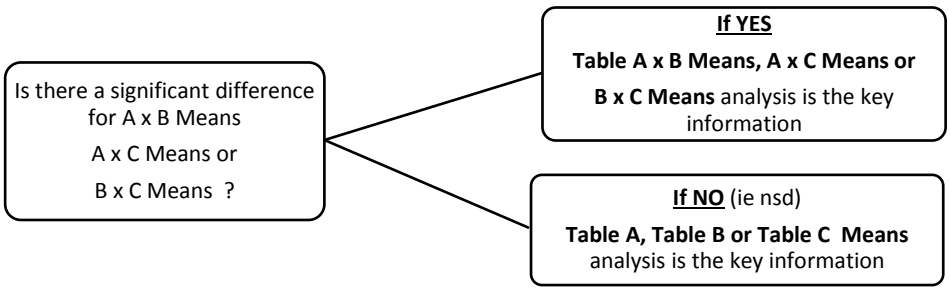
Chickpea Desiccation Timing

Trial ID: RB1808 **Location:** Moree **Trial Year:** 2018
Investigator: Richard Black

Objective:	**To evaluate the impact of harvest management on chickpea yield and harvest losses**		
Crop:	**Chickpea cv. PBA Seamer**		
Planting Date:	**31/05/2018**		
Planting Equipment:	**Tyne Planter**		
Planting Rate:	**65kg/ha**		
Row Spacing:	**76 cm**		
Application Code:	**A**	**B**	**C**
Application Date:	**16/10/2018**	**26/10/2018**	**5/11/2018**
Application Timing:	**26 Days prior to Harvest**	**16 Days prior to Harvest**	**7 Days prior to Harvest**
Crop Stage at Application:	**58% of pods mature, 42% pods immature**	**83% of pods mature**	**88% of pods mature**
Harvest Timing:	**H1 Planned Harvest: 12/11/2018** **H2 Delayed Harvest: 27/11/2018**		
Keywords:	**Chickpea, desiccant**		

NB: Trial designed and analysed as a Factorial

	In Simple Terms
Table of A Means:	Mean of 'Desiccant' performance with **ALL** 'Desiccant Timing' and 'Harvest Timing' treatments
Table of B Means:	Mean of 'Desiccant Timing' performance with **ALL** 'Desiccant' and 'Harvest Timing' treatments
Table of C Means:	Mean of 'Harvest Timing' performance with **ALL** 'Desiccant' and 'Desiccant Timing' treatments
Table of A x B Means:	'Desiccant' performance with **EACH** 'Desiccant Timing' treatment
Table of A x C Means:	'Desiccant' performance with **EACH** 'Harvest Timing' treatment
Table of B x C Means:	'Desiccant Timing' performance with **EACH** 'Harvest Timing' treatment



Significant results highlighted in grey for each assessment

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Trt No.	Treatment	Product Rate	Appln. Code	12/11/2018 DISCOLOUR % 27 DAA/17 DAB/ 7 DAC AA	12/11/2018 LEAF DROP % 27 DAA/17 DAB/ 7 DAC	12/11/2018 & 27/11/2018 YIELD t/ha TY10	26/11/2018 & 5/12/2018 MOISTURE %
	Crop Name / Crop Variety			Chickpea PBA Seamer			
	Assessment Date			12/11/2018	12/11/2018	12/11/2018 & 27/11/2018	26/11/2018 & 5/12/2018
	Assessment Type			DISCOLOUR	LEAF DROP	YIELD	MOISTURE
	Assessment Unit			%	%	t/ha	%
	Treatment-Evaluation Interval			27 DAA/17 DAB/ 7 DAC	27 DAA/17 DAB/ 7 DAC		
	ARM Action Codes			AA		TY10	
TABLE OF A MEANS (Desiccant)							
1	Untreated	-		70td	70e	0.94-	9.3-
2	Weedmaster Argo	1800ml/ha		84tb	81b	0.92-	9.1-
3	Weedmaster Argo Ally	1100ml/ha 5g/ha		88ta	84a	0.98-	9.3-
4	Gp G Hasten	34g/ha 1% v/v		77tc	74d	0.93-	9.3-
5	Gramoxone	800ml/ha		83tb	77c	0.86-	9.3-
6	Reglone Wetter 1000	3000ml/ha 0.2% v/v		79tc	76cd	0.95-	9.3-
TABLE OF B MEANS (Desiccant Timing)							
1	26 Days Pre-harvest		A	83ta	79a	0.90-	9.3-
2	16 Days Pre-harvest		B	81ta	78a	0.95-	9.2-
3	7 Days Pre-harvest		C	76tb	74b	0.94-	9.3-
TABLE OF C MEANS (Harvest Timing)							
1	Planned Harvest		H1	80t-	77-	1.08a	9.5a
2	Delayed Harvest		H2	81t-	76-	0.78b	9.0b
TABLE OF A x B MEANS (Desiccant x Desiccant Timing)							
1	Untreated	-	A	70th	70h	0.96-	9.3a-f
2	Weedmaster Argo	1800ml/ha	A	91ta	87ab	0.92-	9.1b-f
3	Weedmaster Argo Ally	1100ml/ha 5g/ha	A	93ta	91a	0.92-	9.1c-f
4	Gp G Hasten	34g/ha 1% v/v	A	75tfgh	71gh	0.93-	9.4a-d
5	Gramoxone	800ml/ha	A	85tb	78de	0.81-	9.3a-f
6	Reglone Wetter 1000	3000ml/ha 0.2% v/v	A	83tbc	76efg	0.86-	9.4a-e
1a	Untreated	-	B	70th	70h	0.98-	9.4a-d
2a	Weedmaster Argo	1800ml/ha	B	83tbcd	82cd	0.96-	9.1ef
3a	Weedmaster Argo Ally	1100ml/ha 5g/ha	B	92ta	86bc	1.01-	9.5a
4a	Gp G Hasten	34g/ha 1% v/v	B	79tc-g	76ef	0.92-	9.0f
5a	Gramoxone	800ml/ha	B	80tb-f	76ef	0.83-	9.1Def
6a	Reglone Wetter 1000	3000ml/ha 0.2% v/v	B	81tb-e	76efg	0.98-	9.3a-f
1b	Untreated	-	C	70th	70h	0.88-	9.2a-f
2b	Weedmaster Argo	1800ml/ha	C	76te-h	74e-h	0.88-	9.1ef
3b	Weedmaster Argo Ally	1100ml/ha 5g/ha	C	78tc-g	74e-h	1.01-	9.3a-e
4b	Gp G Hasten	34g/ha 1% v/v	C	77td-g	73fgh	0.95-	9.4abc
5b	Gramoxone	800ml/ha	C	83tbc	76efg	0.94-	9.4ab
6b	Reglone Wetter 1000	3000ml/ha 0.2% v/v	C	73tgh	76efg	1.01-	9.2a-f

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

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Crop Name / Crop Variety / Description / Assessment Date / Assessment Type / Assessment Unit / ARM Action Codes				Chickpea PBA Seamer		
				26/11/2018 & 5/12/2018 TEST WEIGHT kg/hL	26/11/2018 & 5/12/2018 SCREENING %	Header Front Grain Loss 27/11/2018 COUNT Grain/m² AS
Trt No.	**Treatment**	**Product Rate**	**Appln. Code**			
TABLE OF A MEANS (Desiccant)						
1	Untreated	-		74.6a	8.0-	96t-
2	Weedmaster Argo	1800ml/ha		74.0ab	8.3-	93t-
3	Weedmaster Argo Ally	1100ml/ha 5g/ha		73.8bc	8.7-	80t-
4	Gp G Hasten	34g/ha 1% v/v		74.2ab	8.0-	70t-
5	Gramoxone	800ml/ha		72.5d	7.8-	76t-
6	Reglone Wetter 1000	3000ml/ha 0.2% v/v		73.2cd	7.7-	76t-
TABLE OF B MEANS (Desiccant Timing)						
1	26 Days Pre-harvest		A	72.9b	7.7-	86t-
2	16 Days Pre-harvest		B	74.0a	8.4-	80t-
3	7 Days Pre-harvest		C	74.2a	8.1-	78t-
TABLE OF C MEANS (Harvest Timing)						
1	Planned Harvest		H1	73.2b	7.3b	69tb
2	Delayed Harvest		H2	74.2a	8.9a	94ta
TABLE OF A X B MEANS (Desiccant x Desiccant Timing)						
1	Untreated	-	A	74.7ab	8.5ab	87t-
1b	Untreated	-	B	74.4abc	8.1ab	107t-
1c	Untreated	-	C	74.8a	7.5bc	95t-
2	Weedmaster Argo	1800ml/ha	A	73.4bc	8.0ab	84t-
2b	Weedmaster Argo	1800ml/ha	B	74.4abc	8.4ab	105t-
2c	Weedmaster Argo	1800ml/ha	C	74.3abc	8.5ab	91t-
3	Weedmaster Argo Ally	1100ml/ha 5g/ha	A	73.1cd	9.3a	120t-
3b	Weedmaster Argo Ally	1100ml/ha 5g/ha	B	73.9abc	8.9ab	62t-
3c	Weedmaster Argo Ally	1100ml/ha 5g/ha	C	74.3abc	7.9ab	63t-
4	Gp G Hasten	34g/ha 1% v/v	A	74.2abc	8.0ab	74t-
4b	Gp G Hasten	34g/ha 1% v/v	B	74.3abc	7.9ab	60t-
4c	Gp G Hasten	34g/ha 1% v/v	C	74.1abc	8.1ab	76t-
5	Gramoxone	800ml/ha	A	70.2e	6.3c	67t-
5b	Gramoxone	800ml/ha	B	73.4bc	9.0a	84t-
5c	Gramoxone	800ml/ha	C	73.7abc	8.1ab	78t-
6	Reglone Wetter 1000	3000ml/ha 0.2% v/v	A	72.0d	6.2c	90t-
6b	Reglone Wetter 1000	3000ml/ha 0.2% v/v	B	73.6abc	8.2ab	69t-
6c	Reglone Wetter 1000	3000ml/ha 0.2% v/v	C	74.1abc	8.7ab	70t-

Chickpea Desiccation Timing

Trial ID: RB1808 **Location:** Moree **Trial Year:** 2018

Crop Name / Crop Variety / Description / Assessment Date / Assessment Type / Assessment Unit / ARM Action Codes				Chickpea PBA Seamer		
				26/11/2018 TEST WEIGHT kg/hL	26/11/2018 SCREENING %	Header Front Grain Loss 27/11/2018 COUNT grain/m² AS
Trt No.	Treatment	Product Rate	Harvest Timing			
TABLE OF B x C MEANS (Desiccant Timing x Harvest Timing)						
1	26 Days Pre-harvest		H1	72.5-	7.0d	80t-
	16 Days Pre-harvest		H1	73.4-	8.0c	66t-
	7 Days Pre-harvest		H1	73.9-	6.9d	63t-
2	26 Days Pre-harvest		H2	73.4-	8.4bc	92t-
	16 Days Pre-harvest		H2	74.6-	8.8ab	95t-
	7 Days Pre-harvest		H2	74.6-	9.4a	96t-

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
12/11/2018
DISCOLOUR % 27 DAA/17 DAB/7 DAC AA

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	6456.992975				
R	3	32.998568	10.999523	0.579	0.6300	
A	5	2491.302051	498.260410	26.235	0.0001	2
B	2	639.482019	319.741009	16.835	0.0001	2
AB	10	940.795004	94.079500	4.954	0.0001	4
C	1	1.389575	1.389575	0.073	0.7873	1
AC	5	82.839534	16.567907	0.872	0.5024	4
BC	2	8.360358	4.180179	0.220	0.8028	2
ABC	10	265.637232	26.563723	1.399	0.1910	6
ERROR	105	1994.188634	18.992273			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
12/11/2018
LEAF DROP % 27 DAA/17 DAB/7 DAC

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	7773.437500				
R	3	119.965278	39.988426	1.921	0.1308	
A	5	3018.229167	603.645833	28.991	0.0001	3
B	2	688.541667	344.270833	16.534	0.0001	2
AB	10	1344.791667	134.479167	6.459	0.0001	5
C	1	29.340278	29.340278	1.409	0.2379	2
AC	5	198.784722	39.756944	1.909	0.0989	4
BC	2	77.430556	38.715278	1.859	0.1609	3
ABC	10	110.069444	11.006944	0.529	0.8665	6
ERROR	105	2186.284722	20.821759			

Chickpea Desiccation Timing

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FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
YIELD t/ha TY10

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	8.240791				
R	3	1.125057	0.375019	14.555	0.0001	
A	5	0.195014	0.039003	1.514	0.1918	0.09
B	2	0.071026	0.035513	1.378	0.2565	0.06
AB	10	0.226472	0.022647	0.879	0.5553	0.16
C	1	3.407956	3.407956	132.264	0.0001	0.05
AC	5	0.226119	0.045224	1.755	0.1285	0.13
BC	2	0.108225	0.054113	2.100	0.1276	0.09
ABC	10	0.175463	0.017546	0.681	0.7399	0.22
ERROR	105	2.705460	0.025766			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
26/11/2018
MOISTURE %

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	20.278264				
R	3	0.897431	0.299144	3.700	0.0141	
A	5	0.689514	0.137903	1.705	0.1397	0.2
B	2	0.077639	0.038819	0.480	0.6201	0.1
AB	10	1.602361	0.160236	1.982	0.0425	0.3
C	1	6.043403	6.043403	74.741	0.0001	0.1
AC	5	0.891181	0.178236	2.204	0.0593	0.2
BC	2	0.106806	0.053403	0.660	0.5188	0.2
ABC	10	1.479861	0.147986	1.830	0.0640	0.4
ERROR	105	8.490069	0.080858			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
26/11/2018
TEST WEIGHT kg/hL

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	142	417.933140				
R	3	26.847801	8.949267	5.145	0.0023	
A	5	71.336798	14.267360	8.203	0.0001	0.8
B	2	45.560247	22.780123	13.097	0.0001	0.5
AB	10	45.520957	4.552096	2.617	0.0070	1.3
C	1	31.765748	31.765748	18.264	0.0001	0.4
AC	5	4.025687	0.805137	0.463	0.8030	1.1
BC	2	1.075802	0.537901	0.309	0.7347	0.8
ABC	10	10.913735	1.091373	0.627	0.7874	1.8
ERROR	104	180.886366	1.739292			

Chickpea Desiccation Timing

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FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
26/11/2018
SCREENING %

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	488.653264				
R	3	49.736319	16.578773	7.886	0.0001	
A	5	14.987847	2.997569	1.426	0.2210	0.8
B	2	12.373889	6.186944	2.943	0.0571	0.6
AB	10	59.537778	5.953778	2.832	0.0037	1.4
C	1	92.961736	92.961736	44.220	0.0001	0.5
AC	5	8.799514	1.759903	0.837	0.5263	1.2
BC	2	17.377222	8.688611	4.133	0.0187	0.8
ABC	10	12.142778	1.214278	0.578	0.8290	2.0
ERROR	105	220.736181	2.102249			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA Seamer
27/11/2018
Header Front Grain Loss
COUNT Grain/m² AS

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	1144.041507				
R	3	15.759353	5.253118	0.627	0.5991	
A	5	39.178758	7.835752	0.935	0.4613	2
B	2	4.840037	2.420018	0.289	0.7497	1
AB	10	70.017542	7.001754	0.836	0.5953	3
C	1	69.573101	69.573101	8.305	0.0048	1
AC	5	5.489011	1.097802	0.131	0.9850	2
BC	2	9.914932	4.957466	0.592	0.5552	2
ABC	10	49.694540	4.969454	0.593	0.8163	4
ERROR	105	879.574234	8.376897			

Assessment Type
DISCOLOUR = Phytotoxicity - discoloration
ARM Action Codes
AA = Automatic arcsine square root % transformation
AS = Automatic square root transformation of X+0.5
TY10 = 0.6944445*[C22]

DAA = Days after Application A
DAB = Days after Application B
DAC = Days after Application C

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Conclusions:

Assessment of leaf discolouration and leaf drop were conducted however the main focus was impact on yield from varied desiccant application timings and the impact from harvest delay. Consistent small plot header settings were attempted but environmental and other conditions varied between harvest dates.

Yields were ~ 27% lower at the delayed harvest timing. Grain moisture was significantly lower at the delayed harvest timing with a significant increase also in % screenings at the delayed harvest timing (increased from 7 to 11%).

An assessment of harvest loss was conducted. Individual grain, pods and splits were counted together with the number of grain/pod and grain weight. NB There was no shattering loss of grain or pod drop prior to either harvest.

'Header Front' losses were pods or grain that did NOT physically get into the small plot header for processing. (Data gathered but not presented for grain losses through header processing.)

Header Front losses (grain or pods 'lost' at the front of the header) averaged ~100 grain/m^2 (~200 kg/ha)

In this trial, the Header Front losses represented an extra ~15-20% of harvested yield.

Application Description			
	A	B	C
Application Date:	16/10/2018	26/10/2018	5/11/2018
Application Start Time:	6:00 AM	6:00 AM	6:00am
Application Stop Time:	8:00 AM	8:00 AM	8:00 AM
Application Method:	SPRAY		
Application Timing:	26 days prior harvest	16 days prior harvest	7 days prior harvest
Air Temperature, Unit:	18 C	19 C	22 C
% Relative Humidity:	65	62	45
Wind Velocity, Unit:	4 km/h	8 km/h	5 km/h
Wind Direction:	ENE	S	NE
Dew Presence (Y/N):	No		
% Cloud Cover:	0		0

Crop Stage at Each Application			
	A	B	C
Crop:	Chickpea		
Stage Scale Used:	Count of % Pod maturity conducted in paddock		
Stage Majority, %:	58% Pods physically mature - 42% immature.	83% Pods physically mature.	88% Pods physically mature.
Height, Unit:	45 cm		

Application Equipment			
	A	B	C
Operation Pressure, Unit:	300 kPa		
Nozzle Type:	AIXR		
Nozzle Size:	110015		
Nozzle Spacing, Unit:	50 cm		
Boom Length, Unit:	4 m		
Boom Height, Unit:	50 cm		
Ground Speed, Unit:	7.2 km/h		
Carrier:	WATER		
Spray Volume, Unit:	100 L/ha		