat</i> |
| Treatments: | <i>2 t/ha and 4/ha of Lime followed by Nil, Deeprip, Mouldboard and Spaded</i> |
| Replicates: | <i>3</i> |
| Sowing date | <i>30/5/2011</i> |
| Seeding rate | <i>Mace 70kg/ha</i> |
| Fertiliser (kg/ha) | <i>March 100kg Super Potash 1:1 Seeding 90 Kg Mallee Extra, 50L Flexi-N 25/6 70kg NS 51, 26/7 50kg Urea 62N, 16P, 25K, 21S, 0.09Cu, 0.18Zn</i> |
| Pre emergent herbicide | <i>1.5L Boxer Gold + 1L Triflur</i> |
| Paddock rotation | <i>2010 Lupins, 2009 Wheat</i> |
| Growing Season Rainfall | <i>295mm May to Sept GSR. 235mm Dec 10 - April 11</i> |

METHOD

Front half of plots 4t/ha Lime, back half 2t/ha prior to any cultivation.

Any cultivation treatments carried out.

All plots seeded (except mouldboard)

Mouldboarding and seeding of mouldboard plots carried out one week later than all other treatments (due to logistical constraints).

All plots have received the same treatment as what the paddock has received.

Table 1: Soil test results *prior to any cultivation or liming*

| | | Site | | | | Mean |
|----|-------|------|-----|-----|-----|------|
| | | 5 | 6 | 7 | 8 | |
| pH | 0-10 | 5 | 4.9 | 4.6 | 4.9 | 4.9 |
| | 20-40 | 4.5 | 4.7 | 4.5 | 4.3 | 4.5 |
| | 60-80 | 4.5 | 4.8 | 4.5 | 4.6 | 4.6 |
| Al | 0-10 | 1.7 | 1.6 | 3.2 | 2.5 | 2.3 |
| | 20-40 | 3.4 | 4.5 | 0.2 | 5.9 | 3.5 |
| | 60-80 | 2.4 | 2.1 | 0.2 | 3.8 | 2.1 |

More soil testing will serve what impact

amounts of lime have had on the pH and Al over time in the soil profile. This will be reported on later.

be carried out to ob-cultivation types and

RESULTS

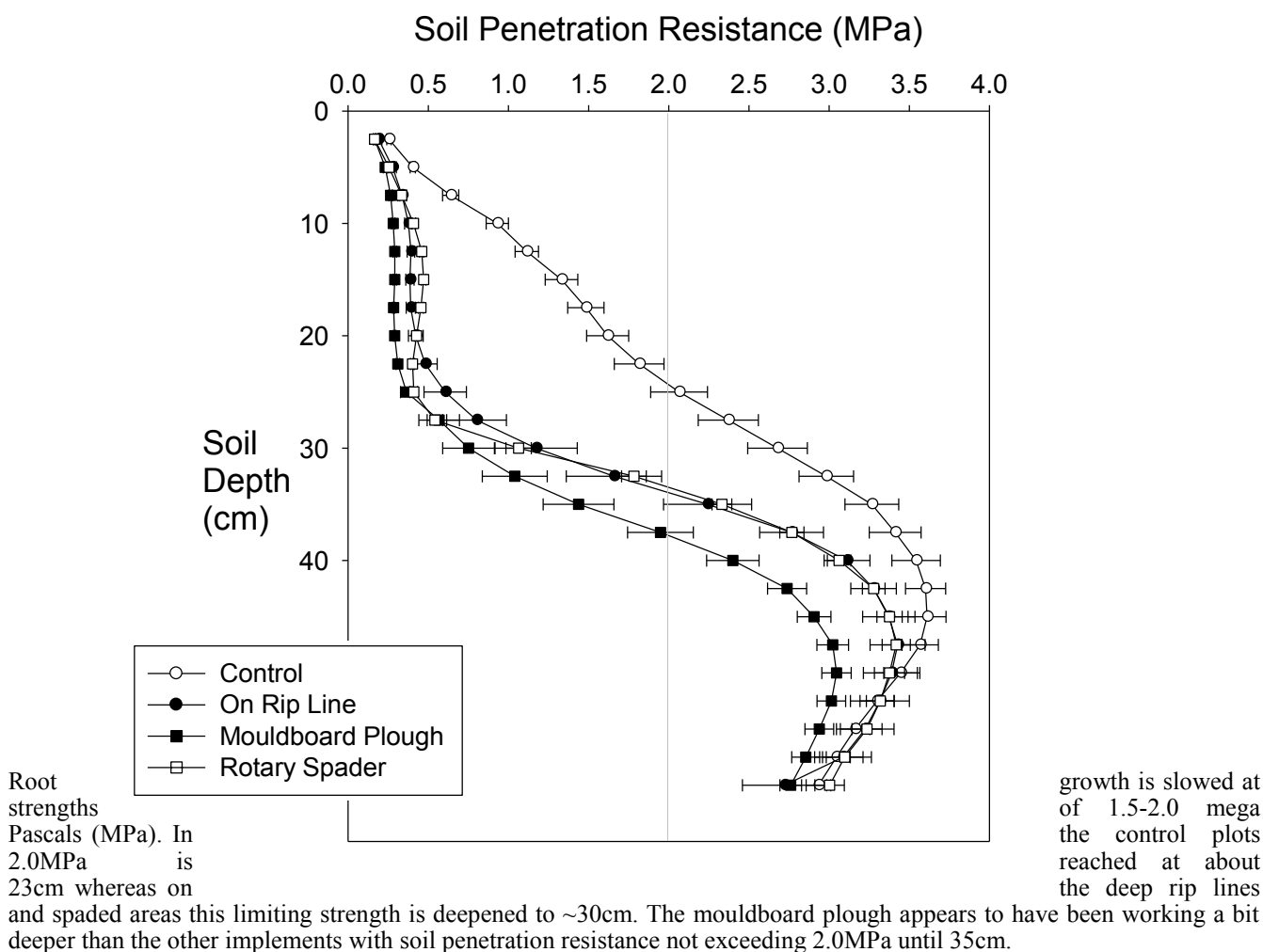
Table 2: Soil Water Repellence Testing of 0-5 cm samples. (Steve Davies, DAFWA, Geraldton)

| Treatment | Water Droplet Penetration Time (secs) | Molarity of Ethanol Droplet | Water Repellence Rating |
|------------|---------------------------------------|-----------------------------|-------------------------|
| Control | 111 | 0.6 | Low |
| Ripper | 349 | 0.9 | Moderate |
| Spader | 2 | 0.0 | Nil |
| Mouldboard | 0 | 0.0 | Nil |

Note: Repellence can be worse below 5cm (5-10cm samples collected but not tested yet). If repellence is worse at 5-10cm this may explain why deep ripping has increased repellence as ripping could bring some of this more water repellent soil to the surface.

Soil Penetration Data – (Stephen Davies, DAFWA, Geraldton)

Soil type at trial site: *Deep yellow sand* – loamy sand (approx. 5% clay) in top 30cm grading to clayey sand (approx. 10% clay) from 30cm to depth.



PHOTOS
26th July 2011

Below: Left Untreated



Right Deepripped



Above: Left spaded



Right Mouldboard (planted 1 week later)

4th October 2011



Above: Left untreated, right deepripped



Above: Left Deepripped, right spaded

Continued on next page

| Treatment | t/ha Lime | Mean Yield t/ ha | % of un- treated 2t/ ha | Quality | | |
|------------|--------------|------------------------|-------------------------------|---------|-----------|-------------|
| | | | | Protein | Weight | Screenings |
| Mouldboard | 2 | 2.89 | 100 | 11.0 | 71 | 8.8 |
| Untreated | 2 | 2.88 | 100 | 10.6 | 74 | 4.6 |
| Deepripped | 2 | 2.97 | 103 | 10.2 | 74 | 4.1 |
| Spaded | 2 | 2.41 | 84 | 13.4 | 63 | 15.2 |
| Mouldboard | 4 | 2.94 | 102 | 11.8 | 72 | 9.7 |
| Untreated | 4 | 2.96 | 103 | 10.6 | 75 | 4.0 |
| Deepripped | 4 | 2.68 | 93 | 10.3 | 71 | 5.2 |
| Spaded | 4 | 2.29 | 80 | 12.6 | 65 | 13.4 |
| LSD 0.05 | | 0.53 | 18 | | | |
| CV | | 11 | | | | |

OBSERVATIONS

1. Spaded plots were the only treatments to yield significantly less than the untreated.
2. Spaded and Mouldboard plots were exceptionally clean for weeds, and virtually leaf disease free.
3. These plots also appeared healthier from a nutrition standpoint however this was not confirmed with a tissue test.
4. Grain samples have been taken for nutrient analysis to determine if cultivation methods or quantities of lime affected grain production in a positive or negative way.
5. Mouldboard plots were planted one week later than all other treatments so comparisons between this and other treatments should be only done with caution.
6. Spaded plots produced the highest biomass and if there was a soil constraint at depth restricting root growth (i.e. low pH and Aluminum toxicity) than this may explain why the Spaded plots yielded significantly less and also had lower test weight and high screenings.

TECHNICAL + IN-KIND SUPPORT

Darren Chitty Landmark R+D

Grant Thompson Crop Circle Consulting

Stephen Davies Research Officer, DAFWA Geraldton

Brady Green

- Trial harvesting

- Trial harvesting

- Soil penetration, resistance and repellence measurements

- Host farmer