

## Seasonal Prevalence of Poultry Diseases in Namakkal District of Tamil Nadu, India

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### ABSTRACT

*The objective of the present study is to ascertain the prevalence of poultry diseases in Namakkal district of Tamil Nadu from 2011 to 2018. Necropsy examination of the sick and dead poultry birds from various poultry farms in Namakkal was carried out in Poultry Disease Diagnosis and Surveillance Laboratory (PDDSL). The diagnosis was made based on history, clinical signs, gross lesions observed during necropsy examination and by using standard microbiological techniques. During the reporting period, 20362 poultry farms were examined and a total of 35069 cases were recorded. The disease prevalence in the year 2011, 2012, 2013, 2014, 2015, 2016, 2017 and 2018 was 9.04%, 12.47 %, 16.19%, 19.03%, 16.38% 8.85%, 8.40% and 9.64% respectively. The disease prevalence was high in the year 2014 (19.03%) and low in the year 2017 (8.40%). Based on Season, the disease prevalence was more in summer (34.69%) when compared to winter (33.59%) and rainy seasons (31.72%). The prevalence of egg peritonitis (12.20%), infectious laryngotracheitis (11.83%), Newcastle disease (9.56%), neoplastic viral diseases (4.34%), and colibacillosis (3.42%) was spread throughout the year. Mycotoxin induced hepatitis (4.97%), coccidiosis (2.33%) and bacterial diseases such as gangrenous dermatitis (2.95%) and necrotic enteritis (2.93%) were prevalent during the winter and rainy seasons. Heat stroke (8.90%) and Fatty liver hemorrhagic syndrome (FLHS) (2.79%) were noticed with more prevalence during the summer season.*

**Keywords:** Poultry disease- Seasonal prevalence-TamilNadu

### INTRODUCTION

The poultry industry in India is growing at a rapid speed to meet quality protein demand of the population. States like Tamil Nadu, Andhra Pradesh and Telangana are the top egg producers in India and Namakkal district of

Tamil Nadu is the top producer of egg production in the state (Chatterjee & Rajkumar, 2015). In Namakkal zone, layer poultry population is approximately 60 million and egg production is nearly 50 million per day.

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The poultry industry in Namakkal continues to be severely threatened by prevalence of many diseases which lead to severe economic losses. The birds are maintained in densely populated, open air tropical poultry houses which makes them vulnerable for infections. Predisposing factors such as concurrent infections, indiscriminate vaccinations, contaminated feed and water, accumulation of contaminated dust in the farm environment, movement of vehicles, and social interactions play a very crucial role in production of infectious diseases or augmenting their virulence. Geographical location, weather condition, farm management methods and biosecurity measures followed in the farms are the determining factors of prevalence of diseases in particular region (Yunus et al., 2009). Global warming has not only affected human health but also affects production of poultry as well. Study on the seasonal prevalence of poultry diseases in Tamil Nadu state is scarce and hence it is essential to document the same, to aid in preparedness for the poultry farmers. Hence, the present study was undertaken to ascertain the influence of seasons in the prevalence of poultry diseases in Namakkal area.

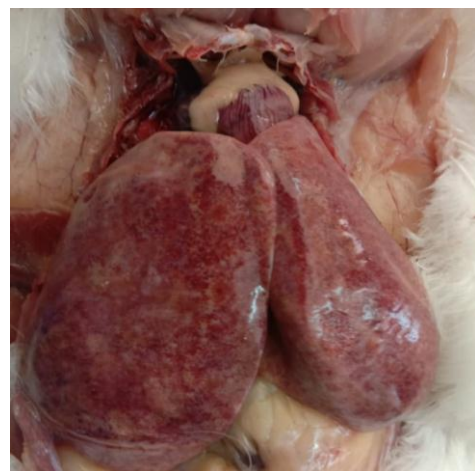
#### MATERIALS AND METHODS

The present study was carried out in Poultry Disease Diagnosis and Surveillance

Laboratory, Namakkal where necropsy examination was carried out from the sick and dead poultry birds received from various poultry farms located in and around Namakkal district of Tamil Nadu. From the period of 2011 to 2018 a total of 20362 poultry farms were examined. The diagnosis was made mainly based on history, clinical signs and gross lesions observed during necropsy examination (Fig.1). Diagnosis of bacterial diseases such as colibacillosis, fowl cholera, infectious Coryza, necrotic enteritis, gangrenous dermatitis and egg peritonitis were done by standard bacteriological techniques and biochemical tests (Fig.2). For some viral diseases, diagnosis was done by HA test and isolation of viruses in chicken embryonated eggs. Newcastle disease has been confirmed by HA test. Agar gel precipitation test was used to diagnose Infectious bursal disease (IBD). Polymerase chain reaction has been employed for diseases like fowl pox and CAV. Based on the climatic conditions the year was divided into 3 seasons namely summer season (March to June), rainy season (July to October) and winter season (November to February) for detail mapping of disease incidence.



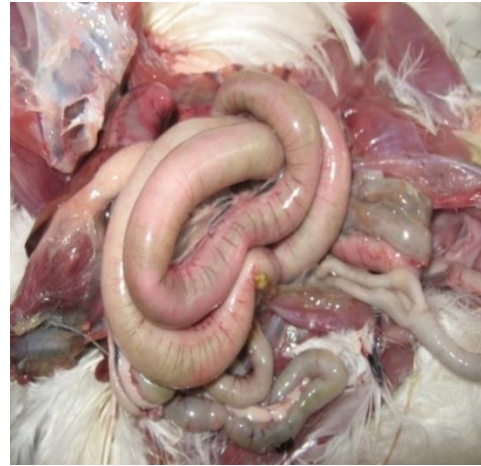
Newcastle disease



Neoplastic viral disease



**Egg peritonitis**



**Necrotic enteritis**

**Fig. 1: Post mortem lesions of important poultry diseases**



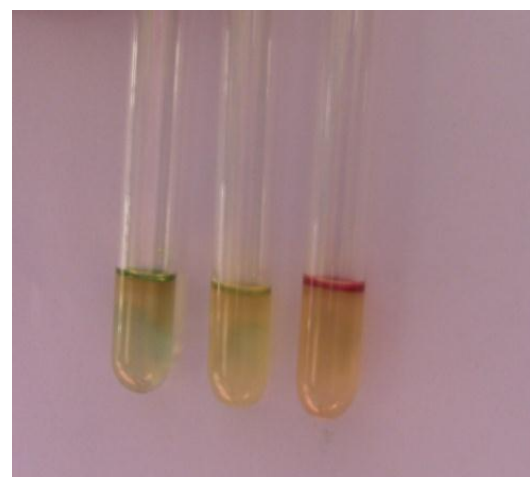
***E.coli* in Eosin methylene blue (EMB) agar**



***Clostridium perfringens* in egg yolk agar**



**Staphylococcus in BP agar**



**Biochemical tests - IMVIC test**

**Fig. 2: Bacteriological culture and biochemical tests**

**RESULTS**

The overall prevalence of poultry diseases in Namakkal area from 2011 to 2018 was presented in table 1. From 20362 poultry farms examined a total of 35069 cases were recorded. More number of cases were recorded in the year 2014, 2015 and 2013. Prevalence of diseases in 2014, 2015 and 2013 was 19.3%, 16.38% and 16.19% respectively. Meanwhile the disease prevalence was 9.04% 12.47 %, 8.85% and 9.64% respectively in the year 2011, 2012, 2016 and 2018. The disease prevalence was low in the year 2017 (8.4%). Season wise prevalence of poultry diseases presented in Table 2 and Fig 3. Based on this, the disease prevalence was more in summer

(34.69%) when compare to winter (33.59%) and rainy seasons (31.72%).

During the reporting period, egg peritonitis (12.20%) and infectious laryngotracheitis (11.83%) were more prevalent in Namakkal district followed by Newcastle disease (9.56%), heat stroke (8.90%), debility (6.61%), Chronic respiratory disease (5.99%), bacterial tracheitis (5.49%), hepatitis (4.97%), neoplastic viral diseases Markes disease (MD) / Lymphoid leucosis (LL) (4.34%), gout (3.45%), colibacillosis (3.42%), gangrenous dermatitis (2.95%), necrotic enteritis (2.93%), Fatty liver hemorrhagic syndrome (FLHS) (2.79%), coccidiosis (2.33%) and infectious bursal disease (0.99%).

**Table 1: Prevalence of poultry diseases in Namakkal from 2011 to 2018**

|     | Name of the Disease          | 2011        |             | 2012        |              | 2013        |              | 2014        |              | 2015        |              | 2016        |             | 2017        |             | 2018        |             | Total        |               |
|-----|------------------------------|-------------|-------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|
| I.  | Viral Diseases               | No.         | Prev(%)     | No.         | Prev(%)      | No.         | Prev(%)      | No.         | Prev(%)      | No.         | Prev(%)      | No.         | Prev(%)     | No.         | Prev(%)     | No.         | Prev(%)     | No.          | Prev(%)       |
| 1   | ILT                          | 120         | 0.34        | 318         | 0.91         | 564         | 1.61         | 1040        | 2.97         | 878         | 2.50         | 495         | 1.41        | 305         | 0.87        | 428         | 1.22        | 4148         | 11.83         |
| 2   | Newcastle disease            | 421         | 1.20        | 359         | 1.02         | 493         | 1.41         | 593         | 1.69         | 459         | 1.31         | 300         | 0.86        | 294         | 0.84        | 432         | 1.23        | 3351         | 9.56          |
| 3   | Infectious bursal disease    | 70          | 0.20        | 43          | 0.12         | 47          | 0.13         | 74          | 0.21         | 37          | 0.11         | 16          | 0.05        | 33          | 0.09        | 28          | 0.08        | 348          | 0.99          |
| 4   | Chicken anemia virus         | 4           | 0.01        | 2           | 0.01         | 7           | 0.02         | 8           | 0.02         | 17          | 0.05         | 29          | 0.08        | 44          | 0.13        | 48          | 0.14        | 159          | 0.45          |
| 5   | Fowl Pox                     | 18          | 0.05        | 32          | 0.09         | 26          | 0.07         | 14          | 0.04         | 22          | 0.06         | 46          | 0.13        | 35          | 0.10        | 45          | 0.13        | 238          | 0.68          |
| 6   | MD/LL/RE                     | 53          | 0.15        | 172         | 0.49         | 329         | 0.94         | 366         | 1.04         | 208         | 0.59         | 89          | 0.25        | 91          | 0.26        | 215         | 0.61        | 1523         | 4.34          |
| II  | Bacterial Diseases           |             |             |             |              |             |              |             |              |             |              |             |             |             |             |             |             |              |               |
| 1   | Colibacillosis               | 114         | 0.33        | 185         | 0.53         | 173         | 0.49         | 151         | 0.43         | 273         | 0.78         | 94          | 0.27        | 106         | 0.30        | 102         | 0.29        | 1198         | 3.42          |
| 2   | Chronic Respiratory Disease  | 276         | 0.79        | 293         | 0.84         | 359         | 1.02         | 372         | 1.06         | 371         | 1.06         | 159         | 0.45        | 109         | 0.31        | 163         | 0.46        | 2102         | 5.99          |
| 3   | Infectious Coryza            | 32          | 0.09        | 37          | 0.11         | 30          | 0.09         | 35          | 0.10         | 26          | 0.07         | 16          | 0.05        | 22          | 0.06        | 20          | 0.06        | 218          | 0.62          |
| 4   | Fowl Cholera                 | 18          | 0.05        | 23          | 0.07         | 19          | 0.05         | 8           | 0.02         | 16          | 0.05         | 31          | 0.09        | 33          | 0.09        | 15          | 0.04        | 163          | 0.46          |
| 5   | Necrotic Enteritis           | 84          | 0.24        | 147         | 0.42         | 194         | 0.55         | 246         | 0.70         | 151         | 0.43         | 27          | 0.08        | 113         | 0.32        | 65          | 0.19        | 1027         | 2.93          |
| 6   | Gangrenous dermatitis        | 67          | 0.19        | 127         | 0.36         | 159         | 0.45         | 172         | 0.49         | 164         | 0.47         | 75          | 0.21        | 138         | 0.39        | 131         | 0.37        | 1033         | 2.95          |
| 7   | Tracheitis                   | 214         | 0.61        | 328         | 0.94         | 293         | 0.84         | 234         | 0.67         | 184         | 0.52         | 215         | 0.61        | 180         | 0.51        | 277         | 0.79        | 1925         | 5.49          |
| 8   | Egg peritonitis              | 365         | 1.04        | 496         | 1.41         | 790         | 2.25         | 809         | 2.31         | 629         | 1.79         | 342         | 0.98        | 415         | 1.18        | 431         | 1.23        | 4277         | 12.20         |
| 9   | Other bacterial diseases     | 30          | 0.09        | 26          | 0.07         | 95          | 0.27         | 124         | 0.35         | 100         | 0.29         | 38          | 0.11        | 23          | 0.07        | 26          | 0.07        | 462          | 1.32          |
| III | Fungal Diseases              | 13          | 0.04        | 10          | 0.03         | 3           | 0.01         | 9           | 0.03         | 40          | 0.11         | 17          | 0.05        | 24          | 0.07        | 12          | 0.03        | 128          | 0.36          |
| IV  | Parasitic Diseases           |             |             |             |              |             |              |             |              |             |              |             |             |             |             |             |             |              |               |
| 1   | Coccidiosis                  | 114         | 0.33        | 140         | 0.40         | 133         | 0.38         | 191         | 0.54         | 130         | 0.37         | 23          | 0.07        | 46          | 0.13        | 39          | 0.11        | 816          | 2.33          |
| 2   | Worm infection               | 54          | 0.15        | 59          | 0.17         | 34          | 0.10         | 39          | 0.11         | 9           | 0.03         | 15          | 0.04        | 8           | 0.02        | 15          | 0.04        | 233          | 0.66          |
| V   | Metabolic disorders          |             |             |             |              |             |              |             |              |             |              |             |             |             |             |             |             |              |               |
| 1   | Gout                         | 98          | 0.28        | 167         | 0.48         | 230         | 0.66         | 238         | 0.68         | 224         | 0.64         | 91          | 0.26        | 76          | 0.22        | 85          | 0.24        | 1209         | 3.45          |
| 2   | Heat Stroke                  | 239         | 0.68        | 342         | 0.98         | 410         | 1.17         | 527         | 1.50         | 563         | 1.61         | 465         | 1.33        | 293         | 0.84        | 282         | 0.80        | 3121         | 8.90          |
| 3   | FLHS/FLS                     | 95          | 0.27        | 111         | 0.32         | 151         | 0.43         | 216         | 0.62         | 170         | 0.48         | 85          | 0.24        | 80          | 0.23        | 70          | 0.20        | 978          | 2.79          |
| 4   | Hepatitis                    | 229         | 0.65        | 295         | 0.84         | 268         | 0.76         | 239         | 0.68         | 330         | 0.94         | 124         | 0.35        | 132         | 0.38        | 127         | 0.36        | 1744         | 4.97          |
| 5   | Debility                     | 150         | 0.43        | 273         | 0.78         | 440         | 1.25         | 506         | 1.44         | 394         | 1.12         | 172         | 0.49        | 179         | 0.51        | 205         | 0.58        | 2319         | 6.61          |
| 6   | Others                       | 292         | 0.83        | 389         | 1.11         | 432         | 1.23         | 463         | 1.32         | 349         | 1.00         | 138         | 0.39        | 168         | 0.48        | 118         | 0.34        | 2349         | 6.70          |
|     | <b>Total number of cases</b> | <b>3170</b> | <b>9.04</b> | <b>4374</b> | <b>12.47</b> | <b>5679</b> | <b>16.19</b> | <b>6674</b> | <b>19.03</b> | <b>5744</b> | <b>16.38</b> | <b>3102</b> | <b>8.85</b> | <b>2947</b> | <b>8.40</b> | <b>3379</b> | <b>9.64</b> | <b>35069</b> | <b>100.00</b> |

Table 2: Prevalence of poultry diseases in Namakkal in different seasons

|                                       | Name of the Disease         | Summer       |              | Rainy        |              | Winter       |              | Total        |         |
|---------------------------------------|-----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| I.                                    | Viral Diseases              | No.cases     | Prev(%)      | No.cases     | Prev(%)      | No.cases     | Prev(%)      | No.cases     | Prev(%) |
| 1                                     | ILT                         | 1649         | 4.70         | 1223         | 3.49         | 1276         | 3.64         | 4148         | 11.83   |
| 2                                     | Newcastle disease           | 1193         | 3.40         | 1049         | 2.99         | 1109         | 3.16         | 3351         | 9.56    |
| 3                                     | Infectious bursal disease   | 98           | 0.28         | 153          | 0.44         | 97           | 0.28         | 348          | 0.99    |
| 4                                     | Chicken anemia virus        | 19           | 0.05         | 35           | 0.10         | 105          | 0.30         | 159          | 0.45    |
| 5                                     | Fowl Pox                    | 38           | 0.11         | 92           | 0.26         | 108          | 0.31         | 238          | 0.68    |
| 6                                     | MD/LL/RE                    | 466          | 1.33         | 490          | 1.40         | 567          | 1.62         | 1523         | 4.34    |
| II                                    | Bacterial Diseases          |              | 0.00         |              | 0.00         |              | 0.00         |              | 0.00    |
| 1                                     | Colibacillosis              | 368          | 1.05         | 492          | 1.40         | 338          | 0.96         | 1198         | 3.42    |
| 2                                     | Chronic Respiratory Disease | 605          | 1.73         | 646          | 1.84         | 851          | 2.43         | 2102         | 5.99    |
| 3                                     | Infectious Coryza           | 65           | 0.19         | 82           | 0.23         | 71           | 0.20         | 218          | 0.62    |
| 4                                     | Fowl Cholera                | 62           | 0.18         | 46           | 0.13         | 55           | 0.16         | 163          | 0.46    |
| 5                                     | Necrotic Enteritis          | 88           | 0.25         | 461          | 1.31         | 478          | 1.36         | 1027         | 2.93    |
| 6                                     | Gangrenous dermatitis       | 150          | 0.43         | 333          | 0.95         | 550          | 1.57         | 1033         | 2.95    |
| 7                                     | Tracheitis                  | 839          | 2.39         | 463          | 1.32         | 623          | 1.78         | 1925         | 5.49    |
| 8                                     | Egg peritonitis             | 1610         | 4.59         | 1303         | 3.72         | 1364         | 3.89         | 4277         | 12.20   |
| 9                                     | Other bacterial diseases    | 105          | 0.30         | 151          | 0.43         | 206          | 0.59         | 462          | 1.32    |
| III                                   | Fungal Diseases             | 19           | 0.05         | 53           | 0.15         | 56           | 0.16         | 128          | 0.36    |
| IV                                    | Parasitic Diseases          |              | 0.00         |              | 0.00         |              | 0.00         |              | 0.00    |
| 1                                     | Coccidiosis                 | 118          | 0.34         | 302          | 0.86         | 396          | 1.13         | 816          | 2.33    |
| 2                                     | Worm infection              | 62           | 0.18         | 73           | 0.21         | 98           | 0.28         | 233          | 0.66    |
| V                                     | Metabolic disorders         |              | 0.00         |              | 0.00         |              | 0.00         |              | 0.00    |
| 1                                     | Gout                        | 315          | 0.90         | 427          | 1.22         | 467          | 1.33         | 1209         | 3.45    |
| 2                                     | Heat Stroke                 | 2066         | 5.89         | 622          | 1.77         | 433          | 1.23         | 3121         | 8.90    |
| 3                                     | FLHS/FLS                    | 407          | 1.16         | 323          | 0.92         | 248          | 0.71         | 978          | 2.79    |
| 4                                     | Hepatitis                   | 387          | 1.10         | 669          | 1.91         | 688          | 1.96         | 1744         | 4.97    |
| 5                                     | Debility                    | 676          | 1.93         | 823          | 2.35         | 820          | 2.34         | 2319         | 6.61    |
| 6                                     | Others                      | 761          | 2.17         | 814          | 2.32         | 774          | 2.21         | 2349         | 6.70    |
| <b>Total number of cases</b>          |                             | <b>12166</b> | <b>34.69</b> | <b>11125</b> | <b>31.72</b> | <b>11778</b> | <b>33.59</b> | <b>35069</b> | 100.00  |
| <b>Total number of farms examined</b> |                             | <b>6869</b>  |              | <b>6631</b>  |              | <b>6862</b>  |              | <b>20362</b> |         |

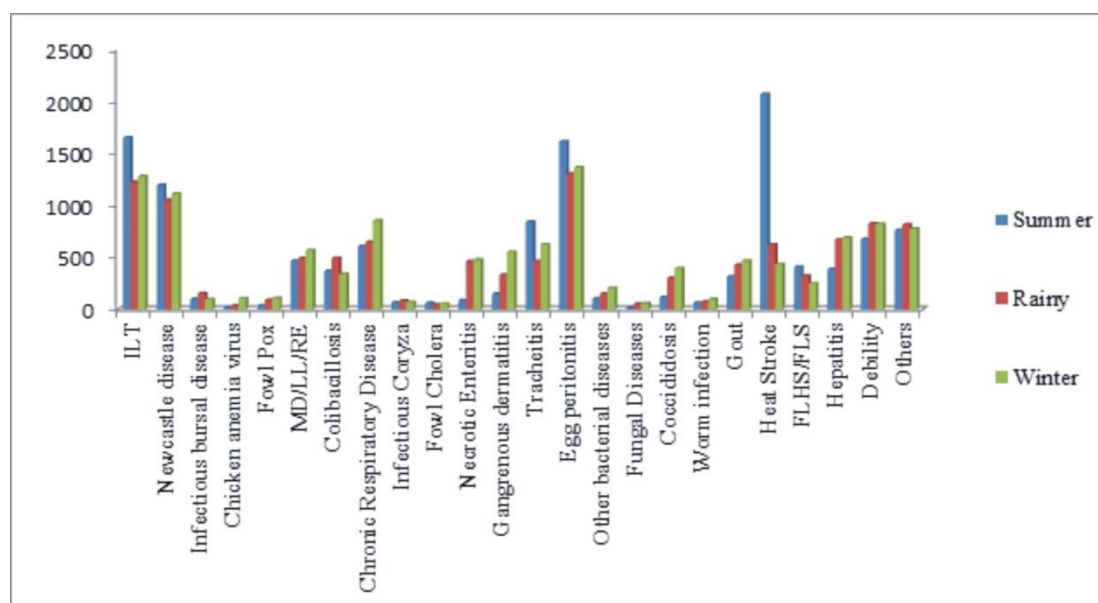


Fig. 3: Season wise prevalence of poultry diseases in Namakkal

## DISCUSSION

The disease prevalence was more in summer (34.69%) when compared to winter (33.59%) and rainy seasons (31.72%) which is agreed with the report of Badruzzaman et al. (2015) but several authors (Islam et al., 2003; Rashid et al., 2013) reported that prevalence of poultry diseases were more in rainy season. This might be due to the prevalence of disease in Namakkal was highly influenced by extreme heat during summer months.

Our study revealed high prevalence of Infectious laryngotracheitis (11.83%) in Namakkal region. There was no seasonal influence in the occurrence of ILT in Namakkal. In 1964 ILT was first reported in India by Singh et al. (1964). The re-emergence of ILT was reported by Srinivasan *et al.* (2012) and Gowthaman et al. (2015) in Namakkal district of South India after that the incidences gradually increased and became a predominant disease affecting layers in Namakkal causing substantiate level of economic loss to the poultry farmers regularly. Newcastle disease (ND) is one of the major disease in Namakkal area. In the present study 9.56% of ND prevalence was documented which was similar to the findings in Bangladesh (Talha et al., 2001; Islam et al. 2003). Incidence of ND was higher during summer season when compared to rainy and winter seasons, which is not in accordance with the reports of Musa et al. (2009) and Rashid et al. (2013). Since the disease is more common in Namakkal region, which warrant antibody titer checkup at periodical intervals to monitor flock immunity.

Prevalence of 4.34% of neoplastic viral diseases (MD/LL) was recorded during this period. The prevalence of neoplastic viral diseases was uniform in all three seasons. In spite of regular vaccination against IBD, 0.99% prevalence was recorded during this period. This might be due to vaccination failure (Godwin, 2001). Other viral diseases like fowl pox (0.68%) and Chicken infectious anaemia (0.45%) were also recorded in this period.

Egg peritonitis is one of the major causes of mortality for commercial layer chicken and gives the appearance of contagious disease. During the reporting period, incidence of 12.2% of egg peritonitis was documented. This is accordance with the report of Srinivasan et al. (2013) in which 15.39% prevalence was noticed in layer birds. The occurrence of egg peritonitis was slightly higher (4.59) in summer season than winter and rainy seasons. Egg peritonitis can be classified as non septic egg peritonitis and septic egg peritonitis. In non septic egg peritonitis there is no involvement of bacterial infections where as septic egg peritonitis is the most common type occurs due to contamination with bacteria like *E. coli* and others (Barnes et al., 2008). This might be due to the heavily contaminated drinking water, feed and feed ingredients.

Chronic Respiratory Disease (CRD) is one of the major disease concern in tropical countries. Seroprevalence of CRD was already documented in Namakkal area (Udhayavel et al., 2016; Vadivalagan et al., 2016). In this study, the prevalence of CRD in Namakkal (5.99%) was lower than the prevalence reported by other authors in subcontinent conditions (Uddin et al., 2010; Sushitha et al., 2017). This might be due to regular prophylactic usage of anti-mycoplasmal drugs in the poultry farms in this region. The occurrence of CRD was slightly more in winter season (2.43%) than other seasons. This is in accordance with the report of Razia et al. (2012) and Irsahad et al. (2013) where CRD was more prevalent in winter season in subcontinent countries.

Colibacillosis is one of the major problem in commercial layer farms. Prevalence of 3.43% of of colibacillosis was recorded in this study. During this reporting period, low prevalence of parasitic diseases were recorded except coccidiosis (2.33%). The prevalence of coccidiosis was high in winter (1.13%) and rainy season (0.86%) than summer. Similarly, prevalence of gangrenous dermatitis (2.95%) and necrotic enteritis (2.93%) were more prevalent in rainy and winter seasons. This might be due to high

moisture content in the feed ingredients during winter and rainy seasons that favour the growth of coccidial oocysts as well as the bacterial agents like *Clostridium perfringens* and *E.coli* (Udhayavel et al., 2017). Low prevalence of infectious Coryza (0.62%) and fowl cholera (0.46%) was also recorded in this study.

The prevalence of heat stroke (8.90%) was high in Namakkal. Heat stroke is the major cause of mortality during summer months (March- June) of every year, where the mean day maximum temperature ranges between 36.33°C and 36.87°C. Increasing cases of heat stroke further warrants formulation of suitable climate management strategies in Namakkal poultry industry in era of global warming and climate change.

### CONCLUSION

In Namakkal district of Tamil Nadu, India the disease prevalence in poultry was high in the year 2014. This study revealed the disease prevalence was more in summer than other seasons. The prevalence of egg peritonitis and infectious laryngotracheitis were high among all the poultry diseases.

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### Disclosure statement

No potential conflict of interest was reported by the authors.

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