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How can insect larvae influence the soil properties?

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Diptera larvae are very abundant in soil of some deciduous forests. Whole range of physiological, energetic and microbiological parameters were measured food excrements and gut of soil larvae of Bibionidae (Insecta, Diptera) including the changes of pH, pO_2, redox potential, enzymatic activity, content of amino-acids, presence of microbial metabolites, direct counts of bacteria, differences in bacterial communities using phospholipid fatty acids (PLFA) analysis and amplified ribosomal DNA restriction analysis (ARDRA), chemical composition of food and excrements using solid-state C-13 nuclear magnetic resonance spectroscopy, utilisation of humic-acid bounded protein and parameters of individual energy budget to evaluate the possible impact of larvae on soil.

The summary results showed that larvae may consume an important part of annual litter fall and produce large amount of faecal pellets, which form an important part of fermentation horizon of some moder forest soils. Direct digestion of cellulose by diptera larvae and presence of cellulolytic microbial symbionts was not proved. Passage of litter material changes the chemical composition of litter. Some larval digestive enzymes may be excreted into excrements. Larvae can contribute to protein mineralization of humic-acid stabilised protein and humification process. The quality of produced faecal pellets influence litter pH, micro-flora and consequently the formation of forest soil.