

Supplementary Information:

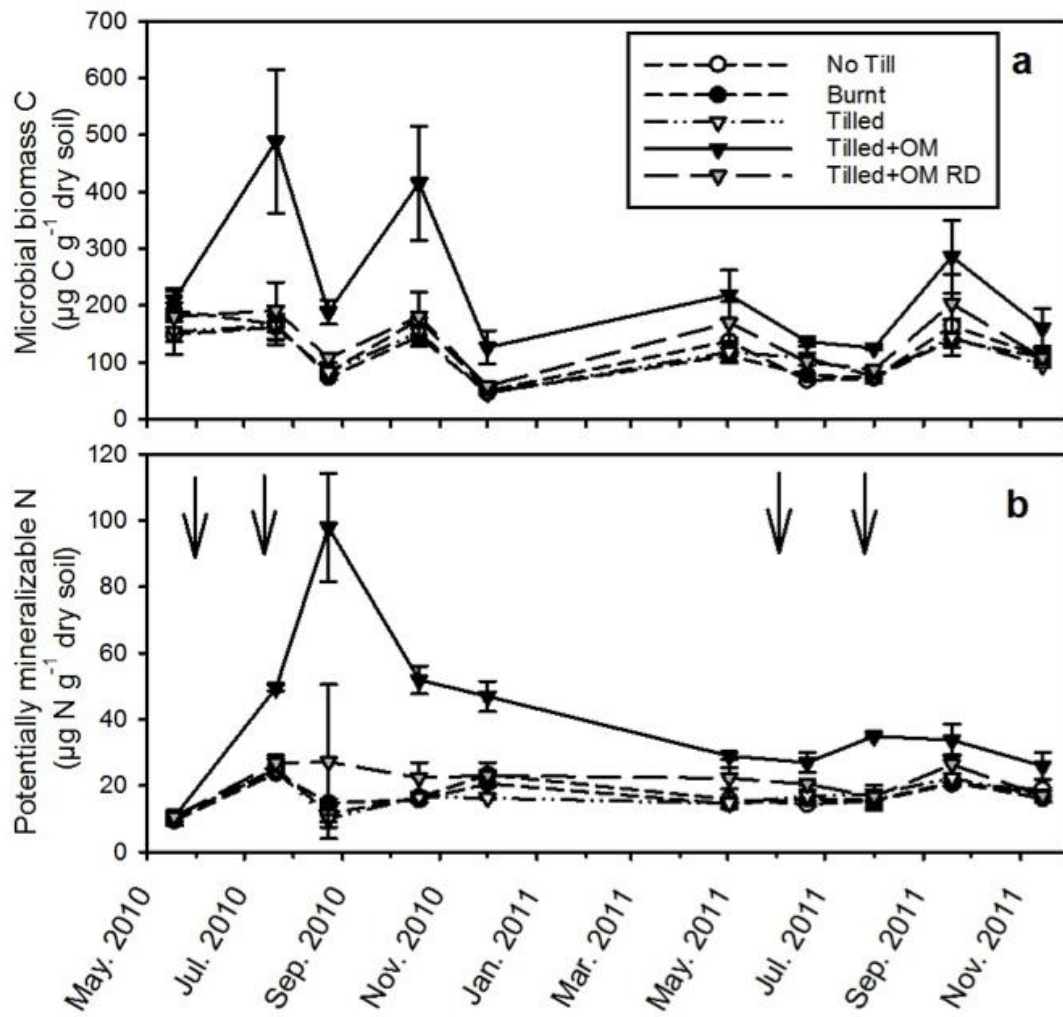
Seasonal dynamics of ammonia-oxidizing bacteria but not archaea influence soil nitrogen cycling in a semi-arid agricultural soil

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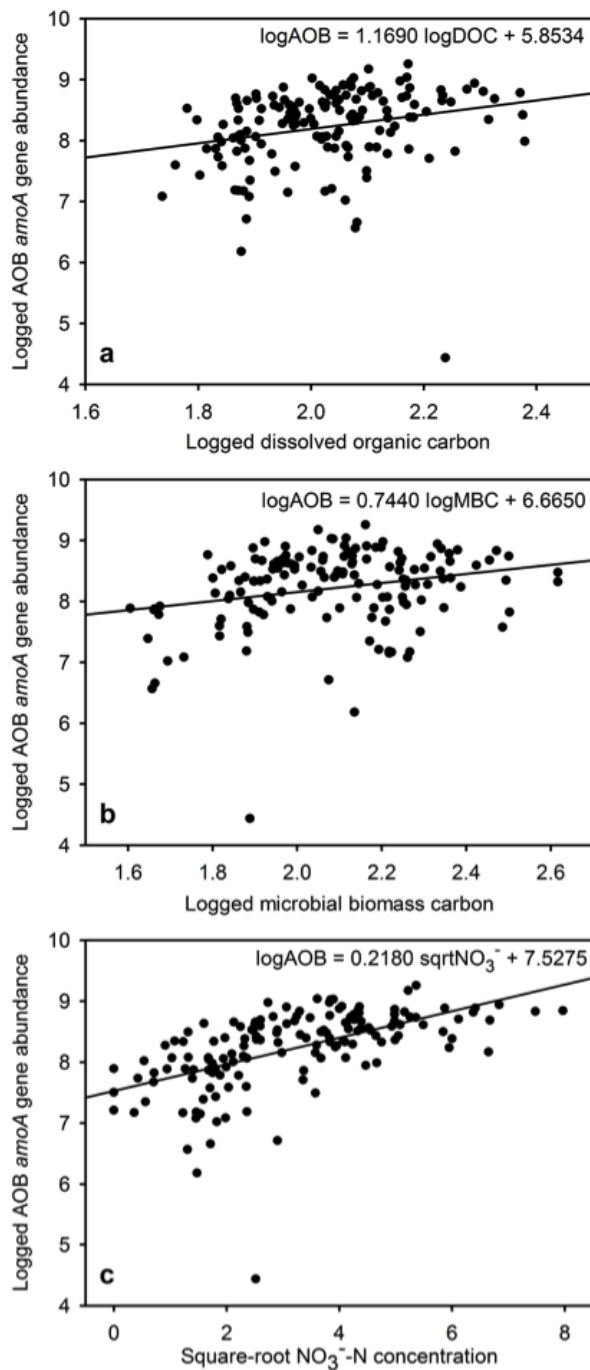
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Supplementary Figure 1: Change in (a) microbial biomass carbon; and (b) potentially mineralizable nitrogen in soil (0–10 cm) through time. Values are a mean of three field replicates, error bars are $\pm$ standard error of the mean. Arrows indicate dates of N fertilization. Legend is the same for all panels. Legend abbreviations: OM, organic matter; RD, Run-Down.



Supplementary Figure 2. Significant linear regression relationships between logged bacterial *amoA* gene abundance per gram of dry soil ($\log AOB$) and (a) logged dissolved organic carbon per gram of soil ($\log DOC$); (b) logged microbial biomass carbon per gram of soil ($\log MBC$); and (c) square root transformed nitrate per gram of soil ($\sqrt{NO_3^-}$).

Supplementary Table 1. Eigenvector loadings of principle components 1–5.

	PC1	PC2	PC3	PC4	PC5
Standard deviation	2.240	1.262	1.150	0.844	0.692
Variance (eigenvalue)	5.019	1.593	1.323	0.712	0.478
Proportion of variance	0.502	0.159	0.132	0.071	0.048
Cumulative proportion of variance	0.502	0.661	0.794	0.865	0.913

Supplementary Table 2. Loadings matrix (eigenvectors) for principle

components 1–5. Abbreviations: Rain, cumulative rainfall of 30 days prior to soil collection; SWC, soil water content at collection; Min. Temp. and Max. Temp., mean daily minimum and maximum soil temperature at 5 cm depth of 30 days prior to soil collection; MBC, microbial biomass carbon per gram of soil; DOC_WC, dissolved organic carbon per gram of soil water; NH4_WC, ammonium per gram of soil water; NO3_WC, nitrate per gram of soil water; PMN, potentially mineralizable nitrogen per gram of soil; log AOB, logged bacterial *amoA* gene abundance per gram of soil.

	PC1	PC2	PC3	PC4	PC5
Rain	-0.317	-0.219	-0.083	-0.502	-0.442
SWC	-0.378	-0.236	-0.207	-0.191	0.189
Min. Temp.	0.416	0.063	0.145	-0.090	-0.363
Max. Temp.	0.411	0.058	0.112	-0.060	-0.457
MBC	-0.072	0.571	-0.355	0.458	-0.085
DOC_WC	0.389	-0.200	-0.278	-0.059	0.019
NH4_WC	0.372	-0.237	-0.311	-0.122	0.134
NO3_WC	0.339	0.145	-0.034	-0.333	0.608
PMN	-0.036	0.330	-0.685	-0.331	-0.164
log AOB	-0.067	0.580	0.382	-0.501	0.081