HPAI H5N1 in Europe 2007: Poultry and Wild Birds

Sigfrido Burgos¹,³ and Sergio A. Burgos²
¹Food and Agriculture Organization of the United Nations, AGAL-PPLPI, Rome, Italy
²Department of Animal and Poultry Science, University of Guelph, Ontario, Canada

Abstract: There were 308 HPAI cases in wild birds, most of them in Germany and 13 HPAI outbreaks in poultry, with clear spatial and temporal infectious patterns. Grebes, swans, ducks, chickens and turkeys got most frequently infected. The United Kingdom, Czech Republic and Germany hosted many viral incursions.

Key words: HPAI H5N1, Europe, poultry, wild birds, avian influenza, bird flu

Introduction
Avian Influenza (AI), more commonly known as bird flu, is an acute, highly contagious viral disease that infects a wide range of domestic birds, wildfowl and shorebirds, but also many other species, including humans, pigs, horses, mink, felids and other mammals. AI can be divided into highly pathogenic (HPAI) and lowly pathogenic (LPAI) depending on its ability to cause disease symptoms and fatality. High mortality rates of 90 to 100% are seen in HPAI-infected poultry, whereas only profound morbidity and weight loss is seen in LPAI-infected birds. This virus replicates predominantly in the intestinal tract of hosts, is shed in faeces and is subsequently transmitted and maintained by faecal-oral routes (Burgos and Burgos, 2007).

Viral transmission has not only been confirmed in domestic fowl but also in birds of prey. For example, falcons shed high levels of infectious virus through the oropharynx and cloaca (Lierz et al., 2007), with many of these residing in central Europe. The close link between sizeable domestic waterfowl populations (i.e. ducks and geese) and poultry is one of the major underlying risk factors in HPAI outbreaks worldwide. Gilbert et al. (2006) has pointed out to the relationship between free-grazing ducks and HPAI in Thailand. Large numbers of duck raising systems are found in high density rice-growing areas such as China, Bangladesh, Indonesia and Vietnam. Large water bodies attract waterfowl. This may be the reason why all countries bordering the Black Sea -a wintering paradise for Siberian migratory birds - have reported HPAI outbreaks. Additionally, all these countries have significant waterfowl populations. Due to the transmission dynamics of this virus, confined poultry flocks are extremely susceptible to infections and die within days. Countries hosting HPAI report massive poultry losses in short time frames (Burgos, 2008).

Evidence: Temporal infectious patterns are shown in Fig. 1a, b. HPAI cases in wild birds occurred from June to August; in poultry from Nov to Feb and from May to July.

Species infected with HPAI are shown in Fig. 2 a, b. In wild birds, grebes, swans and ducks predominate. In poultry, both chickens and turkeys are almost equally infected.

Countries hosting HPAI are shown in Fig. 3 a, b. Most wild bird cases were found in Germany and some in France. In poultry, most outbreaks occurred in the United Kingdom, Czech Republic, Germany and single ones in Poland, Romania and Turkey.

Discussion
From above we can conclude that weather conditions (temperature and humidity) throughout 2007 played a role in the maintenance and persistence of HPAI in nature. Very similar conclusions regarding temporal infectious patterns have been reported in Thailand.
(Tiensin et al., 2005), Vietnam (Pfeiffer et al., 2007) and China (Liu et al., 2007). In general, HPAI outbreaks occur shortly after temperature drops ensues. Grebes grabbed the spotlight in 2007 as compared to outbreaks of disease are formally reported to the European Commission via the Animal Disease Notification System (Pittman et al., 2007). Although geese did not play a significant role in 2007, it has done so in the past. Capua and Mutinelli (2001) confirm that geese contract AI; however some display clear signs of infection, but most do not. Moreover, the delayed diagnosis of HPAI - H5N1 in Hungarian geese indicates that it went unnoticed and may have resulted in onward viral transmission to the UK via frozen goose meat shipments. This is perhaps why surveillance of dead wild birds provides an excellent warning system that the virus is in circulation in a specific region. Anecdotal reports suggest that disease incidence is related to prolonged chilly winter movements of wild birds from Eastern Europe; if this is the case, then survey-based identification of resident and migrating birds might prove useful in determining spatial movements of viral carriers.

Research demonstrates susceptibility differences between domestic ducks and mute swans; the latter having greater susceptibility to lethal infection. Mute swans could therefore serve as natural disease sentinels because HPAI kills them fast and are big enough birds to be easily seen and found (FAO, 2007). De Marco et al. (2003) argues that some waterfowl is suggested that all poultry be kept indoors. Zoos receive preventive vaccinations and if HPAI is suspected, it is reported immediately to competent authorities. Outbreaks of disease are formally reported to the European Commission via the Animal Disease Notification System (Pittman et al., 2007). It is now widely accepted that wild birds, ducks and geese are natural reservoirs of HPAI (Hinshaw et al., 1980; Tumpey et al., 2002; Webster et al., 2002), with most remaining asymptomatic. This has been corroborated in Germany, where apparently healthy domestic duck populations may be propagating HPAI-H5N1 among neighbouring poultry populations. The presence of virus in German duck farms proceeded unobserved because ducks had shown no clinical signs of disease. Due to these peculiarities, European countries established a 3-km control area and a 10-km monitoring area to detect HPAI in wild birds. Bio-security and disease awareness is repeatedly stressed. Also, it
species can shed virus for up to 5 days before displaying disease symptoms, suggesting that these birds can potentially spread virus within limited areas without being long-term reservoirs of this virus. Because HPAI - H5N1 viral loads seem to become amplified in Burgos, S., 2008. HPAI and other zoonotic poultry production systems (Gilchrist et al., 2007) and then spill over into wildlife, this might result in increased wild bird mortalities and local disease dispersion. By palliating or mitigating viral incursions in poultry raising units throughout Europe, this, in theory, should result in fewer wild bird infections and an overall reduced viral load circulation in the Euro-zone.

Concluding Remarks: It is fair to stress that HPAI is primarily a poultry disease with wild birds undoubtedly playing a role in its epidemiology. Control and management measures should be focused on behavioural changes and marketing practices, taking into consideration the social dimensions livestock diseases have in many people’s livelihoods. Having said this, assistance to develop risk diversification options (i.e. beekeeping, small herbivore raising and handicrafts) appears more promising to reduce HPAI-related economic impacts than compensation for poultry losses (Roland - Holst et al., 2008).

The combination of relatively favourable weather, large water bodies, significant waterfowl populations, migratory birds and concentrated poultry raising operations expose Europe to repetitive epidemic waves and this warrants increased reporting incentives for farmer, enhanced surveillance, monitoring and early warnings. Evidence-based recognition of main risk factors has now raised awareness of the importance of active and passive surveillance in poultry and wild birds, thus allowing veterinary officials to modulate prevention and control measures according to their overall relative importance without engaging in panic-fueled reactions. Since domestic ducks, swans and geese play a critical role in the persistence of HPAI - H5N1 in many regions of the world; special emphasis should be placed on easier and faster sampling techniques, refinement of target species, dead bird sampling and proper identification of resident and migrating bird species. Because it is very challenging to determine further disease evolution, European states should continuously review their already established surveillance and control programmes based on incoming field reports and updated epidemiological findings.

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References


