




bee care



Science For A Better Life

Bayer and Bees

The Bayer Bee Care Program

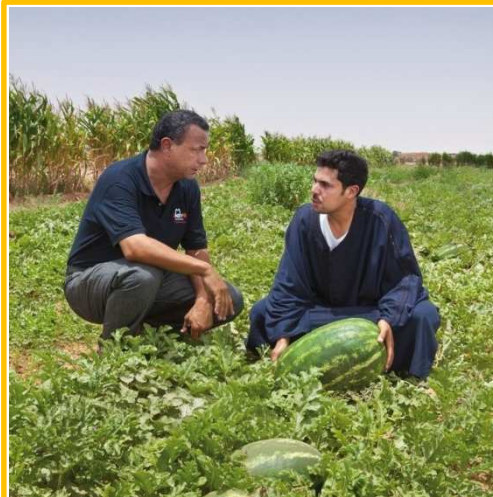
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Scientific Lead BBCC

*European Parliament Apiculture and Pollinator Health subgroup (Biodiversity intergroup)
Strasbourg, February 4th, 2016*



Why are Bees Important for us



For our
customers



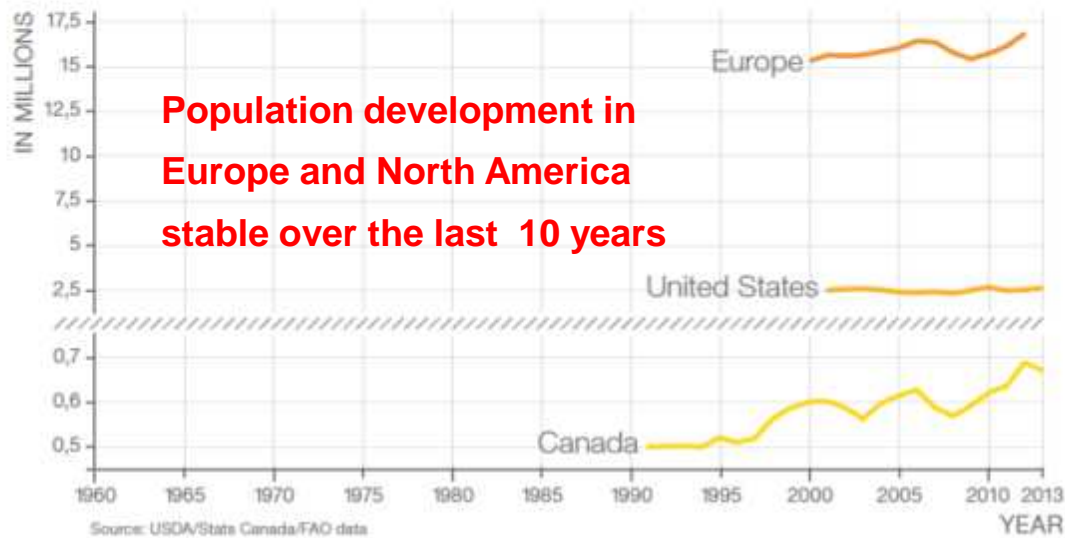
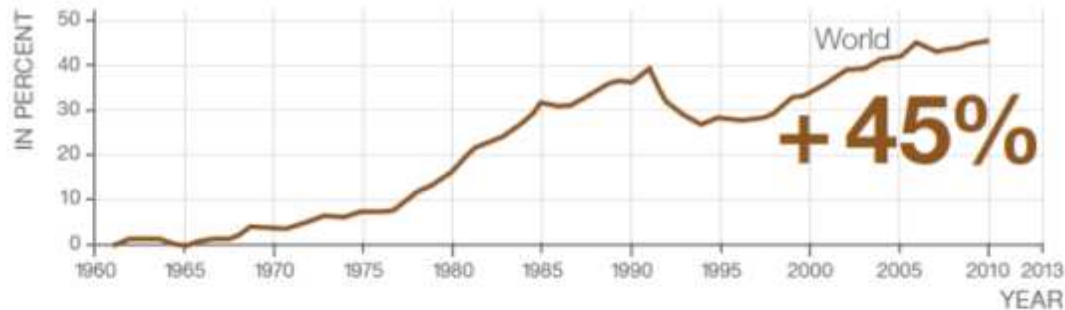
For a healthy,
balanced diet



For our Seeds
business

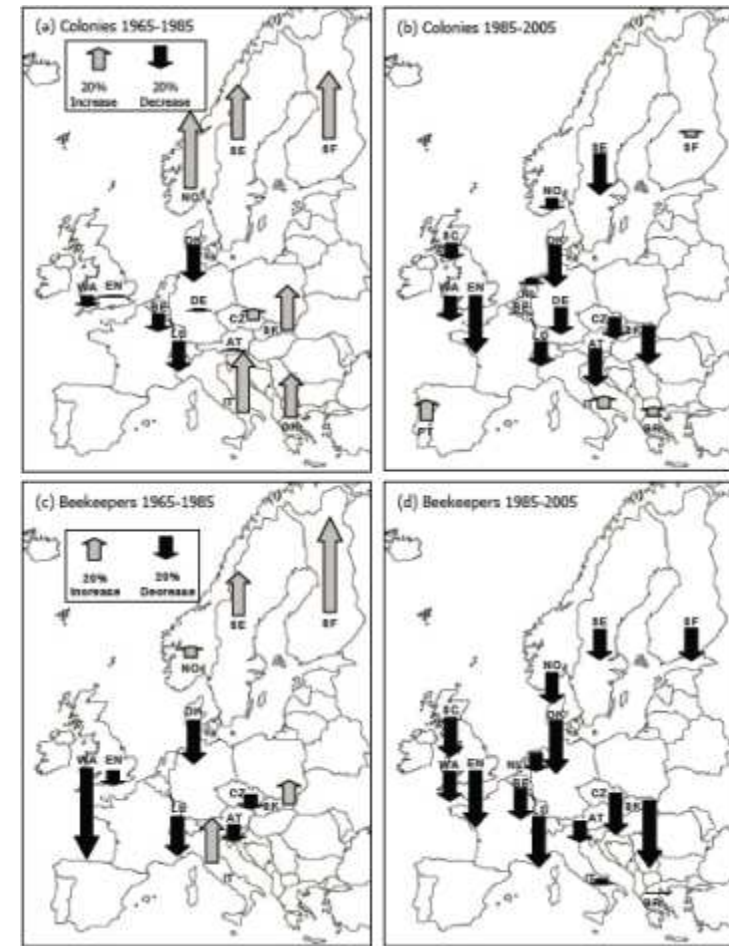


Global Development of Managed Honeybee Populations



Global Development of Managed Honeybee Populations

- Population dynamics of managed honey bee colonies are in the first place determined by **socio-economic factors**
 - Number of beekeepers
 - Apicultural practices (professional vs. amateur, honey production vs. pollination services, etc.)
 - Price of honey (or sugar!)
 - Governmental support for beekeeping
- In **Europe**, number of colonies is clearly correlated with number of beekeepers
- Number of beekeepers has decreased in many countries – for instance, in **Germany** there were twice as many beekeepers 100 years ago than there are today

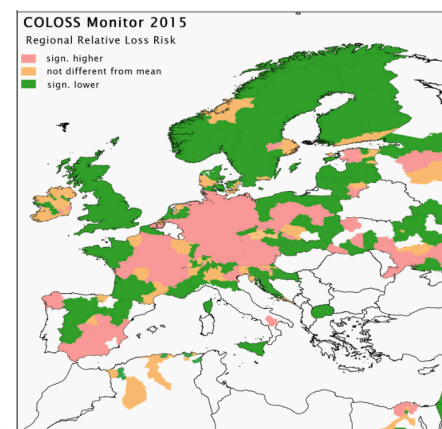
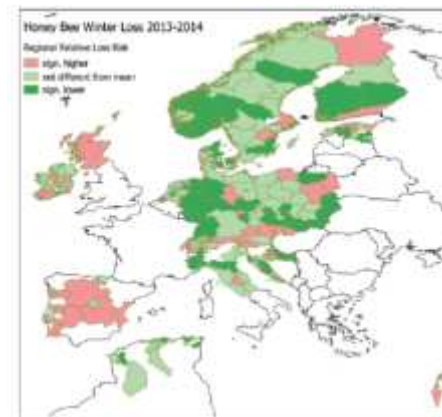


Source : POTTS et al. (2010)



Overwintering Losses in Europe

- In recent years, **increased honeybee colony losses** have been observed every now and again.
- **Monitoring** results highlight **high spatial and temporal variability** with colony losses across European countries
- Average loss rate was 9% in winter 2013/14, the lowest for many years. Losses in 2014/15 were ca. 18%
- There is **no correlation between bee losses and agricultural intensity**, nor is there any clear spatial pattern seen that would suggest the involvement of pesticide exposure or agriculture in general as a key factor
- In the last year in which the full range of neonicotinoid products was still available, losses were particularly low, whereas high losses were recorded in the first year after the restrictions were in place



Source: COLOSS



Bee Health - Multiple Influencing Factors

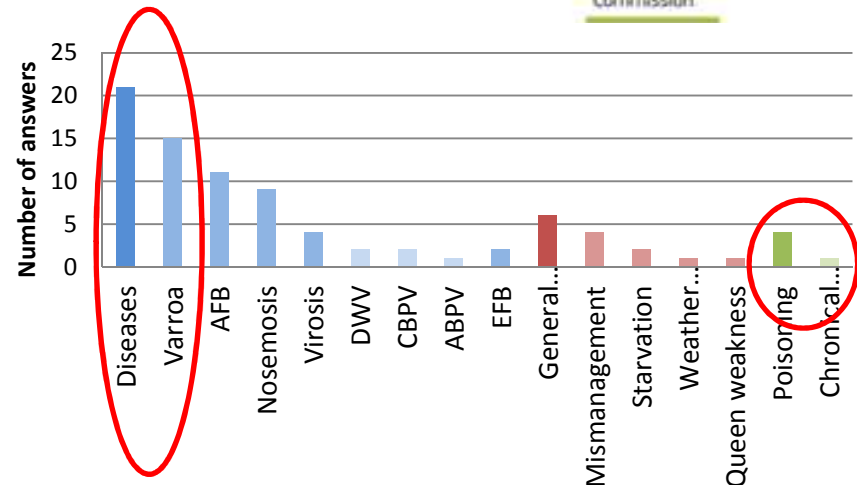
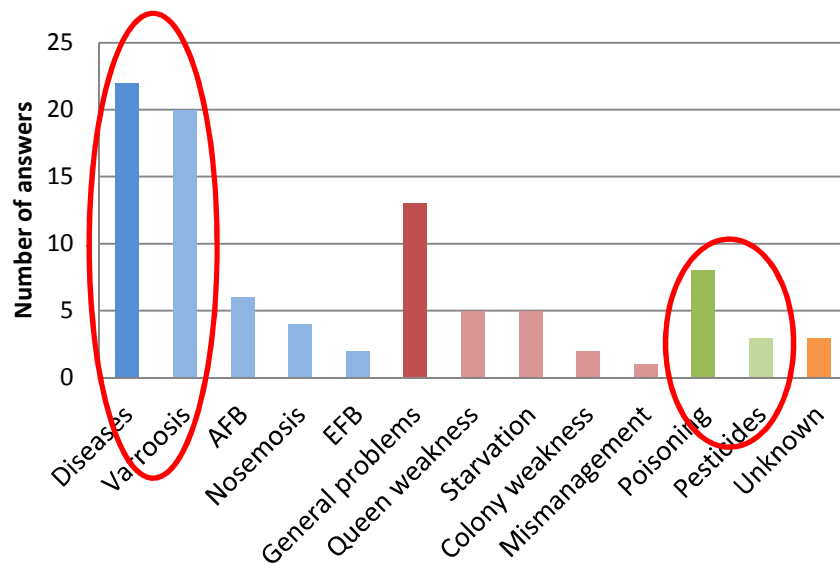


- Honey bee colony health is influenced by a combination of multiple stressors.
- This point of view is consistently supported by the vast majority of bee research scientists
- In particular, the parasitic *Varroa* mite and associated viruses are seen as a common and major threat.
- No consensus about relative importance and interactions between further potential factors



Bee Health - Multiple Influencing Factors

Main Causes of Colony Mortality Reported by EU Beekeepers and MS Reference Laboratories for Bee Health



Source: Presentation «Risk management for bee health» of DG for Health and Consumers, EU Commission
Published by CHAUZAT et al. 2013 (PlosOne 8/11)



The Bee Care Approach – Its Essence and Backgrounds

Scientific view is multi-dimensional

- Bee losses are the result of **several, multifactorial challenges**
- The parasite **Varroa mite** is the **most important cause** for bee colony losses in Europe



Perception in society is one-dimensional

- **Neonicotinoids**, particularly as seed treatments, are **accused** of being responsible for bee losses



▶ We need to **promote bee health** and therefore support bee health **research** and **solutions**

▶ The discrepancy demonstrates that **clear communication with stakeholders** is **crucial** to bring the scientific view to the general public

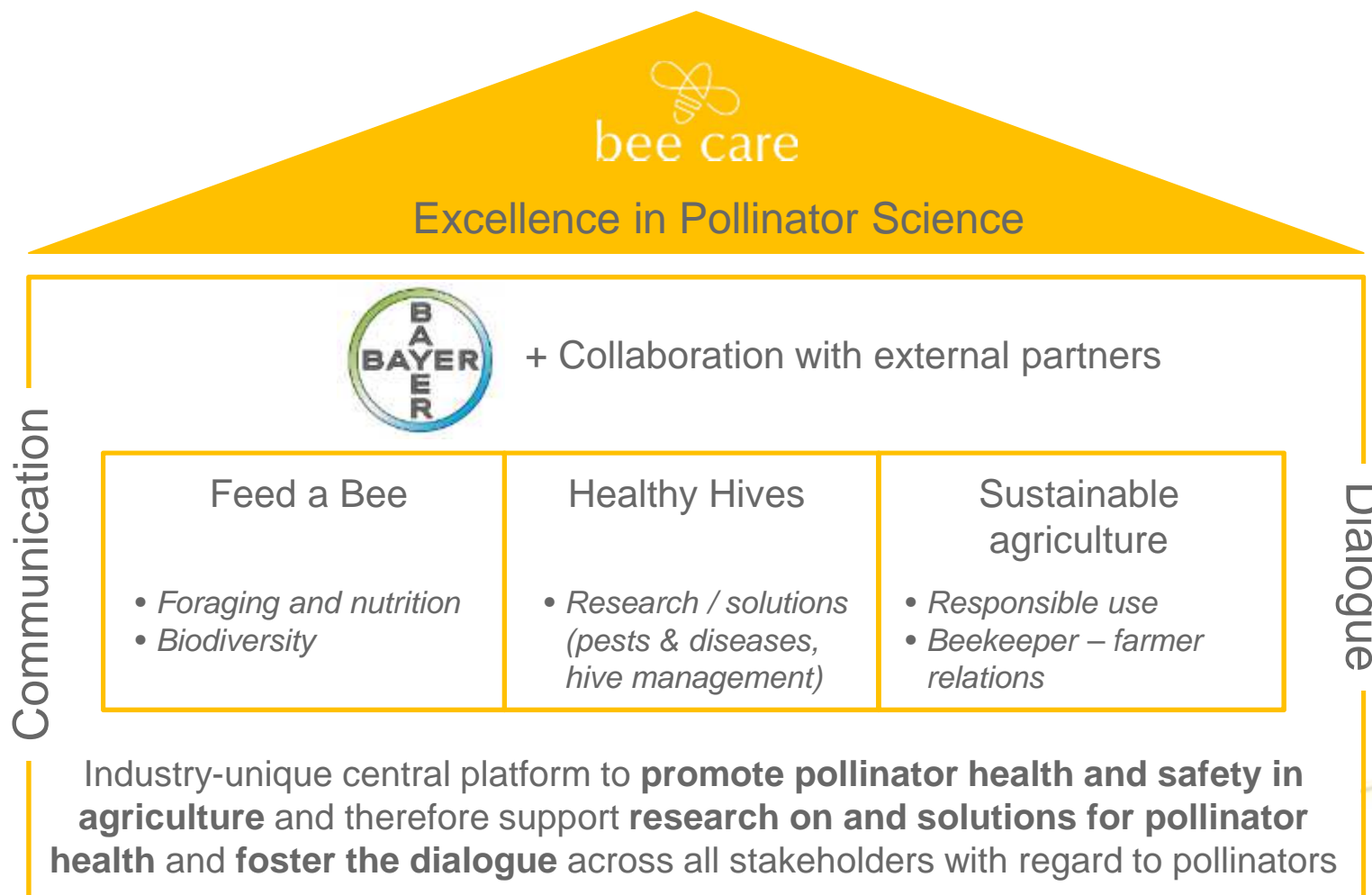


Creation of an industry-unique central platform to foster dialogue beyond agricultural communities and provide valuable insights into current and future public acceptance of our technologies with regard to bees



The Bayer Bee Care Concept

Goal: Recognition as a responsible partner for pollinator health





Excellence in Pollinator Science Collaborative Approach

- Collaborative approach, with Bayer researchers and locally-based external scientific research communities jointly addressing pollinator health and safety issues
- It is of key importance for Bayer to build relationships with key stakeholders and to be recognized as a competent and credible partner in addressing scientific matters

An example ...

Thirteen of the most renowned Brazilian researchers in the bee health area visited the Bee Care Center in Monheim in April 2015 for a three-day discussion and information exchange workshop with Bayer researchers.

From this workshop, various joint projects and collaborative approaches originated, some of which are now underway.





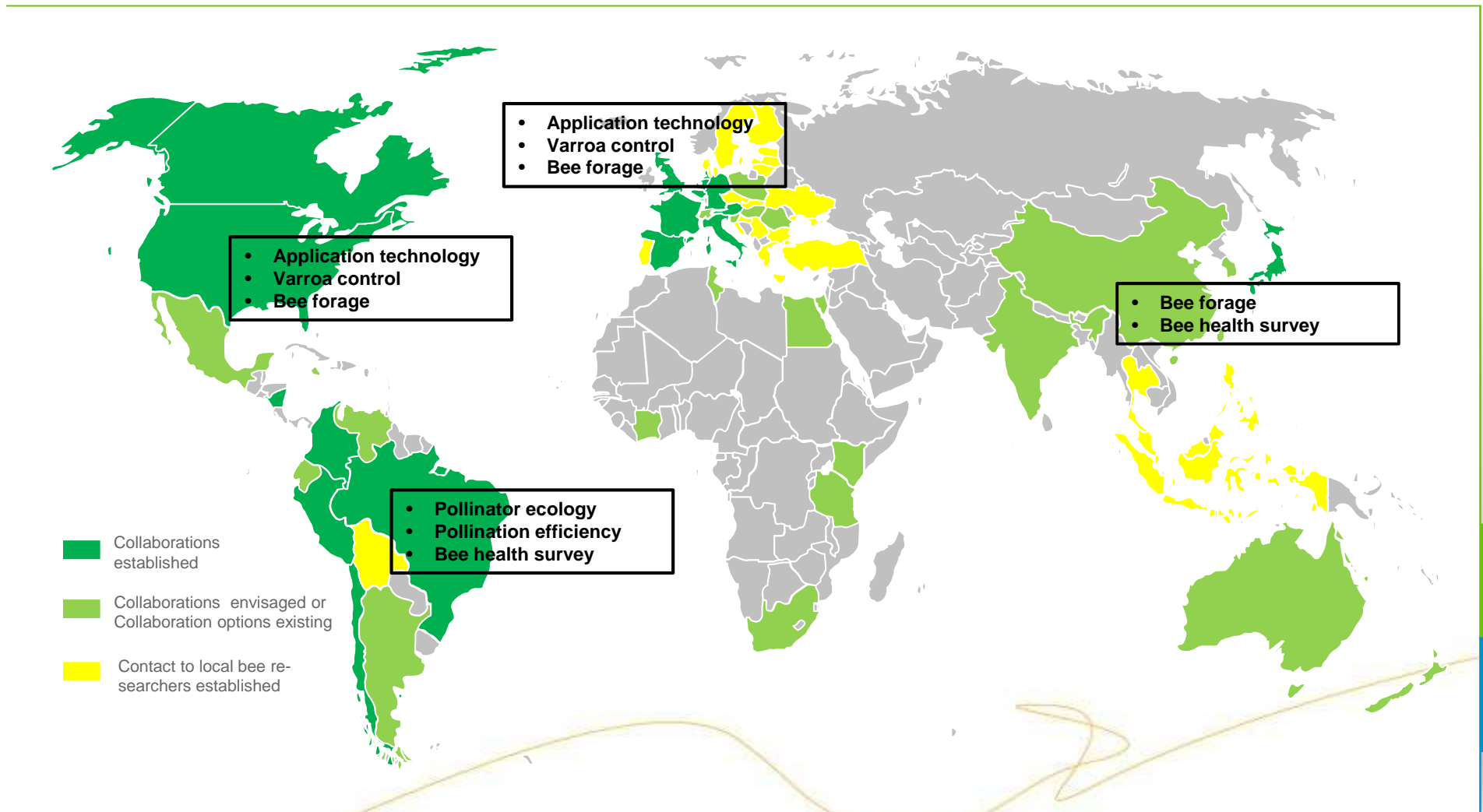
Scope and Areas of Our Activities



- Pollinator health is complex and multifactorial – this is reflected by the setup and the categories of our activities.
- Basically, all categories of pollinator health-related topics are of global relevance. However, for some of them, focus regions can be defined; e.g.
 - *Varroa* control – Europe and North America
 - Pollinator habitats – Europe, North America, APAC
 - Native bees - LATAM
- Specific interest in topics which have links to agriculture, bee pathogens and parasites, and apicultural best practice.



World Map of Bee Care Scientific Collaboration and Dialogue



Healthy Hives – Identifying Factors Affecting Bee Health



Region: LATAM



Bee Health Monitoring Chile

- Collaboration project with Fraunhofer Chile Research Foundation, sponsored by Bayer
- So far, only limited data on bee health and influencing factors was known for Latin America
- Bee health monitoring is established in Chile, based on a multifactorial approach
- Focus on diseases, parasites and other pathogens, apicultural practices and exposure to pesticides
- More than 70 apiaries are participating
- Activities began at the start of 2015, first results are already available
- First data was presented at SETAC LATAM (Buenos Aires) in September 2015



Feed a Bee – How Intensive Agriculture and Biodiversity Can Coexist



Region: Europe



- The effects of biodiversity-enhancing measures (e.g. flowering strips) to pollinator communities are evaluated in a collaboration project between Bayer and two ecology research institutes in a maize growing area in Southwestern Germany
- The enhancing measures were implemented in 2011 after a baseline survey, along with continued surveying activities, the project will be conducted until 2017
- Evaluation focuses on wild plants and on naturally occurring pollinators like wild bees and butterflies but also assesses further insect taxa
- Developed methods to enhance biodiversity can be implemented in other biodiversity projects (e.g. model farms) later on
- Current status: available interim results suggest substantial differences between “upgraded” and control areas became gradually visible not only in terms of abundances but also of diversity on species level

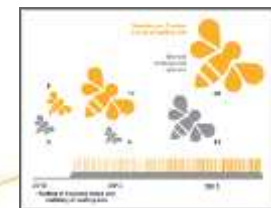
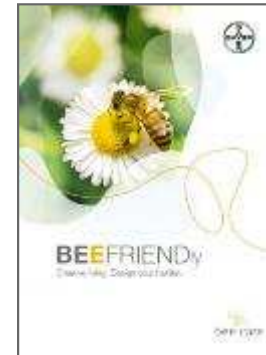
Feed a Bee – Providing Bee Forage and Nutrition



Region: Global



- So far, the Bayer initiative '**BeeFriendly**' has led to the planting of almost **1,000,000 m²** of wildflowers in **Europe**.
- The '**US Feed a Bee Initiative**' in 2015 set out to plant **50 million** bee-attractive flowers within a year and thus provide additional forage acreage for the insects.
 - The goal was reached in only 11 weeks through the participation of more than 200,000 individuals
 - Some 65 million flowers through wildflower seed packets planted by individuals and more than 1,300 hectares through large company partners
 - The project shows what can be accomplished when people work together
- Via **Blooming Strips on our Bayer Sites** we promote and communicate on the need for forage and nutrition



Sustainable Agriculture – Optimization of Application Techniques for the Benefit of Farmers *and* Beekeepers



Region: Europe



- Consumers and beekeepers do not want pesticide residues in their honey
- Ongoing research project between Bayer, Syngenta, Hohenheim University (project coordination) and manufacturers of application devices to evaluate the use of Dropleg technology as a bee-friendly pesticide application in flowering crops
- First steps were mainly targeted to achieve reduced residue levels of fungicides in honey after treatments of oilseed rape
- In later stages, trials to evaluate the option of insecticide applications onto flowering crops with reduced bee exposure to follow
- Results of trials 2011-2015 are very positive with regard to residue reduction. Further effect trials with insecticides began in 2015



Sustainable Agriculture – To improve the Protection of Pollinators, we must Understand Their Ecology



Region: Global



Global Crop Attractiveness Evaluation

- Knowledge of the attractiveness of crops to pollinators is essential as a basis for pollinator-safe pesticide use in the crops and for the bee risk assessment
- However, there is a lack of basic information for many crops, especially in the tropics and sub-tropics
- There is an ongoing project to conduct a comprehensive global survey of bee attractiveness, apicultural relevance and dependence on bee pollination for all major crops
- Survey is based on the evaluation of extensive scientific literature
- Conducted in collaboration with Freiburg University / Germany (Prof. Alexandra Klein), funded by Bayer
- Project was started in 2011 and is nearing finalization now



Sustainable Agriculture – Landscape Level Field Studies on Neonicotinoids



Region: Europe

- In 2014, Bayer commissioned one of the **largest field studies of oilseed rape in the world**. In total, agricultural land over 1,5 times the size of Strasbourg, was used for the study in Northeastern Germany.
- Bayer investigated with the support of bee and agricultural experts of other institutions whether plants grown from seeds treated with clothianidin had an effect on **wild bees, bumblebees, and honey bees**.
- For the three bee species observed, **experts did not find any evidence of harmful effects** from the seed treatment



NO EFFECT TO (WILD) BEES
DEMONSTRATED IN FIELD
REALISTIC CONDITIONS



Large scale landscape study in Northern Germany

During the second half of 2013, Bayer CropScience and its scientific partners launched a landscape study in Mecklenburg-Western Pomerania, a state in Northern Germany. The study analyzed the impact of clothianidin-treated oilseed rape for specific pollinators in field realistic conditions following the restriction imposed by the European Commission (Implementing Regulation (EU) No. 485/2013) of three neonicotinoids (imidacloprid, clothianidin and thiamethoxam) in bee-attractive crops.

The aim of the monitoring study was to assess the exposure situation for pollinators during flowering season and the possible effects on bee species with different life cycles, such as the honey bee (*Apis mellifera*), the great bumblebee (*Bombus terrestris*) and a species of the solitary bee (*Osmia bicornis*).

A contract lab conducted the extensive field studies on behalf of Bayer CropScience together with independent bee researchers from Oberursel Bee Research Institute and Cologne University. The monitoring study did not analyze yield parameters or pest infestation.

The outcome of the study for the different pollinators was presented in March 2015:

- 1 The analysis of pollen and nectar (honey bees) demonstrated that bees foraging in clothianidin-treated oilseed rape fields were exposed - on average - to levels **10-fold below the safety levels** (NOEC).
- 2 Such low exposure has proven to have **no adverse effect in field conditions** on honey bee colony development, bumble bee populations or the reproduction of solitary bees.

Key facts:

- One of the largest and most comprehensive landscape assessments ever conducted for bees.
- Control and treatment sites were 65 square kilometers each.
- 17-18 oilseed rape fields were covered in each site totaling around 600-800 hectares in each area.
- Honey bees, bumblebees and a species of solitary bee were assessed during and after the oilseed rape flowering season.
- No short term or long term adverse treatment-related effects have been found to date.



Communication/education/dialogue

- Stakeholder outreach, e.g. dialogue at our Bayer Bee Care Centers (*Monheim, DE; North Carolina, USA*)
- Working to provide educational and scientific facts (BeeNow magazine, BayLab school program “Bees and Honey”, Information brochures)

Find our activities at: www.beecare.bayer.com





Conclusions and Outlook

- We will continue to **play an active and visible role in pollinator health**
- To do so, we are **focussing on the areas where we feel we can genuinely contribute** to the wellbeing of pollinators: ‘feed a bee’, ‘healthy hives’ and ‘sustainable agriculture’
- In **partnership with external parties**, we will further develop and provide **agricultural and animal health solutions**, for our shared common interest – pollinator health.
 - Key pollinator health and safety projects are ongoing/have been identified to develop and provide solutions to improve these areas
- We aim as being recognized as a **scientifically competent and trustworthy partner** in the area of pollinator science
 - We have established a global network based on dialogue, collaborations, and communication, which we aim to strengthen and further develop
- We remain open for the **constructive dialogue** with all stakeholders who share our interest in pollinator health




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Thank you for your attention!

***What can we do together for
pollinator health?***