Table 1 – One- and two-way ANOVA p-values for soil C and N measurements from each trial

Trial	PMN	PMC	POXC	SOM	TC	TN	C:N
MCC_t	0.376	0.0459*	0.323	0.841	0.775	0.446	0.858
AC_t	0.681	0.689	0.145	0.216	0.126	0.270	0.0737*
CSW_t	0.588	0.188	0.0182**	0.143	0.0553	0.0185**	0.0111**
CS_t - Tillage	0.212	0.000906***	0.00265***	0.233	0.0345*	0.136	0.990
- Rotation	0.798	0.266	0.101	0.380	0.0526*	0.0582*	0.494
- Rtn. x Till.	0.0908*	0.224	0.266	0.460	0.440	0.387	0.216
$CSWA_t$ - N-fertilizer	0.506	0.332	0.620	0.199	0.577	0.814	0.573
- Rotation	$2.01x10^{-6}$***	$5.01x10^{-6}$***	0.00409***	$2.98x10^{-10}$***	$4.68x10^{-6}$***	0.0157**	0.0916
- Rtn. x N-fert.	0.127	0.0582	0.0587	0.202	0.215	0.181	0.518

** = significant at p < 0.10*

*** = significant at p < 0.05*

****= significant at p < 0.01*

MCC_t = Manure and Cover Crops trial; AC_t = Alfalfa-Corn trial; CSW_t = Corn-Soy-Wheat trial; CS_t = Corn-Soy trial; $CSWA_t$ = Alfalfa-Corn-Soy-Wheat trial

Table 2 – Analysis of Variance results (p-values) for each response variable based on treatment effects.

Trial	n	PMN	PMC	POXC	SOM	TC	TN	C:N
$CSWA_t$ – N-fertilizer	64	0.506	0.332	0.620	0.199	0.577	0.814	0.573
$CSWA_t$ - Rotation	64	$2.01x10^{-6}$*	$5.01x10^{-6}$*	0.00409*	$2.98x10^{-10}$*	$4.68x10^{-6}$*	0.0157*	0.0916
$CSWA_t$ - Rtn:N-fert.	64	0.127	0.0582	0.0587	0.202	0.215	0.181	0.518

* = statistically significant.

Table 3 - Analysis of Variance results (p-values) for each response variable based on rotation effects.

Trial	n	PMN	PMC	POXC	SOM	TC	TN	C:N
CSW_t	15	0.588	0.188	0.0182*	0.143	0.0553	0.0185*	0.0111*

* = statistically significant.

Table 4 - Analysis of Variance results (p-values) for each response variable based on rotation and treatment effects.

Trial	n	PMN	PMC	POXC	SOM	TC	TN	C:N
CS_t - Tillage	24	0.212	0.000906*	0.00265*	0.233	0.0345*	0.136	0.990
CS_t - Rotation	24	0.798	0.266	0.101	0.380	0.0526	0.0582	0.494
CS_t - Rtn:Till	24	0.0908	0.224	0.266	0.460	0.440	0.387	0.216

* = statistically significant.

Table 5 – *Analysis of Variance results (p-values) for each response variable based on rotation effects.*

Trial	n	PMN	PMC	POXC	SOM	TC	TN	C:N
AC_t	9	0.681	0.689	0.145	0.216	0.126	0.270	0.0737

* = statistically significant.

Table 6 – *Analysis of Variance results (p-values) for each response variable based on manure and cover crop effects.*

Trial	n	PMN	PMC	POXC	SOM	TC	TN	C:N
MCC_t	12	0.376	0.0459*	0.323	0.841	0.775	0.446	0.858

* = statistically significant.

Table 7 – Coefficient of determination (R^2) for the soil C and N measurements included in this study.

	SOM	TC	TN	POXC	PMC	PMN
SOM	-	-	-	-	-	-
TC	0.7949	-	-	-	-	-
TN	0.197	0.4218	-	-	-	-
POXC	0.4438	0.5183	0.4613	-	-	-
PMC	NS	0.03176	0.1108	0.1177	-	-
PMN	0.03339	NS	0.0848	0.08035	0.1975	-

NS = not significant

Figure 1 – Rotation effects on soil health measures in the Corn-Soy-Wheat-Alfalfa Rotation Trial. Upper case letters in the x-axis represent the phase of the rotation that was planted after samples were collected.

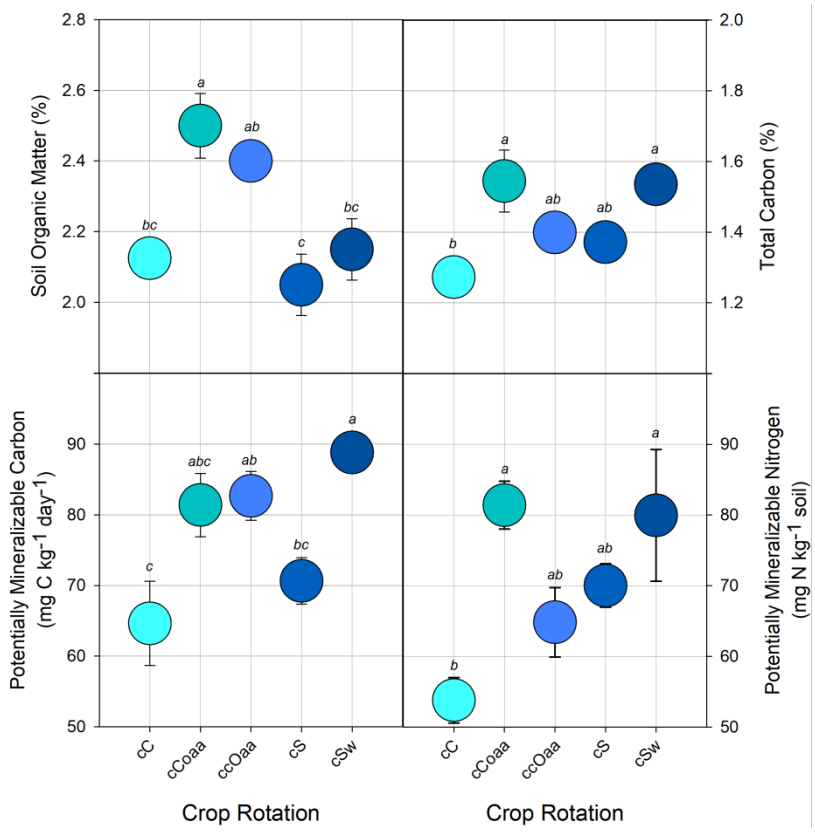

Figure 2 – The effect of "phase of CCOAA rotation" on Potentially Mineralizable Nitrogen in the Corn-Soy-Wheat-Alfalfa Rotation Trial. Upper case letters in the x-axis represent the phase of the rotation that was planted after samples were collected.

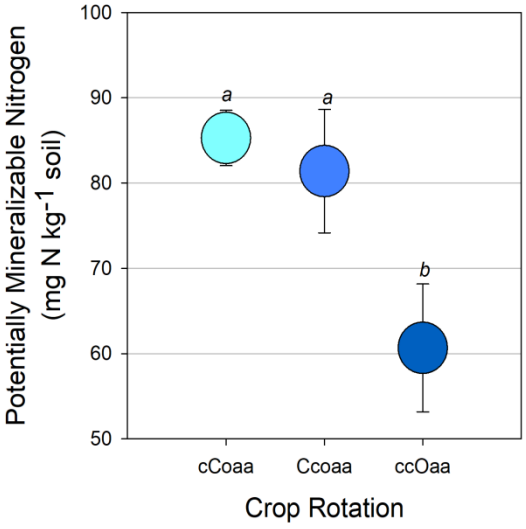

Figure 3 - The effect of "phase of CSW rotation" on Potentially Mineralizable Nitrogen in the Corn-Soy-Wheat-Alfalfa Rotation Trial. Upper case letters in the x-axis represent the phase of the rotation that was planted after samples were collected.

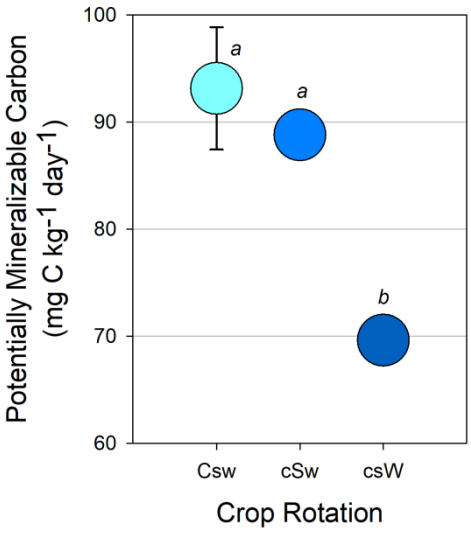

Figure 4 - The effect of crop rotation and phase on total nitrogen (TN) and permanganate oxidizable carbon (POXC) in the Corn-Soy-Wheat Response to Rotation Trial. Upper case letters in the x-axis represent the phase of the rotation that was planted after samples were collected.

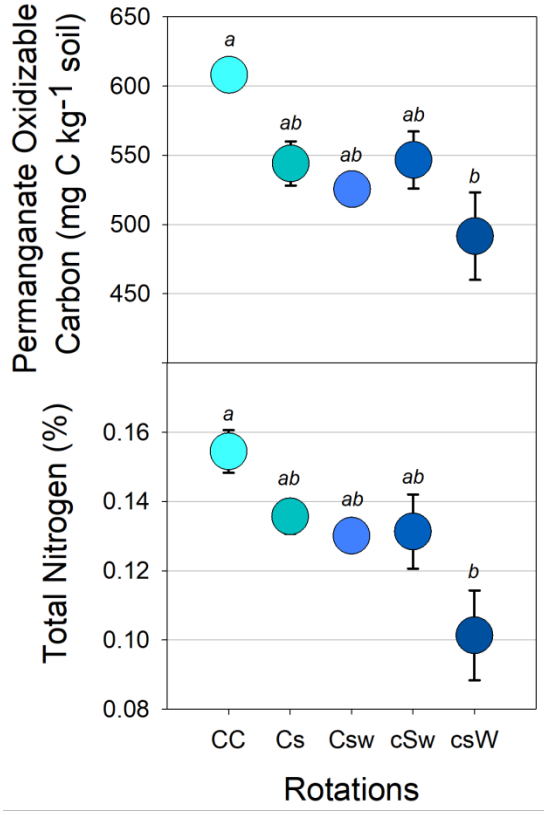

Figure 5 - The effect of crop rotation and tillage on total carbon (TC) in the Corn-Soy Response to Tillage and Rotation Trial.

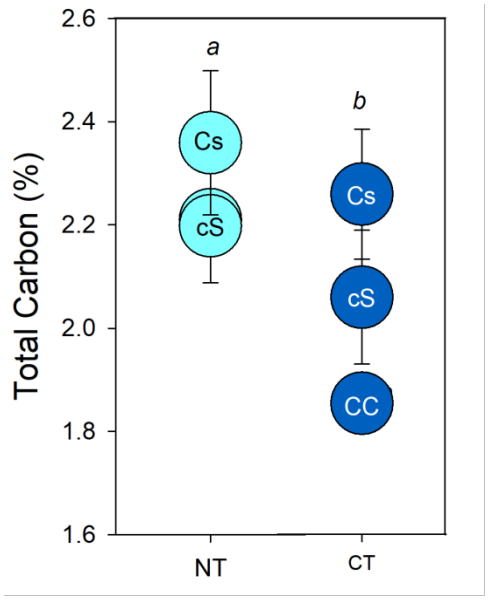

Figure 6 - The effect of crop rotation and tillage on total carbon (TC) in the Corn-Soy Response to Tillage and Rotation Trial. Upper case letters in the x-axis represent the phase of the rotation that was planted after samples were collected.