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Hypopharyngeal glands' morphology, morphometry and vitellogenin transcription level in honey bee few with enriched diet

Claudia D'emilio¹, Valenzano Viviana², Gennaro Di Prisco², Karen Power³, Manuela Martano¹, Paola Maiolino¹

¹Dipartimento di Medicina Veterinaria e Produzioni Animali, Università di Napoli Federico II, Napoli, Italia.

²IPSP-CNR, Consiglio Nazionale delle Ricerche, Istituto per la Protezione Sostenibile delle Piante, Portici, Napoli, Italia.

³Department of Biology, University of Napoli Federico II, Napoli, Italy

Pollen is crucial for the development of hypopharyngeal glands (HPGs) and the synthesis of vitellogenin (VG), a key component of royal jelly, which is essential for larval development and queen nutrition. This study investigated the morphology and morphometry of HPGs, as well as VG transcription levels, in caged worker honey bees fed different diets. HPG morphology and morphometry were assessed using hematoxylin and eosin (H&E) stained samples, while VG transcription levels were measured via qRT-PCR. Histological analysis revealed that honey bees fed a diet of sucrose and multifloral pollen patty had more developed and functional HPG acini compared to honey bees fed only a sucrose patty. Morphometric analysis confirmed the increased HPG size in the Diet B group. While VG transcription levels varied significantly over time, they were not affected by the diet. These findings confirm that pollen-rich diets are essential for proper HPG development and function, with a positive correlation observed between glandular activity/acinar size and secretion amount. Therefore, pollen-supplemented diets represent a promising strategy for enhancing honey bee health and productivity