



Comparison of sampling methods and influence of extensification on grassland Hemiptera

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Introduction

Recently, Metabarcoding analyses are becoming increasingly popular as a tool to study insect diversity. Even though species richness may not be captured completely, Metabarcoding analyses is a useful tool to compare species richness among sampling sites.

In the framework of the project "Evaluation of AES in grassland in insect diversity and biomass" we used Metabarcoding data from Malaise traps and suction sampling to:

- (1) compare sampling methods in terms of Hemiptera species richness, and
- (2) study how agricultural extensification (LEI) affect Hemiptera species richness.

MATERIAL & METHODS

Hemiptera were collected:

- in 72 grasslands with different management intensity
- in 4 regions in Bavaria (SE-Germany): Upper Palatine Forest (VOW), Bavarian Forest (BW), Chiemgau (CH) and Ostallgäu (OA)
- within 1 year (in regions BW & OA in 2019; VOW & CH in 2022) at 3 time points in June, July/August, September
- methods:
 - (1) Malaise trap type "Bartak" stand time 1 week
 - (2) D-Vac: 25 suction samples (5sec) along a ~50 m transect, 2 crossing transects

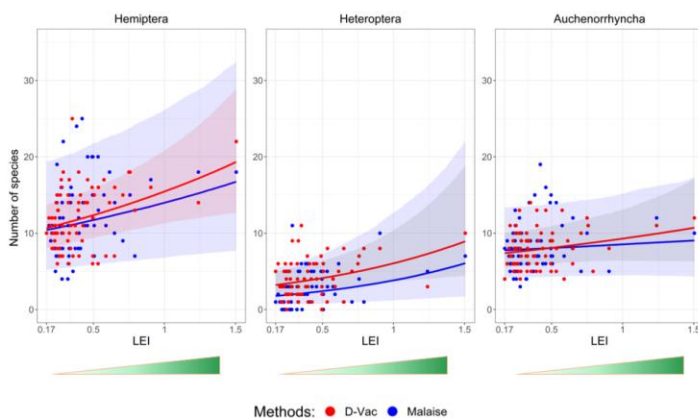
Calculation of Land Extensification Index (LEI)

- ❖ A measure of management intensity in grasslands
- ❖ Includes fertilization (F), mowing frequency (M) and grazing intensity (G)
- ❖ Inverse of Land use intensity (LUI) according to Blüthgen et al. 2012

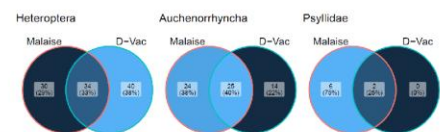
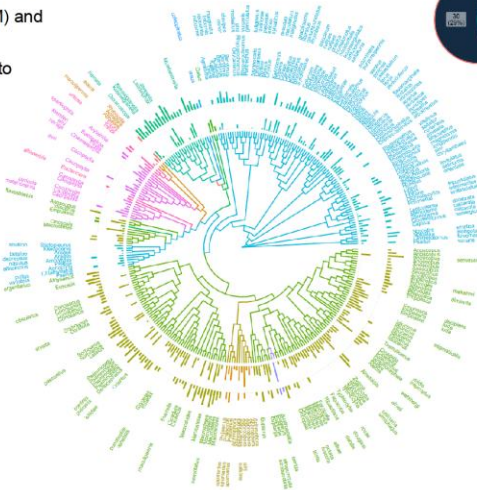
$$LEI_i = LUI_i^{-1} = 1 / \left(\frac{F_i}{F} + \frac{M_i}{M} + \frac{G_i}{G} \right)$$

low  high
Level of extensification

- ❖ The more extensive the agricultural management, the higher the species richness of Hemiptera and Heteroptera
- ❖ Finding is independent of method (Malaise vs. D-Vac)



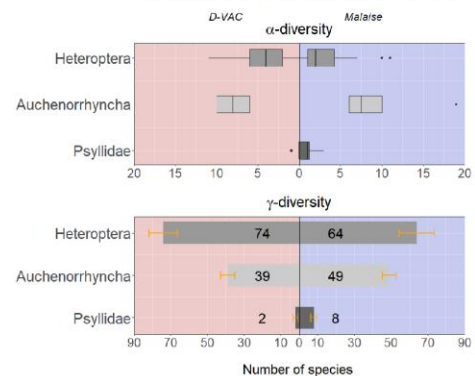
Results



- ❖ Venn diagrams for Heteroptera and Auchenorrhyncha show that different species are collected depending on the method used

2 circles with bars show scaled reads:
 ● Inner circle: Malaise
 ● Outer circle: D-Vac

- ❖ D-Vac more effective for Heteroptera species richness across all grasslands
- ❖ Malaise more effective for total Auchenorrhyncha species richness (γ-diversity), no clear difference between Malaise and D-Vac for average species richness (α-diversity)
- ❖ Species composition for Auchenorrhyncha across sites more similar than Heteroptera



Our results indicated:

- 1) D-Vac was more effective to capture Metabarcoding Heteroptera species richness (α and γ-diversity), Malaise traps for total Auchenorrhyncha species richness (γ-diversity), and
- 2) agricultural extensification (LEI) enhanced Hemiptera and Heteroptera species richness, and this finding was consistent across methods.



ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Heteropteron - Mitteilungsblatt der Arbeitsgruppe Mitteleuropäischer Heteropterologen](#)

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Artikel/Article: [Comparison of sampling methods and influence of extensification on grassland Hemiptera 37](#)