

Molecular and ecophysiological characterisation of the Tunisian bee: *Apis mellifera intermissa*

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Abstract — This study concerns the morphological identification, the molecular features and the eco-physiology of the Tunisian bee *Apis mellifera intermissa*, focused on 655 colonies from 7 populations: Kroumirie Moogod, North East Cap Bon, Ridge and Tell, high steppe, lower steppe, Atlas Chainon, Jeffara and Ouarra. The geometric morphometry of the interior wing of the bee shows polymorphism in size and shape. The size polymorphism is essentially related to beekeeping practices. The characterization by means of a cytoplasmic molecular marker - mitochondrial DNA (DNA m t) - showed that the Tunisian bee originated from lineage **A**, which contradicts its membership to lineage **M** as demonstrated by a study based on biometric data only (Ruttner, 1988). There is a genetic polymorphism of the Tunisian bee in the presence of four haplotypes: A1, A8, A9 and A4. The distribution of the A4 and A9 haplotypes depends on ecological conditions. Foreign haplotypes are present in the region of Ghardimaou near the Algerian border (C7 haplotype). The study of some ecophysiological parameters in colonies of *Apis mellifera intermissa* from 5 sites showed that the Tunisian bee is endowed with a very marked disregard for all haplotypes (A1, A4, A8 and A9). However, we report the existence of a difference between these haplotypes in thermoregulation, oviposition and respiration of solitary bees. The temperature of the A1 and A8 haplotypes brood nest is around 36°C while the A9 and A4 haplotypes brood nest has a temperature of 34°C when weather conditions are extreme. The A4 and A9 haplotypes fall into hibernation, the temperature of the brood nest ranging between 22 and 28°C. The A1 and A8 haplotypes have a high tendency to lay A9 and A4 haplotypes, which however is variable, ranging from zero to average depending on climatic conditions. A study of respiration of isolated honeybees showed a difference in oxygen consumption between haplotypes A1/A8 and A4/A9 at low temperatures.

Index Terms — *Apis mellifera intermissa*, DNA, ecophysiology, Tunisia bee, haplotypes.

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