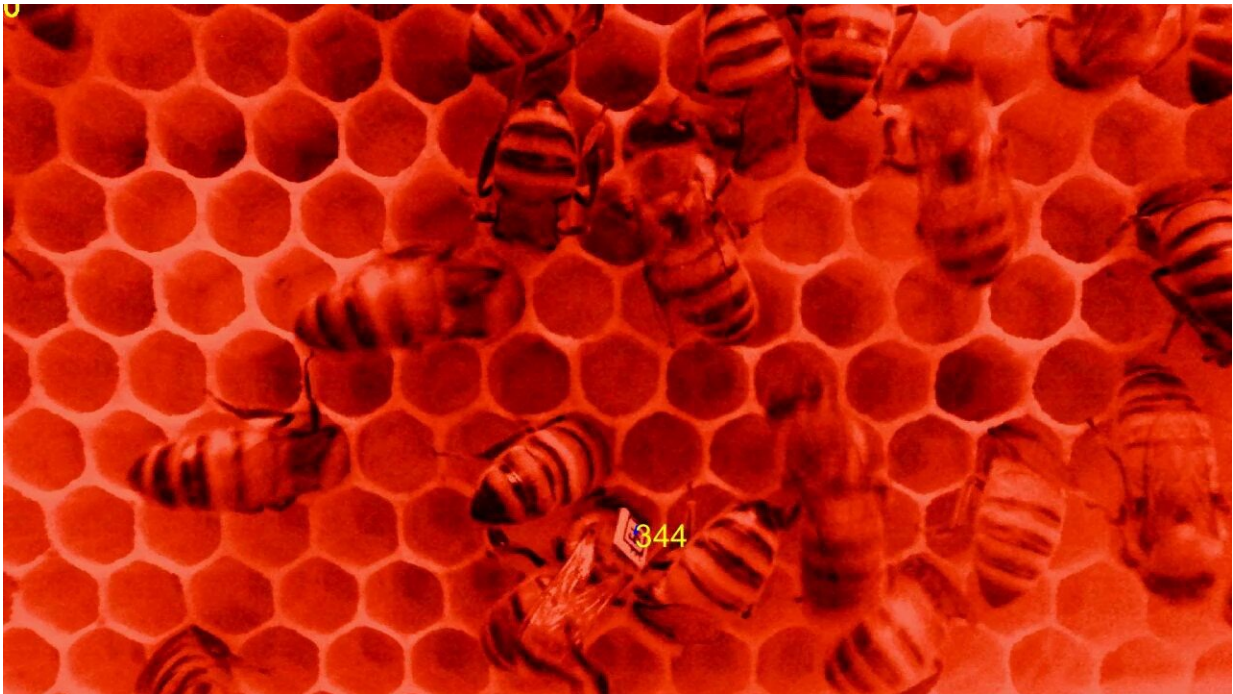


# Healthy bees, healthy planet: The impact of balanced diets on honeybee colonies

July 29 2024

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Under red light (used to film the bees without disturbing them), one barcoded bee as detected by the image-analysis software and its personal identification number appears on the screen. Credit: Danny Minahan/Hebrew University of Jerusalem

A new study from the Hebrew University of Jerusalem has revealed that a balanced diet is essential for the optimal health and task performance of honeybees, a key species for pollination and ecosystem stability. The

study, led by Prof. Sharoni Shafir from the Robert H. Smith Faculty of Agriculture, Food and Environment, investigates how honeybees balance their nutritional intake to maintain homeostasis and enhance fitness.

The findings indicate that an unbalanced diet with a high omega-6:3 ratio (5:1) significantly affects the bees' ability to nurse [larvae](#), delaying the onset of nursing, reducing the frequency of nursing visits, and altering the attention given to larvae of different ages. The study is [published](#) in the journal *Animal Behaviour*.

To test these effects, 1-day-old adult worker bees were fed either a [balanced diet](#) or an unbalanced diet for seven days. The bees were then released into a common-garden hive, tagged with barcodes, and continuously filmed for six days. The analysis revealed that those on the unbalanced diet exhibited delayed nursing behavior and reduced efficiency in caring for larvae, particularly in differentiating between 3-day-old and 4-day-old larvae.

"Balanced nutrition is fundamental for [honeybee](#) colonies, impacting not just individual health but also the overall efficiency and survival of the hive," said Prof. Shafir. "Our study underscores the importance of maintaining a balanced omega-6:3 ratio in the diet of honey bees to ensure they can perform their crucial roles within the colony effectively."

The implications of this research are far-reaching, particularly in cultivated landscapes where the availability of nutritionally balanced pollen sources may be limited. The shift towards a greater omega-6:3 ratio in these areas could pose a significant threat to bee populations, affecting their health, [cognitive abilities](#), and ability to sustain their colonies.

"This study opens new avenues for further research linking fitness-

related behaviors to nutritional balancing in honeybees," added Prof. Shafir. "It also highlights the need for [conservation efforts](#) to ensure diverse and nutritionally adequate pollen sources are available for these essential pollinators."

The research aligns with broader findings in other species, where nutritional imbalances are known to affect survival, [reproductive success](#), and offspring health. It calls for increased awareness and measures to support the nutritional needs of honeybees, essential for maintaining their populations and the vital pollination services they provide.

**More information:** Danny Minahan et al, Unbalanced dietary omega-6:3 ratio affects onset of nursing and nurse–larvae interactions by honey bees, *Apis mellifera*, *Animal Behaviour* (2024). [DOI: 10.1016/j.anbehav.2024.05.007](#)

Provided by Hebrew University of Jerusalem

Citation: Healthy bees, healthy planet: The impact of balanced diets on honeybee colonies (2024, July 29) retrieved 29 July 2024 from <https://phys.org/news/2024-07-healthy-bees-planet-impact-diets.html>

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