

MUST-B & IRC report

Motivation

BEEHAVE would benefit from a set of default scenarios representing foraging conditions within Europe. Think for example of 10-15 scenarios for locations along a north-south gradient. Needed for the scenario development are 1. nectar and pollen availability, with a daily resolution, and 2. the number of foraging hours per day. The number of foraging hours per day can be derived from temperatures and irradiation, both preferably with an hourly resolution.

We would like to discuss the suitability of the available MUST-B project colony performance records and how to derive location specific foraging hours from IRC data.

Data availability

The MUST-B project data was downloaded from zenodo https://zenodo.org/record/4953762#.YYQmzJso_s2. Floral resource and honeybee data were collected at six locations, of which 4 are in Denmark and 2 are in Portugal, in 2019 and 2020. Floral resource availability was recorded for polygons within 1.5 or 3 km distance to the locations repeatedly. Recorded colony performance measures were hive weight, colony size, brood size, ... TODO. The EFSA report about the MUST-B project indicates that also temperatures and irradiation were recorded for the locations, but these data were not presented in the Zenodo data set.

Since GPS positions of MUST-B locations were given, we downloaded temperature and irradiation data with an hourly resolution from https://re.jrc.ec.europa.eu/pvg_tools/en/#TMY.

Small analysis

As a starter, we aimed to derive location-specific nectar and pollen availability for only one location, namely *Hinnerup* in Denmark. We hoped to get at least a qualitative impression about the resource availability over the course of the study years.

In the MUST-B data, resource availability was recorded by transect walks, and per-polygon records were classified. Furthermore, vegetation types per polygon were “Herb”, “Shrub” or “Tree”. For example, for Herbs, class 3 is defined as: “covers at least 75% of the area and flowers are abundant”, and class 1 is: “covers less than 25% and/or flowers are not abundant”. In my opinion, these classifications are too vague to derive quantitative measures from them, as required for the parameterization of BEEHAVE flower patches. Furthermore, even when within-class records are on an ordinal scale, comparisons between vegetation types are still impossible.

As an example, we present the total area of all polygons, separated by resource availability classes, for the “Herb” vegetation type.

Daily foraging hours for the “Hinnerup” locations were derived from IRC data, using “typical meteorological year” data, from 2013. We considered this as suitable for this small analysis, but would of course go for more recent data for the actual scenario development. Notably the last recent available record was from 2016, maybe it is possible to get newer IRC data from other sources? All considered all hours with a temperature below 12 °C and a global radiation below 200 W/m² as not suitable for bee foraging, and summed up the remaining hours to derive the daily foraging hours.

Colony performance was measured nicely, and we show ...

Desired feedback