

**SOIL CARBON AND NITROGEN DISTRIBUTION AND GASEOUS
FLUX DUE TO LANDSCAPE POSITION AND TEMPERATE ALLEY-
CROPPING PRACTICES IN AN AGRICULTURE WATERSHED**

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Soil N₂O and CO₂ efflux can be stimulated by agricultural practices which may contribute to an enhanced global warming effect. However, the efflux of these two gases in response to landscape position and soil conservation management practices such as contour strips in a temperate agroforestry alley cropping system has not been extensively studied. The objective of this study was to assess the effects of alley cropping and landscape position on soil total organic C and total N distribution and N₂O and CO₂ efflux throughout the growing season in three adjacent agricultural watersheds in northeast Missouri. The three watersheds were in a corn-soybean rotation, and contained one of three management systems: 1) cropped only, 2) cropped, interspersed with grass contour strips, or 3) cropped, interspersed with grass-tree contour strips. The four corresponding landscape positions within each watershed were: summit, backslope, footslope, and depositional grass waterway. Soil total organic C and total N were highest in the grass waterways. Soil N₂O efflux was highest in the cropped area and at the upper two landscape positions within each watershed. Soil CO₂ efflux was lowest in the cropped area and at the upper two landscape positions across all three watersheds. Additional research will be conducted under controlled conditions to determine the effects of soil water content and N source on soil N₂O and CO₂ efflux from soil collected under each management system.

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