

Litter decomposition requires the presence of corresponding degradative enzymes, produced mainly by fungi. Forest soils show considerable spatial heterogeneity of distribution of these enzymes at different scales. Moreover, enzyme production varies during the year, usually accompanied by the change in fungal community composition. In this work I examined if this spatial heterogeneity can be seen even at a scale of an individual leaf and whether the fungal community differs among enzyme activity hotspots and inactive parts of the leaves. Another goal was isolation of cellulolytic fungi from cellulose litterbags incubated on forest floor using particle filtration and dilution-to-extinction method.

In a broadleaved forest dominated by oak leaves at different stages of decay were collected: senescent leaves on twigs, and leaves after 2, 10 and 22 months of decomposition. Ten leaves per season were taken for analysis of cellobiohydrolase activity over the leaf surface. Leaves were attached onto melted agarose plate and leaf surface was covered with low melting point agarose containing fluorescently labelled substrate. For each leaf a map of enzyme activity was created and area with the high and low enzyme activity was identified. From both sites a square of approx. 1 cm² was cut out, DNA was extracted and fungal community was analysed using ITS2 sequencing on the Illumina MiSeq platform.

In one spot of 1 cm² area we found DNA of 20 to 68 fungal genera (in average 42 genera). This gives an evidence for substantial diversity even at such a small area as 1cm². Community of active and nonactive areas within a single leaf were different, but not in a consistent way. Exocellulase activity varied considerably over the surface of each individual leaf. The highest activities were detected after 10 and 22 months of decomposition. There was a clear shift in community composition across litter of different stages of decay, early stages dominated by ascomycetes, in later stages with the increase of saprotrophic basidiomycetes.

From cellulose litterbags 14 different genera were isolated, all of which exhibit cellulolytic activity. Among isolates were members of division Ascomycota, Basidiomycota, Mortierellomycotina and Mucoromycotina. The most abundant genera were *Umbelopsis*, then *Fusarium*, *Rhizoctonia* and *Cladosporium*, which was detected also in leaf litter as the eighth most abundant genera. The highest activities of cellulose degrading enzymes were reported in three isolates of *Hypocrea pachybasioides*. Strain identified as *Epicoccum* has highest activity of α -glucosidase, while *Metarhizium* has highest activity of chitinase and phosphomonoesterase.