

Disclaimer:

This document is based on the results from an individual trial and may contain experimental use patterns that are currently off-label. **This document does not provide any interpretation and should not be taken as an endorsement of any unregistered use pattern.** Professional advice should be sought for specific recommendations to ensure access to the most up to date information and knowledge. **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: LB1917	Location: Pittsworth	Trial Year: 2019
Investigator:	Linda Bailey	

Objective:	To evaluate the impact of desiccation timing on chickpea yield and grain quality	
Crop:	Chickpea cv. PBA HatTrick	
Planting Date:	05/07/2019	
Planting Equipment:	Disc Planter	
Row Spacing:	100cm	
Application Code:	A (Timing 1)	B (Timing 2)
Application Date:	25/10/2019	30/10/2019
Crop Stage at Application:	66% of pods physiologically mature	91% of pods physiologically mature
Harvest Date:	1/11/2019 (7 Days after Application)	6/11/2019 (7 Days after Application)
Keywords:	Chickpea, desiccant	

NB: Trial designed and analysed as a Split Plot

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

Is there a significant difference for A x B Means ?

If YES

Table A x B Means analysis is the key information

If NO (ie nsd)

Table A or Table B Means analysis is the key information

Chickpea Desiccation Timing

Trial ID: LB1917 **Location:** Pittsworth **Trial Year:** 2019

Crop Name Crop Variety Assessment Dates Assessment Type Assessment Unit				Chickpeas			
				PBA HatTrick			
				A1: 1/11/2019 A2: 5/11/2019 DISCOLOUR %	A1: 1/11/2019 A2: 5/11/2019 LEAF DROP %	A1: 1/11/2019 A2: 5/11/2019 STEM SNAP %	A1: 1/11/2019 A2: 6/11/2019 YIELD t/ha
Trt No.	Treatment	Product Rate	Appln. Code				
TABLE OF A MEANS (Timing)							
1	Timing 1 (66% maturity)		A	67b	6.3-	85-	0.72-
2	Timing 2 (91% maturity)		B	86a	8.1-	81-	0.65-
TABLE OF B MEANS (Desiccant)							
1	Untreated	-		63e	6.9-	81-	0.70-
2	Crucial	1600ml/ha		79bc	6.9-	80-	0.70-
3	Crucial Ally	1000ml/ha 5g/ha		69de	7.5-	88-	0.67-
4	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v		83b	7.5-	84-	0.77-
5	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v		73cd	6.9-	79-	0.65-
6	Gramoxone	800ml/ha		92a	7.5-	88-	0.63-
TABLE OF A x B MEANS (Timing x Desiccant)							
1a	Untreated	-	A	57e	5.0-	88-	0.66-
2a	Crucial	1600ml/ha	A	70d	6.3-	75-	0.70-
3a	Crucial Ally	1000ml/ha 5g/ha	A	52e	6.3-	90-	0.72-
4a	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v	A	79cd	7.5-	88-	0.88-
5a	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v	A	56e	5.0-	85-	0.65-
6a	Gramoxone	800ml/ha	A	87abc	7.5-	88-	0.74-
1b	Untreated	-	B	70d	8.8-	75-	0.74-
2b	Crucial	1600ml/ha	B	89ab	7.5-	85-	0.69-
3b	Crucial Ally	1000ml/ha 5g/ha	B	85bc	8.8-	85-	0.62-
4b	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v	B	86bc	7.5-	80-	0.67-
5b	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v	B	90ab	8.8-	73-	0.65-
6b	Gramoxone	800ml/ha	B	96a	7.5-	88-	0.52-

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

Chickpea Desiccation Timing

Trial ID: LB1917

Location: Pittsworth

Trial Year: 2019

Crop Name Crop Variety Description Assessment Type Assessment Unit ARM Action Codes				Chickpeas PBA HatTrick				
				PROTEIN %	MOISTURE % AL	Mature Grain COUNT %	Green Grain COUNT % AA	Yellow Grain COUNT % AL
Trt No.	Treatment	Product Rate	Appln. Code					
TABLE OF A MEANS (Timing)								
1	Timing 1 (66% maturity)		A	23.8b	14.9ta	89-	0.19t-	5.1ta
2	Timing 2 (91% maturity)		B	25.1a	10.3tb	95-	0.00t-	0.5tb
TABLE OF B MEANS (Desiccant)								
1	Untreated	-		24.3-	12.6tab	92-	0.21ta	2.0tab
2	Crucial	1600ml/ha		24.1-	12.8ta	88-	0.10tabc	2.8ta
3	Crucial Ally	1000ml/ha 5g/ha		24.6-	13.3ta	91-	0.03tbcd	2.5tab
4	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v		24.7-	11.9tbc	94-	0.02tcd	1.4tbc
5	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v		24.3-	13.1ta	89-	0.17tab	3.0ta
6	Gramoxone	800ml/ha		24.6-	11.1tc	95-	0.00td	0.9tc
TABLE OF A x B MEANS (Timing x Desiccant)								
1a	Untreated	-	A	23.8-	15.3ta	90-	0.83ta	5.8t-
2a	Crucial	1600ml/ha	A	23.5-	15.5ta	83-	0.19tb	6.7t-
3a	Crucial Ally	1000ml/ha 5g/ha	A	23.8-	16.8ta	88-	0.11tbc	6.9t-
4a	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v	A	24.3-	13.6tb	93-	0.01tbc	3.2t-
5a	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v	A	23.4-	16.8ta	83-	0.69ta	9.1t-
6a	Gramoxone	800ml/ha	A	24.0-	12.1tc	96-	0.00tc	1.8t-
1b	Untreated	-	B	24.9-	10.3td	95-	0.00tc	0.3t-
2b	Crucial	1600ml/ha	B	24.8-	10.5td	93-	0.04tbc	0.9t-
3b	Crucial Ally	1000ml/ha 5g/ha	B	25.5-	10.4td	93-	0.00tc	0.6t-
4b	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v	B	25.1-	10.3td	95-	0.04tbc	0.4t-
5b	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v	B	25.1-	10.1td	96-	0.00tc	0.6t-
6b	Gramoxone	800ml/ha	B	25.2-	10.1td	95-	0.00tc	0.2t-

Chickpea Desiccation Timing

Trial ID: LB1917

Location: Pittsworth

Trial Year: 2019

Crop Name Crop Variety Description Assessment Type Assessment Unit ARM Action Codes				Chickpea PBA HatTrick			
				Damaged COUNT	Shrivalled COUNT	Whole Pods COUNT	Germination COUNT
				% AL	% AA	% AL	%
				AL	AA	AL	
Trt No.	Treatment	Product Rate	Appln. Code				
TABLE OF A MEANS (Timing)							
1	Timing 1 (66% maturity)		A	0.7tb	0.2t-	2.5ta	85b
2	Timing 2 (91% maturity)		B	3.4ta	0.1t-	0.8tb	91a
TABLE OF B MEANS (Desiccant)							
1	Untreated	-		2.0t-	0.1t-	1.0tbc	90-
2	Crucial	1600ml/ha		1.4t-	0.3t-	2.7ta	86-
3	Crucial Ally	1000ml/ha 5g/ha		2.0t-	0.3t-	2.0tab	85-
4	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v		1.9t-	0.1t-	1.3tbc	92-
5	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v		1.4t-	0.1t-	2.0tab	85-
6	Gramoxone	800ml/ha		1.7t-	0.3t-	0.8tc	90-
TABLE OF A x B MEANS (Timing x Desiccant)							
1a	Untreated	-	A	1.0t-	0.3t-	1.4t-	88ab
2a	Crucial	1600ml/ha	A	0.5t-	0.2t-	4.7t-	83bc
3a	Crucial Ally	1000ml/ha 5g/ha	A	0.7t-	0.3t-	3.0t-	88ab
4a	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v	A	0.9t-	0.1t-	2.2t-	88ab
5a	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v	A	0.6t-	0.1t-	5.1t-	72c
6a	Gramoxone	800ml/ha	A	0.5t-	0.5t-	0.8t-	93ab
1b	Untreated	-	B	3.7t-	0.0t-	0.6t-	93ab
2b	Crucial	1600ml/ha	B	3.1t-	0.6t-	1.5t-	89ab
3b	Crucial Ally	1000ml/ha 5g/ha	B	4.0t-	0.3t-	1.2t-	82bc
4b	Crucial Sharpen Hasten	1000ml/ha 34g/ha 1% v/v	B	3.4t-	0.0t-	0.6t-	97a
5b	Crucial Sharpen Ally Hasten	1000ml/ha 9g/ha 5g/ha 1% v/v	B	2.6t-	0.0t-	0.5t-	98a
6b	Gramoxone	800ml/ha	B	3.9t-	0.1t-	0.9t-	87ab

Chickpea Desiccation Timing

Trial ID: LB1917

Location:

Pittsworth

Trial Year:

2019

COMPLETE SPLIT-PLOT AOV Chickpeas cv. PBA HatTrick DISCOLOUR %						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	11249.916667				
R	3	81.750000	27.250000	0.669	0.5779	
A	1	4408.333333	4408.333333	956.024	0.0001	2
ERROR A	3	13.833333	4.611111			
B	5	4179.916667	835.983333	20.516	0.0001	7
AB	5	1343.666667	268.733333	6.595	0.0003	9
ERROR B	30	1222.416667	40.747222			

COMPLETE SPLIT-PLOT AOV Chickpeas cv. PBA HatTrick LEAF DROP %						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	295.312500				
R	3	5.729167	1.909722	0.322	0.8096	
A	1	42.187500	42.187500	3.627	0.1530	3.1
ERROR A	3	34.895833	11.631944			
B	5	4.687500	0.937500	0.158	0.9759	2.5
AB	5	29.687500	5.937500	1.000	0.4346	3.5
ERROR B	30	178.125000	5.937500			

COMPLETE SPLIT-PLOT AOV Chickpeas cv. PBA HatTrick % STEM SNAP						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	7231.250000				
R	3	1556.250000	518.750000	4.269	0.0127	
A	1	252.083333	252.083333	1.599	0.2953	12
ERROR A	3	472.916667	157.638889			
B	5	568.750000	113.750000	0.936	0.4719	11
AB	5	735.416667	147.083333	1.210	0.3283	16
ERROR B	30	3645.833333	121.527778			

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick 1/11/201, 6/11/2019 YIELD t/ha T1						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	1.234346				
R	3	0.083648	0.027883	1.100	0.3644	
A	1	0.069864	0.069864	3.127	0.1752	0.14
ERROR A	3	0.067027	0.022342			
B	5	0.100931	0.020186	0.796	0.5609	0.16
AB	5	0.152416	0.030483	1.203	0.3318	0.23
ERROR B	30	0.760460	0.025349			

COMPLETE SPLIT-PLOT AOV Chickpeas cv. PBA HatTrick 1/11/2019, 6/11/2019 PROTEIN %						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	48.539167				
R	3	8.189167	2.729722	6.783	0.0013	
A	1	20.280000	20.280000	13.631	0.0345	1.1
ERROR A	3	4.463333	1.487778			
B	5	2.166667	0.433333	1.077	0.3929	0.6
AB	5	1.367500	0.273500	0.680	0.6423	0.9
ERROR B	30	12.072500	0.402417			

Chickpea Desiccation Timing

Trial ID: LB1917

Location:

Pittsworth

Trial Year:

2019

COMPLETE SPLIT-PLOT AOV Chickpeas cv. PBA HatTrick 1/11/2019, 6/11/2019 MOISTURE % AL						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	0.356899				
R	3	0.007454	0.002485	3.167	0.0387	
A	1	0.263557	0.263557	136.582	0.0013	0.0
ERROR A	3	0.005789	0.001930			
B	5	0.030248	0.006050	7.709	0.0001	0.0
AB	5	0.026309	0.005262	6.705	0.0003	0.0
ERROR B	30	0.023541	0.000785			

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick Mature Grain COUNT %						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	2090.619498				
R	3	180.174573	60.058191	2.588	0.0714	
A	1	402.578752	402.578752	4.993	0.1115	8
ERROR A	3	241.865756	80.621919			
B	5	285.218110	57.043622	2.458	0.0557	5
AB	5	284.485410	56.897082	2.451	0.0562	7
ERROR B	30	696.296896	23.209897			

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick Green Grain COUNT % AA						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	260.011268				
R	3	19.493933	6.497978	2.905	0.0509	
A	1	53.331072	53.331072	7.991	0.0664	2.37
ERROR A	3	20.021296	6.673765			
B	5	41.066651	8.213330	3.672	0.0104	1.53
AB	5	59.001680	11.800336	5.276	0.0014	2.16
ERROR B	30	67.096635	2.236555			

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick Yellow Grain COUNT % AL						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	6.478131				
R	3	0.011637	0.003879	0.122	0.9462	
A	1	4.470496	4.470496	121.913	0.0016	0.18
ERROR A	3	0.110009	0.036670			
B	5	0.665331	0.133066	4.196	0.0052	0.18
AB	5	0.269242	0.053848	1.698	0.1656	0.26
ERROR B	30	0.951416	0.031714			

Chickpea Desiccation Timing

Trial ID: LB1917

Location:

Pittsworth

Trial Year:

2019

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick Damaged Grain COUNT % AL						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	2.661568				
R	3	0.025434	0.008478	0.669	0.5777	
A	1	2.091653	2.091653	132.328	0.0014	0.1
ERROR A	3	0.047420	0.015807			
B	5	0.081776	0.016355	1.291	0.2941	0.1
AB	5	0.035093	0.007019	0.554	0.7342	0.2
ERROR B	30	0.380193	0.012673			

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick Shrivelled Grain COUNT % AA						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	182.649769				
R	3	31.546523	10.515508	3.923	0.0178	
A	1	5.411089	5.411089	1.187	0.3557	2.0
ERROR A	3	13.679423	4.559808			
B	5	29.206670	5.841334	2.179	0.0830	1.7
AB	5	22.393415	4.478683	1.671	0.1721	2.4
ERROR B	30	80.412647	2.680422			

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick Whole Pods COUNT % AL						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	3.949327				
R	3	0.444001	0.148000	3.405	0.0302	
A	1	0.967598	0.967598	14.017	0.0333	0.2
ERROR A	3	0.207096	0.069032			
B	5	0.599530	0.119906	2.759	0.0364	0.2
AB	5	0.427097	0.085419	1.965	0.1128	0.3
ERROR B	30	1.304005	0.043467			

COMPLETE SPLIT-PLOT AOV Chickpea cv. PBA HatTrick Germination COUNT %						
Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	47	4422.979167				
R	3	239.229167	79.743056	1.225	0.3176	
A	1	379.687500	379.687500	14.749	0.0311	5
ERROR A	3	77.229167	25.743056			
B	5	423.354167	84.670833	1.301	0.2898	8
AB	5	1351.187500	270.237500	4.153	0.0055	12
ERROR B	30	1952.291667	65.076389			

Chickpea Desiccation Timing

Trial ID: LB1917

Location:

Pittsworth

Trial Year:

2019

Assessment Type

DISCOLOUR = Phytotoxicity - % discoloration

LEAF DROP = Estimate of % of leaves dropped from plant

STEM SNAP = Measurement of stem dry down as indicator of harvest readiness. 10 plants/plot were twisted and evaluated. Recorded the % of plants where all stems had snapped in 2 twists.

ARM Action Codes

AL = Automatic log transformation of X+1

AA = Automatic arcsine square root % transformation

Conclusions:

This trial was designed to determine the impact of desiccant application timing. Three application timings were planned: at ~70%, 80% and 90% grain maturity. Timing 1 occurred at ~66% maturity, however within 5 days the crop had reached ~91% (timing 2) and 5 days later had reached ~98% maturity (Timing 3). A total fire ban was enforced shortly prior to the planned harvest of the 3rd application timing with no harvest conducted. Due to the application of Timing 3 on 98% mature grain and the lack of harvest and grain quality information, no data is presented from the Timing 3 application.

Harvest was conducted 7 days after each application. Shortly prior to each harvest, visual ratings of crop discoloration and leaf drop were conducted and a physical measure of stem drydown (stem snapping) was performed. Grain quality was evaluated within 24 hours of harvest.

Gramoxone 800 mL/ha provided the largest % discoloration at both application timings. It was significantly greater than all treatments other than Crucial 1000 mL/ha + Sharpen 34 g/ha + 1% Hasten at timing 1 and all treatments other than Crucial 1600 mL/ha or Crucial 1000 mL/ha + Sharpen 9 g/ha + Ally 5 g/ha + 1% Hasten at timing 2.

Levels of leaf drop were less than 10% for all treatments with no improvement compared to the Untreated. No treatment provided any benefit in stem drydown compared to the Untreated at either application timing.

There was no significant impact on yield from any desiccant treatment or application timing with yields averaging 0.7 t/ha.

There was no significant impact from desiccant treatment on % grain protein with no interaction with application timing. Gramoxone 800 mL/ha and Crucial 1000 mL/ha + Sharpen 34 g/ha + 1% Hasten both significantly reduced grain moisture compared to the Untreated at timing 1 but with no difference between treatments at timing 2.

Visual grain assessment was also conducted. There was no significant impact on the % mature grain from any treatment or application timing with levels of ~90-95%. Levels of green immature grain were less than 1% for all treatments. At timing 1, all desiccant treatments other than Crucial 1000 mL/ha + Sharpen 34 g/ha + 1% Hasten recorded significantly less % green grain than the Untreated with no difference between treatments at timing 2. Levels of yellow immature grain overall were significantly higher from timing 1 (~5% v 0.5%). Gramoxone 800 mL/ha recorded significantly less yellow grain than the Untreated with no impact from the other treatments.

Damaged seed levels were significantly higher at the timing 2 harvest (~3% v 1%) with no difference between any desiccant and the Untreated. There was no significant difference in shrivelled seed levels between any treatment and the Untreated with all levels below 1%. There were significantly more whole pods in the harvested samples from timing 1 (~3% v 1%) with Crucial 1600 mL/ha recording significantly higher levels than the Untreated and Gramoxone 800 mL/ha significantly lower.

Seed germination from the Crucial 1000 mL/ha + Sharpen 9 g/ha + Ally 5 g/ha + 1% Hasten treatment at timing 1 was significantly lower than the Untreated. There was no significant impact on germination from any other treatment compared to the Untreated at either timing.

In this situation, application of desiccant treatments at ~66% grain maturity had no significant effect on yield or visual grain assessment. Although this was an encouraging result, the rapid maturing of the crop meant timing 1 may only have been 3-4 days earlier than currently recommended. There was however a significant impact from Crucial 1000 mL/ha + Sharpen 9 g/ha + Ally 5 g/ha + 1% Hasten in reducing seed germination at the timing 1 application.

Crop Description	
Crop:	Chickpea
Variety:	PBA HatTrick
BBCH Scale:	GRDC
Planting Date:	5/07/2019
Planting Method:	Direct Drilled
Planting Equipment:	Disc
Row Spacing:	1m
Harvested Width, Unit:	2m
Harvested Length, Unit:	10.2m

Chickpea Desiccation Timing

Trial ID: LB1917 Location: Pittsworth Trial Year: 2019

Application Description		
	A	B
Application Date:	25/10/2019	30/10/2019
Application Start Time:	11:25 AM	10:45 AM
Application Stop Time:	12:40 PM	11:30 AM
Application Method:	SPRAY	
Application Timing:	PRE-HARVEST	
Application Placement:	FOLIAR	
Air Temperature, Unit:	30.6 C	24.0 C
% Relative Humidity:	32.3	50.5
Wind Velocity, Unit:	3.9 km/h	7.1 km/h
Wind Direction:	NW	
Dew Presence (Y/N):	No	
Soil Moisture:	DRY	
% Cloud Cover:	0	100
Next Moisture Occurred On:	8/11/2019	8/11/2019

Crop Stage at Each Application				
	A		B	
Crop:	Chickpea			
Stage Scale Used:	GRDC			
Stage Majority, %:	18 R11	62%	19 R12	75%
Stage Minimum, %:	17 R10	19%	18 R11	6%
Stage Maximum, %:	19 R12	19%	19 R12	75%

18 R11 = 50% of pods on plant mature

19 R12 = 90% of pods on plant mature

Application Equipment		
	A	B
Application Equipment:	Polaris	
Equipment Type:	BOOM	
Operation Pressure, Unit:	300 kPa	
Nozzle Type:	AIXR	
Nozzle Size:	110015	
Nozzle Spacing, Unit:	50 cm	
Nozzles/Row:	8	
Boom Length, Unit:	4 m	
Boom Height, Unit:	80 cm	
Ground Speed, Unit:	7.2 km/h	