

IMPACT OF KUDZU ON SOIL NITROGEN AND SOIL MICROBIAL COMMUNITIES

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ABSTRACT

Kudzu (*Pueraria montana*), a leguminous vine native to Asia, covers more than 3 million ha in the southeastern United States and is expanding its range northward. With its high rates of nitrogen fixation in its native range and high degree of nodulation and nitrogenase activity in the United States, kudzu is likely to present a substantial new source of nitrogen to these ecosystems. To date, however, the impacts of kudzu invasion on nitrogen cycling in the eastern United States have not been investigated. We examined kudzu's effect on nitrogen inputs to soil and nitrogen cycling at three pairs of invaded and uninvaded sites in Maryland. Newly senesced litter from kudzu contains significantly higher concentrations of nitrogen

than that of co-occurring tree species, suggesting that kudzu represents a new source of organic nitrogen in these sites. Inorganic nitrogen in soils bears out this suggestion: nitrate levels were four times higher in sites invaded by kudzu in April 2006 and remained higher throughout the growing season. We also found increases and trends toward increases in rates of nitrification, nitrogen mineralization, and denitrification enzyme activity in September 2005 although these patterns were not maintained in early 2006. Overall, our data strongly suggest that kudzu is having significant impacts on the nitrogen cycling and availability of invaded ecosystems.