
Impact of wild ungulates on soil properties in temperate forests

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Abstract

A large increase of ungulate populations is observed in most European forests correlated with an increase of browsing, grazing and soil disturbances.

The aim of this 3-year study (2016-2019) is to evaluate the functional responses of soil, pedofauna and vegetation to a high density of ungulates. Permanent plots and temporary plots were set up under both pine and oak within two forests in France: Domaine National de Chambord (high ungulates density) and For t domaniale de Boulogne (normal density). Three treatments will be followed: fenced non-recently rooted plots (control), fenced plots after being rooted (returned one time), and open plots regularly rooted (returned several times).

Plant functional groups and vegetation diversity will be analyzed on both sites. Soil samples will be collected at 0-20 cm for determining physical, chemical and biological properties as well as soil compaction, infiltration and roughness.

Expected results for the first year: rooting by boars would reduce soil compaction, bulk density, OM, thereby decreasing soil structural stability. Conversely, rooting increases structural porosity thus enhancing the infiltration of water. The ungulates' presence increases biodiversity of the environment. However, in this study, the very high ungulates' density should disrupt the ecosystem. Pedofauna will be affected, seeds will germinate less and seedlings will not grow enough to form mature individuals.

Our study on the soil recovery and plant regeneration after rooting will allow adapting ungulates' population management. Socio-economical consequences of ungulate's impacts and services provided to humans should be taken together into account.

Keywords: ungulates, forest, ecosystem, soil, pedofauna, disturbances

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