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FarmLink Research Report 2015

Strategic Use of Tillage within No-Till Systems

GRDC Project code – DAN00152

Project Partners



Funding Partners



Trial Site Location Harden, Daysdale, Thuddungra, Berthong

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Introduction

The project on the strategic use of tillage within no-till systems continued at the 4 sites in 2015: Harden, Daysdale (near Corowa), Thuddungra (near Young) and Berthong (near Cootamundra). Soil physical and chemical properties continued to be monitored throughout 2015. Establishment counts, dry matter and grain yields were also measured. The final harvest for the sites occurred in December 2015, except at the Daysdale site where we grew a vetch brown manure crop that was cut for dry matter in October. The final soil sampling at all sites will take place in autumn 2016.

While some soil properties were adversely affected by tillage that took place in 2011, 2012 or 2013, the effects of tillage on dry matter and grain yield have statistically either been neutral or slightly beneficial over the 4 or 5 seasons at each site. The example below shows the effect of treatments on the dry matter production of the vetch crop at Daysdale during 2015. The treatments at this site included:

- Year in which the soil was tilled: 2012 or 2013
- Application of additional nutrients to transform stubble into soil carbon: +/-
- Tillage: on going no-till, scarifying, or off-set discing.

There were 4 replicates of these 12 treatment combinations. The plots were 6m wide and 20 m long and contained two sown strips within each plot.

In 2015 the main effects of 'year of tillage' or of 'additional nutrient application' were not significant. However the mean impact of 'tillage' that had been undertaken 2 or 3 years earlier remained significant:

no-till 4.82 t/ha, scarification 5.99 t/ha, disced 6.24 t/ha s.e. 0.376 t/ha.

This means that the no-till soil yielded less vetch dry matter than either of the tilled treatments, even 2 and 3 years after that tillage. We are analysing the plant tissues to see if N or P nutrition contributed to this effect.

At the CSIRO site at Harden the canola grain yield was surprisingly high considering the finishing conditions (Table 1). The table shows that 25 years of ongoing stubble and tillage treatments had little impact on grain yield in 2015 (the upper 4 data cells). Of direct relevance to this project, there was no significant effect of strategic tillage in 2011 on grain yields in 2015 (the lower 4 data cells with s.e.m given in parentheses) and it is clear that the application of a strategic tillage in 2011 has not harmed yields in the no-till system.

In 2015 we undertook some soil biological tests at the Thuddungra site to compare the effects of tillage, stubble management and nutrients on biological functions within the soil. Following some additional tests in Switzerland, we hope to be able to report some interesting findings later this year.

Grain data from the Thuddungra and Berthong sites were still being processed at the time of reporting.

After the final soil sampling in autumn 2016 we

	Burnt	Retained
Cultivated	2.65	2.76
No-till	2.73 (0.18)	2.49 (0.15)
No-till,	\$268	
Strategically tilled in 2011	2.86 (0.10)	2.56 (0.18)

Table 1. Canola grain yields at Harden in 2015.

will have a large amount of laboratory work to complete and a large statistical task to complete. Final findings and recommendations from this strategic tillage project will be available in early 2017.