

Lineage often really matters. This fact is well known to the breeders of pedigree dogs, cats or horses. Well-documented, from generation to generation, set of features has often enormous price, from the financial point of view. That is why breeders keep struggling to maintain desired attributes of the champions and their offspring. In the natural environment lineage also really matters. Preserved, from generation to generation set of features has often enormous price: the price of life. Especially in difficult environments, the set of features obtained from the ancestors, means something more than grace, shiny fur or shapely head. In the industrial or agricultural areas under the pressure of heavy metals, aromatic hydrocarbons or pesticides, the ability to survive and reproduce are more important than just beauty. Invertebrates inhabiting polluted areas reproduce and create stable populations. This means that they possess the features that enable them tolerate harmful chemicals and differentiate them from the populations inhabiting unpolluted sites. The aim of this project is the attempt to answer the question whether 30, or 180 generations is enough for the features to appear in the population, whether they are inheritable or just remain within the range of plasticity of the organism. To answer the questions the scientists will apply a very precious culture of “pedigree” moths – pest insects. In the laboratory of the Department of Animal Physiology and Ecotoxicology, University of Silesia in Katowice, there is the culture where the insects have fed only on the cadmium (heavy metal) containing diet for 150 generations. At the same time, for the comparison, a 150-generation strain of insects that eat unpolluted food. Additionally, with the beginning of the project a new strain will be initiated. The insects of this strain will eat Cd-containing diet for the 1st generation. At the end of experiment the main strains will have 180 generations, while the additional one – 30. In the cells of the insects from these strains the features indicating ability to survive will be measured: the concentration of stress and repairing proteins, the level of DNA damage and the number of cells that enter the programmed cell death.

There are three reasons to take up this subject: the first one is the fact that in environmental studies it is usually impossible to determine the character of the differences in the features of populations from variously polluted areas. The recognition of this character will ease making conclusion from the studies led in polluted areas. Moreover, in the environment, animals are exposed to a great number of unfavorable factors that are impossible to analyze separately to reveal their ways of action. In the laboratory we may select and analyze only one of them. The third reason is connected with the development of tolerance to such toxins as pesticides. The problem of insect resistance to pesticides is generally known. The results of this project will, possibly, contribute to the understanding of the resistance mechanisms and direct the searching of new pesticides, efficient and harmless for those animals the population of which is not necessary to be controlled.