Oral Presentation (MP-13)

Antibody Response to Avian Influenza Vaccination in Small-Scale Duck Farming in Mojokerto District, East Java

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INTRODUCTION

Commercial duck farming in Indonesia is practiced either as a nomadic way (moving around) or as an intensified settled system. Since the emergence of Highly Pathogenic Avian Influenza (HPAI) H5N1 subtype clade 2.1.3 in Indonesia in 2003, ducks acted as a reservoir (carrier) without showing clinical signs. In late 2012 the new HPAI H5N1 clade 2.3.2 was introduced which caused high duck mortality, especially in young ducks. Nomadic ducks have a high risk of developing and spreading Avian Influenza (AI). In addition to this high risk, there are many duck farmers who do not practice proper AI vaccination, to achieve protective immunity. One of the measures to control AI is by administering scheduled vaccinations. The objective of this study was to investigate the increase of AI antibody titer in ducks after vaccination and to identify the best timing for vaccination.

MATERIALS AND METHODS

This study was conducted from March to July 2018 in Mojokerto district. The ducks in this study were categorized into two groups; ducks in group A were vaccinated twice, while ducks in group B were vaccinated 3 times using H5N1 monovalent clade 2.3.2 vaccine. Meanwhile, based on the age of ducks at the beginning of the sampling was divided into 3 groups, i.e. 4 weeks (group 1), 14 and 16 weeks, and 22 and 26 weeks (group 3).

Five sentinel ducks (unvaccinated ducks) were placed in each farm to monitor the circulation of AI in the environment. Sera were collected from each flock for Hemagglutination Inhibition (HI) testing before vaccination and at monthly intervals after vaccination. Samples were collected randomly from 20 vaccinated ducks and from the 5 sentinel ducks. The antibody titer test was performed in the virology laboratory of the Faculty of Veterinary Medicine of Airlangga University. In addition to blood serum samples, tracheal and cloacal swab samples and pooled drinking water and environmental swab samples were collected. Testing of the swab samples was performed at the Disease Investigation Center Wates.

RESULT AND DISCUSSION

From the result of AI antibody titer test, the initial status of AI antibody titer protective level of titer 2^4 or more, for sentinel ducks by 19%, whereas for treatment ducks A and B by 14%. After the first vaccination, protective titers were shown in 29% sentinel ducks while 58% of treatment A and B ducks showed 58% protection. One month after the second vaccination, protective titers of sentinel ducks increased to 62%, while ducks with treatment A and B improved to 79%. Protective antibody titers for ducks in group B, following 3 AI vaccinations, reached 83%, with sentinel ducks achieving to 60% protection rate.

From the Figure 1, vaccine treatment 2 times and 3 times does not give a significant difference. Meanwhile, when viewed based on age groups, the increase in antibodies in ducks with different age levels can be seen in Figure 2.

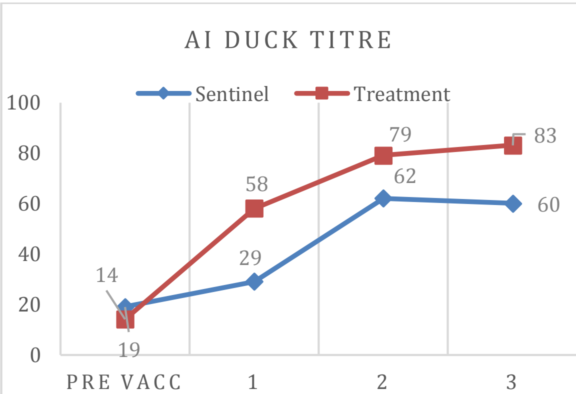

Figure 1. Improvement of duck antibody titer (%)

From the Figure 2, Group 2 (age 14 and 16 weeks) provided maximum protection of 100% when compared to group 1 (age 4 weeks) at 59% and group 3 (over 22 weeks) at 80% after 2 times vaccination. Whereas in sentinel ducks, it was shown that the antibody titers in group 3 at the beginning of taking were 67% but had decreased in subsequent sampling by 36% and 20%. In group 1, the initial and second sentinel titers were 0 and the third was 67%, whereas in group 2 the initial titer of sentinel was 0 and the subsequent titers were 33% and 69%.

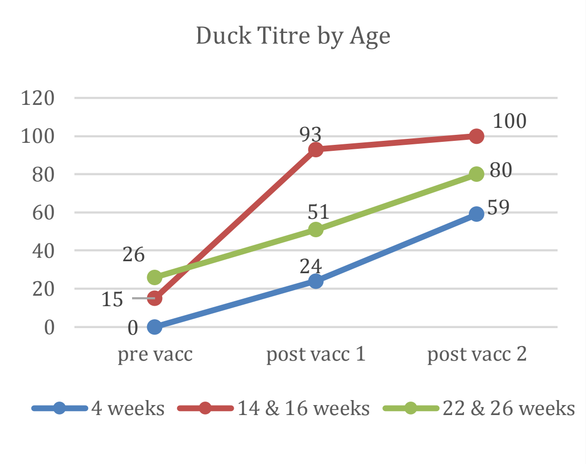

Figure 2. Duck antibody titer by age (%)

Antibody titers in sentinel ducks were probably a result of natural infection or f AI virus circulating in the farm environment; PCR testing for H5 and H9, gave negative result. This may occur due to low biosecurity standards in duck farming systems and the nomadic duck rearing system, which is a risk factor for AI spread. There were no clinical signs of AI in duck farms that had high AI antibody titers in sentinel ducks. The reason for farmers using nomadic farming for ducks over one month of age is to save on food cost.

The data demonstrates that proper on schedule AI vaccination, the use of appropriately matched vaccine and appropriate vaccination techniques, will provide immunity of AI to 100% (Figure 2).

The unvaccinated duckling system has a risk of AI incidence that cause decrease in production, of premature spent duck without vaccination. This was in line with the study conducted by Henning *et al.* (2016) which stated that characteristics of the moving duck production system indicate that it may pose a high risk for the maintenance and transmission of HPAI H5N1. Indriani *et al.* (2014) also state that ducks that were tested with HPAI H5N1 clade 2.3.2 had 67% protection compared to unvaccinated ducks (0% protection).

Vaccination is one tool to control AI in ducks but it is not the only way to prevent AI occurrence in livestock; other ways are include integrated measures such as improved strict biosecurity (3 zones biosecurity) and better flock management.

CONCLUSION

Two monthly scheduled vaccinations of ducks at 14-16 weeks of age using a full dose of H5N1 clade 2.3.2 vaccine before the production periods, will provide 100% protection.

ACKNOWLEDGMENTS

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