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.

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016
Investigator: Denielle Kilby

Planting Date:	**10/5/2016**		
Planting Equipment:	**Small Plot Planter**		
Wheat Varieties:	**EGA Gregory & Lancer**		
Row Spacing:	**32cm**		
Target Plant Population:	**100 Plants /m²**		
Application Code:	**A**	**B**	**C**
Application Date:	**15/02/2016**	**10/05/2016**	**11/07/2016**
Target/Stage:	**Spread Surface Feb**	**Spread & IBS**	**Spread at GS 30**
Harvest Date:	**14/11/2016**		
Trial Reliability:	**Good**		

Trial designed as a Randomised Complete Block and analysed as a Factorial

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

How to interpret?

Is there a significant difference for A x B Means, A x C Means or B x C Means ?

- **If YES**: **Table A x B Means, A x C Means or B x C Means** analysis is the key information
- **If NO** (ie nsd): **Table A, Table B or Table C Means** analysis is the key information

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016

Crop Name			Wheat				
Description						Total Heads	
Assessment Date			30/05/2016	11/07/2016	18/08/2016	28/09/2016	14/11/2016
Assessment Type			EMERGENCE	NDVI	NDVI	COUNT	YIELD
Assessment Unit			/m²	RATIO	RATIO	/m²	t/ha
Crop Stage Majority			12	31	61	69	89
Plant-Evaluation Interval			20 DP1	62 DP1	100 DP1	141 DP1	188 DP1
CV %							8.9
ARM Action Codes			T1			T2	TY3
Trt No.	Treatment	Appln. Code					
TABLE OF A MEANS (Variety)							
1	EGA Gregory		33.3-	0.45a	0.60a	178-	2.28b
2	Lancer		31.6-	0.39b	0.56b	177-	2.55a
TABLE OF B MEANS (Rate)							
1	Urea 50 kg N/ha		32.6-	0.42-	0.57-	168-	2.32b
2	Urea 100 kg N/ha		33.2-	0.42-	0.58-	179-	2.38b
3	Urea 200 kg N/ha		31.5-	0.41-	0.59-	185-	2.55a
TABLE OF C MEANS (Timing)							
1	February Spread	A	34.3-	0.44a	0.62a	197a	2.54a
2	Planting IBS	B	32.3-	0.42ab	0.59a	184a	2.53a
3	GS30 Spread	C	30.6-	0.39b	0.53b	151b	2.18b
TABLE OF A x B MEANS (Variety x Rate)							
1 1	EGA Gregory Urea 50 kg N/ha		30.8-	0.43-	0.58-	167-	2.20-
2 1	Lancer Urea 50 kg N/ha		34.3-	0.42-	0.56-	169-	2.45-
1 2	EGA Gregory Urea 100 kg N/ha		35.9-	0.46-	0.61-	180-	2.24-
2 2	Lancer Urea 100 kg N/ha		30.5-	0.39-	0.56-	177-	2.52-
1 3	EGA Gregory Urea 200 kg N/ha		33.1-	0.47-	0.61-	185-	2.40-
2 3	Lancer Urea 200 kg N/ha		29.9-	0.36-	0.57-	184-	2.70-
TABLE OF A x C MEANS (Variety x Timing)							
1 1	EGA Gregory February Spread	A	33.8-	0.47-	0.64-	185-	2.41-
2 1	Lancer February Spread	A	34.9-	0.42-	0.61-	209-	2.67-
1 2	EGA Gregory Planting IBS	B	34.8-	0.48-	0.62-	199-	2.41-
2 2	Lancer Planting IBS	B	29.9-	0.37-	0.56-	169-	2.64-
1 3	EGA Gregory GS30 Spread	C	31.3-	0.42-	0.53-	149-	2.01-
2 3	Lancer GS30 Spread	C	29.9-	0.37-	0.53-	153-	2.35-

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

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016

Crop Name			Wheat				
Description						Total heads	
Assessment Date			30/05/2016	11/07/2016	18/08/2016	28/09/2016	14/11/2016
Assessment Type			EMERGENCE	NDVI	NDVI	COUNT	YIELD
Assessment Unit			/m²	RATIO	RATIO	/m²	t/ha
Crop Stage Majority			12	31	61	69	89
Plant-Evaluation Interval			20 DP1	62 DP1	100 DP1	141 DP1	188 DP1
CV %							8.9
ARM Action Codes			T1			T2	TY3
Trt No.	**Treatment**	**Appln. Code**					
TABLE OF B x C MEANS (Rate x Timing)							
1 1	Urea 50 kg N/ha February Spread	A	33.2-	0.47-	0.61-	177-	2.39-
2 1	Urea 100 kg N/ha February Spread	A	34.9-	0.44-	0.63-	212-	2.50-
3 1	Urea 200 kg N/ha February Spread	A	35.0-	0.43-	0.63-	202-	2.73-
1 2	Urea 50 kg N/ha Planting IBS	B	31.2-	0.41-	0.58-	174-	2.46-
2 2	Urea 100 kg N/ha Planting IBS	B	34.4-	0.43-	0.59-	185-	2.49-
3 2	Urea 200 kg N/ha Planting IBS	B	31.4-	0.43-	0.61-	192-	2.63-
1 3	Urea 50 kg N/ha GS30 Spread	C	33.3-	0.40-	0.52-	152-	2.11-
2 3	Urea 100 kg N/ha GS30 Spread	C	30.5-	0.41-	0.53-	139-	2.15-
3 3	Urea 200 kg N/ha GS30 Spread	C	28.1-	0.38-	0.53-	161-	2.28-

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016

Crop Name			Wheat			
Assessment Date			16/12/2016	16/12/2016	16/12/2016	16/12/2016
Assessment Type			PROTEIN	TEST WEIGHT	SCREENINGS	N RECOVERY
Assessment Unit			%	kg/hL	%	kg N/ha
ARM Action Codes						T4
Trt No.	Treatment	Appln. Code				
TABLE OF A MEANS (Variety)						
1	EGA Gregory		12.4b	80.0-	4.1a	49.3b
2	Lancer		13.8a	80.1-	2.8b	61.7a
TABLE OF B MEANS (Rate)						
1	Urea 50 kg N/ha		12.7c	80.3a	3.3-	51.8c
2	Urea 100 kg N/ha		13.1b	80.0ab	3.4-	54.6b
3	Urea 200 kg N/ha		13.4a	79.8b	3.6-	60.1a
TABLE OF C MEANS (Timing)						
1	February Spread	A	13.1-	80.0-	3.2b	58.3a
2	Planting IBS	B	13.0-	80.1-	3.4ab	57.5a
3	GS30 Spread	C	13.2-	80.0-	3.6a	50.7b
TABLE OF A x B MEANS (Variety x Rate)						
1	EGA Gregory		12.0-	80.1-	4.2a	46.0-
1	Urea 50 kg N/ha					
2	Lancer		13.4-	80.6-	2.4c	57.6-
1	Urea 50 kg N/ha					
1	EGA Gregory		12.4-	79.9-	4.0a	48.6-
2	Urea 100 kg N/ha					
2	Lancer		13.8-	80.1-	2.8b	60.7-
2	Urea 100 kg N/ha					
1	EGA Gregory		12.7-	79.9-	4.0a	53.2-
3	Urea 200 kg N/ha					
2	Lancer		14.2-	79.7-	3.2b	67.0-
3	Urea 200 kg N/ha					
TABLE OF A x C MEANS (Variety x Timing)						
1	EGA Gregory		12.3-	79.9-	4.0-	52.1-
1	February Spread	A				
2	Lancer		13.8-	80.2-	2.5-	64.6-
1	February Spread	A				
1	EGA Gregory		12.3-	80.0-	3.9-	52.0-
2	Planting IBS	B				
2	Lancer		13.6-	80.1-	3.0-	63.1-
2	Planting IBS	B				
1	EGA Gregory		12.4-	80.0-	4.3-	43.8-
3	GS30 Spread	C				
2	Lancer		14.0-	80.0-	2.9-	57.6-
3	GS30 Spread	C				

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016

Crop Name			Wheat			
Assessment Date			16/12/2016	16/12/2016	16/12/2016	16/12/2016
Assessment Type			PROTEIN	TEST WEIGHT	SCREENINGS	N RECOVERY
Assessment Unit			%	kg/hL	%	kg N/ha
ARM Action Codes						T4
Trt No.	Treatment	Appln. Code				
TABLE OF B x C MEANS (Rate x Timing)						
1 1	Urea 50 kg N/ha February Spread	A	12.7-	80.4-	3.1-	53.1-
2 1	Urea 100 kg N/ha February Spread	A	13.1-	79.9-	3.4-	57.7-
3 1	Urea 200 kg N/ha February Spread	A	13.3-	79.9-	3.3-	64.2-
1 2	Urea 50 kg N/ha Planting IBS	B	12.6-	80.4-	3.4-	54.5-
2 2	Urea 100 kg N/ha Planting IBS	B	12.9-	80.2-	3.2-	56.2-
3 2	Urea 200 kg N/ha Planting IBS	B	13.4-	79.6-	3.7-	61.9-
1 3	Urea 50 kg N/ha GS30 Spread	C	12.8-	80.2-	3.5-	47.8-
2 3	Urea 100 kg N/ha GS30 Spread	C	13.2-	79.8-	3.7-	50.0-
3 3	Urea 200 kg N/ha GS30 Spread	C	13.6-	79.9-	3.8-	54.2-

Assessment Type
NDVI = Normalized difference vegetation index
N RECOVERY = Nitrogen Recovery in grain kg N/ha

Crop Stage Majority
12 = 2 leaves unfolded
31 = First node at least 1 cm above tillering node
61 = Beginning of flowering: first anthers visible
69 = End of flowering: all spikelets have finished flowering, some dry anthers remain
89 = Fully ripe: grain hard, difficult to divide with thumbnail
99 = Harvested product

ARM Action Codes
T1 = ([C1]/4)/.32
T2 = ([C5]/2)/0.32
TY3 = 0.5555555*[C7]
T4 = [C8]*[C9]*1.75

DP1 = Days after Planting

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016

COMPLETE FACTORIAL AOV
Wheat
30/05/2016
EMERGENCE /m² 12 20 DP1 T1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	3326.407539				
R	3	240.775214	80.258405	1.890	0.1429	
A	1	52.905613	52.905613	1.246	0.2695	3.1
B	2	36.231147	18.115573	0.427	0.6550	3.8
AB	2	260.026720	130.013360	3.062	0.0555	5.3
C	2	165.676541	82.838270	1.951	0.1526	3.8
AC	2	108.710395	54.355197	1.280	0.2868	5.3
BC	4	137.668186	34.417046	0.811	0.5242	6.5
ABC	4	159.030490	39.757623	0.936	0.4504	9.2
ERROR	51	2165.383233	42.458495			

COMPLETE FACTORIAL AOV
Wheat
11/07/2016
NDVI RATIO 31 62 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	0.463692				
R	3	0.049668	0.016556	3.599	0.0196	
A	1	0.081379	0.081379	17.690	0.0001	0.03
B	2	0.002228	0.001114	0.242	0.7858	0.04
AB	2	0.022663	0.011332	2.463	0.0952	0.06
C	2	0.031411	0.015706	3.414	0.0406	0.04
AC	2	0.017275	0.008638	1.878	0.1634	0.06
BC	4	0.013276	0.003319	0.722	0.5813	0.07
ABC	4	0.011178	0.002794	0.607	0.6591	0.10
ERROR	51	0.234612	0.004600			

COMPLETE FACTORIAL AOV
Wheat
18/08/2016
NDVI RATIO 61 100 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	0.434826				
R	3	0.061195	0.020398	5.067	0.0038	
A	1	0.021406	0.021406	5.318	0.0252	0.03
B	2	0.005622	0.002811	0.698	0.5021	0.04
AB	2	0.004288	0.002144	0.533	0.5903	0.05
C	2	0.107958	0.053979	13.410	0.0001	0.04
AC	2	0.013602	0.006801	1.690	0.1948	0.05
BC	4	0.002037	0.000509	0.126	0.9722	0.06
ABC	4	0.013423	0.003356	0.834	0.5101	0.09
ERROR	51	0.205296	0.004025			

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016

COMPLETE FACTORIAL AOV
Wheat
14/11/2016
YIELD t/ha 89 188 DP1 TY3

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	6.640578				
R	3	0.421371	0.140457	4.381	0.0081	
A	1	1.369512	1.369512	42.712	0.0001	0.08
B	2	0.651689	0.325845	10.162	0.0002	0.10
AB	2	0.005975	0.002988	0.093	0.9112	0.15
C	2	1.997486	0.998743	31.149	0.0001	0.10
AC	2	0.037445	0.018722	0.584	0.5614	0.15
BC	4	0.089509	0.022377	0.698	0.5969	0.18
ABC	4	0.432351	0.108088	3.371	0.0160	0.25
ERROR	51	1.635239	0.032064			

COMPLETE FACTORIAL AOV
Wheat
16/12/2016
PROTEIN % 99 220 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	51.058750				
R	3	0.432639	0.144213	1.414	0.2493	
A	1	37.411250	37.411250	366.928	0.0001	0.15
B	2	6.380833	3.190417	31.291	0.0001	0.18
AB	2	0.032500	0.016250	0.159	0.8531	0.26
C	2	0.635833	0.317917	3.118	0.0528	0.18
AC	2	0.255833	0.127917	1.255	0.2938	0.26
BC	4	0.243333	0.060833	0.597	0.6667	0.32
ABC	4	0.466667	0.116667	1.144	0.3464	0.45
ERROR	51	5.199861	0.101958			

COMPLETE FACTORIAL AOV
Wheat
16/12/2016
TEST WEIGHT kg/hL 99 220 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	37.669861				
R	3	2.508194	0.836065	1.596	0.2018	
A	1	0.333472	0.333472	0.637	0.4287	0.34
B	2	3.371944	1.685972	3.218	0.0483	0.42
AB	2	1.900278	0.950139	1.814	0.1734	0.59
C	2	0.103611	0.051806	0.099	0.9060	0.42
AC	2	0.230278	0.115139	0.220	0.8035	0.59
BC	4	1.315556	0.328889	0.628	0.6449	0.72
ABC	4	1.187222	0.296806	0.567	0.6880	1.02
ERROR	51	26.719306	0.523908			

N Management in Wheat 2016 – Billa Billa: Variety x Rate x Timing Factorial

Trial ID: DK1603 **Location:** Billa Billa **Trial Year:** 2016

COMPLETE FACTORIAL AOV Wheat 16/12/2016 N RECOVERY kg N/ha 99 220 DP1 T4						
Source	**DF**	**Sum of Squares**	**Mean Square**	**F**	**Prob.(F)**	**LSD (.05)**
Total	71	6118.179250				
R	3	318.214280	106.071427	5.758	0.0018	
A	1	2794.586388	2794.586388	151.705	0.0001	2.0
B	2	854.892708	427.446354	23.204	0.0001	2.5
AB	2	15.050840	7.525420	0.409	0.6668	3.5
C	2	847.839188	423.919594	23.013	0.0001	2.5
AC	2	22.604354	11.302177	0.614	0.5454	3.5
BC	4	50.127556	12.531889	0.680	0.6088	4.3
ABC	4	275.381892	68.845473	3.737	0.0096	6.1
ERROR	51	939.482045	18.421217			

Application Description			
	A	**B**	**C**
Application Date:	**15/02/2016**	**10/05/2016**	**11/07/2016**
Application Start Time:	**12:00 PM**	**11:00 AM**	**12:00 PM**
Application Stop Time:	**1:30 PM**	**12:00 PM**	**3:00 PM**
Application Method:	**SPREAD**		
Application Timing:	**FEBRUARY**	**IBS**	**GS30**
Application Placement:	**SURFACE**	**INCORPN**	**TOPDRESS**
Air Temperature, Unit:	**39 C**	**23 C**	**18 C**
Dew Presence (Y/N):	**No**		
Soil Moisture:	**FAIR**	**FAIR**	**GOOD**
% Cloud Cover:	**5**	**60**	**65**
Next Moisture Occurred On:	**20/02/2016**	**21/05/2016**	**24/08/2016**

Application Equipment			
	A	**B**	**C**
Application Equipment:	**SPREAD**	**PLANTER**	**SPREAD**
Equipment Type:	**MANUAL**	**SMALL PLOT PLANTER**	**MANUAL**