

The effect of tree leaf traits and earthworm on burnability of forest floor based on manipulation experiment.

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Abstract

Accumulation of plant litter in a forest floor and its quality is one of the key factors affecting flammability of forest floor and hence fire occurrence. Foliage properties may substantially affect rate of litter decomposition and consequently its accumulation in forest floor. Beside litter quality decomposition is affected also by many other factors such as soil properties or climatic conditions. The effect of soil biota, namely soil fauna, is however usually neglected in this regard despite the fact that globally more than half annual litter fall is consumed by soil fauna. Here we used laboratory manipulation experiment to test effect of litter quality and earthworms activity on flammability of forest floor.

In metal boxes we reconstructed forest floor of plantation of four tree species *Alnus glutinosa*, *Quercus robur*, *Picea omorica* and *Pinus nigra* growing on post mining sites near Sokolov. Two plantation ages were reconstructed here. Young plantation where litter of respective species was placed directly on overburden and 40 years old plantation where litter was placed on developing Oe and A layers sampled from these plantations. These mesocosms were then inoculated by earthworms and incubated for 4,5 months. Then forest floor in boxes was ignited and burning and smoldering duration, flame height, fire path and soil temperature were recorded. In both types of mesocosms (mimicking young and developed soil) the tree species significantly affect most of the measured fire properties with pine being more flammable than other species. At the same time there were significant differences between young and developed soil in most of fire parameters. In young soil the presence of earthworms has significant effect on most fire properties (generally speaking suppresses flammability), but this effect of earthworm presence disappears in developed soil. However previous research on the same sites show that earthworms in large extent determine formation of topsoil layer and co determine differences in topsoil among tree species. So, we can conclude that earthworms have strong immediate effect on litter accumulation in forest floor in young soils, at the same time they in long run contribute to diversification of forest floor properties under tree species with different litter quality, which enhance effect of tree species on flammability in older plantation. At the same time in older sites, where soil

become more developed, immediate effect of earthworms presence on flammability become less important.

Keywords: fire, litter, earthworms

References

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