Effects of local climate, landscape structure and habitat quality on leafhopper assemblages of acidic grasslands

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Grassland biodiversity is severely threatened by recent land-use change. Agricultural intensification on the one hand, and cessation of traditional land use on the other, have caused habitat loss, fragmentation and often a deterioration in habitat quality of the remaining habitat fragments. However, knowledge about the different environmental effects on species richness is still limited, in particular for under-sampled groups like leafhoppers (Auchenorrhyncha). Our study therefore aims to analyse the impact of local climate, landscape structure and habitat quality on leafhopper assemblages. Several environmental factors were assessed and species richness of leafhoppers was sampled on 30 acidic grassland patches in Central Germany. We used generalised linear models (GLM) to determine the variables that influence species richness. Both landscape structure and habitat quality had a strong influence on the number of leafhopper species. At the landscape scale, a high diversity of open land cover types positively affected species richness. Furthermore, species richness increased with decreasing cover of arable land in the surroundings of a habitat fragment. The best predictor at the habitat scale was the structural diversity, which had a positive impact on the numbers of leafhoppers. Local climatic conditions and patch area played a minor role and had an effect only on threatened species. We recommend establishing a great variety of different structural types within a patch in order to promote species-rich leafhopper assemblages. In addition, conservationists should focus their efforts on the maintenance of different types of grasslands in the surroundings of habitat fragments.

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SLOSS – single large or several small: biodiversity conservation across taxa and landscapes

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Agricultural intensification has been shown to reduce biodiversity through processes such as habitat degradation and fragmentation. We tested whether several small or single large habitat fragments (re-visiting the “SLOSS” debate) support more species across a wide range of taxonomic groups (plants, leafhoppers, true bugs,

snails). The study system were calcareous grasslands, a semi-natural grassland type developed through grazing and mowing, characterized by its exceptional diversity in both plants and invertebrates.

Our study comprised 14 small (< 1 ha) and 14 large (1.5 – 8 ha) fragments of calcareous grassland in Central Germany around the city of Göttingen along orthogonal gradients of landscape complexity and habitat connectivity. Each taxon was sampled on six plots per fragment (plants: relevés, leafhoppers and true bugs: sweep netting (20 sweeps per plot, three times in summer 2010), snails: soil samples and visual search for larger species).

We found that across taxa, species richness did not differ between large and small fragments. However, species-area accumulation curves showed that both overall and specialist species richness was much higher on several small fragments of calcareous grassland than on few large fragments. On average, 85 % of the overall species richness was recorded on all small fragments taken together (4.6 ha), whereas the two largest ones (15.1 ha) only accounted for 37 % of the species, which was not only found for overall species richness but also if specialist species were analysed separately. This could be due to distance decay effects, i.e. the greater geographic extent covered by many small fragments and the greater habitat heterogeneity it entails. However, community composition differed strongly between large and small fragments, and some of the rarest specialist species were only found on large fragments. The surrounding landscape did not show any consistent effects on species richness and community composition.

Our results show that both single large and many small fragments are needed to promote landscape-wide biodiversity across taxa. We therefore question the widespread focus on large fragments in biodiversity conservation only and call for a new diversified strategy.

Reference:

Rösch, V., Tscharntke, T., Scherber, C., & Batáry, P. (2015) Biodiversity conservation across taxa and landscapes requires many small as well as single large habitat fragments. – Oecologia, **179**: 209-222.

Phylogenetic relatedness of potential and known Auchenorrhyncha vectors of phytoplasmas: preliminary results.

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Phytoplasmas are phloem-limited plant pathogenic bacteria transmitted by insect vectors (leafhoppers, planthoppers and psyllids), and are responsible for hundreds of plant diseases worldwide (Bertaccini & al. 2014). Phytoplasma vectors are Hemiptera (Insecta) belonging to the suborders Cicadomorpha (leafhoppers) and Fulgoromorpha (planthoppers) and the family Psyllidae (psyllids) in the suborder Sternorrhyncha. In Cicadomorpha, the superfamily Membracoidea itself contains

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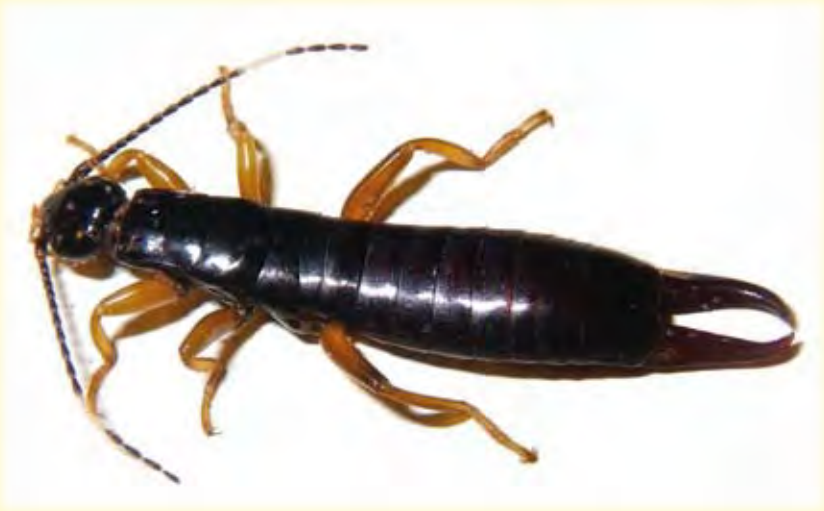

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