



## Scientific Facts on

### Bee health.

Highlight of international initiatives taken to manage the issue of bee losses.

**Source document:**  
EFSA (2013)

**Summary & Details:**  
GreenFacts

### Level 2 - Details on Bee health.

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This is a faithful summary of the leading report produced in 2013 by the European Food Safety Authority (EFSA):  
*"Bee health"*

The full Digest is available at: <https://www.greenfacts.org/en/bee-losses-causes/>

**i** This PDF Document is the Level 2 of a GreenFacts Digest. GreenFacts Digests are published in several languages as questions and answers, in a copyrighted user-friendly Three-Level Structure of increasing detail:

- Each question is answered in Level 1 with a short summary.
- These answers are developed in more detail in Level 2.
- Level 3 consists of the Source document, the internationally recognised scientific consensus report which is faithfully summarised in Level 2 and further in Level 1.

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## 1. Are the causes of bee losses now well identified?

For the European Food and Safety Authority (EFSA) no single cause of declining bee numbers has been identified. However, several possible contributing factors have been suggested, acting in combination or separately. These include the effects of :

- intensive agriculture and pesticide use;
- starvation and poor bee nutrition ;
- viruses, attacks by pathogens and invasive species – This includes the Varroa mite (*Varroa destructor*), the Asian hornet (*Vespa velutina*), the small hive beetle *Aethina tumida* and the bee mite *Tropilaelaps* ;
- genetically modified plants;
- environmental changes (e.g. habitat fragmentation and loss)

Reference : <http://www.efsa.europa.eu/en/topics/topic/beehealth.htm> [see <http://www.efsa.europa.eu/en/topics/topic/beehealth.htm>]

Similarly, for the **National Stakeholders Conference on Honey Bee Health** in the US (2013)<sup>1</sup>, a consensus is building that a complex set of stressors and pathogens is associated with Colony Collapse Disorder, and researchers are increasingly using multi-factorial approaches to studying causes of colony losses.

The conclusions of a report from UNEP (United Nations Environmental Programme) of 2010 "**Global honey bee colony disorders and other threats to insect pollinators**"<sup>2</sup> were also that the available global data and knowledge on the decline of pollinators are not sufficiently conclusive to demonstrate that there is a worldwide pollinator and related crop production crisis. Although honey bee hives have globally increased close to 45% during the last 50 years, declines have been reported in several locations, largely in Europe and Northern America. This apparent data discrepancy, according to the report, may be due to interpretations of local declines which may be masked by aggregated regional or global data. For example, while during the same 50-year period it appears also that global agriculture has become four-fold more pollinator dependant, human activities and their environmental impacts may be detrimental to some species but beneficial to others, with sometimes subtle and counter-intuitive causal linkages.

<sup>1</sup> See: <http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf> [see <http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf>]

<sup>2</sup> See:  
[http://www.unep.org/dewa/Portals/67/pdf/Global\\_Bee\\_Colony\\_Disorder\\_and\\_Threats\\_insect\\_pollinators.pdf](http://www.unep.org/dewa/Portals/67/pdf/Global_Bee_Colony_Disorder_and_Threats_insect_pollinators.pdf)  
[see [http://www.unep.org/dewa/Portals/67/pdf/Global\\_Bee\\_Colony\\_Disorder\\_and\\_Threats\\_insect\\_pollinators.pdf](http://www.unep.org/dewa/Portals/67/pdf/Global_Bee_Colony_Disorder_and_Threats_insect_pollinators.pdf)]

## 2. Which initiatives are taken by the European Food Safety Authority (EFSA) related to bee losses?

EFSA has an important role to play in ensuring that healthy bee stocks are maintained in Europe, given its mandate to improve EU food safety and animal health and to ensure a high level of consumer protection. A short cartoon video from EFSA is available on the subject: "Why are bees under threat" [see <http://www.youtube.com/watch?v=ys4xcom6nnc>]

A number of the Authority's Scientific Panels and Units contribute to this work, principally in the areas of pesticides, animal health and welfare and plant health, genetically modified organisms (GMOs), data collection and scientific assessment :

1. In 2009, EFSA published a **report on honey bee mortality and the ways that colony losses are monitored in Europe** ([www.efsa.europa.eu/en/scdocs/doc/27e.pdf](http://www.efsa.europa.eu/en/scdocs/doc/27e.pdf) [see <http://www.efsa.europa.eu/en/scdocs/doc/27e.pdf>]). The study was carried out by a consortium of scientific institutes led by the French national food safety agency Afssa (*Agence française de Sécurité Sanitaire des Aliments*)<sup>1</sup>.  
The report underlined that there is a general weakness of most of the surveillance systems in the 24 countries investigated and lack of representative data at country level and at EU level for colony losses. It made recommendations on how to improve bee surveillance systems and calls for further studies to better understand the factors that affect honey bee health.
2. In November 2012 a task force coordinated by the EFSA staff, published another report giving **an overview of EFSA's activities** in this matter and making recommendations on how this work should be continued : Inventory of EFSA's activities on bees [see <http://www.efsa.europa.eu/en/supporting/pub/358e.htm>];
3. EFSA also published a major **guidance document on the risk assessment** of pesticides in relation to honey bees, bumble bees and solitary bees based on an opinion of 2012 outlining the scientific basis for the development of the guidance document<sup>3</sup> : Guidance on the risk assessment of plant protection products on bees (*Apis mellifera*, *Bombus spp.* and solitary bees).
4. The same year, more than 100 bee experts took part to **an EFSA Scientific Colloquium on holistic approaches to the risk assessment** of multiple stressors in bees convened in response to the growing consensus among scientists about the multifactorial origins of bee colony losses<sup>4</sup>.  
The colloquium participants underlined that, bees being exposed to multiple pressures, testing one stressor in a laboratory setting may be meaningless and testing in the same time multiple interacting factors can easily become too large to be feasible. Field-scale experiments offer the opportunity to test impacts of multiple drivers at ecologically relevant scales but these are less controllable. Therefore, the experts proposed a hierarchy of approaches to testing effects of multiple pressures
5. In 2013 EFSA published risk assessments of the potential effects on bees of the pesticides thiamethoxam, imidacloprid, clothianidin and fipronil. These assessments paid particular attention to acute and chronic effects on bee colony survival and development, taking into account the effects on bee larvae as well as bee behaviour. The links to these risk assessments can be found on : <http://www.efsa.europa.eu/en/topics/topic/beehealth.htm> [see <http://www.efsa.europa.eu/en/topics/topic/beehealth.htm>]

<sup>3</sup> Scientific Opinion on the science behind the development of a risk assessment of Plant Protection Products on bees (*Apis mellifera*, *Bombus* spp. and solitary bees) [see <http://www.efsa.europa.eu/en/efsajournal/pub/2668.htm>]

<sup>4</sup> See: <http://www.efsa.europa.eu/en/supporting/doc/509e.pdf> [see <http://www.efsa.europa.eu/en/supporting/doc/509e.pdf>]

### 3. What is done at the European Union level about the issue of bee losses?

End 2010, Communication from the European Commission on honeybee health [see [http://ec.europa.eu/food/animal/liveanimals/bees/docs/honeybee\\_health\\_communication\\_en.pdf](http://ec.europa.eu/food/animal/liveanimals/bees/docs/honeybee_health_communication_en.pdf)] provided a series of specific actions that will help better understand the reasons behind the worldwide issue of high bee mortality and will therefore assist the efforts to find solutions to the problem.

It was covering EU animal health framework for bees, the availability of veterinary medicines for bees, residues in honey and food safety aspects, pesticides and genetically modified organisms (GMOs). It covered also the research made on bee health and the protection of bees by addressing biodiversity loss, the relation between common agricultural policy and bee health and global link to international activities.

In July 2013, the use of *thiamethoxam*, *imidacloprid*, *clothianidin* was restricted in Europe for a period of two years, in particular on crops that are pollinized by bees.

A series of 11 research projects were or are funded by DG-RTD/cost bees and pollinators. These cover a large number of topics :sustainable honey production, pathogen transmission, analytical tools for honey quality, synergic interactions between pathogens and pesticides at individual and colony levels, decline of honeybee colonies, varroa resistance, diagnostic tools to detect fungi parasites and honey bee activity and also a contribution to the Coloss project at worldwide level ( [see <https://www.greenfacts.org/en/bee-losses-causes/index.htm#5>]see question 5)

See in particular: Bee EU funded research -Past and future [see <http://www.polsca.be/ppt/121016/ANL.pdf>]

Status and Trends of European Pollinators (STEP) [see <http://www.step-project.net/>]

Various other EC publications on the subject are grouped on [see <http://ec.europa.eu/food/animal/liveanimals/bees/>]

including a Q&A on bees [see <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/10/653&format=HTML&aged=0&language=EN&guiLanguage=en>]

### 4. What are the actions taken in the U.S. related to bee losses?

In the US, a research committee on bees health is coordinated by multi-State teams develop Sustainable Solutions to Problems Affecting Bee Health. The purpose of this committee is to coordinate research that is relevant to bee colony health. Committee members work closely with other stakeholders to develop and implement mitigative strategies that unravel the causes of CCD and other significant bee health problems: Multistate Bee Research 2010 [see [http://www.extension.org/multistate\\_bee\\_research\\_2010](http://www.extension.org/multistate_bee_research_2010)]

In 2013, a comprehensive scientific report on honey bee health - **Report on the National Stakeholders Conference on Honey Bee Health (2013)** was published by the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA)<sup>5</sup>. Its main findings were :

1. **That a consensus is building that a complex set of stressors and pathogens is associated with Colony Collapse Disorder**, and researchers are increasingly using multi-factorial approaches to studying causes of colony losses; Research indicates that gut microbes associated with honey bees play key roles in enhancement of nutrition, detoxification of chemicals, and protection against diseases.
2. **That the parasitic *Varroa* mite is recognized as the major factor** underlying colony loss in the U.S. and other countries and new virus species have been found in the U.S. and several of these have been associated with Colony Collapse Disorder (CCD);
3. **That Increased Genetic Diversity is needed** to improve bees thermoregulation and disease resistance in particular to *Varroa* mites and foulbrood. ;
4. **The need to improve Nutrition Among Honey Bee Colonies** through better forage and a variety of plants to support colony health and keeping them away from pesticide-treated fields ;
5. **The need for Improved Collaboration and Information Sharing on** Best Management Practices associated with bees and pesticide use, and accurate and timely bee kill incident reporting, monitoring, and enforcement;
6. **The need off additional** Research to determine risks presented by pesticides.
7. **That a high priority topic for the USDA and the U.S. EPA** continues to be the decline of honey bees and other pollinators.

<sup>5</sup> <http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf> [see <http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf>]

## 5. Is the issue of bee losses also managed at a worldwide scale?

The report of UNEP previously mentioned<sup>6</sup> recommended a renewed focus on the study, conservation and even management of native pollinating species to complement the managed colony tradition. It presented also the main policies in place that serve as guiding governance and some scientific network and transcontinental collaborations in the area such as:

1. **COLOSS , The Prevention of Honey Bee COLony LOSSes**: (Prevention of Honeybee Colony Losses (COLOSS) [see [http://www.cost.eu/domains\\_actions/fa/Actions/COLOSS](http://www.cost.eu/domains_actions/fa/Actions/COLOSS)]) which is an international European-funded network of 212 members from 52 countries;
2. **BEE DOC - BEes in Europe and the Decline of Colonies** ([www.bee-doc.eu](http://www.bee-doc.eu) [see <http://www.bee-doc.eu>]) which focuses on honey bee pathology and interactions between pathogens;
3. **STEP - Status and Trends of European Pollinators** ([www.step-project.net](http://www.step-project.net) [see <http://www.step-project.net>]) which focuses on pollinator loss across insects;
4. **ALARM - Assessing Large-scale Environmental Risks for Biodiversity with Tested Methods** ([www.alarmproject.net](http://www.alarmproject.net) [see <http://www.alarmproject.net>]), a European collaboration developing and testing methods for assessing large-scale environmental risks in order to minimise the direct and indirect human effect on European terrestrial and freshwater biodiversity and ecosystems;

## 5. **The United States Department of Agriculture, Agriculture Research Service Area-wide Programme for Improving Honey Bee Health.**

<sup>6</sup>See:

[http://www.unep.org/dewa/Portals/67/pdf/Global\\_Bee\\_Colony\\_Disorder\\_and\\_Threats\\_insect\\_pollinators.pdf](http://www.unep.org/dewa/Portals/67/pdf/Global_Bee_Colony_Disorder_and_Threats_insect_pollinators.pdf)  
[see [http://www.unep.org/dewa/Portals/67/pdf/Global\\_Bee\\_Colony\\_Disorder\\_and\\_Threats\\_insect\\_pollinators.pdf](http://www.unep.org/dewa/Portals/67/pdf/Global_Bee_Colony_Disorder_and_Threats_insect_pollinators.pdf)]

## 6. What is done to find medicines to treat and protect bees?

Already in 2006, the **UN Food and Agriculture Organization** (FAO) issued a practical guide which describes the common diseases and pests of honey bees and their importance and provides a practical guide to the basic technology available to beekeepers for their control and prevention : Honey bee diseases and pests: a practical guide.

More recently, the **European Medicines Agency** (EMA) published in March 2010 the minutes of a workshop on the availability of medicines for bees in Europe, in particular what medicines are needed and what the Agency can do to increase the availability of needed medicines.

It is again acknowledged that the problems of the bee keeping sector and the decline in the bee population all over Europe and the world are complex and diverse. One of the concerns raised by interested parties and Member States over the years is the lack of adequate medicines to treat bee diseases. Among the overall conclusions and recommendations of the workshop were:

- That the problem of bee health and appropriate treatment of bees is much more complex and diverse than simply identifying some potentially needed medicines;
- That the overall strategy regarding medicines for bees should be established. Such a strategy should identify for each bee disease whether medication was appropriate, and if medication is the choice of treatment, which medication should be applied as well as the conditions for the appropriate action or treatment be clarified.

Reference: Workshop on medicines for bees – What the Agency can do to increase availability [see [http://www.ema.europa.eu/docs/en\\_GB/document\\_library/Presentation/2010/02/WC500074210.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/Presentation/2010/02/WC500074210.pdf)]

More specifically, in the UK, the Department for Environment, Food and Rural Affairs (Defra) has an *Action Plan on the Availability of Medicines for Bees* which was updated in 2013 : [http://www.vmd.defra.gov.uk/pdf/bee\\_actionplan.pdf](http://www.vmd.defra.gov.uk/pdf/bee_actionplan.pdf) [see [http://www.vmd.defra.gov.uk/pdf/bee\\_actionplan.pdf](http://www.vmd.defra.gov.uk/pdf/bee_actionplan.pdf)]