

The cleptoparasitic bees (Apoidea, Anthophila) from Latium: ecology, behaviour and morphological adaptations

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Introduction

Apoidea Anthophila → monophyletic clade



- Andrenidae
- Apidae
- Colletidae
- Halictidae
- Megachilidae
- Melittidae



Italy has one of the richest wild bee faunas relative to its land area with well over 1000 confirmed species and more than 100 endemic taxa



The knowledge of many ecological aspects of the wild bees in Italy is still limited

Introduction

Cleptoparasitic bees are a poorly known group of insects

254 species in Italy:

Apidae (11 genera, 175 species);
Megachilidae (3 genera, 36 species);
Halictidae (1 genus, 43 species).



Introduction

Cleptoparasitic bees are a poorly known group of insects



Introduction

Cleptoparasitic bees are a poorly known group of insects



- Less common in urban ecosystems
- Could be indicator taxa for assessing bee communities



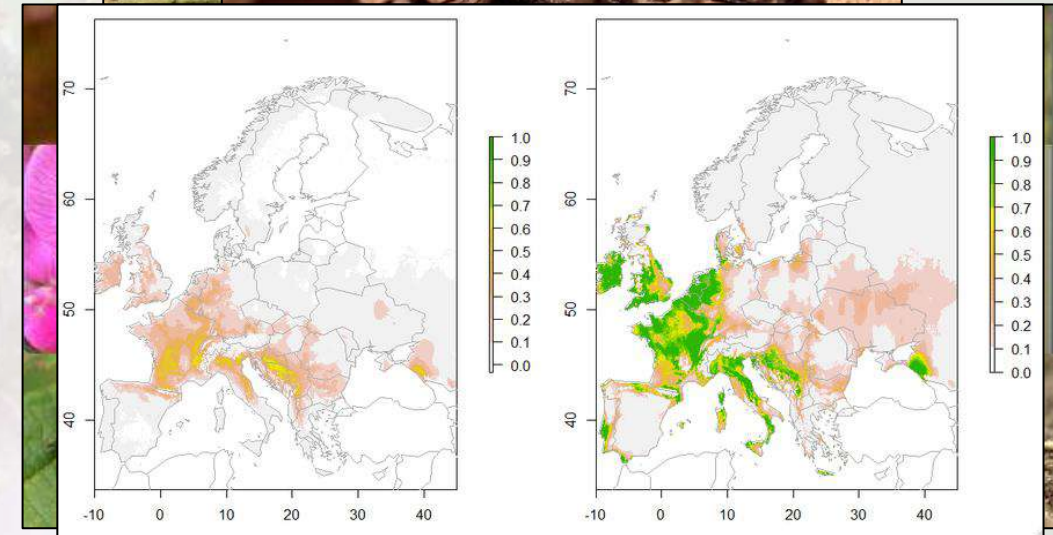
Significant knowledge gaps hampering the effectiveness of conservation efforts



Project aim and objectives

Study the ecological, behavioural and morphological adaptations of cleptoparasitic bees

- Characterizing the effect of habitat at different spatial scales on the diversity of cleptoparasitic bee species and their pollination role
- Investigating behaviour, morphological adaptations and strategies of parasitism
- Investigating the relationship between cleptoparasitic bees, their host species and the wild bee community
- Building Species Distribution Models (SDM) for target cleptoparasitic species to assess their ecological niches and predict potential distribution patterns in Europe



Materials and methods

Characterizing effect of habitat at different spatial scales on the diversity of cleptoparasitic bee species and their pollination role

Four protected areas where the presence of cleptoparasitic bees has been recorded



Three different habitat



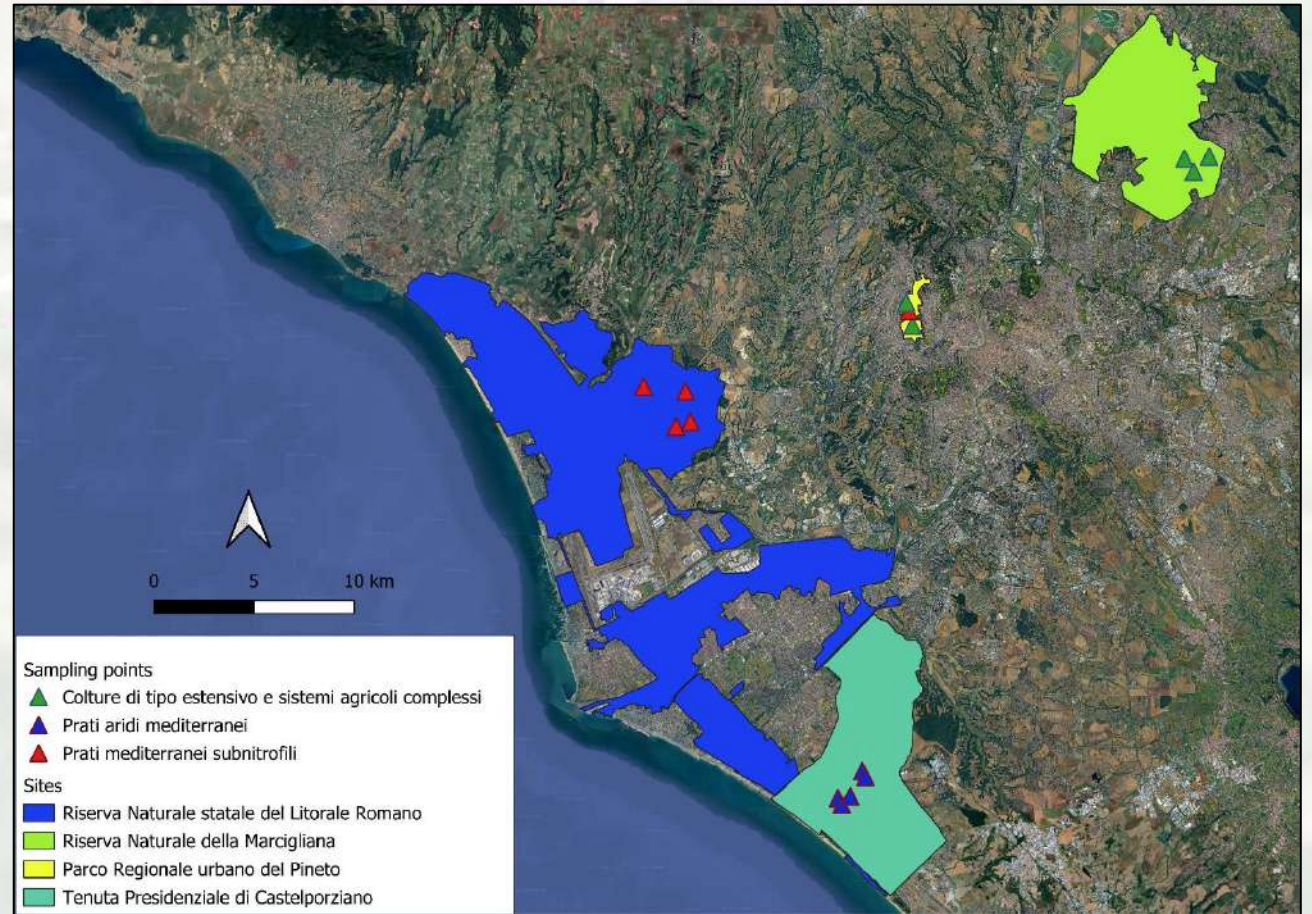
82.3

34.5

34.81



Five transects 200x2 m for each habitat



Materials and methods

Characterizing effect of habitat at different spatial scales on the diversity of cleptoparasitic bee species and their pollination role

Cleptoparasitic bees will be captured using sweep nets from March to October 2025



Each transect will be sampled twice per month



Collection of micro-environmental variables in four standardized plots every 50 m along the transect



A total of 8 days out in the field

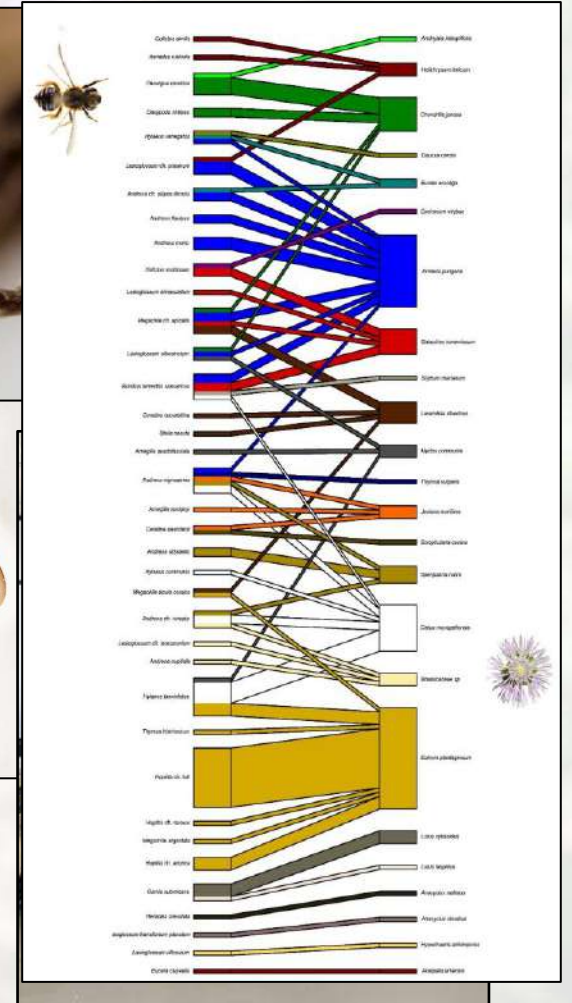
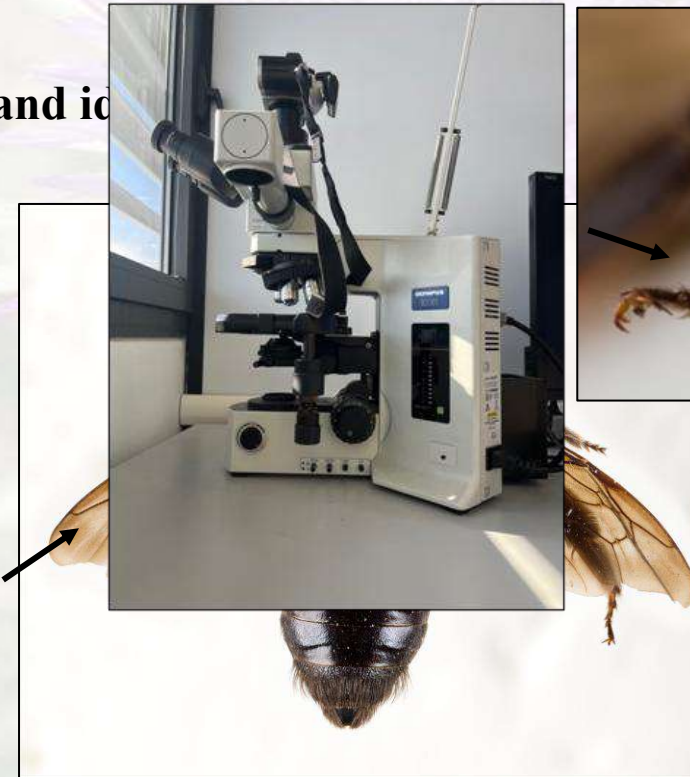
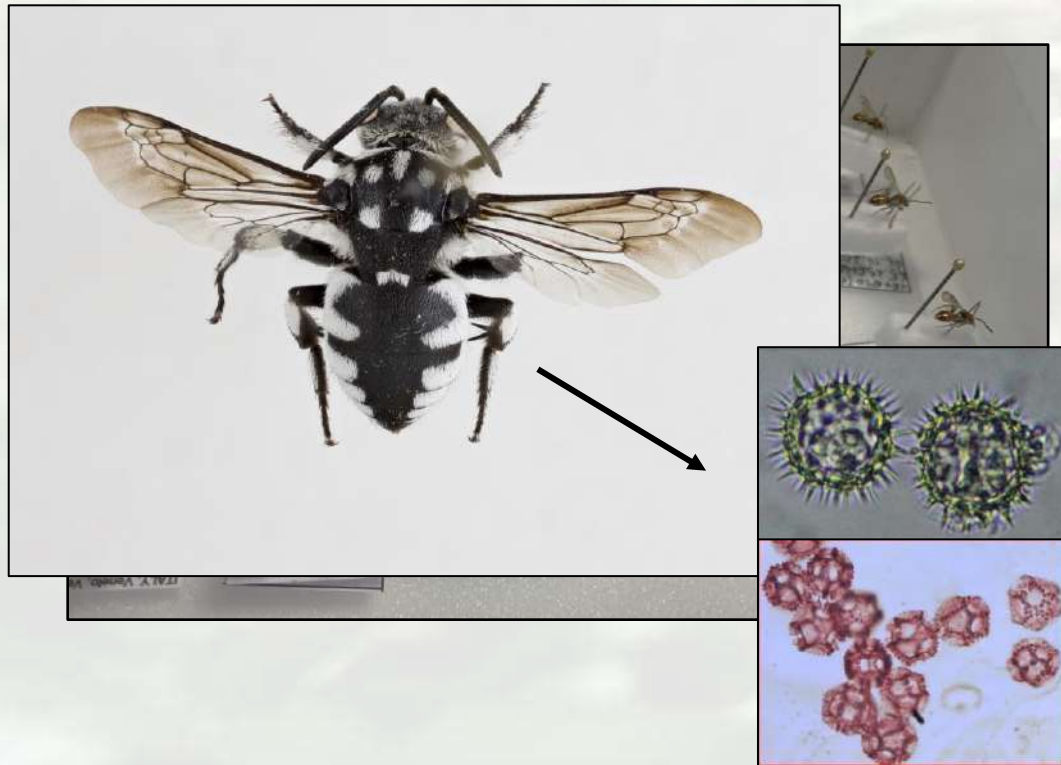


Materials and methods

Characterizing effect of habitat at different spatial scales on the diversity of cleptoparasitic bee species and their pollination role

Identification pollen and statistical analysis

Bee sample preparation and id



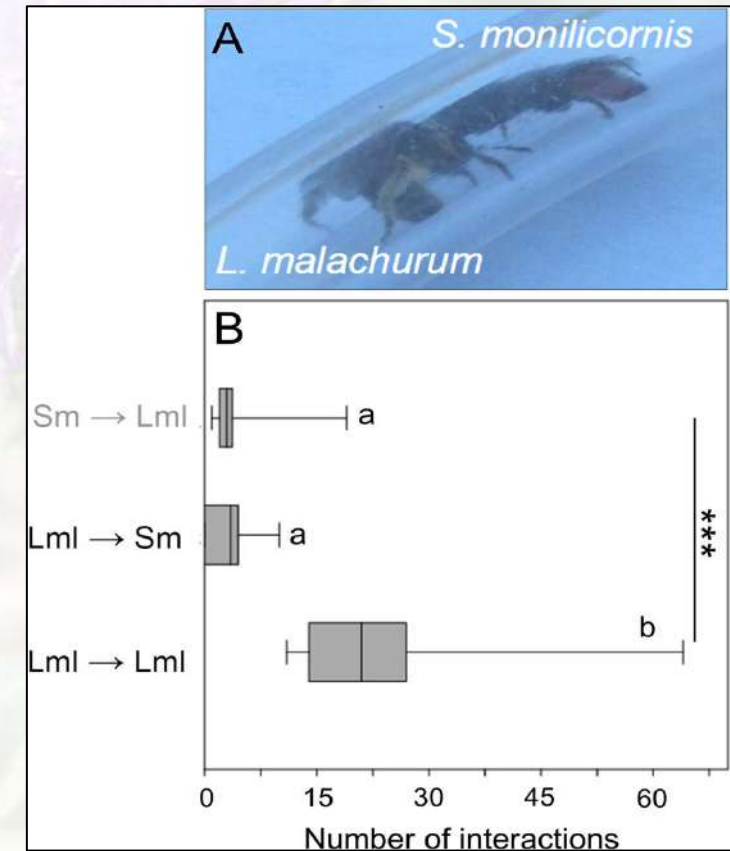
Materials and methods

Investigating behaviour, morphological adaptations and strategies of parasitism

Parasitism behaviour near nests



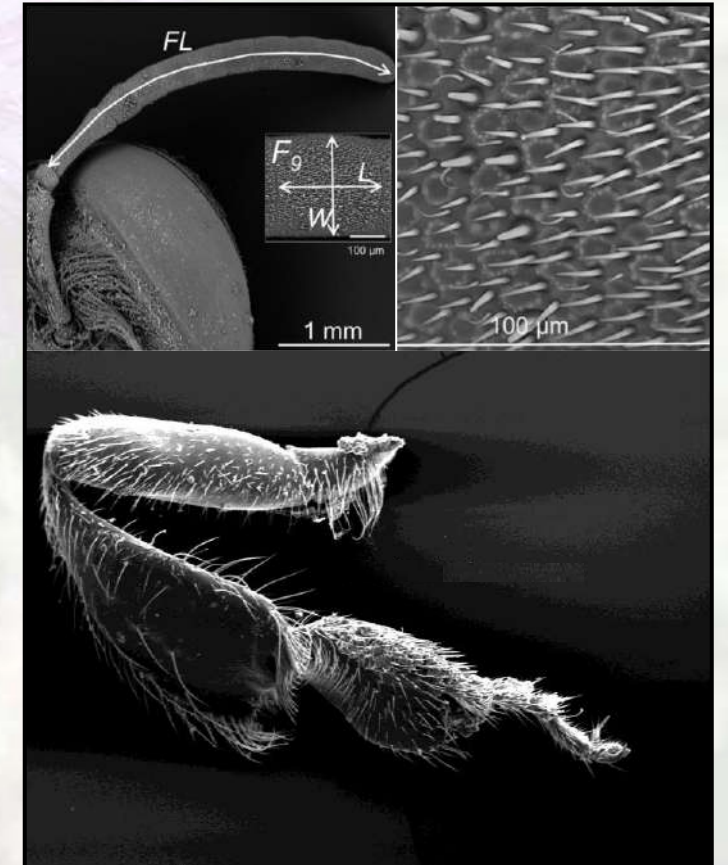
Behavioural experiments



Materials and methods

Investigating behaviour, morphological adaptations and strategies of parasitism

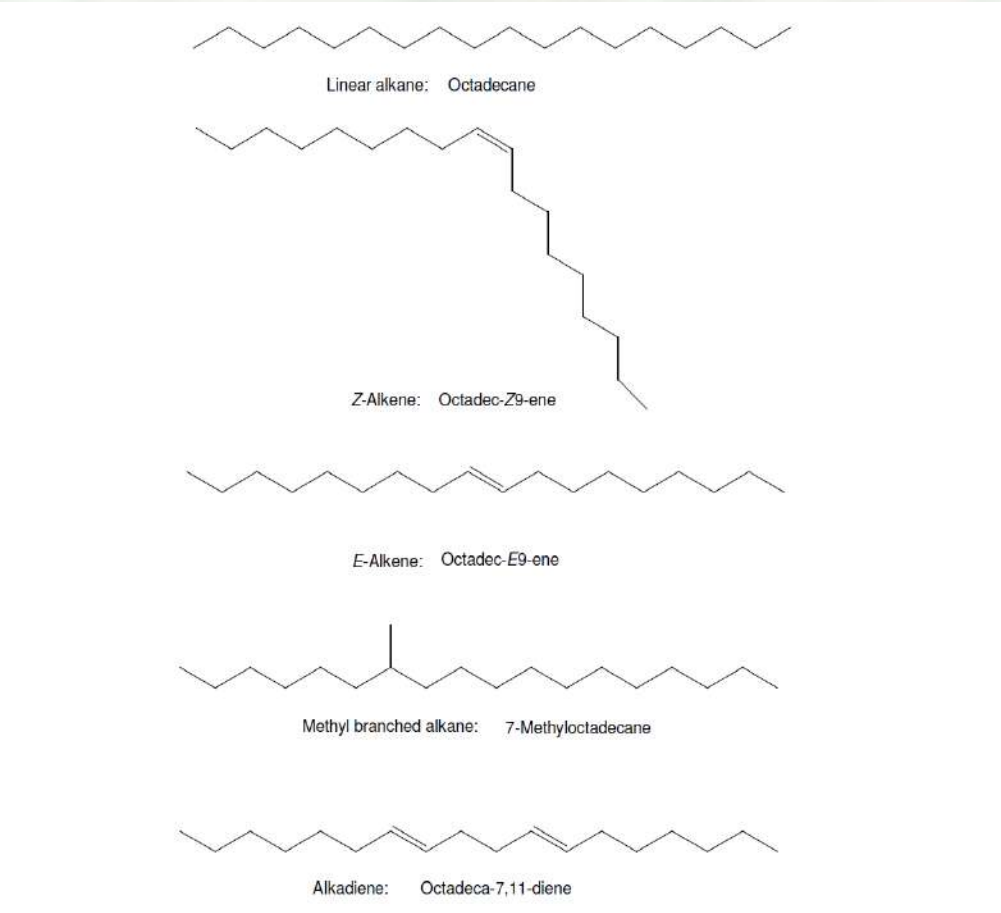
Morphological adaptations of cleptoparasitic bees compared to non-cleptoparasitic species



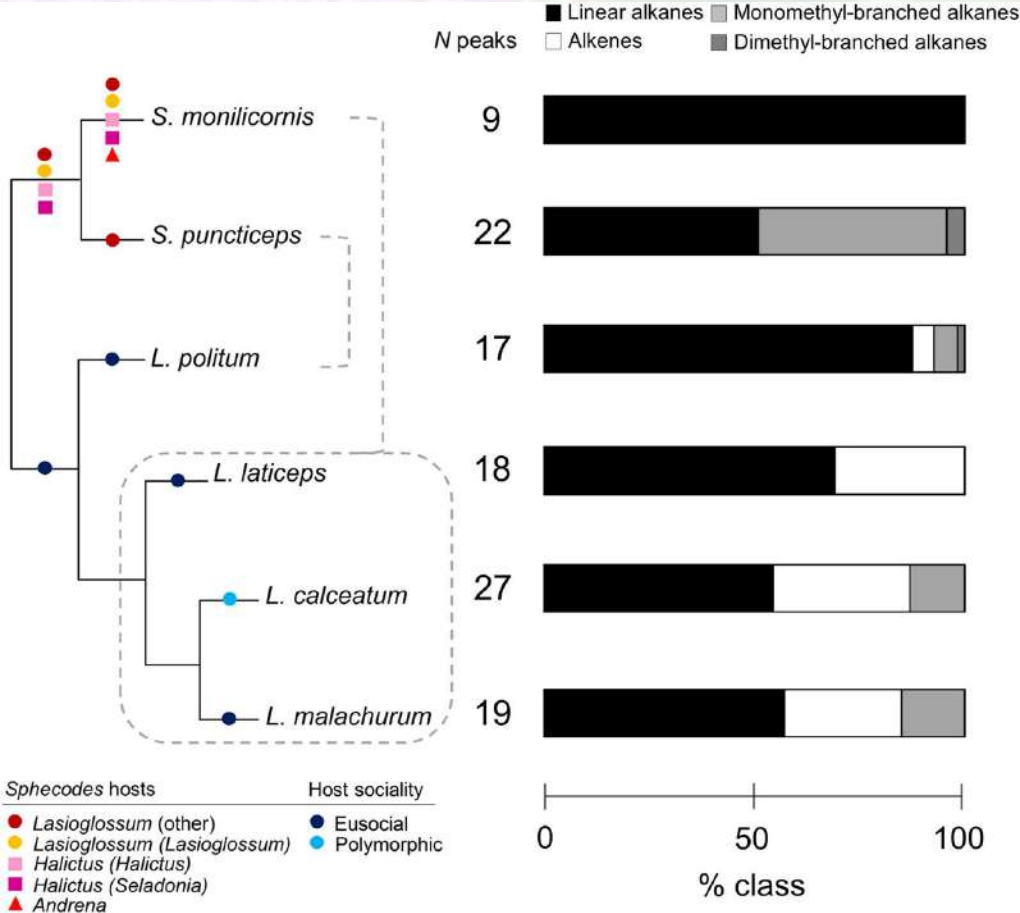
Materials and methods

Investigating behaviour, morphological adaptations and strategies of parasitism

Cuticular hydrocarbon profile (CHC)



Comparison of cleptoparasitic CHC profiles with host CHC profiles



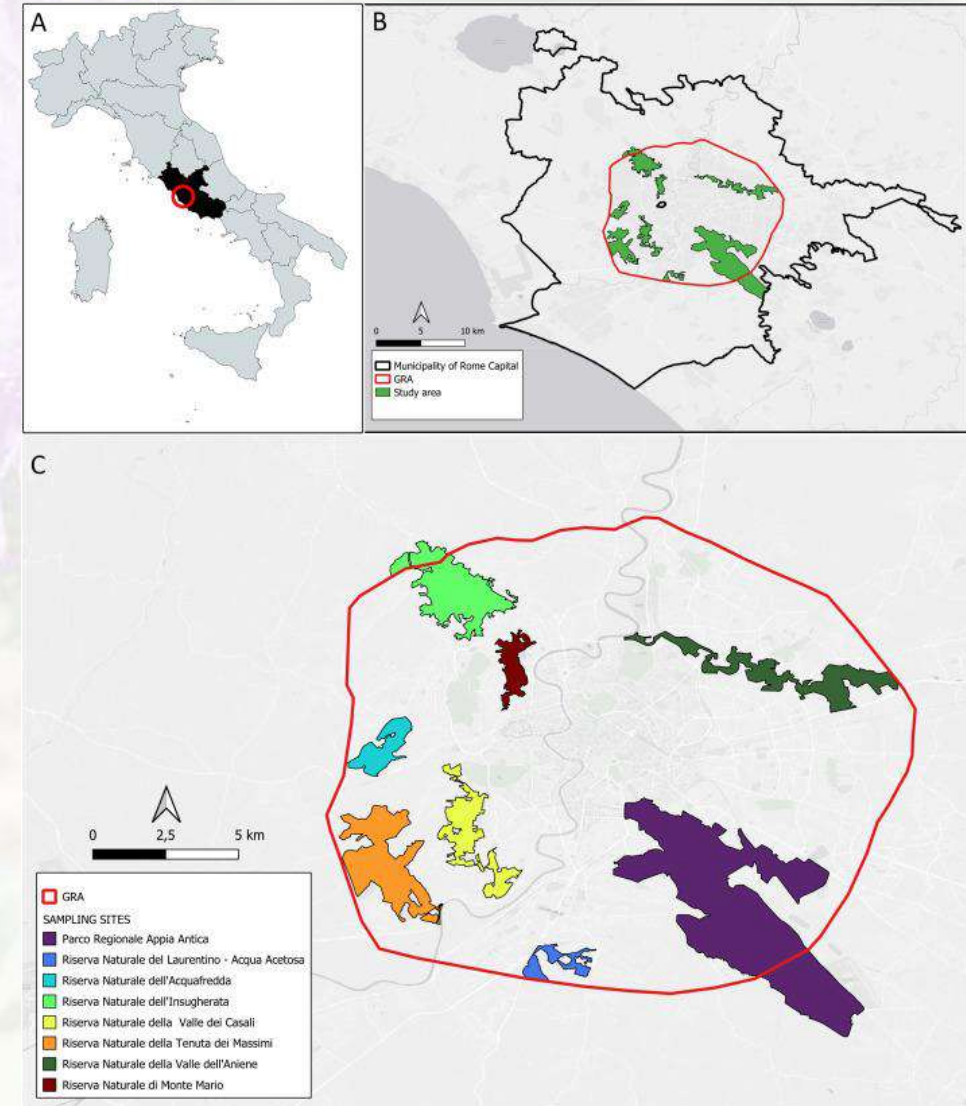
Materials and methods

Investigating relationship between cleptoparasitic bees, their host species and the wild bee community

Data collected on 15 transects in eight urban nature reserves (Fortini et al. 2024)

Analysis from the dataset available at Department of Science,
Roma Tre University

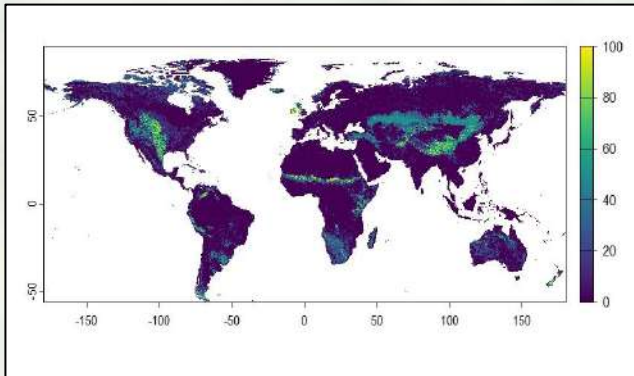
- Regression analysis
- Co-occurrence analysis



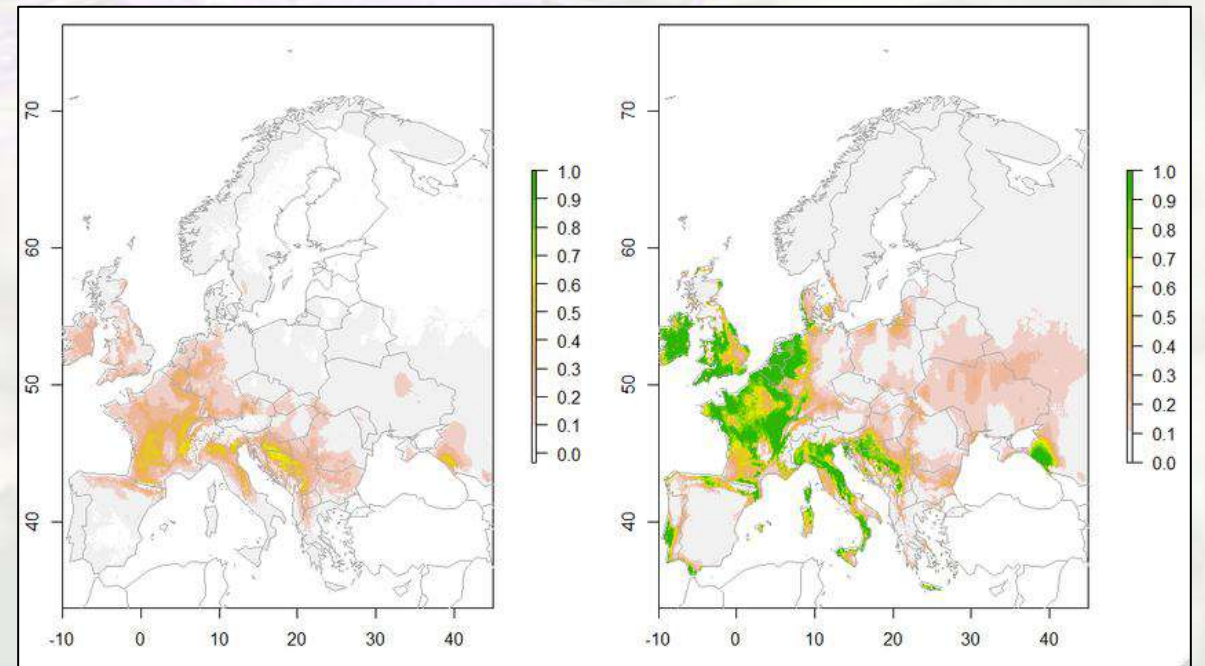
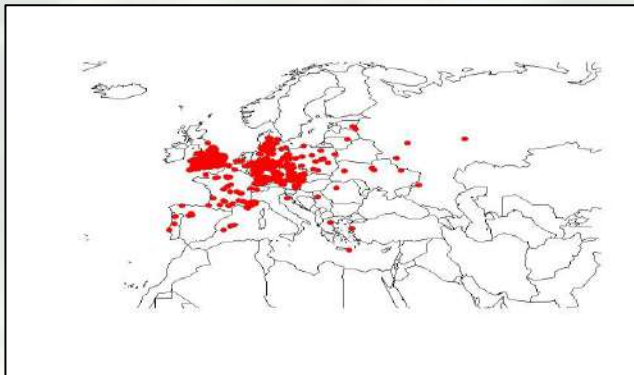
Materials and methods

Building Species Distribution Models (SDM) for target cleptoparasitic species to assess their ecological niches and predict potential distribution patterns in Europe

Bioclimatic and habitat map

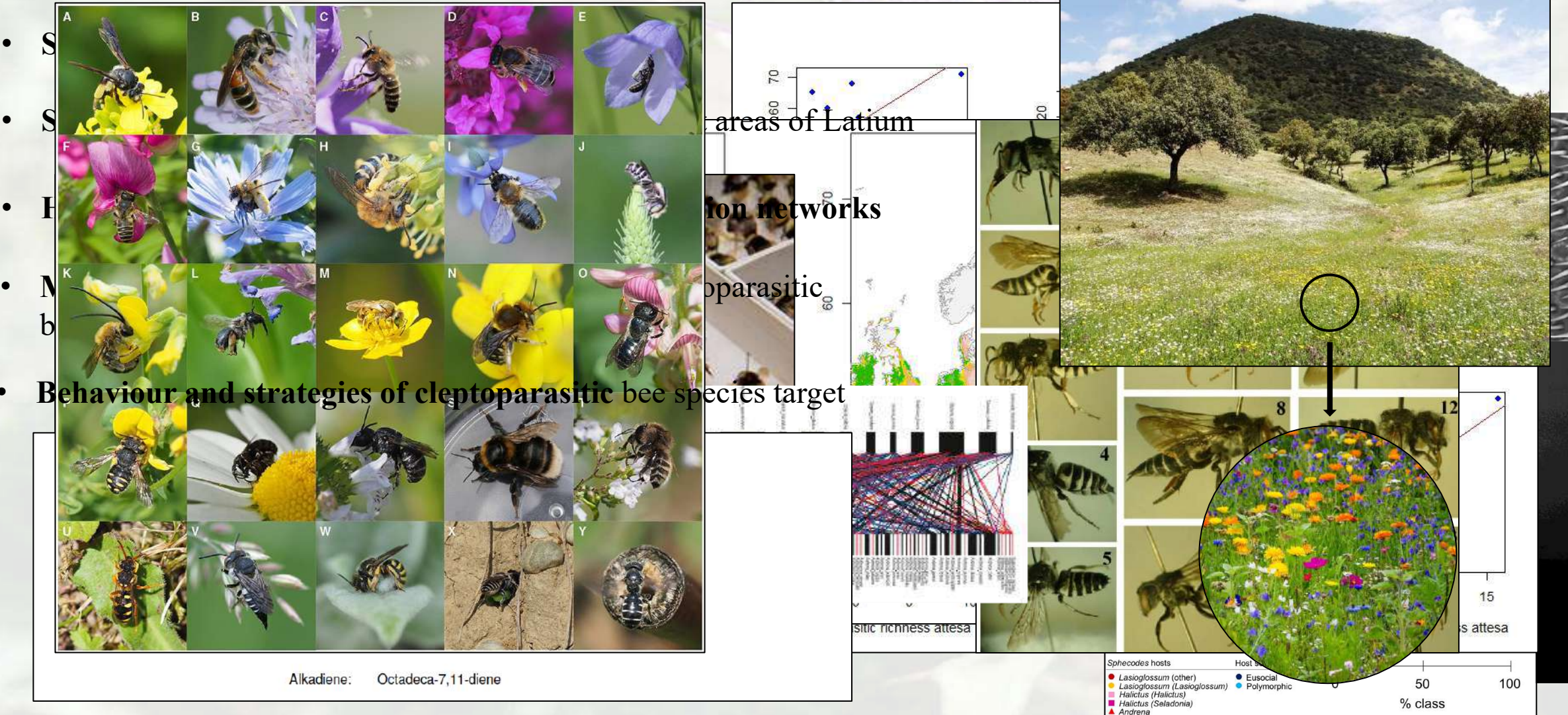


Host taxa distribution (GBIF, iNaturalist)



Expected results

- Relationship between cleptoparasitic bees and the wild bee community in urban environments within Rome



Project organization

Timeline

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References

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