

How nitrogen fertilizer management affects soil concentration and surface flux

June 24 2021, by Li Yuan



Credit: CC0 Public Domain

An international team led by researchers from the Xinjiang Institute of Ecology and Geography (XIEG) of the Chinese Academy of Sciences and the University of Manitoba has revealed the effect of nitrogen (N) fertilizer management on N_2O concentration and surface flux.

Agricultural soil N₂O surface emissions are determined by its production, diffusion, and consumption along [soil profile](#), which can be strongly influenced by N [fertilizer](#) management. Drip fertigation is a widely used strategy in arid and semi-arid climate regions for the benefits of saving [irrigation water](#) and increasing fertilizer use efficiency.

It remains unclear how the source and rate of nitrogen (N) fertilizers affect N₂O concentration and effluxes along the soil profile under the drip-fertigated agricultural system.

The researchers carried out an experiment in a cotton field in arid northwestern China from 2017 to 2018 to elucidate the impact of the applications of conventional urea (Urea), polymer-coated urea (ESN) and stabilized urea (SuperU) at rates of 120 and 240 kg N ha⁻¹ on concentration and efflux of N₂O in the soil profile and its relationship with N₂O [surface](#) emissions.

Results showed that N rate or source did not affect soil N₂O concentrations or effluxes at each depth. Surface emissions of N₂O were mostly associated with that presented in the top layer of 0-5 cm.

Surface N₂O efflux determined by gradient-based (GM) was poorly or not associated with those of chamber measurements, which was attributed to the low N₂O production restricted by [soil](#) moisture condition under the drip-fertigated condition.

The study was published in *Environmental Pollution*.

More information: Yanyan Li et al, Linking soil profile N₂O concentration with surface flux in a cotton field under drip fertigation, *Environmental Pollution* (2021). [DOI: 10.1016/j.envpol.2021.117458](https://doi.org/10.1016/j.envpol.2021.117458)

Provided by Chinese Academy of Sciences

Citation: How nitrogen fertilizer management affects soil concentration and surface flux (2021, June 24) retrieved 27 April 2024 from <https://phys.org/news/2021-06-nitrogen-fertilizer-affects-soil-surface.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.