

## APPENDIX

### Appendix A

#### A 1: Lay out diagram of the field experiment in split-plot design

##### Replication I

Rainfed	Irrigation
N 3	N 1
N 0	N 2
N 2	N 0
N 1	N 3

##### Replication II

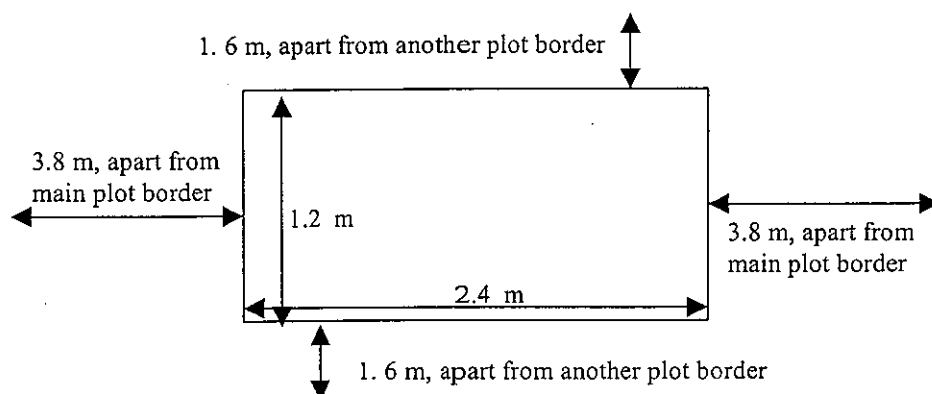
Irrigation	Rainfed
N 0	N 1
N 2	N 0
N 3	N 2
N 1	N 3

##### Replication III

Irrigation	Rainfed
N 3	N 2
N 2	N 0
N 0	N 1
N 1	N 3

Where: N0, N1, N2 and N3 refer as 0,100,200,400 kg N ha<sup>-1</sup> application rate, respectively

#### A 2: Diagram of plot size with 0.3 m x 0.3 m spacing arranged in three rows



**Appendix B: Data of field experiment**B1: Root dry weight (gm hill<sup>-1</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 40 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.41	0.41	0.41	0.41	0.32	0.32	0.32	0.32
N 1	0.36	0.41	0.32	0.36	0.29	0.26	0.24	0.26
N 2	0.25	0.38	0.31	0.31	0.16	0.21	0.15	0.17
N 3	0.14	0.18	0.15	0.15	0.06	0.15	0.14	0.11

B2: Root dry weight (gm hill<sup>-1</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 55 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.59	0.59	0.59	0.59	0.40	0.40	0.40	0.40
N 1	0.46	0.58	0.53	0.52	0.49	0.43	0.34	0.42
N 2	0.45	0.43	0.33	0.40	0.41	0.35	0.27	0.34
N 3	0.26	0.23	0.27	0.25	0.16	0.26	0.18	0.2

B3: Root dry weight (gm hill<sup>-1</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 70 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	1.7	1.7	1.7	1.7	0.71	0.71	0.71	0.71
N 1	2.76	2.31	1.89	2.32	0.95	0.86	0.76	0.85
N 2	2.21	1.98	1.86	2.01	0.51	0.52	0.57	0.53
N 3	0.91	0.45	0.47	0.61	0.47	0.51	0.55	0.51

B4: Root dry weight (gm hill<sup>-1</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 85 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	3.16	3.16	3.16	3.16	0.82	0.82	0.82	0.82
N 1	6.88	5.2	3.69	5.25	1.03	1.14	1.01	1.06
N 2	7.51	5.51	4.62	5.88	0.52	0.59	0.96	0.69
N 3	3.84	3.77	2.75	3.45	0.54	0.63	0.58	0.58

B5: Root dry weight (gm hill<sup>-1</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 100 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	3.45	3.45	3.45	3.45	1.42	1.42	1.42	1.42
N 1	11.69	6.82	6.04	8.18	2.38	4.6	5.17	4.05
N 2	11.67	9.71	7.7	9.69	2.82	3.56	3.39	3.25
N 3	6.46	4.12	6.3	5.62	2.38	2.85	3.51	2.91

B6: Root density (cm cm<sup>-3</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 40 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.108	0.108	0.108	0.108	0.102	0.102	0.102	0.102
N 1	0.103	0.101	0.098	0.101	0.094	0.081	0.066	0.080
N 2	0.092	0.089	0.078	0.086	0.064	0.075	0.039	0.059
N 3	0.078	0.059	0.067	0.068	0.058	0.049	0.045	0.051

B7: Root density (cm cm<sup>-3</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 55 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.141	0.141	0.141	0.141	0.131	0.131	0.131	0.131
N 1	0.220	0.163	0.166	0.183	0.154	0.102	0.115	0.123
N 2	0.122	0.121	0.142	0.128	0.103	0.084	0.082	0.089
N 3	0.1001	0.101	0.081	0.094	0.088	0.064	0.059	0.070

B8: Root density (cm cm<sup>-3</sup>) in observed soil volume (6000 cm<sup>3</sup>) at 70 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.193	0.193	0.193	0.193	0.131	0.131	0.131	0.131
N 1	0.301	0.401	0.452	0.384	0.238	0.124	0.164	0.175
N 2	0.235	0.338	0.361	0.311	0.086	0.175	0.133	0.131
N 3	0.165	0.167	0.125	0.152	0.125	0.106	0.110	0.113

B9: Root density ( $\text{cm cm}^{-3}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 85 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.393	0.393	0.393	0.393	0.115	0.115	0.115	0.115
N 1	0.687	0.734	0.399	0.399	0.193	0.147	0.108	0.149
N 2	0.611	0.472	0.588	0.588	0.094	0.115	0.094	0.101
N 3	0.313	0.341	0.181	0.181	0.103	0.116	0.075	0.098

B10: Root density ( $\text{cm cm}^{-3}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 100 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.437	0.437	0.437	0.437	0.229	0.229	0.229	0.229
N 1	0.987	0.954	0.651	0.864	0.239	0.352	0.607	0.399
N 2	0.948	0.823	0.943	0.904	0.176	0.262	0.332	0.256
N 3	0.569	0.405	0.441	0.471	0.171	0.262	0.396	0.276

B11: Mean of root density ( $\text{cm cm}^{-3}$ ) at different soil layer in soil observed volume ( $6000 \text{ cm}^3$ )

Treat.	Layer (cm)	Root density of in different soil layer at observed stage (DAS)									
		Irrigation					Rainfed				
		40	55	70	85	100	40	55	70	85	100
N0	0-5	0.045	0.053	0.048	0.118	0.131	0.043	0.051	0.025	0.029	0.063
	5-10	0.062	0.066	0.089	0.193	0.230	0.054	0.057	0.078	0.057	0.133
	10-15	0.001	0.021	0.055	0.081	0.076	0.004	0.021	0.026	0.028	0.032
	Total	0.108	0.141	0.193	0.393	0.437	0.102	0.130	0.131	0.115	0.229
N1	0-5	0.040	0.048	0.083	0.173	0.255	0.032	0.036	0.037	0.038	0.196
	5-10	0.060	0.108	0.192	0.253	0.370	0.039	0.058	0.105	0.074	0.160
	10-15	0.000	0.026	0.109	0.181	0.238	0.008	0.029	0.032	0.036	0.043
	Total	0.101	0.183	0.385	0.607	0.864	0.080	0.124	0.175	0.149	0.399
N2	0-5	0.037	0.050	0.084	0.163	0.266	0.027	0.033	0.034	0.023	0.089
	5-10	0.044	0.060	0.149	0.222	0.364	0.030	0.039	0.073	0.050	0.127
	10-15	0.004	0.017	0.077	0.171	0.273	0.001	0.016	0.024	0.026	0.040
	Total	0.086	0.128	0.311	0.557	0.905	0.059	0.089	0.131	0.101	0.257
N3	0-5	0.028	0.037	0.049	0.077	0.136	0.0195	0.022	0.028	0.026	0.083
	5-10	0.039	0.047	0.071	0.151	0.230	0.030	0.036	0.057	0.048	0.163
	10-15	0.001	0.009	0.032	0.050	0.104	0.001	0.012	0.028	0.024	0.030
	Total	0.068	0.094	0.152	0.278	0.471	0.051	0.070	0.114	0.098	0.276

B12: Above ground dry weight (gm hill<sup>-1</sup>) at 40 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	1.93	1.93	1.93	1.93	1.46	1.46	1.46	1.46
N 1	1.51	1.56	1.46	1.51	0.88	0.95	1.05	0.96
N 2	1.38	1.01	1.01	1.13	0.61	0.89	0.78	0.76
N 3	0.64	0.85	0.79	0.76	0.26	0.78	0.29	0.44

B13: Above ground dry weight (gm hill<sup>-1</sup>) at 55 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	3.37	3.37	3.37	3.37	1.51	1.51	1.51	1.51
N 1	4.42	3.38	3.99	3.93	3.17	1.60	1.88	2.21
N 2	3.67	3.81	2.86	3.44	2.77	1.81	1.07	1.88
N 3	1.50	2.07	1.58	1.71	0.76	0.92	0.94	0.87

B14: Above ground dry weight (gm hill<sup>-1</sup>) at 70 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	3.55	3.55	3.55	3.55	2.05	2.05	2.05	2.05
N 1	15.20	10.18	7.63	11.00	3.92	3.3	3.18	3.46
N 2	13.76	12.35	7.22	11.11	3.18	3.03	2.24	2.82
N 3	3.65	3.73	3.61	3.66	1.37	2.16	1.89	1.81

B15: Above ground dry weight (gm hill<sup>-1</sup>) at 85 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	13.01	13.01	13.01	13.01	4.03	4.03	4.03	4.03
N 1	35.25	32.07	29.66	32.33	4.81	6.69	6.12	5.87
N 2	45.95	33.94	28.43	36.11	4.40	4.25	6.69	5.11
N 3	22.31	18.74	20.52	20.52	3.42	3.94	2.80	3.38

B16: Above ground dry weight (gm hill<sup>-1</sup>) at 100 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	39.23	39.23	39.23	39.23	5.49	5.49	5.49	5.49
N 1	129.01	68.04	71.48	89.51	5.69	13.51	16.35	11.85
N 2	125.58	77.76	74.25	92.53	3.55	11.58	13.24	9.45
N 3	53.22	41.4	44.62	46.41	8.87	5.31	7.29	7.15

B17: Total nitrogen content in sugarcane root at 40 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.63	0.63	0.63	0.63	0.56	0.56	0.56	0.56
N 1	0.99	1.00	0.65	0.87	1.23	0.73	0.70	0.88
N 2	1.04	0.99	0.65	0.89	1.14	0.78	1.42	1.11
N 3	1.89	0.92	0.99	1.26	1.30	0.94	0.93	1.05

B18: Leaf area (m<sup>2</sup> hill<sup>-1</sup>) at 85 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.92	0.92	0.92	1.41	0.12	0.12	0.12	0.21
N 1	3.27	2.71	2.48	2.82	0.17	0.21	0.38	0.25
N 2	4.65	3.4	2.39	3.48	0.17	0.23	0.38	0.26
N 3	1.79	1.17	1.13	1.36	0.12	0.13	0.18	0.14

B19: Leaf area (m<sup>2</sup> hill<sup>-1</sup>) at 100 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	3.2	3.2	3.2	4.87	0.27	0.27	0.27	0.45
N 1	11.65	6.95	7.17	8.59	0.27	0.75	0.93	0.65
N 2	12.13	9.14	8.22	9.83	0.13	0.64	0.81	0.52
N 3	5.31	4.35	4.75	4.80	0.56	0.22	0.36	0.38

B20: Number of tillers per hill at 85 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	5	5	5	5	1	1	1	1
N 1	10	7	7	8	2	3	4	3
N 2	10	8	6	8	1	2	3	2
N 3	8	5	6	6.3	2	2	1	1.6

B21: Number of tillers per hill at 100 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	6	6	6	6	2	2	2	2
N 1	13	11	12	12	4	5	6	5
N 2	15	15	10	13.3	3	3	5	3.6
N 3	12	10	10	10.6	3	4	3	3.3

B22: Total nitrogen content in sugarcane root at 55 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.94	0.94	0.94	0.94	0.70	0.70	0.70	0.70
N 1	0.94	1.12	0.94	0.99	1.16	0.78	0.70	0.87
N 2	1.50	1.12	0.99	1.20	1.53	0.73	0.93	1.06
N 3	1.59	1.57	1.93	1.69	1.19	0.94	1.42	1.18

B23: Total nitrogen content in sugarcane root at 70 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.61	0.61	0.61	0.61	0.68	0.68	0.68	0.68
N 1	0.82	0.87	0.72	0.80	1.09	1.52	1.25	1.28
N 2	0.99	0.89	0.84	0.90	1.05	1.81	1.89	1.57
N 3	1.04	1.36	0.93	1.11	1.62	1.77	2.20	1.86

B24: Total nitrogen content in sugarcane root at 85 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.53	0.53	0.53	0.53	0.56	0.56	0.56	0.56
N 1	0.61	0.63	0.55	0.59	0.69	1.23	1.07	0.99
N 2	0.72	0.73	0.68	0.71	1.23	0.82	1.16	1.06
N 3	0.73	0.92	0.60	0.74	1.25	1.05	1.47	1.25

B25: Total nitrogen content in sugarcane root at 100 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.52	0.52	0.52	0.52	0.41	0.41	0.41	0.41
N 1	0.56	0.60	0.55	0.57	1.23	0.63	1.26	1.039
N 2	0.61	0.60	0.75	0.65	1.99	1.62	1.18	1.596
N 3	0.72	0.94	0.78	0.81	1.96	1.77	1.77	1.835

B26: Total nitrogen content in above ground parts at 40 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	1.23	1.23	1.23	1.23	1.14	1.14	1.14	1.14
N 1	1.07	1.62	1.33	1.34	1.7	1.64	1.26	1.53
N 2	1.16	1.36	1.84	1.45	1.65	1.43	1.16	1.41
N 3	1.43	1.24	1.18	1.28	1.89	1.26	2.15	1.76

B27: Total nitrogen content in sugarcane above ground parts at 55 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	1.98	1.98	1.98	1.98	1.54	1.54	1.54	1.54
N 1	2.18	1.99	2.01	2.06	1.57	1.99	1.38	1.64
N 2	2.32	2.18	2.37	2.29	1.50	1.30	1.57	1.45
N 3	2.10	2.32	2.73	2.38	1.59	2.34	1.76	1.89



B28: Total nitrogen content in sugarcane above ground parts at 70 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	1.74	1.74	1.74	1.74	1.04	1.04	1.04	1.04
N 1	2.15	2.39	2.22	2.25	1.72	1.24	1.81	1.59
N 2	1.63	3.15	2.01	2.26	1.98	1.5	1.81	1.76
N 3	2.39	2.16	2.25	2.26	2.01	1.65	1.89	1.85

B29: Total nitrogen content in sugarcane above ground parts at 85 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	1.31	1.31	1.31	1.31	1.48	1.48	1.48	1.48
N 1	2.39	2.02	1.55	1.98	1.28	1.38	1.47	1.37
N 2	2.43	1.91	1.69	2.01	1.40	1.59	1.73	1.57
N 3	2.57	1.96	1.70	2.07	2.05	1.81	1.71	1.85

B30: Total nitrogen content in sugarcane above ground parts at 100 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	1.40	1.40	1.40	1.40	1.35	1.35	1.35	1.35
N 1	1.53	1.59	1.47	1.53	1.81	1.53	1.62	1.65
N 2	1.60	1.72	1.84	1.72	1.86	1.68	1.99	1.84
N 3	1.82	1.93	1.47	1.74	1.86	1.91	2.11	1.96

B31: Effect of nitrogen application on soil pH at 100 DAS

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	6.44	6.44	6.44	6.44	6.55	6.55	6.55	6.55
N 1	6.08	6.3	6.57	6.31	5.94	6.2	5.97	6.03
N 2	6.19	6.19	6.18	6.18	5.99	6.15	5.81	5.98
N 3	6.11	5.9	6.04	6.01	5.79	5.39	5.75	5.64

B32: Effect of nitrogen application on total N content of 100 gm soil at 100 DAS (percentage)

Treatment	Irrigation				Rainfed			
	Rep I	Rep II	Rep III	Mean	Rep I	Rep II	Rep III	Mean
N 0	0.031	0.031	0.031	0.031	0.034	0.034	0.034	0.034
N 1	0.037	0.026	0.031	0.031	0.038	0.031	0.031	0.033
N 2	0.035	0.032	0.034	0.033	0.039	0.045	0.029	0.037
N 3	0.027	0.041	0.036	0.034	0.04	0.031	0.036	0.035

**Appendix C: Analysis of variance**

C 1: Analysis of variance for root dry weight ( $\text{gm hill}^{-1}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 40 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00791	0.00395	8.550	0.1047
W (B)	1	0.05134	0.05134	111.0	0.0089
A*B	2	0.00092	0.00046		
N (C)	3	0.17565	0.05855	55.03	0.0000
B*C	3	0.00761	0.00254	2.390	0.1202
A*B*C	12	0.01277	0.00106		
Total	23	0.25620			

C 2: Analysis of variance for root dry weight ( $\text{gm hill}^{-1}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 55 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00951	0.00475	2.83	0.2610
W (B)	1	0.06202	0.06202	36.93	0.0260
A*B	2	0.00336	0.00168		
N (C)	3	0.26783	0.08928	35.24	0.0000
B*C	3	0.01782	0.00594	2.34	0.1245
A*B*C	12	0.03040	0.00253		
Total	23	0.39093			

C 3: Analysis of variance for root dry weight ( $\text{gm hill}^{-1}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 70 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.19156	0.09578	1.13	0.4691
W (B)	1	6.11050	6.11050	72.20	0.0136
A*B	2	0.16926	0.08463		
N (C)	3	3.35211	1.11737	55.977	0.0000
B*C	3	1.88708	0.62903	31.51	0.0000
A*B*C	12	0.23958	0.01997		
Total	23	11.9501			

C 4: Analysis of variance for root dry weight ( $\text{gm hill}^{-1}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 85 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	2.81531	1.40765	0.77	0.5640
W (B)	1	79.8985	79.8985	43.88	0.0220
A*B	2	3.6420	1.82103		
N (C)	3	8.94438	2.98146	9.20	0.0019
B*C	3	7.49241	2.49747	7.71	0.0039
A*B*C	12	3.88703	0.32392		
Total	23	106.680			

C 5: Analysis of variance for root dry weight ( $\text{gm hill}^{-1}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 100 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	2.51156	1.25578	0.17	0.8578
W (B)	1	88.2050	88.2050	11.64	0.0762
A*B	2	15.1526	7.57628		
N (C)	3	62.6979	20.8993	14.18	0.0003
B*C	3	17.2437	5.74789	3.90	0.0371
A*B*C	12	17.6802	1.47335		
Total	23	203.491			

C 6: Analysis of variance for root dry density in observed soil volume ( $6000 \text{ cm}^3$ ) at 40 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00032	0.00016	1.56	0.3906
W (B)	1	0.00220	0.00220	21.16	0.0442
A*B	2	0.00021	0.00010		
N (C)	3	0.00755	0.00252	64.68	0.0000
B*C	3	0.00031	0.00010	2.68	0.0942
A*B*C	12	0.00046	0.00004		
Total	23	0.01106			

C 7: Analysis of variance for root dry density ( $\text{cm cm}^{-3}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 55 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00191	0.00095	18.63	0.0509
W (B)	1	0.00667	0.00667	130.29	0.0076
A*B	2	0.00010	0.00005		
N (C)	3	0.01748	0.00583	24.31	0.0000
B*C	3	0.00191	0.00063	2.65	0.0960
A*B*C	12	0.00288	0.00023		
Total	23	0.03094			

C 8: Analysis of variance for root dry density ( $\text{cm cm}^{-3}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 70 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00261	0.00130	0.48	0.6773
W (B)	1	0.09004	0.09004	32.89	0.0291
A*B	2	0.00548	0.00274		
N (C)	3	0.07778	0.02593	13.90	0.0003
B*C	3	0.03061	0.01020	5.47	0.0133
A*B*C	12	0.02238	0.00187		
Total	23	0.22890			

C 9: Analysis of variance for root dry density ( $\text{cm cm}^{-3}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 85 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.02156	0.01078	2.68	0.2721
W (B)	1	0.68682	0.68682	170.46	0.0058
A*B	2	0.00806	0.00403		
N (C)	3	0.12653	0.04218	7.73	0.0039
B*C	3	0.08592	0.02864	5.25	0.0152
A*B*C	12	0.06545	0.00545		
Total	23	0.99433			

C 10: Analysis of variance for root dry density ( $\text{cm cm}^{-3}$ ) in observed soil volume ( $6000 \text{ cm}^3$ ) at 100 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00703	0.00352	0.08	0.9275
W (B)	1	0.87402	0.87402	19.42	0.0478
A*B	2	0.09003	0.04502		
N (C)	3	0.04742	0.13581	16.73	0.0001
B*C	3	0.22618	0.07389	9.10	0.0020
A*B*C	12	0.09470	0.00812		
Total	23	1.69758			

C 11: Analysis of variance for above ground dry weight ( $\text{gm hill}^{-1}$ ) at 40 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.04263	0.02132	0.69	0.5922
W (B)	1	1.09654	1.09654	35.43	0.0271
A*B	2	0.06190	0.03095		
N (C)	3	3.85538	1.28513	64.26	0.0000
B*C	3	0.04805	0.01602	0.80	0.5170
A*B*C	12	0.24000	0.02000		
Total	23	5.34450			

C 12: Analysis of variance for above ground dry weight ( $\text{gm hill}^{-1}$ ) at 55 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	1.02766	0.51383	3.51	0.2220
W (B)	1	13.4101	13.4101	91.48	0.0108
A*B	2	0.29317	0.14659		
N (C)	3	10.4533	3.48443	14.84	0.0002
B*C	3	0.91535	0.30512	1.30	0.3196
A*B*C	12	2.81690	0.23474		
Total	23	28.9165			

C 13: Analysis of variance for above ground dry weight (gm hill<sup>-1</sup>) at 70 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	14.7961	7.39803	1.40	0.4162
W (B)	1	138.048	138.048	26.18	0.0361
A*B	2	10.5476	5.27378		
N (C)	3	112.814	37.6047	15.47	0.0002
B*C	3	58.8688	19.6229	8.07	0.0033
A*B*C	12	29.1733	2.43111		
Total	23	364.248			

C 14: Analysis of variance for above ground dry weight (gm hill<sup>-1</sup>) at 85 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	32.5973	16.2986	0.62	0.6180
W (B)	1	2618.56	2618.56	99.29	0.0099
A*B	2	52.7463	26.3732		
N (C)	3	597.216	199.072	23.08	0.0000
B*C	3	433.445	144.482	16.75	0.0001
A*B*C	12	103.519	8.62655		
Total	23	3838.08			

C 15: Analysis of variance for above ground dry weight (gm hill<sup>-1</sup>) at 100 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	893.927	446.964	0.59	0.6292
W (B)	1	20449.3	20449.3	26.96	0.0351
A*B	2	1517.03	758.516		
N (C)	3	4184.17	1394.72	9.42	0.0018
B*C	3	2943.58	981.193	6.63	0.0069
A*B*C	12	1776.09	148.007		
Total	23	31764.1			

C 16: Analysis of variance for number of tiller hill<sup>-1</sup>, at 85 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	3.00000	1.50000	0.29	0.7750
W (B)	1	145.042	145.042	28.07	0.0338
A*B	2	10.3333	5.16667		
N (C)	3	22.1250	7.37500	8.85	0.0023
B*C	3	3.12500	1.04167	1.25	0.3351
A*B*C	12	10.0000	0.83333		
Total	23	193.625			

C 17: Analysis of variance for number of tiller hill<sup>-1</sup>, at 100 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	1.00	0.50	0.11	0.90
W (B)	1	294.00	294.00	65.33	0.0150
A*B	2	9.00	4.50		
N (C)	3	81.00	27.00	19.44	0.0001
B*C	3	24.3333	8.1111	5.84	0.0107
A*B*C	12	16.6667	1.38889		
Total	23	426.000			

C 18: Analysis of variance for leaf area (m<sup>2</sup> hill<sup>-1</sup>), at 85 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.69348	0.34674	0.62	0.6163
W (B)	1	22.8540	22.8540	41.04	0.0235
A*B	2	1.11376	0.55688		
N (C)	3	7.32333	2.44111	20.77	0.0000
B*C	3	5.77285	1.92428	5.68	0.0002
A*B*C	12	1.41057	0.11755		
Total	23	39.1690			

C 19: Analysis of variance for leaf area (m<sup>2</sup> hill<sup>-1</sup>), at 100 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	5.20968	2.60484	0.66	0.6018
W (B)	1	226.874	226.874	57.64	0.0169
A*B	2	4.87176	3.93588		
N (C)	3	48.0455	16.0152	18.56	0.0001
B*C	3	39.7461	13.2487	15.36	0.0002
A*B*C	12	10.3531	0.86276		
Total	23	338.100			

C 20: Analysis of variance for total nitrogen percentage in roots, at 40 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.41816	0.20908	3.93	0.2028
W (B)	1	0.00107	0.00107	0.02	0.9004
A*B	2	0.10636	0.05318		
N (C)	3	1.26708	0.42236	8.48	0.0027
B*C	3	0.01443	0.00481	0.10	0.9604
A*B*C	12	0.59768	0.04981		
Total	23	2.40478			

C 21: Analysis of variance for total nitrogen percentage in roots, at 55 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.17271	0.08635	1.88	0.3470
W (B)	1	0.38507	0.38507	8.39	0.1014
A*B	2	0.09176	0.04588		
N (C)	3	1.31760	0.43920	9.37	0.0018
B*C	3	0.14760	0.04920	1.05	0.4060
A*B*C	12	0.56220	0.04685		
Total	23	2.67693			

C 22: Analysis of variance for total nitrogen percentage in roots, at 70 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.17636	0.08818	0.75	0.5724
W (B)	1	1.47510	1.47510	12.50	0.0715
A*B	2	0.23606	0.11803		
N (C)	3	2.28281	0.76094	21.93	0.0000
B*C	3	0.42075	0.14025	4.04	0.0336
A*B*C	12	0.41632	0.03469		
Total	23	5.00740			

C 23: Analysis of variance for total nitrogen percentage in roots, at 85 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00562	0.00281	0.08	0.9289
W (B)	1	0.63050	0.63050	17.15	0.0536
A*B	2	0.07351	0.03675		
N (C)	3	0.68505	0.22835	8.68	0.0025
B*C	3	0.19031	0.06344	2.41	0.1177
A*B*C	12	0.31587	0.02632		
Total	23	1.9086			

C 24: Analysis of variance for total nitrogen percentage in roots, at 100 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.06056	0.03028	0.43	0.7003
W (B)	1	2.02420	2.02420	28.61	0.0332
A*B	2	0.14151	0.07075		
N (C)	3	2.54751	0.84917	22.91	0.0000
B*C	3	1.22071	0.40690	10.98	0.0009
A*B*C	12	0.44480	0.03707		
Total	23	6.4290			



C 25: Analysis of variance for total nitrogen percentage in above ground parts, at 40 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.01082	0.00541	0.06	0.9393
W (B)	1	0.11207	0.11207	1.34	0.3670
A*B	2	0.16761	0.8380		
N (C)	3	0.38523	0.12841	1.70	0.2192
B*C	3	0.30897	0.10299	1.37	0.3000
A*B*C	12	0.90450	0.07537		
Total	23	1.88920			

C 26: Analysis of variance for total nitrogen percentage in above ground parts, at 55 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.04763	0.02382	0.30	0.7664
W (B)	1	1.77127	1.77127	22.67	0.0414
A*B	2	0.15623	0.07812		
N (C)	3	0.47947	0.15982	3.28	0.0587
B*C	3	0.17233	0.05744	1.18	0.3590
A*B*C	12	0.58520	0.04877		
Total	23	3.21213			

C 27: Analysis of variance for total nitrogen percentage in above ground parts, at 70 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00276	0.00138	0.00	0.9952
W (B)	1	1.94940	1.94940	6.75	0.1217
A*B	2	0.57743	0.28871		
N (C)	3	1.72084	0.57349	6.24	0.0085
B*C	3	0.08103	0.02701	0.29	0.8289
A*B*C	12	1.10208	0.09184		
Total	23	5.43318			

C 28: Analysis of variance for total nitrogen percentage in above ground parts, at 85 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.33033	0.16516	0.76	0.5695
W (B)	1	0.45100	0.45100	2.06	0.2873
A*B	2	0.43691	0.21845		
N (C)	3	1.03541	0.34514	10.13	0.0013
B*C	3	0.50911	0.16970	4.98	0.0180
A*B*C	12	0.40890	0.03408		
Total	23	3.17166			

C 29: Analysis of variance for total nitrogen percentage in above ground parts, at 100 DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00143	0.00072	0.02	0.9806
W (B)	1	0.06510	0.06510	1.79	0.3125
A*B	2	0.07263	0.03632		
N (C)	3	0.81818	0.2723	16.23	0.0002
B*C	3	0.05688	0.01896	1.13	0.3766
A*B*C	12	0.20167	0.01681		
Total	23	1.21590			

C 30: Analysis of variance for effect of nitrogen application on soil pH, at 100DAS

Source	Df	SS	MS	F	P
Rep (A)	2	0.00356	0.00178	0.12	0.8955
W (B)	1	0.20907	0.20907	13.71	0.0658
A*B	2	0.03051	0.01525		
N (C)	3	1.35790	0.45263	17.822	0.0001
B*C	3	0.19777	0.06592	2.60	0.1008
A*B*C	12	0.30473	0.02539		
Total	23	2.10353			

C 31: Analysis of variance for effect of nitrogen application on total nitrogen percentage in 100 gm soil, at 100DAS

Source	Df	SS	MS	F	P
Rep (A)	2	2.258E-05	1.129E-05	0.68	0.5955
W (B)	1	3.038E-05	3.038E-05	1.83	0.3091
A*B	2	3.325E-05	1.622E-05		
N (C)	3	6.446E-05	2.149E-05	0.82	0.5071
B*C	3	7.125E-06	2.375E-06	0.09	0.9638
A*B*C	12	3.142E-04	2.618E-04		
Total	23	4.720E-04			

**CURRICULUM VITAE**

- Name:** Aung Moe Myo Tint
- Date of Birth:** February 11, 1968
- Scholarship for M.S. Study:** Department of Technical and Economic Cooperation (DTEC), Thailand
- Educational Background:**
- 1985-1992 B. Ag (Agriculture)  
Yezin University, Pyin Ma Na, Myanmar
- 2000-2002 M.S. Agriculture (Agricultural Systems)  
Chiang Mai University, Chiang Mai, Thailand
- Work Experiences:**
- 1994-1997 Deputy Assistant Supervisor, Extension Department,  
Myanma Sugarcane Enterprise, Ministry of  
Agriculture and Irrigation
- 1997-Present Assistant Supervisor, Extension Department,  
Myanma Sugarcane Enterprise,  
Ministry of Agriculture and Irrigation
- Home Address:** 105, Htee Su Street, Kuaung Gyi Oo Dan Quarter,  
Pyay, Bago Division, Union of Myanmar
- E-mail:** [aungtint@yahoo.co.uk](mailto:aungtint@yahoo.co.uk), [aungmmt@hotmail.com](mailto:aungmmt@hotmail.com)
- Office Address:** Myanma Sugarcane Enterprise, Ministry of  
Agriculture and Irrigation, Union of Myanmar