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Negative Sero-occurrence of Infectious Bursal Disease, Newcastle Disease and Infectious Bronchitis in Japanese Quail (*Coturnix coturnix japonica*) in selected farms in Cebu, Philippines

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Abstract

Quails along with chicken can be susceptible to common diseases that can reduce egg and meat production in poultry. In this study, a total of 90 quails (45 males, 45 females) from 3 different farms in South Cebu were serologically tested for Infectious Bursal Disease, New Castle Disease and Infectious Bronchitis using a commercial solid phase immunoassay kit. Results showed that samples from the 3 farms were found seronegative, implying no history of exposure or very low antibody against the disease that is rendered undetectable by the test kit. This study would shed light on the aptness of vaccination as a preventive measure in controlling the entry and transmission of infection on the selected diseases in quail farms. Moreover, it is also the first serological study concerning the 3 diseases in quail in the Philippines.

Key Words: Infectious Bursal Disease; Newcastle's Disease; Infectious Bronchitis quails; Cebu; Seroprevalence.

Introduction

Quail farms are continuously expanding throughout the country. In Cebu, it plays an important role in providing a good source of income to small scale entrepreneur in the locality.

There is an increasing demand for quail eggs both locally and internationally. Quail eggs and meat are cheap and with high health benefits.

Commonly raised species is the Japanese quail (*Coturnix coturnix japonica*) because of their large size and adaptability to our environmental condition. These birds require a short period of time to reach market stage (five weeks for meat type compared to six weeks for broiler chickens) and can produce eggs at the age of six weeks to seven weeks. Egg production can reach up to 280 eggs per bird per year. Not only that their production is cost efficient, they only require minimal space for housing and is easy to manage. Moreover, they are quick multipliers with high efficiency in converting feeds to eggs and meat.

For years, it had been established that quails are resistant to diseases commonly affecting poultry. They appear even hardy than chickens and with proper management, mortalities is not a problem (Fah 2005). Hence, they may require no vaccination. For the quail raisers, this assumption is being debated as some deaths encountered in the farms are manifesting similar signs to the common diseases affecting poultry. However, this was not validated as no confirmation or testing was performed.

Infectious bursal disease (IBD) often referred to as “Gumboro” disease was first discovered in 1957 in Gumboro, Delaware, USA (Khan et al 2005). The virus is of low pathogenecity, causing only 1% mortality (Van den berg et al 1991). However in Europe and Asia, the virus has marked increased pathogenecity characterized by 80% mortality in layer pullets and 25% in broilers (Segal 2009). Infections before 3 weeks of age are usually subclinical. According to Khan et al (2005), it is considered as the most important form of the disease because of the significant economic losses that it causes, including impairment of growth and immunosuppression. On the hand, Newcastle disease (ND) would present symptoms depending on the viruses’ tropism to the tissues. Neutropic viruses would result in respiratory and nervous signs while viscerotropic viruses causes respiratory signs, watery-greenish diarrhea and swelling of the tissues of the head and neck (Pappas 2002).

Affecting less commonly the brooder chicks is Infectious bronchitis (IB). It is an acute, rapidly spreading viral disease characterized by respiratory signs. Infectious bronchitis spreads through multiple-age units (Khan et al 2005). Latter strains of IBV are nephropathogenic, producing interstitial nephritis resulting in significant mortality (Van den berg et al 1991).

To the best of the author’s knowledge, there are no documented serological studies on the status of IBD, ND and IB in quails in the Philippines until this study. There have been discussions between farm owners and veterinary practitioners in the country about the need to vaccinate quails, but different opinions have surfaced. The study aimed to assess the sero-occurrence of the 3 diseases, and give insights on the need to vaccinate against these diseases in Japanese Quails in the Philippines.

Materials and Methods

Research design, subjects and environment

The study employed a descriptive design. A total of 90 quail birds (15 males and 15 females from each of the 3 selected farms) in Cebu were utilized in this study. The birds were within the age range of 30-35 days in males and 8-10 months in females with an average weight of 120 grams. Birds were selected randomly in the farm under each category.

The 3 farms were as follows: Taal's Farm, Nuñez Farm and Carbonel's Farm. Taal's farm houses a total of 3000 quail birds. It is located in Brgy. Sabang, Sibonga Cebu. The Municipality of Sibonga lies 50.7 kilometers south of Cebu. It is bounded on the North by the Municipality of Carcar; on the South by the Municipality of Argao; on the West by the Municipalities of Dumanjug and Ronda; and on the East by Bohol Strait. Sibonga has a mixed topographic profile. The eastern portions are practically flatlands or plains where the urban area is located. The southern portion is slightly mountainous while the northern and central parts are very steep. The management feeds quail layer mash to the birds. The birds were raised for egg production, meat production as well as for breeding purposes. The farm has been operating for 3 years and had encountered minor problems like signs of low egg production and egg quality such as thin, soft shelled and has low hatchability. Cases with respiratory sign seen in the farm include nasal discharges and sneezing.

The Nuñez farm houses a total of 2000 quail birds. It is located in Brgy. Tungkil, Minglanilla Cebu, about 4 km from Talisay City proper. The Municipality of Minglanilla is situated in the southern part of the province of Cebu and is about fifteen kilometers from Cebu City. It takes more or less thirty minutes ride from the heart of the city before reaching the town proper. It is bounded on the north by the municipality of Naga, on the east by Bohol Strait and on the west by the city of Toledo. Minglanilla falls under the third type of climate or rainfall condition. It is characterized by a short dry season lasting from one to six months. There's no pronounced maximum rain period. The management feeds quail layer mash to the birds and it is specific in producing quail eggs. The farm has operated for less than a year and had minor production problem regarding rat infestation, low feed conversion resulting to reduce growth rate and mild respiratory problems. Together with the quails, they also raise goats, native chicken and geese inside the farm.

Carbonel's farm houses a total of 2000 quail birds. The farm is known locally for quail meat, egg and breeding stocks. It is located in Brgy. Linao, Talisay City, Cebu, and about 1 km from the City proper. The municipality of Talisay is on the coast of Cebu Province and is the first town located 12 kilometers Southwest of Cebu City. It serves as an intermediate area on the south of Metro Cebu and is the gateway to the west and southern towns of the province. The farm feed their poultry with quail layer mash. Aside from raising quails, they also raise ducks and native chicken. The farm has been operating for 5 years and had encountered minor problems like low egg production and egg quality such as thin and soft shelled. Cases with respiratory signs include nasal discharges and sneezing. Pest infestation was also a problem such as rodents.

Serological testing was conducted at the Southwestern University, College of Veterinary Medicine-Veterinary Teaching Hospital (SWU-CVM VTH), Basak Campus, Sabellano Street, Cebu City.

Blood collection

Blood was collected at the wing vein using 1 ml syringe. Prior to the procedure, collection site was cleansed and disinfected using cotton and 70% alcohol. Collected blood was placed in a sterile plain test tube with rubber stopper and labelled accordingly. Samples were stored in a cooler until further processing at the SWU-CVM VTH. Obtained serum after centrifugation was used for the commercial poultry IBD-ND-IBV Antibody Test Kit (Biogal, Galed Labs).

Data processing

Obtained data were tabulated in a tally sheet and encoded to Microsoft Excel. Simple percentages were obtained.

Results and Discussion

All the animals tested were found seronegative with IBD, ND and IB. It has been shown that quails cannot be infected with IBD (Weisman and Hitchner, 1978). Quails appear also to be resistant to infectious bronchitis from chickens but not to quail bronchitis (Chew-Lim, 1980), which is caused by a different virus (Shankar et al 2008). Lima et al (2004) suggested that quails can be carriers of ND, and that quails should be vaccinated against ND to prevent viral dissemination from those infected.

The negative results indicate possibilities that there was no exposure of the tested quails to the pathogens, or the quails cannot harbor the pathogens. Another possibility is that since the test kit only has 90% sensitivity and 85% specificity, the serological response (or antibody level) maybe too low that is rendered undetectable by the assay. In the case of NDV, the pathogen was isolated in unvaccinated quails suggesting that they can be carriers as no apparent signs were seen after disease challenge (Lime et al., 2004). Quails has been shown to be susceptible to NDV (Reis and Nobrega, 1956; Lancaster and Alexander, 1975). Those exposed to NDV are known to produce antibody response (Inooka et al 1984; Ito et al 2001). Inoculation with the oil vaccine produced a very high titer of HI antibody in the serum for a long time, while inoculation with any of the spray vaccines produced low titer for a short time. However, oil vaccines were shown cause some clinical signs (Ito et al 2001). Although quails can most likely develop resistance against NDV, improvement on laying production may be affected (Jaworek, 1978). This suggest that if the possibility of exposure to diseases is high, vaccination may be considered especially if there is a history of that disease in other poultry species in the area. Vaccination may safeguard quail productivity, and the health of other poultry species which may be affected by pathogens that may naturally be carried by quails. This is especially true in the case of the 2 farms in this study where other poultry species are raised in the area.

In this study, only 3 diseases were tested. Further studies can be done to evaluate other diseases like fowl pox and *Mycoplasma meleagridis* infection (Shankar et al 2008) which affects them, or diseases which can be potentially carried by them with no apparent signs. Avian influenza can be detected from quail, with infected birds showing no signs of the disease (El-Zoghby et al 2012; Ferro et al 2012). In Egypt, molecular analyses showed that the virus was phylogenetically very close to those affecting other poultry suggesting epidemiological links (El-Zoghby et al 2012). This was also suggested by Xu et al (2007). The aforementioned study also found that H9N2 avian influenza virus was found to asymptotically replicate in the respiratory track of quails.

Probably because of its resistance to most poultry diseases, quails have been used to develop vaccines against diseases for other avian species as it has been shown to reduce virulence of viral pathogen after several passages to the bird (Ianconescu et al 1975). On the other hand, a hermetic effect was observed where lead exposed birds had lower morbidity and better survival than controls after challenge with *E. coli* (Nain and Smits, 2011). Quails may have the innate capacity to normally adapt to environmental challenges for survival.

The present study evaluated serological responses of quails to possible exposure of selected diseases. To further investigate functional immunity, using an infectious challenge may be used to better assess actual response of quails in the local settings when exposed to the studied pathogen (Nain et al 2011).

Quails are comparatively sturdy than chickens. Their resistance against disease can be explained by a study conducted on comparative genomic analysis of 2 avian (Quail and Chicken) Major Histocompatibility Complex (MHC) regions. The genomic region of the MHC consists of a number of multigenes families involved in the immune responses of vertebrates. Class I and Class II genes encode glycoprotein that transports foreign peptides to the surface of cells for recognition by TCRs on lymphocytes, which in turn kill infected cells (Takashi et al 1999).

The general management on the quail farms used in the study were not investigated. Also, the study did not eliminate the possibility of exposure to IBD, ND and IB. Thus, over-all management in maintaining a healthy flock, including good husbandry, biosecurity and sanitation measures should be strictly implemented to prevent exposure to the etiological agents of the diseases mentioned. This is essential as quails can serve as reservoir of avian diseases (Lima et al 2004), which may endanger poultry farms near the area. Moreover, farm owners must be educated on information that may affect health and productivity. Special attention must be given, like the controlled use of Malathion to the flock as it has been shown to have an immunosuppressive effect in quails (Nain et al 2011).

Conclusion

There was a negative sero-occurrence of Infectious bursal disease, Newcastle disease and Infectious bronchitis in the selected quail farms in Cebu, Philippines. Vaccination against the selected diseases may not be necessary but continuing disease surveillance must be performed. Serological testing may be done especially in cases where clinical signs suggestive of any of the disease will be seen.

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References

- 1) **Chew-Lim M 1980** Adult Coturnix quail bronchitis. *Avian diseases* 24:520-526.
- 2) **El-Zoghby EF, Arafa AS, Hassan MK, Aly MM, Selim A, Kilany WH, Selim U, Aggor MG, Abdewhab EM and Hafez HM 2012** Isolation of H9N2 avian influenza virus from bobwhite quail (*Colinus virginianus*) in Egypt. *Archives of Virology* 157(6):1167-1172.
- 3) **Fah SK 2005** The Nutrition and Management of Japanese (Coturnix) Quails in the Tropics. Retrieved October 2012 from <http://www.thatquailplace.com/quail/coturn1.html>.
- 4) **Ferro PJ, Khan O, Vuong C, Reddy SM, LaCoste L, Rollins D and Lupiani B 2012** Avian influenza virus investigation in wild bobwhite quail from Texas. *Avian diseases* 56:858-860.
- 5) **Hitchner SB, Appleton GS and Winterfield RW 1964** Evaluation of the immunity response to infectious bronchitis virus. *Avian Diseases* 8(1):153-162.
- 6) **Ianconescu M, Hornstein K, Samberg Y, Aharonovici A and Merdinger M 1975** Development of a new vaccine against turkey meningo-encephalitis using a virus passaged through the Japanese quail (*Coturnix coturnix Japonica*). *Avian Pathology* 4(2):119-131.

- 7) **Inooka S, Takahashi S, Takahashi H and Mizuma Y 1984** Immunological traits in generations 7 to 12 of two lines of Japanese quail selected for high or low antibody response to Newcastle disease virus. *Poultry Science* 63(7):1298-1302.
- 8) **Ito H, Nakatani H and Hayashi T 2001** Adaptability of Japanese quail injected avian Newcastle disease vaccine. *Research Bulletin of the Aichi-ken Agricultural Research Center (Japan)*.
- 9) **Jaworek B 1978** Effects of selection to resistance on Newcastle disease in Japanese quail. *Annales de genetique et de selection animale* 10(4):589-589.
- 10) **Khan CM and Dana A 2005** *The Merck Veterinary Manual*. 9th ed.; New Jersey, USA: Merck and Co.,Inc., 2255-2257.
- 11) **Lancaster JE and Alexander DJ 1975** Newcastle Disease: virus and spread. A review of some of the literature. Canada, Dep. Agriculture – Ottawa.
- 12) **Lima FS, Santin E, Paulillo AC and Doretto Jr L 2004** Evaluation of different programs of Newcastle disease vaccination in Japanese quail (*Coturnix coturnix japonica*). *International Journal of Poultry Science* 3(5):354-356.
- 13) **Nain S and Smits JEG 2011** Subchronic lead exposure, immunotoxicology and increased disease resistance in Japanese quail (*Coturnix coturnix japonica*). *Ecotoxicology and Environmental Safety* 74(4):787-792.
- 14) **Nain S, Bour A, Chalmers C and Smits JEG 2011** Immunotoxicity and disease resistance in Japanese quail (*Coturnix coturnix japonica*) exposed to malathion. *Ecotoxicology* 20(4):892-900.
- 15) **Pappas J 2002** *Coturnix japonica*, *Animal Diversity Web*. <http://animaldiversity.umm2.umich.edu/site/accounts/information/conturnixjaponica.html>
- 16) **Reis J and Nobrega P 1956** *Tratado de doenças das aves*. AGRIS.
- 17) **Segal Y 2009** Gumboro Disease in Poultry. Accessed 12 August 2015. <http://en.engormix.com/MA-poultry-industry/health/articles/gumboro-t1242/165-p0.htm>
- 18) **Shankar BP. 2008**. Common respiratory diseases of poultry. *Veterinary World* 1(7):217-219.
- 19) **Takashi S, Chiori S, Akira O, Yoshika T, Tadashi I, Takashi G, Hanzawa K, Watanabe S and Inoko H 1999** Gene organization of the quail major histocompatibility complex (MhcCoja) class I gene region. *Immunogenetics* 49:384-394.
- 20) **Van den Berg, TP, Gonze M and Meulemans G 1991** Acute infectious bursal disease in poultry: Isolation and characterization of a highly virulent strain. *Avian Pathology* 20(1):133-143.
- 21) **Weisman J and Hitchner SB 1978** Infectious bursal disease virus infection attempts in turkeys and coturnix quail. *Avian diseases* 22:604-609.
- 22) **Xu KM, Li KS, Smith GJD, Li JW, Tai H, Zhang JX and Guan Y 2007** Evolution and molecular epidemiology of H9N2 influenza A viruses from quail in southern China, 2000 to 2005. *Journal of Virology* 81(6):2635-2645.