

Olle Johansson

1. A new very interesting paper about the effect of microwaves on honey bee larvae, pupae and adults after exposure to RF-EMFs originating from phone base station towers under field conditions:

Vilić M, Žura Žaja I, Tkalec M, Tucak P, Malarić K, Popara N, Žura N, Pašić S, Gajger IT, "Oxidative stress response of honey bee colonies (*Apis mellifera* L.) during long-term exposure at a frequency of 900 MHz under field conditions. *Insects*. 2024; 15: 372 (article number), <https://doi.org/10.3390/insects15050372>

In this study, oxidative stress and lipid peroxidation in honey bee larvae, pupae and the midguts of adult bees were investigated during a one-year exposure to radiofrequency electromagnetic fields (RF-EMFs) at a frequency of 900 MHz under field conditions. The experiment was carried out on honey bee colonies at three locations with electric field levels of  $30 \text{ mV m}^{-1}$ ,  $70 \text{ mV m}^{-1}$  and  $1000 \text{ mV m}^{-1}$ . Antioxidant enzymes, glutathione-S-transferase (GST), catalase (CAT) and superoxide dismutase (SOD) and thiobarbituric acid reactive substances (TBARS) as indicators of lipid peroxidation were measured spectrophotometrically. (...) Our results show that RF-EMFs at a frequency of 900 MHz can cause oxidative stress in honey bees, with the larval stage being more sensitive than the pupal stage, but there was no linear relationship between electric field level and effect in any of the developmental stages.

<https://www.mdpi.com/2075-4450/15/5/372>

## 2.

Another very interesting paper is:

Panda DK, Das P, Behera SK, Dhal NK, "Review on the impact of cell phone radiation effects on green plants", *Environ Monit Assess* 2024; 196, 565,

<https://doi.org/10.1007/s10661-024-12623-0>, which I recommend for reading.

<https://link.springer.com/article/10.1007/s10661-024-12623-0>

The aim of this review is to assess the impact of cell phone radiation effects on green plants. (...) Key factors like a range of frequencies, time durations, power densities, and electric fields were found to have differential impacts on the growth and development of green plants. As far as the effects on green plants are concerned in this review, alterations in their morphological characteristics like overall growth, canopy density, and pigmentation to physiological variations like chlorophyll fluorescence and change in membrane potential etc. have been found to be affected by cellular radiation. On the other hand, elevated oxidative status of the cell, macromolecular damage, and lipid peroxidation have been found frequently. On the chromosomal level, micronuclei formation, spindle detachments, and increased mitotic indexes etc. have been noticed. Transcription factors were found to

be overexpressed in many cases due to the cellular radiation impact, which shows effects at the molecular level.

For more information about Professor Olle Johansson:

<https://research.radiation.dk/>