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Strategies for mitigating ammonia emissions from agroecosystems

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Strategies for mitigating ammonia emissions from agroecosystems

Objectives

To provide and evaluate the effectiveness of mitigation & critical information for global N in agricultural systems.

Meta-analysis

145 studies; 824 direct comparisons (from 1971 to April 2016) from Web of Science (ISI), SCOPUS, CAB Abstracts (ISI), Academic Search complete (EBSCO) and Google Scholar

Table 1 Nitrogen loss as NH_3 of applied urea from agricultural land worldwide

Continent	N loss as NH_3			
	%		kg N ha^{-1}	
	Mean	Range	Mean	Range
East Asia	15.9	1.7–48.0	20.6	1.8–96.0
South Asia	30.7	3.0–56.7	37.5	5.6–69.7
Southeast Asia	16.1	14.4–19.5	10.7	8.6–14.6
Australasia	16.0	2.0–30.0	13.7	0.8–49.2
Europe	13.0	0.9–29.8	17.0	0.6–29.8
North America	17.5	0.6–64.0	22.2	0.6–89.6
South America	14.2	1.7–31.8	11.8	0.9–25.4
Average	17.6	0.9–64.0	19.1	0.6–96.0

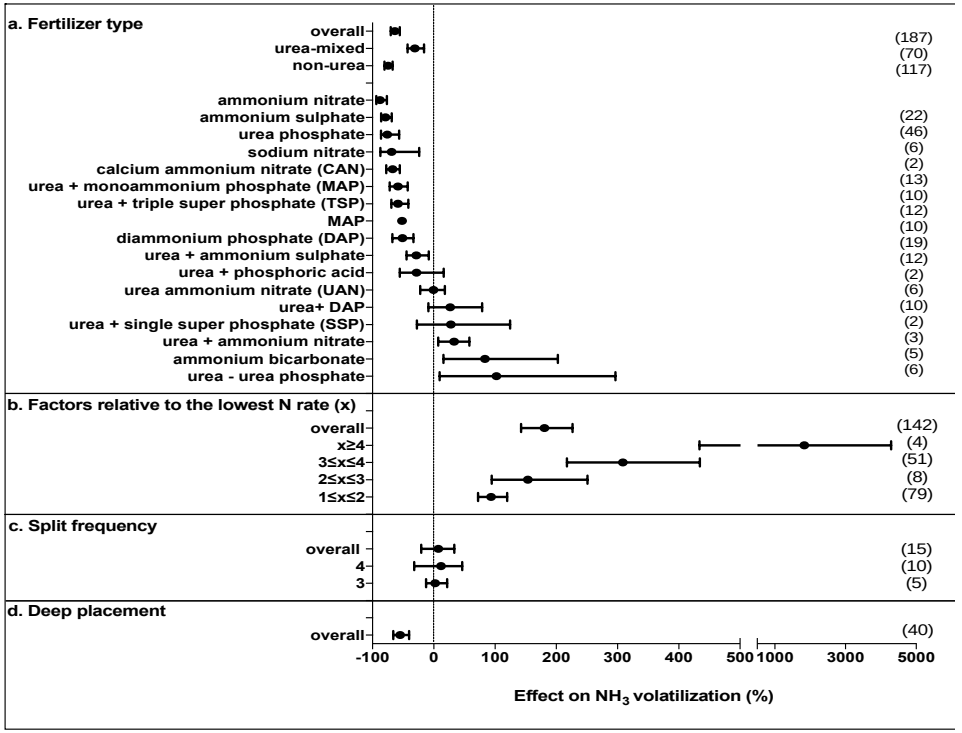

Figure 1. Effects of (a) fertilizer type, (b) factor relative to the lowest N rate, (c) split frequency and (d) deep placement on NH_3 volatilization. Means and 95% confidence intervals are depicted. Numbers of experimental observations are in parentheses.

Strategies for mitigating ammonia emissions from agroecosystems

- ✓ Mitigating NH_3 loss from agriculture is important (0.9 to 64% (a mean of 17.6%).
- ✓ Various strategies effectively decrease the loss（16–88%）.

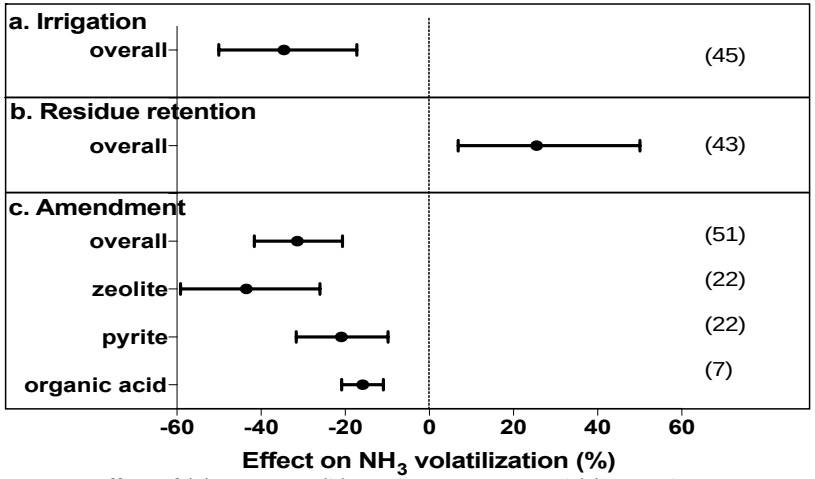

Figure 2. Effect of (a) irrigation, (b) residue retention and (c) amendment on NH_3 volatilization. Means and 95% confidence intervals are depicted. Numbers of experimental observations are in parentheses.

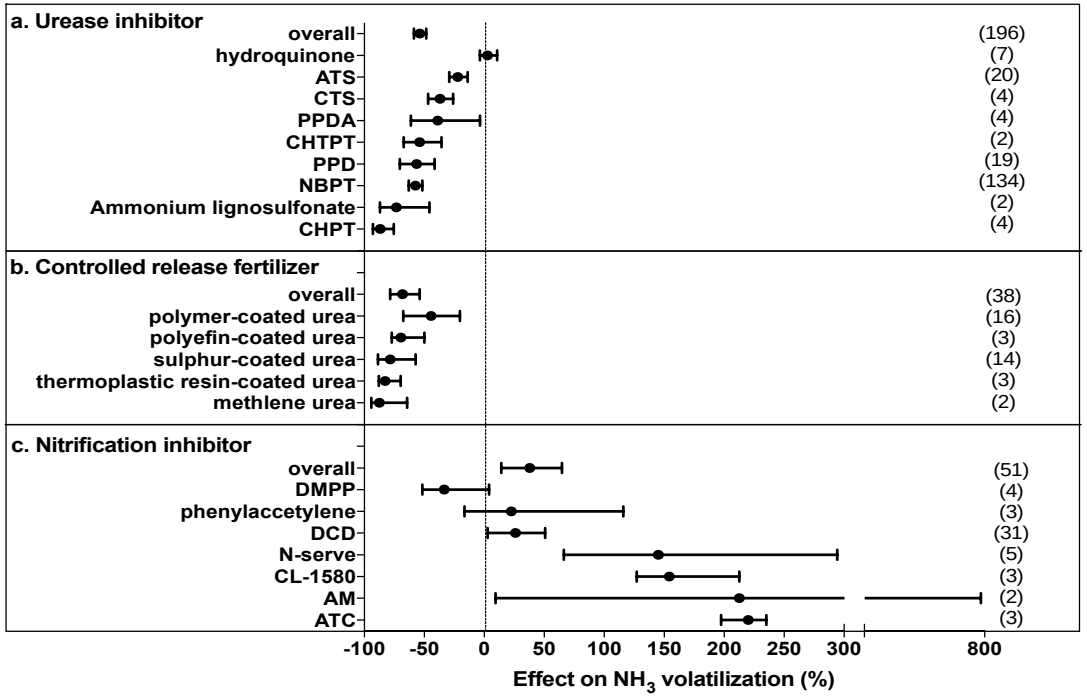

Figure 3. Effect of (a) urease inhibitors, (b) controlled release fertilizers and (c) nitrification inhibitors on NH_3 volatilization. Means and 95% confidence intervals are depicted. Numbers of experimental observations are in parentheses.

For further information: Pan, B., Lam, S. K., Mosier, A., Luo, Y., & Chen, D. (2016). Ammonia volatilization from synthetic fertilizers and its mitigation strategies: A global synthesis. *Agriculture, Ecosystems & Environment,* 232, 283-289.