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SEROPREVALENCE OF AVIAN INFLUENZASUBTYPEH5N1 IN*NYCTICORAX NYCTICORAX*, PULAU DUA SANCTUARY, BANTEN

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Keywords - H5N1, *Waterfowl, Haemaglutination Inhibition, Nycticoraxnyxticorax*

I. INTRODUCTION

In recent decades Avian Influenza has becomed one disease that has spread world wide and once endemic in several countries, including Indonesia[1]. The epidemic has negative impact in terms of social and economic development, such as in the livestock sector, and tourism. Another aspect that should be noticed is the impact on the conservation area status of wild birds, especially waterfowl which is considered as a natural reservoir of avian influenza viruses.

Previous research in 2008 proved that some species was positive with antibody of H5N1. The following research was conducted to complement data in other specieas.It aims to determineseroprevalence of Avian Influenza subtype H5N1 in species namely *Nycticorax nycticorax* or Night HeronsNight Herons whichbelongs to waterfowl speciesin Pulau Dua Sanctuary Bantenis potentially infectedbyH5N1. Finally, it is expected tp obtain some other proposes including biosafety and biosecurity information.

II. BASIC THEORY

Indonesia belongs to migratory bird path. It leads to the interaction between wild bird migratory,resident and domestic poultry. Cases of Avian Influenza in Indonesia is quite high. One of the suspects that emerged was a correlation between the status of Indonesia as the path of migratory birds with avian influenza expansion[2].

Pulau Dua Sanctuary, Banten is a ecosystem that holds hundreds of wild birds, precisely the type of resident waterfowl which belongs to line and migratory birds. Also, there are poultry farmsaround the sanctuary. Previous research in 2009where 13 % of 57 samples of *Bubulcus ibis* showed positive results to H5N1 antigen after tested by serology method[3].

Serology is diagnosis method to analayse antibody. In this case, serology can be implemented through

Hameaglutination Inhibition. This test which works with red blood cell is to determine antibody in serum by H5N1 virus standard[1].

III. MATERIALS AND METHODS

Fieldwork was conducted by taking blood samples of Night Heron. It continued to laboratory test by using Hemagglutination Inhibition[1].

IV. RESULTS AND DISCUSSION

Based on samples collected at Pulau Dua Sancturay, there are nine dominant species being resident including*Nycticoraxnycticorax,Aardeolaspesiosa, Bubulcus ibis, Egrettagarzetta,Egrettaintermedia, Casmerodiusalbus, Ardeacinerea, Ardeapurpurea,* and*Phalacrocorax sp*.. Populations in these ecosystems can be classified into several sub-locations which is located in west, central and north. As shown in Figure 1, there are some species live in each sub-location[4].

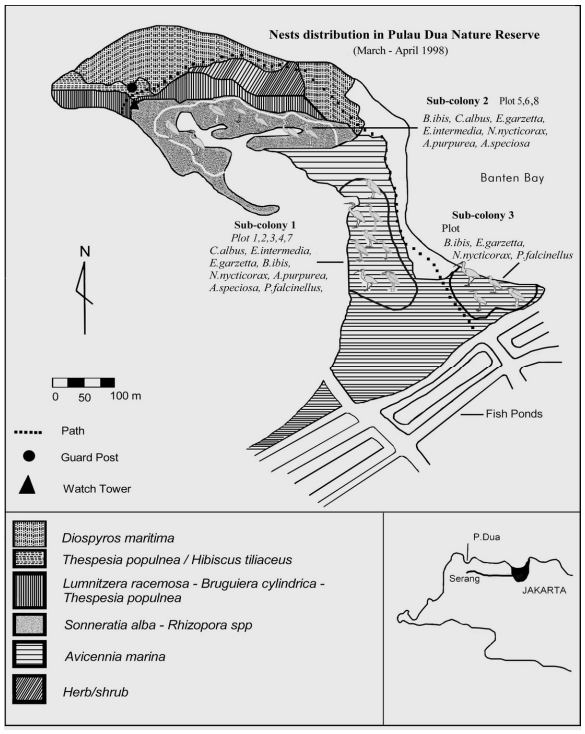

Figure 1. Map of Pulau Dua Sanctuary
(Sources: Wetland Indonesia)

Wetland is place where waterfowl spend most of their time, especially for foraging. The habitats of waterfowlcovers field rice, ponds and beaches. Nearby (±500 meters), the settlement hasopenedpoultryfarm including chicken, duck. At day, thosefarm forag food aroun rice fields and ponds asHeronsand other birds do in evening as shown in Figure 2.

Figure 2 Rice Field AroundPulau Dua Sanctuary
Above: water fowl foraging in the area of rice fields.
Below: domestic poultry roam the fields the same area

In this research, 56 samples were tested consists of 5adultsand 51 juveniles. The results of serologic tests showed that 20% of adult is positive with H5N1 antibody with the average titer reaching $2^{0,8}$. Meanwhile, 9.8% of juvenile showed positive results with the average titer reaching $2^{0,23}$. The average value of all samples tested titer at $2^{0,28}$. Overall the positive sampleis 10.7%. Geometric Mean Titer (GMT) is 0.28 which is shown in Tabel 1. The formula of GMT can be seen as below:

$$\text{Log}_2 \text{ GMT} = \frac{(\text{Log}_2 t_2)(S1) + (\text{Log}_2 t_2)(S_2) + \ldots + (\text{Log}_n t_n)(S_n)}{N} \quad (1)$$

information
N: number of sampel (serum)
Q: antibody titers at the highest dilution (end point)
S: The number of samples with titers
N: The number of antibody titers at N sample

Table 1. Serologic Test with GMT

Sample	∑	Result + (%)	GMT
Juvenile	51	9,8	0,23
Adult	5	20	0,8
Total	56	10,7	0,28

The average of titers of H5N1antibodycan be classified as low antibody titers. The low antibody titers according to WHO[5] may be caused by several factors, including: the tendency of infection in wild birds caused by Low Patogenic Avian Influenza Virus with a small amount of infectionof the virus; virus transmission occured not directly, but through the environment; periode of infection may in long time that can makereduction of antibody titer.

Avian Influenza could transmitted through water and other objects contaminated with the virus. This is contrast to influenza infection in mammals (humans, pigs, horses) that mainly occurs through droplets from the nose and mouth. Avian Influenzacould survive in environment. Virus which is transmitted directly will be more virulent than the one which is transmitted through environment[6].

The cycle of infection among birds generally occurs through fecal-oral chain, meaning that the virus can be transmitted through digestive tract. The case of infected in tiger at a zoo in Thailand after eating the infected birds is evidence that Avian Influenza subtype H5N1 can be transmitted through the gastrointestinal tract[7].

Water is a medium that may cause transmission. H5N1 demonstrated a good ability to maintain its structure in nature, especially in the water. In general, virus has ability to survive for 4 days at 22^{o}C, and more than 30 days at 0^{o}C. Habitat for waterfowl that live in wet areas would be a possibility for transmission through water[5].

Based on the origin of the positive samples, 50% came from the west and 50% came from the east. It showed that the spread occured equally between the two subcolonieswhereNight Herons lives. In this case the transmission that occurs can be classified into intraspesies and interspesies. Intraspesies transmission consists of the transmission between individual and between parent and child. Interspesies transmission may happen between the Night Herons and other waterfowl and domestic poultry.

The transmission between individuals may occured if this species live in a colony and foraging in the same place. Habitat contaminated by the virus is one cause of intraspesies transmission. One of the three main activities of Night Heron is caring for children. When parent feed children with contaminated food, transmission will be occured to children.

Another possibility is interaction between domestic poultry and Night Herons. Banten is one of three provinces that has the highest recorded cases of H5N1 after Jakarta and West Java. Surveillance of domestic poultry in Banten showed a high degree. In general, there may be indirect transmission between from wild birds to domestic poultry[6].

Department of Health Reportindicates evidence relation between the existence of outbreaks in poultry and wild birds.It reported a high prevalence of H5N1 in poultry which located in path of migratory birds seasonally. High prevalence was also recorded in the livestock industry which uses the open cage. Other reports told that epidemics of H5N1 have regional distribution according to the movement of migratory birds[9].

V. CONCLUSION

Nycticorax nycticorax in Pulau Dua is positive with antibody of Avian Influenza subtype H5N1Geometric Mean Titter is $2^{0.28}$which is relatively very low.Following research in molecular biologyis recommended to cunduct in order to obtain more information on the virus strain and phylogenetic relationships. Research on poultry farms around sanctuary is also recommended.

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by Dewi Elfidasari

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