

Migratory birds in disease transmission biology essay

[Science](#), [Biology](#)



Course Code+NameProfessor's NameUniversity NameCity, StateDate Of SubmissionThe role of migratory birds in disease transmissionAbstractThe role of migratory birds in transmitting poultry diseases is becoming a contentious issue in the whole world. The issue has even made researchers and naturalists to differ in opinion regarding their capability to disperse pathogens across continents. Recent studies that were conducted during the bird flu outbreaks found out that a migratory bird is capable of disseminating the deadly H5N1 avian influenza without themselves getting infected. Research has shown that these birds are responsible for transmission of many diseases, especially viral, in types of animals. This study therefore has the mandate to critically analyze how migratory birds aid in transmission of diseases. The study will also focus on the various types of diseases that are transmitted by these birds. IntroductionBirds have been known since time immemorial to be migrating from one region to another. The birds can be local migrants, short distance migrants, long distance migrants and nomadic and vagrant migrants. They do travel across national and international borders. The migration is always due to the instinct for survival. This instinct leads birds to look for seasonal opportunities for food supply and breeding habitats. The findings from the studies conducted on the concept of bird migration reveal that millions of birds migrate annually from unfavorable to favorable conditions (Hubalek, 1994, 2004). Unfavorable conditions are usually in winter while the favorable are in summer. Birds therefore migrate from places where there is winter to places with seasons of winter. This explains why the migration is rampant. The environmental conditions during summer accelerate food accumulation and breeding because of the better

climatic conditions. Through biological systems, birds store up energy and fats during this season. The energy and fats stored aid in migration when there are changing survival conditions in the habitat. During this period, winter falls. An interesting observation is that not all birds migrate with the changing conditions. The pattern of migration differs with species and requirements (Berthold & Peter, 2001). Some birds do migrate over short distance just to look for food and come back. Others migrate over long distance and may come back or not. The migration of these birds is a natural phenomenon. They have to do that in order to maintain ecological balance and most importantly, to survive. However, the natural phenomenon is always followed by harsh repercussions that are unavoidable. It is saddening to know that these birds are either carriers or hosts for pathogens. As they migrate, these birds transfer micro-organisms across localities, nations and even continents. They therefore play a significant role in the ecology and pathogenic organism circulation. These birds are implicated as hosts and mechanical carriers of infected ecto-parasites. They are also implicated in the transmission of zoonoses. It is not possible to put a stop to this sequence but we can minimize the risks involved. This can be done by controlling and preventing perilous situations. Pathogens transmitted by migratory birds Avian Pneumovirus (APV). This virus belongs to the genus Metapneumovirus. It causes a respiratory disease which is known as turkey rhinotrachetis (TRT). This disease is commonly known as swollen head syndrome (SHS) in chickens (Gough, 2003 Lwamba et al., 2002). This disease kills domestic birds, especially turkey at a very high rate. It has been found out that it only takes a few moments after the attack before the bird dies.

When the bird gets a secondary bacterial infection and immunosuppressive viral disease, the severity of APV is accelerated (Lwamba 2002, Jones 2006). The significance of migratory birds in the epidemiology and persistence of APV in domestic flock has been ascertained through isolation process (Shin et al., 2000). When isolation of APV from choanal swab or nasal turbinate of wild birds like geese, sparrows, swallows mallards and starling is done, there is a high persistence of APV occurrence. Bennett (2204) observed a seasonal trend of disease occurrence during APV outbreaks in Minnesota. He suggested the suspected involvement/role of wild migratory birds in APV transmission. When a nucleotide sequencing was done, it was deduced that there was a common source for the APV isolates extracted from wild ducks, domestic turkeys and geese. It was also deduced that the viruses from the different species can cross-infect. This indicated a close relationship (Shin et al., 2002). Duck plague virus (DPV) This is a highly contagious disease of Anseriformes. The duck plague/ viral enteritis causes high mortality and a decline in egg production in chickens and domestic waterfowl (Shawky and Sandhu, 2003). It has also been found to cause viable mortality in wild waterfowl. The disease (DPV) strains have been found to exist from cloacal swabs of pintail ducks, wood ducks and gadwall ducks. It was also found out that wild ducks and geese that survived during the natural outbreaks remained carriers even after four years of post infection. Migratory birds who are carriers have been identified by using virological and serological methods. The role of these birds in the epidemiology and incidence in domestic and wild of duck plague have been estimated (Ziedler and Hlinak). There was clear evidence that the most certain source of infection was DPV-

carrier and American black duck. These birds entered through the major flyways (Kidd and Converse, 2001). This conclusion was reached after the major epizootic of duck plague in wild waterfowl in the US way back in 1973. It has also been found out that the convalescent migrants are the silent carriers for DPV control in poultry. Measures to minimize the spread of the disease should include bio-security, decontamination of the environment and eradication of affected flocks (Pearson and Cassidy, 1997; Converse and Kidd, 2001). Egg drop syndrome virus (EDSV)The EDSV is a vertically transmitted disease in poultry. It causes low egg production with high fragility of eggs. It also leads to substantial decrease in fertility and hatchability of the eggs. This virus (EDS-76) is classified under group III of the Adenoviridae. The disease is usually common in layer chickens. Ducks and geese are thought to be the natural hosts for the virus (McFerran and Adair, 2003). Migratory ducks, egrets, gulls, grebes and wild geese have been found to have been found to have antibodies against this virus (Malkinson and Weisman, 2003; Kaleta et al., 1985). Migratory anseriforms is thought to be disseminating EDSV. The sporadic infections in poultry can be connected to the spread of the disease from wild ducks and geese to domestic flock. The spread can be through sharing of drinking water which has been contaminated with droppings of infected birds. These droppings pollute the water thus making it a source for breeding of the virus (Hubalek, 2004; McFerran and Adair, 2003). *Pasteurella multocida**P. multocida* is a bacterium that has bipolar staining feature. It is the entiological agent of avian or fowl cholera. The disease is highly significant and economically important and causes mortality which is significant in both domestic and wild

birds (Wobeser, 1997; Hubalek, 1994; Dash et al., 2004). Avian cholera spreads rapidly through waterfowls. It is known as a disease with carrier status. The disease is very prevalent among the ducks and turkeys followed by chicken are more susceptible. The disease generally spreads faster among the young ones (Glisson et al., 2003). About 70, 000 migratory ducks and geese were reported to have succumbed to the infection during the US outbreaks in 1979 (Brand, 1984). The dense bird aggregation due to the nature of waterfowls being gregarious, prompts the outbreaks of AC. The bacterium's ability to survive in water for a long period of up to several weeks is high. These aspects enhance the chances of rapidity and the extent of disease spread (Botzler, 1991; Glisson et al., 2003). Those birds that survive during the outbreaks and thus recover have been reported to be long-term carriers of the infectious agents. These birds later help in dissemination of the agent to various distant wetland locations. Free ranging wild birds have also been infected with the bacterium though the greatest magnitude of losses is experienced by the death of waterfowls (Hunter and Wobeser, 1997; Glisson et al., 2003). *Chlamydophila psittaci* The disease (chlamydiosis) is caused by an obligate intracellular bacterium called *C. psittaci*. It is a contagious disease of pet birds and poultry having zoonotic implications. It is also considered as a List B disease in parrots, parakeets and humans (A ndersen and Vanrompay, 2000). Chlamydiosis affects all types of poultry and is usually systematic though occasionally fatal. The disease is often transmitted by inhalation or even ingestion of infectious fecal dust. Birds like wild ducks, egrets, sparrows, grackles, gulls other bird species have a significant reservoir of the bacteria that can spread the

disease. This can be through direct contact or infectious aerosols to a variety of vertebrates including human beings and poultry (Grimes et al., 1979; Page, 1976; Kaleta and Taday, 2003; Brand, 1989; Andersen and Vanrompay, 2000). Research has shown that some chlamydial strains which are not pathogenic to migratory avian hosts are highly virulent for humans and domestic fowls. Suggestions have been made that grackles and thus migratory birds are potential reservoir hosts which can play an important role in the transmission of cycle of the bacterium *C. psittaci* in nature (Roberts and Grimes, 1978). The mechanisms by which the bacteria is introduced in domestic flock is clearly not understood. This is mysterious because wild birds are also infected by the same strains as domestic flock (Andersen and Vanrompay, 2000). This calls for an enhancement in the surveillance and screening in order to find the role of wild birds in the epidemiology of infection in domestic birds (Schwarzova et al., 2006). Other pathogens caused by migratory birds Wild or migratory birds also aid in the transmission of other types of pathogens in animals as well as human beings. There are various animal diseases that are a resultant of the interaction between them and the migratory birds. In the ecological system, living things always interact in order to create a balance. During this time, birds that are infected or carriers of bacteria get to interact with other living things. In the process, they make the environment contaminated and thus high risk of these animals contracting diseases. For example, birds and other animals may share drinking water. If these birds are infected, they pass on the virus into the water thus making it contaminated. As the animal drink the water, they ingest bacteria and thus contract diseases. Human beings may

use these animals as food. Being that the flesh is contaminated, they automatically get the bacteria or virus into their systems. Through this channel, both the animals and human beings contract diseases. The main source of the infection is the bird. There are a number of infections that are transmitted by birds to other animals. Among them include West Nile Fever (WNV). This is a Flavivirus belonging to family flaviviridae. It is a mosquito-borne virus which can result in fatal encephalitis in human beings. The effect can also be on equines and avian species (Hubalek and Halouzka, 1999; Komar, 2000; Rappole and Hubalek, 2000). This disease is maintained in a cycle of epizootic transmission between mosquitoes and birds. Human and horses are the incidental hosts in this case. The migratory birds are central to the epidemiology of WNV infections. This is because they are considered as the main amplifying hosts in the transmission process (Reed et al., 2003). Migratory birds also play a crucial role in the dissemination of zoonotic and enteropathogenic bacteria that cause other infections in animals. For example, wild birds aid in the spread of *Campylobacter* and *Salmonella*. The incidence of infections in human beings by *Campylobacter jejuni* is on a continuous rise. The disease proves to be fatal at some acute stages and thus has led to the deaths of many. From research, it has been proved that the main transmitters of the bacteria are wild birds. The disease is usually rampant in places characterized with high humidity and high temperatures. Research is still on to establish whether there are other transmitters apart from wild birds (Sacks et al., 1986; Tomar et al., 2006). The contamination of the surface water with the bacteria is largely attributed to aquatic and wild birds. Likewise, in the case of *Salmonella* infections, remnants of *S. enteric*

(Typhimurium and Enteritidis) have been isolated from many species of birds. These birds include gulls, ducks, terns, finches and sparrows. Research has confirmed that migratory birds are involved in the dissemination of these bacteria. Conclusion From the above research, we get to know that there are several reasons that make birds migrate among them being harsh weather conditions. They migrate to look for food and for breeding. In the process of this migration, they encounter several things in their environments among them being bacteria and viruses. These birds carry the pathogens to new environments and thus act as transmitters of diseases. There are however measures that can be taken to control the spread of these diseases and thus the economic loss therein. Infected birds and animals should be isolated and necessary treatments given.