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Nitrogen availability in mountain spruce forest floor after forest defoliation

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Spruce forests in the Bohemian Forest Mountains (Czech Republic) have been endangered by bark beetle attack (*Ips typographus*) since the 1990s and, at present, a large area of the forest has already been affected. Many deforestation studies showed that nitrogen (N) leaching from soil increased after forest decline, however, it is still unclear whether lower N immobilization (by vegetation and microbes) or higher microbial N mineralization is the main mechanism affecting the change in N balance. The aim of our study was to evaluate whether lower N immobilization by spruce trees (*Picea abies*) or higher microbial N mineralization in the soil is the main mechanism changing the soil N balance after forest defoliation induced by bark beetle infestation. In the long term study we measured *in situ* mineral N availability (N-NH_4 and N-NO_3)using ion exchange resins, net N mineralization (Nmin, ammonification and nitrification), microbial carbon mineralization (Cmin) and N content in microbial biomass (Nmic) in the forest floor of bark beetle infested and control plots in an unmanaged area of The Bohemian Forest National Park. *In situ* N availability increased before the defoliation culminated (17 vs. 165 mg N $m^{-2}d^{-1}$), which affirms the primary effect of reduced N immobilization by trees. N mineralization was significantly enhanced after maximum forest defoliation (2 vs. 30 μg N $g^{-1}d^{-1}$) due to high litter input with more favourable C:N ratio. The contribution of Nmin to *in situ* available N was supported by the correlations found between *in situ* mineral N availability and Nmin - to - Nmic and Nmin - to - Cmin ratios.