



**SESSION XII**

**SOCIAL INSECTS AND APIDOLOGY**

## **Modelling tools for the optimisation of pollination services provision in agroecosystems**

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Insect-mediated pollination is a vital ecological process that plays a crucial role in maintaining biodiversity, promoting plant reproduction, and ensuring food safety worldwide. Honey bees and wild pollinators are both important for providing pollination services and contributing to the diversity and productivity of natural and agricultural systems. However, multiple stressors, including habitat loss and fragmentation, agricultural intensification, and climate change are negatively affecting the presence, abundance, and diversity of pollinators.

In this work, we present an Individual-Based Model that simulates the foraging and pollination efficiency of interacting honey bee colonies and wild pollinator communities in a realistic landscape. The model simulates the main physiological processes of the hive, including egg-laying, development, mortality, as well as the dynamics of in-hive products such as food influx and consumption. The landscape is simulated as a mosaic of different food patches, and relevant processes such as patch phenology and attractivity, nectar and pollen production, and pollination requirements are considered based on the type of land-use. The characteristics of the wild pollinator community are also estimated considering the type of land-use.

The model represents a tool that might provide key elements for defining and implementing rational management strategies for land use and colonies deployment aimed at mitigating the potential negative impacts of competition between managed honey bees and wild pollinators, optimising the provision of pollination services, and ensuring the conservation of wild pollinators as an essential element of the ecosystems. The model presented has been developed within the SafeAgroBee project, whose main objective is to contribute to the adaptation and mitigation of the effects of climate change and other drivers negatively influencing the sustainability and resilience of the agroecosystems within the Mediterranean basin.

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**KEY WORDS:** *Apis mellifera*, Wild pollinators, Individual-Based Model, Pollination services, Sustainable agroecosystems.

**POSTER**