

The European Commission supports Europe's largest bee research project to date with 6 million Euro.



The diversity of Europe's bee races is the result of natural selection in which each bee has adapted to the climate, vegetation, parasites, and diseases of its unique environment. This naturally led to a vast number of different bee races occurring across the continent. Today, the situation has changed drastically. One reason is the Asian *Varroa destructor* mite, which is tolerated well by native Asian honeybees (*Apis cerana*), but has led to catastrophic losses of European honeybee colonies (*Apis mellifera*) both in Europe and abroad. In addition we observe a systematic replacement of many native European bees with two specific races that have been bred for productivity, gentle behavior, and disease resistance for many years. Both of these factors drastically reduce the genetic diversity of honeybees in Europe and endanger sustainable, regionally-acclimated beekeeping.

In the 6 million Euro, EU-sponsored "SMARTBEES" project, geneticists, molecular biologists, parasitologists, virologists, immunologists, communication specialists, mathematicians, and bee specialists from eleven countries are cooperating to address this problem. The aim of this international project is to analyze the current state of genetic diversity among Europe's bees and to improve it using appropriate methods. Beyond that, the participating scientists will take on the dangerous interrelationship between bees, mites, and viruses to identify which mechanisms allow otherwise innocuous viruses to become so dangerous in combination with Varroa mites.

The reasons for differences in bees' resistance capabilities will also be investigated using the most modern molecular-genetic methods available. Beekeepers' dissatisfaction with the performance of native bee races was the fundamental reason for their replacement with races enhanced by breeding technology. Therefore, breeding

strategies that have proven themselves to be very successful should be adapted for use with previously neglected bee races. This way, these races can be modified to optimally suit the needs of local beekeepers. This will also stop their ecological suppression. Data from the European Reference Laboratory for Bee Diseases will be analyzed in order to prepare for diseases and threats that are not currently problematic, but may become so in the future. Hundreds of thousands of Europeans are involved in beekeeping. The project's findings and development of new methods and strategies will only lead to a sustainable improvement of bee health and diversity if European beekeepers are actively involved. A working group specializing in knowledge transfer will prepare the findings for practical use, creating learning modules and building information networks within and between countries. As the coordinator, Prof. Dr. Kaspar Bienefeld from the Institute for Bee Research Hohen Neuendorf, stated at the beginning of the project, "this is the first time that such disparate disciplines have to come together at such a high level of cooperation to address the problem of bee losses. The challenge is complex, but the project's multidisciplinary concept opens up great opportunities to sustainably improve both the health and genetic diversity of Europe's bees."

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