

# Monitoring Biodiversity In Novel Low-Input Intercropping Systems for Bio-Based Feedstock



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**EUBCE 2024**

32nd European Biomass Conference & Exhibition

24-27 June | Conference & Exhibition

28 June | Technical Tours

Marseille







Crops are grown in **innovative cropping systems** where annual and perennial crops will co-exist to provide both **low-ILUC feedstock** and **high benefits for biodiversity**

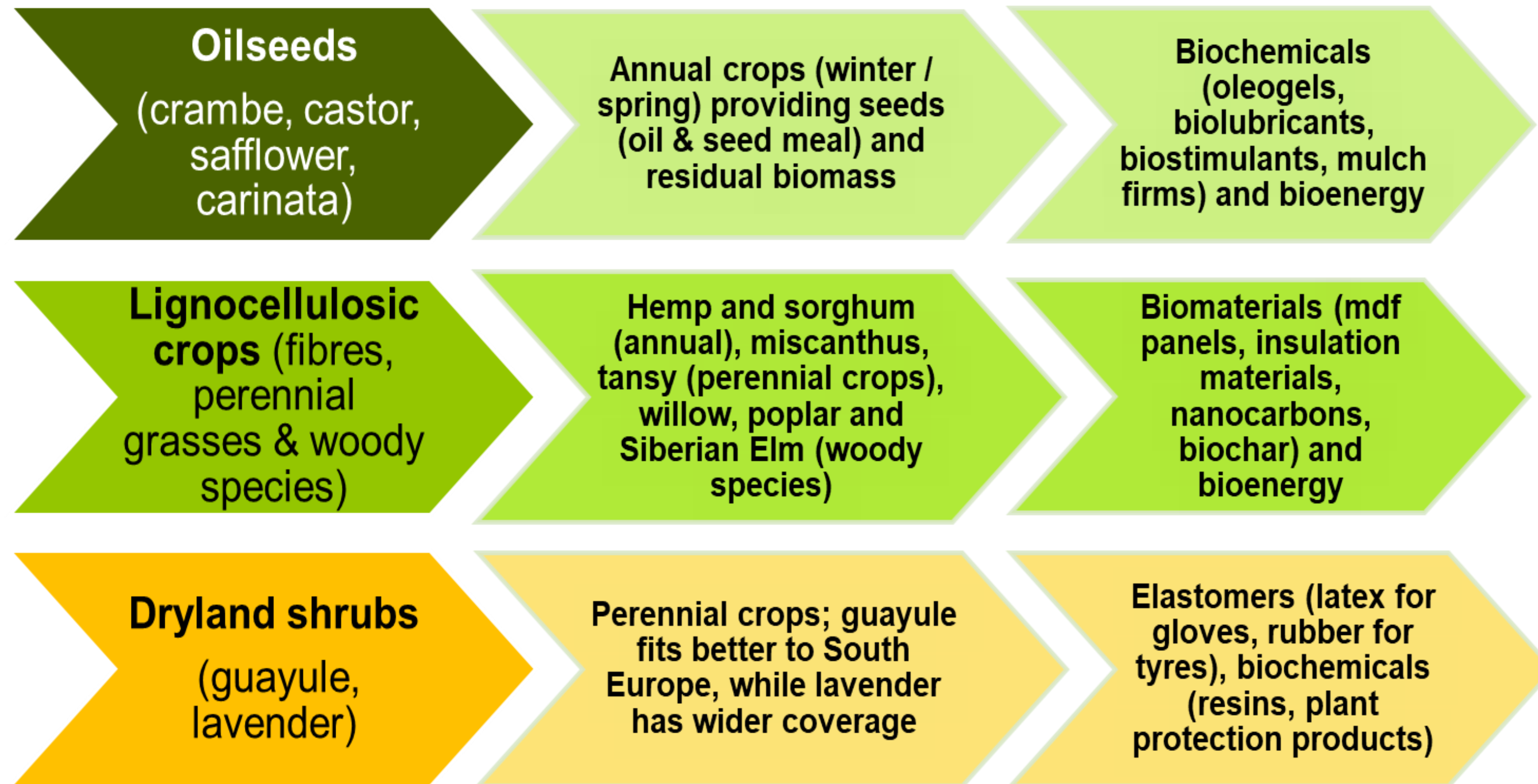


Figure 1: Non-edible crops for MIDAS and uses

Environmental Zone	Agro-ecological Zone (AEZ)
<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #8B4513; border: 1px solid black; margin-right: 5px;"></span> MDM - Mediterranean Mountains</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #FF8C00; border: 1px solid black; margin-right: 5px;"></span> MDN - Mediterranean North</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #FFDAB9; border: 1px solid black; margin-right: 5px;"></span> MDS - Mediterranean South</li> </ul>	1
<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #00B0F0; border: 1px solid black; margin-right: 5px;"></span> ATN - Atlantic North</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></span> ATC - Atlantic Central</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></span> LUS - Lusitanian</li> </ul>	2
<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #2E8B57; border: 1px solid black; margin-right: 5px;"></span> BOR - Boreal</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #32CD32; border: 1px solid black; margin-right: 5px;"></span> CON - Continental</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #7FFFD4; border: 1px solid black; margin-right: 5px;"></span> NEM - Nemoral</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #006400; border: 1px solid black; margin-right: 5px;"></span> PAN - Pannonian</li> </ul>	3

<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFFF00; border: 1px solid black; margin-right: 5px;"></span> Partners responsible for the case studies	<span style="display: inline-block; width: 15px; height: 10px; background-color: #FF4500; border: 1px solid black; margin-right: 5px;"></span> Partner responsible for a replication case
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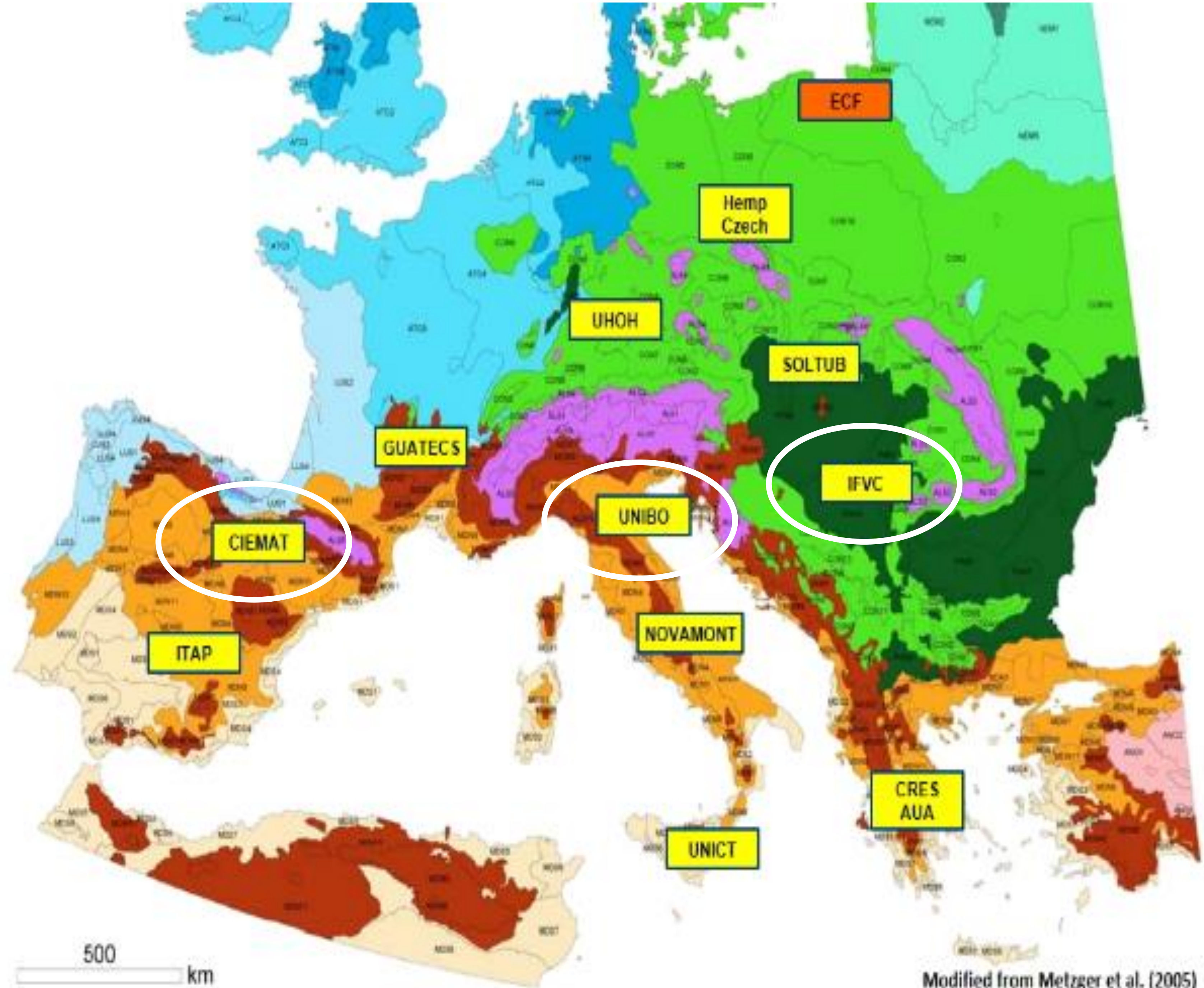
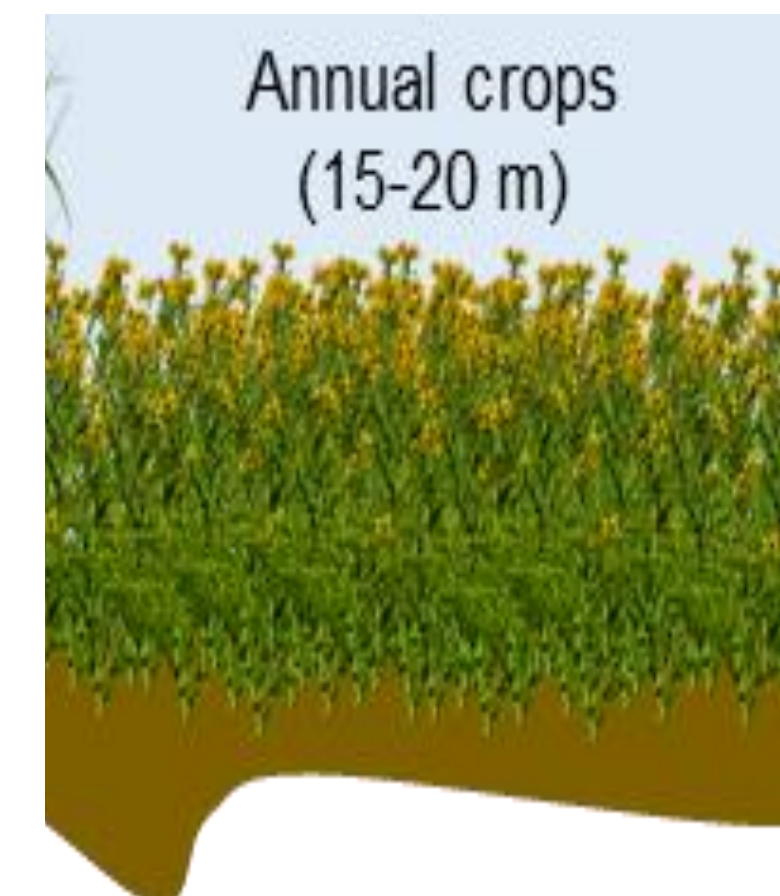


Figure X: Case studies in 9 countries (15 sites) focusing on Med region and central Europe and a replication case in north Poland.

Modified from Metzger et al. (2005)

## A diverse landscape results in a high biodiversity (at the right scale)

- Microhabitat
- Microclimate
- Plant and flower diversity



# **Does intercropping (strip cropping) of non-edible crops on marginal lands increase biodiversity?**

# Method

- 3 countries
- 2 Strip cropping fields + 2 traditional fields
- At each field:
  - Measure flower diversity
    - Species richness
    - Flower abundance
    - Flower surface
  - Measure insect biodiversity
    - Flying insects
    - Pollinators
    - Ground dwelling insects

## Malaise traps: flying insects

1 per field (4 per country),  
5 days per year







**vidas**

al lands, industrial crops  
tive bio-based value chains

## Pitfall traps: ground-dwelling insects

6 per field

5 days per field per year

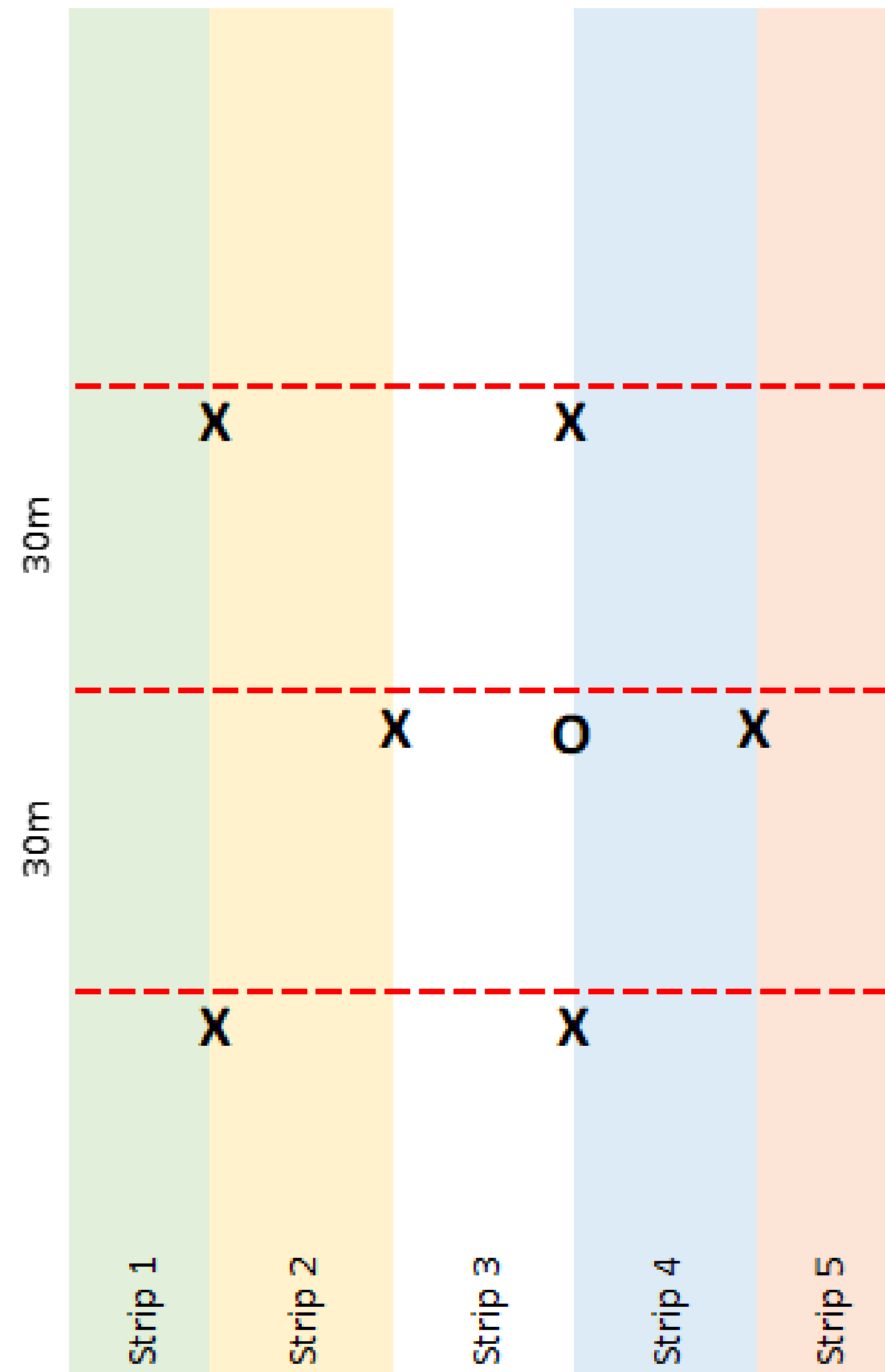


**Sweep netting: pollinators**  
3 transects (25m) per field





# Method



--- 25m Transect (hand net + flower counts)

**X** Pitfall trap

**O** Malaisetraps

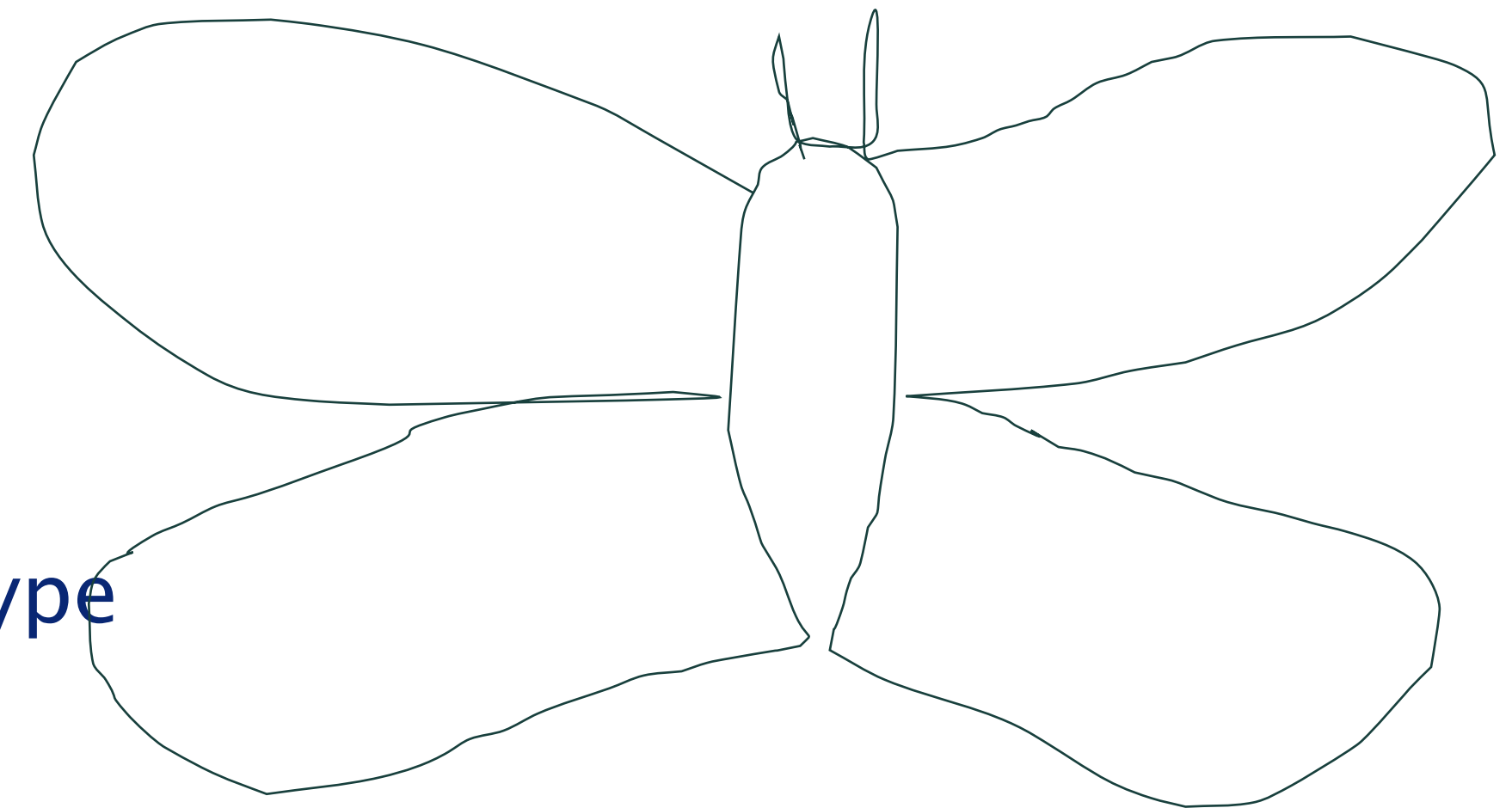
# Insect identification

Total biomass (wet weight) per trap

Identification: DNA extraction + PCR per field per trap type

- 1 Malaise trap
- 6 pitfall traps
- 3 sweep net transects

Species richness, not abundance!



Location	Strip cropping	Traditional crop rotation
2023		
Serbia, IFVC	Perennial (miscanthus) Annual (crambe, safflower and hemp or castor in rotation)	Maize
Italy, UNIBO	Perennial (miscanthus) Annual (crambe, safflower and hemp)	Alfalfa
Spain, CIEMAT	Annual (crambe, safflower and Melilotus officinalis 1 <sup>st</sup> year in rotation) Perennial Lavender	Cereal (wheat)
2024		
Serbia, IFVC	Miscanthus, Safflower, Crambe Sorghum, Castor	Barley
Italy, UNIBO	Perennial (miscanthus) Annual (crambe, safflower and hemp)	Alfalfa
Spain, CIEMAT	Rotation (crambe, safflower and Melilotus officinalis (1 <sup>st</sup> /2 <sup>nd</sup> year in rotation) Perennial Lavender	Sunflower or fallow
2025		
Serbia, IFVC		
Italy, UNIBO		
Spain, CIEMAT		



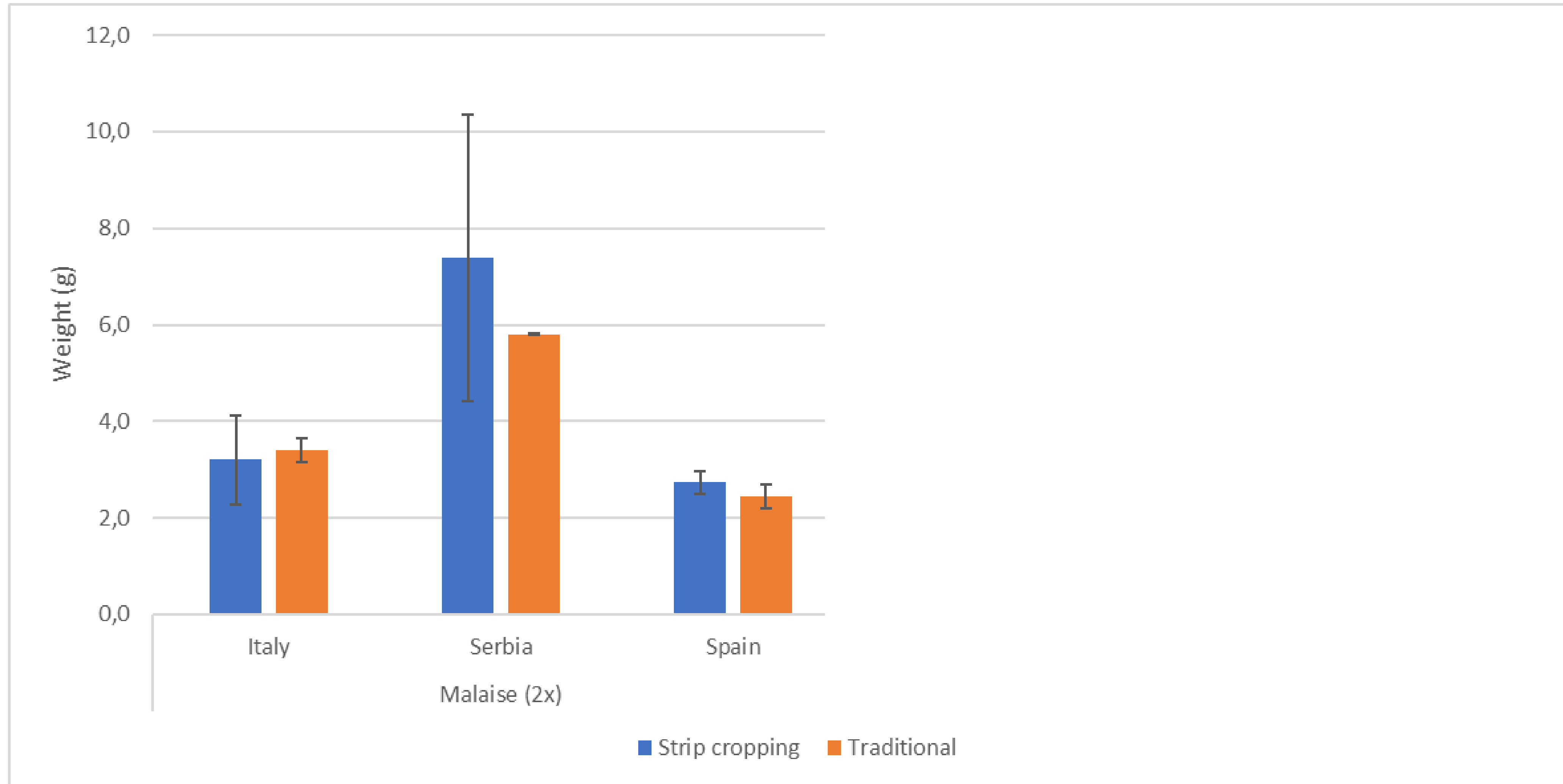
**vidas**

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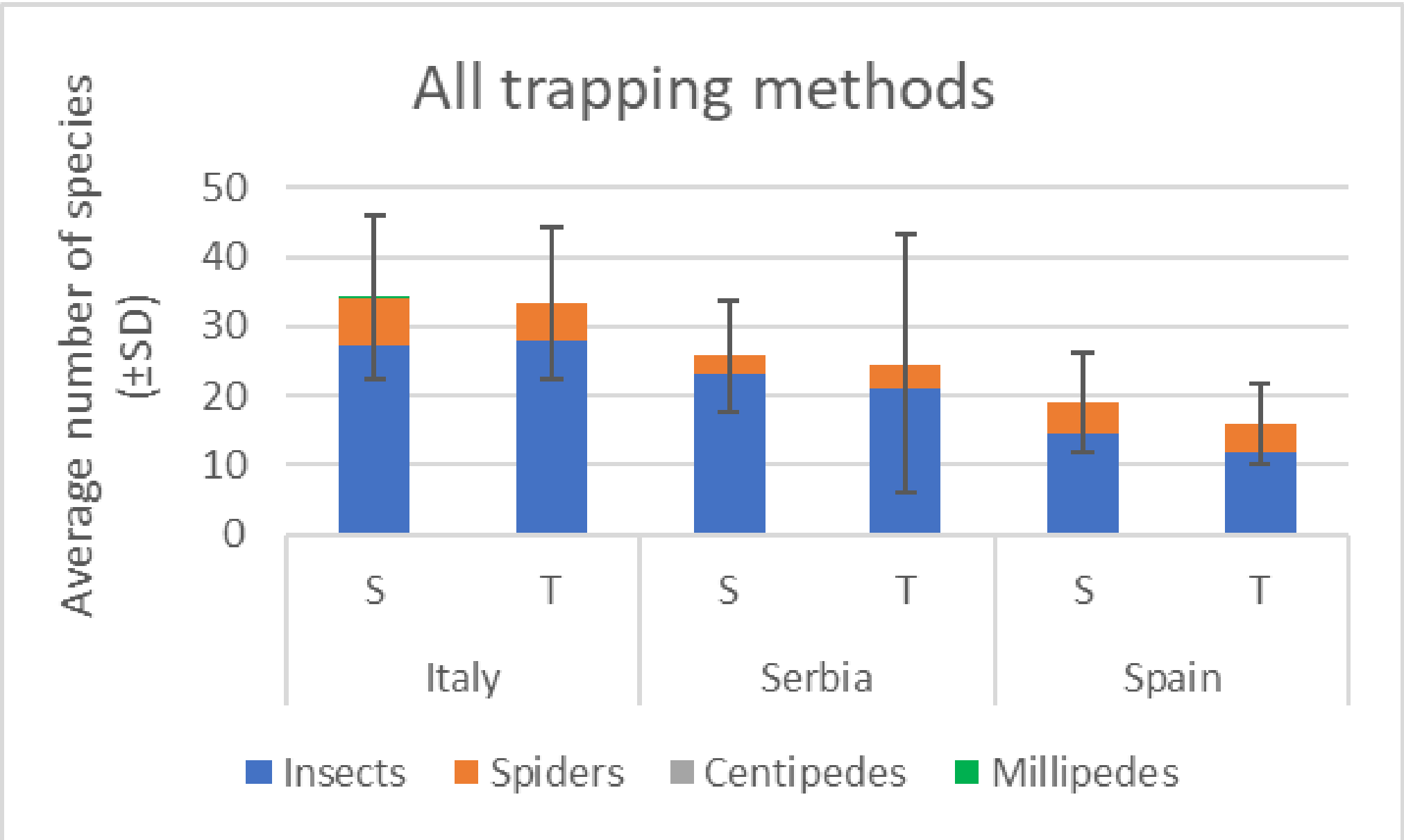


# (Preliminary) results

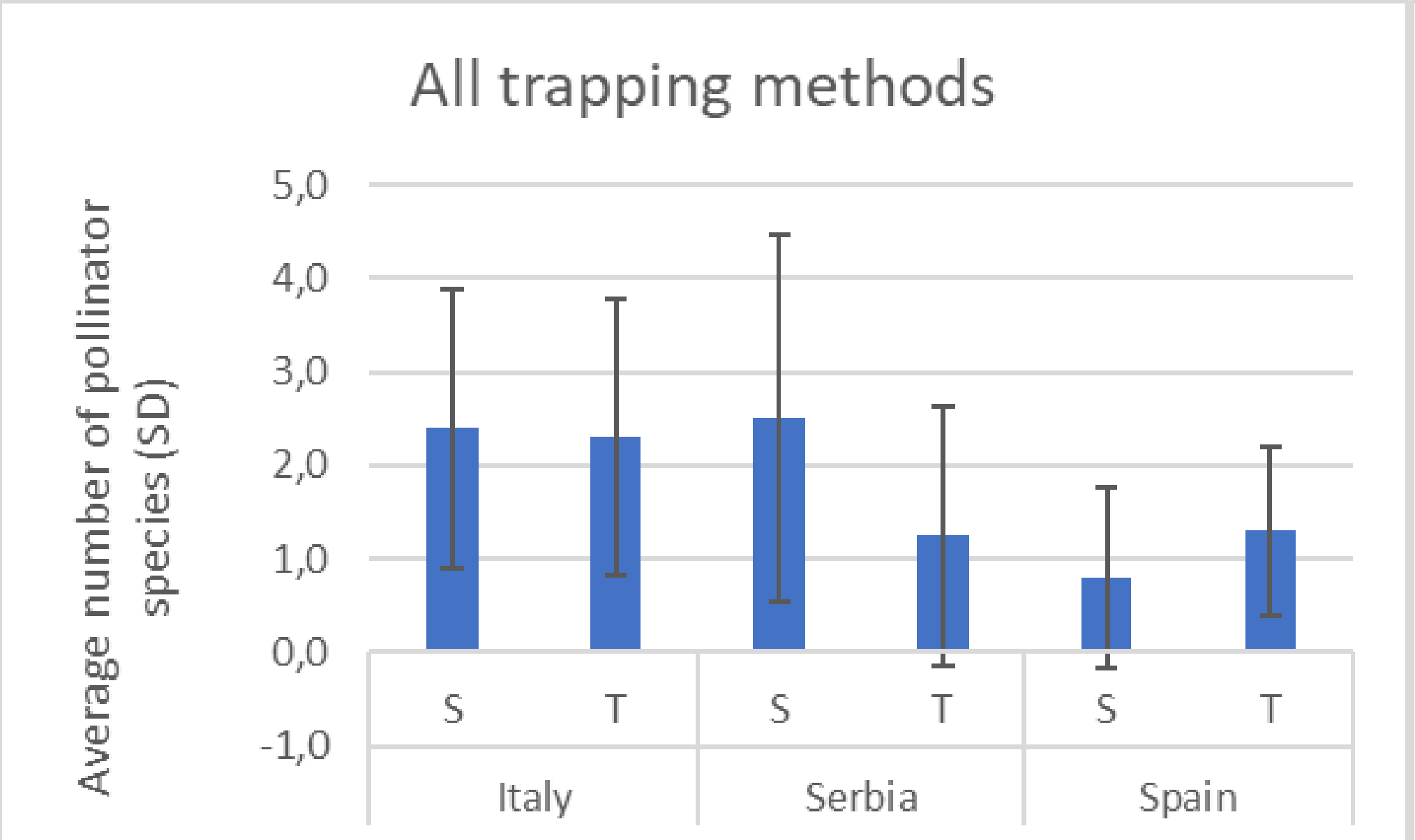
601 unique species (497 insects + 85 spiders + Few centipedes and millipedes)



# Species richness (All invertebrates)



# Pollinators



## Discussion

- Further (statistical) analysis
- Rare species
- Sampling period and duration (flowering period of strips vs traditional crops)



**Serbia:**

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Z. Milovac  
F. Franeta

**Spain:**

L.S. Esteban  
C. Martin Sastre  
S. Soria Franco  
M. Sanz  
C. Sixto Ciria Ramos  
J. Pérez



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