



Biodiversity and ecosystem function responses to disturbance and fertilization in a 35-years' vineyard experiment

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Soil management techniques such as tillage, herbicide weeding, fertilization, and cover crop management have strong effects on soil biota in vineyards such as macro- and mesofauna, microflora and plants. Soil biota, in turn, is a major driver of soil processes and ecosystem functions, however, large gaps in knowledge regarding interactions between management practices, biodiversity and ecosystem functions exist.

In this context, we analyzed the effects of nitrogen fertilization and ground cover management on mesofauna and microflora diversity, soil organic matter and nutrients as well as decomposition rates in an experimental vineyard in Germany where specific management practices are constantly applied for more than 35 years. Plots in this vineyard (Rheingau region near Wiesbaden, Germany) are treated with different amounts of nitrogen fertilizer (0, 30, 60, 90, 120, 150 kg N/ha/year) in four replicates in combination with two types of inter-rows with different ground cover management (tillage vs. permanent cover). Mesofauna diversity (using Berlese funnels), Microflora (using a metagenomics approach) as well as soil variables (standard procedures) were analyzed by sampling and analyzing soil cores (0-10 cm) in the year 2015. In order to assess the decomposition rate, the Teabag Index method was applied.

First results showed that the ground cover management had strong effects on biodiversity, decomposition rate, soil organic matter and nutrients rather than fertilization.