

Using nuclear technology to support early warning and surveillance of avian influenza

The challenge...

Following the first occurrence of highly pathogenic avian influenza (HPAI) in humans in 1997, the migratory pathways of wild birds, particularly ducks, swans, geese and various wading birds, have become a topic of great interest, as these birds are potential carriers. Using nuclear technology – specifically, stable isotope analysis – it is possible to trace the origin of individual birds and to identify their migration patterns during a specific period.

The isotopes accumulate in a bird depending on its food and water intake, and can provide important information on the bird's origin and migration path because diverse geographical regions have different, but relatively constant, stable isotope patterns. Moreover, as the feathers and beak are constantly growing, sequential measurements can provide information on where a particular bird has been during a certain period. Stable isotope measurements of tissues from infected animals provide a way of tracing their movements, enabling more efficient assessment of the risk of disease dissemination.

The project...

A regional technical cooperation project in Europe has, as one of its objectives, the improvement of the early and rapid diagnosis of HPAI using stable isotope analysis.

Under the project, five scientists have been trained at the Federal Centre for Animal Health in Vladimir, Russian Federation. Three regional training courses have also been conducted at the Animal Production and Health Laboratory, Seibersdorf, Austria. With the assistance of the IAEA and partners that included the Wildlife Unit of the Food and Agriculture Organization of the United Nations, Austria Research Centres and the Korea Atomic Energy Research Institute, 18 scientists from 15 countries in the Balkans and Asia also participated in the project. They are now capable of performing the whole diagnostic cycle for the detection and identification of HPAI.



The impact...

Through the project, stable isotope analysis has been proven to be a useful tool for tracing the migratory pathways of wild birds. In addition, harmonized diagnostic protocols for the detection of HPAI have been implemented or upgraded in the participating regional laboratories.

A regional diagnostic platform has been established that is capable of responding to the diagnostic challenges related to a potential HPAI outbreak. The established regional network of scientists provides a solid platform for planned activities for further technology transfer and capacity building related to improved preparedness and response to other emerging transboundary animal diseases, including zoonoses.