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GUEST EDITORIAL

The COLOSS *BEEBOOK* - Part 1

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The COLOSS *BEEBOOK* is a practical manual compiling standard methods in all fields of research on the western honey bee, *Apis mellifera*. The COLOSS network was founded in 2008, as a consequence of the heavy and frequent losses of honey bee colonies experienced in many regions of the world (Neumann and Carreck, 2010). As many of the world's honey bee research teams began to address the problem, it soon became obvious that a lack of standardized research methods was seriously hindering scientists' ability to compare and interpret the results on colony losses obtained internationally. In its second year of activity, during a COLOSS meeting held in Bern, Switzerland, the idea of a manual of standardized honey bee research methods emerged. The manual, to be called the COLOSS *BEEBOOK*, was inspired by publications with similar purpose for fruit fly research (Lindsley and Grell, 1968; Ashburner 1989; Roberts, 1998; Greenspan, 2004). Production of the *BEEBOOK* started after recruiting experts to lead the compilation of each research domain. These senior authors (first in the author list) were tasked with recruiting a suitable team of contributors to select the methods to be used as standards and then to report them in a user-friendly manner (Williams *et al.*, 2013). The initial *BEEBOOK* project will be divided into three volumes: The COLOSS *BEEBOOK*, Volume I: Standard methods for *Apis mellifera* research; The COLOSS *BEEBOOK*, Volume II: Standard methods for *Apis mellifera* pest and pathogen research; and The COLOSS *BEEBOOK*, Volume III: Standard methods for *Apis mellifera* product research.

The reader may wonder what is the difference between the *BEEBOOK* and existing OIE, OECD, and other recognized standards? In the *BEEBOOK*, we often refer to OIE, OECD, and other standards, since they describe methods to diagnose pests and diseases or to, for example, perform routine analyses for toxicity tests. The *BEEBOOK* however, goes well beyond diagnosis and routine analyses, by describing the methods to perform research on the honey bee and associated organisms. Where necessary, the *BEEBOOK* recognizes existing standards such as those provided by the OIE and OECD, and presents a harmonized compendium, written and reviewed by an international team of scientists.

Papers in the *BEEBOOK* are organized according to research topics. The authors have compiled the most frequently used methods in each domain of research. These methods are for both laboratory and field research. We recognize that it is often necessary to use methods from several domains of research to complete a given experiment with honey bees. Whenever there is a need for multi-disciplinary approach, the manual describes the specific instructions necessary for a given method, and cross references all general methods from other papers as necessary. For example, identifying a subspecies of honey bee can be done using genetic tools. The general instructions to use microsatellites are given in the molecular methods paper (Evans *et al.*, 2013) whereas the specific method appropriate for subspecies identification is described in the paper on ecotypes and subspecies identification (Meixner *et al.*, 2013). Consequently, one would visit the ecotypes paper to determine how to identify a given subspecies. That paper would then refer to the molecular methods paper when discussing microsatellites specifically.

The *BEEBOOK* has been deliberately designed to evolve. In addition to a bench friendly manual, and in an effort to make the methods broadly available, every paper forming the *BEEBOOK* will be first available as open access articles in several special issues of the *Journal of Apicultural Research.* To further build on the availability of digital media, a novel concept was developed around the manual. An online version of the manual was imagined, where each method could be discussed online and improvements suggested. Such a Wiki-like tool is useful for keeping track of fast evolving fields, such as for example, in molecular protocols. Development work on the online *BEEBOOK* platform started in 2009, and can be found at

www.coloss.org/beebook. On the platform, each webpage describing a method has a comment field which can be used to suggest changes or additions. Users can thus assist with the improvement and further development of the *BEEBOOK*. Once sufficient updates have accumulated online, a new print version of the manual can then be edited and published.

The *BEEBOOK* is a tool for all who want to do research on honey bees. It was written in such a way that those new to honey bee research can use it to start research in a field with which they may not be familiar. Of course, such an endeavour is often limited by the availability of complex and expensive machinery. However, provided access and training on the necessary equipment are secured, the instructions provided in the *BEEBOOK* can be followed by everyone, from undergraduate student to experienced researcher. All details on how to implement instructions are given.

The editors and author team hope that the *BEEBOOK* will serve as a reference tool for honey bee and other researchers globally. As with the original *Drosophila* book that evolved into a journal where updates and new methods are published, we hope that the honey bee research community will embrace this tool and work to improve it. The online platform is open for everyone to use and further contribute to the development of our research field.

The first group of papers belonging to both Volumes I and II are published here in this Special Issue, and the remainder will be published later in 2013, at the same time as the production of Volumes I and II as hard copy. Volume III will follow in 2014. In this Special Issue the papers on: cell cultures (Genersch *et al.*, 2013); colony strength parameters (Delaplane *et al.*, 2013); hoarding cage studies (Williams *et al.*, 2013); artificial larval rearing (Crailsheim *et al.*, 2013); physiology and biochemistry (Hartfelder *et al*, 2013); and rearing queens (Büchler *et al.*, 2013) will form part of Volume I, and the papers on epidemiology (vanEnglesdorp *et al.*, 2013); varroa (Dietemann *et al.*, 2013); wax moth (Ellis *et al.*, 2013) American foulbrood (de Graaf *et al.*, 2013); European foulbrood (Forsgren *et al.*, 2013); fungi (Jensen *et al.*, 2013) and *nosema* (Fries *et al.*, 2013) will form part of Volume II. These thirteen papers have been written by 98 authors representing 25 different countries, illustrating the unprecedented degree of international collaboration that the crisis in honey bees and the COLOSS network has engendered.

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