



Boosting functional biodiversity to maximize ecosystem services for Mediterranean crop production

Why are wild flowering plants important in sustainable agriculture?

Wild flowering plants provide benefits for sustainable agriculture in terms of functional biodiversity. They support the ecosystem services delivered by beneficial insects which visit flowers to gain resources – such as pollen and nectar- essential for their energetic and nutritional needs. These resources are often scarce in intensive agriculture. Wild flowering plants boost the ecosystem services of natural pest control (delivered by natural enemies such as predators and parasitoids) and pollination (delivered by wild bees, honeybees and other pollinators).

Which plants should be implemented into farms?

In sustainable agriculture, native wild plant species should be strongly preferred, as these species are well adapted to the local environments, they are more likely to attract indigenous beneficial insects and integrate well with the existing biodiversity.

What are the common plants found in Mediterranean environments?

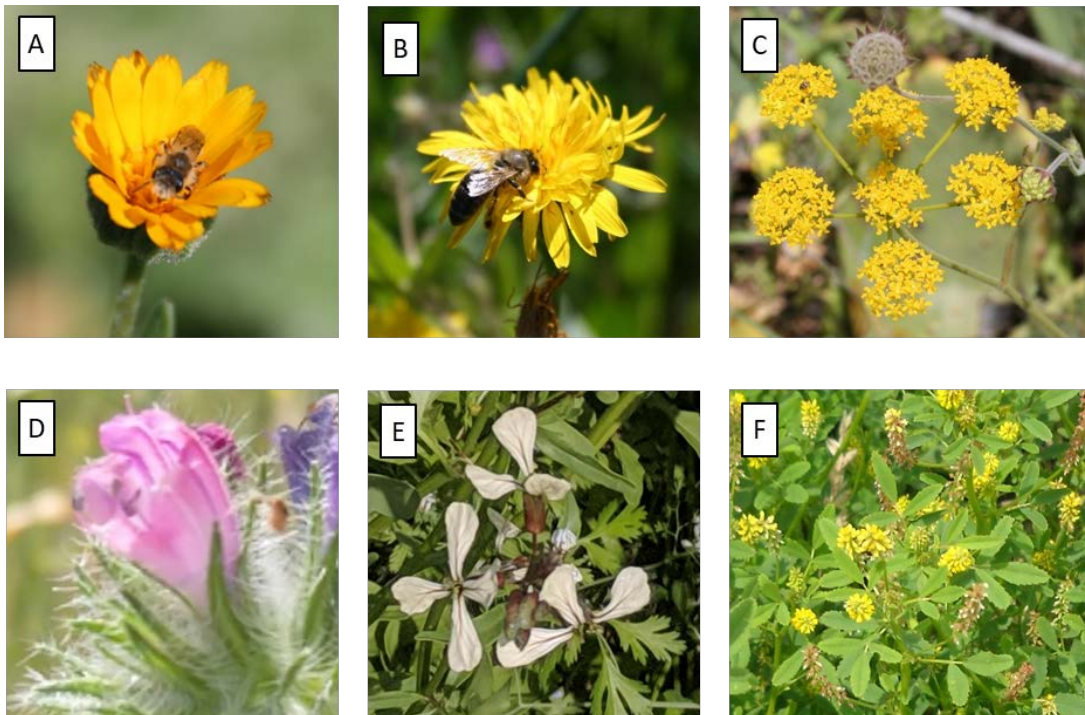
Wild flowering plants are known to boost pollination and biological control in agroecosystems. Yet most of the studies focused on plants, such as buckwheat (*Fagopyrum esculentum*), which are often poorly adapted to Mediterranean

environments. The huge diversity of Mediterranean plant species suggests that it is possible to identify several native species that can promote insect-based ecosystem services. The native plants that maximize not only natural enemies' performance but also pollinators' attraction could prove to be extremely valuable for delivering multiple ecosystem services in the Mediterranean farms.

In the ECOBOOST project, surveys have been carried out during the first (baseline) year to collect seeds of potential candidate plants that support the performance of natural enemies and pollinators (honey bees, bumble bees and solitary bees).

Survey of selected wild plants found in Greece (BPI)

During the survey in Greece (regions Orchomenos Voeotia; Marathon, Attica), seeds were collected from the following selected wild plant species known from the literature as able to support habitats and floral resources for beneficial insects: *Calendula arvensis*-the field marigold (Asteraceae), *Reichard diapicroides* (Asteraceae), *Malabaila aurea* (Apiaceae), *Echium* sp.(Boraginaceae), *Eruca vesicaria* – rochet (Brassicaceae), *Melilotus* sp. (Fabaceae).



A) *Calendula arvensis* – Field marigold – Asteraceae; **B)** *Reichardia picroides* – Common Reichardia - Asteraceae; **C)** *Malabaila aurea*– Apiaceae; **D)** *Echium* sp. – Echium -Boraginaceae; **E)** *Eruca vesicaria* – Rochet – Brassicaceae; **F)** *Melilotus* sp. – Fabaceae

Survey of selected wild plants found in Sicily, Italy (UNIPA)



A) *Lobularia maritima* – Sweet Alyssum – Brassicaceae; **B)** *Calendula arvensis* – Field marigold – Asteraceae; **C)** *Geranium rotundifolium* – Cranesbill - Geraniaceae; **D)** *Erodium malacoides*– Storkesbill– Geraniaceae; **E)** *Borago officinalis* – Borage – Boraginaceae; **F)** *Trifolium nigrescens* – Clover – Fabaceae

How does the ECOBOOST project aim to support insect-based ecosystem services?

- **Natural pest control:** The project aims to screen which wild Mediterranean plants support biological control agents, with a focus on insect parasitoids. In the next coming years, we aim to establish a list of candidate species that do not only improve the performance of insect parasitoids, but are also highly attractive in order to ensure high visitation rates.
- **Pollination:** The project aims to identify which pollinating insects are attracted by selected native wild plants of the examined regions or commercial varieties to be used in proposed agroecological practices of flower strips in tomato fields

margins. The possible enhancement of insect - pollinators will not only maximize the abundance or/and diversity in the agroecosystem but it might assure benefits to the pollination and consequently production of the crop. The recordings will focus on insects which perform buzz pollination that is necessary for tomato fruit set.

- The overall goal is to establish flowering mixtures that are capable of supporting bees and/or biological control agents, enhancing thus crop pollination and reducing the need of pesticide applications in Mediterranean cropping systems. The flowering mixtures can be integrated into farms as strips along the borders or within the farm.



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