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Decomposition of oak leaf litter and millipede faecal pellets in soil under temperate mixed oak forest

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The millipedes Glomeris hexasticha (Diplopoda, Glomerida) were maintained under laboratory conditions and fed on oak leaf litter collected from a mixed oak forest (Abieto-Quercetum) in South Bohemia, Czech Republic. Every fourth day litter was changed and produced faecal pellets were separated and afterwards analysed. Content of organic carbon and C:N ratio lowered in faecal pellets as compared with consumed litter. Changes in content of chemical elements (P, K, Ca, Mg, Na) were recognised as those characteristic for the first stage of degradation of plant material.

Samples of faecal pellets and oak leaf litter were then exposed in mesh bags between the F and H layers of forest soil for up to one year, subsequently harvested and analysed. A higher rate of decomposition of exposed litter than that of faecal pellets was found during the first two weeks. After 1-year exposure, the weight of litter was reduced to 51%, while that of pellets to 58% only, although the observed activity of present biotic components (algae, protozoans, nematodes; CO_2 production, nitrogenase activity) in faecal pellets was higher as compared with litter. Different micro-morphological changes were observed in exposed litter and in pellets although these materials originated from the same initial sources. Comparing to intact leaf litter, another structural and functional processes occurred in pellets due to the fragmentation of plant material by millipedes.

Both laboratory and field experiments showed that the millipede faecal pellets are not only a focal point of biodegradation activity in upper soil layers, but also confirmed that millipede feces undergo a slower decomposition than original leaf litter.