



10th Jubilee

**RAD**

INTERNATIONAL  
CONFERENCE  
ON RADIATION  
IN VARIOUS FIELDS  
OF RESEARCH

*Summer Edition*

July 25-29, 2022  
Palmon Bay Hotel  
Herceg Novi, Montenegro

# BOOK OF ABSTRACTS

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## BOOK OF ABSTRACTS

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## Sex-specific antioxidative strategy and fitness components of *Lymantria dispar* L. in static magnetic field

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Life on Earth exists under the influence of natural magnetic field (geomagnetic field – 25 to 65  $\mu$ T). Nowadays, this is not the only magnetic field (MF) whose effects we find and endure in nature. Human activities (electrification, industrial and technological development) are sources of several strong artificial MFs. These MFs have a stressful impact on the life processes in the organisms and should be treated as a kind of environmental pollutant that deserves constantly growing attention. Insects are sensitive to MFs, showing considerable changes in development, neuroendocrine system, genome, metabolism, antioxidative defence, daily activities, orientation, behavior etc. Static magnetic field (SMF) extensively changes free radical production, increases peroxidation processes of lipid bilayers of cell membranes and expresses a negative influence on insect tissues. Prooxidative stressogenic effect of SMF on insect tissues includes modification of activity of antioxidative enzymes and production of non-enzymatic antioxidants.

The aim of our research was to evaluate differences in fitness components (survival rate, larval mass, development duration) and antioxidative defence strategy (activity of superoxide dismutase - SOD, catalase - CAT, glutathion S-transferase - GST and whole amount of glutathione - GSH) of male and female Gypsy Moth (*Lymantria dispar* Linnaeus, 1758) larvae, after the long-term exposure to SMF (230mT).

Newly hatched male and female larvae of *L. dispar* were exposed to a magnetic field of approximately 230 mT generated by a static double U-shaped magnet (Raytheon, model 6002). It consists of two symmetric halves. Magnetic field has relatively homogenous strength and field was measured by a gaussmeter (HIRST – GAUSSMETER GM 05, with probe PT 2837 – Hirst Magnetic Instruments LTD, Tesla House, Tregonigie, Cornwall, UK). Determination of the differences in activities of antioxidative enzymes and the amount of GSH was done in whole larvae homogenates. SOD was conducted according to the methods described by Mistry & Fridovich (1972). CAT activity was determined according to the method by Beutler (1982). GR activity was measured according to Glatzle *et al.* (1974). GST (antioxidative function) activity was determined according to the method by Habig *et al.* (1974). Determination of the concentrations of reduced GSH was conducted according to Griffith (1980). We also evaluated fitness components daily.

The study provides information on the effects of the long-term exposure of male and female *L. dispar* larvae to the SMF. Such exposure induces significant alterations in their strategy of antioxidative defence that are strikingly sex-specific. Increasing the knowledge of effects of SMF exposure in evolutionary simpler organisms may be the basis for understanding its action in higher organisms and humans.

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