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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.

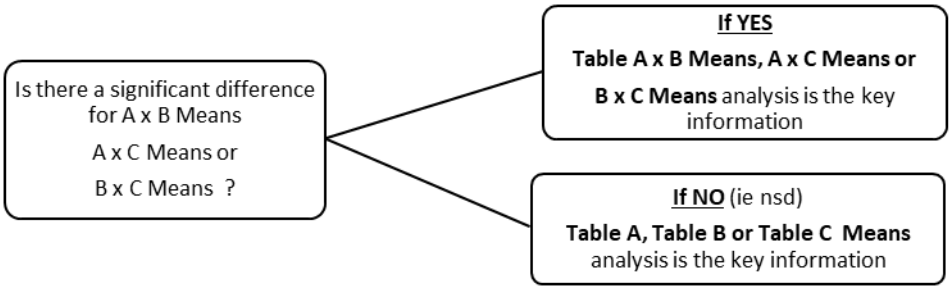
Chickpea Desiccation Timing

Trial ID: BD1811 **Location:** Tulloona **Trial Year:** 2018
Investigator: Branko Duric

Objective:	**To evaluate the impact of harvest management on chickpea yield and harvest losses**		
Crop:	**Chickpea cv. PBA HatTrick**		
Planting Date:	**16/05/2018**		
Planting Equipment:	**Tyne Planter**		
Planting Rate:	**65kg/ha**		
Row Spacing:	**38cm**		
Application Code:	**A**	**B**	**C**
Application Date:	**18/10/2018**	**23/10/2018**	**30/10/2018**
Application Timing:	**20 Days prior to Harvest**	**15 Days prior to Harvest**	**8 Days prior to Harvest**
Crop Stage at Application:	**82% of Pods physiologically mature**	**92% of Pods physiologically mature**	**100% of Pods physiologically mature**
Harvest Timing:	**H1 Planned Harvest: 7/11/2018 (NB crop commercially harvested 30/10/18)** **H2 Delayed Harvest: 20/11/2018**		
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

Chickpea Desiccation - Timing 2018

Trial ID: BD1811 **Location:** Tulloona **Trial Year:** 2018

Crop Name / Crop Variety				Chickpea PBA HatTrick		
Assessment Date				7/11/2018	7/11/2018	7/11/2018 & 20/11/2018
Assessment Type / Assessment Unit				DISCOLOUR %	LEAF DROP %	YIELD t/ha
Treatment-Evaluation Interval				20 DAA/ 15 DAB/ 8 DAC	20 DAA/ 15 DAB/ 8 DAC	
ARM Action Codes						TY13
Trt No.	Treatment	Product Rate	Appln. Code			
TABLE OF A MEANS (Desiccant)						
1	Untreated	-		91c	90ab	1.63-
2	Weedmaster Argo	1800ml/ha		97b	91a	1.64-
3	Weedmaster Argo Ally	1100ml/ha 5g/ha		99a	91a	1.60-
4	Gp G S Hasten	34g/ha 1% v/v		96b	91a	1.62-
5	Gramoxone	800ml/ha		97b	88bc	1.60-
6	Reglone Chemwet 1000	3000ml/ha 0.2% v/v		97b	87c	1.60-
TABLE OF B MEANS (Desiccant Timing)						
1	20 Days Pre-harvest		A	97a	89-	1.58-
2	15 Days Pre-harvest		B	97a	90-	1.64-
3	8 Days Pre-harvest		C	94b	90-	1.62-
TABLE OF C MEANS (Harvest Timing)						
1	Planned Harvest		H1	96b	89-	1.63-
2	Delayed Harvest		H2	96a	90-	1.59-
TABLE OF A x B MEANS (Desiccant x Desiccant Timing)						
1	Untreated	-	A	91hi	89ab	1.63-
2	Weedmaster Argo	1800ml/ha	A	98a-d	93a	1.64-
3	Weedmaster Argo Ally	1100ml/ha 5g/ha	A	100a	91ab	1.55-
4	Gp G S Hasten	34g/ha 1% v/v	A	95efg	91ab	1.56-
5	Gramoxone	800ml/ha	A	99ab	84d	1.54-
6	Reglone Chemwet 1000	3000ml/ha 0.2% v/v	A	99ab	85cd	1.54-
1a	Untreated	-	B	92hi	90ab	1.59-
2a	Weedmaster Argo	1800ml/ha	B	99abc	91ab	1.67-
3a	Weedmaster Argo Ally	1100ml/ha 5g/ha	B	100a	91ab	1.65-
4a	Gp G S Hasten	34g/ha 1% v/v	B	97cde	90ab	1.70-
5a	Gramoxone	800ml/ha	B	96def	88bcd	1.53-
6a	Reglone Chemwet 1000	3000ml/ha 0.2% v/v	B	98a-d	89abc	1.67-
1b	Untreated	-	C	91i	90ab	1.67-
2b	Weedmaster Argo	1800ml/ha	C	93gh	89abc	1.59-
3b	Weedmaster Argo Ally	1100ml/ha 5g/ha	C	97cde	90ab	1.59-
4b	Gp G S Hasten	34g/ha 1% v/v	C	97b-e	91ab	1.58-
5b	Gramoxone	800ml/ha	C	95efg	91ab	1.73-
6b	Reglone Chemwet 1000	3000ml/ha 0.2% v/v	C	94fg	88bcd	1.58-

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

Chickpea Desiccation Timing

Trial ID: BD1811 **Location:** Tulloona **Trial Year:** 2018

Crop Name / Crop Variety				Chickpea PBA HatTrick		
Assessment Date				7/11/2018	7/11/2018	7/11/2018 & 20/11/2018
Assessment Type / Assessment Unit				DISCOLOUR %	LEAF DROP %	YIELD t/ha
Treatment-Evaluation Interval				20 DAA/ 15 DAB/ 8 DAC	20 DAA/ 15 DAB/ 8 DAC	
ARM Action Codes						TY13
Trt No.	Treatment	Product Rate	Harvest Code			
TABLE OF A x C MEANS (Desiccant x Harvest Timing)						
1	Untreated	-	H1	90f	89-	1.62-
2	Weedmaster Argo	1800ml/ha	H1	95d	90-	1.68-
3	Weedmaster Argo Ally	1100ml/ha 5g/ha	H1	99ab	93-	1.66-
4	Gp G S Hasten	34g/ha 1% v/v	H1	96cd	90-	1.63-
5	Gramoxone	800ml/ha	H1	97abc	88-	1.61-
6	Reglone Chemwet 1000	3000ml/ha 0.2% v/v	H1	97bcd	86-	1.61-
1a	Untreated	-	H2	93e	90-	1.65-
2a	Weedmaster Argo	1800ml/ha	H2	98ab	91-	1.59-
3a	Weedmaster Argo Ally	1100ml/ha 5g/ha	H2	99a	89-	1.54-
4a	Gp G S Hasten	34g/ha 1% v/v	H2	96cd	91-	1.60-
5a	Gramoxone	800ml/ha	H2	96cd	88-	1.59-
6a	Reglone Chemwet 1000	3000ml/ha 0.2% v/v	H2	97bcd	88-	1.58-

Chickpea Desiccation Timing

Trial ID: BD1811 **Location:** Tulloona **Trial Year:** 2018

Crop Name / Crop Variety				Chickpea PBA HatTrick			
Assessment Date				21/11/2018 & 3/12/2018	21/11/2018 & 3/12/2018	21/11/2018 & 3/12/2018	21/11/2018 & 3/12/2018
Assessment Type				PROTEIN	MOISTURE	TEST WEIGHT	SCREENING
Assessment Unit				%	%	kg/hL	%
ARM Action Codes				ET17			AL
Trt No.	**Treatment**	**Product Rate**	**Appln. Code**				
TABLE OF A MEANS (Desiccant)							
1	Untreated	-		23.5-	8.8-	73.4-	7.7t-
2	Weedmaster Argo	1800ml/ha		23.6-	8.7-	73.1-	7.9t-
3	Weedmaster Argo Ally	1100ml/ha 5g/ha		23.8-	8.8-	73.2-	7.8t-
4	Gp G S Hasten	34g/ha 1% v/v		23.5-	8.8-	73.0-	7.7t-
5	Gramoxone	800ml/ha		23.5-	8.8-	72.9-	7.7t-
6	Reglone Chemwet 1000	3000ml/ha 0.2% v/v		23.5-	8.8-	73.2-	7.6t-
TABLE OF B MEANS (Desiccant Timing)							
1	20 Days Pre-harvest		A	23.5-	8.8-	73.2-	8.0t-
2	15 Days Pre-harvest		B	23.5-	8.8-	72.9-	7.6t-
3	8 Days Pre-harvest		C	23.6-	8.9-	73.3-	7.7t-
TABLE OF C MEANS (Harvest Timing)							
1	Planned Harvest		H1	23.4b	9.2a	70.0b	6.1tb
2	Delayed Harvest		H2	23.7a	8.4b	76.2a	9.8ta

NB: Factorial analyses of grain quality excluded as there were no significant differences for any assessment.

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA HatTrick
7/11/2018
DISCOLOUR % 20 DAA/ 15 DAB/ 8 DAC

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	1902.826389				
R	3	14.743056	4.914352	1.046	0.3756	
A	5	783.534722	156.706944	33.341	0.0001	1
B	2	200.097222	100.048611	21.287	0.0001	1
AB	10	194.069444	19.406944	4.129	0.0001	2
C	1	22.562500	22.562500	4.800	0.0307	1
AC	5	103.979167	20.795833	4.425	0.0011	2
BC	2	3.125000	1.562500	0.332	0.7179	1
ABC	10	87.208333	8.720833	1.855	0.0598	3
ERROR	105	493.506944	4.700066			

Chickpea Desiccation Timing

Trial ID: BD1811 **Location:** Tulloona **Trial Year:** 2018

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA HatTrick
7/11/2018
LEAF DROP % 20 DAA/ 15 DAB/ 8 DAC

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	3005.555556				
R	3	261.111111	87.037037	5.332	0.0019	
A	5	353.472222	70.694444	4.331	0.0013	2
B	2	34.722222	17.361111	1.064	0.3489	2
AB	10	323.611111	32.361111	1.983	0.0424	4
C	1	0.694444	0.694444	0.043	0.8370	1
AC	5	118.055556	23.611111	1.447	0.2138	3
BC	2	38.888889	19.444444	1.191	0.3079	2
ABC	10	161.111111	16.111111	0.987	0.4594	6
ERROR	105	1713.888889	16.322751			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA HatTrick
20/11/2018
YIELD t/ha TY13

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	141	4.945424				
R	3	1.771186	0.590395	25.419	0.0001	
A	5	0.036855	0.007371	0.317	0.9016	0.09
B	2	0.088692	0.044346	1.909	0.1534	0.06
AB	10	0.360813	0.036081	1.553	0.1314	0.15
C	1	0.066328	0.066328	2.856	0.0941	0.05
AC	5	0.097180	0.019436	0.837	0.5266	0.12
BC	2	0.027183	0.013591	0.585	0.5589	0.09
ABC	10	0.104811	0.010481	0.451	0.9171	0.21
ERROR	103	2.392377	0.023227			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA HatTrick
21/11/2018
PROTEIN % ET17

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	51.745556				
R	3	3.125556	1.041852	3.306	0.0231	
A	5	1.463056	0.292611	0.929	0.4657	0.3
B	2	0.160972	0.080486	0.255	0.7751	0.2
AB	10	2.504028	0.250403	0.795	0.6340	0.6
C	1	4.622500	4.622500	14.668	0.0002	0.2
AC	5	1.225000	0.245000	0.777	0.5681	0.5
BC	2	0.770417	0.385208	1.222	0.2987	0.3
ABC	10	4.784583	0.478458	1.518	0.1430	0.8
ERROR	105	33.089444	0.315138			

Chickpea Desiccation Timing

Trial ID: BD1811 **Location:** Tulloona **Trial Year:** 2018

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA HatTrick
21/11/2018
MOISTURE %

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	43.546389				
R	3	0.861389	0.287130	1.797	0.1523	
A	5	0.164722	0.032944	0.206	0.9592	0.2
B	2	0.258472	0.129236	0.809	0.4482	0.2
AB	10	1.360694	0.136069	0.852	0.5806	0.4
C	1	22.404444	22.404444	140.206	0.0001	0.1
AC	5	0.545556	0.109111	0.683	0.6375	0.3
BC	2	0.106806	0.053403	0.334	0.7167	0.2
ABC	10	1.065694	0.106569	0.667	0.7526	0.6
ERROR	105	16.778611	0.159796			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA HatTrick
21/11/2018
TEST WEIGHT kg/hL

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	1769.516597				
R	3	37.074653	12.358218	4.965	0.0029	
A	5	4.376181	0.875236	0.352	0.8802	0.9
B	2	3.867222	1.933611	0.777	0.4625	0.6
AB	10	41.371944	4.137194	1.662	0.0995	1.6
C	1	1374.555625	1374.555625	552.236	0.0001	0.5
AC	5	9.733958	1.946792	0.782	0.5648	1.3
BC	2	11.735000	5.867500	2.357	0.0997	0.9
ABC	10	25.449167	2.544917	1.022	0.4298	2.2
ERROR	105	261.352847	2.489075			

FACTORIAL/POOLED ERROR AOV
Chickpea - PBA HatTrick
21/11/2018
SCREENING % AL

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	143	2.170704				
R	3	0.065416	0.021805	3.161	0.0277	
A	5	0.002493	0.000499	0.072	0.9962	0.0
B	2	0.009254	0.004627	0.671	0.5136	0.0
AB	10	0.055684	0.005568	0.807	0.6222	0.1
C	1	1.220428	1.220428	176.901	0.0001	0.0
AC	5	0.046508	0.009302	1.348	0.2500	0.1
BC	2	0.000246	0.000123	0.018	0.9823	0.0
ABC	10	0.046287	0.004629	0.671	0.7490	0.1
ERROR	105	0.724389	0.006899			

Assessment Type
DISCOLOUR = % crop discolouration
LEAF DROP= % leaf drop
ARM Action Codes
ET17 = Excluded treatment 17
AL = Automatic log transformation of X+1
TY13 = 0.6944445*[C38]

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

Chickpea Desiccation Timing

Trial ID: BD1811 **Location:** Tulloona **Trial Year:** 2018

Conclusions:

This trial was conducted to evaluate the effects of desiccation product and timing, together with harvest timing, on chickpea yield, grain quality and harvest losses. Application was planned at ¬3, 2 and 1 week before harvest but achieved timings were close to a week later with pod maturity of 82, 91 and 100% respectively.

Assessment of crop 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.

All desiccant treatments significantly increased crop discolouration compared to the Untreated, at all application timings. Product differences were relatively minor but clearer from the 1st and 2nd application timing where Weedmaster Argo plus Ally trended to be the most effective treatment. There was no significant impact from product or desiccation timing on yield or any grain quality assessment.

Unexpectedly, in this situation there was no impact on yield from the harvest delay. Grain moisture was significantly lower at the delayed harvest timing with a significant increase in % screenings at the delayed harvest timing (increased from 6 to 10%). Also unexpectedly, test weight increased from 70 to 76 kg/hL with protein increased from 23-24%. This is most likely to be explained by a header setting with a cleaner grain sample achieved at the delayed harvest. Grain and pod header losses were measured but with high levels of variability and no clear differences.

In this trial, when applied at mature crop stages, there was little impact from desiccant product, desiccation timing or harvest timing on crop yield or grain quality.

Application Description			
	A	B	C
Application Date:	18/10/2018	23/10/2018	30/10/2018
Application Start Time:	2:00 PM	11:00 AM	1:00 PM
Application Stop Time:	4:00 PM	1:00 PM	3:00 PM
Application Method:	SPRAY		
Application Timing:	20 Days prior Harvest	15 Days prior Harvest	8 Days prior Harvest
Air Temperature, Unit:	29 C	27 C	29 C
% Relative Humidity:	53	50	38
Wind Velocity, Unit:	3 km/h	9 km/h	13 km/h
Wind Direction:	NW		
Dew Presence (Y/N):	No		
% Cloud Cover:	95	5	10

Crop Stage at Each Application			
	A	B	C
Crop 1:	Chickpea		
Stage Scale Used:	Count of % Pod maturity conducted in paddock		
Stage Majority, Percent:	82% Pods mature	92% Pods mature	100% Pods mature

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		