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Understanding and improving honey bee nutrition

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Poor nutrition is a one of the major factors implicated in honey bee colony declines world wide. Optimal nutrition is critical in maintaining strong immunity and better survival of honey bee colonies. Although honey bee nutrition has been studied for a relatively long time, there are still huge gaps in knowledge, especially regarding the role and requirements of micronutrients. Further, beekeepers (especially commercial beekeepers) invest significantly in protein supplements, purchasing large quantities annually to maintain colony health. However, despite the widespread use of these protein supplements, there is a scarcity of information on their efficacy or their return on investment (ROI). The existing research on protein supplements is often incomplete, with many studies lacking critical data on the impact of these diets under both laboratory and field conditions.

The goal of our research was to understand and improve honey bee nutrition by (1) investigating the role of 24 methylenechlesterol (24MC) in honey bee nutritional physiology (2) building a comprehensive pollen nutritional composition database by analyzing protein, lipids, amino acids and phytosterol profiles in 100 pollens utilized by bees and (3) evaluating efficacy of commercially available protein supplements.

Our findings suggest that honey bees fed diets with a sterol concentration of 0.5% survived the longest and their head protein and abdominal lipid levels were also among the highest. Our study also provides additional insights regarding the role 24MC in honey bee nutritional physiology and suggest that 0.5% concentration of 24MC may be an ideal concentration for formulating supplemental protein diets for honey bees. We have analyzed pollen nutritional composition of 100 pollens from various plant species utilized by bees. This nutritional composition data will also be discussed in this presentation. Further, the findings from the protein supplement efficacy study will also be presented and discussed.