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Plant exudation and diel fluxes of N2O

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The first recorded diel fluxes of nitrous oxide (N2O) were reported in1978 while assessing a direct in-field method for measuring N2O fluxes from soils. Subsequent studies have assigned such an effect to variations in soil temperature and soil water effects on N2O solubility and microbial processes. However, some studies have found no diel change in N2O emissions despite soil temperature changes while other studies have found that the soil temperature change to be insufficient to explain the observed diel trends. One hypothesis previously noted for the latter was that high periods of irradiance could further enhance N2O fluxes. This potential effect has not been adequately studied. Thus, we used a growth chamber to simulate a summer day/night period, with and without perennial ryegrass (Lolium perenne L.) present. We measured N2O fluxes, soil temperatures, and the concentrations of phenols and sugars in the soil. A preliminary data set will be presented demonstrating the effects of plant presence on soil sugars and phenols and their effects on N2O fluxes.