

## Status on prevalence of Gastrointestinal diseases in laying chicken

**P. Balachandran\*, G.A. Balasubramaniam, S.Sivaseelan,  
P. Srinivasan and B. Mohan**

*Department of Veterinary Pathology,  
Veterinary College and Research Institute, Namakkal- 637 002.*



**Abstract:** *Gastrointestinal diseases among commercial laying chicken housed in 100 farms in and around Namakkal district were investigated. Newcastle disease (ND) was confirmed by haemagglutination, haemagglutination inhibition test, immunoperoxidase test and electron microscopy. The C. perfringens causing necrotic enteritis was confirmed based on the morphological, cultural, biochemical, sugar fermentation tests, stormy reaction of milk, polymerase chain reaction (PCR) technique and immunoperoxidase test. Nutritional roup was confirmed by histopathology. Coccidial parasites were identified based on the morphology of different developmental stages and electron microscopy. Candida albicans and helminths were identified based on the morphology. Prevalence, age-wise and season wise occurrence of these diseases were documented and discussed.*

**Key words:** *Gastrointestinal diseases, Laying chicken, Prevalence.*

### INTRODUCTION

The health status of the poultry birds greatly influences the profitable outcome of the industry. Hence, poultry must have a healthy and functional gastrointestinal (GI) tract to maintain the excellent feed efficiency, which is required in modern poultry production, since feed constitute 66 percent of the total production cost.

The Gastrointestinal (GI) tract which has the vast surface in the body is constantly exposed to a wide variety of potentially harmful pathogens present in feed and water. It invites many disorders of the tract culminating in either death or decreased production performance of Part of commercial layers, which in turn incurs heavy economic loss to the producers (Yegani and Korver, 2008).

Realising the paucity of information on the occurrence of GI diseases in poultry a detailed research on "Pathology of gastrointestinal diseases in laying chicken" was formulated.

### Materials and Methods

Gastrointestinal diseases among commercial laying chicken housed in 100 farms in and around Namakkal district were investigated from October 2009 to September 2010. The information regarding breed and strain of chicken, flock strength, age, method of rearing, vaccination schedule, production performance, symptoms manifested and mortality from various farms having gastrointestinal diseases were collected.

Necropsy was carried out on recently died chicken carcasses and ailing birds having the history and symptoms of gastrointestinal tract diseases. Samples such as crop, esophagus, proventriculus and intestine were collected during necropsy.

Newcastle disease (ND) was confirmed by haemagglutination, haemagglutination inhibition test (Ajinkya *et al*; 1980), immunoperoxidase test and electron microscopy. The C. perfringens causing necrotic enteritis was confirmed based on the morphological, cultural, biochemical, sugar fermentation tests, stormy reaction of milk, polymerase chain reaction (PCR) technique (Schoepe *et al*; 2001) and immunoperoxidase test. Nutritional roup was confirmed by histopathology. Coccidial parasites were identified based on the microscopical morphology of different developmental stages and electron microscopy.

---

*\* Ph.D., thesis of the first author approved by  
Tamil Nadu Veterinary and Animal Sciences  
University, Chennai – 51*

*Corresponding author:  
E mail: balaavg@yahoo.co.in*

*Candida albicans* and helminths were identified based on the morphology.

Age wise (19th to 80th week) and month wise (October 2009 to September 2010) occurrence of these diseases and their different combinations were recorded (Table 1). Morbidity and mortality rates and predisposing factors for the occurrence of these diseases were analysed.

**TABLE 1 FARM WISE INCIDENCE OF GASTROINTESTINAL DISEASES IN LAYING CHICKEN**

| S. No.       | Gastrointestinal diseases   | Number of Farms | Incidence (%) |
|--------------|---|-----------------|---------------|
| 01           | Intestinal coccidiosis  | 18              | 18.0          |
| 02           | Caecal coccidiosis  | 02              | 02.0          |
| 03           | Necrotic enteritis  | 13              | 13.0          |
| 04           | Crop mycosis  | 13              | 13.0          |
| 05           | Newcastle disease   | 14              | 14.0          |
| 06           | Necrotic enteritis + Intestinal coccidiosis                       | 13              | 13.0          |
| 07           | Tapeworm infection  | 06              | 06.0          |
| 08           | Roundworm infection   | 05              | 05.0          |
| 09           | Roundworm infection + Newcastle disease                           | 02              | 02.0          |
| 10           | Tapeworm infection + Newcastle disease                            | 04              | 04.0          |
| 11           | Tapeworm infection + Roundworm infection + Intestinal coccidiosis | 01              | 01.0          |
| 12           | Necrotic enteritis + Newcastle disease                            | 02              | 02.0          |
| 13           | Roundworm infection + Tapeworm infection                          | 02              | 02.0          |
| 14           | Intestinal coccidiosis + Newcastle disease                        | 02              | 02.0          |
| 15           | Gizzard erosion   | 01              | 01.0          |
| 16           | Nutritional roup  | 02              | 02.0          |
| <b>Total</b> |   | <b>100</b>      | <b>100.0</b>  |

## RESULTS AND DISCUSSION

Detection of band at 775 base pair by alpha toxin specific PCR confirmed the *C. perfringens*. ND viruses yielded positive results in HA and HI tests.

The incidences of different gastrointestinal diseases observed in 100 farms are presented in the Table. In the present investigation, gastrointestinal diseases due to single infection was observed in 74 farms (74 per cent), remaining 26 farms (26 per cent) were affected with multiple infections of gastrointestinal diseases in various combinations. Intestinal coccidiosis, necrotic enteritis, crop mycosis and ND were the major gastrointestinal diseases recorded either alone or in combinations.

Gastrointestinal diseases of chicken often have a multiple etiology. The combination of pathogens differs from place to place (Gabriel *et al.*, 2006). Pathology of these diseases rely not only on the host immune status and strain of the pathogen, but also the predisposing factors like age of birds, season, environmental temperature, method of rearing, and nutritional plane.

Intestinal coccidiosis disease occurred in 18 farms (18.0 per cent) as a single infection and 16 farms (16 per cent) as combined infections and claimed to be the most prevalent disease among the gastrointestinal diseases of laying chicken. This observation was well supported by Mattiello *et al.* (2000), who observed coccidiosis in almost all broiler farms of North and South America. Necrotic enteritis was recorded in thirteen farms (13.0 per cent) as a single infection and 15 farms (15 per cent) as combined infections. Most of the outbreaks of this disease occurred as combined infections as reported earlier (Long *et al.*, 1974 and Cowen *et al.*, 1987). Newcastle disease affected 14 farms (14.0 per cent) as a single infection and 10 farms (10 per cent) as combined infections. Common occurrence of this disease among layers in Namakkal region has been supported by earlier workers (Pazhanivel *et al.*, 2002; Sivaseelan, 2008).

Crop mycosis occurred as a single disease in 13 farms (13 per cent). This finding is posing a threat to the layer

industry in Namakkal due to the fact that most of this occurrence has been reported only from unhygienic surroundings and other debilitating conditions (Moretti *et al.*, 2000). The reason for the occurrence of this disease in well maintained healthy farms have to be explored. Tapeworm and Roundworm infections occurred as single infection in 6 farms (6 per cent) and 5 farms (5 per cent) respectively and as combined infection in 2 farms (2 per cent). Worm infection occurred along with other diseases in 7 farms (7 per cent). The observation is in accordance with Amin Babjee *et al.* (1997). Nutritional roup and Caecal coccidiosis occurred in 2 farms (2 per cent) each. Gizzard erosion was also recorded in one farm (1 per cent).

Age related incidences were also documented. The incidence of intestinal coccidiosis, crop mycosis, necrotic enteritis and ND were noticed in all age groups. Most of the Intestinal coccidiosis and necrotic enteritis outbreaks were noticed in the early layers (19 – 40 wk).

The incidence of ND was noticed in all age groups. This finding was well supported by Regnier and Kelley (1981), who reported the heat and cold stresses as predisposing factors for the outbreaks of the disease. Most of the ND outbreaks were noticed in the early layers (19 – 40 wk) as supported earlier by Sivaseelan (2008).

Necrotic enteritis occurrence was also noticed in early layers, which are in contrary to the reports of earlier workers, who recorded this disease commonly among young birds (Nairn and Bamford, 1967; Long, 1973).

Coccidiosis was observed in all age groups which is in concurrence with the observation of Muazu *et al.* (2008) who reported the prevalence of coccidiosis as 37 and 53 per cent among adult and young birds respectively in Nigeria. Nutritional roup has been reported in 31 – 40 wk age group of laying chicken which is in accordance with earlier report of Seifried (1930). Helminthic infection in our study

occurred in all age groups which is in accordance with the report of Umakantha (1989).

The month wise distributions of gastrointestinal diseases were documented. Most of the gastrointestinal disease outbreaks were recorded in the months of October and November (19 farms each; 19.0 per cent) followed by May (13 farms; 13.0 percent). Almost all GI diseases occurred more during rainy months (October and November) followed by hotter months (March to May).

Higher incidences during these months might be due to the cold and heat stress. Regnier and Kelley (1981) reported the ND outbreaks due to heat and cold stress and Abdul Basith (1995) observed more incidence of coccidiosis during rainy months.

Mortality pattern in birds affected with gastrointestinal were documented. Among the various gastrointestinal ailments affecting the birds, NE and ND caused more mortality as single entity (2.72 and 2.89 per cent) and in combination also they produced more mortality (3.15 per cent). Mortality due to other GI diseases was negligible unless they combined with any one of these two major GI diseases. This finding coincides with the earlier report of Helmboldt and Bryant (1971), who observed a mortality rate of one per cent per day with total mortality rate reaching 30 per cent in NE outbreaks. More mortality due to ND in Namakkal region was reported by Sivaseelan (2008).

#### REFERENCES

- Abdul Basith, S. 1995. Studies on coccidiosis in the domestic fowl (*Gallus gallus*). Ph.D., thesis submitted to TamilNadu Veterinary and Animal Sciences University, Chennai.
- Ajinkya, S.M., Survashe, B.D and Suresh Pande, P.D. 1980. Breakdown in immunity to Ranikhet disease (Newcastle disease) with infectious bursal disease (Gumboro disease) in broiler chicks. *Indian Vet. J.*, 57: 265.

- Amin Babjee, S.M., Lee, C.C and Mahmood, A.A. 1997. Prevalence of cestode and trematode in different age groups of village chickens. *J. Veterinar. Malaysia.*, **9**: 61.
- Cowen, B.S., Schwartz, L.D., Wilson, R.A and Ambrus, S.I. 1987. Experimentally induced necrotic enteritis in chickens. *Avian Dis.*, **31**: 904.
- Gabriel, I., Lessire, M., Mallet, S and Guillot, J.F. 2006. Microflora of the digestive tract: Critical factors and consequences for poultry. *World Poult. Sci. J.*, **62**: 499.
- Helmboldt, C. F and Bryant, E.S. 1971. The pathology of necrotic enteritis in domestic fowl. *Avian Dis.*, **15**: 775.
- Long, J.R. 1973. Necrotic enteritis in broiler chickens. A review of the literature and the prevalence of the disease in Ontario. *Can. J. Comp. Med.*, **37**: 302.
- Long, J.R., Pettit, J.R and Barnum, D.A. 1974. Necrotic enteritis in broiler chickens. II. Pathology and proposed pathogenesis. *Can. J. Comp. Med.*, **38**: 467.
- Mattiello, R., Boviez, J.D. and McDougald, L.R. (2000). *Eimeria brunetti* and *E. necatrix* in chickens of Argentina and confirmation of seven species of *Eimeria*. *Avian Dis.*, **44**: 711.
- Moretti, A., Piergilli Fioretti, D. Boncio, L. Pasquali, P. and Del Rossi, E. 2000. Isolation of *Candida rugosa* from turkeys. *J. Vet. Med.*, **47**: 433.
- Muazu, A., Masdooq, A.A., Ngbede, J., Salihu, A.E., Haruna, G., Habu, A.K., Sati, M.N and Jamilu, H. (2008). Prevalence and identification of species of *Eimeria* causing Coccidiosis in Poultry within Vom, Plateau State, Nigeria. *Intl. J. of Poult. Sci.*, **7(9)**: 917.
- Nairn, M.E and Bamford, V.W. 1967. Necrotic enteritis of broiler chickens in western Australia. *Aust. Vet. J.*, **43**: 49.
- Pazhanivel, N., Balasubramaniam, G.A., Titus George, V and Mohan, B. 2002. Study of Natural outbreak of Newcastle Disease in and around Namakkal. *Indian Vet. J.*, **79**: 293.
- Regnier, J.A and Kelley, K.W. 1981. Heat and cold stress suppresses in vivo and in vitro cellular immune response of chickens. *Am. J. Vet. Res.*, **42**: 294.
- Schoepe, H., Pache, C., Neubauer, A., Potschka, H., Schlapp, T., Wieler, L.H and Baljer, G. 2001. Naturally occurring *Clostridium perfringens* non toxic alpha –toxin variant as a potential vaccine candidate against alpha-toxin- associated diseases. *Infect. Immun.*, **69(11)**: 7194.
- Seifried, O. 1930. Studies on A – avitaminosis in chickens. II. Lesions of the upper alimentary tract and their relation to some infectious diseases. *J. Exp. Med.* **52**: 533.
- Sivaseelan, S. 2008. Pathology of Respiratory diseases in chicken. Ph.D., thesis submitted to Tamil Nadu Veterinary and Animal Sciences University, Chennai.
- Umakantha, B. 1989. Prevalence of parasitic diseases in poultry in Karnataka. *Poult. Adv.*, **22**: 37.
- Yegani, M. and Korver, D.R. 2008. Factors affecting intestinal health in poultry. *Poult. Sci.*, **87**: 2052.