PP-502 [Beekeeping for Rural Development]
Selective Breeding for the Conservation and Performance Enhancement of Apis mellifera intermissa in Algeria

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The conservation of local honeybee ecotypes in Algeria is a crucial challenge to ensure the sustainability and productivity of beekeeping in the face of environmental pressures and threats to biodiversity. This study aims to establish a breeding and preservation program for local populations of Apis mellifera intermissa to improve their resilience and performance through a combination of controlled selection and mass selection techniques.

Initially, 70 mother colonies were evaluated based on specific criteria, including gentleness, frame stability, and varroa sensitivity. Using principal component analysis (PCA) with R Studio, 15 queens were selected for further assessment. In a second phase, four mother colonies were retained at the controlled mating station SFC26 and three at the SFC09 site. These colonies were chosen for their superior performance and distinct morphological traits.

In parallel, mass selection was conducted to enhance desirable genetic traits in the broader population. For biometric analysis, 1,800 worker bees were sampled—1,440 from SFC26 and 360 from SFC09—and subjected to wing morphometric analysis. Statistical evaluation of the biometric data confirmed significant variations in wing venation patterns, indicating genetic diversity and local adaptation of the selected colonies. These results reinforced the effectiveness of combining different selection techniques to achieve genetic improvements.

The study continued with the rearing of F1 drones from the selected mother colonies for further controlled matings. Daughter queens and their colonies were evaluated for honey production, brood development, and resilience to environmental stressors. The initial selection of daughter queens resulted in a new generation of bees with 20% higher honey production, better disease resistance, and increased adaptability to local climatic conditions.

This work highlights the importance of combining controlled selection and mass selection to improve the performance of Apis mellifera intermissapopulations. It contributes significantly to the sustainability of beekeeping in Algeria, promoting genetic diversity, enhancing honey production, and aligning with sustainable development goals by preserving natural resources and fostering innovation.