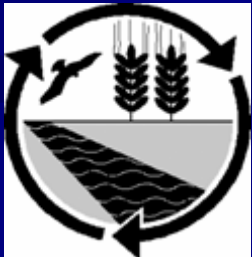


How shelterbelts can stimulate biocenotic regulation: a case from the Dezydery Chłapowski Landscape Park (W Poland)

Seminar on ELN-FAB in Baltic Sea Region
Rakvere, Estonia, 25-26.08.2010



Jerzy Karg, Maria Oleszczuk, **Krzysztof Kujawa**
Institute for Agricultural and Forest Environment,
Polish Academy of Sciences, Poznań

Study area – the Dezydery Chłapowski Landscape Park



Small fields



Wooded patches



Shelterbelts

Framework of recent study on biodiversity

Topics:

- Effect of landscape structure on biodiversity
- Long-term changes in biodiversity in an agricultural landscape
- Prey-predator and host-parasite relationships as factor affecting diversity of selected taxa.

Taxa studied:

- vascular plants
- macrofungi
- insects
- spiders
- amphibians
- birds
- mammals

Spiders



Methods:



Quick trap:

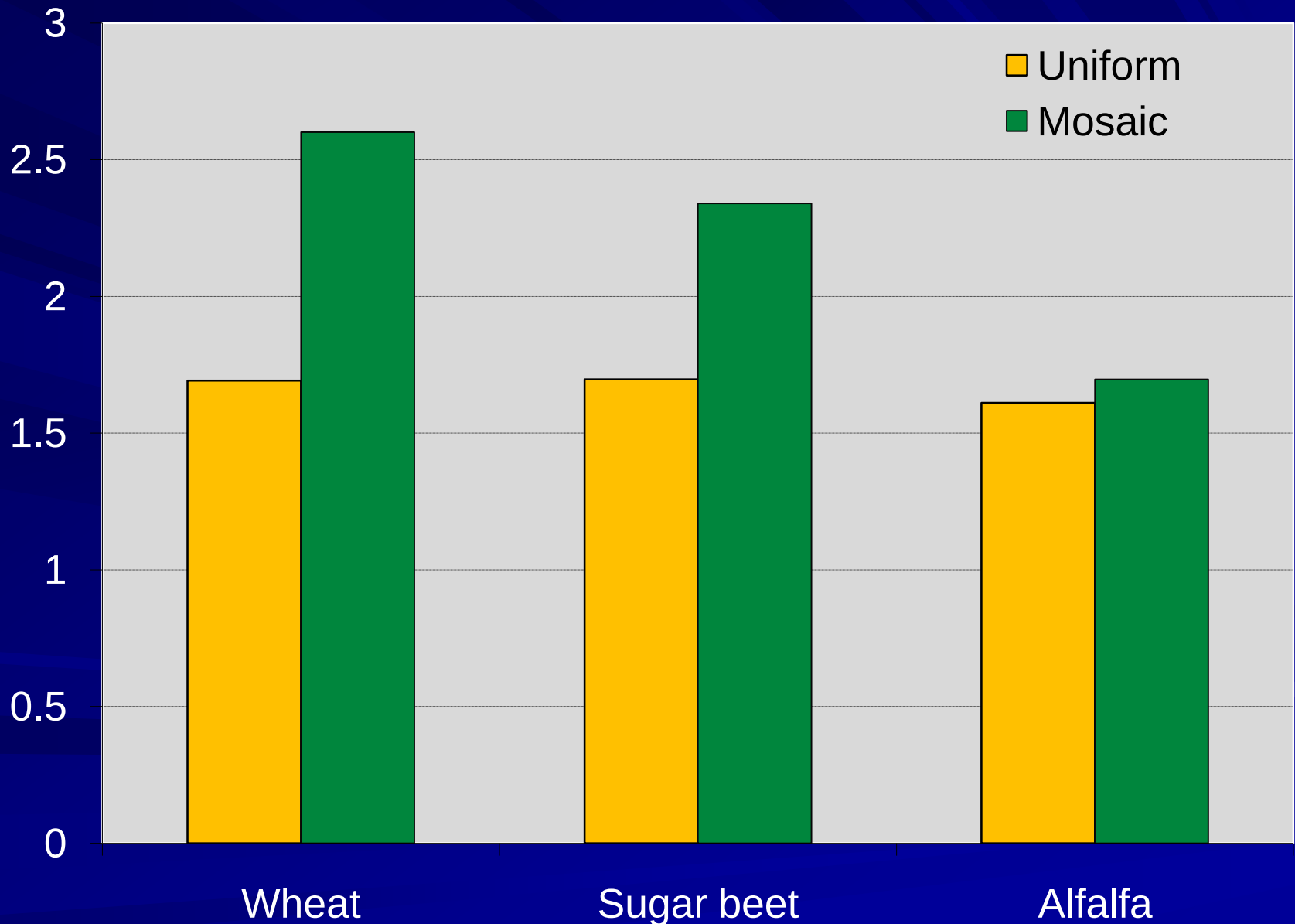


Counting webs sprayed with water

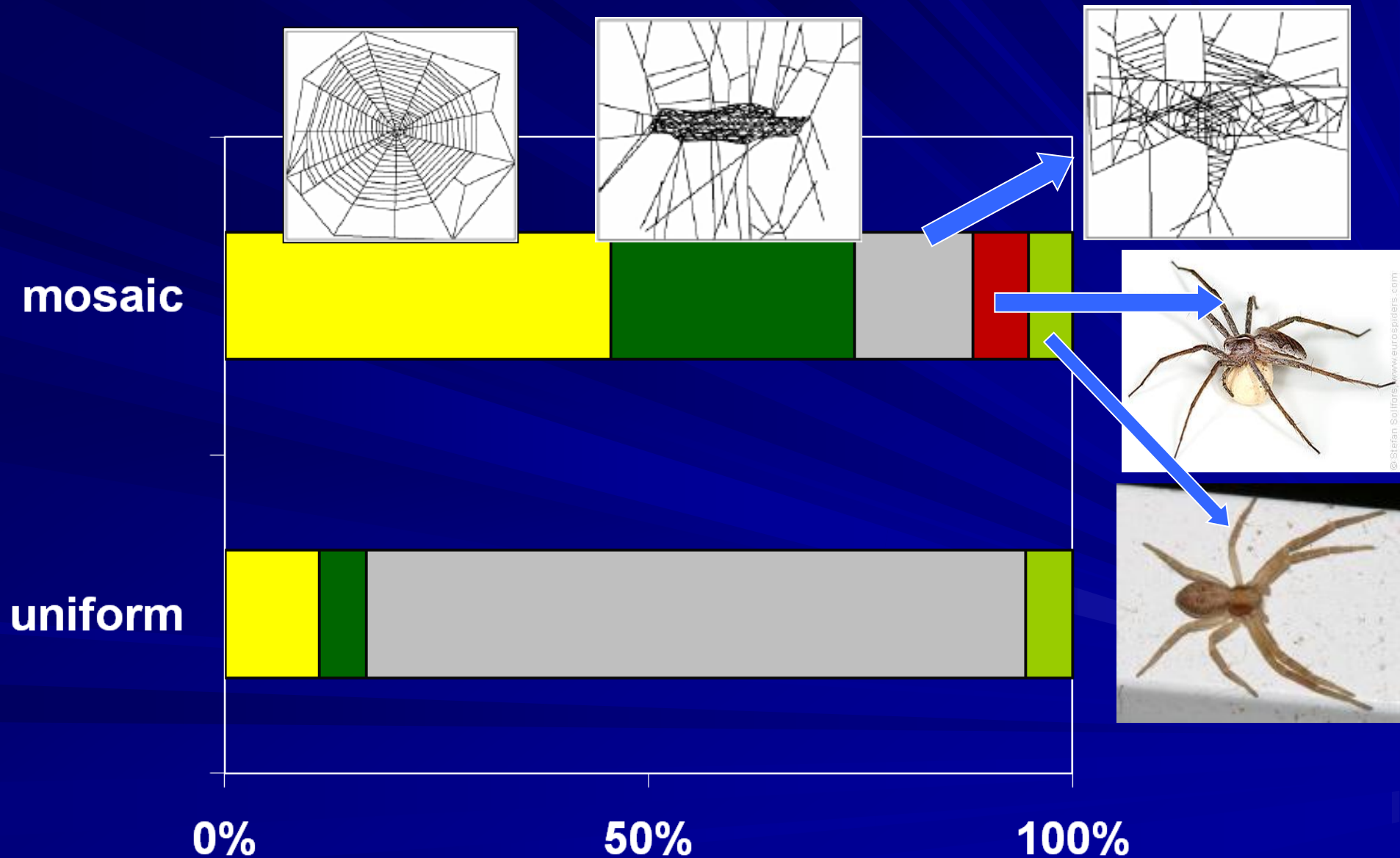


Pitfall traps:

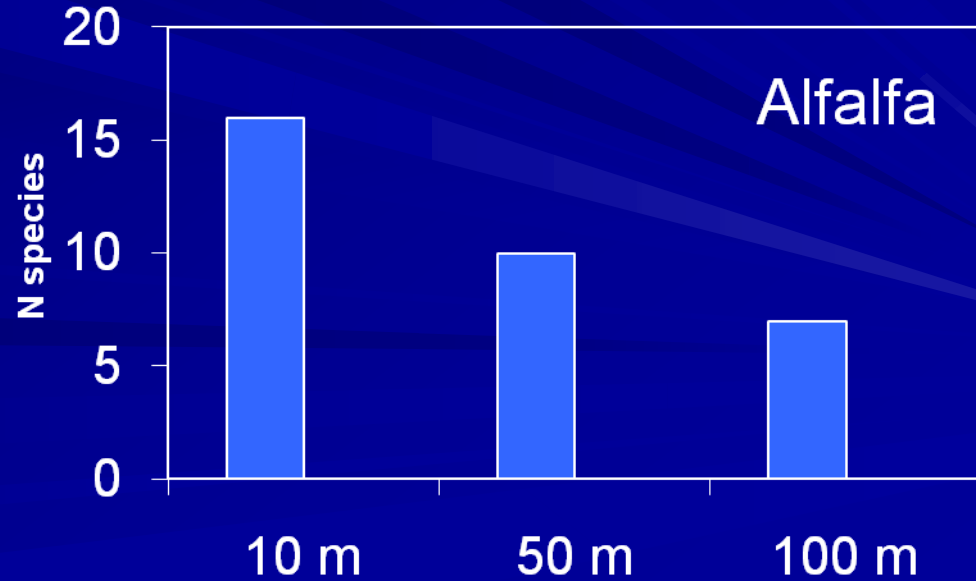
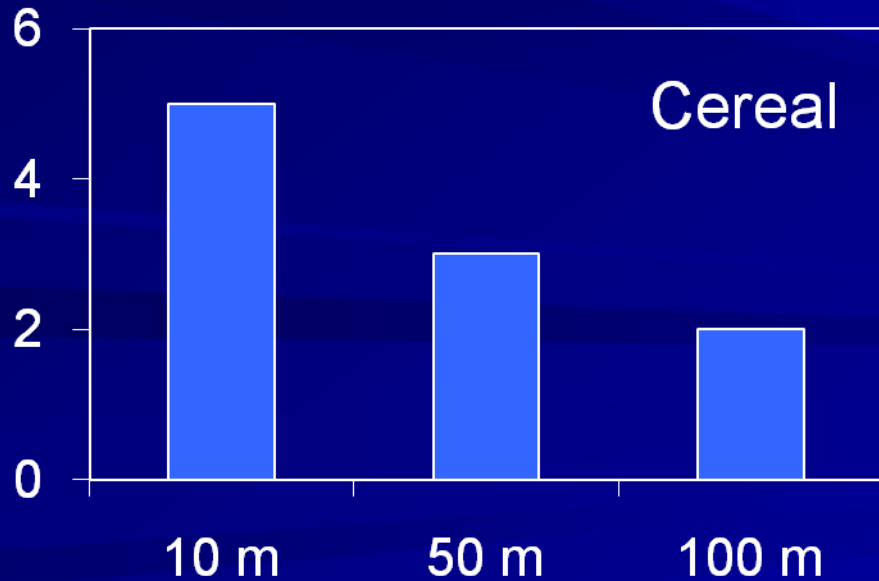
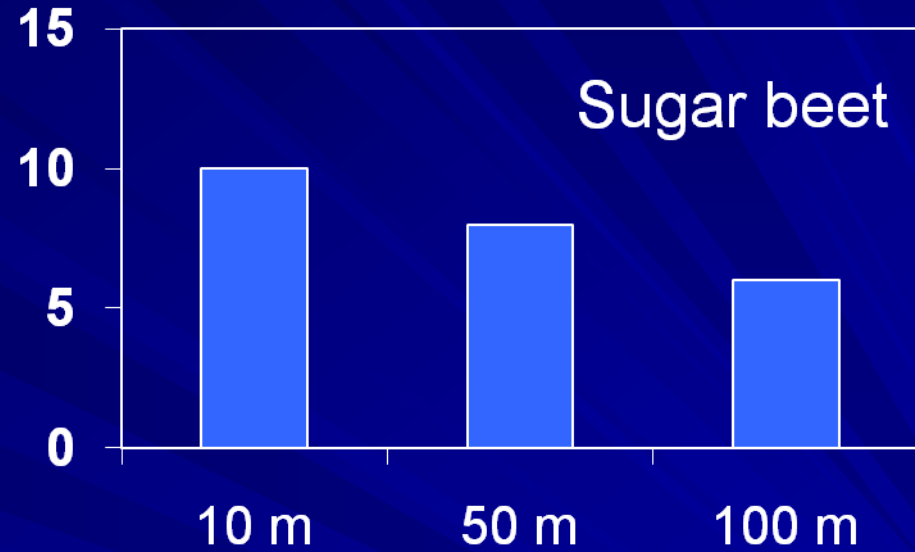
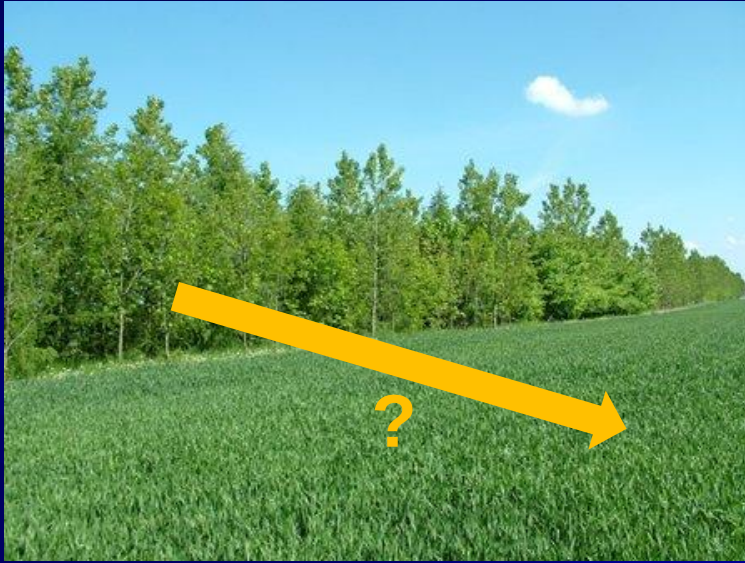
Local vs. landscape factors influencing diversity (H') of epigeic spider assemblages



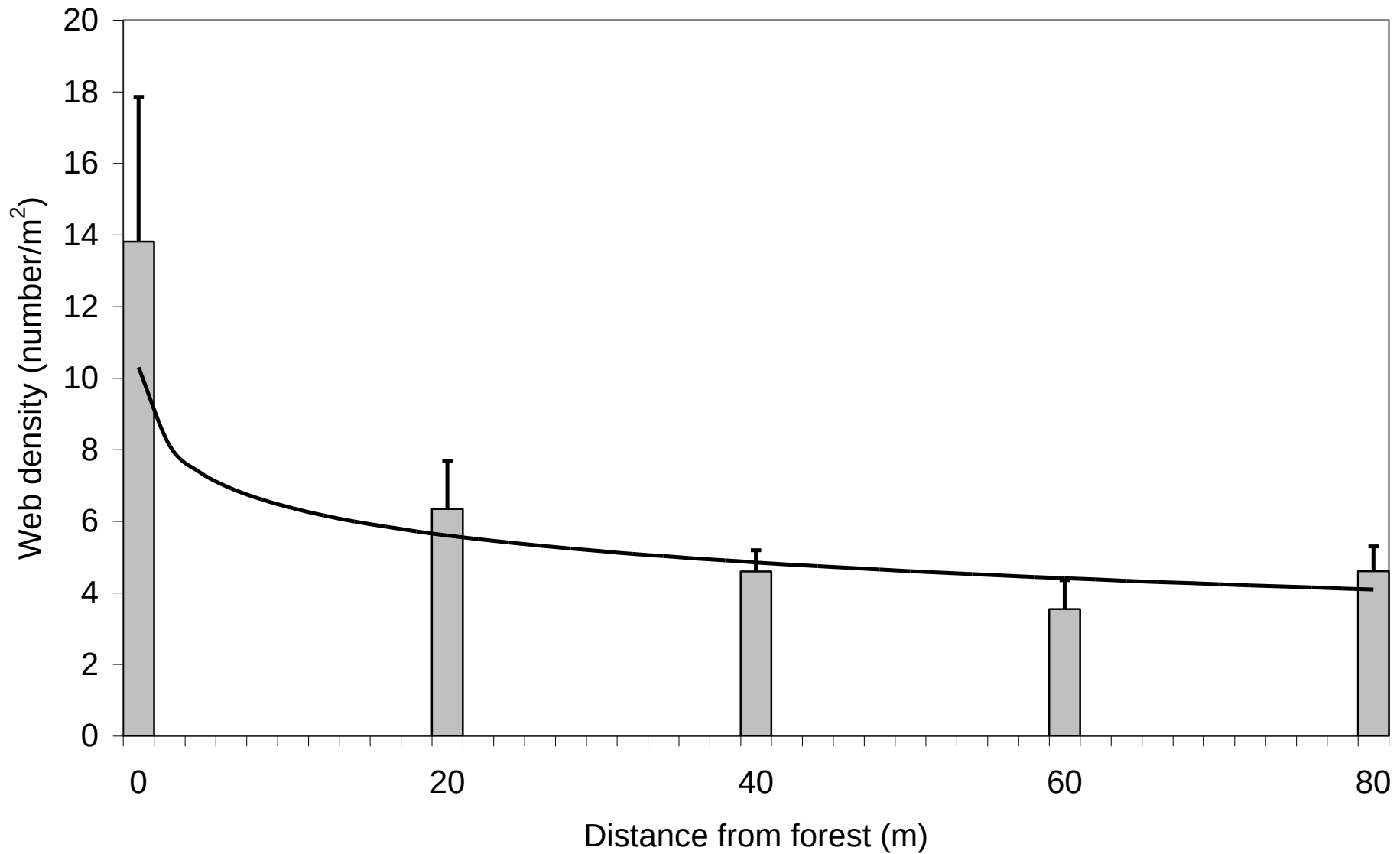
Effect of landscape type on share of types of spiders webs in sugar beet plantations (3-years studies)



Effect of distance from shelterbelt and species numbers of plant-dwelling spiders in crop fields (3-years study)

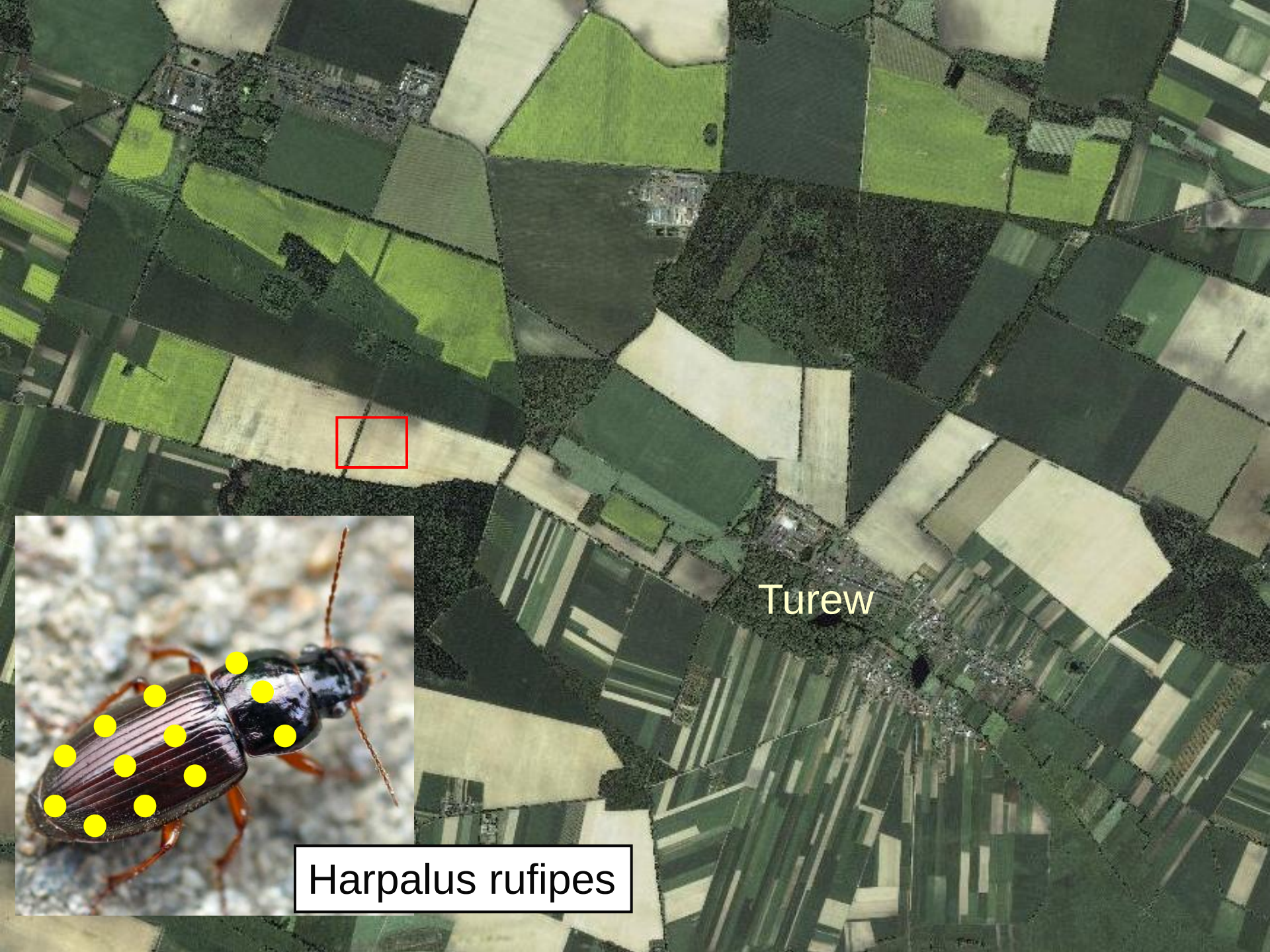


Total density of spider webs in maize plantation in relation to distance from a forest (1 year – study)

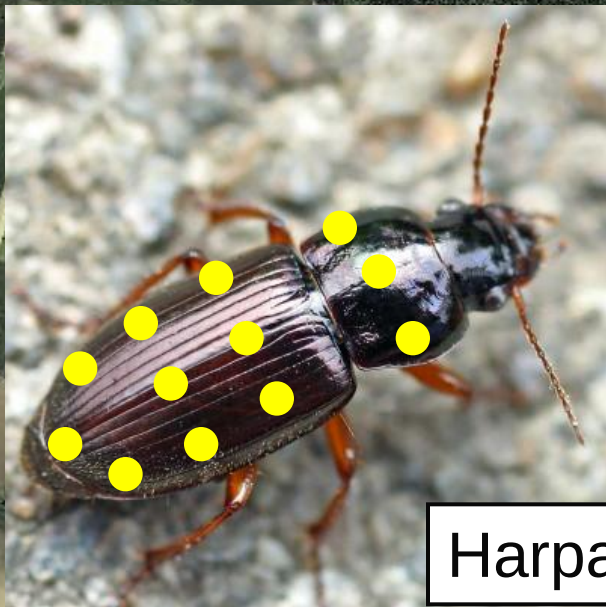


Insects





Turew

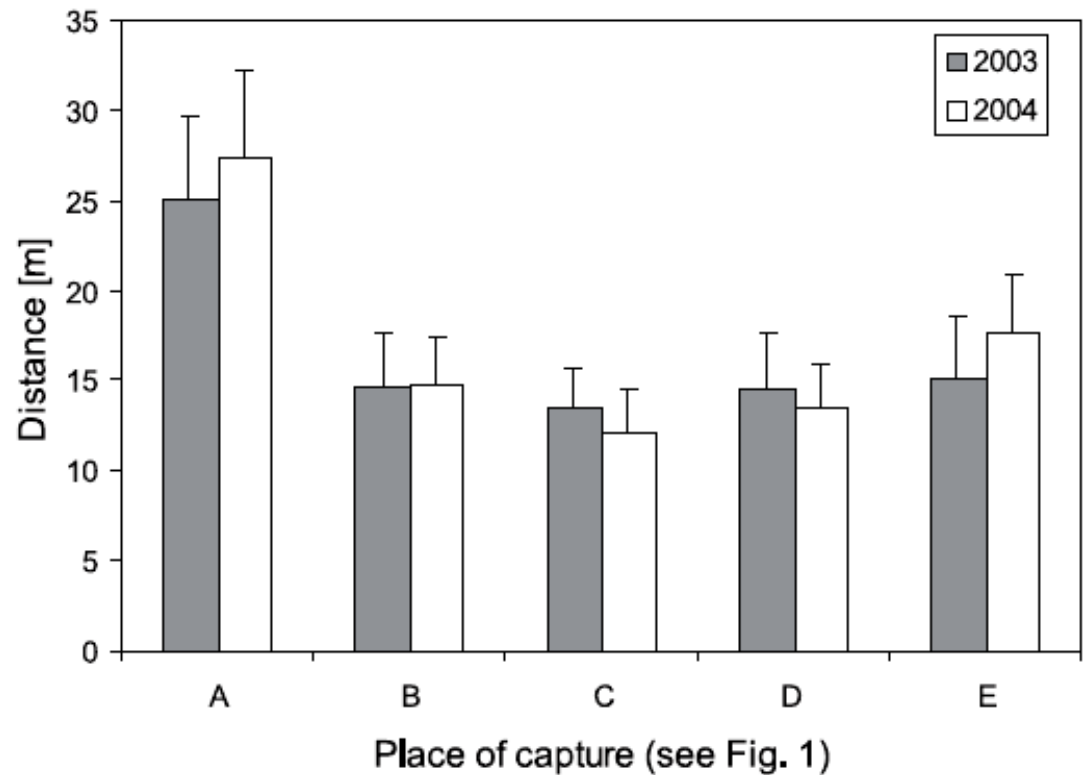


Harpalus rufipes

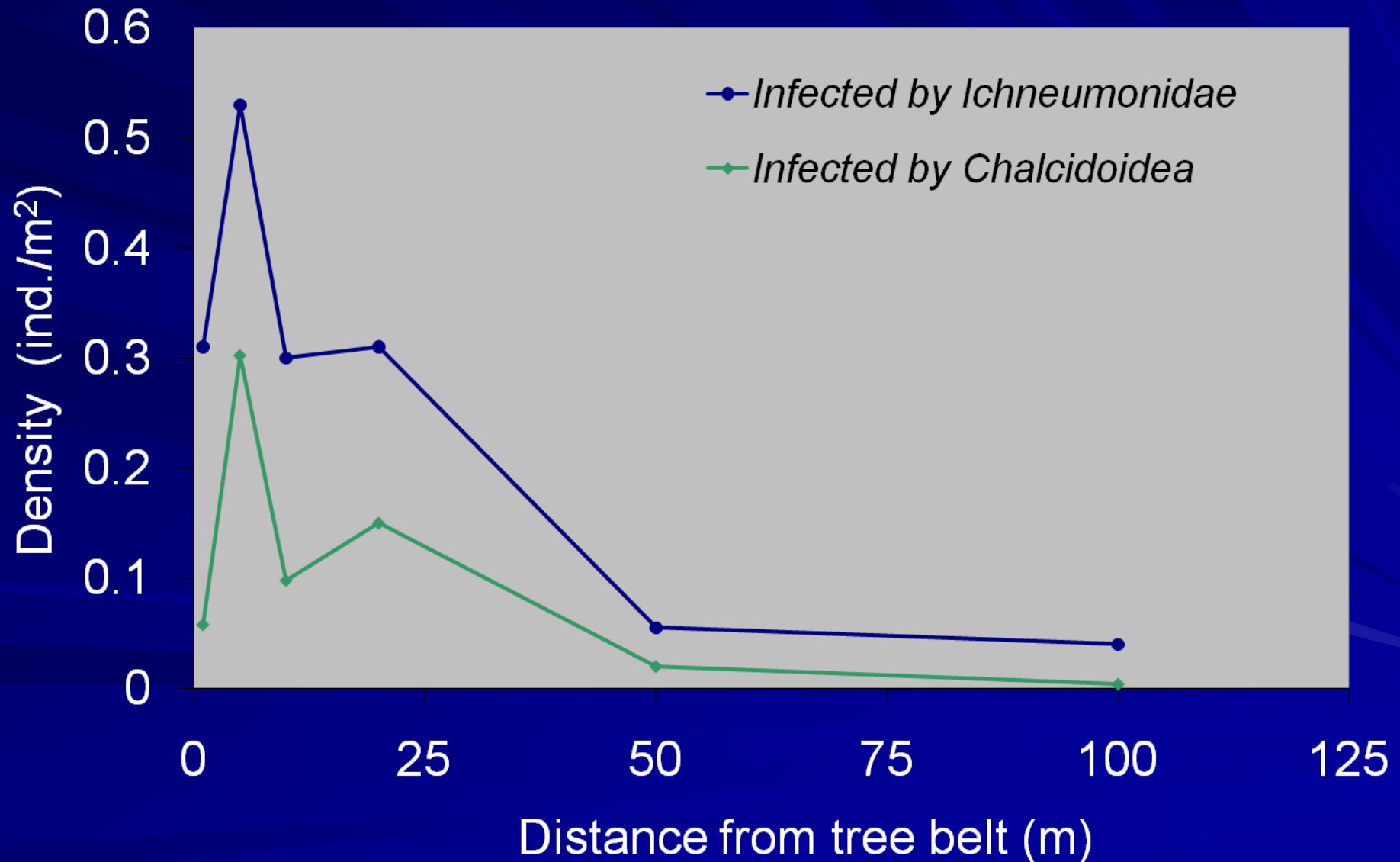
1. Capture-recapture pattern:

- $A \Rightarrow B$ – 1/3 recaptures
- $B \Rightarrow A$ – 1/10 recaptures

2. Differences in distance of movements:



Effect of tree belt on density of insect larvae infected by parasitic insects (*Ichneumonidae* and *Chalcidoidea*)



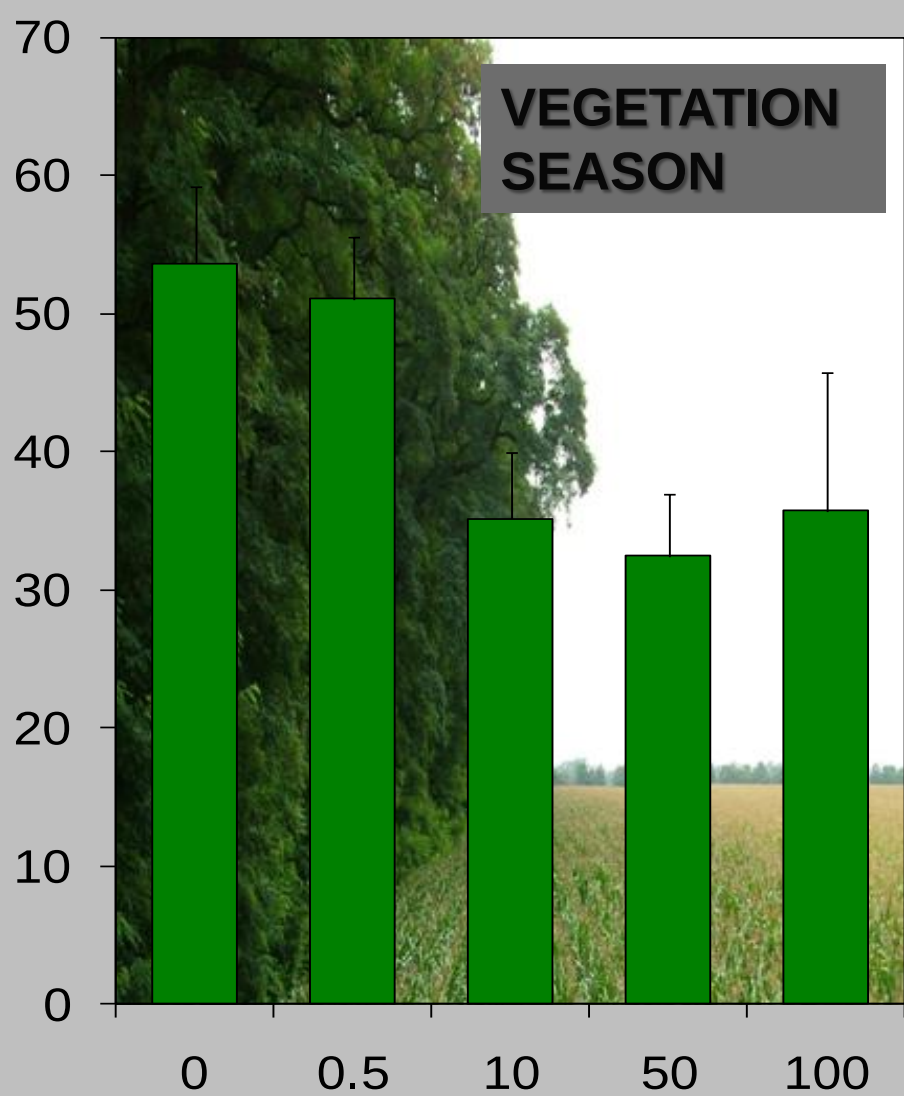
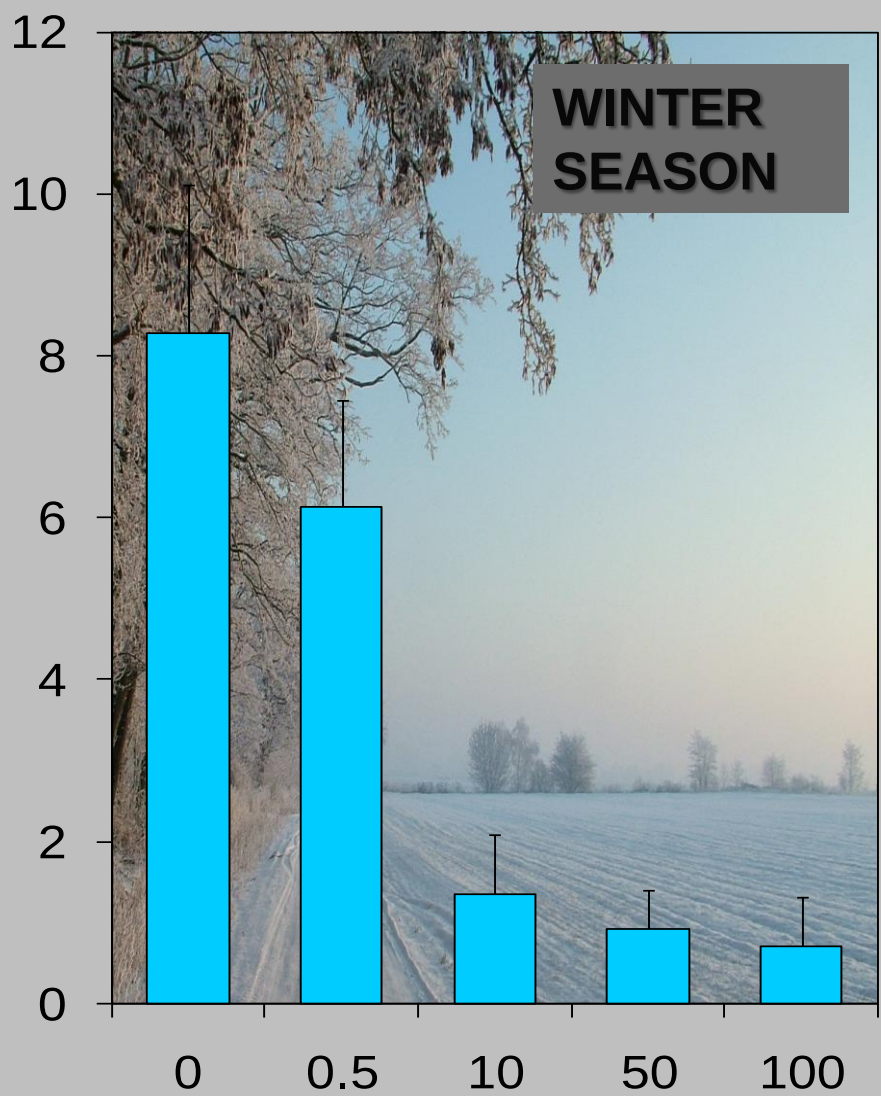
Methods applied in long-term study on insects



For epigeic insects and insects—
quick trap:

- 1980 – up today
- hundred or thousands samples/year
- several thousands ind./year

Mean number (in 1995-2008) of insect **families** in shelterbelts and in adjacent crop fields in relation to distance from the shelterbelts

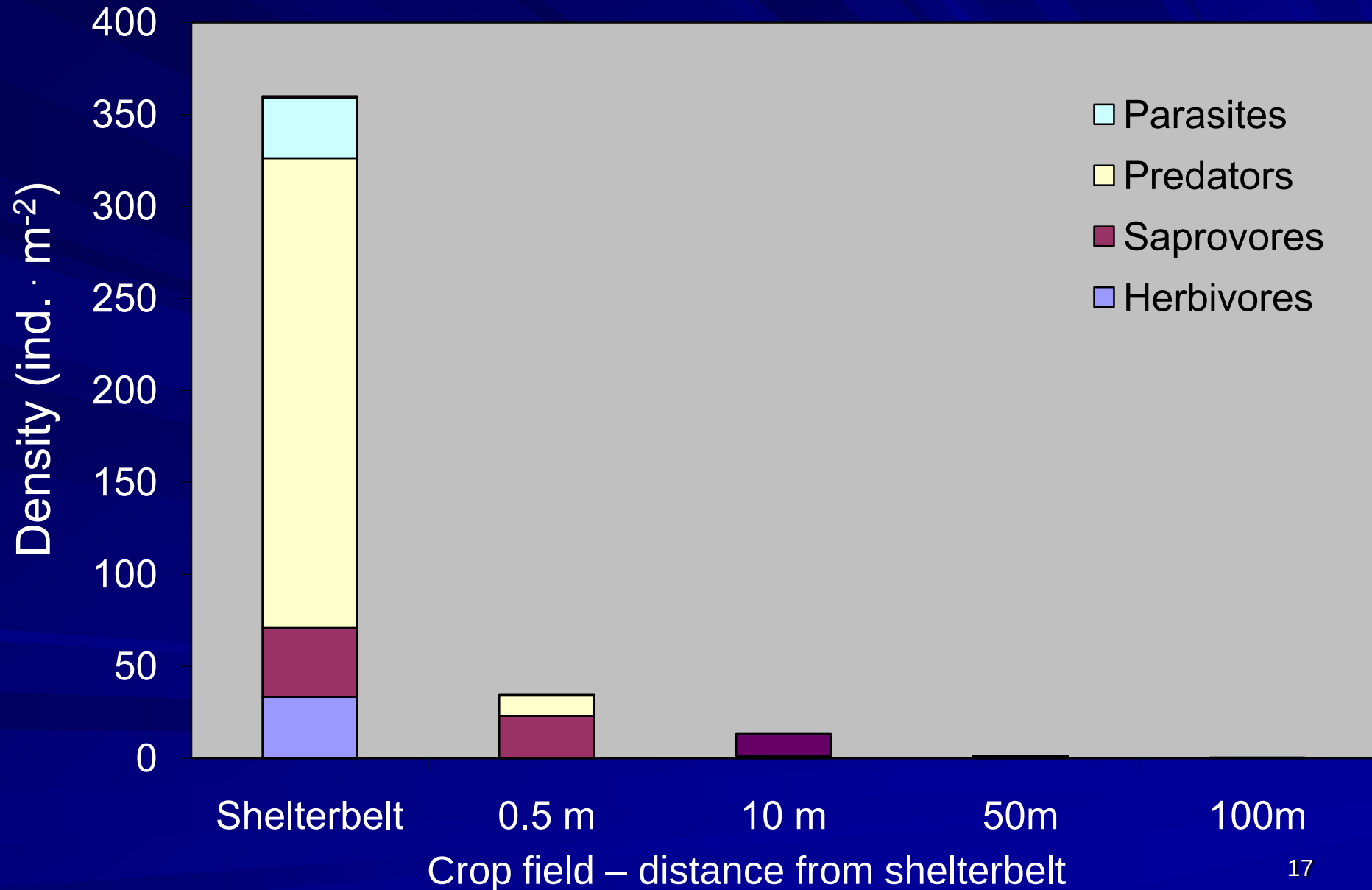


Distance from the shelterbelts (m)

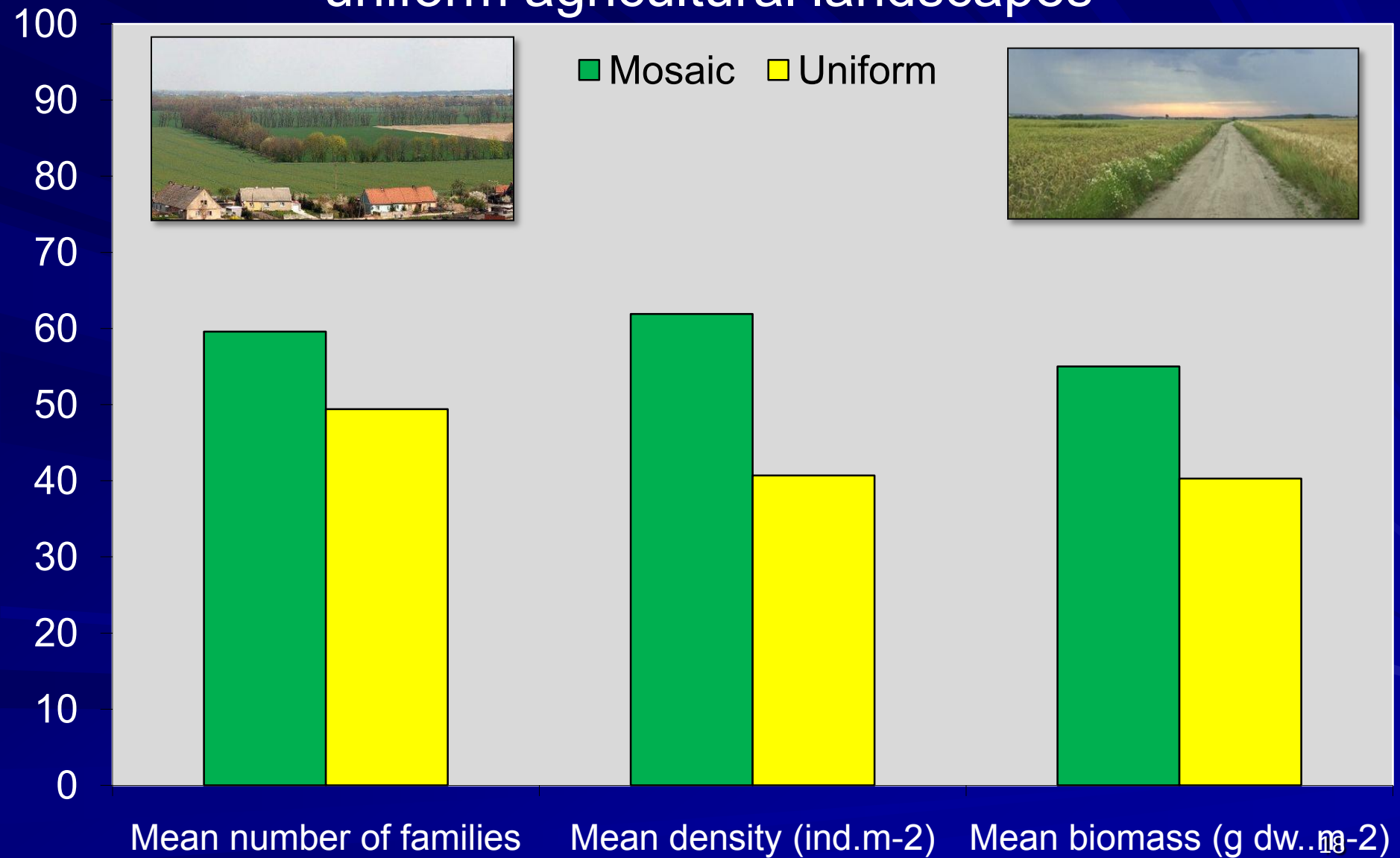
Mean total **density** of insects wintering in soil
(ind./m²) in shelterbelts, crop fields and ecotones
between crop fields and shelterbelts



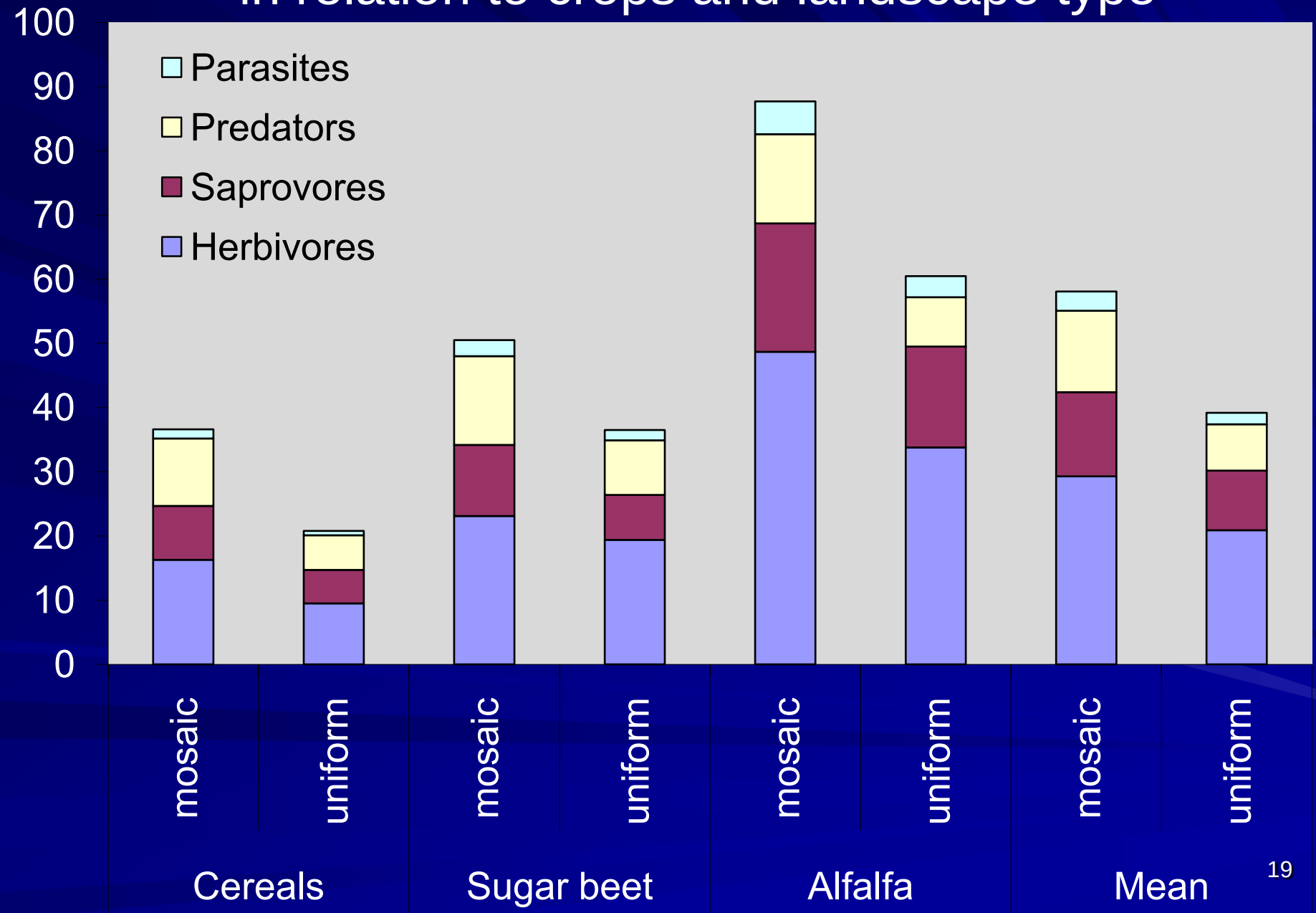
Trophic structure of insect assemblages wintering in crop fields and shelterbelts



Long-term comparison of above-ground insect communities between mosaic and uniform agricultural landscapes



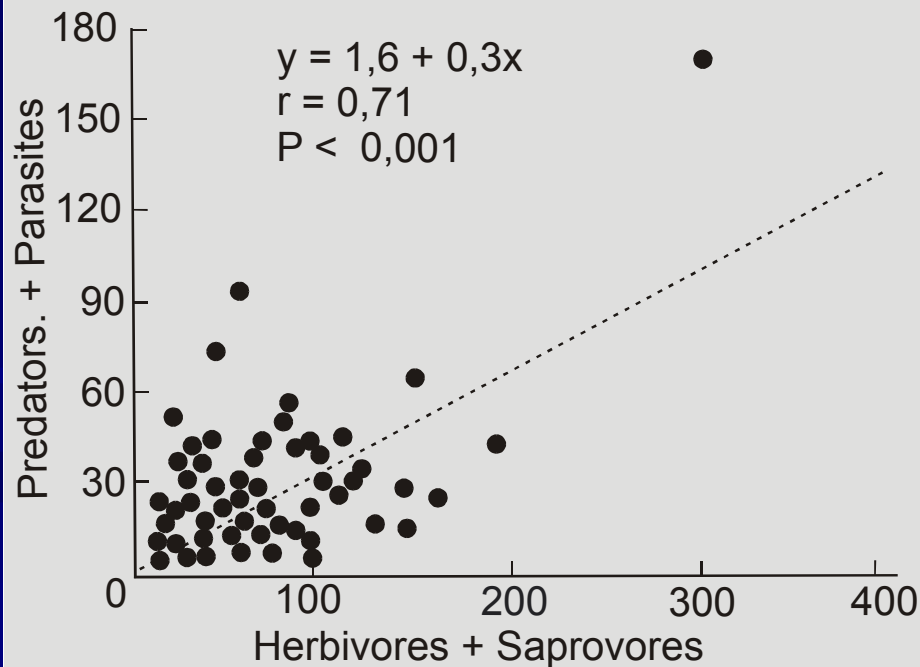
Mean long-term density of trophic groups of insects in relation to crops and landscape type



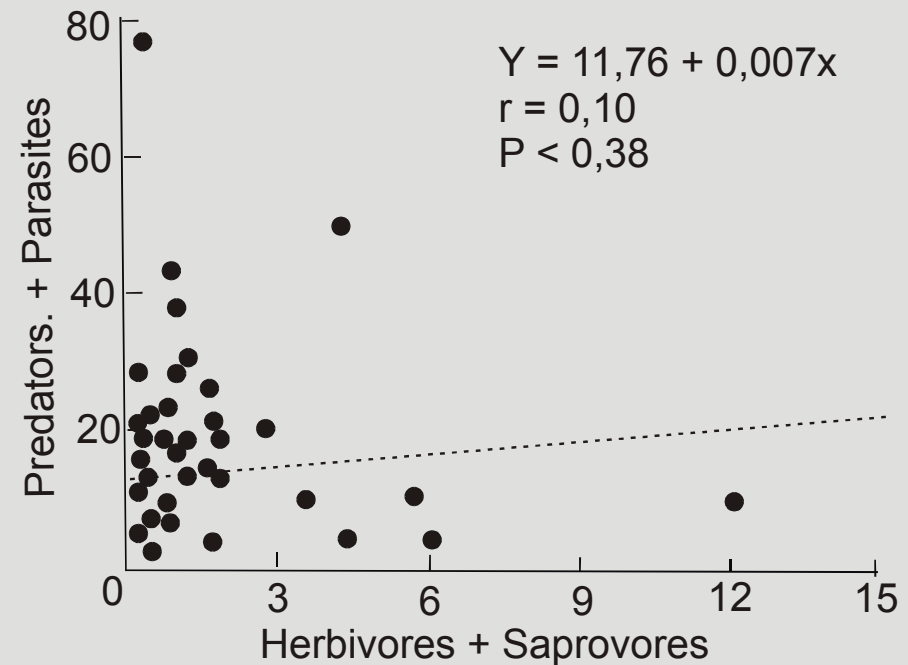
Landscape effect on correlation between trophic groups of insects



Mosaic landscape
(Poland)



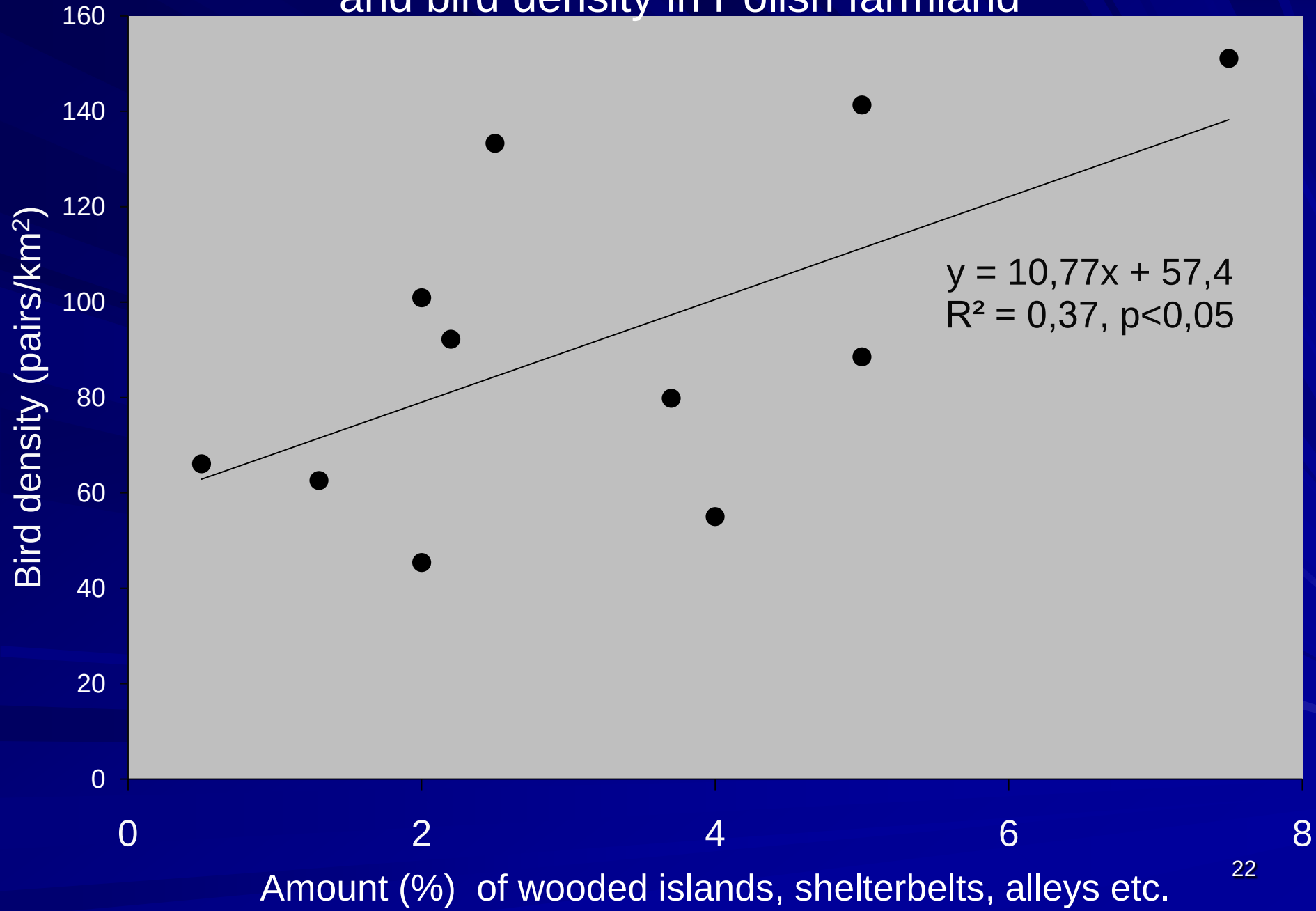
Uniform landscape
(Romania)



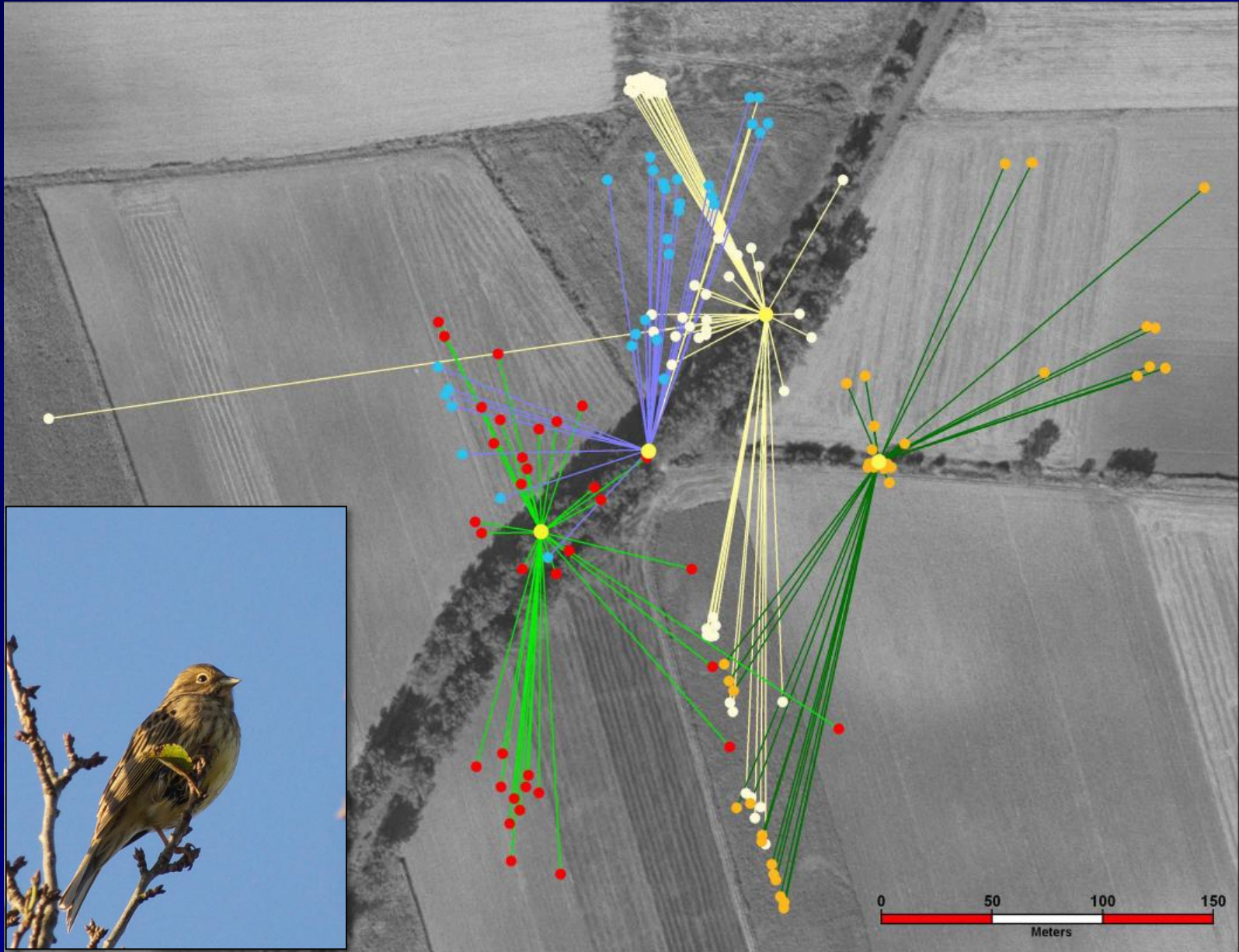
Birds



Relationships between share of small wooded islands and bird density in Polish farmland



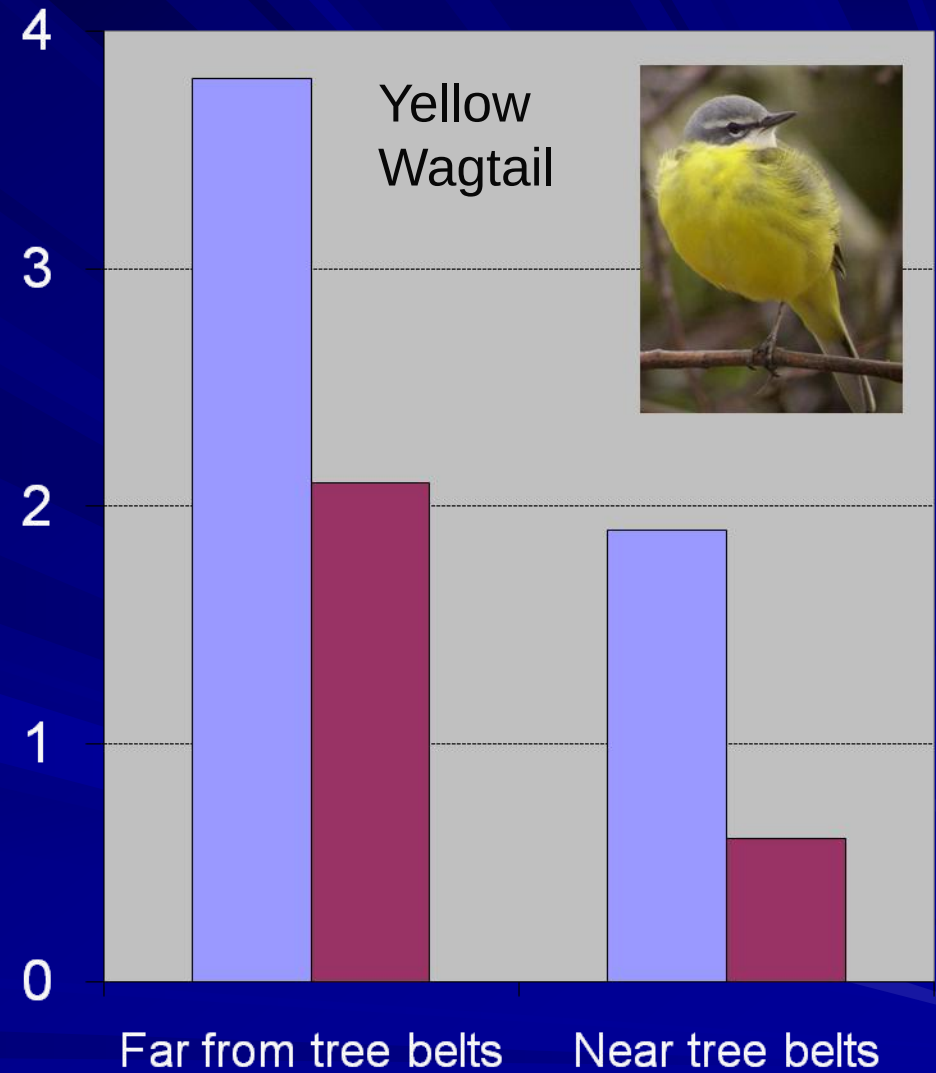
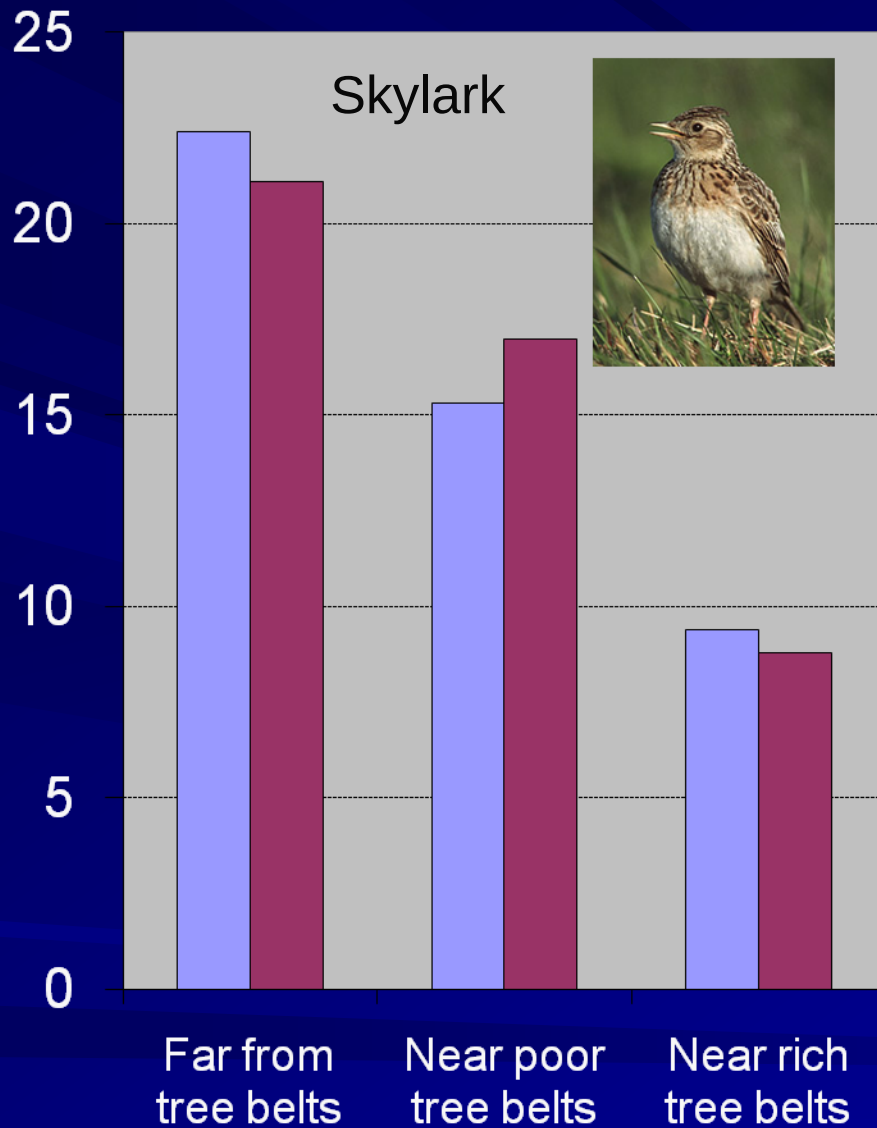
Yellowhammer - Spatial arrangement of flights for food



Fot. K. Kujawa

Wuczyński i Grzesiak, unpubl.

Effect of tree belts on density of common crop field birds



Wielkopolska

Frankonia

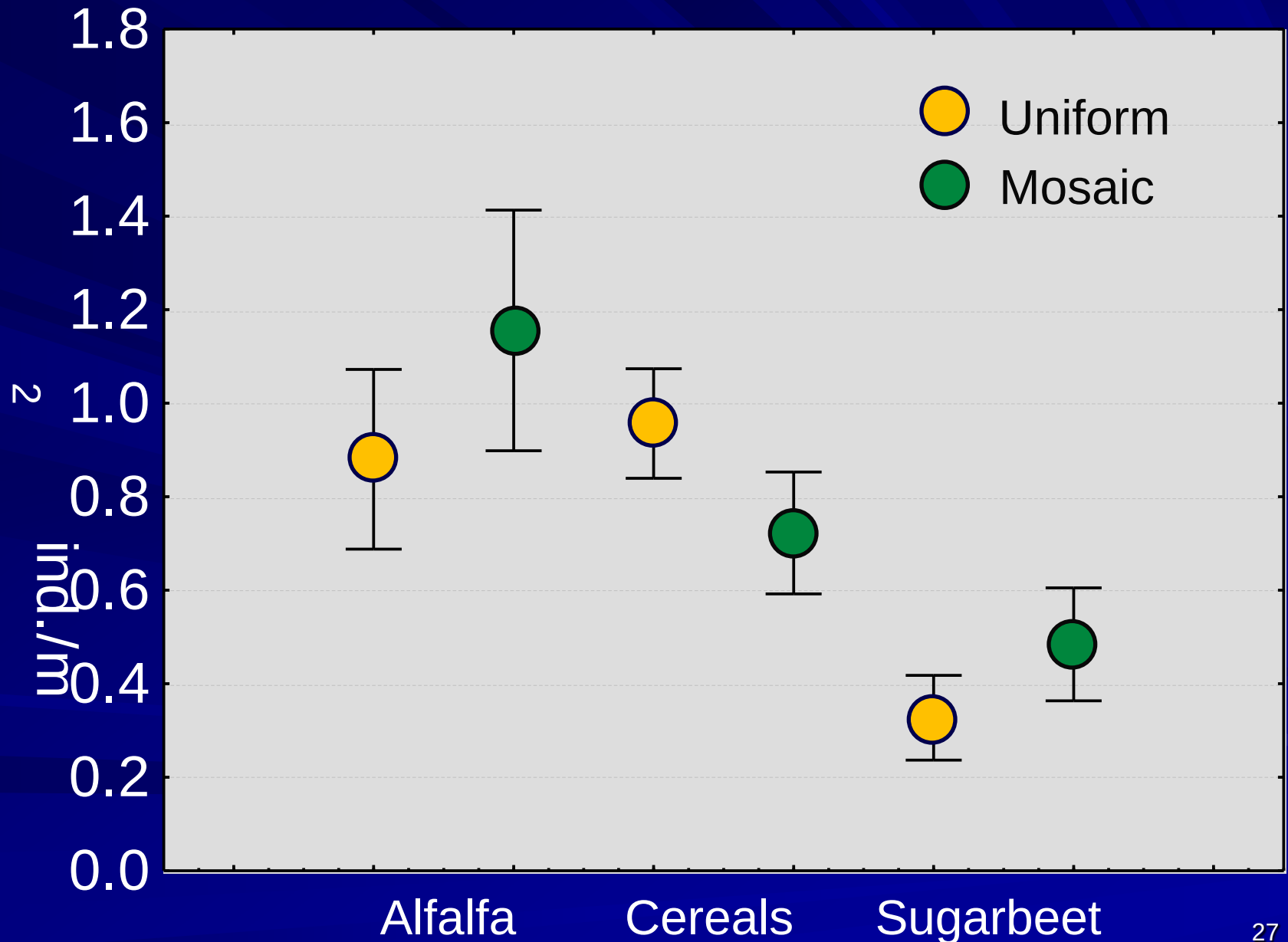
SUMMARY & CONCLUSIONS:

- A variety of non-farmed habitats (mainly small wooded areas) in an agricultural landscape indisputably constitutes basic conditions for maintaining relatively high biodiversity.
- Part of the biodiversity related to small wood island, especially predatory and parasitic species of invertebrates may be important from the functional point of view as may contribute to reduction of some pest abundance.
- Numerous results of research carried out in the area of Turew confirm high potential of shelterbelts, alleys and other small wooded areas in the issue of functional agrobiodiversity.

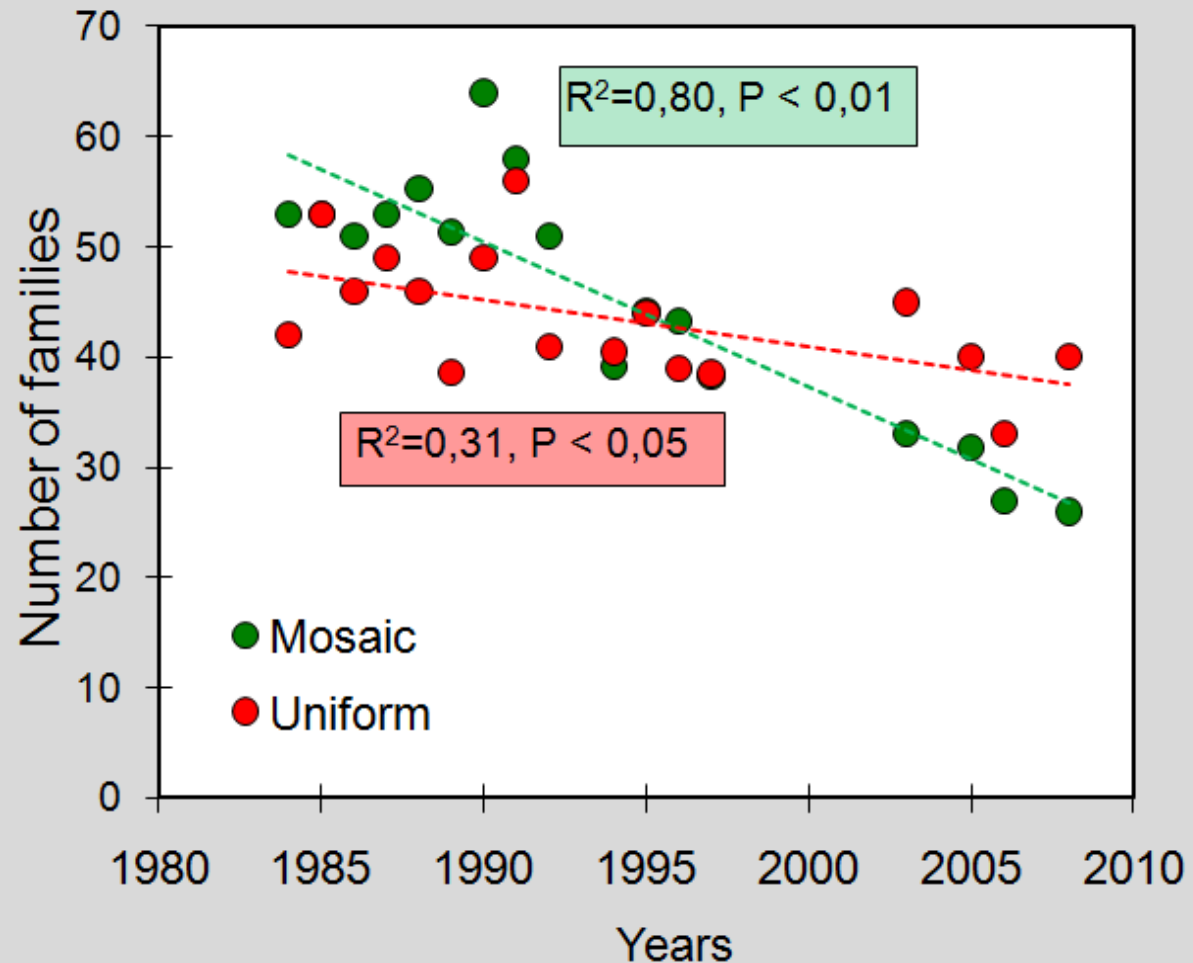
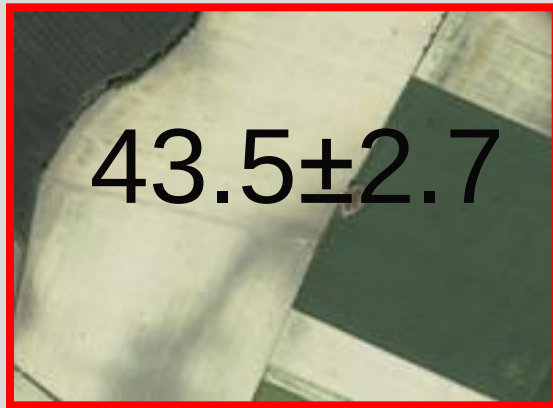
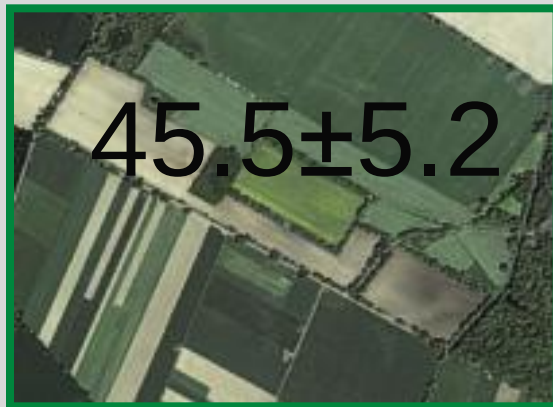


Thank you for attention

Spider density in crop fields (3-years studies)



Long term trends in diversity (number of families) of epigeic insects in cereals in relation to landscape structure



Density of spider web types in maize plantation in relation to distance from a forest (1 year – study)

