LOCATION

Poland

PARTNERS

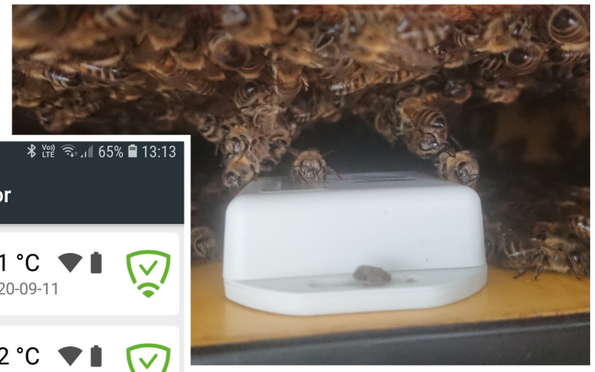
5.3 Pollination Optimisation in Apiculture

CHALLENGE

Honeybees, mainly Apis mellifera, remain the most economically valuable pollinators of crop monocultures worldwide. Yields of some fruit, seed and nut crops decrease by more than 90% without these pollinators (Klein, 2007). Thus, pollination is the highest agriculture contributor to yields worldwide, contributing far beyond any other management practice (Why bees matter, FAO, 2018). The challenge is to protect the honeybee to ensure pollination services for crop production. However, there is a lack of detailed information regarding the field saturation of pollinators and a lack of integrated control on pollination.

AIM

This pilot aims to develop and provide a service for pollination optimisation. The service will connect farm management systems and apiary management systems with advisory and decision support services. The goal of the integration of different agriculture systems is to enable better communication between farmers and beekeepers, to protect bees and to optimise pollination of crops with the aim of improving their yields.



HOW

In this pilot, the eDWIN[1] Virtual Farm is connected with the apiary management system, ControlBee, to manage beekeeping information, including apiaries and farming activities like planned sprayings (based on the information from farmers). Existing systems will be improved with new functionality, enabling collaboration without needing to use a new system. Moreover, as part of the project, existing sensors will be improved, and new apiary sensors are developed to allow remote monitoring of mobile apiaries.

BENEFIT

Benefits will include improved yield and quality of crops for farmers and better gains for beekeepers. It will also deliver better control and management of pollinators and result in better communication between farmers and beekeepers (e.g. notification of the start of flowering of plants). Using DEMETER enhanced services will enable easy integration of the apiary management system with multiple and potentially different farm management systems.

[1] eDWIN is a nation-wide farm management IT system for plant protection, being developed as part of a national project in Poland.

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DEMETER Integration

Pilot 5.3 integrates several technological components to optimize crop pollination by honeybees. One of the key DEMETER enablers used by the pilot solutions is EstimateBeehive which is a domain specific enabler that provides an estimated number of beehives required to optimally pollinate a crop field. Moreover, the pilot adapts the AIM model together with data preparation and integration enablers to enable semantic mapping of data between Pollination Optimization Service and the systems it integrates (ControlBee, eDWIN and EstimateBeehive). Finally, core DEMETER technical components and enablers such as: SOCS, DEH, BSE and ACS are used to enable sharing information about the pilot activities, partners and services/endpoints with providers and consumers of other components in DEMETER ecosystem.

Feedback From Farmers

Farmer and beekeeper communities have been engaged in the pilot since the beginning of the project. The first interactive workshop conducted in January 2020 involving both groups allowed to identify the end users' needs and define the expected scenarios of the pilot solution. Very valuable feedback to the pilot requirements has been provided by the pilot surveys conducted in 2020 among 68 beekeepers and 447 farmers. They verified the interest in the planned functionality, helping to define requirements and priorities for the development of the pollination optimisation service. Moreover, individual beekeepers, farmers and agriculture advisors were involved in providing data, collaborative design, development and testing of the solution and its components by participating in workshops, interviews and meetings.

Outcomes

The pilot provides a digital solutions for beekeepers and farmers to support the optimization of pollination by honeybees that consist of the following digital innovations:

- an improved IoT system for remote monitoring of apiaries (ControlBee) to better supervise apiaries set up in farmers' fields for pollination purposes, as well as monitor hives and bees' welfare during the wintering,
- a working prototype of a Pollination Optimisation Service
- a communication mechanism connecting farm and apiary management systems supporting collaboration of farmers and beekeepers, integrated with national farm management and an advisory system for farmers and apiary management system,
- a more pollinator friendly farming system - thanks to the integration with the pollination optimisation service the eDWIN WG farming system promotes more pollinator friendly agricultural practices.