

A STUDY OF RADIATION EFFECTS ON ECOSYSTEM AND WILDLIFE IN AREAS AFFECTED BY THE FUKUSHIMA ACCIDENT

Masanori Tamaoki

Fukushima Branch, National Institute for Environmental Studies, 10-2 Fukasaku, Miharu, Fukushima, 963-7700, Japan

Abstract

Our research group has been carried out some research projects for environmental disaster after FDNPP accident. Those include research for direct or indirect impacts of radiation on wild organisms and ecosystems in Fukushima. Here, I introduced following three topics carried out in my institute. (1) To evaluate DNA damage caused by radiation to the Japanese field mouse (*Apodemus speciosus*), mice were captured from a highly radiation dose site (Fukushima) and two lower radiation sites (Toyama and Aomori). The accumulation of oxidative stress marker (8-OHdG) was determined. The mice collected from Fukushima showed higher accumulation of 8-OHdG in testis than those from lower radiation sites. However, there was no difference in gene diversity among difference radiation dose sites. These suggest that germ cells of the mice living in highly radiation dose area were suffered oxidative stress but DNA damage was reduced by endogenous anti-oxidative or DNA repair systems. (2) To evaluate DNA repair followed by DNA damage with irradiation, transgenic plants that can detect homologous recombination activity induced by double strand break of DNA were generated. The plants were grown on contaminated soil for 30 days. Thereafter, estimation of frequency of DNA repair in plants was carried out. The result showed that DNA repair frequency was increased with increase of dose of irradiation. In addition, the transgenic plants showed that that DNA damage was mainly occurred from external exposure of gamma-radiation from contaminated soil. (3) To detect effects of evacuation, monitoring project of terrestrial biodiversity such as mammals, insects, birds and frogs was started from 2014 in Fukushima. The aim of the project is to yield information on the biodiversity and ecosystem effects of large-scale and long-term evacuation of the Fukushima area. In the project, a total of 48,081 insects and spiders were sampled from the 47 sampling sites. Most were Hymenoptera and Diptera (16,583 and 20,082 individuals, respectively). In total, 46 taxonomic and caste groups were found at more than 5 sites and were used in the subsequent analyses. The abundance of carpenter bees was lower within the evacuation zone than outside, whereas those of most of the other collected taxa, including pollinators, were higher or not different. Considering previous studies of insects and radiation levels in the evacuation zone, it is unlikely that the radiation has acutely damaged the bee population. Alternatively, a potential cause of the reduced population density of the carpenter bee in the evacuation zone might be a reduction in the numbers of flowers of garden plants following the evacuation.