Appendix A. NNY 2011-2014 Trial Results

Table 1. Successfully completed NNY trials.

NNY 2011-2014			Sidedress N (lb N/ac)				Yield (bu/ac or T/ac						Notes
Trial year	Collab. Name	Farm Name	Adapt-N (A)	Grower (G)	Other N	N diff. A-G	Adapt-N (A)	Grower (G)	Other	Yield Units	p*	Profit Diff. $/ac (A-G)	
2014	Mike Davis	Wilsboro (D1)	120	195	NA	-75	19.13	19.02	NA	T/ac	0.46	$41.98	Variable rate N by plot, Adapt-N rate is average
2014	Mike Davis	Wilsboro (D5)	115	165	NA	-50	21.29	21.96	NA	T/ac	0.22	-$2.27	Variable rate N by plot, Adapt-N rate is average
2014	Eric Young	Miner Institute	0	50	NA	-50	14.00	13.16	14.57	T/ac	NA	$29.20	Variable rate N by plot, rates are average; Tough growing year for NNY due to wet May and later plantings in June.
2013	Peg Cook, Joe Lawrence	Bernie Goblert	NA	50	0	NA	NA	72.5	56.5	bu/ac	0.005	NA (no A-rate in place	Applicator unable to apply recommended rate. Adapt-N successfully identified that more N was needed, recommended amount ikely wourl have been enough. Given a yield increase of 16bu/ac, it is unlikey that 50 lb/ac were needed. Note low yeild due to early harves of silage variety.
2013	Mike Davis	Wilsboro (D1)	129	110	NA	19	14.8	14.3		T/ac	0.18	$14.82	Variable rate N by plot, Adapt-N rate is average
2013	Mike Davis	Wilsboro (D5)	107	110	NA	-3	15.2	16.3		T/ac	0.32	NA (no diff between	N rate difference of 3lb negligible. Variable rate N by plot, Adapt-N rate is average
2012	Eric Bever, Heather Robinson	Bruce Dimock	45	35	NA	10	15.8	16.7		T/ac	0.6	-$50.00	Field varaibility is primary determinant of the apparent insignificant yield loss with 10lb/ac N rate increase
2012	Bever, Robinson	Ed Carter	80	69	NA	11	11.3	12.2		T/ac	0.41	-50.95	Field varaibility is primary determinant of the apparent insignificant yield loss with 11lb/ac N rate increase
2012	Eric Young	Miner Institute	0	50	NA	-50	21.9	21.5		T/ac	NA	$53.00	
2012	Mike Davis	Wilsboro (D1)	81	110	NA	-29	17.9	18.7		T/ac	0.37	-28.96	Variable rate N by plot, Adapt-N rate is average. Weather data changed after late season error correction, and A rate increased
2012	Mike Davis	Wilsboro (D5)	88	110	NA	-22	20.6	21.3		T/ac	0.35	-$25.25	Variable rate N by plot, Adapt-N rate is average. Weather data changed after late season error correction, and A rate increased
2012	Cook, Lawrence	Bernie Goblert	0	50	NA	-50	12.2	12.00		T/ac	0.87	$43.00	
2011	Eric Young	Miner Institute	0	50	25	-50	11.5	12.00	11.9	T/ac	0.26	$9.00	
2011	Bever, Robinson, Deming	Bruce Dimock	45	88	NA	-43	15.3	15.7		T/ac	0.41	$1.17	
2011	Mike Davis	Wilsboro (D1)	91	125	NA	-34	10.3	9.2		T/ac	0.08	$71.90	Variable rate N by plot, Adapt-N rate is average.
2011	Mike Davis	Wilsboro (D5)	104	125	NA	-21	16.5	15.6		T/ac	0.17	$58.33	Variable rate N by plot, Adapt-N rate is average.

*p = statistical significance of the yield comparison between Adapt-N and Grower-N.

Table 2. Summary of NNY trial results.

Overall Adapt-N Performance 2011-2013, NNY

Treatment comparison (Adapt-N) – (Grower-N)	NNY Trials with treatment differences > 15lb N/ac	All NNY Trials*
	(n=9)	(n=11)
N fertilizer input (lb/ac)	-37	-24
Yield (T/ac)	0	-0.1
Profit ($ ac^{-1})	+$23	+$9
Trials with greater profit	78%	64%

* Includes trials in which the treatment difference was less 3, 10, and 11lb/ac, and apparent but non-statistically significant yield losses could only be explained by field variability, thus these were not deemed useful for this analysis.

Table 3. Concentrations in leachate by treatment.

Treatments		Average NO3 and NO2 (mg/L) in leachate by sampling date					
		9/30/2011	10/4/2011	10/17/2011	5/11/2012	Average after 2011 season	After 2012 growing season 5/23 or 5/28/2013*
Sandy	***Adapt-N***	5.68	7.48	5.62	14.84	8.41	18.1
	Grower-N	7.15	10.4	7.45	17.61	10.65	23.35
	p	*0.28*	*0.14*	*0.29*	*0.49*	*0.15*	*0.15*
Clayey	***Adapt-N***	1.36	1.48	1.28	2.33	1.61	6.98
	Grower-N	2.16	2.22	1.5	2.64	2.13	7
	p	*0.02*	*0.02*	*0.45*	*0.48*	*0.008*	*0.99*

Appendix B. Overall Adapt-N performance

Table 4. Overall performance of Adapt-N was evaluated across 104 trials in New York (n=67) and Iowa (n=37) during the 2011-2013 growing seasons. Three consecutive growing seasons demonstrate that Adapt-N is an effective tool for N management in corn systems, with average profit gains of at least $30/ac. and N inputs 44 lb/ac lower when Adapt-N was used, with higher profits and N savings in New York than in Iowa. Adapt-N reduced N applications in 84% of the cases, by 60 lbs N/ac on average. Profits increased in 81% of all NY trials, and 77% overall. With model improvements and increased expert use of the tool, we estimate that profit gains over current grower practices can be expected in at least four out of five cases.

2011-2013 Adapt-N Trial Results

Average Change due to Adapt-N use (Adapt-N - Grower-N)	By State		By N rate change		Grand Mean
	NY trials n=67	IA trials n=37	N decrease (A<G) n=87	N increase (A>G) n=17	n=104
Total N fertilizer applied (lb/ac)	-52	-29	-60	38	-44
Simulated N leaching loss (lb/ac)*	-11	-1	-10	3	-8
Simulated N total loss (lb/ac)*	-36	-4	-34	16	-26
Yield (bu/ac equivalent)	2	0	-2	17	1
Profit ($/ac)	$37	$17	$23	$65	$30

Wilsboro Farm 2014 Trial Results								
Trial ID	Total N applied (lb/ac)			Yield (bu/ac)			Profit ($/ac)**	p ***
	Adapt-N	*Grower*	*A-G**	*Adapt-N*	*Grower*	*A-G**	*A-G**	
D1	120	195	-75	155.72	154.82	+ 0.90	+ $41.98	0.46
D5	115	165	-50	173.30	178.75	- 5.45	- $2.27	0.22

Yield was not significantly different between Adapt-N redcommended rates and Grower rates. Profits were substantially increased or remained nearly the same with Adapt-N, however. Nitrogen applied was significantly decreased with Adapt-N ($p < 0.0001$).

* Difference of Adapt-N minus Grower. Negative number shows decreased N applied due to Adapt-N. Positive and negative numbers show both slight increase and modest decrease in yield due to Adapt N.
** Profit calculation using assumed prices (0.50lb N and $5.00/bu corn)
*** p values above are statistically insignificant.

Table 5. Preliminary results for the 2014 NY trials show that although there was a significant decrease in the total amount of N applied in the Adapt-N fields, yields reamined relatively the same and profits were similar or substantially better under Adapt-N when compared to the Grower rates. This is similar to results we saw in other parts of the country this season where Adapt-N was able to demonstrate the same farmer profit levels with significantly reduced N inputs. The NY case in 2014 demonstrates how using Adapt-N can reduce N use and increase profits, a win-win for both the farm and the environment. Additional data are still being compiled and analyzed over the coming months, and results will continue to inform model adjustments as needed.