

## ABSTRACT

Wildfires are a major disturbant factor, playing a key role in the formation and functioning of ecosystems. We have seen an increase in dangerous fire activity in recent decades. As climate change progresses, the frequency and severity of fires are expected to increase. It is therefore crucial to address this issue in detail.

The quantity and flammability of plant litter is one of the main factors determining ignition and fire behaviour. The properties of litter affect the rate of its decomposition and thus its accumulation on the soil surface. At the same time, they affect soil fauna, which can greatly contribute to litter reduction from the soil surface through bioturbation. These influences depend on the species of trees and, moreover, are influenced by the previous evolution of the ecosystem.

This work examines the influence of the tree species, soil fauna and soil legacy and their interactions on the combustibility of the forest floor through laboratory experiment and the study of physical quantities that determine combustibility. As part of the experiment, soil profiles of plantation of four tree species were simulated (deciduous: *Alnus glutinosa* and *Quercus robur*; and two conifers: *Picea omorica* and *Pinus nigr*) with soils in two stages of development: the initial soil, where the litter was placed directly on overburden and the developed soil (40 years old), where the fall was added to the soil horizon layer sampled from these plantations. Earthworms have been added to half of the simulated profiles. After 4.5 months, the simulated soil profiles were ignited and the burn parameters were measured.

The results of the physical quantities measurement show that the forest floor of coniferous trees is more flammable and therefore can significantly contribute to the ignition and fire spread. The effect of the tree species was also significant for all burn parameters measured. There was also a significant influence of soil legacy on temperature changes, smouldering time, flame height and fire pathway length. In the initial soil, earthworms significantly reduced the burning time, but in the developed soil this effect was no longer conclusive. However, previous research on the sampling site indicates that earthworms in large extend determine formation of topsoil layer. Earthworms significantly affect the burning of forest floor in the initial soils due to changes in its structure. In the case of developed soils, the effect of tree species growing in an environment with an already formed characteristic forest floor, in the formation of which earthworms played a large part, is more pronounced.

**Key words:** wildfires, flammability, fuel, litter, forest floor, soil fauna, soil legacy