The situation

The world’s insects are hurtling down the path to extinction, threatening a “catastrophic collapse of nature’s ecosystems”. If insect species loss cannot be halted, this will have dramatic consequences for the planet and for the survival of the mankind.

More than 40% of insect species are declining and a third are endangered, several analysis found. The rate of extinction is eight times faster than that of mammals, birds and reptiles. The total mass of insects is falling by a precipitous 2.5% a year, according to the best data available, suggesting they could vanish within a century. The decline of bees have a serious effect on pollination of plants, also those that are part of the human diet. Many birds, reptiles, amphibians and fish eat insects: if this food source disappears, all these animals will starve to death.

A standardized protocol measuring total insect biomass deployed over 27 years in 63 nature protected areas in Germany estimated a seasonal decline of 76%, and mid-summer decline of 82% in flying insect biomass (Hallmann et al., 2017).

Insect population collapses have recently been reported also in tropical countries, far from sources of pollution or human impact. Such cascading effects have already been seen in Puerto Rico, where a recent study revealed a [98% fall in ground insects over 35 years](https://www.theguardian.com/environment/2019/jan/15/insect-collapse-we-are-destroying-our-life-support-systems).

Bees have also been seriously affected, with only [half of the bumblebee species found in Oklahoma](https://bioone.org/journals/journal-of-the-kansas-entomological-society/volume-88/issue-4/0022-8567-88.4.418/Bumble-Bees-Hymenoptera--Apidae-of-Oklahoma--Past-and/10.2317/0022-8567-88.4.418.short) in the US in 1949 being present in 2013. The number of honeybee colonies in the US was 6 million in 1947, but [3.5 million have been lost](https://www.ingentaconnect.com/content/resinf/opm/2012/00000023/00000001/art00010) since.

Another way of sampling insects – car windscreens – has often been anecdotally used to suggest a major decline, with people remembering many more bugs squashed on their windscreens in the past…

The mission

Further work is urgently needed to explore the issue in more detail, understanding the consequences and proposing solutions.

Is the decline present and uniform across all Europe? Does the decline affects all the insect groups in the same way? Is it influenced by the global climate change? What is the price we pay in terms of loss of ecosystem services? What are the consequences (economical, on health, etc.)? What kind of solutions or mitigation procedures can we suggest?

This kind of research cannot be undertaken at a local level and for a short period: a pan-European study is necessary, on a long term basis.

Natural History Museums, in collaboration with the Universities, can give an essential contribution to such a research. The decline of the biomass must be measured using standardized methods, but this information will not give all the answers. How the species presence (biodiversity) is changing? How fast is the change? What could be the causes?

N.H. Museums have historical data on the presence of a species in a given area and they can compare the biodiversity over time (for the past) and organize long term monitoring campaigns (for the present and future). N.H. Museums, thanks to their to taxonomists, also have the know-how to identify the species present in the collected biomass, getting information on its change over decades.

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Cross-disciplinarity (ecology, taxonomy, environmental parameter analysis, climate change, field research, etc.)

Clear EU added value: understand and measure insect biomass and biodiversity loss on a long term scale (10-20 years) and propose solutions to mitigate the effects on agriculture, health, environment, etc.(= return to society)

Ambitious but realistic: involve a large number of N.H. Museums and Universities across Europe

Be open: can also involve the citizen science

Addressing the global sustainable development to mitigate the effects of insect decline