



## Editorial

### SPECIAL ISSUE ON BEES

Undoubtedly bees are some of the most extensively researched group organisms on Earth, and this might have to do with a long history of coexistence between these insects and humans. Honey bees and other social bees have been exploited for food since prehistory, and their charms as highly elaborated societies have puzzled curious individuals, from naturalists, philosophers to scientists. Currently, we stand at a stage of having documented the existence of approximately 20,000 species of bees worldwide (and expect that some few thousand more await to be taxonomically described), having characterized genomes of more than a handful of species, and having studied several facets of the basic as well as the applied biology of hundreds of species. In contrast to the impressive body of knowledge about bees nowadays, there exists a massive number of questions begging to be addressed too. This may be an apparent effect of the principle that “the more we learn, the more we realize how much we don’t know.” This is a quote attributed to Albert Einstein, who supposedly also had his concerns about bees! The present issue of *Sociobiology* is dedicated to our beloved bees, to allow us all to learn more about them, but to realize how much we still do not know. In this special issue, we celebrate the 6th anniversary of the publication of the journal *Sociobiology* in Brazil. We are pleased to have a Special Issue on Bees and to have its publication happening concurrently with the XII *Encontro sobre Abelhas*, an event that has allowed bee biologists from various parts of Brazil to gather since 1994.

This issue is composed of 32 papers, dealing with a diversity of topics that reflect the vigor of contemporary bee research. One contributed paper presents an extensive revision on the economic and cultural values of stingless bees among ethnic groups of tropical regions of the Americas – in this case, a collaboration among researchers from four different countries provided examples of successful regional strategies in averting the cultural and economic loss in natural human heritage. Other topics represented in the volume include comparative molecular cytogenetics in *Melipona*, the identification of candidate reference genes for one orchid bee species, and the evaluation of the stability of gene expression across different developmental stages and a characterization of leucine-aminopeptidase A (LAP-A) orthologs in the genome of bee species with varying levels of social organization, and the search for molecular markers to delimit subspecies of bees as well as the application of DNA barcoding to investigate taxonomic questions within a highly polymorphic species. Likewise, comparative analyses are employed to evaluate the intraspecific morphological variation in different contexts, including an investigation of the influence of drought periods on the morphological variation among populations using traditional and geometric morphometric techniques, and analyses of the chemical compounds that might have a pheromonal role in cephalic salivary gland and epicuticle.

From an ecological perspective, there are questions of different natures that help to interpret the importance of characterizing local and regional assemblies of bees to explain aspects of the distribution of diversity through space and how this relates to the biology. These include the level of landscape heterogeneity regarding forest cover and an evaluation of the effect of this factor on bee diversity, the ecology of bee communities in natural and semi-natural habitats, and the analysis of the interaction between geographic range spatial niche overlap in future climate change scenarios. Moreover, bee foraging behavior and diets are investigation topics discussed in this special issue as well as the effects of seasonality on the trophic niche. The general (and growing) interest for pollination is examined when talking about the role of bees as pollinators of agricultural crops and their impact on the productivity at large, and the effects of improved pollination efficiency in greenhouses. Two important applications of basic knowledge about bee biology and their diets are investigation that relates the consumption of fermented artificial protein diet honey bees and its effect on the levels of hemolymph protein and vitellogenin, and the examination of the impact of pesticide toxicity on different species of stingless bees and the assessment of potential risks regarding their exposure to pesticides. Five additional topics complete the range of subjects covered in this special issue: the robbing behavior and plasticity to obtain food resources in the eusocial stingless bees, the description of eusocial behavior in a

sweat bee (Halictidae) species reared in the laboratory, nesting biology of solitary bees, behavior of males and the investigation of toxic metals in honey and propolis.

The future of bee research looks prosperous and is clearly pointing out to very diverse directions. It is a pleasure for Sociobiology to publish this Special Issue and, thus, allow the expression of the enthusiasm for bee research! We thank all authors and reviewers for this interesting and important special issue. Last but not least, we would like to dedicate this special issue to Dr. Warwick Kerr, whose academic legacy echoes in the work of several bee researchers throughout Brazil and elsewhere.

Sincerely,

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