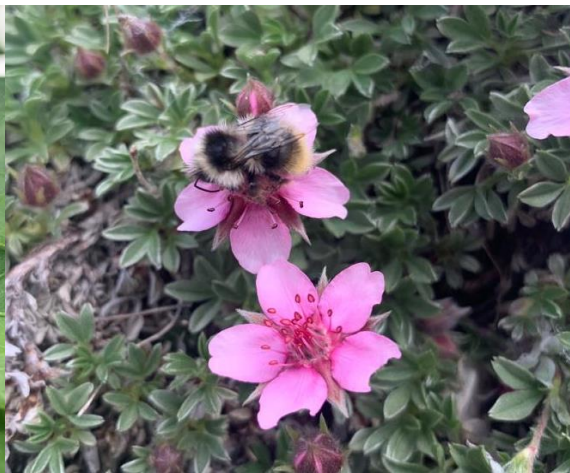


Climate change and pollinator conservation in urban environments

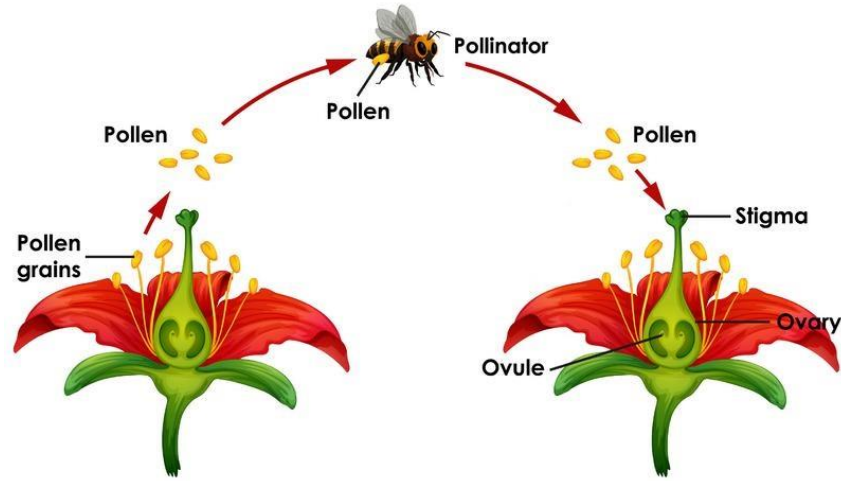
Costanza Geppert

DAFNAE University of Padova

costanza.geppert@unipd.it



Who are pollinators and why are they at risk?



Climate change

Reshuffling biotic interactions

Pesticides and pollution

Increase of urban areas

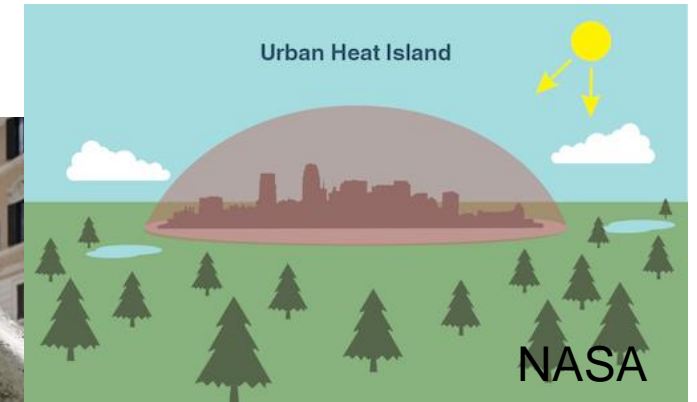
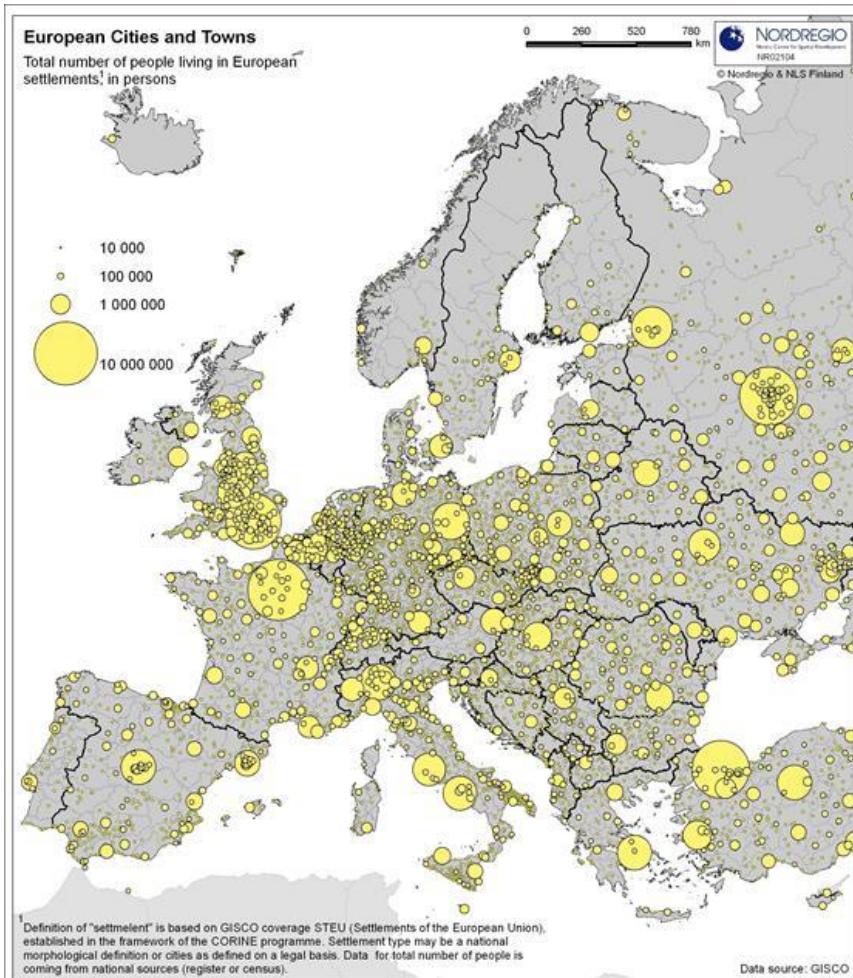
Invasive species

Increase of agricultural areas



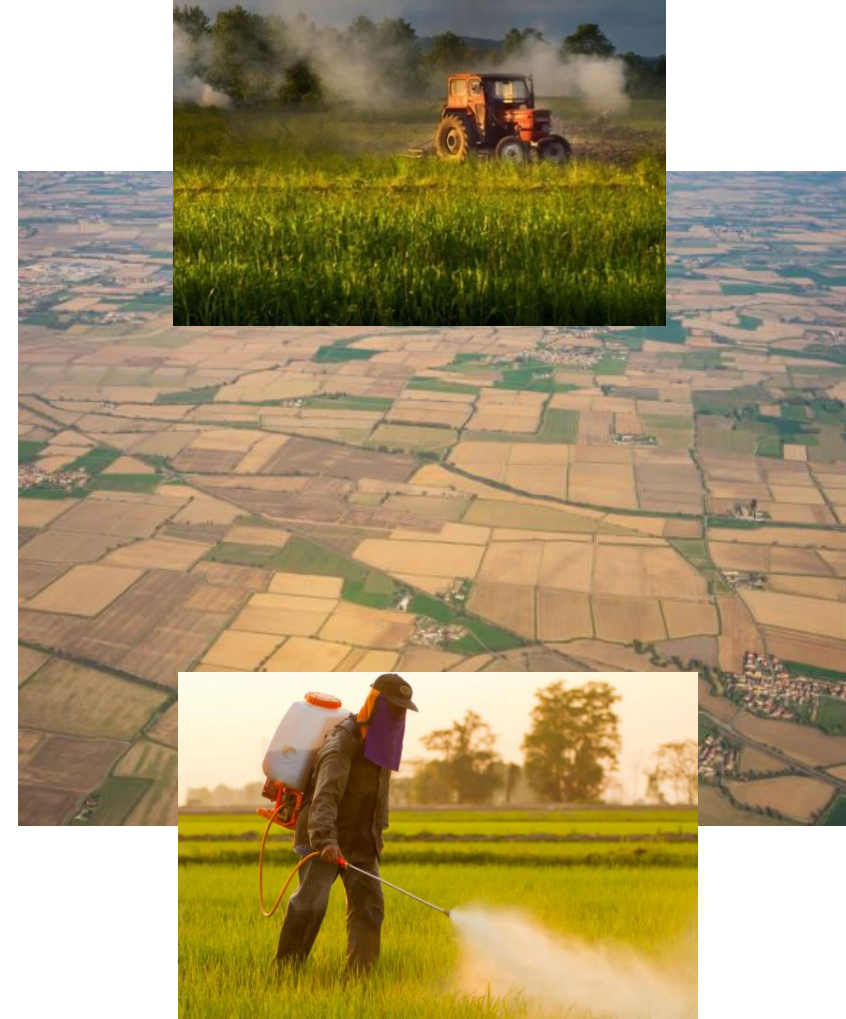
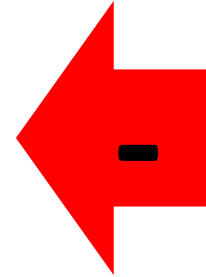
Most people live in cities

Today, 56% of the world's population live in cities. By 2050, the 70% (World Bank 2023)

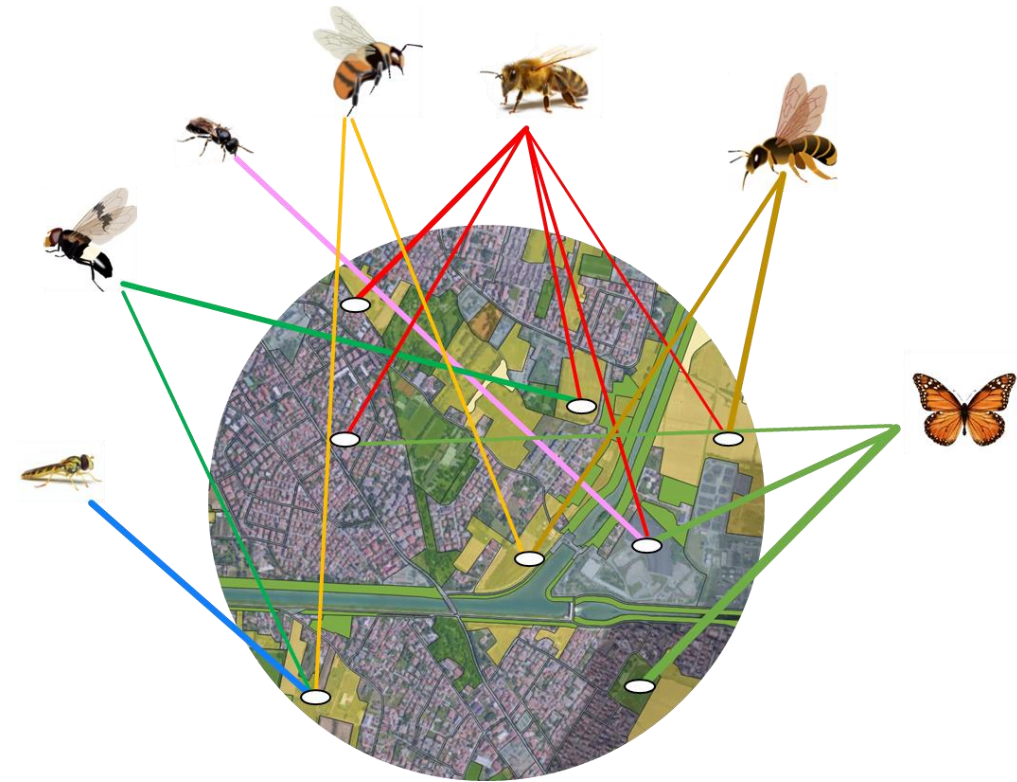
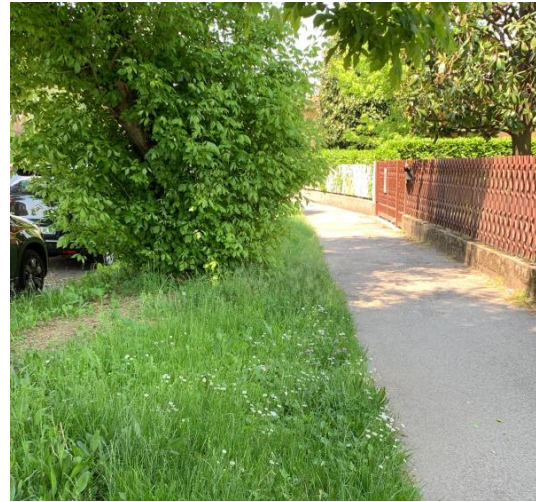


Adapt to the impacts of climate change in urban areas will become increasingly important

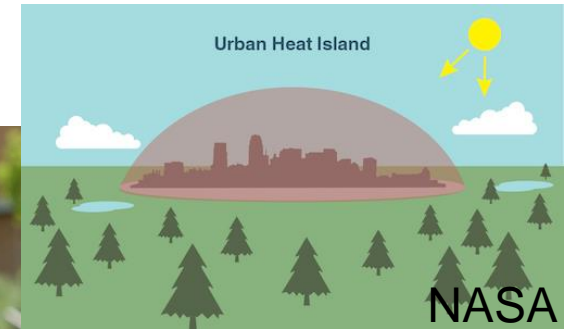
Are cities a refuge for insect pollinators ?



The importance of green areas in cities

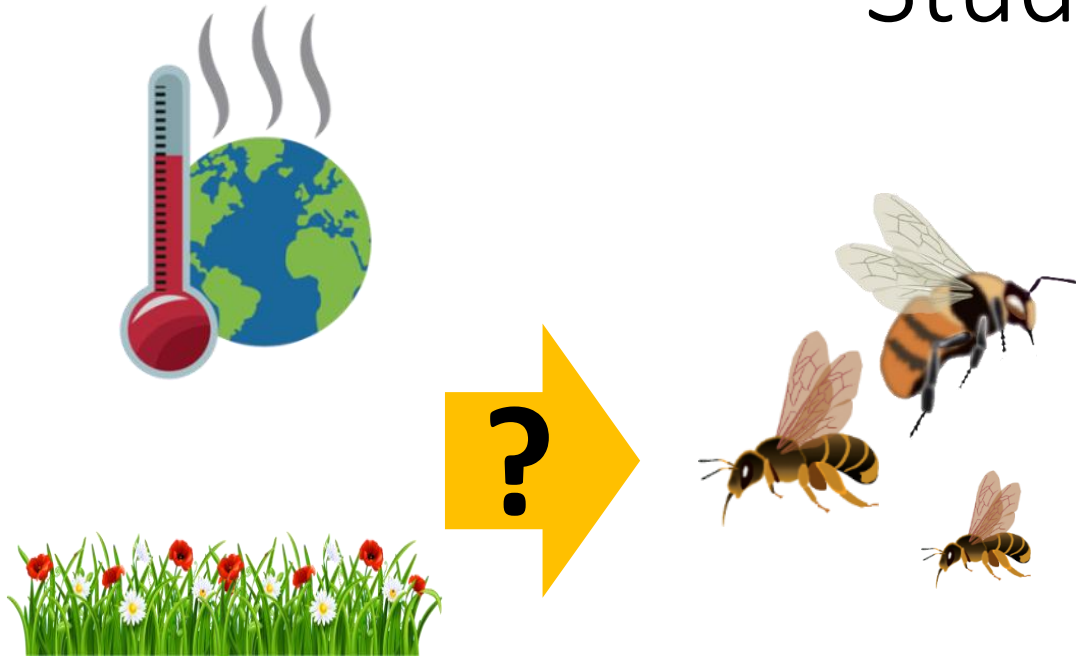


Climate change and pollinators



There are very few studies documenting the effects of heat on urban pollinators

Study aims



- What is the effect of temperature and green open habitat on bee diversity and abundance?
- Will functional traits be filtered by temperatures?



Received: 4 April 2022 | Accepted: 23 July 2022


DOI: 10.1111/icad.12602

ORIGINAL ARTICLE

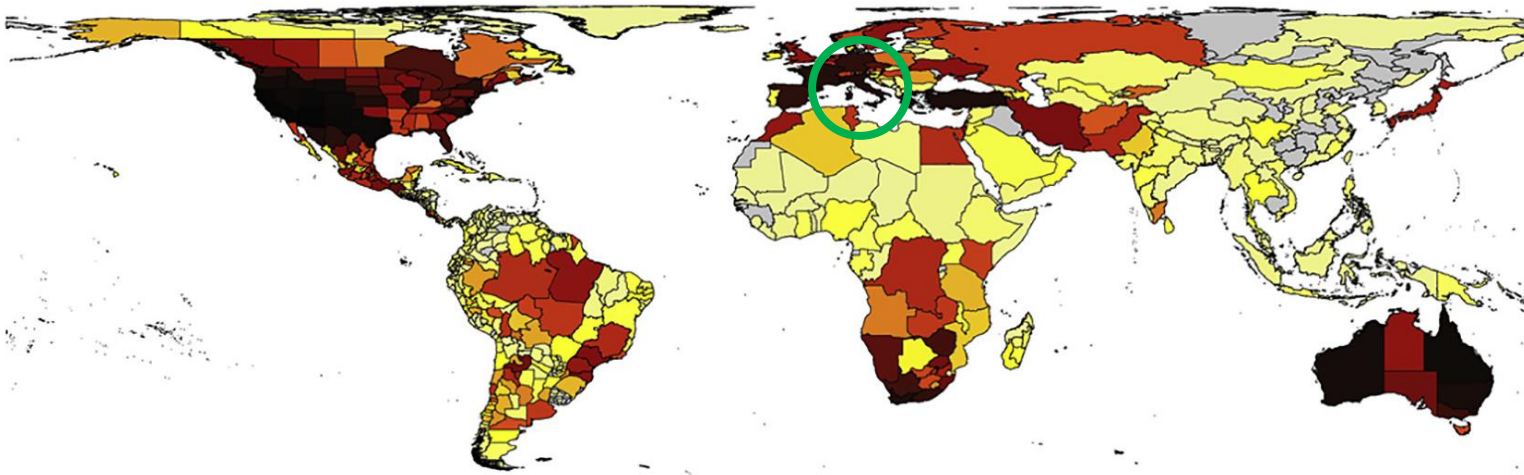
Insect Conservation
and Diversity



Temperature and not landscape composition shapes wild bee communities in an urban environment

Costanza Geppert¹  | Andree Cappellari¹ | Daria Corcos^{1,2} | Valerio Caruso² | Pierfilippo Cerretti² | Maurizio Mei² | Lorenzo Marini¹

Study area and sampling



Gradient of surface temperatures (34 - 43 °C)

Gradient of green open habitat (4 – 53 %)

7 rounds from spring to late summer

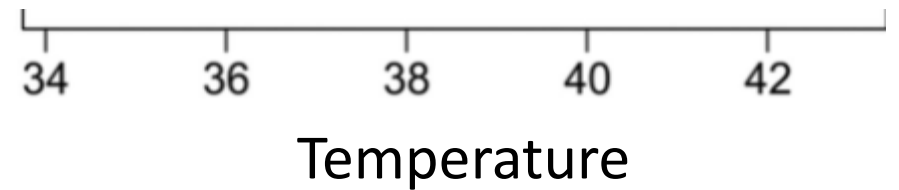
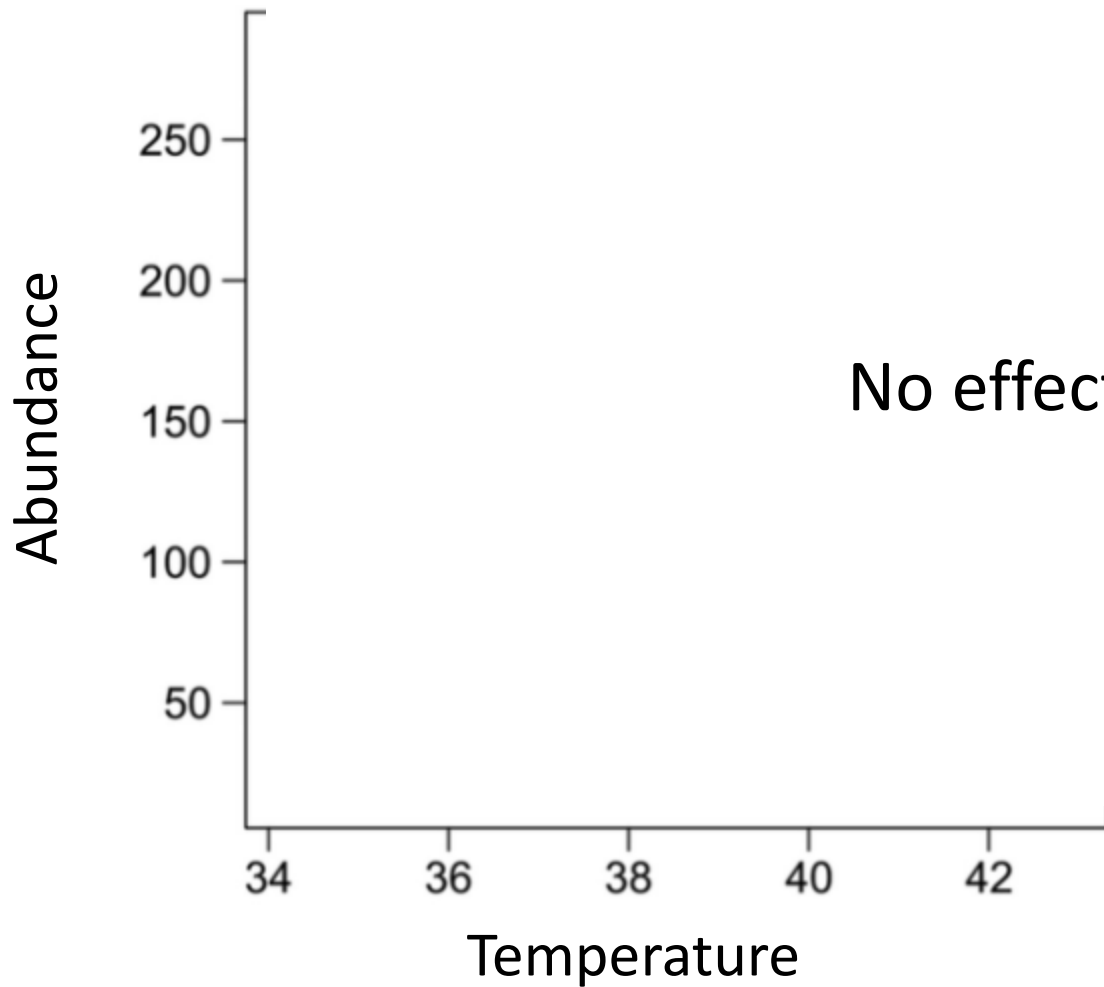


Functional traits

1. body size (mm)
2. social behaviour (solitary or social)
3. nesting strategy (above ground or below ground)
4. diet breadth (oligolectic or polylectic)

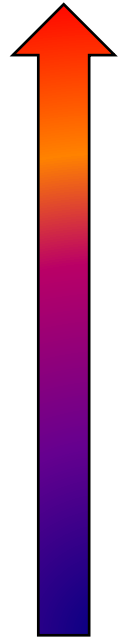


Effect of temperature on abundance and richness

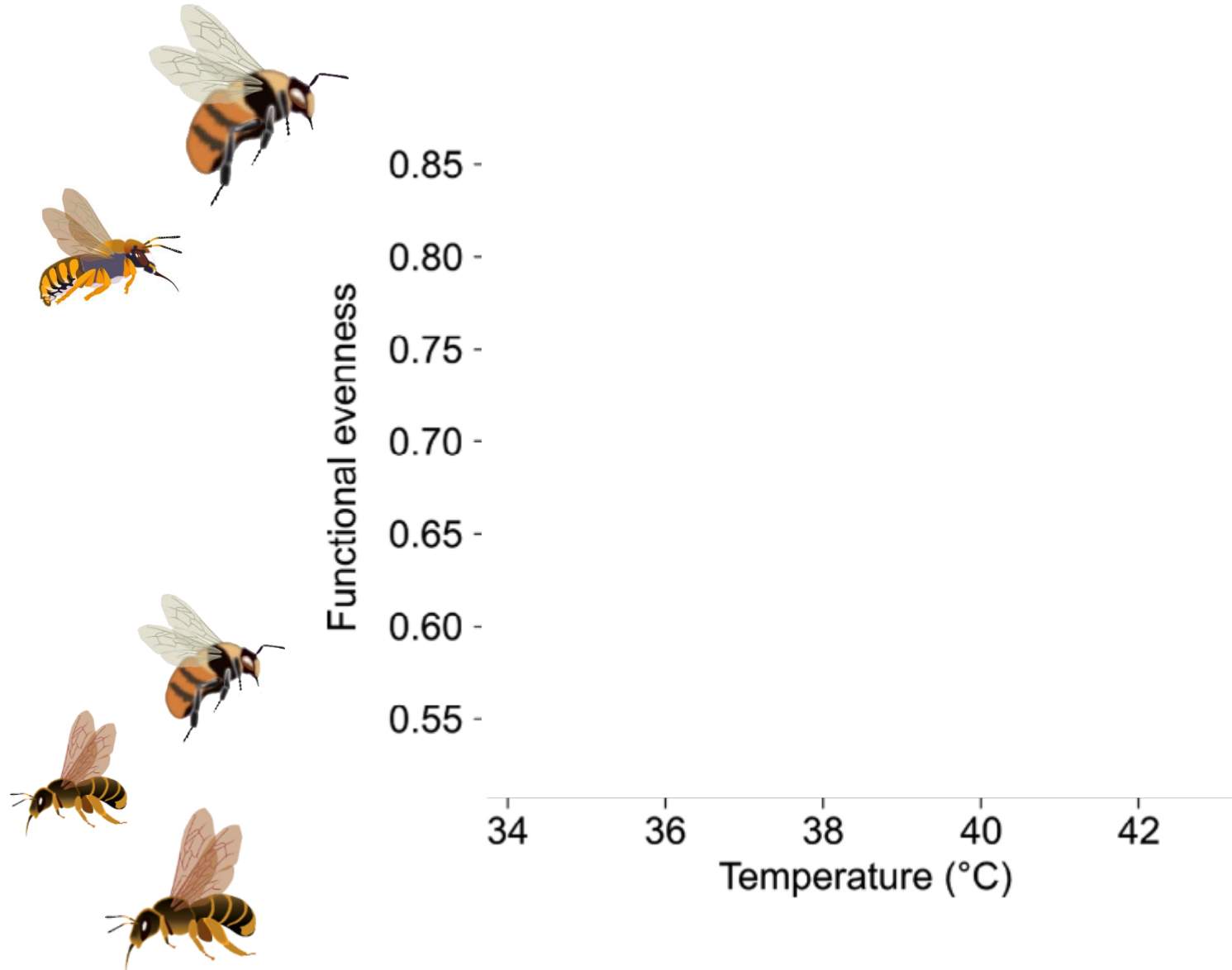


Temperature shifts community traits

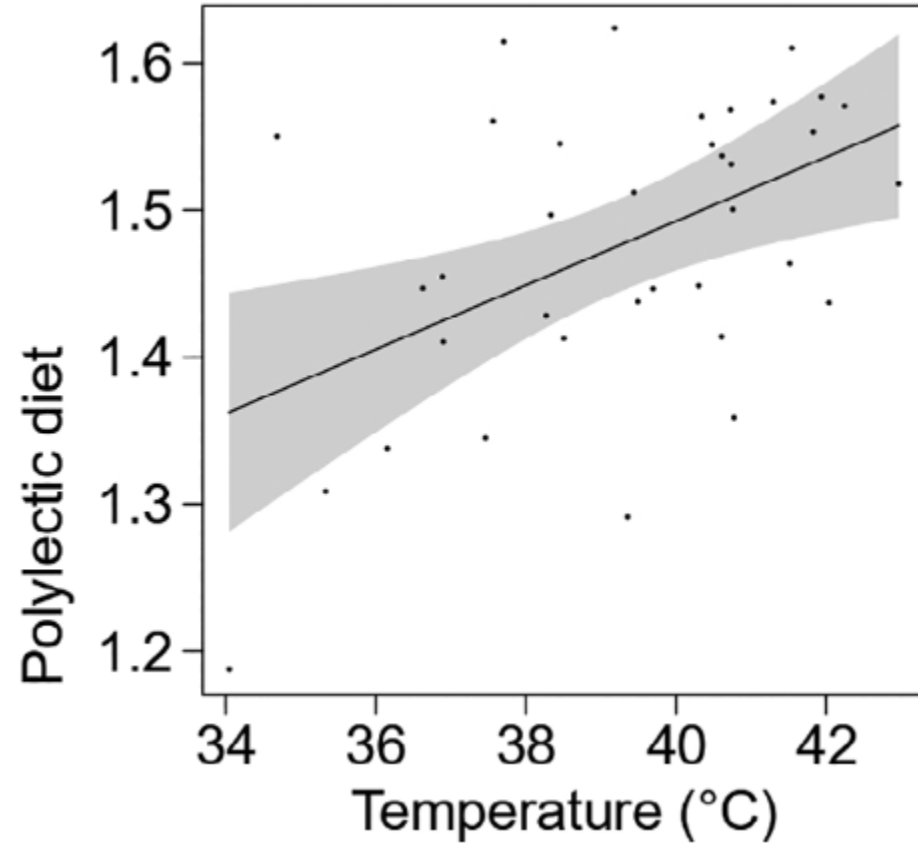
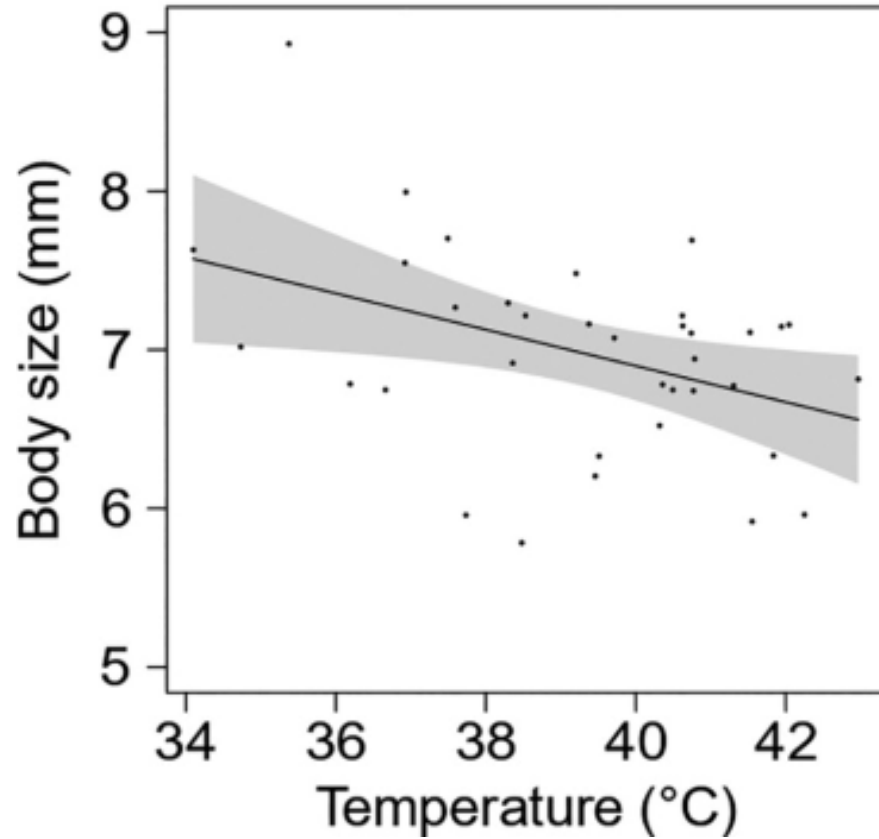
F. Evenness high



F. Evenness Low

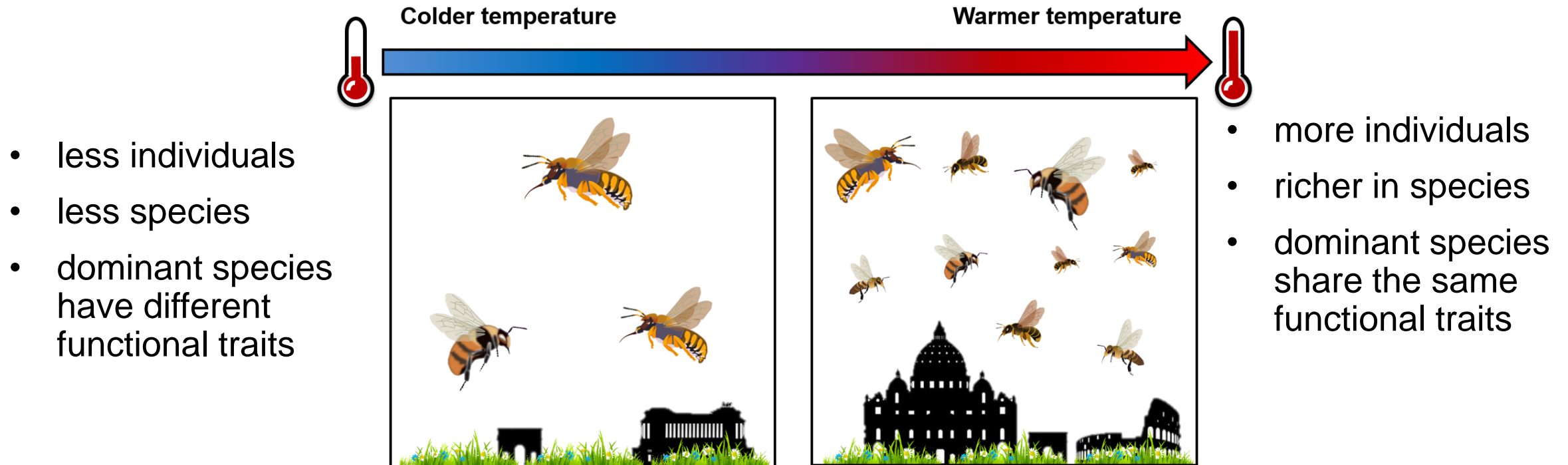


Which traits are favoured?



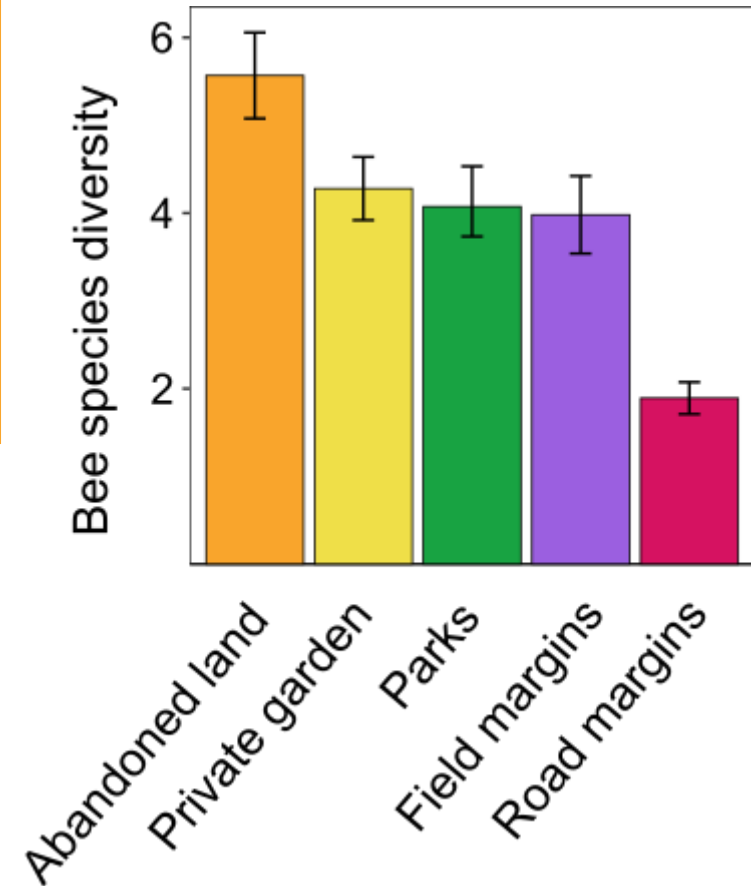
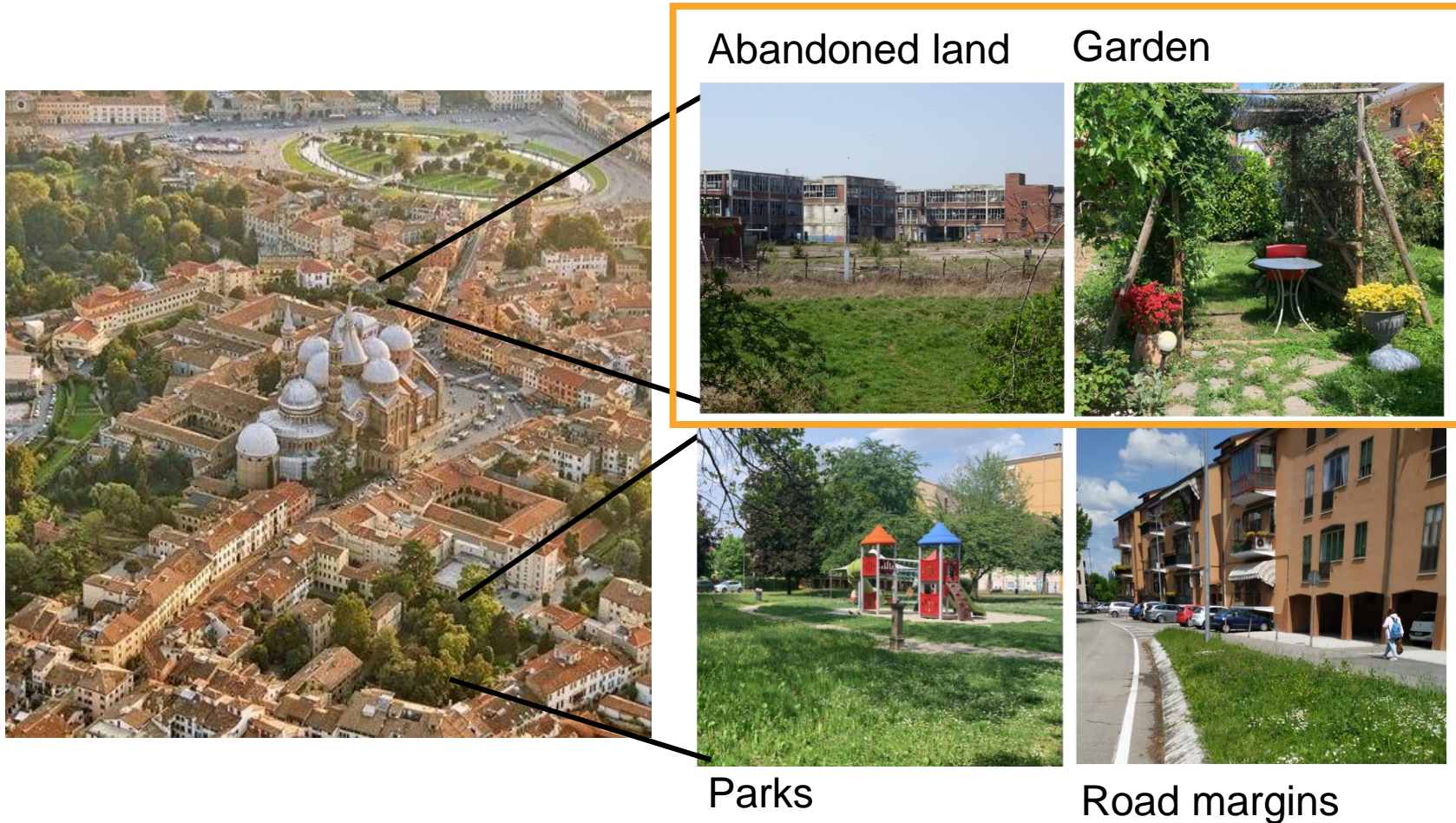
How can we expect urban bee communities to change?

Temperature was the main driver of wild bee communities in Rome



- heat-tolerant wild bee species will benefit from increasing temperatures
- communities will be dominated by polylectic and small-bodied bees

What about the quality of urban green spaces?



Urban greening can protect wild pollinators

1) High quality of green areas: flower and nesting resources



2) Climate change refugia



Urban forests were on average 1.6 °C cooler than comparator areas (Knight et al. 2021)



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