

The Role of Soil Microarthropods in Forest Litter Decomposition

Mariami Abuladze

Email: mariami.abuladze163@ens.tsu.edu.ge

Department of Biology, Faculty of Exact and Natural Sciences,
Ivane Javakhishvili Tbilisi State University
3 I. Chavchavadze Avenue, 0179, Tbilisi, Georgia

The presented study investigates the role of soil microarthropods in forest litter decomposition. The experiment aimed to explore the diversity of microarthropods in a broadleaf forest, their role in the decomposition process of forest litter, and their trophic interactions. The research was conducted in a mixed broadleaf forest near the village of Lelubani, where oak and beech stands were selected. Under each stand, litterbags were placed containing either oak or beech leaves, with 10 litterbags of each leaf type placed under each stand.

At the initial stage of the study, when the litterbags had been in place for only six months, primary decomposers dominated the leaf litter communities. By the end of the year, dominance of the predatory organisms significantly increased. This reflects the dynamics and succession of trophic interactions. As the decomposition process progressed, both the species richness and population density of soil arthropods increased.

The results of the experiment did not confirm the initial hypothesis that beech leaves would decompose faster than oak leaves due to their different chemical composition and thinner structure.

According to the second hypothesis, it was assumed that oak leaves would decompose faster under oak canopies, and beech leaves would decompose faster under beech canopies. Results of the study confirmed our prediction as under the oak trees species composition and abundance of microarthropods significantly differed between the litterbags with oak and beech leaves. Under the beech trees there was no significant difference detected.

The results showed that under the oak canopy, the mass of oak leaves significantly decreased during the first six months of the experiment, but from June to the end of the experiment, no significant further mass loss was observed. Under the beech canopy, loss of leaf mass continued to the end of the experiment.

This study once again highlights the importance of soil microarthropods in the decomposition of forest litter and, more broadly, in nutrient cycling.