

## CHAPTER 1 INTRODUCTION

### 1.1 Background

Avian Influenza (H5N1) is a very pathogenic virus. Avian Influenza is caused by infection from viruses of the family *Orthomyxoviridae* in genus Influenza virus A. Influenza virus A are the only orthomyxoviruses known to naturally affect birds (OIE, 2014). This virus is generally attacks birds such as domesticated chickens, turkeys, ducks, quails and geese, as well as various species of wild birds such as sparrows (FAO, 2008). Avian Influenza (H5N1) virus has been detected in a variety of wild birds. Almost 60% of infected wild birds are in the wetland habitat, but birds that are not in the wetland habitat can also be infected with Avian Influenza virus (H5N1). The most common of these birds are several species of songbirds or perching birds, such as Eurasian Tree Sparrow (*Passer montanus*). This research has never been done before, it is necessary to detect Avian Influenza antibody subtype H5N1 using Hemagglutination Inhibition test in Sparrow located in Ponggok Sub-district, Blitar.

The presence of antibodies in individuals can be obtained from natural exposure to infection in nature or vaccination with specific agents, and can be obtained passively from previously made antibodies (Muflihanah, 2009). Sparrows are wild bird, so they have never been vaccinated. If AI antibodies are detected then it is a result of exposure to the AI virus. Their proximity to humans results in close contact with domestic poultry, especially in open poultry farms where food is easily obtained. So this birds can function as a bridge between wild

birds in their natural habitat and domestic poultry that might be able to transmit the AI virus from wild bird to domestic poultry or vice versa (FAO, 2008).

Species that have the potential to become bridges need to be specifically monitored in relation to outbreaks in poultry and the death of wild animals, in order to determine their potential in developing the disease and its role in transmitting the virus to or from wild habitat (FAO, 2008). Many sparrows can be found around human. Eurasian Tree Sparrows that have been exposed to AI viruses can be at risk of transmitting to poultry, so it can harm humans. Transmission of the AI virus (H5N1) in Indonesia began since Kejadian Luar Biasa in poultry in August 2003 at several commercial poultry farms in West Java and Central Java, then the case spread to East Java. It has been reported by 31 Provinces that domestic poultry died more than 100 million in that year. Based on information from the Direktorat Jenderal Peternakan dan Kesehatan Hewan and the results of the BBVet / BVet investigation during March 2017 there is 1 East Java incident, namely in Mojokerto, Sooko District (Ditjenpkh, 2017).

Ponggok Sub-district, Blitar has a fairly large poultry population. In Ponggok Sub-district there are 50,256 local chickens, 3,835,238 laying hens, 1,927,612 broilers, 465,955 ducks, and 7,417 manila ducks (BPS, 2015). Sparrows are usually in areas that have a lot of food sources for them, for example around farms, in rice fields, and in settlements. Transmission of the disease may occur and can be transmitted by sparrows to domestic poultry or vice versa. The data in this study did not exist before, so it is necessary to detect Avian Influenza antibody subtype H5N1 using Hemagglutination Inhibition test in Eurasian Tree Sparrows (*Passer montanus*) located in Ponggok Sub-district, Blitar.

Diagnostic device needed to monitor antibody serum for sparrow (*Passer montanus*) as well as to support the serological diagnosis of AI virus is to use Hemagglutination Inhibition (HI) test. This is a simple test that can be used to detect antibodies against viruses that agglutinate red blood cells (Siregar, dkk 2006). If the AI antibody detection results on a sparrow show positive results, then it can be a sign that Eurasian Tree Sparrows (*Passer montanus*) have been exposed to AI viruses. This information is important as an anticipation to be aware of the spread of AI viruses in Ponggok Sub-District, Blitar.

## **1.2 Research Problem**

Based on the background stated above, the research problem that can be delivered in this study is there any Antibodies against the Avian Influenza virus subtype H5N1 in Sparrow (*Passer montanus*) serum using Hemagglutination Inhibition test in Ponggok Sub-district, Blitar?

## **1.3 Theoretical Base**

Avian Influenza disease is caused by influenza type A virus. Bird flu can be transmitted through air that contaminated with AI viruses, or due to fecal contamination from infected birds (Sya'baningtyas, 2013). Avian Influenza virus infection in poultry can have acute and fatal consequences with mortality and morbidity of up to 100%, so that it is referred to as High Pathogenic Avian Influenza / HPAI. The classification of avian influenza viruses as an acute form is called Highly Pathogenic Avian Influenza (HPAI) and a mild form called Low Pathogenic Avian Influenza (LPAI) depends on the virulence of the virus in

domestic poultry (FAO, 2008). Clinically, AI disease has various symptoms. The disease that run acutely, showing no clinical symptoms, but sudden death can occur. Avian Influenza can also occur mildly, which usually shows clinical symptoms of lethargy, decreased appetite, snoring, swelling of the facial area, nasal discharge, and other systematic symptoms (Wibowo et al., 2006).

The presence of antibodies in individuals can be obtained from natural exposure to infection in nature or immunization with specific agents or products (active immunity), and can be obtained passively from previously made antibodies (passive immunity). The acquisition of active immunity depends on the role of tissues and host cells after exposed with immunogens that cause antibody synthesis (Muflihanah, 2009). Sparrows are wild bird, so they have never been vaccinated. If AI antibodies are detected then it is a result of exposure to the AI virus. Avian Influenza is a virus that can agglutinate red blood cells, so the virus can be identified using HI test (Kuiken et al., 2004). Hemagglutination Inhibition test is an Avian Influenza serology testing standard that can be used to detect antibodies to AI viruses in poultry (Noah et al., 2009). The advantages of HI test are relatively simple, cheap, fast, the materials used are easy to obtain, specific for H type, can also be used to measure antibody titers from birds that are suspected of being infected. The disadvantage of this test is that antigen titration must be carried out on each test, and the interpretation of the test results requires special expertise (Selleck, 2007).

Avian Influenza virus is easily mutated so that it can make the virus more pathogenic or less pathogenic. Some strains of the LPAI virus are capable of mutating into HPAI viruses. The HPAI virus itself is very infectious and can

cause 100% death in a short time in poultry with or without clinical symptoms. Transmission to other birds occurs through direct contact with the source of transmission of nasal, eye and fecal secretions from infected birds, air in polluted areas, contaminated cage equipment, or indirectly through cage workers, and feed. Stool contaminated with AI virus can last for a very long time, especially in cool and humid conditions (CIDRAP, 2004).

#### **1.4 Research Purposes**

This study aimed to detect AI Antibody subtype H5N1 using HI test on Eurasian Tree Sparrows (*Passer montanus*) in Ponggok Sub-District, Blitar.

#### **1.5 Outcomes of Research**

This research is expected to provide information about the possibility of Eurasian Tree Sparrows (*Passer montanus*) being infected with the AI viruses in Ponggok Sub-District, Blitar. So that it can be utilized, among others, as follows:

- 1) Increase knowledge about the presence of AI antibody in Eurasian Tree Sparrows (*Passer montanus*) that are detected using the HI Test.
- 2) Providing information for farmers so they can avoid Eurasian Tree Sparrows (*Passer montanus*) as carriers that can transmit to several other birds.
- 3) To find out the circulation of AI virus subtype H5N1 on Eurasian Tree Sparrows (*Passer montanus*) in Ponggok Sub-district, Blitar.