

AVIAN INFLUENZA AND OTHER BIRD DISEASES

A British Ornithologists' Union Autumn Scientific Meeting

CONFERENCE SUMMARY

A Conference on avian diseases organised by the British Ornithologists' Union was held in Peterborough on 20-21 November 2006. Presentations explored a wide range of issues relating to the epidemiology of avian diseases in the broadest sense, including infectious, toxic and nutritional diseases, their role in the dynamics of wild bird populations and implications for bird conservation. The second day's programme focussed specifically on Avian Influenza.

The BOU's conference gave a timely opportunity to reflect on emerging issues and future priorities.

GENERAL ISSUES

Profile and awareness of avian diseases

Until recently awareness of avian disease and its significance had largely been restricted to animal health professionals. The spread of West Nile virus, and increasingly frequent outbreaks of avian cholera, avian botulism, Newcastle disease, recent epidemic outbreaks of trichomoniasis in finches in the UK, and especially the recent spread of Asian lineage highly pathogenic avian influenza of subtype H5N1, has resulted in greater awareness of disease issues, not only within wider ornithological and research communities, but also by the public.

The current situation gives an important opportunity to communicate important messages regarding sustainable development, especially with respect to the interface of agriculture, human health, wildlife health, ecosystem health and sociology.

Research co-ordination and collaboration

Disease ecology and ecological immunology are multi-disciplinary subjects. To this end, the development of collaborative, cross-disciplinary research programmes, where the study and monitoring of avian disease is fully included as a key element of integrated monitoring of bird populations, needs to be strongly encouraged and supported.

Recent events have and continue to provide opportunities to build such collaborative programmes of research and monitoring involving those engaged in avian disease surveillance and diagnosis, bird research and conservation, as well as with others with relevant skills and expertise.

Long-term approaches are desirable: the role and implications of disease in the regulation of bird populations can best be understood in the context of longer-term research (ideally over several annual cycles) given that disease prevalence may vary markedly not only between seasons, but also from year to year in response to changing environmental and other conditions. Whilst recognising that disease is a natural process, the role of long-term insidious disease problems may be of greater significance for populations than acute mortality incidents, further supporting the need for long-term perspectives.

Many presentations stressed the importance of partnership approaches in the development of surveillance programmes, and the recent Garden Bird Health *initiative*^[1] provides a good model. Such joint collaborations should be strongly encouraged as a cost-effective means of pooling expertise between organisations.

The development of common standards and protocols related to post-mortem examination, diagnostic procedures, and other areas of disease research and surveillance, are essential so as to maximise the potential to share data between collaborating organisations.

The development of a national wildlife tissue archive would greatly aid retrospective disease surveillance and ancillary research, whilst an international resource would be especially welcome.

Research priorities

The Conference welcomed the proposal that research into avian disease processes are included within any future revision of Annex V of the EC Directive on the Conservation of Wild Birds (which lists priority areas of ornithological research to be encouraged by Member States).

It is important that there is better recognition of wildlife health as an issue of conservation concern. This needs to be reflected in the future funding and development of wildlife health surveillance such that the focus of programmes is wider than considering wildlife just as reservoirs of zoonoses and agricultural diseases.

To this end, the development by DEFRA of a Wildlife Health Strategy was welcomed. This will provide a valuable opportunity to raise the profile of avian disease research generally, and help better to integrate existing activities, not only within multiple government departments and agencies, but with non-governmental organisations and other stakeholders.

Whilst resources will probably always be focussed on *targeted surveillance* of notifiable and some other zoonotic diseases, the maintenance of *scanning surveillance* — to detect undefined, undetected and novel diseases more generally — is very important.

Molecular genetics provide a valuable diagnostic tool which aids in epidemiological understanding. Where possible, it should be included in integrated programmes of avian disease research and control.

Understanding of disease mechanisms relates closely to the understanding of host immune function. However, such functions should be viewed as a suite of mechanisms, rather than a single variable. Further advances in understanding avian immunology depend upon both experimental and comparative/correlative studies of different immunological strategies. A better understanding of the biological relevance of immune indices, particularly in relation to disease susceptibility, is required. In an evolutionary sense, integrated disease threats and individual diseases should both be considered for their role in shaping immune defences. A specific issue relates to the effects of migration on immunocompetence, since this could determine the extent to which birds could carry Asian lineage highly pathogenic avian influenza H5N1 during long-distance migration.

¹ This GBHi is co-ordinated by the Institute of Zoology and involves collaboration between disease investigation centres (Scottish Agricultural College, Department of Pathology, University of Liverpool and the Wildlife Veterinary Investigation Centre) with an established interest in wildlife health, ornithological NGOs (BTO & RSPB) and animal welfare charities (Universities Federation for Animal Welfare) with participation and support from the garden bird food industry sector. A national scheme for garden bird mortality surveillance has been created through a combination of opportunistic and systematic reporting networks involving the general public and the BTO/CJ Garden BirdWatch volunteers. Further information at <http://www.ufaw.org.uk/gbhi.php>.

Disease and climate change

Changes in climate are already affecting the life-cycle phenology of some birds and invertebrate vectors of parasites. Ecological theory suggests that a reduced seasonality of disease occurrence – leading possibly to infection through the year – may favour the evolution of micro- and macro-parasites with higher virulence. Such complex changes affecting environments, hosts and parasites may have great consequences for bird populations and their conservation.

AVIAN INFLUENZA

Whilst much of the discussion of the meeting related to the possible role of wild birds in the spread of Avian Influenza, it was recognised that this was just one means by which the HPAI H5N1 virus was spread. Other vectors include especially the local, international and global movement of poultry and poultry products, but also include movements of other avian livestock and cage birds and associated activities to service the respective industries; through both the legal and illegal trade in birds; as well as movements of people. The relative significance of these modes of spread have varied and evidence of causal links in many cases is weak or lacking.

Whilst many of the conclusions below relate to wild birds, it is essential that overall assessment of risks, nationally and internationally, to the poultry industry from HPAI H5N1 address equally these other vectors. Yet, despite this, it was noted that there had been less attention given to these other modes of viral spread.

Public awareness and understanding

The spread of HPAI H5N1 is of public concern, yet there remains widespread public misunderstanding of the issue in many countries, including circulation of misinformation. This creates political pressure for ill-advised and disproportionate policies such as the culling of wild birds and the destruction of their wetland habitats. Conservation organisations, scientists and veterinary services need actively to work with the media to enhance the accuracy of reporting on this issue. This should include the development of much more effective communication strategies so as to give policy makers, stakeholders and the general public more balanced information on real levels of risk and appropriate responses.

The meeting discussed the possible 'mixed messages' that public can sometimes receive regarding risk. Whilst there is an assessed low risk of human infection by H5N1 from wild birds, photographs of professional staff dressed in comprehensive personal protective equipment can suggest otherwise. News of a current review of risk assessment for humans by the Health and Safety Executive was welcomed. It was hoped that this would allow the development of more balanced health and safety guidance for the staff of organisations that work directly with potentially infected birds. All agreed that it was most important for conservation bodies to avoid the development of a public culture of fear associated with wild birds and to encourage similar attitudes in other relevant professions.

The meeting accepted that recommendations for improved biosecurity to separate poultry from contact with wild birds held welfare implications where these measures involved compulsory indoor housing of poultry.

Collaborative working

Maintaining and developing collaborative approaches to addressing the multiple and complex issues raised by the international spread of HPAI H5N1 is critical to long-term success. To effect successful solutions, collaborative partnerships will need to be fully integrated involving the range of necessary ornithological, wildlife, and wetland management expertise together with those traditionally responsible for both animal and public health, including veterinary, agricultural, virological, epidemiological, and medical expertise. Partnerships are needed at multiple scales, including international, national and local (the latter especially in the context of responses to HPAI H5N1 outbreaks in both poultry and wild birds).

Governments should be aware of, and continue to draw upon expertise within non-governmental organisations and the academic community in developing surveillance programmes for avian influenza, providing appropriate financial support as necessary.

The impact of avian influenza remains most acute in the poultry industry, and there needs to be a continued close engagement and working with that sector to reduce risks.

Surveillance for avian influenza viruses

Broad-scale surveillance for avian influenza viruses in wild birds European scale needs to be more actively co-ordinated at the demographic level between Member States, with the development of flyway approaches to bird surveillance. High standards of data collection are needed with rapid reporting and analysis of results.

At a local level, interpretation of surveillance at major sites is usefully informed by developing integrated approaches involving collection of information on waterbird distributions, numbers and movements, and integrating these with data from viral sampling. This allows modelling of scenarios such as is being undertaken in the Camargue.

The development of an early warning system has been repeatedly called for in international meetings. The meeting welcomed first steps to develop online reporting systems that would contribute to this aim.

There is an urgent need to improve the standards of data collected and reported, especially via OIE, given that in a high proportion of the cases involving wild birds reported by OIE in 2005 and early 2006 crucial information such as the species concerned was lacking. Lack of knowledge of the species of birds involved prevents interpretation of the possible role different populations of wild birds play in virus transmission and thus limits the design of appropriate responses. It would be of benefit to promulgate more widely the standards of data collection now put in place within the EU.

The adequacy of funding for AIV surveillance should be assessed, both at national and EU scales, especially in the light of the experience of implementing the European Commission's Decision of October 2005. Given that resources for this activity will probably always be highly limiting, the results of such a review may point to the need for more strategic approaches to be adopted, so as to enhance the effectiveness of existing programmes.

In the light of known instances of occurrence of Asian lineage HP H5N1 in Europe through both the legal and illegal trade in birds, some participants considered that there would be benefits from giving the current temporary ban on importation of wild birds to the EU a more permanent basis.

Response to outbreaks

Correct and rapid viral diagnosis is essential for implementation of rapid control measures. High laboratory standards and techniques are essential, with a continuing need for development of relevant capacity, through training and other assistance in many countries.

Maximum information should routinely be gathered from each outbreak of HPAI H5N1 (in both wild and domestic birds) on ecological aspects so as to enhance epidemiological understanding. This would be facilitated by including ornithological expertise in response missions so as to collect a broad range of contextual information such as accurate identification of all species present, both healthy and diseased, including age and sex. There is a need for more comprehensive testing of carcasses of wild bird species which have adverse conservation status.

Research needs

Whilst there is an increasing body of research on captive waterbirds experimentally infected with HPAI H5N1, research on the ability of wild birds to survive challenge with these viruses during exposure to stresses equivalent to those imposed by long distance seasonal migration is highly desirable.

Targeted international ringing, colour-marking and satellite telemetry programmes for selection of waterbird species likely to be at higher risk of carrying HPAI H5N1 so as to improve knowledge of migration routes for these populations and their age/sex categories and to identify important stopover points, especially for species that appear to migrate in a series of short stages. The incursion of HPAI H5N1 into Europe in spring 2006 highlighted our lack of understanding of severe weather movements. Analyses of contemporary count data and ring recoveries in cold weather periods would be useful in order to update the only European study on these movements (published in 1990).

There is an urgent need for research on the behaviour and ecology of migratory and non-migratory species living in close association with humans and which might thus provide a 'bridge' for the transmission of HPAI from waterbirds to poultry. Such research should aim to developing practical guidance on ways and means of reducing this risk, especially in free-range conditions.

Risk assessments

The UK ornithological community, government agencies and non-governmental organisations have developed wide-scale national schemes for waterbird monitoring and bird ringing. The data and information collected by these schemes allow assessment of risk and the structuring of UK surveillance programmes. It is crucial that such investment by government and its agencies continues for many reasons, but specifically in the context of avian influenza so as to allow relevant policies to be developed on the basis of best current information.

Current assessments of 'higher risk species' among wild birds is confined only to Anatidae and Charadriiformes: this needs urgently to be expanded to include other relevant waterbirds, as well as of intra-EU migrants, and potential 'bridge' species.

The analysis of the large body of data on movements of waterbirds held at European scale by EURING, and further analysis of waterbird census data held by Wetlands International and others, would greatly assist future risk assessments and the development of 'early-warning systems'.

The UK has developed innovative tools related to risk assessment that allow analysis of large bodies of data to produce effective over-views for decision makers. Similar developments and

techniques have been separately developed in other countries. There would be benefit in the international exchange of such experience and techniques.

It was noted that, in some urban areas, ethnic minorities kept significant numbers of poultry in back-yard flocks. Whilst the numbers of poultry at any one holding was generally below the threshold for registration with the GB Poultry Register, overall there were probably significant numbers of birds involved (70,000 were suggested for Birmingham alone). Trade and movement of such stock was probably also wide-scale. It was suggested that greater attention be given to these poultry in the context of national risk assessments.

The UK rears and releases very considerable numbers of game birds. Given previous infection of game birds with Newcastle Disease, and given a complex chain of game bird production and supply, which often involves birds being moved between multiple locations in a single season, it was urged that greater attention be given to assessment of risk factors associated with this trade.

Despite the wealth of information currently available on wild bird movements and populations, the need to explain the transmission of HPAI H5N1 has highlighted important gaps in this knowledge. However, there is no corresponding information on the scale and size of movements of poultry, which inhibits interpretation of their role. As an important component of the development of risk assessments there is a need for better consolidated information on national and international trade in poultry and poultry products. Efforts should be made to obtain accurate data on the volume of such trade from the poultry industry and estimates of the extent of illegal movements from customs authorities (accepting that this will be a minimum estimate). Similarly, information on the volume of international trade in wild birds should be sought from the Convention on the Trade in Endangered Species (CITES), TRAFFIC, and other relevant sources of data and information.