

Food affected by Fukushima disaster harms animals, even at low-levels of radiation

September 22 2014

Butterflies eating food collected from cities around the Fukushima nuclear meltdown site showed higher rates of death and disease, according to a study published in the open access journal *BMC Evolutionary Biology*.

Researchers fed groups of pale blue grass [butterflies](#) (*Zizeeria maha*) leaves from six different areas at varying distance from the disaster site, and then investigated the effects on the next generation. Feeding offspring the same contaminated leaves as their parents magnified the effects of the radiation. But offspring fed uncontaminated leaves were mostly like normal butterflies, and the authors say this shows that decontaminating the food source can save the next generation.

The 2011 meltdown at the Fukushima Dai-ichi nuclear power plant released substantial amounts of radiation into the surrounding area. Humans were evacuated, and no significant health effects have been reported, but the scientists from the University of the Rukyus, Okinawa, Japan, are studying the impact on the area's wildlife.

In a previous study, the group suggested that eating leaves with high levels of radiation seriously affected the pale grass blue butterfly. Their new study investigated the effect of eating leaves with much lower levels of radiation, which had been collected in 2012, a year after the disaster, from six areas that were 59km to 1760km from the site.

Their study showed that even in these comparatively low levels of

radiation, there was an observable difference in the butterflies' lifespan, depending on the dose of caesium radiation in their food, which ranged from 0.2 to 161Bq/kg. For comparison, leaves collected in the months after the disaster around 20km from the site had radiation in the thousands of Bq/kg. Butterflies fed leaves with higher caesium radiation doses were also smaller and some had morphological abnormalities such as unusually shaped wings.

Professor Joji Otaki, University of Rukyus, says: "Wildlife has probably been damaged even at relatively low doses of radiation, and our research showed that sensitivity varies among individuals within a species."

In the second part of the experiment, the researchers looked at the next generation of butterflies. These were split into groups fed an uncontaminated diet, and those fed the same diets as their parents.

The offspring fed an uncontaminated diet had a similar lifespan, irrespective of the amount of [radiation](#) their parents had been exposed to. The only effect seemed to be that those whose parents had been exposed to higher caesium diets had smaller forewings. But those fed the same contaminated diet as their parents showed magnified effects.

The authors say that this shows that the effects of eating [contaminated food](#) can be significant, and that they can be passed on, but are minimized if the next generation have an unaffected diet.

Professor Otaki says: "Our study demonstrated that eating contaminated foods could cause serious [negative effects](#) on organisms. Such negative effects may be passed down the generations. On the bright side, eating non-contaminated food improves the negative effects, even in the next generation."

More information: Ingestion of radioactively contaminated diets for

two generations in the pale grass blue butterfly, Chiyo Nohara, Wataru Taira, Atsuki Hiyama, Akira Tanahara, Toshihiro Takatsuji and Joji M. Otaki , *BMC Evolutionary Biology* 2014, 14: 193,
www.biomedcentral.com/1471-2148/14/193

Provided by BioMed Central

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