**Agent-Based Model README**

**Overview**

These NetLogo models implement an agent-based simulation designed to study forage diversity in simulated bee colonies. Specifically, the aim of the model is to explore how flower constancy and recruitment behaviour affect forage diversity. The models simulate different environments with either 4 or 12 different flower species. The flower species themselves are distributed either uniformly, clustered or in fragmented patterns.

**Installation**

To run this model, you need to have a recent NetLogo version (e.g. 6.3) installed on your system. You can download NetLogo here: https://ccl.northwestern.edu/netlogo/. Once NetLogo is installed, simply open the provided .nlogo files.

**Usage**

1. Open NetLogo.
2. Load the provided .nlogo file by clicking on File > Open and selecting the file.
3. Adjust the parameters as needed through the interface.
4. Click on the Setup button to initialize the model.
5. Click on the Go button to start a simulation.

**Files**

Five different files with the .nlogo ending, the main NetLogo model file type. README.docx: This file providing instructions and information about the model.

**Parameters**

See Supplementary Table 1 in <https://doi.org/10.1101/2023.11.01.565092> for parameters explored.

* Number of bees
* Flowers per plant species
* Crop capacity (set to 100%)
* Reward size for high-quality and low-quality food sources as percentage of crop capacity
* Recruitment: 1 = Yes; 100000001 = No
* Flower-refilling time
* Nest-stay time
* Levy-mu
* Flight speed
* Probability of constancy (%)
* Flower stay timer (sec)
* Number of flower clusters per species
* Clustering strength

**Outputs**

The main outputs are (i) the number of different food sources (*i.e.* flower species) a colony exploited during a simulation and (ii) the Simpson’s diversity index of all visited food sources. In this project (<https://doi.org/10.1101/2023.11.01.565092>), 30 simulations were run for 36,000 ticks in each parameter combination.

**Contributors**

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