PP-175 [Bee Health]
Effects of Crossbreeding on Grooming Behavior in Iranian Honey Bees (Apis mellifera meda)

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Background/PURPOSE: Grooming behavior in honey bees plays a crucial role in colony health and defense against parasites, particularly the invasive Varroa destructor mite. This behavior is essential for maintaining cleanliness and mitigating the impact of external stressors, such as pests, pathogens, and environmental contaminants.

Problem Description: The western honey bee, Apis mellifera, is the most widespread and well-known species in Iran, with subspecies including the Iranian honey bee (Apis mellifera meda), Carniolan (Apis mellifera carnica), Italian (Apis mellifera ligustica), and their respective hybrids (Iranian × Carniolan and Iranian × Italian). Although previous studies have emphasized the importance of grooming in mite control, few have compared the grooming efficacy across different bee breeds, particularly in the context of Varroa destructor management.

METHODOLOGY: At the beginning of March 2024, marking the end of the wintering season for the colonies, 12 colonies from each of the five bee breeds were randomly selected and standardized based on honey and pollen stores, the number of brood frames, initial population size, and hive type (Langstroth hive). During the experimental period, the colonies did not receive any chemical treatments. Data on mite-grooming behavior and mite damage were collected weekly during the spring of 2024 at the Honey Bee Research Centre, University of Kurdistan, Sanandaj, Iran (35.27788°N; 46.99562°E).

RESULTS: The results indicated that Carniolan bees exhibited superior grooming behavior, performing significantly better ($p < 0.05$) compared to other groups. Italian bees, while still relatively hygienic, were generally less efficient at grooming than Carniolan bees. However, hybrid bees demonstrated greater grooming efficiency compared to the indigenous bees, indicating positive heterosis in the crosses and complementarity between the breeds.

CONCLUSION: These findings suggest that superior grooming performance of Carniolan bees and the increased efficiency of hybrid bees indicate that selective breeding for grooming behavior can enhance mite control and overall colony health.

Practical Implications for Beekeepers: Beekeepers can improve colony resistance to Varroa destructor by selecting higher-performing bee lines, whether purebred or hybrid. This approach may reduce the need for chemical treatments and improve colony health, ultimately enhancing the productivity and sustainability of beekeeping operations.