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Impact of Long Term Controlled Traffic

Trial ID: **BB1804** Location: **Dalby** Trial Year: **2018**
 Investigator: **Brendan Burton**

Objectives:	To investigate the impact of long term controlled traffic on soil compaction, nutrition and crop performance
Crop:	Sorghum
Planting Date:	5/11/2018
Planting Equipment:	Commercial Double Disc Planter, 9.1m wide on 3m wheel centres (12 Rows Planted)
Row Spacing:	76.2cm
Planting Rate:	3.5kg/ha
Planting Depth:	5cm
Plant Density:	60,000 Plants/ha
Harvest Date:	4/03/2019
Keywords:	Controlled traffic, sorghum

The trial was conducted in a paddock which had been farmed using the same configuration of controlled traffic for over 20 years. The grower had observed a consistent pattern of yield variability within tramlines when cropped to mungbeans in summer 2017/18. There was negligible header trash or stubble cover present due to the previous mungbean crop.

Planting configuration was 4 rows outside of the wheeltracks on left hand side, 4 rows between the wheeltracks and 4 rows outside on right hand side. All sampling was conducted in row 1 (guess row, low potential for header trash coverage, low compaction), row 3 (intermediate row, moderate potential for header trash coverage, low compaction) and row 5 (adjacent to and on inside of wheeltrack, high potential for header trash coverage, increased compaction potential).

Soil Characteristics at Planting:

Situation	0-30cm depth	0-30cm depth	0-30cm depth	EM38 0.75m	100-125mm	
Assessment Date	9/11/2018	9/11/2018	9/11/2018	9/11/2018	14/11/2018	
Assessment Type	COLWELL K	EXCHANGEABLE K	EXCHANGEABLE Ca	EM38	PENETROMETER	
Assessment Unit	mg/kg	meq/100g	meq/100g	mS/m	kPa	
Plant-Evaluation Interval	4 DP1	4 DP1	4 DP1	4 DP1	9 DP1	
ARM Action Codes						
Trt No.	Treatment					
1	Guess Row	330b	0.9b	31.4a	164-	707b
2	Intermediate Row	331b	0.9b	30.8a	165-	706b
3	Adjacent to Wheeltrack	403a	1.1a	30.0b	170-	820a
	LSD P=.05	44	0.1	0.7	nsd	75
	Treatment Prob.(F)=	0.0030	0.0058	0.0018	0.0899	0.0058

NB: There was no significant difference found for all other soil tests carried out (N, P, S, OC, Cu, Fe, Mn, Mg, Z, Al, Na, B,pH & Conductivity)

Means followed by same letter do not significantly differ (P=.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

nsd = No Significant Difference

Impact of Long Term Controlled Traffic

Trial ID: BB1804

Location: Dalby

Trial Year: 2018

Crop Performance:

Assessment Date	14/11/2018	20/12/2018	22/01/2019	4/03/2019	5/03/2019	5/03/2019	
Assessment Type	EMERGENCE	NDVI	COUNT	YIELD	TEST WEIGHT	SCREENINGS	
Assessment Unit	/m ²	Ratio	Heads/m Row	t/ha	kg/hL	%	
Plant-Evaluation Interval	9 DP1	45 DP1	78 DP1	119 DP1			
ARM Action Codes		ET1		ET3			
Trt No.	Treatment						
1	Guess Row	6.5-	0.79	5.5-	4.19-	79.0-	20.0-
2	Intermediate Row	5.7-	0.77-	4.9-	3.86-	79.2-	20.8-
3	Adjacent to Wheeltrack	5.8-	0.77-	5.8-	3.65	79.1-	22.0-
	LSD P=.05	nsd	nsd	nsd	nsd	nsd	nsd
	Treatment Prob.(F)=	0.5519	0.9643	0.2589	0.3886	0.7056	0.8237

Yield cv = 18.4%

Assessment Type

EM38 = Soil conductivity

DVI = Normalized difference vegetation index

Assessment Unit

mS/m = Millisiemens per metre

ARM Action Codes

ET1 = Excluded treatment 1

ET3 = Excluded treatment 3

DP1 = Days after Planting

Comments:

The trial was conducted in a paddock which had shown a consistent pattern of yield variability within tramlines when cropped to mungbeans in summer 2017/18. Comprehensive nutrition testing only showed significant differences in Potassium and Calcium levels. Potassium levels were significantly higher adjacent to the wheeltracks, possibly due to increased trash accumulation. However there was no significant difference in organic carbon with levels of 0.8-0.9% (0-30cm). Calcium levels were significantly lower levels adjacent to the wheeltracks.

Assessment with an EM38, to estimate soil moisture differences, did not show any significant differences. However there was a trend ($p=10\%$) to higher readings adjacent to the wheeltracks.

Penetrometer measurements were taken to 700mm depth at 25mm increments. The most obvious difference in compaction was found near the wheeltracks at 100-125mm. However the magnitude of difference was relatively minor.

Good levels of soil moisture were present at planting, with >150mm also received over a 4 day period at ~mid tillering. Negligible rainfall was received after that time.

Under these conditions there was no significant impact on crop performance assessment across the tramlines. However despite having 8 replicates, the variability in yield was large (cv 18%) with all grain downgraded to sorghum 2 (or poorer) due to levels of screenings.