

Identifying *Apis millefera* Strains in Akkar District (North Lebanon) Using Mitochondrial DNA: A Step in Preserving the Local Strain *A. m. syriaca*

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Abstract : The honey bee is a social insect that had driven the human interest much more than any other organism. Beekeeping practices dated the appearance of Man on earth and now it provides a hobby or a secondary work that contributes to the family revenue and requires a little time engagement and money investment. Honey production is not the only contribution of honey bees to the economy, since honey bees play an important role in the pollination. Bee keeping in Lebanon is an important part of the agricultural economy. However, a growing concern about bees is spreading globally, due to an accelerated decline of bees colonies. This raises the alert to preserve and protect local bee strains against uncontrolled introduction of foreign strains and invasive parasitic species. Mitochondrial DNA (mtDNA) markers are commonly used in studying genetic variation in the *Apis mellifera* species. The DraI-COI-COII test is based on the analysis of the intergenic region between the two genes COI and COII. The different honey bee strains differ in the presence or absence of the p sequence and the number of Q sequences present. *A. m. syriaca* belonging to the lineage Z, is the native honey bee subspecies in Lebanon, Syria, Jordan, and Palestine. *A. m. syriaca* is known for its high defensiveness, even though it has many important advantages. However, commercial breeder strains, such as the Italian (*A. m. ligustica*), and Carniolan (*A. m. carnica*) strains, have been introduced by beekeepers and regularly used for honey production. This raises worries about the disappearance of the local subspecies. It is obvious that identifying *A. m. syriaca* colonies and protecting them against uncontrolled mating with other bee strains is a crucial step to protect and improve the original local strain. This study aims to reveal the existing sub-species of honey bee in Akkar - Lebanon and to assess the influence of introgression on the hybridization of the local strain. This will help to identify areas of pure *A.m. syriaca* population over this district to be considered in choosing *syriaca* reserves. We collected samples of bees from different regions of Akkar district in order to perform mtDNA analysis. We determined the restriction fragments length of the intergenic region COI-COII, using the restriction enzyme DraI. The results showed both the C and the Z lineages. Four restriction patterns were identified among the restriction maps of the studied samples. The most abundant mitochondrial lineage is the Z lineage constituting about 60% of the identified samples. Al-Dreib region reported the lowest introgression with foreign mtDNA of 21% making it the most suitable area for a genetic reserve of *syriaca* in Akkar based on its lowest introgression and suitable environment in addition to the attitude of local beekeepers to conserve the local strain. Finally, this study is the first step in constructing conservation programs for the preservation of the local strain and should be generalized to the whole Lebanese population, consistent with the effort done in neighboring countries.

Keywords : Akkar Lebanon, *Apis millefera syriaca*, DraI-COI-COII test, mitochondrial DNA

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