

# Sixth European Conference of Apidology



Murcia (Spain) 9 -11 September 2014



**Sixth European Conference of Apidology**  
**9-11 September 2014**

Edited by Pilar De la Rúa

**President**

M<sup>a</sup> Pilar De la Rúa Tarín

**Secretary**

Francisco A. Tomás Barberán

**Scientific Committee**

Alice Pinto, Anton Stabentheiner, Beth Nicholls, Geoffrey Williams, Geraldine Wright, Helmut Kovac, Michael Lattorff, Patrizia D'Ettore, Per Kryger, Raquel Martín-Hernández, Stephan Wolf, Silvio Eler, Vassya Vankova, Wolfgang Blenau.

**Local Organizing Team**

José Serrano Marino, José Galián Albaladejo, Irene Muñoz Gabaldón, Raquel Hernández García, Miguel Hurtado Burillo, Laura Jara Nicolás, Ana Asensio Pérez

**Congress Secretariat**

GADE Eventos

**Photographs and cover design by**

José A. Acosta Martínez

Printed by: Universidad de Murcia. Servicio de Publicaciones

ISBN: 978-84-697-0855-2

Depósito legal: MU-844-2014

# Table of contents

|  |            |
|--|------------|
| <b>Programme</b> .....   | <b>6</b>   |
| <b>Preface</b> .....   | <b>11</b>  |
| <b>Plenaries</b> .....   | <b>13</b>  |
| <b>Oral presentations</b> .....                                  | <b>19</b>  |
| 1. Advancing bee health .....                                    | 21         |
| 2. Population genetics and conservation .....                    | 51         |
| 3. Effects of stressors on the behavior of bee pollinators ..... | 71         |
| 4. Physiology .....  | 83         |
| 5. Bee products .....  | 95         |
| 6. Advances in chemical ecology of bees .....                    | 101        |
| 7. Genomics .....  | 107        |
| 8. Neural basis of behavior in the honeybee .....                | 111        |
| <b>Poster presentations</b> .....                                | <b>115</b> |
| <b>Author index</b> .....  | <b>217</b> |

the Cevennes national Park launched an interdisciplinary study to record this disappearing traditional ecological knowledge. A major goal of the study is to better understand the distribution of black bees through comparative sampling of bees in framehives, in log-hives and in the wild. Identification of bees is performed by both morphometrical geometry and mitochondrial DNA analyses (COI-COII). Morphometrical results establish that black bees are still present throughout the national Park, but hybridization is also ubiquitous and affects more than 30% of sampled bees. mtDNA sequencing shows that west European evolutionary lineages (M) have almost disappeared in local framehives but still persist in some log-hives. Collected information will be used by the national Park as a means to implement a conservation policy. The challenge is to bring together all beekeeping stakeholders and their respective expectations in order to achieve the conservation of this subspecies.

**Population structure of Iberian honey bees: concordance among mtDNA, geometric morphometrics and SNPs**

M. Alice Pinto, Julio Chávez-Galarza, Dora Henriques, Tiago M. Franco, José Rufino, Irene Munõz, Pilar De la Rúa, Spencer Johnston

Mountain Research Centre (CIMO), Polytechnic Institute of Bragança, *Campus* de Sta. Apolónia, Apartado 1172, 5301-855 Bragança, Portugal

E-mail: apinto@ipb.pt

No other honey bee subspecies has caught so much attention from evolutionary biologists as *Apis mellifera iberiensis*. For over 25 years, Iberian honey bee populations have been surveyed using a wide range of markers, including morphometry, allozymes, mtDNA, microsatellites, and more recently SNPs. Despite the numerous studies, diversity patterns of Iberian honey bees are still not fully dissected and understood. In this study we performed a fine-scale sampling at both geographical and genomic level. Samples from over 711 colonies were collected across three north-south transects. These samples were sequenced for the mitochondrial tRNA<sup>leu</sup>-cox2 intergenic region, scored using geometric morphometrics of forewings, and genotyped for over 383 SNP loci. The three sets of markers concurrently supported the existence of a north-south cline, a pattern that contrasts with the absence of structure inferred from microsatellites. To test the hypothesis that selection has shaped and maintained the nuclear cline, we employed four FST-based outlier methods on the SNP data set. These analyses enabled detection of 74 outlier loci, which supports the selection hypothesis. However, neutral structure, inferred following removal of outliers, was able to recapture the north-south cline, which suggests that selection is not the only evolutionary force shaping the Iberian cline. Our findings further highlight the complexity of the Iberian honey bee diversity patterns and reinforce the importance of this southernmost European territory as a reservoir of *Apis mellifera* genetic diversity, a resource increasingly important in a rapidly changing and demanding world.