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Any product referred to in this document must be used strictly as directed, and in accordance with all label or permit instructions. Always consult the label prior to use.

Chickpea Sowing Setup

Trial ID: RB1801 **Location:** Billa Billa **Trial Year:** 2018
Investigator: Richard Black

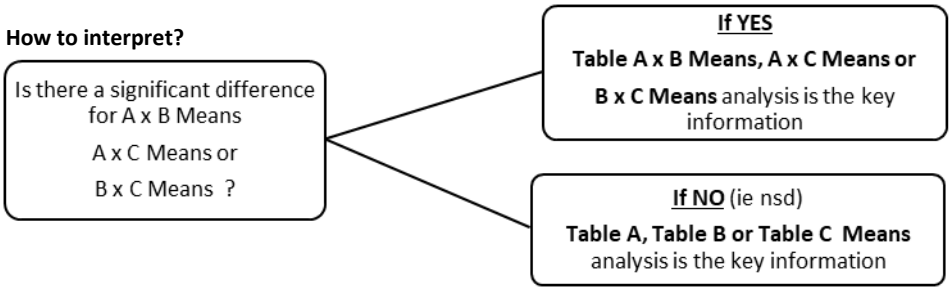
Objective:	**To evaluate the impact of planter type, sowing depth and plant population on chickpea production**			
Row Spacing:	**32 cm**			
Planting Date:	**23/05/2018**			
Planter:	**Small Plot Planter (Disc)**		**Small Plot Planter (Tyne)**	
Planting Depth:	**Shallow**	**Deep**	**Shallow**	**Deep**
Planting Depth (Under press wheel):	**5cm**	**5cm**	**6cm**	**11cm**
Harvest Date:	**1/11/2018**			
Harvest Equipment:	**Small Plot Header**			
Keywords:	**Chickpea, plant population**			

The trial was setup to evaluate planter type, sowing depth, plant population and time of sowing. However establishment at the 2nd sowing time was negligible due to pig damage. Data was only generated from the 1st sowing time.

Trial designed and analysed as a Factorial

	In Simple Terms
Table of A Means:	Mean of 'Planter' performance with **ALL** 'Depth' treatments and 'Plant Population' treatments
Table of B Means:	Mean of 'Depth' performance with **ALL** 'Planter' treatments and 'Plant Population' treatments
Table of C Means:	Mean of 'Plant Population' performance with **ALL** 'Planter' treatments and 'Depth' treatments
Table of A x B Means:	'Planter' performance with **EACH** 'Depth' treatment
Table of A x C Means:	'Planter' performance with **EACH** 'Plant Population' treatment
Table of B x C Means:	'Depth' performance with **EACH** 'Plant Population' treatment

How to interpret?



Chickpea Sowing Setup

Trial ID: RB1801 **Location:** Billa Billa **Trial Year:** 2018

Key data for comparison is highlighted in grey

Crop Name / Crop Variety		Chickpea PBA Seamer		
Assessment Date		18/06/2018	14/08/2018	1/11/2018
Assessment Type		EMERGENCE	NDVI	YIELD
Assessment Unit		/m²	Ratio	t/ha
Plant-Evaluation Interval		26 DP1	83 DP1	162 DP1
ARM Action Codes		T1		TY2
Trt No.	**Treatment**			
TABLE OF A MEANS (Planter)				
1	Disc	13b	0.43b	1.34b
2	Tyne	22a	0.51a	1.54a
TABLE OF B MEANS (Depth)				
1	Shallow	18-	0.49a	1.48a
2	Deep	17-	0.45b	1.40b
TABLE OF C MEANS (Plant Population)				
1	10 Plants/m²	8d	0.36c	1.25c
2	20 Plants/m²	15c	0.45b	1.41b
3	30 Plants/m²	21b	0.48b	1.48b
4	40 Plants/m²	27a	0.58a	1.62a
TABLE OF A x B MEANS (Planter x Depth)				
	Disc x Shallow	14-	0.43-	1.35-
	Disc x Deep	13-	0.42-	1.34-
	Tyne x Shallow	23-	0.54-	1.61-
	Tyne x Deep	22-	0.48-	1.47-
TABLE OF A x C MEANS (Planter x Plant Population)				
	Disc x 10 Plants/m²	6-	0.30-	1.17-
	Disc x 20 Plants/m²	11-	0.40-	1.32-
	Disc x 30 Plants/m²	15-	0.42-	1.34-
	Disc x 40 Plants/m²	22-	0.58-	1.55-
	Tyne x 10 Plants/m²	11-	0.41-	1.33-
	Tyne x 20 Plants/m²	19-	0.50-	1.51-
	Tyne x 30 Plants/m²	27-	0.54-	1.62-
	Tyne x 40 Plants/m²	32-	0.58-	1.69-
TABLE OF B x C MEANS (Depth x Plant Population)				
	Shallow x 10 Plants/m²	7-	0.37-	1.27-
	Shallow x 20 Plants/m²	16-	0.48-	1.50-
	Shallow x 30 Plants/m²	21-	0.49-	1.50-
	Shallow x 40 Plants/m²	28-	0.60-	1.65-
	Deep x 10 Plants/m²	9-	0.35-	1.23-
	Deep x 20 Plants/m²	13-	0.42-	1.33-
	Deep x 30 Plants/m²	21-	0.48-	1.47-
	Deep x 40 Plants/m²	26-	0.56-	1.59-

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

Chickpea Sowing Setup

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Crop Name / Crop Variety		Chickpea PBA Seamer		
Assessment Date		18/06/2018	14/08/2018	1/11/2018
Assessment Type		EMERGENCE	NDVI	YIELD
Assessment Unit		/m²	Ratio	t/ha
Crop Stage Majority		04V2		
Plant-Evaluation Interval		26 DP1	83 DP1	162 DP1
ARM Action Codes		T1		TY2
Trt No.	Treatment			
TABLE OF A x B x C MEANS (Planter x Depth x Plant Population)				
	Disc x Shallow x 10 Plants/m²	5-	0.28-	1.16-
	Disc x Shallow x 20 Plants/m²	14-	0.43-	1.41-
	Disc x Shallow x 30 Plants/m²	13-	0.43-	1.31-
	Disc x Shallow x 40 Plants/m²	23-	0.59-	1.53-
	Tyne x Shallow x 10 Plants/m²	10-	0.45-	1.38-
	Tyne x Shallow x 20 Plants/m²	18-	0.54-	1.59-
	Tyne x Shallow x 30 Plants/m²	29-	0.54-	1.68-
	Tyne x Shallow x 40 Plants/m²	33-	0.62-	1.77-
	Disc x Deep x 10 Plants/m²	8-	0.33-	1.18-
	Disc x Deep x 20 Plants/m²	8-	0.37-	1.23-
	Disc x Deep x 30 Plants/m²	16-	0.41-	1.36-
	Disc x Deep x 40 Plants/m²	22-	0.57-	1.57-
	Tyne x Deep x 10 Plants/m²	11-	0.37-	1.29-
	Tyne x Deep x 20 Plants/m²	19-	0.47-	1.42-
	Tyne x Deep x 30 Plants/m²	25-	0.54-	1.57-
	Tyne x Deep x 40 Plants/m²	31-	0.55-	1.60-

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
18/06/2018
EMERGENCE /m² 26 DP1 T1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	63	6265.680473				
R	3	77.144970	25.714990	0.749	0.5286	
A	1	1198.224852	1198.224852	34.905	0.0001	3
B	1	6.250000	6.250000	0.182	0.6716	3
AB	1	4.474852	4.474852	0.130	0.7198	4
C	3	3163.683432	1054.561144	30.720	0.0001	4
AC	3	131.878698	43.959566	1.281	0.2925	6
BC	3	48.853550	16.284517	0.474	0.7017	6
ABC	3	90.421598	30.140533	0.878	0.4596	8
ERROR	45	1544.748521	34.327745			

Chickpea Sowing Setup

Trial ID: RB1801 **Location:** Billa Billa **Trial Year:** 2018

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
14/08/2018
NDVI Ratio 83 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	63	0.832182				
R	3	0.029578	0.009859	2.212	0.0998	
A	1	0.107671	0.107671	24.154	0.0001	0.03
B	1	0.020080	0.020080	4.504	0.0393	0.03
AB	1	0.007258	0.007258	1.628	0.2085	0.05
C	3	0.412407	0.137469	30.839	0.0001	0.05
AC	3	0.033179	0.011060	2.481	0.0731	0.07
BC	3	0.007475	0.002492	0.559	0.6449	0.07
ABC	3	0.013938	0.004646	1.042	0.3831	0.10
ERROR	45	0.200597	0.004458			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
1/11/2018
YIELD t/ha 162 DP1 TY2

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	62	3.017296				
R	3	0.253633	0.084544	4.872	0.0052	
A	1	0.601343	0.601343	34.656	0.0001	0.07
B	1	0.094784	0.094784	5.463	0.0240	0.07
AB	1	0.053584	0.053584	3.088	0.0858	0.09
C	3	1.118923	0.372974	21.495	0.0001	0.09
AC	3	0.052903	0.017634	1.016	0.3946	0.13
BC	3	0.052582	0.017527	1.010	0.3973	0.13
ABC	3	0.026074	0.008691	0.501	0.6836	0.19
ERROR	44	0.763471	0.017352			

Assessment Type
NDVI = Normalized difference vegetation index
ARM Action Codes
T1 = [C1]*1/0.65
TY2 = 0.5555555*[4]

DP1 = Days after Planting

Chickpea Sowing Setup

Trial ID: **RB1801** **Location:** **Billa Billa** **Trial Year:** **2018**

Conclusions:

This trial was conducted in the Billa Billa area to determine if chickpea sowing depth and method (disc/tyne) had any influence on plant growth, architecture or yield.

Planting time was also looked at but due to wild pig damage this part of the trial had to be abandoned.

Sowing was conducted at deep and shallow depth with both tyne and disc. For each comparison there were four plant populations, targeting 10,20,30 or 40 plants/sq m.

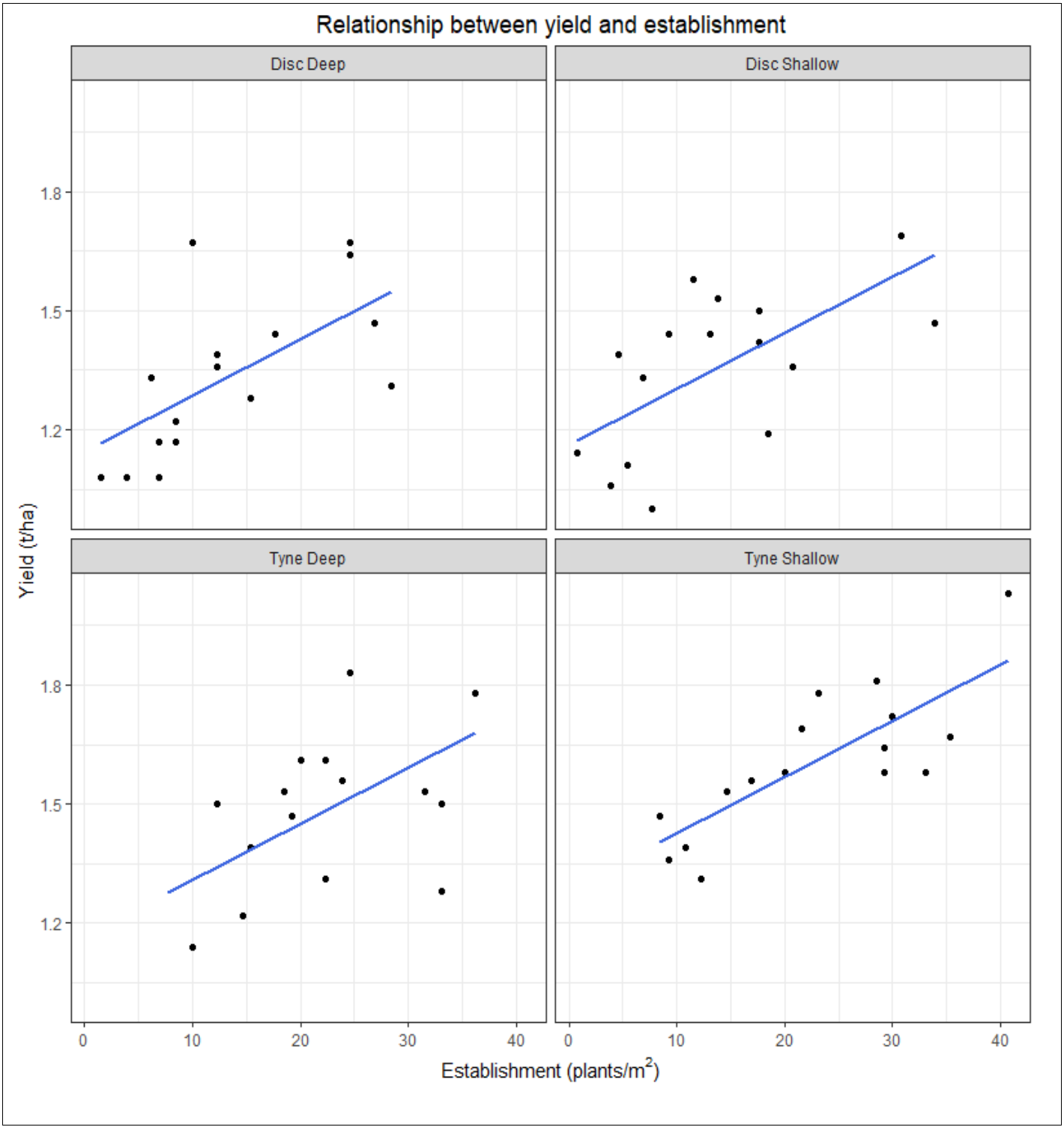
We were unable to differentiate disc planting depth due to conditions. Both disc depth treatments ended up being 5cm under the pressed soil or 10cm from the soil surface.

The two depths achieved with Tyne planting were: 6cm under pressed soil/ 12cm from surface (shallow) to 11cm under pressed soil/17 cm from surface (deep).

Factorial analysis showed tyne planting led to higher population, biomass and yield. There was also a significant yield increase from shallow v deep planting.

As expected, there was a very strong relationship between plant population and yield, with increased yield at higher plant populations. NB even at low populations (eg 5-10 plants/m^2) yields of over 1 t/ha were achieved.

The key analysis was to compare crop yield per unit of plant population. Analysis by SAGI showed a significant yield advantage by shallow sowing with the tyne planter compared to the other sowing methods. Although all planting methods resulted in a similar increase in yield per unit of plant population, the shallow sown tyne planting had increased the yield at all populations. Results below:



Predictions:					
Treatment	**Slope**	**SE Slope**	**Intercept**	**SE Intercept**	**LSD Intercept**
Disc Deep	0.014	0.002	1.145	0.057	b
Disc Shallow	0.014	0.002	1.162	0.057	b
Tyne Deep	0.014	0.002	1.167	0.067	b
Tyne Shallow	0.014	0.002	1.285	0.067	a

There was a significant main effect of Trt, as well as a significant main effect of establishment.

There was not a significant interaction between Treatment and establishment, so there is one common slope for all Treatments, demonstrating that the relationship between yield and establishment is consistent for all Treatments. This means that for each unit increase in establishment, you can expect a yield increase of approximately 0.014 t/ha, regardless of the Treatment considered. The significant Treatment main effect results in different intercepts for each regression line, however only the intercept for the Tyne Shallow treatment combination was significantly different from the other intercepts.