

Negatives and Positives of Cropping Traffic

Aim: Evaluate benefits and penalties of cropping traffic on deep ripping.

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Location: Balla (east of Binu) and Long Term Research Site, Buntine

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Background: Confident adoption of Tramline farming is assisted by reasonable estimates of yield losses from cropping traffic; especially after investment in deep ripping. In two trials we have investigated the yield effect of pre and post seeding traffic in 2003 and 2004.

The results are a little surprising, but confirm some suspicions of some observant farmers that a small amount of compaction, or 'firming' can be beneficial to crop yield.

This is collaboration between the Department and the Northern Agricultural Group at Balla and the Liebe Group at Buntine on their Long Term Research Site. GRDC funds helped support these trials.

Trial Details:

Site	Balla	Buntine (Long Term Trial site)
Plot size and reps	9m x 200m three reps	10.5m x 30m, four replicates
Soil type	Yellow sand over clay	Yellow Sand over Gravel, pH 5.3
Sowing date	2 nd June	29 th May
Conditions at sowing	Moist	Moist
Machinery	Forward 'germinator' single disc	AGWA Airseeder P Sales winged knife points
Seeding rate	75 kg/ha Carnamah	80 kg/ha Wyalkatchem
Fertiliser	68 kg/ha DAPZn, 75 kg/ha Nitrogold and 50 kg/ha MOP	60 kg/ha MAPZSC, 40 kg/ha MOP 40 kg/ha MAPZSC + 60L UAN
Herbicides and Insecticides	Roundup 1 L/ha post = 650mL LV60, 5G logran, 5g Ally	25 th May Roundup; 4 th June 1 L/ha Sprayseed 5 th July 250mL Paragon, 100mL LVE MCPA
Paddock History	2002 = barley, 2003 = lupins	2002 = wheat, 2003 = lupins

Treatments

1. Unripped; **2.** Deep ripped to 300mm between 500mm spaced lupins in 2003 **3.** Deep ripped to 450mm before wheat sown in 2004. All deep ripping was between tramlines at and at 500mm tine spacing at Balla and 450mm at Buntine.

Results:

Grain quality poorer at Balla (15.5% protein, 77.8kg hL wt and 1.7% screenings) and better at Buntine (9.9% protein, 84.1 kg hL wt and less than 1% screenings). Treatment changed quality very little at either site.

Table 1. Grain yields from deep ripped treatments and ‘wheelzones’ (2 x tyre width) in wheeled treatments. Calculations are from header cuts and wheel dimensions. All changes are significant at 95% probability.

Site May-Oct rain	BALLA Ripped '03 to 300mm 170 mm and frost Sown with disc openers		BUNTINE Ripped '04 to 450mm 274 mm Sown with narrow points digging to 150mm	
	ripped yield t/ha	'wheelzone' yield t/ha change from ripped	ripped yield t/ha	'wheelzone' yield t/ha change from ripped
Treatment				
DEEP RIPPED	0.93	kg/ha	3.61	kg/ha
Boom pre seeding	1.085	153	3.730	118
Boom post seeding			3.270	-342
Header pre seeding	1.310	378		
Airseeder Box rear pre seeding			3.503	-109

Table 2. Grain yields on the ripped unwheeled soil or in the ‘wheelzone’ (2 x tyre width) analysed from hand cuts 1m long and 600mm wide.

	Vehicle and timing	Unwheeled	Edge	Centre	% ripped	Net effect
t/ha	Balla header pre.	1.099	1.466	0.736		
%unwheeled			133	67	111	yield gain
t/ha	Balla boom pre.	1.099	1.346	0.698		
%unwheeled			123	64	103	yield gain
t/ha	Buntine.boom pre.	3.098	3.296	2.939		
%unwheeled			106	95	103	yield gain
t/ha	Buntine.boom post.	3.098	3.149	2.665		
%unwheeled			102	86	96	yield loss
t/ha	Buntine.AS box pre.	3.098	3.191	2.433		
%unwheeled			103	79	95	yield loss

All differences between edge and centre yields are significant at 95% probability
The differences between edge and unwheeled yields at Balla are also sig. at 95%

Summary:

- Compaction under the centre of cropping traffic wheelmarks, after deep ripping reduces yield; even in dry seasons.
- ‘Firming’ from lateral forces alongside wheelmarks can improve yield.
- Post seeding traffic and intense traffic from seeding plant can produce net negative effects on yield.
- Post seeding spraying traffic at Buntine increased protein by 0.7% and reduced hL wt by 8.2g from 9.8% protein and 82.83 g/hL.
- Appropriate firming by a loaded roller after deep ripping and pre-seeding should help to improve yields from deep ripping and reduce yield loss in dry season.
- Coil packers may be too light to achieve this firming.

Technically reviewed by: Bindi Webb