1. INTRODUCTION AND OBJECTIVES

1.1 Background and Significance

Outbreaks of highly pathogenic avian influenza (HPAI) H5N1 virus were initially observed in southern China in 1996 and 1997 (Claas *et al*., 1998; Guan *et al.*, 1999; Xu *et al.*, 1999) and has caused major poultry outbreaks in Vietnam, Thailand, Indonesia and other East Asian countries since early 2004 (Li *et al.*, 2004; WHO, 2005a). The virus is now endemic in poultry in these countries and has caused repeated zoonotic transmission to humans (Chotpitayasunondh *et al.*, 2005; Puthavathana *et al.*, 2005).

Highly pathogenic avian influenza is a "List A disease" designated by Office of International des Epizooties (OIE) that is highly lethal to poultry and which is important in the production and trade of poultry and poultry products. Outbreaks of HPAI in Russia and Kazakhstan may be suggestive of the role of wild birds in the epidemiology of HPAI. Looking at the epidemiological data currently available, there is no denying the fact that wild water fowl most likely play a role in the avian influenza cycle and could be the initial source for AI viruses, which may be passed on through contact with resident water fowl or domestic poultry, particularly domestic ducks. But it is also important to verify that the virus undergoing mutations could circulate within the domestic and possibly resident bird populations until HPAI arises. More importantly, great number of people will be at risk with the frequent contact of the domestic resident birds.

The feral pigeon (*Columba livia*) population has increased in most large cities world-wide. Considering the possibility that the free-living pigeon population may be a threat to the well-established poultry industry, public attentions about pigeons as public health issues arise. On the other hand, the role of pigeons in the transmission of

diseases to both humans and domestic species has been well documented by different authors (Weber *et al.*, 1979; Alexander *et al.*, 1982; Haag & Gurdan, 1990; Orlandella *et al.*, 1992).

There are 3 migration routes of wild birds in the mainland of China (Figure 1.1), where H5N1 outbreaks occurred from 2005 until present. Pigeons and quails are the two main resident bird populations with the high chance of mingling with wild birds and also of close contacts with humans and other domestic poultry. Quails have been verified to be susceptible to H5N1 (Hongquan Wan and Perez, 2005), but the susceptibility and the role of pigeons in the transmission of avian influenza appears to vary with the subtypes of avian influenza virus but in general they appear to be less susceptible than poultry and some wild birds. Wild pigeons do not appear to play any significant role in the spread of disease. But it is still controversial whether domestic pigeons can shed the avian influenza virus.

There also has been a gradual development in the China table pigeon industry since its introduction from overseas some years ago. Keeping pigeons for racing and exhibition has also become a popular hobby in China. Rearing pigeons for meat is also an accepted industry in China. Young pigeons bred for meat are known as squabs. But no systematic studies of the city pigeon population have been conducted in China until now.

1.2 Objectives

1.2.1 To detect the circulating antibodies against H5, H7 and H9 subtype of avian influenza virus and Newcastle Disease virus in pigeons in live bird markets.

1.2.2 To evaluate the infection status and the shedding status of H5N1 avian influenza virus of pigeons in the live bird markets.

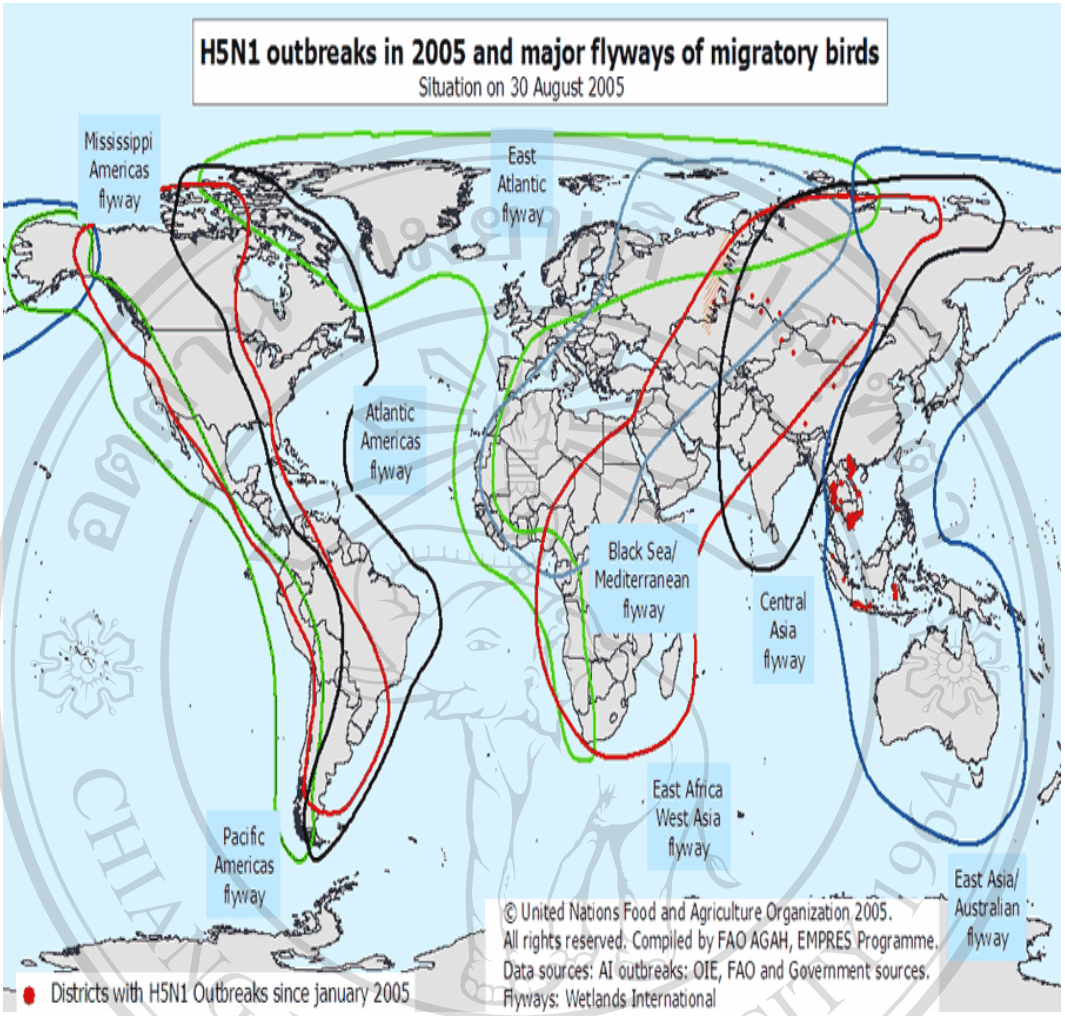

Figure 1.1 H5N1 outbreaks in 2005 and major flyways of migratory birds