

## Studying the Effects of 5G Networks on Insects: Why It Matters

Wireless telecommunication networks, such as 5G, emit electromagnetic waves into the environment, exposing all living organisms, including insects. Despite this widespread exposure, the effects of these waves on insect health and behaviour remain largely unknown. Given the vital role insects play in ecosystems - especially in pollination and biodiversity preservation - it is crucial to investigate if and how the electromagnetic waves from 5G networks might impact them.

Some laboratory studies have already investigated possible effects, such as damage to insects' genetic material. However, it's still unclear whether these effects occur under real-world exposure conditions. This project aims to answer that question by studying the impact of 5G on insect health and behaviour in realistic environmental settings

### What Does the Project Do?

Researchers are testing the effects of 5G on three types of insects:

1. **Fruit flies (Drosophila):** They are exposed to 5G waves in a laboratory chamber at 25°C, with carefully controlled wave intensity.
2. **Honey bees:** They are studied in real-world conditions using frequencies of 3.4 GHz and 24-26 GHz, commonly used in 5G networks.
3. **Bumblebees:** Their health and behaviour are studied in an operational tomato greenhouse where they are used to pollinate the tomato flowers. The greenhouse is equipped with a private 5G network driving horticulture technological innovations.

Each group of insects also has a “control” group. These insects are kept in the same conditions but without exposure to 5G waves, allowing for a comparison of results.

### What Tools and Methods Are Used?

The project uses advanced technologies developed as part of HORIZON Europe projects **ETAIn** and **NextGEM** (HORIZON-HLTH-2021-ENVHLTH-02-01 program) to assess the exposure routes, the exposure level and the risk for humans and insects.

We use innovative technologies to study which genes are up- or down-regulated in insects exposed to 5G. We will also test whether 5G exposure causes DNA damage, helping us understand how their bodies react to the waves in detail.

In addition, possible effects on reproductive capacity, will be assessed, such as sperm viability in honey bees.

Finally, we will carefully observe insect behaviour to detect possible disruptions in their foraging routines or pollination abilities.

## **Why Is This Important?**

This project aims to provide clear answers about the effects of 5G on insects, particularly their genetic health and behaviour. Our aim is to:

- Create research methods and tools to better understand the impacts of wireless technologies on insects and other forms of life.
- Help develop safer strategies and policies to limit the negative effects of waves on insects and, indirectly, on ecosystems and agriculture.

In conclusion, this work could help scientists, industries, and society better assess and manage the effects of 5G, protecting not only humans but also species essential to our planet.