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## Impact of Soil Disturbance on Soil Water

Trial ID: **BB1805**      Location: **Goondiwindi**      Trial Year: **2018**  
Investigator: **Brendan Burton**

<b>Objective:</b>	<b>To evaluate the impact of soil disturbance on soil water capture and subsequent crop production</b>
<b>Situation:</b>	<b>Fallow followed by Sorghum 2019/2020</b>
<b>Previous Crop:</b>	<b>Wheat 2017</b>
<b>Treatments Imposed:</b>	<b>30/11/2018</b>
<b>Fertiliser:</b>	<b>50 kg/ha MAP Zn on 30/11/2018 at 15-20cm depth</b>
<b>Following Crop:</b>	<b>Sorghum cv. MR Taurus on 1.5m solid rows</b>
<b>Planted:</b>	<b>28/01/2020</b>
<b>Harvest Date:</b>	<b>29/06/2020</b>
<b>Keywords:</b>	<b>Furrowing, fallow efficiency, Sorghum</b>

Treatments all imposed using a 12m wide 1tRIPr unit

1. Standard 1tRIPr tillage shank removed and replaced with a shank plus spear point unit. Wavy coulter and rolling basket removed. **Minimal disturbance with stubble still standing.**
2. Standard 1tRIPr shank with shark fin point plus wavy coulter and rolling basket ('traditional' 1tRIPr setup). **Seed bed created**
3. Standard 1tRIPr shank with shark fin point plus bolt on delving sweeps. Wavy coulter and basket removed. **Deep furrows created.**

Situation		Fallow					
Assessment Date		13/05/2019			30/01/2020		
Assessment Type		EM38			EM38		
Assessment Unit		mS/m			mS/m		
Treatment-Evaluation Interval		164 DAT			426 DAT		
Sampling Depth		0-0.375m	0-0.75m	0-1.5m	0-0.375m	0-0.75m	0-1.5m
Trt No.	Treatment						
1	1tRIPr with narrow point shank only	101-	126-	157-	94a	131-	173-
2	1tRIPr with surface levelling	107-	127-	142-	87ab	119-	152-
3	1tRIPr plus furrow	116-	137-	155-	78b	114-	157-
LSD P=		nsd	nsd	nsd	11.2	nsd	nsd
Treatment Prob.(F)=		0.32	0.44	0.44	0.03	0.11	0.14

nsd = no significant difference

DAT = days after treatments imposed

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.

Crop Name		Sorghum				
Crop Variety		MR Taurus				
Assessment Date		20/02/2020	29/06/2020	30/06/2020	30/06/2020	30/06/2020
Assessment Type		EMERGENCE	YIELD	PROTEIN	MOISTURE	TEST WEIGHT
Assessment Unit		/m <sup>2</sup>	t/ha	%	%	kg/hL
ARM Action Codes		ET3				ET3
Trt No.	Treatment					
1	1tRIPr with narrow point shank only	5.3-	2.87-	12.5-	14.8-	78.8-
2	1tRIPr with surface levelling	5.4-	2.85-	12.4-	14.7-	79.1-
3	1tRIPr plus furrow	5.5	2.54-	12.3-	14.6-	77.7
LSD P=		nsd	nsd	nsd	nsd	nsd
Treatment Prob.(F)=		0.87	0.07	0.23	0.40	0.33

Yield cv = 8.8%

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### Assessment Type

EM38 = Soil conductivity

### Assessment Unit

mS/m = millisiemens per metre

### ARM Action Codes

ET3 = Excluded treatment 3

DAT = Days after treatments imposed

### **Conclusions:**

This trial was conducted to evaluate the impact of furrows for improving soil water capture during fallow periods. All treatments were imposed in November 2018 together with fertiliser application. The following crop was not planted until January 2020 due to dry conditions. During this fallow period ~190mm of rain was received.

Treatment 1 provided very little soil disturbance whilst still allowing fertiliser to be applied to ~20cm depth. Treatment 2 resulted in a high level of surface soil disturbance and removed any standing stubble. This treatment allowed an evaluation a 1tRIPr approach compared to minimal soil disturbance. Treatment 3 including the delving units to create a wide furrow with the goal of increasing water storage in the furrowed areas.

An EM38 assessment 2 days after planting showed a significantly lower EM38 reading following a pass of the 1tRIPr with furrow delving Treatment 3) compared to the control treatment (Treatment 1) at the 0.375m depth. For all other EM38 timings and depths there was no significant difference between treatments.

Sorghum emergence counts showed no significant difference between treatments. Crop yields were reasonable given the extended dry fallow period and marginal planting moisture. There was no significant difference in yield between treatments at the 5% level. However, there was a trend (p=10%) for significantly reduced yield where the 1tRIPr with furrowing was imposed. There was no difference in grain quality between treatments.

In this situation, there was no indication of any benefit in soil water measurements using the EM38 from creation of a furrow or from 'roughing up' the soil surface by seed bed creation with a 1tRIPr. There was also no indication of any benefit in yield or grain quality and a clear trend to reduced yield where furrowing had been imposed.

Crop Description	
<b>Crop 1:</b>	Fallow
<b>Crop 2:</b>	Grain Sorghum cv. MR Taurus
<b>Planting Date:</b>	28/01/2020
<b>Planting Rate/Unit:</b>	2.7 kg/ha
<b>Planting Method:</b>	Direct Drilled
<b>Depth:</b>	5cm
<b>Planting Method:</b>	Double Disc
<b>Row Spacing/Unit:</b>	1.5m
<b>Harvest Date:</b>	29/06/2020
<b>Planting Density/Unit:</b>	55,000 plants/ha
<b>Harvest Width/Unit:</b>	12m
<b>Harvest Length/Unit:</b>	1029m
<b>Soil Moisture:</b>	Slightly Wet
<b>Harvest Equipment</b>	CLASS commercial harvester

Application Description	
<b>Application Date:</b>	30/11/2018
<b>Application Start Time:</b>	9.00 AM
<b>Application Stop Time:</b>	1:00 PM
<b>Applied By:</b>	Grower

Application Equipment	
<b>Application Equipment:</b>	1tRIPr