Biochar investigation- John Auld

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Purpose:	To demonstrate if there are any benefits of applying biochar to increase crop and pasture production in the West Midlands
Location:	John Auld, Marchagee Track
Soil Type:	Poor sand over deep gravel
Rotation:	2009 Pasture, 2010 Wheat, 2011 Lupins

Growing Season Rainfall (April- October 2012): 299 mm plus a further 74 mm in November

BACKGROUND SUMMARY

Biochar from wood or wheat straw has been shown to improve wheat production by up to 450 kg/ha when banded into the row at paddock rates of 1 t/ha; using fertiliser rates of about 25 kg/ha DAP or 100 kg/ha of superphosphate on soils with Colwell phosphorus status of less than 10ppm. Encouraging increases in clover growth rates have also been found in small tubes and bands with incorporated biochar.

The results of these trials need to be further tested on farm. However an affordable supply of biochar is hard to source in WA. The trials so far have often used metallurgical grade charcoal from Bunbury or Wundowie to good effect and it is anticipated that charcoal made from wood by simple charcoal kilns (Top Lit UpDraft; TLUD) will make suitable char in almost smoke free burns.

TRIAL DESIGN

Plot size: 7.2mt x 144 mt harvested Plots are 20 m wide and run full length of the paddock

Machinery use: 36 ft Airseeder at 225 mm row spacing

Repetitions: One rep but full length of paddock

Crop type and varieties used: Barley (Vlaming)

Seeding rates and dates: 60kg Ha sown on the 6/7/2012

Fertilizer rates and dates: 80 kg MAP Extra at seeding.

Herbicide rates and dates: Post emergent only 40 g/ha Lontrel + 750ml/ha Tigrex + 250ml/ha Alpha Cypermetheryn.

Other applications/ treatment rates and dates: Paddock was scarified one week prior to seeding. 100 kg/ha of Urea/Sulfate of Ammonia was spread 8/9/2012.

Table 1. Soil test results.

Sample Depth	(0-10cm)
Soil texture	Loamy sand
Soil colour	Grey
Gravel (%)	Nil
pH (1:5 CaCl2)	5.1
pH (1:5 H2O)	6.1
EC (1:5 H2O)	0.05 dS/m
Organic carbon (Walkley Black)	0.94%
Nitrate nitrogen (KCl)	17 mg/kg
Ammonium nitrogen (KCl)	3 mg/kg
Phosphorus (Colwell)	10 mg/kg
Phosphorus Buffer Index (PBI)	4.6
Phosphorus sorption	Very low
Potassium (Colwell)	34 mg/kg
Sulfur (KCl-40)	4.2 (mg/kg)

RESULTS/STATISTICS

Grain yield at maturity was measured. As there was only one replication, four individual strips were harvested from each of the treated and untreated plots to create 'pseudo' replication. Despite this, there was no difference between biochar treated plots and the untreated control.

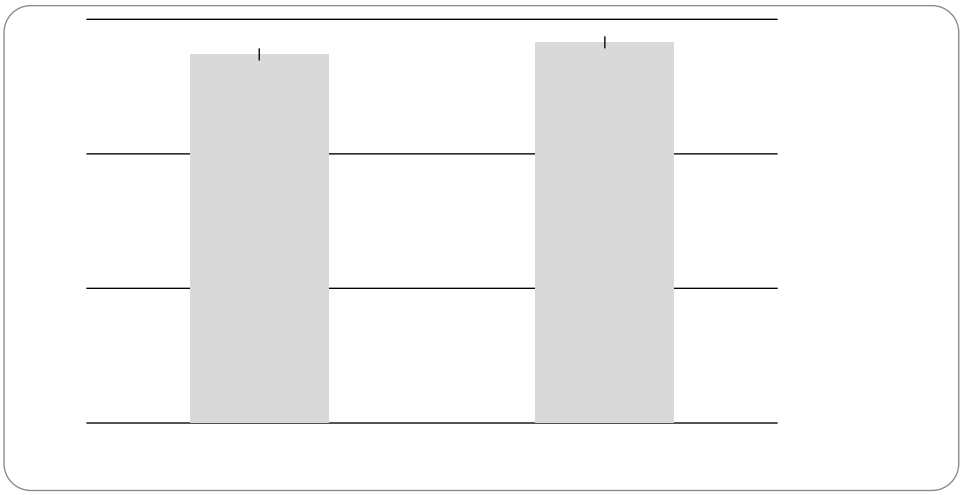

Figure 1. Barley yield with and without biochar, 2012 (t/ha)

OBSERVATION/ DISCUSSION/ MEASUREMENTS

Plant density counts were estimated on the 3rd August 2012 by counting 8 x 1 metre rows along each treatment.

The treatment without Bio Char, there were counted 126 plants per square metre

Where Bio Char was applied, there were 130 plants per square metre.

There were no replications of the treatment applied, so it is difficult to conclude if biochar application was beneficial in plant establishment.

Subsequent visual observations and ratings were done on the 25th September 2012 with no difference noticeable. The inherent variation across the site mad it difficult to gain adequate measurements at this site.

We were not able to detect any difference in grain yield between untreated (nil) and the biochar plot.

Figure 1. Applying and spreading biochar onto the trial, July 2012

PEER REVIEW/REVIEW

Dr Steve Carr, Soiltech and Anne Wilkins (EO WMG)

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