



A COMPARATIVE STUDY OF COLONY PERFORMANCE, HYGIENIC BEHAVIOUR AND PARASITE AND DISEASE INFECTION IN THE ENDEMIC HONEYBEE *A. M. RUTTNERI* AND THE INTRODUCED *A. M. LIGUSTICA* IN MALTA

Marina D. Meixner¹, David Mifsud², Marion Zammit-Mangion³, Simone Cutajar⁴, Thomas Galea⁵, Aleksandar Uzunov^{1,6}

¹ Landesbetrieb Landwirtschaft Hessen - Bieneninstitut Kirchhain, Erlenstraße 9, 35274 Kirchhain, Germany

² University of Malta, Rural Sciences and Food Systems, Institute of Earth Systems, Msida MSD 2080, Malta

³ University of Malta, Department of Biochemistry and Physiology, Msida MSD 2080, Malta

⁴ Greenhouse Malta (VO/0296), 14, Mintba Street, Marsaskala, MSK 3370, Malta

⁵ Breeds of Origin, 63, Triq Nerik Sant, Zebbug, Malta

⁶ Ss. Cyril and Methodius University in Skopje, Faculty of Agricultural Sciences and Food, Str. 16-ta Makedonska brigada No 3, 1000 Skopje, Macedonia

Apis mellifera ruttneri, the honey bee subspecies endemic to Malta, must be regarded as seriously endangered. However, there is a critical need for scientific data to support and guide conservation measures, since only two scientific papers concerning this subspecies were published since its original description in 1997. To this end in June 2017, a first systematic study was initiated to compare colony development, performance, hygienic behaviour and infection levels of honey bee diseases of the endemic honey bee with introduced colonies of *A. m. ligustica*. A total of 33 colonies (*A. m. ruttneri*, n=15 and *A. m. ligustica*, n=18, headed by sister queens) were evenly distributed across two locations on Malta, at a central site UNI (n=17) and a site in the Southern region SIGG (n=16). After an initial treatment against *Varroa destructor*, no further chemical treatment was performed. Standard methods are used to assess colony productivity and behaviour (number of adult bees, number of brood cells, number of visible cells with pollen) in regular intervals. Hygienic behaviour is assessed using the pin test method; *Varroa* infestation is monitored using powdered-sugar and natural mite fall methods. Assessment of infection levels with *Nosema* spp. and the most common honey bee viruses is also being carried out. The selected commercial stocks of *A. m. ligustica* remain consistently less defensive and calmer on the combs. However, by spring 2018, the *A. m. ruttneri* colonies in general showed higher numbers of adult bees, brood cells and pollen cells. Early seasonal drone production and significant swarming behaviour were observed in the colonies of the endemic bee, but not in *A. m. ligustica* colonies. The baseline data on the performance of native and introduced genotypes under Maltese environmental conditions provided by this study will contribute to guiding beekeepers in their decision on queen purchases, and ultimately, support conservation measures for *A. m. ruttneri*.

