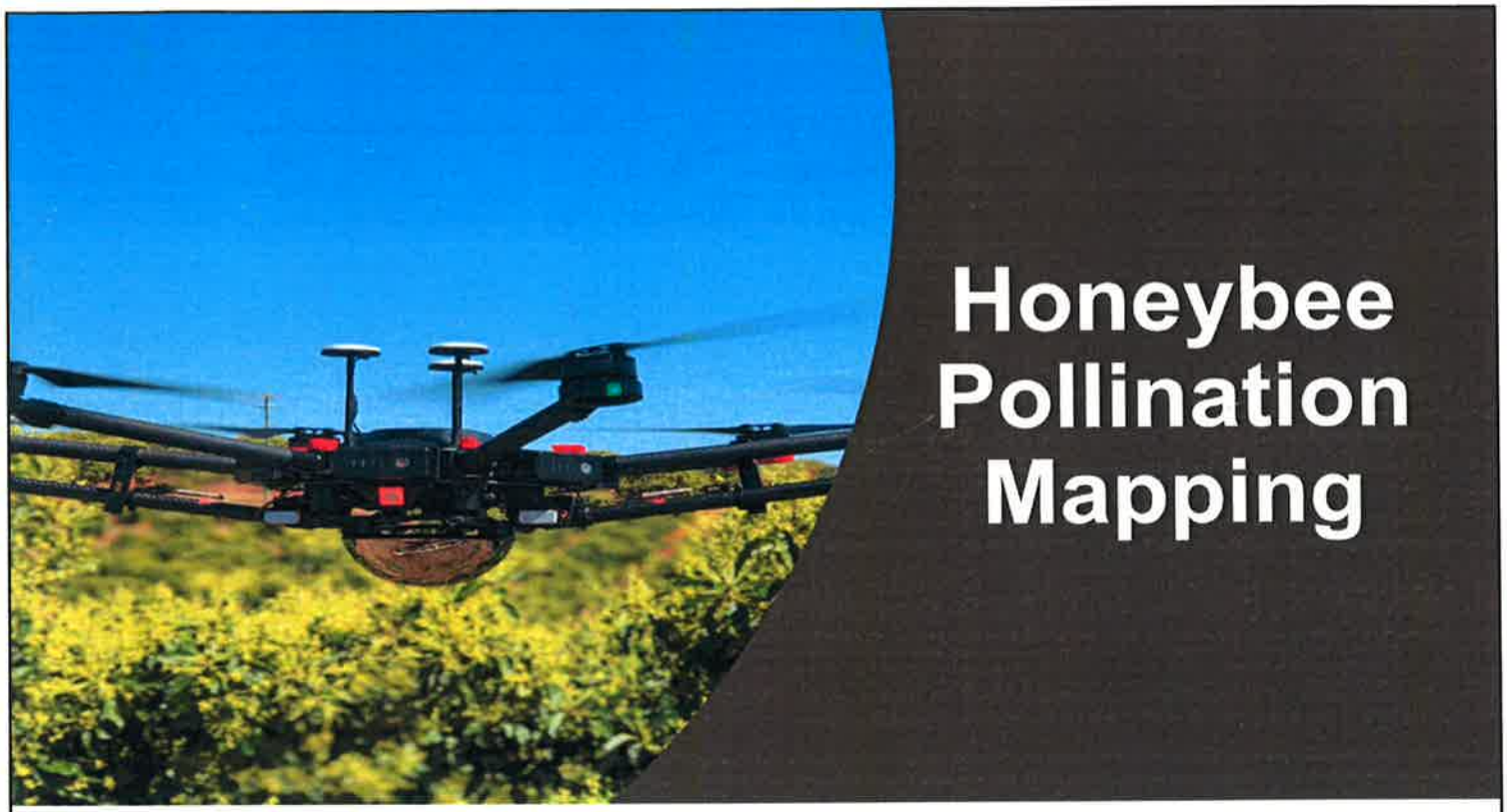

Honeybee Pollination Mapping

The Technology

Bee Innovative's 'BeeDar' technology is a radar-based system that monitors individual bee movement and pollination activity in near real-time.

The system consists of a radar 'dish' mounted to an aerial drone, which transmits data to an associated software program capable of converting the data into pollination density maps.

Pollination activity is measured by the number of bees active in each square metre of crop in a one-hour period. Data is collected from multiple flights and aggregated into 'heat' maps that indicate the variation in pollination activity for a given crop or farm.

Trials

The BeeDar system was trialed on four watermelon crops grown on separate farms in the Bundaberg area during November 2021.

The system was flown over each crop three times (morning, midday and afternoon) over three separate days, for a total of nine flights per crop.

Immediately prior to harvesting, three 10m x 10m areas of crop were demarcated in two of the crops. A test sample of 50 melons from each area was weighted and measured. This data would be used to ground truth trial results.

Findings

Each crop requires different levels of pollination, so density levels indicated on respective heat maps are also different. For this trial, the pollination levels were represented as:

- Red- 0-20 bees/m^2/hr
- Yellow- 21-50 bees/m^2/hr
- Green-- 51-99 bees/m^2/hr
- Dashed Green-> 100 bees/m^2/hr

Resulting pollination maps for the four trial farms are shown below (Note the white icons representing beehive location on farms):

As indicated in the sample heat maps, pollination activity varied between and within the trial crops.

Some pollination variation is a function of where the beehives are located relative to the crop; lower pollination is achieved further from the hive. Other variations are caused by structures, tree lines or prevailing winds.

As expected, the ground truthing data demonstrated a good correlation between pollination activity and crop yield. An average 30% variation in melon size and weight was recorded between green and red zones for the sampled crops.

Costs

Bee Innovative's current model for the BeeDarr service includes a specialist drone operator, provision of density mapping, data interpretation and recommendations for improved pollination.

Costs for this service vary according to the area being mapped and crop type, from $40/ha for areas greater than 400ha to $150/ha for small areas, e.g., 10ha. These costs do not include travel for the drone operator.

Grower Feedback

Upon trial completion, the growers provided the following combined feedback:

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
I see value in this technology					✓
I intend purchasing this technology				✓	
I recommend this technology to other growers					✓
The system provided greater insights to my crop pollination					✓
I am satisfied with the service and support provided by the AgTech company				✓	

Other Considerations

At time of publication, Bee Innovative was exploring other options for provision of the BeeDarr service, including leasing of the technology through approved, local drone operators. Another option for individual, smaller growers to reduce the cost is to merge farms with other growers to form a single integrated mapping zone.

Further Information

For further information on this trial, including details of participating growers, please contact:

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