



THE CHANGES IN THE ECOLOGY AND PHYSIOLOGY OF SOIL INVERTEBRATES UNDER INFLUENCES OF RADIOACTIVE CONTAMINATION

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The soil biota is important in building and maintaining soil structure and fertility. Invertebrates are ideal as potential bioindicators of the environmental impact of radioactive contamination: they are widely distributed, often abundant, and generally thought of as having low dispersive capacity. They can be used as test organisms to detect the side effects of radioactive contamination.

The long-term analysis of ecological and physiological after-effects and biodiversity changes had been studied in the zone of radioactive contamination. Material was collected in the Gomel Region (Belarus) 30 km away from the CNPP in 1986–2004 applying usual pedobiological techniques (soil samples and Barber's pitfall traps) at reference points subjected to radioactive contamination. Soil samples were collected at 0 to 25 cm depth. Samples were taken in locations which had received considerable radionuclide contaminations. These sites differed in contamination by the composition of fall-out, the forms of radionuclide content in soils, their intake into trophic chains and accumulation in animal and plant organisms. The impacts have been investigated at the 1) organism and population levels in terms of individual life histories (birth rate, growth, mortality) or species selection; 2) at the community level to species diversity and to effects on trophic structure. The invertebrates were determined to species or genera, including juvenile stages.

Radioactive contamination caused a distinct decrease in species number; the dominance structure of the community changed. The saprophagous are especially sensitive to environmental disturbances. An initial sharp reduction of animal biodiversity and simplification of the community structure of soil fauna were observed, followed by a long-term process of returning to the initial parameters. Changes in hemolymph, necroses of epithelium and cell structure in connective tissue were registered. The most drastic after-effects were manifested in rates of soil mesofauna reproduction.

Thus, our studies allowed us to estimate correctly the changes induced by radioactive contamination caused by Chernobyl nuclear accident at the level of soil invertebrate communities and to reveal the pattern of their disturbance under constant radiological pressure.

Keywords *Soil invertebrates, radioactive contamination, after-effects*