

## **NEWCASTLE DISEASE IN MALAYSIA: DIAGNOSTIC CASES IN VETERINARY RESEARCH INSTITUTE (VRI) IPOH FROM 2004-2009**

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**ABSTRACT.** A study was carried out on the records of Newcastle Disease (ND) in poultry diagnosed from 2004-2009 by the Avian Virology unit of Veterinary Research Institute (VRI) Ipoh. Data of positive cases were compiled and analyzed. It showed that ND occur throughout the year and the pattern of ND is almost consistent for each year except for certain months in year 2004 and 2006. The high incidence of ND in this period may be due to increased avian cases due to the Highly Pathogenic Avian Influenza (HPAI) outbreak in Malaysia. It is suggested that as more samples were received in VRI for surveillance of HPAI during HPAI outbreak, the chances of detecting ND in these samples were increased. Furthermore, the pattern of ND cases received in VRI was not consistent with the reports of M. A. Awan *et al.* (1994), indicating that the ND epidemics usually occur at times of climatic stress, leading to seasonal occurrence. The great decline of the percentage of ND over the 6 years period suggested that ND is under control. The aim of this study is to understand the prevalence of ND based on cases received in VRI. Therefore further studies on ND in

Malaysia could be carried out to understand the actual trend of ND in Malaysia.

*Keywords:* poultry, Newcastle Disease, seasonal occurrence, HPAI outbreaks

### **INTRODUCTION**

Newcastle disease (ND) is one of the highly contagious diseases found in list A of the Office International des Epizooties (OIE) (OIE Standards Commission, 1996) and it is caused by the avian paramyxovirus serotype-1 (APMV-1). ND is amongst the most important disease of poultry and outbreaks with mortality up to 100% are common (Alders and Spreadbrow, 2001; Saidu and Abdu, 2008). ND infection takes place through virus inhalation or ingestion and its spread depends on the availability of the virus in its virulent infectious form (Whiteman and Bickford, 1983) and its short incubation period of 5-6 days (Chansiripornchai and Sasipreeyajan, 2006). The disease usually affects the respiratory, gastrointestinal and nervous systems with common signs of listlessness, increased respiratory rate, yellowish to greenish diarrhoea and weakness followed

by prostration and death (Chansiripornchai and Sasipreeyajan, 2006).

Malaysia has uniform temperatures throughout the year. The annual variation is less than 2°C except for the east coast areas of Peninsular Malaysia which are often affected by cold surges originating from Siberia during the northeast monsoon. Even there, the annual variation is less than 3°C. The daily ranges of temperatures are large, from 5°C to 10°C at the coastal stations and from 8°C to 12°C at the inland stations. Excessive high day temperature is never experienced here. Malaysia has high humidity. The mean monthly relative humidities are between 70 to 90%, varying from place to place and from month to month. The days are however not very hot and nights are fairly cool throughout the year (Malaysian Meteorological Department). Many authors have reported on the seasonal incidence and severity of ND. In Bangladesh, outbreaks of ND are more frequent during the winter season (Asadullah, 1992) and in Zambia (Sharma *et al.*, 1986) during the hot dry season (September and November) and the hot humid season (January to March). However Martin (1992) in a review concluded that ND outbreaks are often associated with the change of season, specifically at the start of the wet season, with cold and hot weather. According to M. A. Awan *et al.* (1994), the incidence of ND is not associated with any particular season, but rather with periods of climatic stress. Epidemics of ND usually occur at times of climatic stress, leading to

seasonal occurrence (M. A. Awan *et al.*, 1994).

ND was first recognized in 1926 and the first case of Newcastle Disease (ND) recorded in poultry in Malaysia was probably in 1934 (Anon, 1934). However ND appeared to be under control with the introduction of various control measures such as slaughter combined with quarantine, route of vaccination and biosecurity measures at farm level. As ND is one of the most important infectious diseases in poultry, rapid detection and identification of the virus is crucial for the effective control of the disease. The routine diagnosis of ND at the Veterinary Research Institute (VRI) Ipoh is one of the important contributors to the handling of outbreaks in flocks throughout Malaysia where this helps farmers to screen for the disease in their farms.

## MATERIAL AND METHODS

A total of 6,828 cases from avian comprising of cloacal swabs, tracheal swabs and pooled organs were sent and tested at the Avian Virology Unit in VRI from 2004-2009. Samples were subjected to the Virus Isolation technique where Haemaagglutination (HA) test and Hemaagglutination Inhibition (HI) test were performed to confirm Newcastle Disease Virus (OIE, 2009). In molecular detection, the viral RNA was extracted from infected allantoic fluid using TRI LS Reagent (MRC, USA) as described by the manufacturer. One step RT-PCR Access

Quick RT-PCR Kit (Promega, USA) was used as the reagent with specific primer of MV1 and B2 (Herczeg *et al.*, 1999). PCR products were further analyzed by agarose gel electrophoresis using 1.5% agarose. Data were recorded and analysed for the number of samples received from 2004 to 2009.

## RESULTS AND DISCUSSION

From this study, out of 6,828 cases that were tested, 318 cases were found positive for ND. This study also shows that ND occurred throughout the year and the pattern of ND cases received in VRI over the 6 years period (2004-2009) is almost consistent for each year except for year 2004 and 2006 as shown in Figure 1. Figure 1 shows that there was a significant increase of ND cases in August, September and December 2004 compared to other months. The ND

cases in August, September and December 2004 were 18, 28 and 19 cases respectively. Another marked significant increase of ND cases also noted in year 2006. There were 24 cases reported in February and 27 cases in March 2006.

ND is said to occur in poultry throughout the year in most countries (M. A. Awan *et al.*, 1994). Seasonal outbreaks of ND had been reported by many authors. However the pattern of ND cases reported in VRI over the 6 years period (2004-2006) was not significant with the reports of M. A. Awan *et al.* (1994) where the epidemics usually occur at times of climatic stress, leading to seasonal occurrence. ND outbreaks often occur once or twice a year at regular intervals affirming the endemicity of the virus, however, 'mini' outbreaks in individual flocks and sporadic cases in individual birds may occur (M. A. Awan *et al.*, 1994). Malaysia borders Thailand

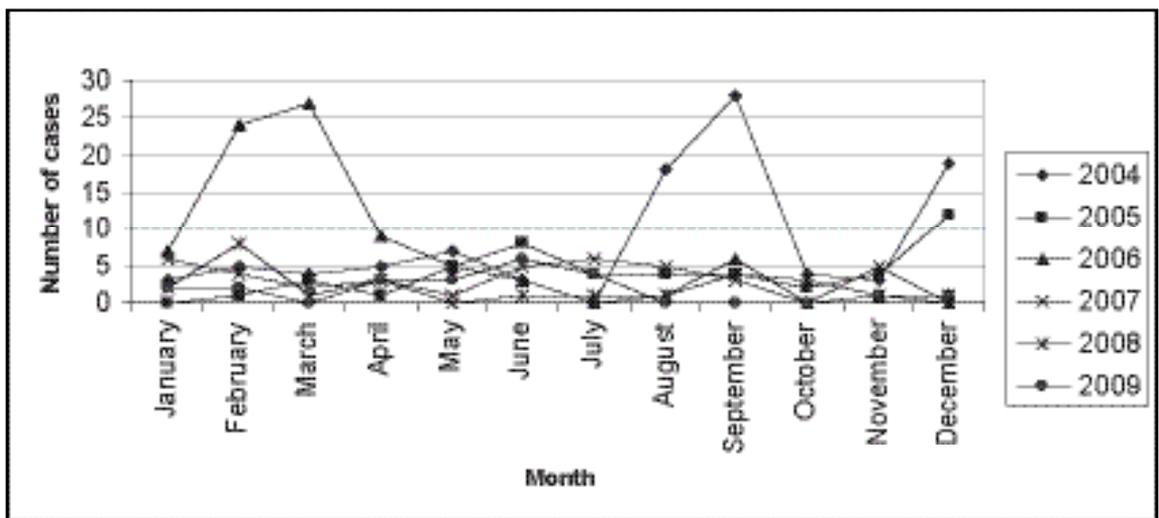
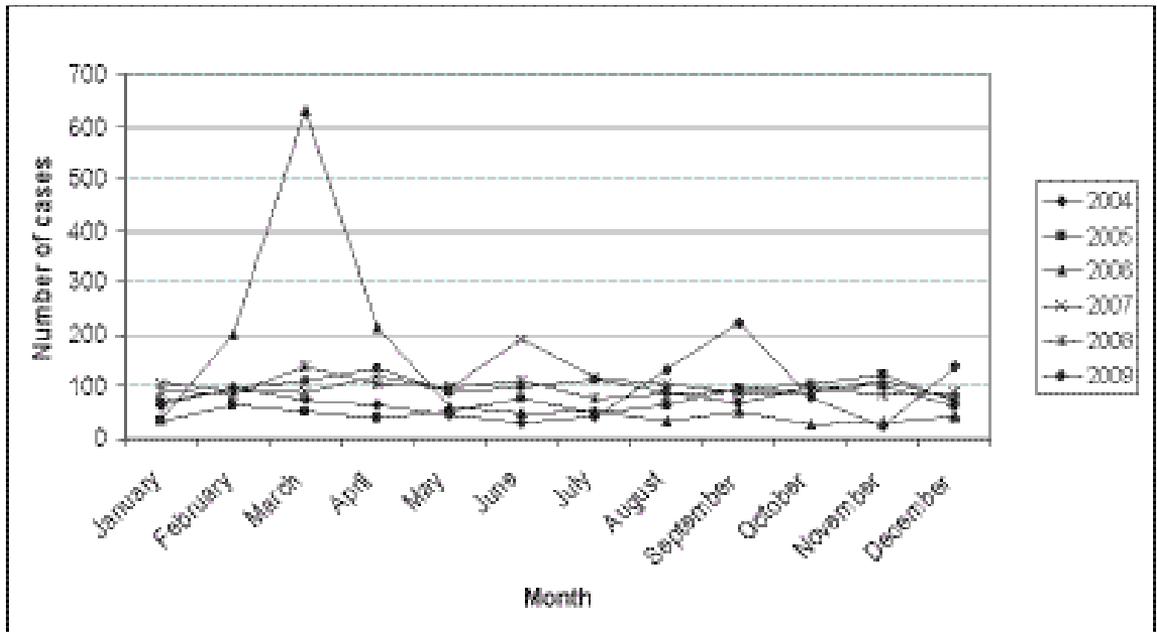


FIGURE 1: Positive ND cases received in VRI from 2004-2009

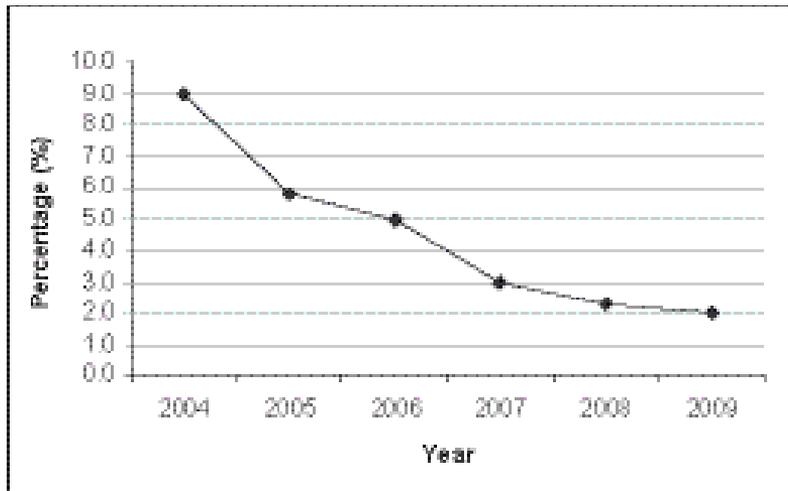


**FIGURE 2:** Total avian cases received in VRI from 2004-2009

in the north, but the pattern of ND cases reported in Malaysia seem to be different from Thailand as Ratanasethakul (1989) reported that ND cases occur throughout the year with incidence peak at the end of dry season between February and April in Thailand.

It is suggested that the high incidence of ND in Malaysia in year 2004 and 2006 may be due to large number of cases received in VRI during Highly Pathogenic Avian Influenza (HPAI) outbreak. According to MAJ (Dr) John T. Sapalo (2010), there were 3 HPAI outbreaks in Malaysia. The first HPAI outbreak occurred from August to November 2004 whereas the second outbreak was between February and March 2006. The total avian cases received in 2004 was significantly increased in August, September and

December, with 132, 220 and 139 cases respectively as shown in Figure 2. Surprisingly, the ND cases reported in these months were markedly increased with 18 cases in August, 28 cases in September and 19 cases in December. It is suggested that as more samples were received in VRI for the surveillance of HPAI during the HPAI outbreak, the chances of detecting ND in these samples were increased. Similarly, the same condition was observed during the second outbreak of HPAI in year 2006 where the total avian cases received were 200 cases in February, 630 cases in March and 212 cases in April (Figure 2). Out of these cases, 24, 27 and 9 ND cases were reported in February, March and April respectively. However, there was no high incidence of ND cases (5 cases) in June 2007 although there was a significant



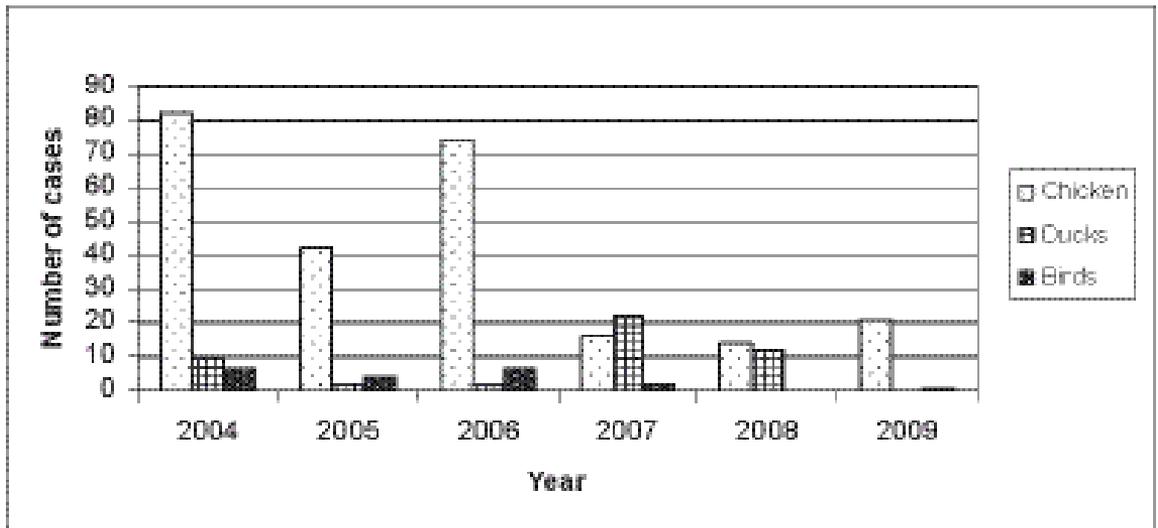
**FIGURE 3:** Percentage of ND cases reported in VRI from 2004-2006

increase of total avian cases (189 cases) received in VRI due to HPAI outbreak reported in the same month.

The percentage of ND cases reported in VRI decreased annually over the 6 years period (2004-2009) as revealed in Figure 3. The percentage of ND cases from year 2004 to 2006 were 9.7%, 5.8%, 5.8%, 3.1%, 2.3% and 2.0% respectively. The great decrease of ND cases reported in VRI may be due to several factors. Farmers' awareness and knowledge about the poultry disease, good management practice, biosecurity and good hygiene in rearing poultry had successfully reduced the occurrence of poultry diseases especially ND. The disease surveillance program is important for early warning of diseases, planning and monitoring of disease control programmes, provision of sound animal health advice to farmers, certification of export livestock and livestock products and international reporting and proof of freedom from

diseases. According to Aziz *et al.*, 2003, this surveillance program aims to reduce losses in poultry production, reduce losses in market value from suspension of exports, ensure poultry products are safe and wholesome, and meet export requirements. Since its inception in 1948, the VRI at Ipoh and the Regional Veterinary Laboratories (RVL) of the Department of Veterinary Services (DVS) have been entrusted with the mandate to carry out animal disease surveillance. The success of the vaccination programme against ND also contributed to this great decline of ND cases. The Malaysian government policy of stamping out all infected poultry in controlling ND outbreak also plays an important role in the decline of ND cases.

ND has been a very important poultry disease throughout the world. More than 240 species of birds have been infected by ND (Kaleta and Baldauf, 1988). Chicken was the highest species infected by ND,



**FIGURE 4:** Host species of ND cases reported in VRI from 2004-2006

follow by ducks and other avian as shown in Figure 4. Out of 318 ND cases, chicken comprise 249 cases (78%); duck, 48 cases (15%) and other avian, 21 cases (7%). This is in agreement with World Organization for animal Health (OIE) view that amongst poultry species, chickens are the most susceptible to ND, whilst ducks and geese are the least susceptible. A similar finding also was reported by Alexander *et al.*, 2003 who found that chickens appear to be the most susceptible to the disease whereas aquatic birds, including geese and ducks, are relatively resistant.

## CONCLUSION

In conclusion, this study has shown that the ND cases occur throughout the year in Malaysia and the pattern of ND cases were quite consistent from 2004-2009 except for two high incidences in certain

months in 2004 and 2006. It is suggested that the high incidence of ND cases may be due to higher sampling rates during the Highly Pathogenic Avian Influenza (HPAI) outbreak in Malaysia. This study also showed that the occurrence of ND cases reported in VRI were not seasonal as reported by many authors. As this study is only focused on the prevalence of ND cases reported in VRI, a further prevalence study of ND cases in Malaysia has to be carried out to understand the actual prevalence of ND in Malaysia.

## REFERENCES

1. Alders R. and P.B. Spreadbrow, 2001. Controlling WD in village chicken: A Field Manual. *Australian Centre for International Agricultural Research (ACIAR)*, Canberra, Australia, pp: 37
2. Alexander D.J. (2003): Newcastle Disease, other Avian Paramyxoviruses, and Pneumovirus Infections, In: *Disease of Poultry*, Iowa State Press, 11<sup>th</sup> Edition, pp.63-99.

3. Anon (1934). Annual Report, p 11. Veterinary Department, Federated Malay states.
4. Asadullah M. (1992). Village chicken and Newcastle disease in Bangladesh. In: SPRADBROW, P.B. (Ed.). *Newcastle Disease in Village Chicken, Control of Thermostable Oral Vaccine*. Proceedings, International Workshop held in Kuala Lumpur, Malaysia, 6-10 October 1991, Centre of International Agriculture Research (ACIAR), Canberra, pp.161-162.
5. Aziz A., Nor Shahidah K., Chua K. & Shamshad. (2003). Proceedings of a Workshop: Emerging Infectious Diseases-A Malaysian Perspective.
6. Chansiripornchai N. and J. Sasipreeyajan, 2006. Efficacy of live<sub>B1</sub> or ulster 2C Newcastle Disease vaccine simultaneously vaccinated either inactivated oil adjuvant vaccine for protection of Newcastle disease virus in broiler chickens. *Acta Vet. Scand.*, 48:1-4
7. J. Herczeg, E. Wehmann, R. R. Bragg, P. M. Travassos Dias, G. Hadjiev, O. Werner and B. Lomniczi. (1999). Two novel genetic groups (VIIb and VIII) responsible for recent Newcastle disease outbreaks in Southern Africa, one (VIIb) of which reached Southern Europe. *Arch Viro.l* **144**: 2087–2099
8. Kaleta E.F. and Baldouf C. (1988). "Newcastle disease in free-living and pet birds", in D.J. Alexander (editor), *Newcastle Disease*, Boston/Dordrecht/London: Kluwer Academic Publishers, 197-246.
9. M.A. Awan, M.J. Otte and A.D. James. (1994). The epidemiology of Newcastle disease in rural poultry: a review. *Avian Pathology*. **23**:405-423
10. M.A.J. (Dr) John T. Sapalo. H5N1 HPAI: Situation In Malaysia, 20<sup>th</sup> APMMC, Jakarta 2010.
11. Martin P.A.J. (1992). The epidemiology of Newcastle disease in village chickens. In: SPRADBROW, P.B. (Ed.). *Newcastle Disease in Village Chicken, Control of Thermostable Oral Vaccine*. Proceedings, International Workshop held in Kuala Lumpur, Malaysia, 6-10 October 1991, Centre of International Agriculture Research (ACIAR), Canberra, pp. 40-45.
12. OIE manual of diagnostic tests and vaccines for terrestrial animals (2009)
13. Ratanasethakul C. (1989) Disease problems of importance in Thai village poultry. Proceedings, International Seminar on Animal Health and Production Services for Village Livestock Khon Kaen, Thailand pp. 113-115.
14. Saidu L. and P.A. Abdu, 2008. Outbreak of Viscerotropic Velogenic form of Newcastle Disease in vaccinated six weeks old pullets. *Sokoto J.Vet. Sci.*, 7]: 37-40
15. Sharma R.N., Hussein N.A., Pandey G.S. and Shandomo M.N. (1986). A study on Newcastle disease outbreaks in Zambia, 1975-1984. *Reveu Scientifique et Technique*, OIE, 5, 5-14.
16. Whiteman C.E and A.A. Bickford, 1983. Newcastle Disease. In : *Avian Disease Manual*, Whiteman, C.E and A.A. Bickford (Eds.). Association of Avian Pathologist, Pennsylvania, Kennett Square, pp. 55-56.

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