Precision Ag Trials

Identifying Zones

Birchip

Although PA tools have been available to Australian grain growers for many years, and the benefits have been well documented, it is estimated that less than 1-% of grain growers utilise PA 'beyond guidance' in any form.

The objective of this GRDC / SPAA funded project is to increase the level of adoption of PA 'beyond guidance' by broadacre farmers. The project specifically aims to increase the level of adoption of variable rate (VR) by growers in the project to 30% by 2013. This goal will be achieved by demonstrating how to use PA tools to growers at a regional level and by increasing the skills of growers and industry in PA to a level where they can then use PA tools in their farming systems to achieve economic, environmental and social benefits.

Trials and demonstrations are conducted on growers' properties and are visited throughout the season using farm walks and workshops to discuss the advantages and disadvantages of PA techniques with the involvement of other regional growers.

This information sheet presents the outcomes of the SPAA trial **1** from season 2011.

Aims:

- To compare the various tools for determining paddock zones
- To determine whether those zones needed to be managed differently

Background:

For many of the growers in Birchip, they have experienced 10 years of below average rainfall, placing substantial financial strain on their enterprises. This has also limited their ability to adopt new technology such as VR controllers and yield mapping capabilities. This has become a major barrier to adoption and the BCG PA group decided to use this case study to demonstrate that practicing PA does not require significant financial investment. The group challenged a local grower, to identify his zones on a Google earth map at the start of the year. EM38, Gamma radiometrics, soil samples and a yield map were collected to compare how well the zones were identified. In addition, Nitrogen- and Phosphorus-rich strips were applied across these zones for comparison.

About the trial:

Reedy Dam (20km West of Birchip), Wheat (c.v. Yitpi), farmer equipment.

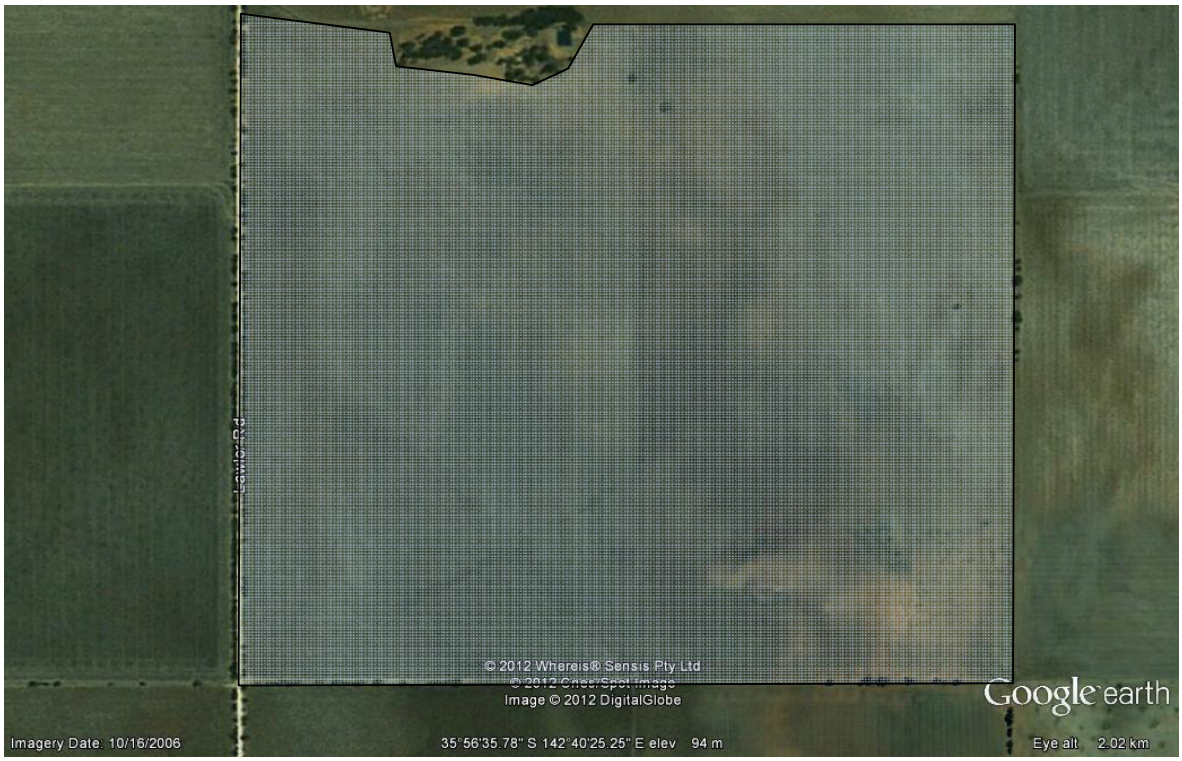

Figure 1: Google Earth imagery of the paddock (The Mill) at Reedy Dam, near Birchip, VIC.

In March, the farmer claimed there were three distinct zones in this paddock; red clay-loam, red sandy ironstone and grey clay loam. Using the Google earth imagery (Figure 1), the farmer drew the boundaries where he believed the zones existed. Figure 2, shows these suggested zones. After those zones were identified, those areas were soil sampled to 1m depth. Six cores were taken in each zone and segmented into different depths (0-10, 10-40, 40-70, 70-100cm). Moisture and nutrient analysis was undertaken.

Yield Prophet is an on-line crop simulation model that predicts the growth and yield of the crop based on the soil analysis and rainfall. Yield prophet was used to predict the crop growth on each of these zones.

The paddock was surveyed for EM38 and Gamma radiometrics provided through Precision Agronomics Australia prior to sowing.

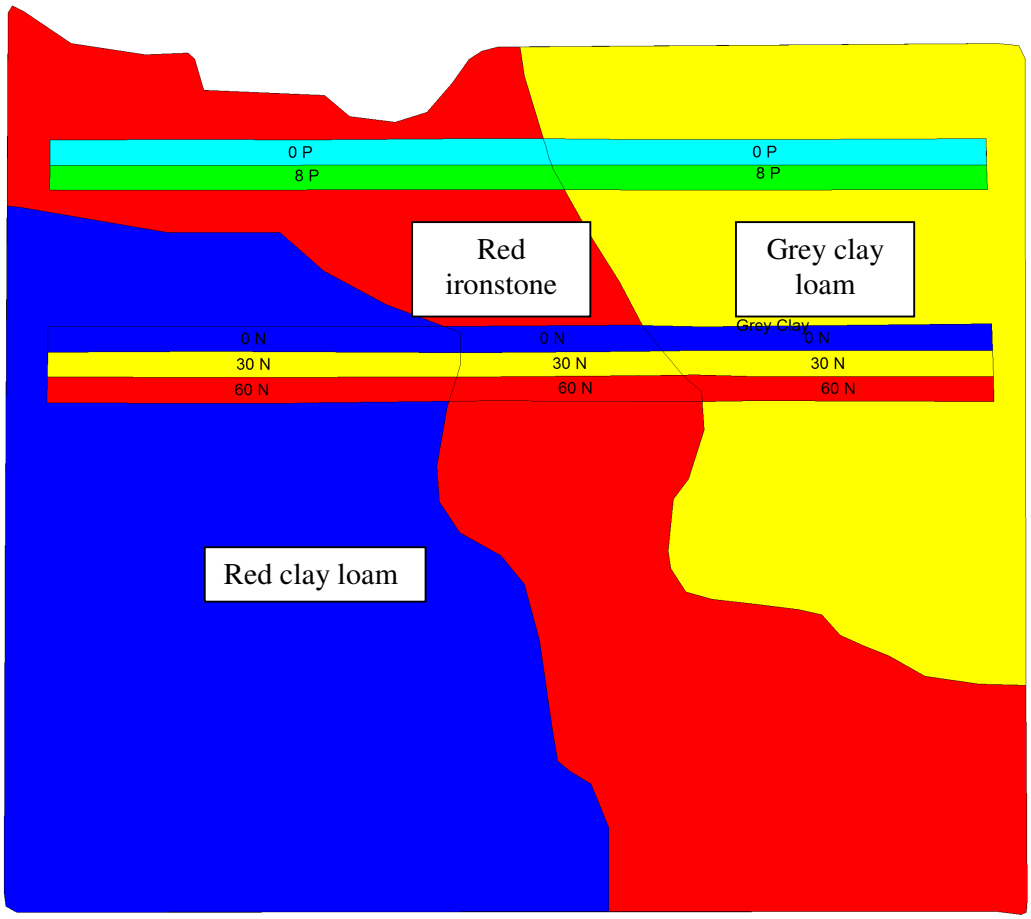

Figure 2: Zones identified by the farmer prior to sowing. The trial strips are also shown.

Assessments:
Soil analysis (April)
Soil moisture (July)
Yield

Results:
After sowing, the paddock had staggered germination due to dry topsoil with moisture at depth, marginal for emergence. This patchy emergence was most notable in the red clay-loam compared to the other zones.

Table 1 below shows summarises the soil results taken in March.

Analysis	Red Clay loam	Red Ironstone	Grey Clay-loam
Plant available moisture (0-100cm)	98	159	117
Total available N (kg N/ha) (0-100cm)	77	36	61
Colwell P (mg/kg)*	27	19	25
PBI*	100	87	83
Status (Colwell P)	Adequate	Responsive	Adequate

DGT*	26	25	24
Status (DGT)	Adequate	Responsive	Adequate
pH ($CaCl_2$) 0-10cm	7.9	8	8
pH ($CaCl_2$) 10-40cm	8.7	8.6	8.4
pH ($CaCl_2$) 40-70cm	9.1	9	8.8
pH ($CaCl_2$) 70-100cm	9	9	9

*Topsoil only

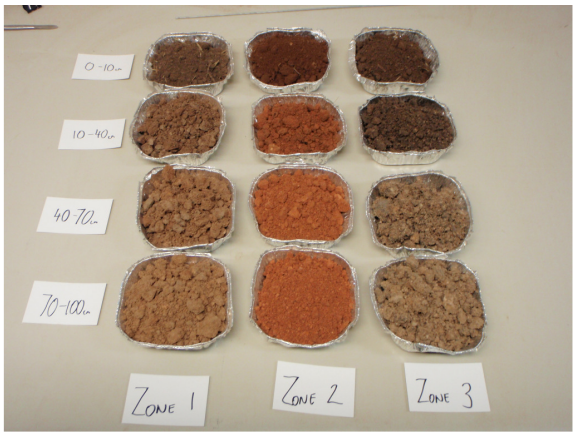

Figure 3: Soil samples taken from the different zones in March.

When comparing the various radiometrics, the EM38 and Potassium seemed to be the best at identifying the distinct zones better than the Total Count and Thorium (Figure 4-7).

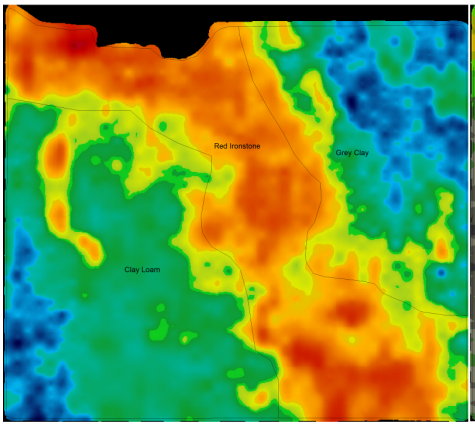

Figure 4: EM38

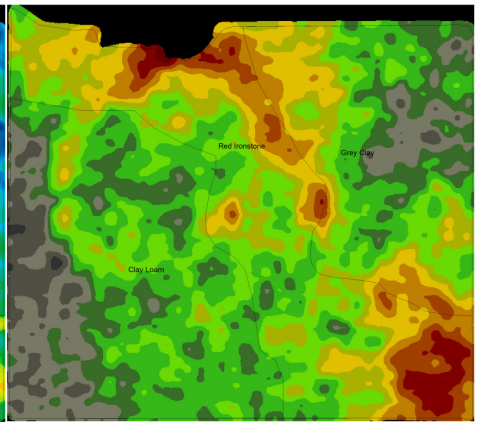

Figure 5: Radiometric: Potassium

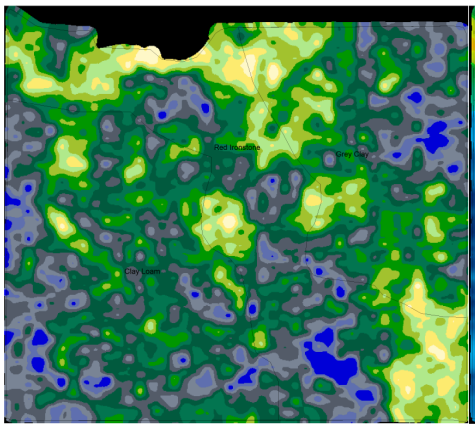

Figure 6: Radiometric Thorium

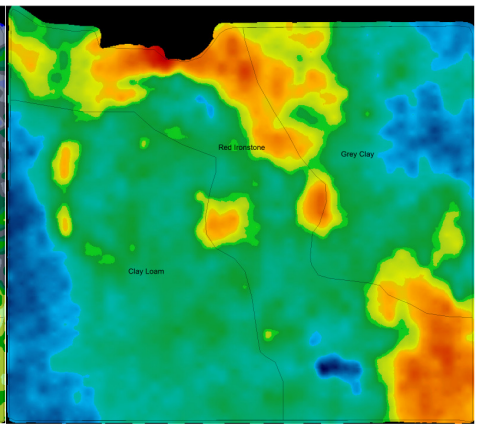

Figure 7: Radiometric: Total Count

Upon harvest, it was evident that the grey clay was higher yielding than the red clay loam. This was contrary to what the farmer would have expected. The growing season was below average in 2011. A higher water storing capacity of the Red Ironstone and Grey clay was higher than Red Clay loam. It was also noted that with staggered germination post sowing, that establishment was relatively poor in the red clay loam compared to the other zones. This difference and the subsequent delayed maturity may well have been the difference in yield in 2011.

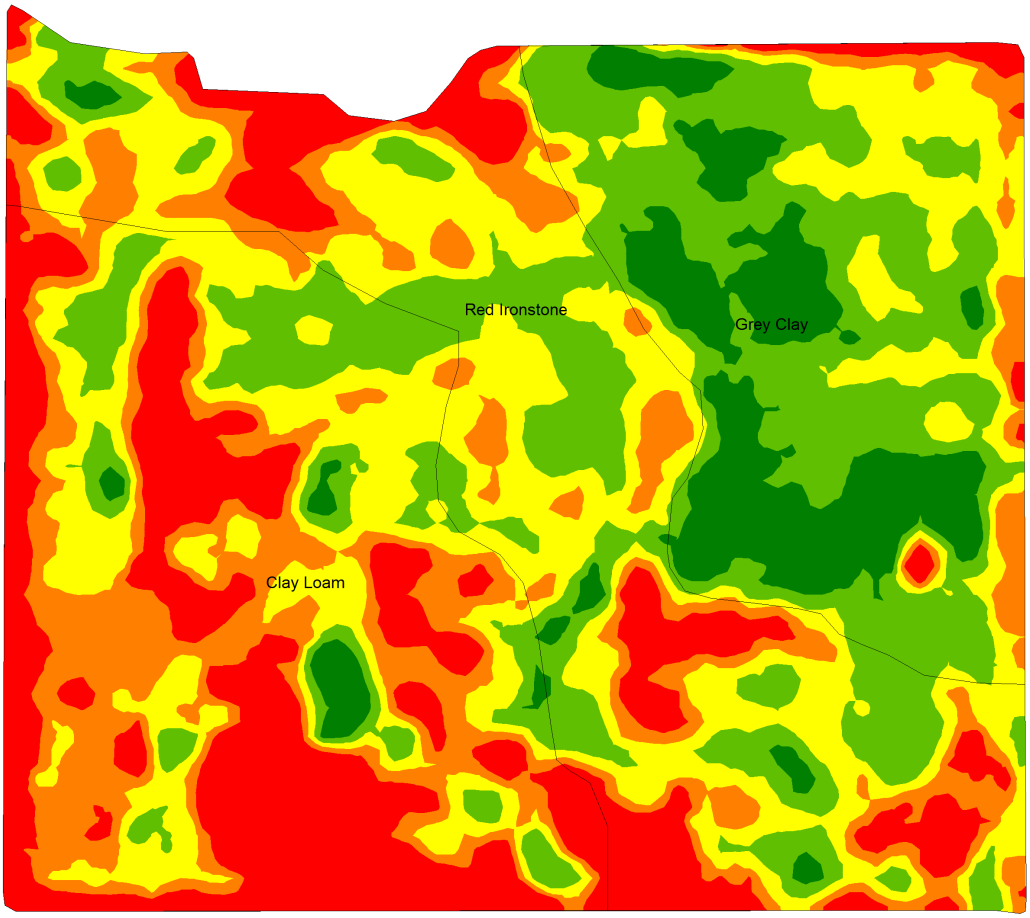

Figure 4: Paddock yield map 2011.

When comparing the strips, there was no noticeable difference between the different rates applied (Figure 4). If anything, there was a tendency for the nil applied to be higher yielding.

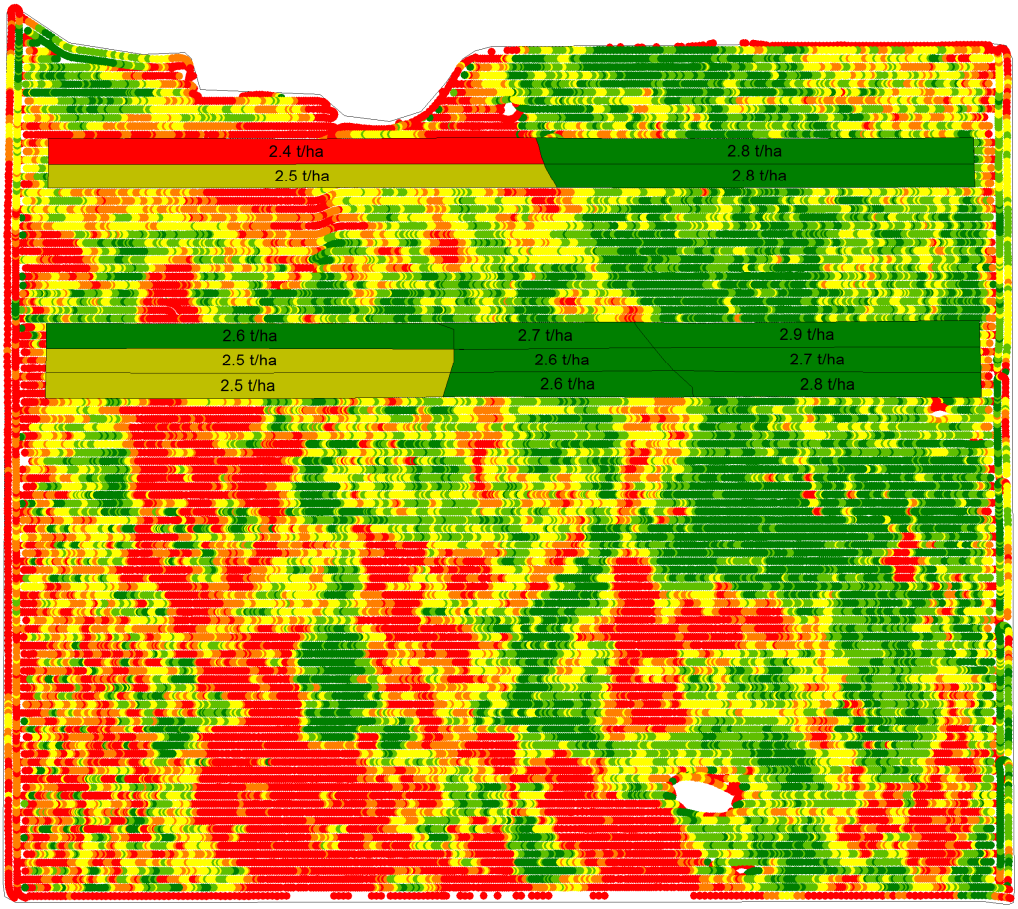

Figure 5: Yield maps with strips. Green yield = 2.5-2.9t/ha, yellow = 2.5t/ha, red = 2.4t/ha.

What does this mean for the farmer?

This demonstration has shown that there are many tools available to help farmers identify paddock zones. In this case, the farmer was easily able to identify roughly each zone, however from the yield map it is apparent that using the yield maps, to get those zones 100%, slight changes were required. There was little advantage in applying fertiliser in any of the zones, however, emergence issues may have confounded some of these responses. Both P tests (Colwell and DGT) indicated that Zone 2 was responsive to P. There appeared to be a slight increase in yield to P. This was indicated visually during the season, though the difference was thought to be greater and unlikely to be significant.

Most importantly, this demonstration has highlighted that you don't need to invest heavily to practice PA and VR. The farmer identified 80-90% of the

variation with the help of other tools. Those tools will prove very important when the zones as less pronounced or in paddocks that have been recently acquired.

Who was involved?

- Cameron Barber (site host)
- BCG trials team
- James Challis, Precision Agronomics Australia
- Simon Craig, BCG Research Agronomist and SPAA trial coordinator
- Andrew Whitlock, Precision Agriculture (Project co-ordinator)

This project was funded by the Grains Research and Development Corporation (GRDC).

For more information

Nicole Dimos
SPAA Executive Officer
P: 0437 422 000
E: nicole@spaa.com.au

Simon Craig
BCG
P: 03 5492 2787
E: simon@bcg.org.au

GRDC
Grains Research & Development Corporation

www.spaa.com.au