POLLINATION: AN ECOSYSTEM SERVICE PROVIDED BY PONDS IN THE AGRICULTURAL LANDSCAPE NEAR GENEVA ?

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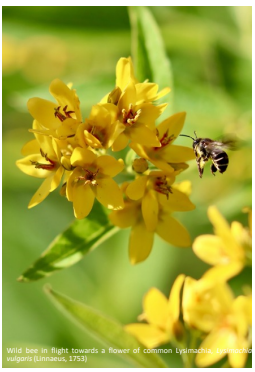
Context and problematic

The present work is part of the European project "Ponderful". The aim of this project is to promote the use of ponds as a nature-based solution for climate change mitigation, biodiversity conservation and the production of ecosystem services. Among the latter, pollination had never been quantified in western Switzerland and in the canton of Geneva. The study therefore focused on this service and on the group of wild bees, considered to be the most efficient for the pollination of wild and cultivated flora.

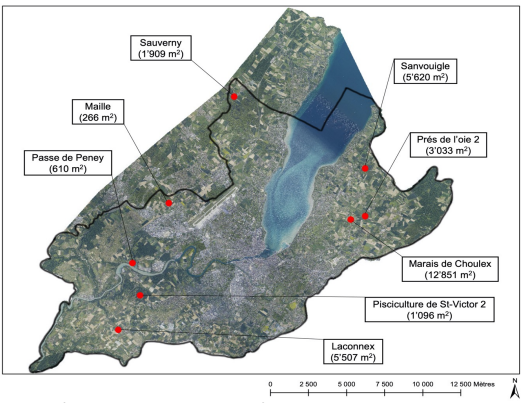


Wild bee in flight towards a flower of common Lysimachia, *Lysimachia vulgaris* (Linnaeus, 1753)

Pond of the Passe de Peney

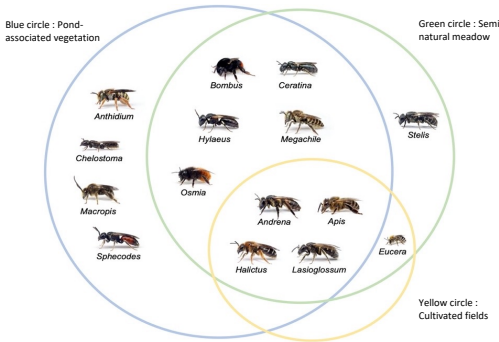
Pond of Laconnex

Study sites

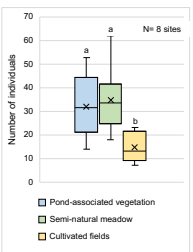


Location of the 8 ponds studied in the canton of Geneva.

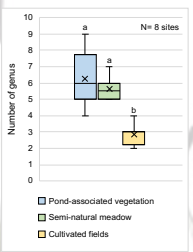
Results & Discussion



The 15 genus of bees found in the 3 types of habitats. Souce : http://www.insekten-sachsen.de/



Distribution of bee abundance in the 3 habitat types.
Paired T test : letters denote significant differeneces (p<0,05).



Distribution of generic richness of bees in the 3 habitat types.
Wilcoxon test : letters denote significant differeneces (p<0,05).

Bees :

- The abundance and generic richness of bees near ponds was statistically higher than in cultivated fields.
- No difference between ponds and semi-natural meadow, but maximum values were often observed near ponds.

Flowering plants :

- The species richness and the coverage of flowering plant was statistically higher near pond than in cultivated fields.

The ecosystem service of pollination is provided by the ponds in Geneva's agricultural landscape.

Methods

The main objective is to know if agricultural ponds in Geneva are favourable to pollinators, by comparing bee communities between 3 types of habitats: pond-associated vegetation, semi-natural meadow and cultivated fields in 8 identical landscape.

Two operational objectives are formulated for this study: (1) to conduct an inventory of pollinators (wild bees) present in the 3 habitat types and (2) to assess the ecosystem service of pollination by measuring indicators of abundance and generic richness for pollinators, as well as available floral resources.

Sampling of bees and floral resources

Active capture with sweep net

Passive capture with pan traps

Identification of wild bee genus in the laboratory

Quantification of floral resources using vegetation quadrats and Braun-Blanquet

Conclusion

These results support the fact that in intensively used agricultural landscapes in Geneva, the presence of semi-natural habitats, including ponds, can benefit biodiversity conservation and crop pollination. Some water bodies, characterized by important floral resources, clearly show higher potential than semi-natural vegetation. Indeed, four genus are only present in pond-associated vegetation.

Literature

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Ponderful
PONDS FOR CLIMATE

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