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Pasture management affects soil carbon and nitrous oxide

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Study co-author Jordan Koos cuts pasture vegetation in the experimental plots at a research farm at West Virginia University. Photo by Zachary Freedman.

Conservation grazing strategies aim to promote pasture productivity and resilience, along with soil health metrics such as carbon storage. However, in some cases, management efforts to increase carbon (C) storage in soils have increased nitrous oxide (N_2O) emissions, especially in high nitrogen or compacted soils.

In *Agronomy Journal*, researchers report on a study of two perennial pasture sites in central Appalachia. For two growing seasons, they implemented a suite of defoliation strategies ranging in severity and frequency of cuttings. They then monitored pasture productivity and belowground microbial activity related to carbon and nitrogen cycling.

The effects of defoliation severity and frequency on soil carbon and microbial activity differed between the sites, suggesting that past management influences belowground responses. Importantly, the team describes greater N_2O production under lower-severity defoliation at one site and under less frequent defoliation at the second site. The researchers identified a link between soil C parameters and the potential for N_2O emission in these perennial pasture systems.

Given the strength of N_2O as an ozone-depleting and greenhouse gas, better understanding of how agricultural management strategies influence the microbial production of N_2O is needed.

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Kelly, C.N., Koos, J., Griggs, T., & Freedman, Z.B. (2022). Prescribed defoliation strategies influence soil carbon and nitrous oxide potential in pastures. *Agronomy*

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