



The conservation effects of Chernobyl 25 years on

The Chernobyl nuclear disaster is still having an impact on local biodiversity more than 25 years after the event, according to a new study. Researchers in France and the US suggest that rare bird species have been particularly affected by the accident and that genetic changes in plants and animals caused by radiation are being passed down the generations.

Regarded as the world's largest ever environmental disaster, the explosion at the Chernobyl nuclear plant in Ukraine in 1986 contaminated 200,000 square kilometres of land in eastern and central Europe. The full extent of the environmental and biological damage caused is still uncertain. Although a recent assessment concluded that the Chernobyl Exclusion Zone contains increasing numbers of rare species, the researchers of the new study argue that this claim is unsubstantiated because it is not based on published scientific data.

In this study, the researchers were interested in addressing two questions: *have rare species been worse affected by the accident?* and *what impact do genetic changes, or mutations, caused by radioactive materials have on conservation status?*

The researchers surveyed bird numbers over three years across 731 locations in Ukraine and Belarus. This revealed that rare birds, such as the globally threatened aquatic warbler, have been disproportionately affected, and are generally only found at sites with low radiation levels. Common birds are more widespread across all sites. Rare birds are also restricted to areas with high species diversity, which suggests that rare species respond differently to radiation than common species.

Answering the second question was more complex. Most new mutations are thought to be harmful, but they occur frequently in plants and animals, even under normal conditions. Some mutations result in death, which prevents these mutations being passed on to new generations, while others may reduce an organism's likelihood of reproducing. In either case, species abundance and therefore conservation status, can be affected. In humans and other vertebrate species, three new mutations are estimated to occur per egg or sperm. The Chernobyl disaster is thought to have increased mutation rates to 20 times their normal level in some species.

The researchers were able to tentatively suggest that, through breeding and migration, harmful mutations could by now have spread long distances over many generations, making their way into western and southern Europe. However, they also found evidence to suggest that species with high levels of mutations did not disperse them as far. They say it should be possible in future research to track the movement of mutations away from Chernobyl over time.

Other future concerns include the movement of radioactive materials from the Chernobyl site to elsewhere – in particular, as a result of forest fires and fires deliberately started by farmers to burn crop stalks. Fires in the region have been known to carry radioactive material to Vilnius, Lithuania, in 2002 and Obninsk, Russia, in 2010. To safeguard humans, as well as other species, policies to mitigate against fires are urgently needed, say the researchers.

Source: Møller, A.P. and Mousseau, T.A. (2011). Conservation consequences of Chernobyl and other nuclear accidents. *Biological Conservation*. 144: 2787-2798.

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