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Title: Ecological differential analysis of carabids from differently cultivated arable land

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## Summary

In this study, the epigaic macrofauna (considering carabids as an example) present on agricultural land has been investigated. Four potato fields and three cereal fields (wheat, rye and barley), subjected to different cultivation intensities, were selected for the study. In order to collect the carabid fauna, pit-fall traps were installed. During the four-month collection period, 1769 individuals belonging to 53 species could be identified. SCHREITER (2001) describes the epigaic arthropods as a category that is especially suitable for the comparison of ecosystems. From carabids, information concerning habitats and their biocenoses can be deduced (KREUTER 2000). The characterisation of the sites was conducted considering the dominance structure, the reproduction type and the species distribution on the different surface areas. The phenological consideration of several species and entire carabid-cenosis provides clues about the habitat quality of an ecosystem.

The analysis of the carabid fauna revealed a higher diversity in the ecologically managed agricultural land. BASEDOW (1987) and STEINBORN & HEYDEMANN (1990) also found that organic agriculture supports the diversity of the carabid fauna, whereas conventional agriculture definitively diminishes the number of carabid species present on arable land.

Regional characteristics in species range have been detected in our study in the frequent occurrence of xerophilous and sandy soil adapted species. The early emergence of autumn species could as well be typical of this region, because of its relatively early warm temperatures. The best balanced dominance structure could be verified on the ecologically cultivated fields. The diversity of the species communities and its evenness led to the same conclusion. The increased number of individuals on conventionally managed fields can be explained by the augmented occurrence of one particular species.

Although the analysis of the carabid fauna was undertaken over a relatively short time frame, the tendency of an increased occurrence of some species could be observed with respect to some sites. Species feeding on plants and xerophilous species of the genus *Amara* and *Harpalus* were more commonly found on organic arable land. Organic cultivation provides a more suitable habitat for these genera. This can be explained by an increased presence of wild plants and a more favorable microclimate. The diminished use of nitrogen in organic farming leads to a decreased stand density and, by that, to a decreased shading due to the crop. This factor favors the presence of xerophilous and thermophilous species. These species are nowadays becoming more and more rarely encountered as a result of intensive cultivation.

Despite its eligibility as an indicator, the use of the arthropod fauna as a workable nature indicator is limited. This study shows that it is possible that differences between agricultural land become more transparent with the help of carabids. In order to estimate environmental conditions, the qualitative information about species is of particular importance; regrettably, this information is only conditionally available. Diversity as a unique indicator cannot describe the state of a field (BÜCHS 2001).