



FarmLink Carbon Action on the Ground Trials

2012 Trial Sites



Project Partners

Cropfacts



Funded by



FarmLink Carbon Action on the Ground Trials

Preamble

Work conducted by Clive Kirkby, CSIRO investigated the feasibility of increasing soil carbon (C) levels with the use of balanced amounts of nutrients and incorporation of stubble. His work has established that the humus portion of soil carbon has relatively constant ratio of N, P and S. This has been established as 80N, 20P and 14S per tonne of humus carbon.

Other work conducted by various researchers found that soil carbon levels in Australia are low and a range of factors contribute to the soils ability to sequester C. Parent material of the soil, rainfall and land use are the main contributors. The Federal Government has provided funding to research agencies to test the impacts on soil C of a range of agricultural practices.

Aim

To determine the impact on soil Carbon fraction levels of applications of balanced nutrients, N, P and S, stubble retention, stubble removal and stubble incorporation.

Method

A trial area was selected in a Canola stubble paddock in April 2012. Stubble cuts were collected and stubble dry matter of 1.75t/ha was calculated. Soil samples were collected to establish initial soil status. Stubble and nutrient treatments were applied prior to sowing. Stubble was removed, incorporated or left intact. Nutrients were applied where required by hand spreading 5.94kg/ha of triple super phosphate and liquid applications of Urea at 10.65kg/ha in 112 litres of water on the 17th May 2012.

Pre sowing herbicide applications consisted of 118gm/ha Sakura, 3l/ha Glyphosate 450, 2l/ha Avadex Extra and 0.25% LI700. This was used to control annual ryegrass, wild oats, volunteer canola and fleabane. Plots were sown with Spitfire wheat at 74kg/ha targeting 150 plants/m² with 50kg/ha of MAP. 500ml/ha of Precept was applied to control late germinations of canola on 1st August, 2012. 110kg/ha of Urea was applied across all the 20m plots on the same day.

Table 1: Treatment list.

Treatment	Stubble	Nutrients	Timing	
1	Intact	Base	Sowing	Absolute control
2	Intact	Base	Harvest	Absolute control
3	Intact	Extra	Sowing	
4	Intact	Extra	Harvest	
5	Incorporated	Base	Sowing	
6	Incorporated	Base	Harvest	
7	Incorporated	Extra	Sowing	
8	Incorporated	Extra	Harvest	
9	Removed	Base	Sowing	
10	Removed	Base	Harvest	
11	Removed	Extra	Sowing	
12	Removed	Extra	Harvest	

Results

Table 2: Trial plan.

12	11	10	9	8	7	6	5	4	3	2	1	Plot number
8	5	6	3	12	11	4	7	9	10	1	2	Replicate 4
1	7	2	4	8	5	12	9	10	11	3	6	Replicate 3
7	4	3	6	11	9	1	5	8	2	12	10	Replicate 2
9	10	8	1	2	4	12	11	6	7	3	5	Replicate 1

Table 3a: Treatment results.

Treatment	Sub-treatment	t/ha
Stubble	Stubble Incorporated	2.8142
	Stubble Intact	2.7258
	Stubble Removed	2.7871
Nutrients	Nutrient Base	2.7562
	Nutrient Extra	2.7954
Timing	Harvest	2.7208
	Sowing	2.8308

NOTE: Stubble treatments were analysed separately.

Table 3b: Treatment results.

Stubble	Nutrients	Base	Extra		
Incorporated	-	2.9483	2.6800		
Intact	-				
Removed	-				
Stubble	Timing	Harvest	Sowing		
		2.7633	2.8650		
		2.6821	2.7696		
Nutrients	Timing	Harvest	Sowing		
		2.6979	2.8142		
		2.7433	2.8475		
Stubble	Timing Nutrients	Harvest Base	Sowing	2.6612	2.6983
		2.8650	3.0321	2.7533	2.8837
		2.6108	2.6554	2.8154	2.9600
	Stubble	Nutrients	Timing	Stubble Nutrients	
Lsd	0.1777	0.1451	0.1451	0.2513	

Establishment and Head Counts

Mean values for **establishment** was 155 plants/m². Mean values for **head counts** were 286/m².



Photo 1: Stubble groundcover.



Photo 2: Removed stubble plots.



Photo 3: Incorporated plots.



Photo 4: Sown plot incorporated.



Photo 5:
Incorporated
stubble base
nutrients at sowing.



Photo 6:
Incorporated
stubble extra
nutrients at sowing.



Photo 7: Removed
stubble extra
nutrients at sowing.



Photo 8: Intact extra
stubble nutrients at
sowing.

Discussion

There was a significant yield advantage for the incorporated stubble plots with a base level of nutrients. This was unexpected and we are unsure why this has occurred. The trial will be continued in 2013 and soil sampling will identify any changes to nutrient status, moisture and C fractions within the treatments. It is the goal of the project to establish two commercial scale trials on-farm in 2013. There will also be three paired paddock sites which will compare pasture and cropping impacts on soil C fractions. We will also investigate the financial impacts of implementing the Kirkby system and if it is economically viable to invest in Carbon sequestration in the Australian carbon trading scheme.