

# Competition of Plants and Microorganisms for Added Nitrogen in Different Fertilizer Forms in Semi-Arid Climate

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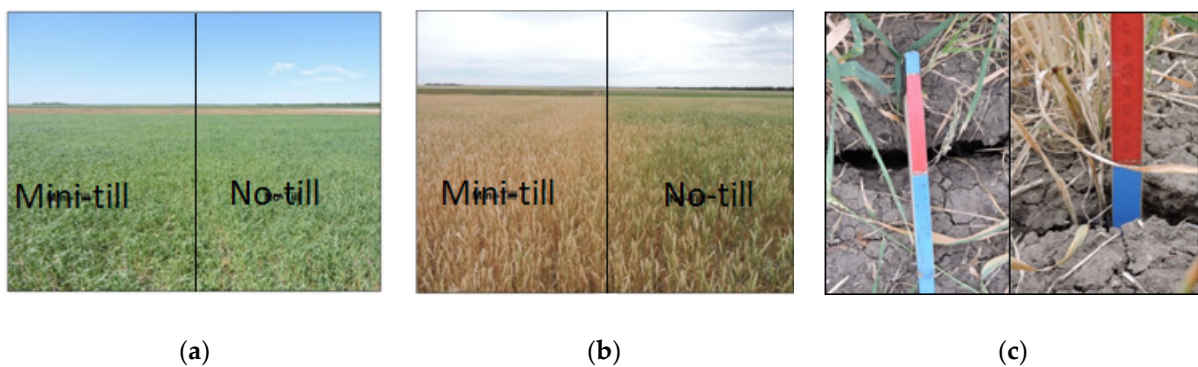
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## Supplementary Material



**Figure S1.** Field observations. Plant development in (a) July (day 43) and (b) August (day 77) for mini-till and no-till and (c) soil cracking in August (day 77)

**Table S1.** Gravimetric water contents in percent for each soil increment for each sampling time point. Given is the mean  $\pm$  the standard deviation of n = 9 microplots.

Tillage	Depth (cm)	May	June	July	August
Mini-till	0-20	26 $\pm$ 6	16 $\pm$ 6	15 $\pm$ 7	14 $\pm$ 2
	20-40	23 $\pm$ 3	17 $\pm$ 7	17 $\pm$ 6	11 $\pm$ 2
	40-60	22 $\pm$ 2	14 $\pm$ 7	15 $\pm$ 5	11 $\pm$ 1
No-till	0-20	22 $\pm$ 5	17 $\pm$ 5	17 $\pm$ 5	13 $\pm$ 4
	20-40	23 $\pm$ 4	16 $\pm$ 5	16 $\pm$ 6	11 $\pm$ 1
	40-60	19 $\pm$ 3	14 $\pm$ 6	18 $\pm$ 6	11 $\pm$ 2

**Table S2.** Absolute  $^{15}\text{N}$  amount in mg per subplot in nitrate, MBN and the 4-20 cm soil depth increment 3 shortly before (May) and after (June) fertilization. Note that in the 4-20 cm soil depth increment  $^{15}\text{N}$  recovered in nitrate and MBN is not included.

Time	Tillage form	Fertilizer form	$\text{NO}_3\text{-}^{15}\text{N}$	$\text{MBN}^{15}\text{N}$	0-20 cm soil
May	Mini-till	Liquid	0 $\pm$ 0	0.0 $\pm$ 0.0	0 $\pm$ 0.0
	Mini-till	Granular	0 $\pm$ 0	0.0 $\pm$ 0.0	0.1 $\pm$ 0.2
	No-till	Liquid	0 $\pm$ 0	0.0 $\pm$ 0.01	0.0 $\pm$ 0.0
	No-till	Granular	0 $\pm$ 0	0.0 $\pm$ 0.0	0.1 $\pm$ 0.2
June	Mini-till	Liquid	22.6 $\pm$ 67.7	5.8 $\pm$ 7.1	27.2 $\pm$ 80.6
	Mini-till	Granular	5.5 $\pm$ 16.6	5.5 $\pm$ 9.8	77.9 $\pm$ 177.9
	No-till	Liquid	20.4 $\pm$ 35.4	5.5 $\pm$ 6.9	78.0 $\pm$ 127.1
	No-till	granular	41.9 $\pm$ 103.6	12.4 $\pm$ 33.0	48.7 $\pm$ 82.3

**Table S3.** Results of 2-way-ANOVAs with post-hoc Tukey HSD test for the influence of fertilizer and tillage form and their interaction on various soil and plant parameters for the sampling times June, July, and August. Only significant interactions are shown. Input units of each parameter were: t ha<sup>-1</sup> for plant yield, kg ha<sup>-1</sup> for plant N uptake, mg kg<sup>-1</sup> for MBN and  $\text{NO}_3\text{-N}$ , g m<sup>-2</sup> for N contents in plant compartments, and % for all  $^{15}\text{N}$  recoveries.

Aboveground dry weight August						A
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.64	0.64	0.27	0.62	
Tillage form	1	6.91	6.91	2.93	0.13	
Fertilizer:Tillage	1	0.54	0.54	0.23	0.65	
Residuals	8	18.84	2.36			
Plant N uptake August						B
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	1040	1040	1.56	0.25	
Tillage form	1	384	384	0.58	0.47	
Fertilizer:Tillage	1	376	376	0.56	0.47	
Residuals	8	5333	667			
Grain yield August						C
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.31	0.306	0.5	0.5	
Tillage form	1	1.89	1.887	3.07	0.12	

Fertilizer:Tillage	1	0.16	0.157	0.26	0.63
Residuals	8	4.92	0.615		

MBN June						D
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	30	30	0.48	0.51	
Tillage form	1	22	22	0.36	0.57	
Fertilizer:Tillage	1	73	73	1.19	0.31	
Residuals	8	494	61.8			

MBN July						E
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	129.8	129.8	7.15	0.028	*
Tillage form	1	57.8	57.8	3.19	0.112	
Fertilizer:Tillage	1	18.1	18.1	1	0.347	
Residuals	8	145.1	18.1			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Comparison	Difference	lwr	upr	p adj
Granular - Liquid	6.577	0.9069	12.25	0.0282

MBN August						F
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	36.4	36.4	1.58	0.244	
Tillage form	1	170.1	170.1	7.42	0.026	*
Fertilizer:Tillage	1	24.1	24.1	1.05	0.336	
Residuals	8	183.5	22.9			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Comparison	Difference	lwr	upr	p adj
No-till - Mini-till	-7.531	-13.91	-1.154	0.0261

T <sup>15</sup> N recovery in 0-20 cm June						G
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	96	96	0.28	0.61	
Tillage form	1	378	378	1.09	0.33	
Fertilizer:Tillage	1	53	53	0.15	0.71	
Residuals	8	2764	346			

T <sup>15</sup> N recovery in 20-40 cm June						H
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.0358	0.0358	1.12	0.32	
Tillage form	1	0.0263	0.0263	0.82	0.39	
Fertilizer:Tillage	1	0.0678	0.0678	2.12	0.18	
Residuals	8	0.2558	0.032			

T <sup>15</sup> N recovery in 40-60 cm June						I
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.123	0.123	2.54	0.15	
Tillage form	1	0.047	0.047	0.97	0.35	
Fertilizer:Tillage	1	0.001	0.001	0.01	0.91	

Residuals	8	0.388	0.0485
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NO <sub>3</sub> - <sup>15</sup> N recovery June						J
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	1	1	0.01	0.92	
Tillage form	1	81	81	0.59	0.47	
Fertilizer:Tillage	1	103	103	0.75	0.41	
Residuals	8	1100	137			

MB <sup>15</sup> N recovery June						K
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	2.9	2.9	0.27	0.62	
Tillage form	1	3	3	0.28	0.61	
Fertilizer:Tillage	1	3.6	3.6	0.33	0.58	
Residuals	8	85.6	10.7			

Soil <sup>15</sup> N recovery July						L
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.0051	0.0051	0.24	0.638	
Tillage form	1	0.1572	0.1572	7.33	0.027	*
Fertilizer:Tillage	1	0.1358	0.1358	6.33	0.036	*
Residuals	8	0.1715	0.0214			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
log10-transformed

Comparison	Difference	lwr	upr	p adj
NT:Liquid - MT:Liquid	0.44171	0.05887	0.8246	0.0252
NT - MT	0.2289	0.03401	0.4239	0.0267

T <sup>15</sup> N recovery in 0-20 cm July						M
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	27	27	0.43	0.5314	
Tillage form	1	798	798	12.79	0.0072	**
Fertilizer:Tillage	1	570	570	9.13	0.0165	*
Residuals	8	499	62			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
log10-transformed

Comparison	Difference	lwr	upr	p adj
No-till - Mini-till	16.31	5.793	26.83	0.0072
NT:Liquid - MT:Liquid	30.09	9.435	50.752	0.007

T <sup>15</sup> N recovery in 20-40 cm July						N
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.128	0.128	2.47	0.15	
Tillage form	1	0.002	0.002	0.04	0.85	
Fertilizer:Tillage	1	0.065	0.065	1.27	0.29	
Residuals	8	0.0517	0.0517			

log10-transformed

T <sup>15</sup> N recovery in 40-60 cm July						O
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.0718	0.0718	3.09	0.12	
Tillage form	1	0.0131	0.0131	0.56	0.47	
Fertilizer:Tillage	1	0.0008	0.0008	0.03	0.86	
Residuals	8	0.1861	0.0233			

log10-transformed

NO <sub>3</sub> - <sup>15</sup> N recovery July						P
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	10.9	10.9	4.37	0.07	.
Tillage form	1	21	21	8.44	0.02	*
Fertilizer:Tillage	1	18	18	7.23	0.028	*
Residuals	8	19.9	2.49			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

log10-transformed

Comparison	Difference	lwr	upr	p adj
No-till - Mini-till	2.647	0.5453	4.749	0.0198
NT:Liquid - MT:Liquid	5.0986	0.9709	9.2263	0.0177
NT:Liquid - MT:Granular	4.5532	0.4255	8.6809	0.0315
NT:granular - NT:Liquid	-4.3576	-8.4853	-0.2299	0.0389

MB <sup>15</sup> N recovery July						Q
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.03	0.03	0.07	0.8	
Tillage form	1	3.20E-01	3.20E-01	0.74	0.42	
Fertilizer:Tillage	1	1.89E+00	1.89E+00	4.35	0.07	.
Residuals	8	3.48E+00	4.35E-01			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Plant <sup>15</sup> N recovery July						R
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	18	18	0.16	0.7	
Tillage form	1	1	1	0.01	0.91	
Fertilizer:Tillage	1	47	47	0.43	0.53	
Residuals	8	873	109.1			

Leave <sup>15</sup> N recovery July						S
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0	0	0	0.99	
Tillage form	1	5	5	0.08	0.78	
Fertilizer:Tillage	1	42	42	0.74	0.41	
Residuals	8	456	57			

Shoot <sup>15</sup> N recovery July						T
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	16.5	16.5	1.6	0.24	
Tillage form	1	11.4	11.4	1.1	0.32	
Fertilizer:Tillage	1	0.1	0.1	0.01	0.91	
Residuals	8	82.7	10.34			

Competition index <sup>15</sup> N July						U
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.000009	0.000009	0.03	0.86	
Tillage form	1	0.000119	0.000119	0.43	0.53	
Fertilizer:Tillage	1	0.000833	0.000833	3	0.12	
Residuals	8	0.00222	0.000278			

Competition index N July						V
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.636	0.636	4.97	0.056	.
Tillage form	1	0.126	0.126	0.99	0.35	
Fertilizer:Tillage	1	0.217	0.217	1.7	0.229	
Residuals	8	1.023	0.128			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Aboveground dry biomass July						W
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.1	0.0095	0.12	0.74	
Tillage form	1	0.087	0.087	1.1	0.33	
Fertilizer:Tillage	1	0.007	0.0071	0.09	0.77	
Residuals	8	0.633	0.0792			

Plant N yield July						X
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	58	57.8	0.59	0.47	
Tillage form	1	224	224.1	2.28	0.17	
Fertilizer:Tillage	1	15	15.3	0.16	0.7	
Residuals	8	786	98.3			

NdfF July						Y
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	1.7	1.74	0.31	0.59	
Tillage form	1	0.1	0.14	0.03	0.88	
Fertilizer:Tillage	1	4	4.01	0.71	0.42	
Residuals	8	45.1	5.64			

Soil <sup>15</sup> N recovery August						Z
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	115.8	115.8	3.47	0.1	.
Tillage form	1	76.6	76.6	2.3	0.17	
Fertilizer:Tillage	1	37.7	37.7	1.13	0.32	
Residuals	8	267.1	33.4			

T <sup>15</sup> N recovery in 0-20 cm August						AA
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	193.2	193.2	5.58	0.046	*
Tillage form	1	6.4	6.4	0.19	0.678	
Fertilizer:Tillage	1	35.6	35.6	1.03	0.34	
Residuals	8	276.8	34.6			

Comparison	Difference	lwr	upr	p adj
Granular - Liquid	-8.025	-15.86	-0.1939	0.0457

T <sup>15</sup> N recovery in 20-40 cm August						AB
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	2.76	2.76	1.83	0.213	
Tillage form	1	5.45	5.45	3.62	0.094	.
Fertilizer:Tillage	1	5.54	5.54	3.68	0.091	.
Residuals	8	12.04	1.51			

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

T <sup>15</sup> N recovery in 40-60 cm August						AC
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	1.05	1.05	1.68	0.23	
Tillage form	1	5.6	5.6	9.01	0.17	*
Fertilizer:Tillage	1	1.17	1.17	1.88	0.208	
Residuals	8	4.97	0.62			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Comparison	Difference	lwr	upr	p adj
No-till - Mini-till	1.366	0.3167	2.415	0.017

NO <sub>3</sub> - <sup>15</sup> N recovery August						AD
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	1.1	1.1	0.26	0.62	
Tillage form	1	0.4	0.4	0.1	0.76	
Fertilizer:Tillage	1	7.5	7.5	1.8	0.22	
Residuals	8	33.4	4.18			

MB <sup>15</sup> N recovery August						AE
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	3.42E-01	3.42E-01	2.29	0.168	
Tillage form	1	7.43E-01	7.43E-01	4.98	0.056	.
Fertilizer:Tillage	1	2.68E-01	2.68E-01	1.8	0.217	
Residuals	8	1.19E+00	1.49E-01			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Plant <sup>15</sup> N recovery August						AF
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	848	848	18.97	0.0024	**
Tillage form	1	319	319	7.15	0.0282	*
Fertilizer:Tillage	1	49	49	1.1	0.324	
Residuals	8	357	45			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Comparison	Difference	lwr	upr	p adj
Granular - Liquid	-16.81	-25.71	-7.909	0.0024
No-till - Mini-till	-10.32	-19.22	-1.418	0.0282
NT:Granular - MT:Granular	-27.126	-44.6	-9.648	0.0048
NT:Granular - NT:Liquid	-20.865	-38.34	-3.386	0.0212

Grain <sup>15</sup> N recovery August						AG
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	493	493	21.74	0.0016	**
Tillage form	1	300	300	13.24	0.0066	**
Fertilizer:Tillage	1	29	29	1.29	0.2887	
Residuals	8	181	23			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Comparison	Difference	lwr	upr	p adj
Granular - Liquid	-12.81	-19.15	-6.477	0.0016
No-till - Mini-till	-10	-16.34	-3.663	0.0066

Leave <sup>15</sup> N recovery August						AH
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	19.37	19.37	5.18	0.052	.
Tillage form	1	0.62	0.62	0.17	0.694	

Fertilizer:Tillage	1	0	0	0	0.973
Residuals	8	29.91	3.74		
Signif. codes: 0 '****' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 ' ' 1					

Shoot <sup>15</sup> N recovery August						AI
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	6.33	6.33	3.76	0.088	.
Tillage form	1	0.06	0.06	0.03	0.857	
Fertilizer:Tillage	1	2.84	2.84	1.68	0.23	
Residuals	8	13.47	1.68E+00			
Signif. codes: 0 '****' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 ' ' 1						

Competition index <sup>15</sup> N August						AJ
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	2.40E-06	2.40E-06	0.16	0.6971	
Tillage form	1	2.88E-04	2.88E-04	19.37	0.0023	**
Fertilizer:Tillage	1	3.00E-07	3.00E-07	0.02	0.8953	
Residuals	8	1.19E-04	1.49E-05			

Comparison	Difference	lwr	upr	p adj
No-till - Mini-till	0.009791	0.00466	0.01492	0.0023
NT:Liquid - MT:Liquid	0.0100932	1.71E-05	0.02017	0.0496

Competition index N August						AK
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.305	0.305	2.32	0.17	
Tillage form	1	0.043	0.043	0.32	0.59	
Fertilizer:Tillage	1	0.044	0.044	0.33	0.58	
Residuals	8	1.053	0.1316			

NHI August						AL
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.00052	0.000519	0.6	0.46	
Tillage form	1	0.00244	0.002444	2.84	0.13	
Fertilizer:Tillage	1	0.00013	0.000126	0.15	0.71	
Residuals	8	0.00688	0.00086			

Ndff August	AM					
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	38.8	38.8	16.68	0.0035	**
Tillage form	1	13.8	13.8	5.93	0.0409	*
Fertilizer:Tillage	1	2.4	2.4	1.02	0.3426	
Residuals	8	18.6	2.3			
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Comparison	Difference	lwr	upr	p adj
Granular - Liquid	-3.595	-5.625	-1.565	0.0035
No-till - Mini-till	-2.143	-4.173	-0.1131	0.0409

NO <sub>3</sub> -N June					AN	
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	9.33E+01	9.33E+01	5.17	0.053	.

Tillage form	1	7.80E+00	7.80E+00	0.43	0.529
Fertilizer:Tillage	1	1.29E+01	1.29E+01	0.72	0.442
Residuals	8	1.44E+02	1.80E+01		

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NO <sub>3</sub> -N July						AO
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	4.30E-03	4.30E-03	0.45	0.521	
Tillage form	1	1.68E-01	1.68E-01	17.55	0.003	**
Fertilizer:Tillage	1	3.91E-02	3.91E-02	7.21	0.028	*
Residuals	8	7.67E-02	9.60E-03			

Comparison	Difference	lwr	upr	p adj
No-till - Mini-till	0.2369	0.1065	0.3673	0.003
NT:Liquid - MT:Liquid	0.3887	1.36E-01	0.64478	0.0055
NT:Liquid - MT:Granular	0.27482	1.87E-02	0.53091	0.036

NO <sub>3</sub> -N August						AP
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	4.80E+00	4.80E+00	9	0.0171	*
Tillage form	1	4.83E+01	4.83E+01	90	1.30E-05	***
Fertilizer:Tillage	1	1.22E+01	1.22E+01	22.7	0.0014	**
Residuals	8	4.30E+00	5.00E-01			

Comparison	Difference	lwr	upr	p adj
Granular-Liquid	1.268	0.293	2.242	0.0171
No-till - Mini-till	-4.011	-4.985	-3.036	0
MT:Granular - MT:Liquid	3.2831	1.37E+00	5.1973	0.0026
NT:Liquid - MT:Liquid	-1.9952	-3.909	-0.08104	0.0413
NT:Granular - MT:Liquid	-2.743	-4.657	-0.82877	0.0077
NT:Liquid - MT:Granular	-5.2783	-7.193	-3.36416	0.0001
NT:Granular - MT:Granular	-6.0261	-7.94	-4.11189	0

C/N grain - August						AQ
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	2.52E+00	2.52E+00	0.96	0.35	
Tillage form	1	6.06E+00	6.06E+00	2.32	0.17	
Fertilizer:Tillage	1	3.10E-01	3.10E-01	0.12	0.74	
Residuals	8	2.09E+01	2.61E+00			

C/N leaf - August	AR					
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	4.90E+01	4.90E+01	1.15	0.31	
Tillage form	1	9.50E+01	9.50E+01	2.22	0.17	
Fertilizer:Tillage	1	2.00E+00	2.00E+00	0.05	0.83	
Residuals	8	3.44E+02	4.30E+01			

C/N shoot - August						AS
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	5.00E+01	5.00E+01	0.14	0.713	
Tillage form	1	2.76E+03	2.76E+03	7.91	0.023	*
Fertilizer:Tillage	1	1.81E+02	1.81E+02	0.52	0.492	
Residuals	8	2.79E+03	3.48E+02			

Comparison	Difference	lwr	upr	p adj
No-till - Mini-till	-30.3	-55.15	-5.452	0.0228

Leaf N July						AT
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.69	0.69	1.3	0.29	
Tillage form	1	0.52	0.52	0.97	0.35	
Fertilizer:Tillage	1	0.16	0.16	0.3	0.6	
Residuals	8	4.23	0.529			

Shoot N July						AU
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.002	0.002	0.01	0.906	
Tillage form	1	0.539	0.539	5.25	0.051	.
Fertilizer:Tillage	1	0.058	0.058	0.57	0.473	
Residuals	8	0.822	0.103			

Leaf N August						AV
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.069	0.069	0.54	0.48	
Tillage form	1	0.019	0.019	0.15	0.71	
Fertilizer:Tillage	1	0.001	0.001	0.01	0.92	
Residuals	8	1.022	0.1278			

Shoot N August						AW
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.086	0.086	0.77	0.41	
Tillage form	1	0.009	0.009	0.08	0.79	
Fertilizer:Tillage	1	0.129	0.129	1.15	0.32	
Residuals	8	0.899	0.1123			

Grain N August						AX
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	7.12	7.12	1.85	0.21	
Tillage form	1	3.66	3.66	0.95	0.36	
Fertilizer:Tillage	1	2.38	2.38	0.62	0.45	
Residuals	8	30.78	3.85			

MBN May						AY
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	1	1	0.02	0.9	
Tillage form	1	5	5	0.1	0.76	
Fertilizer:Tillage	1	10	10	0.21	0.66	
Residuals	8	392	48.9			

NO <sub>3</sub> -N May						AZ
	D.f.	Sum Sq.	Mean Sq.	F value	p value	significance
Fertilizer form	1	0.032	0.032	1.92	0.2	
Tillage form	1	0.0157	0.0157	0.94	0.36	
Fertilizer:Tillage	1	0.0236	0.0236	1.41	0.27	
Residuals	8	0.1334	0.0167			

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