



Credit: FAO

Satellite transmitters on migratory birds provide telemetry information on migratory patterns

THE ISSUE

Wild water birds are reservoirs for low pathogenic avian influenza (LPAI) viruses worldwide. To date, wild birds have not been identified as such for the H5N1 Highly Pathogenic Avian Influenza (HPAI) strain that rapidly spread across Asia into Europe and Africa from 2005 onwards, and affected domestic poultry, wild birds and humans.

Increasing human population and poultry production, coupled with intensification of duck farming and land-use patterns, has resulted in farms and wetlands being in closer

proximity to one another. Open grazing of wild birds and farmed domestic ducks in post-harvested rice fields and wetlands shared with migratory wild birds, creates mechanisms for transmission of influenza viruses between these sectors. Thus, it is important to understand the ecology of this disease and the dynamic drivers of disease introduction and persistence.

THE FACTS

The unusual outbreak of H5N1 avian influenza in wild migratory birds in Qinghai Lake, China in 2005 – which led to the death of over 6 000 wild birds, followed by the rapid geographic expansion of the virus into Europe and Africa – has resulted in the need to evaluate the role of wild birds in maintaining and spreading the H5N1 avian influenza virus, in order to improve disease control. This disease resulted in the death or destruction of millions of domestic poultry, and eliminated an essential protein resource for many urban and rural people in developing countries, greatly impacting on livelihoods, commerce and trade.

With the emergence and spread of H5N1 HPAI in poultry, it became apparent that multidisciplinary in-country and regional capacity building was necessary to address diseases infecting livestock, wildlife, and people. To date, Wildlife Unit of the Food and Agriculture Organization of the United Nations (FAO) has trained more than 1 000 biologists, ecologists, resource managers, veterinarians, medics and poultry specialists. Wild bird surveillance at farms, markets, and in wetlands has engaged collaborative teams to study the epidemiology and ecology of zoonotic diseases, with an emphasis on incorporating the natural history of wildlife, including seasonal habitat use and migratory routes, to better understand the risks posed by wild birds. More than 500 satellite transmitters have been deployed in 12 countries, to monitor global migratory waterfowl movements across more than 40 countries in the East-Asian, Australasian, Central Asian and African-Eurasian flyways, to determine whether wild bird movements are temporarily or spatially associated with H5N1 HPAI outbreaks in poultry. Migratory stop-over sites are being identified in H5N1 HPAI endemic countries, highlighting strategic locations for more focused studies on the wildlife-livestock interface. This multidisciplinary approach is now being used by FAO to address other emerging infectious pathogens, including Nipah and Ebola, rabies, foot-and-mouth disease, *peste des petits ruminants*, Rift Valley fever, West Nile and Japanese encephalitis viruses, and other influenza viruses. FAO also expects to expand this surveillance model to support studies on bat-borne viruses in Southeast Asia, wild ungulate transboundary diseases in East and Southern Africa, and initiate market-chain studies of the health risks associated with bushmeat consumption in the Congo Basin.

CHALLENGES AND GAPS

While the spread of H5N1 HPAI is primarily through the legal and illegal trade of poultry and poultry products, or unintentional movement of the virus through human actions, the extent to which migratory wild birds contribute to sustaining and spreading the disease needs to be determined. Data suggests that wild birds may be transporting influenza viruses along their migratory routes, specifically along the Central Asia flyway between India, Bangladesh, Myanmar, China, Mongolia and Russia. There are also pending questions over the role of wild birds as mixing vessels for other transboundary animal diseases, such as H1N1 and H7N3 influenza viruses, recently detected worldwide.

The nature of wild waterfowl movements and linkages to natural resources and wetland ecosystems raise the following questions:

- ▶ To what extent do wild birds play a role in the spread and transmission of H5N1 HPAI? If their role is confirmed, what precautions can be taken to prevent further interactions between domestic production systems and wild birds?
- ▶ Which are the main policy tools that can be implemented at national and regional levels to address the interactions between pathogens, poultry, farming practices, wild birds and their ecosystems?
- ▶ Although, to date, there are no cost-effective measures to halt disease spread among wild bird populations, evidence suggests that wild birds are not the reservoir for H5N1 avian influenza, but may periodically transmit virus from one location to another. This emphasises the point that prevention and control measures should be focused on domestic poultry.

FAO'S POSITION

Increased proximity and contact between livestock, wildlife and humans creates opportunities for the transmission of endemic and newly emerging infectious diseases across sectors. It is therefore clear that there is a need to establish long-term, sustainable wildlife disease surveillance and monitoring programmes globally, with a focus on understanding the ecology and epidemiology of diseases affecting humans, domestic and wild animals. Wildlife expertise should also be engaged in outbreak response activities to determine the role of wildlife in the introduction of disease, or risk of spill-over from farm to wildlife.

FAO has paved the way to a better understanding of the role of wild birds in the maintenance and spread of H5N1 avian influenza. This effort has been a global collaboration among multiple disciplines, and among agriculture, health, wildlife, and ecosystem resource ministries. The foundations created to address the pandemic threat of H5N1 influenza virus of avian origin serve as a stepping stone for addressing newly emerging infectious diseases in a holistic way – and one that addresses dimensions of human, livestock, wildlife, environment, and ecosystem health. This is at the core of the *One Health* approach embraced as the way forward for FAO.

RECOMMENDATIONS

- ▶ Engage civil society organizations, together with public and private stakeholders, in the evaluation of the role of wildlife in disease transmission and maintenance.
- ▶ Utilise multilateral environmental agreements and the Scientific Task Force on Wildlife Disease co-convened by FAO and the United Nations Environment Programme Convention on Migratory Species to share important science-based disease information with conservationists.
- ▶ Promote and encourage the use of passive and targeted active surveillance, and notify authorities when wildlife or wild bird deaths and/or disease outbreaks occur.
- ▶ Link information between migratory bird movements and habitat use to outbreak data generated through FAO-OIE-WHO Global Early Warning and Response System for Major Animal Diseases (GLEWS) and the disease intelligence unit, to better understand disease emergence risks and patterns.

References and Resources:

- FAO Wildlife Unit:
<http://www.fao.org/avianflu/en/wildlife/index.html>
- Scientific Task Force on Avian Influenza and Wild Birds:
<http://www.aiweb.info/>

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