The BeeMapp app is a tool for beekeepers to explore how forage availability may affect the development of their colonies. BeeMapp allows the mapping of nectar and pollen sources to create input files for the free honeybee model BEEHAVE (http://beehave-model.net/). We recommend that you install the latest BEEHAVE_BeeMapp version on your computer and make yourself familiar with its functionality. A detailed description and a user manual are available on the website.

The BeeMapp app, available for iOS and Android:
> https://itunes.apple.com/us/app/beemapp/id1010236321?ls=1&mt=8
> https://play.google.com/store/apps/details?id=uk.ac.exeter.BeeMapp

BeeMapp - step by step instructions:

1.) Create a new colony: Choose the location of your colony on a map, add a name for the colony and select a hive type - save!

2.) Select a colony to add food sources (or swipe left to edit/delete the colony):
Give the food source a name, define its location and area on a map, choose the crop type (or click "Other" to set up your own). The flowering period can be modified. If "Maintain Flowering Period" is on (green), then the start (or end) date is automatically changed if you change the end (or start) date. Based on the size of the field, the total amount of nectar and pollen is calculated for the whole flowering period.
By swiping left on the food source's name, you can delete it or copy it to another colony.
Add as many food sources to your colony as you like!

3.) Click "Create BEEHAVE Input" to export the dataset and run the BEEHAVE model in your landscape! Select the food sources you wish to include and "Export" to email your file to the address you provide.

4.) You can modify the BEEHAVE runs by providing more data about your colony within BeeMapp: click "Assessments" - "Create Colony Assessment", "Frame Information": Now add a hive box, select a frame type and count the number of seams (space between 2 frames) populated with bees in this box and the number of frame equivalents with honey (e.g. 1 means one comb with both sides filled with honey or two combs with only one side of honey stores). Assess the amount of capped brood in the same way as the honey and repeat for all the boxes of your hive. Finally check if the queen, eggs and larvae are present in the colony and save. These data can now be exported ("Create BEEHAVE Input"). Colony assessments can be repeated throughout the year.

As a BEEHAVE simulation can run for one or several years, you might wish to add food sources which are not present yet, but will be available later in the year. This allows you to better assess colony size and honey stores at the end of the season.

To run BEEHAVE in the landscape mapped with BeeMapp, just save the created input files in the BEEHAVE folder on your computer. Set (on the BEEHAVE interface) *ReadInfile* "on" and provide the file name in *INPUT_FILE* to read in the food sources you have mapped and set *ReadBeeMappFile* "on" and provide the file name in *BeeMapp_FILE* to correct BEEHAVE runs according to your colony assessments.

Finally, we would like to emphasize that BEEHAVE, as well as BeeMapp, are part of ongoing research. Accurately simulating a specific colony's growth and behaviour relies on using appropriate input data for this colony. BeeMapp helps by capturing information about forage near your colony but additional data (e.g. your queen's egg-laying rate) is needed to improve the accuracy of the model predictions. At the current time, we are therefore unable to offer any warranty. However, we are happy to receive your feedback and constructive criticism - just send an email to beehave@exeter.ac.uk.