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 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016
Investigator: Denielle Kilby

Planting Date:	**14/06/2016**		
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:	**24/02/2016**	**14/06/2016**	**8/08/2016**
Target/Stage:	**Spread Top Dress Feb**	**Spread & IBS**	**Spread at GS 30**
Harvest Date:	**15/11/2016**		
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 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

Crop Name			Wheat				
Assessment Date			1/07/2016	8/08/2016	10/10/2016	12/10/2016	15/11/2016
Assessment Type			EMERGENCE	NDVI	NDVI	HEADS	YIELD
Assessment Unit			/m²	RATIO	RATIO	/m²	t/ha
Crop Stage Majority			11	30	65	58	89
Plant-Evaluation Interval			17 DP1	55 DP1	118 DP1	120 DP1	154 DP1
CV %							3.9
ARM Action Codes			T1			T2	TY3
Trt No.	Treatment	Appln. Code					
TABLE OF A MEANS (Variety)							
1	EGA Gregory		67.3-	0.62a	0.66b	268-	4.85a
2	Lancer		68.4-	0.55b	0.72a	272-	4.61b
TABLE OF B MEANS (Rate)							
1	Urea 50 kg N/ha		65.4-	0.58-	0.65c	260b	4.55c
2	Urea 100 kg N/ha		67.5-	0.60-	0.69b	262b	4.76b
3	Urea 200 kg N/ha		70.7-	0.58-	0.73a	287a	4.87a
TABLE OF C MEANS (Timing)							
1	February	A	71.6-	0.61a	0.68-	271b	4.71-
2	Planting	B	65.5-	0.59ab	0.69-	283a	4.79-
3	GS 30	C	66.5-	0.56b	0.69-	256c	4.68-
TABLE OF A x B MEANS (Variety x Rate)							
1 1	EGA Gregory Urea 50 kg N/ha		67.4-	0.62-	0.62-	262-	4.75bc
2 1	Lancer Urea 50 kg N/ha		63.3-	0.54-	0.68-	257-	4.35d
1 2	EGA Gregory Urea 100 kg N/ha		67.1-	0.64-	0.67-	257-	4.89ab
2 2	Lancer Urea 100 kg N/ha		67.8-	0.56-	0.72-	267-	4.63c
1 3	EGA Gregory Urea 200 kg N/ha		67.3-	0.61-	0.70-	285-	4.90a
2 3	Lancer Urea 200 kg N/ha		74.2-	0.55-	0.75-	290-	4.84ab
TABLE OF A x C MEANS (Variety x Timing)							
1 1	EGA Gregory February	A	69.6-	0.65-	0.65-	268-	4.84a
2 1	Lancer February	A	73.6-	0.58-	0.71-	274-	4.59b
1 2	EGA Gregory Planting	B	64.3-	0.63-	0.66-	284-	4.84a
2 2	Lancer Planting	B	66.7-	0.54-	0.72-	282-	4.73a
1 3	EGA Gregory GS 30	C	68.0-	0.59-	0.67-	252-	4.86a
2 3	Lancer GS 30	C	65.0-	0.53-	0.72-	259-	4.50b

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

N Management in Wheat 2016 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

Crop Name			Wheat				
Assessment Date			1/07/2016	8/08/2016	10/10/2016	12/10/2016	15/11/2016
Assessment Type			EMERGENCE	NDVI	NDVI	HEADS	YIELD
Assessment Unit			/m²	RATIO	RATIO	/m²	t/ha
Crop Stage Majority			11	30	65	58	89
Plant-Evaluation Interval			17 DP1	55 DP1	118 DP1	120 DP1	154 DP1
CV %							3.9
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	A	72.4-	0.61-	0.63-	270-	4.49-
2 1	Urea 100 kg N/ha February	A	72.3-	0.62-	0.69-	261-	4.71-
3 1	Urea 200 kg N/ha February	A	70.2-	0.61-	0.73-	282-	4.94-
1 2	Urea 50 kg N/ha Planting	B	61.5-	0.58-	0.66-	263-	4.70-
2 2	Urea 100 kg N/ha Planting	B	68.0-	0.60-	0.69-	286-	4.83-
3 2	Urea 200 kg N/ha Planting	B	66.9-	0.58-	0.73-	299-	4.84-
1 3	Urea 50 kg N/ha GS 30	C	62.2-	0.55-	0.65-	246-	4.47-
2 3	Urea 100 kg N/ha GS 30	C	62.2-	0.57-	0.70-	239-	4.73-
3 3	Urea 200 kg N/ha GS 30	C	75.1-	0.56-	0.72-	281-	4.83-

N Management in Wheat 2016 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

Crop Name			Wheat			
Assessment Date			8/01/2017	8/01/2017	8/01/2017	8/01/2017
Assessment Type			PROTEIN	TEST WEIGHT	SCREENING	N RECOVERY
Assessment Unit			%	kg/hL	%	kg N/ha
ARM Action Codes					AL	T4
Trt No.	Treatment	Appln. Code				
TABLE OF A MEANS (Variety)						
1	EGA Gregory		11.2b	82.2-	4.4-	95.0b
2	Lancer		12.3a	82.3-	4.6-	99.2a
TABLE OF B MEANS (Rate)						
1	Urea 50 kg N/ha		10.8c	82.8a	4.7-	85.9c
2	Urea 100 kg N/ha		11.8b	82.0b	4.6-	98.1b
3	Urea 200 kg N/ha		12.6a	81.9b	4.2-	107.2a
TABLE OF C MEANS (Timing)						
1	February	A	11.4c	82.4-	4.3-	94.3b
2	Planting	B	11.8b	82.3-	4.6-	98.7a
3	GS 30	C	12.0a	82.0-	4.6-	98.2a
TABLE OF A x B MEANS (Variety x Rate)						
1 1	EGA Gregory Urea 50 kg N/ha		10.3-	82.8-	4.7-	85.3-
2 1	Lancer Urea 50 kg N/ha		11.3-	82.9-	4.7-	86.4-
1 2	EGA Gregory Urea 100 kg N/ha		11.2-	82.1-	4.5-	96.1-
2 2	Lancer Urea 100 kg N/ha		12.4-	82.0-	4.7-	100.1-
1 3	EGA Gregory Urea 200 kg N/ha		12.1-	81.8-	4.0-	103.4-
2 3	Lancer Urea 200 kg N/ha		13.1-	82.0-	4.4-	111.0-
TABLE OF A x C MEANS (Variety x Timing)						
1 1	EGA Gregory February	A	10.9e	82.6-	4.0-	92.6c
2 1	Lancer February	A	11.9b	82.2-	4.6-	96.0bc
1 2	EGA Gregory Planting	B	11.1d	82.1-	4.7-	94.4bc
2 2	Lancer Planting	B	12.4a	82.6-	4.4-	102.9a
1 3	EGA Gregory GS 30	C	11.5c	82.0-	4.4-	97.9b
2 3	Lancer GS 30	C	12.5a	82.0-	4.9-	98.5b

N Management in Wheat 2016 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

Crop Name			Wheat			
Assessment Date			8/01/2017	8/01/2017	8/01/2017	8/01/2017
Assessment Type			PROTEIN	TEST WEIGHT	SCREENING	N RECOVERY
Assessment Unit			%	kg/hL	%	kg N/ha
ARM Action Codes					AL	T4
Trt No.	Treatment	Appln. Code				
TABLE OF B x C MEANS (Rate x Timing)						
1 1	Urea 50 kg N/ha February	A	10.5-	83.1-	4.5t-	82.5-
2 1	Urea 100 kg N/ha February	A	11.4-	82.0-	4.5t-	94.0-
3 1	Urea 200 kg N/ha February	A	12.3-	82.1-	4.1t-	106.4-
1 2	Urea 50 kg N/ha Planting	B	11.0-	82.8-	4.7t-	90.3-
2 2	Urea 100 kg N/ha Planting	B	11.8-	82.5-	4.5t-	99.5-
3 2	Urea 200 kg N/ha Planting	B	12.5-	81.7-	4.4t-	106.1-
1 3	Urea 50 kg N/ha GS 30	C	10.9-	82.6-	5.0t-	84.7-
2 3	Urea 100 kg N/ha GS 30	C	12.2-	81.6-	4.7t-	100.9-
3 3	Urea 200 kg N/ha GS 30	C	12.9-	81.8-	4.3t-	109.0-

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

Crop Stage Majority
11 = First leaf unfolded
30 = Beginning of stem elongation: pseudostem & tillers erect, 1st internode elong.
65 = Full flowering: 50% of anthers mature
58 = 80% of inflorescence emerged
89 = Fully ripe: grain hard, difficult to divide with thumbnail

ARM Action Codes
AL = Automatic log transformation of X+1
T1 = ([C1]/4)/.32
T2 = ([C4]/2)/.32
TY3 = 0.5555555*[C7]
T4 = [C8]*[C9]*1.75

DP1 = Days after Planting

N Management in Wheat 2016 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

COMPLETE FACTORIAL AOV
Wheat
1/07/2016
EMERGENCE /m² 11 17 DP1 T1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	11859.503852				
R	3	2997.538249	999.179416	9.083	0.0001	
A	1	24.719238	24.719238	0.225	0.6375	4.9
B	2	351.376004	175.688002	1.597	0.2124	6.1
AB	2	373.687744	186.843872	1.699	0.1931	8.6
C	2	520.443387	260.221693	2.366	0.1041	6.1
AC	2	159.352620	79.676310	0.724	0.4896	8.6
BC	4	749.189589	187.297397	1.703	0.1638	10.5
ABC	4	1072.947184	268.236796	2.438	0.0587	14.8
ERROR	51	5610.249837	110.004899			

COMPLETE FACTORIAL AOV
Wheat
8/08/2016
NDVI RATIO 30 55 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	0.264615				
R	3	0.026033	0.008678	5.069	0.0038	
A	1	0.095000	0.095000	55.499	0.0001	0.02
B	2	0.004044	0.002022	1.181	0.3151	0.02
AB	2	0.001128	0.000564	0.329	0.7208	0.03
C	2	0.033729	0.016864	9.852	0.0002	0.02
AC	2	0.001612	0.000806	0.471	0.6271	0.03
BC	4	0.001880	0.000470	0.275	0.8931	0.04
ABC	4	0.013891	0.003473	2.029	0.1042	0.06
ERROR	51	0.087298	0.001712			

COMPLETE FACTORIAL AOV
Wheat
10/10/2016
NDVI RATIO 65 118 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	0.172859				
R	3	0.002395	0.000798	1.684	0.1822	
A	1	0.053289	0.053289	112.388	0.0001	0.01
B	2	0.079662	0.039831	84.005	0.0001	0.01
AB	2	0.000713	0.000357	0.752	0.4766	0.02
C	2	0.001803	0.000902	1.901	0.1598	0.01
AC	2	0.000899	0.000449	0.948	0.3944	0.02
BC	4	0.004107	0.001027	2.165	0.0861	0.02
ABC	4	0.005811	0.001453	3.064	0.0245	0.03
ERROR	51	0.024182	0.000474			

N Management in Wheat 2016 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

COMPLETE FACTORIAL AOV
Wheat
12/10/2016
HEADS /m² 58 120 DP1 T2

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	94782.409668				
R	3	5786.777072	1928.925691	1.703	0.1780	
A	1	233.595106	233.595106	0.206	0.6516	16
B	2	11283.569336	5641.784668	4.981	0.0106	19
AB	2	727.606879	363.803440	0.321	0.7267	27
C	2	8936.360677	4468.180339	3.945	0.0255	19
AC	2	278.591580	139.295790	0.123	0.8845	27
BC	4	3685.099284	921.274821	0.813	0.5225	34
ABC	4	6090.833876	1522.708469	1.344	0.2663	48
ERROR	51	57759.975857	1132.548546			

COMPLETE FACTORIAL AOV
Wheat
15/11/2016
YIELD t/ha 89 154 DP1 TY3

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	5.328178				
R	3	0.730313	0.243438	8.935	0.0001	
A	1	1.049908	1.049908	38.536	0.0001	0.08
B	2	1.231503	0.615751	22.601	0.0001	0.10
AB	2	0.350201	0.175101	6.427	0.0032	0.13
C	2	0.153635	0.076818	2.820	0.0690	0.10
AC	2	0.189643	0.094822	3.480	0.0383	0.13
BC	4	0.215899	0.053975	1.981	0.1114	0.17
ABC	4	0.017597	0.004399	0.161	0.9568	0.23
ERROR	51	1.389478	0.027245			

COMPLETE FACTORIAL AOV
Wheat
8/01/2017
PROTEIN % 99 208 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	74.599861				
R	3	0.223750	0.074583	0.435	0.7292	
A	1	21.233472	21.233472	123.708	0.0001	0.2
B	2	38.536944	19.268472	112.260	0.0001	0.2
AB	2	0.021944	0.010972	0.064	0.9382	0.3
C	2	4.083611	2.041806	11.896	0.0001	0.2
AC	2	0.298611	0.149306	0.870	0.4251	0.3
BC	4	0.920556	0.230139	1.341	0.2676	0.4
ABC	4	0.527222	0.131806	0.768	0.5511	0.6
ERROR	51	8.753750	0.171642			

N Management in Wheat 2016 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

COMPLETE FACTORIAL AOV
Wheat
8/01/2017
TEST WEIGHT kg/hL 99 208 DP1

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	107.516528				
R	3	3.788194	1.262731	0.838	0.4794	
A	1	0.061250	0.061250	0.041	0.8410	0.6
B	2	12.258611	6.129306	4.067	0.0230	0.7
AB	2	0.335833	0.167917	0.111	0.8948	1.0
C	2	2.067778	1.033889	0.686	0.5082	0.7
AC	2	3.103333	1.551667	1.029	0.3645	1.0
BC	4	2.816389	0.704097	0.467	0.7595	1.2
ABC	4	6.215833	1.553958	1.031	0.4003	1.7
ERROR	51	76.869306	1.507241			

COMPLETE FACTORIAL AOV
Wheat
8/01/2017
SCREENING % 99 208 DP1 AL

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	0.309569				
R	3	0.002731	0.000910	0.222	0.8806	
A	1	0.005045	0.005045	1.231	0.2725	0.0
B	2	0.018574	0.009287	2.265	0.1141	0.0
AB	2	0.003403	0.001702	0.415	0.6625	0.1
C	2	0.008445	0.004222	1.030	0.3643	0.0
AC	2	0.019180	0.009590	2.339	0.1067	0.1
BC	4	0.002004	0.000501	0.122	0.9739	0.1
ABC	4	0.041108	0.010277	2.507	0.0534	0.1
ERROR	51	0.209077	0.004100			

COMPLETE FACTORIAL AOV
Wheat
8/01/2017
N RECOVERY kg N/ha 99 208 DP1 T4

Source	DF	Sum of Squares	Mean Square	F	Prob.(F)	LSD (.05)
Total	71	8371.726256				
R	3	320.048414	106.682805	3.971	0.0128	
A	1	317.662869	317.662869	11.824	0.0012	2.4
B	2	5498.922473	2749.461236	102.343	0.0001	3.0
AB	2	124.570629	62.285315	2.318	0.1087	4.2
C	2	273.796781	136.898391	5.096	0.0096	3.0
AC	2	193.780555	96.890278	3.607	0.0343	4.2
BC	4	238.330896	59.582724	2.218	0.0800	5.2
ABC	4	34.489370	8.622343	0.321	0.8627	7.3
ERROR	51	1370.124269	26.865182			

N Management in Wheat 2016 - Tulloona: Variety x Rate x Timing Factorial

Trial ID: DK1604 **Location:** Tulloona **Trial Year:** 2016

Application Description			
	A	B	C
Application Date:	24/02/2016	14/06/2016	8/08/2016
Application Method:	SPREAD		
Application Timing:	FEBRUARY	IBS	GS30
Application Placement:	SURFACE	INCORPN	TOPDRESS
Dew Presence (Y/N):	No		
Soil Moisture:	DRY	FAIR	FAIR
% Cloud Cover:	0		
Next Moisture Occurred On:	19/03/2016 – 1.4mm	20/06/2016 – 21.6mm	

Application Equipment			
	A	B	C
Application Equipment:	SPREAD		
Equipment Type:	MANUAL		