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More than doubling the honeybee pollination capability using an innovative hive design: experiment on the field and results

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Pollination is a critical environmental service provided by bees that helps to insure food security by increasing the bounty and genetic diversity of plants that we and our livestock depend upon.

Many beekeeping operations rely on income generated from locating hives of bees onto farmland in order to pollinate crops. Unfortunately, beekeepers also need to manage increased operational costs, and contend with high colony mortality. The decreased profitability and unpredictable high risks has become a barrier to beekeepers, leading to a potential shortage in agriculture pollination services and threat to food security.

This research explores the use of innovative hive design and related methodology to double pollination capability, while reducing operational costs.
Fifty (50) honey bee colonies were installed into two types of hives: 25 high thermodynamic efficiency Primal Bee hives and 25 standard wooden Langstroth hives in a commercial operation in Israel. The two groups of colonies were managed in the same way, overwintered and then used to measure and compare survivability and spring pollination activity through the metrics of brood area and forager timing and frequency of bee flights.

The colonies managed in thermodynamic Primal Bee hives resulted in larger brood areas, larger forager populations which began foraging flights earlier and ended foraging later in the day, resulting in increased flight activity by quantity and frequency compared to colonies managed in standard Langstroth hives. The increase in population dynamics resulted in increased pollination services. Data collected on the field show a remarkable difference between the two groups, with Primal Bee hives providing even more than double the pollination capability.

The data collected were used in a comparative analysis of the economics of pollination services. The results demonstrated a margin within which commercial beekeeping operations can reduce the risk of high colony mortality, and increase profitability while providing pollination services to insure our food supply.