isura™ HONEY BEES IN PERIL

Honey bee decline

Populations of the European honey bee, the most important pollinator found around the world, have decreased by 25% over the past 20 years in Europe, and by 59% over the last 58 years in North America and other parts of the world. Despite its name, the European honey bee is also quite common in North America. Indeed, Colony Collapse Disorder (CCD), a term coined for the general decline in the honey bee population, is now a worldwide phenomenon. And this catastrophic global decrease is accelerating.

There are many and complex reasons for this slide toward extinction by the European honey bee, most of them due to humans. The outcome of this situation maybe serious for humanity also, since the loss of the pollinators such as honey bees, will have a major impact on the global availability of foods for people. Albert Einstein predicted this situation, when he said: "Mankind will not survive the Honeybees disappearance for more than five years."

Major challenges for the honey bee

While the European honey bee (*Apis mellifera*) is the most common species of honey bee, there are many challenges for the humble honey bee, which affect her chances for survival:

Loss of flowers/food

One of the most important factors restricting bee populations is food availability, in both urbanized and agricultural settings. Land conversion to housing, roads, parking lots, etc. means less access to food sources for bees and isolates patches of flowering plants. Intensively farmed regions with mass-flowering crops that bloom at the same time provide insufficient variety for bees which require nectar and pollen throughout the foraging season. So, less and less available natural food can weaken and even lead to the death of honey bee colonies. [1]

Bee-killing pesticides

The widespread use of pesticides in agriculture is another direct threat to honey bees. More than 150 identified pesticides and fungicides have been found in honey bee pollen, and nectar samples. These represent a direct threat to the life of the honey bees and their developing larvae. The worst offender (worldwide) is a group of pesticides called "neonicotinoids", which cause both acute, and chronic, poisoning of the honey bees, by destroying their central nervous system. Other pesticides either directly kill the bees, or destroy their immune system. [2]

When pesticides were used in the past, they were sprayed on leaves or the stem of the plant. This left the pollen and nectar for the bees mainly unaffected. However, with the introduction of GMO (Genetically Modified Organism) crops species that contain pesticide components within the plants' DNA and therefore in the plants' pollen and nectar, the entire food supply of a hive of honey bees may be contaminated. [3]

Intensification of agriculture

The loss and fragmentation of grasslands, old fields, shrub lands, forests, and hedgerows has also led to the weakening of honey bee colonies. The large industrial-style monocultures (the use of a single species for a food crop such as corn, wheat, soybean, etc.) commonly found in North America and much of Europe are not natural, and are only sustained with the application of high amounts of fertilizers, pesticides and through the use of heavy machinery. Monocultures result in a lack of biodiversity within and around croplands, and limit the amount of food to which pollinators have access. Industrial practices such as tillage, irrigation, and the removal of woody vegetation also destroy the natural habitat of the pollinators, such as honey bees, accelerating their demise. [4]

Parasites

Parasites, like the Varroa mite, have been identified as a major cause of honey bee colony loss. There is growing evidence that exposure to pesticides compromises the immune system of bees, making them vulnerable to the infestations of parasites, such as Varroa mite (*Varroa destructor*) and small hive beetle (*Aethina tumida*). [5]

Herbicide application

Large-scale herbicide application drastically reduces non-crop plant diversity and abundance, and thus limits food availability for bees. [6]

Climate change

The consequences of climate change, such as increasing temperatures, changes in rainfall patterns, and more erratic or extreme weather events, also impact pollinator populations, including the honey bee. [7]

Does the honey bee have a future?

One of ISURA's industry partners—Natural Factors has a Research Apiary at its organic farms, where they have conducted long-term beekeeping management studies, with an emphasis on bee products, disease prevention, optimal bee-friendly husbandry, and the development of non-toxic, plant-based miticides (naturally occurring compounds that kill off mites). Natural Factors has also focused on using optimal biogenic farming techniques, which serve as a template for other farmers and beekeepers to follow.

As one of North America's largest manufacturers of nutritional products, Natural Factors is committed to conserving and supporting honey bee populations by actively producing and seeking sources of contaminant-free raw materials.

ISURA's ability to test for more than 500 contaminants, including pesticides, provides natural health products consumers, and industry partners like Natural Factors, with the confidence that ISURA-certified products are safe and made from contaminant-free raw products.

Working together, ISURA and Natural Factors are dedicated to providing safe, contaminant-free natural health products which come from honey bee-friendly farms and sources. This in turn helps to ensure a healthier future for honey bees by supporting optimal biogenic farming techniques and practices, and conserving land with diverse and healthy food sources for honey bees.

References:

1. Reshetiloff, Kathy (July 31, 2012) *Bay Journal* "Without pollinators, our flowers, food supply face a stinging loss."
2. Al-Waili, N., Salom, K., Al-Ghamdi, A., Ansari, J.A. (2012) *The Scientific World Journal*, Volume 2012, Article 930849
3. Stanford, Malcolm T. (2014) *Apiservices*, "The World of GMOs - How it Relates to Beekeeping"
4. Klein, A-M, Vaissière, B.E., Cane, J.H., Dewenter I.S., Cunningham, S.A., Kremen C., Tscharntke T. (October 27, 2006) *Importance of pollinators in changing landscapes for world crops.*
5. Nagaraja, N and Gopal, D.R. (December 21, 2009) ISBN-8180940594, *Honey Bees: Diseases, Parasites, Pests, Predators and their Management*
6. Coblentz, B.A. (December 17, 2015) *Mississippi State University Extension*, "Herbicides, not insecticides are biggest threat to bees."
7. Potts, S.G., Biesmeier, J.C., Neumann, P., Kremen C., Schweiger, O., Kunnin, W.E. (February 24, 2010) *Trends in Ecology and Evolution* Vol.25 No.6. "Global Pollinator Declines: Trends, Impacts and Drivers"

Author:

Jan V. Slama is a research scientist and educator. His work in api-pharmacological and apitherapeutical studies span over 35 years, with the special emphasis on researching bee propolis.