

## Radioecological studies of higher aquatic plants within the Chernobyl accident exclusion zone

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The radioactive contamination of the environment as a result of the Chernobyl accident produced a substantial increase in the radiation background, accumulation of radioactive substances by living organisms and, accordingly, an excess radiation dose to biota. The lack of accurate dosimetry measurements creates difficulties in the interpretation of observed (or missing) effects, and their correlation with dose rate. Our study aimed to the assessment of radiation dose resulting from external irradiation and incorporated radionuclides and its influence on higher aquatic plants.

Our researches were carried out during 2000-2007 in water bodies within the 30-km exclusion zone of the Chernobyl NPP. External gamma-background measurements and sampling of higher aquatic plants for radionuclide content and radiobiological (cytogenetic, reproductive and morphological indexes) analysis were made in the littoral zone of water bodies of right- and left-banks flood plain of the Pripjat River. It was obtained that at rather stable internal absorbed dose rate, caused by <sup>137</sup>Cs during 1993-2007, the dose, caused by the <sup>90</sup>Sr content, has grown more than in 20 times for some species of higher aquatic plants in comparison with the beginning of 1990-s in water-bodies of left-bank flood plain of the Pripjat River. As a result the total internal dose of plants irradiation has increased more than in 6 times, that testifies to essential deterioration of radiating conditions for aquatic biota, in particular for higher aquatic plants within the territory of Krasnensky flood-lands on the left bank of the Pripjat River, which is the most contaminated region of the exclusion zone. The rate of chromosome aberrations has been studied in four species of higher aquatic plants: common reed (*Phragmites australis*), sagittaria (*Sagittaria sagittifolia*), flowering rush (*Butomus umbellatus*) and manna (*Glyceria maxima*). The absorbed dose rate for hydrobionts from above water bodies in decreasing sequence was: 3.4-1.6 (Glubokoye Lake) > 0.09-0.05 (Dalekoye Lake) > 0.08-0.02 (Azhibuchin Lake) > 0.05-0.01 (Yanovsky Crawl) > 0.03-0.01 (cooling pond of Chernobyl NPP) > 0.004-0.002 (Pripjat River) > 0.003-0.001 Gy year<sup>-1</sup> (Uzh River). The highest chromosome aberrations rate in root meristems (17.8-10.8 %) was registered in plants from lakes within the left-bank flood lands of the Pripjat River, the lowest one (4.5-2.2 %) - in plants from the Pripjat River and Uzh River. The rate of chromosome aberration in closed and slow-running water

bodies within the right-bank flood land of the Pripjat River was in 3-4 times higher than spontaneous mutagenesis level. Partial or close to complete seed sterility (from 47 to 72 %) were observed for common reed from investigated water bodies, except of running ones. The correlation between high level of chromosome damages and decrease of plant production has been determined.