FarmLink
Research Report 2014

02

The strategic use of tillage within conservation farming

2014 Trial Site

Project Partners

FarmLink Research

CSIRO

NSW GOVERNMENT Department of Primary Industries

Funding Partner

GRDC
Grains Research & Development Corporation

The strategic use of tillage within conservation farming

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The project on the strategic use of tillage within no-till systems continued at the four sites in 2014. This year we report on the ongoing trends in aggregate stability (a soil physical property) at the Harden site. We also show a little of the soil P story that we are working on.

Soil Physical Properties

We have been collecting data on bulk density and water infiltration rates over the last two years. However the variable of most interest is the wet aggregate stability, a measure of how resistant the soil is to breaking down under raindrop impact or traffic. In 2013 we thought the story was over at the Harden site: the soil had recovered. However the wet autumn of 2014 resulted in a general loss of aggregate stability in all treatments (Figure 1). It also became apparent that the treatments where stubble was burnt never quite reached the same stability as where stubble was retained, or under pasture, although the difference at the site in Figure 1 is only ~5%. At the Thuddungra site, where we are also comparing stubble retention vs stubble burning, aggregate stability was less in the burnt system. So the caution is, although the soils in our trials appear to recover their aggregate stability from a single tillage within 1 to 2 years, recovery is slower where return of organic matter is minimal, and aggregate stability is subject to seasonal fluctuations.

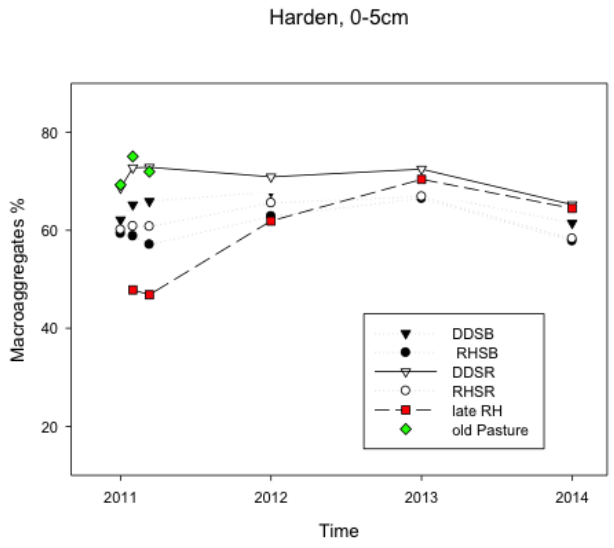

Figure 1. The wet aggregate stability in the surface 0-5 cm at the Harden trial site.

Soil Chemical Properties

Under minimum till or no till management there is a tendency for some nutrients to accumulate on the soil surface. An example from our Daysdale site is given in Figure 2. The soil sampler, when inserted to 10 cm depth, tells us that there is 103 ppm of Colwell P in the soil. As can be seen from the figure however there is a steep gradient of P from 130 to 5 ppm within the top 20 cm of soil. This might not be an issue when there is such an abundance of P in the soil, however in figure 3 we show a site from a P trial. The soil test P is 50 ppm at 0-10cm depth, which sounds more than adequate. However the placement of cereal seed ranged from 3 to 7 cm depth. The emerging seminal roots would experience far less P than indicated by the soil test. This might explain why, in no till systems, we frequently obtain responses to fertiliser P when we would not expect responses. This will be the subject of trial work in 2015.

Final findings and recommendations from this strategic tillage project will be available in 2017.

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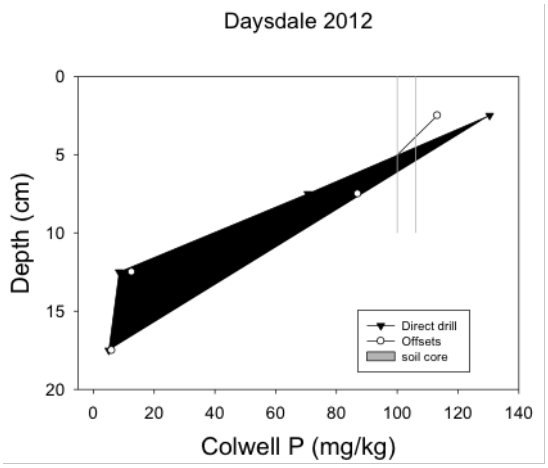
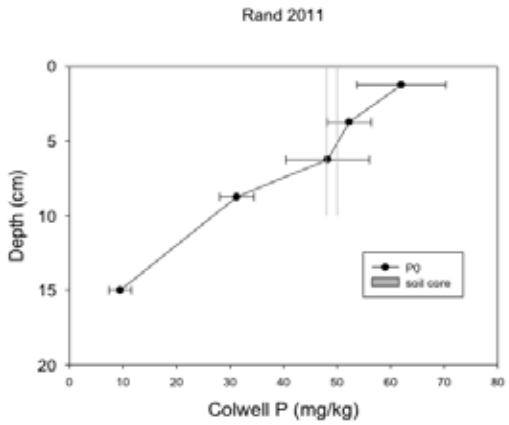


Figure 2. The effect of tillage on the distribution of soil P (Colwell P) with depth at the Daysdale site in 2012.



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