



Food and Agriculture (FA)

Participating countries

AT, BA, BE, BG, CH, CZ, DE, DK, EL, ES, FI, FR, HR, HU, IE, IL, IT, MK, NL, NO, PL, PT, RO, RS, SI, SK, SE, TR, UK

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COST Action no. FA0803

Prevention of honey bee colony losses (COLOSS)

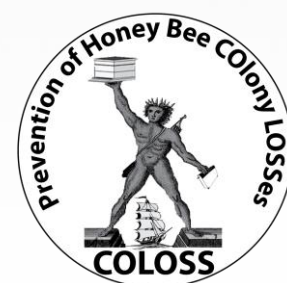
2008 | 2012

Background & Objectives

- Honey bees (*Apis mellifera*) are key pollinators for both agricultural crops and wild plants; however, increased mortality of honey bee colonies have occurred globally.
- The underlying causes of these losses are poorly understood, but believed to be the result of multiple factors acting singly or in combination, such as introduced pathogens, agro-chemicals, and beekeeping practices.
- The goal of COLOSS is to explain and prevent large scale mortality of honey bee colonies by identifying underlying factors responsible, and by developing emergency measures and sustainable mitigation strategies.

Main Achievements

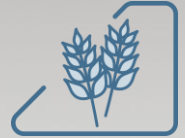
- 312 individual members from 61 countries in Europe and abroad; 35 and 46 % are women and Early Stage Researchers (*i.e.*, students or those that received a Ph.D. <10 years ago), respectively.
- Coordinated numerous honey bee research efforts and scientific meetings. To date, eight conferences, 28 workshops, 29 Short-term Scientific Missions, and one training school have been organized, and 185 joint publications by members have been produced. Selected publications have been translated in 23 languages, including Arabic and Mandarin to foster dissemination to stakeholders.
- Dissemination and extension tool for FP7 projects BEEDOC (BEes in Europe & the Decline Of Colonies) and STEP (Status and Trends in European Pollinators).
- Standardized monitoring of honey bee colony losses globally using the COLOSS Questionnaire.
- Development of an online and hardcopy manual entitled the 'COLOSS BEEBOOK: standard methods for *Apis mellifera* research' that will consist of internationally recognized procedures for honey bee monitoring and research.



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Working Group activities

Working Group 1 (Monitoring & Diagnosis)

- Development of a standardized honey bee colony loss monitoring protocol that consists of four levels: (i) quantification of mortality; (ii) comparison of colony loss data among regions and countries; (iii) identification of causative factors; & (iv) prediction of potential honey bee colony losses.
- Levels (i) & (ii) adopted by 24 COLOSS countries (e.g. most of Europe, China, South Africa, and USA); levels (iii) & (iv) currently under development.

Working Group 2 (Pests & Pathogens)

- Identified a number of major pathogenic causes for colony losses, including: (i) the ectoparasitic mite *Varroa destructor*; (ii) several viruses, especially those vectored by the mite; & (iii) other pathogenic factors, presumably including some that are not yet identified.
- Studied effects of interactions between parasites and pathogens on honey bees, as well as described an important virulence factor and disinfectant for the causative agent of American foulbrood, *Paenibacillus larvae*. Additionally, recommended future sustainable control methods for *V. destructor* to the honey bee scientific community.

Working Group 3 (Environment & Beekeeping)

- Validated a protocol for artificial larval rearing. Factors considered included rearing conditions (e.g. sanitation), as well as environmental (e.g. seasonality) and genetic (e.g. honey bee subspecies) influences.
- Recommended improved protocols for pesticide use in agriculture, and studied effects of sub-lethal pesticide exposure on honey bee colonies.

Working Group 4 (Diversity & Vitality)

- Collected experimental data on genotype-environment interactions in honey bee colonies, including performance traits and disease susceptibility.
- Preliminary data suggest significant interactions for most honey bee traits, except for the mite *V. destructor* and hygienic behavior; however, data are still being analysed from these long-term studies.

Industry participation

Ricola Foundation

Nature & Culture

Ricola Foundation

Laufen, Switzerland

www.ricolafoundation.org



**INTERNATIONAL BEE
RESEARCH ASSOCIATION**

**International Bee Research
Association**

Cardiff, Wales

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