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Balancing conflicting needs - A case study in the conservation of the endemic honeybee, *Apis mellifera ruttneri*

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Apis mellifera ruttneri is an endemic honeybee confined to the Maltese Islands and is one of just ten honey bee sub-species described in Europe. It is an important receptacle of environmental adaptations and if it is to thrive, it is essential that suitable habitats that can provide adequate foraging, with minimal exposure to competitors and pathogens are available.

For many years this endemic sub-species was considered to have become extinct from the Maltese Islands. In the 1980's, replacement programmes, using *Apis mellifera ligustica* in particular, were used to regenerate the apiculture industry. In this communication we report how in 2014, morphometric analysis of 33 parameters identified a number of honeybee colonies that exhibited the morphometric traits of *A. m. ruttneri*. Principle Component Analysis (PCA) and Discriminant Analysis (DA) were used to statistically confirm that *A. m. ruttneri* exhibiting the original characters survived. Analysis of the mitochondrial DNA of specimens from these same colonies showed the prevalence of mitochondrial haplotypes associated with an African lineage (A4, A8 and A9; 20%, 8.5% ,57.1%), although foreign haplotypes were also present.

The low number of colonies (35) identified as *Apis mellifera ruttneri* is a cause for concern where the initiation of a nation-wide identification programme, as well as a breeding programme taking due care of the effects of the latter on the gene pool are recommended. Likewise, the designation of special areas with adequate foraging for *Apis mellifera ruttneri* colonies and isolated mating stations is essential if the local honeybee is to thrive. However given the highly urbanised nature of Malta (>33% of land area), the ongoing loss of agricultural land and the needs of an expanding population (> 436,947 persons) the provision of such areas may be difficult. In this

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communication, the mean hive density (MHD) (9.94 colonies per km^2) for all honeybees on the Maltese Islands will also be presented. The factors affecting the validity of this value, the significantly higher nature of this MHD in terms of the values reported for other countries in the Mediterranean region and the effects on *A. m. ruttneri* colonies will be discussed. The results from a first analysis of the protein content in pollen in Maltese colonies is also reported and analysed in terms of the implications on the sustainability of the Maltese apiculture industry. Finally the issues generated by the unregulated importation of competing honeybees with the unintended introductions of pathogens will also be presented.