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Mahal, NK; Castellano, MJ; Miguez, FE 2018 Conservation Agriculture Practices Increase Potentially Mineralizable Nitrogen: A Meta-Analysis SOIL SCI SOC AM J, 82, 1270–1278 10.2136/sssaj2017.07.0245

### Background and objective

In fertile soils with high soil organic matter (SOM) content, the mineralization of SOM nitrogen (SOM-N) is a major source of N for crop uptake and has been positively associated with crop yield. As a result, researchers have suggested that knowledge about the fraction of SOM-N susceptible to mineralization may help to optimize N fertilizer management. This fraction of SOM-N, commonly referred to as potentially mineralizable nitrogen (PMN). However, the effect size and relationship with crop yield across specific management practices remain uncertain. Authors conducted a quantitative review to understand how conservation agriculture management practices affect PMN

### Search strategy and selection criteria

An extensive literature search was performed using Web of Science with the search terms “soil N mineralization OR Potentially Mineralizable Nitrogen NOT forest NOT tree” which resulted in 6665 studies published before the cut-off date of 1 July 2014. A search was also performed using Google Scholar, but no additional studies were found relevant to our analysis Exclusion criteria: studies that were not relevant in the context of this paper or were not found to include sufficient information regarding soil, crop management, or crops. Conference abstracts and studies not providing quantitative results were also rejected.

### Data and analysis

The effect size was expressed as a response ratio (RR), natural log transformed for normality. Authors applied weights using the reported number of replications. The homogeneity among LRR values from all the studies was analyzed. The data were analyzed for outliers by plotting each observation against the natural log of the response ratio and a box plot. Weighted analysis of variance was used to compare mean response ratio for different management practices and treatments. A meta-regression analysis was performed to analyze data for the effect of continuous variables such as the duration of the management practice and the soil depth. All statistical analyses were conducted with R (version 3.4.2). Significant difference between treatments was considered if p values < 0.05. Bootstrapping procedures were used to generate 95% confidence intervals for weighted mean effect sizes using 500 iterations.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
16	Agricultural soils	Cover crops	No cover crop	Metric: Potentially mineralizable nitrogen (PMN); Effect size: Logarithm of ratio of the considered metrics in the intervention to the considered metrics in the control	81.25

### Results

- Potentially-mineralizable nitrogen was 104% higher in cropping systems with a cover crop in comparison to cropping systems without a cover crop (although the positive effect was limited to legume cover crops).
- NULL
- NULL
- NULL
- NULL

### Factors influencing effect sizes

- No factors influencing effect sizes to report

### Conclusion

Potentially-mineralizable nitrogen was 104% higher in cropping systems with a cover crop in comparison to cropping systems without a cover crop (although the positive effect was limited to legume cover crops).