

ABSTRACT

Ph.D. Thesis

PHYSIOLOGICAL AND BEHAVIOURAL CHARACTERS OF CAUCASIAN (*Apis mellifera caucasica*), ITALIAN (*Apis mellifera ligustica*) AND AEGEAN ECOTYPE OF ANATOLIAN (*Apis mellifera anatoliaca*) HONEY BEES AND THEIR CROSSES UNDER AEGEAN REGION CONDITIONS

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In this study, Aegean[♀] x Aegean[♂], Caucasian[♀] x Caucasian[♂], Aegean[♀] x Caucasian[♂], Caucasian[♀] x Aegean[♂] and Italian[♀] x Aegean[♂] honey bee genotype groups were compared with respect to some physiological and behavioural characters such as colony development (brood area and worker population), flight activity, aggressiveness, wax building ability, swarming and honey production under the conditions of Aegean region. The queens were reared from each of breeder colonies of Aegean, Caucasian and Italian honey bees by grafting method in April and May 2006. When they were 7 to 10 days old, each of the queens was instrumentally inseminated with 8µl semen collected from drones of Aegean or Caucasian colonies to constitute pure and cross genotype groups. After they started oviposition in mating nuclei, they were introduced into colonies. The colonies were equalized with regard to brood area and worker population in September 2006, and then they were overwintered. Statistically significant differences were detected between genotype groups ($P<0.01$) and 10 measurement periods ($P<0.01$) in the brood area, the number of combs covered with bees and flight activity. The differences in honey production between genotype groups were also found to be statistically significant ($P<0.05$). The mean brood areas and the number of combs covered with bees of Aegean[♀] x Aegean[♂], Aegean[♀] x Caucasian[♂], Caucasian[♀] x Caucasian[♂], Caucasian[♀] x Aegean[♂] and Italian[♀] x Aegean[♂] genotypes were 4137.9 ± 302.07 cm² and 8.0 ± 0.44 , 4303.4 ± 282.62 cm² and 8.4 ± 0.40 , 1891.4 ± 227.31 cm² and 4.6 ± 0.36 , 3704.5 ± 357.52 cm² and 7.8 ± 0.42 and 4583.7 ± 325.72 cm² and 9.5 ± 0.43 , respectively. The mean flight activities of Aegean[♀] x Aegean[♂], Aegean[♀] x Caucasian[♂], Caucasian[♀] x Caucasian[♂], Caucasian[♀] x Aegean[♂] and Italian[♀] x Aegean[♂] genotypes were found to be 9 ± 2.04 , 33.5 ± 2.02 , 19.9 ± 1.28 , 28.9 ± 2.67 and 39.7 ± 2.23 bee per minute, respectively. The mean honey yields of Aegean[♀] x Aegean[♂], Aegean[♀] x Caucasian[♂], Caucasian[♀] x Caucasian[♂], Caucasian[♀] x Aegean[♂] and Italian[♀] x Aegean[♂] genotypes were determined as 3.4 ± 0.48 , 4.8 ± 2.41 , 2.8 ± 0.93 , 5.5 ± 1.98 and 7.8 ± 3.69 kg, respectively.

The colony development and honey production of Caucasian honey bee were inferior to those of Aegean, Italian and their crosses under Aegean region conditions. Climatic conditions deviated from average conditions of region during this study resulted in poor colony performances of honey bee colonies. In case of the continuation of climatic changes hereafter, it can be concluded that rearing of Caucasian honey bee will not be possible in Aegean region.

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Key words: Instrumental insemination, crossbreeding, brood area, number of combs covered with bees, flight activity, honey yield