



ECO-OLIVES: Ecological management of European olive agroforestry: linking biodiversity conservation, ecosystem services and productivity

Duration: 03/2022-08/2024 | Funding: [FWF Austria](#)

Wider research context

Ongoing agricultural expansion and intensification are major drivers of biodiversity loss, leading to impaired ecological functionality that impedes progress towards sustainable farming - even in structurally diverse European olive agroforestry landscapes. Linking biodiversity conservation and agricultural production through ecological management of key species and associated functions (“ecosystem services”) that is adapted to relevant spatio-temporal scales (“environmental factors”) and implemented into farming practices (“decision-making”) represents a key step towards agricultural sustainability.

Research questions

This project will address three major research questions on ecological management of olive agroforestry: (1) How does taxonomic and functional diversity of birds, bats and arthropods differ depending on local, landscape and seasonal contrasts?; (2) Which are the environmental key factors promoting biological pest control services provided by birds, bats and arthropods?; (3) How do farmers' perceptions of agricultural biodiversity and ecosystem services influence agricultural decision-making and its (digital) development?

Approach

The study is located in Italy nearby Pisa, and is based on a study design including 12 organic olive agroforestry farms that differ in their local and landscape characteristics. Each farm contains bird and bat enclosure experiments and open controls to assess vertebrate-mediated pest control services, multitrophic interactions and effects on olive productivity over a period of two years, accounting for seasonality effects. Through a novel combination of experimental field studies, ecological modelling approaches, socio-ecological surveys and software design, the project combines basic, applied, statistical, molecular and digital approaches to address interconnected global challenges related to balancing biodiversity conservation and food production.

Level of innovation

The outcomes of this project will significantly advance an ecosystem-level understanding of key factors affecting the relationship between biodiversity and agricultural production. This will promote transferable and sustainable agricultural management – and many further applications in biodiversity conservation, agroecology, pest and disease control, and beyond.

Primary researchers involved

The principal investigator [Dr. Bea Maas \(University of Vienna\)](#) will lead this project based on her expertise in studying ecosystem services and multitrophic interactions of birds, bats and arthropods in agricultural landscapes. Cooperation with [research partners in Italy \(Dr. Camilla Moonen and Dr. Ruggero Petacchi; Scuola Superiore Sant'Anna\)](#) and [Germany \(Prof. Müller; University of Würzburg\)](#) will essentially support the successful implementation and broad dissemination of this project and its findings on managing biodiversity-friendly and productive agroforestry systems.