

# ROLE OF INDIAN HOUSE SPARROWS (*PASSER DOMESTICUS INDICUS*) IN THE EPIDEMIOLOGY OF NEWCASTLE DISEASE\*

**M.Geetha<sup>1</sup>, L.Gunaseelan, P.I.Ganesan, and K.Kumanan**

Department of Veterinary Epidemiology and Preventive Medicine,  
Madras Veterinary College,  
Tamil Nadu Veterinary and Animal Sciences University,  
Vepery, Chennai-600 007

*Newcastle disease (ND) is the single greatest constraint to the poultry enterprise throughout the world. Recurrent epidemics of ND in the well-developed poultry belts provide strong evidence for the role of reservoirs in the maintenance of Newcastle disease virus (NDV) in the population (Awan et al., 1994). Even though the epidemiology of ND in intensive poultry system is well understood, only limited work has been done on the role of free living birds in the spread of this disease to commercial chicken (Raghavan et al., 1998). With this background the present study was planned to assess the potential role of Indian house sparrow (*Passer domesticus indicus*) in the spread of Newcastle disease.*

A total number of twenty five droppings from sparrows were collected in phosphate buffered saline (PBS) (pH 7.2) and preserved at 4°C until further processing. All droppings were screened by HA test as per the method of Alexander (1988) using 1% chicken red blood cells (RBCs). Out of 25 droppings collected from sparrows 20 samples showed the HA titre of more than 2. These twenty droppings were passaged in 9-10 day old embryonated chicken eggs for NDV isolation as described by Alexander (1988). Virus isolation was done as per the procedure recommended by Alexander (1988). Virus characterization was done by assessing the mean death time (MDT) and intra cerebral pathogenicity index (ICPI) of viral isolate was assessed as per the method of Allan and Alexander (1978). Embryo lethal dose (50%) for each isolate was calculated as per Reed and Muench (1938). Strain differentiating characters which includes agglutination of mammalian RBCs, stability of haemagglutinin at 56°C and adsorption of chicken brain cells were done as per the method of Tanwani, (1974).

The persistence of ND virus in an inapparent carrier state in other poultry species such as include geese, turkeys, doves, guinea fowl, crows and parrots (Sulochana *et al.*, 1981) which may play a role in the spread of the disease to commercial poultry. In this study, twenty out of twenty five samples showed HA activity ranged from as low of 2 to 256. Only one viral isolate was recovered out of 20 droppings and subjected to further characterization studies.

As suggested by Alexander (1988) and Werner *et al.*, (1999), characterization of NDV isolate by MDT (114 hours) and ICPI shows that the isolate was of lentogenic pathotype.

The thermostability of haemagglutinins of the obtained NDV isolate was <15 minutes. However thermostability of haemagglutinins has been recognized only as pathotype NDV marker but not related to isolate virulence (Hanson *et al.*, 1967). Newcastle disease virus was found to agglutinate erythrocytes of bovine, ovine, swine and equine species besides human 'O' RBCs (Liu, 1952). This property was used to differentiate the

---

\*-Part of M.V.Sc., thesis of the first author submitted to Tamil Nadu Veterinary and Animal Sciences University, Chennai-51

<sup>1</sup>Corresponding author

NDV strains. The haemagglutination of mammalian erythrocytes by NDV isolate obtained in this study was mostly confined to cattle, goat and human 'O' erythrocytes. The isolate obtained in this study had good adsorption percentage (75%) on the chicken brain cells.

It is concluded that the isolate obtained from the sparrow is a classical reminder that any free living and caged birds can act as natural reservoirs of NDV and strengthens the explanation of Hanson (1984) that the apparent emergence of ND as highly pathogenic disease of poultry was possible because NDV in its virulent form was enzootic in some other species in which it produced disease or unrecognized disease.

The isolate in this study has been pathotyped lentogenic by both ICPI and MDT. Newcastle disease viruses of low virulence are hypothesized to give rise to virulent viruses by mutations and it is not clear whether such mutations takes place in free living birds which act as reservoirs or are introduced into chickens and then mutate. The lack of virulent isolates from free living birds, however suggests that the latter is more likely (Alexander, 2001).

#### ACKNOWLEDGEMENT

The authors thanks the Tamil Nadu Veterinary and Animal Sciences University for the facilities provided.

#### REFERENCES

Alexander, D.J.(1988). Newcastle disease virus. In: Newcastle disease. (Alexandar, D.J.Ed.). Kluwer Academic Publishers. Boston.pp.11-22.

Alexander,D.J.(2001):Newcastle disease. *British Poultry Science*, 42:5-22.

Allan,W.H. and Alexander, D.J. (1978). Newcastle disease vaccines their production and use. FAO Animal Production and Health Series No.10.FAO, Rome, Italy

Awan,M.A., Otte, M.J. and James, A.D. (1994). The epidemiology of Newcastle disease in rural poultry: A review. *Avian Pathology*, 23: 405-423

Hanson,R.P., Splatlin, J. and Dickson, E.M. (1967). Criteria for determining the validity of a virus isolation. *Avian Diseases*, 11:509-514.

Liu,C.(1952). Variables in agglutination and lysis of human red cells by Newcastle disease virus Proceedings Society Experimental Biology,81, New York .pp.646-648.

Raghavan, V.S., Kumanan, K., Thirumurugan, G. and Nachimuthu, K. (1998) Comparison of various diagnostic methods in characterizing Newcastle disease isolates from desichicken. *Tropical Animal Health Production*, 30:287-293.

Reed, L.V. and Muench, H. (1938). A simple method of evaluating 50 per cent end points. *American Journal of Hygiene*, 27:193

Sulochana,S., Pillai, R.M., Nair, G.K. and Sudharma, D. and Abdullah, P.K. (1981). Epizootiology of Newcastle disease in Indian house crows. *Veterinary Record*, 109: 249-251.

Tanwani,S.K.(1974). Pathogenicity and immunogenicity in comparison to other vaccine strains of Newcastle disease, Unpublished Ph.D thesis, Jawaharlal Nehru Krishi Vidwa Vidyalaya, Jabalpur, India.