Decomposition pathways and successional changes

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In soils, energy and nutrient pathways are primarily mediated by bacteria or fungi. Bacteria-dominated systems rapidly transfer nutrients, directly and via consumers, to plants. In contrast, fungal-based decomposition channels are slower; they are driven by more complex organic resources. There are strong linkages between nematodes and their fungal or bacterial food sources. On one hand, consumer organisms affect rates of energy and nutrient release from their prey; on the other hand, they may regulate or even diminish the prey biomass. The nature and abundance of available resources can be monitored by faunal analysis of fungal- and bacterial-feeding nematodes. The resources change constitutively with time. Readily-decomposable portions are rapidly consumed by bacteria and their predators so that the recalcitrant fraction becomes proportionally greater. That change is mirrored by corresponding increase in fungal decomposition and reflected in the nematode fauna. We discuss the relationship of nematode trophic structure with the nature of the incoming organic material and the prevailing state of the physical environment. For example, decomposition pathways of natural forests are predominantly fungal and those of agricultural systems are bacterial. We discuss the significance of the pathways in relation to the structure and functions of the entire soil food web.