BIODIVERSITY - a fading hope

Dr habil. Paweł Sienkiewicz, Prof. UPP

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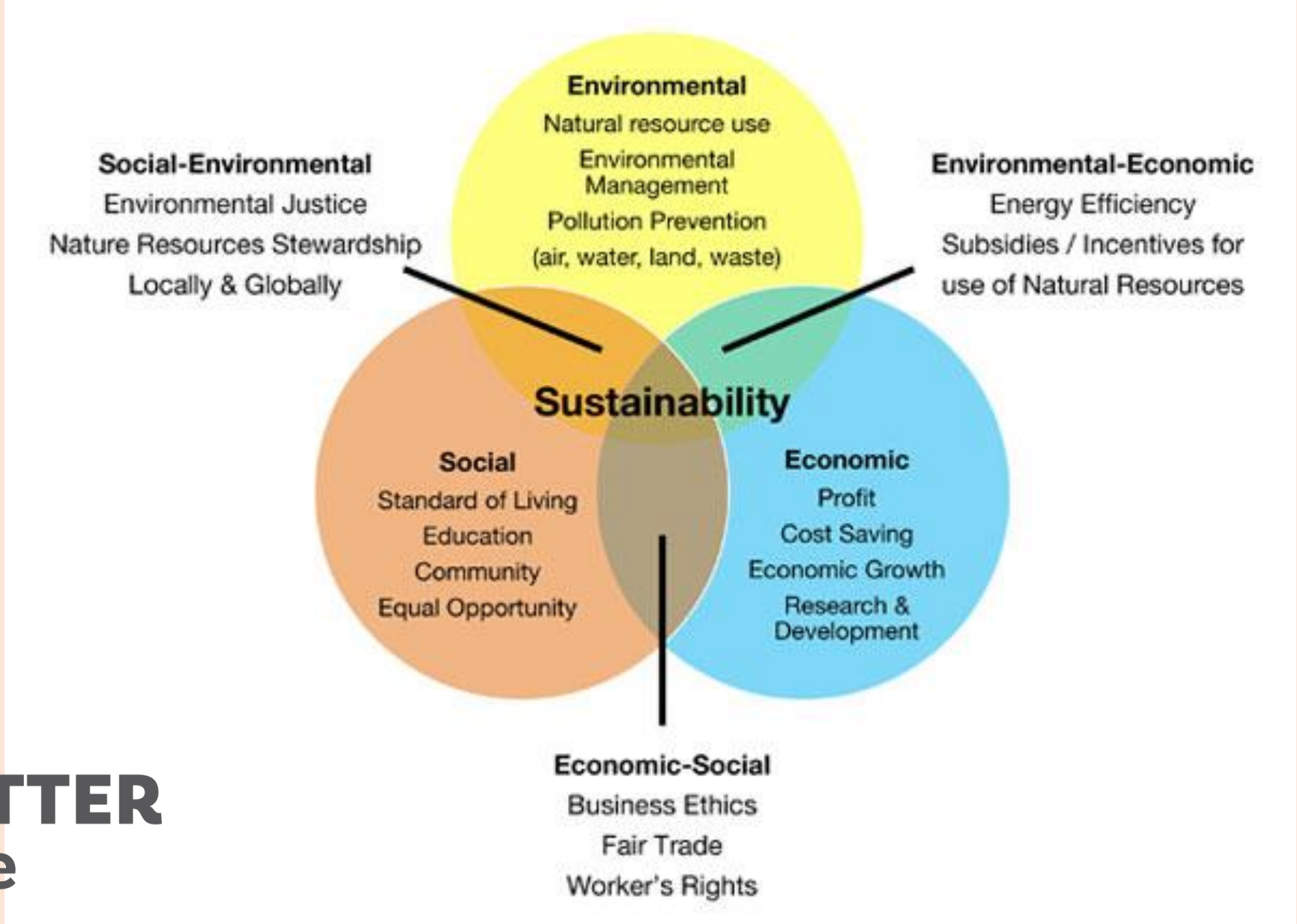
Care on ecological basis of human life = biodiversity



BETTER Life

Definitions of biodiversity

- **The variability of living organisms inhabiting all environments and the variability of the ecological systems of which these organisms are a part, whereby variability so defined includes intra-species diversity, interspecies diversity and ecosystem diversity (Convention on Biological Diversity, 'Earth Summit', Rio de Janeiro, 1992).**

- **The abundance of life forms found on Earth, the diversity of species, intra-species genetic variability, and the variety of multi-species natural systems, i.e. ecosystems and landscapes (Sienkiewicz 2010)**

What is biodiversity?

BETTER Life

FIGURE 1. A-I) Outline and colour pattern: A-F) Adalia bipunctata, G-I. Adalia decempunctata

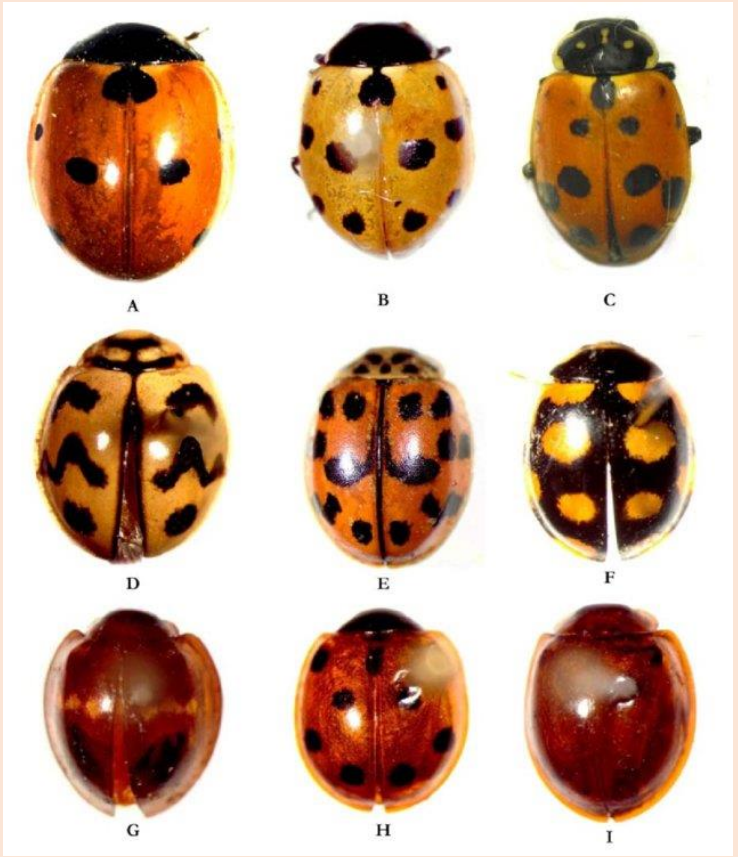
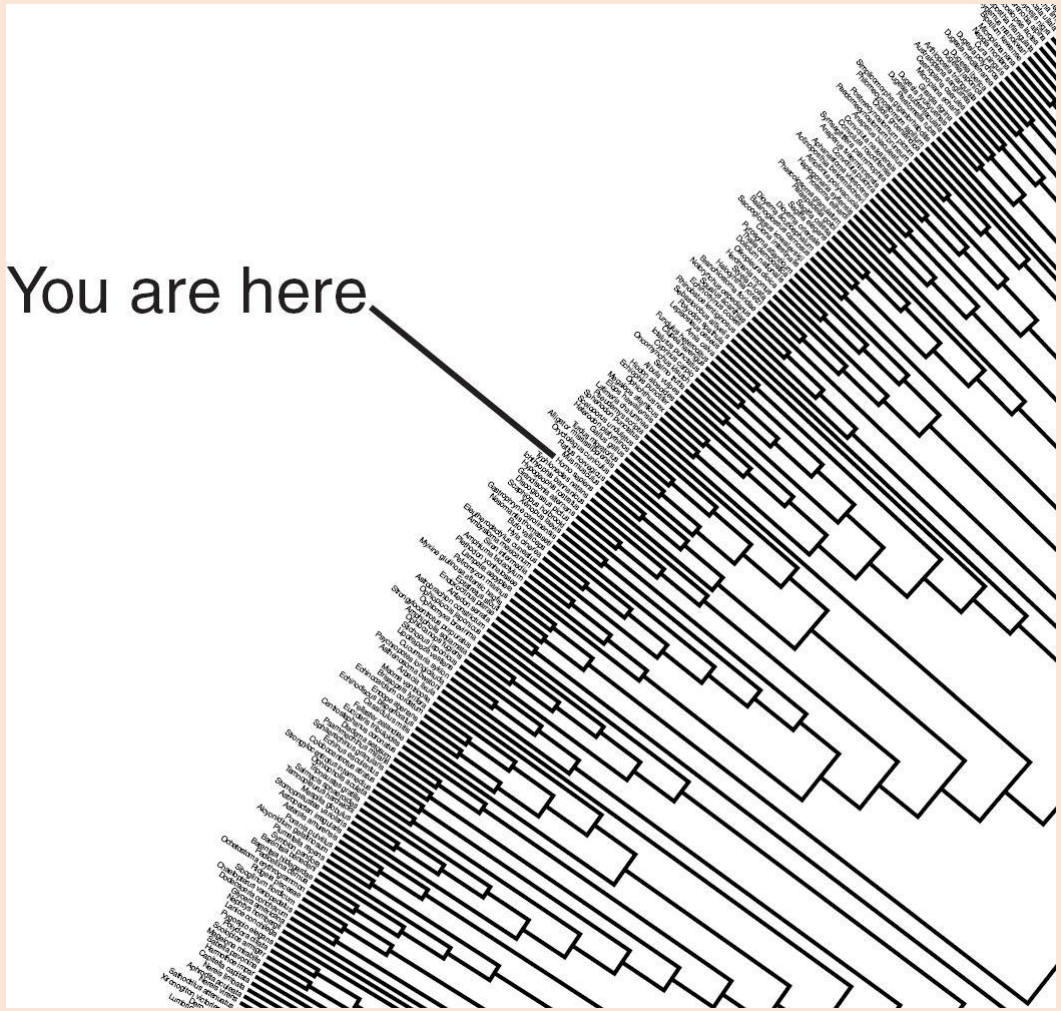
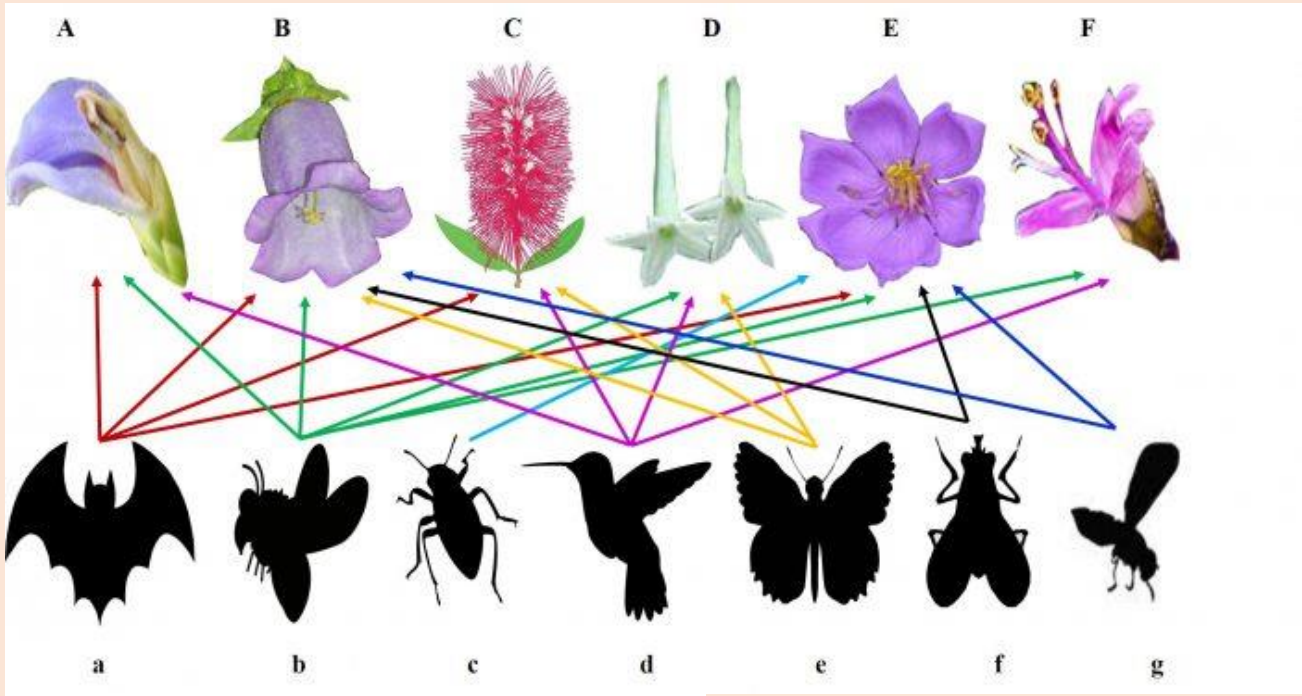
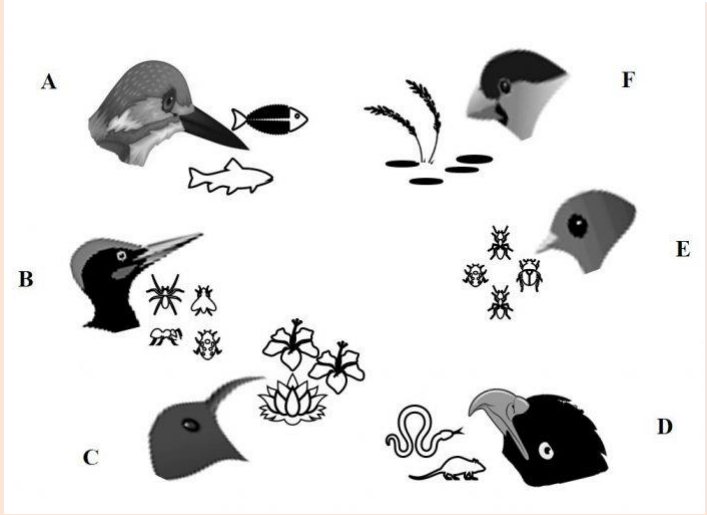


FIGURE 2. A-I) Outline and colour pattern: A) Coccinella septempunctata, B) Coccinella undecimpunctata, C) Hippodamia variegata, D) Menochilus sexmaculatus, E) Oenopia conglobata, F) Oenopia oncina, G) Chilocorus bipustulatus, H) Exochomus octosignatus, I) Exochomus quadripustulatus.

What is biodiversity?







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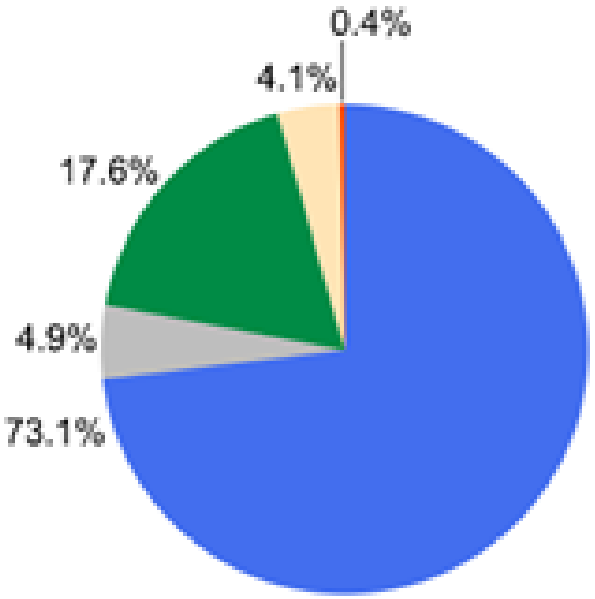
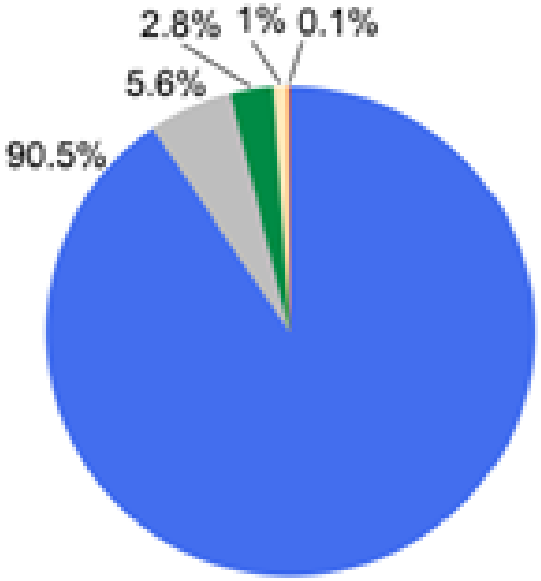
BETTER Life

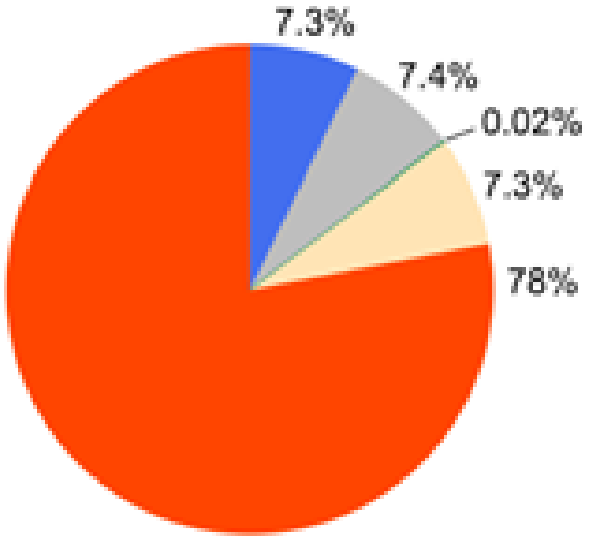
Invertebrates Vertebrates



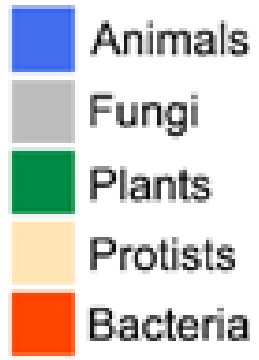
Wilson (1992)



Mora et al. (2011)



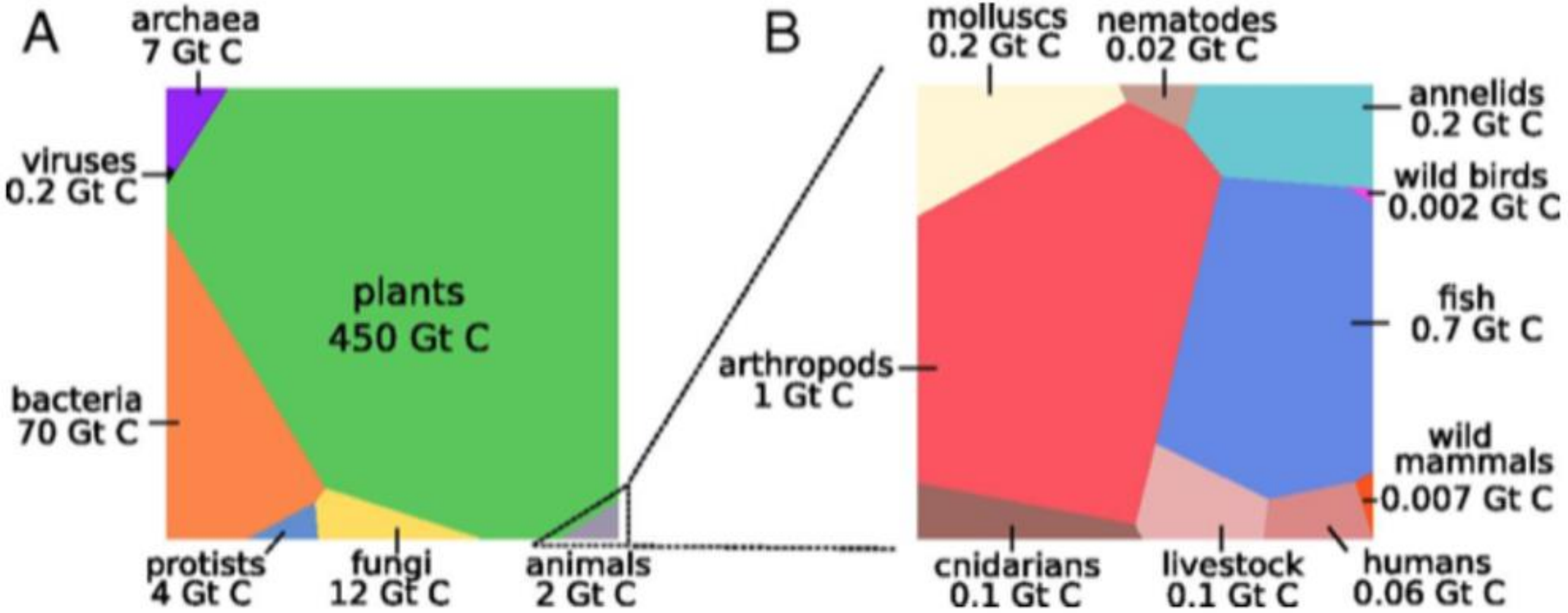
this study



based on Scheffers et al. (2012)

excluding insects

insects only



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Biomass Study, Bar-on, Phillips, Milo: Proceedings of the US National Academy of Sciences, May 21, 2018; Article #17-11842; PNAS

BETTER Life

BIODIVERSITY

What is biodiversity?

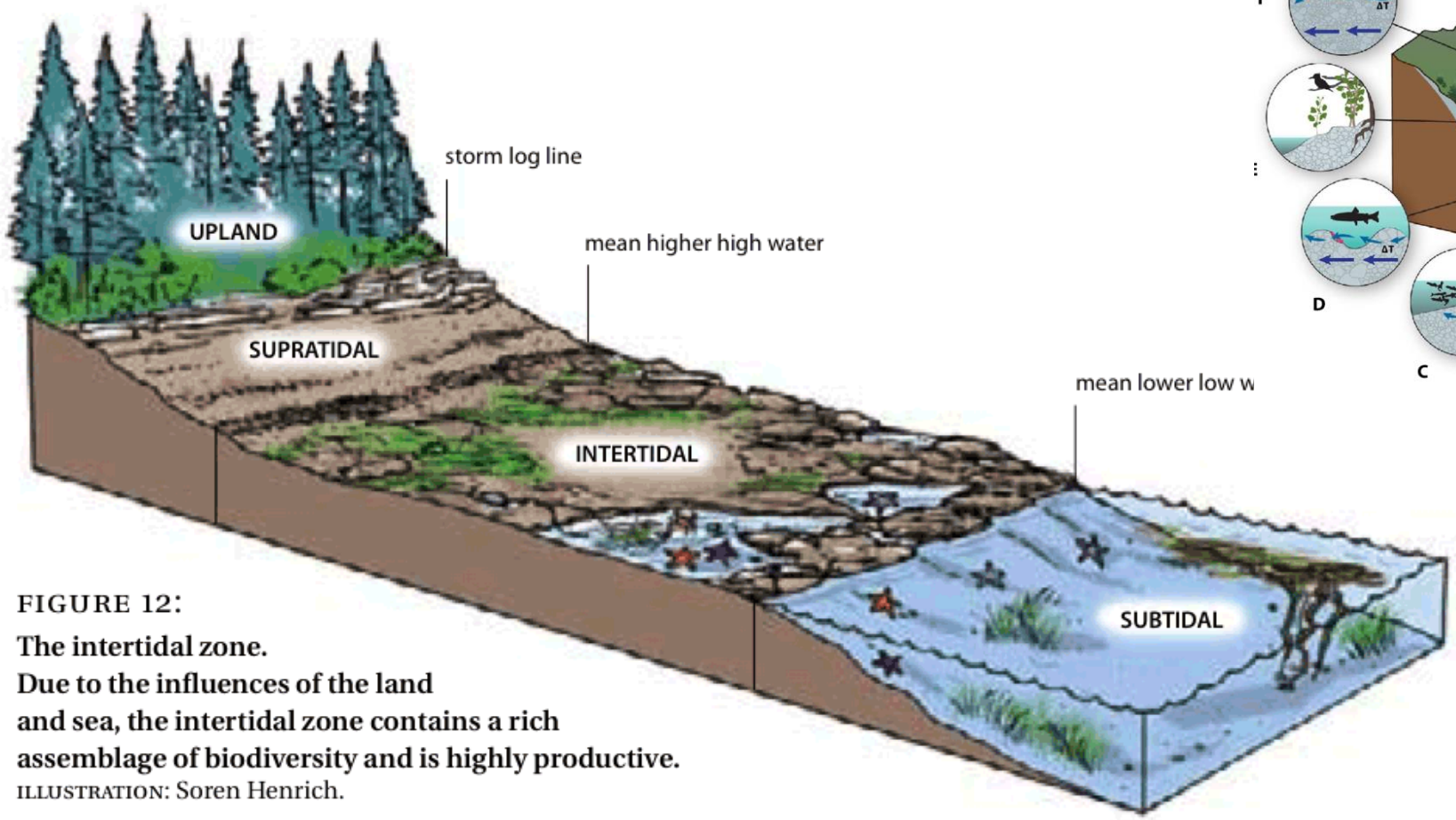
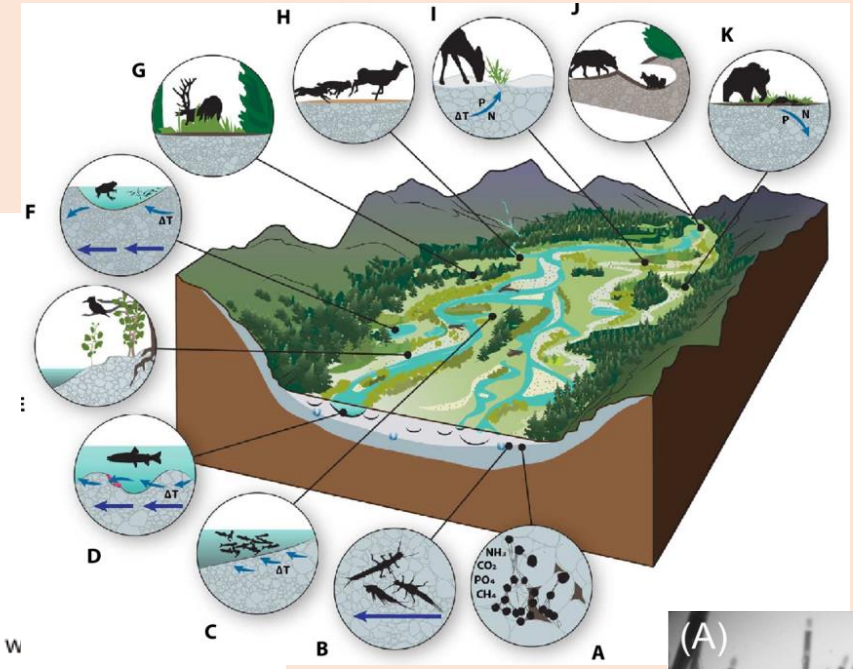
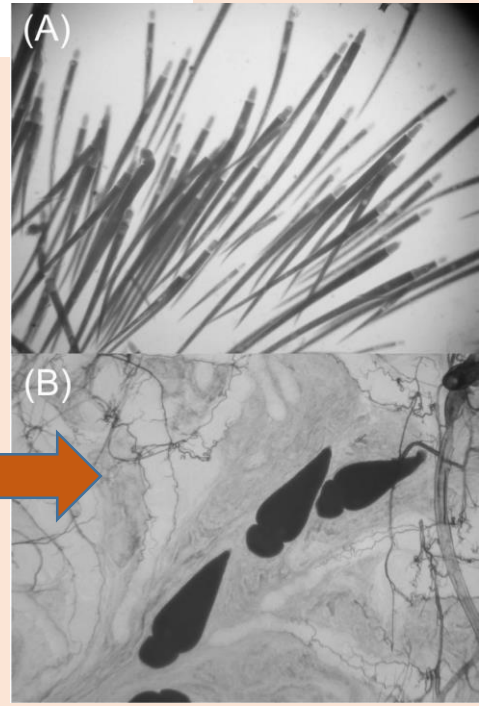


FIGURE 12:
The intertidal zone.
Due to the influences of the land and sea, the intertidal zone contains a rich assemblage of biodiversity and is highly productive.
ILLUSTRATION: Soren Henrich.





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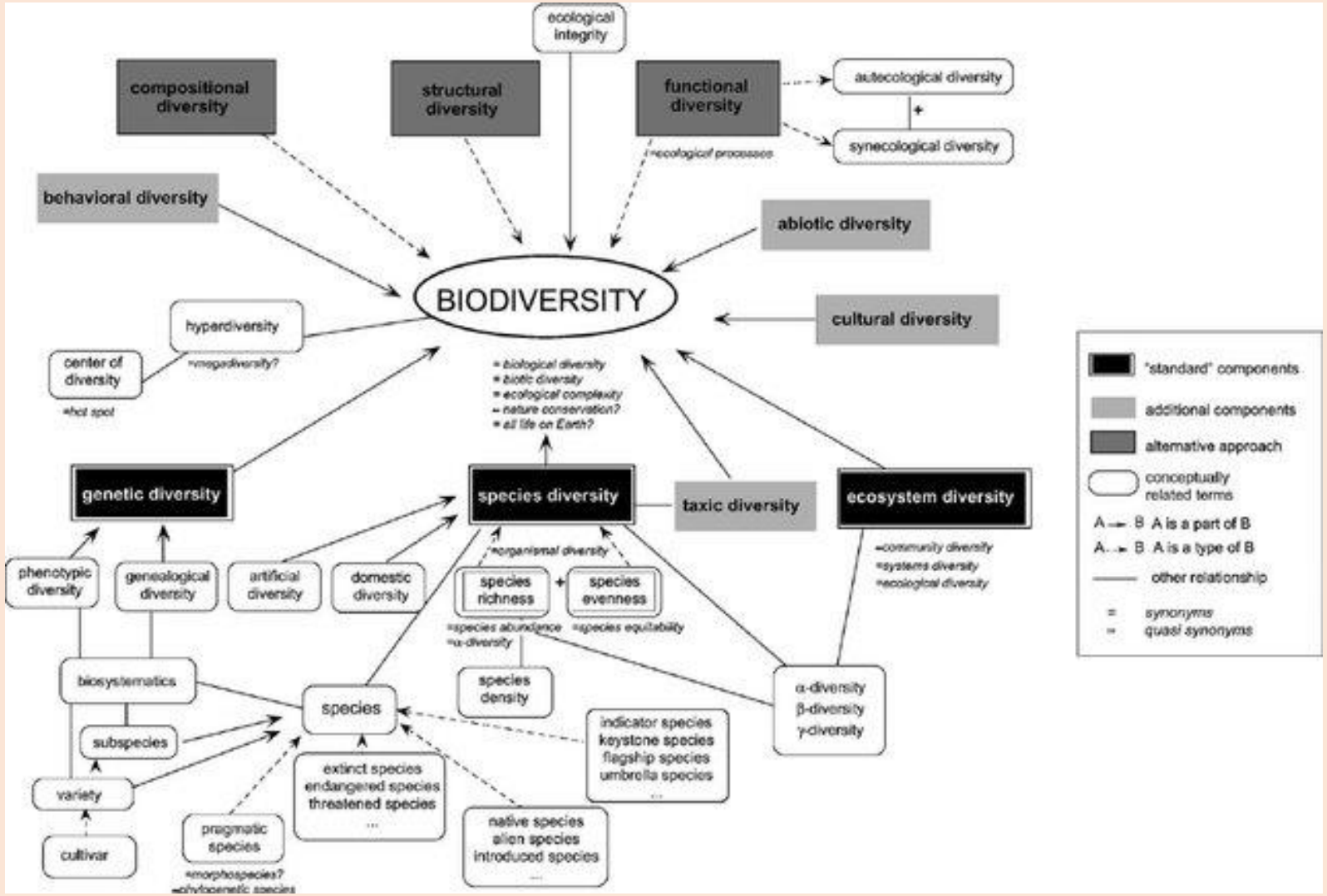

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P. Duelli, M.K. Obrist / Agriculture, Ecosystems and Environment 98 (2003) 87–98

Diversity levels - another perspective

- beta diversity (β) - variation in species between different plant communities
- delta diversity (δ) - changes in species geographical regions

Whittaker 1972

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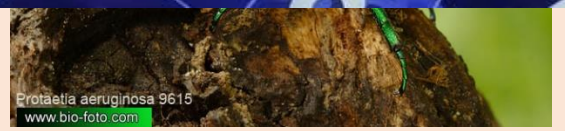
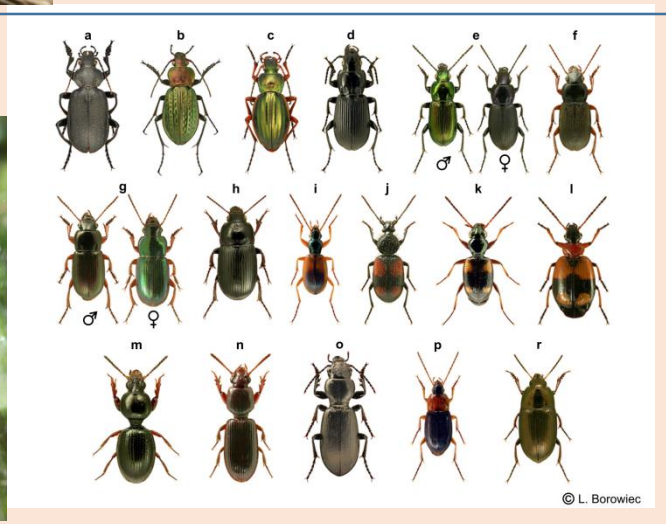
brunatna
zgnilizna
wilgotna
brunatna zgnilizna


Protaetia aeruginosa 9615
www.bio-foto.com

Beneficial arthropods

natural enemies - parasites and predators (also "true seed predators")



Which trophic groups of Carabidae dominate the fields in Poland?

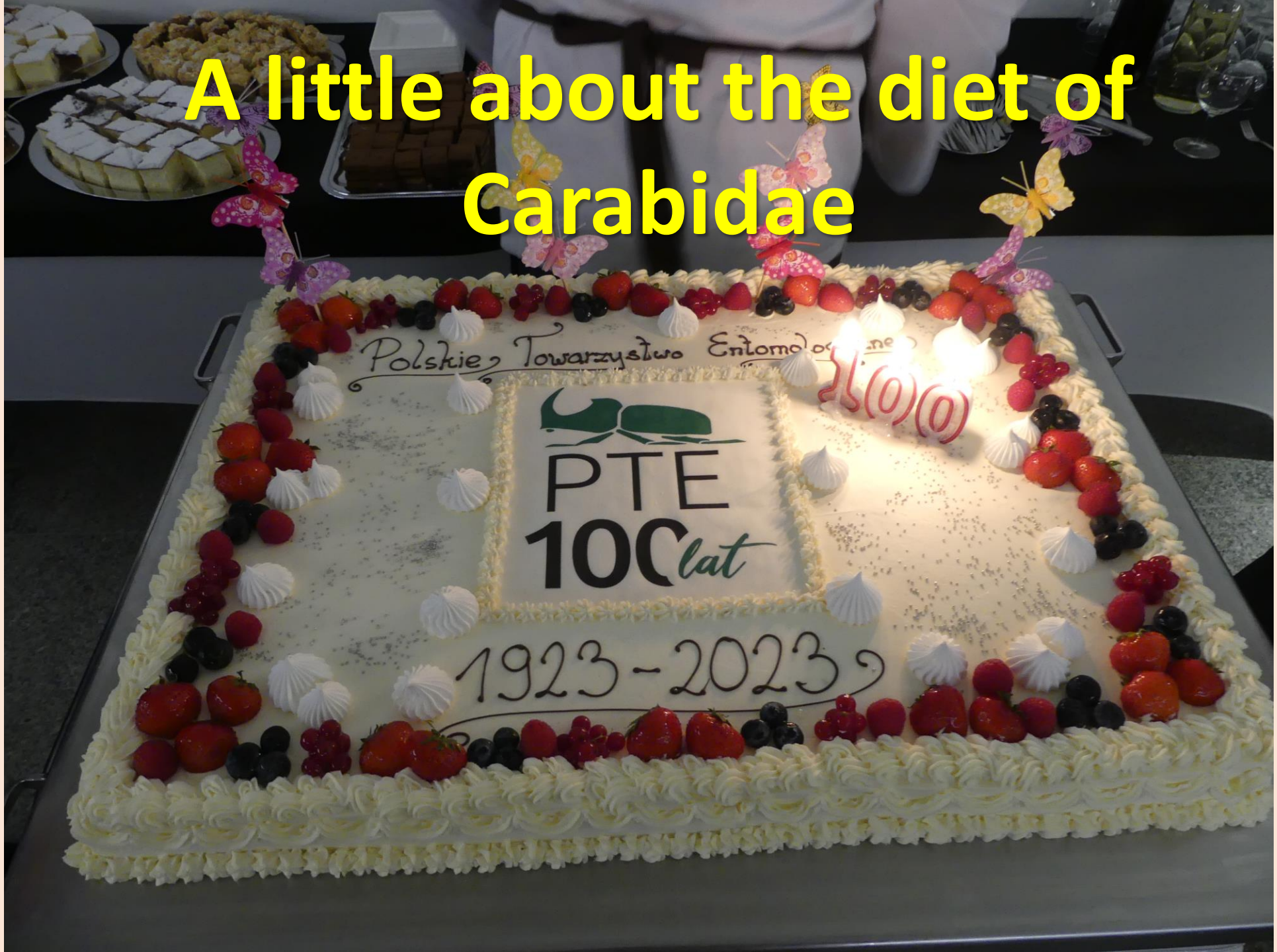
ZOOPHAGES

HEMI(SEMI)ZOOPHAGES

PHYTOPHAGES

Fot. Lech Borowiec

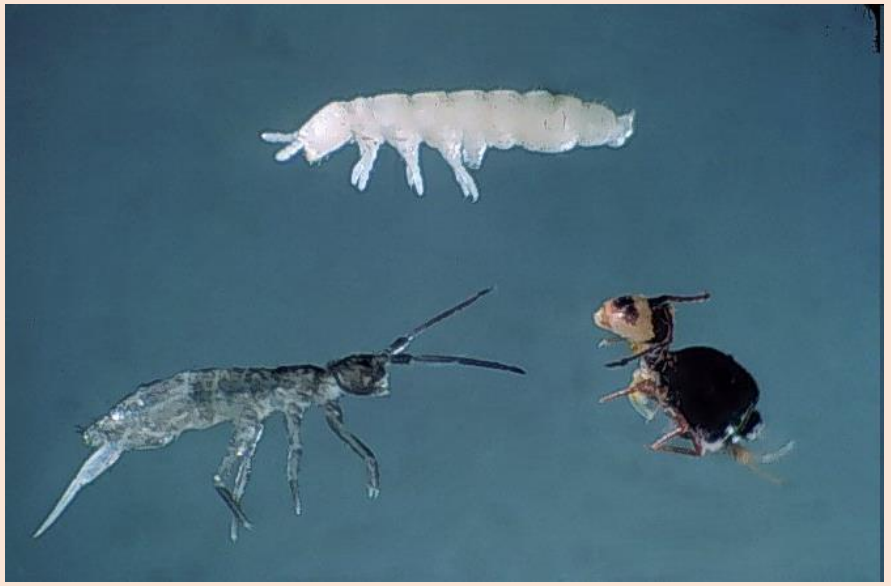
A little about the diet of Carabidae

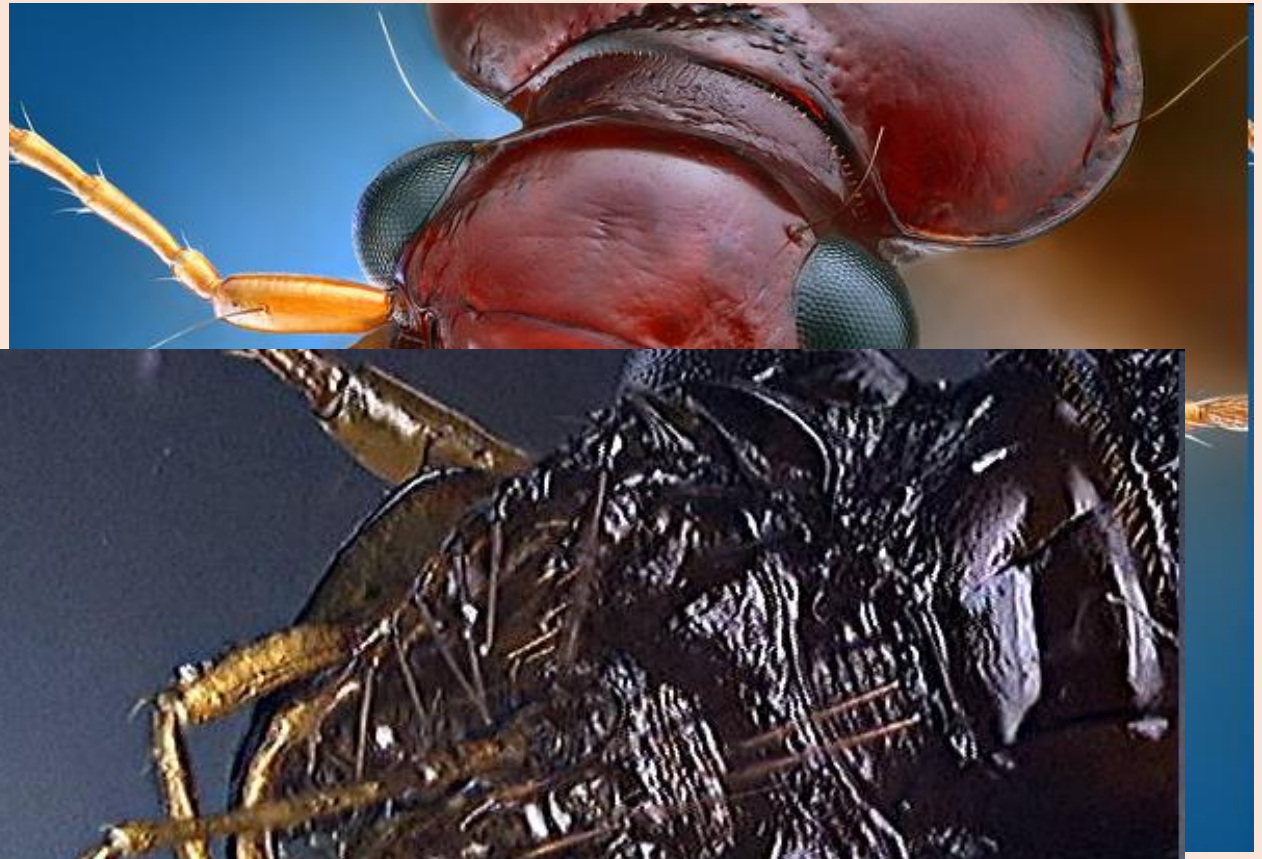


„Molluscs-eaters”

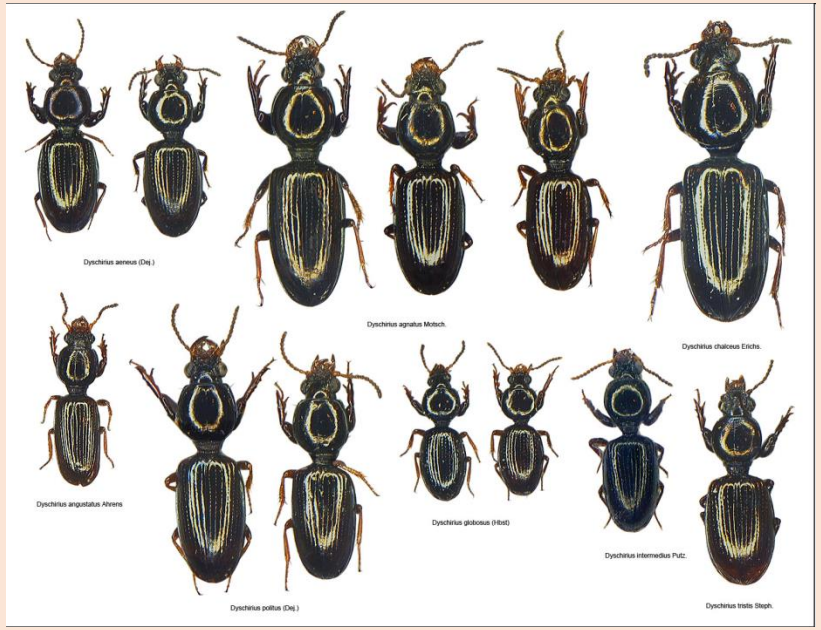
Cychrus caraboides

„Collembola-eaters”





„Bledius-eaters”



Phytophages among predators

Difference in trophic position and resource use between con-specific Carabidae: isotopic study of seven common ground beetles on lake islands

Marcin Zalewski[1,6], Dorota Dudek[1] , Jean-François Godeau[1], Alexei Tiunov[2] , Krzysztof Kujawa[3], Paweł Sienkiewicz[4], Werner Ulrich[5]

[1,6]Centre for Ecological Research Polish Academy of Sciences, Łomianki, Poland, e-mail: zlewek@yahoo.com; [2]Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia; [3]Research Centre for Agricultural and Forest Environment, Polish Academy of Sciences, Kościan, Poland; [4]Department of Entomology and Environmental Protection, Poznań University of Life Sciences, Poznań, Poland; [5]Nicolaus Copernicus University, Toruń, Poland, [6]Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland.

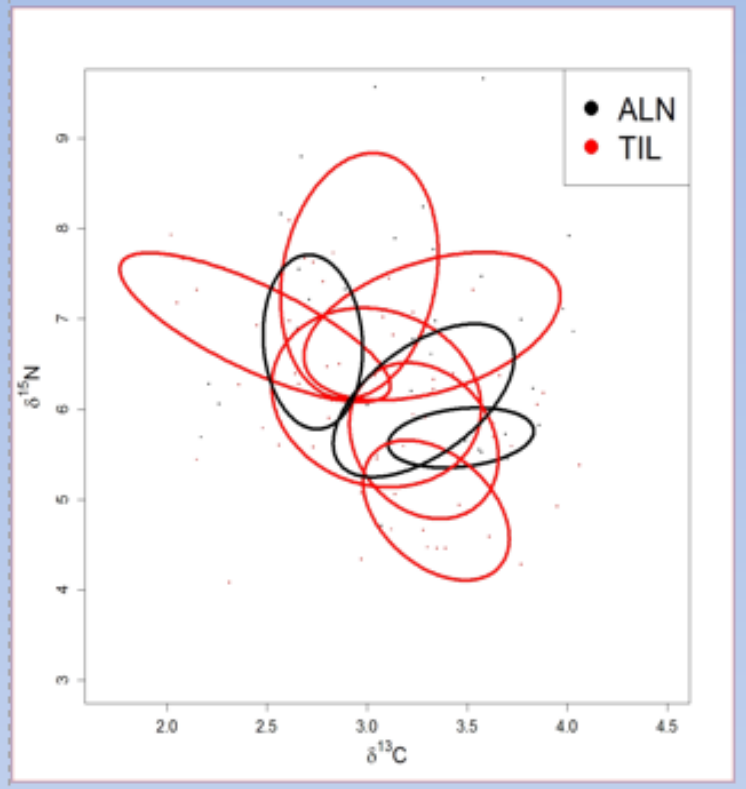
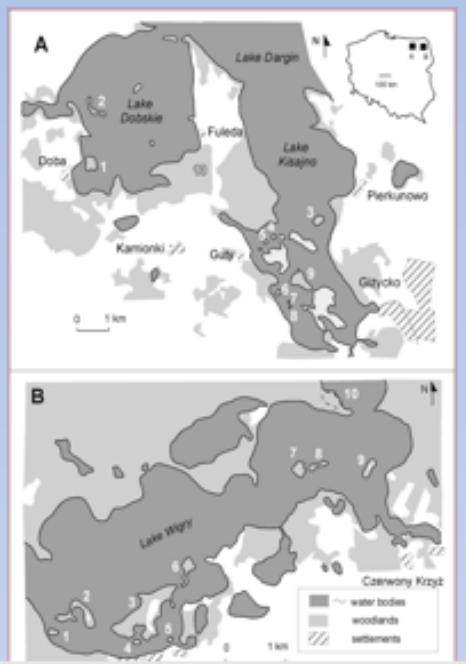


Fig. 2. The variability of isotopic trophic niche space of *Carabus granulatus*. Eigenvalue ellipses of isotopic niche space on different islands dominated by *Alnus* (ALN) and *Tilia* (TIL) (Jackson et al. 2011).

AIM: Ground beetles are commonly considered as generalist predators. However, scale and the meaning of trophic generalism is not well established in this model taxon. Here we study the trophic positions of seven common European species.

METHOD:

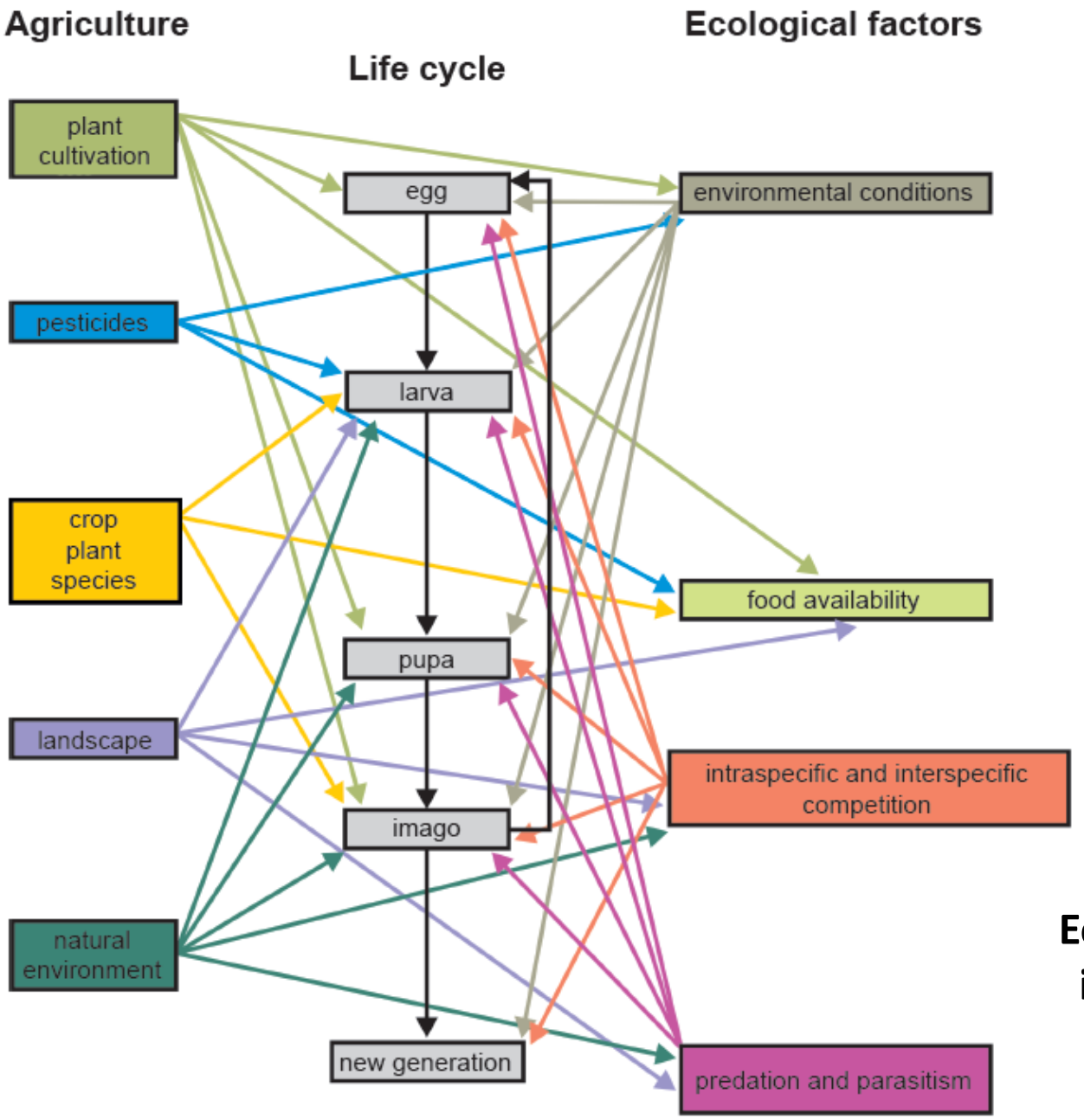
Litter baseline corrected stable isotope ratios ($\delta^{13}C$ and $\delta^{15}N$) were measured for 561 beetles of seven species inhabiting two types of habitat: Alder (ALN) and Lime-Oak



CONCLUSION:

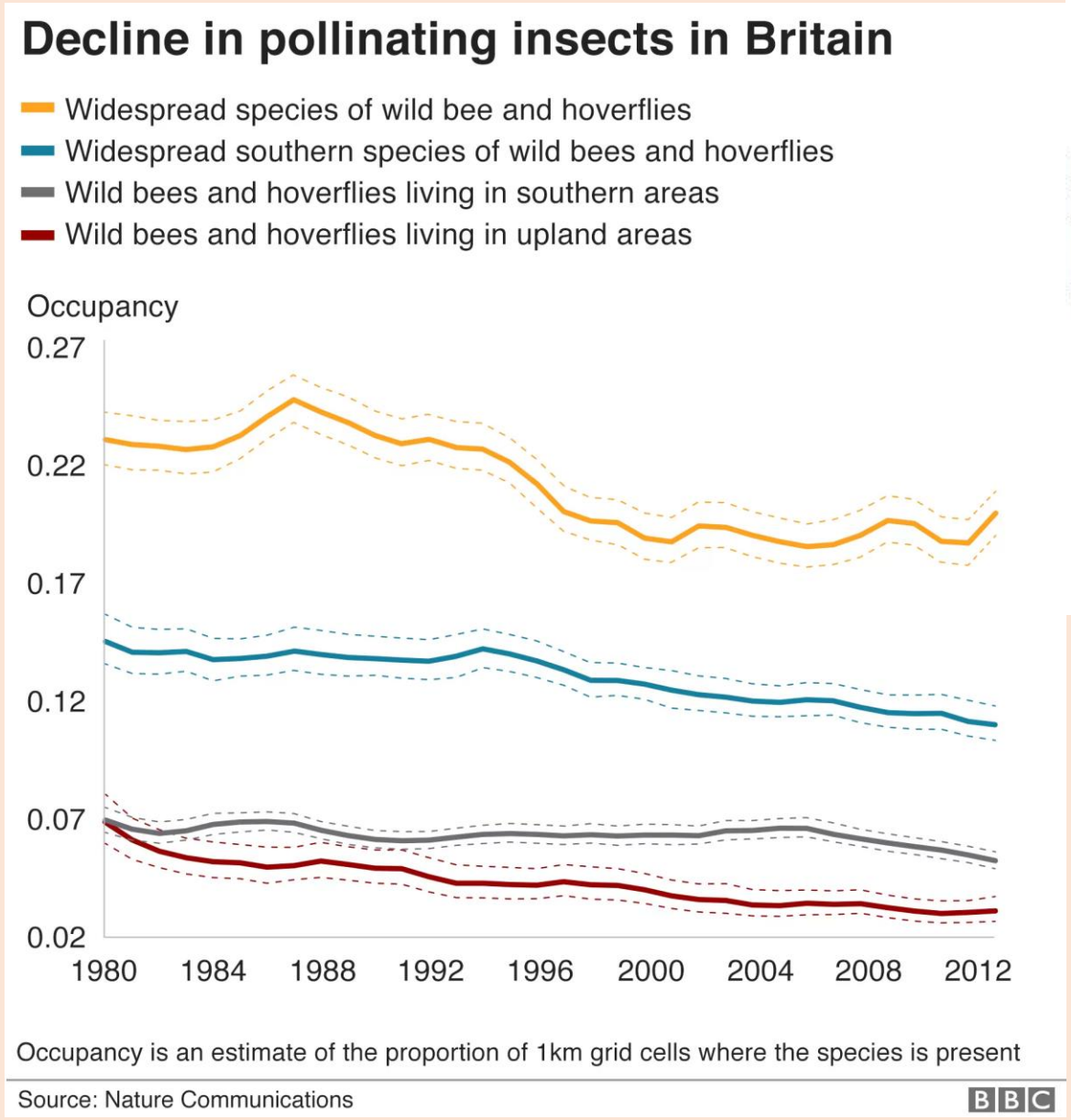
Whereas we expected differences in trophic niches between habitats our results point to local trophic opportunism in common ground beetle species as expressed by isotopic differences between the lake islands of our study. Our results support literature claims that these species can make use of a wide variety of food resources in dependence of local food availability (e. g. Fig 2).

Zalewski, M., Dudek, D., Tiunov, A. V., Godeau, J.-F., Okuzaki, Y., Ikeda, H., Sienkiewicz P. & Ulrich W. (2014): High niche overlap in the stable isotope space of ground beetles. Ann. Zool. Fennici 51: 301–312;



Ecological and anthropogenic factors influencing the life cycle of ground beetles present in arable fields. (According to Holland 2002, modified)

Ground beetles (Carabidae) are voracious slug predators. Slugs transmitted neonicotinoid insecticides, impairing or killing >60% of ground beetles. Photo by Stewart Taylor.



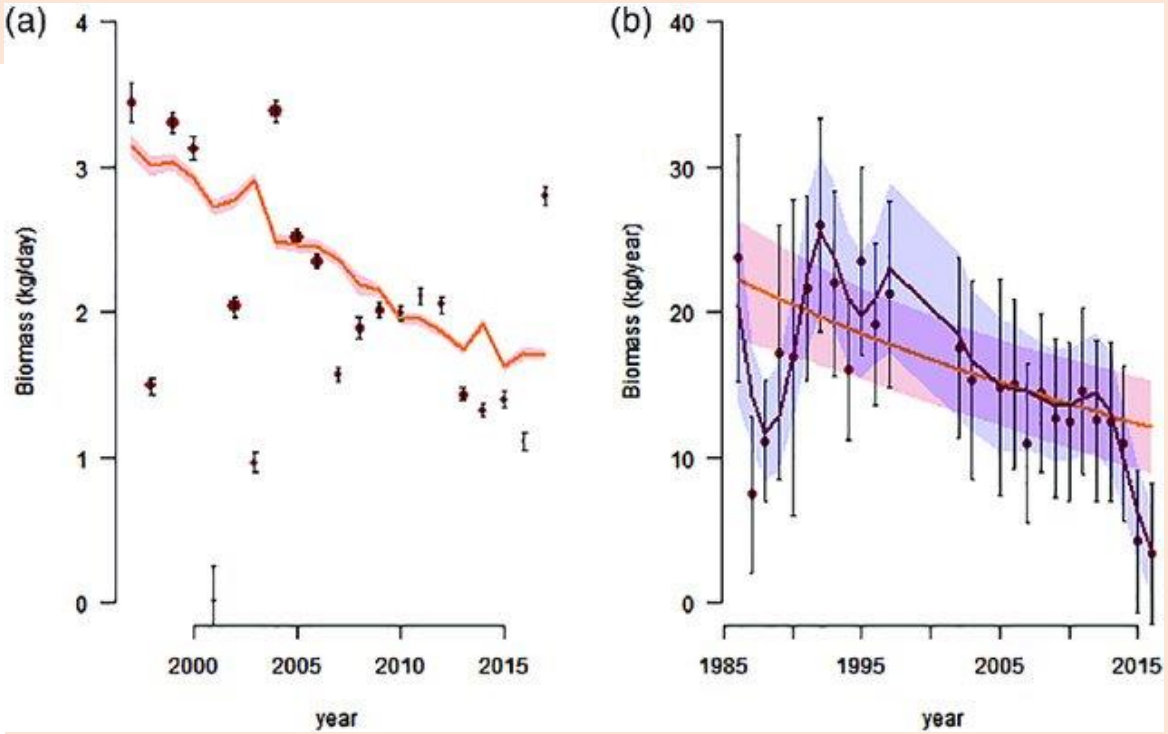


Fig. 5. Biomass trend of (a) macro-moths (Lepidoptera) per trapping night at De Kaaistoep and (b) ground beetles (Coleoptera: Carabidae) per year from pitfalls near Wijster. For each order, the annual indices (points), and estimates of the linear (orange) and non-linear (blue,) trends are given. Evidence for non-linearity is only apparent in Ground beetles, while for the remainder of the macro-moths the estimated trends of the two species are indistinguishable.

Hallmann, C.A.; et all. *Declining abundance of beetles, moths and caddisflies in The Netherlands*. Insect Conserv. Divers. 2020, 13, 127–139 (18)

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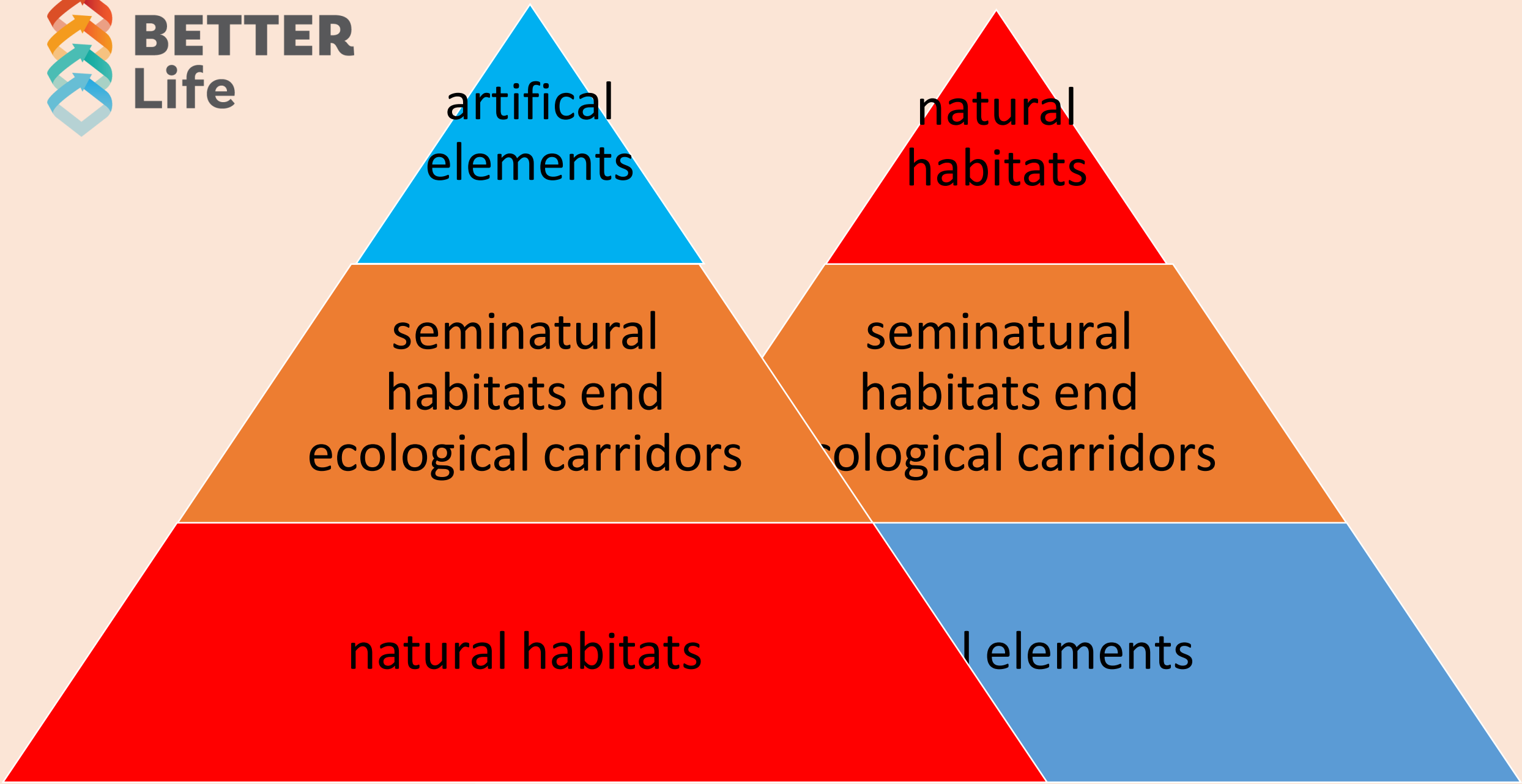
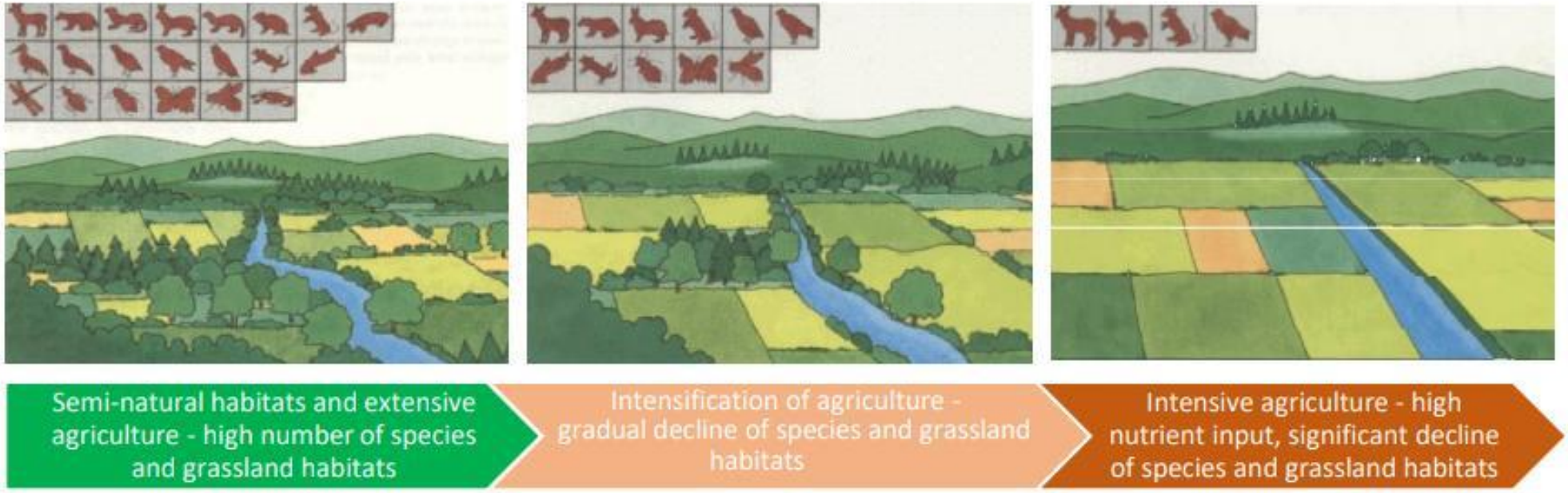

artifical elements
natural habitats
seminatural habitats end ecological carridors
seminatural habitats end ological carridors
natural habitats
l elements

Decreasing biodiversity

Figure 1 – Changes of biodiversity on farmland due to intensification of farmland use



Source: ECA, based on *Landesanstalt für Umweltschutz Baden-Württemberg, Landschaft natürlich* (1992).

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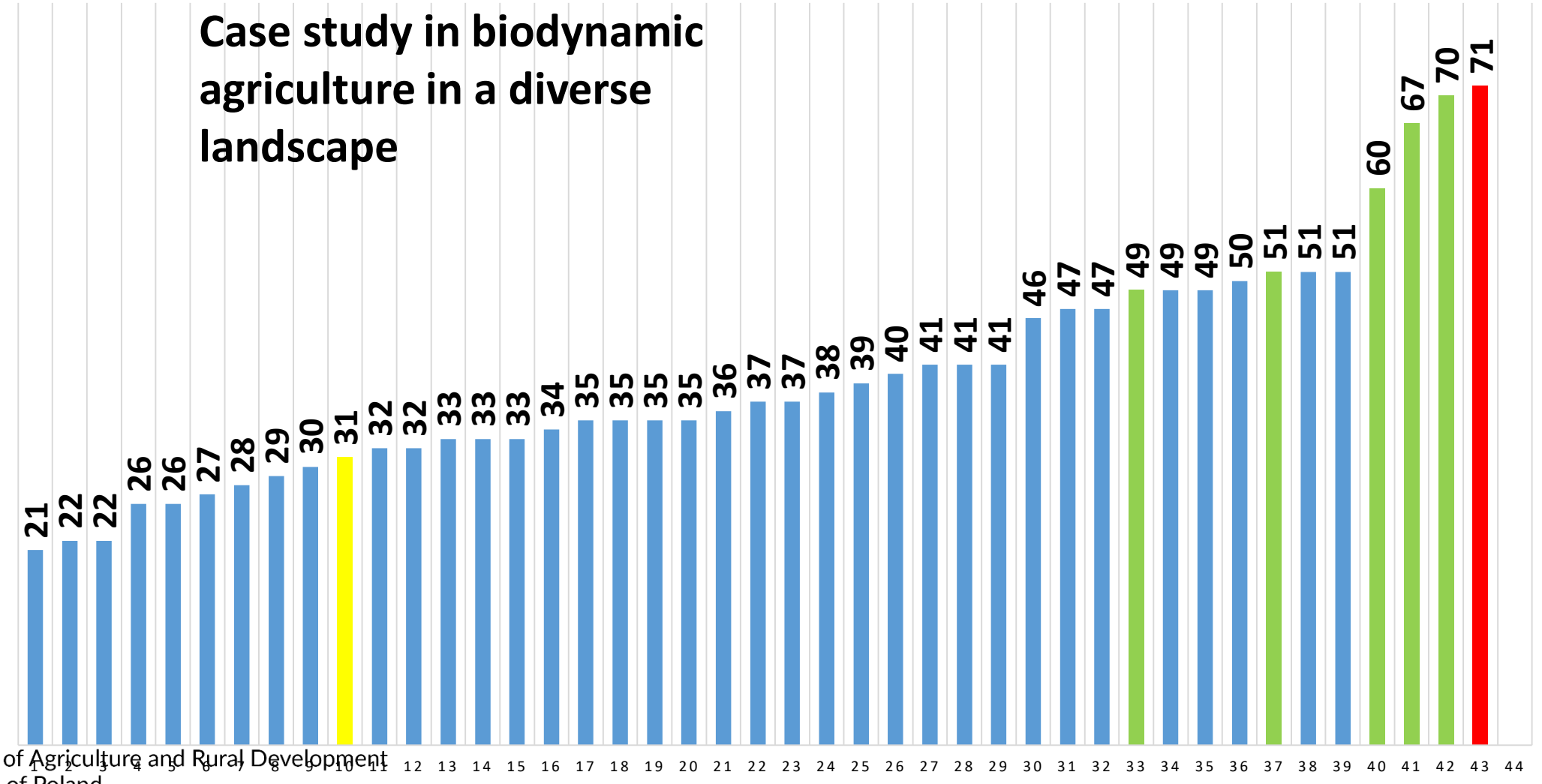
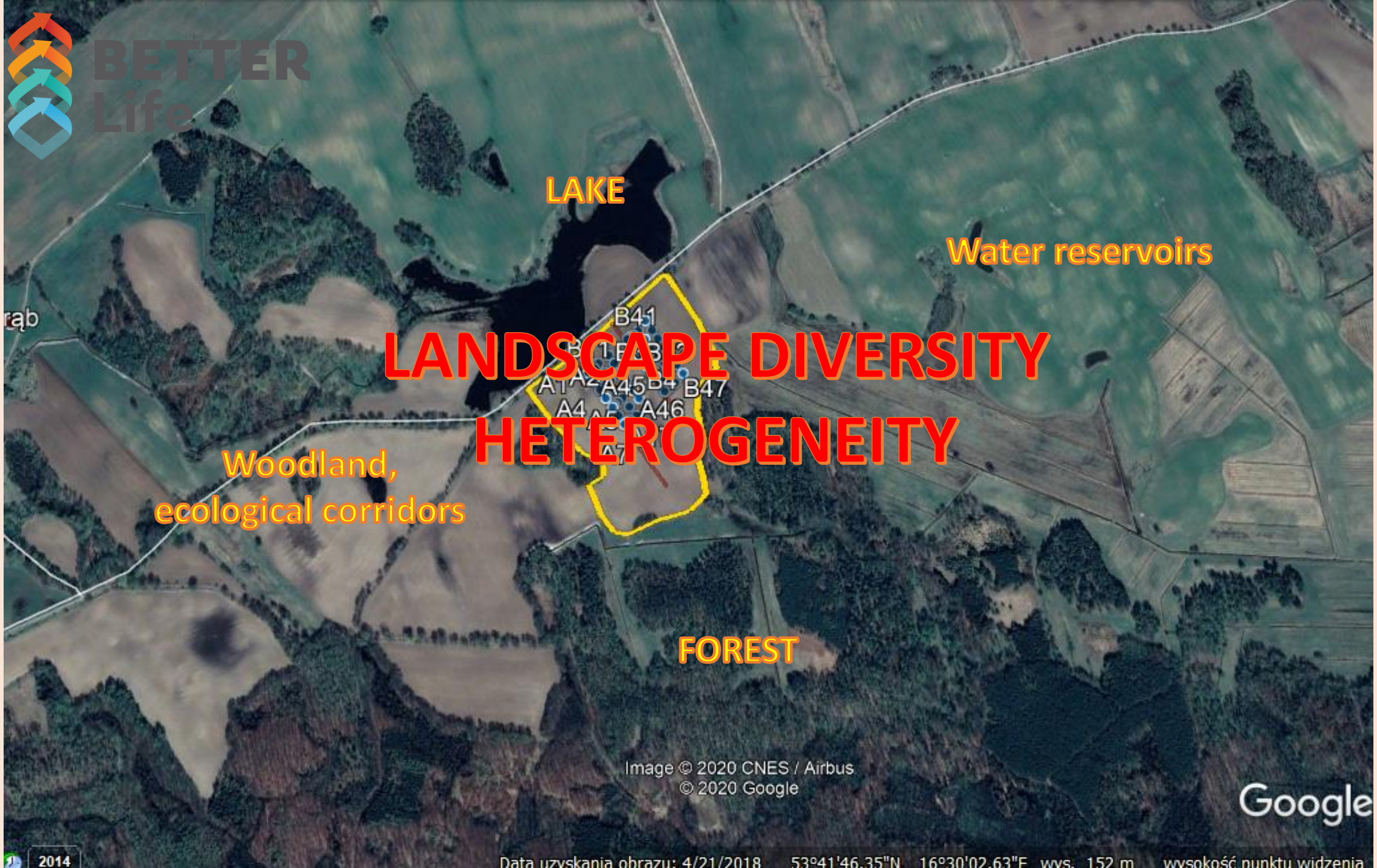
CEREAL CROPS - NUMBER OF CARABID SPECIES




BETTER Life
LAKE
Water reservoirs
LANDSCAPE DIVERSITY
HETEROGENEITY
Woodland,
ecological corridors
FOREST
B41
A45
B47
A46
Image © 2020 CNES / Airbus
© 2020 Google
Google
2014

What we have collected in the rye crop and in the flower strips?

- 15239 specimens
- 75 species!!!

Blemus discus (Fabricius, 1792)

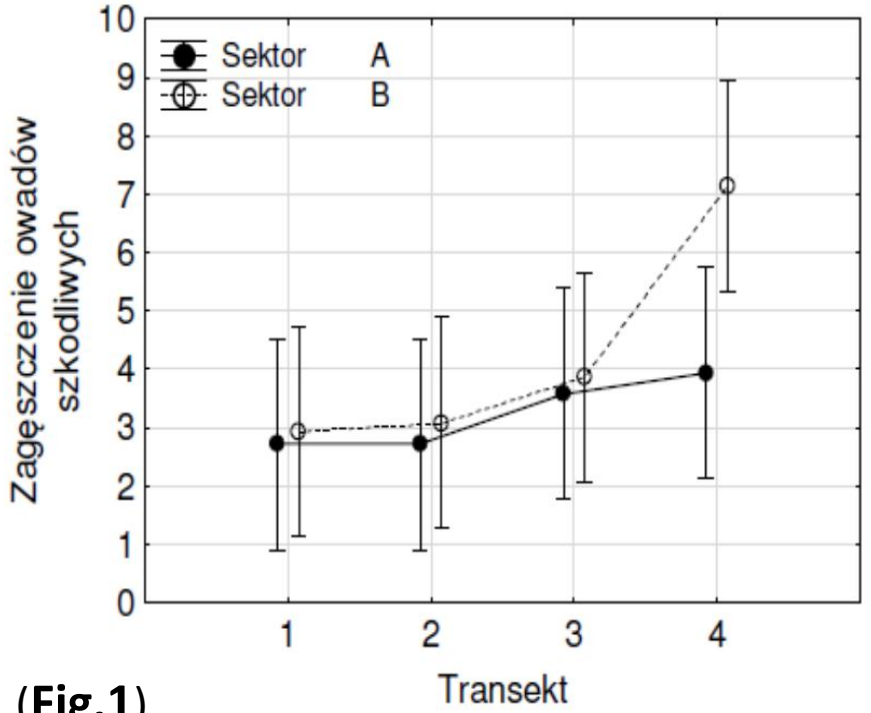
Broscus cephalotes (Linnaeus, 1758)

Trechoblemus micros (J.F.W. Herbst, 1784)

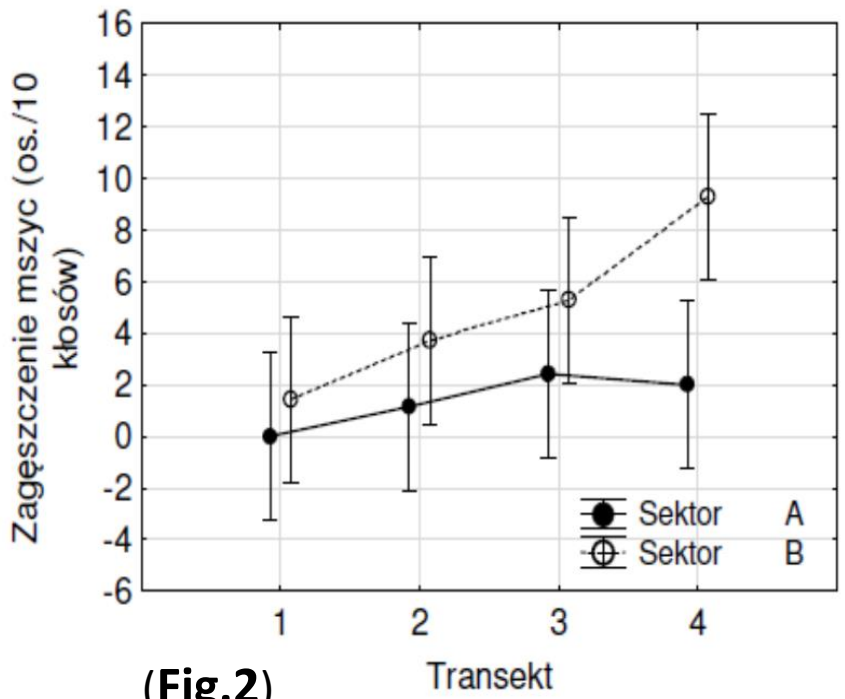
Agonum marginatum (Linnaeus, 1758)

RESULTS - scarce hope?

- The average total **density of pest insects was related to distance from the flower strips, increasing** from about 3 individuals/plant near the strips to an average of 7 away from the strips (Fig.1).
- This was also true for the aphids themselves (Fig.2) The repetition of this pattern in both sectors (A and B) suggests the existence of a mechanism to reduce the density of pest insects near the flower strips.

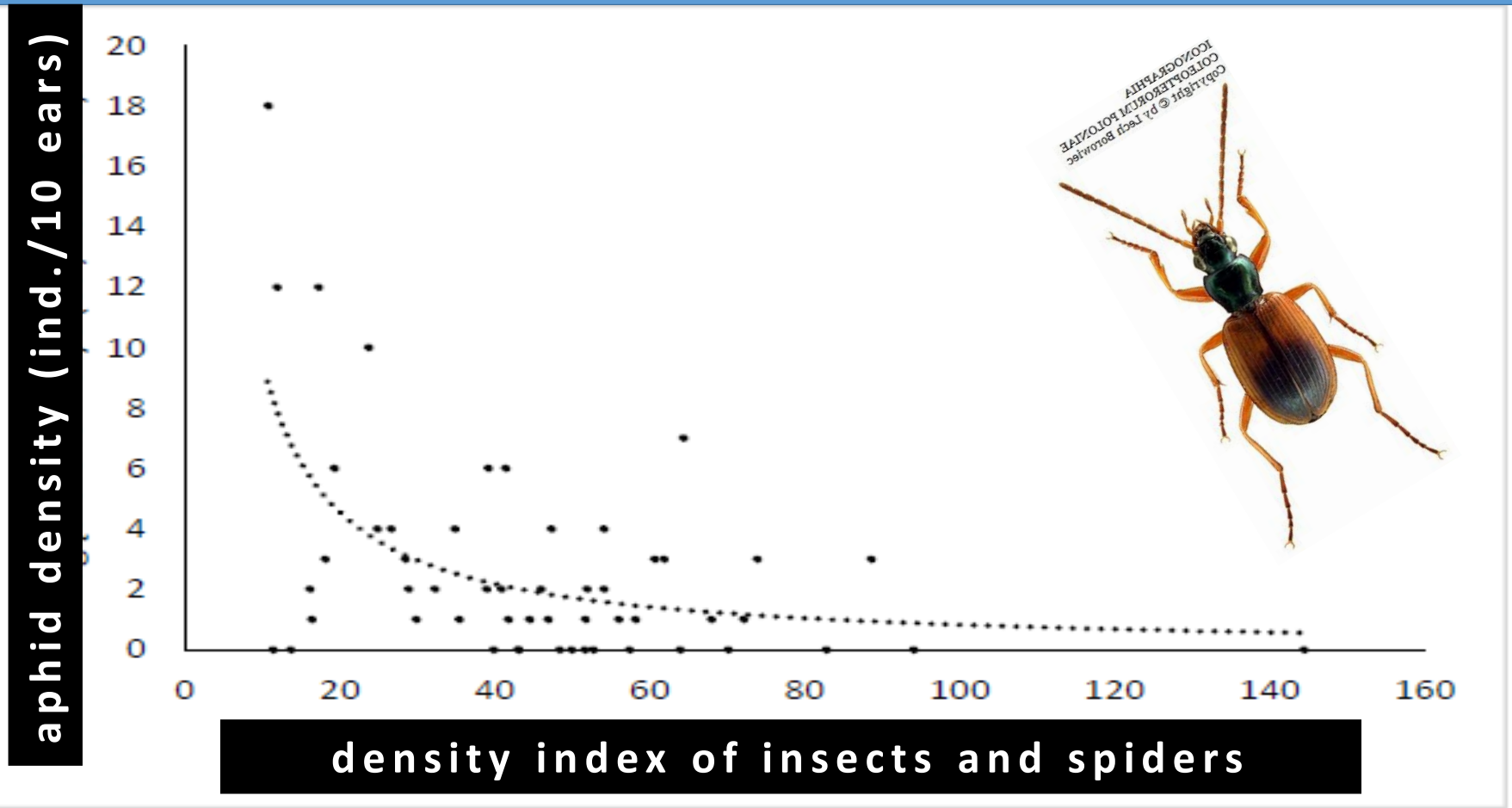


(**Fig.1**)



(**Fig.2**)

A strong indication of a reduction in aphid abundance by predatory insects and spiders is the strong (r=0.58), highly statistically significant (P<0.001) relationship between aphid density and the index of the combined density of predatory insects (runners and others) and spiders. Thus, a mechanism of lowering aphid densities due to the presence of flower strips by maintaining high densities of predatory invertebrates near the strips is likely.



Kujawa K., Bernacki Z., Kowalska J., Kujawa A., Oleszczuk M., Sienkiewicz P., Sobczyk D. 2020, *Agronomy*, 10, 1696

SOLITARY TREES AND SOCIAL BEETLES

ecological analysis of the coleopterofauna of the middle ash tree hollows

SAMOTNE DRZEWA I TOWARZYSKIE CHRZĄSZCZE

analiza ekologiczna koleopterofauny dziupli śródpolnego jesionu

Szymon Konwerski [1], Andrzej Melke [2], Tomasz Rutkowski [1], Paweł Sienkiewicz [3]

[1] Zbiory Przyrodnicze, Wydział Biologii UAM, Poznań [2] ul. Św. Stanisława 11/5, Kalisz [3] Katedra Entomologii i Ochrony Środowiska UP, Poznań

TEREN I METODY BADAŃ: Dolny Śląsk: Głębowice ad Żmigród (XT20), pułapka Barbera w dziupli samotnego jesionu wyniosłego (*Fraxinus excelsior* L.) otoczonego terenem otwartym o charakterze rolniczym; próby pobierane od V 2014 do VI 2016.

WYNIKI: stwierdzono występowanie 115 gatunków chrząszczy (Coleoptera) reprezentujących 29 rodzin, należących do różnych grup ekologicznych:

Skróty wykorzystane w tabeli:

A – związany z żywymi drzewami
G – nidikol
H – synantropijny
N – nekrofilny
d – drapieżnik
f – myrmekofil
k – koprofag
ks – ksylofag
m – mykofag

One, solitary hollow contained:

- 115 species of beetles;
- from many trophic groups;
- pecies associated with open areas and hollows;
- 15 species of Carabidae, mostly predatory;
- 51 species of saproxylobionts;
- 9 nidicolls (associated with burrows or nests);
- 1 ectoparasite;
- 21 rare species.


bounds
ponds
bushes
treebelts
hedges
natural habitats
semi natural habitats
HETEROGENITY
shelter during cultivation;
shelter for wintering;
shelter for developmental stages;
source of food (alternative hosts for parasites, victims for predators, pollen and nectar for pollinators, seed for true seed predators)
natural bank of biodiversity across changed ecosystems
support for ecological balance
ecological corridor

Contents lists available at ScienceDirect

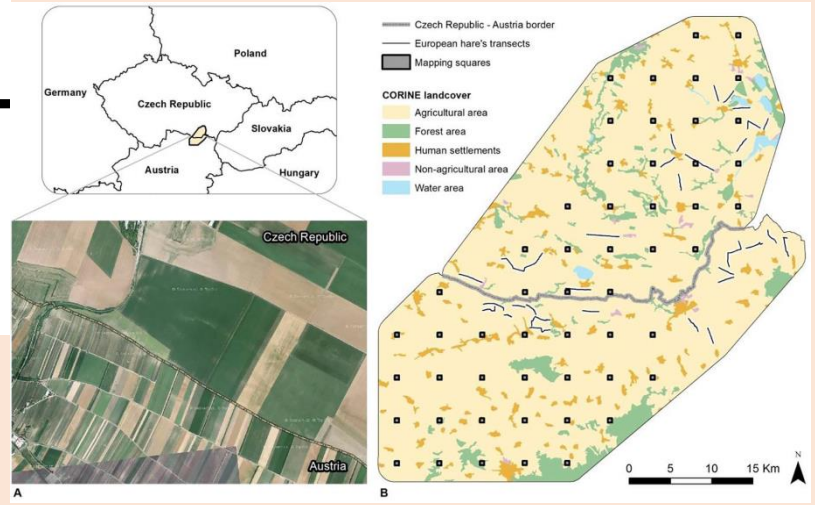
Ecological Indicators

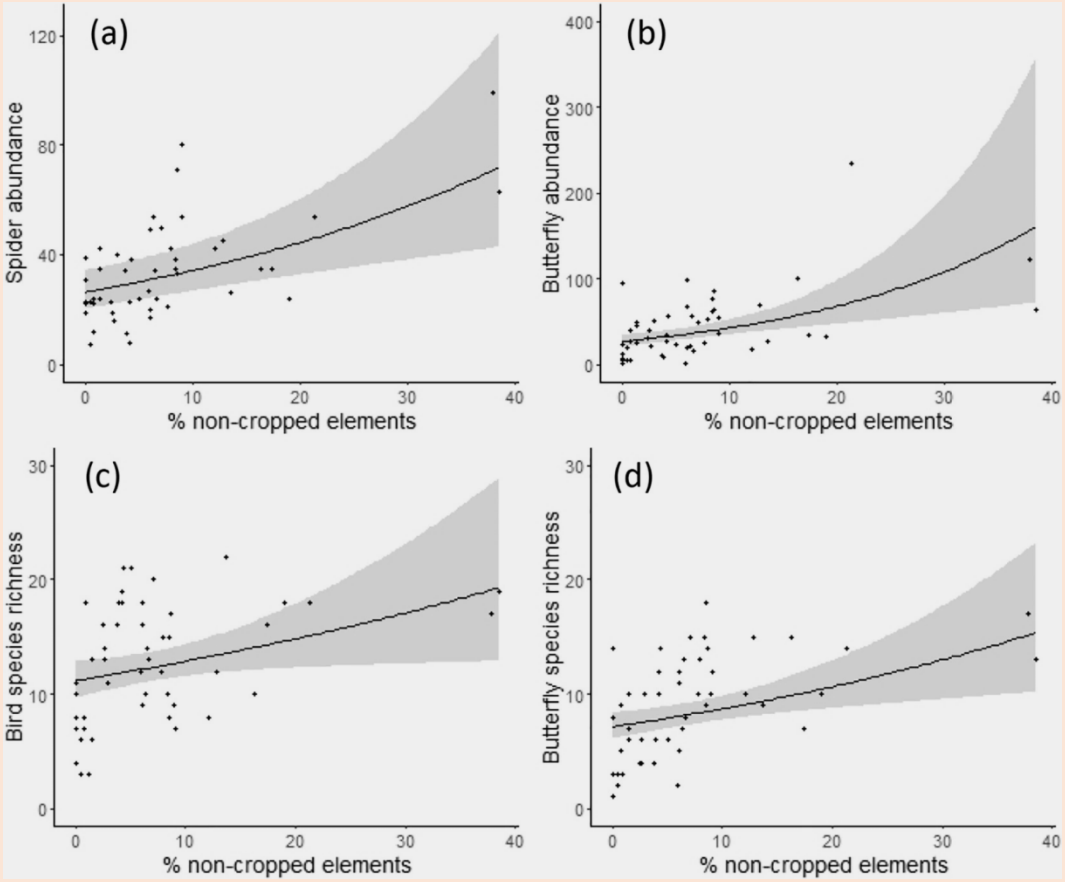
journal homepage: www.elsevier.com/locate/ecolind

Original Articles

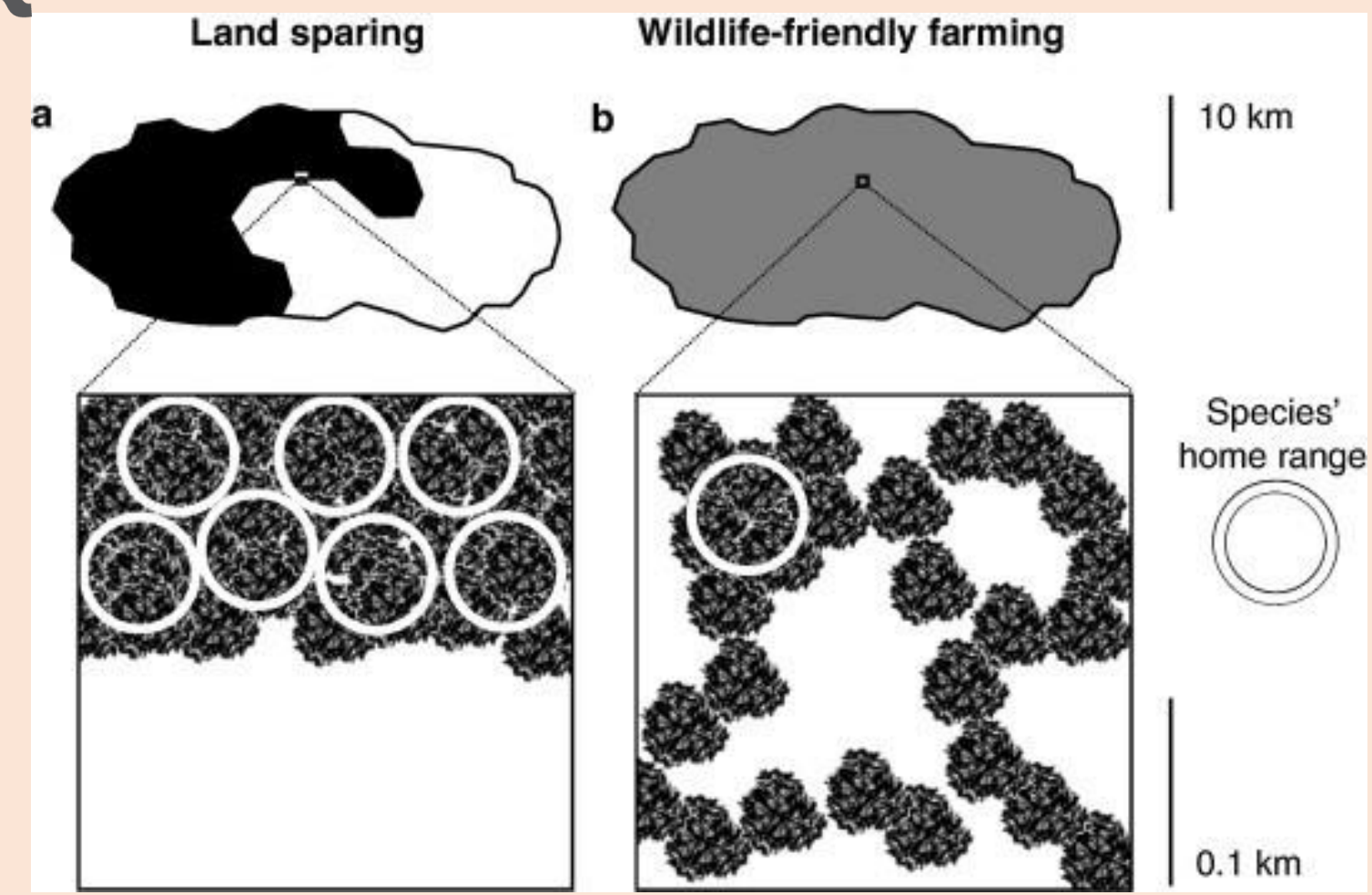
Bringing diversity back to agriculture: Smaller fields and non-crop elements enhance biodiversity in intensively managed arable farmlands

Martin Šálek[a,b,*], Vladimír Hula[c], Marina Kipson[d], Renata Daňková[c], Jana Niedobová[c], Anna Gamero[d]





Significant effects of large-spatial-scale percentage of non-cropped elements on (a) spider abundance, (b) butterfly abundance, (c) bird species richness and (d) butterfly species richness. Dots represent the raw data, lines represent the model predictions based on the corresponding estimates of main effects of the GLMMs presented in Table 2, and bands represent the 95% confidence intervals.



https://conservationbytes.com/2015/10/09/to-spare-or-to-share-that-is-a-muddled-question/ - To spare or to share, that is a muddled question

that would confirm this. There were no human tests that would confirm such pro-health properties of goldenrod honey.

“So far, it has not been proven that goldenrod honey cures any diseases.”

GOLDENROD HONEY - UNHEALTHY FOR NATURE

She added that beekeepers, online stores or even some medical portals increase the demand for goldenrod honey by repeating this unverified information. This, in turn, has an indirect impact on the environment. Goldenrod, from which honey is produced, is a highly invasive plant in Europe, and its impact on biodiversity is definitely unfavourable.

Dr. Lenda said: “Beekeepers should know that goldenrod is not a plant they want. And consumers should be aware that buying goldenrod honey is bad for the environment.

“Nobody has shown before that dietary preferences, marketing of the so-called superfoods and pseudo-medicinal foods, can adversely affect the environment."

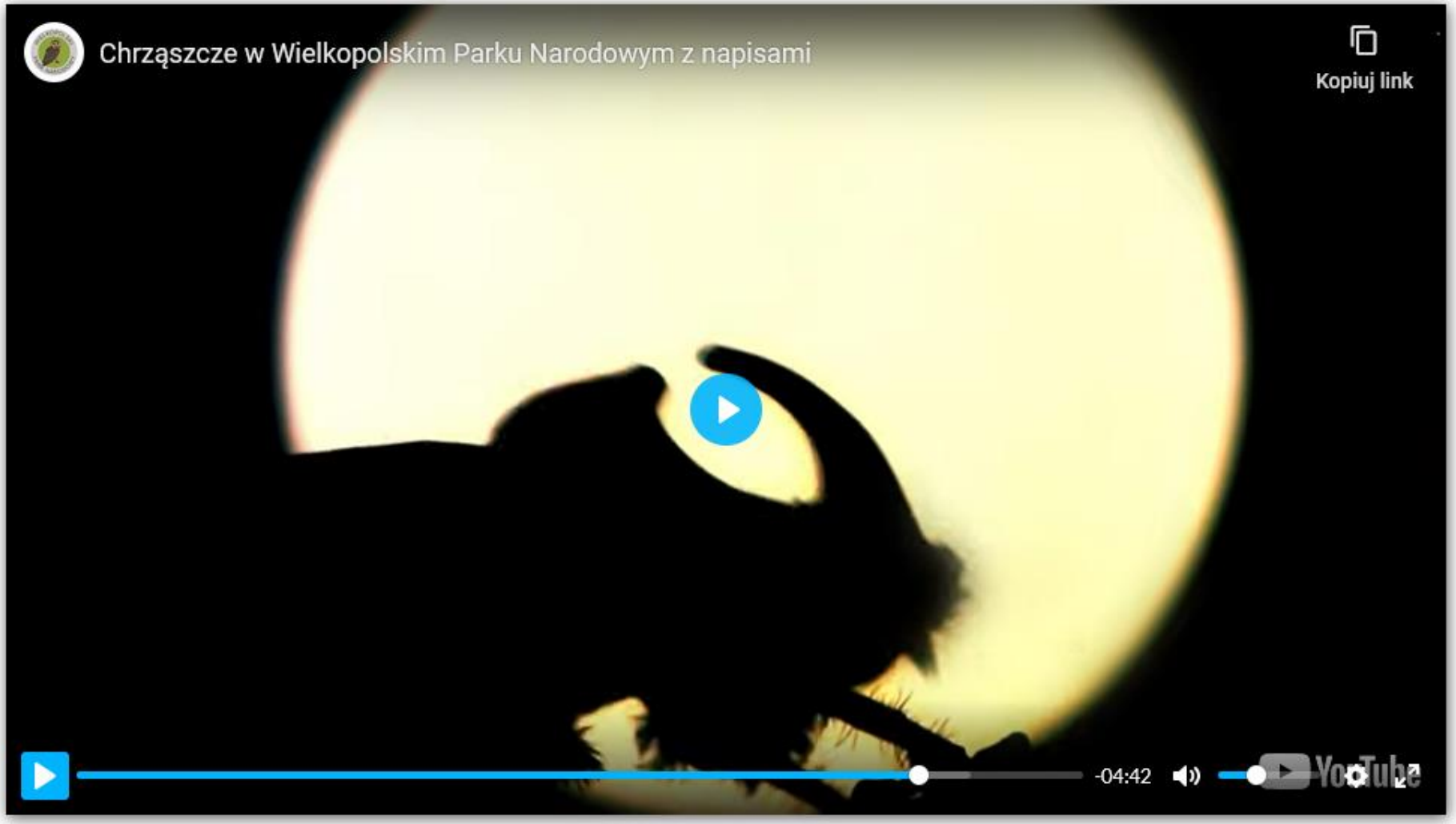
Goldenrod honey harms environment and agriculture, say scientists

https://scienceinpoland.pl/en/news/news%2C85179%2Cgoldenrod-honey-harms-environment-and-agriculture-say-scientists.html

CHRZĄSZCZ BRZMI

INIE NIE BEZ PRZYCZYNY

Jak wziąć udział w projekcie ?



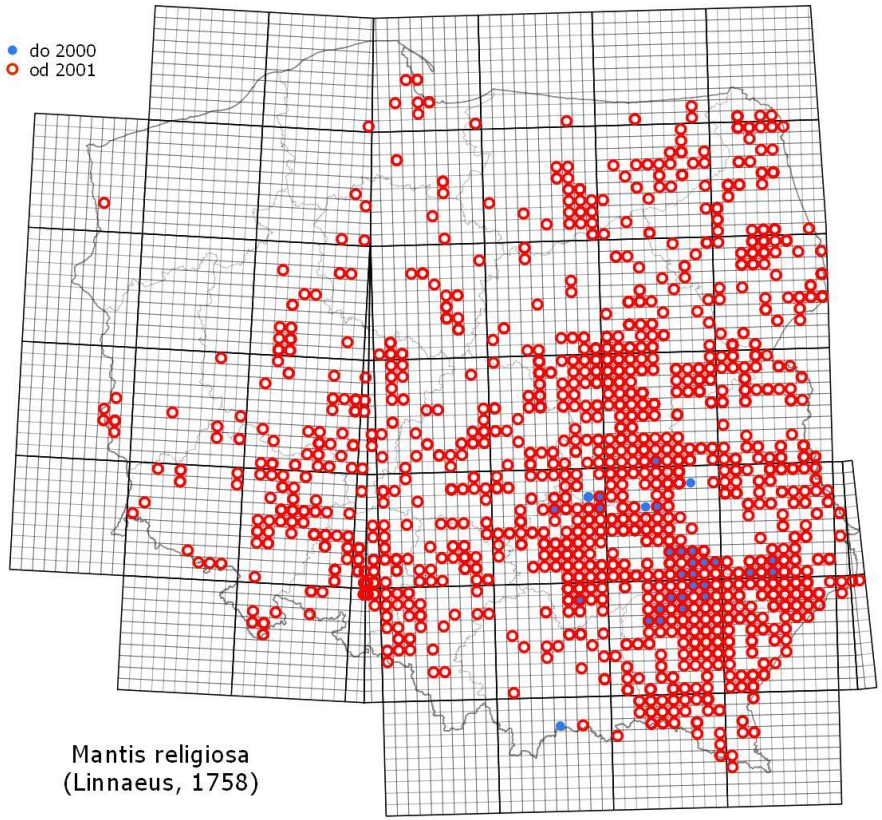
Prostoskrzydłe (Orthoptera) Polski

Szukaj...

Projekt | Gromadzenie danych | Źródła danych | Autorzy danych | Ikonografia | Statystyki | Zagrożone | Prawa autorskie

Prostoskrzydłe Orthoptera | Modliszki Mantodea | Skorki Dermaptera | Karaczany Blattodea

Projekt



https://orthoptera.entomo.pl/index.php

THANK YOU FOR YOUR ATTENTION !!!

What do I have to do with myself?

BETTER Life