



Microbial community composition and nutrient fluxes during mass outbreak of phytophagous insects in a forest ecosystem

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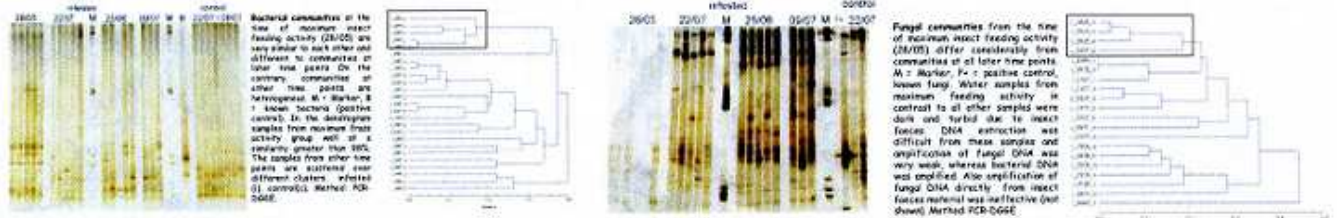
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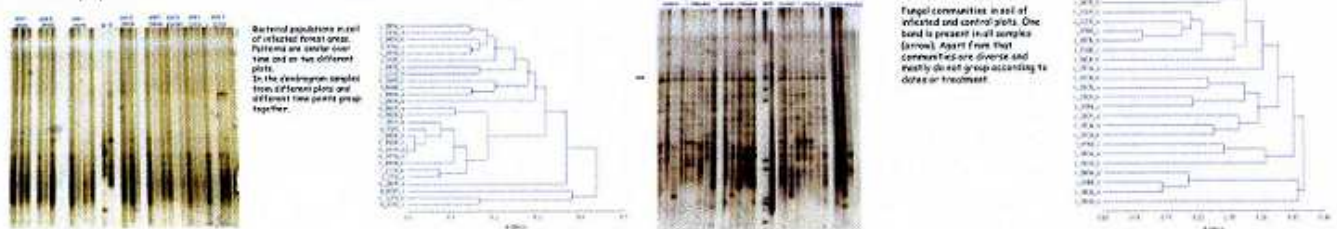
Questions: Leaves fall in autumn – what happens if they are already eaten up in spring?

1. Is there any difference between bacterial and fungal soil communities on insect infested and control forest areas?
During peaking frass activity masses of insect faeces drop on forest floors. These pellets contain nutrients which might favour specific microbial species. (Field trials: Bramwald mountains, Northern Germany, mainly *Quercus petraea*, naturally infested with *Operophtera brumata* and *Erannis defoliaria*).
2. How do microbial communities develop over time after mass outbreak?
3. To which extent does the particulate organic fraction (e. g. insect faeces) contribute to total organic input?

Distinct patterns of bacterial and fungal communities were detected during peaking frass activity in the canopy water samples

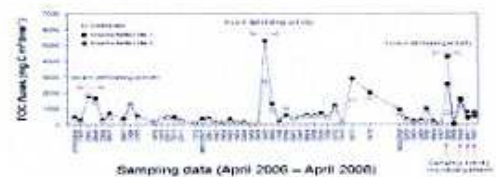


Microbial populations in the soil remained unaffected



Contribution of particulate organic matter: 20% of total C and 12.5 % of organic N

Carbon and nitrogen input in free canopy throughfall were highest during the period of highest insect feeding activity. Particulate organic carbon and nitrogen account for 20% and 12.5 % of total C and N respectively.



Answers:

1. + 2. Characteristic bacterial and fungal communities developed in the canopy during the time of peaking frass activity. In water samples from later time points no differences were detected between infested areas and control. Soil communities remained unaffected by additional nutrient input via insect pellets even at the time of highest frass activity. This might be due to an unfavourable C/N ratio in the pellets.
3. Particulate organic matter contributed considerably to total nutrient fluxes and should be included routinely in ecological studies which to date rely mainly on dissolved organic matter. Le Mellec et al. 2009. AnnForSci