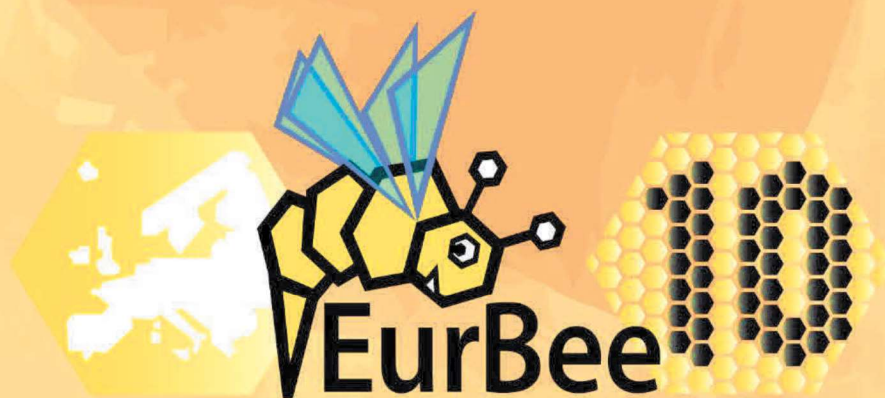




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AN UNCONVENTIONAL POPULATION GENETIC ANALYSIS USING HONEY AS A SOURCE OF ENVIRONMENTAL DNA: APPLICATION IN CASTANEA SATIVA GENETICS

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Abstract

Honey bees are considered generalist foragers because they collect nectar and pollen for their nutrition based on the availability of flowers. The European chestnut (*Castanea sativa*) holds significant value in beekeeping due to its abundant nectar production. While chestnut trees bloom, honey bees can produce chestnut monofloral honey, a unique and highly appreciated honey type. The production area of chestnut honey corresponds to natural distribution of this common deciduous monoecious tree (with domestic and wild varieties), which covers southern Europe, including the entire Italian peninsula. Chestnut honey contains chestnut tree pollen which is a source of chestnut tree DNA. In this study, we obtained information on the genetic variability of *C. sativa* by analysing DNA extracted from 56 chestnut monofloral honey samples produced in Italy. DNA was analysed with 16 chestnut microsatellite markers commonly used to genotype *C. sativa* genetic resources. These microsatellites are molecular markers that can also provide the identification of chestnut varieties, which are mainly related to fruit and flour production. In each honey sample, the DNA fingerprinting was compatible with the presence of more than one chestnut varieties. The fingerprinting of some honey samples suggests the presence of wild chestnut trees often used for wood production. The results revealed a high level of genetic variability in the Italian chestnut tree population. The presence of multiple microsatellites per sample is due to the honey bee foraging activity that can visit several plants in an area of 3 km radius; on the other hand, the chestnut wild tree is more polliniferous than the domestic one and this can explain the high quantity of its pollen inside the honey samples. In summary, our study provided a novel overview of the genetic variability of chestnut accessions in Italy and insights into the honey bees' preference for certain chestnut tree varieties.